



BOX COOLER INSIDE MOUNTING

INSTRUCTION MANUAL

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INTRODUCTION

- > Read this instruction manual carefully before proceeding.
- > Please consult the exploded view of the cooler in General Exploded View for an explanation of the terms used in this manual.
- > Important documents besides this instruction manual are:
 - The order confirmation
 - Thermal performance sheet
 - Final drawing
 - Factory test certificate

These documents are in possession of the NRF client.

The name manufacturer in this document refers to NRF Thermal Engineering B.V.

GUARANTEE AND LIABILITY

All terms and conditions of sales and services are subject to the latest version of General Conditions for the Supply of Mechanical, Electrical and Associated Electronic Products, as for The Netherlands, Country Court Den Haag by the association FME-CWM, as for other countries applies the latest version of the international conditions ORGALIME. We explicitly reject all other general conditions. If required, we will send you a copy of these terms free of charge. Loss of performance and/or damage to the heat exchanger, as a result of the following circumstances are not covered by the guarantee:

- > Not following the instructions in this manual
- > Replacement with non-original parts

RECEIPT OF GOODS

- > Upon receipt of goods, please report any damage or discrepancy to the manufacturer.
- > Always store the box coolers in a dry room with stable temperature conditions
- > Follow the instructions for conservation when the box cooler is not put into operation immediately after receipt.
- > Compare the data on the nameplate, order confirmation and on the drawings
- > **Content of wooden box:**
 - Leaflet installation
 - Instruction manual
 - Cover
 - Mounting frame
 - Heat Exchanger coil
 - Cover gasket
 - Mounting frame gasket
 - Bolts
 - Nuts
 - Collar bolts

This is the scope of supply with new box coolers, if spare parts are ordered only the spare parts will be delivered as mentioned on the invoice.

WARNINGS



PRODUCTS MUST BE CHECKED FOR DAMAGE AND/OR MISSING PARTS WHEN RECEIVED. IF ANY ABNORMALITY IS FOUND, MANUFACTURER MUST BE NOTICED WITHIN 7 DAYS.



KEEP PRODUCT IN A DRY PLACE, WHERE BAD WEATHER CONDITIONS CAN NOT AFFECT, UNTIL MOUNTING. PLEASE TAKE PRECAUTIONS TO KEEP IT FROM DIRT AND OTHER ENVIROMENTAL EFFECTS.



THE SEACHEST NEEDS TO BE PROTECTED FOR CORROSION AFTER WELDING THE MOUNTINGFRAME INSIDE THE SEACHEST. THE THREADED HOLES IN THE MOUNTING FRAME HAVE TO BE FREE FROM COATING AND DIRT.



AFTER MOUNTING THE HEAT EXCHANGER COIL THE RESISTANCE HAS TO BE MEASURED OVER THE SEACHEST AND COIL / TUBE -SHEET.



BOLTS , WASHER , NUTS AND COLLARBOLTS HAVE TO BE STORED IN DRY CONDITIONS AFTER CHECK OF GOODS TILL FINAL ASSEMBLY



USED INHIBITOR HAS TO BE SUITABLE VOOR THE FOLLOWING MATERIALS: CUZN20AL2,STEEL AND CUZN38SNALF39/F43.



DO NOT TOUCH COVERS, CONNECTION PIPES AND TANKS BEFORE BEING SURE THAT USED LIQUIDS ARE COOLED DOWN. HOT SURFACES MAY CAUSE INJURIES



COVERS, CONNECTION PIPES AND TANKS CAN BE VERY HOT DUE TO HOT LIQUIDS.



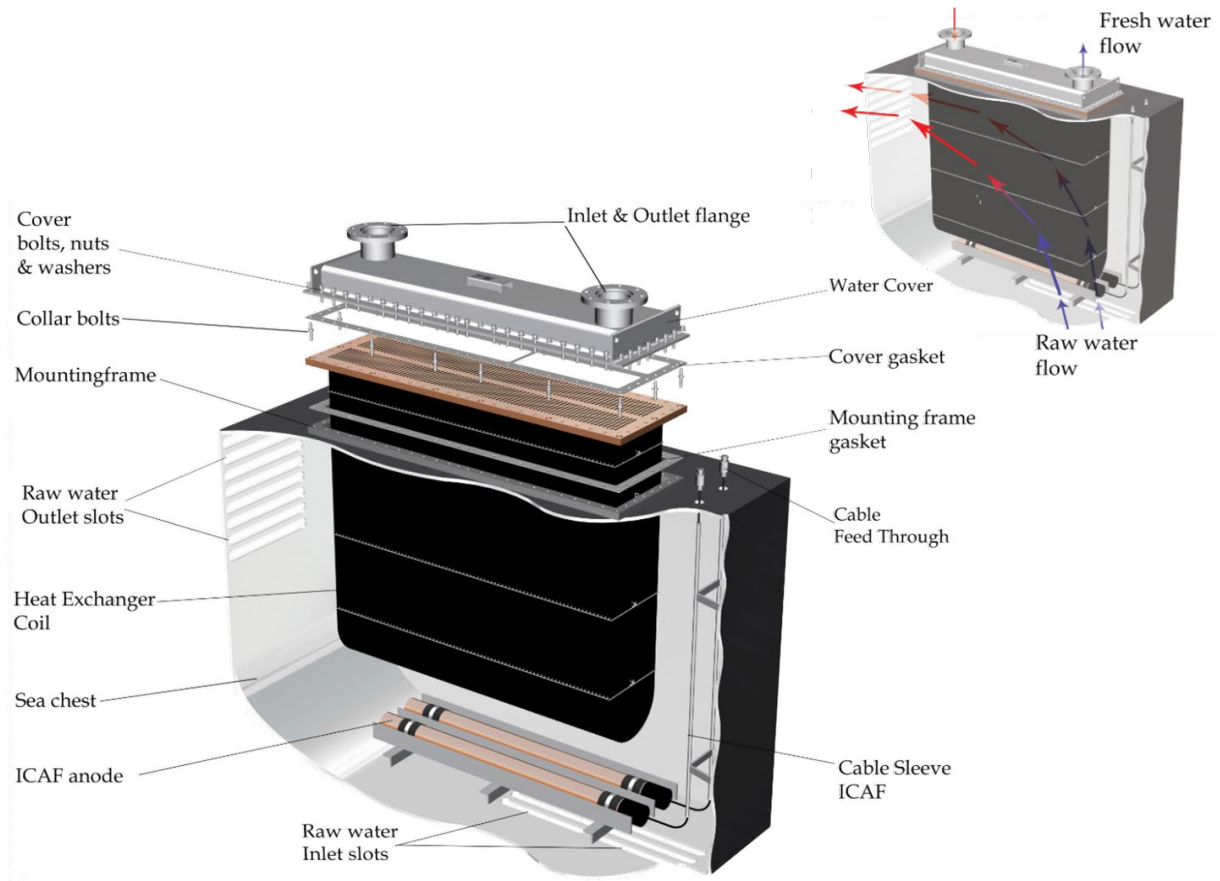
KEEP YOUR HANDS, FEET, FLOOR, WALKING OR SERVICE ZONE AROUND THE BOXCOOLER FREE FROM OIL, WATER, ANTIFREEZE, ETC. IN ORDER TO PREVENT SLIPS AND FALLS DUE TO A "SLIPEREY SURFACE ".



PRODUCT NAMEPLATE

Each box cooler has its own nameplate which shows the serial number, drawing number, volume per section and test pressure. Those tag information are very important and necessary for ordering replacement part, guarantee and service needs.

GENERAL EXPLODED VIEW



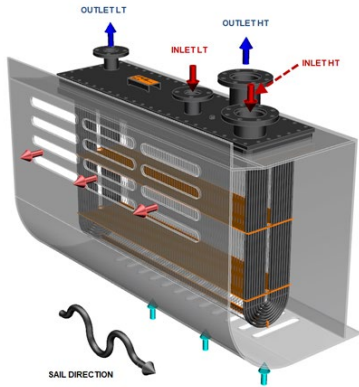
DESIGN OF THE SEA CHEST

The box cooler is suitable for a maximum internal working pressure of 3 bar. The sea chest should be positioned to ensure that the joint between the box cooler and mounting frame is never more than 30m below the water line. The sea chest should be designed and positioned in the hull to limit the local seawater velocities at the box coolers to a maximum of 2 m/s during all operations of the vessel.

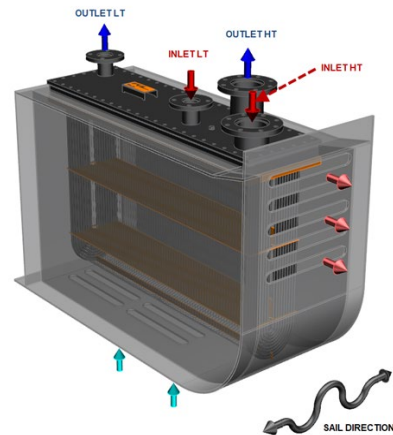
The sea chest should be designed to provide a free space of at least 100 mm (4") on all sides of each tube bundle. Large sea chests or interconnected sea chests with partially open frames can cause locally high seawater velocities that can cause serious damage to the coolers. For this reason, manufacturer recommends that not more than three box coolers should be installed in one sea chest. The frames between each sea chest should be completely closed. The frames within one sea chest should be completely open.

If the cooling system consists of more than one box cooler connected in series or parallel, then each box cooler must be installed in a separate sea chest.

Installing a low and high temperature cooling system of box coolers in the same sea chest is prohibited. Consult manufacturer if you have any doubts. If approved for coolers mounted athwart-ship, then the HT section should be located closest to the outlet grids. If approved for coolers mounted longitudinally, then the HT section should be mounted at the aft end of the sea chest.



Longitudinal orientation



Athwart-ship orientation

We recommend that seawater inlet/outlets for other systems should not be positioned in sea chests used for box coolers. If this can't be avoided then the equipment should be arranged so that it has no effect on the local seawater velocities in the area of the box coolers.

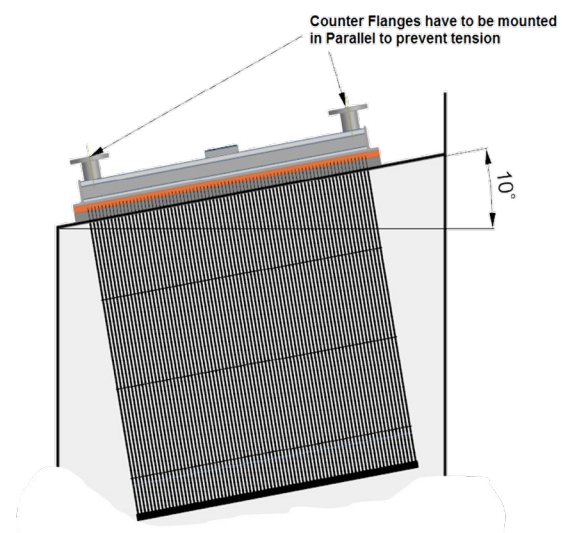
The top of the sea chest must be constructed to support the complete box cooler. A weak construction may lead to leakage between the tube-bundle and mounting frame. The top of the mounting frame, which is welded to the top-plate of the sea chest, must be located below or at the light-ship waterline.

The shape of the top plate is of great influence for the cooling. Ideally the top plate between the box cooler and the outlet grid should be inclined (e.g. 10 degrees), sloping upwards towards the uppermost outlet grids to optimize the cooling water circulation and the de-aeration of the sea chest.

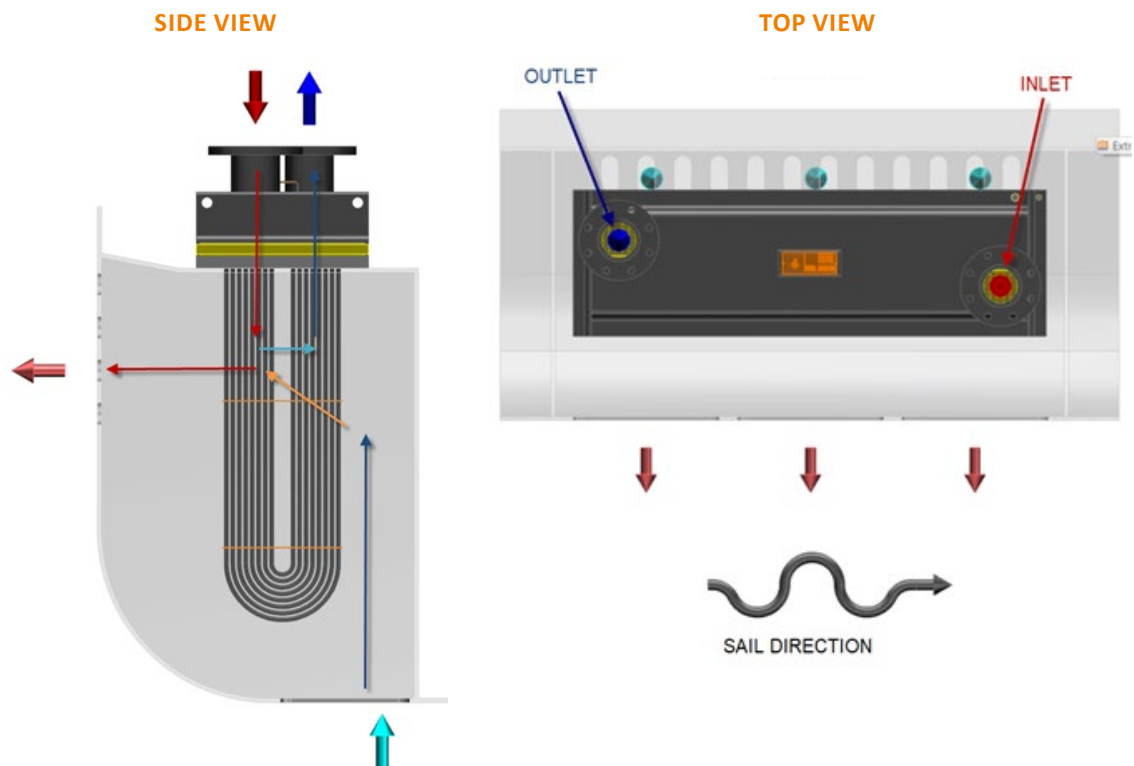
In any case, no flow-restrictions should be positioned on the underside of the top plate (e.g. stiffening ribs running across the flow direction). Such features will interrupt the flow to the outlet grids and reduce cooling capacity.

ORIENTATION AND LEVELING OF THE BOX COOLER

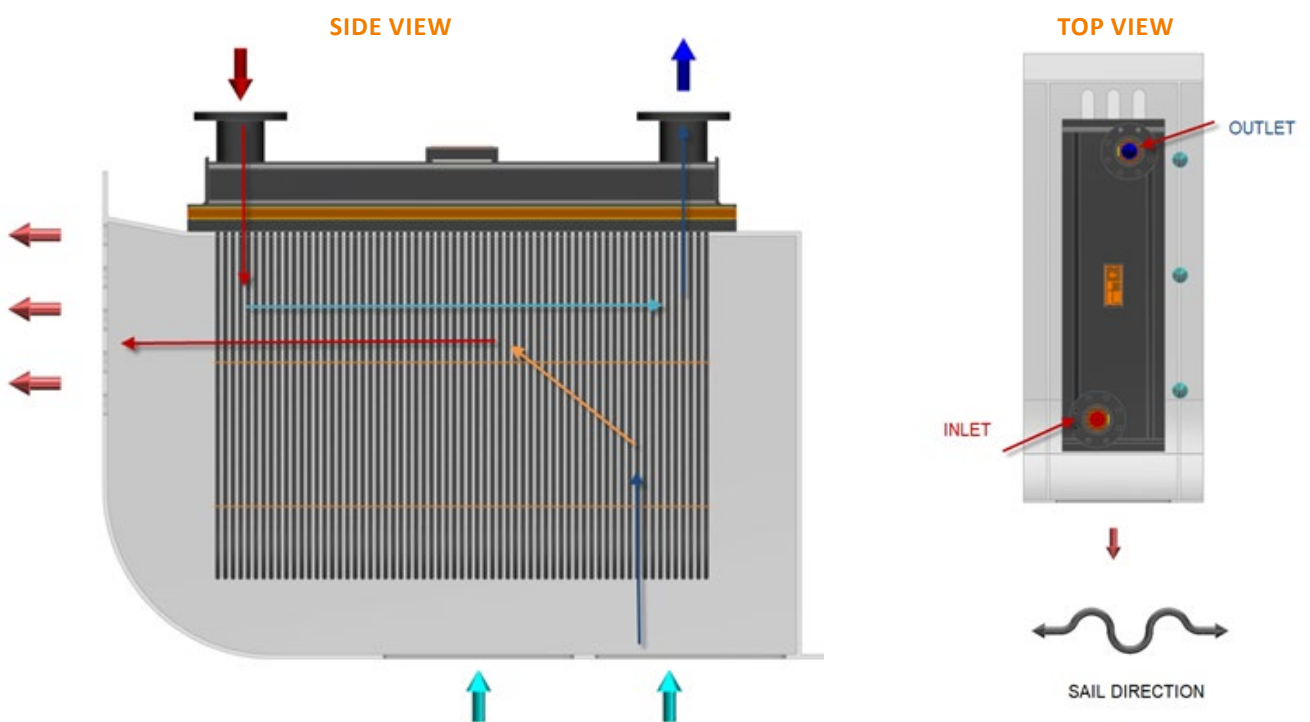
The box cooler can be positioned both athwart-ship or longitudinally. The box cooler must be set level and square so that pipe connections can be made without forcing. An inclined ($>5^\circ$) installation of the box cooler is only allowed after consulting manufacturer.



LONGITUDINAL MOUNTING



ATHWART-SHIP MOUNTING



SEAWATER INLET GRIDS IN THE SHIP'S HULL

- > **Location:** The seawater inlet grids should be located at the lowest possible position directly below the tube bundle.
- > **Orientation:** Orientation of the inlet grids must be transverse to the sailing direction. This prevents excess turbulence and high-water velocities near the lower end of the bundle
- > **Shape:** The inlet grids should be no larger than 50mm wide and 500mm long. A web distance of not less than 35mm should be used between the grids.



NO SCOOPS ARE ALLOWED

- > **Dimension:** The total area of the seawater inlet grids must be between 0,3 dm² and 0,4 dm²/ per m² cooling surface of the cooler.

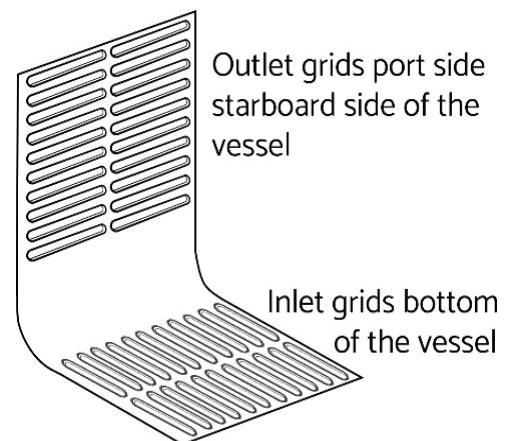
SEAWATER OUTLET GRIDS IN THE SHIP'S HULL

- > **Location:** The seawater outlet grids should be located at the highest possible position, directly under the top-plate but always below the light-ship waterline



MAXIMUM DISTANCE FROM UNDERSIDE TOP PLATE TO THE UPPERMOST OUTLET GRID IS 25MM.

- > **Orientation:** Orientation of the outlet grids must be longitudinal to the sailing direction.
- > **Shape:** The width of the outlet grids must be no larger than 70 mm. The length of approximately 100 mm shorter than the frame pitch or in any case a maximum of 500mm. A minimum web distance of 35mm should be used between grids. A pattern of holes for seawater outlet grids is strictly forbidden.
- > **Dimension:** The total area of the seawater outlet grids must be between 0,6 dm² and 1,0 dm² /per m² cooling surface of the cooler.



The actual cooling surface is mentioned on the thermal specification sheet of the supplied box cooler.

Smaller inlet or outlet grids than specified above may be possible after consulting manufacturer. Please contact manufacturer for an estimate of the total number and size of the grids required. A drawing of the sea chest with all relevant dimensions should be sent together with your request.

FITTINGS, PIPING CONSTRUCTION, AND NOZZLE LOADS

The pipe work systems must be constructed to give free access for mounting and maintenance of the box coolers. The piping must be designed and installed in such a way that the flange loads on the cover are negligible. The box cooler is not designed to serve as an anchor point for piping; this can result in damage to the box cooler and leakage.

- > **Vents:** It is advisable to install vent valves in the piping for de-aeration of the system.
- > **Drains:** The piping must be provided with drains near the box cooler. The installation of isolation valves on all drains is recommended.
- > **Valves:** We recommend installing valves in the piping system to permit inspection and repairs without draining the complete system.
- > **Anodes:** Manufacturer supplies 2 to 4 anodes with uncoated coolers. These anodes have to be installed next to each cooler.

Spare anodes can be obtained at manufacturer under Part number:

- 07710010 Anode-Length = 500
- 07710011 Anode-Length = 250

CLEARANCE FOR DISMANTLING AND CLEANING

Provide sufficient clearance above the box cooler to permit withdrawal and replacement of the tube-bundle. It is advisable to install a hoisting lug above the cooler for use during maintenance (hoisting instructions are given later in this manual). we recommend providing extra flange connections and valves in the piping near the cooler to make an easy dismounting possible.

INSTRUCTIONS FOR STORAGE

The box cooler is supplied without any conservation. If the box cooler is not to be installed immediately, then we advise that you treat the box cooler with a rust preventive liquid of a type suited for long term conservation. When conservation is necessary, contact a specialized company and ensure that the treatment used is compatible with the material of the box cooler (see specification sheet). Be aware that in uncontrolled storage conditions large amounts of water can accumulate in the heat exchanger because of condensation.

UNPACKING



THE TUBE-BUNDLE CAN EASILY BE DAMAGED. IF SMALL IS DAMAGED PLEASE REPAIR WITH REPAIR LACK/PAINT 22210105

The box cooler should be unpacked near to the job site to reduce the risk of handling damage. Steps to be followed during unpacking of the box cooler:

- A. Remove cover of the wooden packing case.
- B. Remove the mounting frame for installation on top of the sea chest.
- C. Close the packing case to protect the other parts of the box cooler until needed for installation.
- D. Remove cover and sidewalls of the packing case.
- E. Rotate the bundle as described in section 'Hoisting instructions' below.
- F. Attach the hoisting beams or eye bolts to make the bundle suitable for hoisting. Perform the hoisting as described in section below.

HOISTING INSTRUCTIONS

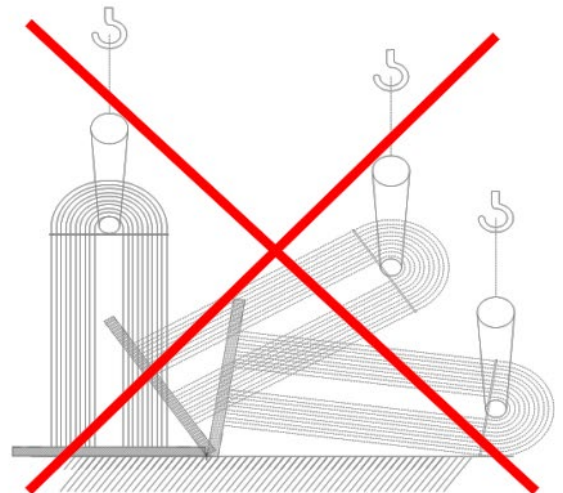
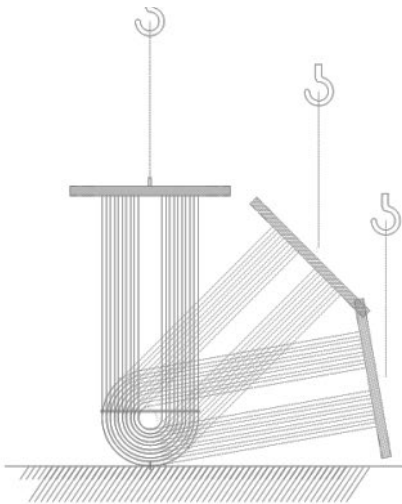
HOISTING TOOLS

Use hoisting material and tools suitable for the load. The weight of the tube bundles is stated in the specification sheet for the box cooler. There are two correct methods for hoisting of the tube bundles:

- > Use four eye-bolts M12 (DIN580; C15) according to Attachment 1. Four threaded holes are available in the tube sheet for this purpose. Eye-bolts are not supplied with the box cooler. Make sure that the load is uniformly spread over all of the eye-bolts.
- > Use a hoisting bar and beam according to Attachment 2. These may be used for hoisting the tube bundle out of the packing and to the job site. These tools are not supplied with the box cooler.

ROTATING THE TUBE BUNDLE

Each tube bundle must be rotated according to the hoisting procedure to get it into the mounting position. This operation must be performed on a flat surface, free from obstacles. Always use a protective material such as rubber between the surface and tube bundle to prevent damage.



PLACE DURING HANDLING ALWAYS RUBBER MATERIAL UNDER BENDING OF THE HAIRPINS FROM THE COIL TO PREVENT DAMAGES.



DO NOT HOIST THE TUBE BUNDLE BY USING AN AXLE, CABLES/ROPES OR CHAINS THAT ARE RUN THROUGH THE SPACE IN THE MIDDLE OF THE BUNDLE OR CONNECTED TO A SUPPORT PLATE. THIS WILL CAUSE SEVERE DAMAGE TO THE TUBE BUNDLE. ROTATING A TUBE BUNDLE BY PUSHING IT OVER AND LET IT FALL TO THE FLOOR IS NOT ALLOWED.

INSTALLATION

CUT-OUT IN TOP PLATE, MOUNTING FRAME AND FINAL PAINTING.

The mounting frame must be positioned and welded in the top-plate.

Cut a hole of the correct size in the top-plate of the sea chest. The size of the cut-out is obtained using dimension E and C as shown in attachments 4 and 5. You should consult the final drawings supplied by manufacturer for the values E and C for each box cooler together with attachment 3 or 4. The radius in each corner of the cut-out should be less than 25mm. The recommended welding arrangement is shown in attachment 3 (normal version) or attachment 4 (square version).



THE FLATNESS OF THE MOUNTING FRAME AFTER WELDING MUST BE WITHIN THE LIMITS STATED IN ATTACHMENT 4 AND 5. MACHINING OF THE MOUNTING FRAME AFTER WELDING IS NOT ALLOWED, SO PLEASE TAKE THE FLATNESS REQUIREMENTS INTO ACCOUNT WHEN WELDING.

Large mounting frames have an extra reinforcement strip between the long sides. Do not remove this until the mounting frame is welded to the top plate. Round-off all edges after welding – before the touch-up paint is applied. See also attachment 3 (normal version) or attachment 4 (square version). The inside of the sea chest and mounting frame must be adequately protected. We advise the use of an epoxy paint system after welding. This should be taken up in the painting and protection schemes for the sea chest.

MOUNTING OF THE BOX COOLER

Perform the steps as detailed in attachment 6 to mount the box cooler.

WARNING! The order of installation, fastener tightening, the tightening torque and the repeat of the tightening procedure detailed out in attachment 5 must be followed to ensure proper installation of the tube bundle and the cover.



MACHINING OF THE COVER IS NOT ALLOWED.

START-UP OPERATION

The equipment is designed for use with the conditions as specified on the specification sheet/drawing and identification plate. It must not operate at conditions that exceed these specifications.

PROTECTIVE PLUGS AND COVERS:

All nozzle openings must be inspected for foreign material. Protective plugs and covers may not be removed until just prior to connection of the piping.

DIRT REMOVAL:

The entire system should be clean before starting operation. If foreign material can be expected, the use of strainers in the piping upstream of the heat exchanger is required.

START UP:

During start-up all vent valves should be opened and left open until all passages have been purged from air and are filled with coolant.

SHUT DOWN:

When shutting down the system, the box cooler should be drained completely or filled with suitable antifreeze liquid if there is a possibility of freezing or corrosion damage. The bundle tubes can only be completely drained by disassembling the box cooler and by pouring the coolant by turning the pipe bundle upside-down.

INHIBITORS:

There can be reasons to add inhibitor to the cooling water circuit of the box cooler. Contact a specialized company to confirm the compatibility of the inhibitor with the materials of the box cooler (See specification sheet for materials of the tube bundle) Follow the instructions of the supplier for use of the inhibitor.

BOLTED JOINTS:

Due to normal relaxing of the gaskets, all external bolted joints will require re-tightening after the box cooler has reached its operating temperature. Re-tightening may only be done when the unit is cold and depressurized. The same torque wrench moment as mentioned in section 'Installation' step 1 and 2 is applicable.

MAINTENANCE

REMOVAL OF THE COVER:

Depressurize and drain the cooling system by closing the valves in the inlet- and outlet piping of the box cooler. The ship must be trimmed in such a way that the top plate of the box cooler is not more than 0,5m below the waterline. Loosen the hexagon bolts and the nuts on the collar bolts but do not remove them. Wait until the remaining coolant has leaked out between the tube sheet and the cover. If water leaks between the tube sheet and the mounting frame, tighten the collar bolts/inside hexagon socket head screws in such a way that the leaking stops.



**DO NOT PROCEED IF WATER CONTINUES TO LEAK BETWEEN THE TUBE SHEET AND THE MOUNTING FRAME.
NEVER LOOSEN THE COLLAR BOLTS /INSIDE HEXAGON SOCKET HEAD SCREWS WHILE THE SHIP IS IN OPERATION!**



TO PREVENT MOVING OF THE GASKET BY WATER PRESSURE REPLACE THE HEXAGONAL BOLTS BY THREADED ROD!

The hexagon bolts and the cover can now be removed.

REMOVAL OF THE INSIDE MOUNTED BOX COOLER:

To allow removal of the box cooler the top plate of the box cooler must be at least 0,2m above any remaining water surrounding the ship. Follow the procedure above, drain the system and remove the cover. The collar bolts / inside hexagon socket head screws can now be removed, and the tube bundle hoisted to the required position following the hoisting instructions shown in this manual.



THE BOX COOLER SHOULD NEVER BE REMOVED WHILE THE SHIP IS IN OPERATION!

INSPECTION:

At regular intervals i.e. docking periods of the ship, an examination should be carried out to check the exterior condition of the box cooler. The sea chest should also be inspected for dirt and the condition of anti-fouling (e.g. paint system and ICAF system). The sacrificial anodes in the sea chest should be cleaned or replaced. The interior condition of the cooler (inside the cooler) does not require examination.

CLEANING:

Uncoated and coated coolers can be cleaned with steam or chemical agents:

- **Steam cleaning:** With steam cleaning the maximum temperature should be limited to maximum 120°C. In principle, cleaning time of the surface should not exceed more than half an hour.
- **Chemical cleaning:** We advise that chemical cleaning should only be performed by specialized/certified companies. The coating is resistant to short-term exposure to common detergents and cleaning agents in the range PH4 – PH9.
- Internal cleaning of the tube bundle can be done by using foam pigs (Art.nr.27150806) . The special oversized “Foam Pigs” can be pressed through the tubes by using compressed air. Both for dry and wet applications. Minimum pressure to be used by the Jet launcher is 4.5 Bar Max 6.9 Bar.



THE USE OF A HIGH PRESSURE WATER INSTALLATION TO CLEAN BOX COOLERS IS NOT ALLOWED. THIS CAN DAMAGE THE COOLER WHEN REMOVING BARNACLES AND OTHER OBJECTS THAT STICK TO THE TUBES!

IDENTIFYING LEAKING TUBES:

Extreme weather conditions, collision and objects entering the sea chest can damage the tube bundles of the box cooler causing leakage. Such damage can be overcome or repaired:

- **If the ship is afloat:** Remove the cover following the instructions shown above.



DO NOT PROCEED IF WATER CONTINUES TO LEAK BETWEEN THE TUBE SHEET AND THE MOUNTING FRAME. NEVER LOOSEN THE COLLAR BOLTS /INSIDE HEXAGON SOCKET HEAD SCREWS WHILE THE SHIP IS AFLOAT.

The pressure acting on the outside of the bundle will fill the leaking tube with water making identification of the leak possible. Leaking tubes can be plugged-off with brass conical plugs. Do not apply too much of force when installing a plug. This will cause deformation of the tube sheet that will result in leakage of the surrounding tubes. Conical plugs of the correct size are obtainable at manufacturer (Art nr.07700017 2 per hairpin).

- **If the ship is in dry-docking:** Depressurize and drain the cooling water system by closing the valves of the inlet- and outlet piping of the box cooler. Remove the cover. The tube that loses water is the leaking one. If the damage is so small that you cannot trace it visually, then re-install the cover, blind-off the flanges and connect on one of the blind flanges a compressed air connection. Bring the cooler under pressure with compressed air (max 3 Bar). Depressurize, remove the cover and check again which tube contains no water.

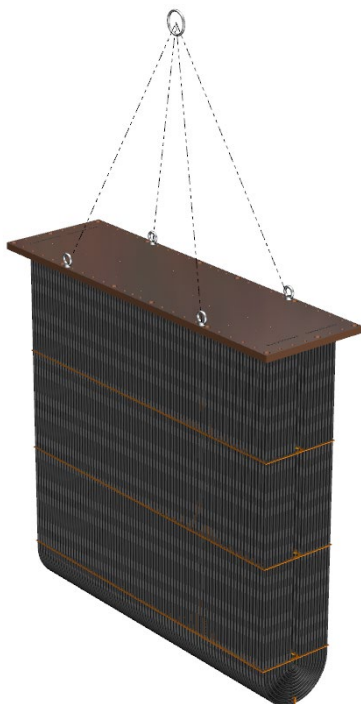
PERFORMANCE FAILURES

The failure of the box cooler to perform satisfactorily may be caused by one or more factors, such as:

- A. Excessive fouling at the outside of the tubes.
Solution: clean tube bundle according to the [Maintenance](#) section.
If fouling becomes a frequent problem, then installation of an anti-fouling system should be considered. Contact manufacturer
- B. Presence of air or gas, resulting from improper piping installation or lack of suitable vents.
Solution: Vent the complete system
- C. Restricted outboard water flow
Solution: Check the inlet- and outlet openings for restrictions
Check for air-trap in the upper region of the sea chest
Check size of the openings and/or consult manufacturer.
- D. Operating conditions differ from design conditions.
- E. Thermal specification of box cooler does not comply with actual values.

ATTACHMENT 1: HOISTING EYE BOLTS

M12 or M16 lifting eye bolt Class C15 // Angle of rope between 0 and 30°

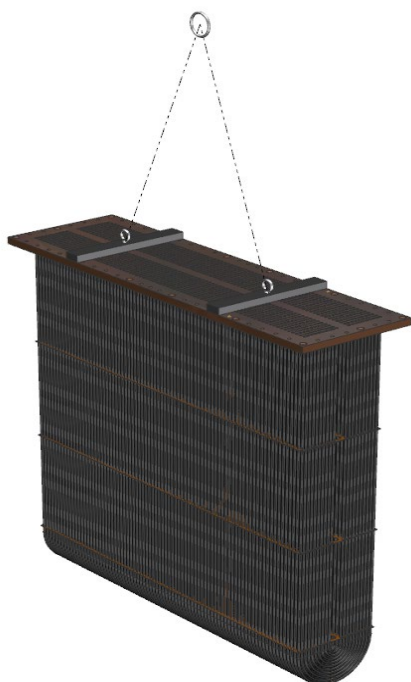


Option 1: till 2140 kg



Option 2: Max till 600 kg

ATTACHMENT 2: HOISTING BEAM



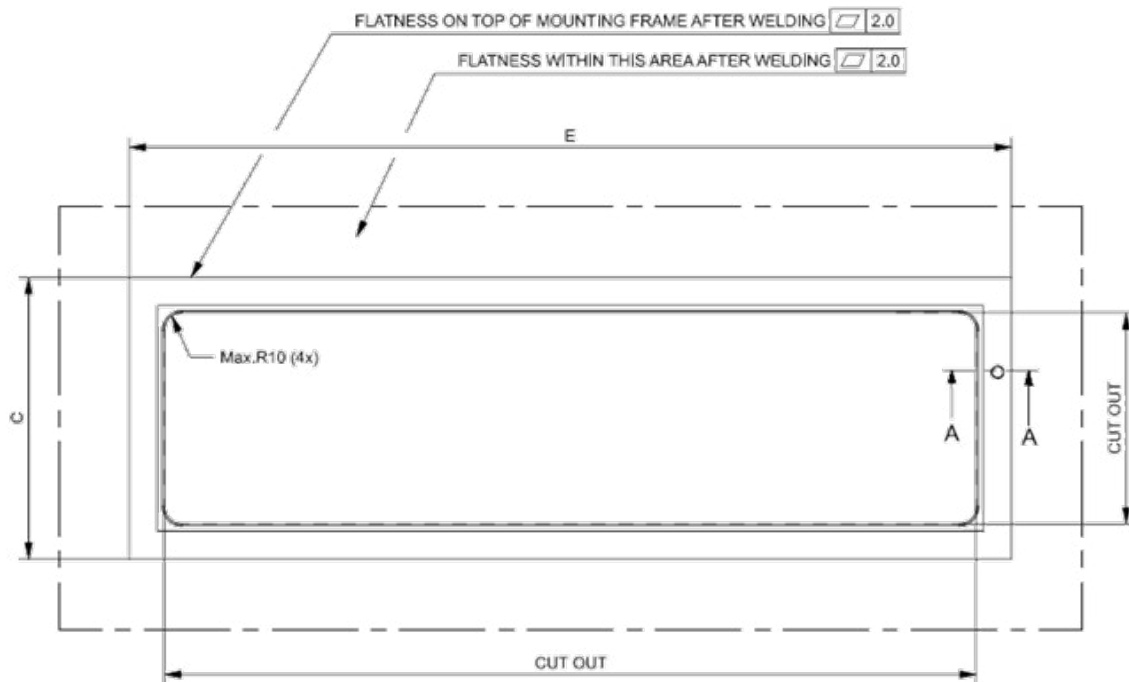
M16 lifting eye bolt Class C15 // Angle of rope between 0 and 30°

Use hexagon bolts for mounting beams on the tubesheet have to be M16 class 8.8

Note: can't be used to position the bottom pull mounted tube bundle for installation

ATTACHMENT 3: MOUNTING FRAME INSTALLATION AND WELDING RECOMMENDATION RECTANGULAR TYPE BOX COOLERS

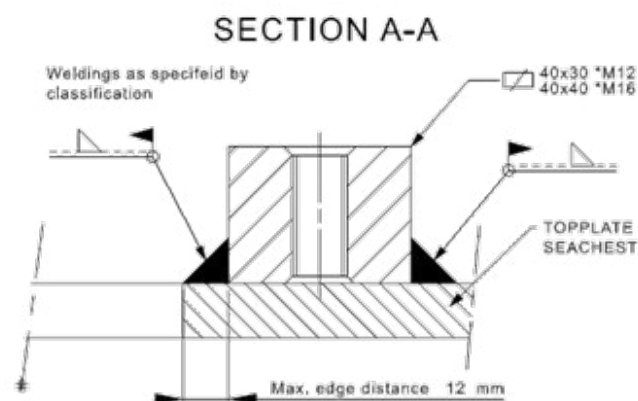
NOTE: These are general mounting recommendations; If any Classification Society Guidelines need to be fulfilled, please check the updated version in the corresponding official website.



SIZE OF HOLE TO BE CUT IN TOPPLATE OF SEACHEST:

LENGTH (MIN) = E-100mm.

WIDTH (MIN) = C-100mm.

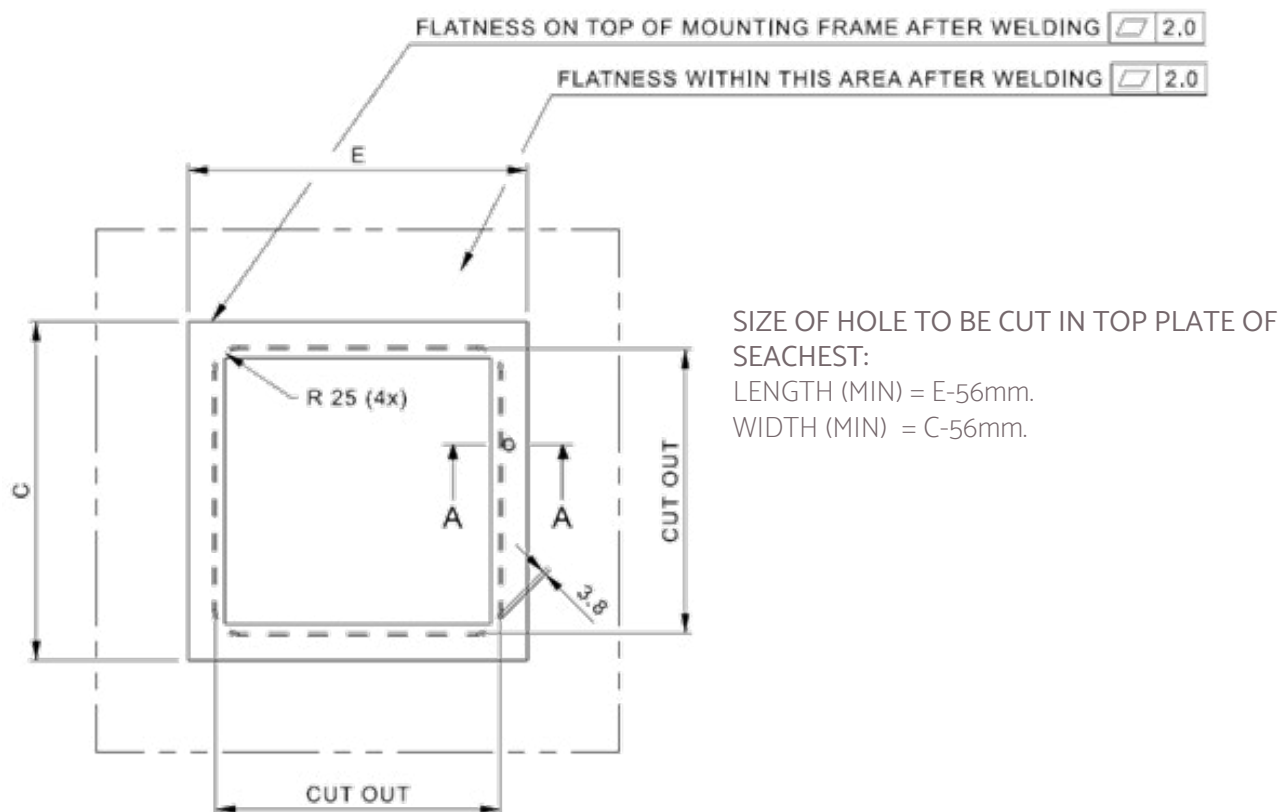


NOTE:

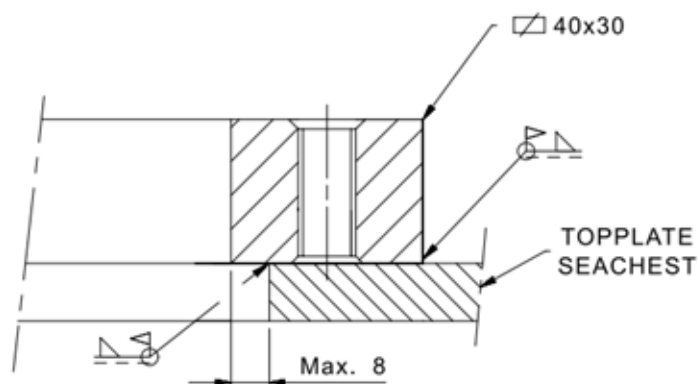
- > Section A-A shows general welding recommendations.
- > Check Classification Society guidelines if they are required.
- > Welds non-destructive testing in accordance with the requirements of the classification society.

ATTACHMENT 4: MOUNTING FRAME INSTALLATION AND WELDING RECOMMENDATION SQUARE TYPE BOX COOLERS

NOTE: These are general mounting recommendations; If any Classification Society Guidelines need to be fulfilled, please check the updated version in the corresponding official website.



SECTION A-A



NOTE:

- > Section A-A shows general welding recommendations.
- > Check Classification Society guidelines if they are required.
- > Welds non-destructive testing in accordance with the requirements of the classification society.

ATTACHMENT 5: MOUNTING INSTRUCTIONS FOR BOX COOLERS

Perform the following steps during mounting of the box cooler.

- > **Step 1**
Place mounting frame gasket (without web) into position on the mounting frame.
- > **Step 2**
Place the tube bundle in position of the mounting frame. For hoisting instructions, see Instruction Manual section 'Hoisting instruction'.



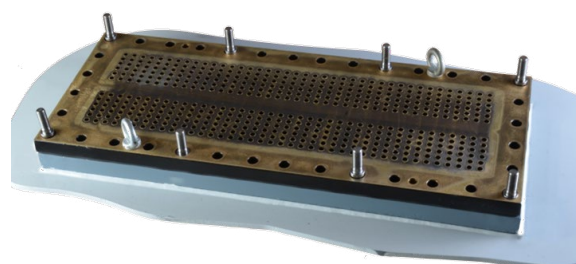
FOR POSITIONING GASKETS, BUNDLE/COIL AND COVER WE ADVISE TO PLACE 4 M12/M16 THREADED ROD NEAR THE CORNERS (NOT ON THE POSITIONS WHERE THE COLLAR BOLTS ARE POSITIONED).

Collar bolts version:

Install the collar bolts in the stepped holes of the tube sheet.

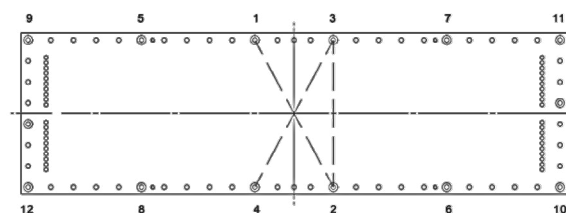


Put collar bolt with longest part into stepped holes of tube plate.



Screw the collar bolts into the under laying mounting frame by hand.

Tighten collar bolts following a diametrically staggered pattern (see drawing for typical example).



Repeat this pattern at least 3 times until all collar bolts support a torque wrench moment of:

M12: 55 – 65 Nm

M16: 65 – 75 Nm.

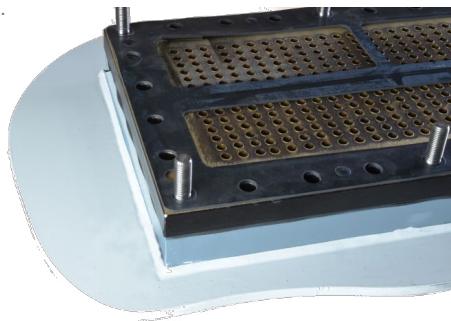
To get grip on these bolts you can use a double nut arrangement. After installation it is advised to conserve the collar bolts and nuts with electrically conductive grease (Marine grade anti-seize).

Internal hexagon socket head screw version:

Install the internal hexagon socket head screws and washers in the stepped holes of the tube sheet using the same procedure and order of tightening as described until all bolts support a torque wrench moment of 55 - 65Nm. After installation it is advised to conserve the screws with electrically conductive grease (Marine grade anti-seize).

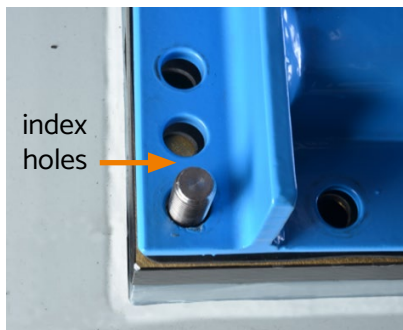
> Step 3

Place the cover gasket (with web) on the tube sheet and confirm that the gasket web matches the position of partition plates on the cover. An extra hole is made in the bolt circle to check the correct position of the gasket and cover versus the tube sheet.



> Step 4

Position the cover and install all hexagon bolts.



Check if the index hole matches the index in the gasket to ensure the gasket position is right.

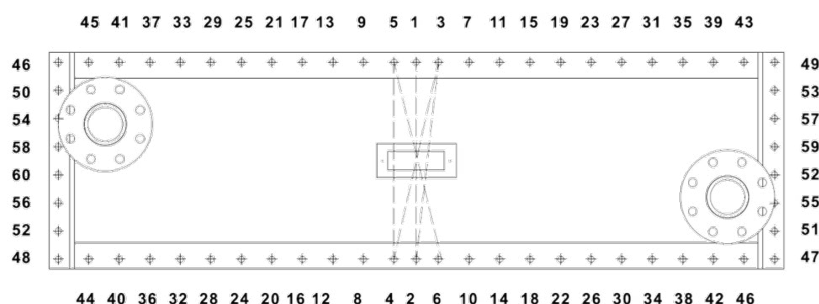


Tighten the Bolts and nuts

It is important that these bolts are tightened following a diametrically staggered pattern as shown here. Repeat this pattern for 2 or 3 times until all bolts support a torque wrench moment of:

M12: 55 - 80Nm

M16: 65 - 80Nm.



Thereafter fit the nuts to the collar bolts and tighten to support a torque wrench moment of:

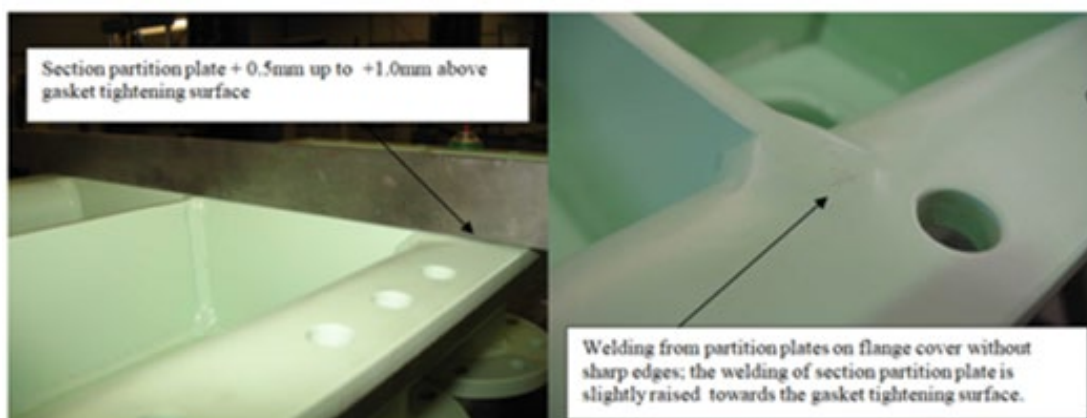
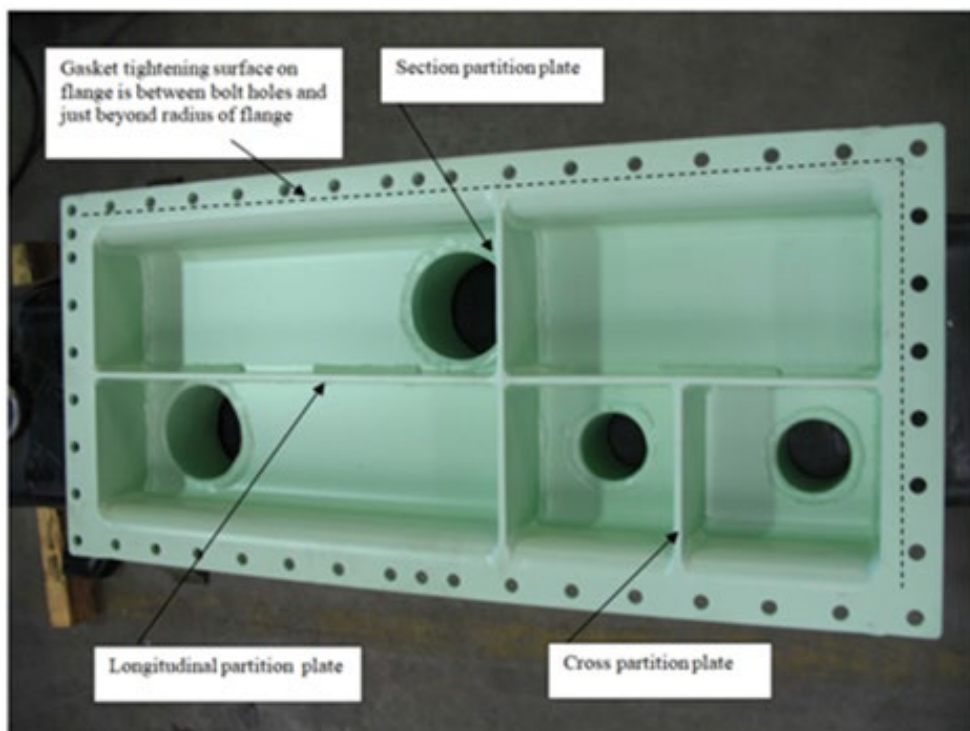
M12: 55 – 65 Nm

M16: 65 – 75 Nm.

After installation it is advised to conserve the collar bolts and nuts with electrical conductive grease (Marine grade anti-seize).

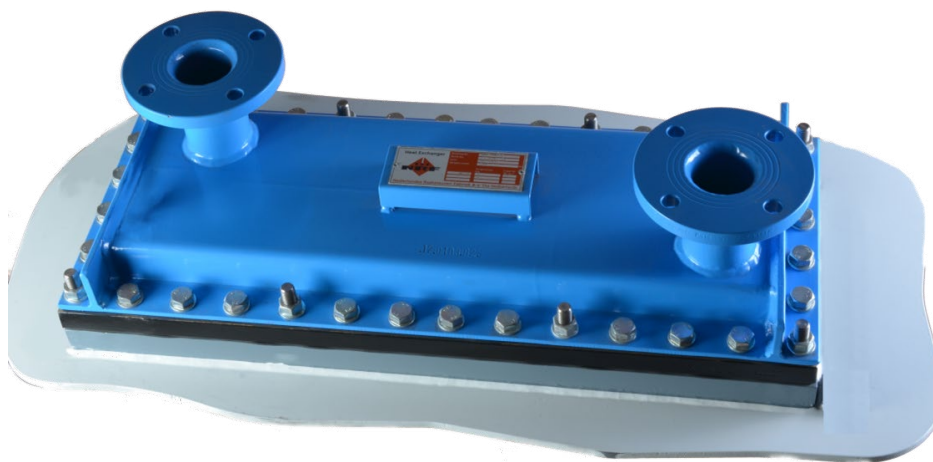
IMPORTANT INFORMATION FOR INSTALLING A MULTI-SECTION COVER

Pictures multi-section cover:



Note: It is not allowed to grind the section partition plate flat.

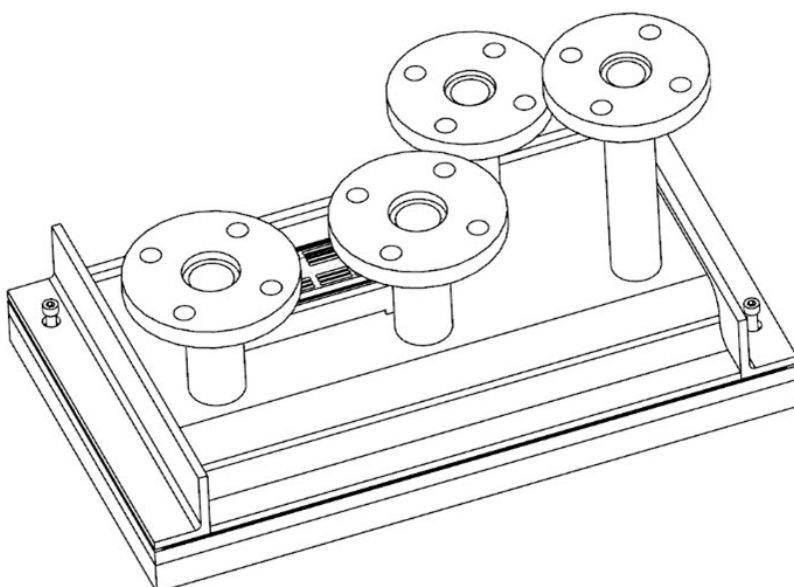
When tightening the bolts, the section partition plate may be regarded the starting position for the diametrical staggered pattern.



- > Step 5
Twist two M8 rivet with bolts in the open cover holes.



CHECK REGULARLY IF THE BOLTS TIGHTEN.



- > Step 6
Connect the piping. Position the piping at the connection points and confirm that the flanges meet up without loading the cover. If necessary, adjust the pipe work to properly match the installed position of the cooler. Install jointing and tighten according to the recommendations of the pipe system design.

ATTACHMENT 5: ORDER FORM SPARE PARTS

EXAMPLE INFORMATION BOX COOLER REFERENCES:

MENTIONED ON NAMEPLATE POSITIONED ON THE COVER		
Serial number/Reference number		"position 1"
Drawing number		"position 2"
MENTIONED ON THE DRAWING	Quantity	Evt. Ref. number
Collar bolts		Dep. Serial number
Cover		Mentioned on drawing
Mounting frame		Mentioned on drawing
Bundle		Mentioned on drawing
Cover gasket		Mentioned on drawing
Mounting frame gasket		Mentioned on drawing
Mounting frame		Dep. Serial number
GENERAL SPARE OPTION		
Conical plugs		07700017
Bundle repair lack/paint "small surfaces"		22210105
Stabilization clip		09401203
Cleaning Foam-pigs (100 pcs)		27150806

Heat Exchanger 	Drawing No.	Position 2
	Serial No.	Position 1
	Date	
	Weight empty	KG
	Testpressure	Capacity
	bar	10 m
Nederlandse Radiateurs Fabriek B.V. The Netherlands		

*If nameplate is missing see tip below.

IF NAMEPLATE IS MISSING

If the Nameplate on the boxcooler cover is missing a unique ref. number is also punched on the side of the tubesheet. This number can also be used to identify the bundle.

Build-up of the reference numbers are:

XX XXXX XL

X = Number

L = Letter



Nederlandse Radiateurs Fabriek Thermal engineering B.V. shall expressly retain ownership of goods delivered until full and final settlement of the price, interest, and related expenses. Failure to make any one payment upon due date may result in a claim for the return of the goods. These conditions shall not prevent the transfer to purchaser, upon delivery, of all risks of loss or damage to the goods sold or any damage that they may cause. Purchaser shall be obliged to monitor the good condition of the goods, not to sell pledge or in other way dispose of the goods or part thereof, until such time as full title shall be transferred to him.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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