

codex alimentarius commission

FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD HEALTH
ORGANIZATION

JOINT OFFICE:

Via delle Terme di Caracalla 00100 ROME: Tel. 57971 Telex: 610181 FAO I. Cables Foodagri

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION

Sixteenth Session

Geneva, 1-12 July 1985

REPORT OF THE SIXTEENTH SESSION OF THE CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Bergen, Norway, 7-11 May 1984

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INTRODUCTION

1. The Codex Committee on Fish and Fishery Products held its Sixteenth Session in Bergen, Norway, from 7-11 May 1984 by courtesy of the Government of Norway. Dr. O.R. Braekkan, Norway, was chairman of the Session.

2. Mr. Viggo Jan Olsen, Deputy Director-General of Fisheries, welcomed the participants on behalf of the Minister of Fisheries, Mr. T. Listau. He referred to the Working Group on Harmonization of Defect Tables in Codex Standards which had met in Bremerhaven previous to the Session and stressed the importance of their work to producers, inspection services and to consumers. He thanked the Government of the Republic of Germany for their hospitality and the organization of the Working Group's Programme.

3. The Session was attended by Government delegations and observers from the following 26 countries:

Australia	Ireland	Spain
Canada	Italy	Sweden
Cuba	Japan	Switzerland
Denmark	Netherlands	Thailand
Finland	New Zealand	United Kingdom
France	Norway	United States of America
Rep. of Germany	Philippines	Uruguay
Iceland	Poland	South Africa
India	Portugal	(Observers)

Observers from the following International Organizations were present: AIPCEE, AOAC.

The List of Participants, including officers from FAO and WHO is contained in Appendix I to this Report.

ADOPTION OF THE AGENDA

4. The Agenda was adopted without change. On the proposal of the Chairman, Mr. R. Sawyer (United Kingdom) was appointed as rapporteur.

STATEMENT BY THE REPRESENTATIVE OF WHO

5. The WHO Representative informed the Committee that food hygiene activities were

being performed by different programmes in the Organization (Veterinary Public Health, Food Safety Programme, Diarrhoeal Diseases Programme, Nutrition, and International Programme on Chemical Safety). Particularly, he drew attention to the four Guidelines which were coordinated by the Veterinary Public Health Unit, namely: Food Virology; Prevention and Control of Salmonellosis; Organization and Management of Surveillance of Foodborne Diseases and Paralytic Shellfish Poisoning, all of which had been issued and were available from the Organization.

6. Most relevant to the work of this Committee was the publication on Paralytic Shellfish poisoning. It contained up-to-date information on the public health significance, the chemical and physical properties of the toxins, and the surveillance, prevention and control of paralytic shellfish poisoning, as well as recommendations on international programmes, coordination and cooperation in this field.

7. It was emphasized that in preparing the WHO Guidelines on food hygiene which were intended for the different professions involved in the prevention and control of foodborne diseases, various Codex documents, including the General Principles of Food Hygiene were used.

8. With regard to the microbiological criteria for foods the WHO Representative informed the meeting that the Organization had summarized four comprehensive reports of the FAO/WHO expert consultations and working groups on this topic in one document (VPH/83.54). The purpose of this document was to give the reader the most important information on general principles for the establishment and application of the microbiological criteria, as well as concrete recommendations on microbiological limits.

9. Together with the International Union of Microbiological Societies, Committee on Food Microbiology and Hygiene, the World Health Organization convened a consultation on present international problems in food microbiology (Budapest, 18-19 July 1983). Amongst the items proposed for future international activity on elaboration of microbiological criteria, the consultation suggested different foods including smoked fish.

10. The Delegates were informed about the preparatory FAO/WHO meeting on Residues of Veterinary Drugs in Foods which tentatively defined "veterinary drugs" as "any substance applied or administered orally or parenterally to any food-producing animals, such as meat or milk-producing animals and fish whether for therapeutic, prophylactic or diagnostic purposes or for modification of physiological functions or behaviour". The FAO/WHO Expert Consultation on this question will be convened at the end of October 1984.

11. The WHO European Surveillance Programme for control of foodborne infections and intoxications in Europe was organized by the FAO/WHO Collaborating Centre on Food Hygiene and Zoonosis in Berlin (West). The second comprehensive report as well as four newsletters on the present situation with regard to foodborne diseases, including those caused by consumption of fish and fishery products in Europe had been issued and distributed to all WHO Regions.

12. WHO continued its training activities in the field of food hygiene. Last year the Organization conducted an expert consultation on undergraduate and postgraduate teaching in veterinary public health and particularly, in food hygiene. (Brno, Czechoslovakia, 20-24 June 1983). This Consultation elaborated syllabuses for teaching food hygiene and technology based on the general principles and approaches used by the Codex Alimentarius Commission.

STATEMENT BY THE REPRESENTATIVE OF THE FAO FISHERIES DEPARTMENT

13. The Representative of FAO Fisheries Department informed the Committee of the relevant activities of the Department, particularly of the Fishery Industries Division, that had taken place since the last session.

14. As in the previous period, during the last two years the efforts of the Division have been focussed on four main subjects: training in fish processing and quality control, improved handling and distribution of fish and fishery products in developing countries, quality control and inspection of fish and fishery products as well as international marketing.

15. With funds provided by DANIDA two FAO Regional Training Courses had been held in Africa. One, for Portuguese speaking countries, was held in Luanda (Angola 1983) and the second one, for English speaking countries, in Mwanza (Tanzania 1983). These courses provided training in fish technology and quality control for about 50 people and they were now followed by courses at national level in Tanzania, Mozambique, Ethiopia, Cape Verde and other countries.

16. Further courses were scheduled for francophone countries in Africa.

17. Recognizing the urgent need to improve the quality of shrimp exported from South East Asia, the FAO project "Marketing Information and Advisory Services for Fish Products in the Asian/Pacific Region (INFOFISH) which also provided advice to member countries on quality assurance had organized the Regional Training Course on Shrimp Quality Control and Inspection held in Penang (Malaysia 1983). The course was followed by a series of workshops on the subject organized by the participants in their respective countries. INFOFISH had also prepared a training kit on shrimp quality control and inspection with emphasis on in-plant quality assurance programmes. The training kit, which consists of two parts (general and shrimp quality control), was now available from INFOFISH in its provisional form. The final version should be available from FAO Headquarters later this year.

18. INFOFISH has also surveyed national inspection systems in most of its member countries like Pakistan, Bangladesh, India, Sri Lanka, Malaysia, Singapore, Hong Kong, Thailand, and Papua New-Guinea. The final report was now under preparation and it was proposed to hold a high level officer's meeting from the above mentioned countries to discuss findings of this survey and the necessary steps to be taken at national as well as regional level to improve the existing situation.

19. The FAO Regional Office for Latin America and the Caribbean organized the Round-table Discussion on Fish Inspection and Quality Control in Latin America, held in Santiago, Chile, 1-2 December 1983. The meeting was attended by specialists from seven countries (Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Uruguay) who represented their official fish inspection and quality control institutions. They identified needs and problems of common interest and discussed the ways of possible solutions. A programme of cooperative activities had been established and approved, which emphasized the need for closer collaboration between national inspection services; within the region training with the use of regional expertise and facilities (four training courses on different subjects of quality control and inspection would be held in 1984/85) as well as development of closer relationship and cooperation with inspection/control institutions in the main importing countries. Such collaboration should lead to improvements in the quality of exported products thus decreasing the present number of rejections.

20. A survey made on fish inspection and quality control in Africa indicated that in some countries such services already exist but were at a very early stage of development. However, efforts were apparent and countries like, e.g., Egypt, Kenya, Mozambique, and Nigeria had elaborated quality standards and codes of practice and were considering possible ways for their implementation. In most cases the Codex Standards and Codes had been used as very helpful examples.

21. Problems of improved handling of fish had been studied particularly in Africa where application of insulated fish containers, both on board and ashore, gave very good results. Apart from answering the technical questions, experiments had proved that there was a high demand for good quality fresh fish and a substantial group of consumers was prepared to pay a higher price for the quality. This also meant a higher revenue to fishermen.

22. Within the framework of the Indo-Pacific Fisheries Commission (IPFC) research network on fish technology a working group meeting on the mechanisms and effects of production of histamine in fish was held in Hobart, Australia in February 1984. The meeting was attended by research workers from Australia, Philippines, Taiwan, Thailand and the U.S.A., and was expected to lead to an intensification of research effort in this field, including a survey of canned, fermented and salted/dried products. There was concern that histamine levels in some products were higher than advisable.

23. Following the very successful operation of the regional marketing and technical

advisory services like INFOPECSA and particularly INFOFISH, FAO with support from Norway was launching a new project for West Africa called INFOPECHE. Advance preparations have also been made for INFOSAMAK - the project for Arab speaking countries.

24. The regional network of marketing and technical advisory services together with other additional inputs would be coordinated worldwide by a fully computerized centre in Rome called GLOBEFISH.

25. The Committee was further informed about applied research carried out by the Tropical Development and Research Institute in London, in Malawi, Kenya and Gambia on the use of insecticides to prevent insect infestation in cured fish. These experiments should lead to the documentation of the most effective use of pesticides and the submission to the Joint Meeting on Pesticide Residues (JMPR) for approval of permissible levels of residues.

26. The Committee was informed of the new publications available from FAO through its "Distribution and Sales Branch". They were:

- Road transport of fish and fishery products (FIIP/T232)
- Support and development of the retail trade in perishable (fishery products FIIU/T235)
- Markets for fish and fishery products in Eastern Europe (9FIIU/241)
- Proceedings from the Expert Consultation on fish Technology in Africa (FIIU/268 Suppl.)
- The production and storage of dried fish (FIIU/R279 Suppl.)
- International Directory of Fish Inspection and Quality Control Institutions (FIIU/T244)

27. Three new volumes of the series FAO Species Catalogue had been issued, they were:

- Vol. 2, Scombroids of the world (FIR/S125), Vol. 2)
- Vol. 3, Cephalopods of the world (FIR/S125, Vol. 3)
- Vol. 4, Sharks of the world (FIR/S125, Vol. 4) two volumes.

28. The Committee was also informed of the forthcoming Fisheries Department activities particularly the "FAO World Conference on Fisheries Management and Development" which will take place in Rome from 27 June to 7 July 1985.

REVIEW OF MATTERS RELEVANT TO THE COMMITTEE AS DISCUSSED BY THE CODEX ALIMENTARIUS COMMISSION AND VARIOUS CODEX COMMITTEES

A. Codex Alimentarius Commission (15th Session, ALINORM 83/3)

29. The Commission adopted the following Draft Codes of Practice at Step 8 of the Procedure:

- Draft Code of Practice for Minced Fish
- Draft Code of Practice for Crabs.

30. It also adopted the following at Step 5:

- Draft Code of Practice for Frozen Battered and/or Breaded Fishery Products.

Products containing Pork Fat (Lard)

31. The problem of acceptance of products containing lard had been raised by the Delegation of Nigeria, which thought that the use of lard should be clearly labelled.

The Committee, recognizing that this was a problem faced by several Commodity Committees, had agreed that the matter should be referred to the Commission for guidance.

32. The Commission noted that the Codex Committee on Food Labelling, at its last Session (ALINORM 83/22), when considering the Revised General Standard for the Labelling of Pre-packaged Food, had agreed to include under Sub-section 4.2.3 "Specific names/class names" both pork fat and beef fat among fats requiring declaration.

33. It also noted that the Revised General Standard for the Labelling of Pre-packaged Foods contained the necessary labelling requirements to identify pork and beef fats and that it had been retained at Step 6. The Commission agreed that there would be further opportunity to comment on this matter at the next session of the Codex Committee on Food Labelling.

34. The Committee noted that in addition to the class names which were listed in sub-sections 4.2.2.1 and 4.2.2.2, of the Revised Draft General Standard for the Labelling of Pre-packaged Foods states:

"4.2.2.2 Notwithstanding the provision set out in Sub-section 4.2.2.1, pork fat, lard and beef fat shall always be declared by their specific names".

Inclusion of Further Species in the Standard for Canned Sardines and Sardine Type Products

35. The Committee noted that, as agreed by the Commission (ALINORM 79/38, paras 340-341) the following species should be included in the above Standard - Sardinella fimbriata, Sardinella serim, Sardinella longiceps, Sardinella gibbosa and Engraulis mordax: a corrigendum to the Standard had been prepared to this effect.

Standard for Quick Frozen Lobster

36. The Commission agreed with the Committee that the Standard (CODEX STAN - 95-1981) should be amended by the addition of a footnote to the defects table in Annex C-1, Table 1 to except "whole" lobster parts from the allocation of "serious" defect points for "incomplete removal of intestine".

B. OTHER CODEX COMMITTEES

Codex Committee on Pesticide Residues (CCPR) - 14th Session

1. Pesticide Residues in Fish and Fishery Products

37. The indiscriminate use of pesticides, especially in tropical countries to prevent insect infestation of dried or smoke dried fish and fishery products may lead to potentially dangerous situations and the Codex Committee on Fish and Fishery Products sought guidance from the Codex Committee on Pesticide Residues on how best to tackle the problem (ALINORM 83/18, paras. 279-282).

38. The Codex Committee on Pesticide Residues suggested that FAO, through its Fisheries Division should identify those insecticides which could be used safely to control infestation by insects, which could damage fish both during and after drying. The levels at which the insecticides could be used according to Good Agricultural Practice and the resulting residue levels should be determined. As for the principles for selection of appropriate insecticides, the criteria suggested by JMPR, 1981 (Evaluation, FAO Plant Production and Protection Paper No. 62, page 50) should be considered. These were:

- (i) must be effective at economic rates of use;
- (ii) must be effective against a wide variety of insects pests;
- (iii) must be acceptable to health authorities;
- (iv) must be capable of being used without hazard to operators: and
- (v) must not be flammable explosive or corrosive.

39. The Committee was informed by the Representative of the Fisheries Department of FAO, about research carried out by the Tropical Development and Research Institute of London,

(see also para 25).

Codex Committee on Methods of Analysis and Sampling (CCMAS) - 13th Session

40. The progress made by various Codex Commodity Committees in their review of methods of analysis was noted.

41. The CCMAS had noted that the Committee on Fish and Fishery Products had not undertaken such a review but that for the most part the methods included in its standards were simple quality inspection procedures for Fish and Fishery Products, e.g., CAC/RM 40-1971. Thawing and Cooking Procedures for Quick Frozen Fish and CAC/RM 41 Determination of Net Contents of Products covered by Glaze. The Committee recognized, however, that it might in future require methods for the determination of phosphates and other additives in some products. It was noted that the CCMAS had elaborated General Principles for the Establishment or Selection of Codex Sampling Procedures which had been adopted by the Commission at its 15th Session.

42. The General Principles classified types of Sampling plans and procedures for (a) Commodity Defects; (b) Net Contents; (c) Compositional Criteria; and (d) Specific Sampling Plans for Health related Properties.

43. It was agreed to give further consideration to the classification when examining standards under agenda Items 8 and 9.

Codex Committee on Food Hygiene (CCFH) - 19th Session (ALINORM 85/13)

44. Hygiene and Handling - Draft Standard for Quick Frozen Blocks of Fish Fillets Minced Fish flesh and Mixtures of fillets and Minced Fish Flesh.

45. The CCCFH had noted the discussion which had taken place at the last session of the Committee with regard to provisions for parasites and biotoxins. The CCFH had agreed with this Committee that the present provisions adequately covered the nature and quality of the fish required and endorsed the following provisions:

- 5.1 When tested by appropriate methods of sampling and examination, the product:
 - (a) shall be free from micro-organisms in amounts which may represent a hazard to health;
 - (b) shall be free from parasites which may represent a hazard to health; and
 - (c) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.
- 5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.
- 5.3 It is recommended that the product covered by the provisions of this Standard be prepared and handled in accordance with the following codes:
 - (i) the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1);
 - (ii) the Code of Practice for Frozen Fish (CAC/RCP 16-1978); and
 - (iii) the Draft Code of Practice for Minced Fish, (ALINORM 81/18, Appendix VIII).

MICROBIOLOGICAL CRITERIA FOR PRE-COOKED FROZEN SHRIMPS AND PRAWNS

46. The Representative of WHO had informed the CCFH of the results of the Working Group on Microbiological Criteria for Pre-cooked Frozen Shrimps and Prawns (see documents CX/FH 83/8 and CX/FH 83/2) which had met during the 15th Session of the Committee. In

particular, he had drawn attention to the discussion on whether the microbiological criteria elaborated by the above Working Group were microbiological guidelines or end-product specifications.

47. It had been noted that the majority of the Working Group had proposed the microbiological criteria as guidelines and not end-product specifications. After a three-year period of testing there would be sufficient information available to decide whether to introduce end-product specifications.

48. The Representative of WHO had reminded the CCFH that the question of the establishment of microbiological guidelines for the purposes of the FAO/WHO Food Standards Programme was thoroughly considered at its 19th Session (ALINORM 83/13, para 114) which had recommended that "the manufacturer should define his own sampling plan for microbiological purposes and establish limits that will ensure that limits in microbiological end-product specifications will be as a minimum adhered to and preferably bettered". In his opinion, it would therefore be a logical sequence to elaborate, first of all, end-product specifications which would help the manufacturer define his own sampling plan, thus producing the food in accordance with existing codes of hygienic practice.

49. The Delegations of the U.K., U.S.A., France, Canada and Australia had expressed a preference for the proposed microbiological criteria as end-product specifications to be attached to the appropriate Code of Hygienic Practice. The Committee agreed with this point of view.

50. The attention of the CCFH had been drawn to the fact that the Delegation of Thailand which participated in the above Working Group noted that if the microbiological criteria were considered by the CCFH as end-product specifications the figure for Staphylococcus aureus would be two instead of one. The Committee accepted this proposal. The Delegation of Denmark proposed to include enterococci for control of production hygiene. The Delegation of France had informed the CCFH that existing provisions in national regulations distinguished between whole pre-cooked frozen shrimps and peeled pre-cooked frozen shrimps. Tests for the determination of Staphylococcus were only made on peeled shrimps because the extra handling increased the risk of contamination. The Delegation of France would have also preferred to include a criteria for E. Coli as a good indicator of contamination rather than make reference to Enterococci.

51. The Secretariat referred to the discussion on this subject by the Working Group as well as to the recommendations of the 2nd Joint FAO/WHO Expert Consultation which had concluded that "the inclusion of a microbiological criterion for E. Coli offered no added benefit in deciding compliance with the Code of Practice". The Committee decided not to include E. Coli or Enterococci in the proposed end-product specifications and had recommended the following microbial limits:

Mesophilic aerobic bacteria

$n = 5, c = 2, m = 10^5, M = 10^6$

Staphylococcus aureus

$n = 5, c = 2, m = 500, M = 5000$

Salmonella

$n = 5, c = 0, m = 0.$

52. The CCFH had agreed that these criteria should be circulated to Governments at Step 3 of the procedure with a view to their incorporation as end-product specifications into the Code of Hygienic Practice for Shrimps and Prawns.

53. At its present session the Committee noted that in the opinion of the Delegation of the Netherlands there should be further consideration of microbiological criteria for pre-cooked frozen shrimps and prawns particularly concerning the possible inclusion of limits for Shigella and E. Coli as an indicator of contamination.

Code of Practice for Food Grade Fish Protein Concentrate (FPC)

54. The CCFH had noted that this Committee had deferred further consideration on the elaboration of the above Code until more comprehensive data on production, trade and consumption of the product were available.

55. The Delegation of Thailand pointed out that its country and other developing countries of the region received large amounts of FPC through Food Aid Programmes and reiterated its opinion (see also ALINORM 83/18, paras 270-276) that there appeared to be a need for the Asian region to have guidelines for determining the suitability of the product for human consumption; it sought assurance that such products should conform to the compositional and microbiological criteria for fish protein concentrate type B prepared by the Protein and Calorie Advisory Group of the United Nations (PAG).

56. The Committee agreed to keep the matter under review.

Priority Foods for Future Work on Microbiological Criteria

57. The Committee noted that the CCFH would consider among other items, dried fishery products for microbiological criteria at its next session.

A. Codex Committee on Food Additives (CCFA) - 18th Session)

2. Inclusion of "Water binding agents" in the list of class names for food additives

58. The Committee had included all the phosphates as contained under Food Additive provisions in the Standards for (i) Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillet and Minced fish Flesh; and (ii) Quick-Frozen Sticks (Fish Fingers) and Fish Portions Breaded for in Batter, under "water binding agents" and had agreed to refer this to the Codex Committee on Food Additives (CCFA) for its opinion as to the class name suggested (ALINORM 83/18, p. 136).

59. The CCFA had discussed the above question at its 18th Session. The ad hoc Working Group on Class Names of the CCFA had expressed the view that the class name "Phosphates" provided adequate information to the consumer and consequently there was no necessity for including a new class name of food additives, "Water Binding Agents", in the existing list. The CCFA, however, had disagreed with the opinion of the Working Group and the question raised by CCFHP had now been referred to the Codex Committee on Food Labelling.

Coordinating Committee for Asia (CCA) - 4th Session

60. The Delegation of Thailand had raised several matters at the 4th Session of the CCA pertaining to items on the present agenda of this Committee. It was agreed that the points raised would be discussed at the appropriate agenda items.

Coordinating Committee for Latin America (CCLA) - 3rd Session

61. The CCLA had agreed to consider the development of a Regional Standard for Shark Fins on the basis of a background document to be prepared for its 4th Session by the Delegation of Cuba.

62. It had also proposed that this Committee should give consideration to an International Standard for Molluscan Shellfish and to a Code of Practice for Aquaculture. It was agreed to discuss these matters further under "Future work".

Acceptance of Codex Recommended Standards

63. A summary of Acceptance, Part 1, Rev. 2, had been issued which gave the position with regard to worldwide and regional standards as at February 1983.

64. As reported at the last session of the Committee some 30 countries had given acceptances to one or more of the Codex Standards for Fish and Fishery Products.

65. The progress report given at the Fifteenth Session of the Commission indicated that Sweden had decided in principle to accept five standards for quick frozen fish and hoped to be in a position to confirm notification of acceptance before the next session of the Commission. Some 21 countries at the Commission reported that they were actively

pursuing the acceptance of Codex Standards in their national legislation and would report further progress at the next session of the Commission.

66. In the meantime, the Secretariat in distributing the latest volume of Codex Standards (Volume XII) had again asked Governments to indicate their positions regarding acceptance of Codex Standards.

67. At the present session, the Observer of South Africa informed the Committee that it had communicated to the Commission its decision on acceptance of Codex Standards and had expressed reservations in Standards for Canned Products on the lack of any factory hygiene requirements and of specifications in respect of assessment of can integrity which was likely to affect acceptance.

PROPOSED REVISION OF THE CODEX STANDARD FOR CANNED PACIFIC SALMON

68. The Committee had before it the proposed revision of the above Standard (ALINORM 83/18), Appendix II) and Government comments contained in CX/FFP 84/4 and addenda. It also had for consideration a revised Table of Defects for Canned Pacific Salmon proposed by the Delegation of Canada.

General

69. The Committee noted the comments of the Observer of South Africa with regard to lack of provisions in the Standard for factory hygiene requirements and for specificity of can integrity (see also para. 67).

70. The Delegation of the Federal Republic of Germany was of the opinion that a general recommendation could be made for the harmonization of the layout of this standard with the more recently developed standard for canned mackerel. The Committee then considered the following provision of the Standard.

2.2 Presentation

2.2.2.3 Minced Salmon

71. The Committee accepted an amendment proposed by the Delegation of the Federal Republic of Germany as follows "Grated Shredded or Minced Salmon - salmon which had been comminuted (minced) and not having the consistency of a paste".

2.2.2.4 Salmon Tips or Tidbits

72. The Committee agreed to define Salmon Tips or Tidbits as "irregular bite-sized portions (bits)".

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

73. The Committee noted that as only fish was packed in the can, there was no need for requirements for packing media. It recognized, however, that as the solid/liquid ratio of the fish pack was subject to seasonal and species variations and was not controllable during processing, there could be some variation in net contents. No changes were made to this section.

FOOD ADDITIVES

74. The Committee noted that no food additives were used in the manufacture of Canned Salmon.

Contaminants

75. The Delegation of Poland proposed to introduce tolerances for heavy metals in the Standard. The Committee was informed by the Delegation of Canada that extensive testing had shown that both mercury and lead concentrations were well below established tolerances. Unlike, for example, certain canned fruit and vegetable products, Canned Pacific Salmon, had neutral acidity and therefore caused little or no interaction with the can metal or can lining.

76. The Delegations of Switzerland and Thailand supported in principle the proposal of Poland since they were of the view that heavy metal contaminants could be a problem for packaging technology and that this aspect needed control.

77. The Committee noted these comments and decided that no provisions for contaminants were required.

5. LABELLING

5.2 List of ingredients. The reference to the Recommended International General Standard for Labelling of Pre-packaged Foods was updated (CODEX STAN 1-1981).

Date Marking

78. The Committee was informed by the Delegation of Thailand that it was studying the possibility of the use of the manufacturing date for the purposes of date marking.

79. It was noted that at the last session of the Committee there had been a full discussion of date marking. It had been pointed out that canned salmon was a low acid canned food where no interaction between can and contents would normally occur over a period of 10-15 years, and there had been a good measure of agreement that date marking could not provide useful information to the consumer and should not be included in this Standard.

80. The Committee decided to maintain the decision it had taken at its previous session not to include any form of date marking in the present standard.

81. The Delegation of Switzerland expressed its view that this latter fact should appear in the Standard. The Committee took the view that negative requirements were unnecessary; the Delegation of Switzerland expressed a reservation on the matter.

DEFECT TABLE FOR CANNED PACIFIC SALMON

82. The Delegation of Canada introduced the amended defects table which it had proposed to replace the present Annex A to the Standard. It informed the Committee that it had tested the table extensively since the last session and as a result had made several changes to the detailed provisions.

D. Colour of Flesh

83. It was noted that this defect had now been changed from "mixed species" to "mixed colours" in a single can, the reason being that in the present provisions of the Standard under 3.1 and 5.1.1 the presence of different species in the same can was a question of mislabelling or fraud and not a defect as such. The Committee was informed that mixed colours in a single can were largely caused by the effect of local environmental variations on the fish and were therefore not classified as a serious defect. It agreed with this point of view and accepted the proposed amendment - "mixed colours". It noted that Section D had been further modified to include the defect "belly burn" which carried 2 major points for major defect. As a consequence the points classified as major and minor had been increased from 8 to 10.

84. In further consideration of the possible use of mixed species it was recognized that this was not only a case of mislabelling, but if it occurred, it constituted a serious defect. As a result it was agreed to add a new Section J "Mixed Species" - mixed species in a single can - "Defective".

85. The Delegation of Canada expressed its concern regarding the inclusion of the defect category "mixed species in a single can" as there was no known objective method for its determination and, in its experience, examiners could not determine different species in a single can. It suggested that this could be confused with the defect category "mixed colours in a single can".

G. Texture

86. The Delegation of Canada stated that in its examination of 10 300 cans of salmon no

instances of "honeycomb-like flesh" had been encountered. The provision had been retained but account of the low incidence had been taken in assessing the total allowable marks for major defect.

87. The Delegation of the Republic of Germany was of the opinion that the defect table should be brought into line with the proposals of the 1982 Working Group on Harmonization of Defect Tables, that is only one column should be used for defectives and for other defect category numbers and a total of 10 or more points should render a sample unit defective.

88. The Committee noted these comments by the Delegate of the Federal Republic of Germany and agreed that the table as proposed by Canada was acceptable; attention could be paid to the issue raised by the Federal Republic of Germany as an editorial matter.

Status of the Standard

89. The Committee agreed to advance the proposed revision of the Codex Standard for Canned Pacific Salmon to Step 8 of the Procedure (see Appendix II).

HARMONIZATION OF DEFECT TABLES IN THE CODEX STANDARDS OF QUICK FROZEN FISH FILLETS

90. The Committee had before it the report of the Working Group which had met in Bremerhaven, Federal Republic of Germany, 2/4 May 1984 to continue the work begun at the 15th Session of the Committee (see ALINORM 83/18, paras 261-267 and Appendix VI).

91. The Working Group had made a proposal for the harmonization of Recommended Defects Tables in Standards for Quick Frozen Fillets of Cod/Haddock, Ocean Perch, Flat Fish and Hake, which was attached as Annex A to its report.

92. In introducing the report the Chairman of the Working Group, Mr. H. Houwing (the Netherlands) informed the Committee that before discussing the various defects in details, the Group amended the three styles which were forms of presentation under which bones and fins were removed as follows:

Style 1 In boneless fillets which are presented as completely boneless. (free from bone defects as defined).

Style 2 In fillets from which bones, including pin bones, have been removed. The product may be presented as boned, deboned, clear cut, or other wording to indicate that it is reasonably free of bones.

Style 3 In fillets from which bones other than pin bones have been removed.

93. The Delegation of Norway informed the Committee that it had not agreed with the Working Group's proposal to delete "boneless" from the presentation under Style 2. It also disagreed with the Working Group's decision to adopt the definition of bone defect as formulated by the West European Fish Technologists Association (WEFTA) at its Analytical Working Group meeting in March. It was of the opinion that at present, technology was not advanced enough to warrant the application of demerit points under Style 1 for any defect bone.

94. The Delegation of Iceland agreed with this point of view and proposed that "boneless" should be re-inserted in the Style 2 provision to avoid adverse effects on trade.

95. The Delegation of Canada, supported by Iceland and Norway, expressed strong opposition to the bone provisions proposed for fillets because of the impossibility of ensuring complete removal. The consequences of introducing the style provisions for bone into the block standard had wider and even more serious implications, namely, the labelling of blocks by bone content. Currently, the labelling Sub-section 6.1.2 of the block standard indicated that labelling was voluntary. A consequential change in labelling requirements for sticks and portions in respect of the terms "boneless" and "boned" would also be enforced. This appeared to be in direct contradiction to current trade practices.

96. Other delegations, while agreeing that it was not possible to produce a completely boneless fillet pointed out that technology was at the point where fillets free of defect bones were being produced and thought that to include a provision for the description "boneless" in both Styles 1 and 2 would lead to confusion.

97. After some further discussion the Committee noted that there was a concensus for adopting the Styles 1, 2 and 3, as proposed by the Working Group in its Annex A (see Appendix VI with the following amendment to Style 1):

"Style 1 - In boneless fillets which are free from bone defects as defined".

98. The remaining definitions were accepted as presented.

99. It noted the strong reservation of the Delegations of Canada, Iceland and Norway to this action.

Annex A (Bremerhaven Working Group Report).

100. The Committee noted that there was general agreement in principle with Annex A and the Chairman invited participants to comment heading by heading on the contents. Comments were made only on the following provisions.

Parasites

101. The Committee noted that the definition column specified "detection by the candling procedure or any other physical means". No biochemical (e.g., proteolytic) methods had been suggested. Some delegations queried the meaning of the phrase "other physical means" and to make this clear the Committee adopted the following amended text:

"Parasites or parasitic infestation detected by the candling procedure or any non destructive physical means".

102. It also noted that a description of the candling process appeared in the Code of Practice for Fresh Fish.

103. The Committee also agreed to a rewording of the defect description to read "any significant parasitic infestation as recognized by its colour...".

Bones

104. The Delegation of Norway, supported by the Delegation of Iceland, repeated its disagreement with the proposed change in the dimensions of a "defect bone" from those decided at the last session of the Committee. It stated that a philosophy which appeared to be emerging was that a bone was defined as such when it could be detected by the most diligent searching.

105. The Delegation of Canada proposed amendments with regard to demerit points for the critical degree of bone defect in the three styles which would make the demerit score less strict.

106. Some delegations expressed their opposition to these latter proposals and the Committee made no change in the scoring system.

107. The Delegation of the Federal Republic of Germany pointed out that technology was such that less than 1 defect bone per 4 kg of product could now be achieved and proposed an increase in the demerit points for Style 2 from 2 to 4. The Committee noted that this point had also been discussed by the Working Group and made no change in this respect.

108. The Committee noted that the Working Group had reduced the demerit points for loose scales on skinless hake fillets from 2 to 1 because of the softer texture of hake scales as compared to those of, for instance, ocean perch.

109. The Committee was informed that this position was justified on the grounds that hake was significantly different from the other species considered in the table.

110. The Committee later agreed that this change could be effected in another way, namely by the doubling of the count for loose scales in respect of hake and revising the figure for "readily noticeable loose scales" to 2 demerit points in each case. (see Appendix VI, page 5).

111. The Delegation of the U.K. stated that it wished to keep the total demerit points which equated to a defective in square brackets.

Status of Proposal for Harmonization of Recommended Defects Tables in Standards for Quick Frozen Fillets of Cod/Haddock, Ocean Perch, Flat Fish and Hake

112. The Committee noted the opinion of several delegations that the above proposal as amended by the Working Group was now in a suitable state for testing and that Governments should be given the opportunity to apply it in practice.

113. It decided to advance the Proposal to Step 5 of the Procedure (see Appendix VI).

The Committee noted that consequential amendments to the Standards would be necessary.

Inclusion of Sardine *Sardinella* sp. in the Product Definition of the Codex Standard for Canned Sardines and Sardine-type Products

114. At its last session the Committee had noted that the Codex Coordinating Committee for Asia had proposed the inclusion of Sardine *Sardinella* (see ALINORM 83/18, para 71). It was agreed that a clarification of the taxonomic position of Sardine *Sardinella*, product samples and trade figures should be submitted to the CCFPP for examination as specified in ALINORM 79/18, para 111.

115. The Commission had noted the action taken by the Codex Committee on Fish and Fishery Products which agreed to consider the proposal of the Coordinating Committee for Asia to include the species Sardine *Sardinella* Sp in the product definition in the standard on canned sardines, when the required information, as outlined in para 111 of ALINORM 79/18, was provided to it by the Committee. The Delegation of India agreed to make the required information available to the Committee on Fish and Fishery Products (see ALINORM 83/43, paras 342-343).

116. The Committee noted that no such information was available at its present session and agreed to defer consideration of the matter until its next session when it was understood the required information would be ready.

117. It also noted a proposal by the Delegation of Cuba to include a further species Ophystonema Oglinum in the Codex Standard for Canned Sardines and Sardine type products. It informed the Committee that Ophystonema Oglinum was being canned in oil and tomato by Cuba and was marketed as a high quality product similar to sardines. These species were found in large quantities in the coastal waters of Cuba and other countries, and there were considerable untapped reserves.

118. The Delegation undertook to provide information as outlined in para 111 of ALINORM 79/18 so that the Committee could give the matter consideration at its next session.

CONSIDERATION OF DRAFT STANDARD FOR QUICK FROZEN BLOCKS OF FISH FILLET, MINCED FISH FLESH AND MIXTURES OF FILLETS AND MINCED FISH FLESH

119. The Committee had available for consideration the Draft Standard (ALINORM 83/18, Appendix III) and Government comments contained in CX/FFP 84/5, CX/FFP 84/5, Add. 1, CX/FFP 84/5, Add. 2 and Appendix I to CX/FFP 84/5. The Committee had also available the following conference room documents:

1. Status of endorsement of Food Additive Provisions - prepared by the Secretariat.
2. Determination of Mince Content in Quick Frozen Blocks and Portions from mixtures of Boneless Fish Fillets and Minced Fish Flesh:
 - (a) collaborative study by the West European Fish Technologists Association; and

(b) Collaborative study by USA.

3. US comments on sampling plans for fish blocks.

4. Report of the Working Group on Harmonization of Defects Tables in Fish Standards (Bremerhaven 2-4 May 1984).

1. SCOPE

120. The Committee reiterated its view that whilst the scope as presently worded did not preclude the use of brown fish, the defects table in the Standard (Annex C) was applicable to only white fish. The Delegate of the Federal Republic of Germany stated that the Bremerhaven Working Group had considered the application of the defects table only to white fish products and the Committee agreed that the matter of defects in other products needed further investigation.

2. DESCRIPTION

2.2 Product Definition

121. The Delegation of the Federal Republic of Germany proposed that "and pieces of such fillets" should be re-instated in 2.1(a) since in the production of mixed boneless fillets/minced fish blocks it was common manufacturing practice to add fillet strips to improve the mixture.

122. Some delegations were of the opinion that such pieces required definition. The Committee noted, however, that there were provisions describing dimensions and number of allowable pieces in the Hake Standard and agreed to the proposal of the Federal Republic of Germany. After further discussion the following text was agreed for 2.1(a):

"Quick frozen blocks are rectangular or other uniformly shaped masses of cohering fish fillets, pieces of such fillets, minced fish or a mixture thereof comprising:

- (i) a single species: or
- (ii) a mixture of species.

2.3 Presentation

123. There was considerable discussion as to which types or styles should be included in the section.

124. The Federal Republic of Germany thought that all main types of block presentations should be described and that there should be adequate description of mixed boneless fillet/mince blocks which were mainly used for fish fingers. The Delegation also proposed to add provision for fillets, skin-on, skinless, and skinless and boneless.

125. The Committee noted that the Delegation of Denmark had made a similar proposal for the inclusion of fillets.

126. The Committee agreed that in view of the title of the Standard and the provision of 2.1 it was logical to include fillets and agreed to the following wording as the first item in presentation:

"Fillets (i) skin-on, (ii) skinless, (iii) skinless and boneless, boned, or pin bones present".

Proportion of Mince

127. Several delegations thought that it was unnecessary to include a figure of 25% for the mince component of mixed blocks since on the one hand this was largely decided in agreements between buyer and seller and on the other, methods of estimation of minced fish in blocks content were not sufficiently precise to guarantee a standard deviation of less than 10%. This was particularly true of mixed hake fillet/mince block because of the softer texture compared to such fish as Atlantic cod.

128. The Delegation of the Federal Republic of Germany and of the USA pointed to collaborative studies which had been carried out showing that there were now methods available (see Appendix III, Sub-section 7.5) which showed good reproducibility.

129. The Committee noted that these methods had also taken into account some possible variables such as block to block and within block variation and the presence of thickening agents.

130. After some further discussion the Committee decided to attach both methods to the Standards to give Governments an opportunity to make further comparative texts.

131. Concerning whether or not to include a limiting percentage of minced fish the Committee asked the delegation of Denmark to prepare proposed texts and consequential amendments for both eventualities. The Committee subsequently examined the proposal which proposed amendments if (a) the 25% limit was maintained in 2.3 or (b) the 25% limit was deleted.

132. In discussing the proposal the Committee noted that there was growing support for deletion of the 25% limit on the mince component and for the inclusion of provisions which would satisfy labelling requirements and at the same time allow flexibility for producer/processor transactions, for instance substitution of a 25% limit with bands of 10% increments of minced fish, beginning at 25% as proposed by the Delegation of the Netherlands.

133. The Delegation of Canada pointed out that with a method accurate to $\pm 5\%$ for estimating mince, permitting a range of 25-35% would allow actual amounts of 20-40%; if stated as 30% $\pm 5\%$ it would allow a 25-35% range. It therefore proposed to amend 6.1.5 to read:

"for products referred to in 2.3(b), the labelling shall show the proportion of minced fish incorporated in the block expressed as " $x\% \pm 5\%$ ".

134. The Delegation pointed out that carryover of minced fish from blocks into the final products were best dealt with in the "Fish Sticks and Portions" Standard.

135. The Committee however accepted the amendments proposed by the Delegation of the Netherlands as follows:

"delete 2.3(b) (i) and (ii)
delete 3.3.4

amend 6.1.5 to read: "The proportion of mince in percentage of net fish content shall be declared by stating the percent ranges: less than 25, 25-35 etc. Blocks with more than 90% mince are regarded as mince blocks".

136. The Delegation of the Federal Republic of Germany expressed its reservation to the decision.

ESSENTIAL COMPOSITION AND QUALITY FACTORS

Optional Ingredients

137. The Delegation of Japan proposed to amend the provision to include spices, herbs, vegetable seasonings, cereals/flours, potato flour, sodium chloride and spice oils.

138. The Delegation of Spain also proposed to include sugar and hydrolysed protein as optional ingredients.

139. The Committee decided that this would amount to including speciality blocks in the Standard and in the interests of simplicity, decided not to pursue these proposals.

3.3 Final Product

140. The Committee agreed that the provisions of 3.3 needed editing to be consistent with the defects table. It agreed to the following amended text:

3.3.1

141. Blocks shall be reasonably regular in shape and weight and have a uniform colour characteristic of the species. They shall be free from:

- Foreign matter;
- Viscera; and
- subject to the tolerances, free from:
 - Fins or parts of fins;
 - Discoloured flesh;
 - Bruises;
 - Blood clots;
 - Membrane (belly lining);
 - Parasites;
 - Scales; and
 - where appropriate, subject to the tolerances, free from:
 - skin and bones.

4. FOOD ADDITIVES

142. The Committee was informed that the Food Additive provisions were considered by the 18th Session of the Codex Committee on Food Additives with a view to endorsement. None of the Food Additives were endorsed by CCFA pending more information being made available by CCFFP, on the technological justification of the use of food additives and on the synonyms and chemical formulae of the additives.

143. In this latter respect it was pointed out that the technological justification for use of phosphates was for "drip loss prevention".

144. The Delegation of Switzerland stated that it wished to reserve its position on the use of phosphates.

145. The Delegation of the Federal Republic of Germany informed the Committee that investigations were in progress in its country and that certain information sought by CCFA could be provided by it in the very near future.

147. The Delegation of Japan informed the Committee that certain sugars and D-sorbitol were used in its country as water binding agents and proposed their inclusion in the food additive provisions.

148. It was pointed out that the present list required some editorial amendment to clarify and simplify the list. It was agreed that this would appear in the amended standard (see Appendix III).

Labelling

149. The Committee noted that the references at the head of this section to the Guidelines for Labelling of Non-retail Containers and throughout the labelling provisions to "freight containers" had been inserted in anticipation of the finalisation by the CCFL of these Draft Guidelines.

150. In fact since the last session of the Committee the Commission had agreed "that further work on the Draft Guidelines on the Labelling of Non-retail Containers at Step 5 should be suspended until the real need for such guidelines had been demonstrated. In the light of this decision, the Commission advised the Labelling Committee to review that part of Section 1 - Scope - of the General Standard for the Labelling of Pre-packaged Foods which referred to non-retail containers".

151. The Committee was of the opinion that for this Standard and for others under elaboration such as the Standard for Salted Dried Fish a labelling provision for non-retail containers was required.

152. The Committee decided to remove the reference at the head of the section and to

put in its place the wording of the present 6.8, that is:

"The information required in 6.1-6.6 may be supplied by the name of the food and code identification and given only in related documents provided that such a code is clearly identifiable with the related documents".

153. Reference to (freight containers) was removed and replaced by "in accompanying documents".

Date Marking

154. The Committee re-affirmed its previous discussion (see ALINORM 83/18, para 149) that date marking was not required.

Country of Origin

155. The square brackets were removed from the provision under 6.5.2.

METHODS OF ANALYSIS AND SAMPLING

7.1 Sampling

156. The Committee referred to the classification of methods of sampling elaborated by the CCMAS (see also paras 40-43).

157. It recognized that the Codex Sampling Plans for Pre-packaged Foods (AQL 6.5) CAC/RM 42-1969 were unsuitable for the examination of fish blocks - at previous sessions it had already referred to the undesirability of use of sampling plans which required the destruction of large amounts of expensive foods.

158. The Delegation of the USA referred to work that had been undertaken in consultation with members of the CCMAS on alternative sampling plans for fish blocks. A comparison had been made between the above Codex Sampling Plans and two statistically derived plans where the sample size had been reduced from 29 blocks to 12 and 16 respectively with a minimal reduction in AQL.

159. The Committee agreed to delete reference to the current Codex Sampling Plans and to attach sampling plans to the report (see Appendix III, Annex F) and seek advice and guidance proposed above and a sampling plan submitted by the Federal Republic of Germany from the CCMAS.

7.3 Quantities for Physical and Organoleptic Examination

160. In line with the recommendation of the Working Group the Committee amended the amount of material required under 7.3(ii) to "whole block".

161. The Delegation of Spain suggested that methods of analysis for biochemical indices to control cold storage condition should be considered.

162. The Committee after some discussion, decided not to pursue the matter: since many fish species were involved, numerous methods could be required and in any case the defect tables adequately controlled the texture and quality of the final product.

Lot Acceptance

163. In addition to "lot acceptance for quality" the Committee decided to make a provision for net contents as follows:

164. "A lot will be considered as meeting the weight requirement when the average net content of all blocks examined is not less than the declared weight provided that there is no unreasonable shortage in individual blocks".

Definition of Bone Defects and Defect Tables Annexes B and C

165. The Committee was informed that the Bremerhaven Working Group had produced revised

definitions of defects for use with the defects table of the Standard.

166. The Delegations of Canada, Iceland and Norway stated that they were dissatisfied with the proposed definitions of "bones" or the definitions of "styles" of blocks.

167. The Committee did not discuss the amended report in detail. The Delegation of Canada said that it could not accept the suggestion that the revisions were merely editorial; they were matters of substance with far-reaching consequences especially in respect of labelling.

168. The Committee agreed that the proposals should be attached to the Standard and drawn to the attention of Governments. The need for detailed study and further comment on the definitions and tables was emphasized.

Status of the Standard

169. The Committee recognized that many important and constructive changes had been made to the text and that many aspects of the Standard, for instance the revised defect tables and methods of determination for mince content, required examination by Governments.

170. Since it was desirable that the Standard (see Appendix III) and the "Fish Stick Standard" advance in tandem, it was agreed to defer a decision on whether or not to advance the "Blocks Standard" until such time as the "Fish Stick Standard" has been discussed.

DRAFT STANDARD FOR QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

171. The Committee had available for consideration the Draft Standard (ALINORM 83/18, Appendix IV) and Government comments contained in CX/FFP 84/6 and CX/FFP 84/6, Add. 1. The Committee also had available a conference room document prepared by the Secretariat on the status of endorsement of the food additive provisions considered by the Codex Committee on Food Additives.

172. The Delegate of the Federal Republic of Germany drew the Committee's attention to the general statement in CX/FFP 86/4 and indicated that it proposed to comment accordingly on the appropriate sections of the draft standard.

2. DESCRIPTION

2.1.1

173. The Delegation of the Federal Republic of Germany proposed an addition to 2.1.1 to the effect that fish stick cores may be cut from boneless fish fillet blocks with re-added minced flesh up to 25%. The Observer from South Africa and the Delegation from Thailand expressed the view that reference to percentage of minced flesh should be deleted since such restriction would affect the trade in products containing higher amounts of minced flesh. The Delegation of Norway expressed the opinion that the addition proposed by the Federal Republic of Germany should be rather included in 3.1.1 than 2.1.1. After discussion the Committee agreed that the definition of raw material was adequately covered in 3.1.1 and that the addition proposed would cause problems. It decided not to amend the text.

3.2 Final Product

3.2.1

174. The Delegation of the Federal Republic of Germany was of the view that the present text in 3.2.1 did not meet the market situation and proposed a new more detailed wording. The Delegation of Denmark reminded the Committee of the very lengthy discussion at its last session on the subject, and expressed the opinion that the requirements represented a minimum and that excessive detail was not required. The Delegation of the U.S.A. proposed a figure of 50% of the declared weight of the final product as a minimum requirement for proportions of fish flesh core for all types of products. The Federal Republic of Germany proposed a 60% minimum for fish portions, but after discussion the

Committee agreed to the proposal of the Delegate of the U.S.A.

3.2.2

175. The Committee agreed to retain all the requirements for fish sticks as contained in 3.2.2 but to align them with the order in the defect tables.

176. The Delegation of the Federal Republic of Germany proposed for inclusion in the Standard a new provision on compliance to percentage of minced fish; the Committee did not agree to this since reference to percentage of mince was not included in the text of the Standard.

3.2.4

177. The Committee agreed to delete the Note in square brackets appended to this provision.

3.2.6

178. The text was amended to include reference to Annexes B and C.

4. FOOD ADDITIVES

179. The Delegations of France, Poland, Switzerland, Thailand and of the Federal Republic of Germany informed the committee of their reservations for acceptance of food additive provisions for phosphates and colours. The Delegation of Japan informed the Committee about the use of flavour enhancers and paprika in fish sticks in its country and proposed these for inclusion in the food additive provisions.

180. The Committee was of the opinion that paprika was an optional ingredient and that no provision was necessary in this respect. It did not confirm the use of additional flavour enhancers.

181. The Delegation of Norway informed the Committee that the comments from the 17th Session of Codex Committee on Food Additives needed careful study. The Committee should recognize the need to provide that Committee with the required information on technological justification on additives and levels of use where needed and act accordingly. The Delegation of the U.K. was also of a similar view and expressed the opinion that the matter be treated as one of urgency and proposed that the Secretariat should seek information by means of a circular letter from Governments and International Agencies on the questions raised by CCFA. It was suggested that a working group should be convened to meet at the next session of CCFFP to consider the replies received from Governments and to prepare a document providing the information required by CCFA. The Committee agreed to this proposal of the U.K.

6. LABELLING

6.1.2

182. The Federal Republic of Germany proposed a modification of the text to include reference to a declaration of species in accordance with the law and custom of the country concerned. The proposal was not accepted by the Committee.

6.1.5

183. The Delegation from the Federal Republic of Germany proposed a new text to exclude any need for labelling of fish sticks prepared from fillet with re-added minced fish flesh up to 25%. The Committee did not agree to the proposal since reference to percentage of mince was not included in the text of the Standard. The present text was unchanged.

6.1.6

184. The Committee did not accept a proposal from the Federal Republic of Germany to reword the text to restrict the provision to fish-sticks only. The Delegation of the

Federal Republic of Germany wished to note a reservation on this matter since it was of the opinion that fish portions would normally be made from fillets defined in Style 3 from fillets from which the pinbones are not removed.

6.8 Cooking Instructions

185. The Committee noted that whilst cooking instructions were informative to the consumer, they were not essential for the instruction of institutional caterers. Hence the Committee opposed changing the present wording "should" to shall.

7.3 Determination of Net Content

186. The Committee agreed that the final sentence of the text was repeated in para 9 and could be deleted.

7.4 Estimation of Fish Flesh Core

187. The Committee noted that the present text, while recognizing the AOAC method as the defining method, left the possibility for development of alternate methods. The Committee noted the availability of an alternate method developed by the West European Fish Technologists Association (WEFTA) for the determination of fish core content in Quick Frozen Breaded/Battered Fish Sticks and Portions which had been collaboratively tested by eight countries and which gave reproducible results. The Delegation of the Federal Republic of Germany informed the Committee that the method developed by WEFTA would soon be published and would be available to interested countries.

188. The Committee noted that the method would be classified as a defining method and proposed to leave the text unaltered pending further information.

189. The Delegation of the Federal Republic of Germany proposed for inclusion under a new paragraph (7.5) a method for determination of mince content. The Committee did not agree to this since no provision existed in the Standard which required such a method.

8.1

190. Text was amended to include reference to Annex C.

Annex B

191. A working group chaired by Dr. Houwing (the Netherlands) met during the session and elaborated definitions for defects in fish core of quick frozen fish sticks (fish fingers) and fish portions - breaded or in batter. These definitions were incorporated in Annex B of Appendix IV, ALINORM 83/18. The whole Annex was put in square brackets and comments from Governments were requested.

192. The Committee did not discuss the definitions proposed in Annex B but suggested that it be reviewed by a working group to be convened prior to the next session of the Committee.

Annex C

193. The same working group which prepared Annex B elaborated a defects table for fish core of quick frozen fish sticks (fish fingers) and fish portions - breaded or in batter. This defects table was harmonized with the existing defects table for fish sticks and fish portions available as Annex C of Appendix IV, ALINORM 83/18. The whole Annex was enclosed under square brackets and comments from Governments were requested.

194. The Committee did not discuss the defects table available as Annex C and suggested a similar mechanism as for review agreed in paragraphs 191 and 192 above.

Status of the Standard

195. The Committee noted that there were still two sections in the Standard which should be looked into carefully to bring the Standard up to date. These were:

- (i) to review food additive provisions and to provide the information requested by CCFA; and
- (ii) to review the definitions (Annex A, Appendix IV) and defects (Annex C, Appendix IV) which were enclosed in square brackets.

196. The Committee decided to retain both Standards at Step 3 (See Appendices III and IV).

DRAFT STANDARD FOR DRIED SALTED FISH (KLIPPFISH) OF THE GADOID FISH FAMILIES

197. The Committee had available for consideration the Draft Standard (ALINORM 83/18, Appendix V) and Government comments as contained in CX/FFP 84/7, CX/FFP 84/7 - Add. 1 and CX/FFP 84/7 - Add. 2. While discussing the Standard, the Committee also took into consideration the comments of South Africa and Mexico, as appended to ALINORM 83/18, Appendix V.

GENERAL

198. The Delegation of Thailand and the Observer from South Africa informed the Committee that in their countries, various species of fish other than those included in the Standard were salted and dried and traded internationally. A suggestion was made that the Standard be expanded to make provision for inclusion of other species of fish which were so processed.

199. The Committee was reminded that it had considered the question raised by Thailand and South Africa at its last (15th) Session, when it expressed the opinion that it would be unwise to expand the scope of the Standard since inclusion of other fish which varied widely in their compositional characteristics would pose insurmountable problems in standardization (ALINORM 83/18, paras 255-257). Since the product referred to by the delegate of Thailand appeared to be traded regionally, it was considered appropriate that the matter be discussed further by the Coordinating Committee for Asia and a regional standard elaborated if necessary.

TITLE

200. The Committee noted that the present standard made provision for dried salted fish from species Gadidae and Merlucciidae both of which belonged to the Gadoid fish family. While it was recognized that international trade in products widely known as Bacalao or klipfish obtained from fish of Gadidae (Cod, Tusk, Haddock, Saithe and Ling) was very extensive, the same was not the case for products from fish of Merlucciidae (e.g., Hake). Hence the Committee agreed to exclude Merlucciidae species from the standard and changed the title of the standard to read "Draft Standard for Dried Salted Fish (Klipfish) of the Gadidae Fish Family".

2.1 Product Definition

2.1 (a) Consequent to the discussion in paragraph 200 the Committee deleted reference to Merlucciidae from 2.1(a).

2.1 (b)

201. The Delegation of U.S.A. informed the Committee that cod and other Gadidae species of fish should be bled as soon as possible after they were caught. Otherwise, dried salted cod products would have an undesirable offwhite or greyish appearance. The Committee agreed with the suggestion of U.S.A. to insert the word "bled" before "guttled".

202. The Observer from South Africa drew attention to the request to include "head-on" fish within the product definition. After substantial discussion in which the specific nature of the product presently under consideration was described, the Committee decided to retain the present definition. However, it suggested that if there was need for a separate standard for products prepared from other species, from small fish with "head-on" presentation and by variations of the process condition, then such a proposal could be prepared for consideration at a future date.

2.2.1 Salting

203. The Observer from South Africa proposed inclusion of a third salting method in which fish was placed in a water-tight container and immersed in saturated brine. Excess salt was added if needed to ensure that the brine remained saturated. The fish was subsequently removed from the container and stacked in a manner which allowed the brine to drain away. This proposal did not receive the agreement of the Committee.

2.2.2(b) Artificial drying

204. The Delegation of Denmark was of the view that it was important that both humidity and temperature were controlled during drying. In some cases it might be necessary to chill the air instead of heating it. The Committee agreed with the views of Denmark and accepted the new text proposed by Denmark as follows:

Artificial drying: The fish is dried in mechanically circulated air of controlled temperature and humidity.

2.3 Presentation

205. The Committee noted that most of the dried salted cod and other species of fish belonging to the Gadidae family which moved in international trade was with skin on and did not agree to the suggestion of Japan to make provision for a skinless variety.

2.3.2 Split fish with entire backbone

206. The Delegation of Norway proposed a rewording of this section to read "split with the backbone not removed". The Committee agreed to this amendment.

3.1 Raw Material

207. The Committee agreed with the Delegation of Denmark that the raw material for dried salted fish was in fact, salted fish and agreed to change the text as below:

"The raw material shall be salted fish prepared from sound fresh fish of the designated species which are of a quality such as to be fit to be sold for human consumption, and shall be fully salted to keep quality during correct (cold) storage; the salt content of the final product may be controlled by steeping the salted fish in water".

208. The change in text of 3.1 necessitated a consequential change in the text of 2.2, which was modified to read as follows:

"The product shall be prepared by one of the salting processes
.....from the neck to the caudal fin".

3.2 Salt

209. The Delegation of Portugal proposed that salt used for processing should be free from micro-organisms or, if possible, maximum limits for micro-organisms per gram of salt should be set. The Committee expressed the opinion that the proposal of Portugal would be taken care of by the hygienic provisions of the Standard and did not consider any changes in the text to be necessary.

3.3.1 Appearance

210. The Delegation of Denmark informed the Committee that the present text was ambiguous and would permit acceptance of any bad quality product. The Committee expressed the opinion that the comments of Denmark would be taken care of by the defects table. The Committee, however, agreed to change the text as below as suggested by Norway:

"Dried salted fish shall not be extensively cracked or ragged, or completely broken, nor shall the belly wall have been decomposed by the action of liver, bile or gut contents. It shall not be completely pressed together nor show severe

signs of liver staining, severe burning during the drying process, pronounced evidence of halophilic mould (dun) nor visible evidence of red halophilic bacteria (Pink)".

211. The Committee noted that the text proposed would accommodate the comments by Italy.

3.3.2 Odour

212. The Delegation of U.S.A. proposed addition of flavour and texture requirements to the Standard. The Committee agreed that both flavour and texture were essential aspects of the organoleptic assessment of the final product, but expressed the opinion that there was no need for the addition of new clauses in the Standard, since the provisions were taken care of in 8.2 and the defects table (Annex B). It agreed that the title of 3.3.2 could be amended to Sensory Characteristics and that the text of the provision be amended accordingly.

Water Activity

213. The delegation of U.S.A. proposed that water activity be included in the Standard and suggested an official AOAC method (32,044 -32,009) for its determination. Since the delegation had no experience with the application of the method to dried salted fish, it agreed to reconsider the proposal and to comment further at the next (17th) Session.

3.3.3

214. The Committee agreed to the new text proposed by Norway for 3.3.3 to the effect that "the products in the various forms of presentation shall comply with the definitions and essential quality factors set forth in this Standard subject to tolerance allowances as set forth in Annex B".

4 FOOD ADDITIVES

215. The Committee agreed to the provision of sorbic acid and its calcium, sodium or potassium salts in the Standard since they acted as an effective surface treatment agents for mould inhibition which was especially useful in hot and humid climates. In many of the developed countries the dried salted fish was stored in conditions of low temperature, and this would not necessitate the use of the sorbic acid or its salts in the product. Since the additive was used for surface treatment only, the maximal level in the final product would be low.

216. The Delegation of Switzerland reserved its position concerning the use of sorbic acid and pointed out the need for its declaration under list of ingredients.

5 HYGIENE AND HANDLING

217. The Committee agreed to delete "toxic" from the text of 5.3(c), so that the text was in line with that in other Standards.

6. PACKAGING

218. The Committee agreed that the description of "containers" under packaging would include bales made of hessian or jute which were generally used for packing of dried, salted fish. The Committee noted that while most of the trade in the product was in bulk packages, small quantities were also traded in retail packs; the labelling provisions should reflect this aspect of trading.

8. SAMPLING PLANS

219. The Committee noted that sampling plans for pre-packaged foods (CAC/RM 42-1969) were not generally applicable to the product covered by the Standard and agreed to amend the text of 8.1.1 and 10(a) as proposed by the Delegation of Norway to reflect the general trading situation and the need for appropriate Sampling plans.

9. CLASSIFICATION OF DEFECTIVES

220. The Committee agreed to modify the text as follows:

"A sample unit shall be considered as a "defective" when it fails to meet the requirements of Sub-sections 2.3 and 3.3 subject to the defect definitions and tolerances in Annex B".

10. LOT ACCEPTANCE

221. The Committee agreed to delete reference to Sampling Plans for Pre-packaged Foods and amend the text to include the phrase "appropriate sampling plans (to be elaborated)".

Defects Table

222. As a follow-up of the recommendatin of the 15th Session of the Codex Committee on Fish and Fishery Products (ALINORM 83/18, para 259) the Delegation of Norway elaborated a defects table for inclusion in the Standard. The Committee did not discuss the table in detail but agreed to incorporate it in the Standard as such and discuss it at its next (17th) Session. The defects table elaborated by the Delegation of Norway was attached as Annex B to the Standard. Governments were requested to test the provisions of the Standard and the defects table against products in trade and to report on experience gained.

Status of the Standard

223. The Committee advanced the Standard (Appendix V) to Step 5 of the Codex Procedure.

CONSIDERATION OF DRAFT CODES OF PRACTICE

224. As requested by the Committee, an ad hoc Working Group comprising members of the Delegations of Australia, Canada, Cuba, Denmark, Norway, South Africa (Observer), Uruguay, U.S.A. and a representative of FAO - Mr. Z.S. Karnicki (Rapporteur) met under the chairmanship of Mr. A. Matthys (USA). They reviewed the two Codex of Practice listed in the light of comments either received or made known by the various delegations represented.

DRAFT CODE OF PRACTICE FOR FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS (ALINORM 83/18, Appendix IX)

225. This was reviewed by the Representatives of Australia, Canada, Cuba, Denmark, Norway, South Africa (Observer) and U.S.A.

226. The only comments received were those from the Government of Denmark and they refer only to the status of the code which in its opinion should be at the same step as the corresponding standard (ALINORM 83/18, Appendix IV).

227. After detailed consideration the Working Group decided to recast SECTION III - RAW MATERIAL REQUIREMENTS to make it more in accordance with commercial practice.

228. The paragraphs were recorded as follows:

3.1.2 becomes 3.1.4, 3.1.4 becomes 3.1.5, 3.1.5 becomes 3.1.2.

Section IV

229. Amendments were proposed as follows:

para 4.1.3.1: delete "non food products" in line 8 and insert "items/products not intended for human consumption".

para 4.4.4.1: insert new text line 5 "Batter should be kept at a temperature not exceeding 10 C (15 F)."

230. The Delegation of Australia wished to delete the word "vegetable" from the title of this section. The Committee had no objection to the proposal, but in view of possible confusion with mineral oil, agreed to the suggestion of the Delegation of Sweden to

substitute the word "edible" for "vegetable". The proposed title reads "ONLY GOOD QUALITY EDIBLE OILS SHOULD BE USED IN PREFRYING OR FULLY FRYING BATTERED AND/OR BREADED FISH PRODUCTS'.

231. The proposed revisions were considered and adopted by the Committee.

Status of the Code

232. The Committee agreed with the recommendation of Working Group advance the Code to Step 8 of the Procedure (see Appendix VII).

233. The Delegate of Denmark, in view of retaining the relevant standard at Step 3 withdrew his proposal to have the Code at the same step as the standard.

PROPOSED DRAFT CODE OF PRACTICE FOR CEPHALOPODS (CX/FFP 82/11, March 1982)

234. This was reviewed by the Representatives of Australia, Canada, Cuba, South Africa (Observer), Uruguay and U.S.A.

235. The Working Group drew the attention of the Committee to the fact that this Proposed Draft Code of Practice for Cephalopods had a significantly larger scope than any other code prepared so far by this Committee. The Code include handling and processing of fresh, frozen, salted/dried and smoked cephalopods. A request had also been made by the Delegate from Cuba to include canned cephalopods.

236. Though the Working Group could accept a broad scope it was agreed that substantially more technical information and guidance should be provided by the member countries, particularly specific information on handling cephalopods and the processing methods applied.

237. The Working Group found itself lacking sufficient technical expertise to make substantial improvements to the Code. This referred especially to the problem of chilling cephalopods with ice or chilled/refrigerated sea water and the effect of these methods and the colour of the final product, which was one of the significant quality factors.

238. However, the Working Group was aware that the value of the colour in overall quality assessment was not the same in different countries. This might require the recommendation of different chilling methods for cephalopods destined for different markets.

239. The recommendations given in para 5.4.4 "Dry-salting and drying", were to some extent contradictory to product process definition, and were not sufficient to provide adequate technical guidance on this processing method.

240. With this in mind, the Working Group proposed to put the entire paragraph as well as Appendix II in square brackets and request the member Governments which have experience in this particular processing method for cephalopods to provide more information.

241. Chapter 5.4.6 Packaging, Storage and Distribution referred exclusively to smoked cephalopods and in the opinion of the Working Group should be expanded to deal with all products covered by the Code.

242. A substantial number of other smaller amendments were recommended by the Working Group.

243. The amended text of the Code as detailed in Annex VIII and as presented to the Committee was adopted.

244. The Working Group pointed out to the Committee that the preparation of a Code of Practice was usually accompanied by the preparation of a corresponding commodity standard. Such a procedure complemented the technical expertise, information and guidance, provided in the Code of Practice.

245. The Working Group therefore proposed to the Committee the elaboration, parallel to the Code of Practice, of a standard for frozen cephalopods or as a first step, a standard for frozen squid.

246. The attention of the Committee was drawn to the fact that frozen cephalopods had recently become an important commodity in international trade. The elaboration of corresponding standards would be of great interest to some developing countries which were significantly increasing their cephalopod catches and were seeking guidance to assure an acceptable quality of such products on the international market.

Status of the Code

247. The Committee agreed to retain the Proposed Draft Code for Cephalopods at Step 3 of the Procedure (see Appendix VIII).

248. The Working Group expressed concern that Codes of Practice already prepared by the Committee did not provide sufficient information and clear guidance on technical matters and thus reduced their value and practical application.

249. The Working Group concurred with the proposal of the Delegate of Norway that when the present series of codes was completed the Committee should undertake the preparation of a single, concise document which would combine provisions common to all codes and separate specific requirements for different products.

250. The layout of this Code of Practice for Cephalopods and particularly the "Reference Manual for Codes of Practice" prepared by the Department of Fisheries of FAO was the first step in this direction.

DRAFT REPORT OF THE AD-HOC WORKING GROUP ON MICROBIOLOGICAL SPECIFICATIONS FOR FROZEN COOKED CRAB MEAT

251. As requested by the Committee an ad hoc Working Group composed of the Delegations of Canada, United Kingdom, Norway, Cuba, Thailand, India, Finland, Denmark and a representative of WHO (Dr. Koulikovskii) met to consider the above subject.

252. The WHO Representative informed the participants of the present status of the elaboration of microbiological criteria for frozen cooked crabmeat. It was recognized that the hygienic conditions of the production of pre-cooked frozen crabmeat were comparable with those for pre-cooked frozen shrimps and prawns, for which microbiological criteria had already been developed. Particularly, these products were hand-picked from the shell prior to packaging and freezing and were commonly consumed without further heating.

253. At the 14th Session of the Committee a Working Group on this subject recommended that "Governments should collect data, in accordance with the protocol and methodologies used for frozen cooked ready-to-eat shrimps and prawns, for frozen cooked crabmeat, to be considered for possible inclusion in the Code of Practice for Crabs". At the 15th Session of the Commission this Code had been advanced to Step 8, and at its 15th Session the Committee had therefore decided to renew the request to Governments for microbiological data for Frozen Cooked Crabmeat for consideration at the Committee's present meeting. (see ALINORM 83/18, para 251).

254. The Secretariat had received comments from Canada, Cuba, Poland, Finland, Denmark and South Africa on microbiological specifications for frozen cooked crabmeat, in response to circular letter CL 1983/44 FFP, which were considered by the ad hoc Working Group.

255. The Working Group took note of the proposal by Poland to include into microbiological specifications for frozen cooked crabmeat faecal coliforms as well as Vibrio parahaemolyticus. Reference was made in this connection to the Report of the FAO/WHO Expert Consultation which dealt with microbiological specifications for pre-cooked frozen shrimps and prawns (WHO document VPH/83 54) which concluded that the inclusion of Vibrio parahaemolyticus as a criterion for these products was not feasible until such time as defined methods for this micro-organism were available.

256. With regard to the faecal coliforms the participants agreed in general with the recommendation of the above-mentioned Expert Consultation which decided that testing of pre-cooked frozen shrimps and prawns for Enterobacteriaceae, coliforms, faecal coliforms and Escherichia coli offered no added benefit in deciding lot acceptability. This approach could be also valid in connection with microbiological criteria for frozen cooked crabs. However, some of the Working Group felt that a test for E. coli could be considered for incorporation into microbiological specifications and guidelines for frozen cooked crabmeat, as an indicator of the sanitary condition at the production level. In this connection, Canada and Denmark kindly agreed to provide the FAO/WHO Secretariat data on the public health significance of E. coli in pre-cooked frozen shrimps, prawns and crabs.

257. Finally, the Working Group decided to accept proposals by Denmark and Cuba that microbiological specifications including sampling plans and microbiological limits elaborated for pre-cooked frozen shrimps and prawns could be provisionally applied for frozen cooked crabmeat. The following microbiological limits were recommended in this connection:

Mesophilic aerobic bacteria

$n = 5, c = 2, m = 10^5, M = 10^6$

Staphylococcus aureus

$n = 5, c = 2, m = 500, M = 5000$

Salmonella

$n = 5, c = 0, m = 0.$

258. The Delegation of Thailand which was in favour of the above specifications in general, expressed its view that since technology of production of the frozen cooked crabmeat was quite different from pre-cooked shrimps and prawns, the microbiological specifications for crabmeat should be less strict than for shrimps and prawns.

259. The Working Group agreed that these provisional microbiological specifications should be circulated to Governments for comment after consideration by the Codex Committee on Food Hygiene.

HISTAMINE (SCOMBRIDAE) POISONING IN FISH AND FISHERY PRODUCTS

260. The WHO Representative informed the Committee that the draft of the Monograph on histamine poisoning associated with fish, cheese, and other foods prepared by Dr. L. Taylor was intended to provide a perspective on the importance and impact of histamine poisoning on a worldwide basis. The draft was considered by the Codex Committee on Food Hygiene (CCFH) (ALINORM 85/13) which had requested WHO to issue it as an FAO/WHO document for worldwide distribution.

261. The CCFH was of the opinion that fish technologists should have an opportunity to discuss the incidence of histamine in fish and fishery products and agreed to bring Dr. Taylor's paper to the attention of this Committee for comment.

262. The Committee recognized that most countries did not have regulatory limits on the permissible levels of histamine in fish and fishery products, and that further research was needed in this field. This was a situation report and was not intended to promote establishment of regulatory limits for histamine in food products on a local, national or worldwide basis in the near future but was intended to focus attention on the problems related to the epidemiology of this food poisoning, on methodology for the detection of histamine in foods, on the mechanism of formation of histamine in foods and on precautions for the prevention of histamine poisoning. Consideration of the feasibility of setting regulatory limits for histamine in foods at the national level were included.

263. Delegates were requested to provide the FAO/WHO Secretariat with any existing information on the epidemiology of histamine poisoning in their countries, on control measures and on any regulatory limits for histamine in fish and other foods before 15 July 1984.

264. The Delegation of the U.K. commented on the situation and emphasized the need for cool storage control of fish after catch. The Committee noted the information.

CONTENT AND LAYOUT OF CODEX STANDARDS

265. The Secretariat informed the Committee that the Commission had discussed the matter at its 15th Session on the basis of a paper prepared by India (see ALINORM 83/36 and CX/FFP 84/2).

266. The paper set forth the view that quality criteria like styles, cut, defects, etc., incorporated in certain Codex standards, especially those for processed fruits and vegetables and fish and fishery products, could possibly give rise to difficulties in international trade, which could be contrary to one of the main objectives of the programme. The quality criteria did not, in any way, pose a health hazard and should be made "optional", subject to mutual agreement between the importer and exporter. The Delegation of India thought that the inclusion of more details in the Standards, of a kind which were not health related, could possibly have an adverse effect on trade in commodities, especially exports from developing countries. All safety requirements like hygiene, food additives and contaminants should be made mandatory and the rest optional.

267. The Commission expressed the opinion that the problem raised by India was a fundamental issue, which needed to be considered in depth. The Commission decided, therefore, to take no decision on this matter at this time, and considered that the problem should be rediscussed as a general issue by the next (16th) Session of the Commission.

268. It proposed the following sequence of action:

- (a) The Codex Committees on Processed Fruits and Vegetables (CCPFV) and Fish and Fishery Products should discuss the subject of whether too much detail by way of quality attributes in Codex Standards could result in difficulties from an international trade point of view. The discussion should be on the basis of ALINORM 83/36 and of papers to be prepared by India highlighting the problems especially in trade with (i) Processed Fruits and Vegetables; and (ii) Fish and Fishery Products, and indicating the particular provisions in the Codex Standards where there was a need for modification.
- (b) The midterm session of the Executive Committee was requested to discuss the subject in the light of views expressed by CCPFV and by this Committee and also in the light of a paper to be prepared by the Secretariat on this subject.
- (c) The Report of the Executive Committee and the paper prepared by the Secretariat should be sent to all Governments well ahead of the next (16th) Session of the Commission for comments.
- (d) The subject would be discussed by the Commission at its next session.

269. The Committee was informed that the matter had been discussed by the CCPFV at its latest session at which time several delegations agreed that many standards were unnecessarily sophisticated, especially with regard to styles and defect tables and that these could cause trade barriers.

270. The CCPFV had concluded that "there was a large measure of agreement that many standards already published contained criteria which were perhaps over-elaborate in some details; in future efforts should be directed to the more essential matters of composition, quality, hygiene, food additives and food labelling. This should also be borne in mind when revising existing standards. This would not only reduce trade barriers but would simplify the work of enforcement and control. At the same time it was recognized that many details, for instance in the labelling sections were required both by international trade and by the consumer".

271. The Delegation of Switzerland informed the Committee that Swiss Food legislation did not include detailed forms of presentation or style: these were in the hands of marketing organizations. The Delegation agreed in principle that Codex Standards were in some cases unnecessarily detailed. It pointed out that the matter had been discussed at

the Codex Committee on General Principles (CCGP) at which time it had been proposed that minimum standards should be developed with optional quality criteria in appendices.

272. The Delegation of New Zealand also referred to the wide discussion of this matter in the CCGP. The Delegation was also opposed to excess detail in Codex Standards but did not favour the inclusion of optional criteria.

273. The Delegation of Thailand associated itself with the views expressed by the Delegation of Switzerland and thought that too many details could be an obstacle to trade and would inhibit the acceptance of Codex Standards by some countries. He informed the Committee that the matter had also been discussed at the 4th Session of the Coordinating Committee for Asia (CCA). In view of the wide variety of opinions expressed it had been decided to issue a questionnaire and to discuss the question again at the 5th Session of the CCA.

274. Other delegations pointed out that much detail arose in Codex Standards because member countries of the Commission wished their national legislation to be taken into account when international standards were elaborated. They pointed out that in such standards lack of detail could also render the standards ineffective.

275. The necessity to include adequate provisions to ensure the health of the consumer, and to safeguard food products by adequate labelling provisions was emphasized. Standards must be complete in themselves and should take account not only of the current market situation but also potential trade in food products.

276. The application of standards in some countries could be greatly assisted by the Model Food Law.

277. It was also pointed out that Codex Standards were intended to be legal documents and that optional requirements could not therefore be part of standards intended for acceptance into national legislation.

278. The Committee noted that there was general agreement in principle that standards should be kept as simple as possible and associated itself with the views expressed by the CCPFV (see paras 269 and 270). It also encouraged member countries to study the matter further, to identify specific problems and to bring these to the notice of the Commission. In this respect particular attention could be drawn to the need to look at the level of acceptance of Codex Standards by member countries.

FEASIBILITY OF ELABORATING A STANDARD FOR BLOCKS OF WHOLE, HEADLESS AND GUTTED FISH

279. The Committee had available for consideration a background document on feasibility of developing a standard for frozen blocks of whole, headless and gutted fish prepared by Australia (ALINORM 81/18, Appendix VI) and Government comments contained in CX/FFP 84/14, later amended to CX/FFP 84/13, CX/FFP 84/14, Add. 1 and CX/FFP 84/13, Add. 2.

280. Considerable support was expressed in the Committee (Denmark, Poland, Portugal, Thailand, Cuba, New Zealand, South Africa and U.S.A.) for the elaboration of a standard for blocks of whole, headless and gutted fish. It was stated that there was a substantial international trade in the commodity and a high potential for its expansion. The Delegation of Thailand and the Federal Republic of Germany expressed their opinion that the standard should be applicable to single frozen fish.

281. The Delegation from the U.K. considered that the blocks of whole, headless and gutted fish were intended for further processing and not to be sold directly to the consumer. The standard to be elaborated would encompass a variety of species of fish and hence might pose insurmountable difficulties for standardization. In its view, the standard to be elaborated would need to be simple and contain minimum requirements.

282. The Committee agreed to commence work on the elaboration of the standard if approval was given by the Codex Alimentarius Commission to commence such work. The Committee noted that a document on grading of blocks of whole, headless and gutted fish had been prepared by the Western European Fishery Technologists Association (WEFTA) and that the document would provide a basis for further work.

Other Business

283. The Committee considered a proposal from Portugal to amend sections 2 and 6 of Codex Standard 94-1981 "Canned Sardines and Sardine-type products" available as document CX/FFP 84/15.

284. The Delegation of Portugal was of the view that Sardine pilchardus (Walbaum) was the true sardine. Hence only products obtained from Sardina pilchardus (Walbaum) should be classified as canned sardines and products obtained from other species of fish included in the standard should be classified as Canned Sardine-type products. To take the above into consideration, Portugal proposed for consideration by the Committee an amendment to Sections 2 and 6 of Codex Standard 94-1981, Canned Sardines and Sardine-type products.

285. The amendment proposed by Portugal received support from the Delegations of Spain, France and Switzerland which expressed the opinion that the amendments proposed were not of substance but of form, and would avoid misinterpretation, only Sardina pilchardus (Walbaum) was the true sardine, and the standard if amended as proposed by Portugal would avoid processing of the true sardine mixed with other species of fish.

286. The Committee noted that the problem raised by Portugal had been discussed at previous sessions where the view had been expressed that the labelling section of the existing standard provided adequate protection to the consumer. The Observer from South Africa informed the Committee that the product was moving in international trade. He showed the Committee labels of products, to demonstrate that the labelling section provided adequate protection to the consumer. The Committee agreed not to take further action on the matter.

Future Work

287. The Delegation of Cuba brought the attention of the Committee to the proposal made by the 3rd Session of the Codex Coordinating Committee for Latin America (CCLA) on the need for a Code of Practice for Aquaculture and a Standard for Molluscan Shellfish. Aquaculture, of late was receiving more and more attention and guidelines for the development of this art were urgently needed.

288. The Committee appreciated the importance of the proposals made by the CCLA and suggested that the necessary background papers should go to the Commission.

289. The Delegation of Finland reminded the Committee of an exercise that it had undertaken to provide an objective method of determining the final quality of salted herrings (salt content, minimum 11% in fillets) during prolonged storage issued in a draft form to the Committee as document CX/FFP 79/13. The document was not finalized since the Committee identified a number of problems which were difficult to overcome. Finland had now modified the paper in the light of comments received from a number of scientists active in the field and proposed to submit the modified document to the Committee for discussion at its next session. The Committee agreed to the proposal.

290. The Delegation of the U.S.A. proposed that a standard for Frozen Squid be elaborated by the Committee. The Committee recalled that a similar proposal was made by the ad hoc Working Group which considered the Codes of Practice for Cephalopods. The proposal of the U.S.A. received support from the Delegations of Thailand, Italy, Spain, Poland, Norway and Japan.

291. The Committee agreed that preliminary work should be undertaken to allow the Committee to determine whether a standard should be elaborated. As a first step in the exercise, the FAO Representative informed the Committee that the Fisheries Department of FAO would prepare a paper on "Handling and Processing of Cephalopods" (this would include trade statistics). The Delegation of the U.S.A. in cooperation with the Delegations of the Federal Republic of Germany and Poland undertook to correspond and prepare a background informational document on "Frozen Squid". Both the documents would be available to the Committee for discussion at its next session.

292. The Delegation of New Zealand expressed the opinion that the Committee should not undertake any new work, until the heavy programme on hand was completed.

293. The Delegation of the U.K. reminded the Committee of the need for a detailed review of methods of analysis and sampling in Fish and Fishery Products Standards (Codex Alimentarius Vol. 5 (see also CX/FFP 84/2, p. 4). The U.K. proposed that the Committee should set up a working group at the next session to carry out such a review in respect of the requirements for methods of analysis, use of sampling plans and provisions for lot acceptance in all the standards.

Date and Place of Next Session

294. The next session would in all likelihood be held in Bergen, Norway. The exact date for holding the next session would be decided by agreement between the Secretariat and the Norwegian authorities.

295. The Delegation from New Zealand informed the Committee the difficulties it faced in preparing for the session because of the late arrival of documents and made a plea to the concerned authorities responsible for documentation to make it available early.

296. The Committee was informed that the delay in communication of documentation was mainly due to the late arrival of comments from the member countries. A general plea was made that all the member countries should make every effort to send their comments in time.

ALINORM 85/18
APPENDIX I

LIST OF PARTICIPANTS
LISTE DES PARTICIPANTS
LISTA DE PARTICIPANTES

Chairman
President
Presidente

Dr. O. R. Braekkan
Institute of Nutrition
Directorate of Fisheries
P.O. Box 4285
N-5013 Nygaardstangen-Bergen
Norway

AUSTRALIA
AUSTRALIE

A.P. Biggs
Embassy of Australia
51-52 Ave. des Arts
Brussels 1180
Belgium

CANADA

B.J. Emberley
Director
Inspection Branch
Department of Fisheries & Oceans
Ottawa, Ontario
K1A 0E6
Canada

R.J. Bourque
Director Inspection Br. Gulf Region
P.O. Box 5030
Moncton
New Brunswick
E1C 9B6
Canada

D.R. White
Chief
Inspection Division
Newfoundland Region
Department of Fisheries & Oceans
P.O. Box 5667
St. John's, Newfoundland
A1C 5X1
Canada

D. Bevan
Chief
Inspection Division
Department of Fisheries & Oceans
2250 South Boundary Road
Burnaby
British Columbia
V7P 3H8
Canada

CANADA (Cont.)

S.K. Law
Director Southern Operations
Western Region
Department of Fisheries & Oceans
501 University Crescent
Winnipeg, Manitoba
R3T 2N6
Canada

R.E. Mills
Head
Fish and Fish Product Inspection
Department of Fisheries & Oceans
P.O. Box 5667
St. John's, Newfoundland
A1C 5X1
Canada

A. Kenney
Manager
Quality Assurance
National Sea Products Ltd.
P.O. Box 2130
Halifax, Nova Scotia
B3J 3B7
Canada

D. Barbour
Director
Product Assurance
British Columbia Packers Ltd.
Box 5000
Vancouver, British Columbia
V6B 4A8
Canada

F.H. Allen
Chief
Inspection Division
Department of Fisheries & Oceans
P.O. Box 550
Halifax, Nova Scotia
B3J 2S7
Canada

CUBA

M. Blanco
Director de Normalizacion
Ministerio de la Industria Pesquera
Barlovento
Ciudad Habana
Cuba

R. Diaz Garcia
Normalizador
Ministerio de la Industria Pesquera
Barlovento
Ciudad Habana
Cuba

DENMARK
DANEMAR
DINAMARCA

P.F. Jensen
Director
Fish Inspection Service
Fiskeriministeriets Industritilsyn
Dronningens Tvaergade 21
Postbox 2111
DK-1014 Copenhagen K
Denmark

A. Birch
Civ. in.
Fiskeriministeriets Industritilsyn
Dronningens Tvaergade 21
Postbox 2111
DK-1014 Copenhagen K
Denmark

Marjun Hanusardottir
Head of Department
Hygienic Institute
Fisheries and Veterinary Department
3800 Thorshavn
Faroe Islands

M. Prydz
Den Kongelige Grønlandske Handel
Strandgade 100
DK-1004 Copenhagen K
Denmark

J. Sieverts
Civ.ing.
Bornholm Konserverfabrik A/S
Sigurdsgade 37-39
DK-220 Copenhagen N
Denmark

FINLAND
FINLANDE
FINLANDIA

Dr. K. Salminen
Head
Division of Food Hygiene
Ministry of Agriculture and Forestry
Vuorikatu 16
00100 Helsinki 10
Finland

Eeva Eklund
Dr. Head of Biochemical Section
Finnish Customs Laboratory
Tekniikantie 13
02150 Espoo 15
Finland

Dr. M. Kiesvaara
Research Officer
Technical Research Centre of Finland
Food Research Laboratory
Biologinkuja 1
02150 Espoo 15
Finland

P. Valkaisenmäki (M.Sc.)
Kalayhtymä Oy
21200 Raisio
Finland

FRANCE
FRANCIA

H.Y. Carré
Inspecteur Général
Direction de la Consommation et de la
Répression des Fraudes
13, rue St. Georges
75009 Paris
France

Christine Gaillot
Docteur Vétérinaire
Ministère de l'Agriculture
Service Vétérinaire d'Hygiène Alimentaire
Direction de la Qualité
44-46 Boulevard de Grenelle
Cedex 15
74735 Paris
France

GERMANY, Fed. Rep. of
ALLEMAGNE, Rép. féd. d'
ALEMANIA, Rep. Fed. de

H. Hesse
Bundesministerium Für
Landwirtschaft und Forsten
Postfach
D-5300 Bonn 1
Federal Republic of Germany

GERMANY, Fed. Rep. of (Cont.)
ALLEMAGNE, Rép. Féd. d'
ALEMANIA, Rep. Fed. de

Dr. E. Raschke
Ministerialrat
Bundesministerium für Jugend
Familie und Gesundheit
D53 Bonn 2
Federal Republic of Germany

Dr. N. Antonacopoulos
Federal Research
Centre for Fisheries
Palmaille 9
D-2000 Hamburg 50
Federal Republic of Germany

Dr. Ing. H. Kolb
Scint. worker
Fed. Health Office Berlin
Thielallee 88
O-1000 Berlin 33
Federal Republic of Germany

Dr. W. Krane
Adviser
Hinschweg 12
D 2857 Langen Bremerhaven
Federal Republic of Germany

ICELAND
ISLANDE
ISLANDIA

Ossur Kristinsson
Icelandic Freezing Plants Cooperations
Adalstroeti 6
Reykjavik
Iceland

Halldor Thorsteinsson
Chief
Quality Control
Samband of Iceland
Fish Products Division
Sambandshus
Reykjavik
Iceland

Dr. Grimur Thor Valdimarsson
Icelandic Fisheries Laboratories
Reykjavik
Iceland

INDIA
INDE

R. Ganapathy
Chief Technical Officer
Marine Products Export
Developments Authority
Cochin
India

IRELAND
IRELANDE
IRLANDA

M. Dorgan
Divisional Engineer
Department of Fisheries and Forestry
Leeson Lane
Dublin 2
Ireland

ITALY
ITALIE
ITALIA

Dr. L. Vercillo
Dirigente Ministero Industria
Via Vittorio Veneto
Rome
Italy

Dr. L. Lestini
A.I.I.P.A.
Via Paolo di Dono, 3A
Rome
Italy

JAPAN
JAPON

N. Itoh
Deputy Director
Fishery Marketing Division
Fishery Agency, 1-2-1 Kasumigaseki
Chiyodaku
Tokyo
Japan

Y. Minezaki
Technical Adviser
Japan Exporting Frozen Marine
Products Association
New Marunouchi Building 6.F, 1-5-1
Marunouchi, Chiyodaku
Tokyo
Japan

NETHERLANDS
PAYS-BAS
PAISES-BAJOS

D. Tielenius Kruythoff
Ministry of Agriculture and Fisheries
P.O. Box 2500 EK
The Hague
The Netherlands

M.J.M. Alofs
Commission for the Dutch Food and
Agriculture Industry
c/o Unilever N.V.
P.O. Box 760
3000 DK Rotterdam
The Netherlands

NETHERLANDS (Cont.)

PAYS-BAS
PAISES-BAJOS

H. Houwing
Head
Institute for Fishery Products (TNO)
Dokweg 37
1976 CA IJmuiden
The Netherlands

NEW ZEALAND
NOUVELLE ZELANDE
NUEVA ZELANDIA

Dr. J.D. McNab
New Zealand High Commission
New Zealand House
Haymarket
London SW1Y 4TQ
United Kingdom

NORWAY
NORVEGE
NORU

Dr. O.R. Braekkan*
Institute of Nutrition
Directorate of Fisheries
P.O. Box 4285
N-5013 Nygaardstangen
Bergen
Norway

H. Blokhus
Chief Inspector
Directorate of Fisheries
P.O. Box 185
5001 Bergen
Norway

Jan Gjerde
Chief of Section
Directorate of Fisheries
P.O. Box 185
5001 Bergen
Norway

R. Jørgensen
Director
The Official Norwegian Quality Control
Institute for Canned Fish Products
P.O. Box 329
4001 Stavanger
Norway

P. Haram
The Royal Ministry of Fisheries
P.O. Box 8118 Dept.
Oslo 1
Norway

NORWAY (Cont.)

NORVEGE
NORU

V. Knudsen
Counsellor
Ministry of Fisheries
P.O. Box 8118 Dept.
Oslo 1
Norway

Ø. Lie
Production Director
Frionor Norwegian Frozen Fish Ltd.
P.O. Box 3057
Elisenberg
Oslo 2
Norway

J. Race
Superintending Veterinary Officer
P.O. Box 8007 Dept.
Oslo 1
Norway

H. Pedersen
Managing Director
The Norwegian Canner Association
P.O. Box 327
4001 Stavanger
Norway

N. Farstad
Royal Norwegian Embassy
Washington, D.C.
U.S.A.

J. Muri
Director
Norwegian Export Committee for
Fresh Fish
P.O. Box 348
6001 Alesund
Norway

J. Fredriksen
Head of Laboratory
Nestle-Findus A/S
9600 Hammerfest
Norway

P.D. Iversen
Counsellor
Directorate of Fisheries
P.O. Box 185
5001 Bergen
Norway

S. Størkson
Counsellor
Directorate of Fisheries
P.O. Box 185
5001 Bergen
Norway

* Chairman, Président, Presidente.

PHILIPPINES
FILIPINAS

E.E. Floranda
Senior Chemist
Bureau of Fisheries & Aquatic Resources
Ministry of Natural Resources
860 Queson Ave.
Queson City
Philippines

POLAND

J. Zalewski
Chief
Quality and Standardization Laboratory
Sea Fisheries Institute
Aleje Zjednoczenia 1
Gdynia
Poland

K. Multanowski
Senior Executive Officer
Office of Economy Maritime
Hoza 20 Str.
Warsaw
Poland

PORTUGAL

L. Torres
Instituto Portugues de Conservas de Peixe
Avenida 24 de Julho 76
1200 Lisboa
Portugal

Dr. B. Moutinho
Instituto de Qualidade Alimentar
Rua Castilho, 36-3^o
1000 Lisboa
Portugal

SPAIN
ESPAGNE
ESPAÑA

C.B. Quirós
Jefe de la sección de Vigilancia y
Aplicación de las disposiciones de
los acuerdos con la CEE para productos
agropecuarios
Dirección General de Política Commercial
Ministerio de Economía y Hacienda
Despacho 10-21 Castellana 162
Madrid-16
Spain

M.J. Sánchez Mora
Director de Servicios Técnicos del Fondo
de Ordenación y Regulación del
Mercado de Productos de la Pesca y
Cultivos Marinos (From)
c/ Estebanez Calderón, 5-7^a
Madrid
Spain

SPAIN (Cont.)
ESPAGNE
ESPANA

A. Moral Rama
Investigador Científico
Instituto del Frio (CSIC)
Ciudad Universitaria
Madrid 3
Spain

SWEDEN
SUEDE
SUECUA

O. Agren
Head of International Secretariat
National Food Administration
Box 622
S-751 26 Uppsala
Sweden

B. Ahlström
Head of Department
Swedish Government Control of Dairy
Products and Eggs
Box 5062
S-400 25 Göteborg
Sweden

P. Goll-Rasmussen
Head of Laboratory
ABBA AB
Box 2099
S-451 02 Uddevalla
Sweden

SWITZERLAND
SUISSE
SUIZA

P. Rossier
Head of Codex Alimentarius Section
Haslerstrasse 16
CH-3008 Berne
Switzerland

O. Bindschedler
Adviser
Nestec
Case postale 88
CH-1814 La Tour-de-Peilz
Switzerland

Dr. G.F. Schubiger
Adviser
Nestec
Case postale 88
CH-1814 La Tour-de-Peilz
Switzerland

THAILAND
THAILANDE
THAILANDIA

Bung-orn Saisithi
Deputy Director-General
Department of Fisheries
Rajadmnoen Ave.
Bangkok
Thailand

T. Satasuk
Director
Food Control Division
Food and Drug Administration
Ministry of Public Health
Samsaen Road
Bangkok 10200
Thailand

UNITED KINGDOM
ROYAUME-UNI
REINO UNIDO

W.D. Knock
Senior Executive Officer
Ministry of Agriculture, Fisheries
and Food
Great Westminster House
Horseferry Road
London SW1P 2AE
United Kingdom

K. Dale
Principal Scientific Officer
Ministry of Agriculture, Fisheries
and Food
Great Westminster House
Horseferry Road
London SW1P 2AE
United Kingdom

Dr. H.C. Murrell
Medical Officer
Department of Health and
Social Security
Alexander Fleming House
Elephant and Castle
London SE1 6BY
United Kingdom

R. Sawyer
Superintendent Food and Nutrition
Laboratory of the Government Chemist
Cornwall House
Stamford Street
London SE1 9NQ
United Kingdom

M.A. Cockerill
United Kingdom Association of Frozen
Food Producers
c/o Birds Eye Walls Ltd.
South Denes Road
Great Yarmouth
Norfolk
United Kingdom

UNITED STATES OF AMERICA
ETATS-UNIS D'AMERIQUE
ESTADOS UNIDAS DE AMERICA

J.R. Brooker
National Marine Fisheries Service (NOAA)
3300 Whitehaven Street, NW
Washington, D.C. 22180
U.S.A.

R. Creitz
National Standards Coordinator
National Seafood Inspection Program
National Marine Fisheries Service (F/S32)
3300 Whitehaven St., NW
Washington, D.C., 20235
U.S.A.

R.L. Learson
Laboratory Director
Gloucester Laboratory
National Marine Fisheries Service (NOAA)
Emercon Avenue
Gloucester
Massachusetts 01930
U.S.A.

L. Wood
Executive Officer for Codex Alimentarius
U.S. Department of Agriculture
14th and Independence Ave., S.W.
Washington, D.C., 20250
U.S.A.

A. Matthys
Director, Regulatory Affairs
National Food Processors Association
1401 New York Avenue, NW, Suite 400
Washington, D.C., 20005
U.S.A.

K. Iwamoto
Technical Services Manager
The Gordon Group
327 Main St.
Gloucester
Massachusetts 01930
U.S.A.

G. Cox
Chief Executive Officer
Cox and Cox Investments
12006 Uth Lane
Silver Spring
Maryland 20902
U.S.A.

Dr. F. King
National Marine Fisheries Service
Gloucester Laboratory
Emerson Avenue
Gloucester
Massachusetts
U.S.A.

URUGUAY

Dr. E. Morales
Director
Division Industrias Pesqueras
Instituto Nacional de Pesca
Constituyentes 1497
Montevideo
Uruguay

OBSERVER COUNTRIES
PAYS OBSERVATEURS
PAISES OBSERVADORES

SOUTH AFRICA
AFRIQUE DU SUD
SUDAFRICA

S.P. Malherbe
Director
Biological Sciences Department
South African Bureau of Standards
Private Bag X191
Pretoria
Rep. of South Africa

J.P. du Plessis
Head
Foods Standards and Inspection
South African Bureau of Standards
P/Bag X191
Pretoria
South Africa

T.C. Bennett
Group Produce Development Manager
Irvin & Johnson Ltd.
P.O. Box 1628
Cape Town
South Africa

M.J. McGregor
Development Manager
Sea Harvest Corporation
P.O. Box 52
Saldanha 7395
South Africa

INTERNATIONAL ORGANIZATIONS
ORGANISATIONS INTERNATIONALES
ORGANIZACIONES INTERNACIONALES

A.I.P.C.E.E.

Dr. W. Krane
Observer
Hinschweg 12
D 2857 Langen Bremerhaven
Fed. Rep. of Germany

INTERNATIONAL ORGANIZATIONS (Cont.)
ORGANISATIONS INTERNATIONALES
ORGANIZACIONES INTERNACIONALES

A.O.A.C.

R.L. Learson
Observer
Gloucester Laboratory
National Marine Fisheries Service (NOAA)
Emerson Avenue
Gloucester
Massachusetts 09130
U.S.A.

SECRETARIAT
SECRETARIA

FAO

J.M. Hutchinson
Food Standards Officer
Joint FAO/WHO Food Standards Programme
FAO
Via delle Terme di Caracalla
00100 Rome, Italy

Dr. N.Rao Maturu
Food Standards Officer
Joint FAO/WHO Food Standards Programme
FAO
Via delle Terme di Caracalla
00100 Rome, Italy

Z.S. Karnicki
Fishery Industry Officer
Fishery Industries Division
FAO
Via delle Terme di Caracalla
00100 Rome, Italy

WHO

Dr. A. Koulikovskii
Food Hygienist
Veterinary Public Health
Division of Communicable Diseases
World Health Organization
1211 Geneva 27
Switzerland

PROPOSED REVISION
CODEX STANDARD FOR CANNED PACIFIC SALMON

(CAC/RS - 3-1969, Rev. 1)

(at Step 8)

1. SCOPE

This Standard applies to Canned Pacific Salmon in its own juice with or without added salmon oil. It does not apply to speciality products where salmon constitutes only a portion of the edible contents.

2. DESCRIPTION

2.1 Product Definition

Canned Pacific Salmon is the product:

- prepared from the following species:

Oncorhynchus nerka
Oncorhynchus kisutch
Oncorhynchus tshawytscha
Oncorhynchus gorbuscha
Oncorhynchus keta
Oncorhynchus masou

- packed in hermetically sealed containers; and

- processed by heat so as to prevent spoilage and to soften bones.

2.2 Presentation

The product shall be presented in one of the following styles and forms of pack.

2.2.1 Style of Pack

2.2.1.1 Regular Style consists of canned salmon to which salt has been added.

2.2.1.2 No added Salt consists of canned salmon to which no salt has been added.

2.2. Forms of Pack

2.2.2.1 Regular Pack - sections which are cut transversely from the fish and which are filled vertically into the can. The sections shall be packed so that the cut surfaces are approximately parallel with the ends of the container.

2.2.2.2 Skinless and Boned Salmon - regular pack canned salmon from which the skin and vertebrae have been substantially removed.

2.2.2.3 Minced Salmon - grated, shredded or minced salmon which has been comminuted minced, and not having the consistency of a paste.

2.2.2.4 Salmon Tips or Tidbits - irregular bite size portions (bits)

2.2.3 Other Presentations

Any other presentation shall be permitted provided that it:

(1) is sufficiently distinctive from other forms of presentation laid down in this Standard;

- (ii) meets all the other requirements of this Standard; and
- (iii) is adequately described on the label to avoid confusing or misleading the consumer.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

The product shall be prepared from clean, wholesome and sound fish belonging to one of the species listed under Sub-section 2.1 and may be fresh or frozen and shall be of a quality suitable for human consumption.

3.2 Optional Ingredients

3.2.1 Salt

3.2.2 Oil - edible salmon oil comparable in colour, viscosity and flavour to the oil which would naturally occur in the product.

3.3 Processing

- The fish shall have heads (including gills), tails, fins, loose scales, viscera, including eggs, milt and blood removed; damaged or discoloured flesh associated with bruises or small wounds shall be cut away.
- The fish shall be well washed; the body cavity thoroughly cleaned to remove blood and viscera.
- The fish shall be well packed in accordance with the form of pack desired, in clean containers which are free from dents, rust or defective seams.
- The containers shall be sealed under vacuum and shall be heat processed and cooled.

3.4 Final Product

3.4.1 Appearance

- (i) The can shall be well filled with fish.
- (ii) The product in a can shall comprise fish of an appearance and colour characteristic of the species processed and packed in the manner indicated in Sub-section 2.2.2.
- (iii) The oil and liquid released during processing shall be normal and characteristic of the species packed.
- (iv) The product shall be practically free from bruises, blood spots, honeycombing, abnormal colours or viscera and reasonably free from pieces of loose skin and scales.
- (v) In the case of regular packs, the sections of fish shall be arranged so that the cut surfaces are approximately parallel to the opened end and the skin side parallel to the walls of the can. Regular packs shall be reasonably free from cross packs and pieces or sections of vertebrae across the top of the can.

3.4.2 Odour and Flavour

The product shall have an odour and flavour characteristic of the species and be free from objectionable odours and flavours of any kind.

3.4.3 Texture

The fish shall have a texture characteristic of the species.

3.4.4 Bones

Bones when present shall be soft (see also Sub-section 2.2.2.2).

3.4.5 Foreign Matter

The product shall be free from foreign material.

3.5 Defects and Tolerance

A can which does not comply with the definition and quality factors as set forth in this Standard subject to the tolerance allowances as defined in Annex A shall be considered defective.

4. HYGIENE

4.1 To the extent possible in good manufacturing practice the product shall be free from objectionable matter.

4.2 When tested by appropriate methods of sampling and examination, the product:

- (a) shall be free from micro-organisms capable of development under normal conditions of storage; and
- (b) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.

4.3 Products with an equilibrium pH above 4.6 shall have received a processing treatment sufficient to destroy all spores of Clostridium botulinum.

4.4 In order to achieve the above requirements, it is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the following Codes:

- (i) the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1);
- (ii) the Recommended International Code of Practice for Canned Fish (CAC/RCP 10-1976); and
- (iii) the Draft Code of Hygienic Practice for Low Acid Anned Foods.

5. LABELLING

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Pre-packaged Foods (Ref. No. CAC/RS 1-1969) the following specific provisions apply /subject to endorsement by the Codex Committee on Food Labelling/.

5.1 The Name of the Food

5.1.1. The name of the product as declared on the label shall be the designation appropriate to the species of the fish packed as shown below:

<u>Species</u>	<u>Designation</u>
Oncorhynchus nerka	Sockeye Salmon or Red Salmon
Oncorhynchus kisutch	Coho Salmon, Silver Salmon or Medium Red Salmon

Oncorhynchus tshawytscha	Spring Salmon, King Salmon or Chinook Salmon
Oncorhynchus gorbusha	Pink Salmon
Oncorhynchus keta	Chum Salmon or Keta Salmon
Oncorhynchus masou	Cherry Salmon

5.1.2 The style and form of pack shall be declared in accordance with Sub-sections 2.2.1 and 2.2.2 with the exception of Regular Style 2.2.1.1 and Regular 2.2.2.1 which need not be declared.

5.1.3 If the product is produced in accordance with Sub-section 2.2.3, the label shall contain in close proximity to the name of the product such additional words or phrases that will avoid misleading or confusing the consumer.

5.2 List of Ingredients

A complete list of ingredients shall be declared on the label in descending order of proportion; Sub-sections 3.2(b) and (c) of the Recommended International General Standard for Labelling of Pre-packaged Foods (CODEX STAN 1-1981) are applicable.

5.3 Net Contents

The total net contents shall be declared by weight in either the metric system ("Systeme international" units) or avoirdupois or both systems of measurement as required by the country in which the product is sold.

5.4 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the product shall be declared.

5.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

5.6 Lot Identification

Each container shall be embossed or otherwise permanently marked in code or in clear to identify the producing factory and the lot.

6. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis described hereunder are international reference methods.

6.1 Sampling for Destructive Examination

Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Pre-packaged Foods (AQL-6.5) (CAC/RM 42-1969).

6.1.1 Organoleptic Assessment

Organoleptic assessment of the product shall be made only by persons trained in such assessment.

6.2 Determination of Net Contents

Net content shall be determined by averaging the results from all containers of sample representing a lot.

Procedure

- (1) Weigh the unopened container.
- (2) Open the container and remove the contents, wash the container, cover and dry with absorbant paper or cloth.
- (3) Weigh the empty container, including the top.
- (4) Subtract the mass of the empty container from the mass of the unopened container. The resultant figure shall be considered to be the net content.

7. CLASSIFICATION OF DEFECTIVES

A container which fails to meet the end-product requirements specified in Sub-section 3.5 shall be considered a "defective".

8. LOT ACCEPTANCE

A lot will be considered as meeting the requirements for essential composition and quality factors and net contents of this Standard when the total number of "defectives" does not exceed the acceptance number (c) of the appropriate sampling plan (AQL-6.5) in the FAO/WHO Codex Alimentarius Sampling Plans for Pre-packaged Foods (CAC/RM 42-1969) and when the average net contents of all containers examined is not less than the declared net contents, provided there is no unreasonable shortage in any individual container.

ANNEX A

DEFECT TABLE FOR CANNED PACIFIC SALMON

A. Appearance

Crossfile	1
Ragged appearance	1

B. Hard Bone

Defective

C. Odour or Flavour

Distinctly objectionable odour or flavour	Defective
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D. Colour of Flesh

Mixed colours in a single can	1
Abnormal pale colour for the species	1
Belly burn	2

E. Discolouration of Skin

Slight to moderate water marks	1
Extensive water marks	2

F. Workmanship

Parts of heads or tails or fins, each instance	1
Loose skin, each complete 5 cm	1
Scales, each 5 to 10 loose scales	1
Each additional 5 scales	1
Parts of viscera, each instance	2

G. Texture

Mushy fish flesh or physical disintegration	Defective
Soft fish flesh	1
Honeycomblike flesh	2
H. <u>Bruising and Blood Spots</u>	
Affecting up to 10% by weight of the contents	1
Affecting 10% or more by weight of the contents	2
I. <u>Foreign Material</u>	
	Defective
J. <u>Mixed Species</u>	
Mixed species in a single can	Defective

Defective Unit - A sample unit is considered defective if the demerit points total 10 or more.

ALINORM 85/18
APPENDIX III

PROPOSED DRAFT STANDARD FOR QUICK FROZEN BLOCKS OF FISH FILLET, MINCED FISH FLESH AND MIXTURES OF FILLETS AND MINCED FISH FLESH
(at Step 3)

1. SCOPE

This Standard shall apply to quick frozen blocks of cohering fish flesh, prepared from fillets or minced fish flesh or a mixture of fillets and minced fish flesh which are intended for further processing.

2 DESCRIPTION

2.1 Product Definition

- (a) Quick frozen blocks are rectangular or other uniformly shaped masses of cohering fish fillets, pieces of such fillets, minced fish or a mixture thereof comprising:
 - (i) a single species; or
 - (ii) a mixture of species.
- (b) Fillets are slices of fish of irregular size and shape which are removed from the carcass by cuts made parallel to the back bone and pieces of such fillets.
- (c) Minced fish flesh used in the manufacture of blocks are particles of skeletal muscle which have been separated from and are essentially free from bones and skin.

2.2 Process Definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete until the product temperature has reached a level which will ensure that the temperature at the thermal centre will not be higher than -18 C after thermal stabilisation. The product shall be maintained under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. The recognized practice of further processing of intermediate quick frozen material under controlled conditions followed by the reapplication of the quick freezing process is permitted.

2.3 Presentation

- (a) Fillets:
 - (i) skin on;
 - (ii) skinless; and
 - (iii) skinless and boneless, boned or pin bones present.
- (b) Fillets and minced fish fles.
- (c) Minced fish flesh.
- (d) Other presentations.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

Quick frozen blocks shall be prepared from well drained fillets or minced flesh of sound fish which are of a quality fit to be sold fresh for human consumption.

3.2 Optional Ingredients

Sodium chloride may be present at a level not exceeding 1.0% m/m.

3.3 Final Product

3.3.1 Blocks shall be reasonably regular in shape and weight and have a uniform colour characteristic of the species. They shall be free from:

- Foreign matter
- viscera

and, subject to the tolerances, free from:

- Fins or parts of fins
- Discoloured flesh
- Bruises
- Blood clots
- Membrane (belly lining)
- Parasites
- Scales

and where appropriate, subject to the tolerance, free from:

- skin and bones (see Annexes B, C and D).

3.3.2 The blocks shall be free from deep dehydration conditions which masks the normal colour, cannot be easily removed by scraping, and cover more than 5% of the surface area of a block.

3.3.3 After cooking by steaming, baking or boiling as set out in Annex A, the product:

- (a) shall have a flavour and odour characteristic of the species or mixture of species and be free from any objectionable flavour and odour; and
- (b) shall have a texture characteristic of the species or mixture of species packed and shall not be spongy or rubbery or mashy or gelatinous or tough or gritty (see Annexes, B, C and D).

4.	<u>FOOD ADDITIVES</u>		<u>Maximum level in the final product</u>
4.1	<u>Water-binding Agents</u>		
4.1.1	Monophosphate, monosodium or monopotassium (Na or K pyrophosphate))))	
4.1.2	Diphosphate, tetrasodium or tetrapotassium (Na or K pyrophosphate)	) ) )	5 g/kg expressed as
4.1.3	Triphosphate, pentasodium or pentapotassium or calcium (Na, K or Ca tripolyphosphate)	) ) )	P ₂ O ₅ , singly or combination.
4.1.4	Polyphosphate, sodium (Na hexametaphosphate)))	
4.1.5	Sodium alginate	)	5 g/kg
4.2	<u>Antioxidant</u>		
4.2.1	Ascorbic acid or its sodium or potassium salt	) )	1 g/kg expressed as ascorbic acid.
4.2.2	Propyl gallate, octyl gallate and dodecylgallate	) )	100 mg/kg singly or in combination.
	<u>In addition, for Minced Fish Flesh only:</u>		
4.3	<u>Antioxidants</u>		
4.3.1	Citric acid and Na or K salts	)	1 g/kg
4.4	<u>Thickening Agents</u>		
4.4.1	Guar gum))	
4.4.2	Carob bean (locust bean) gum	) )	5 g/kg singly or
4.4.3	Pectin))	
4.4.4	Carboxymethyl cellulose, sodium salt	) )	in combination
4.4.5	Xanthan gum))	
4.4.6	Carrageenan))	
4.4.7	Methyl Cellulose)	
5.	<u>HYGIENE AND HANDLING</u>		
5.1	To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.		
5.2	When tested by appropriate methods of sampling and examination, the product:		
	(a)	shall be free from micro-organisms in amounts which may represent a hazard to health;	
	(b)	shall be free from parasites which may represent a hazard to health; and	
	(c)	shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.	
5.3	It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the <u>Recommended International Code of</u>		

Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1) and the Recommended Code of Practice for Frozen Fish (CAC/FFP 79/4, Rev. 1) being developed.

6. LABELLING

The information required in 6.1-6.6 may be supplied by the name of the food and code identification and given only in related documents provided that such a code is clearly identifiable with the related documents.

6.1 Name of the Food

6.1.1 The name of the food shall be declared as "x y blocks" in accordance with the law custom or practice of the country in which the product is distributed, "y" shall represent the common name of the species or species packed and "x" shall represent the form of presentation of the block (filleted, minced, filleted plus minced). Where more than one species is used in a block, the name of the species shall appear in close proximity to the name of the food.

6.1.2 Blocks prepared from skinless and/or boneless fillets may be designated as such.

6.1.3 Blocks prepared from "skin-on" fillets shall be designated on the /freight container/. "skin-on" and may be designated as boneless when boning is completed.

6.1.4 In addition, the labelling shall show the term "frozen", or "quick frozen" whichever is customarily used in the country in which the product is distributed, to describe a product subjected to the freezing process described in Sub-section 2.2.

6.1.5 For products referred to in 2.3(b), the labelling shall show the proportion of minced fish incorporated in the block expressed as x% + 5%.

6.2 List of Ingredients

6.2.1 A complete list of ingredients shall be declared in order of proportion.

6.3 Net Contents

6.3.1 The net content shall be declared by weight in metric system ("Système international" units) or avoirdupois or both systems as required by the country in which the food is distributed

6.3.2 Where products have been glazed the declaration of the net contents of the product shall be exclusive of the glaze.

6.4 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

6.5 Country of Origin

6.5.1 The country of origin shall be declared if its omission would mislead or deceive the consumer.

6.5.2 When a food undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

6.6 Lot Identification

Each /container/ shall be permanently marked in code or in clear to identify the producing factory and the lot.

6.7 Storage Instructions

The /containers/ shall bear clear directions for storage.

7. METHODS OF SAMPLING, EXAMINATION AND ANALYSIS

The methods of sampling, examination and analysis described hereunder are international reference methods.

7.1 Sampling

Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Pre-packaged Foods (AQL 6.5 - CAC/RM 42-1969).

7.2 Organoleptic and Physical Examination

Samples taken for organoleptic and physical examination shall be assessed by persons trained in such examination.

7.2.1 Weight

The net weight (exclusive of packing material or protective coating) of each sample block shall be determined in the frozen state.

7.3 Quantities for Physical and Organoleptic Examination

The amount of material to be used for physical and organoleptic examination shall be as follows:

- (i) whole block - Frozen state
 - net weight
 - dehydration
 - irregularity
 - glaze;
- (ii) whole block - Thawed state
 - % mince
 - physical defects
 - sensory - raw odour; and
- (iii) 250 grams - Cooked state
 - odour
 - flavour
 - texture.

7.4 Determination of Net-content of Products covered by Glaze

(Method to be developed).

7.5 Determination of Proportions of Fillet and Minced Fish and Quick Frozen Blocks prepared from Mixtures of Fillets and Minced Fish

(Method to be developed).

8. CLASSIFICATION OF DEFECTIVES

A block which fails to meet the requirements of Sub-section 3.3.1 or 3.3.2, 3.3.3 or 3.3.4 shall be considered "defective".

9. LOT ACCEPTANCE

(i) Quality

A lot will be considered as meeting the Final Product requirements of this Standard when the total number of "defectives" in a sample does not exceed the acceptance number specified in the sampling plan.

(ii) Net contents

A lot will be considered as meeting the weight requirement when the average net content of all containers examined is not less than the declared weight provided there is no unreasonable shortage in individual containers.

ANNEX 'A'

COOKING METHODS

Following procedures are based on heating product to internal temperature \geq 70 C (160 F). Cooking times vary according to size of product and equipment used. If determining cooking time, cook extra sample using temperature measuring device to determine internal temperature.

Cut 3 portions, each about 10 x 7.5 x 1.2 cm (4 x 3 x 0.5 in.) for sample.

- (a) Baking Procedure: Wrap product in aluminium foil and distribute evenly on flat cookie sheet or shallow flat pan. Heat in ventilated oven, preheated to 204 C (400 F), until internal temperature of product reaches \geq 70 C (160 F).
- (b) Steaming Procedure: Wrap product in aluminium foil and place on wire rack suspended over boiling water in covered container. Heat until internal temperature of product reaches \geq 70 C (160 F).
- (c) Boiling in Bag: Place the product into a boilable film-type pouch and seal. Immerse the pouch and its contents into boiling water and cook until the internal temperature of the product reaches \geq 70 C (160 F).

ANNEX B

DEFINITION OF DEFECTS IN QUICK FROZEN BLOCKS OF FISH FILLETS
AND BLOCKS OF MIXTURES OF FILLET AND MINCED FISH FLESH

Block Irregularity

Deviations from dimensions (e.g. length, width and thickness of a block/portion), non-uniformity of shape, poor angles, ragged edges, voids, ice pockets, air pockets or other damage, which would result in product loss.

Dehydration (freezerburn)

(i) Deep dehydration:

An excessive loss of moisture from the surface of the sample unit which shows clearly on the surface of the product, penetrates below the surface and cannot be easily removed by scraping.

(ii) Moderate dehydration:

A loss of moisture from the surface of the sample unit which is colour masking, but does not penetrate the surface and can be easily removed by scraping.

Skin

Does not include subcutaneous layer (silver lining).

Black Membrane or Belly Lining

Does not include white membrane.

Scales

Means readily noticeable loose scales. Scales which are not easily detectable by virtue of their size or soft texture and which do not impair the organoleptic properties are disregarded.

Colour Defects

(i) Fillet Blocks:

Blood clots (spots) - any mass or lump of clotted blood.

Discolouration - appears as significantly intense discolouration due to melanin deposits, bile stains, liver stains or other causes.

Bruises - diffused blood causing distinct reddish, brownish or greyish off colouration.

(ii) Minced Part of Fillet Mince:

The colour of the mince shall be characteristic of the species used and shall not contain any readily noticeable discolouration, spots or particles, derived from skin, membrane (black or white), blood clots, blood spots, spinal cord or viscera.

Bones (including pin bones and single pin bones)

Bone Defect (Applies to Styles 1, 2 and 3)

A bone is regarded as a defect if its length is \gg 10 mm or its diameter is \gg 1 mm; a bone \gg 5 mm in length is not to be considered as a defect if its diameter does not exceed 2 mm. The foot of a bone (where it has been attached to the vertebr) shall be disregarded if its width is less than 2 mm or if it can be easily stripped off by a finger nail.

Critical Degree of Bone Defect (Applies to Styles 2 and 3)

Each bone defect whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40,0 mm and a width of 10,0 mm (400 square mm). Does not include pin bones of any size in Style 3.

Fins or Part Fins

(i) Fillet Blocks

Two or more bones connected by membrane, including internal or external bones, or both, in a cluster.

(ii) Minced Part/Mince Blocks

Not applicable - shows as bone or membrane or both.

Viscera

Any portion of the internal organs.

Parasites

Parasites or parasitic infestation detected by the candling procedure or any other physical means.

Each parasite with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.

Each parasitic infestation may be recognized by its colour, its effect on softening the fish flesh or by other indications.

Foreign Matter

- (i) Any material not derived from fish or not permitted by the standard other than packaging.
- (ii) Packaging material.

Odour and Flavour

Any odour, in cooked or thawed state, which is distinctly objectionable.

Texture

Any texture which either in the thawed state or after cooking is significantly different to the characteristic of the species, e.g., is mushy, soft, gelatinous tough or gritty.

ANNEX C

DEFECTS TABLE FOR QUICK FROZEN BLOCKS OF FISH FILLETS AND BLOCKS OF MIXTURES OF FILLETS AND MINCED FISH FLESH

<u>Defect Description</u>	<u>Demerit Points</u>
<u>FROZEN STATE (Sample Unit = Entire Block)</u>	
1. <u>Block Irregularity</u>	
(a) Deviation from declared (nominal) dimensions:	
Width, length and thickness.	
(i) Over 5.0 mm in any dimension	Defective
(ii) Over 3.0 mm and up to and including 5.0 mm in any direction	8
Edges (formed by two surfaces)	
(i) A gap greater than 10.0 mm between the actual and true edge	Defective
(ii) A gap greater than 5.0 mm and up to and including 10.0 mm between the actual and true edge	4
Angles (formed by three surfaces)	
(i) A gap greater than 10.0 mm between the actual and true corner measured at the apex of the corner	Defective
(ii) A gap greater than 5.0 mm and up to and including 10.0 mm between the actual and true corner measured at the apex of the corner	4

- (b) Ice Pockets
 - (i) Each pocket with a surface area greater than 10 cm and up to and including 20 cm 4
 - (ii) Each additional complete area of 10 cm or part thereof 2
- (c) Air Pockets
 - (i) Each pocket with a surface area greater than 2 cm up to and including 5 cm and with a depth greater than 3 mm 4
 - (ii) Each additional complete area of 5 cm or part thereof or if the depth is greater than 10 mm 2

2. Dehydration

(a) Deep dehydration

An excessive loss of moisture from the surface of the sample unit which shows clearly on the surface of the product, penetrates below the surface and cannot be easily removed by scraping.

- (i) Over 10% of the surface area
 - or
 - (a) ≤ 200 g units ≥ 25 cm Defective
 - (b) 201-500 g units ≥ 50 cm
 - (c) 501-5000 g units ≥ 150 cm
 - (d) > 5000 g units ≥ 300 cm
- (ii) Over 1% and up to and including 10% of surface area
 - or
 - (a) ≤ 200 g units 2.5 - 25 cm 4
 - (b) 201-500 g units 5.0 - 50 cm
 - (c) 501-5000 g units 15.0 - 150 cm
 - (d) > 5000 g units 30.0 - 300 cm

(b) Moderate Dehydration

A loss of moisture from the surface of the sample unit which is colour masking, but does not penetrate the surface and can easily be removed by scraping.

- (i) Over 10% of surface area
 - or
 - (a) $\leq \frac{1}{2}$ 200 g units ≥ 25 cm 2
 - (b) 201- 500 g units ≥ 50 cm
 - (c) 501-5000 g units ≥ 150 cm
 - (d) > 5000 g units ≥ 300 cm

THAWED STATE (Sample Unit = Entire Block)

3. Skin and Membrane

(a) Skinless Fillet

- (i) Each piece of skin and or membrane, greater than 3 cm and up to and including 10 cm . 4
- (ii) Each additional complete area of 5 cm or part thereof 2

(b) Skin-on Fillets

- (i) Each piece of black membrane greater than 2 cm and up to and including 10 cm . 4

	(ii) Each additional complete area of 5 cm or part thereof	2
4.	<u>Scales</u>	
	(a) Skin-on Fillets - scaled	
	(i) Each area of scales greater than 3 cm and up to and including 10 cm .	2
	(ii) Each additional complete area of 5 cm or part thereof	2
	(b) Skinless Fillets	
	(i) First 5 to 10 (in the case of hake fillets 10 to 20) readily noticeable loose scales	2
	(ii) If more than 10 (for hake 20) loose scales each additional complete unit of 5 (for hake 10) readily noticeable loose scales or part thereof	2
5.	<u>Blood Clots and Discolouration (including bruising)</u>	
	(a) Each clot greater than 5 mm in diameter or 0.2 cm	2
	(b) (i) Any aggregate area of discolouration or bruising exceeding 3 cm and up to and including 5 cm	2
	(ii) Each additional complete area or 5 cm or part thereof	2
	(c) Mince component of mixed block	
	(i) Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species	Defective
	(ii) Readily noticeable deviation from the colour of the fillet	2
6.	<u>Bone, Fin and Part Fin</u>	
	(a) Style 1 fillet block	
	Any defect bone	Defective
	(b) Style 2 fillet block	
	(i) Each bone defect	2
	(ii) Each critical bone	Defective
	(c) Style 3 fillet block	
	(i) Each bone defect excluding pin bones	2
	(ii) Each critical bone excluding pin bones	Defective
7.	<u>Viscera</u>	
	Each instance	8
8.	<u>Parasites</u>	
	(a) Each parasite as defined	4

	(b) Parasitic infestation - each fillet affected	8
9.	<u>Foreign Matter</u>	
	(a) Each instance of foreign matter other than packaging material	Defective
	(b) Each instance of packaging material	2
10.	<u>Odour (raw)</u>	
	Distinctly objectionable	Defective
11.	<u>Texture (raw)</u>	
	Distinctly objectionable	Defective
<u>COOKED STATE (Use Sub-sample of at least 500 g or 1 lb)</u>		
12.	<u>Odour or Flavour</u>	
	Distinctly objectionable	Defective
13.	<u>Texture</u>	
	Texture which after cooking is significantly different to that characteristic of the species, e.g., is mushy, soft, gelatinous, tough or gritty	Defective

Maximum Allowable Tolerance for Defects

The total number of demerit points is to be calculated on 1-kilogram-basis and recorded to the nearest whole number except where the points are derived from examination of the frozen block. Total points derived from examination of the frozen block shall be added to the total derived from examination of the thawed and cooked state calculated on a 1 kg basis. A sample unit is considered defective if the total number of demerit points exceeds 20 for species of the family Gadidae (cod, haddock and hake) and 32 for species of the family Scorpaenidae (red fish) or the order Pleuronectiformes.

ANNEX D

DEFECT TABLE FOR QUICK FROZEN BLOCKS OF MINCED FISH FLESH

Defect Description

FROZEN STATE (Sample Unit = entire block)

1.	<u>Block Irregularity</u>	As per Annex D.
2.	<u>Dehydration</u>	As per Annex D.
3.	<u>Discolouration, blood clots, skin membrane, scale, viscera, spinal cord</u>	
	(a) 10 - 25 instances	2
	(b) Over 25 each additional 15 instances or part thereof	2
	(c) Overall colouration	
	(i) Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species	Defective

(ii) Readily noticeable deviation from the colour of the species

2

THAWED STATE (Sample Unit = entire block)

- | | | |
|----|--|-----------|
| 4. | <u>Bone</u> | |
| | (a) Style 1 only | |
| | Any bone | Defective |
| | (b) Style 2 only | |
| | Each bone defect | 2 |
| | Each critical bone | Defective |
| | (Bone material in amounts exceeding 0.2% calculated as calcium). | |
| 5. | <u>Parasites</u> - each instance | 4 |
| 6. | <u>Foreign Matter</u> | |
| | (a) Other than packaging material - each instance | Defective |
| | (b) Packaging material - each instance | 2 |
| 7. | <u>Odour</u> (raw) - distinctly objectionable | Defective |
| 8. | <u>Texture</u> (raw) - distinctly objectionable | Defective |

COOKED STATE (Sub-sample at least 500 g)

- | | | |
|-----|--|-----------|
| 9. | <u>Odour and Flavour</u> - distinctly objectionable | Defective |
| 10. | <u>Texture</u> - distinctly objectionable, e.g., the flesh is definitely spongy, gelatinous, rubbery, crumbly, tough or gritty | Defective |

Maximum Allowable Tolerance for Defects

Demerit point totals calculated on a kg basis should be recorded to the nearest whole number.

A sample unit is considered defective if the demerit points total more than 20.

ANNEX E

DETERMINATION OF PROPORTIONS OF FILLETS AND MINCED FLESH IN

QUICK FROZEN BLOCKS

(Method proposed by F.R. collaboratively studied by West European Fish Technologists Association (WEFTA)).

Pre-weigh the sample in quick frozen condition, after stripping the coating if present. Transfer it (e.g., a portion of 100 g or 5 fish stick cores of 20 g each) in a suitable sized watertight plastic bag. Thawing is carried out by immersing into a gently agitated water bath of ca 20 C (max. 25 C). Needed time: 10-30 min., depending on surface respective to size of sample.

After draining the exuded fluid 2 min., using a pre-weighed circular sieve, the weight of the flesh is recorded. The separation of the mince is carried out on a plate by means of a soft plastic spatula. The weights of the fillet and mince parts are

recorded. The fluid is allocated to the two parts proportionally. This procedure seems practicable because the N-content of the fluid normally decreases the fish-N not more than 15% (e.g., in a fillet block with 25% mince N = 1.07: 1.26).

Determination of Proportions of Fillets and Minced Fish in Mixed Fillet - Minced Fish Blocks

(Modified Norwegian Procedures - Revision No. 4)

The sample size is an entire fish block. Thaw the sample on a pre-weighed tray in air at ambient (room) temperature. (Generally, this takes overnight). After the block has been thawed completely, it should not be held for more than eight (8) hours before examination.

Drain the exuded fluid (thaw, drip). Determine the weight of the drained flesh (weight = A) using a scale of adequate capacity with a sensitivity of 25 ounces (7 grams).

Immerse the drained flesh in a tub of cold tap water (50-70 F). Use a ratio of 2 to 3 parts water to 1 part fish by weight. Separate the fillets by hand and wash the minced fish flesh from the fillets in the tub. Place the washed fillets on the upper section of a pre-weighed tray with 3-8/mm holes covering the entire bottom of the tray. Incline the tray at an angle of 20-40 to facilitate draining. Pour the water from the tub containing the minced fish and small pieces of fillets through a U.S. No. 8 sieve. Remove the fillet pieces from the sieve and place them on the drain tray with the fillets. Allow the fillets and pieces to drain for 15 minutes. Remove any excess wash water from the lower section of the tray, then weigh the drained fillets (weight = B) using a scale of adequate capacity with a sensitivity of 25 ounces (7 grams).

The proportion (percentage) of minced fish (M) and fillets (F) is calculated as follows:

$$M = \frac{A - B}{A} \times 100$$

$$F = \frac{B}{A} \times 100$$

ANNEX F

EXAMPLE ALTERNATIVE SAMPLING PLANS

for:
(40,000 Lot of 2,424 blocks x 16.5 pounds)

n = Sample size

c = Acceptance number

AQL = Acceptable quality level (producers risk = 5%)

RQL = Rejectable quality level (consumers risk = 10%)

p = Probability in percent

L(p) = Probability in percent of accepting a lot having p percent defective (operating characteristic curve).

Codex Sampling Plan for Pre-packaged Products

Alternative Plan A

Alternative Plan B

n = 29

n = 12

n = 16

c = 4
AQL = 7.0%
RQL = 26%

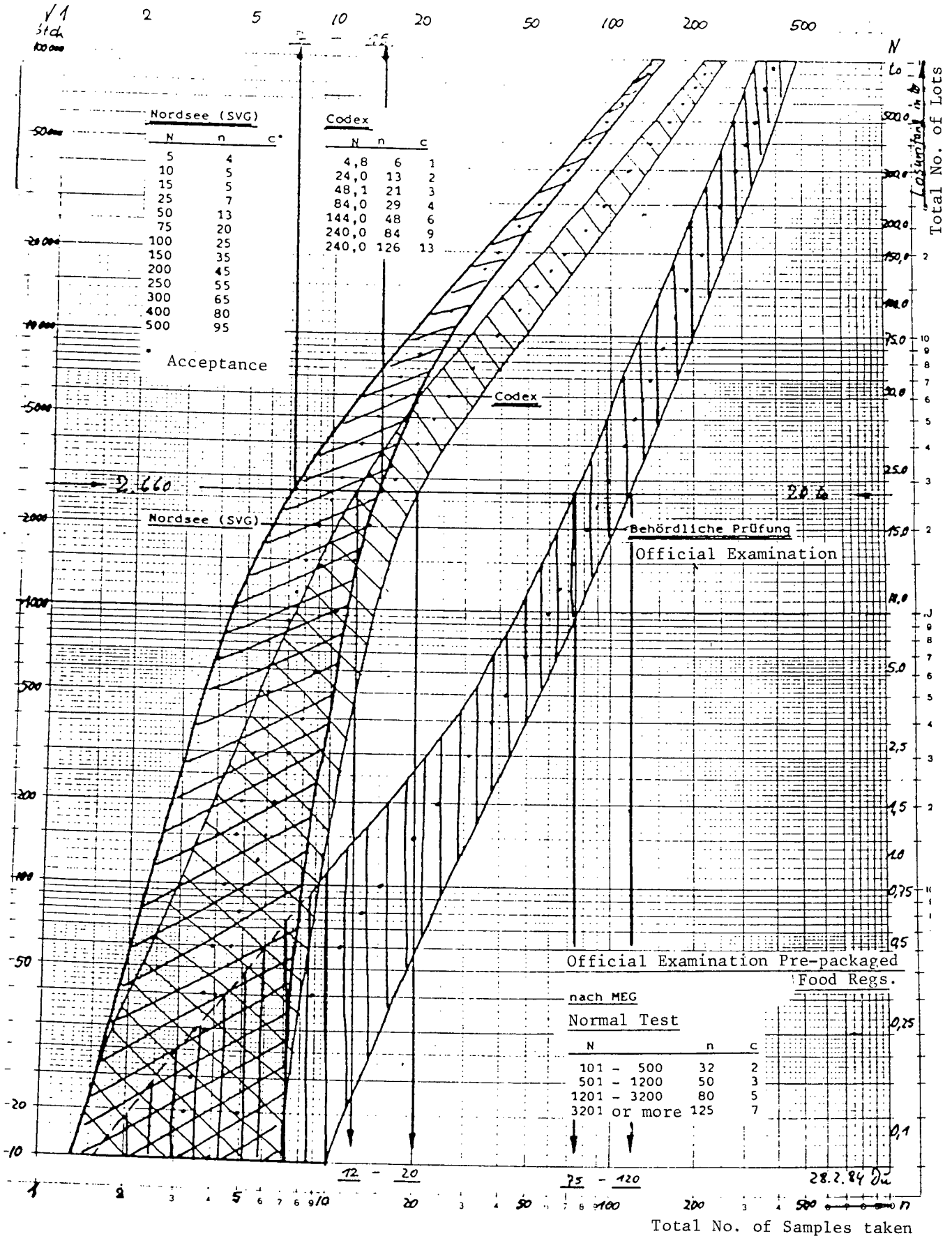
c = 1
AQL = 3%
RQL = 29%

c = 2
AQL = 5.3%
RQL = 30%

<u>P</u>	<u>L(p)</u>	<u>L(p)</u>	<u>L(p)</u>
5	99	88	95
10	84	66	79
20	28	27	35
30	4	8	10
40	-	2	2
50	-	-	-

- - - -

Sampling Plans for Quick Frozen Products
(Submitted by the Federal Republic of Germany)



Total No. of Samples taken

PROPOSED DRAFT STANDARD FOR QUICK FROZEN FISH STICKS
(FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

Returned to Step 3

1. SCOPE

This standard applies to quick frozen fish sticks (fish fingers) and fish portions cut from quick frozen fish flesh blocks or formed from fish flesh with breaded or batter coatings, singly or in combination, raw or partially cooked and offered for direct human consumption without further processing. This standard does not apply to natural fish fillets with breaded or batter coatings.

2. DESCRIPTION

2.1 Product Definition

2.1.1 A fish stick (fish finger) is the product including the coating weighing not less than 20 g (0.7 oz.) and not more than 50 g (1.8 oz.) shaped so that the length is not less than three times the greatest width. Each stick shall be not less than 10 mm thick.

2.1.2 A fish portion including the coating, other than products under 2.1.1, may be of any shape and size excluding fish sticks (fish fingers).

2.2 Process Definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete until the product temperature has reached a level which will ensure that the temperature at the thermal center will not be higher than -18°C after thermal stabilization. The product shall be maintained under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. (See also CX/FFP 79/8. Code of Practice for Frozen Battered and/or Breaded Fishery Products). The recognized practice of further processing of intermediate quick frozen material under controlled conditions followed by the re-application of the quick freezing process is permitted.

2.3 Presentation

- (i) Raw breaded fish sticks (fingers)
- (ii) Raw breaded fish portions
- (iii) Partially cooked breaded fish sticks (fingers)
- (iv) Partially cooked breaded fish portions
- (v) Battered partially cooked fish sticks (fingers)
- (vi) Battered partially cooked fish portions
- (vii) Other presentations

Any other presentation of the product shall be permitted provided that it:

- (a) is sufficiently distinctive from other presentations laid down in this standard;
- (b) meets all the other requirements of the standard; and
- (c) is adequately described on the label to avoid confusing or misleading the consumer.

The ingredients shall when appropriate be in agreement with the relevant Codex standard.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3. Raw Material

3.1.1 Fish

Quick frozen breaded or battered fish sticks (fish fingers) and breaded or battered fish portions shall be prepared from fish fillets or minced fish flesh or mixtures thereof, of edible species which are of a quality such as to be sold fresh for human consumption. The raw materials may be in the form of quick frozen blocks.

3.1.2 Coating

The coating used shall consist of ingredients fit for human consumption (see also Section 4).

3.1.3 Frying fat (oil)

A fat (oil) used in the cooking operation shall be suitable for human consumption and for the desired final product characteristics (see also Section 4).

3.2 Final Product

3.2.1 Minimum Requirements for Proportions of Fish Flesh Core: % of declared weight of final product: 50.

3.2.2 On opening, the pack shall be reasonably free from loose coating and shall comprise fish sticks (fish fingers) or fish portions which are:

- (a) easily separated into individual units;
- (b) reasonably free from broken or cracked or damaged units;
- (c) reasonably free from discolouration;
- (d) free from excessive dehydration (freezer burn);
- (e) free from foreign matter;
- (f) reasonably uniform in size (unless an indication of mixed sizes is given on the label); and
- (g) reasonably free from excess fat (oil).

3.2.3 The coating shall be reasonably complete and reasonably uniform in colour.

3.2.4 The fish content of the product shall be:

- (a) reasonably free from any parts of the internal organs;
- (b) reasonably free from bones, fins or parts of fins; and
- (c) reasonably free from discoloured flesh, blood clots, black membrane, parasites, skin and scales.

3.2.5 The product shall be free from objectionable odour, flavour and texture. If the product is presented under a species name, the odour, flavour and texture and the colour of the flesh shall be characteristic of the species or mixture of species used.

3.2.6 The products in the various forms of presentation shall comply with the definitions and essential quality factors as set forth in this standard subject to tolerance allowances as set forth in Annexes B and C.

3.3 Optional Ingredients

Spices, herbs, vegetable seasonings, cereal flours, potato flour, sodium chloride and spice oils. The ingredients shall be suitable for human consumption and shall be free from abnormal taste, flavour or odour.

4. FOOD ADDITIVES

The maximum level in the final product is in proportion to the requirements given in 2.2.

<u>FOOD ADDITIVES (For Fish Fillets and Minced Fish Flesh only)</u>	<u>Maximum level in the final product</u>
4.1.1 <u>Water-binding agents (drip-loss prevention)</u>	
4.1.1.1 Monophosphate, monosodium (Na or K orthophosphate)	) 5 g/kg expressed as) P ₂ O ₅ , singly or in) combination)
4.1.1.2 Diphosphate, tetrasodium or tetrapotassium (Na or K pyrophosphate)	) 5 g/kg expressed as) P ₂ O ₅ , singly or in) combination)
4.1.1.3 Triphosphate, pentasodium or pentapotassium or calcium (Na, K or Ca tripolyphosphate)	) 5 g/kg expressed as) P ₂ O ₅ , singly or in) combination)
4.1.1.4 Polyphosphate, sodium (Na hexametaphosphate)	) 5 g/kg
4.1.1.5 Sodium alginate	5 g/kg
4.1.2 <u>Antioxidant</u>	
4.1.2.1 Ascorbic acid, sodium or potassium salts	) 1 g/kg expressed as) ascorbic acid
4.1.2.2 Propyl gallate, octyl gallate and dodecylgallate	) 100 mg/kg singly or) in combination
4.2 <u>In addition, for Minced Fish Flesh only:</u>	
4.2.1 <u>Antioxidants</u>	
4.2.1.1 Citric acid and Na or K salts	1 g/kg
4.2.2 <u>Thickening Agents</u>	
4.2.2.1 Guar gum)
4.2.2.2 Carob bean (locust bean) gum)
4.2.2.3 Pectin)
4.2.2.4 Carboxymethyl cellulose, sodium salt	) 5 g/kg singly or) in combination)
4.2.2.5 Xanthan gum)
4.2.2.6 Carrageenan)
4.2.2.7 Methyl cellulose)
4.3 <u>Food Additives for Bread or Batter</u>	<u>Maximum level in bread or batter</u>
4.3.1 <u>Leavening Agents</u>	
4.3.1.1 Monocalcium phosphate)
4.3.1.2 Dicalcium phosphate)
4.3.1.3 Sodium aluminium phosphate	) Limited by G.M. P.)
4.3.1.4 Sodium acid pyrophosphate)
4.3.1.5 Sodium, potassium and ammonium carbonates)
4.3.1.6 Sodium, potassium and ammonium bicarbonates)
4.3.1.7 Sodium, potassium and ammonium carbonates)

Maximum level in bread
or batter

4.3.2	<u>Flavour Enhancers</u>	
4.3.2.1	Monosodium glutamate	Limited by G.M.P.
4.3.3	<u>Acidifying agents</u>	
4.3.3.1	Lactic acid)
4.3.3.2	Citric acid or their Na and K salts	) 1 g/kg of the final product) expressed as lactic or citric) acid
4.3.4	<u>Colours</u>	
4.3.4.1	Annatto 75120)
4.3.4.2	Beta carotene 75130)
4.3.4.3	Other carotenes	) Limited by G.M.P.
4.3.4.4	Azogeratinine or Red 2G 18050)
4.3.4.5	Caramel)
4.3.4.6	Tartrazine 19140)
4.3.4.7	Sunset yellow, FCF 15985)
4.3.4.8	Red 40)
4.3.4.9	Ponceau 4R 16255)
4.3.5	<u>Thickeners</u>	
4.3.5.1	Guar gum)
4.3.5.2	Carob bean (Locust bean) gum	) 5 g/kg singly or) in combination
4.3.5.3	Carrageenan)
4.3.5.4	Xanthan gum)
4.3.5.5	Pectins)
4.3.5.6	Sodium alginate	) 2.5 g/kg
4.3.5.7	Hydroxypropyl cellulose)
4.3.5.8	Hydroxypropyl methyl cellulose	) 5 g/kg singly or) combination
4.3.5.9	Methylethylcellulose)
4.3.5.10	Sodium carboxymethylcellulose)
4.3.6	<u>Emulsifying agents</u>	
4.3.6.1	- Glyceryl monostearate or lactylate)
4.3.6.2	- Sodium steroyl 2 - lactylate or)
4.3.6.3	- Lecithin, mono and diglycerides	) 5 g/kg of the final product) singly or in combination
4.3.7	<u>Chemically Modified Starches</u>	
4.3.7.1	- Acid treated starches)
	(including white and yellow dextrans))
4.3.7.2	- Alkali treated starches)
4.3.7.3	- Bleached starches)
4.3.7.4	- Distarch adipate, acetylated)
4.3.7.5	- Distarch glycerol)
4.3.7.6	- Distarch glycerol, acetylated	) Limited by G.M.P.
4.3.7.7	- Distarch glycerol, hydroxypropyl)
4.3.7.8	- Distarch phosphate)
4.3.7.9	- Distarch phosphate, acetylated)
4.3.7.10	- Distarch phosphate, hydroxypropyl)
4.3.7.11	- Distarch phosphate, phosphated)
4.3.7.12	- Monostarch phosphate)
4.3.7.13	- Oxidized starch)
4.3.7.14	- Starch acetate)
4.3.7.15	- Starch, hydroxypropyl)

5. HYGIENE AND HANDLING

5.1 When tested by appropriate methods of sampling and examination, the product:

- (a) shall be free from microorganisms in amounts which may represent a hazard to health;
- (b) shall be free from parasites which may represent a hazard to health; and
- (c) shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the following codes:

- (i) the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1);
- (ii) the (Recommended) Code of Practice for Frozen Fish (CAC/RCP 16-1978); and
- (iii) the Draft Code of Practice for Minced Fish (ALINORM 81/18, Appendix VIII).

6. LABELLING

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Prepackaged Foods (CAC/RS 1-1969) the following provisions apply, subject to endorsement by the Codex Committee on Food Labelling.

6.1 Name of the Food

6.1.1 The name of the food shall be "breaded fish sticks" (fish fingers), "breaded fish portions", "battered fish sticks", (fish fingers) or "battered fish portions" as appropriate or other specific name used in accordance with the law and custom of the country in which the food is sold and in a manner so as not to mislead the consumer.

6.1.2 The label may, in addition, include reference to the species or mixture of species.

6.1.3 In addition there shall appear on the label either the term "quick frozen" or the term "frozen" whichever is customarily used in the country in which the food is sold, to describe a product subjected to the freezing processes as defined in sub-section 2.2

6.1.4 Where the pack contains products which are not reasonably uniform in size, this shall be shown clearly on the label.

6.1.5 The label may show whether the products are prepared from minced fish flesh, fish fillets or a mixture of both.

6.1.6 Products prepared from raw material from which the pin bones are not removed shall be labelled accordingly in close proximity to the name of the food.

6.2 List of Ingredients

A complete list of ingredients, using generic terms where appropriate, shall be declared on the label in descending order of proportion. The provisions of sub-section 3.2(b) and 3.2(c) of the Recommended International General Standard for the Labelling of Prepackaged Foods (CAC/RS 1-1969), shall also apply.

6.3 Net Contents

The net content shall be declared by weight in either the metric system ("Système international" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold.

6.4 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

6.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

6.6 Lot Identification

Each container should be permanently marked in code or in clear to identify the producing factory and the lot.

6.7 Storage Conditions

The label shall include information on proper storage conditions.

6.8 Cooking Instructions

The label should include cooking instructions.

7. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis described hereunder are international reference methods which are to be endorsed by the Codex Committee on Methods of Analysis and Sampling.

7.1 Sampling for Destructive Examination

Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5)(CAC/RM 42-1969).

7.2 Organoleptic Examination

Organoleptic assessment of the product shall be made only by persons trained in such assessment.

7.3 Determination of Net Content

The net weight (exclusive of packaging material) of each sample representing a lot shall be determined in the frozen state.

7.4 Estimation of Fish Flesh Core

The fish flesh core is estimated according to A.O.A.C. method 18.002 (13th Edition 1980) or an alternative method under development.

8. CLASSIFICATION OF DEFECTIVES

8.1 A sample unit of product which fails to meet the requirements of Section 3.2 and Annex C shall be considered "defective".

9. LOT ACCEPTANCE

A lot will be considered as meeting the final product and weight requirements of this standard when the total number of "defectives" as classified according to Annex C does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (AQL-6.5)(CAC/RM 42-1969) and when the average net contents of all containers examined is not less than the declared weight provided there is no unreasonable shortage in individual containers.

ANNEX "A"

METHODS OF COOKING QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

The frozen sample shall be cooked prior to organoleptic assessment according to the cooking instructions on the package. When such instructions are not given, or equipment to cook the sample according to the instructions is not obtainable, the frozen sample shall be cooked according to the applicable method(s) given below:

The following procedures are based on procedure 18.003 of the A.O.A.C. (13th Edition 1980). It is based on heating product to an internal temperature $\geq 70^{\circ}\text{C}$ (160°F). Cooking times vary according to size of product and equipment used. If determining cooking time, cook extra sample, using temperature measuring device to determine internal temperature.

In the procedures given below, conversions between metric units and Fahrenheit, inches or ounces have been rounded for ease of measurement. Slight variations in these units are acceptable as long as the product is heated to an internal temperature $\geq 70^{\circ}\text{C}$ (160°F).

PARTIALLY COOKED FISH STICKS (FISH FINGERS) OR FISH PORTIONS (OF ANY SIZE OR SHAPE)

Baking Procedure

Distribute product evenly on a flat cookie sheet or shallow flat pan. Heat in ventilated oven, preheated to 200°C (400°F) until internal temperature of product reaches 70°C (160°F).

RAW BREADED FISH STICKS (FISH FINGERS) (Weight of each stick (finger) as defined in Sub-Section 2.1.1)

Shallow Frying

Place liquid or hydrogenated cooking oil to a depth of 3 mm ($1/8''$) in a frying pan. The oil should be hot before adding the product. Cook for 8 minutes turning the product once.

Deep Fat Frying

Use a deep fat fryer with 5 cm ($1\ 7/8''$) of oil preheated to 180°C (360°F) and cook the product for 4 minutes.

Grilling

Space the product evenly on base of grill pan. Grill the product for 10 minutes turning once during this time and adjusting the heat if necessary.

RAW BREADED FISH PORTIONS (Weight of each portion not less than 50g (1.8 oz) and not more than 70 g (2.5 oz))

Shallow Frying

Place liquid or hydrogenated cooking oil in a frying pan to give approximately 6 mm. (1/4") depth. With medium heat of 175°C (350°F), cook the product for 10 minutes turning once.

Deep Fat Frying

Use a deep fat fryer with 5 cm (1 7/8") of oil. Pre-heat the fat to 175°C (350°F) and cook the product for 5 minutes.

An Alternative Method of Cooking

Cooking times vary according to size of the product and equipment used; for battered/breaded products a uniform colour and crispness of the coating have to be obtained as well. Cooking time is based on heating the product to an internal temperature +70°C (according to A.O.A.C. Method 18.003) (13th Edition 1980). Turning shall be carried out twice at -5°C and + 40°C respectively. If determining cooking and turning times, cook extra sample, using temperature measuring device to determine internal temperature. The product shall, before cooking, be adjusted to ca. -18°C to achieve standard cooking conditions.

Shallow frying

Place liquid or hydrogenated cooking oil/fat of neutral taste into a frying pan, preferably with thermostatically adjustable temperature. The melted fat of approximately 3 mm depth shall be preheated to 170°C before adding the product (e.g. the control lamp switches off, when the adjusted temperature is reached, but the samples should not be added before the control lamp switches on again, to come into the heating phase of the pan).

Examples

Fish sticks of 30 g (8.5 x 2.4 x 1.5 cm) take about 6 minutes and should be turned after 1.5 and 4 minutes respectively. Fish portions of 100 g (10 x 6 x 1.8 cm) take about 12 minutes and should be turned after 3 and 8 minutes respectively.

ANNEX "B"

DEFINITION OF DEFECTS IN QUICK FROZEN FISH STICKS (FISH FINGERS)
AND FISH PORTIONS - BREADED OR IN BATTER

Presence of Surplus Loose Coating

An excessive amount of loose breading material in a package.

Excessive Fat (oil)

Perceptible amounts of oil which have stained the inside of and soaked through the package.

Defects of the Whole Product

Ease of Separation

Upon removal from the container in the frozen state, units should separate easily by slight force exerted by hand without damage and without packing material sticking to the surface. Coating which is damaged or product units which break as a result of separation by slight hand pressure are considered defective.

Size Uniformity

Size irregularity applied to those types of presentation 2.3(i), 2.3 (ii) and 2.3(iii) may be caused by improper or non-uniform cutting of a fish block. For fish sticks (fish fingers), size uniformity is measured by the difference in the combined length and width between the largest and smallest stick (finger) in a sample unit. For fish portions irregularity which refers to the three types of presentation 2.3 (i), 2.3(ii) and 2.3(iii) is the difference in the surface area between the largest and smallest portion in a sample unit.

Alternative Proposal

The product should be uniform in weight and shape according to the type of presentation (2.3) and the final product requirements (3.2). Deviations from nominal weights and for dimensions (length, width, height or diameter) may be caused by improper or non-uniform cutting of a fish block.

Broken

A broken fish stick (finger) or fish portion is one that has separated into two or more than one pieces.

Cracked

A crack is a break in the coating greater than 10 mm in length which extends into the flesh.

Damaged (other than broken or cracked)

Product that has been squashed, mashed or otherwise mutilated to the extent that the appearance is materially affected.

Discolouration of Coating

Colour of individual fish sticks (fish fingers) or fish portions which are black or very dark brown or otherwise significantly different from other units in the sample.

Coating Defects (not arising as a result of the assignment of ease of separation)

- (i) Raw breaded or partially cooked units - an individual unit which has more than 15% of the surface area devoid of coating.
- (ii) Battered units - an individual unit which has more than 2 cm² of surface devoid of coating.

N.B. Consideration should be given to replacing the percentage area in (i) by a fixed unit of area (e.g., 1 cm²) especially in the case of irregularly shaped portions.

Foreign Matter

- (i) Any material not derived from fish or coating material or not permitted by the Standard other than packaging.
- (ii) Packaging material.

Core Defects Frozen State Dehydration

Dehydration which shows clearly on the surface of the fish core, penetrates below the surface and cannot be easily removed by scraping.

Thawed State

Skin and Membrane

Does not include subcutaneous layer (silver lining).

Black Membrane or Belly Lining

Does not include white membrane.

Scales

Means readily noticeable loose scales. Scales which are not easily detectable by virtue of their size or soft texture and which do not impair the organoleptic properties are disregarded.

Colour Defects

(i) Fillet fraction

Blood clots (spots) - any mass on lump of clotted blood.

Discolouration - appears as significantly intense discolouration due to melanin deposits, bile stains, liver or other causes.

Bruises - diffused blood causing distinct reddish, brownish or greyish off-colouration.

(ii) Minced fraction

The colour of the mince shall be characteristic of the species used and shall not contain any readily noticeable discolouration, spots or particles, derived from the skin, membrane (black or white), blood clots, blood spots, spinal cord or viscera.

Bone Defect (Applies to Styles 1, 2 and 3)

A bone is regarded as a defect if its length is 10 mm or its diameter is 1 mm: a bone 5 mm in length is not to be considered as a defect if its diameter does not exceed 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded if it can be easily stripped off by a finger nail.

Critical Degree of Bone Defect (Applies to Styles 2 and 3)

Each bone defect whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40.0 mm and a width of 10.0 mm (400 square mm). Does not include pin bones of any size in Style 3.

Fins or Part Fins

Two or more bones connected by membrane, including internal or external bones, or both, in a cluster.

Viscera

Any portion of the internal organs.

Foreign Matter

(i) Any material not derived from fish or not permitted by the Standard other than packaging.

(ii) Packaging material.

Parasites

Parasites or parasitic infestation detected by the candling procedure or by any other physical means.

Large Parasite - Each parasite with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.

Small Parasite - Each parasite with a capsular diameter smaller than 3 mm or a parasite not encapsulated and shorter than 10 mm in length.

Parasitic Infestation - Each parasitic infestation, recognized by its colour, its effect on softening the fish flesh or by other indications.

Odour

In the thawed state, any odour which is distinctly objectionable.

Texture

In the thawed state, any texture which is significantly different from the characteristics of the species, e.g., is mushy, soft, gelatinous, tough or gritty.

Examination of the Cooked Product

Odour and Flavour

Any odour of flavour which is objectionable, e.g., rancid or tainted.

Texture

Any texture which is objectionable, e.g., spongy, rubbery, mushy, gelatinous, or tough.

Coating Defects after Cooking

Any objectionable discolouration, texture deviation or other damage which appears after cooking.

- e.g., - Discolouration: black or dark brown or other atypical colour
- Texture: distinctly pasty or shiny
- Damage: blistering, cracking or detachment of the coating.

ANNEX C

DEFECTS TABLE FOR QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS

Sample Unit = 1 kg of product for assessment in the raw state
200 g of product for assessment in the cooked state.

N.B. Consult the sampling plans for pre-packaged foods to determine sample size.

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<u>Defect</u>	<u>Unit of Measurement</u>	<u>Demerit Points</u>
A. <u>Final Pack</u> <u>Frozen State</u>		
(1) <u>Presence of surplus</u> <u>loose coating</u>	Over 0.75% of declared net contents - each container	1

<u>Defect</u>	<u>Unit of Measurement</u>	<u>Demerit Points</u>
(2) <u>Excessive fat (oil)</u>	Each container affected with staining or oil soaked through container	1
<u>N.B.</u> Consideration must be given to exactly what the sample will be for defects (1) and (2).		
<u>B. Whole Product</u>		
(3) <u>Ease of separation</u>	More than 40% of the sticks (fingers) or portions in a container cannot be separated by hand.	Defective
	20-40% of the sticks (fingers) or portions only separated by hand with difficulty	4
(4) <u>Size Uniformity</u>		
(a) Fish sticks (fingers)	Over 20 mm	2
The difference in the combined length and width between the largest and smallest stick (finger)	Over 10 mm and up to and including 20 mm	1
(b) Fish portions - the difference in surface area between the largest and the smallest portion	Over 20% difference in surface area	2
	Over 10% and up to and including 20% difference in surface area	1
(5) <u>Broken</u>	Over 20% of sticks (fingers) or over 40% of portions	Defective
(6) <u>Cracked</u>	Over 20% of sticks (fingers) or over 40% of portions	2
(7) <u>Damaged</u>	Over 10% and up to and including 20% of sticks (fingers)	1
(a) Fish Sticks (fingers)	Over 20% for each further 10% or part thereof	1
(b) Fish Portions	Over 20% and up to and including 40%	1
	Over 40% for each further 20% or part thereof	1
(8) <u>Discolouration of Coating</u>		
(a) Black or very dark brown	10% or more of sticks (fingers) or portions in the sample	Defective
(b) Colour of sticks (fingers or portions significantly different from that of the others	Over 20% of sticks (fingers) or 40% of portions	1

<u>Defect</u>	<u>Unit of Measurement</u>	<u>Demerit Points</u>
(9) <u>Coating Defects</u>		
(a) Fish sticks (fingers) - breaded or partially cooked	Over 10% and up to and including 20% of fingers affected. Over 20%.	4 Defective
(b) Fish sticks (fingers) - battered	Each stick (finger) with more than 2 cm ² of surface area	2
(c) Fish portions - breaded or partially cooked	Over 20% and up to and including 40% of portions affected. Over 40%	4 Defective
(d) Fish portions - battered	Each portion with more than 2 cm of surface area affected.	2
B. <u>Core Defects</u>		
Sample Unit	- 1 kg of entire product from which the coating is removed.	
<u>Frozen State</u>		
Weight of sample	- Weight core material following removal of the coating.	
10. <u>Dehydration</u>		
(i)	Each instance >5 cm ² up to and including 10 cm ²	2
(ii)	Each instance >10 cm ²	4
11. <u>Skin and Membrane</u>		
(a) Skinless fillets		
(i)	Each piece of skin and/or membrane greater than 3 cm ² and up to and including 10 cm ²	4
(ii)	Each additional complete area of 5 cm ² or part thereof	2
(b) Skin-on fillets		
(i)	Each piece of black membrane greater than 3 cm ² and up to and including 10 cm ²	4
(ii)	Each additional complete area of 5 cm ² or part thereof	2
12. <u>Scales</u>		
(a) Skin-on fillets - scaled		
(i)	Each area of scales greater than 3 cm ² and up to and including 10 cm ²	2
(ii)	Each additional complete area of 5 cm ² or part thereof	2
(b) Skinless fillets		
(i)	First 5 to 10 (in the case of hake 10 to 20) readily noticeable loose scales	2
(ii)	Each additional complete unit of 5 (for hake, 10) readily noticeable loose scales or part thereof	2

<u>Defect</u>	<u>Unit of Measurement</u>	<u>Demerit Points</u>
<u>Thawed State</u>		
13. <u>Colour Defects</u>		
<u>Blood clots</u>	(a) Each blood clot greater than 5 mm in diameter or 0.2 cm ²	2
Discolouration and bruising	(b) (i) Any aggregate area of discolouration or bruising exceeding 3 cm ² and up to and including 5 cm ²	2
	(ii) Each additional complete area of 5 cm ² or part thereof	2
	(c) Mince fraction	
	(i) Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species	Defective
	(ii) Readily noticeable deviation from colour of the species	2
14. <u>Bone, Fin and Part Fin</u>		
(a) Style 1	Any bone defect	Defective
(b) Style 2	(i) Each bone defect	2
	(ii) Each critical bone	Defective
(c) Style 3	(i) Each bone defect excluding pin bones	2
	(ii) Each critical bone excluding pin bones	Defective
15. <u>Viscera</u>	Each instance	8
16. <u>Parasites</u>	(a) Each large parasite as defined	4
	(b) Each small parasite as defined	2
	(c) Parasitic infestation - each portion affected	8
17. <u>Foreign Matter</u>	(a) Each instance of foreign matter other than packaging material	Defective
	(b) Each instance of packaging material	2
18. Odour (Raw)	Distinctly objectionable	Defective
19. <u>Texture (Raw)</u>	Distinctly objectionable	Defective
C. <u>Cooked Sample</u>		
	Sample Unit = 200 g of whole product.	
20. <u>Coating Defects after Cooking</u>		
(a) Discolouration		
(i) Black or very dark brown		Defective
(ii) Significantly abnormal colour deviation of units within the sample		2

<u>Defect</u>	<u>Unit of Measurement</u>	<u>Demerit Points</u>
(b) <u>Damage</u> Coating distinctly blistered and/or deformed or shrunk	Each instance	4
21. <u>Odour</u>	Distinctly objectionable	Defective
22. <u>Flavour</u>	Distinctly objectionable	Defective
23. <u>Texture</u>	Distinctly objectionable Moderately objectionable	Defective 4

Maximum Allowable Tolerance for Defects

Total all demerit points from the examination of the whole product, the core and the cooked sample. The sample will be considered to be defective if the total number of demerit points exceeds /40/ for members of the family Gadidae or /50/ for members of other species.

N.B. The Working Group which elaborated these definitions and defect tables need Government comments and feels that there is a need to meet to consider comments prior to the next session of the Codex Committee on Fish and Fishery Products.

ALINORM 85/18
APPENDIX V

PROPOSED DRAFT STANDARD FOR DRIED SALTED FISH (KLIPPFISH)
OF THE GADIDAE FISH FAMILY
(at Step 5)

1. SCOPE

This Standard applies to dried salted fish of the species as defined below and offered for consumption without further processing.

2. DESCRIPTION

2.1 Product Definition

Dried salted fish is the product obtained from fish:

- (a) of the species belonging to the family Gadidae; and
- (b) which has been bled, gutted, beheaded, split or filleted, washed, salted and dried. All parts of the fish shall have reached salt/water equilibrium prior to drying.

2.2 Process Definition

The product shall be prepared by one of the salting processes defined in 2.2.1 and one or both of the drying processes defined in 2.2.2. When the fish is split a cut is made in a straight line close to one side of the backbone from the neck to the caudal fin.

2.2.1 Salting

- (a) Dry Salting (kench curing) is the process of mixing fish with suitable food grade salt and stacking the fish in such a manner that the excess of the resulting brine drains away; and
- (b) Wet Salting (pickling) is the process whereby fish is mixed with suitable food grade salt and stored in watertight containers under the resultant brine (pickle) which forms by solution of salt in the water extracted from the fish tissue. The fish is subsequently removed from the container and stacked so that the brine drains away.

2.2.2 Drying

- (a) Natural Drying - the fish is dried by exposure to sun and wind; and
- (b) Artificial Drying - the fish is dried in mechanically circulated air of controlled temperature and humidity.

2.3 Presentation

Dried salted fish shall be presented, with or without the black membrane (belly lining), scaled or unscaled, in one of the following ways:

- 2.3.1 Split fish - split and with approximately the anterior two thirds of the backbone removed.
- 2.3.2 Split fish with entire backbone - split with the whole of the backbone not removed.
- 2.3.3 Fillets - split and divided longitudinally into two parts and with fins, fin bones, tail, earbones (collar bones) and the whole of the backbone removed.
- 2.3.4 Semi-boneless fillets - split and divided longitudinally into two parts and with fins, fin bones, tail and all bones except the pin bones removed.
- 2.3.5 Boneless fillets - split and divided longitudinally into two parts and with fins, fin bones, tail and all bones, including pin bones, removed.
- 2.3.6 Cuts - split fish or fillets cut up transversely into fairly regular pieces.
- 2.3.7 Other presentation: any other presentation of the product shall be permitted provided that it:
 - (i) is sufficiently distinctive from other forms of presentation laid down in this Standard;
 - (ii) meets all other requirements of this Standard; and
 - (iii) is adequately described on the label to avoid confusing or misleading the consumer.
- 2.3.8 Individual containers shall contain only one form of presentation from only one species of fish.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

The raw material shall be salted fish prepared from sound fresh fish of the designated species which are of a quality such as to be fit to be sold for human consumption, and shall be fully salted to keep quality during correct (cold) storage; the salt content of the final product may be controlled by steeping the salted fish in water.

3.2 Salt

Salt used to produce dried salted fish shall be clean and not previously used, free from foreign matter and foreign crystals, show no visible signs of contamination with dirt, oil, bilge or other extraneous materials and comply with the requirements laid down in Annex A to this Standard.

3.3 Final Product

3.3.1 Appearance

Dried salted fish shall not be extensively cracked or ragged or completely broken, nor shall the belly wall have been decomposed by the action of liver, bile or gut contents. It shall not be completely pressed together nor show severe signs of liver staining, liver, burning during the drying process, pronounced evidence of halophilic mould (dun) nor visible evidence of red, halophilic bacteria (pink).

3.3.2 Sensory properties

Dried salted fish shall have organoleptic properties which are characteristic of the product and shall be free from any objectionable odour.

3.3.3 The products in the various forms of presentation shall comply with the definitions and essential quality factors set forth in this Standard subject to tolerance allowances as set forth in Annex B.

4. FOOD ADDITIVES

(subject to endorsement by the Codex Committee on Food Additives).

4.1 Preservatives

Maximum Level

Sorbic acid and its calcium, sodium and potassium salts.

1 g/kg solution for surface treatment only. 0.6 mg/cm² surface of the product.

5. HYGIENE AND HANDLING

5.1 It is recommended that the product covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the following codes:

- (i) Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1).
- (ii) Recommended International Code of Practice for Fresh Fish (CAC/RCP 9-1976).
- (iii) Recommended International Code of Practice for Salted Fish (CAC/RCP 26-1979)

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:

- (a) shall be free from micro-organisms in amounts which may represent a hazard to health;
- (b) shall be free from parasites which may represent a hazard to health; and
- (c) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

Any container for dried salted fish shall be clean and dry and shall protect the organoleptic and other quality characteristics of the product during storage and transport. It shall not pass on to the product any foreign odour, flavour, colour or other foreign characteristics.

7. LABELLING

(Subject to endorsement by the Codex Committee on Food Labelling).

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Pre-packaged Foods (CAC/RS 1-1969) the following specific provisions apply:

7.1 Name of the Food

7.1.1 The name of the product as declared on the label shall be "dried salted fish", or "klippfish" or other designations according to the law, custom or practice in the country in which the product is to be distributed. In addition, there shall appear on the label in conjunction with the name of the product, the name of the species of fish from which the product is derived.

7.1.2 For forms of presentation other than described in 2.3.1 "split fish" the form of presentation shall be declared in conjunction with the name of the product in accordance with sub-sections 2.3.2 to 2.3.6 as appropriate. If the product is produced in accordance with Sub-section 2.3.7, the label shall contain in close proximity to the name of the food, such additional words or phrases that will avoid misleading or confusing the consumer.

7.2 Net Contents

The total net contents shall be declared by weight in either the metric system ("Systeme International" units) or avoirdupois or both systems of measurement as required by the country in which the product is sold.

7.3 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the product shall be declared.

7.4 Country of Origin

7.4.1 The country of origin shall be declared if its omission would mislead or deceive the consumer.

7.4.2 When the product undergoes further processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purpose of labelling.

7.5 Lot Identification

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot.

8. METHODS OF SAMPLING, EXAMINATION AND ANALYSIS

The methods of sampling, examination and analysis described hereunder are international reference methods.

8.1 Sampling

8.1.1 Sampling for Visual and Organoleptic Defects.

For those provisions detailed in Sub-sections 2.3 and 3.3 of this Standard, sampling shall be carried out in accordance with FAO/WHO Codex Alimentarius Plans (to be elaborated).

8.1.2 Sampling for Net Weight shall be carried out in accordance with the FAO/WHO Sampling Plans for the Determination of Net Weight (under elaboration).

8.2 Examination of Physical Defects and Organoleptic Assessment

Organoleptic and physical assessment of the product shall be made only by persons trained in such assessment.

9. CLASSIFICATION OF DEFECTIVES

A sample unit shall be considered as a "defective" when it fails to meet the requirements of Sub-sections 2.3 and 3.3 subject to the defect definitions and tolerances in Annex B.

10. LOT ACCEPTANCE

A lot will be considered as meeting the final product requirements of this Standard when:

- (a) the total number of "defectives" as defined in Section 9 of this Standard does not exceed the acceptance number (c) of the appropriate sampling plans (to be elaborated).
- (b) the average net contents of the lot as determined by appropriate sampling plans for net contents is not less than the declared net contents (sampling plans for net contents to be elaborated).

ANNEX 'A'

SPECIFICATIONS FOR SALT USED IN THE PRODUCTION OF DRIED SALTED FISH OF THE GADIDAE SPECIES

1. Salt used in the production of dried salted fish shall comply with the "Codex Alimentarius Specifications for Food Grade Salt" (being developed by the Codex Committee on Food Additives).

Notwithstanding this, the additional or different provisions in Sections 2 and 3 below shall apply to salt used in the production of dried salted fish of the Gadidae Species.

2. COMPOSITION

2.1 Total dry matter min. 96%.

2.2 Calcium max. 3 g/kg expressed as Ca.
Magnesium max. 1 g/kg expressed as Mg.

3. CONTAMINANTS

Copper max. 0.1 mg/kg expressed as Cu.
Iron max. 10 mg/kg expressed as Fe.

ANNEX B

PROPOSED DEFECT TABLE FOR DRIED SALTED FISH (KLIPPFISH)

A sample unit is the fish content of the smallest containers in a lot of DRIED SALTED FISH of the same presentation, size and fish-species.

A. GENERAL DEFECTS

(Section 3.3)

	<u>Defect Description</u>	<u>Demerit Points</u>
1.	<u>Extensively Cracked</u> More than 2 instances each instance	Defective 24
2.	<u>Extensively Ragged</u> More than 2 instances each instance	Defective 24
3.	<u>Completely Broken</u> More than 2 instances each instance	Defective 24
4.	<u>Decomposed by Liver Action</u> At least 3/4 of one belly wall: each instance from 1/3 up to 3/4 of one belly wall: each instance	24 12
5.	<u>Signs of Liver Staining</u> Severe: More than 1/2 of the fish side: each instance	12
6.	<u>Decomposed by Bile or Gut Contents</u> At least 1/2 of the belly wall: each instance from 1/3 up to 1/2 of the belly wall: each instance	24 12
7.	<u>Completely Pressed together</u> Each instance	15
8.	<u>Severe Burning</u> More than 1 instance each instance	Defective 36
9.	<u>Halophilic Mould (Dun)</u> Pronounced evidence: on more than 1/3 of the fish-flesh side - more than 2 instances each instance	Defective 24
10.	<u>Red Halophilic Bacteria (Pink)</u> Visible evidence: 1 instance	Defective
11.	<u>Odour and Flavour</u> Any odour or flavour which is objectionable: 1 instance	Defective
12.	<u>Extraneous Matter</u> Sand and/or alien/coloured particles on more than 1/4 of the fish-flesh surface or 1/2 of the skin-side: more than 4 instances each instance	Defective 12
B.	<u>DEFECTS REGARDING PRESENTATION (Sub-section 2.3)</u> Lots of dried salted fish designated as	

1.	<u>Without Black Membrane (White Wings)</u>	
	The entire or major parts of the black membrane: more than 3 fish each instance	Defective 16
2.	<u>Scaled</u>	
	Unscaled fish: more than 4 fish Unscaled or partly unscaled fish: each instance	Defective 4
3.	<u>Split Fish (2.3.1)</u>	
	Not split: each instance Entire backbone: each instance	36 36
4.	<u>Fillets (2.3.3)</u>	
	Whole or split fish: 1 instance Fin, finbone, tail or earbone: each instance Entire backbone: each instance	Defective 3 12
5.	<u>Semi-boneless Fillets (2.3.4)</u>	
	The entire, or parts of, backbone, bellybone, fin, finbone, earbone or tail: each instance	3
6.	<u>Boneless Fillets (2.3.5)</u>	
	Each single bone 10x3 mm, but less than 40x10 mm: each instance	8
	Each single bone 40x10 mm in any dimension (critical bone): each instance	24
7.	<u>Split Fish or Fillets (2.3)</u>	
	Pieces of fish: more than 2 pieces each instance	Defective 16
8.	<u>Fish Species (2.3.8)</u>	
	Fish species other than designated: more than 2 instances each instance	Defective 16

DEFECTIVE UNIT

A sample unit shall be considered a defective if it is found to be DEFECTIVE or is allocated MORE THAN 48 DEMERIT POINTS.

PROPOSAL FOR HARMONISATION OF RECOMMENDED DEFECTS TABLES IN STANDARDS FOR
QUICK FROZEN FILLETS OF COD/HADDOCK, OCEAN PERCH, FLAT FISH AND HAKE

(at Step 5)

DRAFT REPORT OF THE HARMONISATION WORKING GROUP

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINT (1 kg sample unit)			
		COD HADDOCK	OCEAN PERCH	FLAT FISH	HAKE
<u>Dehydration (freezerburn)</u>					
(i) Deep dehydration An excessive loss of moisture from the surface of the sample unit which shows clearly on the surface and cannot be easily removed by scraping	Over 10% of surface area or (a) ≤ 200 g units ≥ 25 cm ² (b) 201-500 g units ≥ 50 cm ² (c) 501-5000 g units ≥ 150 cm ² (d) > 5000 g units ≥ 300 cm ² Over 1% up to and including 10% of surface area or (a) ≤ 200 g units 2.5-25 cm ² (b) 201-500 g units 5.0-50 cm ² (c) 501-5000 g units 15.0-150 cm ² (d) > 5000 g units 30.0-300 cm ²	Defective	Defective	Defective	Defective
(ii) Moderate dehydration A loss of moisture from the surface of the sample unit which is colour masking, but does not penetrate the surface and can be easily removed by scraping	Over 10% of surface area or (a) ≤ 200 g units ≥ 25 cm ² (b) 201-500 g units ≥ 50 cm ² (c) 501-5000 g units ≥ 150 cm ² (d) > 5000 g units ≥ 300 cm ²	2	2	2	2
<u>Small pieces</u>					
(not applicable to fillets cut from blocks)	If the sample unit came from a pack of 1 kg or greater, each occurrence over 1 piece	4	4	4	4
A fillet piece weighing less than 25 g	If the sample unit came from a pack less than 1 kg per pack, each occurrence over one piece per pack	4	4	4	4

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINT 1 kg sample unit)			
		COD HADDOCK	OCEAN PERCH	FLAT FISH	HAKE
<u>Ragged or torn fillets</u> Longitudinal edges markedly and excessively irregular	Each instance	1	1	1	1
<u>Black membrane</u> (belly lining) (does not include white membrane)	Each instance greater than 3 cm ² up to and including 10 cm ² Over 10 cm ² each additional area of 5 cm ² or part thereof	4 2	4 2	4 2	4 2
<u>Skin (skinless fillets)</u> Does not include sub-cutaneous layer (silver lining)	Each piece > 3 cm ² - < 10 cm ² Over 10 cm ² each additional complete 5 cm ² or part thereof	4 2	4 2	4 2	4 2
<u>Scales</u> - attached to skin - readily noticeable loose scales	<u>Skin-on fillets - scaled</u> Each area of scale > 3 cm ² up to and including 10 cm ² Over 10 cm ² , every additional complete 5 cm ² or part thereof <u>Skinless fillets</u> First 5 to 10 (in the case of hake fillets 10 to 20) readily noticeable loose scales If more than 10 (for hake 20) loose scales each additional complete unit of 5 (for hake 10) loose scales or part thereof	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINT (1 kg sample unit)			
		COD - HADDOCK	OCEAN PERCH	FLAT FISH	HAKE
<u>Colour Defects</u> <u>Blood clots (spots)</u> Any mass or lump of clotted blood <u>Discolouration</u> Appears as significantly intense discolouration due to melanin deposits, bile stains, liver stains or other causes <u>Bruises</u> Diffused blood causing distinct reddish, brownish or greyish off-colouration	Each clot > 5 mm in diameter or > 0.2 cm ² (i) Any aggregate area of <u>discolouration or bruising</u> exceeding 3 cm ² up to and including 5 cm ² (ii) Over 5 cm ² each additional area of 5 cm ² or part thereof	2	2	2	2
<u>Bones (including pin bones and single fin bones)</u> <u>Defect bone</u> (Applies to Styles 1, 2 and 3) A bone is regarded as a defect if its length is ≥ 10 mm or its diameter is ≥ 1 mm; a bone ≤ 5 mm in length is not to be considered as a defect if its diameter does not exceed 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded if its width is less than 2 mm or if it can be easily stripped off by a finger nail. <u>Critical degree of bone defect</u> (Applies to Styles 2 and 3). Each bone defect whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40.0 mm and a width of 10.0 mm (400 square mm). Does not include pin bones of any size in Style 3.	<u>Style 1:</u> Any defect bone <u>Style 2:</u> Each defect bone Any critical bone <u>Style 3:</u> Each defect bone excluding pin bones Any critical defect excluding pin bones	Defective 2 Defective 2 Defective	Defective 2 Defective 2 Defective	Defective 2 Defective 2 Defective	Defective 2 Defective 2 Defective

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINT (1 kg sample unit)			
		COD - HADDOCK	OCEAN PERCH	FLAT FISH	HAKE
<u>Parasites (Cont.)</u>	Each parasite with a capsular diameter smaller than 3 mm or a parasite not encapsulated and smaller than 10 mm in length	2	2	2	2
	Any significant parasitic infestation as recognized by its colour, its effect on softening the fish flesh or by other physical indications - Each fillet affected	8	8	8	8
<u>Foreign Matter</u>					
(i) Any material not derived from fish or not permitted by the standard other than packaging	Each instance	Defective	Defective	Defective	Defective
(ii) Packaging material	Each instance	2	2	2	2
<u>Odour and Flavour</u>					
Objectionable odour in thawed state	Any odour which is distinctly objectionable	Defective	Defective	Defective	Defective
Objectionable odour or flavour in cooked state	An odour or flavour which after cooking is distinctly objectionable	Defective	Defective	Defective	Defective
<u>Texture</u>					
Any texture which either in the thawed state or after cooking is significantly different to the characteristic of the species	Definitely not characteristic of the species, e.g., is mushy, soft, gelatinous or tough	Defective	Defective	Defective	Defective
A sample unit is considered if the demerit points total more than		20	32	32	20

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINT (1 kg sample unit)			
		COD HADDOCK	OCEAN PERCH	FLAT FISH	HAKE
<u>Fins or part of fins</u> Two or more bones connected by membrane, including internal or external bones, or both, in a cluster	<u>Style 1: Any instance</u>	Defective	Defective	Defective	Defective
	<u>Style 2 and 3:</u> Each separate instance up to and including 3 cm ²	4	4	4	4
	Each additional 3 cm ² or part thereof in the same cluster	2	2	2	2

<u>Viscera</u> Any portion of the internal organs	Each instance	8	8	8	8
<u>Parasites</u> Parasites or parasitic infestation detected by the candling procedure or any other non-destructive physical means	Each parasite with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length	4	4	4	4

DRAFT CODE OF PRACTICE FOR
FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS

(Step 8)

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INTRODUCTION

This Code of Practice is intended to assist all those who are concerned with the production, inspection, storage, distribution, and marketing of frozen battered and/or breaded fishery products, in achieving a high standard of quality, and a wholesome and attractive product that can be accepted by the consumer on a repetitive basis. It contains technological information and essential hygiene requirements for the production of high quality battered and/or breaded fishery products and is based on generally recognized good manufacturing practices.

This code should be beneficial in the training of production and quality control staffs in the plants and helpful in providing managers and entrepreneurs with a broad general view of those requirements which are fundamental to good industry practices.

The code is also intended as advisory information and as a guideline for the elaboration of national quality standards, quality control and fishery products inspection programmes in countries where these have not yet been developed. However, it must be acknowledged that most of the practical information pertaining to the hygiene and the technology involved with the processing of battered and/or breaded fishery products has been gained from the industrial experiences of very few countries. With this limitation in mind, this code therefore should not be regarded as a set of rules and regulations to be followed on a general basis without taking into account the regional peculiarities of specific areas.

The information provided is not intended to replace the advice or guidance of trained and experienced technologists regarding the complex technical problems which might be unique to a specific geographical area or to new technological developments.

The practical applications of this "international code" with regard to "national" industries will therefore require some modifications and amendments, taking into account local conditions and specific consumer requirements. In other words, despite existing variances between countries, "national" codes of practice could be elaborated for the guidance of individual fishery products industries, based on information contained in this code.

The recommendations given here are based on well-established principles and the most recent technological information available; however, the code will need to be revised periodically to incorporate the advances that are being continually made in the technology applied to the processing of fishery products.

DRAFT CODE OF PRACTICE FOR FROZEN BATTERED
AND/OR BREADED FISHERY PRODUCTS

NOTE

- The hygiene and some of the technological requirements of this Code are partially based on the Revised Draft Code of Practice - General Principles of Food Hygiene, the Recommended International Code of Practice for Fresh Fish, the Code of Practice for Frozen Fish, and the Code of Practice for Shrimp or Prawns (see Appendix II).
- The letter and number codes given in the right-hand margin indicate requirements as taken from the following Codes of Practice:

- Code of Practice for Fresh Fish	- FF
- Code of Practice for Frozen Fish	- FR
- Code of Practice for Shrimp or Prawns	- SP
- Code of Practice - General Principles of Food Hygiene	- GP

SECTION I - SCOPE

1. This Code of Practice applies to frozen battered and/or breaded fishery products intended for human consumption, prepared from different species of fish, shrimp, scallops, oysters, clams, etc., and other fresh or frozen products which may be cut into sticks (fingers) or portions, and which are either cooked, partially cooked or raw.

It contains the technological guidelines and the essential requirements of hygiene for the production, storage and handling of frozen battered and/or breaded fishery products.

It deals also with the distribution and display in retail cabinets of the products under consideration.

SECTION II - DEFINITIONS

For the purpose of this code:

- 2.1 "adequate" means sufficient to accomplish the intended purpose of this code. GP 2.1
- 2.2 "air blast freezer" is a freezer in which heat is removed from the product by a stream of rapidly moving cold air. In the continuous type, the product is frozen as it is conveyed through an air blast freezing chamber or tunnel. In other FR types, the product is placed in the freezer on suitable trays or racks which remain 2.1 stationary during the freezing process. The air blast freezer can accommodate a wider range in shape and size of product than can the contact freezer.
- 2.3 "batter" is a mixture consisting of dry batter mixed with potable water in a ratio suitable for product coating.
- 2.4 "breeding or breader" is an ingredient which may consist of simply a flour, or a blend of flours and other functional ingredients which may include flavouring agents and which may be made into a dough, baked, dried, ground and screened to a desired particle size or granulation, or could also consist in whole or in part of breadcrumbs or cracker meal which are either fabricated or obtained as by-products of the baking industry.
- 2.5 "chilling" is a process where the product is cooled to a temperature approaching that of melting ice. FF 2.4/mod.
- 2.6 "chilled sea water" is clean sea water reduced in temperature by the addition of ice prepared from potable water or clean sea water. FF 2.5/mod.
- 2.7 "clean sea water" is sea water which meets the same microbiological standards as potable water and is free from objectionable substances. FF 2.6
- 2.8 "cleaning" means the removal of soil, food residues, dirt, grease or other objectionable matter. GP 2.2
- 2.9 "coating" is the resultant enrobing of fish flesh with batter and/or breading with or without oil.
- 2.10 "contact freezer or plate freezer" is a freezer in which heat transfer occurs by contact between the product and metal plates, through which the refrigerant passes. Two types in use today are the vertical contact plate freezer, mostly freezing large blocks of whole or gutted fish and the horizontal contact plate freezer, in which small fish or fillet blocks or packages of fish or fillets are frozen. Pressure is used to bring the plates to bear on the product or package to ensure good surface contact during freezing. FR 2.9
- 2.11 "contamination" means the occurrence of any objectionable matter in the product. GP 2.4
- 2.12 "cryogenic freezer" is a freezer in which heat is extracted from the product by direct contact with an evaporating, non-toxic refrigerant liquid or with its vapour. Examples are liquid nitrogen and refrigerant R-12 freezers. FR 2.11/mod.

- 2.13 "defrosting" is the process of removing frost and ice from freezer and freezer store refrigerated plates or coils, by the introduction of heat, or by brushing and scraping. This is done because coatings of frost or ice greatly reduce the efficiency of these cooling surfaces. Contact freezers also require defrosting to allow for efficient loading and unloading. FR 2.12
- 2.14 "dehydration" is the loss of moisture from frozen products through evaporation. This may occur if the products are not properly packaged, or stored. Dehydration adversely affects the appearance and surface texture of the product and is commonly known as "freezerburn". FR 2.14
- 2.15 "denaturation" is the change which takes place slowly in the protein of fish during frozen storage and which adversely affects the appearance, texture and flavour of the product. The rate at which protein denaturation occurs decreases at lower storage temperatures. FR 2.15
- 2.16 "disinfection" means the reduction without adversely affecting the food, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of microorganisms to a level that will not lead to harmful contamination of food. GP 2.4
- 2.17 "dry batter" is an ingredient which usually consists of a blend of flours, starches and other functional ingredients such as leavening or flavouring agents.
- 2.18 "equipment" means all processing machines, conveyors, tables, sinks, utensils, washing machines, flumes, tanks, pumps, and similar items used in a fishery products plant.
- 2.19 "fillets" are slices of irregular size and shape removed from the carcass by cuts made parallel to the backbone and sections of such fillets cut so as to facilitate packing. FR 2.10/
mod.
- 2.20 "fish" means any of the cold-blooded aquatic vertebrate animals commonly known as such and shellfish. This includes Pisces, and Elasmobranchs.
- 2.21 "fish handling" means any operation in the growing and harvesting, preparation, processing, packaging, storage, transport, distribution and sale of fish. GP 2.6/
mod.
- 2.22 "freezing process" is a process which is carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The freezing process should not be regarded as complete until the product temperature has reached a level which will ensure that the temperature at the thermal centre will not be higher than -18°C (0°F) after thermal stabilization. FR 2.19/
mod.
- 2.23 "freezer" is equipment designed for freezing fish and other food products, by quickly lowering the temperature so that after thermal stabilization the temperature in the thermal centre is the same as the storage temperature. FR 2.20
- 2.24 "freezer store" is an insulated and refrigerated room specifically designed for the storage of frozen products. Freezer stores have sufficient refrigerating capacity to maintain a temperature of -18°C (0°F) or lower for products already frozen, but are not designed to freeze products or to cool them down to storage temperature. FR 2.21/
mod.
- 2.25 "frozen fish sticks, battered and breaded or fingers or portions" are clean, wholesome, uniform, unglazed masses of cohering pieces of fish flesh coated with batter and/or breading and presented either raw, partially cooked, or fully cooked which have been subjected to a freezing process/ sufficient to reduce the temperature of the product to a level low enough to preserve the inherent quality of the product and which have been maintained at this low temperature during transportation, storage and distribution up to and including the time of final sale.

- 2.26 "frozen fish blocks" are rectangular masses of cohering fish flesh which have been subjected to a freezing process sufficient to reduce the temperature of the whole product to -18°C (0°F) or lower to preserve the inherent quality of the fish and which have been maintained at this low temperature during transportation, storage and distribution up to the time of further processing.
- 2.27 "packaging materials" are all those materials, such as foils, films, wax paper, cartons, dividers, or boxes used for covering and protecting the frozen product and which are approved by the official agency having jurisdiction. FR 2.27/mod.
- 2.28 "pests" are any animals capable of directly or indirectly contaminating food. GP 2.9
- 2.29 "plant or establishment" means any building(s) or area(s) in which food is handled after harvesting and the surroundings under the control of the same management. GP 2.5
- 2.30 "potable water" is fresh water fit for human consumption. Standards for potability should not be lower than those contained in the latest edition of the "International Standards for Drinking Water", World Health Organization. FF 2.18
- 2.31 "readily cleanable" means easily accessible and of such design, material and finish that residues from or caused by processing operations may be completely removed by normal, safe cleaning methods.
- 2.32 "refrigerated sea water" is clean sea water reduced in temperature by a suitable refrigeration system. Its salt content is normally about 3 percent. FF 2.21/mod.
- 2.33 "shellfish" means those species of crustacea and molluscs including cephalopods that are usually used for foods.
- 2.34 "suitable corrosion-resistant material" means impervious material which is free from pits, crevices and scale, is non-toxic and unaffected by sea water, ice, fish slime, or any other corrosive substance with which it is likely to come in contact. Its surface must be smooth and it must be capable of withstanding exposure to repeated cleaning, including the use of detergents.
- 2.35 "tempering" is a controlled warming process for frozen fish where the temperature of the product is raised to approximately -7°C (20°F). It is used to facilitate cutting and chopping procedures.
- 2.36 "thawing" is a process whereby heat is introduced into the frozen product in order to raise its temperature above its freezing point. FR 2.37
- 2.37 "utensils" means any hand implements or multi-use portable containers used in the preparation, processing, conveying, holding and storage of fishery products.

SECTION III - RAW MATERIAL REQUIREMENTS

3.1 General Considerations

- 3.1.1 **FISH INTENDED FOR BATTERING AND/OR BREADING SHOULD BE OF GOOD QUALITY. IT SHOULD RECEIVE THE SAME CARE AND ATTENTION FROM THE TIME OF CAPTURE AND THROUGH PROCESSING AS THOSE INTENDED FOR MARKETING FRESH OR FROZEN.**

Many processes and principles involved in the preparation of battered and/or breaded fishery products are similar to those that would be involved in preparing fish for marketing as fresh or frozen. Therefore, the Recommended International Code of Practice for Fresh Fish, the Codes of Practice for Frozen Fish, Shrimp or Prawns and Minced Fish should be used as a guide for the handling, preparation and freezing of battered and/or breaded fishery products.

3.1.2 FISH OR INGREDIENTS SHOULD BE PLACED AS SOON AS RECEIVED IN APPROPRIATE STORAGE AREAS.

Frozen materials should be swiftly moved into cold storage after they are unloaded in the plant. Frozen storage should be kept at -18°C (0°F) or below. Dry products should be stored in a clean, dry area not subjected to excessive temperature variations.

3.1.3 FISH OR INGREDIENTS INTENDED FOR FURTHER PROCESSING SHOULD BE EXAMINED AS SOON AS THEY ARE DELIVERED TO THE PLANT TO ENSURE THEIR SUITABILITY FOR PROCESSING AND THAT THEY MEET APPLICABLE ESTABLISHED SPECIFICATIONS.

All materials, whether fish or ingredients destined to be part of the battered and/or breaded products, should be inspected as soon as possible after they are delivered to the plant and before they are introduced into the manufactured products.

Inspection should include all relevant quality factors such as presence of foreign matter, the physical condition and organoleptic state of the fish or ingredients, and uniformity, compactness and angular configuration with respect to fish blocks. If fish or ingredients are held in storage for unexpected long periods of time, they should be re-inspected to determine suitability.

3.1.4 NO FISH OR INGREDIENTS WHICH HAVE UNDERGONE DETERIORATION, DECOMPOSITION OR CONTAMINATION TO AN EXTENT WHICH HAS RENDERED THEM UNFIT FOR HUMAN CONSUMPTION, SHOULD BE USED FOR HUMAN FOOD.

SP
1.2.3/
mod.

Fish and ingredients should be rejected if they are found to contain harmful, decomposed or foreign substances which cannot be removed to acceptable levels by normal procedures of sorting or preparation. Fish in a diseased condition should be discarded or the diseased portion removed as appropriate. Only clean and sound fish should be used for further processing into battered and/or breaded products.

A natural odour or flavour reminiscent of iodoform in fish is not regarded as a defect unless excessive.

3.1.5 FISH OR INGREDIENTS NOT MEETING INSPECTION REQUIREMENTS SHOULD BE REJECTED AND DISPOSED OF WITHOUT UNDUE DELAYS.

Materials that are found to be defective should be rejected and removed from the processing area promptly. If contamination of other stored lots should result from entry of refused materials into the plant, they should not be permitted into storage areas. This will particularly apply to dry batter, breadings or any other dry food ingredient that may be found contaminated with live insects.

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

4.1 Plant Construction and Layout

4.1.1 General considerations

4.1.1.1 BATTERED AND/OR BREADED FISH PROCESSING AND FREEZING PLANTS SHOULD BE SPECIALLY DESIGNED FOR THE PURPOSE.

FR
5.1.1/
mod.

Raw fish spoils considerably faster than raw meat of warm blooded animals. The keeping time of the fish delivered to the processing plant has been already reduced by time and conditions of handling and storage on the fishing vessel. Nothing can be done by the processing and freezing to improve the quality of fish delivered.

The battered and/or breaded processing and freezing plant therefore should meet the same requirements for construction and sanitary facilities and general operating practices as detailed in the Recommended International Code of Practice for Fresh Fish, the Codes of Practice for Frozen Fish, for Shrimp or Prawns, Minced Fish, and the General Principles of Food Hygiene.

- 4.1.1.2 BATTERED AND/OR BREADED FISHERY PRODUCTS OPERATIONS SHOULD BE DESIGNED TO CONVERT FISH INTO FURTHER PROCESSED, WHOLESOME, CONVENIENT, EASY-TO-PREPARE, BATTERED AND/OR BREADED FISHERY PRODUCTS. FR 5.1.1.1/mod.

The decision to initiate a battered and/or breaded fishery products operation should be based on reasonable assurances that there will be sufficient supplies to sustain the operation and that the further processed products will be wholesome, will remain stable and will be attractive to consumers in the intended markets.

The proposal to handle any non-fish food products together with the fish should also be carefully assessed before the decision is taken. The handling and processing of fish should also be conducted in separate buildings or areas which are physically separated to prevent any contamination of fish or fishery products.

- 4.1.1.3 PLANTS FOR THE PROCESSING AND FREEZING OF BATTERED AND/OR BREADED FISHERY PRODUCTS SHOULD BE DESIGNED AND EQUIPPED SO THAT ALL HANDLING, PROCESSING AND FREEZING OPERATIONS CAN BE CARRIED OUT EFFICIENTLY AND THE PRODUCTS CAN PASS FROM ONE STAGE OF PROCESSING TO THE NEXT IN AN ORDERLY MANNER AND WITH MINIMUM DELAY. FR 5.1.1.3/mod.

To conserve their quality, fishery products destined for freezing should be handled, processed and frozen as soon as possible after they enter the processing stages. A great deal of care should be taken in planning the layout and equipment of a plant to ensure that there are sufficient space and suitable facilities to carry out each operation efficiently and to move products through the various stages in an orderly manner. Adequate working space should be provided to allow for satisfactory performance of all operations.

The location of the freezer store for incoming and final products should also be taken into account when arranging the equipment, positioning the freezers and elaborating the flow diagram for the whole operation.

In designing a freezer store for battered and/or breaded fishery product operations, the following additions and modifications might be worth while considering:

- (a) Tempering room where fish blocks can be held at a slightly higher temperature for conditioning prior to cutting into sticks or portions, and
- (b) a temporary holding freezer store where small batches of the product can be held for a short period of time either before shipment or for further processing.

Use should be made of conveyors and other mechanical moving devices wherever they become economically practical. The use of continuous lines instead of batch operation is recommended.

Considerable elasticity of operation could be achieved by having adequate storage facilities for the incoming material. Fishery products which could not be immediately handled and processed should be kept chilled or frozen and protected from contamination and damage until ready for further handling and processing.

4.1.2 Plant construction and sanitary design

- 4.1.2.1 THE GROUNDS ABOUT A FOOD PLANT SHALL BE FREE FROM CONDITIONS WHICH MAY RESULT IN THE CONTAMINATION OF FOOD.

There should not be improperly stored equipment, litter, waste, refuse, and uncut weeds or grass within the immediate vicinity of the plant that may constitute an attractant, breeding place or harbourage for rodents, birds, insects and other pests.

The surrounding area should also be free of excessively dusty roads, yards or parking lots that may constitute a source of contamination in areas where food is exposed.

4.1.2.2 SURROUNDING AREA OF PLANT SHOULD BE ADEQUATELY DRAINED.

The plant should be located in areas not subject to flooding. The area around the plant should be properly drained and free of stagnant pools of water that may contribute contamination to food products through seepage or foot-borne filth and by providing a breeding place for insects or microorganisms.

4.1.2.3 THE PLANT AND SURROUNDING AREA SHOULD BE KEPT REASONABLY FREE FROM OBJECTIONABLE ODOURS, SMOKE, DUST OR OTHER CONTAMINATION. THE BUILDINGS SHOULD BE SUFFICIENT IN SIZE WITHOUT CROWDING OF EQUIPMENT OR PERSONNEL, WELL CONSTRUCTED AND KEPT IN GOOD REPAIR. THEY SHOULD BE OF SUCH DESIGN AND CONSTRUCTION AS TO PROTECT AGAINST THE ENTRANCE AND HARBOURAGE OF INSECTS, BIRDS OR OTHER VERMIN AND TO PERMIT READY AND ADEQUATE CLEANING.

FF
5.1.2.1/
mod.

The location of a plant, its design, layout, construction and equipment, should be planned in detail with considerable emphasis on the hygienic aspect, sanitary facilities and quality control.

National or local authorities should always be consulted in regard to building codes, hygiene requirements of the operation and sanitary disposal of sewerage and plant waste.

Prior to construction of a new plant or modification of the existing one, a proper flow pattern of operation should be considered. Only a well organized work flow could ensure the maximum efficiency of the operation and the better quality product.

The food handling area should be completely separate from any part of the premises used as living quarters.

4.1.2.4 SUFFICIENT WORKING SPACE SHOULD BE PROVIDED SO AS TO PREVENT CONTAMINATION OF FOODS AND FOOD CONTACT SURFACES BY EMPLOYEES DURING THE HANDLING, PROCESSING AND PACKING CHORES.

Aisles or working spaces between equipment and between equipment and walls should be unobstructed and of sufficient width to permit employees to perform their duties without contamination of food or food contact surfaces with clothing or personal contact.

4.1.2.5 THE PLANT SHOULD BE ADEQUATELY PROTECTED AGAINST THE ENTRANCE OF BIRDS, INSECTS, RODENTS AND OTHER PESTS.

The plant should be provided with effective screening or other protective devices against the entrance of birds and vermin including, but not limited to, insects and rodents. Doors should have a good fitting to both the frame and the floor. Windows should also be well fitted and protected with wire screening.

4.1.2.6 FLOORS SHOULD BE HARD SURFACED, NON-ABSORBENT AND ADEQUATELY DRAINED.

FF
5.1.2.2

Floors should be constructed of durable, water-proof, non-toxic, non-absorbent material which is easy to clean and disinfect. They should be non-slip and without crevices and should slope evenly and sufficiently for liquids to drain off to trapped outlets protected by a grill.

If floors are ribbed or grooved to facilitate traction, any grooving of this nature should always run towards the drainage channel.

The junctions between the floors and walls should be impervious to water and should be coved or rounded for ease of cleaning.

Concrete, if not properly finished and cured, is porous and can be affected by animal oils, strong brines, various detergents and disinfectants. If used, it should be dense, of a good quality and with a well-finished water-proof surface.

- 4.1.2.7 DRAINS SHOULD BE OF AN ADEQUATE SIZE, SUITABLE TYPE, EQUIPPED WITH TRAPS AND WITH REMOVABLE GRATINGS TO PERMIT CLEANING. FF 5.1.2.3

Suitable and adequate drainage facilities are essential for removing of liquid or semi-liquid wastes from the plant. There should not be any floor area where water might collect in stagnant pools. Drains should be constructed of smooth and impervious material and should be designed to cope with the maximum flow of liquid without any over-flowing and flooding. Each drainage inlet should be provided with a deep seal trap which is appropriately located and easy to clean.

Drainage lines carrying waste effluent should be properly vented, have a minimum internal diameter of 10 cm (4 inches) and, if required, run to a catch basin for removal of the solid waste material. Such a basin should be located outside the processing area and should be constructed of waterproof concrete or other similar material, designed to the local specifications and approved by the local authority having jurisdiction.

- 4.1.2.8 INTERNAL WALLS SHOULD BE SMOOTH, WATERPROOF, RESISTANT TO FRACTURE, LIGHT COLOURED AND READILY CLEANABLE. FF 5.1.2.4

Acceptable materials for finishing walls inside are cement render, ceramic tiles, various kinds of rust-resistant, metallic sheeting such as stainless steel or aluminium alloys and a variety of non-metallic sheetings which have adequate impact resistance, desirable surface qualities and are easily repairable. All sheeting joints should be welded or else sealed with a mastic or other compound resistant to hot water and mould growth and cover strips should be applied where necessary.

Wall-to-wall junctions should be coved or rounded to facilitate cleaning.

Walls should be free from projections and all pipes and cables should be sunk flush with the wall surface, neatly boxed in and sealed to the wall or neatly boxed in adequately high above floor level, e.g. 1.5 m, and mounted from the wall to allow for adequate cleaning and prevention of insect harbourage.

- 4.1.2.9 WINDOW SILLS SHOULD BE KEPT TO A MINIMUM SIZE, BE SLOPED INWARD AT 45° AND BE AT LEAST 1 M FROM THE FLOOR. FF 5.1.2.5

Window sills and frames should be made of a smooth, water-proof material and, if of wood, should be kept well-painted. Internal window sills should be sloped to prevent storage of miscellaneous materials or accumulation of dust and should be constructed to facilitate cleaning.

Windows should be filled with whole panes and those which open should be screened. The screens should be made so as to be easily removable for cleaning and should be made from suitable corrosion-resistant material.

- 4.1.2.10 ALL DOORS THROUGH WHICH FISH AND THEIR PRODUCTS ARE MOVED SHOULD BE SUFFICIENTLY WIDE, WELL CONSTRUCTED OF A SUITABLE MATERIAL AND SHOULD BE OF A SELF-CLOSING TYPE. FF 5.1.2.6

Doors through which fish and their products are moved should be either of a corrosion-resistant metal or sheathed with a corrosion-resistant metal or made from other suitable material impervious to moisture with adequate impact resistance and, unless provided with an effective air screen, should be of self-closing type.

Both the doors and the frames of the doorways should have a smooth and readily cleanable surface.

Doors through which the product is not moved, such as those providing staff access, should be appropriately constructed or covered with a surface impervious to moisture, at least on the processing area site, to allow for ease of cleaning.

4.1.2.11 CEILINGS SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT ACCUMULATION OF DIRT AND CONDENSATION AND SHOULD BE EASY TO CLEAN.

FF
5.1.2.7/
mod.

Ceilings should preferably be at a minimum of 3 m from the floor in height, free from cracks and open joints and should be of a smooth, water-proof, light coloured finish, which does not permit growth of mould.

In buildings where beams, trusses, pipes or other structural elements are exposed, the fitting of a suspended ceiling just below is desirable. However, ceilings of this type should be frequently inspected for the potential harbourage of pests and dust accumulation.

Where the roof beams and trusses cannot be covered, the underside of the roof may constitute a satisfactory ceiling providing all joints are sealed and the supporting structures are of a smooth, well-painted and light coloured surface, easily cleanable and constructed to protect the fish products from falling debris, dust or condensate.

Ceilings in processing area should be cleared of any fixture that may be a cause for contamination of foods or equipment.

Fixtures, ducts, pipes and other similar service attachments should not be suspended over working areas in such manner that drip or condensate may contaminate the fish, ingredients or food contact surfaces.

4.1.2.12 A MINIMUM ILLUMINATION OF 220 LUX (20 FT CANDLES) IN GENERAL WORKING AREAS AND NOT LESS THAN 540 LUX (50 FT CANDLES) AT POINTS REQUIRING CLOSE EXAMINATION OF THE PRODUCT SHOULD BE PROVIDED AND SHOULD NOT ALTER COLOURS.

FF
5.1.2.9/
mod.

Light bulbs and fixtures suspended over the working areas where fishery products are handled in any step of preparation should be of the safety type or otherwise protected to prevent food contamination in case of breakage. It is highly desirable to have the light fixtures either recessed flush with the ceiling or with the upper surface of the light fixtures fitting flush with the ceiling in order to prevent the accumulation of dust on them.

Reflector fixtures should be designed to allow easy dismantling, cleaning and re-assembling.

4.1.2.13 PREMISES SHOULD BE WELL VENTILATED TO PREVENT EXCESSIVE HEAT, CONDENSATION AND CONTAMINATION WITH ODOURS, DUST, VAPOUR OR SMOKE.

FF.
5.1.2.8

Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes, vapours or contaminating aerosols. The air-flow in the premises should be from the more hygienic areas to the less hygienic areas. Good ventilation is important to prevent condensation and growth of moulds in overhead structures. Ventilation openings should be screened and, if required, equipped with proper air filters. Windows which open for ventilation purposes should be screened. The screens should be made easily removable for cleaning and should be made from suitable corrosion-resistant material.

4.1.2.14 THE FREEZER STORE SHOULD BE ADEQUATE FOR THE INTENDED PRODUCTION, TIME AND TEMPERATURE OF STORAGE.

FR
5.1.2.11/
mod.

The freezer store should be designed taking into account the size of intended production, the type of fishery products, the intended time of storage and the optimal temperature requirements. The store should be equipped with indicating thermometer. Fitting of recording thermometers is strongly recommended.

It is also desirable that the location and the design of the freezer store should be integrated into the general layout of the whole establishment and its operation should be incorporated into the flow pattern of the overall

operation. The freezer boats or the incoming trucks should be able to transfer their frozen fishery products into the freezer store with the minimal exposure to ambient temperature and with the least possible handling. The same requirements should also apply to the loading of the refrigerated vehicles or railway cars.

In designing the freezer store and depending on the requirements of the operation, it might be worth while considering a tempering room where fish blocks can be held at a slightly higher temperature for conditioning prior to cutting into sticks, fingers or portions.

- 4.1.2.15 A GOOD VAPOUR SEAL IS REQUIRED ON THE OUTSIDE SURFACES OF THE FREEZER STORE AND PRECAUTIONS SHOULD BE TAKEN TO AVOID DANGER OF FROST HEAVE FROM THE SUBSOIL. FR 5.1.2.12

It is extremely important to have an effective water vapour barrier totally enveloping the warm face of the insulation layer in the freezer store walls, ceiling and floor. In the absence of such a barrier, the water vapour from the warm outside air will diffuse into the insulating material and freeze on reaching the 0°C (32°F) boundary. Freezing of this kind will bring about a gradual build-up of ice within the insulation layer, thus reducing its insulating efficiency and eventually could result in a serious structural deterioration of the whole building.

- 4.1.2.16 THE INFLOW OF OUTSIDE AIR INTO THE FREEZER STORE SHOULD BE MINIMIZED AS MUCH AS POSSIBLE. WHERE A FREEZER STORE DOOR MUST BE OPENED FREQUENTLY, THE FLOW OF AIR THROUGH THE DOOR SHOULD BE RESTRICTED BY THE USE OF AN AIR LOCK CHAMBER, A COLD AIR CURTAIN, SELF-CLOSING SHUTTERS OR SOME OTHER SIMILAR DEVICE. FR 5.1.2.13

When a freezer store door is opened to the outside atmosphere, a strong convection current will rapidly exchange the cold air in the store with warm air from outside. This in turn will raise the temperature of the store appreciably and put an additional load on the cooling equipment. The moisture brought in with the outside air will also freeze on the cooling surfaces and reduce their efficiency. If a freezer store has more than one entrance, only one door should be open at a time; otherwise, air currents may greatly increase the inflow of warm outside air.

The proper installation and use of air lock chambers, cold air curtains, self-closing shutters or similar devices will greatly reduce the flow of warm air into a freezer store during loading and unloading operations.

- 4.1.2.17 TEMPERATURE DIFFERENCE BETWEEN THE PRODUCT AND THE FREEZER STORE COOLING SURFACES SHOULD BE AS SMALL AS POSSIBLE AND EXCESSIVE AIR CIRCULATION SHOULD BE AVOIDED. FR 5.1.2.14/mod.

The bigger the difference between the temperature of the store and the product, the faster the dehydration will be. The drying of products in a freezer store is, however, a complex matter depending on many factors, such as movement of air, its humidity, incidental leakage of heat into the store (frequent opening of the doors), fluctuation in storage temperature, storage conditions or type of packaging material used for the products. Even with the best conditions of storage and packaging, frozen fishery products will dry slowly if held too long.

- 4.1.2.18 PROVISION SHOULD BE MADE FOR AN EFFECTIVE AND REGULAR DEFROSTING OF THE FREEZER STORE COOLING SURFACES. FR 5.1.2.15

All freezer store cooling surfaces should be regularly defrosted in order to prevent an excessive build-up of ice or frost which could seriously affect the efficiency of the cooling system and may unnecessarily overload refrigeration equipment.

Defrosting in modern plants is done automatically while in some older installations it could be done manually by scraping and brushing off, by a hot defrost, or by allowing the ice to thaw.

During the defrosting operations care should be taken to prevent any frost, ice or melt water falling on to the stored fish or fish products.

- 4.1.2.19 ALL FREEZER STORES SHOULD BE FITTED WITH AN ALARM DEVICE, OPERATED FROM FR INSIDE, SO THAT ANYONE TRAPPED INSIDE CAN OBTAIN ASSISTANCE QUICKLY. 5.1.2.16

It should always be possible to open freezer store doors from within. An efficient system of signalling for aid is however necessary in case a person is trapped inside a freezer store. The alarm should sound in an area of the plant where there is always someone on duty. Workers should not enter freezer stores alone without advising someone else of their intention to do so.

Doors leading to the freezer store should preferably be of a sliding type and mechanically operated. A gasket heater should be present to facilitate the opening of the door.

4.1.3 Hygiene Facilities

- 4.1.3.1 AREAS WHERE FISH OR INGREDIENTS ARE RECEIVED, STORED, PROCESSED OR PACKAGED SHOULD BE SEPARATED IN SUCH A MANNER AS TO PREVENT CONTAMINATION OF THE FINISHED PRODUCT. FF 5.1.3.1/mod.

Well defined areas of adequate size, preferably separate rooms, should be provided for receiving and storing the fish, receiving and storing the ingredients, operations like heading and gutting fish, washing, filleting, and steaking of the fish, and breaching and/or battering or other processing and packaging.

Manufacture or handling of food intended for human consumption should be entirely separate and distinct from the areas used for the handling and storage of items/products not intended for human consumption.

Receiving and storage areas should be clean and readily capable of being maintained in a clean condition and should provide protection for the fish or ingredients from deterioration and contamination.

- 4.1.3.2 A SEPARATE REFUSE ROOM OR OTHER EQUALLY ADEQUATE OFFAL STORAGE FACILITIES SHOULD BE PROVIDED ON THE PREMISES. FF 5.1.3.2

If offal or other refuse is to be collected and held before removal, adequate precautions should be taken to protect it against rodents, birds, insects and exposure to warm temperatures.

A separate refuse room for storing waste in water-tight containers or offal bins should be provided. The walls, floor and ceiling of such a storage room, and the area under the elevated bins should be constructed of impervious material which can be readily cleaned. Where waste material is held in containers outside the establishment, the containers should be lidded. A separate enclosure should be provided for their storage with easy access for vehicles loading and unloading. Stands for the containers should be of solid, hard and impervious material which can be easily cleaned and properly drained.

If containers are used in large numbers, a mechanical washing plant might be advisable to provide for routine washing. Containers should be capable of withstanding repeated exposure to normal cleaning processes.

- 4.1.3.3 ANY BY-PRODUCT PLANT SHOULD BE ENTIRELY SEPARATE FROM THE PLANT WHICH IS PROCESSING FISHERY PRODUCTS FOR HUMAN CONSUMPTION. FF 5.1.3.3/mod.

The layout and construction of a plant processing fish for human consumption should be such as to ensure that the areas in which fishery products for human consumption are held, processed and stored are used for that purpose only.

Any processing of by-products or non-fish products not intended for human consumption should be conducted in separate buildings or in areas which are physically separated in such a way that there is no possibility of contamination of fish or fish products.

- 4.1.3.4 AN AMPLE SUPPLY OF COLD AND HOT POTABLE WATER AND/OR CLEAN SEA WATER UNDER ADEQUATE PRESSURE SHOULD BE AVAILABLE AT NUMEROUS POINTS THROUGHOUT THE PREMISES AT ALL TIMES DURING THE WORKING HOURS. FF 5.1.3.4

All water available for use in those parts of establishments where fish are received, held, processed, packaged and stored should be potable water or clean sea water and should be provided at a pressure of no less than 1.4 kg/cm² (20 lb/in²). If sea water is used, it must be clean sea water.

An adequate supply of hot water of potable quality at a suitable temperature should be available at all times during the plant operation.

Water used for washing or conveying raw materials should not be recirculated unless it is restored to a level of potable quality.

- 4.1.3.5 WHEN IN-PLANT CHLORINATION OF WATER IS USED THE RESIDUAL CONTENT OF THE FREE CHLORINE SHOULD BE MAINTAINED AT NO MORE THAN THE MINIMUM EFFECTIVE LEVEL FOR THE USE INTENDED. FF 5.1.3.5

The cold water supply used for cleaning purposes should be fitted with an in-line chlorination system allowing the residual chlorine content of the water to be varied at will in order to reduce multiplication of microorganisms and prevent the build-up of fish odours.

Chlorination systems should not be relied on to solve all sanitation problems. The indiscriminate use of chlorine cannot compensate for non-hygienic conditions in a processing plant.

- 4.1.3.6 ICE SHOULD BE MADE FROM POTABLE WATER OR CLEAN SEA WATER AND SHOULD BE MANUFACTURED, HANDLED AND STORED SO AS TO PROTECT IT FROM CONTAMINATION. FF 5.1.3.6

Ice used in the operation of the fishery products processing establishment should be made from potable water or clean sea water.

A special room, or other suitable storage facilities, should be provided to protect the ice from contamination and excessive melting. Dust, flakes of paint, bits of wood or sawdust, chips of concrete, straw and rust are the most frequent contaminants transferable by ice into the final product. Foot traffic should be kept to a minimum.

Care must be taken that ice used to chill fish, fishery products or any ingredients does not contaminate them.

- 4.1.3.7 WHERE A NON-POTABLE AUXILIARY WATER SUPPLY IS USED, IT SHOULD BE STORED IN SEPARATE TANKS, CARRIED IN SEPARATE LINES, IDENTIFIED BY CONTRASTING COLOURS, LABELLED, AND HAVE NO CROSS-CONNECTIONS OR BACK-SIPHONAGE WITH LINES CARRYING POTABLE WATER. FF 5.1.3.7

Non-potable water may be used for such purposes as producing steam, cooling heat exchangers and fire protection.

It is very important that the systems of storage and distribution of potable and non-potable water are entirely separate and there is no possibility of cross-connection or of inadvertent usage of non-potable water in the fish processing areas. Only potable quality water should be used for the supply of hot water.

The same requirement for separation on systems would apply for clean sea water when it is used in the processing of fish.

4.1.3.8 ALL PLUMBING AND WASTE DISPOSAL LINES, INCLUDING SEWER SYSTEM, SHOULD BE LARGE ENOUGH TO CARRY PEAK LOADS AND SHOULD BE PROPERLY CONSTRUCTED. FF 5.1.3.8/
mod.

All lines should be water-tight and have adequate deep seal traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water or clean sea water supplies.

Sumps or solid matter traps of the drainage system should preferably be located outside the processing area and so designed as to allow them to be emptied and thoroughly cleaned at the end of each working day or more often as needed.

When waste systems are installed overhead in processing rooms to service upper floors, the installation and location of these systems should be such as to preclude any chance of contaminating processing lines.

The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.

4.1.3.9 PROPER FACILITIES FOR WASHING AND DISINFECTION OF EQUIPMENT SHOULD BE PROVIDED. FF 5.1.3.9/
mod.

Facilities should be present in every fishery products processing establishment for cleaning and disinfection of trays, removable cutting or filleting boards, containers and other similar equipment and working implements. Such facilities should be located in a separate room or in a designated area where there is an adequate supply of hot and cold potable water or clean sea water, under good pressure, and where there is proper drainage.

Any containers and equipment used for offal or contaminated materials should not be washed in the same area.

4.1.3.10 ADEQUATE AND CONVENIENTLY LOCATED TOILET FACILITIES SHOULD BE PROVIDED. FF 5.1.3.10/
mod.

Toilet rooms should have walls and ceilings of a smooth, washable, light coloured surface and floors constructed of impervious and readily cleanable material. Toilet facilities should be well lit, ventilated and kept in a hygienic condition at all times. An adequate supply of toilet paper should be available in each toilet cubicle.

The doors leading to the facilities should be a self-closing type and should not open directly into the food processing areas.

Hand washing facilities of a type not requiring operation by hand with an adequate supply of warm or hot and cold potable water or clean sea water, with liquid or powdered soap and with a suitable hygienic means of drying the hands, should be provided adjacent to the toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles for used towels should be provided.

Notices should be posted directing personnel to wash their hands after using the toilets.

The following formula could be used in assessing the adequacy of toilet facilities in relation to the number of employees:

1 to 9 employees	1 toilet
10 to 24 employees	2 toilets
25 to 49 employees	3 toilets
50 to 100 employees	5 toilets
For every 30 employees over 100	1 toilet

Note: Urinals may be substituted for toilets, but only to the extent of one-third of total toilets required.

- 4.1.3.11 FACILITIES SHOULD BE AVAILABLE IN THE PROCESSING AREAS FOR EMPLOYEES TO WASH AND DRY THEIR HANDS AND FOR DISINFECTION OF PROTECTIVE HAND COVERINGS. FF 5.1.3.11/
mod.

In addition to hand washing facilities available in toilet rooms, a number of washbasins with an adequate supply of hot and cold potable water or clean sea water and appropriate liquid or powdered soap should be provided whenever the process demands. They should be located at all employee entrances in full view of the processing floor and should be of a type not requiring operation by hand or be fed by a continuous flow of potable water or clean sea water. Single use towels are recommended; otherwise the method of drying hands should meet the requirements of the official agency having jurisdiction, In case single use paper towels are provided a sufficient number of dispensers as well as receptacles for used towels should be available. The facilities should be kept in a hygienic condition at all times.

- 4.1.3.12 STAFF AMENITIES CONSISTING OF LUNCHROOMS, CHANGING-ROOMS OR ROOMS CONTAINING SHOWER OR WASHING FACILITIES SHOULD BE PROVIDED. FF 5.1.3.12

Where workers of both sexes are employed, separate facilities should be present for each except that the lunchrooms may be shared. As a general guide, the lunchrooms should provide seating accommodation for all employees and the ~~changing-rooms~~ should provide enough space for lockers or some alternative facilities for each employee without causing undue congestion. Clothing and footwear not worn during working hours must not be kept in any processing area.

- 4.1.3.13 STORAGE FACILITIES SHOULD BE AVAILABLE FOR THE PROPER DRY STORAGE OF DRY BATTERS, BREADINGS, OTHER DRY INGREDIENTS AND PACKAGING MATERIALS. FF 5.1.3.13/
mod.

Separate facilities for the storage of dry materials such as dry batters, breadings and other dry ingredients, cartons and other packaging materials should be provided in order to protect them against moisture, dust, rodents, birds, crawling and flying insects and other sources of contamination.

- 4.1.3.14 IF POISONOUS OR HARMFUL MATERIALS, INCLUDING CLEANING COMPOUNDS, DISINFECTANTS AND PESTICIDES ARE STORED, THEY SHOULD BE KEPT IN A SEPARATE ROOM DESIGNED AND MARKED SPECIFICALLY FOR THIS PURPOSE. FF 5.1.3.14

All such materials must be prominently and distinctly labelled so that they can be easily identified. The room should be kept locked and the materials contained in it should be handled only by personnel trained in their use.

4.2 Equipment and Utensils

- 4.2.1 ALL WORK SURFACES AND ALL CONTAINERS, TRAYS, TANKS AND OTHER EQUIPMENT USED FOR PROCESSING BATTERED AND/OR BREADED FISH PRODUCTS SHOULD BE OF SMOOTH, IMPERVIOUS, NON-TOXIC MATERIAL WHICH IS CORROSION-RESISTANT AND SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT HYGIENIC HAZARDS AND PERMIT EASY AND THOROUGH CLEANING. WOOD SHOULD NOT BE USED FOR THIS PURPOSE. FF 5.2.1/
mod.

Contamination of fish or ingredients during processing can be caused by contact with unsatisfactory surfaces. All food contact surfaces should be smooth, free from pits, crevices and loose scale, substances harmful to man, unaffected by salt, fish juices or other ingredients used, and be capable of withstanding repeated cleaning and disinfection.

Machines and equipment should be so designed that they can be easily dismantled to facilitate thorough cleaning and disinfection.

The design, construction and use of such equipment and utensils should preclude the adulteration of the foods with lubricants, fuel, metal fragments, contaminated matter or any other contaminants. All equipment should be installed

and maintained so as to facilitate the cleaning of the equipment and of all adjacent space.

Containers used for holding fish should preferably be constructed of plastic or corrosion-resistant metal. **Wicker baskets should not be used.**

All seams should be smoothly soldered, welded or bonded to prevent accumulation of fish residues, batter, or any other materials that may be capable of sustaining microbial multiplication.

Stationary equipment should be installed in such a manner as will permit easy access and thorough cleaning and disinfection. Fish washing tanks should be designed to provide a constant change of water with good circulation, and to have provisions for drainage and to be easily cleaned.

Equipment and utensils used for inedible or contaminated materials should be identified as such and should not be used for handling fish and products intended for human consumption.

4.2.2 **BATTER AND/OR BREADING PROCESSING LINES SHOULD BE DESIGNED AS A CONTINUOUS SYSTEM WITH THE VARIOUS STAGES OF THE OPERATION SO ARRANGED AS TO SWIFTLY MOVE THE IN-PROCESS PRODUCTS FROM ONE POINT TO THE NEXT ONE BY CONVEYORIZED MEANS WITHOUT UNDUE DELAYS AND STOPPAGES AND PROVIDING MAXIMUM PROTECTION FROM CONTAMINATION.**

Batter and/or breading lines should be properly designed and synchronized with the rest of the fish plant's operation and in line operations to adequately handle the desired production volume without impairing the microbiological or physical quality of the finished product and with the least cost of processing.

The batter and/or breading equipment should be constructed of suitable corrosion-resistant material. There should be an easy access to every part of the line and it should be easy to dismantle for cleaning purposes.

4.2.3 **BATTER AND/OR BREADING SHOULD BE APPLIED BY MEANS OF MECHANICAL EQUIPMENT THAT WILL ASSURE A FAST FLOW OF PRODUCT AND A UNIFORM COATING THROUGHOUT THE PRODUCTION RUN.**

Manual application of batter and/or breading **may lead to unsatisfactory** hygienic conditions and to lack of uniformity in the level of coating desired. Under these conditions the temperature of the batter is difficult to control and the batter can get easily contaminated by the manual dipping of the fish by the operator. Mechanical systems of application should be used to properly control temperature and viscosity of the batter and to diminish the sources of contamination and microbial growth. Mechanical batter systems should be equipped with viscosity recorders and controls and a recording thermometer. Ideally, batter systems should also be equipped with an automatic cooling system such as a heat exchanger to cool the batter continuously rather than by adding ice made from potable water intermittently. Mechanical batter equipment should be able to recirculate the batter continuously through the cooling system and to progressively incorporate new batter in the system to replace the depleted batter used on the product.

Breading application equipment should be capable of dispensing the breading from a suitable size hopper into a moving belt where the breading particles are picked up by the moist moving product. The product may be moistened by the simple application of water (dip or spray) or by the application of batter.

4.2.4 **FRYERS SHOULD BE SUITABLE FOR PREPARATION OF THE PRODUCT.**

The type of equipment, batch or continuous, should suit the production capacity of the plant. The design should be such that the absorption of oxygen should be minimal. Vortexing and cascading of oil should be avoided. Proper location of the pump can preclude the formation of vortices.

The fryer should not expose to the oil any copper, copper containing or other catalytically active metals that may cause its deterioration. Care should be taken to minimize or eliminate "hot-spots" or localized over-heating of the oil. Any type of filtration system should be designed to prevent aeration of the heated oil. An adequate system for the removal of cooker fumes should be provided. The fryer should be designed to use the absolute minimum amount of cooking oil necessary. The cooker should be constructed to permit easy cleaning. Cookers that are intended for use with hard fats as contrasted to liquid cooking oils should be equipped with a low-heat source or with an external preheater unit.

- 4.2.5 MECHANICAL CONVEYORS SHOULD BE INSTALLED WHENEVER PRACTICAL TO HANDLE FISH AND FISH PRODUCTS DURING PROCESSING FLOW OPERATIONS. FR 5.2.6/mod.

Manual methods of moving fish and fish products through the various phases of the processing flow are usually inefficient, costly in manpower, time-consuming and often risky microbiologically. Manual methods may also be detrimental to the physical quality of the battered and/or breaded fishery products. The use of mechanical conveyors should be encouraged wherever they are applicable.

- 4.2.6 FREEZING EQUIPMENT SHOULD BE SUITABLE FOR THE PARTICULAR PRODUCT AND SHOULD HAVE AN ADEQUATE CAPACITY TO HANDLE THE MAXIMUM PRODUCTION CAPABILITIES OF THE PLANT AT ANY GIVEN TIME. FR 5.2.8/mod.

It is essential that all freezing processes be undertaken in an orderly manner, using equipment of sufficient capacity and suitable for the product. The freezers should have proper defrosting facilities and be designed so that they are easy to clean. Refrigeration equipment needs to be reliable, capable of running for long periods with minimum attention and should have an automatic device for shutting it down in an emergency. An expert in this field should be consulted.

- 4.2.7 FREEZERS AND FREEZER STORES SHOULD BE FITTED WITH TEMPERATURE CONTROL DEVICES AND THERMOMETERS THAT ENSURE PROPER FUNCTIONING OF THE REFRIGERATING UNITS.

Each freezer and freezer store used for fish, ingredients, materials in process, or finished product should be fitted with an automatic control for regulating temperatures or an automatic alarm system to indicate a significant temperature change in a manual operation. Freezers should also have an indicating thermometer so installed as to show accurately the temperature and a recording thermometer to indicate accurately at all times the temperature within the compartment. Thermometers should have an accuracy of $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$).

4.3 Hygienic Operating Requirements

- 4.3.1 GENERAL **HYGIENE** IN AN ESTABLISHMENT WHERE BATTERED AND/OR BREADED FISH ARE PROCESSED SHOULD BE OF THE HIGHEST STANDARD. FF 5.3.1/mod.

All fish and ingredients used in the processing of battered and/or breaded products as well as all surfaces, equipment, containers and utensils which come in contact with the raw materials, in-process products or finished products should be treated in a hygienic manner.

Fish, because of its highly perishable nature, requires strict adherence to specific hygiene requirements which should become part of a daily operational routine of the plant. All operations should be carried out in a manner and condition suitable for the handling of food for human consumption.

- 4.3.2 THE BUILDING AND OTHER PHYSICAL FACILITIES OF THE PLANT SHOULD BE KEPT CLEAN, IN GOOD REPAIR AND MAINTAINED IN AN ORDERLY AND HYGIENIC CONDITION. FF 5.3.2/mod.

All surfaces which come in contact with fish should be hosed down with cold or hot potable water or clean sea water (as appropriate) as frequently as necessary to ensure cleanliness. It is important that the cleaning method will remove all residues and the disinfecting method will reduce the microbial population of the surface being cleaned.

The use of cold or hot potable water or clean sea water alone is generally not sufficient to accomplish the required result. Aids such as suitable cleaning and disinfecting agents together with manual or mechanical scrubbing, wherever appropriate, should be used to assist in achieving the desired objective. High pressure cleaning systems can be effective cleaning methods. After the application of cleaning and disinfecting agents the surfaces which come in contact with fish ~~should~~, after an adequate contact time has elapsed, be rinsed thoroughly with cool potable water or cool clean sea water before use.

4.3.3 EQUIPMENT AND UTENSILS SHOULD BE KEPT CLEAN, IN GOOD REPAIR AND SHOULD BE MAINTAINED IN AN ORDERLY AND HYGIENIC CONDITION.

Saws, conveyors, tables, containers, utensils and food contact surfaces should be rinsed and disinfected as appropriate during plant operations. Batter application equipment which is not provided with an enclosed cooling system should be flushed and disinfected as appropriate during operation. Batter which is enclosed in continuously circulating equipment should be flushed and the equipment cleaned and disinfected at the end of each work day. All batter application equipment, regardless of its type, should be dismantled, cleaned and sanitized at the end of the day's operation.

Breeding application equipment, utensils and other processing equipment excluding breeding holding tanks and breeding pneumatic conveying systems should be thoroughly cleaned and disinfected at the end of the day's operation. Breeding holding tanks and breeding pneumatic conveying systems should be cleaned as appropriate.

Before beginning the day's operation, all utensils and product contact surfaces of equipment except breeding holding tanks, pneumatic conveying systems and packaging lines should be in a clean state.

Containers used to convey or store food should not be handled in a manner conducive to direct or indirect contamination of the contents. Saw blades should be cleaned and disinfected before installation and installed in such a manner as to preclude contact with the floor or other insanitary surfaces. The blades should be free from rust or corrosion which might be transferred to the product.

4.3.4 CLEANING AND DISINFECTION PROCEDURES SHOULD BE EFFECTIVE.

SP
4.3.15/
mod.

Cleaning agents and disinfectants used should be appropriate for the purpose and should be so used as to present no hazard to public health and should meet the requirements of the official agency having jurisdiction.

Cleaning agents and disinfectants should not be allowed to come into contact with fishery products or ingredients. Any residue of cleaning agents used for the equipment or utensils should be removed by thorough rinsing with potable fresh water or clean sea water before the equipment or utensil is used again.

In choosing and applying different cleaning agents and disinfectants, one should be fully aware of their properties and limitations. Many agents are effective only when prepared and used in strict accordance with the manufacturer's recommendations.

Temperature of the solution, its acidity or alkalinity, concentration of the active ingredient, presence of other chemicals, kind of surface to be treated or type of soil (dirt) and mode of application are some of the factors that will determine the usefulness of the agent. Different agents should not be combined without it having been established that they are compatible since one agent may neutralize the activity of another.

4.3.5 ALL MACHINES USED FOR THE PRODUCTION OF BATTERED AND/OR BREADED FISH PRODUCTS SHOULD BE THOROUGHLY CLEANED, DISINFECTED AND RINSED AT SUITABLE TIME INTERVALS AND AT THE END OF OPERATIONS AND BEFORE RESUMPTION OF PRODUCTION FOLLOWING EXTENDED WORK STOPPAGES; AND AT OTHER TIMES WHEN NECESSARY.

FF
5.3.5/
mod.

The use of machinery reduces the risk of contamination from human sources. If, however, these machines are not properly maintained and cleaned as mentioned in section 4.3.3, they can become a serious source of contamination.

- 4.3.6 MACHINERY AND EQUIPMENT SHOULD BE INSPECTED BEFORE PROCESSING BEGINS TO ENSURE THAT IT HAS BEEN PROPERLY CLEANED, DISINFECTED, RINSED AND REASSEMBLED. FF 5.3.6/mod.

Dirty(soiled) surfaces and residues of the cleaning and disinfecting agents which have not been removed by rinsing will contaminate the product.

Mechanized or automated equipment should be regularly checked to prevent breakdowns.

- 4.3.7 ALL TRAPPED OR ACCUMULATED PRODUCTS IN MACHINERY AND EQUIPMENT SHOULD BE REMOVED PERIODICALLY THROUGHOUT THE WORKING DAY. FF 5.3.7

Fish or pieces of fish trapped in equipment spoil rapidly and can contaminate the rest of the product. Fish fillets or similar products which drop on the floor should be discarded.

- 4.3.8 REMOVAL OF SOLID, SEMI-SOLID OR LIQUID WASTES, DEBRIS OR REFUSE RESULTING FROM THE CONVERSION OF FISH INTO BATTERED AND/OR BREADED PRODUCTS SHOULD BE ON A CONTINUOUS OR NEAR-CONTINUOUS BASIS USING WATER AND/OR APPROPRIATE EQUIPMENT SO THAT THESE AREAS ARE KEPT CLEAN AND THERE IS NO DANGER OF CONTAMINATING THE PROCESSED PRODUCTS. FF 5.3.10/mod.

All waste materials resulting from the operation should be disposed of as soon as possible in such a manner that they cannot contaminate food and water supplies and offer harbourage or breeding places for rodents, insects or other vermin.

Containers, conveyors, flumes or chutes used for removal, collection or storage of wastes should be cleaned and disinfected frequently. All waste material from containers and vehicles should be removed in such a way as not to cause contamination and not to create a nuisance. Arrangements for the disposal of inedible refuse and waste should be approved by the appropriate official agency having jurisdiction.

- 4.3.9 IN-LINE FREEZERS SHOULD BE PROPERLY CLEANED AT THE END OF THE DAY'S OPERATION.

When battered and/or breaded fishery products are frozen by means of in-line freezing systems, the freezing equipment should be effectively cleaned at the end of the day's operation or less often if it is kept at -18°C (0°F). The cleaning may be done by shutting off the refrigeration unit, opening the doors or side panels to bring the temperature up faster, and then proceeding to collect and remove all particles of breadding, damaged products, pieces and any other waste material which has accumulated in the freezer. The interior section of the freezer and conveyors are washed with a hot detergent solution heated to an appropriate temperature and then rinsed with hot water. After washing is completed, conveyors and food contact surfaces are rinsed with a disinfectant solution. Air fans are turned on to dry the excess water before the freezer is refrigerated again.

More advanced in-line freezers are equipped with self-cleaning devices which will spray hot water and cleaning and disinfectant solutions and upon inspection, if a hygienic discrepancy is found, it can be corrected by a manual follow-through.

In-line freezers should be fitted with water flows leading to floor drains.

- 4.3.10 EFFECTIVE MEASURES SHOULD BE TAKEN TO PROTECT AGAINST THE ENTRANCE INTO THE PREMISES, ESPECIALLY STORAGE AREAS, AND THE HARBOURAGE ON THE PREMISES OF INSECTS, RODENTS, BIRDS OR OTHER VERMIN. FF 5.3.13/mod.

An effective and continuous programme for the control of insects, rodents, birds or other vermin within the establishment should be maintained. The plant and surrounding area should be regularly examined for evidence of infestation. Where control measures are necessary, treatment should be under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of harmful residues being retained by the fish or their products, and the chemical, biological or physical agents used should meet the requirements of the official agency having jurisdiction.

The use of insecticides during the plant operation, without any provision for collection of dead insects, should be discouraged. Instead, the use of adhesive insect traps or very efficient ultraviolet insect killers with the attached collecting trays is recommended. Insect traps and light sources which may attract insects should not be located directly over the processing areas and should be away from windows and doors. Ultraviolet insect killers should be left on overnight with all doors and windows shut.

Fumigation should never be undertaken during production time. Extreme care should be taken to avoid exposure of foods to fumigants. After fumigation, every piece of equipment and all utensils should be thoroughly rinsed clean and disinfected.

All rodenticides, fumigants, insecticides or other harmful substances should be of a type approved by the official agency having jurisdiction and should be stored in separate locked rooms or cabinets used only for that purpose and handled only by properly trained personnel.

4.3.11 DOGS, CATS AND OTHER ANIMALS SHOULD BE EXCLUDED FROM AREAS WHERE FISH AND INGREDIENTS ARE RECEIVED, HANDLED, PROCESSED OR STORED. FF 5.3.14/mod.

Dogs, cats and other animals are potential carriers of diseases and should not be allowed to enter or to live in areas where fish, packaging materials, ingredients and fishery products are handled, prepared, processed or stored.

4.3.12 ALL PERSONS WORKING IN A BATTERED AND/OR BREADED FISHERY PRODUCTS PLANT SHOULD MAINTAIN A HIGH DEGREE OF PERSONAL CLEANLINESS WHILE ON DUTY AND SHOULD TAKE ALL NECESSARY PRECAUTIONS TO PREVENT THE CONTAMINATION OF FISH OR THEIR PRODUCTS OR INGREDIENTS WITH ANY FOREIGN SUBSTANCE. FF 5.3.15/mod.

All employees should wear, appropriate to the nature of their work, clean, light coloured protective clothing including footwear and a covering for the hair or for beards where required, all of which articles are either washable or disposable.

Gloves used in the handling of fish, and their products, should be maintained in a sound, clean and hygienic condition and should be made of an impermeable material except where their usage would be incompatible with the work involved. Hands should be washed thoroughly with soap or another cleansing agent and warm water and disinfected before commencing work, on every occasion after visiting a toilet, before resuming work and whenever necessary. The wearing of gloves does not exempt the operator from having thoroughly washed hands. Gloved hands should be disinfected at frequent intervals during the processing operations and be treated the same as hands not protected by gloves.

Any behaviour which can potentially contaminate the fish such as eating, smoking, chewing of tobacco or other materials and spitting should be prohibited in any part of the food processing and handling areas.

Operators should remove all insecure jewellery such as earrings that may accidentally fall in the foods and should also remove any jewellery that cannot be adequately disinfected or which may constitute a source of contamination to the foods, such as wrist watches, rings, etc. Clothing should not be stored in areas where food or food ingredients are exposed or in areas for washing equipment or utensils.

4.3.13 NO PERSON WHO IS KNOWN OR SUSPECTED TO BE SUFFERING FROM, OR WHO IS A CARRIER OF A DISEASE LIKELY TO BE TRANSMITTED THROUGH FOOD, OR HAS AN INFECTED WOUND OR OPEN LESION SHOULD BE ENGAGED IN THE PREPARATION, HANDLING OR TRANSPORTING OF FISHERY PRODUCTS AND THEIR INGREDIENTS. GP 6.3 6.4

Plant management should take care to ensure that no person while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea is permitted to work in any food handling area in any capacity in which there is a likelihood of such a person directly or indirectly contaminating fish, fish products or ingredients with pathogenic microorganisms. Any person so affected should immediately report to the management that he is ill.

Any person who has a cut or wound should not continue to handle fisheries products, their ingredients or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

- 4.3.14 CONVEYANCES USED FOR TRANSPORTING FISH SHOULD BE CLEANED AND DISINFECTED IMMEDIATELY AFTER EACH USE AND SHOULD BE SO MAINTAINED AS NOT TO CONSTITUTE A SOURCE OF CONTAMINATION FOR THE PRODUCT. FF 5.3.17/mod.

The cleaning of vehicles, together with receptacles and equipment thereon, should be a regular planned routine. Hosing, scrubbing and cleaning with potable water or clean sea water to which a suitable detergent and/or disinfectant has been added is usually necessary. Receptacles, including pallets, should be stored in a manner which precludes contamination or damage.

- 4.3.15 ALL HANDLING AND PROCESSING OPERATIONS INVOLVED IN THE PREPARATION, STORAGE AND DISTRIBUTION OF BATTERED AND/OR BREADED PRODUCTS SHOULD BE CARRIED OUT UNDER HYGIENIC CONDITIONS. FF 5.3.8/mod.

Fish and fishery products are particularly vulnerable to contamination as their preparation in some cases involves much handling. When the flesh is exposed, any contamination with microorganisms will rapidly reduce potential keeping time and accelerate quality deterioration under fluctuating temperatures. All plant, equipment and workers should therefore comply with the hygienic operating requirements.

In removing the dry batter or breading mixes or other dry ingredients from multi-walled bags, the outer layer of the bag should first be removed. The bag should be slit in the exposed area and the contents removed without contact with the seam ends or closures. If the entire contents are not removed at one time the remainder should be protected against contamination. Ingredients capable of supporting rapid bacterial growth should be closely examined to assure that only clean, wholesome materials are used in production.

- 4.3.16 THE FRYING OF BATTERED AND BREADED PRODUCTS SHOULD BE CONDUCTED IN A MANNER WHICH PRECLUDES CONTAMINATION, PHYSICAL DEFECTS IN THE PRODUCTS AND ENVIRONMENTAL NUISANCES.

The frying oil should be filtered on a continuous basis to eliminate dark particles and crumbs and protect the oil from breaking down at a fast rate. The fryer should be washed every day at the end of production to eliminate surplus fat deposits, crumbs and other residues that may contribute to oil rancidity and polymerization. An alkaline detergent is recommended for cleaning the fryer, followed by the application of an acid rinse and a final rinse with potable water. Water or soap residue in the fryer can cause hazardous foaming of hot oil. Excessive water and soap residues may also result in blow-offs of batter from the product.

Bulk oil storage tanks should be properly sealed to prevent contamination.

Proper ventilation and removal of fumes from the fryer by an exhaust system should be installed to keep the fumes from permeating the plant environment. Fumes from the fryer should be treated or reduced in such a way as to prevent the odours from becoming a nuisance to the surrounding community.

- 4.3.17 FREEZER STORES SHOULD BE FREE FROM ODOURS AND SHOULD BE MAINTAINED IN A GOOD HYGIENIC CONDITION. FR 5.3.9/mod.

The freezer store should be subject to the same hygiene requirements as any other food handling establishment. A regular clean-up procedure should be maintained to ensure a good sanitary environment. Frozen products of questionable quality should not be stored with products of good quality unless they are well separated and easily identified. Any motorized transportation that is producing odours should not be used inside the freezer store.

4.4 Operating Practices and Production Requirements

4.4.1 General considerations

- 4.4.1.1 FISH AND THEIR PRODUCTS SHOULD ALWAYS BE TREATED IN A HYGIENIC MANNER. FF 5.4.1.2/mod.

Thawing, peeling and deveining of shrimp; sawing, cutting and chopping of frozen fish blocks; battering and/or breading of fish and shrimp and other operations in the handling and processing of battered and/or breaded fishery products should be clean and hygienic. Precautions should be taken to protect the products from contamination by animals, insects, birds, chemical or microbiological contaminants or other objectionable substances during processing, handling and storage.

Preparatory operations leading to the finished product and to the freezing and packaging operations should be so timed as to permit expeditious handling of consecutive batches in production within the time and temperature range that will prevent deterioration, spoilage and development of microorganisms of public health significance and will allow for proper freezing rates and temperatures.

- 4.4.1.2 FISH IN AN UNFROZEN STATE SHOULD MOVE WITHOUT DELAYS TO THE BATTER AND/OR BREADING OPERATIONS.

Products such as peeled and deveined shrimp, fish fillets, scallops, etc., which are not frozen at the time of further processing should move continuously to battering and/or breading operations. If such products are held or transported in pans or trays this interval should be kept to a minimum. The time between frying and freezing should also be kept to a minimum.

- 4.4.1.3 FRESH OR THAWED FISH WHICH CANNOT BE PROCESSED IMMEDIATELY SHOULD BE WELL ICED IN CLEAN CONTAINERS AND STORED IN SPECIALLY DESIGNATED AREAS WITHIN THE PLANT WHERE THEY WILL BE PROTECTED FROM HEAT AND WILL NOT BE CONTAMINATED BY DUST, INSECTS OR VERMIN. WHERE POSSIBLE, THE ICED FISH SHOULD BE STORED IN A CHILL ROOM, THE TEMPERATURE OF WHICH IS JUST ABOVE THAT OF MELTING ICE. FF 5.4.3.1/mod.

In order to produce good quality frozen battered and/or breaded fishery products, the quality of the raw fish should be maintained by protecting it from heat, contamination from other sources and physical damage.

It should be stressed that placing quantities of fish in a chill room does not supplant the need for adequate icing. Chill rooms are designed to maintain a chill temperature and to keep already cool fish from warming up. The refrigeration machinery used in chill room operations is not adequate to lower the temperature of a mass of fish in a short time. Furthermore, under those circumstances, it is difficult to remove heat from a large mass of product in an efficient manner. Usually the heat is removed only from the surface of the mass and the core will retain the heat for a longer time. The initial cooling should be done by the addition of crushed or flaked ice in alternative layers of fish and ice, starting with a layer of ice at the bottom of the tub or container.

It is a poor practice, therefore, to load the chill room with large quantities of fish or shellfish that were not pre-chilled effectively to the temperature of the melting ice.

The chill room should be equipped with a recording thermometer and an automatic temperature control and should be so designed that it can be kept in a clean hygienic condition at all times. The chill room should also be equipped with an automatic alarm system to alert the proper personnel when the temperature drops below 0°C (32°F) or rises above 10°C (50°F).

- 4.4.1.4 IF THE FISH OR THEIR PRODUCTS ARE TO BE DIPPED, SPRAYED OR TREATED IN ANY MANNER WITH FOOD ADDITIVES, THIS SHOULD BE DONE IN THE MANNER IN ACCORDANCE WITH THE REQUIREMENTS OF THE OFFICIAL AGENCY HAVING JURISDICTION. FF 5.4.3.8/mod.

Food additives cannot be used indiscriminately. Some are effective only with certain types of food, and in all cases the concentration of the additive must be rigidly controlled. Food laws differ from one country to another and it is essential to seek specialist advice before using a particular additive, whether the product is for domestic use or for export.

The use of additives or the additional treatment of fish during the processing increases the cost and therefore should be measured against the benefits gained.

- 4.4.1.5 WHERE PRODUCTS ARE PACKAGED BEFORE FREEZING THEY SHOULD BE MOVED INTO THE FREEZER RAPIDLY TO AVOID UNDUE RISE IN TEMPERATURE. FR 5.4.1.7/mod.

Temperature of fish and their products may rise during packaging. Temperatures of 10°C (50°F) and above are not unusual in processing factories and the spoilage rate will rapidly increase if the products are held for too long at these higher temperatures.

- 4.4.1.6 PRECAUTIONS SHOULD BE TAKEN DURING PACKAGING TO ELIMINATE THE POSSIBILITY OF METAL OBJECTS OR FRAGMENTS BEING CARRIED INTO THE PRODUCTS.

The packaging lines should be equipped with a fine tuned metal detector which can detect even minute fragments or slivers of metal in the product. The metal detector should activate a buzzer or other type of signalling device to alert the attention of the packaging personnel to the carton containing such metal substance. In some systems, the metal detector, upon finding a metal substance in the carton, will activate a mechanism by which the carton is automatically removed from the packaging conveyor.

4.4.2 Thawing and tempering

- 4.4.2.1 ONLY GOOD QUALITY FROZEN FISH OR SHELLFISH SHOULD BE SELECTED FOR FURTHER PROCESSING WHICH MAY INVOLVE TEMPERING OR THAWING AND REFREEZING AND EVERY PRECAUTION MUST BE TAKEN TO PREVENT OR MINIMIZE QUALITY DETERIORATION.

Tempering or complete thawing of fish is sometimes necessary to prepare the products before subsequent production steps are applied. A great quantity of prepared fishery products is manufactured today from fish which has been frozen at sea or on shore and then stored, thawed, processed and refrozen. It is evident that even when applying optimum handling and processing conditions, the quality of the final product will be affected at each stage of the operations, hence every precaution must be taken to prevent or minimize a deterioration in quality. It is clear then that in order to produce a good quality product out of fish or shellfish which has been subjected to thawing, further processing and then refreezing, it is necessary to use only good quality raw material and to carry out the handling, thawing, further processing and refreezing in accordance with the best of accepted practices.

- 4.4.2.2 IF FROZEN FISH IS USED AS RAW MATERIAL THE THAWING SHOULD BE DONE PRIOR TO PROCESSING AND IN THE MANNER RECOMMENDED IN THE "CODE OF PRACTICE FOR FROZEN FISH" PARA 5.5. IF PROCESSING CANNOT COMMENCE IMMEDIATELY IT SHOULD BE TRANSFERRED TO CHILLED ENVIRONMENT. FR 5.5.2/mod.

Exposure of fish to elevated temperatures during thawing should be carefully controlled and be done in the manner recommended in the "Code of Practice for Frozen Fish". When frozen fish has been thawed, it is susceptible to spoilage in the same

manner as the fresh product. The rate of spoilage increases as temperature is increased appreciably above that of melting ice and the holding time at the higher temperature is prolonged. It is important therefore that the temperature to which the fish are exposed during thawing should be no higher than is necessary to carry out the operation reasonably quickly and that the fish or shellfish should be either processed or thoroughly chilled as soon as they are thawed. It is generally desirable to commence processing or return the fish to a chilled environment a little before thawing is complete, since the centres will continue to thaw until the temperatures within the product have been equalized.

For some types of product it may be practical and desirable to carry out the processing operations such as cutting, battering and/or breading, cooking or packaging, using fish which have been only partly thawed. Frozen blocks of fish or fish portions may, in some circumstances, require thawing only to the stage at which the individual pieces can be separated without damage.

4.4.2.3 THE THAWING METHOD CHOSEN SHOULD SUIT THE VOLUME AND TYPE OF PRODUCT THAT IS TO BE PROCESSED AND SHOULD BE ECONOMICALLY PRACTICAL. FR 5.5.3/
mod.

It is difficult to make general recommendations as to which thawing method is most suitable for a particular product. The processor, in making his decision, should consider the capital, maintenance, operating and labour costs, as well as the volume and particular requirements of the product to be thawed. It is felt that a technologist who is familiar with the thawing practice should be consulted on such matters.

4.4.2.4 ALL THAWING OPERATIONS SHOULD BE CARRIED OUT UNDER CONTROLLED HYGIENIC CONDITIONS. FR 5.5.4/
mod.

Since thawed fish are subject to the same risks of contamination and spoilage as fresh fish, it is essential that all areas, equipment, tanks and other facilities used in thawing and all handling practices, should meet the same high standards for hygiene as set out in all other relevant codes. It should be required that all equipment, tanks and utensils used in thawing be kept clean and disinfected at frequent intervals and that all handling practices be carried out in accordance with the highest attainable level of hygiene. The floor of the room in which the thawing takes place should not accumulate drip. Where drip runs on to the floor, the floor should be regularly hosed down to prevent unpleasant odours and microbial build-up.

If water thawing is used, potable water is recommended although clean sea water might be used. All precautions should be taken to eliminate the possibility of contaminating the product. Flow of water in the thawing tank should be at a rate that will prevent excessive contamination or accumulation of blood, slime and micro-organisms. The tanks should be drained and thoroughly cleaned at regular intervals.

Where a thaw tank is used, the product should not remain in the tank any longer than one-half hour after it is thawed. If the product is going to remain for longer time before moving to the next processing phase, it should be kept as close to the temperature of melting ice as possible until it is ready to be processed. If water is heated to accelerate thawing, the product should be immediately cooled to the temperature of melting ice after thawing and before passing to the next processing stage. Frozen fish entering the thaw tank should be free of exterior packaging material and substantially free of liner material such as cellophane or polyethylene wrappers.

4.4.2.5 TEMPERING OF FROZEN FISH PRIOR TO APPLICATION OF BATTER AND BREADING SHOULD BE CONDUCTED BY METHODS WHICH ASSURE THE INTEGRITY OF THE PRODUCTS.

There are times when it is necessary and advisable to temper the frozen fish blocks or other frozen fish products before the subsequent processing steps and the application of the batter and breading. Frozen fish blocks are usually tempered to condition them for the cutting or sawing operations. Frozen fish blocks kept at a very low freezing temperature may be difficult to saw or cut into portions or sticks. The hardness of the blocks may affect or damage the sawing or cutting equipment and the product may also crack or break excessively under the stress required for cutting, thus resulting in excessive waste and high cost of production. Additionally, thoroughly frozen fish are usually tempered before the application of the batter and breading in order to attain a more effective adhesion of the batter and breading to the flesh of the frozen product.

Tempering of frozen fish should be conducted in a manner that will not affect the quality of the product. The frozen products are usually tempered in a tempering room kept at near -7°C (20°F). The internal temperature of the tempered products should be controlled in such a manner that will not exceed -9°C (16°F) before the subsequent processing operations.

If mechanical tempering devices are used, they should be constructed of readily cleanable materials and should be so designed as to allow a hygienic operation.

4.4.3 Cutting operations

4.4.3.1 THE METHOD USED TO PREPARE UNIFORM STICKS, FINGERS OR PORTIONS SHOULD BE CHOSEN WITH CARE.

The most commonly used machines for cutting fish blocks are bandsaws, gangsaws, circular saws and guillotine-type cutting machines. All have their advantages and disadvantages and the most suitable machine or combination of machines that meet the individual requirements of the product to be produced and the processing plant's operation should be considered.

Bandsaws produce very uniform sticks in shape and size, have relatively low sawdust loss and easy positioning of the blade. Their costs are higher owing to slow, repetitive operations requiring several machines, and more labour is required than with other types of cutting machinery.

Gangsaws make many cuts at one operation, reducing time and labour and are safer to use than bandsaws. It is more difficult to replace the blades or to adjust them or to check their position and there is relatively large sawdust loss. Prior to designing such a machine, careful consideration should be given to the characteristics of the blade to minimize the amount of sawdust formed.

Guillotine-type cutting machines have no sawdust waste, time and labour costs are very low per unit of product prepared, the production rate is very high per hour of operation; they are safer than the other saws. Cracking or damage of fish blocks, when they are improperly handled (performance is improved, and strain on the machine is lessened by "tempering" the block prior to the cutting operation) may cause greater

waste than does that which occurs in the sawdust losses from the other types of machines. The sticks are not always uniform in width, tempering the blocks increases labour and time requirements, and repairing or re-positioning the blade is costly in time and money.

4.4.3.2 THE SIZE OF THE FISH BLOCK SHOULD SUIT THE CUTTING OPERATION.

There may be up to three cutting operations to produce a product such as fish sticks from most styles of fish blocks. Each saw cut will remove as sawdust a strip of flesh slightly wider than the saw blade. Specifications as to the size of the original fish block would be different if a gangsaw were used for the final cut to prepare a uniform size fish stick rather than a guillotine-type cutting machine.

4.4.3.3 THE SEPARATED RESIDUAL MATERIAL FROM THE CUTTING OPERATION, SUCH AS BROKEN PIECES AND SAWDUST, SHOULD BE CAREFULLY REMOVED ON A CONTINUOUS OR NEAR-CONTINUOUS BASIS.

Broken pieces collected from clean surfaces in a hygienic manner should be handled without any unnecessary delays and be frozen or chilled for further utilization.

Sawdust from block cutting may involve wastage of the raw material which may be used in other product forms.

If fish sawdust is used for products intended for human consumption, it should be collected and handled in a satisfactory hygienic manner which will preclude contamination and excessive microbial growth.

4.4.4 Battering and/or breading operations

4.4.4.1 BATTER SHOULD BE KEPT AT A TEMPERATURE WHICH OFFERS PROTECTION AGAINST RAPID MICROBIAL MULTIPLICATION DURING ITS APPLICATION.

Batter which is continually prepared, held and circulated during application in enclosed equipment should be disposed of at the end of each work day as appropriate.

Batter not handled in enclosed equipment should be disposed of at more frequent intervals during operation and at the end of the day's operation.

Batter should be kept at a temperature not exceeding 10°C (50°F).

Hand operation should be discouraged.

4.4.4.2 BREADING SHOULD BE HANDLED IN A WAY THAT PREVENTS CONTAMINATION AND UNDUE MICROBIAL MULTIPLICATION.

Breading equipment should apply the breading in a manner that will keep the breading particles in constant circulation and sifted through a proper size screen to eliminate moist lumps. Moist lumps are susceptible to bacterial growth and should be periodically removed from the system. Breading remaining in the breading application equipment at the end of the day's operation may be re-used within 24 hours if it is sifted to eliminate the moist lumps and placed in freezer storage in a covered hygienic container. All material removed by sifting should be discarded.

Hand operation should be discouraged.

4.4.4.3 MANUAL MANIPULATION OF BATTERED AND/OR BREADED PRODUCTS SHOULD BE KEPT TO A MINIMUM.

All operations pertaining to the handling and packing of the products once they have been battered and/or breaded should be conducted in such a manner as to keep to a minimum the manual manipulation of the products. It is recommended that all manual operations which involve touching of the unpacked products after the products have been battered and/or breaded be conducted using clean gloves to minimize the possibility of contamination.

4.4.5 Frying

4.4.5.1 ONLY GOOD QUALITY VEGETABLE OILS SHOULD BE USED IN PREFRYING OR FULLY FRYING BATTERED AND/OR BREADED FISH PRODUCTS.

It should be noted that storage life of frozen fried fish depends on storage temperature and quality of packaging material, quality and stability of oil used for frying and on the quality and stability of fish. In most instances the quality and stability of frying fat absorbed will determine the shelf life of the product.

The oils used in the cooking operation should be refined and deodorized food grade oils with a high stability, that will impart a desirable flavour to the product. The physical and chemical properties of the frying oils should be routinely inspected. The oil should be replenished or changed during the frying operation in such a way as to prevent development of rancidity or excessive build-up of free fatty acids. Oil quality should be monitored as received and during use. This may be done by determining the organoleptic quality of the oil and measuring the free fatty acid content or both. The percentage of frying oil absorbed depends on the temperature and type of oil, and the duration of frying as well as the nature of the batter and/or breading materials.

4.4.5.2 BATTERED AND/OR BREADED PRODUCTS SHOULD BE MOVED TO THE FRYER AS FAST AS POSSIBLE AND THE FRYING OPERATION SHOULD BE CONDUCTED AT AN ESTABLISHED TIME/TEMPERATURE RELATIONSHIP TO ACHIEVE DESIRED RESULTS.

Battered and/or breaded fish products to be precooked or cooked should move continuously to the frying operation using special wire mesh conveyors between breading, battering and frying units in order to dispose of such particles which do not hold to the product. If batch fried, no more than twenty minutes should elapse after battering and/or breading and before cooking. In larger operations, it is preferable to install a continuous fryer operation for the sake of efficiency and to attain a more effective microbiological control before and during the frying process. A certain time/temperature relationship should be established for each product, and temperature and time variation during frying should be kept to a minimum. Certain products are only slightly fried to develop the colour and crispness of the coating; in this case the flesh of the fish should remain as raw as possible with relation to the respective products. These products need to be cooked completely by the consumer either by frying, oven cooking or other means. With slightly fried products, the time between the frying and cooling/freezing process should be as short as possible to avoid microbial multiplication. Other products are fully cooked during frying or prior to frying. These latter products need only warming before consumption. In each case the processor should establish exact frying time and temperature requirements to achieve the desired uniformity of colour, texture, crispness and flavour in the products and also to attain a certain degree of microbial kill in accordance with the nature of fish, ingredients and the processing operations taking place before frying.

4.4.5.3 THE FRYER SHOULD BE EQUIPPED WITH AN EFFECTIVE CONTINUOUS FILTERING SYSTEM TO EXTEND OIL QUALITY.

Fryers should be fitted with an effective continuous oil filtering device which will constantly filter the hot oil and return it to the fryer. The filtering system should be capable of eliminating crumbs and particles thus maintaining a satisfactory oil clarity and minimizing the development of undesirable chemical changes in the oil. The fried products will also be devoid of undesirable dark particles on the surface of the coating. Additionally, an efficient oil filtering system will contribute significantly to lower oil usage and a corresponding cost reduction.

If continuous filtering is not available, filtering should be done at least once daily, or more frequently if indicated; the oil should be pumped from the fryer through a filter to a storage tank. Loose crumbs should be flushed from the fryer to the filter with freshly filtered oil before the fryer is refilled.

4.4.6 Freezing

4.4.6.1 BATTERED AND/OR BREADED PRODUCTS SHOULD BE EFFECTIVELY FROZEN BEFORE OR AFTER PACKAGING WITHOUT UNDUE DELAYS.

Battered and/or breaded fish may be frozen in-line prior to packaging or may be packaged and then submitted to rapid freezing. When in-line freezing is used, the product should be thoroughly frozen **when leaving** the freezer before packaging. When the products are packaged before freezing, the packages should be such as to permit rapid freezing and the individual packages should not be cased in master cartons until freezing is complete.

4.4.6.2 FREEZING SHOULD BE RAPID TO ELIMINATE OR DIMINISH QUALITY DETERIORATION.

Battered and/or breaded fishery products should be rapidly frozen to ensure a high quality product. It is known that fishery products can suffer detrimental changes including protein denaturation and cell damage when exposed to extremely slow freezing or incomplete freezing. The quality losses can seriously affect the texture, flavour and keeping time of the products. Hence the importance of quick freezing, rapid reduction of product temperature and the maintenance of proper freezing capability of the freezer for the production of products with an acceptable quality.

4.4.6.3 FREEZING SHOULD BE COMPLETED IN THE FREEZER AND SHOULD NEVER BE CARRIED OUT BY PLACING UNFROZEN OR PARTIALLY FROZEN PRODUCTS IN A FREEZER STORE.

Freezing of battered and/or breaded fishery products should be completed in a blast, contact or cryogenic freezer before the products are moved to the freezer store. Refrigeration equipment in freezer stores usually does not have sufficient capacity to effectively take care of additional heat load. Warm products placed in a freezer store will not only take a very long time to freeze but may also warm up other products already in the store.

4.4.6.4 PRECISE FREEZING TIMES FOR BATTERED AND/OR BREADED FISHERY PRODUCTS SHOULD BE CAREFULLY DETERMINED.

FR
4.4.2.4/
mod.

The freezing time required for different products is influenced by many variables, such as product shape and size, composition, the area exposed to the refrigerated surface or the refrigerated medium, and the temperature of the refrigerant. A calculated freezing time may serve as a rough guide when planning production, but whenever a new product is frozen in a freezer, the exact freezing time should be determined by direct measurements of the product temperatures during the freezing process.

4.4.6.5 BLAST FREEZERS SHOULD BE OPERATED IN SUCH A WAY THAT THERE IS A SUFFICIENT FLOW OF COLD AIR AROUND THE PRODUCT.

FR
4.4.2.10/
mod.

In this process, heat is transferred from the product to a cold air stream and carried to the cooling surfaces of the freezer. Adequate air circulation is essential and any obstruction to the flow of air around the product will result in poor freezing rates and variable product quality. If product units are placed too close together because of overloading the freezer, cold air circulation around the surfaces of individual units will be obstructed and freezing times may be greatly increased. Wrapping the product or placing it in cartons will also slow down the rate of freezing.

4.4.6.6 CRYOGENIC FREEZING METHODS MAY NECESSITATE SPECIAL CONSIDERATIONS TO PREVENT PHYSICAL DAMAGE TO THE PRODUCTS.

Cryogenic freezing techniques have been adopted by segments of the battered and/or breaded fishery products industry. The cryogenic freezers freeze the product

by spraying or immersing it in liquefied gases such as nitrogen or refrigerant R-12. They offer advantages in regard to the short time needed for achieving complete freezing. However, care must be taken so that the products are not cracked or deformed by freezing them too quickly. Certain cryogenic systems may also discolour fried products by dissolving or removing surface oil from the coating during application of the refrigerant. A thorough evaluation of the freezing system as applied to various products is recommended before adoption is finalized. Capital investment and cost of freezing per unit of product should also be carefully considered when evaluating a freezer system. Compounds used as freezing media should be acceptable to the official agency having jurisdiction.

- 4.4.6.7 FREQUENT CHECKS SHOULD BE MADE ON THE PRESSURES AND TEMPERATURES IN THE REFRIGERATION SYSTEM TO ENSURE CORRECT OPERATION. FR 4.4.2.14

If frequent checks are made and records of these maintained, there will be little chance of the refrigerant's temperature being too high or the equipment not functioning correctly. Any defects noted should be rectified quickly. It is important to watch the temperature gauges for superheating at the compressor's delivery side and sub-cooling of the liquid before the expansion valves. Sometimes these two readings will indicate leaks of refrigerant before there is any serious loss of freezing capacity.

- 4.4.6.8 ACCURATE RECORDS OF ALL FREEZING OPERATIONS SHOULD BE KEPT. FR 4.4.2.15

An accurate record of all loading and unloading times of the freezer and number of blocks, sticks, portions, etc., frozen, will greatly assist in the efficient management and control of the operations.

- 4.4.6.9 PRODUCTS WHICH ARE REJECTED OR PUT ON HOLD FOR FURTHER INSPECTION SHOULD BE PROPERLY TAGGED AND SEGREGATED IN THE STORE FREEZER.

When a product is rejected because it does not meet physical or microbiological requirements, or when there is a question about its quality or acceptance, it should be properly tagged or labelled with a clear indication that it is rejected or put on hold for further inspection before a final disposition is made. In either case the product should be segregated in the freezer store so that it cannot be erroneously shipped.

4.4.7 Packaging

- 4.4.7.1 FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS SHOULD BE PROPERLY PACKAGED TO PROTECT THEIR QUALITY DURING STORAGE, SHIPPING, DISTRIBUTION AND DISPLAY IN THE RETAIL MARKETS.

The protection of quality in battered and/or breaded fishery products is intimately related to the packaging materials and packaging design and construction. It is widely known that the quality of the frozen products will deteriorate during the storage and distribution cycle if the package does not offer sufficient protection against dehydration, oxidation, physical, chemical or microbiological contamination and handling. The packaging materials existing today are numerous and their composition also varies within a large range. The selection of the packaging material should be carefully studied in accordance with the type of product to be packed and the cost of packaging. The packaging should be functional in character and should not add excessively to the cost of the product.

- 4.4.7.2 PACKAGING SHOULD BE DESIGNED AND MATERIALS CHOSEN TO CREATE AN ATTRACTIVE, CONVENIENT AND ECONOMICAL PACKAGE WHICH WILL PROTECT THE PRODUCT ADEQUATELY. FR 5.4.3.6/mod.

There are many factors to consider in designing packages for frozen fishery products. It is important that the product be presented in a package that is attractive to the buyer and which is convenient to handle. Labels should be

clearly printed and must comply with the labelling laws of the country where the product is marketed.

In addition, the packages of frozen fishery products should bear clear indication as to how they should be kept from the time they were bought at the retailer to that of their use.

When selecting materials, it is necessary to consider the whole packaging plan to ensure that all the required protective qualities are adequately provided. Since packaging materials vary considerably in cost, they will usually be selected in a manner that meets the requirements most economically without affecting product quality or presentation.

In some cases the decision whether to use one type or another of packaging material depends on whether the frozen battered and/or breaded products are raw or precooked. Raw breaded products need more protection against the dehydration which takes place under temperature fluctuations. Since the problems involved in selecting the proper packaging materials for frozen battered and/or breaded fishery products require a high degree of specialized knowledge, it is recommended to seek the advice of experts in the packaging field.

4.4.7.3 CONSUMER PACKAGES FOR BATTERED AND/OR BREADED PRODUCTS SHOULD BE SUFFICIENTLY STRONG, WATERPROOF AND STAIN-RESISTANT. THEY SHOULD HAVE WATER VAPOUR AND GAS BARRIER PROPERTIES TO MEET THE REQUIREMENTS OF THE PARTICULAR PRODUCT AND SHOULD BE OF THE PROPER SIZE AND SHAPE. FF 5.4.3.8/mod.

A large proportion of battered and/or breaded fishery products are packed in paperboard cartons with or without an inner wrapping. To provide the required water, stain resistance and barrier properties, the paperboard is usually coated on one or both sides with petroleum wax, extruded polyethylene, or a petroleum wax combined with a copolymer, resin or other additives, or it is varnished.

The packages should be sufficiently sturdy to protect the product from physical damage during handling, transport and retailing. They should be sufficiently water-repellent to avoid staining or weakening when wet. Packages for fried products should not be susceptible to grease stains. If there is no inner wrapper or if the wrapper is not a good water vapour and gas barrier, this protection should be provided by the package.

Packages should be of proper size and shape for the product to fit snugly so that the air space within the package will be as small as possible. Large air spaces within the package increase the risk of dehydration or rancidity. The contents of loosely filled packages are also more easily damaged during handling, roughly breaded surfaces will rub against each other and the resulting abrasive effect will cause excessive loose breading in the package. Additionally, a product which is to be frozen after packaging will freeze much more quickly if there is no air space in the package. Furthermore, an unnecessarily large package with much empty space could be deceiving to the consumer.

Retail packages should be preserved intact up to the time of final sale.

4.4.7.4 PACKAGING MATERIALS SHOULD NOT CONTAMINATE THE PRODUCT IN ANY WAY. FR 5.4.3.9

Since foreign odours and flavours will adversely affect the acceptability of the product, all wrappings, dividers, adhesives and printing material likely to come into contact with it should be odourless. The packaging material should ensure that the original product flavour and odour are retained. Furthermore, there should be no risk that substances likely to be harmful to health will be transferred from the packaging material to the food.

- 4.4.7.5 PACKAGING MATERIAL SHOULD NOT UNDULY INCREASE THE TIME REQUIRED FOR FREEZING. FR 5.4.3.10

In practice, it is often necessary to consider the type of packaging used in the light of its effect on the freezing time. The thicker and more elaborate the packaging material, the longer the freezing time required.

- 4.4.7.6 PACKAGES SHOULD HAVE LOW WATER VAPOUR PERMEABILITY. FR 5.4.3.11/
mod.

Packaging material with a low water vapour permeability is necessary to reduce product dehydration. The permeability of such materials depends on both temperature and relative humidity. Water vapour permeability of fishery products packages should not exceed $0.2 \text{ g/m}^2/24 \text{ h}$ at -20°C (-4°F) at a relative humidity of 80 percent.

- 4.4.7.7 PACKAGES SHOULD HAVE LOW PERMEABILITY TO GASES AND ODOURS. FR 5.4.3.12

Packing materials should resist the penetration of oxygen and other gases and should be properly sealed in order to minimize rancidity and prevent the absorption of odours during storage. Films and foils used for packaging should not be easily pin-holed during processing and handling. This is especially important if the packages are vacuum-packed or flushed with inert gas. Outer paperboard containers may be necessary in some instances for additional protection.

- 4.4.7.8 PACKAGING MATERIALS SHOULD BE SUFFICIENTLY STRONG AND DURABLE TO WITHSTAND STRESSES DURING PROCESSING, HANDLING, STORAGE AND DISTRIBUTION. FR 5.4.3.13/
mod.

The package should be able to withstand stresses during assembly, filling, machine closing, freezing, storage, transport and thawing. Low temperature flexibility of the packaging material will prevent it from rupturing or tearing during storage or transportation. Laminated materials should not separate when damp.

- 4.4.7.9 PACKAGES SHOULD BE IMPERMEABLE TO FATS AND OILS. FR 5.4.3.14/
mod.

The impermeability and resistance of the packaging material to fats and oils is an important property, especially where precooked products are packed. If the packaging material becomes impregnated with oil, rancidity will develop during storage and the appearance of the product will suffer.

- 4.4.7.10 PACKAGING MATERIALS SHOULD NOT STICK TO THE WET OR FROZEN SURFACE OF THE PRODUCTS. FR 5.4.3.15

Packaging materials which stick to wet or frozen products are a source of annoyance to the consumer.

- 4.4.7.11 OUTER CONTAINERS (MASTER CARTONS) FOR WHOLESALE PACKAGING SHOULD BE LIGHT AND STRONG AND SHOULD PROVIDE GOOD PROTECTION FOR THE FROZEN PRODUCTS. FR 5.4.3.18

Fibreboard and corrugated paperboard have been found to be satisfactory materials for outer containers (master cartons) which usually enclose a number of consumer cartons or packages. To facilitate handling, these containers should not be too large. A good wet strength and bursting strength are required. Outer containers may be strapped with wire or bands to provide additional strength.

4.4.8 Storage and Distribution

- 4.4.8.1 UPON COMPLETION OF THE FREEZING PROCESS, THE TEMPERATURE OF THE PRODUCT AFTER THERMAL STABILIZATION SHOULD BE CLOSE TO OR JUST BELOW THAT OF THE FREEZER STORE. FR 5.4.4.1/
mod.

The freezer store is designed to hold products at the proper frozen storage temperature and should not be used either for freezing or for reducing the temperature of a frozen product to the temperature level of the freezer store.

- 4.4.8.2 IF PARTIALLY THAWED PRODUCTS ARE RECEIVED FOR FROZEN STORAGE, THEY SHOULD BE REFROZEN IN PROPER FREEZING EQUIPMENT PRIOR TO THEIR STORAGE IN THE FREEZER STORE. FR 5.4.4.2/mod.

In some cases, frozen products may become partially thawed during transfer or shipment. If these products are still considered to be of an acceptable quality for human food, they should be refrozen rapidly in a proper freezing plant.

- 4.4.8.3 FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS SHOULD BE STORED AT APPROPRIATE TEMPERATURES AND IN ACCORDANCE WITH INTENDED TIME OF STORAGE. FR 5.4.4.3/mod.

Frozen battered and/or breaded fishery products will experience some deterioration at a gradual pace during frozen storage. However, if proper temperatures are maintained on a constant basis, the changes will be minimized even after a prolonged storage time.

Temperature and temperature stability are the two most important factors affecting the quality of the product. Lower and stable temperatures retard adverse quality changes. The rate of quality loss is a function of temperature and time of storage. Temperature fluctuations during storage should be kept to the minimum. Temperature fluctuations cause moisture sublimation from the product to the surrounding atmosphere in the package; frost and dehydration will then occur under such conditions.

Another factor influencing the choice of storage temperature is the capacity of air to hold moisture. The higher the temperature, the more moisture air can carry without becoming saturated. At higher temperatures, therefore, there is a faster transfer of water vapour from the product to the cooling surfaces and thus a greater degree of product dehydration.

The development of rancidity in frozen storage is mainly determined by oil quality. If the frying oil is of poor quality, development of rancidity in the product takes place faster.

- 4.4.8.4 THE TEMPERATURE OF THE FREEZER STORE SHOULD BE CONTROLLED CAREFULLY TO AVOID FLUCTUATIONS. FR 5.4.4.4

Excessive product temperature fluctuations either in range or frequency are undesirable. Fluctuations of more than 2°C (4°F) in the freezer store temperature should be avoided. Moisture transfer from the product to the colder refrigeration surfaces is accelerated as the temperature difference is increased. Consequently, fluctuations of the freezer store temperature promote dehydration of the stored products. The air velocity in cold freezer stores should be moderate and no higher than necessary to achieve sufficient uniform temperature within the store.

- 4.4.8.5 FREEZER STORE TEMPERATURES SHOULD BE CHECKED OFTEN, PREFERABLY BY THE USE OF TEMPERATURE RECORDING DEVICES, AND RECORDS SHOULD BE MAINTAINED. FR 5.4.4.5/mod.

Frequent checks of store temperature allow prompt action to correct any malfunctioning. When deviations occur, the refrigeration equipment should have sufficient reserve capacity to regain quickly the correct temperature level.

- 4.4.8.6 THE PRODUCTS SHOULD BE STACKED IN THE FREEZER SO THAT THERE IS ALWAYS A SPACE FOR COLD AIR TO CIRCULATE ALONG THE WALLS AND FLOOR, FR 5.4.4.6

Although distances of 5-10 cm (2-4 in) from walls and floors are sometimes regarded as adequate, occasionally large gaps may be required. Where possible, pallet storage should be practised, allowing air spaces below and around the outside of the stacked products. If this is done, ~~any heat which leaks~~ into the room will be absorbed by the circulating cool air instead of being absorbed by the product.

- 4.4.8.7 WHEREVER POSSIBLE, FREEZER STORES SHOULD MOVE THE LONGEST STORED PRODUCTS INTO DISTRIBUTION FIRST. FR 5.4.4.7

Products held in frozen storage should be clearly identified and records should be kept to prevent older stocks from being allowed to deteriorate in quality through lengthy storage while newer stocks are being passed into distribution channels. A first-in, first-out principle should be followed.

- 4.4.8.8 REFRIGERATED TRANSPORT VEHICLES SHOULD BE SO CONSTRUCTED AS TO PROVIDE MAXIMUM PRODUCT PROTECTION.

All refrigerated transport vehicles should be equipped with air leak-proof cargo spaces, including tight fitting doors and suitable closures for drain holes to prevent air leakage. Vehicles should also be raked, stripped, baffled or otherwise so constructed as to provide clearance for air circulation around the load, unless of coldwall or envelope type construction.

- 4.4.8.9 ALL VEHICLES USED IN THE TRANSPORT OF FROZEN FISH SHOULD BE CAPABLE OF MAINTAINING THE LOW TEMPERATURE REQUIRED TO PRESERVE THE QUALITY OF THE PRODUCT. FR 5.4.4.8/mod.

Under ideal conditions the temperature of frozen battered and/or breaded fishery products during transport should be the same as the freezer storage temperature. It is recommended that vehicles transporting frozen fishery products should be capable of maintaining temperature at -18°C (0°F) or lower by means of mechanical refrigeration systems, dry ice or liquefied refrigerants.

Frozen products should not be stacked directly against the floor, walls or roof of the carrier unless the carrier has a body of the jacketed type, but should be stacked in such a manner that cold air can circulate around the load to absorb heat which leaks into the vehicle. A minimum distance of 5 cm (2 in) between the load and the vehicle's floor, roof and walls is suggested.

Local multiple-stop deliveries from distributing warehouses to shops or restaurants may present problems quite different to those encountered in long distance transport between coastal and inland freezer stores. In the absence of mechanical refrigeration, insulated containers with dry ice may be used to keep the temperature of the product from rising. Loading for multiple-stop deliveries should be planned in accordance with the delivery route. The opening of vehicle doors should be kept to a minimum to prevent loss of cold air. Such a loss may be further reduced by the use of flexible self-closing inner doors.

Low temperature deliveries of small orders can also be made in individual insulated boxes which are packed in the freezer store prior to loading for distribution.

- 4.4.8.10 CARE SHOULD BE TAKEN THAT FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS ARE NOT EXPOSED TO HIGH TEMPERATURE DURING LOADING AND UNLOADING OF TRANSPORT VEHICLES. FR 5.4.4.9/mod.

Frozen battered and/or breaded fishery products warm very quickly. The effects of any temperature fluctuations, even of short duration, are cumulative and detrimental.

The load should be assembled in the freezer store on pallets, and mechanical methods of loading should be used wherever possible. It is important that the products should not be allowed to stand in non-refrigerated areas. Vehicles should be pre-cooled to $+10^{\circ}\text{C}$ (50°F) or lower prior to loading and should also be equipped with devices to record temperatures during transport. Loading into and unloading from vehicles and into and from freezer stores should be as fast as practicable and the methods used should minimize the rise in product temperature.

Some recently constructed freezer stores provide low temperature loading bays, with flexible connecting loading tunnels that fasten directly to the doors of transport vehicles.

- 4.4.8.11 THE OPERATION OF THE REFRIGERATION UNITS ON TRANSPORT VEHICLES SHOULD BE CHECKED FREQUENTLY EN ROUTE. FR 5.4.4.10

A temperature rise of the product during transport from one freezer store to another to -15°C (5°F) due to unforeseen circumstances may be tolerated. Otherwise, any rise in temperature of the product higher than -18°C (0°F) should be reduced to this temperature or lower without unnecessary delay.

Every frozen product transport vehicle should be fitted with a properly installed thermometer so that the temperature in the cargo space can be checked regularly without having to open doors and a record of these temperature readings should be kept for future reference. An insulation test should be carried out at regular intervals; tests every two years are recommended in some countries.

- 4.4.8.12 THE SUITABILITY OF REFRIGERATED TRANSPORT VEHICLES AND THE CARE WITH WHICH THEY ARE LOADED, OPERATED AND MAINTAINED SHOULD BE CHECKED OCCASIONALLY BY MEASURING PRODUCT TEMPERATURES AT THE BEGINNING AND END OF A JOURNEY. FR 5.4.4.11

Occasional checks should be made by measuring the temperature of the product at the bottom, sides and top of the load when the vehicle is being loaded and again when it is unloaded. If any excessive warming has occurred, the cause should be determined and the fault corrected.

Specially designed thermometers are used for this purpose.

- 4.4.8.13 VEHICLES SHOULD BE PROPERLY CONDITIONED BEFORE LOADING OF FROZEN PRODUCTS AND LOADING SHOULD BE CONDUCTED IN A MANNER THAT ASSURES EFFICIENT HEAT TRANSFER.

All vehicles should be pre-cooled to an inside temperature of 10°C (50°F) or lower prior to loading. No product should be loaded in such a manner in any vehicle that it will interfere with the free flow of air into or out of the refrigeration unit; nor with the free flow of air around the load in vehicles other than envelope or coldwall type construction or those using liquid nitrogen or refrigerant R-12 as the cooling media.

The vehicle's refrigeration unit should be turned on and the door kept closed during any period when loading and unloading operations are interrupted. After loading is completed and the vehicle doors are closed, the carrier's equipment should be checked prior to departure to ensure that the refrigeration system is in proper working order. The thermostat in the vehicle's refrigeration unit should be set at -18°C (0°F) or lower.

4.5 Quality Assurance

- 4.5.1 AN EFFECTIVE QUALITY CONTROL PROGRAMME SHOULD BE ESTABLISHED IN PLANTS PROCESSING BATTERED AND/OR BREADED FISHERY PRODUCTS.

Maintenance of quality and protection of the products from contamination is a continuous commitment. It is desirable that each fish processing plant in its own interest create a strong Quality Control Programme in the plant, one that is independent of production directives and which reports to either plant or corporate management in accordance with the structure and size of the organization. Quality control policies and objectives should be clearly defined within the programme and implemented by an individual to whom the responsibility of maintaining the required quality has been assigned.

- 4.5.2 THE INDIVIDUAL IN CHARGE OF QUALITY CONTROL SHOULD HAVE TECHNICAL COMPETENCE AND SPECIAL TRAINING FOR THE JOB.

The person entrusted with the responsibility of managing or supervising the quality control should be technically capable of handling such an important task and should be able to communicate intelligently with his production counterparts as well as to supervise other individuals under him.

- 4.5.3 IN ADDITION TO ANY CONTROL BY THE OFFICIAL AGENCY HAVING JURISDICTION, IT IS DESIRABLE THAT EACH FISH PROCESSING PLANT IN ITS OWN INTEREST SHOULD HAVE ACCESS TO LABORATORY CONTROL TO ESTABLISH HYGIENE AND QUALITY OF THE PRODUCTS PROCESSED AND FOR PROCESS MONITORING.

The extent and type of such control will vary with the food product as well as the needs of management. Such control should reject all foods that are unfit for human consumption or otherwise fail to meet the specifications at issue.

Analytical procedures used should follow recognized standard methods in order that the results may be readily interpreted.

4.6 Hygiene Control Programme

- 4.6.1 IT IS DESIRABLE THAT EACH FISH PROCESSING PLANT IN ITS OWN INTEREST DESIGNATES A SINGLE INDIVIDUAL, WHOSE DUTIES ARE PREFERABLY DIVORCED FROM PRODUCTION, TO BE HELD RESPONSIBLE FOR THE CLEANLINESS OF THE ESTABLISHMENT.

Such a person or his staff should be a permanent part of the organization, or employed by the organization, and should be well trained in the use of special cleaning tools, methods of dismantling equipment for cleaning and in the significance of contamination and the hazards involved. A permanent cleaning and disinfection schedule should be drawn up to ensure that all parts of the establishment are cleaned appropriately and that critical areas, equipment and material are designated for cleaning and/or disinfection daily or more frequently if required.

SECTION V - END PRODUCT SPECIFICATIONS

- 5.1 Appropriate methods should be used for sampling and examination to determine compliance with the following specifications: FF
6.1/
mod.
- A. Battered and/or breaded fishery products should be free from micro-organisms in amounts harmful to man, free from parasites harmful to man and should not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.
 - B. Battered and/or breaded fishery products should be free from chemical contaminants in amounts which may represent a hazard to health.
 - C. Battered and/or breaded fishery products should be to the extent possible in good manufacturing practice, free from other objectionable matter and also parasites not harmful to man.
 - D. Battered and/or breaded fishery products should comply with any requirements set forth by the Codex Alimentarius Commission on pesticide residues and food additives as contained in permitted lists of Codex commodity standards, or should comply with the requirements on pesticide residues and food additives of the country in which the products will be sold.

SECTION VI - RETAIL DISPLAY

- 6.1 FROZEN FOOD SHOULD BE OFFERED FOR SALE FROM REFRIGERATED CABINETS DESIGNED FOR THE PURPOSE. FR
7.1/
mod.

Display cabinets used for frozen battered and/or breaded fishery products in retail stores or other outlets should be capable of maintaining the low temperatures required to preserve the quality of the product.

Retail display cabinets are usually kept at a higher temperature than is recommended. The cabinets should be capable of maintaining a temperature of -18°C (0°F) or lower, but during sale operations, some fluctuation seems unavoidable and a slight rise of temperature may be tolerated for short periods but the product temperature should not be allowed to become higher than -15°C (5°F). The temperature should be carefully controlled and all cabinets should be equipped with reliable thermometers where bulbs are in contact with the top layers of product so that temperatures can be readily checked several times daily.

In order to ensure constant temperature and for reasons of economy, cabinets should not be exposed to warm air currents, direct sunlight, heating or lighting equipment. The cabinets should be covered at night and over the weekend. The stocking of cabinets should be carried out quickly to minimize the time during which the product is exposed to ambient temperature.

It is advantageous to arrange storage space for new stock prior to its delivery. The temperature of products at the time they are delivered should be checked.

Although the air temperature in a cabinet can be readily checked, the actual temperature of the product should be measured occasionally. Advice on how to measure frozen product temperatures accurately may be obtained from the frozen product technologists or from various fishery research organizations. A special type of thermometer is required for this purpose.

- 6.2 CONTENTS OF THE CABINET SHOULD NEVER BE STACKED ABOVE THE DESIGNATED LOAD LINE MARK. FR 7.2

The cabinet refrigeration system is not designed to maintain the temperature of products stacked higher than the load line marked on the cabinet. Packages should be stored close together but not too tightly packed. If displays are packed too tightly they take longer to stock, customers have difficulty in removing packages and damage often results. Simple dividers may be of assistance in stocking the cabinet and creating an orderly display. Stocks should not be removed from and returned to the cabinet except when absolutely necessary. Unpacked products are subject to risks of contamination and dehydration and should be stored and displayed in compartments separate from those used for packaged frozen foods.

- 6.3 FROZEN BATTERED AND/OR BREADED FISHERY PRODUCTS SHOULD NOT BE STORED IN RETAIL CABINETS FOR LONG PERIODS. FR 7.3/mod.

Refrigerated retail display cabinets are designed to hold frozen products for short periods only. Long term storage should be in low temperature freezer stores.

Merchants should avoid holding stock in retail display cabinets for much longer than one week and this should be borne in mind when ordering supplies. New supplies should be placed under or behind the stock of that particular item so that the packages which were delivered first will be sold first. Large stocks of frozen fish products with a slow turn-over should be avoided.

- 6.4 DISPLAY CABINETS SHOULD BE DEFROSTED AT LEAST ONCE A WEEK. FR 7.4
- Defrosting cycles should be programmed in such a way that, as much as possible, defrosting takes place outside the normal shopping hours.

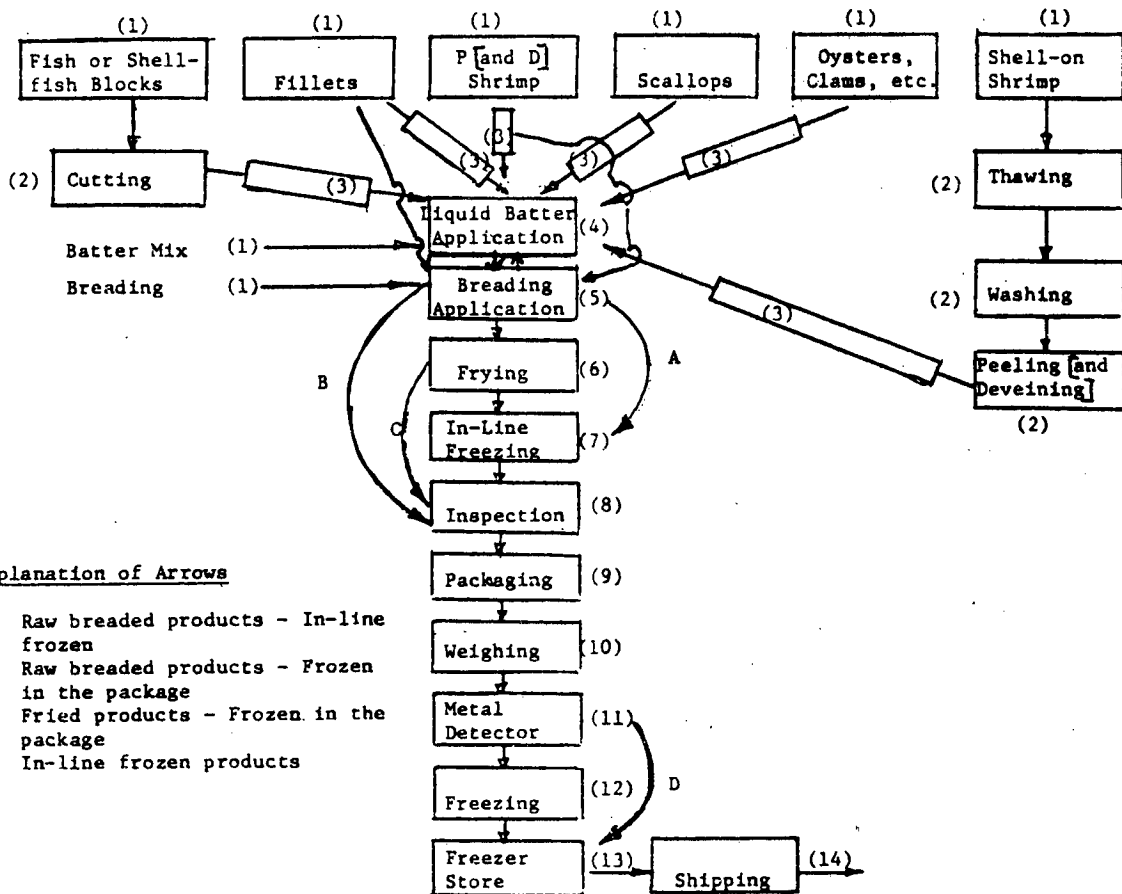
If the cabinet is not defrosted regularly, the effectiveness of its refrigeration system will be seriously reduced by accumulation of frost and ice on the cooling surfaces. This can adversely affect running costs and operating temperature. For efficient operation, the inner walls and floor of the cabinet should be kept clean and free from thick frost. Unless it has an automatic defrost, the cabinet should be emptied for defrosting and during this time the product temperature should not be allowed to rise unduly. It is also advisable to have the cabinet checked from time to time by a competent refrigeration service man.

- 6.5 RETAIL DISPLAY CABINETS ARE DESIGNED TO STORE ALREADY FROZEN PRODUCTS AND NOT TO FREEZE THEM. FR 7.5/mod.

Unfrozen or partially thawed battered and/or breaded fishery products should never be placed in a frozen food cabinet for freezing or chill storage. These cabinets are neither designed nor do they have the refrigeration capacity for quick freezing.

APPENDIX I

Flow Diagram for Battered and Breaded Fishery Products



Inspection and Control Points

- | | |
|---|---|
| 1. Fresh, thawed or frozen raw product inspection | 8. Physical quality requirements |
| 2. Equipment sanitation, product handling | 9. Equipment and personnel sanitation, time/temp. control |
| 3. Aligning, time/temperature control | 10. Net weight checks |
| 4. Equipment sanitation, temp. control | 11. Metal detection |
| 5. Equipment sanitation, product handling | 12. Sanitation, freezing time/temp. |
| 6. Equipment sanitation, time/temp. control | 13. Temperature control. Housekeeping |
| 7. Equipment sanitation, time/temp. control | 14. Transport vehicle temperature, product temperature. |

APPENDIX II

References to Related Codes and Standards

Recommended International Code of Practice for Fresh Fish	<u>CAC/RCP 9-1976</u>
Code of Practice for Frozen Fish	<u>CX/FFP 77/8</u> (FAO Fish. Circ. No. C145(rev.2))
Code of Practice for Shrimp or Prawns	<u>CX/FFP 77/7</u> (FAO Fish. Circ. No. C322(rev.1))
Recommended International Code of Practice - General Principles of Food Hygiene	<u>CAC/RCP 1-1969</u> *
International Standards for Drinking Water - WHO 3rd Edition 1971	
Code of Practice for Smoked Fish	<u>CX/FFP 77/6</u> (FAO Fish. Circ. No. C321(rev.1))
Code of Practice for Lobsters and Related Species	<u>CX/FFP 76/16</u> (FAO Fish. Circ. No. C330)

* For the purposes of this Code, the revised Code of Practice -
General Principles of Food Hygiene (ALINORM 79/13, Appendix II)
has been used.

PROPOSED DRAFT CODE OF PRACTICE FOR CEPHALOPODS

Step 3

(Working Document prepared by Fish Utilization and Marketing Service,
FAO Fishery Industries Division)

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INTRODUCTION

This code of practice has been written for the use of those engaged in the cephalopod processing industry. It contains technological and essential hygiene requirements for the preparation of high-quality cephalopod products, and is based on long-established and widely recognized good commercial practices.

This code is intended also as background information or as a guideline for the elaboration of national quality standards, quality control and fish inspection programmes in countries where these have not yet been developed.

However, it must be acknowledged that most of the practical information pertaining to the hygiene and technology of cephalopod processing has been gained from the industrial experience of very few countries. With this limitation in mind, this code should, therefore, not be regarded as a set of rules to be followed explicitly without any concern for local conditions.

The information provided is not intended to replace the advice or guidance of trained and experienced technologists regarding the complex technical problems which might be unique to a specific geographical area.

In some countries, cephalopods have been used for human consumption from ancient time, and many varieties of the products were available as their traditional food. Therefore, the practical application of this "international" code with regard to "national" cephalopod processing industries, will probably require some modifications according to local conditions and specific (traditional) consumer preferences. In other words, a "national" code of practice could be developed from the information contained in this code.

This code provides, as mentioned above, the information which covers typically standardized procedures for handling and processing of cephalopods at sea and on shore.

This code will require periodical revision, as research and experience in commercial practice bring new techniques and facilities into operation.

DRAFT CODE OF PRACTICE FOR CEPHALOPODS

Note

- The hygiene and some of the technological requirements of this code are partially based on FAO/WHO Recommended International Codes of Practice - General Principles of Food Hygiene, the Recommended International Code of Practice for Fresh Fish, the Recommended International Code of Practice for Canned Fish, the Code of Practice for Frozen Fish, the Code of Practice for Shrimp or Prawns, the Code of Practice for Lobsters and Related Species, the Code of Practice for Smoked Fish, and the Code of Practice for Crabs (See Appendix III).

- The letter and number codes given in the right hand margin indicate requirements taken from the following documents;

Recommended International Code of Practice for Fresh Fish	- FF
Recommended International Code of Practice for Canned Fish	- CF
Code of Practice for Shrimp or Prawns	- SP
Code of Practice for Lobsters and Related Species	- Lob
Code of Practice for Smoked Fish	- SMF
Code of Practice for Crabs	- Crb
Modified for the purpose of this Code	- Mod

1.

SECTION I - SCOPE

This code of practice applies to fresh and processed cephalopods including commercially important cuttlefish (Sepia and Sepiella), squid (Loligo, Loliolus, Sepioteutis, Symplectoteuthis and Todarodes), and octopuses (Octopus, Polypus, and Eledone) intended for human consumption.

It contains the technological guidelines and the essential hygiene requirements for harvesting, processing and handling of cephalopods at sea and on shore. The technology of canning, other than the preparation of cephalopods for canning, is not covered in this code.

2.

SECTION II - DEFINITIONS

For the purpose of this code:

2.1 "autolysis" is the breakdown or deterioration of the cephalopods meat or viscera by means of indigenous enzymes;

Crb 2.1/Mod

2.2 "batch systems" are those processing methods where cephalopods are processed as bulk units;

Crb 2.3/Mod

- 2.3 "brining" means the process of placing cephalopods in a solution of food grade salt (sodium chloride) in potable water for a period of sufficient length for the cephalopod tissue to absorb a desirable quantity of salt; SMF 2.1/Mod
- 2.4 "chilling" is the process of cooling cephalopods to a temperature approaching that of melting ice; FF 2.4/Mod
- 2.5 "chilled sea water" is clean sea water reduced in temperature by addition of ice prepared from potable water or clean sea water; FF 2.5/Mod
- 2.6 "chlorinated water" is potable water containing about 5 ppm available chlorine;
- 2.7 "clean sea water" is sea water which meets the same microbiological standards as potable water and is free from objectionable substances; FF 2.6
- 2.8 "cleaning" means the removal of soil, food residues, dirt, grease or other objectionable matter; FF 2.7/Mod
- 2.9 "contamination" means direct or indirect transmission of objectionable matters to the cephalopods; FF 2.8/Mod
- 2.10 "cooking" means boiling of cephalopods in potable water, clean sea water or brine or heating in steam for a period of time sufficient for the thermal centre of the cephalopods to reach a temperature adequate to coagulate the protein; SP 2.7/Mod
- 2.11 "disinfection" means the application of hygienically satisfactory chemical or physical agents and processes to clean surfaces with the intention of eliminating micro-organisms; FF 2.9
- 2.12 "dry-salting" is the process of mixing cephalopods with dry food grade salt (sodium chloride) and/or sugar in such a manner that the resulting brine drains away; SMF 2.11/Mod
- 2.13 "enzymatic activity" is the catalytic action of enzymes on biochemical reactions; Crb 2.15
- 2.14 "mechanical smoking kiln on smoking tunnel" means the type of equipment in which forced flow of smoke and air passes around the cephalopods to be smoked. The required smoke is generated outside the smoking chamber; SMF 2.18/Mod
- 2.15 "pasteurization" means subjecting cephalopod meat to heat at times and temperatures which destroy a high proportion of objectionable micro-organisms without noticeable changes in appearance, texture and flavour of the product; SP 2.14/Mod
- 2.16 "plant or establishment" means the building or buildings, or parts thereof, used for, or in connection with, the manufacture or holding of food for human consumption; FF 2.17
- 2.17 "potable water" is fresh water fit for human consumption. Standards of potability should not be lower than those contained in the latest edition of the "International Standards for Drinking Water", World Health Organization; FF 2.18

- 2.18 "refrigerated sea water" is a clean sea water reduced in temperature by a suitable refrigeration system. Its salt content is normally about 3 percent; FF 2.21/Mod
- 2.19 "roasting" means heat processing of cephalopods by holding cooked and seasoned fillets between two heated iron plates;
- 2.20 "salt" means salt (sodium chloride) of an appropriate quality and otherwise suitable for the purpose; SMF 2.22
- 2.21 "smoke" means the volatile products derived from combustion of wood or sawdust. This term includes derivatives obtained by condensation or absorption of smoke in a suitable food grade liquid; SMF 2.23/Mod
- 2.22 "splitting" means cutting cephalopods along the mantle to produce a single fillet;
- 2.23 "suitable corrosion-resistant material" means impervious material which is free from pits, crevices and scales, is non-toxic and unaffected by sea water, ice, fish slime or any other corrosive substance with which it is likely to come in contact. Its surface must be smooth and it must be capable of withstanding exposure to repeated cleaning, including the use of detergents; FF 2.25
- 2.24 "traditional smoking kiln" means an enclosed space, essentially a large chimney, in which cephalopods can be subjected to the action of smoke that flows around the product by natural draught; SMF 2.26
- 2.25 "viscera" refers to the contents of the gut cavity of cephalopods; Crb 2.30
- 2.26 "waste" means those cephalopod parts which remain after the meat removal operation is completed. Crb 2.31

3. SECTION III - RAW MATERIAL REQUIREMENTS

3.1 General Considerations

- 3.1.1 FRESH CEPHALOPODS ARE EXTREMELY PERISHABLE, AND SHOULD BE HANDLED AT ALL TIMES WITH GREAT CARE AND IN SUCH A WAY AS TO PREVENT CONTAMINATION AND INHIBIT THE MULTIPLICATION OF MICRO-ORGANISMS FF 3.1.1/Mod

Fresh cephalopods deteriorate rapidly and their potential keeping time is shortened if they are not handled and stored properly.

Cephalopods should not be exposed to direct sunlight or to the drying effect of winds, or any other harmful effects of the elements, but should be carefully cleaned and cooled down to the temperature of melting ice, 0°C (32°F), as quickly as possible. Any careless treatments or delay in reducing the temperature of the cephalopods will have a marked effect on their potential keeping time.

- 3.1.2 CEPHALOPODS INTENDED FOR MARKETING AS FRESH, SHOULD BE OF THE HIGHEST POSSIBLE QUALITY FF 3.1.2/Mod

With cephalopods intended for fresh market, special care should be taken to retain their natural colour, to prevent physical damage, and to control microbiological contamination.

3.1.3 NO CEPHALOPODS OR INGREDIENTS WHICH HAVE DETERIORATED OR DECOMPOSED, OR ARE CONTAMINATED TO AN EXTENT WHICH RENDERS THEM UNFIT FOR HUMAN CONSUMPTION, SHOULD BE USED FOR THE PROCESSING OF FOOD PRODUCTS

SP 3.1.2/Mod

Raw material should be rejected if it contains harmful, decomposed or extraneous substances which cannot be removed to acceptable levels by normal procedures of sorting or preparation.

Freshly caught cephalopods can easily be recognized by their appearance. The presence of lacerations, breakages and discolouration of the skin, or a yellowish tinge spreading from the liver and digestive organs inside the mantle, are the first indications of quality deterioration.

Any putrefaction or off odours can be detected by smelling. The material having any such unpleasant smell should be rejected.

3.1.4 CEPHALOPODS INTENDED FOR PROCESSINGS SHOULD RECEIVE THE SAME CARE AND ATTENTION FROM THE TIMES OF CAPTURE UNTIL THEY ARE PROCESSED AS THOSE INTENDED FOR MARKETING FRESH

SMF 3.1.2/Mod

The processes and the principles involved in the preparation of cephalopods for smoking or other processings are for the most part similar to those that would be involved in preparing them for marketing as fresh. Therefore, the recommendations of the Recommended International "Code of Practice for Fresh Fish" and, where applicable, the "Code of Practice for Frozen Fish" should be used as a guide for the handling and preparation of cephalopods for processing.

HANDLING OF CEPHALOPODS AT SEA

4. SECTION IV A - FISHING VESSEL FACILITIES AND OPERATING REQUIREMENTS

4.1 General Considerations

4.1.1 THE FISHING VESSEL SHOULD BE DESIGNED FOR RAPID AND EFFICIENT HANDLING OF CEPHALOPODS, EASE OF CLEANING AND DISINFECTION, AND SHOULD BE OF SUCH MATERIAL AND CONSTRUCTION AS NOT TO CAUSE ANY DAMAGE OR CONTAMINATION OF THE CATCH

FF 4.1.1/Mod

In designing a squid or cuttlefish fishing vessel, many other factors, apart from the vessel's performance as a harvesting unit, should be considered. Contamination of cephalopods with bilge water, sewage, smoke, fuel, oil, grease or other objectionable substances must be avoided. The catch should be protected against physical damage, exposure to high temperatures and drying effects of sun and wind.

All surfaces with which the cephalopods might come in contact should be of suitable corrosion-resistant material which is smooth and easily cleanable.

4.2 Vessel Construction and Sanitary Design

4.2.1 DECK POUND OR PENS STANCHIONS AND DIVIDING BOARDS AND HOLDING TANKS SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL. THEY SHOULD BE ADEQUATE IN NUMBER AND HEIGHT TO PREVENT CRUSHING OF THE CEPHALOPODS DUE TO EXCESS WEIGHT OR TO THE VESSEL'S MOTION, AND TO HOLD THE ESTIMATED CATCH

Lob 4.2.1/Mod

In practice, wood is still used in many fisheries for deck pound boards and steel for stanchions and other fixtures. Where this is the case, the wood should be treated to prevent the entry of moisture and should be coated with a durable non-toxic paint or other non-toxic surface coating that is smooth, readily cleanable and light colour. Steelwork should be coated with an anti-corrosion non-toxic paint. Whenever possible, suitable corrosion-resistant materials should be used.

- 4.2.2 VESSEL HOLDS OR TANKS FOR STORAGE OF ICED CEPHALOPODS, SHOULD BE ADEQUATELY INSULATED WITH A SUITABLE MATERIAL. ANY PIPES, CHAINS OR CONDUITS PASSING THROUGH THE HOLD SHOULD, IF POSSIBLE, BE SUNK FLUSH OR NEATLY BOXED IN AND INSULATED

Lob 4.2.2/Mod

Adequate insulation will reduce the amount of heat entering the hold and consequently the rate of icemeltage. If the quality and structure of the insulation is poor, considerable ice meltage will take place near bulkheads and shipside.

- 4.2.3 HOLD OR TANK LININGS SHOULD BE COMPLETELY WATER-TIGHT. THE INSULATION LAYER SHOULD BE PROTECTED BY A LINING MADE OF CORROSION-RESISTANT METAL SHEETS OR ANY OTHER EQUALLY SUITABLE NON-TOXIC MATERIAL HAVING WATER-TIGHT JOINTS

FF 4.2.4/Mod

It is important to prevent water from carrying dirt and offal to parts of the vessel where effective cleaning is virtually impossible. The melt water, seeping through the vessel hold lining, will also reduce the efficiency of the insulation and this will, in turn, lead to an increase in the temperature of the cephalopods. The insulation should be covered with corrosion-resistant metal sheets, or any other equally suitable material having water-tight joints to ensure protection from such contamination. An effective drainage system should be able to remove the melt water into a sump as fast as it accumulates.

- 4.2.4 WOODEN HOLDS OR WOODEN HOLDING TANKS SHOULD BE LINED WITH A SUITABLE MATERIAL

FF 4.2.5/Mod

The linings of wooden holds or tanks should be similar to those described above. They should be sealed and coated with a suitable impervious and non-toxic material which is easy to keep clean and not difficult to repair.

- 4.2.5 THERE SHOULD BE NO SHARP CORNERS OR PROJECTIONS IN THE HOLD OR TANK AS THESE WILL MAKE CLEANING DIFFICULT AND MAY DAMAGE THE CEPHALOPODS

FF 4.2.14/Mod

Contamination with dirt and offal will build up rapidly on surfaces, in corners or around projections which are not smooth and impervious.

Any ledges or projections resulting from the encasement of pipes, wires, chains and conduits, that are passing through the vessel hold, should be so constructed as to allow free drainage, ease of cleaning and not to cause any physical damage to the cephalopods.

- 4.2.6 PORTABLE BOARDS OF SUITABLE CORROSION-RESISTANT MATERIAL OR IMPREGNATED AND PAINTED WOOD, SHOULD BE USED FOR MAKING SHELVES AND VERTICAL DIVISIONS IN THE HOLDS

FF 4.2.6/Mod

The use of portable boards, which are a good fit in the stanchions, allows the shelf and dividing structure to be dismantled and removed for cleaning. Wooden boards should be treated to prevent the entry of moisture and should be coated with durable non-toxic paint or other equally suitable surface coating that is smooth, readily cleanable and repairable. Wherever possible, the shelving and the partitioning boards should be interchangeable in size.

4.2.7 SHELVING BOARDS SHOULD BE DESIGNED TO ALLOW ADEQUATE DRAINAGE

FF 4.2.7

A continuous trickle of melt water will help to carry away slime and micro-organisms which should not be allowed to collect on the shelves. Corrugated boards of corrosion-resistant material are most suitable for this purpose.

4.2.8 THERE SHOULD ALWAYS BE AMPLE DRAINAGE SPACE BETWEEN THE LOWEST SHELVES OR THE "FALSE BOTTOM" AND THE FLOOR OF THE HOLD. THIS SPACE SHOULD BE OPEN TO A CENTRAL DRAIN, DISCHARGING DIRECTLY INTO ONE OR MORE SUMPS OR WELLS, LOCATED SO THAT THE HOLD CAN BE EFFICIENTLY DRAINED AT ALL TIMES. BILGE PUMP CONNECTIONS TO THESE SUMPS SHOULD BE FITTED WITH COARSE SCREEN FILTERS

FF 4.2.9/Mod

Proper drainage facilities can prevent a build-up of large quantities of melt water, dirt and offal. If drainage is inadequate, the bottom layers of the cephalopods in the hold may be contaminated by this dirty liquid, especially during the periods of severe motion of the vessel.

4.3 Sanitary Facilities

4.3.1 DECK HOSES SHOULD BE SUPPLIED WITH CLEAN SEA WATER, AT ADEQUATE PRESSURE, BY A PUMP USED ONLY FOR CLEAN SEA WATER

FF 4.3.4/Mod

A good supply of clean sea water, at adequate pressure, with an addition of chlorine, if possible, should be available.

The intake for sea water should be well forward of and on the opposite side of the vessel from the toilet, waste and engine cooling discharge. Sea water should not be used while the vessel is in harbour or in areas where there is a danger of it being polluted. Clean sea water should be taken in while the vessel is in forward motion.

The piping for the clean sea water supply should have no cross connections with the engine or condenser cooling system. It should be so constructed as to prevent any possibility of back-syphonage from the kitchen sink or toilets.

4.3.2 ICE SHOULD BE MADE FROM POTABLE WATER OR CLEAN SEA WATER AND SHOULD NOT BE CONTAMINATED WHEN MANUFACTURED, HANDLED OR STORED

FF 4.3.5/Mod

Ice made from water which is neither potable nor clean sea water, may contaminate the cephalopods with water-borne micro-organisms or other objectionable or even harmful substances. Such contamination will result in the loss of quality, reduced keeping time and may create a health hazard.

When vessels are taking ice to sea, only fresh clean ice should be taken on board at the beginning of each voyage. Ice storage on board should be in an insulated hold and all unused ice should be discarded at the end of the trip.

- 4.3.3 THE VESSEL'S TOILET FACILITIES AND ALL PLUMBING AND WASTE DISPOSAL LINES SHOULD BE SO CONSTRUCTED AS NOT TO CONTAMINATE THE CATCH

FF 4.3.7/Mod

All the plumbing and waste disposal lines servicing the vessel's toilets, hand wash basins or kitchen sinks, should be large enough to carry peak loads, be watertight and should not go through the holds where cephalopods are being handled or stored.

- 4.3.4 IF POISONOUS AND HARMFUL MATERIALS, INCLUDING CLEANING COMPOUNDS, DISINFECTING MATERIALS AND PESTICIDES, ARE STORED ON BOARD THE VESSEL, THEY SHOULD BE KEPT IN A SEPARATE COMPARTMENT RESERVED AND MARKED SPECIFICALLY FOR THIS PURPOSE

FF 4.3.11/Mod

Extreme caution must be exercised to prevent poisonous or harmful materials from contaminating the cephalopods. All such materials should be prominently and distinctly labelled so that there can be no confusion between these and edible materials used aboard the vessel. Such compartments should be kept locked and the materials contained in them should be handled only by personnel trained in their use.

- 4.3.5 THE FISHING VESSEL SHOULD BE EQUIPPED WITH BRUSHES, SCRAPERS, WATER HOSES, SPRAY NOZZELS AND OTHER SUITABLE WASHING AND DISINFECTING EQUIPMENT

FF 4.3.10

Although there is a variety of cleaning and disinfecting equipment available on the market, good quality hand brushes, of several sizes and shapes, are still the most inexpensive and versatile tools for cleaning operations. Brushes should be kept in a clean and sound condition, disinfected after each use (dipping in 50 ppm chlorine solution is recommended) and when not used, should be stored in a dry state. Unclean brushes could spread dirt and micro-organisms. Micro-organisms may proliferate in a dirty brush when stored in a wet condition. The use of steel wool for scouring should be avoided as there is a constant danger of introducing small, sometimes hardly visible, bits of wire into the final product. If for some reason cleaning cannot be done effectively with a good brush, then plastic, brightly coloured scouring pads might be used.

The high pressure and high frequency oscillating water or detergent-spraying equipment has been found to be quite effective in cleaning, but it usually requires an experienced operator to prevent damage to painted surfaces.

4.4 Equipment and Utensils

- 4.4.1 ALL CONTAINERS USED FOR ICE STOWING OF CEPHALOPODS, SHOULD BE OF UNIFORM AND SUITABLE SIZE, EASY TO HANDLE WHEN LOADED, AND SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL

FF 4.4.6/Mod

Such containers, when fully loaded, should be easy to handle by one or two men without tilting, tipping or jerking.

If wooden boxes are used, they should be of a smooth construction and of durable, non-toxic and waterproof finish or should be new.

Baskets should not be used for handling cephalopods on board the vessel or on shore, as they are difficult to clean and disinfect.

- 4.4.2 ALL EQUIPMENT USED IN FREEZING AND FROZEN STORAGE OF CEPHALOPODS ABOARD THE VESSEL SHOULD MEET THE REQUIREMENTS OF THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH"

Most of the recommendations made in that code would apply equally to freezing and frozen storage of cephalopods.

4.5 Hygienic Operating Requirements

- 4.5.1 ALL TUBS, TANKS, BARRELS AND OTHER EQUIPMENT USED IN HANDLING, WASHING AND CONVEYING OPERATIONS SHOULD BE THOROUGHLY CLEANED, DISINFECTED AND RINSED AFTER EACH CYCLE OF USE

FF 4.5.2/Mod

Any dirt or offal if allowed to dry and accumulate on surfaces with which cephalopods come in contact, will be very difficult to remove later and will thus contaminate the subsequent loads of cephalopods.

- 4.5.2 DURING FISHING TRIPS THE VESSEL'S HOLD AND BILGE SUMP SHOULD BE DRAINED REGULARLY. THE SUMP SHOULD BE ACCESSIBLE AT ALL TIMES

FF 4.5.3/Mod

Bilge water containing dirt and offal, if not regularly pumped out, will provide a medium for the multiplication of micro-organisms and give rise to offensive odours in the hold.

- 4.5.3 ADEQUATE PRECAUTIONS SHOULD BE TAKEN TO ENSURE THAT HUMAN AND OTHER WASTES FROM THE FISHING VESSEL ARE DISPOSED OF IN SUCH A MANNER AS NOT TO CONSTITUTE A PUBLIC HEALTH AND HYGIENE HAZARD

FF 4.5.12

With man's increased concern for the protection of his environment, in some countries the disposal of any waste from any boat into the surrounding water is restricted by law.

The fishermen should be fully aware of their responsibilities in this regard. Discharge of animal, human or any other wastes from the fishing vessel into the sheltered waters close to man-inhabited areas, or over the shellfish growing areas, should not be practised.

- 4.5.4 SEA WATER WHICH HAS BEEN USED FOR COOLING ENGINES, CONDENSERS OR SIMILAR EQUIPMENT SHOULD NOT BE USED FOR WASHING CEPHALOPODS, DECK, HOLD OR ANY OTHER EQUIPMENT WHICH MIGHT COME IN CONTACT WITH CEPHALOPODS

FF 4.5.5/Mod

The water used for cooling engines is usually at a higher temperature than fresh sea water and might be contaminated with oil or other petroleum products or contain rust and other by-products of metal corrosion.

Such water, therefore, will considerably accelerate spoilage of cephalopods by raising the temperature and might impart objectionable taste, odour or undesirable discolouration.

- 4.5.5 WHEN CLEANING AND HOSING OPERATIONS ARE CARRIED OUT, WHILE THE VESSEL IS IN PORT, POTABLE WATER OR CLEAN SEA WATER SHOULD BE USED

FF 4.5.6/Mod

Harbour water is usually heavily polluted and should never be used for cleaning purposes. This is also true for sea water in the close vicinity of towns, villages, industrial plants, fish processing establishments and factory ships.

4.5.6 IMMEDIATELY AFTER THE CATCH IS UNLOADED THE DECK AND ALL DECK EQUIPMENT SHOULD BE HOSED DOWN, BRUSHED, THOROUGHLY CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED

FF 4.5.7/Mod

Guts, slime and other residue left on the deck will support multiplication of micro-organisms which may contaminate future catches. If allowed to dry, dirt and offal are very difficult to remove.

Thorough cleaning should always precede disinfection, especially when chlorine is used as the disinfecting agent. Any organic matter which is not removed from the surfaces that are to be disinfected, will rapidly combine with and neutralize the micro-organism killing ability of chlorine or any other disinfectant.

4.5.7 AT THE END OF EACH TRIP ANY UNUSED ICE SHOULD BE DISCARDED

SP 4.3.13

Despite all precautions, unused ice in the hold will become contaminated and will contaminate the new catch.

4.5.8 IMMEDIATELY AFTER THE CATCH IS LANDED THE HOLD AND BILGE SUMP SHOULD ALSO BE EMPTIED COMPLETELY. ALL SURFACES IN THE HOLD, POUND BOARDS AND SUMP SHOULD BE THOROUGHLY CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED

FF 4.5.8/Mod

This is necessary to remove all dirt, offal and other residue as soon as the catch is landed, in order to avoid multiplication of micro-organisms, offensive odours and the drying of residues on the hold or other surfaces. Cleaning should be completed before fresh ice is taken on board for the next trip.

4.5.9 CLEANING, WASHING AND DISINFECTING PROCEDURES SHOULD BE EFFECTIVE

SP 4.3.15/Mod

Detergents and disinfectants should conform to public health requirements and should not be allowed to come into contact with cephalopods. Any residue of cleaning agents used for washing of boats and the equipment, should be removed by thorough rinsing with potable fresh or clean sea water before the area or equipment is used again for stowing or handling cephalopods.

In choosing and applying different detergents, sanitizers and disinfectants, one should be fully aware of their properties and limitations. Many agents are effective only when prepared and used in strict accordance with the manufacturer's recommendations.

Temperature of the solution, its acidity or alkalinity concentration of the active ingredient, presence of other chemicals, kind of surface to be treated or type of soil (dirt) and mode of application, are some of the factors that will determine the usefulness of the agent. Different agents should not be combined since one agent may neutralize the activity of another.

4.5.10 EMPTY VESSEL HOLDS OR STORAGE TANKS SHOULD BE VENTILATED

SP 4.3.16/Mod

Strong odours associated with mildew, stagnant humid air and decomposing organic matter will develop in the absence of ventilation. All the containers, pails, boxes and tubs, after washing and sanitizing should be stacked in such a way as to permit sufficient aeration.

4.5.11 EFFECTIVE MEASURES SHOULD BE TAKEN TO PROTECT THE FISHING VESSEL AGAINST INSECTS, RODENTS, BIRDS OR OTHER VERMIN

FF 4.5.13/Mod

Rodents, birds and insects are potential carriers of many diseases which could be transmitted to many by contamination of the catch. Fishing vessels should be regularly examined for evidence of infestation and, when required, effective control measures should be taken.

All rodenticides, fumigants, insecticides and other harmful substances should be used only in accordance with the recommendations of the appropriate official agency having jurisdiction.

4.5.12 DOGS, CATS AND OTHER ANIMALS SHOULD BE EXCLUDED FROM AREAS OF THE VESSEL WHERE CEPHALOPODS ARE RECEIVED, HANDLED, PROCESSED AND STORED

FF 4.5.14/Mod

Because of public health hazards and for aesthetic reasons, no surface of the fishing vessel and of the equipment thereon which comes in contact with cephalopods, should be exposed to contamination with animal hair or excreta.

4.6 Handling and Processing of Cephalopods at Sea

4.6.1 General Considerations

4.6.1.1 DURATION OF THE TRIP FOR A CEPHALOPOD HARVESTING VESSEL SHOULD BE DETERMINED BY THE FACILITIES AVAILABLE ON THE VESSEL FOR HANDLING AND KEEPING THE CATCH WELL CHILLED OR FROZEN, DISTANCE FROM THE PROCESSING PLANTS OR MARKETS AND THE LOCAL ENVIRONMENTAL CONDITIONS

From the time the cephalopods are caught, there is a continual and irreversible deterioration in quality. The progress and degree of such deterioration are governed mainly by the time the cephalopods are held and the temperatures at which they are handled and stored on board the harvesting vessel. With short distances from the processing plant and market, more time might be spent on the fishing grounds, providing the boat is equipped with adequate facilities to handle, effectively chill and hold the catch at low temperature. With more distant fishing grounds proper freezing and freezer facilities should be provided.

4.6.2 Handling the Catch on Board

4.6.2.1 PROPER HANDLING OF CEPHALOPODS AT SEA SHOULD ENSURE THAT THE CATCH RETAINS ITS INITIAL FRESHNESS UNTIL LANDING

The freshness of caught cephalopods depends mainly on temperature and time of storage and cleanliness of immediate environment. The temperature is the most important single factor influencing the keeping quality of fresh cephalopods. The effects of increasing temperature are cumulative; that is, some potential keeping time is lost each time the temperature of the cephalopods rises. The extent of this loss depends both on the degree of the rise and the length of time the cephalopods remain at the higher temperature. It is therefore important to chill the catch quickly to the temperature of melting ice and maintain it in a chilled condition until it reaches the processor or the market. Also, it is essential to maintain a high standard of cleanliness on deck, inside the holds and processing areas.

4.6.2.2 IMMEDIATELY AFTER THE CEPHALOPODS ARE CAUGHT THEY SHOULD BE TRANSFERRED RAPIDLY FROM HARVESTING MACHINE TO HOLDS OR WORKING AREA

For efficient and rapid transfer of the cephalopods from the deck to holds or working area a properly designed transfer system should be used. In the case of squid jigging vessels, an open flume, adequately sloped, should be provided along the harvesting machines. The cephalopods are dropped into the flume and are carried away toward the hatches of working areas by a stream of clean sea water (see Appendix I "General Deck Layout of Squid Jigging Vessel").

4.6.2.3 THE CEPHALOPODS WHICH ARE TO BE TRANSFERRED TO THE PROCESSING HALL SHOULD BE KEPT SEPARATELY IN ICE OR ICE WATER

If cephalopods are to be processed at sea they should be chilled immediately after they are caught and kept throughout chilled until the processing commences. The deteriorating effects of increased temperature are cumulative and cannot be reversed by further processing.

4.6.2.4 CEPHALOPODS SHOULD BE CHILLED RAPIDLY IN MELTING ICE OR IN CHILLED SEA WATER OR BRINE AND SHOULD BE STORED SO THAT THE TEMPERATURE DOES NOT RISE

Cooling with ice should preferably be preceded by cooling in chilled sea water where direct and rapid heat removal takes place. Iced cephalopods are commonly stored in wooden or steel boxes. The amount of ice required to ensure adequate protection for three days storage depends on the ambient temperature. The amount of ice used should be adequate to chill and maintain cephalopods temperature at about 0°C (32°F).

Rapid chilling takes place only when the ice is melting and the resulting ice-cold melt water percolates downward through the layers of cephalopods. When the ice stops melting because of low temperature, its effectiveness as a cooling agent diminishes considerably.

4.6.2.5 CEPHALOPODS IN ICE SHOULD BE STOWED IN SHALLOW LAYERS

SP 4.4.3.2/Mod

In bulk stowing the cephalopods should be well mixed with finely divided ice or iced in layers which are not excessive in depth. Adequately shelved holds, or pends, or proper containers should be used for this purpose. Chilling of cephalopods in bulk by top icing only should be avoided.

4.6.2.6 FINELY DIVIDED ICE SHOULD ALWAYS BE USED

SP 4.4.3.4/Mod

This gives close contact with the cephalopods, reduces damage by crushing and gives rapid cooling.

4.6.2.7 WHERE BOXES ARE USED FOR STOWING CEPHALOPODS THEY SHOULD BE PROPERLY ICED AND NOT OVERFILLED

SP 4.4.3.5/Mod

It is an advantage to pack cephalopods with ice into boxes at sea. The cephalopods, if adequately iced, can remain undisturbed in the boxes until they reach the processor or the market. Unloading the catch can be simpler and, if required, more ice can be added to the boxes on landing without disturbing the cephalopods.

Each day's catch can also be separated more easily. Since boxes are stacked one on top of another in the hold, overfilling will result in damage to the cephalopods. For efficient cooling each box should contain a layer of ice on the bottom, then cephalopods and ice mixed together, and lastly a top layer of ice.

4.6.2.8 WHERE APPROPRIATE, A STOWAGE PLAN SHOULD BE KEPT ON ANY VESSEL FISHING FOR MORE THAN A DAY OR TWO

FF 4.6.27/Mod

A well prepared stowage plan enables the various day's catches to be kept separate when unloading. Cephalopods from different days' catches should never be mixed together when stowed.

4.6.2.9 FOR RAPID CHILLING OF CEPHALOPODS THE USE OF CHILLED OR REFRIGERATED SEA WATER IS RECOMMENDED

Both methods, if properly used, will assure the most thorough and rapid heat removal. It has been suggested that the storage in ice should preferably be preceded by cooling in chilled or refrigerated sea water. For ice storage, the chilling takes place only when the ice is melting and the resulting ice-cold melt water percolates downward through the layers of cephalopods.

When the ice stops melting its effectiveness as a cooling agent diminishes considerably. This will not occur if the cephalopods are stored in either chilled or RSW, where the low temperature of water is constantly maintained.

In certain geographical regions the use of chilled or refrigerated sea water, or brine, has been practised extensively and with excellent results.

4.6.3 Processing the Catch on Board

4.6.3.1 CHLORINATED WATER SHOULD BE USED FOR PROCESSING OF CEPHALOPODS

The use of chlorinated water during the processing helps to check the multiplication of micro-organisms on working surfaces of equipment and on the surface areas of the product.

The cephalopods which are intended for skinning, removal of tentacles, heads, viscera, deboning or trimming, should be thoroughly washed with clean potable water containing about 5 ppm available chlorine.

After processing the fillets from cuttlefish and tubes from squids should be immersed again in ice water of the same chlorine level.

4.6.3.2 GUTTING OF CEPHALOPODS SHOULD BE CARRIED OUT UNDER CONTINUOUS SUPPLY OF CLEAN SEA WATER TO CARRY THE VISCERAL CONTENT OVER THE SHIPSIDE OR TO A SUITABLE CONTAINER

During the gutting of squids, the centre of abdominal cavity is slit open straight from the head to the tip of the fin with a sharp knife without cutting through the viscera.

After careful evisceration and the removal of the eyes and the mouth, the meats should be thoroughly washed in running clean sea water. The visceral content of cephalopods is highly proteolytic, containing large concentration of digestive enzymes and spoilage micro-organisms, which if not removed rapidly and thoroughly, will result in marked deterioration of quality.

In disposing of offal into the surrounding water, some consideration should be given to the possibility of a serious pollution problem, especially if this is done in sheltered waters, close to public beaches or inhabited areas.

4.6.3.3 AS THE PROCESSING PROGRESSES THROUGH VARIOUS STAGES, CARE SHOULD BE TAKEN TO PREVENT ANY WARMING UP OF THE CEPHALOPOD MEATS

After completion of each stage of processing, it is strongly recommended to keep the material constantly chilled either by ice or by immersion in clean ice water.

4.6.3.4 CLEAN CHILLED BRINE OR REFRIGERATED SEA WATER SHOULD BE USED TO FIRM UP THE TEXTURE OF THE CEPHALOPOD MEATS

The original flesh texture of the meats could be regained by having them immersed in either one percent salt solution in ice potable water or in clean chilled or refrigerated sea water.

Approximately 15 to 20 minutes exposure to this level of salinity should be sufficient. The adequacy of treatment, could be easily ascertained by compressing the meat in between two fingers and comparing its texture with a freshly cut cephalopod fillet.

4.6.3.5 THE MATERIAL TREATED WITH SALT WATER SHOULD BE WASHED AGAIN IN CLEAN ICE WATER

Once the salt water treatment is completed, the material should be rinsed in clean ice water to excess salt that might have been absorbed. This procedure should be completed as quickly as possible, otherwise softening of texture will occur again.

4.6.4 Freezing and Freezer Storage

4.6.4.1 THE CEPHALOPODS SHOULD BE FROZEN ON BOARD THE VESSEL IF THE FISHING OPERATIONS LAST LONGER THAN THREE DAYS

Any prolonged holding of raw cephalopods, even at temperatures approaching that of melting ice, results in gradual deterioration of quality. For the fishing operations lasting longer than three days, the cephalopods should be frozen, glazed and stored at -20°C (-4°F) to -25°C (-13°F).

4.6.4.2 FREEZING AND FROZEN STORAGE ON BOARD VESSELS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH"

Lob 4.6.2.7/Mod

The hygienic requirements on board vessels should be just as high as those required in shore processing plants. Although the Recommended International "Code of Practice for Frozen Fish" does not deal specifically with the freezing of cephalopods, most of the recommendations made would apply.

4.6.4.3 ONLY THE HIGHEST QUALITY CEPHALOPODS SHOULD BE USED FOR FREEZING WHOLE

Segregation should be made on the basis of colour, size and absence of visible physical damage. Such cephalopods should be thoroughly washed and the openings of ink sacks should be closed by a string or a plastic clip.

Immediately after the washing and segregation and prior to freezing, they should be well prechilled in clean ice water or refrigerated sea water. Time of prechilling and the presence of certain salts in the water might affect the texture and the colour. For best results some experimentation should be undertaken.

4.6.4.4 FREEZING SHOULD BE RAPID TO ELIMINATE OR DEMINISH QUALITY DETERIORATION

The cephalopods should be rapidly frozen to ensure a high quality product. It is known that the cephalopods can suffer detrimental changes, including protein denaturation and cell damage when exposed to a very slow or incomplete freezing. The quality losses can seriously affect the texture, flavour and keeping time of the products.

4.6.4.5 FREEZING SHOULD BE COMPLETED IN THE FREEZER AND SHOULD NEVER BE CARRIED OUT BY PLACING UNFROZEN OR PARTIALLY FROZEN PRODUCTS IN A FREEZER STORE

Freezing of cephalopods should be completed in a blast or contact freezer before they are moved to a freezer store. Refrigeration equipment in freezer stores usually does not have sufficient capacity to take care effectively of additional heat load. Warm products placed in a freezer store will not only take a very long time to freeze, but may also warm up other products already in the store.

4.6.4.6 PRECISE FREEZING TIMES FOR CEPHALOPODS SHOULD BE CAREFULLY DETERMINED

The freezing time required is influenced by many variables, such as product shape, size, the area exposed to the refrigerated surface and the temperature of the refrigerant. The exact freezing time should be determined by direct measurements of the product temperatures during the freezing process. In many countries, practical advice on how to freeze the cephalopods and how to measure product temperature adequately, can be obtained from fishery research organizations.

4.6.4.7 ACCURATE RECORDS SHOULD BE KEPT OF ALL FREEZING OPERATIONS

An accurate record of all loading and unloading times of the freezer, type and the size of the product and any other relevant information, will greatly assist in the efficient management and control of the operation.

4.6.4.8 FROZEN CEPHALOPODS SHOULD BE GLAZED OR WRAPPED IMMEDIATELY AFTER FREEZING TO PROTECT THEM FROM DEHYDRATION AND OXIDATION IN THE FREEZER STORE

The cephalopods frozen in blocks or individually quick frozen cephalopods are usually glazed or packed in wrappers or cartons to protect them from dehydration and oxidation and also to safeguard their hygienic condition.

Food additives cannot be used indiscriminately in ice glazing. Food laws differ from one country to another and it is essential to seek advice of a specialist in this field before an additive is used.

4.6.4.9 A STOWAGE PLAN OF THE FREEZER STORE SHOULD BE KEPT TO FACILITATE LOCATING PRODUCTS OF DIFFERENT SPECIES, SIZE AND RAW MATERIAL CONDITION

A well prepared stowage plan will assist, during unloading, in separating lots of different species, size, stage of processing, level in quality and intended for different purposes.

4.7 Unloading and Transport of the Catch

4.7.1 SUITABLE LANDING AREAS SHOULD BE PROVIDED

Lob 4.7.1

Landing directly onto beaches or uncontrolled areas can lead to contamination. Provision of a wharf, quay or pier is most desirable.

4.7.2 LANDING AREAS SHOULD BE KEPT CLEAN

Lob 4.7.2

Refuelling and handling of fuel, lubricants and other material which might contaminate the catch, should be done in areas separate from those where the catch is unloaded. It should be the specific responsibility of an individual to keep the unloading areas clean.

4.7.3 UNLOADING FACILITIES SHOULD EITHER BE PROVIDED ON THE WHARF OR INCORPORATED ON THE VESSEL

Lob 4.7.3/Mod

Such facilities should enable the catch to be transferred to the wharf rapidly without causing damage and in a manner that will not lead to contamination.

4.7.4 CONTAINERS USED FOR UNLOADING SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL. THEY SHOULD BE CLEAN TO AVOID CONTAMINATION AND STRONG ENOUGH TO PREVENT PHYSICAL DAMAGE TO THE CEPHALOPODS DURING TRANSIT. WICKER BASKETS AND WOODEN BOXES SHOULD NOT BE USED

Lob 4.7.4/Mod

Care should be taken not to damage the cephalopods during unloading, or removal from the container. If cephalopods are iced in boxes, the boxes should be large enough to hold sufficient ice.

- 4.7.5 CEPHALOPODS AFTER UNLOADING SHOULD BE TRANSFERRED WITHOUT DELAY INTO TRANSPORT VEHICLES

Crb 4.7.6/Mod

Landings will either be direct to a processing plant or some transport by truck, rail or air will be necessary.

- 4.7.6 SURFACE TRANSPORT VEHICLES SHOULD BE INSULATED OR PREFERABLY REFRIGERATED TO KEEP CEPHALOPODS COOL

Crb 4.7.7/Mod

Cephalopods iced at sea should be carried as close to melting ice temperature as may be practicable and re-iced as necessary. Cephalopods frozen at sea should not be allowed to thaw out in transit. The temperature should be maintained as close to the freezer store temperature as possible and should not exceed -18°C (0°F).

4.8 Hygiene Control Programme

- 4.8.1 IT IS DESIRABLE THAT EACH FISHING VESSEL SHOULD DEVELOP ITS OWN SANITARY CONTROL PROGRAMME BY INVOLVING THE WHOLE CREW AND BY ASSIGNING TO EACH MEMBER A DEFINITE TASK IN CLEANING AND DISINFECTING THE BOAT

FF 4.8/Mod

A permanent cleaning and disinfecting schedule should be drawn up to ensure that all parts of the boat and equipment thereon are cleaned appropriately and regularly.

The fishermen should be well trained in the use of special cleaning tools; methods of dismantling equipment for cleaning and should be knowledgeable in the significance of contamination and the hazards involved.

HANDLING OF CEPHALOPODS ON SHORE

5. SECTION IV B - PLANT FACILITIES AND OPERATING REQUIREMENTS

5.1 Plant Construction and Layout

5.1.1 General Considerations

- 5.1.1.1 CEPHALOPOD PROCESSING PLANTS SHOULD BE DESIGNED AND EQUIPPED SO THAT ALL HANDLING AND PROCESSING OPERATIONS CAN BE CARRIED OUT EFFICIENTLY, AND ALL MATERIALS AND PRODUCTS CAN PASS FROM ONE STAGE OF PROCESSING TO THE NEXT IN AN ORDERLY MANNER AND WITH MINIMUM DELAY

SMF 4.1.1.1/Mod

A great deal of care should be taken in planning the layout and equipment of a cephalopod processing plant to ensure that there is sufficient space and suitable facilities to carry out each operation efficiently with due concern for hygiene and quality of the final product and to move cephalopods and materials through the various stages in an orderly manner.

In order to prevent cross-contamination between different processing activities and safeguard the wholesomeness and quality of products, the following operations should be conducted in separate rooms or in well defined areas of adequate size.

- (a) receiving and storage of raw materials;
- (b) processing (dressing, skinning, dry-salting);
- (c) roasting or smoking or splitting, seasoning;
- (d) cooling, packaging, and
- (e) storage of final products.

The handling of cephalopods and storage areas should be entirely divorced from:

- (f) storage of waste materials;
- (g) storage of packaging materials;
- (h) storage of cleaning and disinfecting compounds, and
- (i) storage of wood and wood products used in the smoking process.

Rooms or areas where dripping and drying of cephalopods prior to smoking or cooling of products after the smoking are carried out should comply with all building and sanitary requirements stated for other handling and processing areas. Adequate chill room facilities should be provided for dry-salting prior to smoking and after skinning, if the ambient temperature necessitates it.

5.1.1.2 CEPHALOPODS PROCESSING PLANTS SHOULD BE SPECIALLY DESIGNED FOR THE PURPOSE

SP 5.1.1.1/Mod

Meat of cephalopods spoils even more rapidly than fish. It is therefore essential that the processing is carried out rapidly in a plant designed to handle cephalopods and that no build-up of part-processed products occurs.

5.1.2 Plant Construction and Sanitary Design

5.1.2.1 THE PLANT AND SURROUNDING AREA SHOULD BE SUCH AS CAN BE KEPT REASONABLY FREE FROM OBJECTIONABLE ODOURS, SMOKE, DUST OR OTHER CONTAMINATION. THE BUILDINGS SHOULD BE SUFFICIENT IN SIZE WITHOUT CROWDING OF EQUIPMENT OR PERSONNEL, WELL CONSTRUCTED AND KEPT IN GOOD REPAIR. THEY SHOULD BE DESIGNED AND CONSTRUCTED TO PROTECT AGAINST THE ENTRANCE AND HARBOURING OF INSECTS, BIRDS OR OTHER VERMIN, AND TO PERMIT READY AND ADEQUATE CLEANING

SP 5.1.2.1/Mod

The location of a processing plant, its design, layout, construction and equipment should be planned in detail with considerable emphasis on the hygienic aspect, sanitary facilities and quality control.

Where new premises are constructed, or when existing buildings are modified, national or local authorities should always be consulted in regard to building codes, hygienic requirements of the operation and sanitary disposal of sewage and plant waste.

Prior to the construction of a new plant or modification of the existing one, a proper flow pattern of operation should be considered (see Appendix II, "Flow Diagram for Handling and Processing of Cephalopods"). Only a well-organized work flow could assure the maximum efficiency of the operation and the better quality product.

The food handling area should be completely separate from any part of the premises used as living quarters.

5.1.2.2 FLOORS SHOULD BE HARD SURFACED, NON-ABSORBENT AND ADEQUATELY DRAINED

FF 5.1.2.2

Floors should be constructed of durable, waterproof, non-toxic, non-absorbent material which is easy to clean and disinfect. They should be non-slip and without crevices and should slope evenly and sufficiently for liquids to drain to trapped outlets fitted with a removable grill.

If floors are ribbed or grooved to facilitate traction, any grooving of this nature should always run toward the drainage channel.

The junctions between the floors and walls should be impervious to water and should be coved or rounded for ease of cleaning.

Concrete, if not properly finished, is porous and can be affected by animal oils, strong brines, various detergents and disinfectants. If used, it should be dense, of a good quality, and with a well finished waterproof surface.

5.1.2.3 DRAINS SHOULD BE OF AN ADEQUATE SIZE, SUITABLE TYPE, EQUIPPED WITH TRAPS AND WITH REMOVABLE GRATINGS TO PERMIT CLEANING

FF 5.1.2.3

Suitable and adequate drainage facilities are essential for removal of liquid or semi-liquid wastes from the plant. There should be no floor area where water might collect in stagnant pools. Drains should be constructed of smooth and impervious material and should be designed to cope with the maximum flow of liquid without any overflowing and flooding. Each drainage inlet should be provided with a deep seal trap which is appropriately located and easy to clean.

Drainage lines carrying waste effluent, except for open drains, should be properly vented, have a minimum internal diameter of 10 cm (4 in) and, if required, run to a catch basin for removal of solid waste material. Such a basin should be located outside the processing area and should be constructed of waterproof concrete or other similar material designed to the local specifications and approved by the local authorities having jurisdiction.

5.1.2.4 INTERNAL WALLS SHOULD BE SMOOTH, WATERPROOF, RESISTANT TO FRACTURE, LIGHT COLOURED AND READILY CLEANABLE

FF 5.1.2.4

Acceptable materials for finishing walls inside are cement render, ceramic tiles, various kinds of corrosion-resistant metallic sheeting, such as stainless steel or aluminium alloys, and a variety of non-metallic sheeting which have adequate impact resistance, desirable surface qualities and are easily repairable.

All sheeting joints should be sealed with a mastic or other compound resistant to hot water and cover strips should be applied where necessary.

Wall-to-wall and wall-to-floor junctions should be coved or rounded to facilitate cleaning.

Walls should be free from projections and all pipes and cables should be sunk flush with the wall surface or neatly boxed in.

5.1.2.5 WINDOW SILLS SHOULD BE KEPT TO A MINIMUM SIZE, BE SLOPED INWARD AT 45° AND BE AT LEAST 1 METRE FROM THE FLOOR

FF 5.1.2.5

Window sills and frames should be made of a smooth, waterproof material and, if of wood, should be kept well painted. Internal window sills should be sloped to prevent storage of miscellaneous materials or accumulation of dust and should be constructed to facilitate cleaning.

Windows should be filled with whole panes and those which open should be screened. The screens should be constructed so as to be easily removable for cleaning and should be made from suitable corrosion-resistant material.

5.1.2.6 ALL DOORS THROUGH WHICH CEPHALOPODS OR THEIR PRODUCTS ARE MOVED SHOULD BE SUFFICIENTLY WIDE, WELL CONSTRUCTED OF A SUITABLE MATERIAL AND SHOULD BE OF A SELF-CLOSING TYPE

FF 5.1.2.6/Mod

Doors through which cephalopods or their products are moved, should be either sheathed with or made of corrosion-resistant metal or other suitable material with adequate impact resistance and, unless provided with an effective air screen, should be of a self-closing type.

Both the doors and the frames of the doorways should have a smooth and readily cleanable surface.

Doors through which the product is not moved, such as those providing staff access, should be appropriately surfaced, at least on the processing area side, to allow for ease of cleaning.

5.1.2.7 CEILINGS SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT ACCUMULATION OF DIRT AND CONDENSATION AND SHOULD BE EASY TO CLEAN

FF 5.1.2.7/Mod

Ceilings should be preferably a minimum of 3 m from the floor in height, free from cracks and open joints and should be of a smooth, waterproof, light coloured finish, which does not permit the growth of mould.

In buildings where beams, trusses, pipes or other structural elements are exposed, the fitting of a suspended ceiling just below is desirable.

Where the roof beams and trusses cannot be covered, the underside of the roof may constitute a satisfactory ceiling providing all joints are sealed and the supporting structures are of a smooth, well painted and light coloured surface, easily cleanable and constructed to protect the cephalopod products from falling debris, dust or condensate.

5.1.2.8 PREMISES SHOULD BE WELL VENTILATED TO PREVENT EXCESSIVE HEAT, CONDENSATION AND CONTAMINATION WITH OBNOXIOUS ODOURS, DUST, VAPOUR OR SMOKE

FF 5.1.2.8

Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes, vapours or contaminating aerosols. The air-flow in the premises should be from the more hygienic areas to the less hygienic areas. Good ventilation is important to prevent condensation and growth of moulds in overhead structures. Ventilation openings should be screened and, if

required, equipped with proper air filters. Windows which open for ventilation purposes should be screened. The screens should be made easily removable for cleaning and should be made from suitable corrosion-resistant material.

5.1.2.9 A MINIMUM ILLUMINATION OF 220 LUX (20 FOOT CANDLES) IN GENERAL WORKING AREAS AND NOT LESS THAN 540 LUX (50 FOOT CANDLES) AT POINTS REQUIRING CLOSE EXAMINATION OF THE PRODUCT, SHOULD BE PROVIDED AND SHOULD NOT ALTER COLOURS

FF 5.1.2.9/Mod

Light bulbs and fixtures suspended over the working areas where cephalopods are handled at any stage of preparation, should be of the safety type or otherwise protected to prevent food contamination in case of breakage.

It is highly desirable to have the light fixtures either recessed flush with the ceiling or with the upper surface of the light fixtures fitting flush with the ceiling in order to prevent the accumulation of dust on them.

5.1.2.10 SEPARATE AND ADEQUATE STORAGE SHOULD BE PROVIDED FOR WOOD, SAWDUST OR SIMILAR MATERIALS USED IN SMOKING OF CEPHALOPODS

SMF 4.1.2.10/Mod

Wood, wood shavings or sawdust should be stored in a separate storage room or building away from the cephalopods processing area and in such a manner that there is no contamination by dust or other foreign matter.

To prevent spontaneous heating and the growth of moulds, the wood shavings and sawdust should be sufficiently dry on delivery and should not be stored in large containers, heaps or silos. Storage in bags is advantageous as it allows better aeration, drying and more convenient handling.

5.1.3 Hygiene Facilities

5.1.3.1 AREAS WHERE RAW MATERIALS ARE RECEIVED, STORED OR HANDLED, SHOULD BE SEPARATED FROM THE AREAS IN WHICH PRODUCT PREPARATION, PROCESSING AND PACKAGING ARE CONDUCTED

FF 5.1.3.1/Mod

Well defined areas of adequate size, preferably separate rooms, should be provided for receiving and storing of raw materials.

Receiving and storage areas should be clean and readily capable of being maintained in a clean condition and should provide protection for the raw cephalopods from deterioration and contamination.

5.1.3.2 A SEPARATE REFUSE ROOM OR OTHER EQUALLY ADEQUATE OFFAL STORAGE FACILITIES SHOULD BE PROVIDED ON THE PREMISES

FF 5.1.3.2

If offal or other refuse is to be collected and held before removal, adequate precautions should be taken to protect it against rodents, birds, insects and exposure to warm temperatures.

A separate refuse room for storing waste in water-tight containers or offal bins should be provided. The walls, floor and ceiling of such a storage room, and the area under the elevated bins, should be constructed of impervious material which can be readily cleaned. Where waste material is held in containers outside the establishment, the

containers should be lidded. A separate enclosure should be provided for their storage with easy access for vehicles loading and unloading. Stands for the containers should be of solid, hard and impervious material, which can be easily cleaned and properly drained.

If containers are used in large numbers, a mechanical washing plant might be advisable to provide for routine washing. Containers should be capable of withstanding repeated exposure to normal cleaning processes.

5.1.3.3 ANY BY-PRODUCT PLANT SHOULD BE ENTIRELY SEPARATE FROM THE PLANT WHICH IS PROCESSING FRESH CEPHALOPODS FOR HUMAN CONSUMPTION

FF 5.1.3.3/Mod

The layout and construction of a plant processing cephalopods for human consumption should be such as to ensure that the areas in which cephalopods for human consumption are held, processed and stored are used for these purposes only.

Any processing of by-products or non-fish products, not intended for human food, should be conducted in separate buildings or in areas which are physically separated in such a way that there is no possibility for contamination of fresh or processed cephalopods.

5.1.3.4 AN AMPLE SUPPLY OF COLD AND HOT POTABLE WATER AND/OR CLEAN SEA WATER UNDER ADEQUATE PRESSURE SHOULD BE AVAILABLE AT NUMEROUS POINTS THROUGHOUT THE PREMISES AT ALL TIMES DURING WORKING HOURS

FF 5.1.3.4/Mod

All water available for use in those parts of establishments where cephalopods are received, held, processed, packaged and stored should be potable water or clean sea water and should be supplied at a pressure of no less than 1.4 kg/cm^2 (20 lb/in^2). If sea water is used, it must be clean sea water.

An adequate supply of hot water of potable quality and suitable temperature should be available at all times during working hours.

Water used for washing or conveying raw materials should not be recirculated unless it is restored to a level of potable quality.

5.1.3.5 WHEN INPLANT CHLORINATION OF WATER IS USED, THE RESIDUAL CONTENT OF FREE CHLORINE SHOULD BE MAINTAINED AT NO MORE THAN THE MINIMUM EFFECTIVE LEVEL FOR THE USE INTENDED

FF 5.1.3.5

The cold water supply used for cleaning purposes should be fitted with an in-line chlorination system allowing the residual chlorine content of the water to be varied at will in order to reduce multiplication of micro-organisms and prevent the build-up of fish odours.

A chlorination system should not be relied on to solve all hygiene problems. The indiscriminate use of chlorine cannot compensate for a non-hygienic condition in a processing plant.

Ice used in the operation of the smoked cephalopod processing establishment should be made from potable water or clean sea water.

A special room, or other suitable storage facilities, should be provided to protect the ice from contamination and excessive meltage. Dust, flakes of paint, bits of wood or sawdust, straw and rust, are the most frequent impurities transferable by ice into the final product.

Care must be taken to ensure that ice used to chill the raw material or products does not contaminate them.

5.1.3.6 WHERE A NON-POTABLE AUXILIARY WATER SUPPLY IS USED THE WATER SHOULD BE STORED IN SEPARATE TANKS AND CARRIED IN SEPARATE LINES, IDENTIFIED BY CONTRASTING COLOURS AND LABELLED AND WITH NO CROSS-CONNECTIONS OR BACKSIPHONAGE WITH THE LINES CARRYING POTABLE WATER

FF 5.1.3.7/Mod

Non-potable water may be used for such purposes as producing steam, cooling heat exchangers and fire protection.

It is very important that the systems of storage and distribution of potable and non-potable water are entirely separate and there is no possibility for cross-connection or for inadvertent usage of non-potable water in the processing areas. Only potable quality water should be used for the supply of hot water.

5.1.3.7 ALL PLUMBING AND WASTE DISPOSAL LINES, INCLUDING THE SEWER SYSTEM SHOULD BE LARGE ENOUGH TO CARRY PEAK LOADS AND SHOULD BE PROPERLY CONSTRUCTED

FF 5.1.3.8

All lines should be water-tight and have adequate deep seal traps and vents. Waste should not be disposed of in a way that may contaminate potable water or clean sea water supplies.

Sumps or solid matter traps of the drainage system should preferably be located outside the processing area and so designed as to allow them to be emptied and thoroughly cleaned at the end of each working day.

The plumbing and manner of waste disposal should be approved by the official agency having jurisdiction.

5.1.3.8 PROPER FACILITIES FOR WASHING AND DISINFECTION OF EQUIPMENT SHOULD BE PROVIDED

FF 5.1.3.9/Mod

Facilities should be present in every cephalopod processing establishment for cleaning and disinfection of trays, removable cutting or filleting boards, containers and other similar equipment and working implements. Such facilities should be located in a separate room or in a designated area in the work rooms where there is an adequate supply of hot and cold potable water or clean sea water, under good pressure, and where there is proper drainage.

Any containers and equipment used for offal or contaminated materials should not be washed in the same area.

5.1.3.9 ADEQUATE AND CONVENIENTLY LOCATED TOILET FACILITIES SHOULD BE PROVIDED

FF 5.1.3.10

Toilet rooms should have walls and ceilings of a smooth washable, light-coloured surface and floors constructed of impervious and readily cleanable material. Toilet facilities should be well lit, ventilated and kept in a hygienic condition at all times. Adequate supply of toilet paper should be available in each toilet cubicle.

The doors leading to the facilities should be of a self-closing type and should not open directly into the processing areas.

Handwashing facilities of a type not requiring operation by hand, with an adequate supply of warm or hot and cold potable water or clean sea water, with liquid or powdered soap and with suitable hygienic means of drying the hands, should be provided adjacent to the toilets and in such a position that the employee must pass them when returning to the processing room. Where hot and cold water are available, mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles for used towels should be provided.

Notices should be posted directing personnel to wash their hands after using the toilets.

The following formula could be used as a guideline in assessing the adequacy of toilet facilities in relation to the number of employees:

1 to 9 employees = 1 toilet
10 to 24 employees = 2 toilets
25 to 49 employees = 3 toilets
50 to 100 employees = 5 toilets
for every 30 employees over 100 = 1 toilet

5.1.3.10 FACILITIES SHOULD BE AVAILABLE IN THE PROCESSING AREAS FOR EMPLOYEES TO WASH AND DRY THEIR HANDS AND FOR DISINFECTION OF PROTECTIVE HAND COVERINGS

FF 5.1.3.11

In addition to hand washing facilities available in toilet rooms, a number of wash basins with an adequate supply of hot and cold potable water or clean sea water and liquid or powdered soap, should be provided whenever the process demands. They should be located in full view of the processing floor and should be of a type not requiring operation by hand or be fed by a continuous flow of potable water or clean sea water. Single-use paper towels are recommended, otherwise the method of drying hands should be approved by the official agency having jurisdiction. The facilities should be kept in a hygienic condition at all times.

5.1.3.11 STAFF AMENITIES CONSISTING OF LUNCH ROOMS, CHANGING ROOMS OR ROOMS CONTAINING SHOWER OR WASHING FACILITIES SHOULD BE PROVIDED

FF 5.1.3.12

Where workers of both sexes are employed, separate facilities should be present for each, except that the lunch rooms may be shared. As a general guide, the lunch rooms should provide seating accommodation for all employees and the changing rooms should provide enough space for lockers for each employee without causing undue congestion. Clothing and footwear, not worn during working hours, must not be kept in any processing area.

- 5.1.3.12 SALT AND OTHER INGREDIENTS USED IN CURING OF CEPHALOPODS SHOULD BE STORED DRY AND IN A MANNER TO PREVENT THEIR CONTAMINATION

SMF 4.1.3.13/Mod

Salt and other ingredients used for processing cephalopods should be of food grade.

- 5.1.3.13 STORAGE FACILITIES SHOULD BE AVAILABLE FOR THE PROPER DRY STORAGE OF PACKAGING MATERIALS

FF 5.1.3.13

Separate facilities for the storage of cartons, wrappings or other packaging materials should be provided in order to protect them against moisture, dust or other contamination.

- 5.1.3.14 IF POISONOUS OR HARMFUL MATERIALS, INCLUDING CLEANING COMPOUNDS, DISINFECTANTS AND PESTICIDES ARE STORED, THEY SHOULD BE KEPT IN A SEPARATE ROOM DESIGNED AND MARKED SPECIFICALLY FOR THIS PURPOSE

FF 5.1.3.14

All such materials must be prominently and distinctly labelled so that they can be easily identified. The room should be kept locked and the materials contained in it should be handled only by personnel trained in their use.

5.2 Equipment, Utensils and Working Surfaces

- 5.2.1 ALL WORKING SURFACES AND ALL CONTAINERS, TRAYS, TANKS, VATS OR OTHER EQUIPMENT USED FOR PROCESSING CEPHALOPODS SHOULD BE OF SMOOTH, IMPERVIOUS, NON-TOXIC MATERIAL WHICH IS CORROSION-RESISTANT AND SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT HYGIENIC HAZARDS AND PERMIT EASY AND THOROUGH CLEANING. IN GENERAL THE USE OF WOOD FOR THIS PURPOSE IS NOT RECOMMENDED

SMF 4.2.1.1/Mod

Contamination of cephalopods during processing can be caused by contact with unsatisfactory surfaces. All food contact surfaces should be smooth, free from pits and crevices, substances harmful to man, unaffected by salt, body fluids from cephalopods or other ingredients used, and capable of withstanding repeated cleaning and disinfection. Wood should be used for cutting surfaces only when no other suitable material is available. Machines and equipment should be so designed that they can be easily dismantled to facilitate thorough cleaning and disinfection.

Containers, vats and barrels used for holding cephalopods should preferably be constructed of plastic or corrosion-resistant metal and, if of wood, they should be treated to prevent the entry of moisture and coated with a durable non-toxic paint or other surface coating that is smooth and readily washable. Wicker baskets should not be used.

Stationary equipment should be installed to permit easy access and thorough cleaning and disinfection.

Fish washing tanks should be designed to provide a constant change of water with good circulation, and to have provisions for drainage and to be easily cleaned.

Equipment and utensils used for inedible or contaminated materials should be identified as such and should not be used for handling of cephalopods and products intended for human consumption.

- 5.2.2 BOARDS AND OTHER SURFACES ON WHICH CEPHALOPODS ARE CUT SHOULD BE MADE OF IMPERVIOUS MATERIALS WHICH MEET THE PHYSICAL REQUIREMENTS FOR CUTTING SURFACES

SMF 4.2.1.2/Mod

Considerable microbial contamination of cephalopods is caused by contact with the filleting and cutting boards. Wooden cutting surfaces are porous and quickly become waterlogged and are practically impossible to clean thoroughly. They are not recommended as suitable for this type of work.

If in the absence of other materials wood has to be used, a single board of a well finished and smooth surface is recommended. Once the surface becomes badly worn or pitted, then the board should be reconditioned or discarded.

The use of plywood or other boards of laminated structure should be discouraged.

- 5.2.3 THE USE OF PROPERLY DESIGNED MACHINES FOR GUTTING, WASHING, SPLITTING, SKINNING, STEAKING, BRINING AND TENTERING IS TO BE ENCOURAGED

SMF 4.2.1.3/Mod

Where large quantities of cephalopods are processed, properly designed machines will simplify the production of cephalopod products in quantity with consistently low bacterial counts. This is mainly because well designed machines have impervious and corrosion-resistant working surfaces, are easy to dismantle, clean, disinfect and are capable of handling the cephalopods with a minimum of delay.

It is essential that the installation of new machinery should be well researched and economically justified. The units should be rigorously tested before being put into commercial use, otherwise costly failures may arise.

- 5.2.4 BRINING AND SALTING VATS SHOULD BE MADE OF SUITABLE CORROSION-RESISTANT MATERIAL AND SHOULD BE SO CONSTRUCTED AS TO PERMIT EASY CLEANING AND COMPLETE DRAINAGE

SMF 4.2.1.4

Such vats or containers could become a serious source of contamination by micro-organisms, rust, dirt and miscellaneous detritus if not made of suitable material or if not kept clean.

- 5.2.5 COOKERS SHOULD BE DESIGNED TO PROVIDE CONSTANT AND ADEQUATE SUPPLY OF HEAT SO THAT ALL CEPHALOPODS COULD BE GIVEN THE SAME TIME/TEMPERATURE EXPOSURE DURING THE COOKING OPERATION

SP 4.2.5/Mod

Cooking, or any other heat treatment of cephalopods, is a very critical process as far as the yield and quality of the final product are concerned.

The cooker should be constructed to provide a good control of time/temperature exposure of the cephalopods at the maximum processing load.

It is poor practice to keep cephalopods in hot water for a long time before the boiling commences. Furthermore, an inadequately fired cooker will slow down the whole operation sequence.

- 5.2.6 COOKERS SHOULD BE MADE OF SUITABLE CORROSION-RESISTANT MATERIAL AND BE BUILT IN SUCH A WAY THAT THEY CAN BE DRAINED AND EASILY DISMANTLED FOR CLEANING

SP 4.2.6/Mod

All parts of the cooker that come in contact with the cephalopods should be made of suitable corrosion-resistant material. The cooker, of a conventional or continual type, should be designed to permit easy and frequent drainage and dismantling for washing and santizing.

- 5.2.7 SUITABLE EQUIPMENT FOR COOLING OF COOKED CEPHALOPODS SHOULD BE PROVIDED

SP 4.2.7/Mod

Cephalopods should be cooled rapidly and thoroughly either by immersion in a tank containing clean sea water or by exposure to an effective air cooling system.

The cooling tank should be of suitable corrosion-resistant material and should be designed to provide a constant change of water with good circulation. It should be located close to the cooker, but in such a way that the chance of contamination with micro-organisms derived from the raw cephalopods is reduced to a minimum.

- 5.2.8 DRYING EQUIPMENT SHOULD BE OF ADEQUATE CAPACITY FOR THE INTENDED PRODUCTION

In sun-drying, the drying proceeds so slowly in most cases, especially in bad weather, that a certain amount of decomposition is likely to take place prior to the desired reduction in water content is attained. Therefore where economically justified, use of a mechanical dryer should be recommended.

- 5.2.9 REFRIGERATION AND FREEZING EQUIPMENT SHOULD BE PROPERLY DESIGNED AND CONSTRUCTED AND SHOULD BE OF ADEQUATE CAPACITY

Lob 5.2.5/Mod

The freezing equipment should be designed and operated in accordance with the requirements stated in the Recommended International "Code of Practice for Frozen Fish" (CAC/RCP 9-1976) so that freezing of cephalopods is accomplished rapidly.

- 5.2.10 ALL FREEZER AND COLD STORAGE FACILITIES SHOULD BE ADEQUATE FOR THE INTENDED PRODUCTION AND SHOULD BE FITTED WITH AUTOMATIC TEMPERATURE CONTROLLING AND RECORDING DEVICES

Lob 5.2.6/Mod

Frozen cephalopods and their products should be stored at a uniformly low temperature if a considerable quality loss is to be avoided. Freezer stores should be able to operate at -30°C (-22°F) or lower as cephalopods deteriorate more rapidly than fish. Thermometers, or other temperature recording devices, should be capable of being read easily within a 2° accuracy. More detailed requirements for the construction and operation of a freezer store are given in the Recommended International "Code of Practice for Frozen Fish" (CAC/RCP 9-1976).

5.2.11 TRANSPORT VEHICLES SHOULD BE DESIGNED TO PROTECT CEPHALOPODS FROM WARMING UP DURING TRANSPORTATION AND SHOULD BE OF SUCH MATERIAL AND CONSTRUCTION AS TO PERMIT EASY AND THOROUGH CLEANING

FF 5.2.11/Mod

Vehicles used for transporting cephalopods and cephalopod products should be designed to provide some means of refrigeration and constructed to ensure constant protection to the cephalopods against contamination by dust and the drying effect of sun or wind. Even where ice is very cheap and journey times or distances are relatively short, the use of an insulated vehicle provides an additional insurance against inadequate icing or unforeseen delays. The walls, roof and the floor of the vehicle should be insulated. The thickness of insulation employed will depend on the outside temperatures normally encountered. It should be remembered that insulation cannot help to cool the cephalopods but helps to keep it at the temperature at which it was put into the vehicle.

Vehicles used for transporting frozen cephalopods should be capable of maintaining the cephalopods at a temperature appropriate of -18°C (0°F) or less.

For the purpose of cleaning, the vehicles transporting cephalopods should have the wall, floor and roof linings made of suitable corrosion-resistant material with smooth and non-absorbent surface. Floors should be adequately drained.

5.2.12 THE PROCESSING PLANTS SHOULD BE EQUIPPED WITH EITHER TRADITIONAL OR MECHANICAL SMOKING KILN

SMF 4.2.2.1/Mod

Both types of kilns, traditional and mechanical, should be preferably designed and constructed by specialists to ensure safe and efficient operation and to facilitate easy cleaning.

The mechanical kiln gives better prospects for controlling the operation and the quality of the final product. The traditional kiln is essentially a large chimney with means to suspend cephalopods strung on tenters (sticks or rods on which cephalopods are hung) over a fire of smouldering wood. It is easy and cheap to construct. In this type of kiln the hot air generated by the smouldering wood in the kiln creates a vertical current of smoke which passes the cephalopods to be smoked. The speed of this current is usually slow and uneven. Some improvement and a limited amount of process control can be obtained by installing a suction fan and dampers in the chimney at the top of the kiln. Recirculation of smoke is not practised.

The traditional type of kiln should preferably be constructed of material with good insulation properties such as bricks. This results in smaller heat losses, in more uniform temperature distribution, and prevents the condensation of moisture on the inner surfaces during cold weather.

The inner surface of the kiln should preferably be finished smoothly with a lining such as stainless steel or other suitable material to facilitate cleaning of the walls with steam and hot water.

In a traditional kiln the fire must be looked after constantly as it could flare up suddenly and cook, or even burn, the lowest hanging cephalopods. For this reason, therefore, it is advisable to equip the kiln with a high temperature alarm device which is relatively inexpensive and simple to install. The fire in the traditional kiln is usually built up of a layer of wood shavings covered by a layer of moist sawdust and should be attended by an experienced operator.

The mechanical kiln offers many more possibilities for process control. The movement of the air-smoke mixture in this type of kiln is done by ventilators (electric fans). The speed of the air-smoke current can be controlled as well as its relative humidity. If fitted with cooling coils, the temperature can be more precisely controlled and this facility will be of particular value in cold smoking.

Smoke required for the mechanical kiln is always produced outside the chamber in which cephalopods are smoked, either in a simple fire box or a more sophisticated smoke generator. The positive movement of the air-smoke mixture through the kiln allows for its recirculation which, in turn, will result in better fuel utilization.

In large and long mechanical kilns, in order to create more uniform processing conditions, it is advisable to shift the product's position with respect to the point of entry of the smoke or to provide for reheating of the air-smoke mixture during its passage.

5.3 Hygienic Operating Requirements

5.3.1 CEPHALOPOD PROCESSING SHOULD ALWAYS BE CARRIED OUT IN A HYGIENIC MANNER

SMF 4.3.1/Mod

All the handling, processing and packaging of cephalopods should be carried out in a clean manner.

Precautions should be taken at all times to protect the cephalopods from contamination by animals, insects, birds, chemical or microbiological contaminants or other objectionable substances.

Preparatory operations leading to the finished product and the packaging operations should be so timed as to permit expeditious handling of consecutive batches in production within the time and temperature range that will prevent deterioration, spoilage or the multiplication of micro-organisms of public health significance.

It is considered good practice to develop a schedule of permitted times in which each operation will be allocated a definite portion of the total time permitted for each cephalopod to remain on the premises of the processing plant.

5.3.2 THE BUILDING, EQUIPMENT, UTENSILS AND OTHER PHYSICAL FACILITIES OF THE PLANT SHOULD BE KEPT CLEAN, IN GOOD REPAIR AND SHOULD BE MAINTAINED IN AN ORDERLY AND HYGIENIC CONDITION

FF 5.3.2/Mod

All surfaces which come in contact with fresh cephalopods should be hosed down with cold or hot water of potable quality, or clean sea water, as frequently as necessary to ensure cleanliness. It is important that the cleaning method used will remove all residues and the disinfecting method will reduce the microbial population of the surface being cleaned.

The use of cold or hot potable water alone is generally not sufficient to accomplish the required result. It is desirable, if not essential, that aids such as suitable cleaning and disinfecting agents, together with manual or mechanical scrubbing, wherever appropriate, be used to assist in achieving the desired objective. After the application of cleaning and disinfecting agents the surfaces which come in contact with cephalopods should be cleansed thoroughly with cool potable water or clean sea water before use.

Cleaning agents and disinfectants used should be approved by the official agency having jurisdiction, should be appropriate for the purpose, and should be so used as to present no hazard to public health.

5.3.3 SPLITTING AND CUTTING BOARDS SHOULD BE FREQUENTLY AND THOROUGHLY SCRUBBED AND TREATED WITH DISINFECTANT. WHEREVER PRACTICABLE, THE BOARDS SHOULD BE CONTINUOUSLY FLUSHED WITH RUNNING POTABLE OR CLEAN SEA WATER DURING USE

FF 5.3.3/Mod

It is recognized that the degree of microbial contamination found on cephalopods and cephalopod products is related to microbial contamination of the working surfaces on which they are processed. All such surfaces should, therefore, be cleaned, scrubbed and disinfected, at least at the end of each working day.

5.3.4 ALL MACHINES USED FOR GUTTING, BEATING, WASHING, SPLITTING, TENTERING OR SIMILAR OPERATIONS SHOULD BE THOROUGHLY CLEANED, DISINFECTED AND RINSED DURING REST OR MEAL BREAKS AND BEFORE RESUMPTION OF PRODUCTION FOLLOWING OTHER WORK STOPPAGES

FF 5.3.5/Mod

The use of machinery reduces the risk of contamination from human sources. If, however, these machines are not properly maintained and cleaned at least once every day, they can become a serious source of contamination.

5.3.5 UTENSILS AND FOOD-CONTACT SURFACES OF EQUIPMENT SHOULD BE PROTECTED FROM CONTAMINATION

SMF 4.3.6/Mod

Cleaned and disinfected portable equipment and utensils should be stored above the floor in a clean, dry location. Suitable space and facilities should be provided for such storage so that food-contact surfaces are protected from splash, dust, and other contamination.

The same requirement should also apply to the exposed food-contact surfaces of the fixed equipment.

Utensils should be air-dried before being stored or should be stored in a self-draining position on hooks or racks constructed of corrosion-resistant material. When the storage in protective liquids or other solutions is practised, the equipment and utensils so stored should subsequently be washed, disinfected and rinsed prior to re-use. Wherever practicable, stored containers and utensils should be covered or inverted.

- 5.3.6 SINGLE SERVICE ARTICLES, SUCH AS PLASTIC BAGS, BOXES AND PACKAGING MATERIALS SHOULD BE STORED IN A SEPARATE ROOM AND IN CLOSED CARTONS OR CONTAINERS TO PROTECT THEM FROM CONTAMINATION

Such articles should be handled and dispensed in such a manner as to protect them from contamination with dust, dirt, water, insects, rodents, birds, or other vermin.

- 5.3.7 CLEANING OF SMOKING AND DRYING EQUIPMENT SHOULD BE MADE INTO A REGULAR ROUTINE

SMF 4.3.7/Mod

The periodical removal of tarry deposits on walls, ceilings, fans, tenters, racks, trolleys, etc., is necessary not only for hygienic reasons but also to reduce the risk of fire.

Both the traditional and the mechanical kilns used for smoking and drying present a potential fire hazard if large amounts of tar are allowed to accumulate.

Centrifugal fans are likely to collect an appreciable amount of tar in the fan housing. A special drain hole should be provided on the bottom of the fan's enclosure.

Cleaning methods usually involve the application of alkaline solutions. This can be done manually with a brush or can be sprayed on the walls and ceilings by means of a spray gun which is connected to a hot water or steam supply. The detergent and the dissolved deposits should be rinsed off thoroughly with a copious amount of clean water. For better and more uniform contact of the detergent with the soiled surfaces the use of a foam solution of detergent is recommended.

Easy day-to-day maintenance can be achieved by installing permanent rotating spray nozzles inside the smoking kiln.

Whenever new kilns are being designed, consideration should be given to the accessibility of all parts for easy cleaning; necessary drainage points must be provided.

- 5.3.8 THE BRINE WHICH EXUDES DURING THE DRY-SALTING OF CEPHALOPODS SHOULD BE DISCARDED UNLESS THE RECOVERY OF SALT COULD BE ECONOMICALLY JUSTIFIED

SMF 4.4.3.5/Mod

The resulting brine from the dry-salting operation will contain a high concentration of impurities, such as sugar, particles of dirt, slime, blood, gut content, dissolved proteins and other foreign matter. Such impurities, if not removed, will contaminate the subsequent loads of cephalopods and will, in turn, affect the quality of the final product.

In some countries, where salt is an expensive commodity, it may be worthwhile to recover it from the used brine.

- 5.3.9 ONLY NEW AND CLEAN BOXES, CARTONS AND WRAPPING MATERIAL SHOULD BE USED FOR THE TRANSPORT AND DISTRIBUTION OF PROCESSED CEPHALOPOD PRODUCTS

FF 5.3.10/Mod

As it is very important to protect processed cephalopod products from all sources of contamination, only new or clean non-returnable containers should always be used.

- 5.3.10 WATER USED FOR WASHING OR CONVEYING RAW MATERIALS, INCLUDING SEA WATER FOR CONVEYANCE OF CEPHALOPODS INTO THE PLANT, SHOULD BE FROM SUCH A SOURCE, OR SUITABLY TREATED, AS NOT TO CONSTITUTE A PUBLIC HEALTH HAZARD

SMF 4.3.10/Mod

During gutting or for washing cephalopods, equipment and utensils, water of potable quality or clean sea water should be used. It should not be recirculated unless suitably treated to meet the required standards of potability.

- 5.3.11 REMOVAL OF SOLID, SEMI-SOLID OR LIQUID WASTES FROM CEPHALOPOD UNLOADING, HOLDING AND PROCESSING AREAS SHOULD BE ON A CONTINUOUS OR NEAR CONTINUOUS BASIS USING WATER AND/OR APPROPRIATE EQUIPMENT SO THAT THESE AREAS ARE KEPT CLEAN AND THERE IS NO DANGER OF CONTAMINATING THE PRODUCT

FF 5.3.12/Mod

All waste materials resulting from the operation of a processing plant should be disposed of as soon as possible in a way that they cannot be used for human food and in a manner that they cannot contaminate food and water supplies and offer harbourage or breeding places for rodents, insects, or other vermin.

Containers, flumes, conveyors, bins or storage bays used for removal, collection or storage of offal and other waste, should be cleaned frequently with potable water or clean sea water containing an appropriate amount of free chlorine.

All waste material from containers and vehicles should be removed in such a way as not to cause any contamination and not to create a nuisance.

Arrangements for the disposal of trade refuse and inedible waste should be approved by the appropriate official agency having jurisdiction.

- 5.3.12 EFFECTIVE MEASURES SHOULD BE TAKEN TO PROTECT AGAINST THE ENTRANCE INTO THE PREMISES AND THE HARBOURAGE ON THE PREMISES OF INSECTS, RODENTS, BIRDS OR OTHER VERMIN

FF 5.3.13/Mod

An effective and continuous programme for the control of insects, rodents, birds or other vermin within the establishment should be maintained. The plant and surrounding area should be regularly examined for evidence of infestation. Where control measures are necessary, treatment should be under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of harmful residues being retained by the cephalopods or their products. The chemical, biological or physical agents used should meet the requirements of the official agency having jurisdiction.

The use of insecticides, during the plant operation, without any provision for collection of dead insects, should be discouraged. Instead the use of adhesive insect traps or very efficient "black light insecticutor" lamps with the attached collecting trays, are recommended. Insect traps should not be located directly over the processing areas and should be away from windows and doors.

All rodenticides, fumigants, insecticides or other harmful substances should be of an approved type and should be stored in separate locked rooms or cabinets and handled only by properly trained personnel.

- 5.3.13 DOGS, CATS AND OTHER ANIMALS SHOULD BE EXCLUDED FROM AREAS WHERE CEPHALOPODS IS RECEIVED, HANDLED, PROCESSED OR STORED

FF 5.3.14/Mod

Dogs, cats and other animals are potential carriers of diseases and should not be allowed to enter or to live in rooms or areas where cephalopods or their products are handled, prepared, processed or stored.

- 5.3.14 ALL PERSONS WORKING IN A CEPHALOPOD PROCESSING PLANT SHOULD MAINTAIN A HIGH DEGREE OF PERSONAL CLEANLINESS WHILE ON DUTY AND SHOULD TAKE ALL NECESSARY PRECAUTIONS TO PREVENT THE CONTAMINATION OF THE CEPHALOPOD PROCESSING OR FISH PRODUCTS OR INGREDIENTS WITH ANY FOREIGN SUBSTANCE

FF 5.3.15/Mod

All employees should wear, appropriate to the nature of their work, clean protective clothing including a head covering and footwear, all of which articles are either washable or disposable. The use of waterproof aprons, where appropriate, is recommended.

Gloves used in the handling of cephalopods should be maintained in a sound, clean and sanitary condition and should be made of an impermeable material except where their usage would be incompatible with the work involved. Hands should be washed thoroughly with soap or another cleansing agent and warm water before commencing work, on every occasion after visiting the toilet, before resuming work, and whenever necessary. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

Any behaviour which can potentially contaminate the cephalopods, such as eating, smoking, chewing of tobacco or other materials and spitting should be prohibited in any part of the handling areas.

- 5.3.15 NO PERSON WHO IS KNOWN TO BE SUFFERING FROM, OR WHO IS A CARRIER OF ANY COMMUNICABLE DISEASE OR HAS AN INFECTED WOUND OR OPEN LESION, SHOULD BE ENGAGED IN THE PREPARATION, HANDLING OR TRANSPORTING OF FRESH OR PROCESSED CEPHALOPODS

FF 5.3.16/Mod

Plant management should require that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to the management. Management should not allow any person known to be affected with a disease capable of being transmitted through food, or known to be a carrier of such disease, or while afflicted with infected wounds, sores or diarrhoea, to work in any area of a plant in a capacity in which there is a likelihood of such a person contaminating raw or processed cephalopods with disease-causing micro-organisms.

Minor cuts and abrasions on the hands should be immediately treated and covered with a suitable waterproof dressing of contrasting colour and of a nature that it cannot be accidentally detached, but if infection should occur subsequently, the worker should not be allowed to handle the cephalopods.

- 5.3.16 CONVEYANCES USED FOR TRANSPORTING CEPHALOPODS SHOULD BE CLEANED AND DISINFECTED IMMEDIATELY AFTER EACH USE AND SHOULD BE SO MAINTAINED AS NOT TO CONSTITUTE A SOURCE OF CONTAMINATION FOR THE PRODUCT

FF 5.3.17/Mod

The cleaning of vehicles, together with receptacles and equipment thereon, should be planned to a regular routine. Hosing, scrubbing and cleaning with potable water or clean sea water, to which a suitable detergent or disinfectant has been added, is usually necessary.

5.4 Operating Practices and Production Requirements

5.4.1 General Considerations

- 5.4.1.1 THE CEPHALOPOD PRODUCTS SHOULD BE OF A GOOD QUALITY, WELL PREPARED AND PACKAGED SO THAT THEY WILL REMAIN ATTRACTIVE AND SAFE TO EAT

SMF 4.4.1.1/Mod

Cephalopods which are not good enough to be sold as fresh or frozen should not be used for the processing of other products. Processing cannot correct faults that are due to the poor physiological condition of the raw material, improper handling practices or prolonged storage.

Even in smoking of cephalopods, the poor quality raw material will result in poor quality final product despite the masking effect of smoke on taste, odour and colour of cephalopod meats.

5.4.2 Handling of Raw Material

- 5.4.2.1 ALL CEPHALOPODS SHOULD BE CAREFULLY INSPECTED, SORTED, OR CULLED BEFORE THEY ARE PROCESSED. ANY DAMAGED, CONTAMINATED OR OTHERWISE UNACCEPTABLE CEPHALOPODS SHOULD BE DISCARDED

SMF 4.4.2.3/Mod

The quality and keeping time of the final product is largely dependent on the quality of the raw cephalopods from which it is produced.

Cephalopods which are damaged (crushed, mutilated) will produce a very poor or unacceptable product and, if contaminated in any way, can spread this contamination to working surfaces and other raw cephalopods.

- 5.4.2.2 ALL CEPHALOPODS SHOULD BE THOROUGHLY WASHED BEFORE PROCESSING OR IMMEDIATELY AFTER OPERATIONS LIKE DRESSING

SMF 4.4.2.4/Mod

Spoilage micro-organisms come mainly from the surface of the cephalopods and their digestive tract. Experience has shown that a large part of the surface micro-organisms can be removed by proper washing.

During the dressing, eviscerating (gutting), or trimming operations, each cephalopod should be washed by a flow or spray of potable water or clean sea water which is sufficient in quantity and pressure and is applied in such a manner as to clean the cephalopods thoroughly.

Water used for washing, rinsing or conveying, should not be recirculated unless suitably treated to maintain a potable level of quality.

- 5.4.2.3 WHERE CEPHALOPODS ARE BEING GUTTED, SKINNED, BONED OR PORTIONED, THESE OPERATIONS SHOULD BE CARRIED OUT IN A CLEAN AND HYGIENIC MANNER

SMF 4.4.2.5/Mod

All waste material resulting from these operations should be collected immediately into suitable containers which are removed and emptied regularly or be removed continuously by mechanical means or flumes.

- 5.4.2.4 THAWING OF FROZEN CEPHALOPODS PRIOR TO PROCESSING SHOULD BE DONE IN THE MANNER OUTLINED IN THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH"

The thawing method chosen should suit the volume and type of product that is to be processed and should be economically feasible. Exposure of cephalopods to elevated temperatures during the thawing should be carefully controlled.

Where cephalopods are thawed in still air, the ambient temperature should not exceed 18°C (65°F).

The water used for thawing should be either potable or clean sea water and its temperature should not exceed 20°C (68°F). Maximum time for use of water in batch thawing should not exceed 4 h.

All thawing operations should be carried out under strict hygienic conditions.

5.4.3 Cooking

- 5.4.3.1 ALL EQUIPMENT USED IN THE COOKING AND COOLING OF CEPHALOPODS SHOULD BE FREQUENTLY HOSED DOWN, BRUSHED TO REMOVE ALL VISIBLE DIRT, CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED THOROUGHLY

SP 4.3.8/Mod

During the cooking of cephalopods, impurities such as sand, clay, miscellaneous sea-bottom detritus, parts of cephalopods and coagulated proteinaceous material accumulate. These may discolour the cooked cephalopods and introduce undesirable odours and flavours. Foam which is formed in dirty cooking water may harbour and protect the spores of thermophilic micro-organisms and this may cause trouble during subsequent processing.

It is important, therefore, that a thorough cleaning of the cooker, cooling tank and other associated equipment should be carried out frequently and at least once daily.

- 5.4.3.2 PERSONNEL ENGAGED IN COOKING, COOLING AND HANDLING OF COOKED CEPHALOPODS SHOULD TAKE ALL THE NECESSARY PRECAUTIONS NOT TO CONTAMINATE THE COOKED PRODUCT WITH MICRO-ORGANISMS WHICH MIGHT CAUSE SPOILAGE OR CONSTITUTE A PUBLIC HEALTH HAZARD

SP 4.3.9/Mod

Cephalopods, when removed from the cooker, are practically free from living micro-organisms. Recontamination commences during

cooling and increases progressively during further handling. Workers who are engaged in cooking, cooling or handling of cephalopods should maintain the same high degree of personal cleanliness as workers in other parts of the processing plant. If the same worker handles the raw, as well as the cooked product, precautions should be taken to prevent contamination of cooked cephalopods with micro-organisms from the raw material.

5.4.4 Dry-Salting

5.4.4.1 DRY-SALTING SHOULD BE CARRIED OUT WITH THE FULL UNDERSTANDING OF THE EFFECT ON THE QUALITY OF THE FINAL PRODUCT AND SHOULD BE DONE UNDER STRICT HYGIENIC CONDITIONS

SMF 4.4.3.1/Mod

Dry-salting gives the processed product its taste, appearance (attractive gloss), texture and prolongs its shelf life.

As there is usually a loss of moisture from the cephalopods, strict control of the process should be maintained in order to keep the resulting loss of weight within the profit margin of the operation.

To assure the uniform salt and sugar contents of the final product, the cooked cephalopods in dry-salting batch should be uniform in size and weight.

As a proper dry-salting procedure, it is advisable to arrange the cephalopods, which were sprinkled with salt, sugar and flavouring materials, in stainless steel containers in several layers. The top layer should be weighted to achieve uniform distribution of salt and sugar in the product.

5.4.4.2 DRY FOOD GRADE QUALITY, SALT AND SUGAR SHOULD BE USED IN DRY-SALTING OF CEPHALOPODS

Salt used in the salting of cephalopods should be of good grade and with the least of impurities.

The composition of salt differs according to the origin. Some of the mine salts could be almost pure sodium chloride while the others could contain a high concentration of other salts like calcium sulphate, magnesium sulphate and chloride as impurities.

Magnesium salts, if present at too high a concentration, will give rise to unpleasant bitter flavours and may cause spoilage during the salting operation.

When only impure salt is available, most of the calcium and magnesium impurities can be washed away by using rain or fresh clean water and draining off wash water. This practice will remove calcium and magnesium salts which are highly soluble.

5.4.4.3 DURING DRY-SALTING CEPHALOPODS SHOULD BE KEPT AT A TEMPERATURE BELOW 3°C (37.4°F)

SMF 4.4.3.6/Mod

Dry-salting should always be done in a chill-room temperature, if not, yeasts which survive in sugar may cause abnormal fermentation in forming acids and alcohols. Dry-salted cephalopods should be thoroughly covered by the juice exuded from the cephalopods to prevent rancidity, discoloration, and off-flavour and to give taste.

- 5.4.4.4 IMMEDIATELY AFTER DRY-SALTING, CEPHALOPODS SHOULD BE SUSPENDED ON RODS (TENTERS) OR HOOKS, OR LAID OUT ON TRAYS FOR DRYING

SMF 4.4.3.9/Mod

After dry-salting, cephalopods should be subjected to drying which could be carried out in an open area or in a mechanical dryer under controlled conditions. For this reason and for the purpose of subsequent smoking or processing, the cephalopods should be suspended on rods, hooks or laid out on trays. Care should be taken to ensure that the suspended cephalopods do not touch each other, otherwise they will be unevenly dried and damaged physically during the separation.

- 5.4.4.5 DRYING OF CEPHALOPODS PRIOR TO SUBSEQUENT PROCESSING SHOULD BE CARRIED OUT UNDER CONTROLLED CONDITIONS AND IN A HYGIENIC MANNER

SMF 4.4.3.10/Mod

Drying of cephalopods after the dry-salting refers to the removal of the adhering surface water and evaporation of the surface moisture. If it is done properly, the formation of a glossy pellicle will result. The pellicle is important because it helps to seal in the natural juices and flavours of the cephalopod meats and forms a smooth and attractive surface.

Drying of cephalopods may be done outdoors providing there is no chance for contamination by insects, birds and dust, or in the smoke house. An ideal system is in the chill room with the aid of a blower where a steady current of cool, clean air could be provided.

- 5.4.4.6 IF FOOD PRESERVATIVES ARE USED THEY SHOULD BE OF A TYPE APPROVED BY THE OFFICIAL AGENCY HAVING JURISDICTION

SMF 4.4.3.11/Mod

Only approved food preservatives should be added to the brine or applied after brining. Dissolved food preservatives should not be applied to the surface of the smoked product as this will tend to spoil the appearance.

5.4.5 Smoking

- 5.4.5.1 FOR SMOKE PRODUCTION, THE WOOD, WOOD SHAVINGS OR SAWDUST SHOULD BE DRY AND FREE FROM SOIL DUST AND HARMFUL SUBSTANCES SUCH AS WOOD PRESERVATIVES AND PAINT

SMF 4.4.4.1/Mod

Soft resinous woods give the product an acrid unpleasant taste.

The best combustion temperatures for the wood are in the range of 250-350°C (482-662°F). Temperatures of more than 400°C (752°F) are to be avoided because of the development of undesirable components in the smoke.

The smoking of cephalopods is carried out at 20-25°C (68-77°F) for the initial 1-2 h at 50-60°C (122-140°F) for the succeeding period, and at 60-70°C (140-158°F) for the final 2-3 h. It requires about 7-9 h to obtain good results.

Wet or mouldy sawdust should not be used; however, depending on the type of wood and the nature of the operation, it may be desirable to use damp sawdust. It is a bad practice to use water during the smoking operation for damping the fire in an attempt to regulate the rate of sawdust burning.

5.4.5.2 ASH DERIVED FROM BURNING WOOD OR SAWDUST SHOULD BE PREVENTED FROM BEING DEPOSITED ON THE PRODUCT

SMF 4.4.4.2

It is important, therefore, that the current of air passing the burning wood or sawdust is not so fast that it carries burned particles (ash) into the kiln. Ash should not be allowed to accumulate in large amounts in the boxes where smoke is generated.

The use of smoke scrubbers for the removal of fly-ash, soot and tars is recommended. It may be necessary to re-circulate the scrubbing water which rapidly becomes saturated with the lighter fractions which impart the desired smoke flavour. Colour development of the fish product might be affected.

5.4.5.3 IN PREPARATION FOR SMOKING, CARE SHOULD BE TAKEN TO ARRANGE THE CEPHALOPODS ON TENTERS, HOOKS OR ON TRAYS IN SUCH A MANNER AS TO PROVIDE FOR UNIFORM SMOKE ABSORPTION, TEMPERATURE EXPOSURE AND DEHYDRATION

SMF 4.4.4.4/Mod

Cephalopods should be hung or laid out on trays without overcrowding and touching each other.

Trays or screens used for laying out cephalopods will occasionally imprint a distinct design on one side of the product. In certain products, such a design might add to the appearance of the cephalopods, otherwise screens should not be used if the cephalopods can be hung. Trays and screens used in smoking should be clean and greased with food grade vegetable oil or should be coated with teflon or another suitable release agent approved by the official agency having jurisdiction.

In traditional kilns, the position of cephalopods in relation to fire should be changed frequently. The same requirement will also apply to mechanized kilns where electric fans are used and where cephalopods are located directly in front of the air/smoke inlet. If no remedial action is taken a distinctly darker colour, a bitter tarry taste and a tougher texture will result.

To obtain even smoking and dehydration of the cephalopods in the same batch, the cephalopods should be of reasonably uniform size and weight.

5.4.5.4 IMMEDIATELY AFTER SMOKING AND PRIOR TO FURTHER PROCESSING OR PACKAGING, THE WARM PRODUCTS SHOULD BE COOLED TO AN AMBIENT TEMPERATURE OR LOWER

SMF 4.4.4.8/Mod

When smoking is finished, the resulting product should be cooled thoroughly before it is further processed, otherwise it will turn flabby, moist and sour or mouldy.

Cooling can be conducted in an ambient temperature or in a chill room, providing the humidity is not too high and there is a continual movement of clean, cool air or the kiln itself can be used for cooling at the end of the working day if it is equipped with cooling coils.

In large operations, air blast chilling tunnels, capable of accommodating full trolleys and operating at 0°C (32°F), can be used.

The ash from burning wood or sawdust or any other impurities deposited on the surface of smoked cephalopods should be wiped off with a clean cloth or brush.

5.4.5.5 SEASONING OF SMOKED CEPHALOPODS SHOULD PREFERABLY BE DONE IN A STAINLESS STEEL ROTARY MIXER

Smoked or roasted cephalopods, which are either split or cut up into relatively fine rings, are sprayed with the water solution of sugar, salt and spices, and then are placed into a stainless steel rotary mixer where, through agitation, a thorough and uniform distribution of seasoning liquor takes place.

5.4.5.6 IN CASE OF A FIRE IN A MECHANICAL KILN, THE FANS SHOULD BE SWITCHED OFF AND ALL DAMPERS CLOSED. ALL OTHER SUPPLIES OF ELECTRICITY TO THE KILN SHOULD ALSO BE TURNED OFF

SMF 4.4.4.10/Mod

There is a serious fire hazard if the kiln is allowed to become coated with a fatty condensate from the smoke. If a fire occurs the outside of the kiln should, as far as possible, be kept cool by spraying water. The fire inside should be fought by the injection of carbon dioxide into the closed kiln.

5.4.6 Packaging, Storage and Distribution

5.4.6.1 PACKAGING MATERIALS SHOULD BE CLEAN AND STORED IN A HYGIENIC MANNER. PACKAGING SHOULD BE CARRIED OUT UNDER CONDITIONS THAT PREVENT CONTAMINATION OF THE PRODUCT

FF 5.4.3.14/Mod

Packaging materials used for processed cephalopod products should not transfer to the products any objectionable or harmful substances or odours and flavours and should protect the products against damage, deterioration and contamination.

5.4.6.2 PROCESSED CEPHALOPOD PRODUCTS WHICH ARE NOT FROZEN, SHOULD BE PACKED FOR TRANSPORT SO THAT THERE IS NO DIRECT CONTACT WITH ICE OR MELT WATER

SMF 4.4.5.4/Mod

Intimate contact with ice or melt water will result in the leaching away of flavour and colour, softening of the texture and in general deterioration of the product.

Ice packed in the same container with smoked cephalopods, but not in direct contact with them, is still the most common method of maintaining a chilled condition during transport.

Wet-strength paper or plastic film should be used to wrap the products and separate them from ice. Dry ice or pre-chilled eutectic solutions, in plastic or metal containers, can be used in master cartons having good insulation.

5.4.6.3 BOXES CONTAINING PROCESSED CEPHALOPOD PRODUCTS SHOULD BE HANDLED VERY CAREFULLY DURING TRANSPORT AND DISTRIBUTION. THEY SHOULD NEVER BE UP-ENDED

FF 5.4.3.16/Mod

In some areas boxes may be handled and stacked many times during distribution. Handling practices are often very rough, due to shortage of time at transfer points and use of outdated methods for handling large quantities of boxes. Boxes should never be up-ended as this can result in physical damage to the product.

5.5 Sanitary Control Programme

- 5.5.1 IT IS DESIRABLE THAT EACH CEPHALOPOD PROCESSING PLANT IN ITS OWN INTEREST DESIGNATES A SINGLE INDIVIDUAL, WHOSE DUTIES ARE PREFERABLY DIVORCED FROM PRODUCTION, TO BE HELD RESPONSIBLE FOR THE CLEANLINESS OF THE ESTABLISHMENT

FF 5.5.1/Mod

Such a person or his staff should be a permanent part of the organization or employed by the organization and should be well trained in the use of special cleaning tools, methods of dismantling equipment for cleaning and in the significance of contamination and the hazards involved. A permanent cleaning and disinfection schedule should be drawn up to ensure that all parts of the establishment are cleaned appropriately and that critical areas, equipment and material are designated for cleaning and/or disinfection daily or more frequently if required.

5.6 Laboratory Control

- 5.6.1 IN ADDITION TO ANY CONTROL BY THE OFFICIAL AGENCY HAVING JURISDICTION, IT IS DESIRABLE THAT EACH CEPHALOPOD PROCESSING PLANT IN ITS OWN INTEREST SHOULD HAVE ACCESS TO LABORATORY CONTROL TO ESTABLISH QUALITY OF THE PRODUCTS PROCESSED

FF 5.6.1/Mod

The extent and type of such control will vary with the food product, as well as the needs of management. Such control should reject all foods that are unfit for human consumption.

Analytical procedures used should follow recognized standard methods in order that the results may be readily interpreted.

6. SECTION V - END PRODUCT SPECIFICATIONS

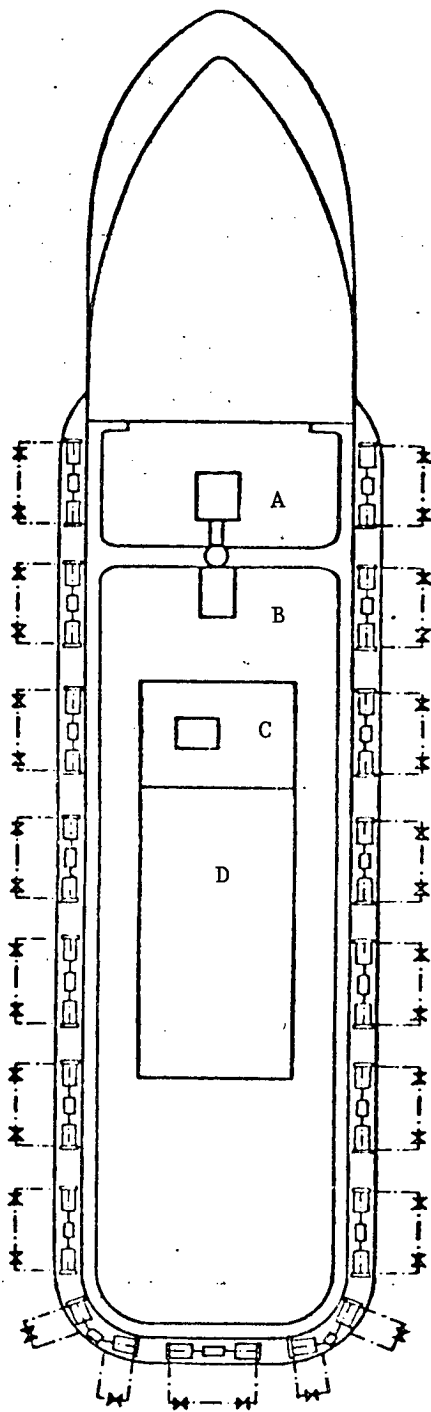
Crb 6/Mod

- 6.1 Appropriate methods should be used for sampling and examination to determine the compliance with the following specifications:

- A. Cephalopods or cephalopod products should be, to the extent possible in good manufacturing practice, free from objectionable matter and parasites;
- B. Cephalopods or cephalopod products should be free from micro-organisms in amounts harmful to man, free from parasites harmful to man and should not contain any substances originating from micro-organisms in amounts which may represent a hazard to health;
- C. Cephalopods or cephalopod products should be free from chemical contaminants in amounts which may represent a hazard to health;
- D. Cephalopods or cephalopod products should comply with any requirements set forth by the Codex Alimentarius Commission on pesticide residues and food additives as contained in permitted lists or Codex commodity standards, or should comply with the requirements on pesticide residues and food additives of the country in which the cephalopods will be sold.

APPENDIX I

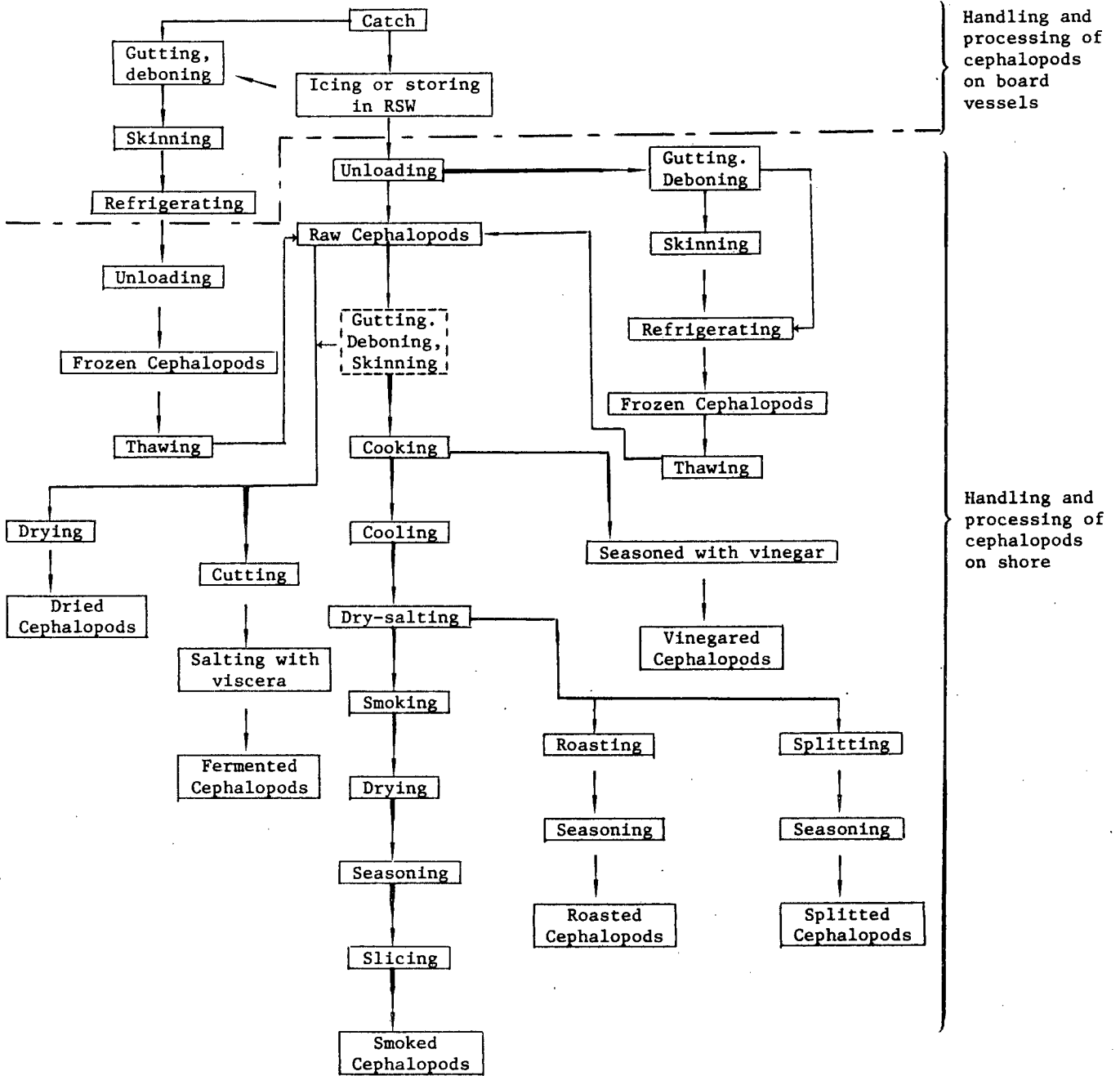
General Deck Layout of Squid Jigging Vessel



- A - squid receiving and washing machine
- B - squid portioning machine
- C - pre-freezing preparations
- D - freezer and freezer store

APPENDIX II

Flow Diagram for Handling and Processing of Cephalopods



APPENDIX III

References to Related Codes and Standards

Recommended International Code of Practice for Fresh Fish	<u>CAC/RCP 9 - 1976</u>
Recommended International Code of Practice for Canned Fish	<u>CAC/RCP 10 - 1976</u>
Code of Practice for Shrimp and Prawns	<u>CX/FFP 77/7</u> (FAO Fish.Circ., No.C322 Rev. 1)
Code of Practice for Lobsters and Related Species	<u>CX/FFP 76/16</u> (FAO Fish.Circ., No. 330)
Code of Practice for Smoked Fish	<u>CX/FFP 77/6</u> (FAO Fish.Circ., No.C321 Rev.1)
Code of Practice for Crabs	FAO Fish.Circ., (349):49 pages 1977
International Standards for Drinking Water	(WHO) Third edition, 1971
Code of Practice for Frozen Fish	<u>CX/FFP 77/16</u> (FAO Fish.Circ., No.C145 Rev.1)