

# Fish meal & fish oil

## Product specifications





FF Skagen is one of the world's leading producers of fish meal and fish oil. We develop, produce and market healthy products used as protein supplements for rearing animals and fish.

FF Skagen A/S is owned by the "FF Skagen Foundation", mainly owned by the fishermen and the fishing industry. The company's factories are located at the port of Skagen and port of Hanstholm - with the sea as our nearest neighbour and direct access to daily supplies of fresh fish. Here, 130 employees transform 500.000 tons of fresh fish into approximately 170.000 tons of FF fish meal and FF fish oil annually at advanced processing plants. FF Skagen has an annual turnover of DKK 1.8 billion and exports to more than 60 countries.

FF Skagen is certified according to ISO 9001:2015, ISO 14001:2015, MSC, IFFO RS, GMP+, Soil Association and Naturland.

FF Skagen is a member of the Marine Ingredients Denmark.

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## FF LT Supreme

- fish meal in a class of its own for piglets, trout, salmon and mink

FF LT Supreme fish meal is gently prepared under very low heat. FF LT Supreme fish meal is in a class of its own with a high content of proteins and minerals and unsurpassed high protein digestibility. The result is an exceptional growth rate. FF LT Supreme is particularly suitable for the first weeks of an animal's life, during which it is absolutely crucial that the composition of the feed is as close to animals' natural food as possible.

FF LT Supreme means not only an extraordinarily good feeding economy. It also means increased welfare because FF LT Supreme provides a feed content balance, where rapid growth does not come at the expense of animals, natural development, strength and health.

FF LT Supreme is guaranteed salmonella-free.



| Chemical composition  |                              |
|-----------------------|------------------------------|
| Protein               | 68 - 72 %                    |
| Fat                   | max 12 %                     |
| Water                 | max 10 %                     |
| Salt                  | max 4.5 %                    |
| Ash                   | 10 - 18 %                    |
| TVN                   | max 0,18 % NH <sub>3</sub> N |
| Water soluble protein | min 18 % max 32 %            |
| PH-Stat digestibility | min 90 %                     |
| Histamin              | max 500                      |
| Cadevarin             | max 1000                     |

| Amino acid content mean value in g / kg DM |        |               |       |
|--------------------------------------------|--------|---------------|-------|
| Alanine                                    | 48.43  | Lysine        | 66.08 |
| Arginine                                   | 47.92  | Methionine    | 26.07 |
| Aspartic                                   | 76.81  | Phenylalanine | 34.42 |
| Cystine                                    | 8.24   | Proline       | 34.66 |
| Glutamic acid                              | 106.22 | Serine        | 35.51 |
| Glycine                                    | 43.61  | Threonine     | 35.89 |
| Histidine                                  | 20.66  | Tryptophan    | 9.31  |
| Isoleucin                                  | 38.75  | Tyrosine      | 29.01 |
| Leucine                                    | 62.47  | Valine        | 46.76 |

| Minerals (content per kg DM) |          |
|------------------------------|----------|
| Calcium                      | 35.2 g   |
| Phosphorus                   | 23.9 g   |
| Magnesium                    | 2.2 g    |
| Sodium                       | 7.3 g    |
| Potassium                    | 13.0 g   |
| Iron                         | 332.0 mg |
| Manganese                    | 15.0 mg  |
| Copper                       | 5.0 mg   |
| Zinc                         | 106.0 mg |
| Selenium                     | 2.38 mg  |

| Vitamins (content per kg DM) |         |
|------------------------------|---------|
| Vitamin E                    | 4.0 mg  |
| Tiamin                       | 1.0 mg  |
| Riboflavin                   | 7.5 mg  |
| Pyridoxine                   | 2.5 mg  |
| Niacin                       | 65.0 mg |
| Biotin                       | 8.0 mg  |
| Vitamin B12                  | 0.04 mg |

*Antioxidant min 150 ppm ethoxyquin added during production.*





## FF NSM/Special A

- easily digestible nutrient concentrate for piglets, salmon and mink

FF NSM/Special A fish meal is a protein concentrate made from fresh fish and processed in a gentle process that preserves the original natural qualities of the flesh of the fresh fish. FF NSM/Special A meal is packed with nutritional content that is as close to the animals' natural food as possible. It has the same high levels of the essential amino acids and an unparalleled ease of digestibility.

FF NSM/Special A can be used in both wet as well as dry feed mixes. It can also be combined with FF Golden Oil. The result is a feed base that corresponds closely to the natural food of salmon and trout, both in taste and nutritional value.

FF NSM/Special A is guaranteed salmonella-free.



| Chemical composition  |           |
|-----------------------|-----------|
| Protein               | 68 - 72 % |
| Fat                   | max 12 %  |
| Water                 | max 10 %  |
| Ash                   | 10 - 20 % |
| Salt                  | max 4.5 % |
| PH-Stat digestibility | min 88 %  |

| Minerals (content per kg DM) |          |
|------------------------------|----------|
| Calcium                      | 35.2 g   |
| Phosphorus                   | 23.9 g   |
| Magnesium                    | 2.2 g    |
| Sodium                       | 7.3 g    |
| Potassium                    | 13.0 g   |
| Iron                         | 332.0 mg |
| Manganese                    | 15.0 mg  |
| Copper                       | 5.0 mg   |
| Zinc                         | 106.0 mg |
| Selenium                     | 2.38 mg  |

| Amino acid content mean value in g / kg DM |        |               |       |
|--------------------------------------------|--------|---------------|-------|
| Alanine                                    | 49.57  | Lysine        | 60.92 |
| Arginine                                   | 47.17  | Methionine    | 23.55 |
| Aspartic                                   | 75.52  | Phenylalanine | 30.19 |
| Cystine                                    | 7.43   | Proline       | 33.44 |
| Glutamic acid                              | 111.82 | Serine        | 34.02 |
| Glycine                                    | 50.18  | Threonine     | 32.96 |
| Histidine                                  | 15.48  | Tryptophan    | 8.49  |
| Isoleucine                                 | 35.98  | Tyrosine      | 25.10 |
| Leucine                                    | 60.59  | Valine        | 41.37 |

| Vitamins (content per kg DM) |         |
|------------------------------|---------|
| Vitamin E                    | 4.0 mg  |
| Tiamin                       | 1.0 mg  |
| Riboflavin                   | 7.5 mg  |
| Pyridoxine                   | 2.5 mg  |
| Niacin                       | 65.0 mg |
| Biotin                       | 8.0 mg  |
| Vitamin B12                  | 0.04 mg |

Antioxidant min 150 ppm ethoxyquin added during production.





## FF Classic

- all-round protein supplement for chicken, hens, pigs as well as eel and shrimp

FF Classic is a nutritious all-round fish meal product that is suitable for a wide variety of animal species. FF Classic combines high biological value with better feed efficiency and greater economy. Animals fed with FF Classic achieve high daily growth through FF Classic's significant contribution to amino acid content in the healthy, balanced compound.

FF Classic is particularly suitable for egg-laying hens as a significant protein source in the production of hatching eggs. For pigs and pregnant sows, FF Classic's high content of raw fats and varied mineral content results in larger litters, improved viability and increased fertility. FF Classic is also a good and nutritious feed for eel and shrimp farms, where the biological values and easy digestibility promote a higher daily growth rate.

FF Classic is guaranteed salmonella-free.



| Chemical composition |           |
|----------------------|-----------|
| Protein              | 70 - 72 % |
| Fat                  | max 12 %  |
| Water                | max 10 %  |
| Salt                 | max 4.5 % |
| Ash                  | 10 - 18 % |

| Minerals (content per kg DM) |          |
|------------------------------|----------|
| Calcium                      | 35.2 g   |
| Phosphorus                   | 23.9 g   |
| Magnesium                    | 2.2 g    |
| Sodium                       | 7.3 g    |
| Potassium                    | 13.0 g   |
| Iron                         | 332.0 mg |
| Manganese                    | 15.0 mg  |
| Copper                       | 5.0 mg   |
| Zinc                         | 106.0 mg |
| Selenium                     | 2.38 mg  |

| Amino acid content mean value in g / kg DM |        |               |       |
|--------------------------------------------|--------|---------------|-------|
| Alanine                                    | 47.55  | Lysine        | 55.90 |
| Arginine                                   | 41.38  | Methionine    | 21.76 |
| Aspartic                                   | 67.93  | Phenylalanine | 27.93 |
| Cystine                                    | 6.29   | Proline       | 30.09 |
| Glutamic acid                              | 101.99 | Serine        | 31.15 |
| Glycine                                    | 45.92  | Threonine     | 30.73 |
| Histidine                                  | 14.94  | Tryptophan    | 7.53  |
| Isoleucin                                  | 33.56  | Tyrosine      | 21.70 |
| Leucine                                    | 55.90  | Valine        | 40.38 |

| Vitamins (content per kg DM) |         |
|------------------------------|---------|
| Vitamin E                    | 4.0 mg  |
| Tiamin                       | 1.0 mg  |
| Riboflavin                   | 7.5 mg  |
| Pyridoxine                   | 2.5 mg  |
| Niacin                       | 65.0 mg |
| Biotin                       | 8.0 mg  |
| Vitamin B12                  | 0.04 mg |

*Antioxidant min 150 ppm ethoxyquin added during production.*







## FF Natur

### Protein supplement for salmon farming

FF Natur is a nutritious fish meal product that is targeted at salmon farming. It is used in one of the world's most discerning and salmon consumer-oriented industries, namely the Norwegian.

FF Natur is the closest you can get to salmon's natural food in taste and nutritional values. Made from herring and filleting waste from the herring industry - totally compliant with the requirements for sustainability and welfare. Only natural antioxidants are added to make FF Natur the perfect protein supplement in a balanced feed compound.

FF Natur is primarily supplied in bulk as larger batches - guaranteed salmonella-free.



#### Deklaration:

|         |           |
|---------|-----------|
| Protein | 65 - 72 % |
| Water   | max 10 %  |
| Fat     | max 12 %  |
| Salt    | max 4.5 % |

*500 ppm natural antioxidant added during production.*





## FF Soil Association

Certified as a Soil Association approved protein supplement for use in organic fish feed

FF Soil Association is a nutritious fish meal product that is targeted at organic salmon farming. It is used in one of the world's most discerning and salmon consumer-oriented industries, namely the Norwegian.

FF Soil Association is the closest you can get to salmon's natural food in taste and nutritional values. Made from herring and filleting waste from the herring industry - totally compliant with the requirements for sustainability and welfare. Only natural antioxidants are added to make FF Soil Association the perfect protein supplement in a balanced and ecological feed compound.

FF Soil Association is primarily supplied in bulk as larger batches - guaranteed salmonella-free and approved as an organic protein supplement in the UK and France by the Soil Association.



### Declaration:

|         |           |
|---------|-----------|
| Protein | 65 - 68 % |
| Water   | max 10 %  |
| Fat     | max 12 %  |
| Salt    | max 4.5 % |

500 ppm natural antioxidant added during production.







## FF Naturland Fish Meal

FF Skagen Naturland fishmeal is produced from sustainable trimmings from the fishing industry - approved by the German Naturland as protein supplement in organic farming and aquaculture. Naturland is one of the world's most respected organic brands with more than 53,000 members. The organization works in accordance with organic standards stricter than e.g. the German ecolabel, Bio-Siegel. FF Naturland fishmeal is guaranteed free from salmonella.



The Program Comprises:

### FF Naturland Classic

All-round protein supplement for organic chicken, hens, pigs, eel and shrimp. With high biological value, FF Naturland Classic adds both an improved exploitation of the feed and a better economy. Animals who are fed with FF Naturland Classic achieve a higher daily growth rate due to the high amount of amino acids in the healthy, balanced feed.

### FF Naturland LT

Fishmeal second to none for organic piglets, trout, salmon and mink. FF Naturland LT fishmeal has a high content of proteins and minerals and an unsurpassed high protein digestibility. The result is an extreme growth. FF Naturland LT is especially suitable for the animals' first weeks, during which the feed essentially should be very close the animals' natural feed as possible.

### FF Naturland Special A

Easily digestible nutrient concentrate for organic piglets, salmon and mink. FF Naturland Special A has been bred through a gentle process, which preserves the original qualities of the fish. It is filled with nutritious values, which are very close to the animals' natural feed and has the same high content of essential amino acids and equal unsurpassed digestibility.

### FF Naturland Trimmings

Approved as protein supplement by Naturland and Soil Association. FF Naturland Trimmings is a nutritious fishmeal product targeted organic salmon farming. The product is added natural antioxidants, which make FF Naturland Trimmings a perfect protein supplement to a well-balanced and organic feed. It is, among other places, used in one of the world's most quality conscious salmon industries - namely the Norwegian.

### Declaration:

|         |           |
|---------|-----------|
| Protein | 65-68 %   |
| Water   | Max 10 %  |
| Fat     | Max 12 %  |
| Salt    | Max 4.5 % |

*Added antioxidant min 500 ppm natural antioxidant during production.*







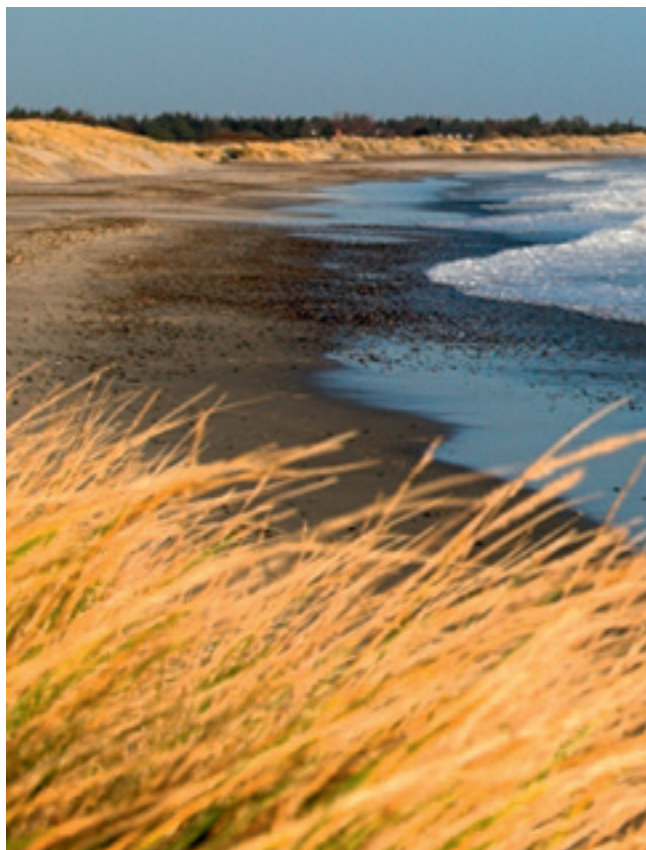
## FF MSC

**Certified as an organic protein supplement by the Soil Association**

FF MSC is a nutritious fish meal product that is targeted at organic salmon farming. It is used in one of the world's most discerning and salmon consumer-oriented industries, namely the Norwegian.

FF MSC is the closest you can get to salmon's natural food in taste and nutritional values. Made from herring and filleting waste from the herring industry - totally compliant with the requirements for sustainability and welfare. Only natural antioxidants are added to make FF MSC the perfect protein supplement in a balanced and ecological feed compound.

FF MSC is primarily supplied in bulk as larger batches - guaranteed salmonella-free and approved as an organic protein supplement in the UK and France by the Soil Association.



### Declaration:

|         |           |
|---------|-----------|
| Protein | 65-68 %   |
| Water   | Max 10 %  |
| Fat     | Max 12 %  |
| Salt    | Max 4.5 % |

*Added antioxidant min 500 ppm Naturox during production.*





# Hanstholm Prime

- all-round protein supplement for chicken, hens, pigs as well as eel and shrimp

Hanstholm Prime is a nutritious all-round fish meal product that is suitable for a wide variety of animal species. Hanstholm Prime combines high biological value with better feed efficiency and greater economy. Animals fed with Hanstholm Prime achieve high daily growth through Hanstholm Prime's significant contribution to amino acid content in the healthy, balanced compound.

Hanstholm Prime is particularly suitable for egg-laying hens as a significant protein source in the production of hatching eggs. For pigs and pregnant sows, Hanstholm Prime's high content of raw fats and varied mineral content results in larger litters, improved viability and increased fertility. Hanstholm Prime is also a good and nutritious feed for eel and shrimp farms, where the biological values and easy digestibility promote a higher daily growth rate.

Hanstholm Prime is guaranteed salmonella-free.



| Chemical composition |           |
|----------------------|-----------|
| Protein              | 70 - 72 % |
| Fat                  | max 12 %  |
| Water                | max 10 %  |
| Salt                 | max 4.5 % |
| Ash                  | 10 - 16 % |

| Minerals (content per kg DM) |          |
|------------------------------|----------|
| Calcium                      | 35.2 g   |
| Phosphorus                   | 23.9 g   |
| Magnesium                    | 2.2 g    |
| Sodium                       | 7.3 g    |
| Potassium                    | 13.0 g   |
| Iron                         | 332.0 mg |
| Manganese                    | 15.0 mg  |
| Copper                       | 5.0 mg   |
| Zinc                         | 106.0 mg |
| Selenium                     | 2.38 mg  |

| Amino acid content mean value in g / kg DM |        |               |       |
|--------------------------------------------|--------|---------------|-------|
| Alanine                                    | 47.55  | Lysine        | 55.90 |
| Arginine                                   | 41.38  | Methionine    | 21.76 |
| Aspartic                                   | 67.93  | Phenylalanine | 27.93 |
| Cystine                                    | 6.29   | Proline       | 30.09 |
| Glutamic acid                              | 101.99 | Serine        | 31.15 |
| Glycine                                    | 45.92  | Threonine     | 30.73 |
| Histidine                                  | 14.94  | Tryptophan    | 7.53  |
| Isoleucin                                  | 3.56   | Tyrosine      | 21.70 |
| Leucine                                    | 55.90  | Valine        | 40.38 |

| Vitamins (content per kg DM) |         |
|------------------------------|---------|
| Vitamin E                    | 4.0 mg  |
| Tiamin                       | 1.0 mg  |
| Riboflavin                   | 7.5 mg  |
| Pyridoxine                   | 2.5 mg  |
| Niacin                       | 65.0 mg |
| Biotin                       | 8.0 mg  |
| Vitamin B12                  | 0.04 mg |

*Antioxidant min 150 ppm ethoxyquin added during production.*



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## FF Golden Oil

Energy efficient supplement for growth, firm meat and healthy, tasty fish

FF Golden Oil is produced from fresh fish. A fast, hygienic and controlled production provides a clean, fresh product with an exceptionally low content of free fatty acids. The very low free fatty acid content increases the appetite of the fish, because the oil both smells good and tastes good - exactly like their natural food: fresh fish.

FF Golden Oil fish oil is a crucial element in the composition of an energy-rich fish food. The oil is the energy in the feed, which, in addition to encouraging rapid growth, simultaneously provides the salmon with the right consistency and the sought-after fat marbling. Golden Oil strengthens the characteristics of adipose tissue as a taste binder - and ensures the optimal tasty end product.



### Declaration:

|                       |           |
|-----------------------|-----------|
| Free Fatty Acids      | 1 - 7 %   |
| Iodine Value          | 140 - 190 |
| Unsaponifiable matter | 1 - 3 %   |
| Moisture & Impurities | <1 %      |

*Antioxidants can be added according to customer demands.*





# FF Golden Oil Soil Association

Organic supplement for healthy fish, certified as a Soil Association approved product

FF Golden Oil Soil Association is produced from 100% trimmings from the fishing industry - approved and certified as ecologically and socially responsible protein supplement from Soil Association, which is one of the world's most respected ecological brands. Soil Association is a UK organic non-profit organization working for sustainable agriculture and aquaculture. Soil Association has over 27,000 members.

FF Golden Oil Soil Association is produced in a fast, hygienic and controlled production, which provides a clean, fresh product with an exceptionally low content of free fatty acids. The very low free fatty acid content increases the appetite of the fish, because the oil both smells good and tastes good - exactly like their natural food: fresh fish.



## Deklaration:

|                       |           |
|-----------------------|-----------|
| Free Fatty Acids      | 1 - 7 %   |
| Lodine Value          | 140 - 190 |
| Unsaponifiable matter | 0 - 3 %   |
| Moisture & Impurities | <1 %      |

*Antioxidants can be added according to customer demands.*







# FF Golden Oil Naturland

FF Golden Oil Naturland is produced from sustainable trimmings from the fishing industry. The products is approved by the German Naturland as protein supplement in organic farming and aquaculture. Naturland is one of the world's most respected organic brands with more than 53,000 members. The Organization works in accordance with organic standards stricter than e.g. the German ecolabel, Bio-Siegel.

FF Golden Oil Naturland is produced in a fast, hygienic and controlled production, which provides a clean, fresh product with an exceptionally low content of free fatty acids. The very low free fatty acid content increases the appetite of the fish, because the oil both smells good and tastes good - exactly like their natural food: fresh fish.



| Declaration:            |           |
|-------------------------|-----------|
| Free Fatty Acids        | 1 - 7 %   |
| Iodine Value            | 140 - 190 |
| Unsaponifiable matter   | 0 - 3 %   |
| Moisture and Impurities | <1 %      |
|                         |           |
|                         |           |

*Natural antioxidants can be added according to customer demands.*



# Analyses Fish Meal

LT Supreme - NSM/Special A - Classic - Natur

## Biogenic Amine Analyses of FF Skagen Fish Meal

| Biogenic Amines ppm | No. Of samples | Average | Minimum | Max  | Standard Deviation |
|---------------------|----------------|---------|---------|------|--------------------|
| Agmatine            | 88             | 182     | 26      | 2213 | 221                |
| Cadaverine          | 88             | 1502    | 174     | 4138 | 858                |
| Histamine           | 88             | 114     | 11      | 1278 | 156                |
| Putrescine          | 88             | 599     | 44      | 1878 | 370                |
| Tyramine            | 88             | 727     | 55      | 1907 | 466                |

TVN average 2009: 33,23 in the raw material. TVN average 2010: 38,00. TVN average 2012: 39,61

The samples have been analysed at the FF lab

## Minerals

| Tobis              | Calcium %  | Phosphorus% | Magnesium% | Potassium % | Sodium %   | Manganese mg/kg | Zinc mg/kg | Copper mg/kg | Iron mg/kg   |
|--------------------|------------|-------------|------------|-------------|------------|-----------------|------------|--------------|--------------|
| 8010-99229 & 92742 | 1.9        | 2.2         | 0.22       | 1.8         | 1.2        | 6               | 110        | 5            | 100          |
| 8010-99229 & 92742 | 1.7        | 2.2         | 0.23       | 1.7         | 1.4        | 6               | 110        | 5            | 96           |
| 8010-99229 & 92742 | 1.8        | 2.2         | 0.20       | 1.7         | 1.0        | 7               | 110        | 5            | 110          |
| 8010-99229 & 92742 | 2.2        | 2.3         | 0.21       | 1.6         | 1.0        | 8               | 110        | <5           | 110          |
| 8010-99229 & 92742 | 2.0        | 2.2         | 0.22       | 1.6         | 1.3        | 8               | 110        | <5           | 120          |
| <b>Average</b>     | <b>1.9</b> | <b>2.2</b>  | <b>0.2</b> | <b>1.7</b>  | <b>1.2</b> | <b>7.0</b>      | <b>110</b> | <b>3.0</b>   | <b>107.2</b> |

| Brisling           |             |             |              |            |              |             |            |            |            |
|--------------------|-------------|-------------|--------------|------------|--------------|-------------|------------|------------|------------|
| 8010-99229 & 92742 | 2.1         | 2.1         | 0.18         | 1.5        | 0.85         | 11          | 120        | 6          | 190        |
| 8010-99229 & 92742 | 2.2         | 2.1         | 0.17         | 1.5        | 0.68         | 10          | 120        | <5         | 130        |
| 8010-99229 & 92742 | 2.4         | 2.2         | 0.18         | 1.5        | 0.78         | 11          | 120        | 5          | 150        |
| 8010-99229 & 92742 | 2.2         | 2.1         | 0.17         | 1.6        | 0.66         | 11          | 120        | 5          | 150        |
|                    | 2.2         | 2.1         | 0.17         | 1.4        | 0.74         | 10          | 110        | 5          | 120        |
| <b>Average</b>     | <b>2.22</b> | <b>2.12</b> | <b>0.174</b> | <b>1.5</b> | <b>0.742</b> | <b>10.6</b> | <b>118</b> | <b>4.2</b> | <b>148</b> |

| Blue Whiting       |             |            |              |             |            |            |             |            |            |
|--------------------|-------------|------------|--------------|-------------|------------|------------|-------------|------------|------------|
| 8010-99229 & 92742 | 2.9         | 2.3        | 0.23         | 1.3         | 1.4        | 7          | 110         | 6          | 110        |
| 8010-99229 & 92742 | 3.7         | 2.6        | 0.25         | 1.3         | 1.2        | 5          | 78          | 5          | 100        |
| 8010-99229 & 92742 | 3.8         | 2.6        | 0.18         | 1.4         | 1.0        | 5          | 68          | <5         | 120        |
| 8010-99229 & 92742 | 3.5         | 2.6        | 0.27         | 1.3         | 1.3        | 7          | 100         | 6          | 110        |
| 8010-99229 & 92742 | 4.2         | 2.9        | 0.20         | 1.5         | 1.1        | 5          | 62          | 5          | 150        |
| <b>Average</b>     | <b>3.62</b> | <b>2.6</b> | <b>0.226</b> | <b>1.36</b> | <b>1.2</b> | <b>5.8</b> | <b>83.6</b> | <b>4.4</b> | <b>118</b> |

| Boar               |            |            |            |            |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 8010-99229 & 92742 | 5.6        | 3.4        | 0.7        | 0.74       | 2.4        | 11         | 120        | <5         | 570        |
| 8010-99229 & 92742 | 6.0        | 3.5        | 0.51       | 0.74       | 3.8        | 8          | 110        | <5         | 210        |
| <b>Average</b>     | <b>5.8</b> | <b>3.5</b> | <b>0.4</b> | <b>0.7</b> | <b>3.1</b> | <b>9.5</b> | <b>115</b> | <b>0.0</b> | <b>390</b> |

| Trimblings         |             |             |              |            |              |          |            |            |            |
|--------------------|-------------|-------------|--------------|------------|--------------|----------|------------|------------|------------|
| 8010-99229 & 92742 | 2.3         | 2.2         | 0.16         | 1.1        | 0.86         | 8        | 100        | <5         | 190        |
| 8010-99229 & 92742 | 2.6         | 2.5         | 0.17         | 1.8        | 0.88         | 9        | 120        | <5         | 160        |
| 8010-99229 & 92742 | 3.0         | 2.5         | 0.22         | 1.6        | 1.3          | 9        | 97         | 6          | 180        |
| 8010-99229 & 92742 | 2.6         | 2.5         | 0.14         | 1.7        | 0.72         | 10       | 98         | 6          | 140        |
| 8010-99229 & 92742 | 2.1         | 2.2         | 0.17         | 1.8        | 0.91         | 9        | 120        | 5          | 130        |
| <b>Average</b>     | <b>2.52</b> | <b>2.38</b> | <b>0.172</b> | <b>1.6</b> | <b>0.934</b> | <b>9</b> | <b>107</b> | <b>3.4</b> | <b>160</b> |

The samples have been analysed at Eurofins / Steins







## Vitamins

| Tobis - g/100g |              | Aspartic acid | Threo nine | Serine | Glumatic acid | Proline | Glycine | Alanine | Valine | Iso- Leucine |
|----------------|--------------|---------------|------------|--------|---------------|---------|---------|---------|--------|--------------|
| 100601M        | TBS/ETH 15/4 | 5.91          | 2.78       | 2.66   | 8.58          | 2.6     | 4.26    | 4.11    | 3.23   | 2.66         |
| 100602M        | TBS 22/4     | 5.63          | 2.71       | 2.43   | 8.09          | 2.3     | 3.79    | 3.84    | 3.21   | 2.74         |
| 100603M        | TBS/ETH 26/4 | 6.27          | 2.97       | 2.78   | 8.89          | 2.6     | 4.02    | 4.2     | 3.48   | 2.92         |
| 100604M        | TBS/ETH 3/5  | 5.52          | 2.77       | 2.45   | 8.31          | 2.43    | 3.67    | 4       | 3.2    | 2.7          |
| 100605M        | TBS/ETH 11/5 | 5.91          | 2.76       | 2.54   | 8.37          | 2.61    | 3.92    | 4.04    | 3.34   | 2.84         |
| 100606M        | TBS/NAT 22/5 | 6.43          | 2.99       | 2.71   | 8.91          | 2.74    | 3.94    | 4.38    | 3.71   | 3.18         |
| 100607M        | TBS 5/6      | 6.4           | 2.97       | 2.79   | 9.05          | 2.55    | 3.88    | 4.12    | 3.5    | 3.02         |
| 100608M        | TBS/NAT 8/6  | 6.58          | 3.05       | 2.9    | 9.33          | 2.81    | 4.12    | 4.35    | 3.64   | 3.1          |
| Average        |              | 6.081         | 2.875      | 2.658  | 8.691         | 2.58    | 3.95    | 4.13    | 3.414  | 2.895        |

|         |              | Leucine | Tyrosine | Phenyl-<br>alanine | Histi-<br>dine | Lysine | Arginine | Trypto-<br>phan | Cystein+<br>Cystine | Methi-<br>onine | Ornithine |
|---------|--------------|---------|----------|--------------------|----------------|--------|----------|-----------------|---------------------|-----------------|-----------|
| 100601M | TBS/ETH 15/4 | 4.8     | 2.08     | 2.54               | 1.35           | 4.87   | 3.78     | 0.702           | 0.547               | 1.9             | 0.05      |
| 100602M | TBS 22/4     | 4.66    | 2.08     | 2.54               | 1.26           | 4.59   | 3.39     | 0.676           | 0.558               | 1.88            | 0.090     |
| 100603M | TBS/ETH 26/4 | 5.11    | 2.18     | 2.7                | 1.4            | 5.12   | 4        | 0.761           | 0.572               | 2.06            | 0.031     |
| 100604M | TBS/ETH 3/5  | 4.84    | 1.71     | 2.42               | 1.19           | 4.2    | 3.2      | 0.615           | 0.478               | 1.86            | 0.182     |
| 100605M | TBS/ETH 11/5 | 4.9     | 2.03     | 2.54               | 1.34           | 4.83   | 3.58     | 0.744           | 0.587               | 1.96            | 0.056     |
| 100606M | TBS/NAT 22/5 | 5.46    | 2.24     | 2.87               | 1.45           | 5.19   | 3.74     | 0.77            | 0.562               | 2.17            | 0.084     |
| 100607M | TBS 5/6      | 5.18    | 2.26     | 2.71               | 1.49           | 5.37   | 3.89     | 0.778           | 0.655               | 2.09            | 0.053     |
| 100608M | TBS/NAT 8/6  | 5.36    | 2.38     | 2.75               | 1.52           | 5.4    | 4.09     | 0.785           | 0.613               | 2.11            | 0.035     |
| Average |              | 5.039   | 2.12     | 2.634              | 1.375          | 4.946  | 3.709    | 0.729           | 0.572               | 2.004           | 0.073     |

| Brisling - g/100g |              | Aspartic acid | Threo nine | Serine | Glumatic acid | Proline | Glycine | Alanine | Valine | Iso- Leucine |
|-------------------|--------------|---------------|------------|--------|---------------|---------|---------|---------|--------|--------------|
| 100609M           | ØBR/NAT 20/3 | 6.61          | 3.04       | 2.87   | 9.18          | 2.88    | 4.27    | 4.46    | 3.64   | 2.99         |
| 100610M           | ØBR/NAT 28/3 | 6.48          | 3          | 2.82   | 9.27          | 2.94    | 4.21    | 4.47    | 3.52   | 2.9          |
| 100611M           | ØBR/ETH 5/4  | 6.79          | 3.15       | 2.83   | 9.76          | 2.95    | 4.26    | 4.68    | 3.79   | 3.16         |
| 100612M           | ØBR/NAT 25/4 | 6.06          | 2.8        | 2.54   | 8.65          | 2.65    | 3.86    | 4.16    | 3.43   | 2.83         |
| 100613M           | ØBR/NAT 27/4 | 5.8           | 2.76       | 2.6    | 8.42          | 2.57    | 3.92    | 4.03    | 3.22   | 2.61         |
| 100614M           | ØBR/ETH 2/5  | 6.4           | 3.03       | 2.71   | 9.16          |         | 3.98    | 4.43    | 3.64   | 3.02         |
| 100615M           | ØBR/ETH 16/5 | 6.49          | 3          | 2.73   | 9.19          | 2.8     | 4.3     | 4.49    | 3.64   | 3.02         |
| 100616M           | ØBR/ETH 15/5 | 6.38          | 3          | 2.8    | 8.99          | 2.77    | 4.17    | 4.36    | 3.51   | 2.96         |
| Average           |              | 6.376         | 2.973      | 2.738  | 9.078         | 2.794   | 4.121   | 4.385   | 3.549  | 2.936        |

|         |              | Leucine | Tyrosine | Phenyl-<br>alanine | Histi-<br>dine | Lysine | Arginine | Trypto-<br>phan | Cystein+<br>Cystine | Methi-<br>onine | Ornithine |
|---------|--------------|---------|----------|--------------------|----------------|--------|----------|-----------------|---------------------|-----------------|-----------|
| 100609M | ØBR/NAT 20/3 | 5.32    | 2.42     | 2.84               | 1.58           | 5.63   | 4.35     | 0.812           | 0.664               | 2.12            | 0.019     |
| 100610M | ØBR/NAT 28/3 | 5.29    | 2.3      | 2.82               | 1.59           | 5.62   | 4.27     | 0.799           | 0.652               | 2.02            | 0.022     |
| 100611M | ØBR/ETH 5/4  | 5.61    | 2.49     | 2.9                | 1.75           | 5.9    | 4.37     | 0.841           | 0.641               | 2.25            | 0.03      |
| 100612M | ØBR/NAT 25/4 | 5.03    | 2.22     | 2.63               | 1.41           | 5.13   | 3.93     | 0.749           | 0.535               | 1.97            | 0.025     |
| 100613M | ØBR/NAT 27/4 | 4.8     | 2.08     | 2.42               | 1.31           | 4.92   | 3.86     | 0.7             | 0.598               | 1.85            | 0.038     |
| 100614M | ØBR/ETH 2/5  | 5.36    | 2.45     | 2.91               | 1.58           | 5.54   | 4.02     | 0.832           | 0.622               | 2.13            | 0.039     |
| 100615M | ØBR/ETH 16/5 | 5.35    | 2.36     | 2.88               | 1.52           | 5.5    | 4.21     | 0.808           | 0.631               | 2.16            | 0.048     |
| 100616M | ØBR/ETH 15/5 | 5.33    | 2.34     | 2.79               | 1.42           | 5.37   | 4.16     | 0.801           | 0.62                | 2.08            | 0.043     |
| Average |              | 5.261   | 2.333    | 2.774              | 1.52           | 5.451  | 4.146    | 0.793           | 0.620               | 2.073           | 0.033     |

The samples have been analysed at the FF lab



# Analyses Fish Meal & Fish Oil

LT Supreme - NSM/Special A - Classic - Natur - Golden Oil

## Elements

|             |                   | No. of analyses | Average | Maximum | Minimum | LOQ  | Limiting values |          |            |            |
|-------------|-------------------|-----------------|---------|---------|---------|------|-----------------|----------|------------|------------|
| Atomic mass | Unit              |                 |         |         |         |      | Fish meal       | Fish oil | Fish feeds | Full feeds |
| 9           | Fluorine          | mg/kg           | 40      | 24      | 65      | 9    | 10              | 500      | 350        | 150        |
| 33          | Arsenic total     | mg/kg           | 40      | 6       | 12.8    | 1.3  |                 | 25       | 10         | 2          |
| 33          | Arsenic inorganic | mg/kg           | na      | na      | na      | na   |                 | 2        | 2          |            |
| 34          | Selenium          | mg/kg           | 6       | 3.2     |         |      | Old data        |          |            |            |
| 48          | Cadmium           | mg/kg           | 40      | 0.2     | 0.5     | 0.02 |                 | 2        | 1          | 0.1        |
| 80          | Mercury           | mg/kg           | 40      | 0.07    | 0.15    | 0.01 |                 | 0.5      | 0.2        | 5          |
| 82          | Lead              | mg/kg           | 40      | 1.3     | 6.3     | 0.05 |                 | 10       |            |            |

## Vitamins

|           |       |    |    |    |    |  |  |  |      |  |
|-----------|-------|----|----|----|----|--|--|--|------|--|
| Vitamin D | IE/kg | na | na | na | na |  |  |  | 3000 |  |
|-----------|-------|----|----|----|----|--|--|--|------|--|

## Organic matters

|                                                 |                   |    |       |       |       |       |  |      |      |    |
|-------------------------------------------------|-------------------|----|-------|-------|-------|-------|--|------|------|----|
| Nitrite (Na-nitrite)                            | mg/kg             | 40 | 1.6   | 9     | 0.1   |       |  | 60   |      | 15 |
| Toxaphene (Chlorcampher) (26,50,62,sum)         | mg/kg             | 30 |       |       |       |       |  | 0.02 | 0.2  |    |
|                                                 | 26 mg/kg          |    | 0.02  | 0.02  | 0.01  |       |  | 0.02 | 0.2  |    |
|                                                 | 50 mg/kg          |    | 0.02  | 0.02  | 0.01  |       |  | 0.02 | 0.2  |    |
|                                                 | 62 mg/kg          |    | 0.02  | 0.02  | 0.01  |       |  | 0.02 | 0.2  |    |
|                                                 | sum mg/kg         |    | 0.06  | 0.1   | 0.01  |       |  | 0.02 | 0.2  |    |
| Aldrin                                          | mg/kg             | 30 | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.01 | 0.1  |    |
| Dieldrin                                        | mg/kg             | 30 | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.01 | 0.1  |    |
| DDD                                             | O,p mg/kg         | 30 | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.05 | 0.5  |    |
|                                                 | P,p mg/kg         |    | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.05 | 0.5  |    |
| DDE                                             | mg/kg             | 30 |       |       |       |       |  | 0.05 | 0.5  |    |
|                                                 | O,p mg/kg         |    | 0.005 | 0.005 | 0.005 |       |  | 0.05 | 0.5  |    |
|                                                 | P,p mg/kg         |    | 0.006 | 0.006 | 0.005 |       |  | 0.05 | 0.5  |    |
|                                                 | sum mg/kg         |    |       |       |       |       |  | 0.05 | 0.5  |    |
| DDT (sum af DDT +TDD+DDE isomere)               | mg/kg             |    |       |       |       |       |  | 0.05 | 0.5  |    |
|                                                 | O,p mg/kg         | 30 | 0.005 | 0.005 | 0.005 |       |  | 0.05 | 0.5  |    |
|                                                 | P,p mg/kg         |    | 0.005 | 0.005 | 0.005 |       |  | 0.05 | 0.5  |    |
|                                                 | sum mg/kg         |    |       |       |       |       |  | 0.05 | 0.5  |    |
| Chlordane (gamma/trans - Alphe/cis - Oxi - Sum) | mg/kg             |    |       |       |       |       |  | 0.02 | 0.05 |    |
|                                                 | Gamma/trans mg/kg | 30 | 0.006 | 0.015 | 0.005 | 0.005 |  | 0.02 | 0.05 |    |
|                                                 | Alpha/cis mg/kg   |    | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.02 | 0.05 |    |
|                                                 | Oxi mg/kg         |    | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.02 | 0.05 |    |
|                                                 | sum mg/kg         |    |       |       |       |       |  | 0,02 | 0.05 |    |
| Endosulphane (Alpha - Beta - Sulphate - sum)    | mg/kg             |    |       |       |       |       |  | 0.1  | 0.05 |    |
|                                                 | Alpha mg/kg       | 30 | 0.01  | 0.01  | 0.01  | 0.01  |  | 0.1  | 0.05 |    |
|                                                 | Beta mg/kg        |    | 0.01  | 0.01  | 0.01  | 0.01  |  | 0.1  | 0.05 |    |
|                                                 | Sulphate mg/kg    |    | 0.02  | 0.02  | 0.02  | 0.02  |  | 0.1  | 0.05 |    |
|                                                 | sum mg/kg         |    |       |       |       |       |  | 0.1  | 0.05 |    |

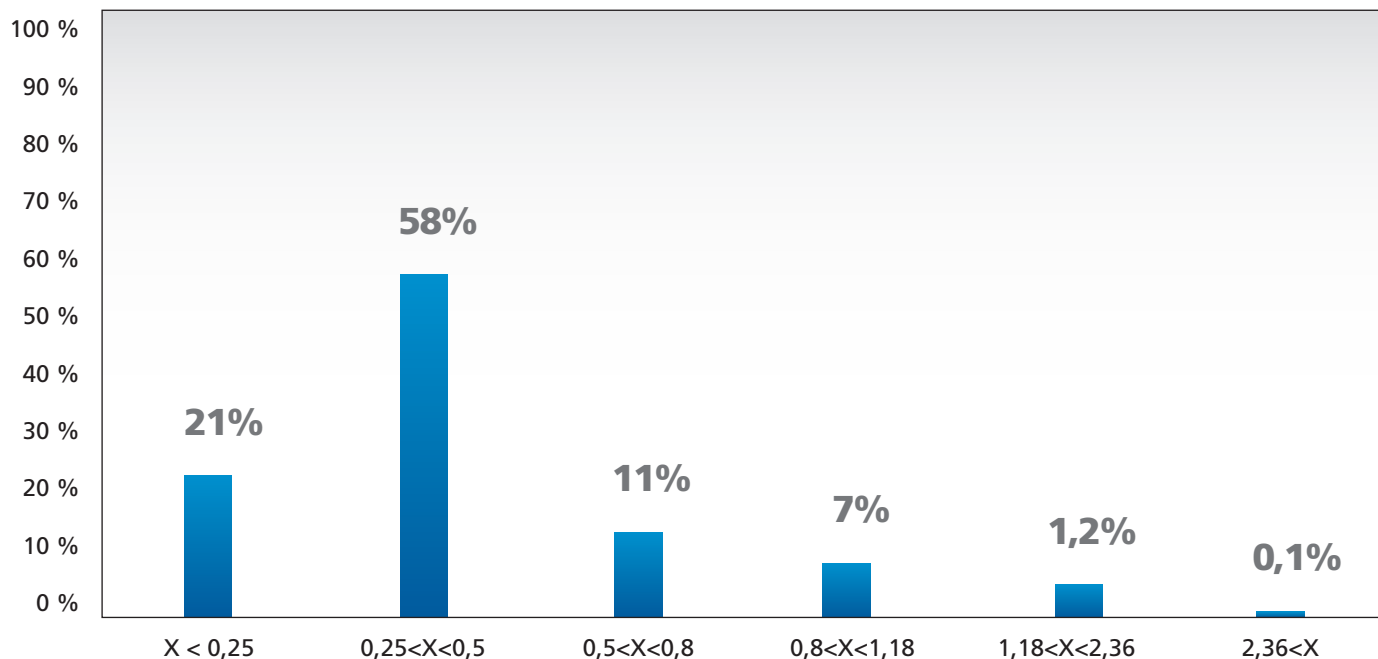






|                                                            |       | No. of analyses | Average | Maximum | Minimum | LOQ   | Limiting values |          |
|------------------------------------------------------------|-------|-----------------|---------|---------|---------|-------|-----------------|----------|
| Atomic mass                                                | Unit  |                 |         |         |         |       | Fish meal       | Fish oil |
| Edrin                                                      | mg/kg | 30              | 0.01    | 0.01    | 0.01    | 0.01  | 0.01            | 0.05     |
| Heptachlor                                                 | mg/kg | 30              | 0.005   | 0.005   | 0.005   | 0.005 | 0.01            | 0.2      |
| HCB Hexachlorbenzene                                       | mg/kg | 30              | 0.005   | 0.005   | 0.005   | 0.005 | 0.01            | 0.2      |
| HCH (Hexachlorcyclohexane) alpha isomers                   | mg/kg |                 |         |         |         |       | 0.02            | 0.2      |
| HCH Alpha                                                  | mg/kg | 30              | 0.005   | 0.01    | 0.005   | 0.005 | 0.01            | 0,1      |
| HCH Beta                                                   |       |                 | 0.007   | 0.01    | 0.005   | 0.01  |                 |          |
| HCH Gamma/lindane                                          | mg/kg |                 | 0.05    | 0.05    | 0.05    | 0.005 | 0.2             | 2        |
| Chloramphenicol                                            | µg/kg | 15              | nd      |         |         | 0.1   |                 |          |
| PAH (measured as benzo(a)pyrene)                           | µg/kg | 30              | na      |         |         |       |                 |          |
| Dioxin                                                     | ng/kg | 1500            | 0.71    |         |         |       | 1.25            | 6        |
| PCB                                                        | ng/kg | 1500            | 0.59    |         |         |       | 3.25            | 18       |
| NDL-PCB                                                    | µg/kg | 174             | 12      |         |         |       | 30              | 175      |
| Brominated flame retardants (BFRs)                         |       |                 | na      |         |         |       |                 |          |
| Perfluorinated compounds: PFOS, PFOA and related compounds |       |                 | na      |         |         |       |                 |          |

## Average particle size of FF Skagen fish meal







## Certified quality and feed safety



FF Skagen is certified and continuously evaluated according to a number of different standards from the ISO family: DS/EN ISO 9001:2015 (quality), DS/EN ISO 14001:2015 (environment). The certificates are issued by DNV-GL.



The Marine Stewardship Council (MSC) is an independent international eco-label for "sustainable fishing methods". Fish with the blue MSC eco-label is a guarantee that the company operates in an environmentally sustainable manner and does not contribute to the global environmental problem of overfishing. The certificate is issued by Det Norske Veritas (DNV).



FF Skagen is IFFO RS certified according to the "Global Standard and Certification Programme for the Responsible Supply of Fish Meal and Fish Oil". The certificate demonstrates FF Skagen's commitment to responsible practice in all areas of feed safety, raw material procurement and delivery.



FF Skagen is certified according to the Soil Association, a British eco-label whose purpose is to protect the environment and promote sustainability. The Soil Association label guarantees that the product - in addition to living up to the ecological requirements of the EU - also meets additional, enhanced ethical, ecological and sustainability standards.



FF Skagen is a member of the Federation of Oils, Seeds and Fats Associations (FOSFA), a union of international traders in oil, seeds and fats. FOSFA International has more than 900 members in 77 countries and sets contract formulation standards.



FF Skagen Naturland fish meal is certified as ecologically and socially responsible protein supplement from Naturland, which is one of the world's most respected ecological brands. Naturland has more than 53,000 members and work in accordance with organic standards which is stricter than e.g. the German ecolabel, Bio-Siegel.



FF Skagen's food safety certification, GMP+ B1 (HACCP) is defined based on standards set by the FDA (the U.S. Food and Drug Administration), the WHO (the World Health Organisation) and the EU. The GMP+ B1 includes production, trading and service.





# Special products FF Skagen know how...



FF Skagen also develops and manufactures custom-made special products that match the individual needs for e.g. nutritional content, protein digestibility, binding capacity etc. In our advanced production plant, we can give meal and oil products different properties so that the special product is targeted at specific needs and requirements.

An effective control system ensures a final product that meets the agreed specifications 100%. We take sealed samples of all supplies for any possible subsequent analysis by the accredited laboratory of the customer's choice.

