

**Good manufacturing practice:**

**Guidelines for  
Nephrop Fishermen**

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M. Myers and J.Combes

**Working with the seafood industry to satisfy consumers, raise standards, improve efficiency and secure a sustainable future.**

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We develop standards, training programmes and learning support materials. We also promote training opportunities for all sectors of the sea fish industry through a national network of Group Training Associations. Quality award schemes are available for processors and friers.



Seafish Technology

Author: Michael Myers  
Date: April 2004

## **Good Manufacturing Practice Guidelines for Nephrop Fishermen**

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## **1 Purpose and Scope**

These guidelines provide advice to nephrop fishermen on good manufacturing practice (G.M.P.). Their purpose is to help fishermen to comply with food law and to secure a better return for their products. This includes ensuring food safety, maximizing product quality and meeting the needs of the market.

Advice is given on business management, vessel and equipment design and on working practices. Its scope is from capture to landing and covers fresh whole and tailed nephrops, live nephrops and frozen nephrops.

The guidelines were produced by Seafish in collaboration with a panel of representatives from the relevant sectors of the trade and official bodies (as listed in Appendix I). It is one of a series of Guidelines that provide recommendations for good practice in various sectors of the fish industry.

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## **2 Background**

Although nephrops and the by-catch of nephrop fishing operations are generally low-risk products, high standards of food safety are important to ensure public confidence in products as being safe and wholesome. Food safety risks are mostly associated with contamination, infestation or bacterial spoilage of product.

Beyond basic standards that ensure food safety, high standards of care are necessary when handling nephrops in order to achieve a level of product quality that will provide for consumer satisfaction, minimise waste and maximise value.

Nephrops are particularly susceptible to poor quality control after capture, with spoilage accelerated by bad handling, poor cleaning and inadequate temperature control. Fresh nephrops have a characteristic fresh odour and sweet flavour which they gradually lose before developing ammoniac odours and sour flavours. During the spoilage process discoloration will occur due to oxidation and gut autolysis leading to loss of yield, texture and flavour. Chilling is the most effective way of preserving quality.

Nephrops may also be of intrinsic poor quality during the times of year when they moult their shells. The new shell is soft after moulting and they absorb water to stretch the new shell. The meat is poor at this time and mortalities high for product destined for the live market. Females may also develop discoloration of the head when the mature gonads, which are dark-green/black in colour become visible through the shell (commonly known as 'green-heads'). The market does not generally welcome green-heads.

### 3 Summary of Legal Requirements

**The Food Safety Act 1990** requires that all food must not be unsafe or misleadingly described. It empowers the food authorities and prohibits the sale for human consumption, or being in possession of food that does not comply with food safety requirements. The only defence permitted is that of due diligence.

**The Food Safety (Fishery Products and Live Shellfish)(Hygiene) Regulations 1998** as amended prescribe detailed rules for facilities, equipment and practices that include fishing vessels and the landing of fishery products.

**The Miscellaneous Food Additives Regulations 1995** specify legally approved additives that may be used for specific foods including the use of sodium metabisulphate on nephrops and maximum residual levels in product.

**The Materials and Articles in Contact with Food Regulations 1987** require that any articles that come into contact with foods do not endanger human health or bring about unacceptable changes in the food.

**Regulation EC/178/2002 laying down the general principles and requirements of food law** is enacted in law but the relevant sections do not come into force until January 2005. The regulation extends food law throughout the food chain from primary production to retailing and will be the principle element of food law. Fishing is included in primary production. Like the Food Act it requires that food shall not be unsafe or be misleadingly presented and places the responsibility on food business operators to ensure that their businesses comply with food law. It also requires that traceability is established at all stages of the food chain and that food business operators withdraw or recall food that does not comply with food law.

The proposed **EU Regulation on the Hygiene of Foodstuffs** is scheduled to be implemented in 2006. It will establish basic hygiene rules for all food businesses and includes a specific set of hygiene rules for primary production that includes training requirements. It will extend the requirement for labelling of fishery products to primary production. The general rules include the registration of food businesses and the implementation of HACCP principles by food business operators, although HACCP will not be required for primary production. It encourages the development of officially approved guides to good practice, particularly for primary production.

The proposed **EU Regulation laying down specific hygiene rules for food of animal origin** is also scheduled to be implemented in 2006. It will establish additional, more detailed sets of hygiene rules for specific foods including fishery products. It is similar to and will replace the current fishery products hygiene regulations.

**The Sea Fish (Marketing Standards) Regulations 1988** as amended, require that nephrops (and prescribed by-catch species) be graded in accordance with common standards of freshness and size (weight) categories (see appendices II and III and that box weights be expressed in kilograms and be within defined tolerance at point of first sale.

**The Fish Labelling Regulations 2003** require that the commercial designation of species, production method (caught or farmed) and FAO catch area be provided at each stage of the production chain by labelling of the product or by means of a commercial document accompanying the goods.

**Within this document the use of the word ‘must’ implies a legal requirement. Recommendations for good practice are not necessarily a legal requirement.**

Users of the document should be aware that legislation is subject to constant review and change. If in any doubt advice should be sought from the appropriate authority. Legal documentation may be accessed from the following web-sites;

|                       |  |
|-----------------------|--|
| UK Legislation        | <a href="http://www.hmsso.gov.uk">www.hmsso.gov.uk</a>   |
| EU Legislation        | <a href="http://www.europa.eu.int">www.europa.eu.int</a> |
| Food Standards Agency | <a href="http://www.food.gov.uk">www.food.gov.uk</a>     |

## **4 Management Responsibilities, Training and Traceability**

- 4.1 Vessel owners must ensure that the handling, preparation, storage and landing of fishery products on fishing vessels is undertaken in a hygienic way and in accordance with the detailed conditions prescribed by food safety legislation.  
(The legislation covers the hygienic design and construction of a vessel and its equipment, protection of product from contamination and heat sources, care in handling, and personal hygiene).
- 4.2 Under the proposed hygiene of foodstuffs regulation (section 3) vessel owners/skippers must ensure that crew handling fishery products are in good health and undergo training on health risks.
- 4.3 It is recommended that all crew members are trained in basic food hygiene and have a clear understanding of the importance of high standards of cleanliness and the means of achieving them.
- 4.4 It is recommended that all crew members are trained in care of the catch quality procedures.
- 4.5 It is recommended that skippers familiarise themselves with the concept and use of hazard analysis as a way of minimising the risk of contamination of the catch.
- 4.6 Under EC Regulation 178/2002 (see section 3) vessel owners/skippers must have in place systems and procedures to facilitate traceability of product.
- 4.7 It is recommended that the catch details listed in 5.7 plus date of landing and name and address of the buyer be recorded for inspection by the competent authority.
- 4.8 Vessel owners/skippers are also legally responsible for compliance with Fisheries Control Regulations, Fish Marketing Regulations, Fish Labelling Regulations, Health and Safety Regulations and Environmental Legislation.

## **5 Recommendations on Good Marketing Practice**

- 5.1 As far as is practically possible, fishing operations should be planned with due regard to market requirements for size, quality and product form (whole or tails etc.)
- 5.2 The capture of nephrops of known poor intrinsic quality (soft and green-heads) or nephrops of very small size, for which there is a weak market, should be avoided where possible.
- 5.3 Landings should be scheduled as far as possible to meet demand requirements in the short term (during the week) and over the fishing season to provide continuity of supply and price stability.
- 5.4 While at sea it is recommended that skippers provide accurate detail of catches and provide advance notification of landing to their P.O./agent or contract buyer. (Scheduling and forward notification of landings in detail enables merchants and processors to plan purchases, production, promotion and to negotiate sales. It is in the long-term interests of both the onshore sector and fishermen).
- 5.5 Great care should be taken in the supply of nephrops to a buyer specification, to ensure that the specification is met. (Tails should be free of legs or body parts, quality or size grades should not be mixed, foreign bodies and trash fish should be removed and unhealthy or damaged Nephrops should not be supplied to the live market etc.)
- 5.6 It is recommended that only creel-caught nephrops or nephrops captured by trawl under very carefully controlled conditions on board and subsequent holding ashore be supplied to the live market.
- 5.7 To satisfy legal requirements, the following information must be provided of landings prior to first sale:
  - boat identity
  - species
  - product form (e.g. tails/whole)
  - size grade
  - freshness grade
  - area of capture (FAO area)
  - box weight (actual weight or estimated)
  - treatment if any (e.g. metabisulphate)
- 5.8 It is recommended that the above information (5.7) and the date of capture be included on a label on each box.

## **6 Recommendations for Good Manufacturing Practice**

### **6.1 Fishing Vessel/Equipment Design and Construction**

- 6.1.1 Vessels must be configured, constructed and utilised so as not to cause contamination of product by bilge water, sewerage, smoke, fuel, oil, grease or other objectionable substances.
- 6.1.2 Product handling and storage areas must be of adequate size and arranged in such a way as to minimise the potential for cross-contamination.
- 6.1.3 Equipment with which product comes into contact must be of suitable corrosion-resistant material of food-grade which is smooth and easy to clean. Surface finishes must be durable and non-toxic. Stainless-steel, aluminium and food-grade plastics are recommended. Wooden tailing boards and wooden boxes are not suitable.
- 6.1.4 Glass in product handling and holding areas should be avoided where possible or protected from damage and potential contamination of product.
- 6.1.5 Chutes, conveyors and handling systems should be designed to prevent physical damage caused by long drops or crushing.
- 6.1.6 The receiving area for taking the catch onboard must be easy to clean and designed so as to protect the catch from the sun and elements and any source of contamination. Chilling of reception hoppers/areas is recommended.
- 6.1.7 Adequate provision must be made for the washing and disinfecting of equipment where appropriate. Seawater used for wash-down and supplied by deck-hoses must be clean with the intake located so as to avoid contamination from toilet wastes and engine discharges. Deck-hose pumps must only be used for handling seawater and seawater lines and be clearly identified and separate from potable water lines to avoid contamination. Hoses should reach all areas that require cleaning and have sufficient pressure for effective wash-down.





**Figure 1 - Hoses should reach all areas that require cleaning and have sufficient pressure for effective wash-down**

- 6.1.8 A lockable facility must be provided for the secure storage of cleaning products, disinfectants and potentially toxic substances separate from fish handling/storage areas.
- 6.1.9 Adequate hand-washing and toilet facilities isolated from fish handling/storage areas should be provided where appropriate. There must be 'wash hand' signs at all wash-hand basins and toilets.
- 6.1.10 Purpose-designed continuous systems of washing, dipping and chilling of nephrops that reduce manual control and handling of baskets are recommended.
- 6.1.11 Fish holds and containers used for storage of catch must allow for efficient drainage and removal of melt-water and drip loss.
- 6.1.12 Systems for freezing of nephrops at sea must have sufficiently powerful refrigeration equipment to achieve rapid reduction in temperature of product to -25 degrees C or lower.

- 6.1.13 Frozen storage areas must be capable of holding product at -18 degrees C or lower and be equipped with a temperature recording device.
- 6.1.14 It is recommended that chilled fish-rooms are fitted with a temperature recording device.
- 6.1.15 Bait carried by creel boats must be held separate from the catch and in such a manner that it cannot contaminate the catch. Bait containers must be labelled and not used for any other purpose.
- 6.1.16 Systems that are capable of weighing and labeling at sea and transmitting catch records to shore are recommended for vessels making trips in excess of 24hours.

## **6.2 Hygiene and Cleaning**

- 6.2.1 Prior to the start of any fishing trip the skipper or a designated crew member must check the standard of hygiene of the vessel and equipment, especially catch reception areas, sorting tables and fish boxes and clean if necessary.
- 6.2.2 Between hauls, hoppers, deck-pounds, conveyors, tables and any equipment coming in contact with product must be cleared and sluiced down with clean sea-water. Any fish debris trapped in the net must be removed.
- 6.2.3 At the end of each fishing trip and after landing of the catch, all fish handling and stowage areas, equipment and boxes etc., must be thoroughly cleaned in accordance with a documented schedule that specifies the cleaning agents and application. Any unused and stale or contaminated ice must be discarded and the storage area thoroughly cleaned.
- 6.2.4 Only potable or clean seawater may be used for cleaning. Dock water is not suitable and must not be used.



**Figure 2- Dock water is not suitable for wash down purposes**

- 6.2.5 Smoking is not permitted in the fishroom or fish handling areas.
- 6.2.6 Crew members handling nephrops must take particular care to maintain clean hands and clothing and to refrain from unhygienic personal habits.
- 6.2.7 It is recommended that gloves, oilskin jacket and trousers are cleaned and sanitised daily after use.
- 6.2.8 Crew members must report any illness to their skipper and must not work if suffering from gastric illness and must not handle the catch if they have infected wounds.
- 6.2.9 It is recommended that sticking plaster used to cover minor cuts and grazes be coloured (non-white).

### **6.3 Catching Gear and Practices**

- 6.3.1 In the overall economics of their fishing operations it is recommended that fishermen carefully consider the benefits of different fishing techniques (trawling/creeling) and preservation method (icing/freezing).
- 6.3.2 It is recommended that consideration be given to the use of separator trawls or panels and to gear design (mesh sizes, mesh shape, twine size and cod-end configuration etc.) to target nephrops and minimize discards.
- 6.3.3 Prior to taking onboard any haul of nephrops it is essential that the previous haul is cleared away first and that different hauls are not mixed.
- 6.3.4 Tow times should be kept as short as practical. Long tow times result in damage and quality loss to nephrops and the by-catch.
- 6.3.5 Where bottom conditions are muddy, the net may be towed behind the vessel for a short time after hauling to wash away mud and other sea-bottom detritus. As the temperature of the surface water may be higher than that at which nephrops are caught however, the period should be short.

### **6.4 Onboard Handling and Stowage**

- 6.4.1 Prior to taking the catch onboard, the deck pounds, hoppers, hauling equipment and boxes etc., must be clean.
- 6.4.2 Great care must be exercised when handling nephrops and by-catch as any damage will accelerate the spoilage and reduce their market value.
- 6.4.3 Sorting and grading must be conducted out of direct sunlight and sources of contamination. Spray bars and the application of ice is recommended for reception hoppers, pounds and over tables to keep the catch moist and cool.
- 6.4.4 Nephrops should be size graded as required by the market. Nephrops and by-catch under minimum landing size must be returned to the sea. (see appendix IV )
- 6.4.5 Marketable fish by-catch is valuable and should be treated with the same level of care as that given to nephrops and in accordance with good recommended practice.
- 6.4.6 Tailed nephrops should not include any head parts, internal organs or legs.

- 6.4.7 To avoid fighting, damage and mortalities caused by bleeding, it is recommended that nephrops destined for the live market be transferred straight from the creel into the appropriate size grade of tub matrix, or to a lidded punnet, as the market requires. Nephrops transferred to tubes should be placed tail-first and the tubes aligned vertically to mimic their natural posture in their burrows. To transfer them from the creel to a holding tray, while the fleet is hauled and sorting them afterwards is not good practice as they fight in the tray. During handling every effort must be made to minimise exposure to daylight and to rapid temperature change as it is stressful for the animals. Live nephrops should be held in a wet cool environment.
- 6.4.8 Nephrops must be carefully and thoroughly cleaned using only clean seawater to remove all traces of mud and sand etc. Where a fish basket and deck-hose are used, then the deck hose should be of low pressure. The basket should only be half-filled and gently shaken. Dock water must not be used.
- 6.4.9 Where whole nephrops are to be dipped in a melanosis inhibiting solution it must be undertaken in strict accordance with the manufacturers recommendations, including those that safeguard the health and safety of crew members. Sodium metabisulphite should never be applied as a powder. Tails should not be dipped. Note that dipping only inhibits discoloration and does not reduce spoilage or extend shelf-life.
- 6.4.10 The recommended practice for dipping is to add 1 kilogram of sodium metabisulphite powder to 40 litres of clean seawater and dip half a fish basket of nephrops for three minutes. After ten dips the solution should be discarded and a new solution made up. As the solution is highly corrosive it should not be discharged to the bilge or via sea-cocks. Standards of cleanliness must be high otherwise the treatment is ineffective. Empty powder bags should be stored in a lidded container for disposal.
- 6.4.11 Weighing of washed and graded nephrops at sea is recommended as it allows for efficient icing practice that eliminates the need for check weighing on landing. Check-weighing requires the removal of ice which often results in temperature rise and damage to the nephrops. Recommended maximum box weights for the standard 70 litre plastic box are 20 kilogram (3 stone) for whole and 25 kilogram (4 stone) for tails. Due allowance should be made when weighing at sea for drip loss.
- 6.4.12 Both tailed and whole nephrops (other than live) must be maintained at the temperature of melting ice. It is recommended that this be achieved by thorough mixing of ice throughout the box sufficient to last the trip. Pre-chilling of nephrops by immersion, for a short period of time, in an ice-water mix or slurry ice, prior to boxing and icing is recommended for rapid cooling. The use of papers between the ice and nephrops is not

recommended as it reduces the effectiveness of chilling. Only ice made from potable or clean seawater may be used. Before use it must be stored under conditions that prevent its contamination.

- 6.4.13 Where fish by-catch is headed and/or gutted on board, such operations must be carried out hygienically and the products must be washed immediately and thoroughly with potable or clean seawater.
- 6.4.14 When freezing nephrops at sea it is recommended that after grading and washing, whole nephrops be pre-chilled in refrigerated or iced water prior to blast freezing. Nephrops should be handled and frozen in rigid containers to prevent the shedding of limbs or damage when handling frozen. It is recommended that core temperatures be brought down to -25 degrees C within four hours.
- 6.4.15 After boxing and icing, freezing or live holding, nephrops must be stored under prescribed conditions of hygiene and temperature control. Fresh nephrops must be maintained at the temperature of melting ice and frozen nephrops at -18 degrees C or lower. Boxed nephrops and fish must be protected from the elements and sources of contamination at all times.



**Figure 3 - Boxed Nephrops and fish must be protected from the elements and sources of contamination at all times**

- 6.4.16 If tailing of nephrops is not completed on return to port and continues in port, no body parts or legs are to be dumped overboard into the dock. They must be landed and disposed of in an approved manner.

## **7 Recommendations on landing**

- 7.1 While at sea, vessels working longer than day trips, should liaise with their agents or buyers on market conditions or factory supply requirements regarding landing arrangements. Prior to landing, vessels should confirm details of their catches.
- 7.2 Unloading and landing operations must proceed rapidly, with nephrops and by-catch placed in a protected environment that will maintain product at prescribed temperatures. Fresh landings should be maintained at the temperature of melting ice and frozen landings at -18 degrees C.
- 7.3 When live nephrops are not collected daily on landing, live product may be stored in the sea by hanging them from a large buoy or from a jetty etc., provided that the water is clean. It is recommended that live nephrops are stored well below the surface so that they do not suffer from freshwater run-off of low salinity or pollutants that can kill suspended nephrops. To avoid predation and contamination it is recommended that they are not stored on the seabed.

## Appendix I

### Nephrops Guidelines Panel Members

#### Members

|                          |                  |   |
|--------------------------|------------------|---|
| Bob Cason                | NFFO             | Heleanora@btinternet.com                      |
| Dick James               | NIFPO            | Nifpo@aol.com                                 |
| Ian Duncan               | SFF              | Ian@sff.co.uk                                 |
| Robert Stevenson         | UKAFPO           | Robert@westofscotlandfpo.idps.co.uk           |
| Hugh Allen               | MNWFA            |   |
| Freddy Buchan            | Scotprime        | Fred@scotprime.co.uk                          |
| Elizabeth Reynolds-Lewis | Youngs Bluecrest | Elizabeth_reynolds-lewis@youngsbluecrest.com. |
| Peter Hunt               | SAGB             | Sagb@shellfish.org.uk                         |
| Neil McKay               | EHO              | Nmckay.ecp@aberdeenshire.gov.uk               |
| Jes Sparks               | Seafish          | J_sparks@seafish.co.uk                        |
| Peter Wilson             | Seafish          | P_wilson@seafish.co.uk                        |
| Jason Combes             | Seafish          | J_combes@seafish.co.uk                        |
| Mike Myers               | Seafish          | M_myers@seafish.co.uk                         |

#### Consultation

|               |         |                                      |
|---------------|---------|--------------------------------------|
| Mike Glavin   | FSA     | Mike.glavin@foodstandards.gsi.gov.uk |
| Wesley Denton | Seafish | W_denton@seafish.co.uk               |
| Ian Lawler    | BIM     | Lawler@bim.ie                        |





## Appendix II

### EC Marketing size grades for Nephrops

| Size grade | Count per Kilo |               | Approximate total length (mm) |
|------------|----------------|---------------|-------------------------------|
|            | Whole          | Tails         |                               |
| 1          | 20 and less    | 60 and less   | 137 and above                 |
| 2          | 21 to 40       | 61 to 120     | 136 to 112                    |
| 3          | 41 to 60       | 121 to 180    | 111 to 100                    |
| 4          | More than 60   | More than 180 | 99 and below                  |



## Appendix III

### EC freshness grades for Nephrops

|                | Freshness category                                    |  |  |
|----------------|---|--|--|
|                | Extra   | A  | B  |
| Shell          | Pale pink or pink to orange-red                       | Pale pink or pink to orange-red; no black spots          | Slight discoloration: some black spots and greyish colour, particularly on shell and between tail segments |
| Eyes and Gills | Shiny black eyes: pink gills                          | Eyes dull and grey/black: gills greyish                  | Gills dark grey or some greenish colour on dorsal surface of shell   |
| Smell          | Characteristic mild shellfish smell                   | Loss of characteristic shellfish smell. No ammonia smell | Slightly sour  |
| Flesh (tail)   | Translucent and blue in colour, tending towards white | No longer translucent but not discoloured                | Opaque and dull in appearance  |



## Appendix IV

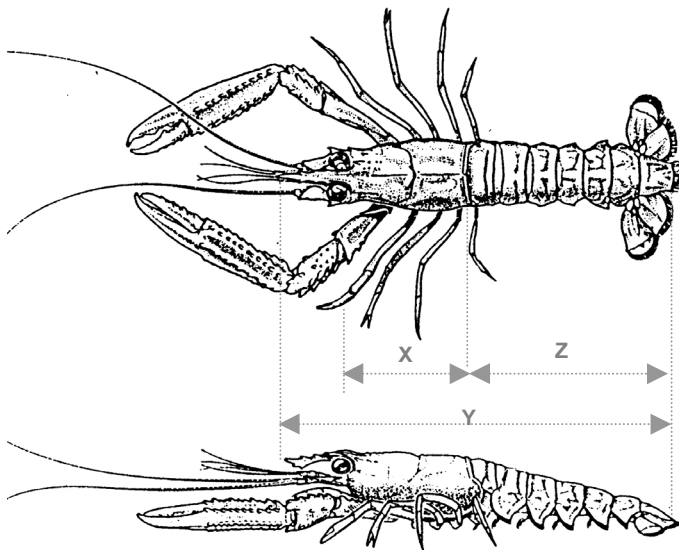
### Minimum sizes for Nephrops Regions 1 to 5 except Skagerrak/Kattegat

#### Whole Nephrop

- a) Whole area except Region 3 and ICES VIa, VIIa  
Total length (y) 85mm  
Carapace length (x) 25mm
- b) ICES VIa, VII; Region 3  
Total length (y) 70mm  
Carapace length (x) 20mm

#### Nephrop tails

- a) Whole area, except Region 3 and ICES VIa, VIIa: 46mm  
ICES VIa, VIIa, Region 3: 37mm



X = Back of eye socket to the distal edge of carapace

Y = Tip of rostrum to the rear end of the telson, not including the setae

Z = Edge of first tail segment to rear end of telson, not including the setae. To be measured flat on the dorsal side.