Garware Technical Fibres Ltd.

Pune, India

User Manual – Aquaculture Net

Year 2023

Garware Technical Fibres Ltd.

(Formerly Garware-Wall Ropes LTD.)

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1) Introduction

GARWARE TECHNICAL FIBRES LTD. is having corporate office at Pune, India & manufacturing facilities one located at Wai (Satara) & other at Pune (North of Mumbai). GARWARE TECHNICAL FIBRES LTD. also having sales & distribution offices at Mumbai and other cities in India.

The company is ISO 9001:2015, ISO14001:2015 & ISO 27001:2013 certified by accredited bodies of ISO.

GARWARE TECHNICAL FIBRES LTD. is having well laid out Quality Management System (QMS), is maintained throughout all the stages of manufacturing & is monitored by technically qualified and experienced staff. QMS ensures consistent quality the FIRST TIME! EVERY TIME!!

GARWARE TECHNICAL FIBRES LTD. is having well equipped In-house testing Laboratories for consistent quality production at various stages as well as for finished products

To meet the objective of continuously improving and widening our product range, we have a setup of a full-fledged Research and Development Centre, recognized by the Department of Science & Technology, Government of India

In our constant endeavor to improve existing products and to meet stringent requirements of domestic as well as overseas clients, our R & D has been continuously developing application focused new products

GARWARE TECHNICAL FIBRES LTD., Wai manufactures wide range of products catering to Fishing, Sports, Aquaculture, defence, transportation and Agriculture.

These products are made mainly from High Density Polyethylene (HDPE), Nylon, Polyester, Polypropylene, UHMPE etc. polymers. Based on the application, suitable grades of HDPE polymers being used in manufacturing high quality yarns, twines, ropes & nets. As these are made in-house consistent quality is maintained throughout the manufacturing process.

The main applications of our products are in

a) Fisheries sector
b) Sports Sector
c) Aquaculture Sector
d) Industrial Sector
e) Agricultural Sector
f) Transport
g) Material storage

The manufacturing and testing is done on sophisticated and modern equipments, so as to be in conformance with the requirements of our valued customers. This infrastructure is backed up by qualified and well-trained work force.

Out of total production, approximately 60% are exported to about 75+ countries around the world.

The customers span the entire globe and are from countries like Denmark, United Kingdom, Germany, Spain, France, Australia, United Arab Emirates, South Africa, Italy, Canada, Norway, and United States of America etc.

1.1) Why Net from GTFL

Garware Technical Fibres Ltd. (GTFL) formerly Garware-Wall Ropes Ltd. is one of India's leading players in the Technical Textiles sector. Established in 1976, the company today is a multi-divisional, multi-geographical technical textiles company and is known for providing world class innovative solutions in high performance Aquaculture nets, Fishing nets, Sports nets, Safety nets, Agricultural nets, Coated fabrics, Polymer ropes and Geo Textiles.

Our mission is to provide innovative, application focused solutions to enhance value of our customers globally.

A Net is a very important & main component of an aquaculture farming facility, and it will help to contribute to good and efficient production of fish. At the same time, it is a significant component that will prevent escape of fish from farm facility. The Net must therefore be treated correctly and within the tolerance limits for which it is designed. Inspection and maintenance must be carried out according to recommended routines.

GTFL's aim is to manufacture nets of good quality and durable. In this user manual we have described how these nets should be handled.

This user manual is available on our website, https://garwarefibres.com It applies to all nets produced by GTFL. The main purpose of the user handbook is to provide users with clear and simple guidance on the safe installation and use of main components and extra equipment in order to prevent the escape of fish.

The user manual has been written down with the aim of meeting the requirements given in NS 9415:2021 and the NYTEK regulations.

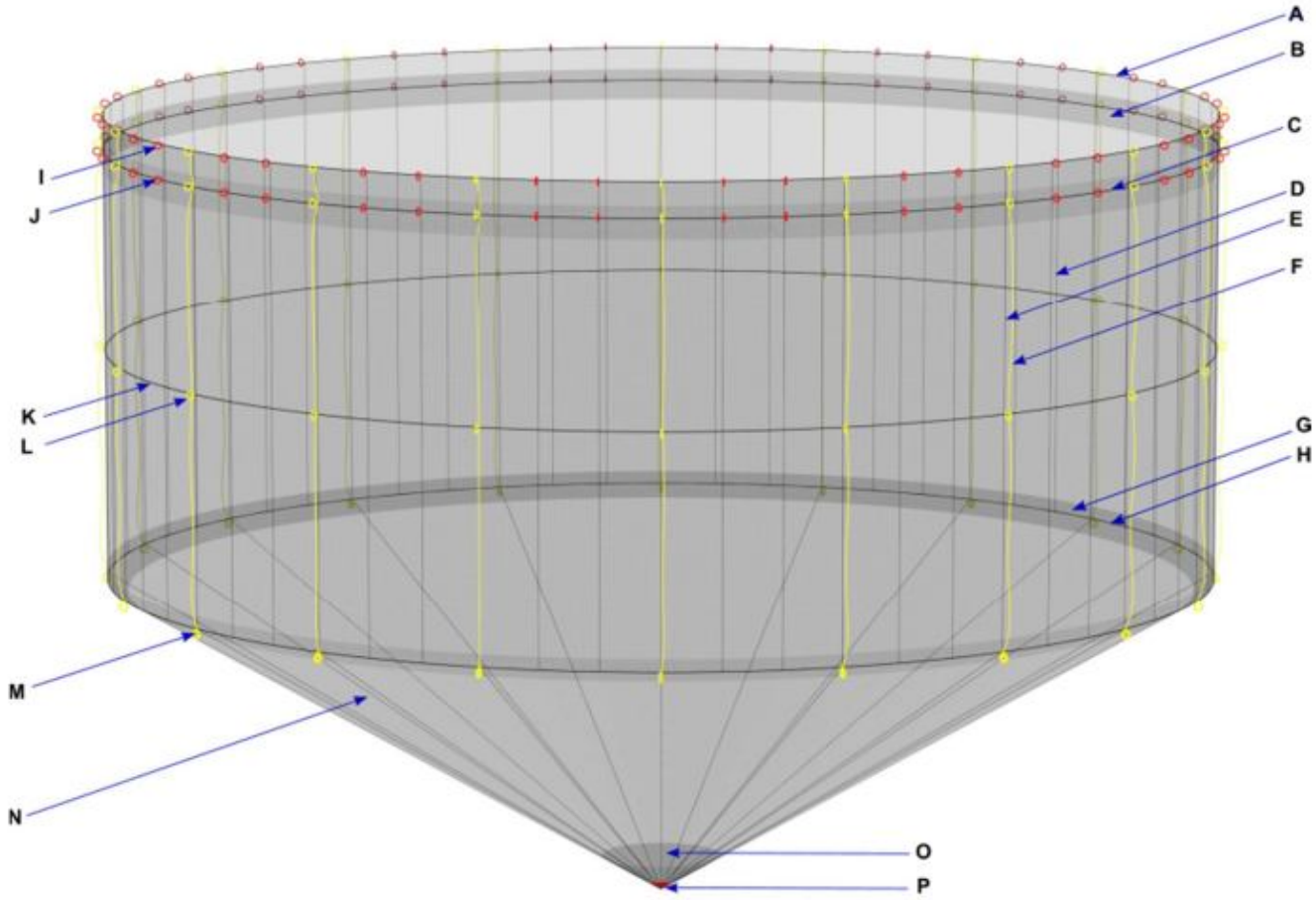
Changes from the previous revision are highlighted in chapter no.10.

Together we will contribute to environmental friendly fish farming and sustainable growth of the industry that produces safe and healthy seafood for the global population.

2) Description of the component and its constituent parts

In this chapter description of components, its key constituent parts & its mode of operation explained

Fig.1 – Net & its constituent Parts



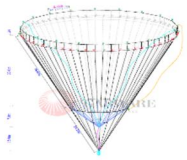
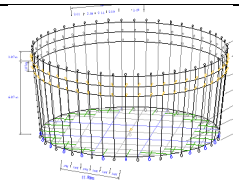
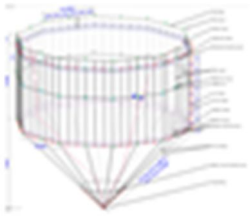
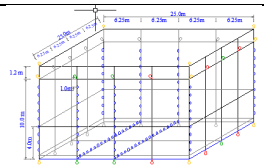
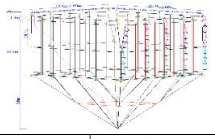
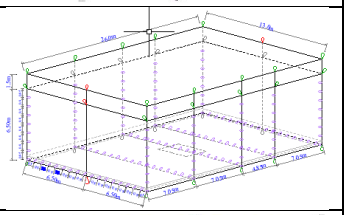
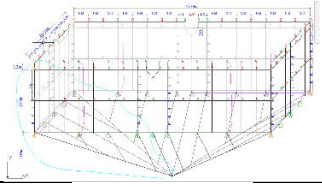
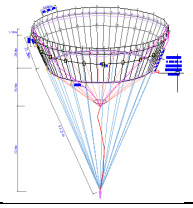
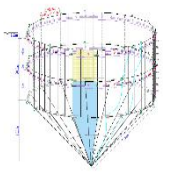
Key

A	Top rope (structural element)
B	Waterline reinforcement area
C	Main rope (structural element)
D	Vertical rope (structural element)
E	Lifting rope – vertical rope connected to a cross rope (structural element)
F	Haul rope (non-structural element)
G	Reinforcement area at side-to-bottom transition
H	Bottom rope (structural element)
I	Loop on top rope
J	Loop on main rope (attachment point)
K	Waistrope
L	Loop on waistrope
M	Loop on bottom rope (attachment point)
N	Cross rope (structural element)
O	Bottom reinforcement area
P	Bottom centre

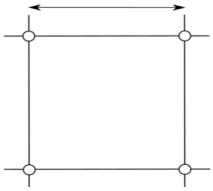
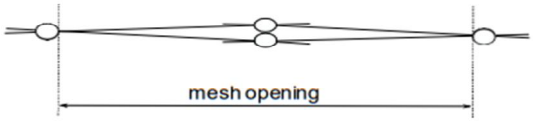
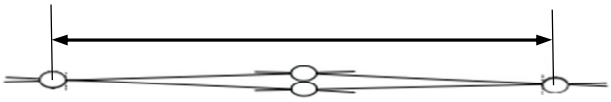
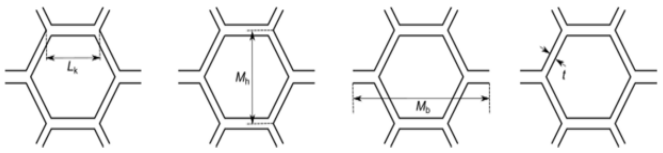
2.1.0) Definitions of components

Key	Term	Definition
A	Top rope (structural element)	Uppermost horizontal rope in a net
B	Waterline reinforcement area	Area at waterline protected by additional netting layer
C	Main rope (structural element)	Horizontal Rope along the waterline
D	Vertical rope (structural element)	Vertical rope in a net which takes load coming on the netting
E	Lifting rope – vertical rope connected to a cross rope (structural element)	Vertical rope connected to cross rope used for lifting
F	Haul rope (non-structural element)	Rope runs parallel to lifting rope, bottom connected to Pen bottom line loop and threaded through guide rings on lifting rope
G	Reinforcement area at side-to-bottom transition	Additional layer of netting along the bottom line which protects wear of netting.
H	Bottom rope (structural element)	Rope line which runs along the Wall and Base panel joint which aligns vertical and cross ropes.
I	Loop on top rope	Connection point which is used to hang jump fence on to hand rail
J	Loop on main rope (attachment point)	Connection point which is used hang net on to floating collar at water line.
K	Waist rope	Horizontal rope runs in the middle of the wall panel which aligns all vertical ropes in the middle.
L	Loop on waist rope	Connection at middle of the wall panel used for lifting Pen waist rope up to the water line
M	Loop on bottom rope (attachment point)	Connection points used for stretch system and for lifting bottom line to the water level
N	Cross rope (structural element)	Rope which runs radially into the base centre and centre to the opposite periphery
O	Bottom reinforcement area	Additional layer netting in the base centre which bears load from centre weight and lift up system weights
P	Bottom centre	Centre point of the base where all cross ropes meets.

2.1.1) Types of Net

Code	Pen Type	Drawing
GCC	Circular Conical	
GCF	Cylinder with flat base	
GCB	Cylinder with cone base	
GSF	Square with flat base	
GSC	Square with conical base	
GRF	Rectangle with flat base	
GRC	Rectangle with conical base	
GSPC	Spaghetti Pens	
GCCN	Cylinder with combi net	

2.1.2) Mesh definitions

Sr.No.	Mesh Type	Measurement	Schematic Diagram
1	Square mesh side	The mesh side is determined by measuring the length of over at least 10 meshes & dividing this measurement by number of meshes measured. Mesh side shall be measured in three different places on the netting and specified as the mean value of the measurements. The value is the rounded to the nearest half millimetre.	
2	Mesh Opening (Inside Full mesh)	Mesh opening is determined by the measuring the inside distance of the two opposite knots in machine direction for knotless & cross machine direction in knotted nets in stretch condition. Mesh opening shall be measured in 10 meshes in different places on the netting and specified as the mean value of the measurements	
3	Knot To Knot (Knot to knot full mesh)	Mesh size is determined by measuring from the centre distance of the two opposite knots in machine direction for knotless & cross machine direction in knotted nets in stretch condition. The Full mesh side is determined by measuring the length of over at least 5 meshes & dividing this measurement by number of meshes measured.	
4	Hexagonal mesh	Out of total 6 sides the two sides with twice the quantity of twine volume are referred to as a 'knots' while the remaining sides are referred to as legs. Knot length – L_k refer fig1 Mesh height M_h refer fig 2 Mesh Width M_b refer fig 3 Twine diameter t refer fig 4	Fig 1 Fig 2 Fig 3 Fig 4 

2.2) Assumptions & limitation in use

Nets from GTFL are manufactured and certified for fish farming. The Pen must not be used for any purpose other than fish farming. Mesh size in the net must be adapted to the fish it is intended for and it must prevent small fish from escaping through the mesh in an intact net.

Throughout its lifetime, the Net must have a residual strength in the net panel that satisfies the requirements as per NS 9415. A Net that no longer satisfies the requirements for strength must not be used for farming fish.

While designing the net it is assumed that the interacting components are designed well above the capacity of the net. In a total system, the component that is designed according to the highest environmental requirements will be indicative for approval of the total system. For example, a flotation collar may be approved to withstand larger waves and current conditions than a net.

A heavily fouled net will cause increased strain on the net, buoyancy collar and mooring, as well as a poorer supply of oxygen to the fish. The net is adapted to the buoyancy collar so that the Pen stands correctly in the sea.
The design of extra equipment and other playing systems are adapted to the net.

In case the Fish farmer has supplied the design then it is assumed that the farmer has already analysed & validated for ultimate limit stress & accidental limit stress from NS 9415 accredited agency.

2.3) The maximum allowable loads & load distribution

The largest loads applied to the net normally occur in the attachment to the floating collar.

These are therefore important checkpoints during routine and special inspections by Fish farmer. Another critical point is when installing and using the Total Farm System (additional equipment).
The load applied to the net varies greatly with current and wave conditions at the site, as well as the type of deployment system used. Incorrect installation of the extension system can cause a skewed load and can lead to tearing in the netting panel. Lifting the net at high speed will also cause heavy loads and possible weakening or tearing of the netting panel. Ultimate load conditions (static & dynamic condition) & accidental conditions on mooring system, anchoring, floater & stretching systems need to get validated & audited by accredited agency before deploying Net.

Information on permitted loads and weights is given in the product certificate.

If End User has provided net specifications & drawing to GTFL then end user is responsible for doing design validation & load factor calculations. GTFL is manufacturing Pen as per as end user requirements. GTFL providing drawing, SOP of manufacturing Pen, specification of ropes, twine & Nets, Bill of material to end user. After confirmation from end user/customer, GTFL is bind to manufacture Pen as per agreed contract.

2.4) Risks of structure failure due to critical loads

The net is designed so that all the load must be absorbed by the ropes.
There are, however, some critical factors that can lead to damage to net:
1) External influences such as storms or strong currents can lead to contact between the net and float collar which can further lead to chafing and wear.
2) Incorrect installation of fastening loops
3) Abnormal algae formation and mussels growth.
4) Contact between the net and mooring, release system or other extra equipment, which can lead to chafing and wear.
5) Insufficient removal of dead fish, which can lead to predators making holes in the net panel in an attempt to get hold of the dead fish.
6) Improper cleaning of the net, which increases the fouling, as a result of the net having been in the sea for too long
7) Raising awareness of aqua firm personnel who handle the net, and who are responsible for daily supervision, will in many cases reduce the risk of accidents involving escape occurring.

2.5) Assumptions & limitations related to alteration & reconstruction.

In case if end user fish farmer wants or required to alter net, design, the same has to be revalidated from accredited body before deploying the altered Pen in water.

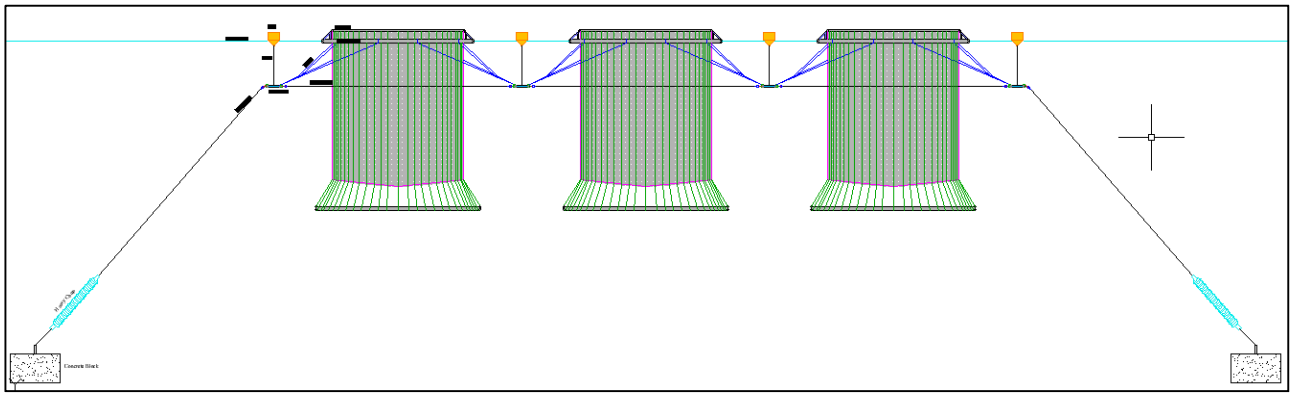
The alteration which need to be carried out should ensure no fish escape during installation & application.

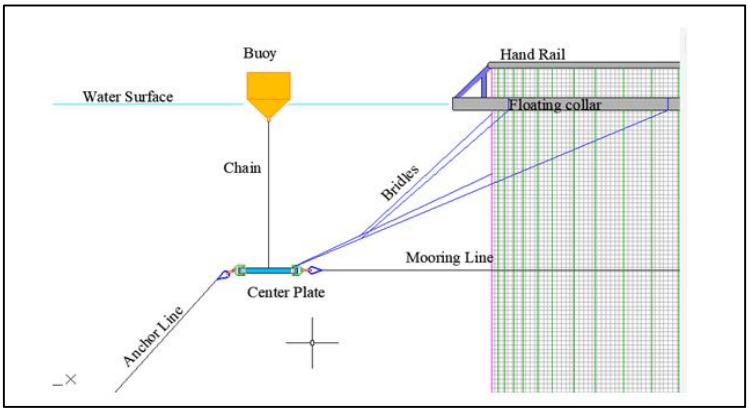
The team which alters the Pen should inform GTFL and discuss the type of alteration it is going to do in the supplied Pen & follow the instructions.

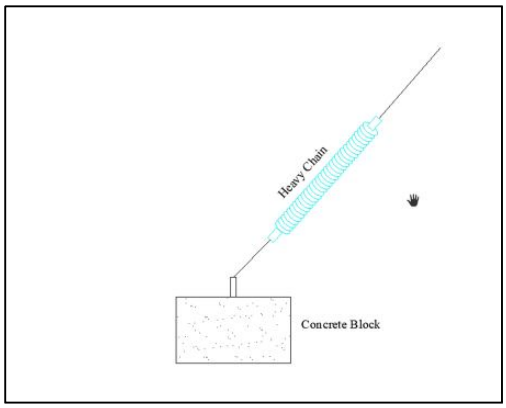
The team should document the alteration and keep the record for the inspection by accredited body.

3) Interaction of net with other components

As shown in below sketch, Net is interacting with floating collar, sinker tube, dead fish lift up system, net washer, antilousing equipment, service boats etc.







3.1 Net with Floating collar

In the net there are loops along the waterlines & the top lines. The Net is connected to floating collar and hand rail through these loops. The connections between loops and collar have to be strong enough and durable. So the strength of these connections has to be higher than the loop strength. This is determined from certificate. Periodic inspection of these connections are important and has to be audited & recorded by the farm management team.

3.2 Net with Sinker tube

As stated above sinker tube is also an important component of the stretch system. The connection between the bottom loops of the Pen and the sinker tube have to be strong enough. All the loads coming on the Pen through vertical loads is directed to sinker tube. The connection ties between Pen bottom line and sinker tube have to be uniform length. Periodic inspection of these connections are important and has to be audited & recorded by the farm management team.

3.3 Arrival of service boat

When arriving by boat, the breeder must ensure that the boat docks on the correct side in relation to the direction of the current, so that the boat does not come into contact with the net. One must be aware that the current direction can change during a work operation. Loading and unloading of fish to and from the net must be carried out in such a way that the net is not damaged. The breeder and boat operator must take care that the tools used do not come into contact with the net in such a way that it is exposed to chafing. The same applies to other work operations that are carried out, for example de-lice removal.

3.4 Cleaning of nets at sea

Cleaning of nets at sea must be carried out in a gentle manner, so that the net is not damaged.

Cleaning equipment must not be used in ways that could lead to damage to the net. The net must be checked after cleaning, and this must be documented in log book by the Farm management team.

In order to arrive at the best practice in connection with cleaning of the nets at sea, it is important to have a good dialogue between the farmer, supplier of nets, impregnation and cleaning services. Farmer must carry out risk assessments in order to arrive at the best solutions in connection with cleaning nets to ensure the service life of the net and to prevent damage to the net.

It is recommended that water pressure when cleaning nets in sea does not exceed 100 bar.

3.5 Handling of the net in connection with work operations

Correct treatment of the net is important for its lifespan. There are many work operations that are carried out regularly, and these can be carried out in different ways depending on the type of plant, available tools, modes of operation, etc. Procedures and routines must be prepared that are adapted to the mode of operation in connection with the individual work operation.

Examples of such work operations can be:

- Changing the net
- De-lice or other form of treatment of fish
- Delivery of fish

The following general conditions must be taken into account to reduce the risk of injuries during handling of the net. Check weather and current conditions be familiar with the construction of the net before the operation starts. Have sufficient staffing and equipment to ensure proper handling to remove strain from the stretching system before lifting.

The net must never be lifted by the netting panel. Lift the net only by a lifting rope, or via a hoist rope fitted to a lifting rope.

3.6 Changing the net

It may be necessary to change a net while it contains fish. This is mainly done either by threading a new netting Pen under the old one, or by sewing it together with the existing netting Pen and then pulling it into place in the floating collar.

Changing the net is a risky operation, and the designated responsible person must ensure that all other participants follow the guidelines and routines that the farmer has drawn up for changing the net, and that the necessary safety equipment is used. Handling/changing of nets must not be carried out in weather and current conditions that entail a risk of damage to personnel and equipment. Before changing the net, extra equipment located inside or near the net must be secured so that it cannot cause damage to the net. Dead fish system and weights are removed before the operation starts. A net change must be closely monitored by experienced staff to ensure that no incidents occur that could lead to the escape of fish. A new net is fitted to the float collar, a dead fish system and sinker tube can be fitted. New net is inspected for any holes, damage during change over & record any damages in log book

3.7 Removal of the net from the floating collar after harvesting

When a net has been emptied off fish, it must be removed from the floating collar. After use, it can be handed over to a service station for re-certification or possible disposal if it does not meet requirements according to NS 9415.

Before the net is removed from the floating collar, it must be ensured that all fishes have been taken out and that any dead fish have been removed from the net. If a hole has to be cut at the centre bottom to remove the remains of dead fish, it is recommended not to cut close to a cross rope. It is also recommended to cut the hole as small as possible. This will reduce the time spent on a repair / re-certification.

If hooks on handrails are fitted to the floating collar, these must be removed or covered during removal of the net from the collar. This is to prevent the net from getting stuck and/or damaged.

Check the water current direction and if the net is being taken up against the direction of the current.

If the net is extended with a sinker tube, then the net must be detached from it. This is done by lifting the bottom ring to the surface, or by a diver swimming down and cutting the net free from the sinker tube.

ATTENTION! Make sure that the rope that is attached between the net and the sinker tube is cut - not in the bottom loop itself.

Start by grabbing a loop on the bottom rope or in the centre bottom of the net. Take the net on board the boat little by little.

Removal of the net from the float collar must only be carried out when weather and current conditions permit. A person with experience from such operations must be responsible.

Make sure to use certified lifting equipment throughout the process.

Make sure to use the correct protective equipment according to the fish farmer's routines.

3.8 Special environmental conditions

3.8.1 Water current conditions

In case of strong current, additional inspection of the net is required. Fixing loops must be checked. It must be checked that the net is sufficiently extended and that the dead fish system is placed in the centre of the base.

3.8.2 Storms

If there is a risk of storms, the connecting loops, the connections elements with floating collar & sinker tube, the anchoring & mooring connections & ropes, net panel, stretching system and dead fish system must be checked by farm management staff. This must be done again after the storm.

3.8.3 Ice during the winter period

Exposed localities can have challenges with drift ice in winter, as well as with ice and snow on the jump net. farmers must be aware of this, and find solutions that prevent strain or damage to the net.

If there is ice on the jumping net, following can help:

1) Attach the jumping net to the row support on the floating collar - use thin wire.

2) Check that the Ropes that are used for attaching jumping nets are attached as usual & are hung with a good amount of slack.

If there is ice that weighs down the jump net, the thin thread breaks and the jump net goes down into the sea. Thus the ice melts. The rope with slack holds the jumping net up, so much so that there is no danger of the jumping net going too far down towards the water.

4) Assembly of Net

4.1 Check of documentation – check point before assembly

Before the net is put into use, the farmer must make sure that all documentation (Product certificate, service card, user manual) is available and in accordance with the net's identification number. Check that the net meets the requirements for waves and currents in the relevant location, and that it has the correct mesh size. The packaging is checked for damage. Visible damage to the packaging is a sign that something has touched the net during transport or storage. In such cases, the not Pen must be specially inspected.

GTFL recommends that a person with experience from this type of operation be designated as responsible for the installation itself. Fitting a net can be a risky operation, and a designated responsible person must ensure that all other participants follow the guidelines and routines that the farmer has drawn up for fitting a net and that the necessary safety equipment is used. The assembly and handling of nets must not be carried out in weather and current conditions that entail a risk of damage to personnel or equipment.

4.2 Lifting

An approved lifting strap must be used to lift the net into place.

If the net is packed in a sack, it must be checked that the loops on the sack are approved for lifting. For all lifting, the net must be handled gently and in a controlled manner.

4.3 Need for additional tools when installing the net

Nets can have a lot of weight. It is therefore recommended that one or more workboats with sufficient crane capacity are used when installing nets. Furthermore, the use of a nock or winch is recommended to haul the net into place. These are risky operations and farmers must have good routines for this type of work to avoid crushing injuries.

Extra rope that is attached to the net, or other equipment used in connection with assembly, must be removed after use. This is to avoid loose rope ends floating in the sea and posing a risk of tearing or weakening the net if the rope gets caught in a work boat or the like.

4.4 Installation of net in the floating collar

The procedure for installing a net in a floating collar can vary depending on size, access to equipment and personnel as well as the individual farmer's routines and experience.

Nets are usually packed with the base centre in the bottom and the top of the net in the top of the package.

Make sure the top of the net is attached/secured before the net deployment starts.

The bottom is lifted out first. The centre bottom is attached to the boat or flotation collar, this will then act as a safeguard for the net during assembly to the floating collar is in progress. It will also be easier to fit sinker tube.

The rest of the net is lifted overboard until only the top part of the net remains.

The first fastening loop is installed. If a bottom ring is to be used, or another type of extension system that requires anchoring in the floating collar, the farmer must make sure that the first attachment point is by a lifting rope. The attachment loop on the lifting rope must be mounted at a point on the float collar that is prepared for attachment of the net and deployment system. Fastening loops are attached to the float collar as the work boat pulls the net along the float collar. Make sure that the top and water line loops are mounted correctly each other. Continue until approximate half the circumference of the float collar. NETTING is now double.

Attach rope straps to the top loops to be mounted on the opposite side of the floating collar.

Make sure that the right loop comes in the right place, so that these come in the right place when they are pulled over.

Then pull the rest of the net over to the opposite side and fasten the remaining fastening loops.

Check that all the fastening loops are in use and that they are securely mounted.

The attachment loop must not be raised too high so that the knot is left rubbing against the float collar. This can weaken the loop and cause it to break.

4.5 Check after installation

A net must be checked after assembly, even if the net is new or comes directly from service. GTFL recommends a visual inspection after the net and stretch system have been installed in the floating collar to detect any damage or errors that may have occurred during installation. Check that all attachment loops are fitted properly. Check that the deployment system is not in contact with the net. Check that the jump net does not bear the weight of the net.

Check that there are no holes in the netting panel in the net. The mooring system must be fitted correctly and in such a way that the net does not come into contact with mooring components.

5) Installation of extra equipment and other components at the site

5.1 Attaching the net to the floating collar

The net must be adapted to the float collar it is mounted in. All nets have their own loops that must be used for attachment. The number of loops varies, but in any case, the location of the attachment point on the net must correspond to the float collar in which it is mounted.

Only loops mounted on the main rope are to be used for attachment to the flotation collar. All the load the net is subjected to is transferred to the floating collar via the attachment loops. Loops mounted on the top rope must not be used to attach the net to the floating collar. These are only intended for lifting and attaching jumping nets.

Rope is used to attach the loop, in some cases polyester strap. Loop must be fitted to float collar in such a way that it is not exposed to chafing or wear; it must not be fitted too tightly to the vertical support of the floating collar.

It is recommended that the rope for fixing is fitted in a loop on the net before it is attached to the float collar.

This will make the installation itself easier. An eye can advantageously be spliced into one end of the anchoring rope, this is threaded into the anchoring loop. The recommended length of anchoring rope is 3-5 metres, then you can thread the rope twice through the loop and get an even stronger attachment. The size of the rope for attachment depends on the size of the net.

5.2 Assembly and handling of the fish releasing system

When using a release system, the farmer must make sure that this cannot damage the net or other important equipment. A release system must only be attached to the net at a point designed for this. The weight of the stretching system must not, under any circumstances, impose a load on the net that exceeds the capacity of the loops used. The maximum permitted load in the attachment point for unfolding is stated in the net's product certificate.

5.2.1 Sinker tube or single weight in Pen bottom line loops]

When using a sinker tube or single weight in bottom loops, only loops intended for lifting should be used for unrolling. These loops are mounted on bottom rope where side ropes continue as cross ropes at the bottom. The maximum permitted load in the attachment point for unfolding is stated in the net's product certificate.

It is recommended that the bottom ring be placed deeper than the bottom rope on the net, approx. 45 degrees. You will then get a better performance. The length of the rope for attachment is adjusted to the distance between the bottom loops on the net and the sinker tube.

See the user manual for the flotation collar and sinker tube for more information on fitting the net to the sinker tube.

5.2.2 Installation of Centre weight in nets

The weight must be lowered slowly with its own rope until the weight is transferred to the net. This is done after the net has been securely attached to the float collar. Weight depends on the net's size, current conditions, etc. The maximum permitted load at the attachment point for unfolding is stated in the net's product certificate. Also make sure that weights do not come into contact with underwater moorings.

It may be a good idea to mount a thin rope at the very top where weight lines are mounted in float collars. This as one safety if the lead rope in the center of the net should smoke, and the weight line is left hanging by the rope that is fixed in the float collar. A thin rope will break when it receives. load from weights, and it will avoid skewed load on the floating collar.

5.3 Assembly and handling of dead fish system

Dead fish nets, lift ups or other systems for collecting fish should make it easier to remove dead fish from nets. Dead fish are regularly removed. This is, among other things, to prevent other fish/predators from starting to bite the dead fish from the outside - this can weaken the net panel and lead to damage to the net.

Equipment used in connection with dead fish collection must be located in the center of the bottom of the net - where there is reinforcement in the netting panel. The dead fish system is checked in connection with the farmer's routine inspection. If continuous rope is used for the dead fish net, then the rope for the weight line under the net

must be so long that the weight line does not come into contact with the net. This reduces the strain on the net when the dead fish net is pulled up. The fishing line (dip net rope) used must be adapted to the net. See Dead Fish Net User Manual for more information.

5.4 Additional equipment

Additional equipment that is mounted on the float collar or in the net must be adequately secured, so that it cannot come into contact with the net. Equipment that is not used must be removed.

Examples of additional equipment can be a dead fish net, lift up, feed hoses, camera, roof net and cleaning fish hide.

5.4.1. Implementation of components in net panel on net

It is recommended that the feed hose be fitted between the jumping net and the railing on the float collar, by tying a rope around the railing and feed hose. Leave some slack on the rope, so that the hose hangs with some distance from the railing - this will lead to less risk of wear and tear on the hose. Feel free to use several ropes as security.

Check regularly that the hose does not come into contact with the railing or the jumping net in the net.

In some cases, components must be passed through the net panel in a net, for example, this could be a hose for a dead fish system. Before this can happen, the net panel must be secured by mounting a plate in the jump net on the net. This is made of PE or PA 6. The hole in the center of the plate must be adapted to the component that is to be passed through the notched line. The plate is mounted in the jump net on the net, above the waterline. It is sewn to a side rope, to ensure that it stays in the right position. After it is mounted, a hole is cut out in the center of the plate. The hole is cut as small as possible. There must be some slack in the jump net where the plate is mounted, so that there is no strain on the net panel. If there is a feed hose or a hose for a dead fish system that is passed through the net panel, the hose must be attached with rope to the hand rail/walkway - this as a secondary safeguard.

A checklist must be drawn up for the plate, and this must be included in the farmer's routine inspection of the facility. Plate and bushing are also checked after unforeseen events such as storms or strong currents.

Check that the plate is intact and that it has no load or wear damage.

Check that components that have been routed through the net panel in the net are not exposed to stress.

6) Use of equipments for net handling

Equipments are used in such way to avoid any damage while net handling -

- Normal handling and use of the equipments: - Other equipment such as cranes, forklift, washing tools, service boats, frame repairing tools should be used in such a way that net is not damaged.
- Assumptions and limitations regarding use and handling in special physical environmental conditions:- Environment conditions required to be normal at the time of installation , repairing & replacement of Pen at site so that it will not harmful to net
- Professional special competency required for who is using and handling of the net along with other components.

7) Inspection & Maintenance

7.1 General

Maintenance of nets is essential to get the best possible production of fish. To ensure optimal service life for a net, it is important that it is checked regularly when it is in the sea. Controls and inspections will reveal any abnormal conditions, and help prevent fish escaping.

The farmer must establish routines for monitoring the net when it is mounted in a floating collar as long as there are fish in the net. The person who is to carry out the inspection must have knowledge of the net, size and shape as well as experience from farming facilities, so that the person concerned is able to observe any abnormal events. All inspections and maintenance must be recorded in the log book.

In the net, no parts that must be maintained or replaced by the farmer. Fixed loops, ropes and netting panels must only be changed by a certified service workshop (Net loft). Loose ropes, such as hoist ropes, can be replaced by the farmer as long as they are secured properly at the intended point. Contact one of certified service centre if there is uncertainty about what the farmer can and cannot carry out in terms of maintenance and replacements.

7.2 Checklist for routine inspection

Routine inspection aims to uncover possible damage and weak points at the earliest possible stage. Farmers must incorporate these check points into their operating routine check list.

The following points must be inspected at least weekly and recorded:

CHECKPOINT	CONTROL
ATTACHING THE NET	Check that all connecting loops are attached to the floating collar in the correct way, and that there is no chafing or damage on the visible part of the attachment rope.
TOP LOOP	Check that the loop is intact and has no signs of wear out. Heavy load in the top loop can be a sign of a failure with the attachment of the connecting loop.
TOP ROPE, MAIN ROPE, SIDE ROPE (VISIBLE PART)	Check that the rope has no breakage, pinching damage or other signs that it is prone to chafing. Check that there is no damage or holes in the net panel.
JUMP NET AND VISIBLE PART OF NET PANEL BELOW MAIN ROPE	Check that there are no holes or obvious damage (skinning of the thread), Check the area around attachment points in particular. Check that the jump net hangs well up to the railing and that there is no abnormal loads.
DISPLAY SYSTEM	Check for abnormal conditions of any attachment system in the float collar. If the rope/chain of the stretching system is loose or missing, it can lead to an increased load on the net.
EXTRA EQUIPMENT	Check that all additional equipment fitted in or near the net is attached in a way that cannot damage the net panel.
OTHER TYPES OF FISH INSIDE THE PEN	If a different type of fish is observed inside the net, it is a sign that there may be a smaller or larger hole in the net panel. The farmer must then send divers or use a camera/ROV to inspect net panel in side and mend the hole temporarily.

7.3 Checklist for special inspection

GTFL recommends that the net be inspected visually by a diver, camera or ROV at least once every 3 months, and that this be included in the farmer's inspection routines.

Inspection of the net under water is carried out after installation before fish are released. An inspection is also carried out after changing the net and when changes are made to the deployment system, mooring lines etc. The net must also be checked after severe storms or other unforeseen events that may have caused damage, as well as after work operations such as de-lousing have been carried out. If there is a suspicion that something may be wrong with the net or associated components, an inspection must be carried out.

7.4 Inspection of the net at a certified service workshop

A net must be inspected and checked by a certified service workshop, in accordance with the requirements of NYTEK regulations and NS 9415, within 24 months after the net was put into use for the first time. If, among other things, the net satisfies the standard's minimum requirements for breaking strength in new net panel, the net can be approved and used for another 24 months before the next inspection by a certified service workshop.

If the net panel has a breaking strength of at least 80% (75% for jumping nets) of the standard requirement for a used net panel, the net can be approved and used for up to 18 months before the next inspection by a certified service workshop.

If the net panel has a breaking strength of at least 65% (60% for jumping nets) of the standard requirement for a used net panel, the net can be approved and used for up to 12 months before the next inspection by a certified service workshop. A net where the breaking strength of the net panel is less than 65% of the standard requirement for used net panel within the same dimension class must be discarded.

In order for a net to be able to be used for more than 24 months after it was put into use as new, the farmer must ensure that the net receives a valid service card which confirms that the net still meets the requirements for use. Such a service card can only be issued by a service workshop that is certified for this type of control.

Nets at service are normally washed for 2 hours in a washing machine, and a maximum of 4 hours - depending on how dirty the net. Service centres should assess the degree of cleanliness of the net before handing it in for repair and inspection.

A check at a certified service workshop must include inspection and testing of the entire net. This includes a visual check of rope, net panel, loops etc. The net panel must be checked in accordance with the current requirements in NS 9415. Net parts that are damaged or weakened must be replaced.

7.5 Log

All inspection and maintenance carried out on a net must be recorded in log book.

The log must describe at least:

1. Action carried out (type of inspection, cleaning, maintenance or repair), with reference to plan and procedure.
2. Result after action taken
3. Necessary follow-up as a conclusion after action taken Date
4. Performing person/institution
5. Signature

7.6 Disposal/Reuse

A net that no longer meets the minimum breaking strength requirements, or is in such a condition that it is no longer advisable to use it for fish farming, must be discarded. The net is normally produced from HDPE , Nylon, polyester, UHMPE and rope, which in most cases can be recycled. It is therefore important that the net is delivered to a certified service workshop that has a return scheme. This will ensure that the net is taken care of in an appropriate and environmentally friendly way. Refer MSDS for disposal in annexure A & B.

Generally Net loft service stations have arrangements for the destruction and reuse of used nets. Discarded nets are delivered to these service stations. Here they are washed, disinfected and packed before being delivered for dismantling and recycling.

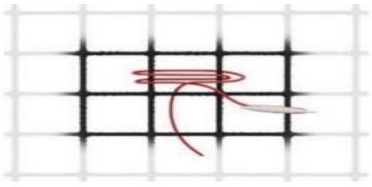
7.7 Temporary remedy to prevent escape

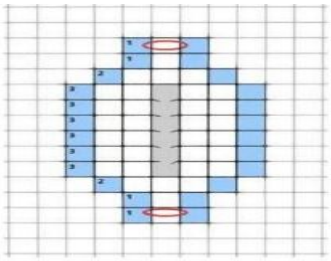
The farmer must immediately implement temporary mending if holes or damage are discovered in the net. In the case of holes in the net panel, you must ensure that thread of sufficient strength is used, if you do not have thread available, strips can be used. A temporary mending is not considered a repair according to the provision in the NYTEK regulations. The work must therefore be assessed by personnel with documented competence. Personnel from certified net lofts can assist with this, in addition to advice and guidance if necessary.

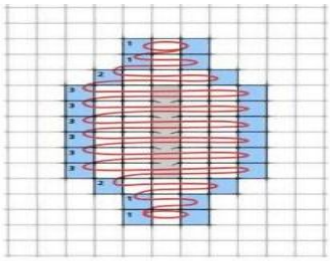
Procedure when using thread, according to sketches below:

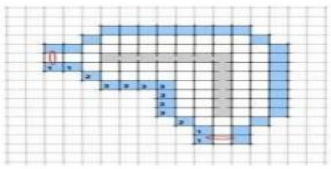
- Start 3 bar over the hole, and insert a double flag stitch to secure the knot.
- When sewing together a hole, it is important to go far enough into the net panel (marked 1,2, 3) to avoid unravelling.
- Make a double half stitch as closely as possible, maximum distance is 10 cm.
- Finish stitching the hole with a double flag stitch.
- Go back two bars and insert a double half stitch to secure the knot.

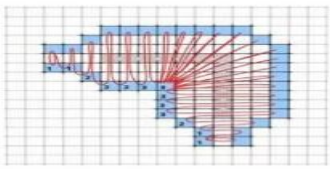
Principle for carrying out temporary mending of net panel:











8) Transport & storage

8.1 Reception of Net

When receiving a net, the packaging must be checked for damage. Visible damage to the packaging is a sign that something has touched the net during transport. In such cases, the net must be checked before use and GTFL and the carrier must be notified.

When the netting Pen is to be transported, it is very important to ensure that the rope and netting do not get caught and tear. Ideally, the net should be stored in its original packaging. The net is then easier to transport and the risk of damage is reduced. The net must always be checked after assembly to the floating collar. This is a requirement even if the net comes directly from a certified service work station.

8.2 Moving net

If the farming facility is to be moved with a net mounted in the floating collar, the towing must be carried out very carefully. Any stretching system must be removed and the towing speed must not exceed the current speed to avoid net damage.

8.3 Storage of nets

Nets must be stored in such a way that they are not exposed to external influences that could cause damage to the filament, rope or the net as a whole. The materials in the net are easily damaged by heat, and the net must therefore not be stored near heat sources. Work that involves strong heat must also not be carried out in the vicinity of the net, such as welding work. When the net has been received by the farmer, it is the farmer's responsibility to ensure that the net is properly stored.

The net must be protected against prolonged exposure to strong sunlight. In most cases, the original packaging will be sufficient protection against weather and sunlight, and it will be easier to observe any external stress the net may have been exposed to during storage. Indoor storage is considered the best storage location for a net.

All nets should be stored on pallets. This also applies even if the net is packed in a Pen with loops that are certified for lifting. If the net is packed in a Pen with loops, it is important to check the capacity of the loops before lifting is carried out. Nets must not be dragged along the ground, as this can lead to damage to the net. The farmer must check that pests such as mice and rats have not been in contact with the net during storage.

A large amount of dead fish at the bottom of the net can lead to a risk, considering the increased load on the net or other associated components. Although the net itself can handle large quantities of dead fish, the mass of dead fish can create large dynamic forces when the net is moving. In extreme cases, these forces can become so great that they lead to a risk of damage to the net and/or floating collar.

Farmer must have frequent monitoring of the amount of dead fish, as well as prepare a contingency plan that describes measures in connection with the mass death of fish in a net.

The weight of dead fish in the sea is assumed to be approx. 5 – 10% of real weight in air. This is not a scientifically documented ratio, and can only be used as an estimate in connection with assessing the condition of the net with a view to large quantities of dead fish.

9) Manufacturer & Product identification

9.1 Manufacture Contact details

For questions about nets, contact our head office or the nearest oversees offices.

A) HEAD OFFICE

Garware Technical Fibres Ltd.

(Formerly Garware – Wall Ropes Ltd.)

Plot No.11, Block D1 MIDC, Chinchwad, Dist.Pune 411019, India

Web Address: - www.garwarefibres.com

B) OVERSEAS OFFICES

1) USA Garware Technical Fibres Ltd. Mr. Gopa Kumar NARROWS REACH BUSINESS CENTER,UNIT 500,6102-NORTH 9TH STREET,WA.98406, USA	2) CANADA Garware Technical Fibres Ltd. Mr. Sujit Mishra NARROWS REACH BUSINESS CENTER,UNIT 173,525 NOVO STAR DRIVE MISSISSAUGA ON,L5W1Y1, CANADA
3) NORWAY Garware Technical Fibres Ltd. Mr. Pal Korneliussen LYNGBERGER13,5038 BERGEN, NORWAY	4) SCOTLAND Garware Technical Fibres Ltd. Mr. Alan Sutherland 35 CORTON LEA,AYR, SCOTLAND,KA66GJ
5) AUSTRALIA Garware Technical Fibres Ltd. Mr. Amit Kulkarni ADELAIDE-AUSTRALIA	6) UK Garware Technical Fibres Ltd. Mr. Kanwal Malik 16, EMMETT CLOSE, EMERSON VALLEY, MILTON KEYNES,MK9 2UB,UNITED KINGDOM
7) CHILE Garware Technical Fibres Ltd. Mr. R.T. Borse CHILE SPA, KLENNER 547, OFFICE NO-2, PUERTO VARAS,LOS LAGOS,CHILE.	

9.2 Documentation

A net must have a product certificate that contains information about the size class, validity period and details about the net and the made by materials. In addition, there must be a user manual and any service cards. This type of documentation must be available on site.

9.3 Identification of net

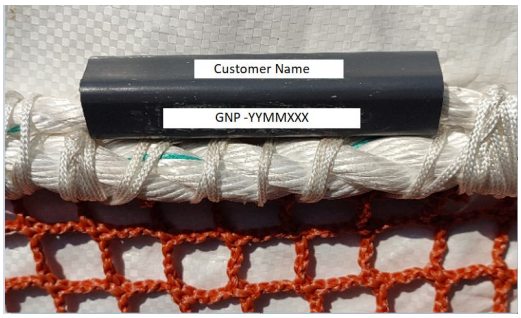
Each individual net has a unique identification number. All production-related information, as well as service history is recorded and stored with reference to this identification number.

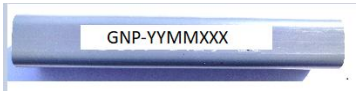
3 pieces of tags with unique identification numbers are mounted on each net;

2 pieces mounted on the top rope and 1 piece mounted at the center of the bottom.

The identification marks have the following information:

Manufacturer, year of manufacture, identification number, size class, net shape and dimension, and type of netting. On square Pens, a separate special mark is mounted in each corner of the top rope.



Sr.No.	Identification code	Identification details	Actual Photo
1	GNP-YYMMXXX	GNP- Garware Net Product YYMMXXX-Year/Month/Sr.NO	
2	SV2- 22mmHM – 106Kg	Star V2 22mm half Mesh Mesh B.S. – 106Kgf	
3	200m – 20m– 37m-Class E	200mtr Pen Perimeter – 20m Wall Depth – 37m Total Depth	
4	ABCDEFG	End Customer Name.	

PRODUCT CERTIFICATE

GARWARE
TECHNICAL FIBRES

Certificate Number: GNQ-2306001
Issue date: 05/June/2023
Package/Tag ID: GNP-2305001 – 006

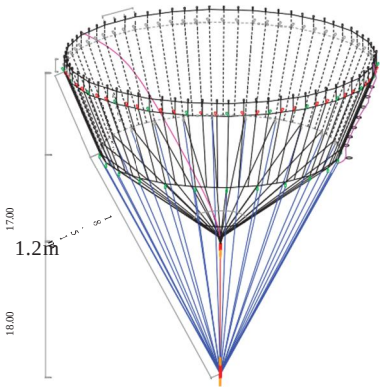
Net Pen dimension Class '0'

Manufactured Month/Year: 06/2023

Customer: MOWI ASA, Norway

CPON: KNUT VERPE

PRODUCT SERIES CODE: GSPC 2001718



Max 50-Year Hs [m]:	**3.5**
(1/7) 50-Year Tp [sec]:	**5.5**
(1/11) 50-Year Tp [sec]:	**6.8**
Max 50-Year Vc [m/sec]	**1.07**
Cage Circumference (Nominal) [m]:	**203**
Depth to Bottom Line [m]:	**17**
Depth total in center [m]:	**18**
Number of sides in bottom:	**24**
Lifting ropes:	**24**
Vertical ropes total number:	**72**
Cross ropes:	**24**
Dis. Between lifting ropes[m]:	**8.46**

Rev.1

Design Documents for Product Series GSPC 2001718

User manual valid for this net:	User Manual GTFL Netting Rev.0 Dated 30 Dec 2022
Global net analysis:	TR-30897-100836-1-
Drawing number:	MOS-2205-312a-Rev
Project number product certification:	30897-100317

This is to certify that the net cage is produced according to NS 9415 standard. Refer our user handbook available at (www.garwarefibres.com). Also refer BOM and Drawing which are part of product documentation. The information in the product documentation is only valid provided the requirements in the user handbook and this document are complied with.

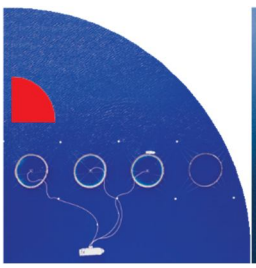
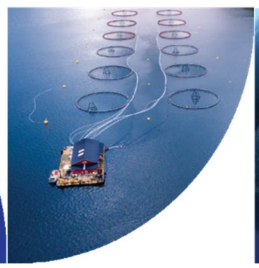
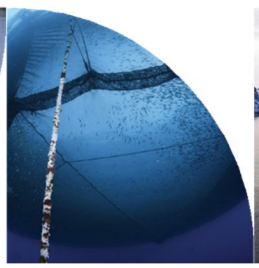
Date: 06-06-2023

Signature

Place: Wai

G T Vrundaiah

DGM – Production


Netting types and placement:			
Placement in net:	**Name and Type of net:**	**Size Twine / Half mesh [mm]**	**Mesh MBL[Kg] / Solidity clean net [%]**
Jump net	CFR	2.0/21.5	120 / 19.5
Side wall	CFR	2.0/21.5	120 / 19.5
Side wall (Combi net)	NA	NA	NA
Bottom	CFR	2.0/21.5	120 / 19.5
Enforcement bottom rope 50cm	CFR	2.0/21.5	120 / 19.5
Enforcement waterline rope 50cm	NA	NA	NA
Enforcement in center bottom 10x10m	CFR	2.0/21.5	120 / 19.5

Rope types and placement:			
Placement in net (Depth meters):	**Name and Type of the rope material:**	**Size diameter [mm]**	**Minimum allowed MBL [Kg]**
Top rope 1: (+1.2):	3 Str X2 / PP	22	8900
Top rope 2: (+1.5):	NA	NA	NA
Main rope: (0)	3 Str X2 / PP Hard	22	6700
Main rope 2 (-1):	NA	NA	NA
Waist rope 1 (-5):	NA	NA	NA
Waist rope 2 (-10):	NA	NA	NA
Bottom rope (-15):	3 Str X2 / PP	22	8900
Lifting rope:	3 Str X2 / PP	24	10400
Vertical rope:	3 Str X2 / PP	24	10400
Cross rope:	3 Str X2 / PP	22	8900
Spaghetti Rope :	12 Str X2Ultra / PP-PES	16	6500
Connector rope:	3 Str Maxima / PP	32	14850

Stretching system allowed: Spaghetti (multiple ropes from net to single lump)			
Lump material:	**Connector rope [Y/N]:**	**Weight in air[Kg]**	**Weight in sea [Kg]**
Steel	Yes	-	5000
Connected in nets by maximum length of spaghetti ropes [m]:	**Number of spaghetti ropes**	**Minimum length of the connector rope [m]:**	**Loads incl load factor, from to net at bottomropes [Kg]**
63.1	24	40.5	1478

Floater allowed together with the net: Type – Plastic tube			
Tube material:	**Circumference [m]:**	**Total weight in air [kg/m]**	**Total weight in sea [Kg/m]:**
HDPE	205	-	-
Wall thickness in tube [mm/SDR]:	**Diameter [mm]:**	**Connection points in net:**	**Load incl load factor from net [Kg]:**
46.3 / 13.6	630	72	5588

Center weights and dead fish system: Type – Single lump and dead fish pump			
Dead fish system type:	**Net prepared for pump [No/Yes]:**	**If prepared, [pocket or 35º net bottom**	**Total weight in sea [Kg]**
Pump	Yes	Pocket in net bottom	800
Lump material:	**Total weight in sea[Kg]:**	**Connection center min MBL[Kg]:**	**Loads incl load factor, from net [Kg]**
Connector rope	-	-	-

9.4 Validity Period

A net cannot be used for farming fish without valid documentation.

The validity period for a new net is 36 months. The product certificate's validity period starts when the net is put into sea, but no more than 12 months after the date of manufacture. After 24 months, a net must have a valid service card as an attachment. A service card can extend the net validity period by a maximum of 24 months provided that requirements for residual strength and general conditions are satisfactory.

A service card can only be issued by a certified service workshop. See NS 9415 standards for additional requirements for validity period and possible extension of such validity.

9.5 Net-Register

Net-Register is a user-friendly equipment log that also covers the need for checklists and documentation of mooring. With this tool, farmers have a full overview of their locations as well as the status of the technical equipment. For both internal and external audits, the tool is used to retrieve, among other things, plant certificates, drawings, documentation and certificates for each individual component in the entire plant.

9.6 Change, reconstruction and expansion

All changes, rebuilding and expansion of nets must be done in consultation with GTFL. In the event of changes that result in information in the product certificate no longer being correct, the net must be certified again.

GTFL must be contacted in advance of any rectification of the net.

9.7 Deviations and handling of errors

If errors or deficiencies are discovered in the net, this must be reported immediately to our sales representative or GTFL Norway/India office. The type of error or deficiency will be decisive for the measures to be taken, whether the error or deficiency must be rectified on the spot or whether the net must be returned to the nearest service station. If the error or deficiency is of such a nature that it can wait until the net is sent to regular service.

10) Revision history

10.1 Revision history

User manual issued on dated 01st Dec-2022 with Revision 00

Page No.	Revision No.	Revision Date	Reason & details of revision
All Manual	00	01/12/2022	Made new manual as per requirements of NS9415:2021 & NYTEK guidelines.
All manual	01	01/04/2023	Made changes in manual as applicable clauses to GTFL mentioned in NS9415:2021, scope in certifications & NYTEK guidelines.
27	02	01/07/2023	Product certificate revised

Annexure A- Material Safety Data Sheet for HDPE net

Material Safety Data Sheet				
1. Identification of the substance/preparation and of the Company/Undertaking				
Product Name:	HDPE NETS			
Company Identification:	Garware Technical Fibres Ltd, Plot No. C-1, MIDC Wai, Dist.-Satara Pin-412 803, Maharashtra, India			
Telephone:	+91 2167 308301			
Fax:	+91 2167 265057			
E-mail:	wai_admin@garwareropes.com			
Emergency Telephone Number:	+91 2167 308300			
Use of substance / Preparation:	Nets for fishing purpose only.			
2. Hazards Identification:	This product is not classified as dangerous for supply & use. The preparation does not meet the criteria for classification in accordance with Directive 1999/45/EC and Directive 1272/2008/EC			
3. Composition / Information on Ingredients: HDPE Granules CAS No.: 9002-88-4; 92 to 98 % Organic and/or inorganic pigment: 0 to 3 % Additives: 2 to 5%				
HAZARDOUS INGREDIENTS	% W W	CAS NO.	EC NO.	EC CLASSIFICATION
None				
4. First Aid Measures:				
4.1 Inhalation:	If symptoms are experienced, move the victim to fresh air. Obtain medical attention if breathing difficulty persists.			
4.2 Skin Contact:	If molten material contacts the skin, immediately flush with large amount of water to cool the affected tissues and polymer. Do not attempt to			

	peel the polymer from skin. Obtain immediately emergency medical attention if burns are deep or extensive.
4.3 Eye Contact:	Flush eyes thoroughly with water for several minutes and seek medical attention if discomfort persists.
4.4 Ingestion:	Adverse health effects due to ingestion are not anticipated.
4.5 Further Medical Treatment:	Unlikely to be required but if necessary treat symptomatically.
5. Fire - Fighting Measures:	
5.1 Extinguishing Media	As appropriate for surrounding fire. Extinguish preferably with foam, carbon dioxide or dry chemical.
5.2 Unsuitable Extinguishing Media	Do not use water jet or water spray.
5.3 Fire Fighting Protective Equipment	A self-contained breathing apparatus & suitable protective clothing should be worn in fire conditions.
5.4 Hazardous Decomposition Product(s)	Combustion or thermal decomposition will evolve toxic and irritant vapours.
5.5 Other	Can melt and burn in a fire. Molten material tends to flow or drip and will Propagate fire.
6. Accidental Release Measures:	
Accidental dispersion/spill:	Collect material for controlled re-use or waste disposal. No special safety risks or risks to the environment. Refer to section 13 for disposal information.
7. Handling & Storage:	
7.1 Handling	Control dust formation. Do not eat, drink or smoke at the work place. Wash face and hands before eating, drinking or smoking. Will accumulate static

	charges that may cause an electric spark (ignition source). Take precautionary measures against static discharges.
7.2 Storage	Keep away from direct sources of ignition or heat. Keep in dry, cool, well ventilated area
Storage Temperature:	Ambient.
Storage Life:	Stable at ambient temperature
Specific use:	Nets for fishing purpose only.
8. Exposure Control/ Personal Protection:	
Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposures.	
OCCUPATIONAL EXPOSURE LIMITS High Density Polyethylene- CAS No- 9002-88-4 - No Occupational Exposure Limit assigned.	
8.1 Respirators	No special requirements. Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Where engineering controls are not fitted or inadequate wear suitable respiratory protective equipment.
8.2 Eye Protection	Suitable eye protection is recommended.
8.3 Gloves	Wear suitable gloves if prolonged skin contact is likely. When dealing with hot material: Insulating gloves EN 407 (Heat).
8.4 Other	Protective working garments (e.g. safety shoes long sleeved protective working garments). Contaminated clothing should be thoroughly cleaned.
9. Physical/Chemical Properties:	

Form:	Solid	Specific Gravity (H20 = 1)	Low: 0.92, High: 0.97
Boiling Point	N/A	Decomposition Temperature:	>300° C
Vapor Pressure (mm Hg)	N/A	Melting Point	Low: 100° C High: 120° C

Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)		N/A
Solubility in Water (at 30° C):	Insoluble	Ph value:		N/A
Odor:	Odorless	Oxidizing properties		None
Flash Point (Method Used):	>300° C	Flammability:	LFL: N/A	UFL: N/A
Explosive Properties:		Not explosive. Unlikely to represent a dust hazard under normal handling conditions.		
10. Stability & Reactivity:				
10.1 Chemical Stability		Stable under normal conditions. Decomposes at temperatures above 300°C		
10.2 Conditions to avoid		Heat and direct sunlight.		
10.3 Materials to avoid		Direct contact with open flames, self-igniting and explosive materials.		
10.4 Hazardous Decomposition Product(s)		Carbon monoxide, Carbon dioxide, Hydrocarbons and Acrid smoke		
11. Toxicological Information: Low toxicity under normal conditions of handling and use				
11.1 Ingestion		Low oral toxicity. High Density Polyethylene: LD50 (rat): >5000 mg/kg		
11.2 Inhalation		Low acute toxicity. Dusts and vapours or fumes evolved during thermal processing may cause irritation to the respiratory system.		
11.3 Skin Contact		No evidence of irritant effects from normal handling and use.		
11.4 Eye Contact		Dust may have irritant effect on eyes. Permanent damage is unlikely.		
11.5 Long Term Exposure		Chronic effects are unlikely.		

12.Ecological Information:
12.1 Environmental fate & distribution: Solid insoluble in water. Floats on water. The product has low mobility in soil.
12.2 Persistence and Degradation: The product is non-biodegradable.
12.3 Toxicity: Low toxicity to aquatic organisms.
12.4 Effect on Effluent Treatment: Unlikely to affect biological treatment processes.
13. Disposal Considerations:
13.1 Regulatory information: Do not allow entering drains, sewers or watercourses. Disposal should be in accordance with local, state or national legislation.
13.2 Recommended: For unused & uncontaminated product, including packing material preferred options are sending to a licensed recycler, reclaimer, incinerator or other thermal distribution device.
14. Transport Information:
International Transport Regulations: Not classified as dangerous for transport UN No.: Road/Rail (ADR/RID): Not applicable. Class/Packing Group: Not applicable. IMDG Class: Not applicable. ICAO/IATA Class: Not applicable.
15. Regulatory Information:
EC Classification: Not classified as dangerous for supply/use. Hazard Symbol: Not applicable. Risk Phrases: Not applicable. Safety Phrases: Not applicable.
16. Other Information:
This Material Safety Data Sheet was prepared in accordance with Directive 2001/58/EC and EC Regulation (EC) No.1907/2006. This Material Safety Data Sheet and the health, safety and environmental information it contains are intended to provide a summary of our knowledge and guidance regarding use of the designated Product. Its contents are offered in good faith as accurate and complete as of the date specified below, but without guarantee. The data herein applies only to the Product sold by entities of the Garware Technical Fibres LTD group and not to products sold by others. It relates only to the Product and does not relate to its use in combination with any other product or material or in any process. Local laws and regulations and conditions of use and suitability of the product for particular uses are beyond the control of

Garware; all risks of use, storage, handling, transportation and disposal of the Product are therefore assumed by the user and Garware expressly disclaims all warranties of every kind and nature, including warranties of merchantability and fitness for a particular purpose in respect to the use or suitability of the Product. Garware shall not be responsible for any damage or injury resulting from abnormal use of the Product, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the Product.

Appropriate warnings and safe handling procedures should be provided to all handlers and users. In the case of a user in the European Union, as per Article 34 of REACH Regulation (EC) No. 1907/2006, user shall communicate to Garware any new information on hazardous properties of the Product and/or new information relevant to risk management measures for the identified uses.

Date of issue: Jan 2018

Annexure B- Material Safety Data Sheet for Nylon net

Material Safety Data Sheet				
1. Identification of the substance/preparation and of the Company/Undertaking				
Product Name:	NYLON NETTING			
Company Identification:	Garware Technical Fibres Ltd, Plot No. C-1, MIDC Wai, Dist.-Satara Pin-412 803, Maharashtra, India			
Telephone:	+91 2167 308301			
Fax:	+91 2167 265057			
E-mail:	wai_admin@garwareropes.com			
Emergency Telephone Number:	+91 2167 308300			
Use of substance / Preparation:	For fishing purpose only.			
2. Hazards Identification:	This product is not classified as dangerous for supply & use. The preparation does not meet the criteria for classification in accordance with Directive 1999/45/EC and Directive 1272/2008/EC.			
3. Composition / Information on Ingredients: Polyamide 6 polymer CAS No.: 25038-54-4 = 78 to 100 % Additives (lubricants, emulsifiers and anti-electrostatics.): 0 to 20%. Color pigments: 0 to 2 %. Physical nature: Filament continuous yarn, different dtex, counts and types. Raw white or spun dyed in different colors, wound on suitable spools or cylinders. Spin-finish: Yarns are treated with a spin-finish; typical content 0.6% - 1.2% of the yarn weight depending on type and dtex.				
HAZARDOUS INGREDIENTS	% W W	CAS NO.	EC NO.	EC CLASSIFICATION

None				

4. First Aid Measures:	
4.1 Inhalation:	Not specifically concerned
4.2 Skin Contact:	Not specifically concerned. Traces of spin-finish may be washed away with water. In case of fire, the molten product may cause burns. Rinse with plenty of water. Do not attempt to remove clothes (danger of adherence to the skin). Call for a physician.
4.3 Eye Contact:	Not specifically concerned.
4.4 Ingestion:	Not specifically concerned
4.5 Further Medical Treatment:	Unlikely to be required but if necessary treat symptomatically.
5. Fire - Fighting Measures:	
5.1 Fire extinguishing agents:	All usual extinguishing media may be used
5.2 Restrictions	No restrictions.
5.3 Hazardous Decomposition Product(s)	Depending on temperature and oxygen availability, combustion off-gases contain variable quantities of toxic substances: carbon monoxide (CO), hydrogen cyanide (HCN), Nitrous oxides (NOx) and various organic compounds, which must not be inhaled.
5.4 Protective equipment for fire-fight	Use autonomous respirators to fight fire in door or in poorly ventilated areas.
6. Accidental Release Measures:	
6.1 Accidental dispersion/spill	Collect material for controlled re-use or waste disposal. No special safety risks or risks to the environment. Refer to section 13 for disposal information.

7. Handling & Storage:	
7.1 Handling	In accordance with good industrial hygiene and safety practices.
7.2 File precautions	Remove dust, fly and finish residues by ventilation and vacuum cleaning, especially on heat setting operations. Keep away from ignition sources. Beware of static electricity and discharges.
7.3 Storage	No special safety precautions for storage rooms. Stable under normal storage conditions.
8. Exposure Control/ Personal Protection:	
No special risks to humans and environment if handled in accordance with good industrial hygiene practice and any legal requirements.	
8.1 Respiratory protection	Avoid inhalation of eventual vapors or smokes during processing.
8.2 Hand Protection	After long exposure times additives may cause a temporary irritation of skin. Protect hands with suitable protective gloves.
8.3 Eye Protection	Suitable eye protection is recommended.
8.4 Skin Protection	Respect usual Safety standards for Polymer- and textile industries.
8.5 Occupational Exposure Limits	None

9. Physical/Chemical Properties:			
Form:	Solid	Specific Gravity (H20 = 1)	Low: 1.12, High: 1.15
Boiling Point	N/A	Decomposition Temperature:	>300° C
Vapor Pressure (mm Hg)	N/A	Melting Point	Low: 200° C High: 220° C
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water (at 30° C):	Insoluble	Ph value:		N/A
Odor:	Odorless	Oxidizing properties		None
Flash Point (Method Used):	>400° C	Flammability:	LFL: N/A	UFL: N/A
Explosive Properties:		Not explosive. Unlikely to represent a dust hazard under normal handling conditions.		
10. Stability & Reactivity:				
10.1 Conditions to avoid		None under normal storage conditions		
10.2 Materials to avoid		None under normal storage conditions		
10.3 Hazardous Decomposition Product(s)		None under normal storage conditions		
11. Toxicological Information: No significant hazards to humans and environment are associated with this article, if used in accordance with good industrial hygiene practice.				
11.1 Eye Contact		Not irritating to eyes. During proceeding possible risk of mechanical impact.		
11.2 Skin Contact		After long exposure times spin finish may cause a temporary irritation of skin.		
11.3 Inhalation		Not relevant.		
11.4 Ingestion		No adverse health effects are expected if small amounts are swallowed.		
11.5 Long Term Exposure		Chronic effects are unlikely.		
12.Ecological Information:				
The yarn product is not associated with ecological problems, provided that the wastes are orderly disposed of. Because of its chemical nature, the product is not ecotoxic and not readily biodegradable. Wastewater from proceeding steps should be disposed off in waste water treatment plants according to local regulations.				
13. Disposal Considerations:				

13.1 Regulatory information: Do not allow entering drains, sewers or watercourses. Disposal should be in accordance with local, state or national legislation.
13.2 Recommended: Can be disposed of as solid waste or burned in suitable installations, subject to local regulations. Recycling or thermal recycling is recommended for both the product and packaging material.
14. Transport Information:
International regulations: Class RID/ADR: not classified as hazardous material Class ICAO/IATA: not classified as hazardous material Class OMI/IMDG: not classified as hazardous material
15. Regulatory Information:
EC Classification: Not classified as dangerous for supply/use. Hazard Symbol: Not applicable. Risk Phrases: Not applicable. Safety Phrases: Not applicable.
16. Other Information:
This Safety Data Sheet follows the EC-Regulation 1907/2006 dated 18.12.2006, Annex II though the yarns are classified as articles and not as a dangerous substance or preparation defined in Article 31. This Material Safety Data Sheet and the health, safety and environmental information it contains are intended to provide a summary of our knowledge and guidance regarding use of the designated Product. Its contents are offered in good faith as accurate and complete as of the date specified below, but without guarantee. The data herein applies only to the Product sold by entities of the Garware Technical Fibres LTD group and not to products sold by others. It relates only to the Product and does not relate to its use in combination with any other product or material or in any process. Local laws and regulations and conditions of use and suitability of the product for particular uses are beyond the control of Garware; all risks of use, storage, handling, transportation and disposal of the product are therefore assumed by the user and Garware expressly disclaims all warranties of every kind and nature, including warranties of merchantability and fitness for a particular purpose in respect to the use or suitability of the product. Garware shall not be responsible for any damage or injury resulting from abnormal use of the product. Appropriate warnings and safe handling procedures should be provided to all handlers and users. User shall communicate to Garware any new information on hazardous properties of the Product and/or new information relevant to risk management measures for the identified uses. Alteration or re-publication of this document in whole or part is strictly prohibited. Date of issue: Jan 2018