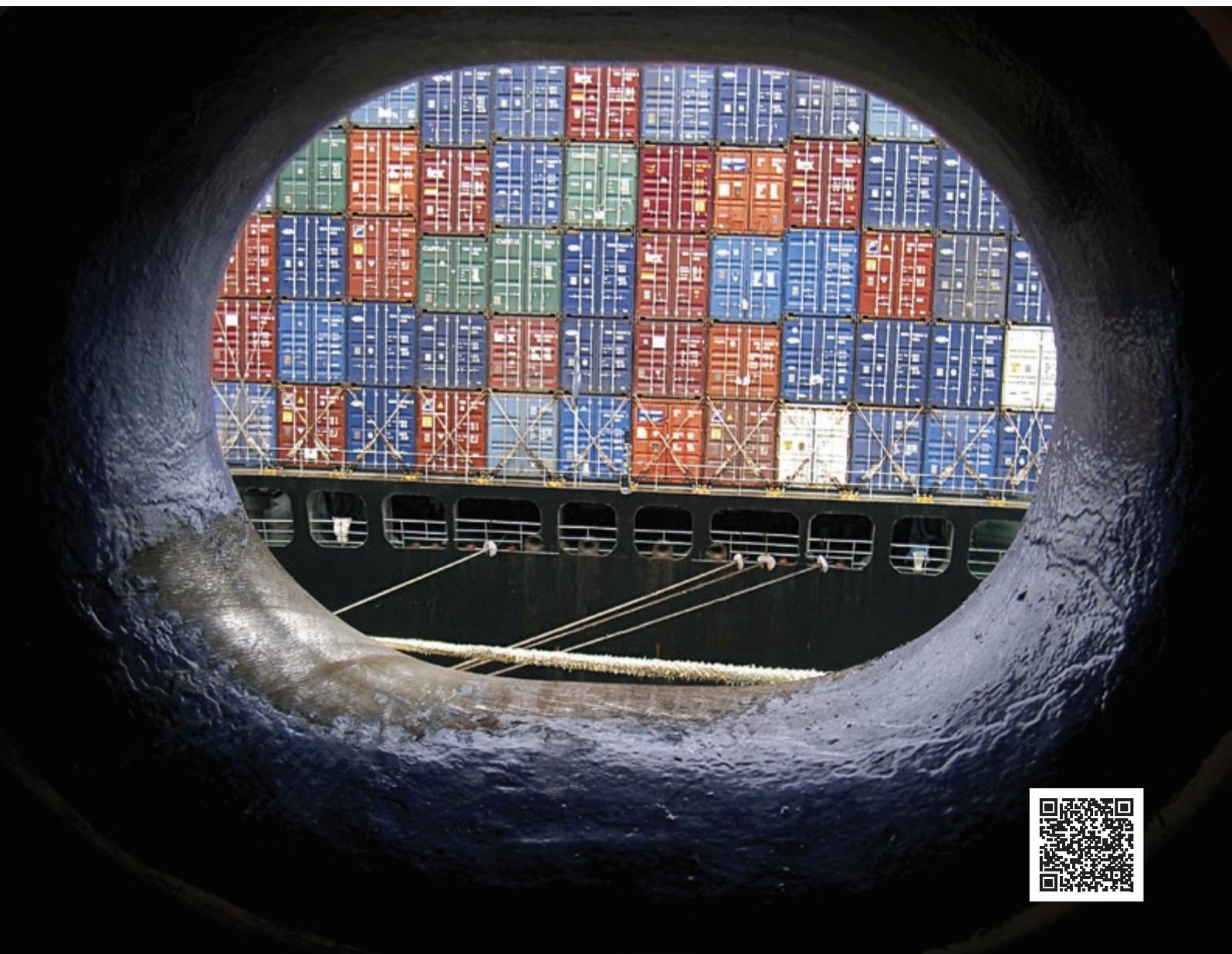


Container securing systems

Product catalogue



MACGREGOR

Designed to perform with the sea

Passion for performance – united by the sea

MacGregor is a family of innovators. By engineering solutions that make the sea more accessible, safe and reliable, we support you whose livelihood depends on the changing conditions of the sea. To enable that we have a variety of strong product brands and committed experts with a passion for solving challenges – and the power of the sea is sure to provide those.

Our founders braved new frontiers in different times and places. Those origins merge at today's MacGregor, inspiring us to continue the stories, and create new ones. The spirit of our founders lives on in the pride we have for what we do, and our determination to find new solutions for the people we work with. Together with you we will write the next chapters.

We are a global team of professionals, who create value for you; the shipbuilders, owners and operators,

in the offshore and marine industries. Understanding your business and way of life is key to our work. It is the foundation to addressing your needs with tailored solutions for load handling, cargo handling, mooring or essential auxiliary equipment. Your productivity, sustainability, and equipment lifetime benefit from our combination of expertise and technology. As innovators, we work together with you to set benchmarks in innovative solutions and value creation. Our deep respect for and experience of the sea lays the foundation for adapting to its challenging conditions. Wherever we work around the world, we work together with a passion for performance and a love of challenges – united by the sea. Our shared values - integrity, quality and safety - propel us forward, and are an important factor in our ability to continue to deliver what our customers need to succeed; solutions that are *designed to perform with the sea.*



MACGREGOR

Designed to perform with the sea

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Contents

| | | | |
|--|-----------|---------------------------------------|-----------|
| The birth of a ship | 9 | Fixed container fittings | 93 |
| Container stowage solutions | 10 | Twistlock foundations..... | 94 |
| Container lashings from drawing board to operation | 12 | Lifting foundations..... | 103 |
| Container securing | 14 | Dovetail foundations | 104 |
| Commissioning and training..... | 32 | Sliding foundations | 105 |
| Always in the lead | 34 | Twistlock pockets | 108 |
| Lifetime support | 36 | Guide fittings..... | 110 |
| Cargo securing systems | 38 | Lashing rings | 111 |
| | | Lashing eyes..... | 113 |
| | | Lashing plates..... | 114 |
| | | Lashing pots..... | 117 |
| | | Doubling plates..... | 118 |
| | | Welding cones | 119 |
| | | Counter bearings | 120 |
| | | Stack splitter..... | 122 |
| | | Tools..... | 124 |
| PRODUCT SECTION | | | |
| Product Catalogue | 47 | | |
| Lashmate stowage calculation software | 48 | | |
| Loose container fittings | 49 | | |
| Automatic twistlocks..... | 50 | | |
| Semi-automatic twistlocks | 51 | | |
| Manual twistlocks | 54 | | |
| Dovetail twistlocks | 56 | | |
| Terminal stackers | 58 | | |
| Midlocks | 63 | | |
| Turnbuckles | 65 | | |
| Lashing bars..... | 72 | | |
| Operating rods..... | 81 | | |
| Stacking cones..... | 83 | | |
| Bridge fittings..... | 85 | | |
| Pressure elements | 86 | | |
| Pressure adapters..... | 87 | | |
| Terminal pressure stackers..... | 88 | | |
| Tension pressure elements..... | 89 | | |
| Flat racks and storage bins | 90 | | |
| Reefer platform | 91 | | |
| Accessories | 92 | | |





The birth of a ship

The design criteria for a feeder vessel's container stowage solution differ completely from the criteria for an ultra large container carrier, and so do their container securing systems. Whatever the size of the vessel, MacGregor knows how to design and deliver an efficient cargo handling and stowage system for containerised cargo.

We know how to get all the parts of this system to work in unison, ensuring that your vessel sails with the best possible performance.

A vessel designed for its cargo

Building a new vessel is a major investment and the decisions taken at the early design phase will define the loading capacity throughout the vessel's lifetime. Optimisation of the loading capacity can lead to increased earnings. For example, a lower centre of gravity allows a better cargo mix, or in a best case scenario, the vessel may be able to carry one extra tier of loaded containers.

We can be your advisor from when the earliest ideas for your new vessel are conceived, your design expert during the project through to delivery, and your service partner throughout the vessel's lifetime.

MacGregor's involvement at an early stage in the process makes it possible to achieve an optimised custom-made container stowage solution, with a lashing system designed for all operational criteria.

The design of the container stowage solution for a new vessel involves many different steps. At MacGregor we know what is needed to ensure that all parties get the correct information at all stages of the project. We can deliver the total solution including all documentation from, for example, the initial loading concept and full vessel stack weight calculations to the offset drawing needed for fixed fitting welding positions and the final cargo securing manual.

Before the final design is fixed we perform a full scale mock-up test to verify the performance of the lashing system. We also consider elements such as the locations of hand rails and other structures that might interfere with lashing equipment. When everything is designed, tested, manufactured and approved, all relevant documentation is made available in the cargo securing manual needed on board for the vessel's maiden voyage.



An aerial photograph of a container ship's deck. The deck is filled with stacks of blue and red containers. A large crane is visible at the top of the frame. A red forklift is positioned on the deck. The ship's hull is visible at the bottom, with various markings and numbers. A red rectangular box is overlaid on the right side of the image, containing the text 'Container stowage solutions'.

Container stowage solutions

The best container stowage solutions are built around their intended cargo

All elements of the container stowage solution influence each other; understanding all these elements is necessary to define critical areas and find the best possible solutions.

An efficient container stowage solution can only be achieved by treating the ship's hull and its cargo handling system as a single optimised entity, not as separate blocks. Consequently, parts of the container stowage system, such as the hatch covers, lashing bridges, container stanchions, loose and fixed container fittings on deck and in the holds, and the cell guide system in the cargo holds, should be considered from an overall container stowage solution point of view, not as separate products.

MacGregor is unique as the only supplier who can design and deliver all these products for you and this enables us to take a whole-ship approach to make the most of each ship's container stowage system.



Hatch covers



Lashing bridges



Container fittings on deck



Loose container fittings (twistlocks, lashing bars, turnbuckles)



Container stanchions



Cell guides in hold

Built-in efficiency:

“The more efficient the container stowage solution is, the greater the number of TEUs a ship can carry, which, in turn, reduces the cost and emissions per carried TEU and subsequently per transported commodity, and at the same time increases the ship's profitability and income.”

Container lashings from drawing board to operation

Why should we know about your cargo profile?

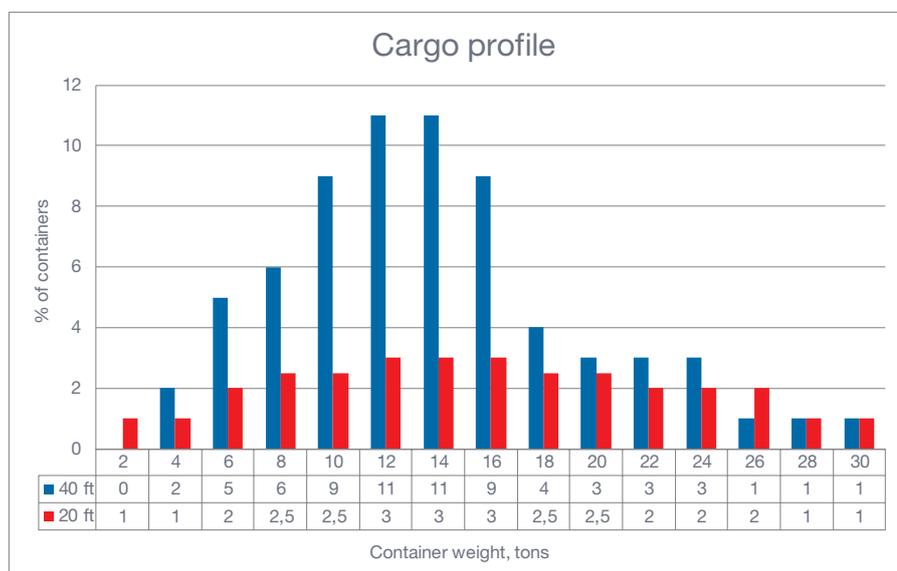
One of the cornerstones of the way we work is to improve the productivity of our customers' cargo handling systems, helping them to increase both their competitiveness and their environmental efficiency.

With the right indicators, which lead to the right design parameters for your vessel and its cargo handling system, we can maximise the amount of cargo carried in relation to deadweight tonnage. The onboard distribution of heavy and light containers, and subsequently total cargo weight, should therefore be one of the main factors when making decisions around a new vessel project.

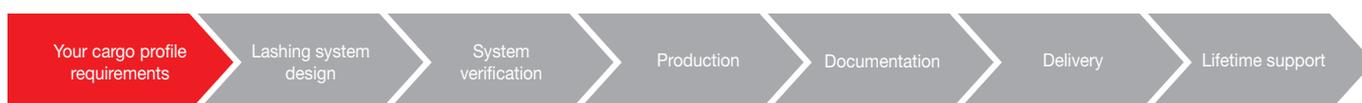
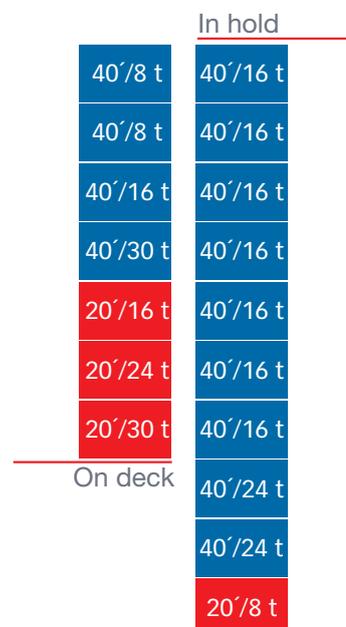
We believe that defining the cargo profile should be the cornerstone and starting point for the ship design process and its container stowage solution. A container

vessel is designed to carry a maximum number of containers loaded in hold and on deck. The traditional method for deciding this figure has been twofold: the first being the total number of boxes allowed by visibility rules from the bridge; and the second one is the homogeneous loading limited by the displacement of the hull. Both of these considerations lead to different maximum capacity calculations, with a significant dispersion. To avoid this we need to know more about the ship's cargo profile at an early stage of the project.

Change is inevitable and can happen if a vessel is re-located to operate on another route or when the charter period ends and a new charterer takes up the operation. Therefore, when designing the ship, consideration must be given both to the initial cargo profile and to the flexibility necessary to accommodate possible future changes to the cargo profile.

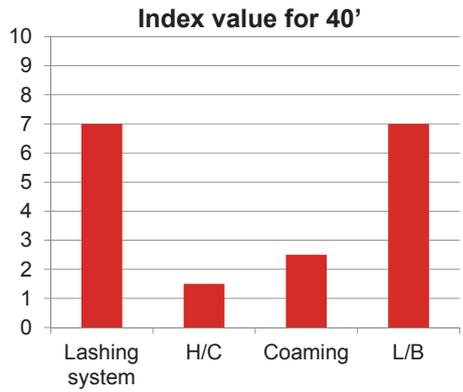
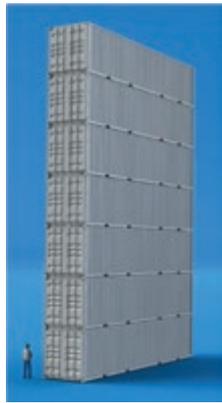


MacGregor defines cargo profile as the distribution of containers on board a ship in terms of container sizes and container weights, on a certain route



Critical components of the container stowage solution

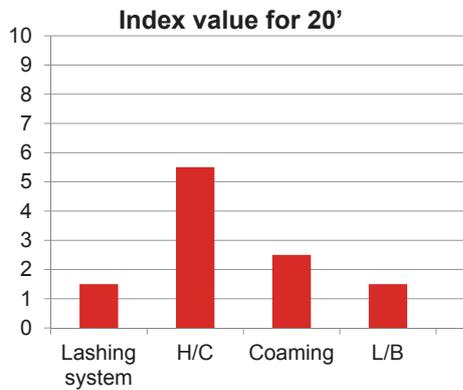
With regard to deck systems, the different components of the container stowage solution have individual design features for different container loading scenarios, which depend on the cargo profile, the number of different container sizes and the weight range.



Cargo system index value of 40' containers

When determining the container stowage system, it is important to consider the effect of different loading requirements that have an impact on individual components.

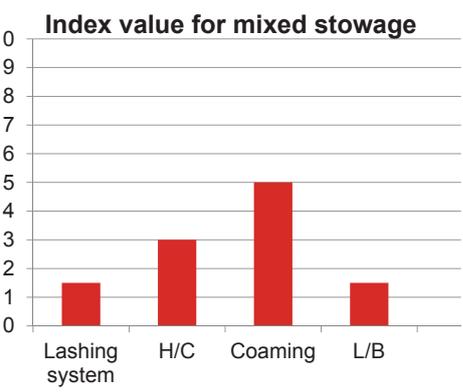
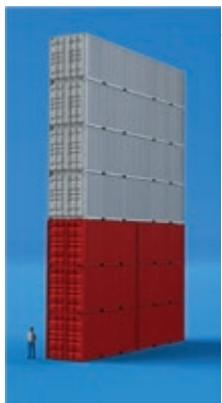
From the 40' container loading example, it can be seen that major effects come from the container lashing system and lashing bridge design, leaving hatch covers and coamings playing a smaller role, as shown in Figure 1.



Cargo system index value of 20' containers

On the other hand, for 20' container loading, hatch covers play a significant role, but can be easily handled with the 40' container lashing system, as seen in Figure 2.

Finally, mixed loading of 20' and 40' containers has a significant effect on the coaming, through the increased slot weight, as shown in Figure 3. This means that the arrangement of the bearing pad system on the coaming needs careful consideration.



Cargo system index value of mixed stowage



Container securing

It is all about cargo safety.

The container is a weak box loaded with heavy cargo inside and above. The mass of the cargo is accelerated by the six types of movement of a ship in response to sea conditions and by additional forces from wind and green seas. To handle these forces, and to secure the valuable cargo, containers need to be further stabilised and secured by lashing equipment.

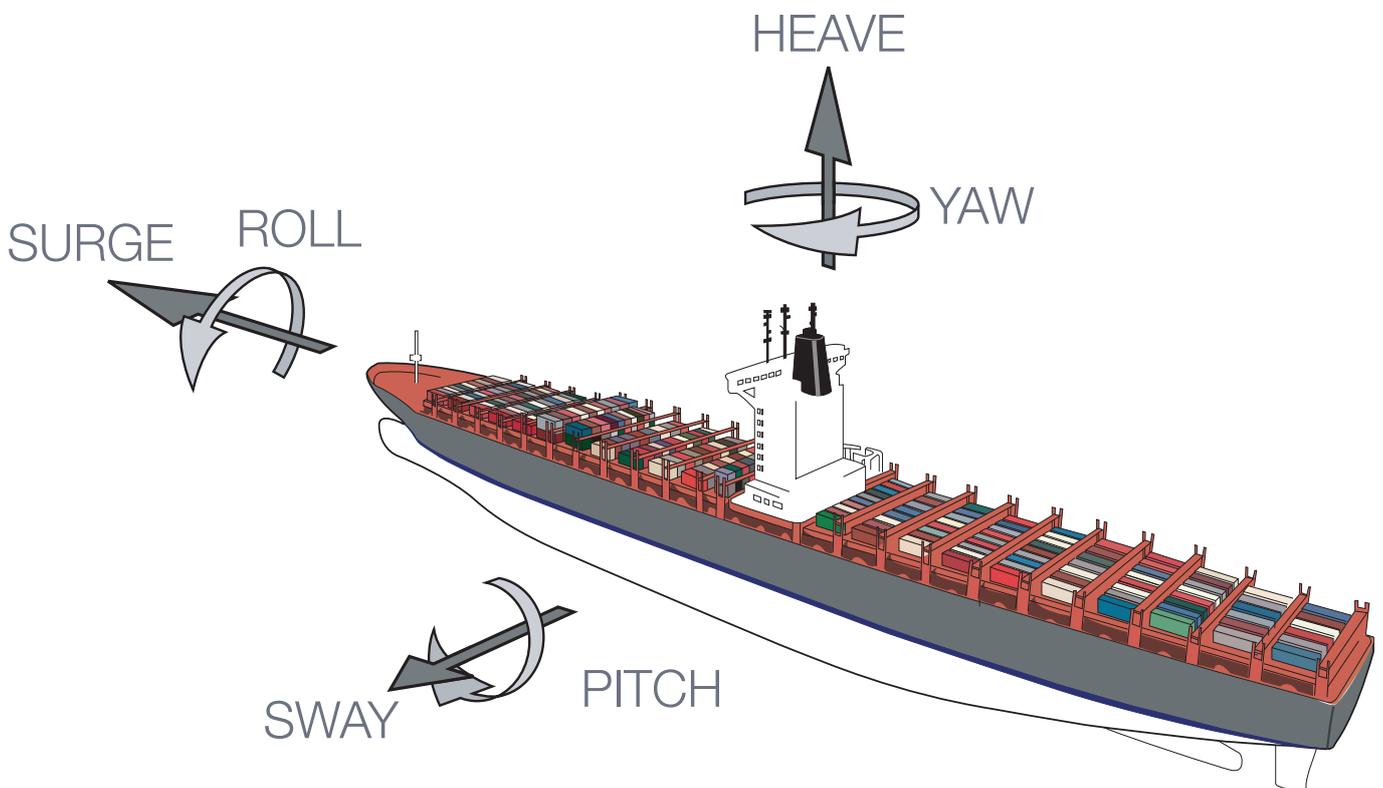
MacGregor container stowage solutions are your first choice for the highest cargo safety standards. Innovative

product design, together with high grade materials and uncompromised quality standards, ensure that your vessel will perform at its peak from its maiden journey throughout its lifetime.

MacGregor has always been the pioneering brand in the container cargo securing market, bringing value adding solutions to your container vessel operation. And we continue to do so with our intensive cargo system solutions research and development activity.

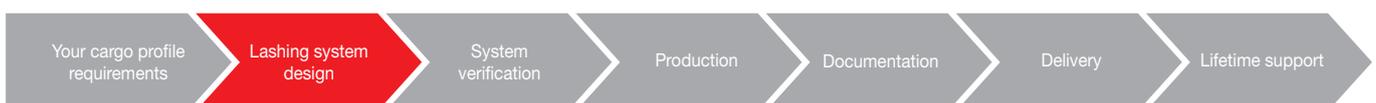
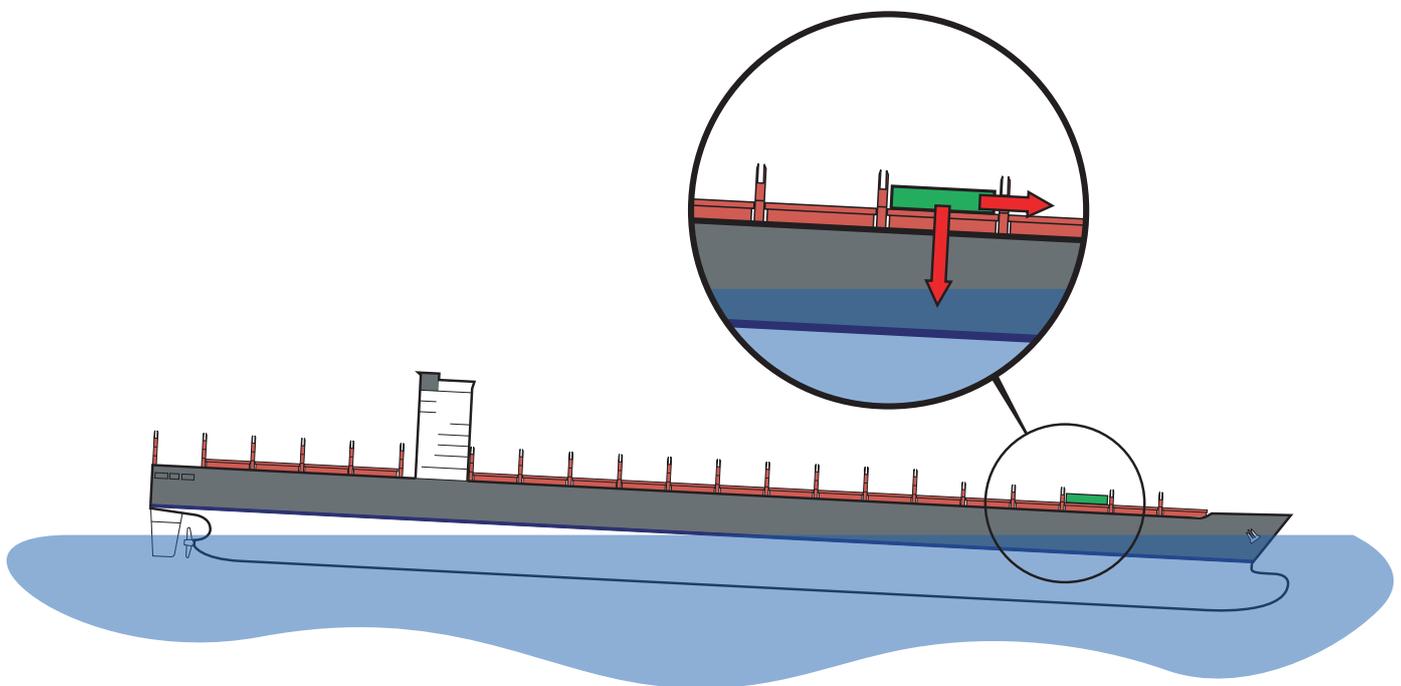
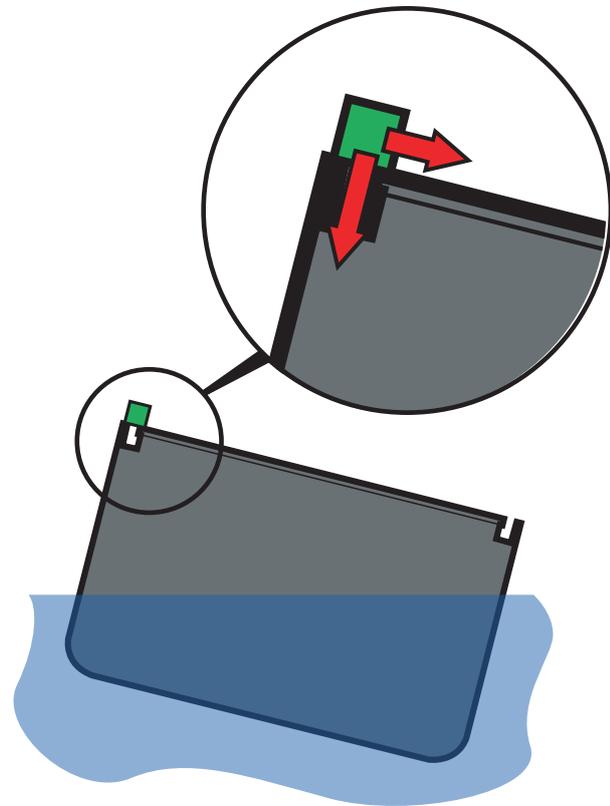
Our package for improving your container securing system performance and cargo safety:

- Lashmate® stowage calculation software ensures that the lashing system can handle the cargo, based on what has actually been loaded and where
- Lashing products and systems with margins for unintentional overload included
- Lashing products that incorporate margins for rough handling
- Lashing products designed for limiting and eliminating incorrect operation
- Lashing products that include design margins for fatigue, wear and corrosion
- Global spares and service support throughout the vessel's lifetime

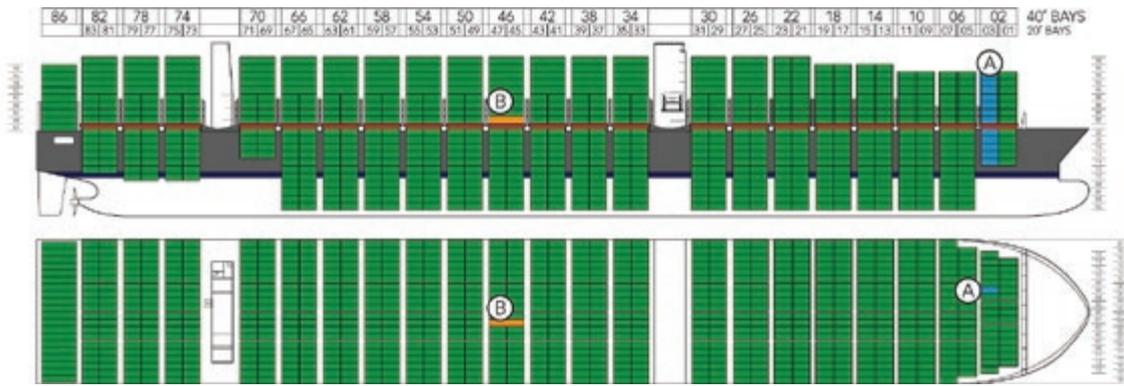


Static and dynamic components

The forces acting on the container in both longitudinal and transversal sliding depend on the static and dynamic forces. The static force is gravity and the dynamic forces are those caused by the ship's motion (roll, pitch, heave, yaw, surge and sway), windage and heavy seas.

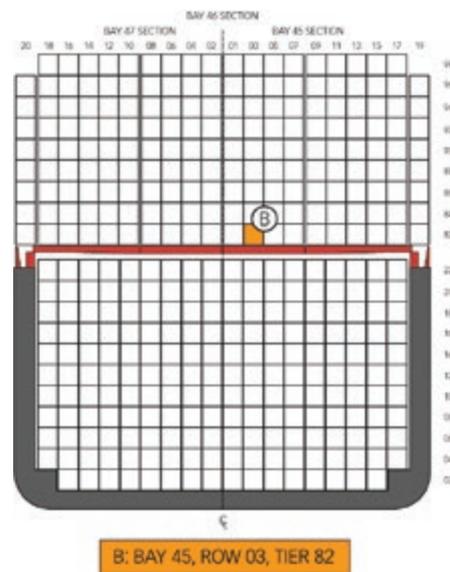
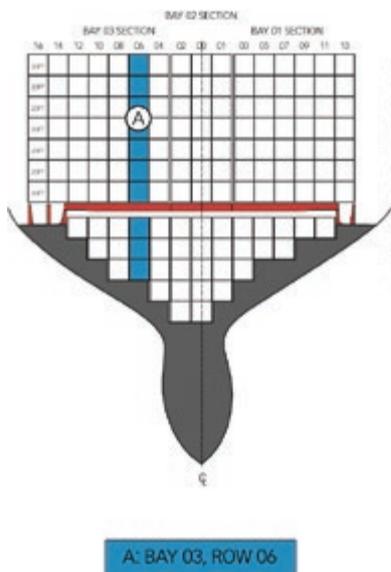
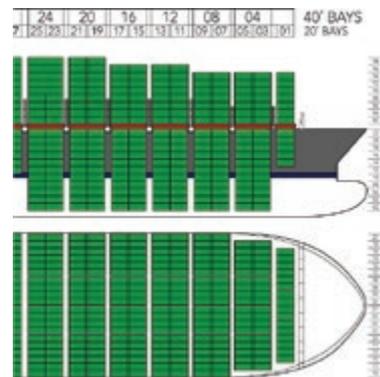


Code of container position

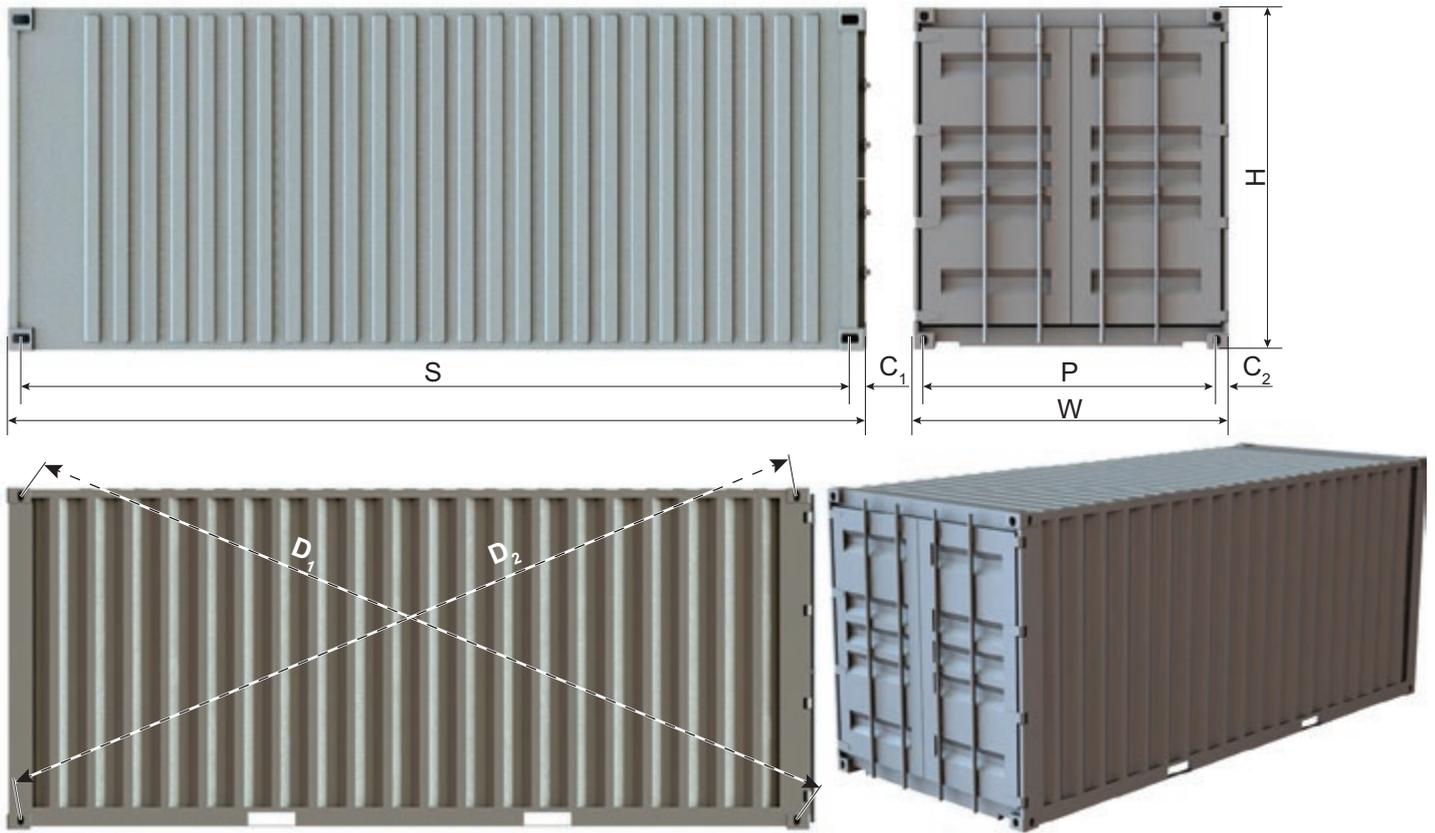


Definition

- Ⓐ Position of a stack → Bay no. Row no.
- Example of a 20' stack → 03 - 06
- Ⓑ Position of a container → Bay no. Row no. Tier no.
- Example of a 40' stack → 45 - 03 - 82

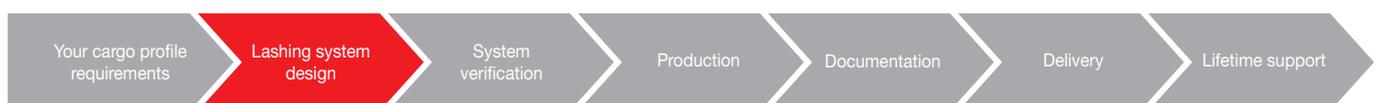


Container dimensions



| Designation | | | ISO 668 | | | | | | | | | | |
|---|----------------|--------|------------------------|----------------------|----------------------|-------------------------|-----------------------|----------------------|----------------------|--------|----------------------|----------------------|--------|
| | | | 40' | | | | 30' | | | | 20' | | |
| | | | 1A | 1AA | 1AAA | 1AX | 1B | 1BB | 1BBB | 1BX | 1C | 1CC | 1CX |
| Height | H | [ft] | 8' | 8'6" | 9'6" | <8' | 8' | 8'6" | 9'6" | <8' | 8' | 8'6" | <8' |
| | | [mm] | 2438 ^{0/-5} | 2591 ^{0/-5} | 2896 ^{0/-5} | < 2438 | 2438 ^{0/-5} | 2591 ^{0/-5} | 2896 ^{0/-5} | < 2438 | 2438 ^{0/-5} | 2591 ^{0/-5} | < 2438 |
| Length | L | [ft] | 40' | | | | 29'111/4" | | | | 19'101/2" | | |
| | | [mm] | 12192 ^{0/-10} | | | | 9125 ^{0/-10} | | | | 6058 ^{0/-6} | | |
| | S | 11985* | | | | 8918* | | | | 5853* | | | |
| | C ₁ | | | | | 101,5 ^{0/-1.5} | | | | | | | |
| Width | W | [ft] | | | | | 8' | | | | | | |
| | | [mm] | | | | | 2438 ^{0/-5} | | | | | | |
| | P | | | | | 2259* | | | | | | | |
| | C ₂ | | | | | 89 ^{0/-1.5} | | | | | | | |
| Difference D ₁ -D ₂ | | | ≤ 19 mm | | | | ≤ 16 mm | | | | ≤13 mm | | |
| Max. Gross; Mass [kg] | | | 30480 | | | | 25400 | | | | 24000 | | |

(*) The tolerances to be applied for S and P governed by the tolerances shown for the overall length and width in the ISO 668 and ISO 1161.



Comparison of container sizes

| ISO | Designation Side view | Length | | Height | | Width | | Weight 1) |
|-------------|---|--------|-------|--------------|--------------|-------|------|-----------|
| | | ft | mm | ft | mm | ft | mm | kg |
| 1AAA 1AA |  | 40' | 12192 | 9'6" 8'6" | 2896 2591 | 8' | 2438 | 30480 |
| 1CC 1C |  | 20' | 6058 | 8'6" | 2591 | 8' | 2438 | 30480 |
| 1EEE |  | 45' | 13716 | 9'6" | 2896 | 8' | 2438 | 30480 |
| * |  | 48' | 14630 | 9'6 1/2" | 2908 | 8'6" | 2591 | 30480 |
| * |  | 53' | 16154 | 9'6 1/2" | 2908 | 8'6" | 2591 | 30480 |
| * |  | 43' | 13107 | 8'6" | 2591 | 8' | 2438 | 32500 |
| * |  | 40' | 12192 | 9'6" 8'6" | 2896 2591 | | 2500 | 30480 |
| 1BB |  | 30' | 9125 | 8'6" | 2591 | 8' | 2438 | 25400 |

(*) Containers are not standardised by ISO. Given dimensions may differ from container variants.

(1) Weights are maximum gross weights and may differ from container variants.

Tolerances:

Width: +0 - 5 mm for all containers

Height: +0 - 5 mm for all containers

Length: +0 - 10 mm for 53' - 30' containers

+0 - 6 mm for 20' containers

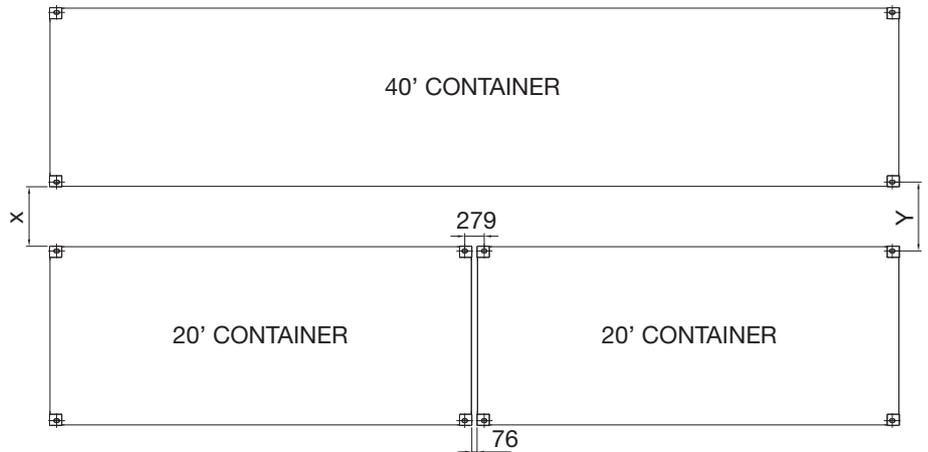
Common for all containers is the transverse measure from centre to centre point of the holes of corner fittings, approx. 2259 mm.



Common container spaces*

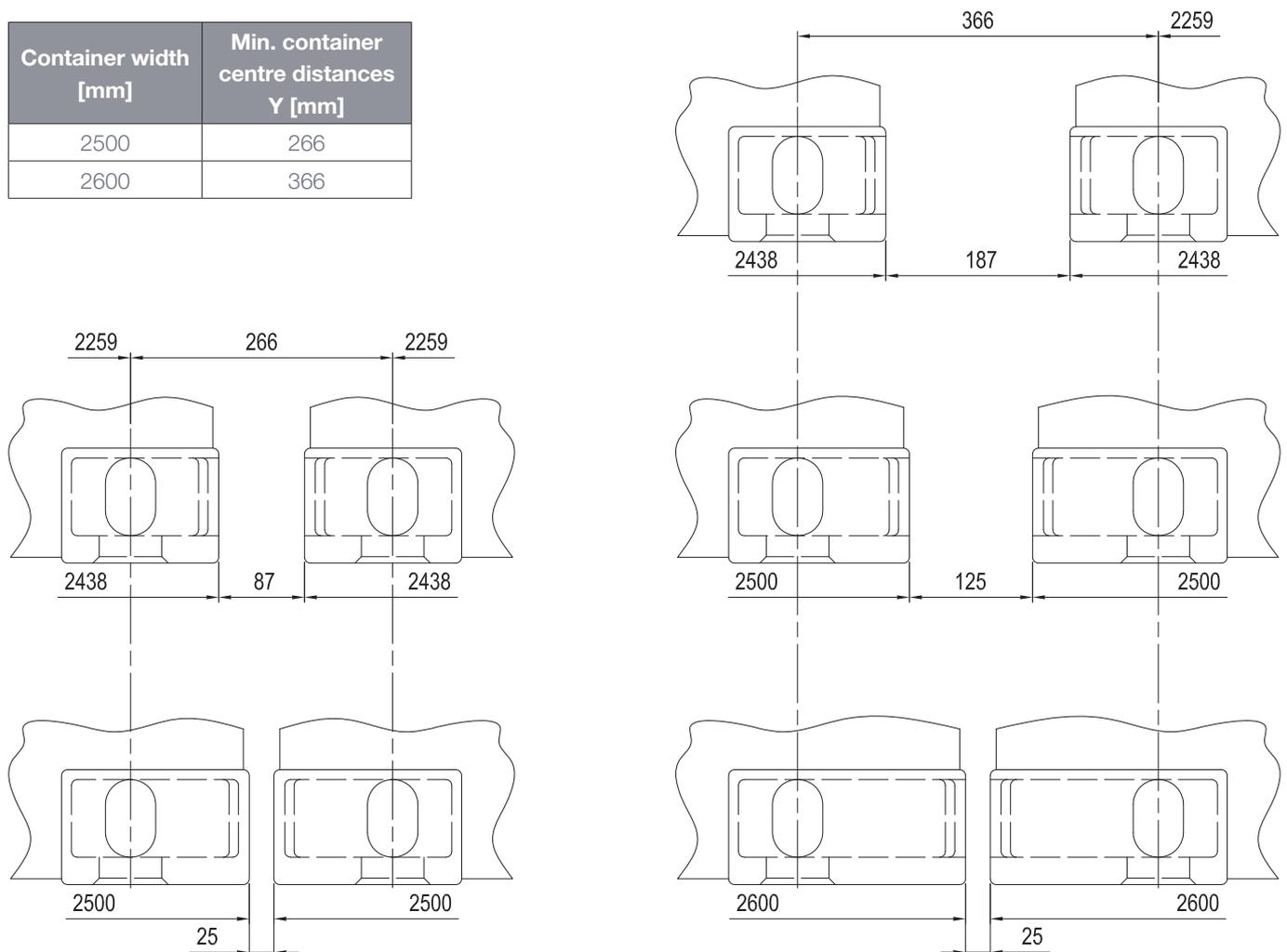
*also other spaces/distances possible

| Container spaces X [mm] | Container centre distances Y [mm] |
|-------------------------|-----------------------------------|
| 25 | 203 |
| 38 | 216 |
| 80 | 258 |
| 187 | 366 |

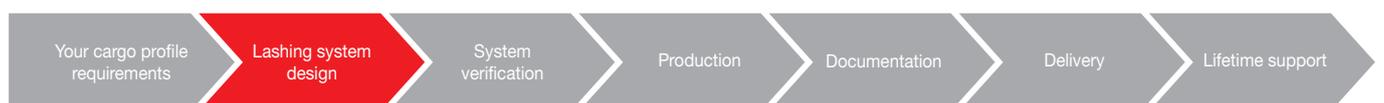


Transversal distances of wide-body containers

| Container width [mm] | Min. container centre distances Y [mm] |
|----------------------|--|
| 2500 | 266 |
| 2600 | 366 |



Special attention must be given when wide body containers are stowed in cellguides.



Container securing system design

What do we need to know about your new ship project?

Our container securing system design process starts in close cooperation with our customers by creating a full picture of the ship's cargo profile and defining effective lashing patterns. Crucial information like weight distribution calculations and the comparison of total costs for different container securing systems help our customers to decide the best fit for their ships. A container stowage plan can also be designed as part of a complete container securing system.

We begin by defining the lashing arrangement, the scope of loose container fittings and the lashing lengths and by creating a preliminary container securing arrangement. For this, we need to know the following:

- Ship's details
- Classification society
- Container data
- Container heights on deck
- Container heights in hold
- Required stackloads on hatch covers and on main deck/poop deck and forecastle deck, and in holds for 20', 40' and possible other container sizes
- Transversal distances between the containers on deck and in hold, as well as longitudinal distances between two 20' containers
- Type of twistlocks
- Preferred type of lashing system
- Lashing bridge particulars
- Type of fixed container fittings and securing points on deck and in hold

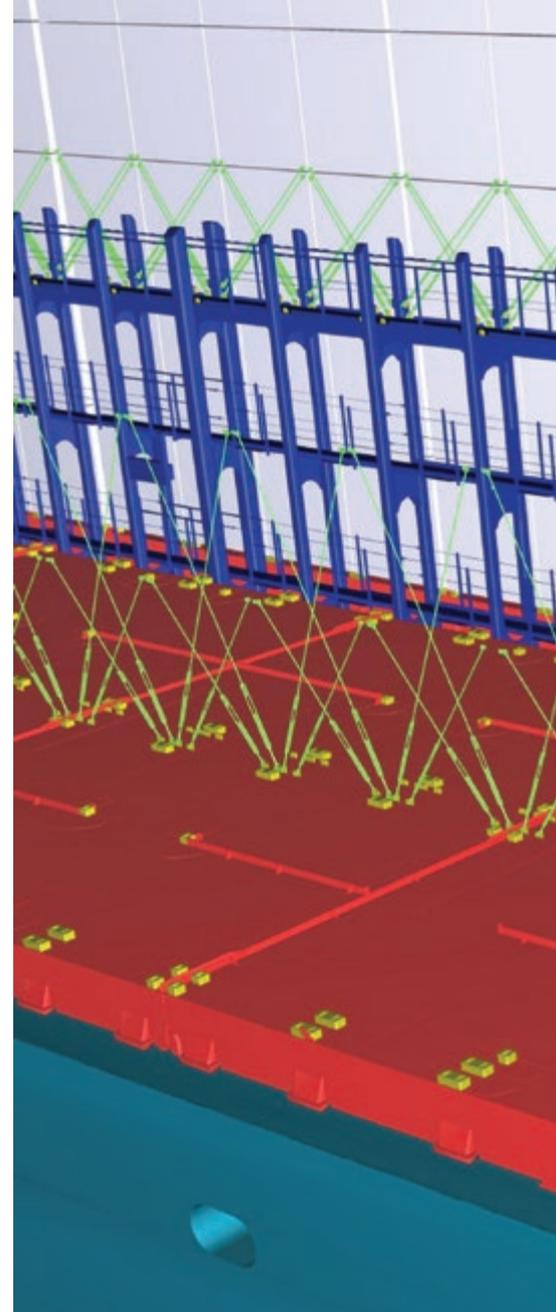
When our experts are involved in the design of the container securing system at an early stage of the ship project, we can help by making proposals around these details and compare the various arrangements to find the best possible system for each ship.

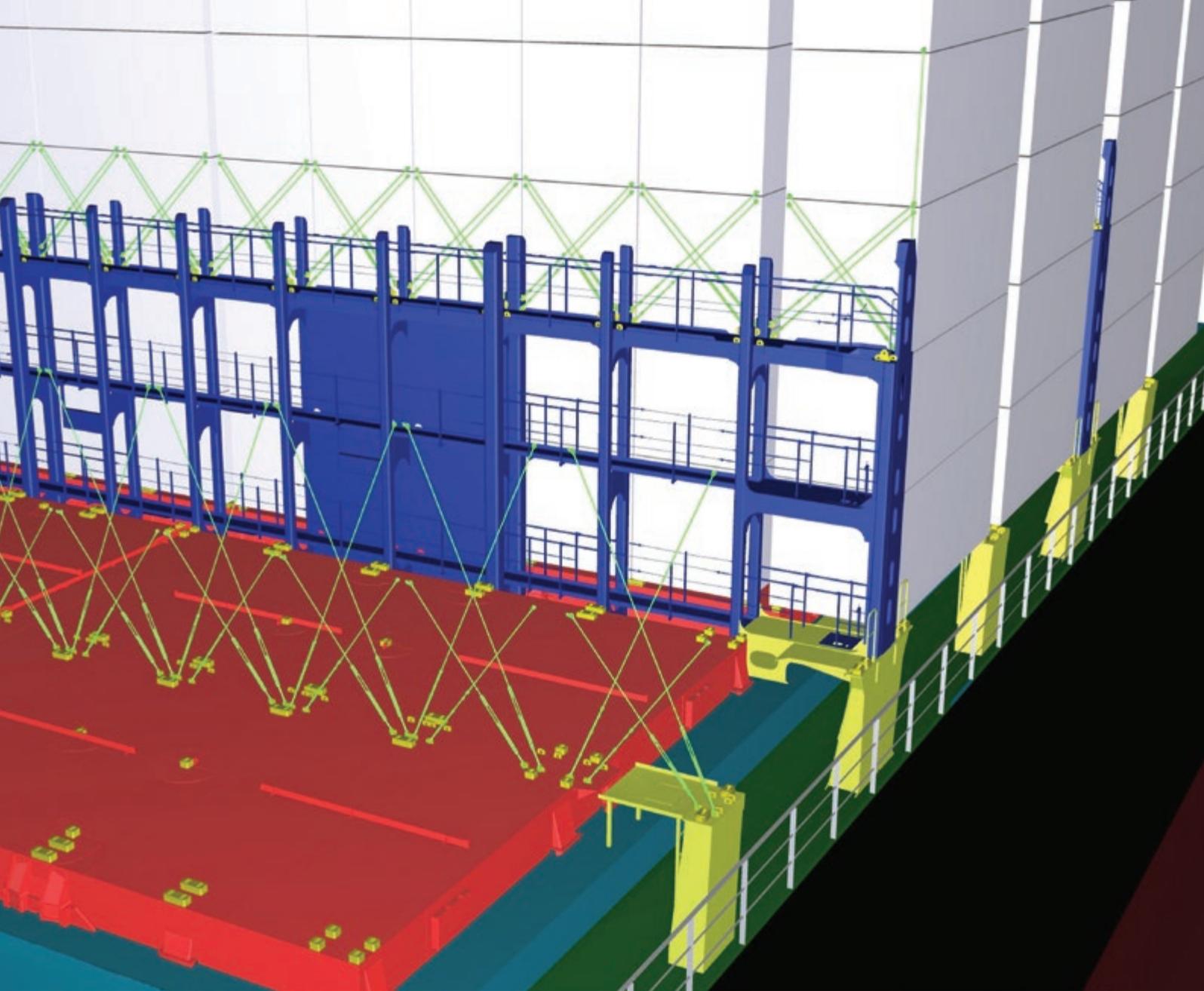
When the container securing system details have been decided, we finalise the container securing arrangement (CSA), which can be tested and verified efficiently by a full-size mock-up test. The CSA, once approved by the customer, is then reviewed in a design review meeting and sent to the classification society for its approval. At the same time, the lashing gear delivery arrangements begin in order to meet the requested delivery date.

When classification society approval has been received, the CSA forms a part of the cargo securing manual (CSM), which again is sent to the classification society for approval. At the same time, our designers finalise all related documentation and software.

As a result of the container securing system design process, our customer receives the approved cargo securing manual and all completed documentation, while at the same time the hardware delivery reaches its destination at the shipyard.

All system details are documented in our product data management system for easy reference later on.





Responsible industry members should also evaluate container securing systems using realistic conditions based on a broader perspective. They should consider:

- The actual cargo, what is being loaded and where
- Margins against unintentional overload (reasons: incorrect loading and/or extreme weather)
- Margins against rough handling
- Safety of designs to prevent incorrect operation
- Design margins for fatigue, wear and corrosion, which reduce the system's original strength over time
- Material's strength, durability and resistance in relation to ambient conditions





 **MACGREGOR**

MOCK-UP
TEST
CASE 13
40'x8'
1/6-2/12



Mock-up tests - peak performance verified

The purpose of a cargo securing system mock-up test is to verify the function and performance of the designed system.

This verification process ensures at an early stage of the project that the calculated lashing lengths are correct, and that the lashing bridge structures and the loose lashings, such as turnbuckles and lashing rods, do not interfere with each other during securing operations and on passage.

This early confirmation that the cargo securing system performs according to its design ensures easy and safe operation throughout the vessel's lifetime.

Mock-up tests are always a necessity for container vessels with lashing bridges as these systems have a high number of load scenarios. The mock-up test is particularly important in a situation where the loose lashing system and the lashing

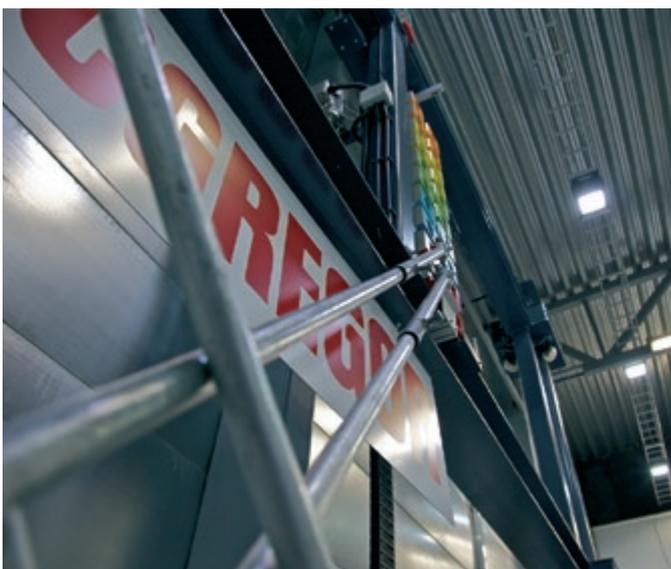
bridge design come from two different suppliers. In such cases, eventual discrepancies may not be found during the ship's basic design due to separate design documents.

Mock-up tests are convenient and cost-effective for all parties involved. Possible discrepancies and associated modification requirements can be identified and rectified at an early stage of the design, removing the need for costly adjustments on board an in-service vessel.

Mock-up tests demonstrate possible interference between lashing elements and the ship's steel structures, such as lashing bridges and hatch covers. Lashing bar and turnbuckle lengths are checked for optimised operations and for enough margin to handle tolerances in the final fitting of socket and eye arrangement on board the vessel.

Advantages:

- All loading scenarios can be tested in presence of all parties involved
- The simplest and easiest way to lash can be found and verified
- Cost savings: need for adjustments on board an in-service vessel removed, additional lashing material avoided
- Simpler after sales by optimised product portfolio



Approved production methods ensure quality and competitiveness

Today's open global markets call for competitive pricing and allow for no compromise on quality.

A highly qualified and motivated workforce equipped with the most modern designs, planning instruments and production techniques, coupled with sophisticated logistics, ensures that our products are successful everywhere in the world.

Our own quality assurance ensures consistent and continuously controlled production.

Our production processes comply with classification society rules and ISO standards. We have approved partner suppliers and permanent quality control at their premises.

Our production is located close to our customers and consists of a network of carefully chosen partner suppliers to ensure a steady supply flow and competitive prices.

All deliveries are tested and approved by the relevant classification societies. All approval tests, reports and documents are delivered in accordance with the technical requirements and regulations relevant to classification society rules.

Development of new and advanced systems and products is the daily business of our R&D team, as well as optimising products for production-friendly design and improved onboard operations.

All new products under development are carefully tested with dedicated

equipment and on-the-spot follow-up prior to undertaking mass production.

Practical testing employs mock-up devices where functionality is verified at the full scale level. Further tests are carried out on our dynamic load test machine. Our mock-up arrangements allow for product demonstration, practical instruction and customer training, along with internal trials for new system investigations.

Priority number one - production quality

Quality is the highest priority at all our production facilities. All components are sourced from leading, certified industry manufactures and the manufacturing equipment in use is calibrated by recognised authorities.

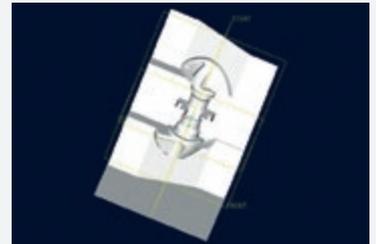
All suppliers are approved by the corresponding classification societies and, in addition, we carry out regular audits of our suppliers. During an audit, the supplier's quality management system is monitored, the production processes are reviewed, and improvements, based on related non-conformity reports, are examined.

Continuous internal training ensures that our specialists' knowledge is always up to date.

All our personnel are also trained to report any non-conformities. For smooth communications, all non-conformities or possible claims are handled by our contract managers who are familiar with our customers and their projects. Corrective actions are recorded and followed up by our Quality Assurance team and improvements are implemented.

Forging process

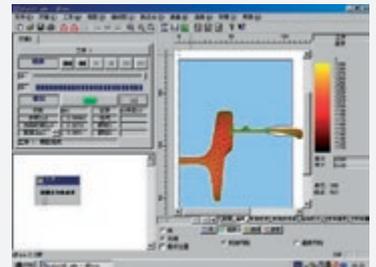
1. Mould design
2. Mould manufacturing
3. Raw material cutting
4. Preheating
5. Forging
6. Punching off the leftover material
7. Grinding
8. Inspection



Mould designing



Mould manufacturing



Forging process analysis



Forging factory



Sample of a forged product



Precision casting process

Wax injection

Wax models of the desired precision castings are produced by injection moulding or by using rapid prototyping. These prototypes are directly produced from CAD data files. The wax models of the prototypes are referred to as patterns.



Assembly of the wax stick

Patterns are then attached to a central wax stick, called the gating system, to produce a former on which to build up a ceramic shell.



Ceramic shell building

The shell is built by alternately immersing the wax model in liquid ceramic slurry and placing it in a bed of fine sand. Up to eight layers can be applied in this manner, depending on the shape and weight of the part.



De-wax

Once the ceramic shell is dry, the wax former is melted out, creating a negative impression of the assembly within the ceramic and sand shell.

Conventional casting

Molten metal is gravity poured into the ceramic shell. As the metal solidifies and cools, the part, the gating system, the sprues and the pouring cup become one solid casting.



Knock-out

Once the metal is solid and cool the ceramic shell is broken off.

Cut-off of parts

The gating system and sprues are then cut away using a high speed saw.

Finished metal investment castings

Following further operations such as machining, galvanising, assembly, final quality control and classification society approval, the precision metal castings, identical to the original wax patterns, are ready for shipment to the customer.



Quality assurance means that quality is generated, not just checked. Therefore, our customers can rely on our products wherever in the world they are.

MacGregor operates a quality management system in accordance with the rules of ISO 9001:2008.





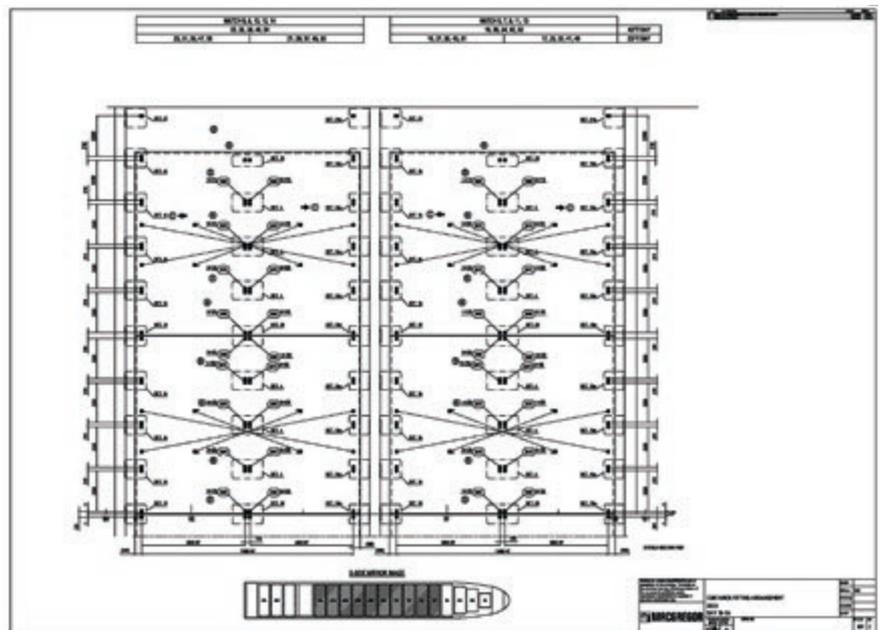


Documentation

Offset plans form the basis for installing fixed container fittings

These plans indicate the position of all MacGregor fixed container fittings delivered to the vessel. They show, for example, the correct position of twistlock foundations and lashing plates on weatherdecks and positions of guide fittings and welding cones in cargo holds. The offset plan drawings include all the necessary dimensions, together with bay-by-bay installation tolerances, for the correct positioning of container securing elements.

The offset drawings are an essential part of the scope of supply for fixed container fittings. Unlike other documents, such as the cargo and container securing manuals, offset plans are not subject to classification society approval.



Offset plan - top view



Clear documentation ensures safe and efficient loading of containers.

System verification documentation

The cargo securing system function is verified by a mock-up test, during which all crucial lashing cases are tested. The test is carefully documented and the results are used for adjusting the arrangement where needed to provide the best possible lashing system.

Delivery documentation

Delivery documentation consists of documents that are vital from the ship's operational point of view. Some of them are required by classification societies, while others are optional and delivered on request to further support the vessel's smooth operation.

Cargo- and container securing manual

According to the International Maritime Organisation, all operating vessels need to be provided with a cargo securing manual (CSM) approved by classification societies. The content of the cargo securing manual defines what kind of cargo can be carried on the vessel and how it should be secured to ensure safe working conditions. The CSM consists of five main parts:



- General information
- Securing equipment
 - Loose fittings
 - Fixed fittings
 - Operation, inspection & service
- Stowage and securing of non-standard cargo
- Stowage and securing of containers
 - Container securing arrangement (CSA)
 - Calculation examples
- Annexes

The CSM includes all the necessary information for container loading. Our target is that the manual will improve the effectiveness of container operations and support our customers so that all the information that they need for their lashing systems, and after sales, can be found easily even after years of operation.



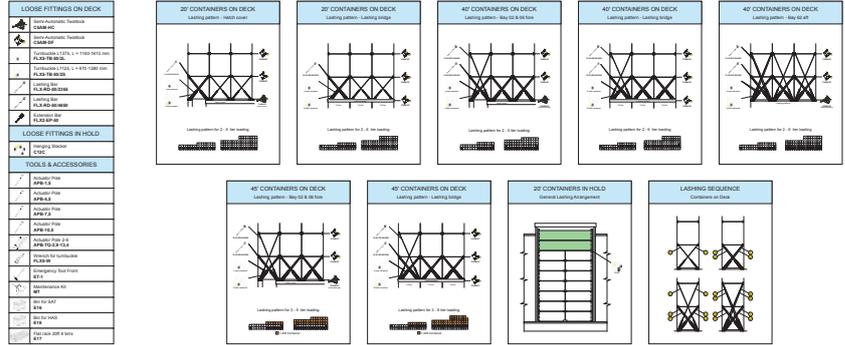
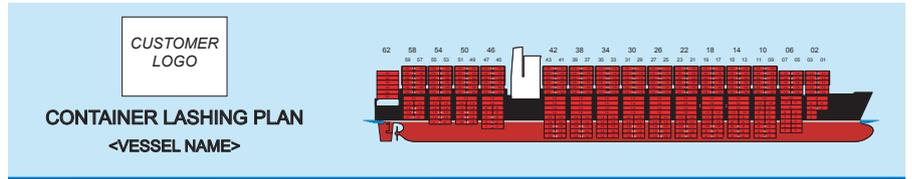
Lashing posters and instruction boards

To improve the working environment and ensure that the crew has a good overall knowledge of correct container securing, we provide lashing posters and instruction boards upon request. While lashing posters show the overall situation on one sheet, the instruction boards show different lashing principles in each bay. This information supports the stevedores for efficient and correct container securing.

The instructions are made from weatherproof self-adhesive material and fixed to visible locations, for example, hatch cover coamings. Their size is normally A4, but other layouts are available on request.

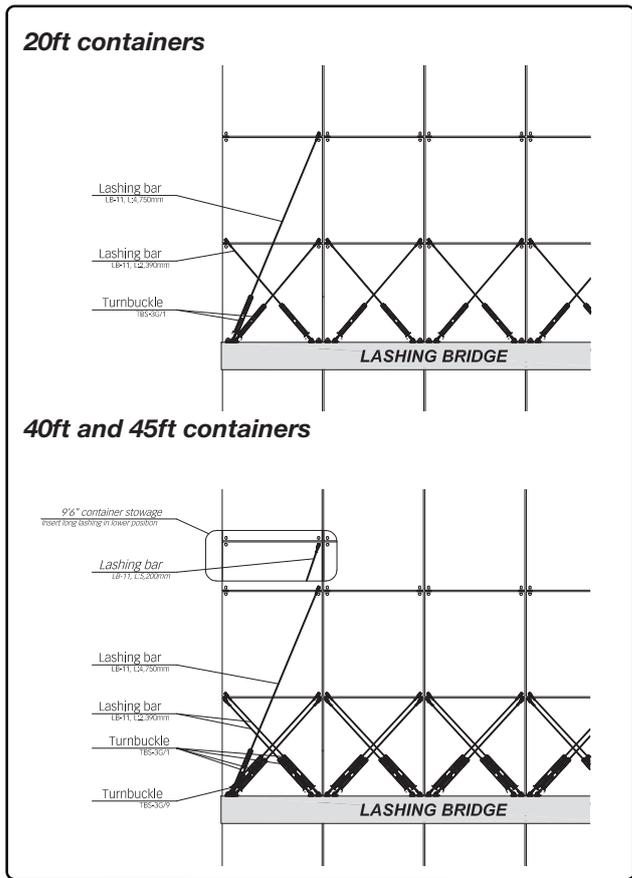
Maintenance manuals

Maintenance manuals are available upon request. Our products have been designed and manufactured to withstand tough marine conditions, but the vessel's working efficiency over years of operation can be enhanced and improved by proper maintenance. This manual gives basic instructions for onboard maintenance and maintenance frequency requirements.



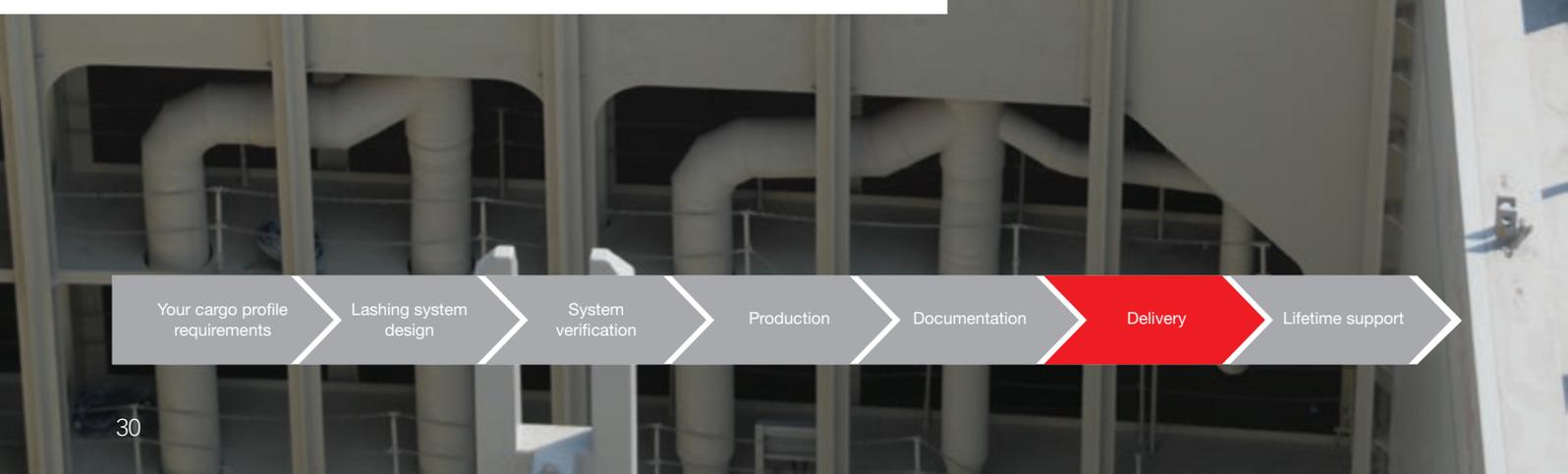
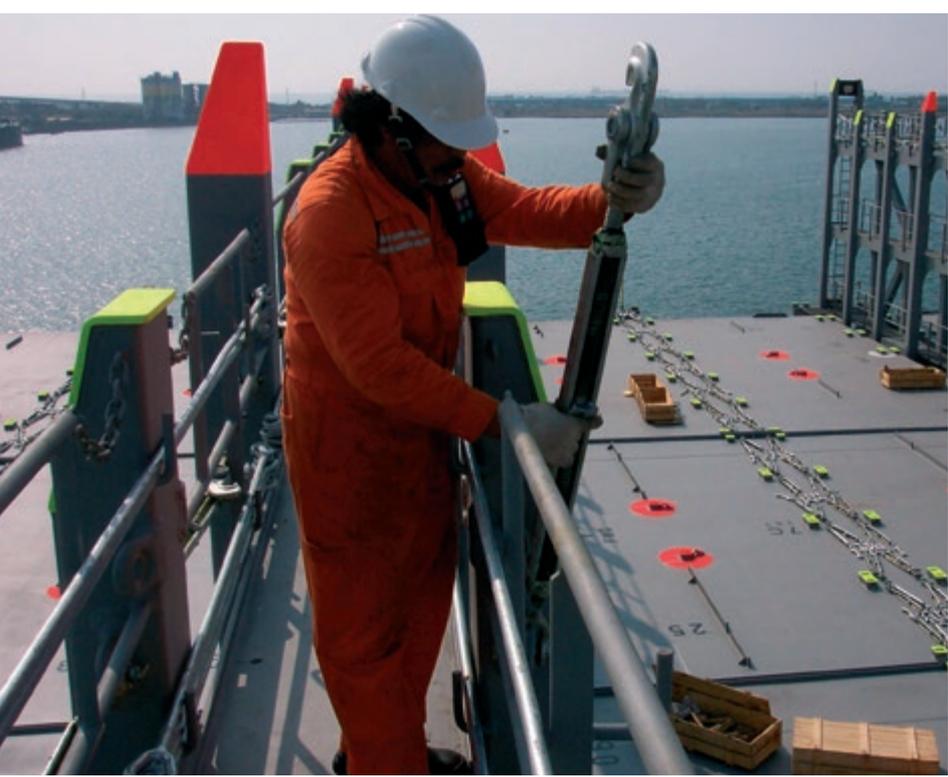
Lashing poster

LASHING PATTERN LASHING BRIDGE - BAY 82-02



Lashing pattern





Your cargo profile requirements

Lashing system design

System verification

Production

Documentation

Delivery

Lifetime support

Optional services

We deliver lashing equipment that is a perfect fit for your cargo securing system, together with cargo securing manuals, lashing posters and stickers for its safe and efficient use, but that is not all.

Our experts are ready to provide a range of additional optional services to give your vessel a flying start:

- When the equipment arrives, we help to position it on board
- We arrange for crew training to ensure the efficient and safe operation of the equipment
- We install the Lashmate® stowage calculation software and provide user training and guidance
- Our authorised experts carry out CSC (International Convention for Safe Containers) safety approvals for flat racks

If you are interested in these optional services, we will be pleased to tailor a suitable package to meet your needs. An early agreement ensures availability of our experts at the chosen time.



A safety approval plate, conforming to the specifications set out by the CSC convention, will be fixed to every approved flat rack in a readily visible position



Your cargo profile requirements

Lashing system design

System verification

Production

Documentation

Delivery

Lifetime support

Commissioning and training

Case examples from a MacGregor Lashing Project Manager's log

Reason for boarding:

Lashing affairs

Location: Shipyard

Participants: Chief officer

April 2nd and 3rd: Meeting with Chief Officer for a full review and discussion of the lashing system delivery

- Lashing gear delivery (April 3rd, April 17th)
- Lashing gear onboard installation/on-position and distribution
- Lashing patterns and lashing arrangements
- Lashmate® software (installation and training)

April 3rd: First delivery of loose lashing gear (all lashing bars, turnbuckles and HC-twistlocks) arrived at yard on time. Counted all quantities, together with the Chief Officer, no problems. We also discussed loose lashing gear installation, distribution and spare storage with the engineer in charge and foreman of the shipyard.

April 4th, 10th, 16th: Supervise the installation work of the HC-twistlocks, turnbuckles and lashing bars together with the shipyard staff.

April 17th: Second delivery of loose lashing gear (DF-twistlocks and hanging stackers) arrived. Checked the quantities with the Chief Officer, no problems.

Lashmate(R) software installation and training

Software installed and tested, and its functions demonstrated to the Chief Officer, until program is fully understood.



Outcome: Chief Officer understands the program and its functions very well; no problems with operating the system.



Reason for boarding: Crew training in loose lashing gears

Location: Shipyard

Participants: Chief Officer, Deck Officers, Bosun and other deck crew on board

April 20th: We started with a practical example of operating the gear on deck for the following items:

1. C5AM HC, Hatch cover twistlocks, C5AM DF, Intermediate twistlocks: The crew can understand the functions of these items very well. Nevertheless, the demonstration has been carried out and their function has been explained, as well as outlining the emergency tool for twistlock. The crew had no problems whatsoever.

2. C19A, Midlock: The crew has had no experience of this equipment before, but they understood the functionality of the C19A very well after the demonstration. They were also reminded that this item should be used only on both inner ends of 20' containers.

3. SDL 1, Hanging stacker in cargo hold: Went through the operational demonstration, and the crew do not show any problems with its use. Their operation is well-understood by the crew.

4. FLX5 TB, Flexilash turnbuckle: This turnbuckle is equipped with a special patented 'safety lock nut' design to ensure the turnbuckles remain in tension during a voyage. The demonstration to the crew showed how the safety lock nut worked, and as carried out with a lashing bar in tandem to ensure the crew's full appreciation of its use. The crew now fully understand the operation and function of the 'safety lock nut'.

5. FLX and FLX D, Flexilash lashing rod: To make the crew fully understand how this lashing rod works, we used a



turnbuckle in tandem to demonstrate how the knob on the lashing bar is secured onto the turnbuckle. The crew understood totally its operation.

After these practical demonstrations on deck, all participants moved to the deck office, for a full explanation and discussion of the lashing system; lashing pattern instructions and the operation of all loose lashing gear was discussed and demonstrated in accordance with the cargo securing manual (CSM).

I also inspected the condition of the loose lashing gear installation (in position) on random rows. All of the lashing gear inspected/witnessed were installed correctly in position.



Always in the lead

It has always been clear to us that an integrated container stowage solution is more than a sum of its parts. Therefore, lashings for container securing form an important part of our product portfolio for container ships - together with hatch covers, lashing bridges and shipboard cranes. We are able to offer our customers integrated solutions that perfectly fit any cargo profile. Since 1992, MacGregor has been a pioneering brand for container securing systems as a natural and essential part of its reliable and efficient cargo flow solutions.

The roots of our lashing knowledge are in Germany and Sweden. In 1992, the company acquired the world leading container lashing manufacturer, Conver

and its product portfolio. Our design knowledge was further strengthened by acquiring the Swedish company Allset Marine Lashing in 2005.

Examples of Conver's ground-breaking solutions were the first one-piece housing twistlock, the first semi-automatic dual wire twistlock, removable cell guides and multi-lash systems. As for Allset Marine Lashing, the company always combined product development and design skills with the ability to interpret its customer's needs, converting them into solutions that create value. An important milestone was the introduction of the first one-wire semi-automatic twistlock in the 1990s, which set a new standard for the industry.

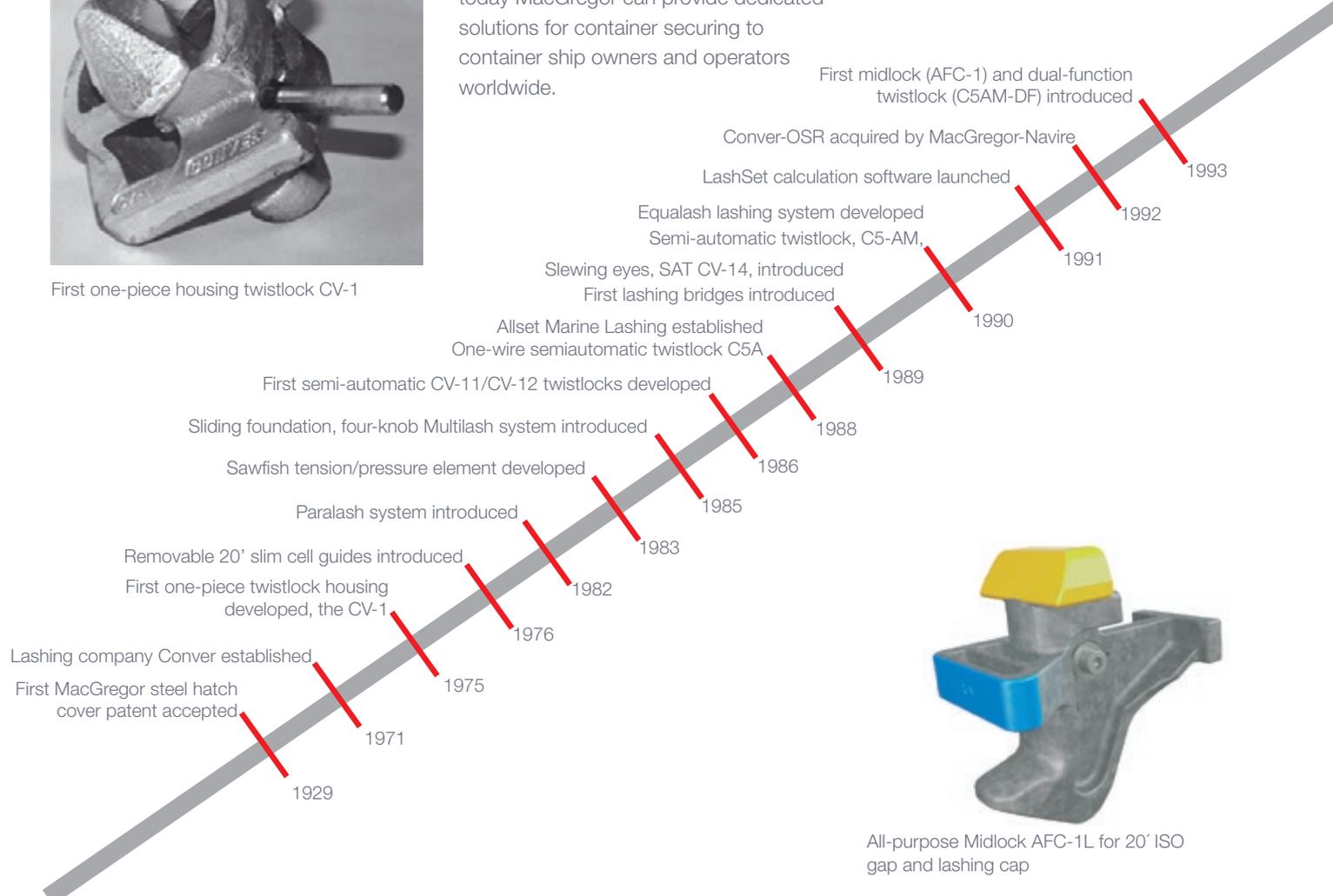


Lashing bridges

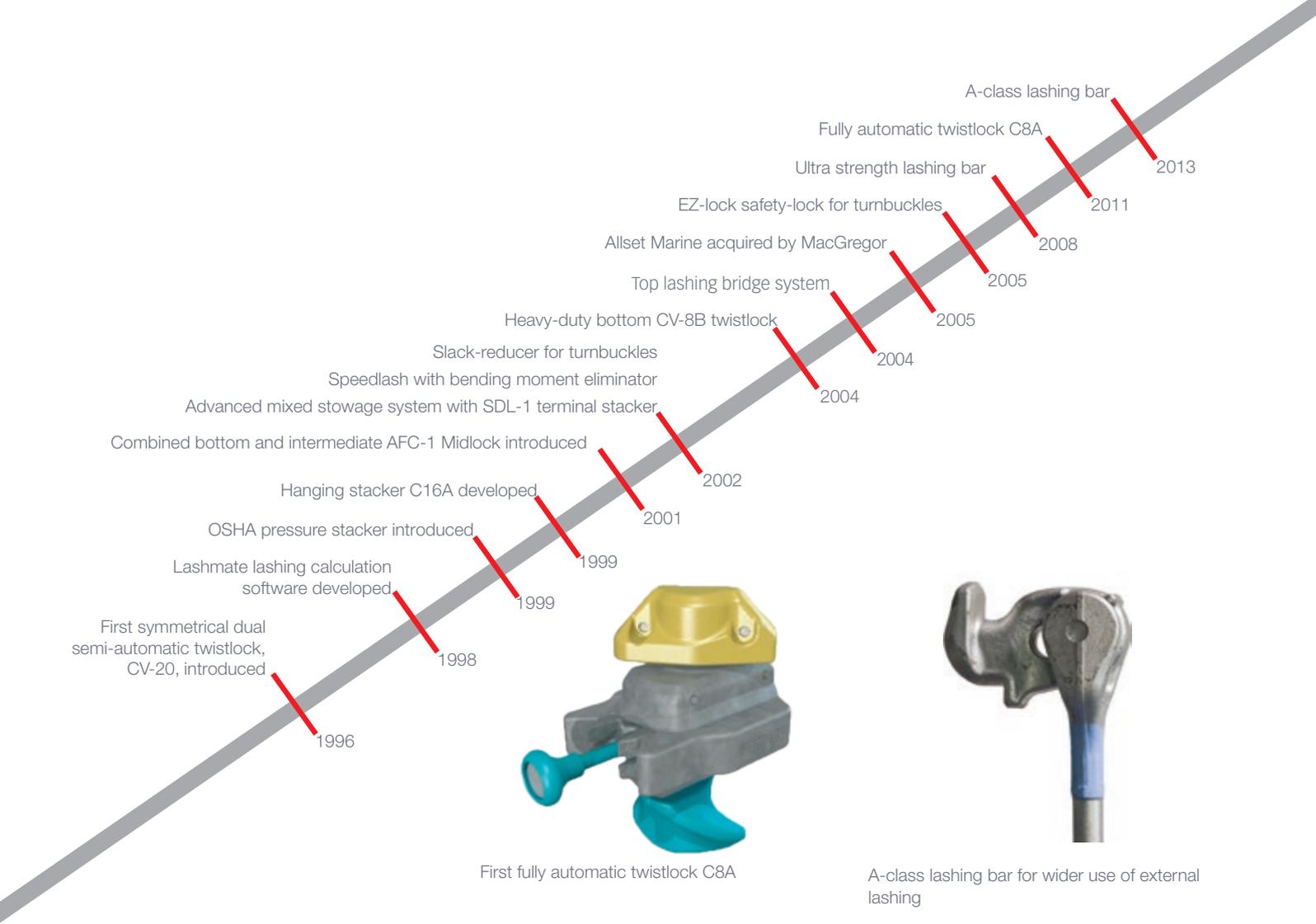


First one-piece housing twistlock CV-1

By combining the strengths of Conver and Allset Marine Lashing, today MacGregor can provide dedicated solutions for container securing to container ship owners and operators worldwide.



All-purpose Midlock AFC-1L for 20' ISO gap and lashing cap



First fully automatic twistlock C8A



A-class lashing bar for wider use of external lashing



First symmetrical Dual SAT CV-20



Semi-automatic dual function twistlock C5AM-DF



Heavy-duty bottom twistlock CV-8B



Terminal stacker SDL-1



MacGregor slack reducer



Allset safety lock

Lifetime support

Keeping your ships on hire



MacGregor operates in more than 50 countries. Our global service network consists of approximately 60 service centres providing service, maintenance and spare parts with 24-hour availability, dedicated to maintain your cargo handling equipment.

We can support you to keep your operation “on hire”, wherever you are in the world, throughout the lifetime of your ship or fleet.

By providing inspections at regular intervals, reports on findings, recommendations for remedial action, and maintenance programmes we ensure long-term trouble-free safe and fast cargo securing and handling.

Do not compromise on safety or efficiency. Make sure stevedores, yard experts and your crew are trained in all aspects of correct operation during normal and emergency operation, to enable troubleshooting and correctly maintained lashing equipment. Tuition sessions can be theoretical and practical, and arranged in the port or at shore-based facilities – yours or ours.

Global presence. Local service.

We can ensure operative availability of your cargo flow systems, supply original MacGregor spare parts and repair services on a planned schedule, on demand, or on an emergency basis.

Our service portfolio covers all cargo handling equipment on board:

- Spare parts
- Service and maintenance
- Damage repairs
- Modernisations
- Conversions
- Inspections
- Installations
- Dry-dockings
- Training for crew and personnel
- 24/7-support services
- Consultancy services

MacGregor Onboard Care service agreements offer you sustainable ship operations and revenue earning capabilities by ensuring that equipment works when it is needed through flexible planned maintenance.

MacGregor Onboard Care is a modular service concept; each module can be adjusted. Modules are grouped under four main categories; Availability support, Onboard Maintenance, Spare Parts Management and Customer Training.



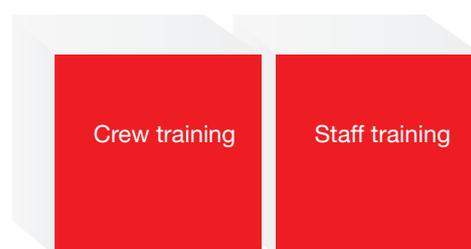
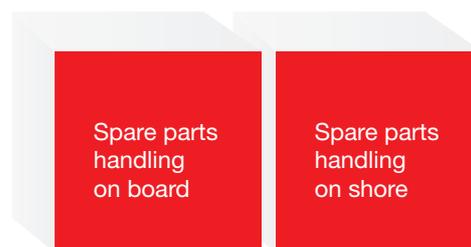
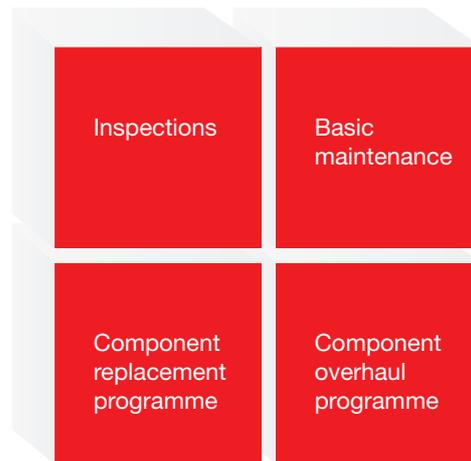
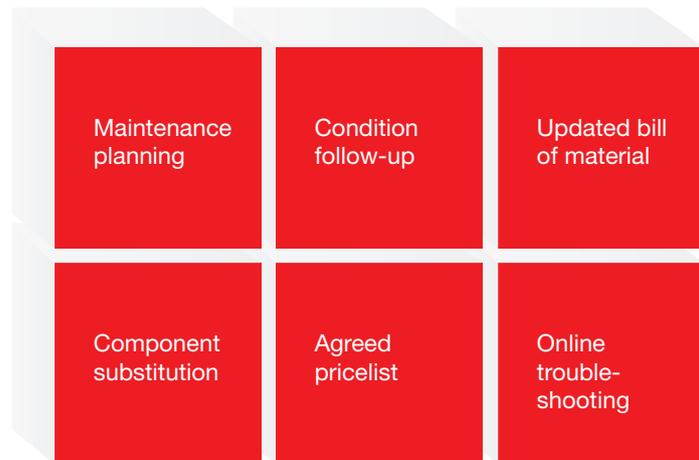
This is MacGregor Onboard Care (MOC):

AVAILABILITY SUPPORT prepares and supports you to maintain optimum operation. With availability support, necessary issues like budget prediction and planning procedures become easier. Availability support contains one basic element – a nominated coordinator as a single point of contact – this is included in all of the MOC agreements, regardless of the chosen services.

ONBOARD MAINTENANCE offers a wide range of preventive, corrective and/or condition-based maintenance work on board. Its main objectives are to avoid breakdowns and keep equipment ready for their designed operation at all times. The degree of planned maintenance can be separately agreed for each piece of your equipment.

SPARE PARTS MANAGEMENT makes sure that you have the spare parts and components you need, and relieves you of inventory management. Onboard spare parts management consists of a stock inventory and a spare parts kit, while ashore, it comprises a unique, customer specific management of spare parts, as well as taking care of the availability of standard components. Purchase, management and stock are all handled by MacGregor.

CUSTOMER TRAINING allows you to take the most out of your investments. It familiarises your personnel with the operation and maintenance of the equipment. Training programmes are available for crew on board and management (officers & superintendents) ashore.





Cargo securing systems

Container lashing systems need to have design margins for rough handling and tough sea conditions. A safe and robust design made for active duty is therefore important in reducing operational delays and ensuring durability throughout years of service. We offer a wide range of MacGregor and Allset lashing products and cutting-edge lashing systems, which have designs based on decades of experience. Our lashings offer the highest possible cargo safety standards and are quick and easy to operate to meet tight port schedules and minimise downtime.

Container lashing systems form an integrated part of our container stowage system, consisting of fixed and loose container lashings on deck and in the hold, software, lashing bridges, hatch covers and the hatch cover coaming

arrangement. These products can also be used on general cargo ships and can be custom-made for projects involving container handling.

Our in-house developed stowage calculation software, Lashmate®, helps evaluate actual loading with respect to your vessel's real stability conditions, taking into account the vessel's installed lashings system and the forces to which they are exposed.

Our mission is to keep your operation up and running, wherever you are in the world, throughout the lifetime of your ship or fleet. For more information regarding MacGregor's after sales services for lashing systems, you are welcome to contact our after sales personnel.



Flexilash

The parallel internal lashing system is the most commonly used system on container vessels today. The MacGregor Allset Flexilash system has some unique features promoting cargo and working safety throughout its long working lifetime.

The EZ-lock fail-safe turnbuckle locking system with auto-engage function, the spring-loaded toggle pin in the jaw, and the design of the swage-fitted rod head on the lashing bar make sure that the turnbuckles stay safely tightened under all conditions.

The same technical features contribute to working safety by ensuring that components cannot work loose, fall out and cause injury. In addition, the sliding nut reduces the amount of lifting involved in hooking on, and the equipment can be instantly reduced to its minimum length for storage.

High grade steel alloys and fully forged components give the Flexilash system highest durability and ensure a long working lifetime. The small diameter and hard surface of the lashing bars substantially reduce wear at the intersection of two lashing bars. All Flexilash components are hot-dip galvanised, even the threads on the turnbuckle.

Related lashing products:

FLX-RD Lashing bars, *see page 77*

FLX5 Turnbuckles, *see page 67*





Multilash

The MacGregor Multilash system has some unique features for easy operation and high levels of cargo safety:

- The optional slack reducer turnbuckle locking system prevents slackening of the turnbuckle during the voyage
- The gravity operated toggle pin enables the quick and easy repositioning of the turnbuckles
- The rugged design for active duty ensures easy operation and system flexibility on board the vessel.

All Multilash components exposed to the marine environment are hot-dip galvanised for the highest durability. The MacGregor Multilash system is well-recognised worldwide, which ensures its correct and easy operation at your port of call.

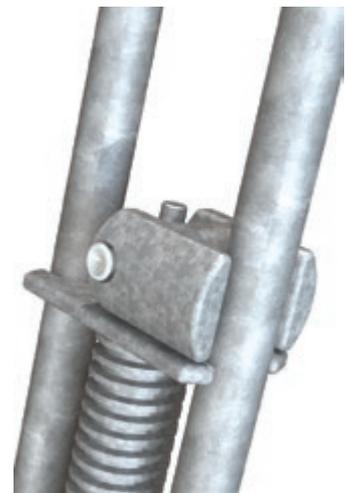
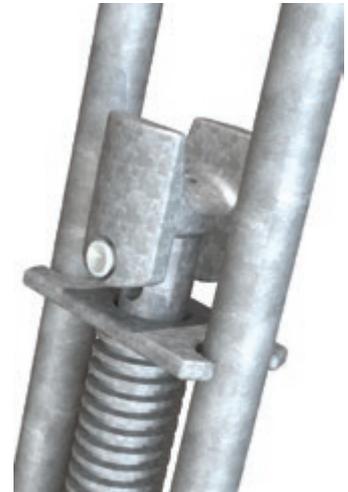
Related lashing products:

TBS 3G Turnbuckle family, *see page 65*

LB-11 Lashing bars, *see page 72*

LB-28 Lashing bars, *see page 73*

LB-31 Lashing bars, *see page 74*





External lashing

MacGregor Allset design external lashings were introduced over a decade ago and have been trusted ever since. Unlike the internal lashing, the external lashing system secures the lifting side of the container instead of the compressed side, which reduces both lifting and compression forces. This allows container stacks to be loaded with better weight distribution, with heavier containers higher up in the stacks, compared to an internal lashing system.

The external lashing system uses a variation of Flexilash equipment, with tailor-designed distances between knobs on the lashing bars for minimised length of the turnbuckles and optimised handling when lashing different container heights. All external lashing systems are tailor-made to fit each vessel's design.

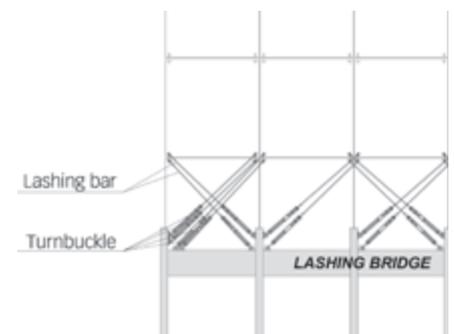
The turnbuckles are equipped with the EZ-lock fail-safe turnbuckle locking system with auto-engage function and are designed for optimised lashing

lengths, which results in lower weights. They are fitted to the eye plates with a toggle pin that is secured with a split pin to ensure that the correct turnbuckles stay in the correct position, safely secured under all conditions.

The rod head on the external lashing bar has two positions for the jaw to prevent bending or interference in the corner casting area. This feature, in combination with the small diameter and hard surface of the lashing bars significantly reduces wear at the intersection of two lashing bars and eliminates interference with other equipment.

The one-piece design swage-fitted rod head on the lashing bar makes sure that lashing bar assembly will stay intact in the toughest conditions throughout the lashing bar's lifetime.

These technical features contribute to an improved stack weight distribution, and they also improve working safety



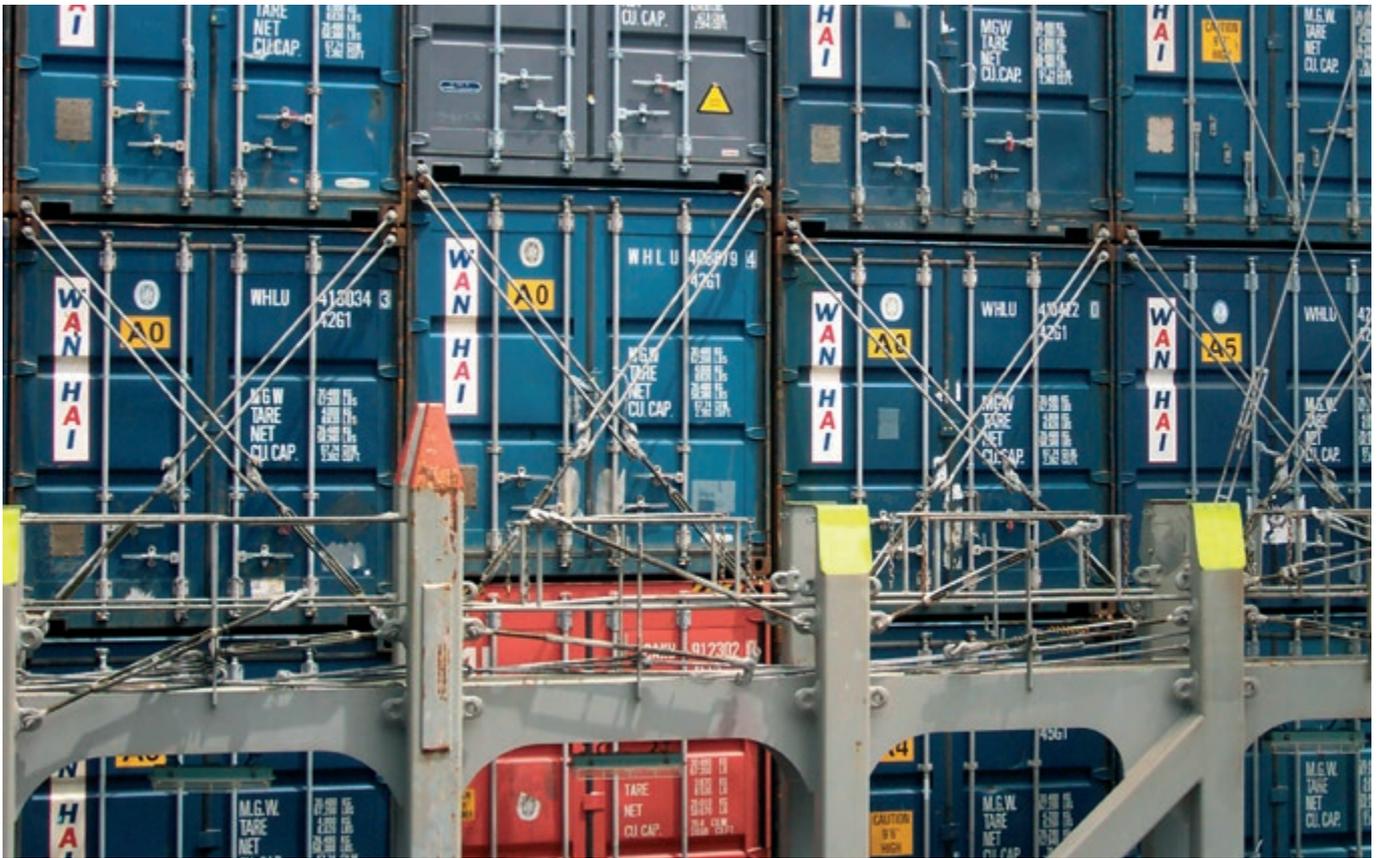
by ensuring that components cannot loosen, fall out and cause injury. All external lashing system equipment is hot-dip galvanised to ensure the best possible durability and lowest lifecycle costs.

Related lashing products:

K-series Lashing bars, *see page 79*

LB-A Lashing bars, *see page 78*

FLX5-A/S Turnbuckles, *see page 69*



Equalash

The MacGregor Allset design Equalash lashing system requires fewer turnbuckles to be installed and operated on board, but has the same flexibility and durability as other MacGregor Allset lashing systems.

The Equalash system requires only one turnbuckle for each pair of lashing bars and has some unique features increasing cargo and operational safety:

- Turnbuckles can be equipped with the EZ-lock fail-safe turnbuckle locking system with auto-engage function
- The compact dimensions of the turnbuckles minimise interference with other equipment
- The spring-loaded toggle pins ensure that the turnbuckles stay safely secured in all conditions
- The small diameter and hard surface of the lashing bars substantially reduce wear at the intersection of two lashing bars and also minimise interference with other equipment

- The one-piece swage-fitted rod head design of the lashing bar ensures that it stays intact in the toughest conditions throughout the Lashing bar's lifecycle

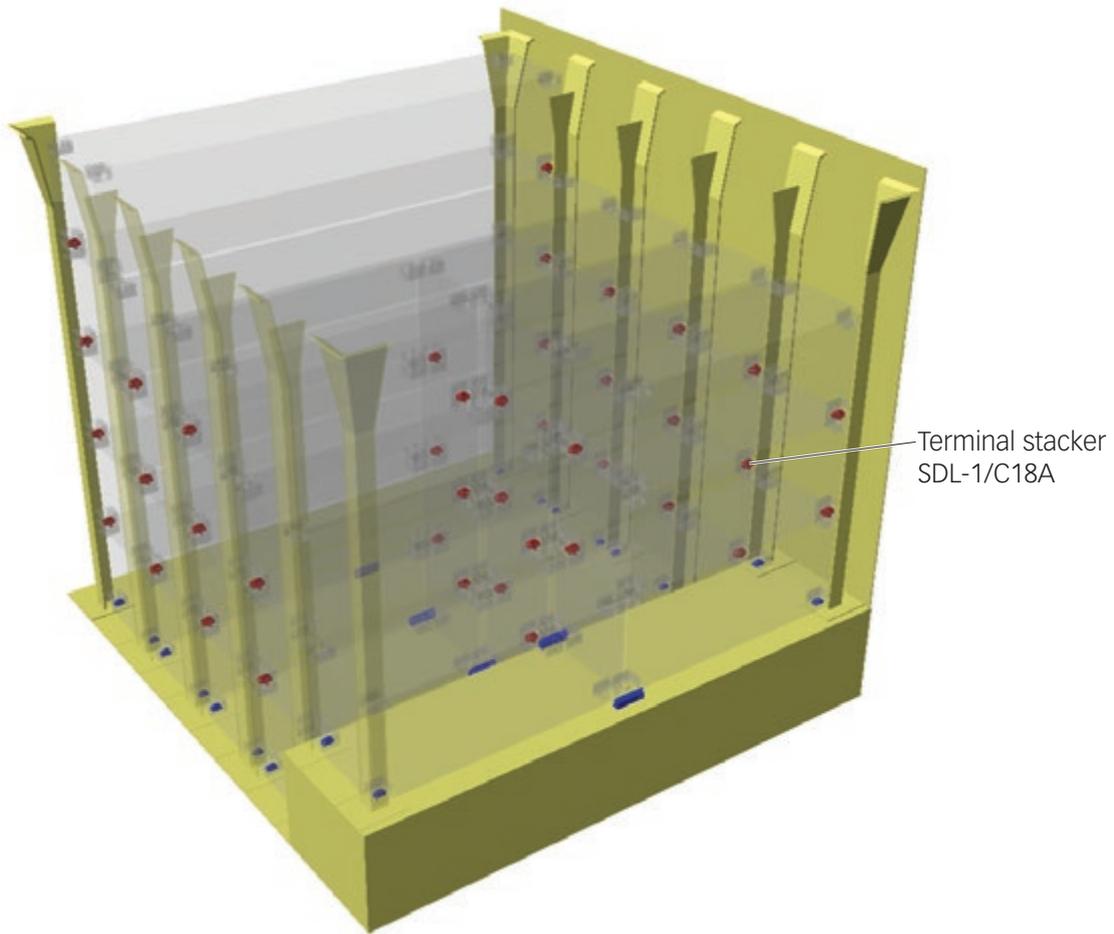
These technical features contribute to working safety by ensuring that components cannot loosen, fall out and cause injury. The innovative design of the Equalash system, high grade steel alloys, fully forged design and the hot-dip galvanised surface ensure the best possible durability and lowest lifecycle costs.

Related lashing products:

ELB-C Lashing bars, *see page 80*

ELT Turnbuckles, *see page 71*





Terminal stacker
SDL-1/C18A

Mixed stowage in hold

It is possible to stow 20ft containers in 40ft cell guides when secured by positive securing devices such as terminal stackers, with or without flange. The mixed stowage system with terminal stackers complies fully with OSHA requirements in holds. In conjunction with our 'mixed stowage system', the flangeless terminal stacker reduces the number of fittings needed by 50 percent compared to stackers with flanges. In addition to this, the number of flat racks and storage bins might also be reduced, depending on the ship's size.

The simple 'one stacker per container end' rule guarantees a fool-proof system. These terminal stackers are arranged with one piece per container end only (left or right), so that the risk of them being wrongly inserted through human error is reduced to an absolute minimum.

This mixed stowage system will stow up to the maximum possible number of tiers according to valid class rules. The permissible container weights differ and

depend on class rules, number of stacks and accelerations. If the 20ft stack is 'topped' by one or more 40ft containers higher stack weights can be realised. For discharging, it is not necessary for stevedores to work on top of containers because the terminal stackers for this system remain on the lower container corner of the lifted container and will be dismantled on the quayside.

This securing system offers a high degree of flexibility in container stowage with a minimum number of fixed elements. Reinforcements at the longitudinal bulkhead are not required. The simple handling method of the container stackers ensures fast trouble-free operation by the stevedores. In addition, the flangeless stacker will slightly decrease the centre of gravity in the container stacks, which is an advantage for ship stability.

Related lashing products:

Flangeless terminal stackers
(two required per 20ft container, one at each end of container)

SDL-1 Terminal stacker
(flangeless), *see page 58*

C18A Terminal stacker
(flangeless, Allset design), *see page 62*

Terminal stackers with flanges
(four required per 20ft container, two at the ISO gap end to avoid transversal sliding and two at the cellguide end for leveling purpose only).

SDL-4 Terminal stacker, *see page 59*

C12C Terminal stacker
(Allset design), *see page 60*

Pressure system

Containers in a hold can be secured using a 'block stowage pressure system'.

With this system, container blocks are generated using double stacking cones, single stacking cones, bridge fittings and pressure elements. The container stacks in a block are coupled transversally by double stacking cones and on top of the upper tier by bridge fittings.

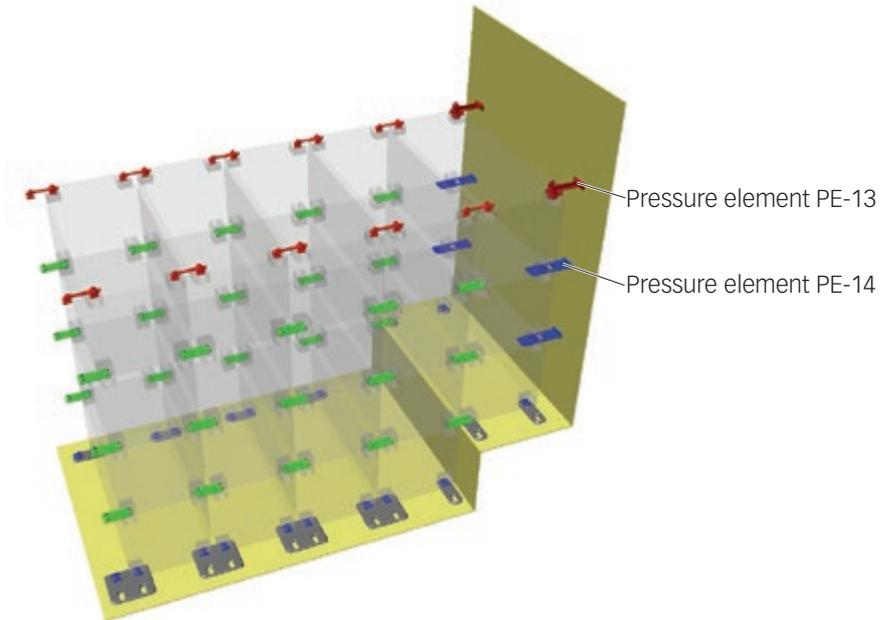
The pressure elements, for example, PE-14 units between the container tiers and PE-13 units on top of the uppermost tier, are arranged between the longitudinal bulkhead and the outermost container stack.

This ensures that the transverse pressure forces acting on the containers are transmitted to the longitudinal bulkhead of the vessel. The bulkhead has to be reinforced accordingly, but the installation of counter bearings is not required.

The pressure elements for the longitudinal bulkhead can be omitted when a fixed pressure rail at the bulkhead is installed.

With this stowage system, the container tiers have to be loaded completely and each tier has to be loaded with containers of uniform height only. The containers need to be loaded or discharged layer by layer.

The permissible container weights differ and depend on class rules, the number of stacks and accelerations. As the permissible weight decreases with the number of stacks, this system is applied especially on smaller multi-purpose vessels and on older ships without a cell guide system.



For smaller vessels, the system is also used for 20ft container stowage in 40ft cell guides, which realises higher stack weights for the 20ft containers.

For container loading and discharge, it is necessary for stevedores to work on top of the containers to fit or remove the loose stowage elements.

Related lashing products:

Pressure element PE-13, see *page 86*

Pressure element PE-14, see *page 86*

OSHA compliant terminal pressure stacker system

Containers in the hold can be secured by using an OSHA compliant 'terminal pressure stacker system'.

This system is based on a conventional 'block stowage pressure system', but the conventional loose lashing gear, including double stacking cones, single stacking cones and pressure elements, have been replaced by the special terminal pressure stacker TPS-1.

TPS-1 stackers are fitted and dismantled on the quayside before and after loading in the same way as semi-automatic twistlocks on deck are used.

When the vessel is rolling, container stacks can lean against the next and transfer the transversal forces to the

outermost stack, which transmits them to the longitudinal bulkhead.

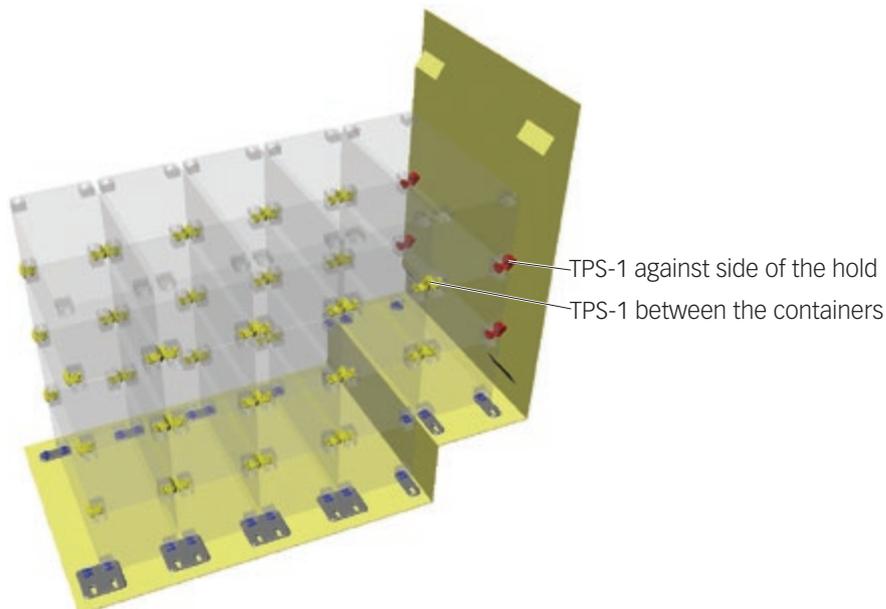
The permissible container weights differ and depend on class rules, number of stacks and accelerations. As the permissible weight decreases with the number of stacks, this system is especially applied on smaller multi-purpose vessels.

With this stowage system, container tiers have to be loaded completely and each tier has to be loaded with containers of uniform height only. The longitudinal bulkhead has to be reinforced accordingly, but the installation of counter bearings is not required. Fixed installed pressure rails at the longitudinal bulkhead are recommended.

The TPS-1 facilitates the safe handling of containers in accordance with OSHA requirements, which effectively ban stevedores from climbing on top of containers to release securing devices. Moreover, the TPS-1 allows independent and flexible loading and unloading of both 20ft and 40ft containers without restriction and without the need to reduce weights in accordance with Germanischer Lloyd requirements

Related lashing products:

Terminal pressure stacker TPS-1, see page 88



Tension pressure system

Containers in a hold can be secured by the use of a 'block stowage tension/pressure system'.

This system generates container blocks by using double stacking cones, single stacking cones, bridge fittings and tension/pressure elements. To avoid the effect of external forces from the vessel's deflections, generally two container blocks are created per bay.

The container stacks in a block are coupled transversally by double stacking cones and on the top of the upper tier by bridge fittings.

The tension/pressure elements – for example, TPE-13 units between the container tiers and TPE-25 on the top of the uppermost tier – are arranged between the longitudinal bulkhead and the outermost container stack. Single stacking cones are used in the transverse gap between the container blocks.

The transversal tension and pressure forces on the containers are transmitted to the vessel's longitudinal bulkhead. The bulkhead has to be reinforced accordingly and counter bearings for the tension/pressure elements at the longitudinal bulkheads are necessary.

The blocks of container tiers have to be loaded completely and each tier has to

be loaded with containers of uniform height only. The containers need to be loaded or discharged layer by layer.

The permissible container weights differ and depend on class rules, number of stacks and accelerations. In comparison with a pressure system, either the permissible container weight is higher or the number of stacks is larger with similar weights. So this system is especially applied on multi-purpose vessels with high stack weights, on con-bulkers and on older vessels without a cell guide system.

For container loading and discharge, it is necessary for stevedores to work on top of containers to fit or remove the loose stowage elements.

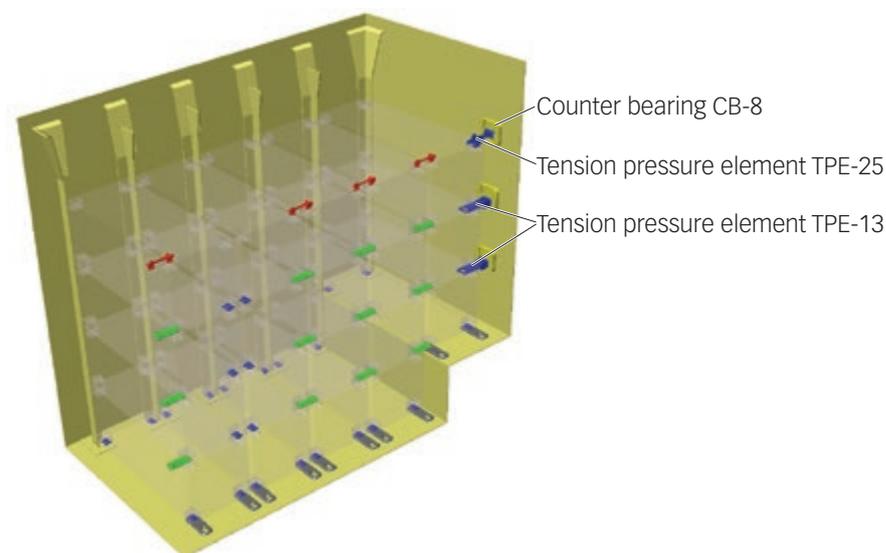
Also a mixture of tension/pressure system is possible. The container stacks in one bay form three blocks. One on each side works as the described tension pressure system and the centre block works as a pressure system. The centre block leans towards the adjacent block on the port or starboard side according to the vessel's direction of roll.

Related lashing products:

Tension pressure element TPE-13, see page 89

Tension pressure element TPE 25, see page 89

Counter bearing CB-8, see page 121



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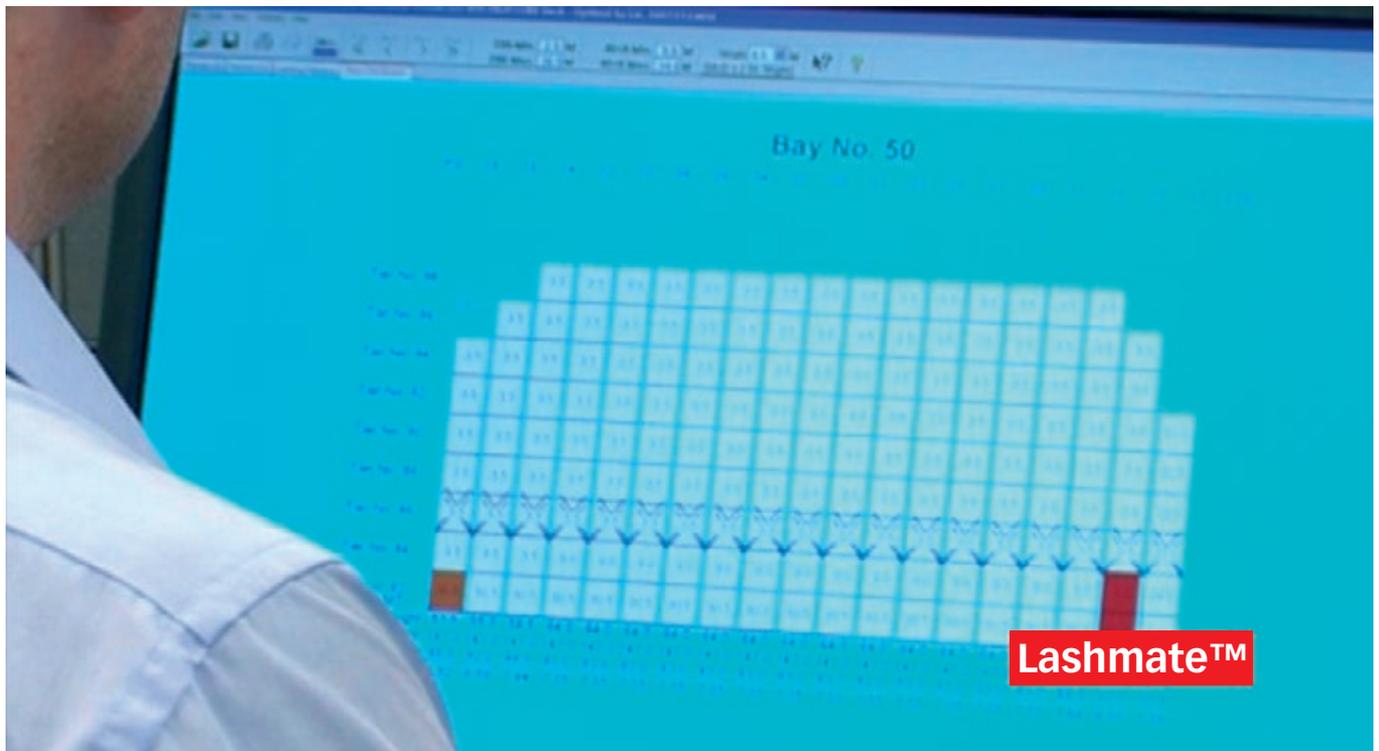
E-mail: lashingsalesorder@macgregor.com



Product Catalogue

Our lashing products can be provided with approval from all classification societies.

Please verify the suitability of the product for your lashing system with our sales personnel.



Lashmate for easy and efficient cargo planning

MacGregor is a complete solutions provider, and that also applies when it comes to container stowage solutions. Our Lashmate™ stowage calculation software has been developed with the benefit of decades of lashing system design experience, providing an efficient, easy to use cargo planning tool.

With Lashmate™ on board, the safety of the cargo is easily verified. The Lashmate™ software uses export files from the onboard loading computer with the actual cargo profile. Lashmate™ then checks the loaded cargo with the vessel's particulars and lashing system to verify that all safety conditions are fulfilled. If there are excess forces detected, Lashmate™ can also propose alternative stack distributions.

The main features of Lashmate™:

- Calculates the lashing forces for the entire ship's lashing system and actual loading cases
- Gives a warning if excessive forces are detected
- Can calculate and suggest an optional stack distribution
- Calculations can be made according to GL, DNV, LR, ABS, BV and KR rules
- Lashmate™ uses interface files from loading computers as input files
- Can read standard EDIFACT BAPLIE and several other input file formats
- Be sure that your lashing system can handle your cargo based on what you have actually loaded and where you have put it - Lashmate™.



Loose container fittings

Automatic twistlocks

C8A-DF, C8A-HC

Automatic dual function twistlock

Improved efficiency and productivity

C8A-DF has several features which help to cut down port turnaround times and to increase vessel's productivity:

- As there is no need to unlock the C8A-DF twistlock in areas above the lashings, the unloading can start very soon after a vessel arrives in port.
- The C8A-DF only needs to be opened in way of the lashing bars and below. As C8A-DF is suitable for every container locking function, there is no need to sort out and store different kinds of twistlocks in separate storage bins.
- C8A-DF is a proven solution for tandem lifts.
- The crane operators can feel the twist cone rotation "at their fingertips", thanks to the C8A-DF's screw shape. This adds to smooth operation.

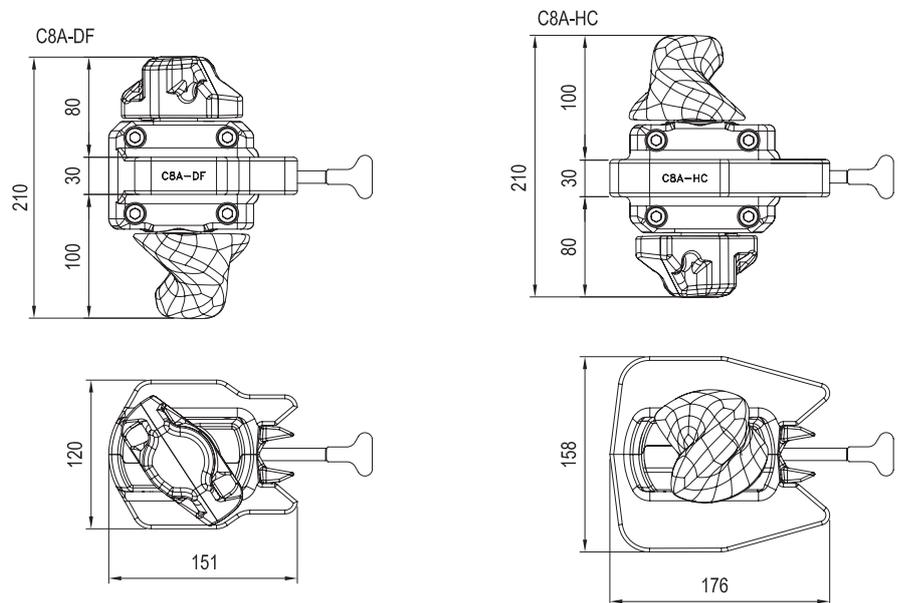


Symmetrical locking

The C8A-DF load carrying areas provide symmetric locking between twistlock and container and distribute high stresses evenly. The high safety factor means there is also an improved margin for preventing loss and damage to containers.

Lashing protection mode

In way of the lashing bars and in areas below this level the lashing protection mode needs to be engaged by pulling the lock's handle. The locking status is clearly indicated by the handle position. The lashing protection mode works actively as a part of the lashing system resulting in lower stresses for lashing eyes, lashing bars and turnbuckles. It also reduces the side to side movements of the container stacks on deck.



C8A

| Order number | Product | Weight kg | Shaft material | Housing material | Handle material | Treatment | Safe Working Load Tension, automatic mode, kN | Safe Working Load Tension, locked mode, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|---------------------------|------------------|--|--------------------|---|--|-----------------------------|--------------------------------------|--|-----------|
| 1186663 | C8A-DF | 7.4 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 230 | 250 | 210 | Automatic twistlock, dual function | Container castings, twistlock foundations, operating rod APB-C8A | MacGregor |
| 1197597 | C8A-HC | 8.3 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 230 | 250 | 210 | Automatic twistlock for bottom tiers | Container castings, twistlock foundations | MacGregor |

CV-20, CV-20G

Fully symmetrical dual function semi-automatic twistlock

The fully symmetrical MacGregor CV-20 twistlock is extremely simple and safe to operate. Its unique, patented design makes incorrect insertion impossible because it can be fitted into the container corner castings either way up. Safe and correct insertions are therefore automatically guaranteed for efficient container handling.

The MacGregor CV-20 is designed for active duty and benefits from decades of use in marine container securing operations.

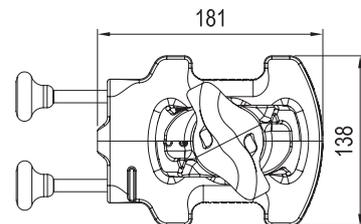
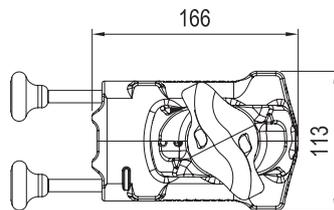
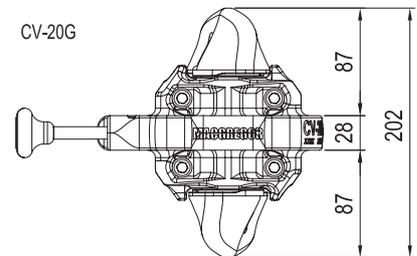
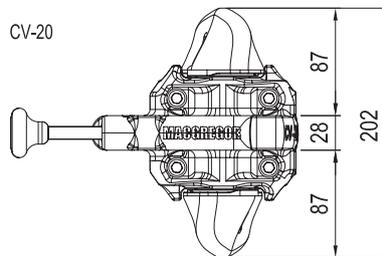
The hot-dip galvanised closed housing guarantees durable performance and trouble-free operation throughout its lifetime, protecting the twistlock's mechanism from the wear and tear of marine cargo operations. The CV-20 also has a carefully chosen anti-corrosion marine lubricant sealed inside to protect it from the tough marine environment.

The CV-20 can be approved and certified for vertical tandem lift (VTL) by all classification societies. Two stoppers on each side prevent the twistlock falling out even during rough operations. For areas subject to higher pressure forces, such as on top of container stanchions, we recommend the CV-20G heavy-duty twistlock.

CV-20



CV-20G



CV-20

| Order number | Product | Weight kg | Shaft material | Housing material | Handle material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|-----------------------------------|----------------------|--|--------------------|-------------------------------|-----------------------------|--|---|-----------|
| 1237596 | CV-20 | 5.2 | Forged high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, fully symmetrical | Container castings, twistlock foundations, Operating rod OR-W | MacGregor |
| 1215106 | CV-20 | 5.2 | Precision cast high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, fully symmetrical | Container castings, twistlock foundations, Operating rod OR-W | MacGregor |
| 1238334 | CV-20G | 6.0 | Forged high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, fully symmetrical | Container castings, twistlock foundations | MacGregor |
| 1237597 | CV-20G | 6.0 | Precision cast high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, fully symmetrical | Container castings, twistlock foundations | MacGregor |

Semi-automatic twistlocks

CV-16

Safe and simple operation

The CV-16 is a single-wire twistlock, which is easy and safe to operate, and combines the strength of a forged shaft with a precision-cast housing.

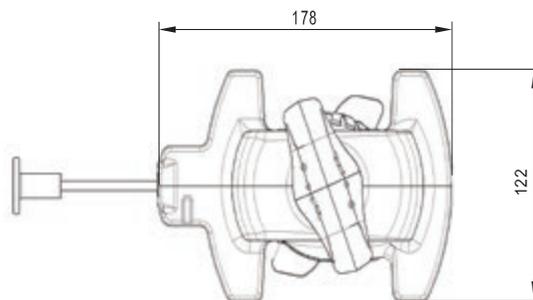
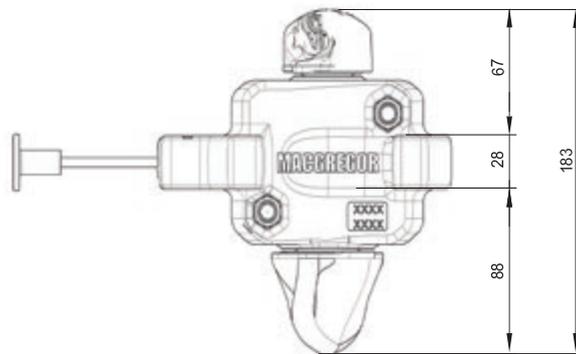
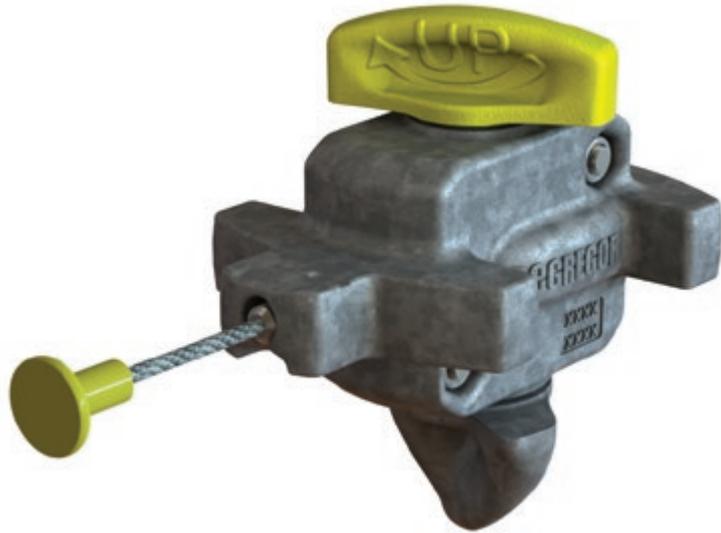
Its upper cone is yellow and marked with the text 'UP', which ensures quick and easy orientation. The unit's wire position clearly indicates the twistlock's operational status. When the wire points down, the lower cone is unlocked and when in a horizontal position, both cones are locked and the container is safely secured.

The closed hot-dip galvanised housing protects the twistlock's internal mechanism from wear and tear at sea and during cargo handling operations, guaranteeing durable performance and trouble-free operation throughout its lifetime.

The CV-16 has been proven in onboard trials and combines optimised construction with functionality, reliability and ease of operation.

CV-16 can be approved for Vertical Tandem Lifts (CV-16L).

NOTE: Parts are not interchangeable with the CV-15 twistlock.



CV-16

| Order number | Product | Weight kg | Shaft material | Housing material | Handle material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|-----------------|-----------|---------------------------|----------------------|--|--------------------|-------------------------------|-----------------------------|-------------------------------|---|-----------|
| 1245293 | CV-16 | 4.5 | Forged high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function | Container castings, twistlock foundations | MacGregor |
| 1245294 | CV-16L Liftlock | 4.5 | Forged high tensile steel | Precision cast steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function | Container castings, twistlock foundations | MacGregor |

C5AM-DF, C5AM-HC

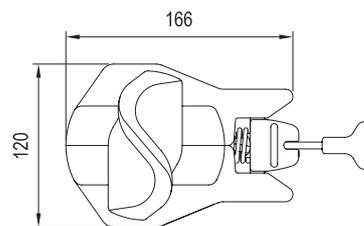
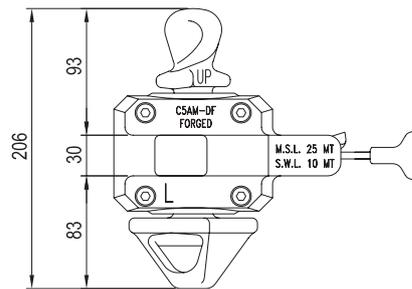
Semi-automatic one wire twistlock

The one-wire MacGregor Allset C5AM-DF/HC twistlock is a second generation development of the C5AM design, which set a new global standard for twistlocks when it was first introduced to the market in the early 1990s. It is still one of our most popular twistlocks; trusted by shipowners and operators worldwide.

The C5AM-DF is the only fully forged semi-automatic twistlock on the market. As a result, it offers outstanding durability and performance.

All manufactured parts are forged and assembled in one place, combining decades of forging knowledge and full production control. The C5AM-DF is a perfect choice for absolute cargo safety and low lifecycle costs.

The C5AM-DF family is for intermediate use and the C5AM-HC is used on the bottom layer. Additional versions include: the C5AM-DF/GL with Germanischer Lloyd-approved wear surface; a low temperature version, the C5AM-DF/LT; and the C5AM-DF/W with an extra wide body.



C5AM-DF

| Order number | Product | Weight kg | Shaft material | Housing material | Handle material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|--------------|-----------|---------------------------|------------------|--|--------------------|-------------------------------|-----------------------------|---|--|--------|
| 1120907 | C5AM-DF | 6.1 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function | Container corner castings, twistlock foundations | Allset |
| 1187322 | C5AM-DF/LT | 6.1 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, for low temperature use (-40°C) | Container corner castings, twistlock foundations | Allset |
| 1120911 | C5AM-HC | 7.9 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, wider housing for higher pressure forces (bottom tiers) | Container corner castings, twistlock foundations | Allset |
| 1131134 | C5AM-DF/W | 10.4 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic twistlock for wide containers | Container corner castings, twistlock foundations | Allset |
| 1193431 | C5AM-DF/GL-N | 6.8 | Forged high tensile steel | Forged steel | Stainless steel wire with plastic end knob | Hot-dip galvanised | 250 | 210 | Semi-automatic, dual function, wider housing for higher pressure forces | Container corner castings, twistlock foundations | Allset |

CV-8, CV-8G Manual twistlock

The MacGregor CV-8 and CV-8G bottom twistlocks are designed to handle the large forces and wear that occur at the bottom of a container stack. In accordance with Germanischer Lloyd's rules for higher pressure forces, the CV-8G bottom twistlock housing is designed with a larger wear surface.

Bottom twistlocks are used on the bottom corners of containers sitting on hatch covers, pedestals and deck extensions. At sea, these twistlocks incur longitudinal forces caused by torsional deformations of the ship's hull. These longitudinal forces have to be addressed by either incorporating sliding foundations or by using ISO standard twistlock foundations, which have an elongated ISO hole.

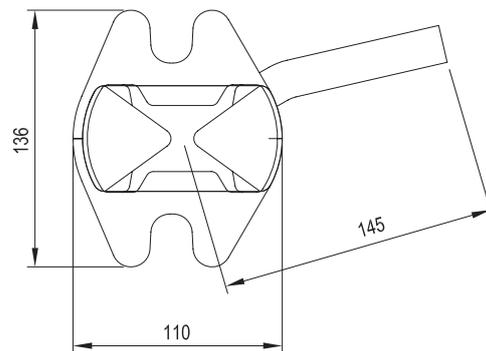
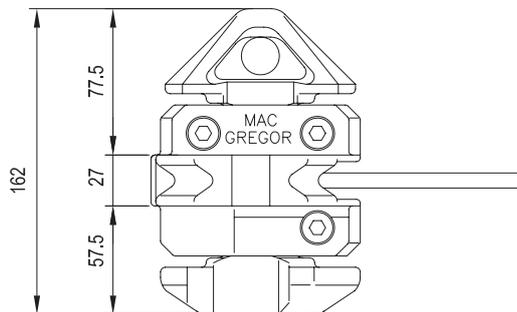
When torsional deformation occurs the containers will slide on the pedestals, causing wear to the base of the twistlocks.

When the forces and the torsional deformation are large the wear can be excessive. In worst case scenarios, the forces and wear can cause cracking and finally failure of the bottom twistlocks during a voyage.

MacGregor CV-8 and CV-8G bottom twistlocks fulfil all safety criteria and out-perform others in this tough environment. The CV-8 series of bottom twistlocks are designed for active duty and are easy to operate with a manual locking handle. To best match your vessel's needs, the CV-8 series of manual twistlock are available in three different models: the standard CV-8; the CV-8G with an enlarged wear surface; and the CV-8B with an extra large wear surface and built-in wear indicator.

Both the CV-8 and CV-8G units have left-hand locking mechanisms.

CV-8

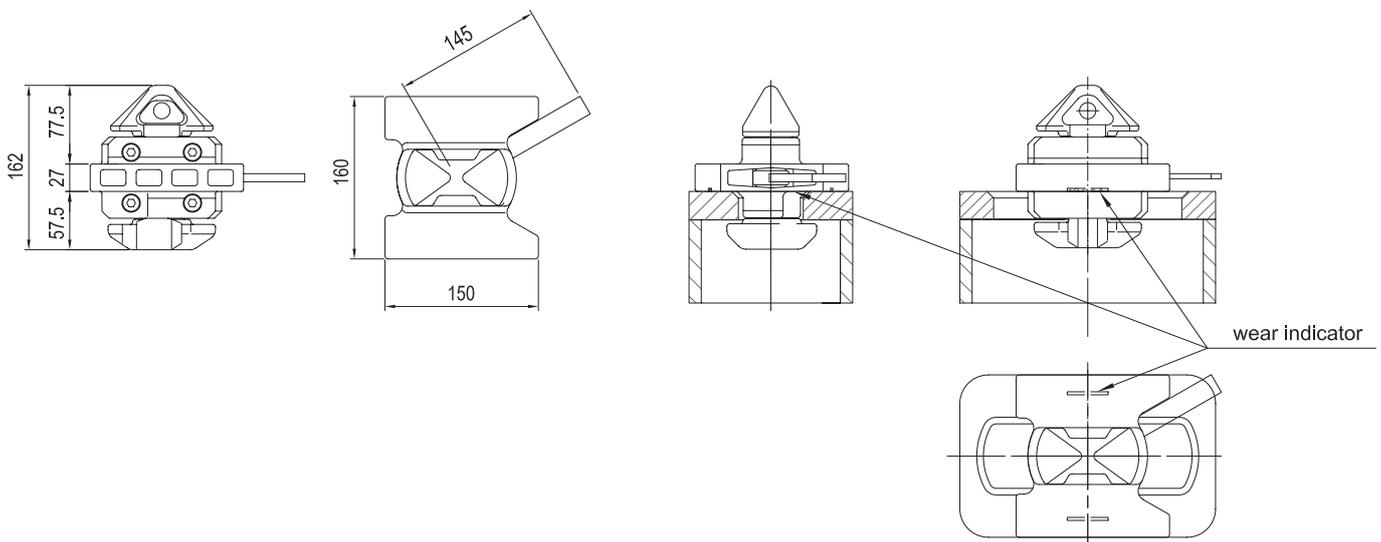


| Order number | Product | Weight kg | Shaft material | Housing material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|---------------------------|----------------------|--------------------|-------------------------------|-----------------------------|---|---|-----------|
| 1070783 | CV-8R | 5.1 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for bottom tiers, right hand locking | Container castings, twistlock foundations | MacGregor |
| 1108154 | CV-8R-Z | 4.9 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for use with cellguides, right hand locking | Container castings, twistlock foundations | MacGregor |
| 1108155 | CV-8-Z | 4.9 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for use with cellguides, left hand locking | Container castings, twistlock foundations | MacGregor |
| 1020835 | CV-8 | 4.7 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for bottom tiers, left hand locking | Container castings, twistlock foundations | MacGregor |
| 1065830 | CV-8G | 5.6 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for bottom tiers, left hand locking, wider housing for higher pressure forces | Container castings, twistlock foundations | MacGregor |

CV-8B Manual twistlock

The MacGregor CV-8B heavy duty bottom twistlock incorporates a built-in wear indicator and an extra large wear surface. It is designed to handle the toughest conditions of forces and wear that can occur at the bottom of a container stack.

The built-in wear indicator is easy to read and displays the operating status of the bottom twistlock so that worn out equipment can be replaced in good time. A quick visual inspection of the wear indicator determines whether the bottom twistlock is safe for active duty.



CV-8B

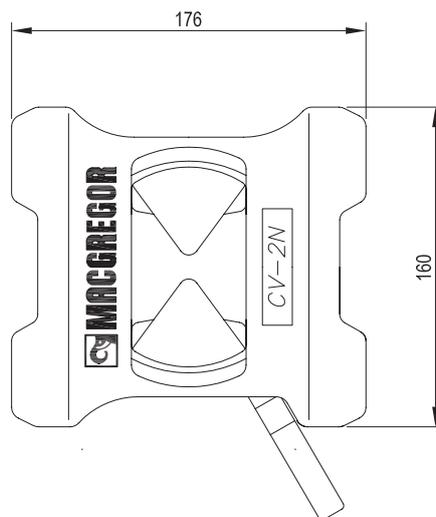
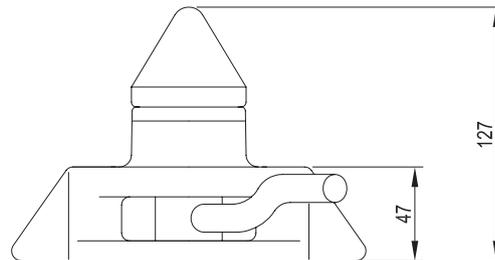
| Order number | Product | Weight kg | Shaft material | Housing material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|---------------------------|----------------------|--------------------|-------------------------------|-----------------------------|--|--|-----------|
| 1081129 | CV-8B | 7.1 | Forged high tensile steel | Precision cast steel | Hot-dip galvanised | 250 | 210 | Manual, for bottom tiers, left hand locking, extra wide housing for higher pressure forces & sliding | Container castings, twistlock foundations with normal & long ISO holes | MacGregor |

Dovetail twistlocks

CV-2N, CV-5N

Dovetail twistlock

MacGregor dovetail twistlocks are available in two versions; the CV-2N is used from the short end of the container and the CV-5N from the long side of the container. These twistlocks are attached to the APT dovetail foundation, which makes them easy to attach and detach, leaving only the fixed frame.



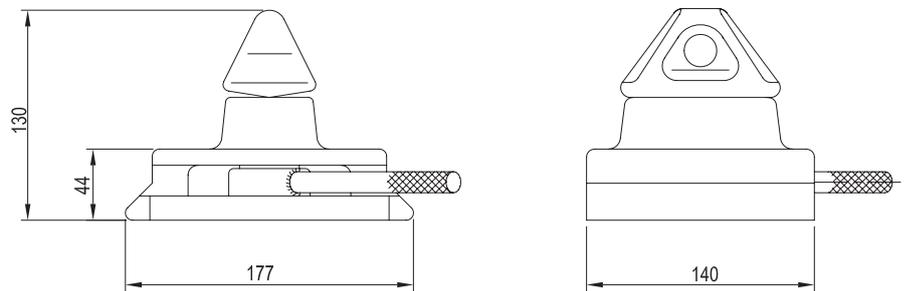
CV-2N, CV-5N

| Order number | Product | Weight kg | Shaft material | Housing material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|---------------------------|----------------------|--------------------|-------------------------------|-----------------------------|---|---|-----------|
| 1034841 | CV-2N | 7.6 | Forged high tensile steel | precision cast steel | Hot-dip galvanised | 250 | 210 | Dovetail angle 55°. Left hand locking | Container corner casting, dovetail foundation | MacGregor |
| 1043896 | CV-5N | 7.6 | Forged high tensile steel | precision cast steel | Hot-dip galvanised | 250 | 210 | Dovetail angle 55°, for transversal shifting. Left hand locking | Container corner casting, dovetail foundation | MacGregor |

C44

Dovetail twistlock

The MacGregor Allset design C44A dovetail twistlock is available in both left and right locking versions. The C44A is used together with the D5A single or the D5B double dovetail foundation.



C44

| Order number | Product | Weight kg | Shaft material | Housing material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|---------------------------|------------------|--------------------|-------------------------------|-----------------------------|--|---|--------|
| 1131117 | C44A-RL | 6.9 | Forged high tensile steel | Forged steel | Hot-dip galvanised | 200 | 210 | Dovetail angle 45°, left hand locking | Container corner casting, dovetail foundation | Allset |
| 1131118 | C44A-LL | 6.9 | Forged high tensile steel | Forged steel | Hot-dip galvanised | 200 | 210 | Dovetail angle 45°, right hand locking | Container corner casting, dovetail foundation | Allset |

SDL-1

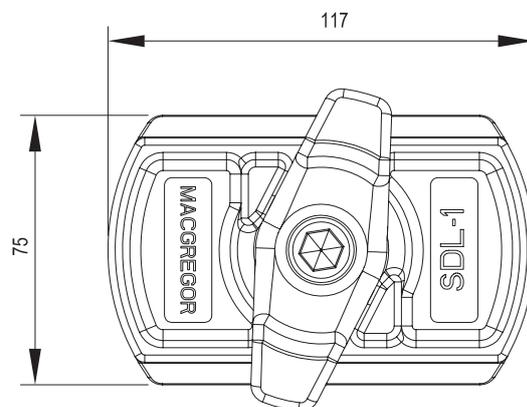
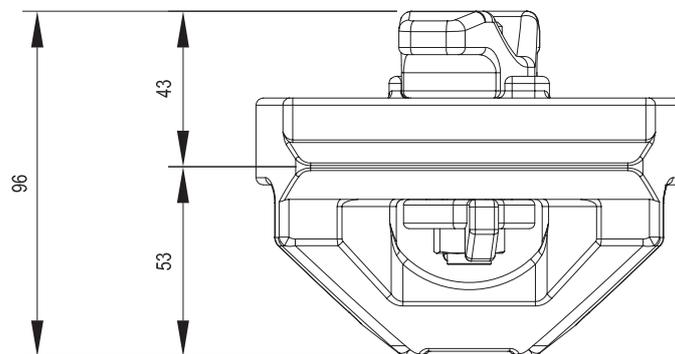
Terminal stacker for advanced mixed stowage systems

The flangeless MacGregor SDL-1 terminal stacker is a flexible, easy to operate device that will increase the cargo efficiency of your container vessel.

The simple 'one stacker per container end' system guarantees a simple, secure, timesaving method for container operations. This securing arrangement offers a high degree of flexibility in container stowage, employing a minimum number of fixed elements.

The flangeless stacker slightly decreases the height of the centre of gravity of a container stack, which is an advantage for the ship's stability.

The cargo hold of the vessel can also be utilised more efficiently with the flangeless stacker system as containers are stowed more compactly. Two SDL-1 units are required per 20ft container: one fitted at the ISO gap end and one fitted at the cell guide end.



SDL-1

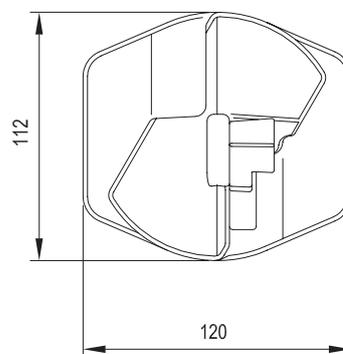
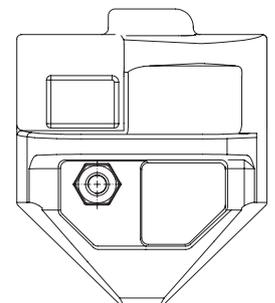
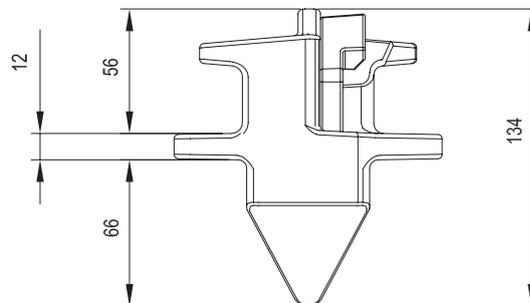
| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Shear, kN | Details | Counter part | Related system | Design |
|--------------|---------|-----------|----------------------|--------------------|-----------------------------|-----------|--------------------------|--|-----------|
| 1068830 | SDL-1 | 2.1 | Precision cast steel | Hot-dip galvanised | 210 | No flange | Container corner casting | OSHA-compliant advanced mixed stowage system | MacGregor |

SDL-4

Terminal stacker for mixed stowage system

The MacGregor SDL-4 is an easy to use hanging stacker. The simple handling method of the SDL-4 ensures fast trouble-free operation by the stevedores.

The solid one piece design housing ensures the highest possible safety and durability levels. Four SDL-4 units are required per 20ft container: two fitted at the ISO gap end to avoid transversal sliding and two fitted at the cell guide end for levelling purposes only.



SDL-4

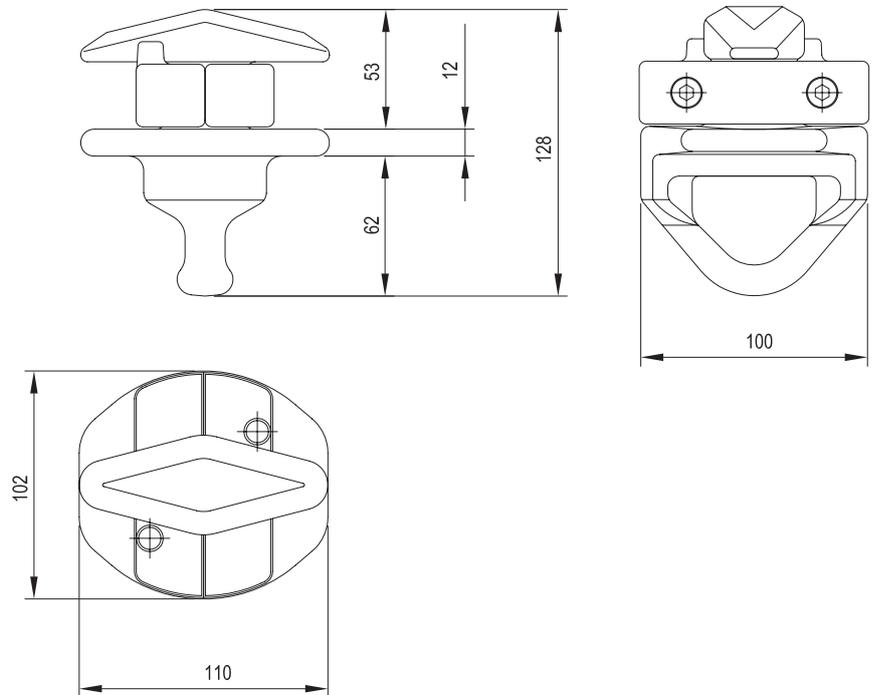
| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|--------------|-----------|----------------------|--------------------|-----------------------------|-------------|--------------------------|-----------|
| 1019754 | SDL-4 | 3.1 | Precision cast steel | Hot-dip galvanised | 210 | With flange | Container corner casting | MacGregor |
| 1064036 | SDL-4/CV-117 | 3.7 | Precision cast steel | Hot-dip galvanised | 210 | With flange | Container corner casting | MacGregor |
| 1080889 | SDL-4/117 | 3.1 | Precision cast steel | Hot-dip galvanised | 210 | With flange | Container corner casting | MacGregor |

C12C

Hanging stacker

The MacGregor Allset C12C is a fully forged hanging stacker. The fully forged design offers the highest durability and low lifecycle costs. It is easy to use and handle and is designed for active duty in tough marine conditions, all to ensure fast trouble-free operation by the stevedores.

Four C12C units are required per 20ft container: two fitted at the ISO gap end to avoid transversal sliding and two fitted at the cell guide end for levelling purposes only.



C12C

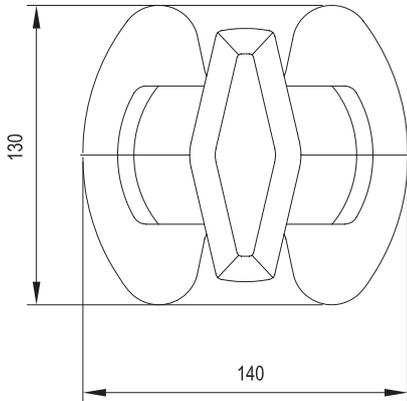
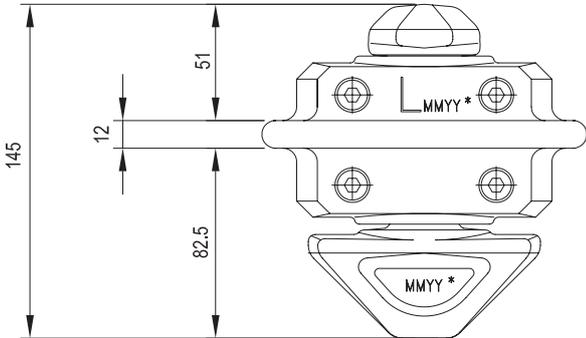
| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|--------------|--------------------|-----------------------------|-------------|--------------------------|--------|
| 1120850 | C12C | 3.4 | Forged steel | Hot-dip galvanised | 210 | With flange | Container corner casting | Allset |

C16A Hanging stacker

The MacGregor Allset C16A is a fully forged hanging stacker. Its fully forged design offers the highest durability and low lifecycle costs.

The C16A has a larger flange area compared to the C12C, but it is as easy to use and handle.

Four C16A units are required per 20ft container: two fitted at the ISO gap end to avoid transversal sliding and two fitted at the cell guide end for levelling purposes only.



C16A

| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|--------------|--------------------|-----------------------------|-------------|--------------------------|--------|
| 1120853 | C16A | 4.1 | Forged steel | Hot-dip galvanised | 210 | With flange | Container corner casting | Allset |

C18A

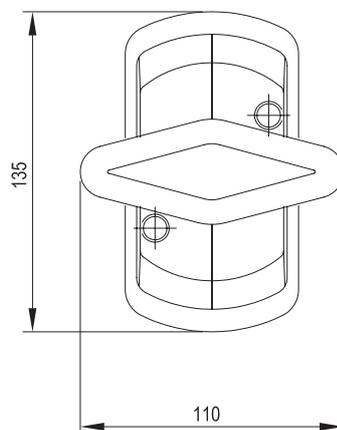
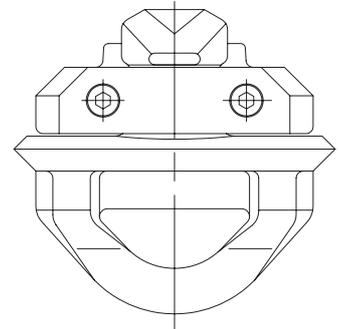
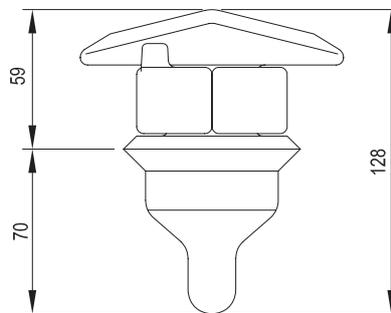
Flangeless hanging stacker

The MacGregor Allset C18A is a fully forged flangeless hanging stacker. The fully forged design offers the highest durability and low lifecycle costs.

The C18A is easy to use and handle and is designed for active duty in tough marine conditions, all to ensure fast trouble-free operation by the stevedores. This securing arrangement offers a high degree of flexibility in container stowage, employing a minimum number of fixed elements.

The flangeless stacker slightly decreases the height of the centre of gravity of a container stack, which is an advantage for the ship's stability.

The cargo hold of the vessel can also be utilised more efficiently with a flangeless stacker system as containers are stowed more compactly. Two C18A units are required per 20ft container: one fitted at the ISO gap end to and one fitted at the cell guide end.



C18A

| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|--------------|--------------------|-----------------------------|-----------|--------------------------|--------|
| 1120854 | C18A | 3.5 | Forged steel | Hot-dip galvanised | 210 | No flange | Container corner casting | Allset |

AFC-1L

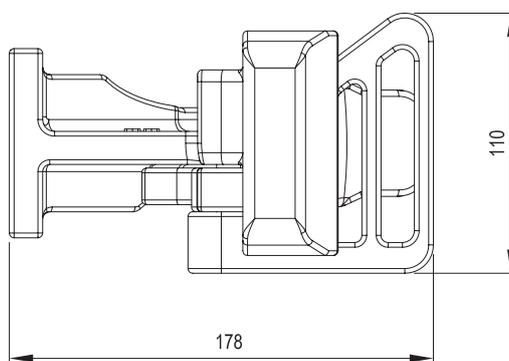
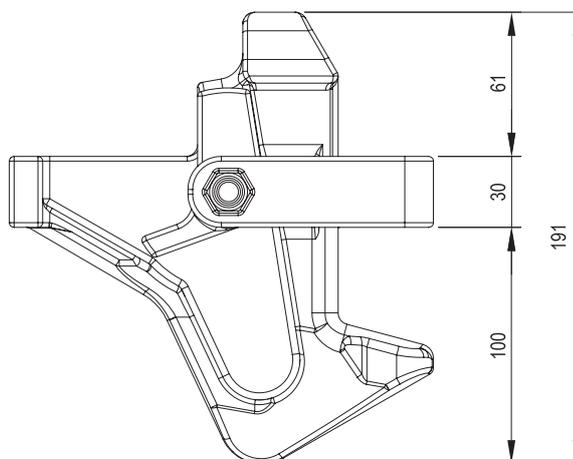
All-purpose midlock for 20' ISO gap and lashing gap

The second generation AFC-1L midlock was developed from the proven features of the world's first automatic fixing cone – the renowned AFC-1.

The AFC-1 was a pioneer product in modern container securing arrangements because it provided the opportunity to easily and efficiently stow 20' containers with minimum longitudinal clearance on board vessels.

The AFC-1L midlock is always used in conjunction with semi-automatic or manual twistlocks to ensure safely secured containers.

As for ship design, the AFC-1L provides the opportunity to either shorten a ship's overall length with a fixed number of container bays or accommodate additional container bays to a given ship length.



AFC-1L

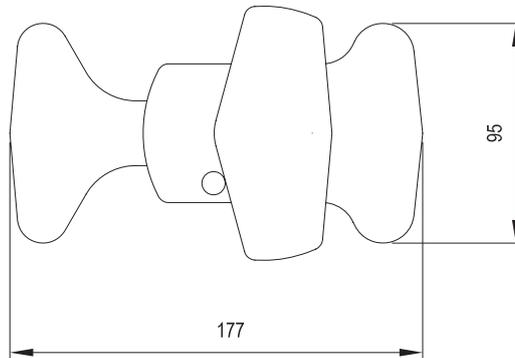
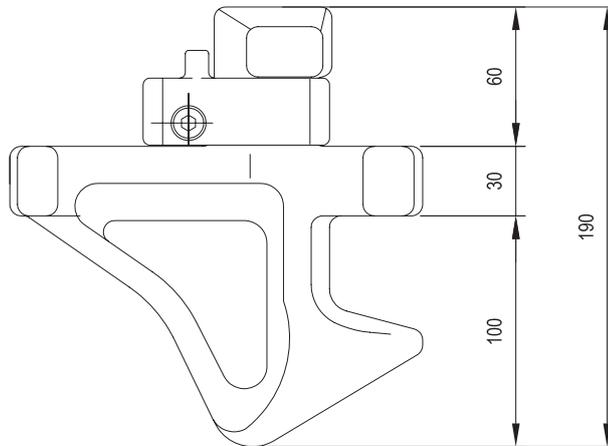
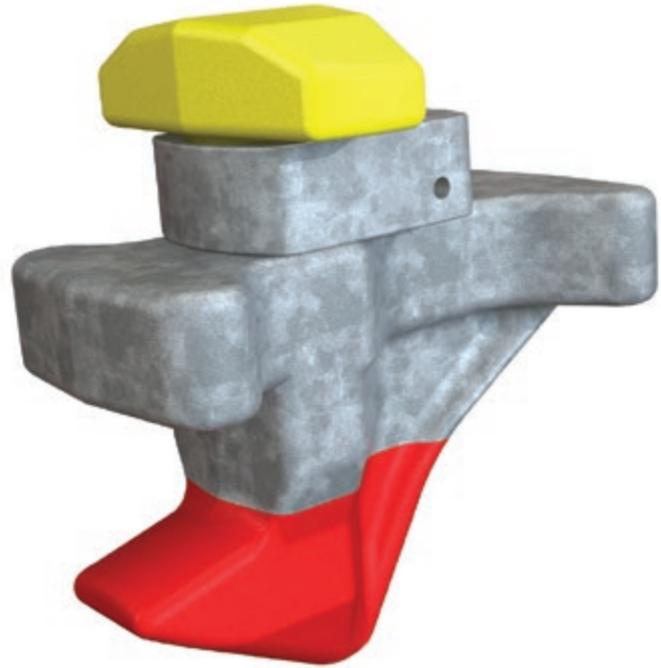
| Order number | Product | Weight kg | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|-----------|-----------------------------------|--------------------|-------------------------------|-----------------------------|--|---|-----------|
| 1086914 | AFC-1L | 5.2 | Precision cast high tensile steel | Hot-dip galvanised | 250 | 210 | For use in ISO-gap, only in combination with semi-automatic twistlocks | Container castings, twistlock foundations | MacGregor |

C19A Midlock

The C19A fully forged midlock is easy to use and reliably designed to secure 20' containers with an ISO gap between units.

It is efficient at reducing loading and discharging times because no locking or unlocking is required. This adds an additional safety feature for the operator, as stevedores are not required to open the C19As on the top of the container stacks.

The C19A midlock is always used in conjunction with semi-automatic or manual twistlocks to ensure safely secured containers. The C19A is compliant with OSHA rules and with the latest requirements of international classification societies.



C19A

| Order number | Product | Material | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|---------|--------------|-------------------------------|-----------------------------|--|---|--------|
| 1120845 | C19A | Forged steel | 250 | 210 | For use in ISO-gap, only in combination with semi-automatic twistlocks | Container castings, twistlock foundations | Allset |

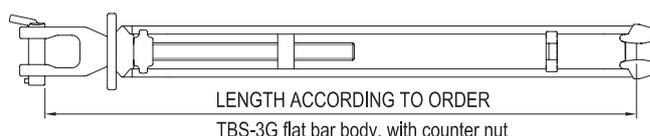
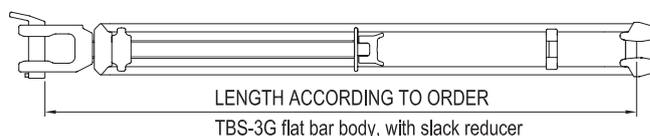
TBS-3G for Multilash lashing system

TBS-3G is a family of turnbuckles in the MacGregor Multilash lashing system. The Multilash knob-type lashing system consists of TBS-3G turnbuckles and LB-11 lashing bars. This user-friendly system offers easily-adjustable container lashing arrangements for fast and trouble free port operations.

The TBS-3G turnbuckle has a body made from a round or flat bar. An adjustable spindle, with a jaw mechanism attached, is inserted into a sliding nut inside the turnbuckle body. The jaw is easily attached to a lashing eye-plate on the hatch cover, or other suitable structure, and secured with the gravity-activated locking bolt.

The MacGregor TBS-3G turnbuckle is available either with or without the traditional counter nut, or with the easy-to-use MacGregor slack reducer.

The MacGregor slack reducer is easily engaged when the turnbuckle has been correctly tightened. Its unique design enables quick and reliable visual verification of the safely locked turnbuckle and no tools are needed for checking. When the slack reducer is in the 'up' position, the turnbuckle is ready for opening or tightening, when it is in a 'side' position, it means that your cargo is safely stowed and ready for the voyage.



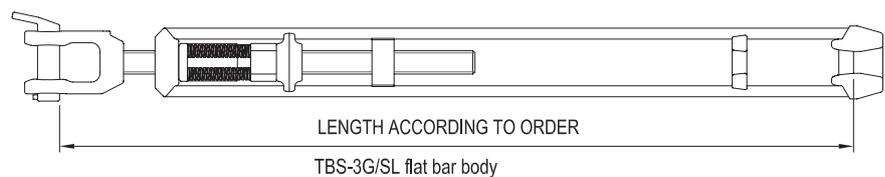
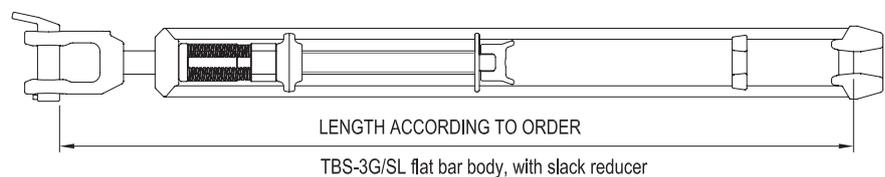
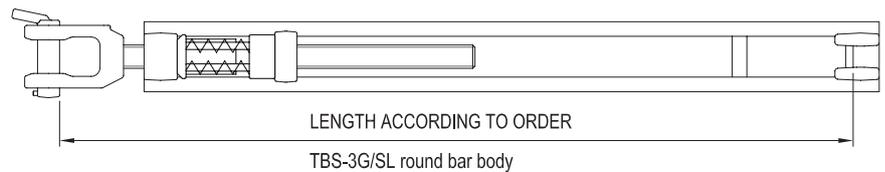
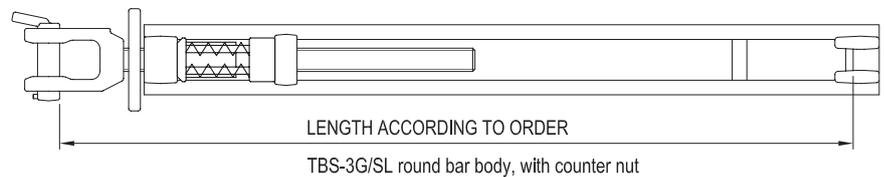
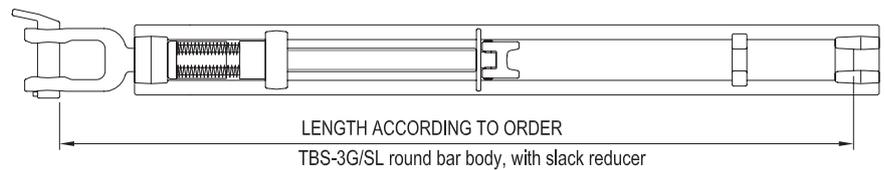
TBS-3G

| Product | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------|----------------------|--------------------|-------------------------------------|-------------------------------|--|----------------|-----------|
| TBS-3G | According to order | High tensile steel | Hot-dip galvanised, spindle greased | 250 | LB-11 Lashing bar, LB-14 Extension bar | Multilash | MacGregor |

TBS-3G/SL for vertical lashing

The MacGregor TBS-3G/SL turnbuckle is used together with LB-28 or LB-31 lashing bars for vertical lashing at the outermost container position in the container bay.

Design includes a spring-loaded element to absorb the initial vertical movement of the containers caused by the clearance between the twistlock and the container. This ensures that the turnbuckle and the lashing bar assembly are not activated until the twistlock clearance has settled and the forces are evenly distributed across all components in the securing system.



TBS-3G/SL

| Product | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|-----------|----------------------|--------------------|-------------------------------------|-------------------------------|--|------------------|-----------|
| TBS-3G/SL | According to order | High tensile steel | Hot-dip galvanised, spindle greased | 250 | LB-28 & LB-31 Lashing bar, LB-14 Extension bar | Vertical lashing | MacGregor |

FLX5-TB for Flexilash lashing system

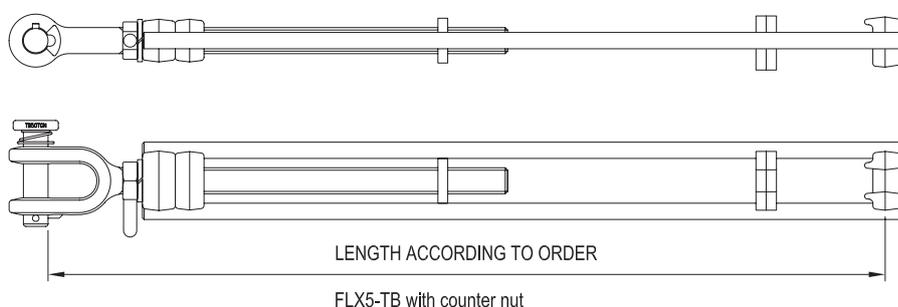
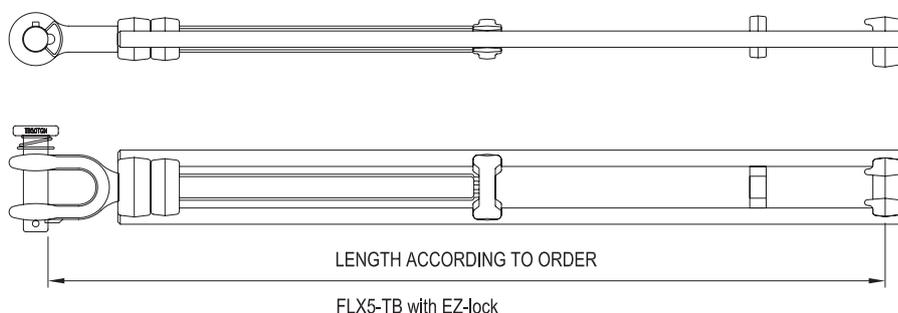
The MacGregor Allset FLX5-TB is a family of compact and fully forged turnbuckles, which are used in the Flexilash system. Their lightweight and compact design ensures smooth easy operation and also minimises the problem of turnbuckles grinding against each other during the voyage.

The FLX5-TB turnbuckle has a round bar body with forged end fittings that are welded to it. A one-piece forged adjustable spindle with jaw is inserted into a sliding nut inside the turnbuckle body, allowing fast and easy operation.

The complete assembly is protected from the marine environment by hot-dip galvanising. The jaw is easily attached to a lashing eye-plate on the hatch cover, or another suitable structure, with a unique spring-loaded toggle pin. The bayonet-type fitting toggle pin ensures the highest cargo safety without compromising ease of operation.

The MacGregor Allset FLX5-TB turnbuckle is available either with traditional counter nuts or with the patented and easy-to-use MacGregor Allset design slack reducer (EZ-lock). This unique slack reducer is located on top of the spindle and thanks to its ratchet function, it can remain in a locked position while tightening the turnbuckle. When the turnbuckle has been tightened, the ratchet function prevents the lashing from slackening. This feature saves valuable time in port operations as it guarantees that the cargo is safely secured throughout the voyage.

The FLX5-TB family is available in numerous lengths and has a 50-tonne breaking load. In addition, versions with a 60-tonne breaking load are available for use as single external lashings.



FLX5-TB

| Product | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------------------------------------|----------------------|--------------------|--------------------|-------------------------------|--------------------|----------------|--------|
| FLX5-TB-50 | According to order | High tensile steel | Hot-dip galvanised | 250 | FLX-RD lashing bar | Flexilash | Allset |
| FLX5-TB-50 with two connection points | According to order | High tensile steel | Hot-dip galvanised | 250 | FLX-RD lashing bar | Flexilash | Allset |
| FLX5-TB-60 | According to order | High tensile steel | Hot-dip galvanised | 300 | FLX-RD lashing bar | Flexilash | Allset |

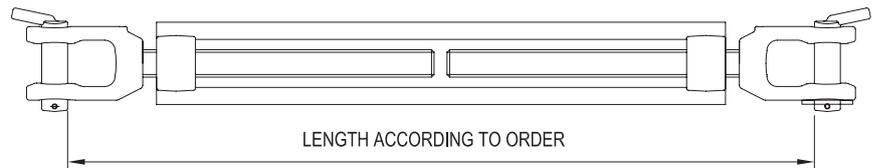
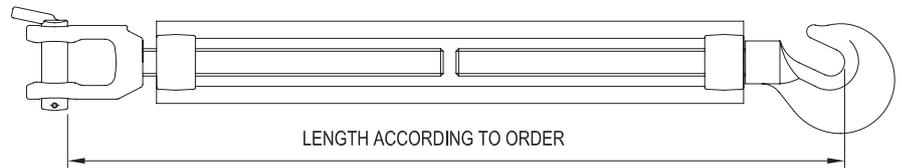
Turnbuckles

TBO

for use with LB-10 lashing bars

The MacGregor TBO family of turnbuckles is a classic hook-eye type of securing system. The hook-eye turnbuckle is used together with the LB-10 type of lashing bars and is commonly used on board older container vessels.

The TBO turnbuckle length is adjusted by the double-sided threads in the turnbuckle body. The lashing bars are of a fixed length with a closed eye-loop connecting to the turnbuckle.



TBO

| Order number | Product | Weight kg | Jaw Width, mm | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Details | Counter part | Design |
|--------------|----------|-----------|---------------|----------------------|--------------------|-------------------------------------|-------------------------------|--|--|-----------|
| 1018030 | TBO-1G/2 | 19.5 | 42 | 1058 - 1660 | High tensile steel | Hot-dip galvanised, spindle greased | 245 | Flat bar body, jaw-hook, with counter nut | ZP lashing plate, ZA-3 lashing eye, ZA-7 slewing eye, LB-10/4T/4 lashing bar | MacGregor |
| 1065373 | TBO-1G/N | 12.6 | 46 | 900 - 1460 | High tensile steel | Hot-dip galvanised, spindle greased | 245 | Round bar body, jaw-hook | ZP lashing plate, ZA-3 lashing eye, ZA-7 slewing eye, LB-10/4T/4 lashing bar | MacGregor |
| 1065374 | TBO-1G/N | 13.5 | 46 | 900 - 1470 | High tensile steel | Hot-dip galvanised, spindle greased | 245 | Round bar body, jaw-hook, with counter nut | ZP lashing plate, ZA-3 lashing eye, ZA-7 slewing eye, LB-10/4T/4 lashing bar | MacGregor |
| 1130238 | TBO-1H/N | 12.8 | 46 | 865 - 1439 | High tensile steel | Hot-dip galvanised, spindle greased | 245 | Round bar body, jaw-jaw | ZP lashing plate, ZA-3 lashing eye, ZA-7 slewing eye, LB-10/4T/4 lashing bar | MacGregor |

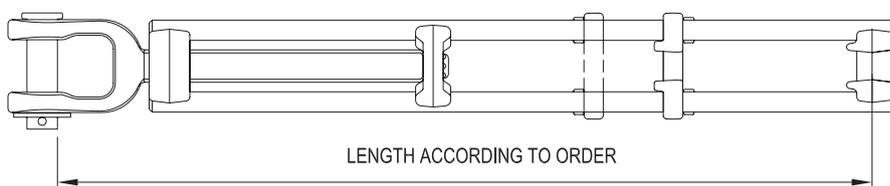
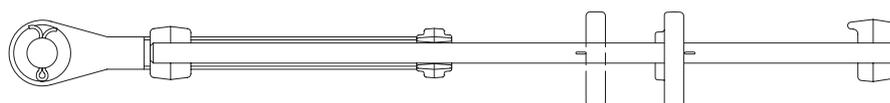
FLX5-A/S for external lashing

The MacGregor Allset FLX5-A/S is a family of compact and fully forged turnbuckles. Their compact and lightweight designs make lashing operations smooth and easy. The compact dimensions also minimise the problem of turnbuckles grinding against other turnbuckles during the voyage.

The FLX5-A/S type of turnbuckle is used together with special lashing bars for external lashing. The FLX5-A/S turnbuckle has a round bar body with forged end fittings welded to it. It offers an adjustable support ring for the lashing bar as its corresponding lashing bar uses non-symmetrical knob distances. While the FLX5-TB series uses a sliding nut for easy length adjustment during operations, the FLX5-A/S series uses a fixed position nut, incorporated into the end fitting of the turnbuckle, in combination with the sliding support ring.

The MacGregor Allset FLX5-A/S turnbuckle is available either with traditional counter nuts, or with the patented and easy-to-use MacGregor Allset design slack reducer (EZ-lock). This unique slack reducer is located on top of the spindle and thanks to its one-way ratchet function, it can remain in a locked position while tightening the turnbuckle. When the turnbuckle has been tightened, the ratchet function prevents the lashing from slackening. This feature saves valuable time in port operations as it guarantees that the cargo is safely secured throughout the voyage.

The one-piece forged jaw and spindle is attached and secured to the lashing eye-plate on the hatch cover, or another suitable structure, with a toggle pin. The turnbuckle is then locked with a cutter pin to ensure that it is used at the correct position in the lashing system.



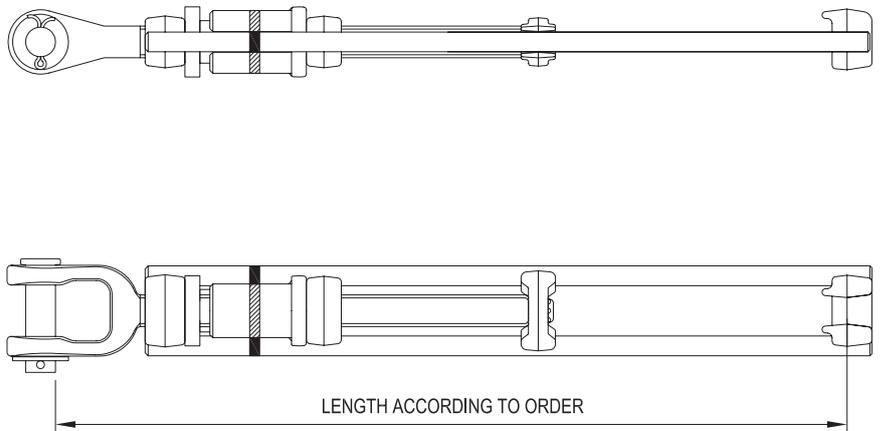
FLX5-A/S

| Product | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|----------|----------------------|--------------------|--------------------|-------------------------------|----------------------|------------------|--------|
| FLX5-A/S | According to order | High tensile steel | Hot-dip galvanised | 250 | K-series lashing bar | External lashing | Allset |

FLX5-TB1, FLX5-TB2 for vertical lashing

MacGregor Allset design FLX5-TB1/2 turnbuckles are used together with FLX-RD-E or FLX-RD-J lashing bars for vertical lashing at the outermost container position in the container bay. The design includes a spring-loaded element to absorb the initial vertical movement of the containers caused by the clearance between the twistlock and the container.

With this design, the turnbuckle and the lashing bar assembly are not activated until the twistlock clearance has settled and the forces are evenly distributed across all components in the securing system. Unique markings shows stevedores and crew when the turnbuckle is tightened to the correct length, this ensures that the whole lashing system works in unison.



FLX5-TB1, FLX5-TB2

| Product | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Details | Counter part | Related system | Design |
|--|----------------------|--------------------|--------------------|-------------------------------|-----------------------------|--|-----------------------------|--------|
| FLX5-TB1 | According to order | High tensile steel | Hot-dip galvanised | 210 | Max. Vertical movement 13mm | FLX-RD-E lashing bar, FLX-RD-J lashing bar | Flexilash, vertical lashing | Allset |
| FLX5-TB2 | According to order | High tensile steel | Hot-dip galvanised | 210 | Max. Vertical movement 23mm | FLX-RD-E lashing bar, FLX-RD-J lashing bar | Flexilash, vertical lashing | Allset |
| FLX5-TB2-50 with two connection points | According to order | High tensile steel | Hot-dip galvanised | 250 | Max. Vertical movement 23mm | FLX-RD-E lashing bar, FLX-RD-J lashing bar | Flexilash, vertical lashing | Allset |

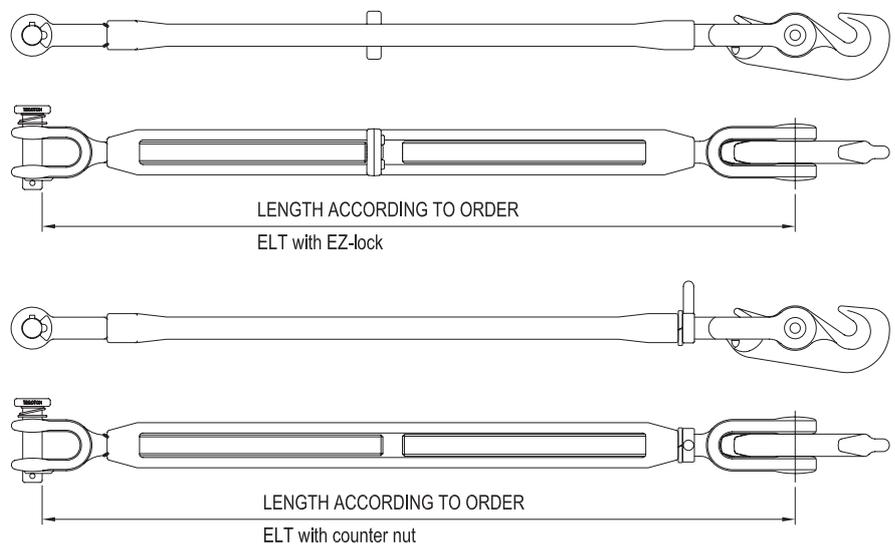
ELT for the Equalash lashing system

The MacGregor Allset Equalash turnbuckle family has a unique design that requires only one turnbuckle per pair of lashing bars. The ELT family uses a double hook to connect to the pair of ELB-C lashing bars. This double hook evenly distributes forces between the two lashing bars. The system can be used with either one or two lashing bars, depending on the container stack situation.

ELB turnbuckles are fully forged as per the MacGregor Allset design standard and are easily attached to a lashing eye-plate on the hatch cover, or other suitable structures, with a unique spring-loaded toggle pin. The bayonet-type fitting toggle pin ensures the highest level of cargo safety without compromising ease of operation.

The MacGregor Allset ELT series is available either with a counter-nut or with the patented and easy-to-use MacGregor Allset design slack reducer. This unique slack reducer activates automatically when the turnbuckle is tightened. This feature saves valuable time in port operations as it guarantees that the cargo is safely secured throughout the voyage.

The ELT family is available in different lengths with 55-tonne and 65-tonne breaking loads.



ELT

| Order number | Product | Weight kg | Jaw Width, mm | Length min - max, mm | Material | Treatment | Safe Working Load Tension, kN | Details | Counter part | Related system | Design |
|--------------|------------|-----------|---------------|----------------------|---------------------|--------------------|-------------------------------|--------------|-------------------|----------------|--------|
| 1120860 | ELT-65XL | 22.0 | 42 | 1160 - 1930 | Steel, fully forged | Hot-dip galvanised | 325 | | ELB-C lashing bar | Equalash | Allset |
| 1120858 | ELT-65L(A) | 19.0 | 42 | 1030 - 1670 | Steel, fully forged | Hot-dip galvanised | 325 | | ELB-C lashing bar | Equalash | Allset |
| 1131050 | ELT-60(a) | 18.0 | 42 | 945 - 1445 | Steel, fully forged | Hot-dip galvanised | 325 | | ELB-C lashing bar | Equalash | Allset |
| 1120859 | ELT-65L-S | 18.5 | 42 | 1030 - 1670 | Steel, fully forged | Hot-dip galvanised | 325 | With EZ-lock | ELB-C lashing bar | Equalash | Allset |
| 1131048 | ELT-55 | 17.0 | 42 | 945 - 1445 | Steel, fully forged | Hot-dip galvanised | 275 | | ELB-C lashing bar | Equalash | Allset |

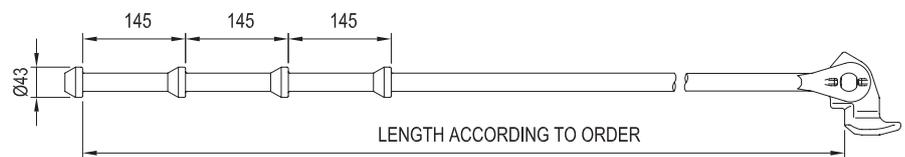
Lashing bars

LB-11

for Multilash lashing system

The MacGregor LB-11 knob-type lashing bars are used together with the TBS-3G family of turnbuckles in the MacGregor Multilash system.

The LB-11 is available in various lengths according to the vessel's needs. In its standard version, the LB-11 is designed for 50-tonne breaking loads, but it can also be supplied in a lighter 36-tonne breaking load version, the LB-11/22.



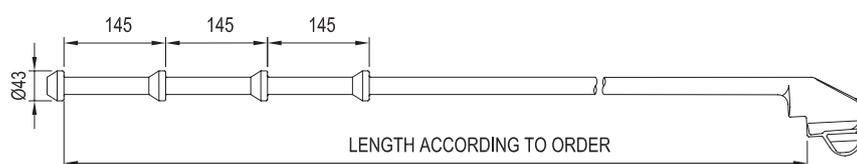
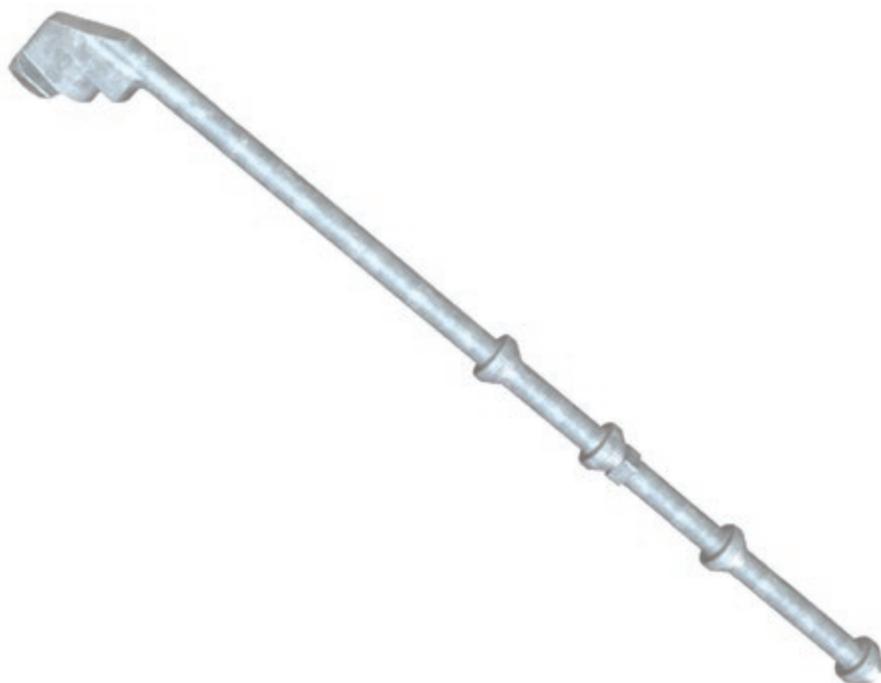
LB-11

| Product | Length, mm | | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------|--------------------|--------------------|--------------------|-------------------------------|--|----------------|-----------|
| LB-11 | According to order | High tensile steel | Hot-dip galvanised | 245 | TBS 3G/(1) turnbuckle, LB-14 Extension bar | Multilash | MacGregor |

LB-28 for Multilash lashing system

MacGregor LB-28 knob-type lashing bars are used together with the TBS-3G family of turnbuckles in the MacGregor Multilash system for vertical lashing.

The LB-28 unit is available in various lengths according to the vessel's needs, and is used for lower corner casting of upper container. For upper corner casting of the upper container, the LB-31 is used.



LB-28

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------|--------------------|--------------------|--------------------|-------------------------------|---|------------------|-----------|
| LB-28 | According to order | High tensile steel | Hot-dip galvanised | 245 | TBS 3G/(1/SL) turnbuckle, LB-14 Extension bar | Vertical lashing | MacGregor |

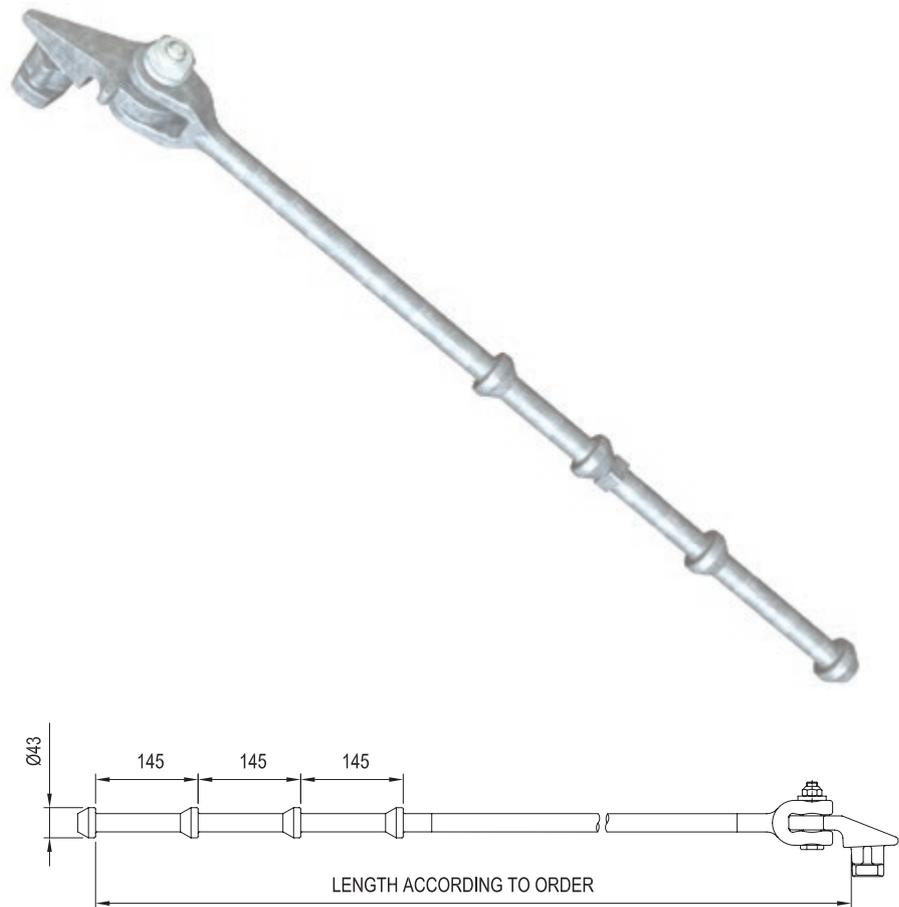
Lashing bars

LB-31

for Multilash lashing system

MacGregor LB-31 knob-type lashing bars are used together with the TBS-3G family of turnbuckles in the MacGregor Multilash system for vertical lashing.

The LB-31 bar is available in various lengths according to vessel's needs. For upper corner casting of the lower container, LB-31 is used and for lower corner casting of the upper container, the LB-28 lashing bar is used.

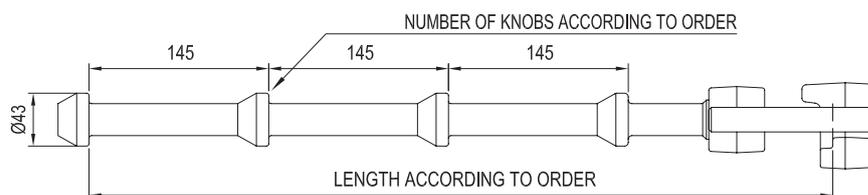
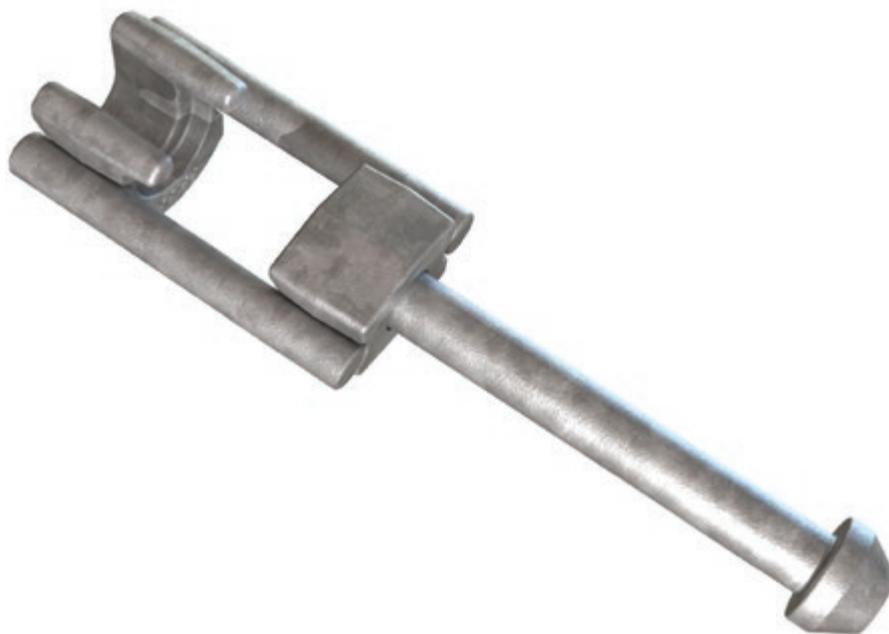


LB-31

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------|--------------------|--------------------|--------------------|-------------------------------|---|------------------|-----------|
| LB-31 | According to order | High tensile steel | Hot-dip galvanised | 245 | TBS 3G/(1/SL) turnbuckle, LB-14 Extension bar | Vertical lashing | MacGregor |

LB-14 Lashing bar extension for Multilash lashing system

MacGregor LB-14 knob-type extension lashing bars are used together with the LB-11 and the LB-31 lashing bars in the MacGregor Multilash system. The LB-14 bar can be supplied in various lengths and number of knobs according to the vessel's needs.



LB-14

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------|--------------------|--------------------|--------------------|-------------------------------|--|----------------|-----------|
| LB-14-K | According to order | High tensile steel | Hot-dip galvanised | 245 | TBS 3G(/1/SL) turnbuckle, LB-14 Extension bar, LB-11, LB-28, LB 31 lashing bar | Multilash | MacGregor |

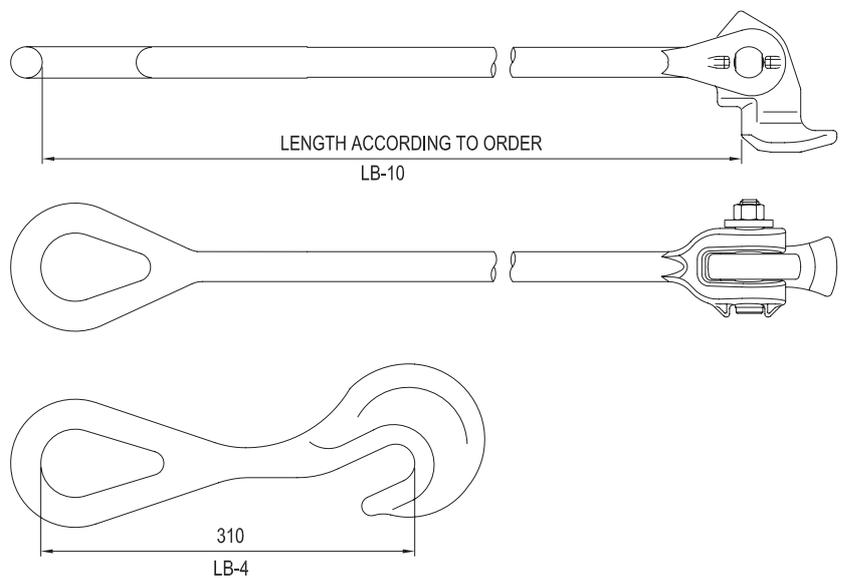
Lashing bars

LB-10

for use with TBO turnbuckles

MacGregor LB-10 eye-type lashing bars are used together with the MacGregor TBO family of turnbuckles. The LB-10 lashing bars can be supplied in various lengths according to the vessel's needs.

In its standard version, the LB-10 is designed for a 50-tonne breaking load, but can also be supplied in a lighter 36-tonne breaking load version, the LB-10/22.



LB-10

| Product | Weight kg | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Design |
|---------|-----------|--------------------|--------------------|--------------------|-------------------------------|---|-----------|
| LB-10 | | According to order | High tensile steel | Hot-dip galvanised | 245 | TBO-1G/N, TBS-4G/2.1 turnbuckle, LB-4 extension bar | MacGregor |
| LB-4 | 3.3 | 310 | High tensile steel | Hot-dip galvanised | 245 | TBO-1G/N, TBS-4G/2.1 turnbuckle, LB-10 lashing bar | MacGregor |

FLX-RD for Flexilash lashing system

MacGregor Allset-design FLX-RD knob-type lashing bars are used together with the FLX5-TB family of turnbuckles in the MacGregor Flexilash system.

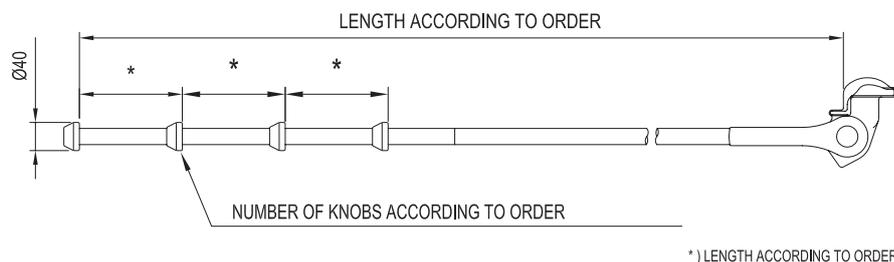
The FLX-RD is compact and fully forged, and is one of the lightest lashing bars on the market. This makes handling and operating the system easier and faster for the stevedores.

The standard version of FLX-RD is designed for a 50-tonne breaking load, but this lashing bar can also be supplied as a lighter 36-tonne breaking load version, the FLX-RD-36.

For increased cargo safety, MacGregor Allset lashing bars have a swage-fitted shaft for the rod head. This one-piece design is more compact and offers higher durability than nut and bolt assemblies of lashing bars.

We have developed the design of the FLX-RD system even further and introduce an extra low weight version – with a maintained breaking load value – to the FLX-RD family, the FLX Ultra Strength lashing bar. Advanced and accurate heat treatment of the lashing bar enables the steel strength potential to be fully utilised.

The Ultra Strength lashing bar is only 23mm in diameter and has a 50-tonne breaking load. The 36-tonne breaking load version is only 20mm in diameter. This means an extra light lashing bar that can be handled more safely, easily and faster by the stevedores in port.



*) LENGTH ACCORDING TO ORDER

FLX-RD

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Related system | Design |
|--------------------------|--------------------|--------------------|--------------------|-------------------------------|----------------|--------|
| FLX-RD-36 | According to order | High tensile steel | Hot-dip galvanised | 180 | Flexilash | Allset |
| FLX-RD-50 | According to order | High tensile steel | Hot-dip galvanised | 250 | Flexilash | Allset |
| FLX-RD-36 Ultra strength | According to order | High tensile steel | Hot-dip galvanised | 180 | Flexilash | Allset |
| FLX-RD-50 Ultra strength | According to order | High tensile steel | Hot-dip galvanised | 250 | Flexilash | Allset |

Lashing bars

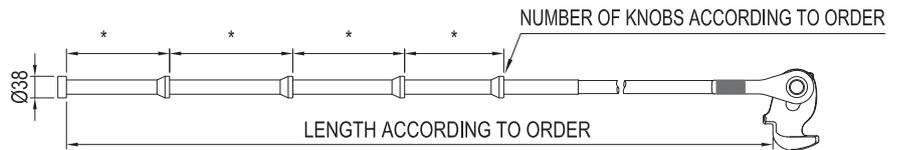
A-class lashing bar for external lashing

The innovative new A-class MacGregor lashing bar is our response to the challenge of optimising cargo carrying capacity. Its innovative rod head allows even more ships to enjoy all the advantages of converting to an external double-cross lashing system, therefore utilising the ship's full loading potential.

External lashing reduces both lifting and compression forces on the container stack. A container stack secured with external lashings has more flexibility in weight distribution and can carry heavier and potentially more containers compared to a stack with internal lashings. In the right circumstances, this equates to one more container for every stack.

An external lashing system has been challenging to accomplish due to vessel design. Internal lashing was traditionally the only practical possibility because of a number of limiting factors, most critically, the transversal gap between containers, where a distance of at least 38mm was previously needed. The A-class bar offers a wider operational range to include, for example, vessels with a 25mm transversal gap or with previously incompatible lashing bridges.

For conversion to an external lashing arrangement, little or no modification work is necessary to the eye plate arrangement on the lashing bridges, but strength calculations for lashing bridges and hatch covers should be considered due to increased loading capacity.



*) LENGTH ACCORDING TO ORDER

A-class lashing bar

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|---------------------|--------------------|--------------------|--------------------|-------------------------------|---------------------|------------------|-----------|
| A-class lashing bar | According to order | High tensile steel | Hot-dip galvanised | 250 | FLX5-A/S turnbuckle | External lashing | MacGregor |

K-series for internal or external lashing

The MacGregor Allset design K-series of lashing bars, for internal and/or external lashing use, feature a special rod head design with more positioning options.

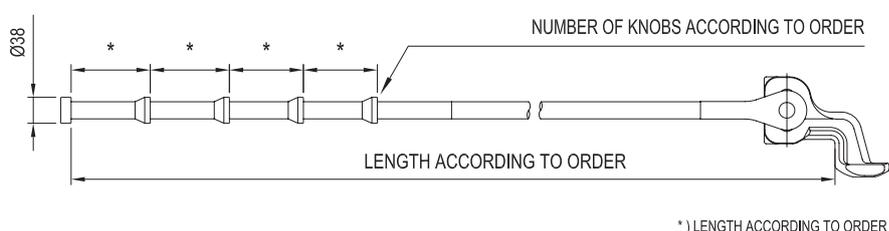
The K-series of lashing bars are used together with FLX5-A type of turnbuckles and offer an adjustable rod head with two possible positions, inner or outer, for the lashing bar. This feature makes double parallel external lashing possible and better stack weight distribution can be achieved.

The lashing bars use custom-designed distances between the knobs to minimise the revolutions needed for length adjustments of the turnbuckle depending on the container types in the stack.

We have developed the K-series lashing bar system even further and introduce an extra low weight version – with a maintained breaking load value – of the K-series, the Ultra Strength lashing bar.

Advanced and accurate heat treatment of the lashing bar enables the steel strength potential to be fully utilised.

The Ultra Strength lashing bar is only 23mm in diameter and has a 50-tonne breaking load. The 36-tonne breaking load version is only 20mm in diameter. This means an extra light lashing bar that can be handled more safely, easily and faster by the stevedores in port.



K-series

| Product | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Counter part | Related system | Design |
|-------------------------|--------------------|--------------------|--------------------|-------------------------------|-------------------|------------------|--------|
| K-series | According to order | High tensile steel | Hot-dip galvanised | 250 | FLX5-A turnbuckle | External lashing | Allset |
| K-series Ultra Strength | According to order | High tensile steel | Hot-dip galvanised | 250 | FLX5-A turnbuckle | External lashing | Allset |

ELB-C

for Equalash lashing system

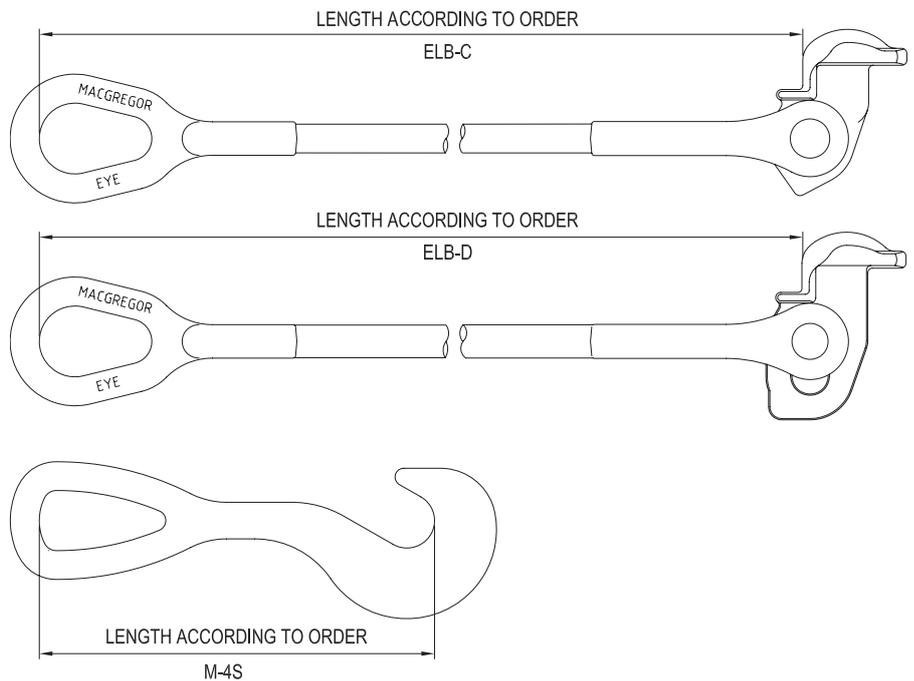
The ELB-C is a compact and fully forged design and one of the lightest lashing bars on the market. It makes handling and operation easier and faster for the stevedores.

The standard version of ELB-C is designed to have a 50-tonne breaking load, but this lashing bar can also be supplied as an even lighter 36-tonne breaking load version, the ELB-C-36.

The ELB series is also available with a special rod head that offers dual positioning, inner and outer, of the lashing bar, ELB-D. This feature helps to reduce the risk of wear on the turnbuckle due to grinding against other lashing bars.

For increased cargo safety, the MacGregor Allset design lashing bars have a swage-fitted shaft for the rod head. This one piece design is more compact and offers higher durability than nut and bolt assemblies of lashing bars. The MacGregor Allset design ELB-C eye-type lashing bars are used together with ELT family of turnbuckles in the MacGregor Equalash system.

The MacGregor Allset M-4S eye-type extension lashing bar is used together with the ELB-C and ELB-D lashing bar in the MacGregor Equalash system. The M-4S can be supplied in various lengths according to the vessel's needs.

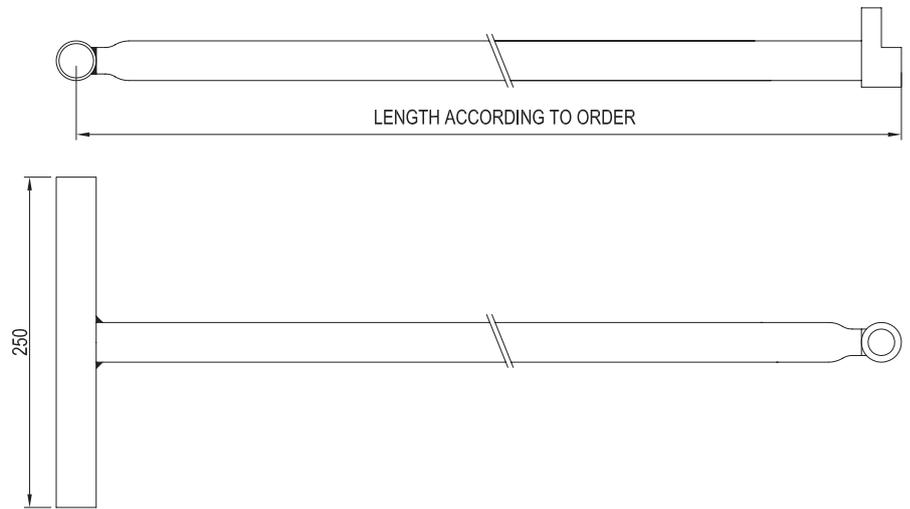


ELB-C

| Order number | Product | Weight kg | Length, mm | Material | Treatment | Safe Working Load Tension, kN | Details | Counter part | Related system | Design |
|--------------|-----------|-----------|--------------------|---------------------|--------------------|-------------------------------|---------------------|-------------------|----------------|--------|
| | ELB-C-36 | | According to order | Steel, fully forged | Hot-dip galvanised | 180 | | ELT turnbuckle | Equalash | Allset |
| | ELB-C-50 | | According to order | Steel, fully forged | Hot-dip galvanised | 250 | | ELT turnbuckle | Equalash | Allset |
| | ELB-D-36 | | According to order | Steel, fully forged | Hot-dip galvanised | 180 | | ELT turnbuckle | Equalash | Allset |
| | ELB-D-50 | | According to order | Steel, fully forged | Hot-dip galvanised | 250 | | ELT turnbuckle | Equalash | Allset |
| 1130857 | M-4S-1 | 3.5 | 300 | High tensile steel | Hot-dip galvanised | 250 | | ELB-C lashing bar | Equalash | Allset |
| 1130855 | M-4S-2/50 | 3.5 | 300 | High tensile steel | Hot-dip galvanised | 250 | Eye rotated 90 dec. | ELB-C lashing bar | Equalash | Allset |
| 1130854 | M-4S-50 | 3.5 | 310 | High tensile steel | Hot-dip galvanised | 250 | | ELB-C lashing bar | Equalash | Allset |

OR-type

For manual twistlocks with round bar handle



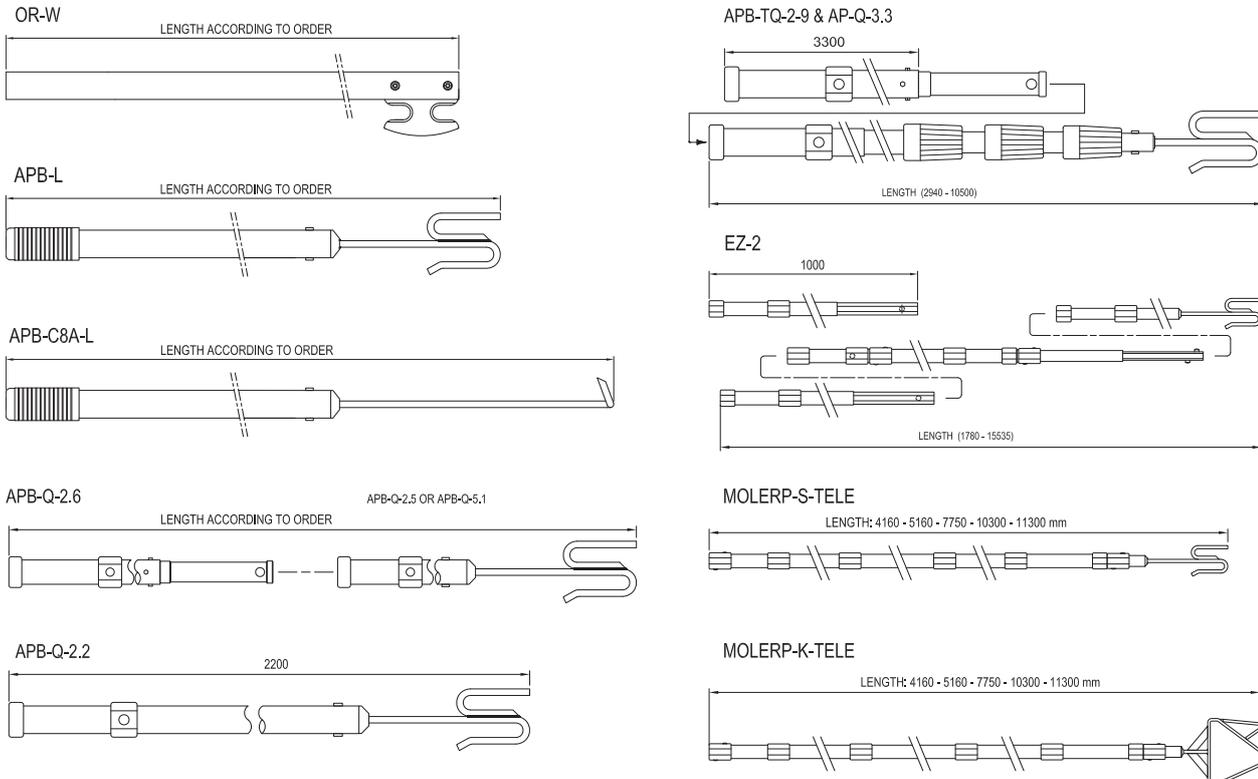
OR-type

| Product | Length, mm | Material | Counter part | Design |
|---------|--------------------|-----------|--------------|-----------|
| OR-1 | According to order | Aluminium | CV-2N, CV-5N | MacGregor |

Operating rods

APB, EZ, MOLERP and OR-W -types

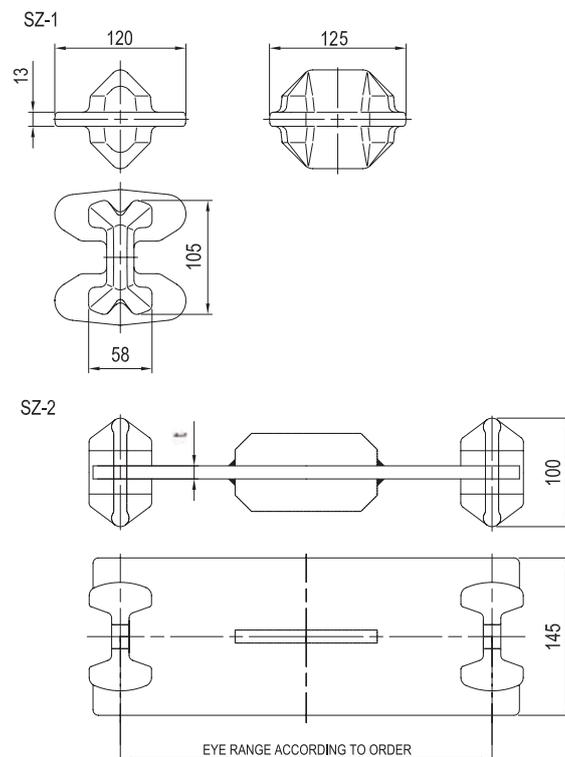
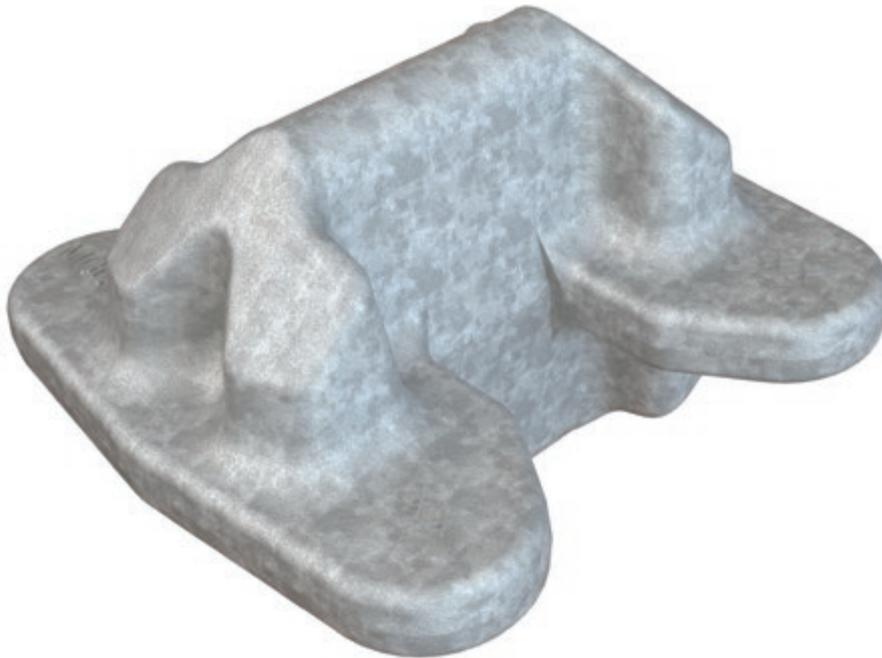
Operating rods for semi-automatic twistlocks. Both fixed and adjustable lengths are available.



APB, EZ, MOLERP and OR-W -types

| Order number | Product | Weight kg | Length, mm | Length min - max, mm | Material | Details | Counter part | Design |
|--------------------|-----------------------|--------------------|--------------------|----------------------|-------------------|--|---|-----------|
| According to order | APB | According to order | According to order | | Aluminium / steel | | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| According to order | APB-C8A | According to order | According to order | | Aluminium / steel | | C8A-DF, C8A-HC | Allset |
| 1131140 | APB-Q complete rod | 6.4 | | 2500 - 10300 | Aluminium / steel | Adjustable operating rod for operation of semi-automatic twistlocks. Includes 1 x APB-Q-2.5 & 3 x AP-Q-2.6 | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1120577 | APB-Q complete rod | 4.8 | | 2500 - 7700 | Aluminium / steel | Adjustable operating rod for operation of semi-automatic twistlocks. Includes 1 x APB-Q-2.5 & 2 x AP-Q-2.7 | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131143 | APB-Q complete rod | 6.0 | | 5100 - 10300 | Aluminium / steel | Adjustable operating rod for operation of semi-automatic twistlocks. Includes 1 x APB-Q-5.1 & 2 x AP-Q-2.8 | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131147 | AP-Q-2.6 part of rod | 1.6 | 2600 | | Aluminium / steel | Extension rod for quick joint operating rod | APB-Q-2.2, APB-Q-2.5, APB-Q-5.1 | Allset |
| 1131151 | APB-Q-2.2 | 1.5 | 2200 | | Aluminium / steel | Top piece with hook for quick joint operating rod, can be used as fixed operating rod on its own or combined with AP-Q-2.6 | AP-Q-2.6, C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131141 | APB-Q-2.5 | 1.5 | 2500 | | Aluminium / steel | Top piece with hook for quick joint operating rod, can be used as fixed operating rod on its own or combined with AP-Q-2.6 | AP-Q-2.6, C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131148 | APB-Q-5.1 | 3.1 | 5100 | | Aluminium / steel | Top piece with hook for quick joint operating rod, can be used as fixed operating rod on its own or combined with AP-Q-2.6 | AP-Q-2.6, C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131158 | EZ-2/5 | 7.0 | | 1800 - 11300 | Aluminium / steel | Adjustable telescopic operating rod for operation of semi-automatic twistlocks | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1120580 | EZ-2/6 | 8.1 | | 1800 - 13000 | Aluminium / steel | Adjustable telescopic operating rod for operation of semi-automatic twistlocks | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1120581 | EZ-2/7 | 9.6 | | 1800 - 15500 | Aluminium / steel | Adjustable telescopic operating rod for operation of semi-automatic twistlocks | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1120578 | APB-TQ-2.9 & AP-Q-3.3 | 13.2 | | 2900 - 13800 | Aluminium / steel | Telescopic operating rod with steples adjustment & extension rod, for operation of semi-automatic twistlocks | C5AM, C5AM-DF, C5AM-HC, CV-15 | Allset |
| 1131152 | MOLERP-K-TELE | 7.2 | | 4160 - 11300 | Aluminium / steel | Adjustable telescopic operating rod for operation of semi-automatic twistlocks, polehead K | C5AM, C5AM-DF, C5AM-HC | Allset |
| 1120582 | MOLERP-S-TELE | 7.0 | | 4160 - 11300 | Aluminium / steel | Adjustable telescopic operating rod for operation of semi-automatic twistlocks, polehead S | C5AM, C5AM-DF, C5AM-HC | Allset |
| According to order | OR-W | According to order | According to order | | Aluminium/steel | | CV-20, CV-15 | MacGregor |

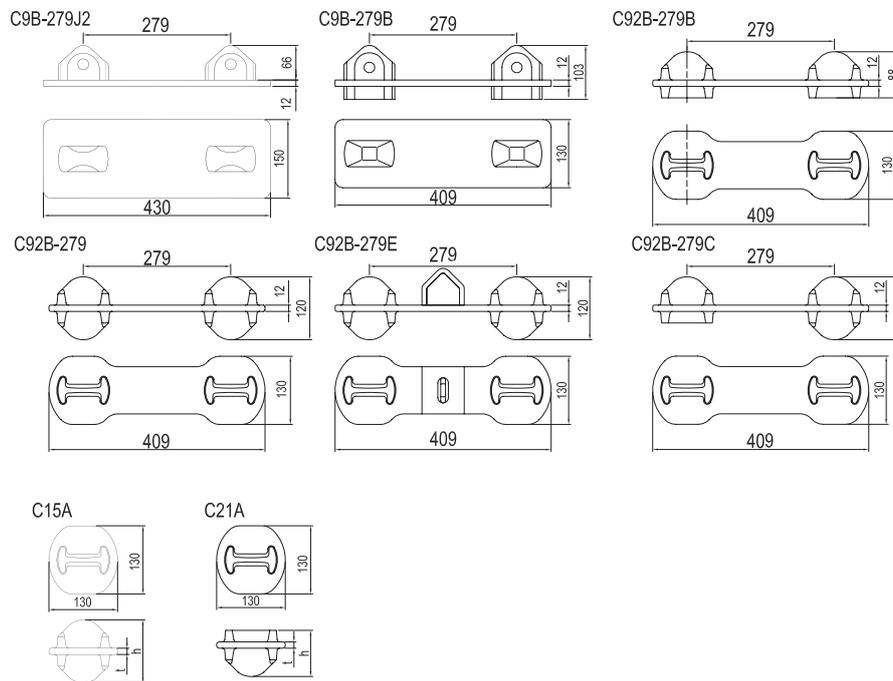
Stacking cones, SZ-type



SZ-type

| Order number | Product | Weight kg | Eye range, mm | Material | Treatment | Safe Working Load Shear, kN | Counter part | Design |
|--------------|--------------------|-----------|--------------------|----------------------|--------------------|-----------------------------|--|-----------|
| | SZ-2, 13mm flange | | According to order | Steel | Hot-dip galvanised | 560 (GL) | Container corner casting | MacGregor |
| | SZ-2, 12mm flange | | According to order | Steel | Hot-dip galvanised | 560 (GL) | Container corner casting | MacGregor |
| 1062595 | SE-1, 13mm flange | 2.5 | | Precision cast steel | Hot-dip galvanised | 210 | Container corner castings, twistlock pockets | MacGregor |
| 1019905 | SZ-1, 13 mm flange | 2.6 | | Precision cast steel | Hot-dip galvanised | 210 | Container corner casting | MacGregor |

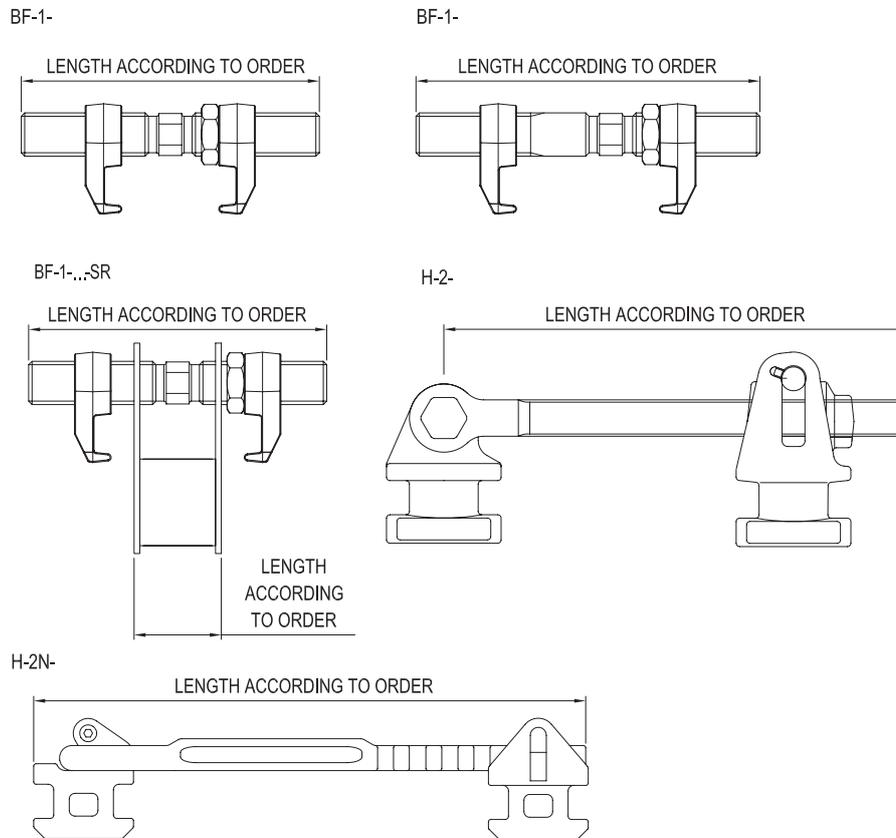
Stacking cones, C-type



C-type

| Order number | Product | Weight kg | Eye range, mm | Flange thickness, mm | Material | Treatment | Safe Working Load Shear, kN | Safe Working Load Pressure, kN | Details | Counter part | Design |
|--------------|-----------|-----------|---------------|----------------------|--------------|--------------------|-----------------------------|--------------------------------|---|--|--------|
| 1155893 | C9B-279J2 | 7.0 | 279 | 12 | Steel | Hot-dip galvanised | 200 | | Cones only on upper side | Container corner casting | Allset |
| 1131019 | C9B-279B | 6.4 | 279 | 12 | Steel | Hot-dip galvanised | 210 | | Full cones upper side, below cone height 25mm | Container corner castings, twistlock pockets | Allset |
| 1131020 | C92B-279 | 6.9 | 279 | 12 | Steel | Hot-dip galvanised | 210 | | | Container corner casting | Allset |
| 1131018 | C92B-279E | 8.0 | 279 | 12 | Steel | Hot-dip galvanised | 200 | 200 | Stacker with anti-rack spacer | Container corner casting | Allset |
| 1131023 | C92B-279B | 6.4 | 279 | 12 | Steel | Hot-dip galvanised | 210 | | Full cones upper side, below cone height 22mm | Container corner castings, twistlock pockets | Allset |
| 1131024 | C92B-279C | 6.7 | 279 | 12 | Steel | Hot-dip galvanised | 210 | | Full cone on one end, below cone height 22mm on the other end | Container corner castings, twistlock pockets | Allset |
| 1131021 | C15A | 2.8 | | 12 | Forged steel | Hot-dip galvanised | 210 | | | Container corner casting | Allset |
| 1131028 | C15A-M | 2.9 | | 13 | Forged steel | Hot-dip galvanised | 210 | | | Container corner casting | Allset |
| 1131022 | C21A | 2.6 | | 12 | Forged steel | Hot-dip galvanised | 210 | | Full cone upper side, below cone height 22mm | Container corner castings, twistlock pockets | Allset |
| 1131029 | C21A-M | 2.7 | | 13 | Forged steel | Hot-dip galvanised | 210 | | Full cone upper side, below cone height 22mm | Container corner castings, twistlock pockets | Allset |

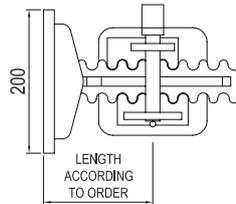
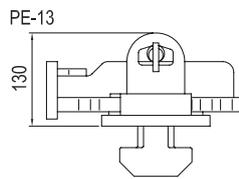
Bridge fittings BF-type, H-type



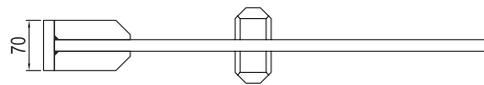
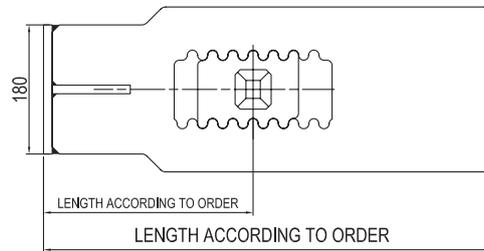
BF, H

| Order number | Product | Weight kg | Length min - max, mm | Spacer Width, mm | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Pressure, kN | Details | Counter part | Design |
|--------------|---------|-----------|----------------------|--------------------|----------------------|-------------------------------------|-------------------------------|--------------------------------|---|--------------------------|-----------|
| | BF-1 | | According to order | | Steel | Hot-dip galvanised, spindle greased | 50 | | Free adjustment of container distance | Container corner casting | MacGregor |
| | BF-1-SR | | According to order | According to order | Steel | Hot-dip galvanised, spindle greased | 50 | | Spacer between the containers | Container corner casting | MacGregor |
| 1003860 | H-2 | 11.6 | 0 - 180 | | Steel | Hot-dip galvanised, spindle greased | 200 | 190 | Free adjustment of container distance | Container corner casting | MacGregor |
| | H-2-L | | According to order | | Steel | Hot-dip galvanised, spindle greased | 200 | 150 | Free adjustment of container distance | Container corner casting | MacGregor |
| | H-2N | | According to order | | Precision cast steel | Hot-dip galvanised | 200 | 200 | Adjustment of container distance by toothed bar | Container corner casting | MacGregor |

Pressure elements PE-type

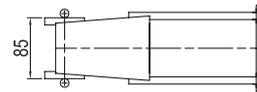
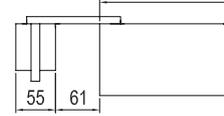


PE-14



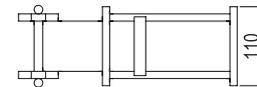
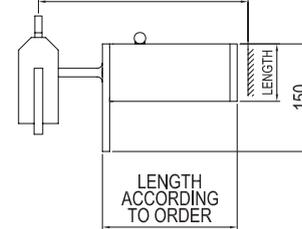
PE-25

LENGTH ACCORDING TO ORDER



PE-515

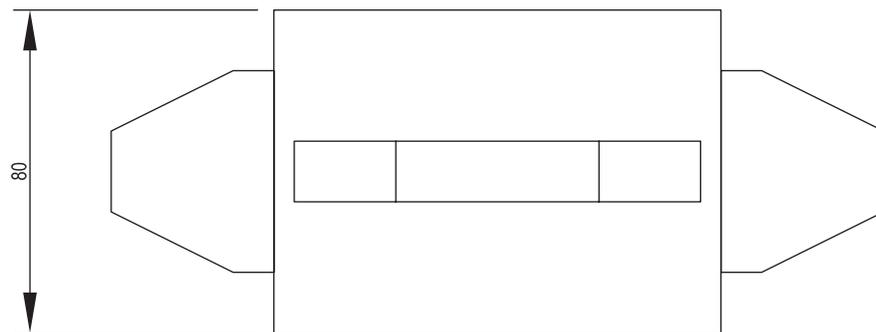
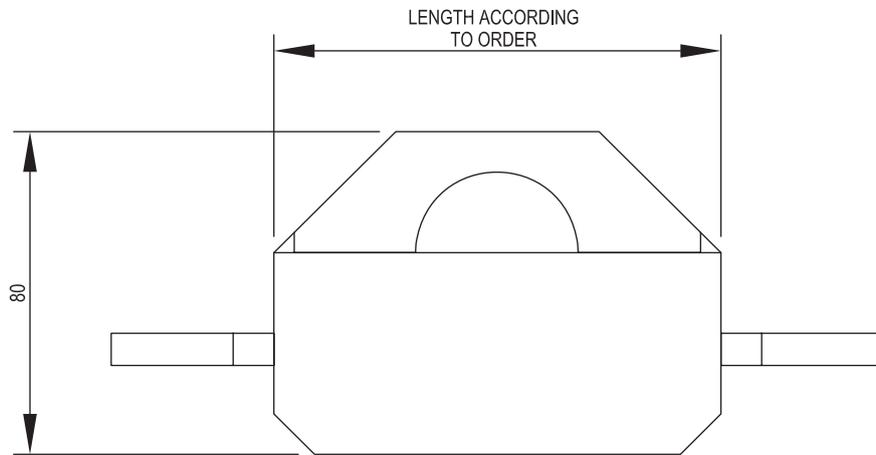
LENGTH ACCORDING TO ORDER



PE

| Product | Length, mm | Length min - max, mm | Material | Treatment | Safe Working Load Pressure, kN | Details | Counter part | Design |
|---------------------|--------------------|----------------------|----------|--------------------|--------------------------------|---|--------------------------|-----------|
| PE-13 | | According to order | Steel | According to order | 250 | Adjustment of container distance by toothed bar | Container corner casting | MacGregor |
| PE-14, 12mm flange | According to order | | Steel | Painted | 650 | Adjustment of container distance by toothed bar | Container corner casting | MacGregor |
| PE-14, 15mm flange | According to order | | Steel | Painted | 650 | Adjustment of container distance by toothed bar | Container corner casting | MacGregor |
| PE-25 | According to order | | Steel | Hot-dip galvanised | 250 | Non adjustable | Container corner casting | MacGregor |
| PE-515, 12mm flange | | | Steel | According to order | 650 | Non adjustable | Container corner casting | MacGregor |

Pressure adapters PA-type

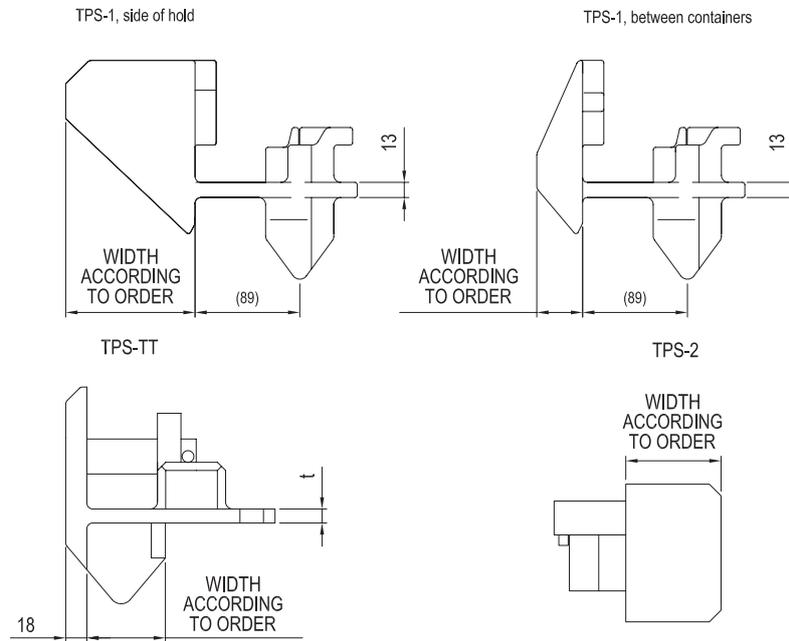


PA

| Product | Eye range, mm | Material | Treatment | Safe Working Load Pressure, kN | Details | Counter part | Design |
|---------|--------------------|----------|--------------------|--------------------------------|--------------------------|-------------------------------|-----------|
| PA-1 | According to order | Steel | Hot-dip galvanised | 650 | Between container stacks | Corner castings, SZ-1 stacker | MacGregor |

Terminal pressure stackers

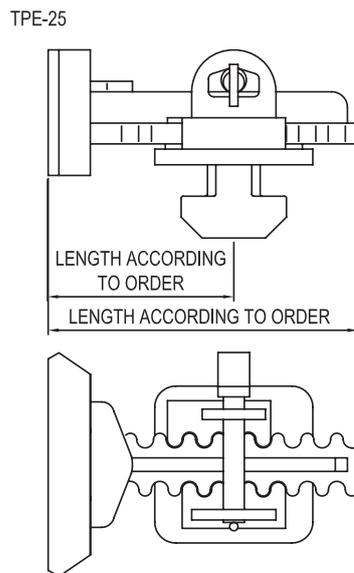
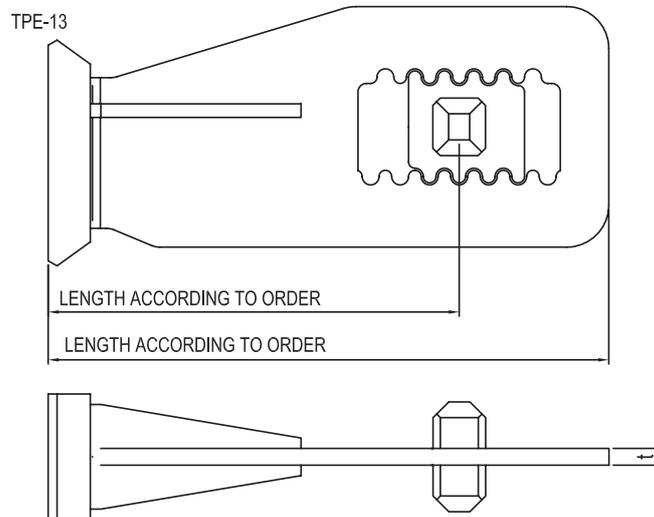
Terminal pressure stackers TPS-type



TPS

| Order number | Product | Weight kg | Width, mm | Material | Treatment | Safe Working Load Pressure, kN | Details | Counter part | Design |
|--------------|----------------------|-----------|--------------------|----------------------|--------------------|--------------------------------|---|-----------------|-----------|
| | TPS-1, 13m flange | | According to order | Precision cast steel | Hot-dip galvanised | 650 | Between container stacks and side of hold | Corner castings | MacGregor |
| | TPS-1, 13m flange | | According to order | Precision cast steel | Hot-dip galvanised | 650 | Between container stacks | Corner castings | MacGregor |
| 1086577 | TPS-1/31, 13m flange | 6.6 | 31 | Precision cast steel | Hot-dip galvanised | 100 | For 2438mm wide containers in 2524mm cellguides | Corner castings | MacGregor |
| 1104764 | TPS-2/81, 13m flange | 6.3 | 81 | Precision cast steel | Hot-dip galvanised | 150 | For 2438mm wide containers in 2622mm cellguides | Corner castings | MacGregor |
| | TPS-TT, 30mm flange | | According to order | Steel | According to order | 650 | On tank step | Corner castings | MacGregor |
| | TPS-TT, 12mm flange | | According to order | Steel | According to order | 650 | On tank step | Corner castings | MacGregor |
| 1104765 | TPS-2/31, 13m flange | 3.7 | 31 | Precision cast steel | Hot-dip galvanised | 150 | For 2438mm wide containers in 2524mm cellguides | Corner castings | MacGregor |

Tension pressure elements TPE-type

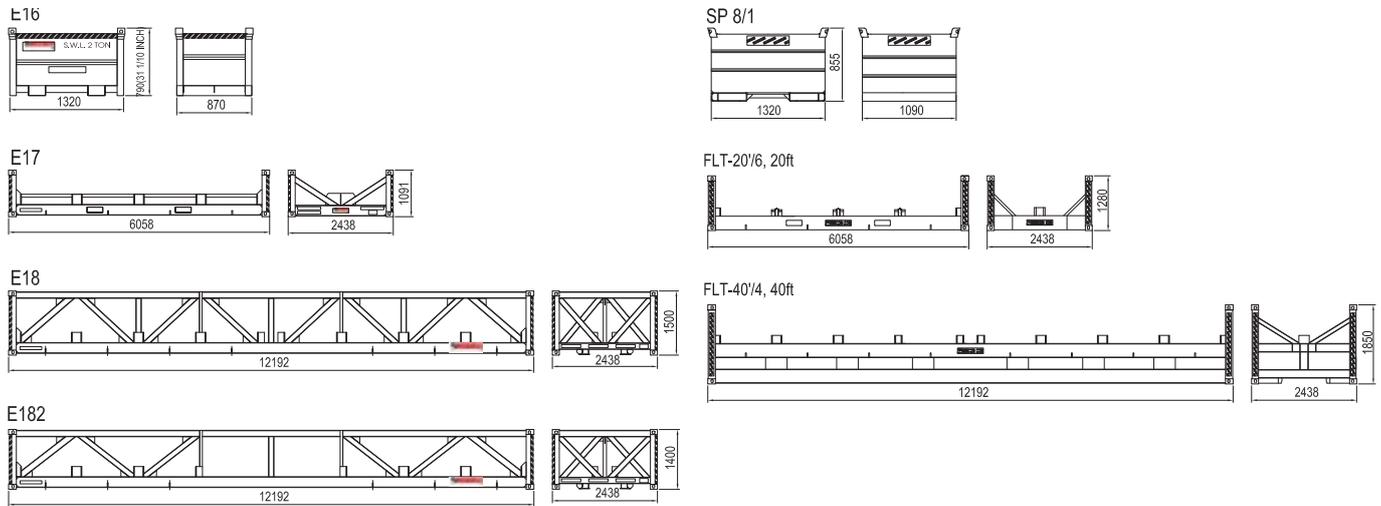


TPE

| Product | Width, mm | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Pressure, kN | Details | Counter part | Design |
|---------------------|--------------------|----------|--------------------|-------------------------------|--------------------------------|---|--------------------------------------|-----------|
| TPE-13, 12mm flange | According to order | Steel | Painted | 650 | 650 | Between containers | Corner castings, CB-counter bearings | MacGregor |
| TPE-25 | According to order | Steel | According to order | 250 | 250 | On top of containers, adjustment of distance by toothed bar | Corner castings, CB-counter bearings | MacGregor |

Flat racks and storage bins

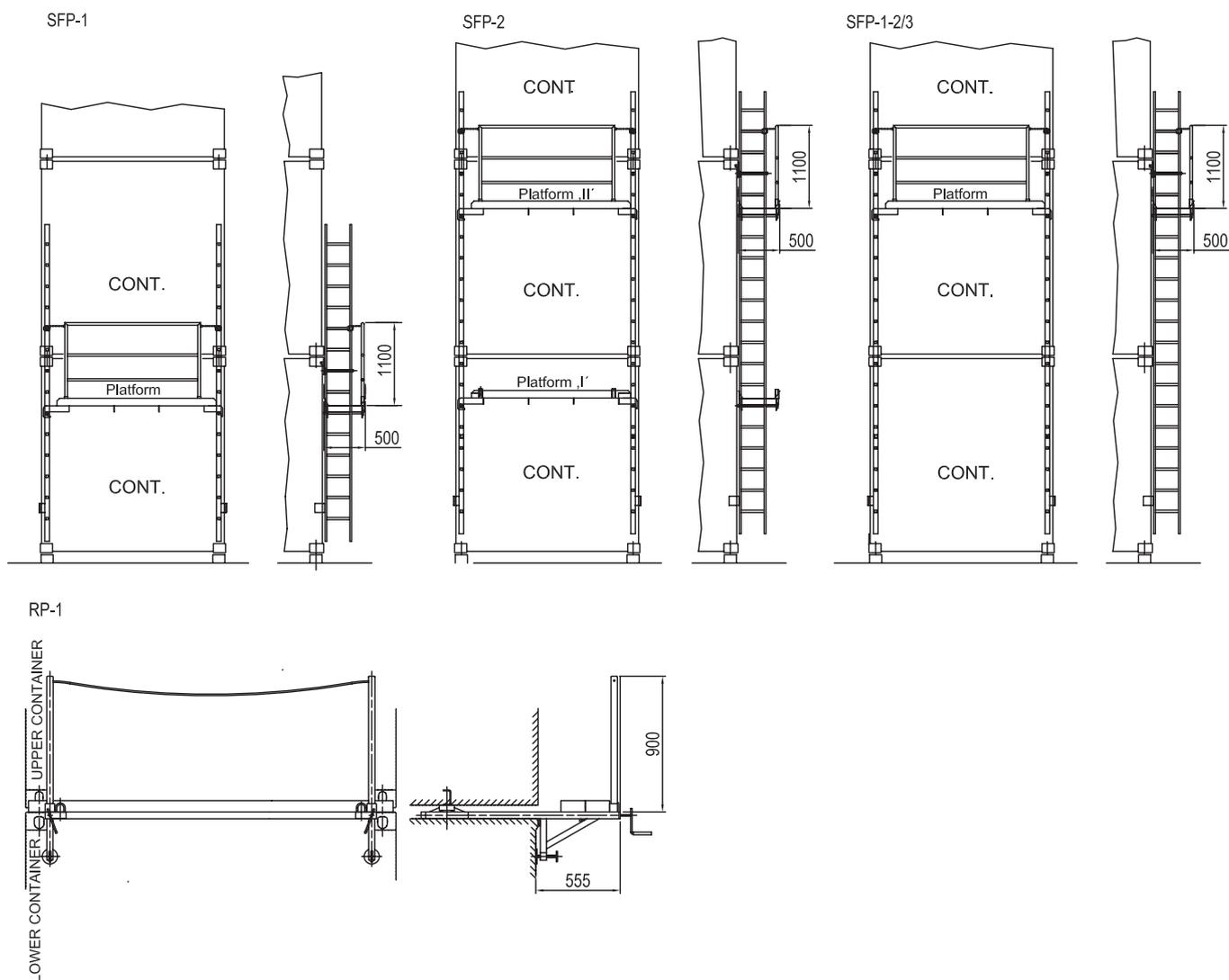
Flat racks and storage bins



Flat racks and storage bins

| Order number | Product | Weight kg | Material | L x W x H, mm | Treatment | Details | Counter part | Design |
|--------------|----------------------------|-----------|----------------------|-------------------|--------------------|---------------------------------|---------------------------------|-----------|
| 1120549 | E16-M for twistlocks | 155 | Mild steel structure | 1200 x 1000 x 900 | Hot-dip galvanised | | Flat rack E17-M & E18-M | Allset |
| 1120545 | E16-M for hanging stackers | 155 | Mild steel structure | 1200 x 1000 x 900 | Hot-dip galvanised | | Flat rack E17-M & E18-M | Allset |
| 1120547 | E16-M for midlocks | 155 | Mild steel structure | 1200 x 1000 x 900 | Hot-dip galvanised | | Flat rack E17-M & E18-M | Allset |
| 1120538 | E17-M, 20 ft | 1480 | Mild steel structure | | Hot-dip galvanised | Intended for 8 pcs bins E16-M | Bin E16-M | Allset |
| 1120542 | E18-M, 40 ft | 3000 | Mild steel structure | | Hot-dip galvanised | Intended for 14 pcs BINS E16-M | Bin E16-M | Allset |
| 1120548 | E16 for twistlocks | 145 | Mild steel structure | 1320 x 870 x 790 | Hot-dip galvanised | | Flat rack E17, E18 & E182 | Allset |
| 1120544 | E16 for hanging stackers | 145 | Mild steel structure | 1320 x 870 x 790 | Hot-dip galvanised | | Flat rack E17, E18 & E182 | Allset |
| 1120546 | E16 for midlocks | 145 | Mild steel structure | 1320 x 870 x 790 | Hot-dip galvanised | | Flat rack E17, E18 & E182 | Allset |
| 1120537 | E17, 20ft | 1480 | Mild steel structure | | Hot-dip galvanised | Intended for 8 pcs bins E16 | Bin E16 | Allset |
| 1120540 | E18, 40 ft | 3000 | Mild steel structure | | Hot-dip galvanised | Intended for 14 pcs bins E16 | Bin E16 | Allset |
| 1120541 | E182, 40 ft | 2800 | Mild steel structure | | Hot-dip galvanised | Intended for 12 pcs bins E16 | Bin E16 | Allset |
| 1018051 | SB-8/1 | 122 | Mild steel structure | 1320 x 1090 x 855 | Hot-dip galvanised | | Flat rack FLT-20'/6 & FLT-40'/4 | MacGregor |
| 1018085 | FLT-20'/6, 20ft | 1870 | Mild steel structure | | Painted | Intended for 8 pcs bins SB-8/1 | Bin SB-8/1 | MacGregor |
| 1020013 | FLT-40'/4, 40ft | 4500 | Mild steel structure | | Painted | Intended for 14 pcs bins SB-8/1 | Bin SB-8/1 | MacGregor |

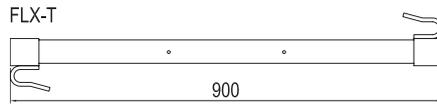
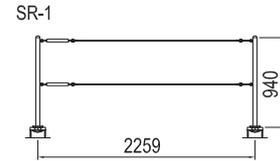
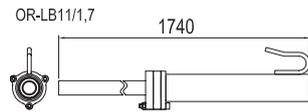
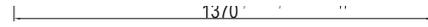
Reefer platform



Reefer platform

| Order number | Product | Weight kg | Material | Treatment | Details | Counter part | Design |
|--------------|-----------|-----------|-------------------|--------------------------------|---|--------------|-----------|
| 1023493 | SFP-1 | 42.2 | Aluminium / steel | Steel parts hot-dip galvanised | For maintenance of reefer containers on second tier | Container | MacGregor |
| 1034485 | SFP-2 | 64.8 | Aluminium / steel | Steel parts hot-dip galvanised | For maintenance of reefer containers up to third tier. Two platforms | Container | MacGregor |
| 1108048 | SFP-1-2/3 | 50.2 | Aluminium / steel | Steel parts hot-dip galvanised | For maintenance of reefer containers up to third tier. One platform | Container | MacGregor |
| 1185426 | RP-1 | 48 | Steel | Hot-dip galvanised | For maintenance of reefer containers. Installation between containers. Storage in dry conditions. | Container | Allset |

Accessories



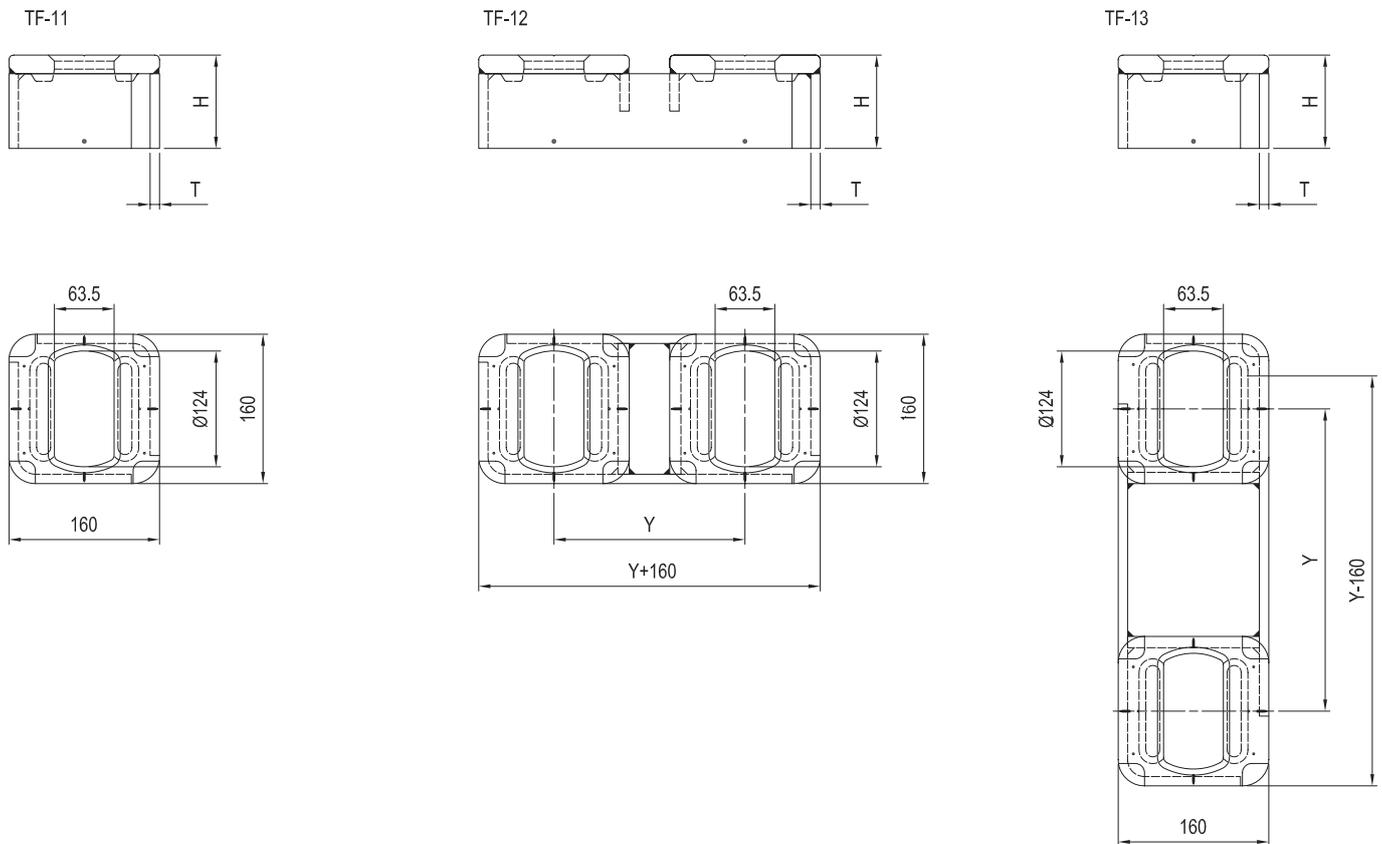
| Order number | Product | Weight kg | Jaw Width, mm | Length min - max, mm | Material | Treatment | Details | Counter part | Design |
|--------------|---------------------------|-----------|---------------|----------------------|-----------|--------------------|--|---------------------------------|-----------|
| 1006929 | Plastic Plug PP-LS | | | | Plastic | | Plug for ISO-hole on twistlock foundation / pocket | Twistlock foundations / pockets | MacGregor |
| 1159189 | Operating rod OR-LB11/1,7 | 4.8 | 1740 | | Steel | Hot-dip galvanised | Tool for operating LB-11 lashing bars | LB-11 lashing bar | MacGregor |
| 1120534 | Extension tool FLX-T | 1.4 | 900 | | Aluminium | | Tool for operating FLX lashing bars | FLX lashing bar | Allset |
| 1120535 | Extension tool FLX-T2 | 2.0 | 1370 | | Aluminium | | Tool for operating FLX lashing bars | FLX lashing bar | Allset |
| 1120552 | SR-1 | 9.0 | | L=2259 | | | | | Allset |



Fixed container fittings

Twistlock foundations

TF-11-12-13



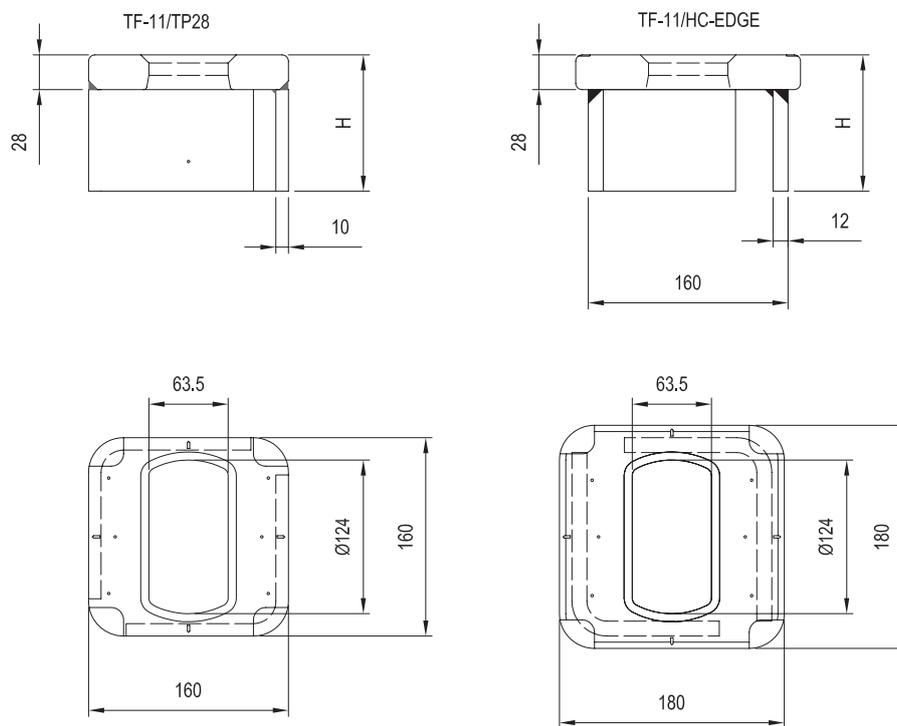
TF-11-12-13

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension N | SWL Shear kN | Details | Counter part | Design |
|--------------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|---------------|--------------|-----------------------------|---|-----------|
| TF-11-1 | 70-180 | | 160 | 124 | | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-11-2 | 70-180 | | 160 | 124 | | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-11/SP12-1 | 70-180 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-11/SP12-2 | 70-180 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-11/SP15-1 | 70-220 | | 160 | 124 | | 15 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-11/ARCTIC | 70-180 | | 160 | 124 | | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Impact test at -50°C | Manual and semi-automatic twistlock | MacGregor |
| TF-12-1 | 70-180 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension N | SWL Shear kN | Details | Counter part | Design |
|--------------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|---------------|--------------|-----------------------------|---|-----------|
| TF-12-2 | 70-180 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-12/SP12-1 | 70-180 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-12/SP12-2 | 70-180 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-12/SP15-1 | 70-220 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 15 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-12/ARCTIC | 70-180 | 203,216,258,278, other hole distances Y also available | Y+160 | 124 | 124 | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Impact test at -50°C | Manual and semi-automatic twistlock | MacGregor |
| TF-13-1 | 70-180 | 279, other hole distances Y also available | Y+160 | 124 | 124 | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-13-2 | 70-180 | 279, other hole distances Y also available | Y+160 | 124 | 124 | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

Twistlock foundations

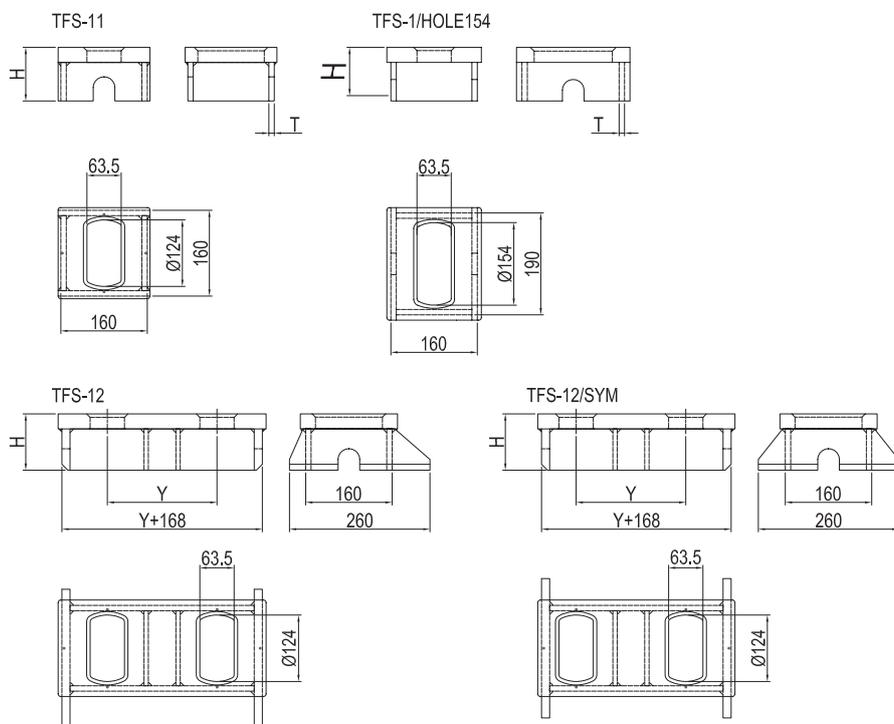
TF-11



TF-11

| Product | Height H mm | Length L mm | Hole length L1 mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|---------------|-------------|-------------|-------------------|--------------------|------------------------|----------------|--------------|-----------------------------|---|-----------|
| TF-11/TP28 | 65-180 | 160 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-11/HC-EDGE | 90-150 | 160 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

TFS-11,12

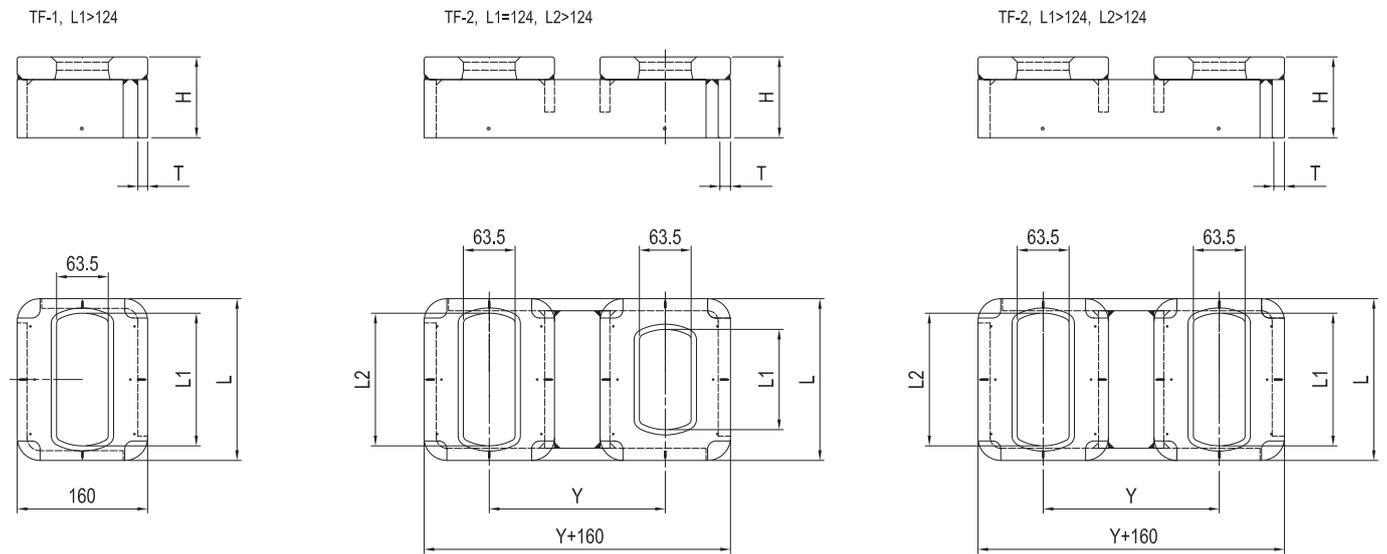


TFS-11,12

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|---------------|-------------|--|-------------|-------------------|-------------------|--------------------|------------------------|----------------|--------------|--|---|-----------|
| TFS-11 | 105-125 | | 160 | 124 | | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation | Manual and semi-automatic twistlock | MacGregor |
| TFS-1/HOLE154 | 105-125 | | 190 | 154 | | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation | Manual and semi-automatic twistlock | MacGregor |
| TFS-12-1 | 105-180 | 203,216,258,264, other hole distances Y also available | Y+168 | 124 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation | Manual and semi-automatic twistlock | MacGregor |
| TFS-12-2 | 105-180 | 203,216,258,264, other hole distances Y also available | Y+168 | 124 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation, topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TFS-12/SYM-1 | 105-180 | 203,216,258,264, other hole distances Y also available | Y+168 | 124 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation | Manual and semi-automatic twistlock | MacGregor |
| TFS-12/SYM-2 | 105-180 | 203,216,258,264, other hole distances Y also available | Y+168 | 124 | 124 | High Tensile steel | Shotblasted and primed | 250 | 210 | selfsupporting foundation, topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

Twistlock foundations

TF-1, 2 elongated hole



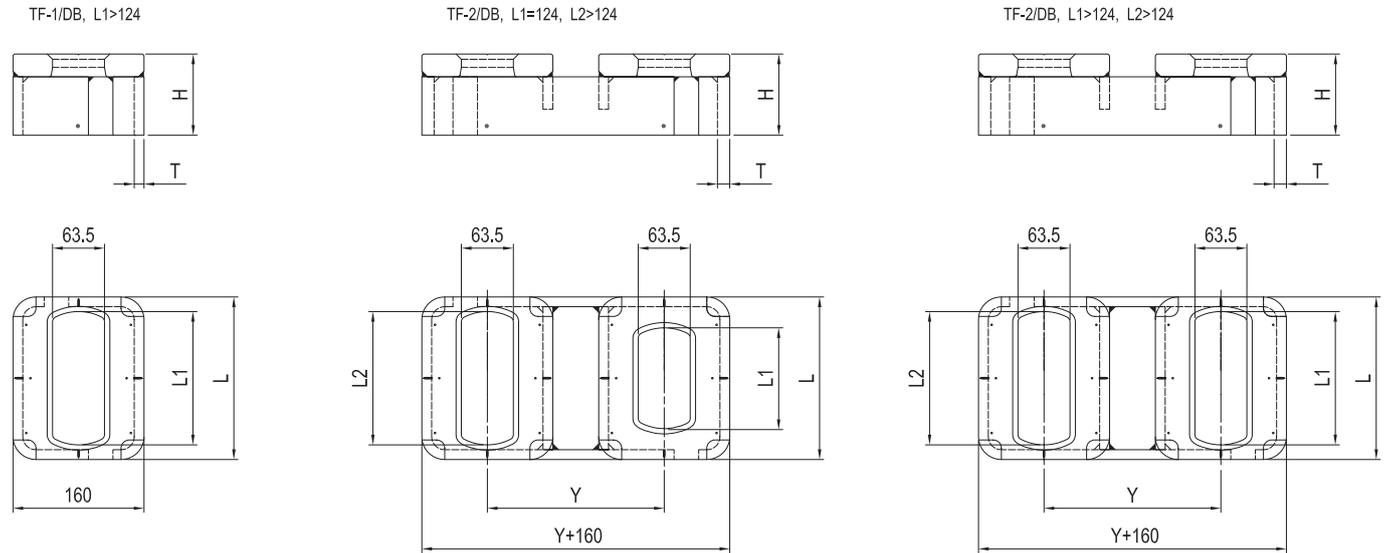
TF-1, 2

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|---------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-----------------------------|---|-----------|
| TF-1-1 | 70-160 | | 250 | 144 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-2 | 70-160 | | 250 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-3 | 70-160 | | 250 | 204 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-4 | 70-160 | | 290 | 244 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-5 | 70-160 | | 228 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-6 | 70-160 | | 186 | 144 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-7 | 70-160 | | 200 | 164 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-8 | 70-160 | | 220 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-9 | 70-160 | | 230 | 190 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1-10 | 70-160 | | 260 | 224 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-1 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 144 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-2 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-3 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 204 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|---------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-----------------------------|---|-----------|
| TF-2-4 | 70-160 | 203,216,258, other hole distances Y also available | 290 | 244 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2-8 | 70-160 | 203,216,258, other hole distances Y also available | 220 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2-9 | 70-160 | 203,216,258, other hole distances Y also available | 230 | 190 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2-11 | 70-160 | 203,216,258, other hole distances Y also available | 260 | 224 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock | MacGregor |
| TF-2-12 | 70-160 | 203,216,258, other hole distances Y also available | 228 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-13 | 70-160 | 203,216,258, other hole distances Y also available | 186 | 144 | 144 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-14 | 70-160 | 203,216,258, other hole distances Y also available | 200 | 164 | 164 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-15 | 70-160 | 203,216,258, other hole distances Y also available | 220 | 184 | 184 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-16 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 184 | 184 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-17 | 70-160 | 203,216,258, other hole distances Y also available | 230 | 190 | 190 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-18 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 204 | 204 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-19 | 70-160 | 203,216,258, other hole distances Y also available | 260 | 224 | 224 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-20 | 70-160 | 203,216,258, other hole distances Y also available | 290 | 244 | 244 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2-21 | 70-160 | 203,216,258, other hole distances Y also available | 200 | 164 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2-22 | 70-160 | 203,216,258, other hole distances Y also available | 186 | 144 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |

Twistlock foundations

TF-1/DB -2/DB elongated hole



TF-1/DB -2/B

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|------------|-------------|---------------|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-----------------------------|---|-----------|
| TF-1/DB-1 | 70-160 | | 250 | 144 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-2 | 70-160 | | 250 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-3 | 70-160 | | 250 | 204 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-4 | 70-160 | | 290 | 244 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-5 | 70-160 | | 228 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-6 | 70-160 | | 186 | 144 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-7 | 70-160 | | 200 | 164 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-8 | 70-160 | | 220 | 184 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-9 | 70-160 | | 230 | 190 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-1/DB-10 | 70-160 | | 260 | 224 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

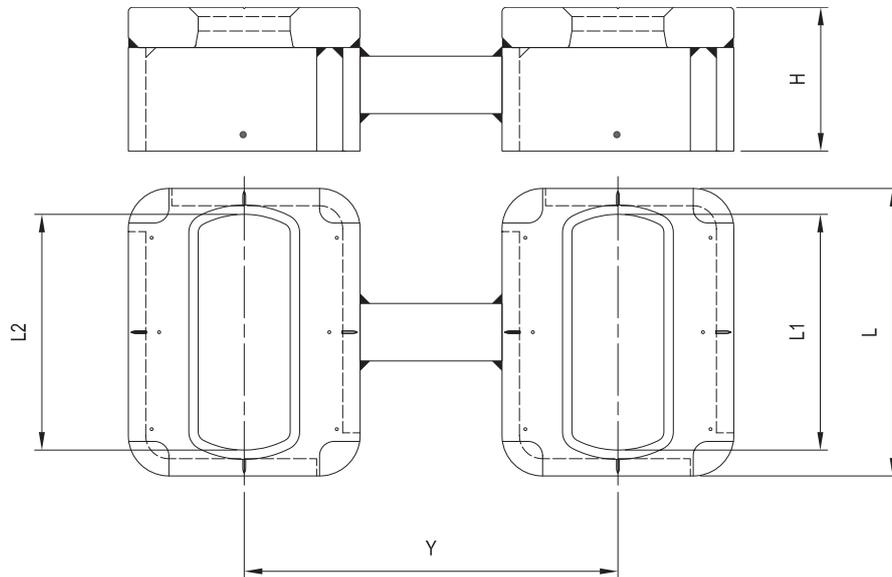
Twistlock foundations

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|------------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-----------------------------|---|-----------|
| TF-2/DB-1 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 144 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-2 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-3 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 204 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-4 | 70-160 | 203,216,258, other hole distances Y also available | 290 | 244 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2/DB-8 | 70-160 | 203,216,258, other hole distances Y also available | 220 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2/DB-9 | 70-160 | 203,216,258, other hole distances Y also available | 230 | 190 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2/DB-11 | 70-160 | 203,216,258, other hole distances Y also available | 260 | 224 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual and semi-automatic twistlock | MacGregor |
| TF-2/DB-12 | 70-160 | 203,216,258, other hole distances Y also available | 228 | 184 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-13 | 70-160 | 203,216,258, other hole distances Y also available | 186 | 144 | 144 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-14 | 70-160 | 203,216,258, other hole distances Y also available | 200 | 164 | 164 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-15 | 70-160 | 203,216,258, other hole distances Y also available | 220 | 184 | 184 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-16 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 184 | 184 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-17 | 70-160 | 203,216,258, other hole distances Y also available | 230 | 190 | 190 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-18 | 70-160 | 203,216,258, other hole distances Y also available | 250 | 204 | 204 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-19 | 70-160 | 203,216,258, other hole distances Y also available | 260 | 224 | 224 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |
| TF-2/DB-20 | 70-160 | 203,216,258, other hole distances Y also available | 290 | 244 | 244 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual and semi-automatic twistlock, fully automatic lock | MacGregor |

Twistlock foundations

TF-2/RB

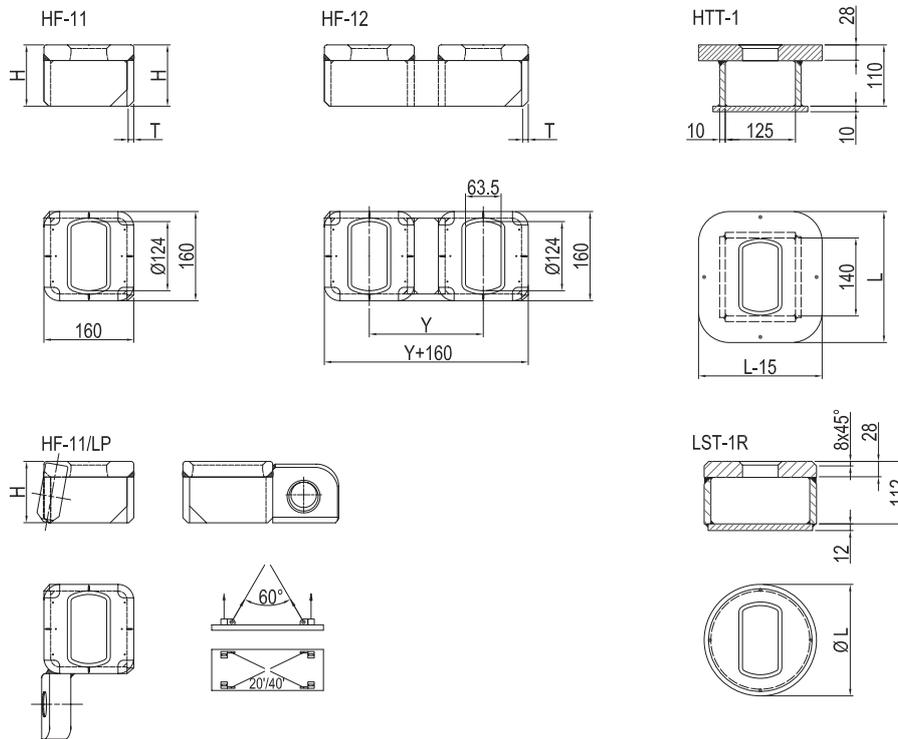
elongated hole



TF-2/RB

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Counter part | Design |
|-----------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-------------------------------------|-----------|
| TF-2/RB-1 | 70-180 | 258, other hole distances Y also available | 200 | 164 | 164 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| TF-2/RB-2 | 70-180 | 203 other hole distances Y also available | 190/160 | 164 | 124 | 12/10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| TF-2/RB-3 | 70-180 | 216, other hole distances Y also available | 260/160 | 224 | 124 | 12/10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| TF-2/RB-4 | 70-180 | 203, other hole distances Y also available | 200/160 | 164 | 124 | 12/10 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |

HF, HTT, LST

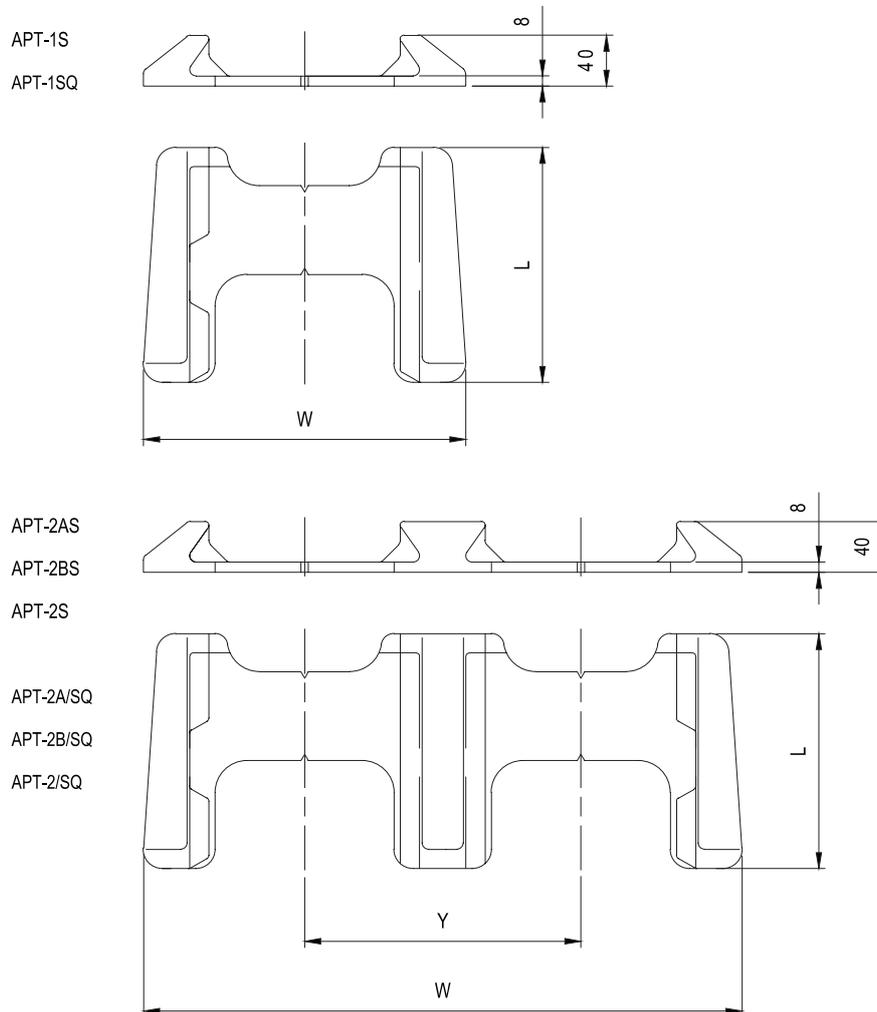


HF, HTT, LST

| Product | Height H mm | Distance Y mm | Length L mm | Hole length L1 mm | Hole length L2 mm | Sideplate thickness T mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Details | Counter part | Design |
|------------|-------------|--|-------------|-------------------|-------------------|--------------------------|--------------------|------------------------|----------------|--------------|-----------------------------------|---|-----------|
| HF-11-1 | 110-160 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| HF-11-2 | 110-160 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual-, semi-automatic- and spreader twistlock, fully automatic lock | MacGregor |
| HF-11/LP-1 | 110-160 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| HF-11/LP-2 | 110-160 | | 160 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual-, semi-automatic- and spreader twistlock, fully automatic lock | MacGregor |
| HF-12-1 | 110-160 | 203,216,258, other hole distances Y also available | 160 | 124 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| HF-12-2 | 110-160 | 203,216,258, other hole distances Y also available | 160 | 124 | 124 | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | Topplate hardness min 235HB | Manual-, semi-automatic- and spreader twistlock, fully automatic lock | MacGregor |
| HTT-1-1 | | | 225 | 124 | | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | chamfered topplate also available | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| HTT-1-2 | | | 265 | 124 | | 10 | High Tensile steel | Shotblasted and primed | 250 | 210 | chamfered topplate also available | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| LST-1R-2 | | | Ø200 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual-, semi-automatic- and spreader twistlock | MacGregor |
| LST-1R-3 | | | Ø216 | 124 | | 12 | High Tensile steel | Shotblasted and primed | 250 | 210 | | Manual-, semi-automatic- and spreader twistlock | MacGregor |

Dovetail foundations

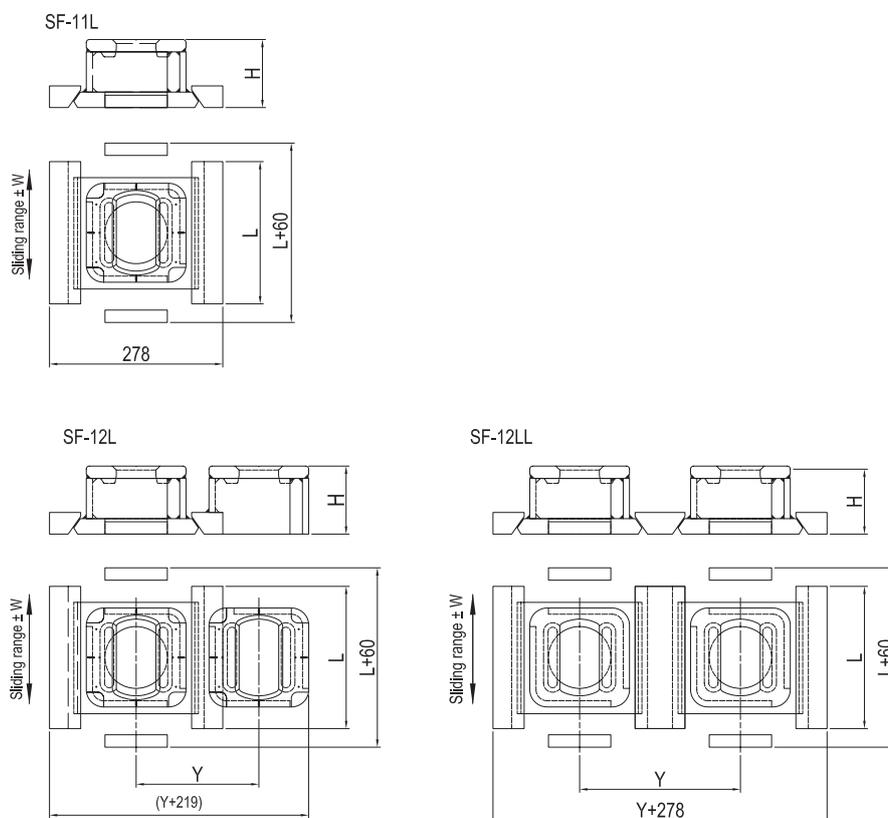
APT



APT

| Order number | Product | Weight kg | Length, mm | Width, mm | Distance Y mm | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Counter part | Design |
|--------------|-----------|-----------|------------|-----------|---------------|-------------------------|-------------------------|-------------------------------|-----------------------------|--------------------|-----------|
| 1065988 | APT-1S | 3.85 | 185 | 252 | | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |
| 1066047 | APT-1SQ | 5.3 | 235 | 252 | | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |
| 1066046 | APT-2AS | 6.8 | 185 | 455 | 203 | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |
| 1066045 | APT-2BS | 8.7 | 185 | 468 | 216 | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |
| 1066044 | APT-2S | 10.1 | 185 | 510 | 258 | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |
| 1086987 | APT-2A/SQ | 10.6 | 235 | 455 | 203 | high tensile cast steel | Shot blasted and primed | 250 | 210 | Dovetail twistlock | MacGregor |

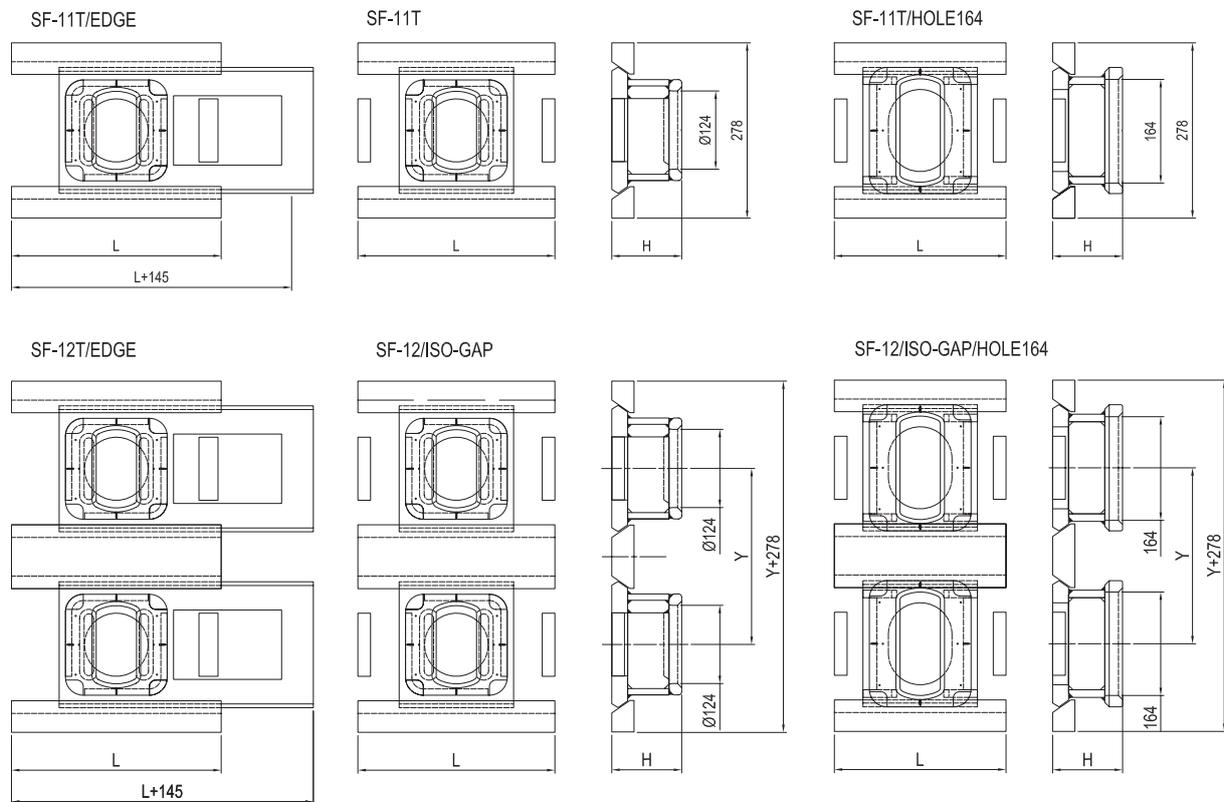
SF-L



SF-L

| Product | Height H mm | Distance Y mm | Length L mm | longitudinal sliding range mm | transversal sliding range mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Counter part | Design |
|-------------|-------------|--|-------------|-------------------------------|------------------------------|--------------------|------------------------|----------------|--------------|-------------------------------------|-----------|
| SF-11L-210 | 70-180 | | 210 | ±30 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-11L-230 | 70-180 | | 230 | ±40 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-11L-280 | 70-180 | | 280 | ±65 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-11L-320 | 70-180 | | 320 | ±85 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-11L-360 | 70-180 | | 360 | ±105 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12L-210 | 70-180 | 203,216, other hole distances Y also available | 210 | ±30 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12L-230 | 70-180 | 203,216, other hole distances Y also available | 230 | ±40 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12L-280 | 70-180 | 203,216, other hole distances Y also available | 280 | ±65 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12L-320 | 70-180 | 203,216, other hole distances Y also available | 320 | ±85 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12L-360 | 70-180 | 203,216, other hole distances Y also available | 360 | ±105 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12LL-210 | 110-140 | 203,216,258, other hole distances Y also available | 210 | ±30 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12LL-230 | 110-140 | 203,216,258, other hole distances Y also available | 230 | ±40 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12LL-280 | 110-140 | 203,216,258, other hole distances Y also available | 280 | ±65 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12LL-320 | 110-140 | 203,216,258, other hole distances Y also available | 320 | ±85 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |
| SF-12LL-360 | 110-140 | 203,216,258, other hole distances Y also available | 360 | ±0 | ±0 | High Tensile steel | Shotblasted and primed | 250 | 210 | Manual and semi-automatic twistlock | MacGregor |

SF-T



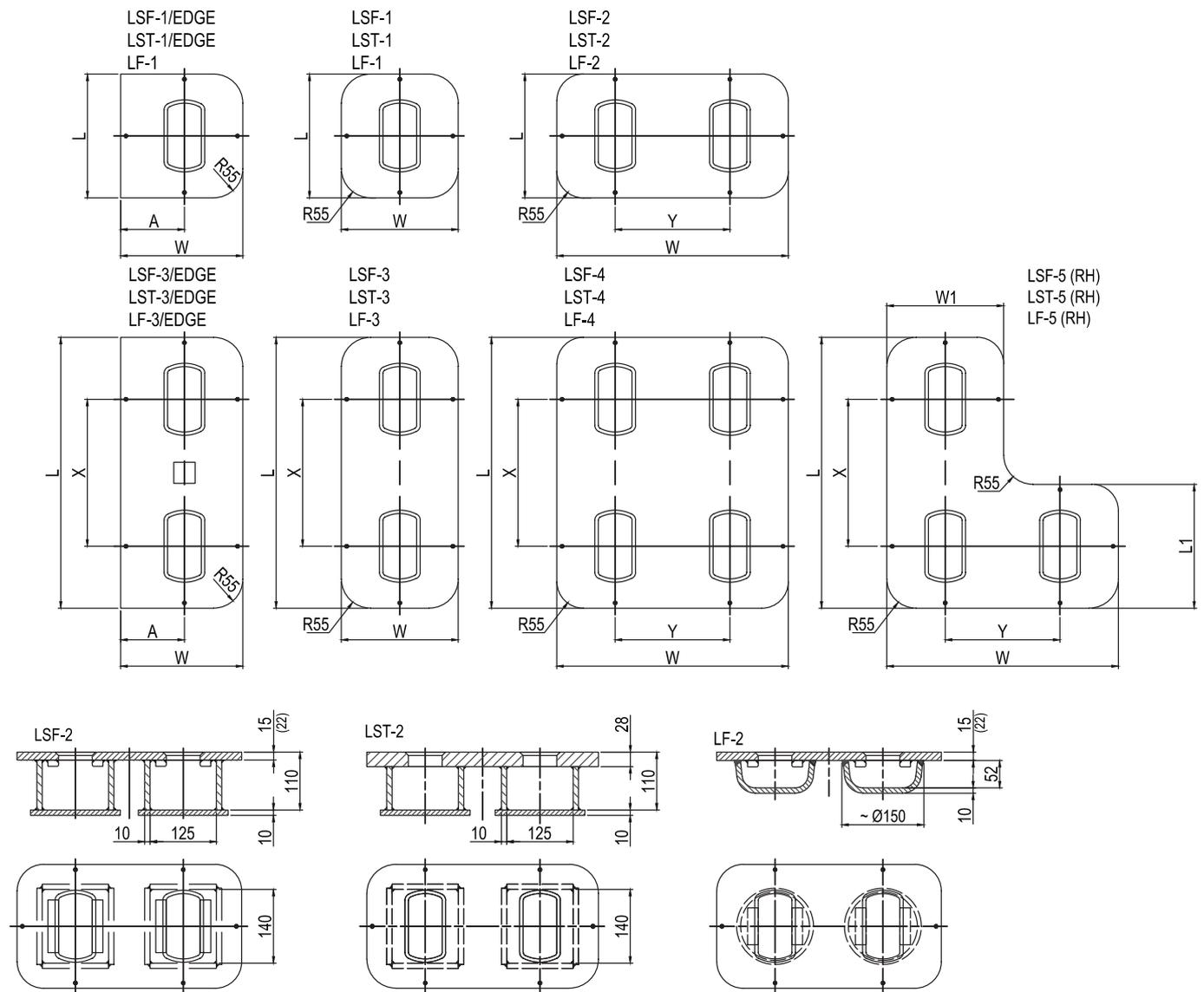
SF-T

| Product | Height H mm | Distance Y mm | Length L mm | longitudinal sliding range mm | transversal sliding range mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Counter part | Design |
|------------------|-------------|--|-------------|-------------------------------|------------------------------|--------------------|------------------------|----------------|--------------|-------------------------------------|-----------|
| SF-11T-280 | 70-140 | | 280 | ±0 | ±30 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11T-300 | 70-140 | | 300 | ±0 | ±40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11T-350 | 70-140 | | 350 | ±0 | ±65 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11T-390 | 70-140 | | 390 | ±0 | ±85 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11T-430 | 70-140 | | 430 | ±0 | ±105 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP-280 | 70-140 | 278, other hole distances Y also available | 280 | ±0 | ±30 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP-300 | 70-140 | 278, other hole distances Y also available | 300 | ±0 | ±40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP-320 | 70-140 | 278, other hole distances Y also available | 350 | ±0 | ±65 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP-360 | 70-140 | 278, other hole distances Y also available | 390 | ±0 | ±85 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP-430 | 70-140 | 278, other hole distances Y also available | 430 | ±0 | ±105 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11T/EDGE-1 | 70-150 | | 330 | ±0 | +100 / -40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |

| Product | Height H mm | Distance Y mm | Length L mm | longitudinal sliding range mm | transversal sliding range mm | Material | Treatment | SWL Tension kN | SWL Shear kN | Counter part | Design |
|--------------------------|-------------|--|-------------|-------------------------------|------------------------------|--------------------|------------------------|----------------|--------------|-------------------------------------|-----------|
| SF-12T/EDGE-1 | 70-150 | 278, other hole distances Y also available | 330 | ±0 | +100 / -40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12T/EDGE-2 | 70-150 | 278, other hole distances Y also available | 360 | ±0 | +90 / -60 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11/Hole164-210 | 70-140 | | 210 | ±20 | ±30 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11/Hole164-230 | 70-140 | | 230 | ±20 | ±40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11/Hole164-280 | 70-140 | | 280 | ±20 | ±65 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-11/Hole164-360 | 70-140 | | 360 | ±20 | ±105 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP/HOLE164-230 | 70-140 | 278, other hole distances Y also available | 230 | ±20 | ±40 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |
| SF-12/ISOGAP/HOLE164-280 | 70-140 | 278, other hole distances Y also available | 280 | ±20 | ±65 | High Tensile steel | Shotblasted and primed | 250 | 0 | Manual and semi-automatic twistlock | MacGregor |

Twistlock pockets

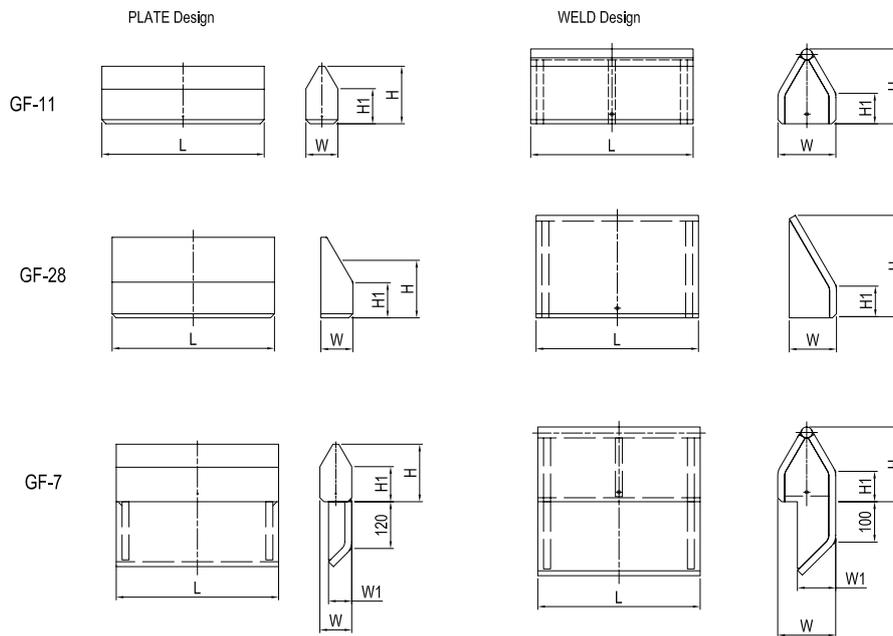
LST, LSF, LF



LST, LSF, LF

| Product | Distance Y/X mm | Material | L x W x H, mm | Treatment | Safe Working Load Tension, kN | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------------|-----------------|-------------------------------|---------------|-------------------------|-------------------------------|-----------------------------|---|-------------------------------------|-----------|
| LST-1-2-T | | High tensile structural steel | 265x250x120 | Shot blasted and primed | 250 | 210 | Other chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-1/EDGE-2-100-T | | High tensile structural steel | 265x225x120 | Shot blasted and primed | 250 | 210 | Other chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-2-203-2-T | 203 | High tensile structural steel | 265x453x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-2-216-2-T | 216 | High tensile structural steel | 265x466x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-2-258-2-T | 258 | High tensile structural steel | 265x508x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-3-279-2-T | 279 | High tensile structural steel | 544x250x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-4-1-2-T | 203/279 | High tensile structural steel | 544x453x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-4-2-2-T | 216/279 | High tensile structural steel | 544x466x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |
| LST-4-3-2-T | 258/279 | High tensile structural steel | 544x508x120 | Shot blasted and primed | 250 | 210 | Other distances and chamfer preparations also available | Manual and semi-automatic twistlock | MacGregor |

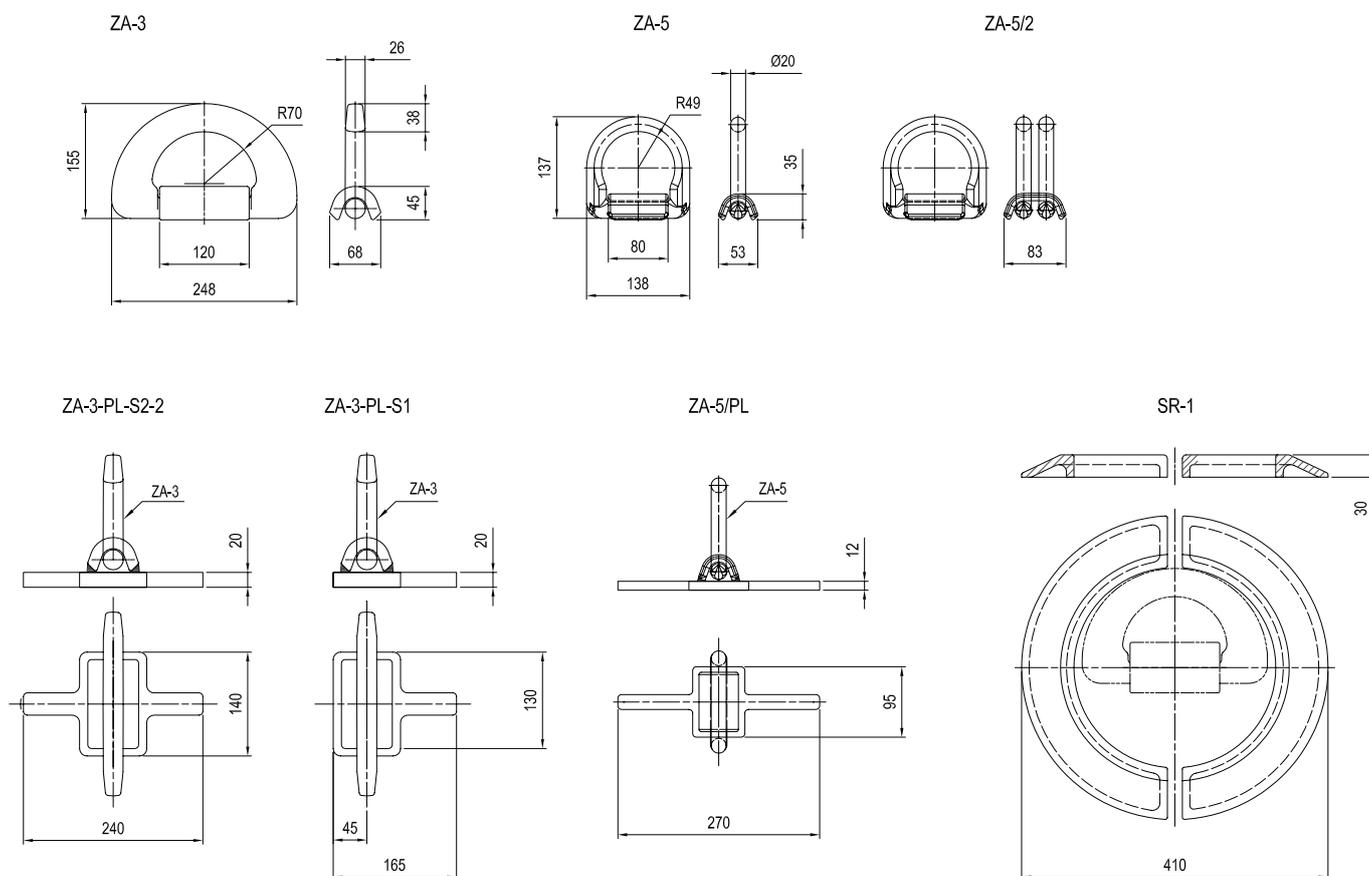
GF-11, -28, -7



GF-11, -28, -7

| Product | Material | Gap, mm | L x W x H, mm | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|----------------|------------------------------------|---------|---------------|-------------------------|-----------------------------|---------------------------------|-------------------|-----------|
| GF-11-26-140 | High tensile structural/cast steel | 42-51 | 140x26x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-11-26-280 | High tensile structural/cast steel | 42-51 | 280x26x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-11-38-140 | High tensile structural/cast steel | 52-63 | 140x38x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-11-38-280 | High tensile structural/cast steel | 52-63 | 280x38x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-11-50-140 | High tensile structural/cast steel | 64-75 | 140x50x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-11-50-280 | High tensile structural/cast steel | 64-75 | 280x50x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-11-60-140 | High tensile structural/cast steel | 74-85 | 140x60x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-11-60-280 | High tensile structural/cast steel | 74-85 | 280x60x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-28-30-140 | High tensile structural/cast steel | 38-42 | 140x30x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-28-30-280 | High tensile structural/cast steel | 38-42 | 280x30x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-28-35-140 | High tensile structural/cast steel | 43-47 | 140x35x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-28-35-280 | High tensile structural/cast steel | 43-47 | 280x35x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-28-40-140 | High tensile structural/cast steel | 48-52 | 140x40x100 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-28-40-280 | High tensile structural/cast steel | 48-52 | 280x40x100 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-28-45-140 | High tensile structural/cast steel | 53-57 | 140x45x140 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-28-45-280 | High tensile structural/cast steel | 53-57 | 280x45x140 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-28-50-140 | High tensile structural/cast steel | 58-62 | 140x50x140 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-28-50-280 | High tensile structural/cast steel | 58-62 | 280x50x140 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-7-50-30-140 | High tensile structural/cast steel | 64-75 | 140x50x242 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-7-50-30-280 | High tensile structural/cast steel | 64-75 | 280x50x242 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |
| GF-7-60-40-140 | High tensile structural/cast steel | 74-85 | 140x60x252 | Shot blasted and primed | 210 | Other dimensions also available | Container casting | MacGregor |
| GF-7-60-40-280 | High tensile structural/cast steel | 74-85 | 280x60x252 | Shot blasted and primed | 420 | Other dimensions also available | Container casting | MacGregor |

E, ZA, D3A

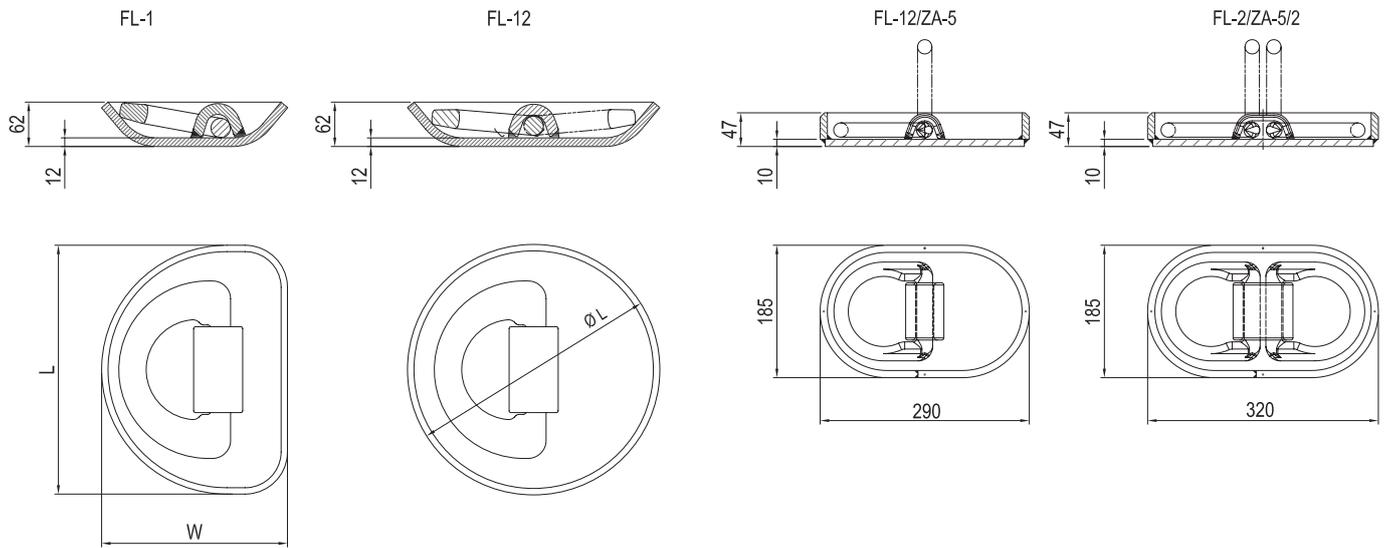


E, ZA, D3A

| Order number | Product | Weight kg | Material | Treatment | SWL Tension kN | Counter part | Design |
|--------------|-----------------|-----------|--------------------|------------------------|----------------|------------------------------------|-----------|
| 1021154 | ZA-3-1 | 5.1 | High Tensile steel | Shotblasted and primed | 245 | Turnbuckle | MacGregor |
| 1035376 | ZA-3-2 | 5.1 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| | ZA-5-1 | 1.7 | High Tensile steel | Shotblasted and primed | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| | ZA-5-2 | 1.7 | High Tensile steel | Hot-dip galvanised | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194596 | ZA-5/ARCTIC-1 | 1.7 | High Tensile steel | Shotblasted and primed | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194597 | ZA-5/ARCTIC-2 | 1.7 | High Tensile steel | Hot-dip galvanised | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| | ZA-5/2-1 | 2.9 | High Tensile steel | Shotblasted and primed | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| | ZA-5/2-2 | 2.9 | High Tensile steel | Hot-dip galvanised | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194594 | ZA-5/2-ARCTIC-1 | 2.9 | High Tensile steel | Shotblasted and primed | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194595 | ZA-5/2-ARCTIC-2 | 2.9 | High Tensile steel | Hot-dip galvanised | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1166438 | ZA-3-PL-S2-2 | 7.8 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| 1166439 | ZA-3-PL-S1 | 7.4 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| 1094867 | ZA-5/PL | 2.7 | High Tensile steel | Hot-dip galvanised | 100 | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1012812 | SR-1 | 7.6 | Cast steel | Shotblasted and primed | | Lashing ring ZA-3 | MacGregor |

Lashing rings

FL

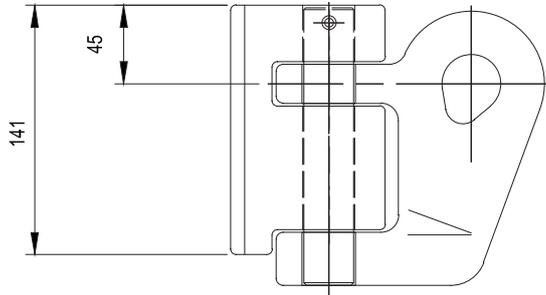


FL

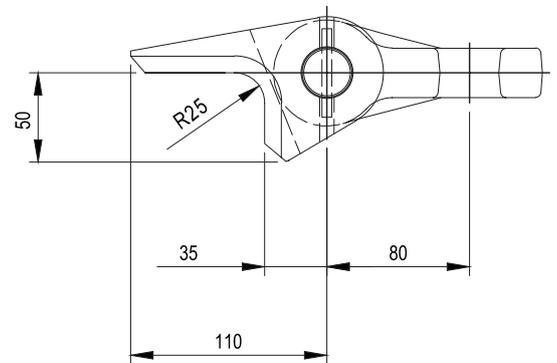
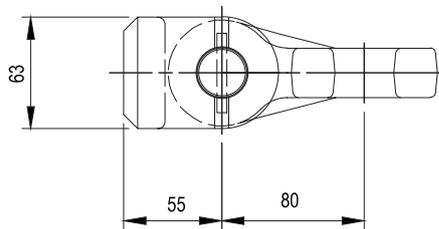
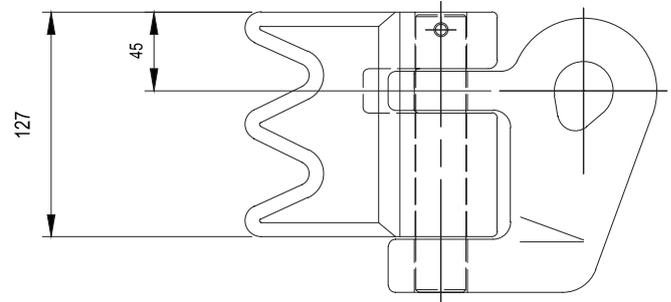
| Order number | Product | Weight kg | Material | Treatment | SWL Tension kN | Details | Counter part | Design |
|--------------|----------------------|-----------|--------------------|------------------------|----------------|--------------------------------------|------------------------------------|-----------|
| 1014741 | FL-1-1 | 13.7 | High Tensile steel | Shotblasted and primed | 245 | other plate thickness also available | Turnbuckle | MacGregor |
| 1180332 | FL-1-2 | 13.7 | High Tensile steel | Hot-dip galvanised | 245 | other plate thickness also available | Turnbuckle | MacGregor |
| 1149152 | FL-12-A | 16.0 | High Tensile steel | Shotblasted and primed | 245 | other plate thickness also available | Turnbuckle | MacGregor |
| 1148910 | FL-12-B | 16.0 | High Tensile steel | Hot-dip galvanised | 245 | other plate thickness also available | Turnbuckle | MacGregor |
| | FL-12/ZA-5-1 | 7.2 | High Tensile steel | Shotblasted and primed | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| | FL-12/ZA-5-2 | 7.2 | High Tensile steel | Hot-dip galvanised | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194590 | FL-12/ZA-5/ARCTIC-1 | 7.2 | High Tensile steel | Shotblasted and primed | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194592 | FL-12/ZA-5/ARCTIC-2 | 7.2 | High Tensile steel | Hot-dip galvanised | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| | FL-2/ZA-5/2-1 | 9.0 | High Tensile steel | Shotblasted and primed | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| | FL-2/ZA-5/2-2 | 9.0 | High Tensile steel | Hot-dip galvanised | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194588 | FL-2/ZA-5/2-ARCTIC-1 | 9.0 | High Tensile steel | Shotblasted and primed | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1194589 | FL-2/ZA-5/2-ARCTIC-2 | 9.0 | High Tensile steel | Hot-dip galvanised | 100 | other plate thickness also available | Hook, jaw, shackle, chain, webbing | MacGrego |

ZA hinged

ZA-7/3



ZA-7/1

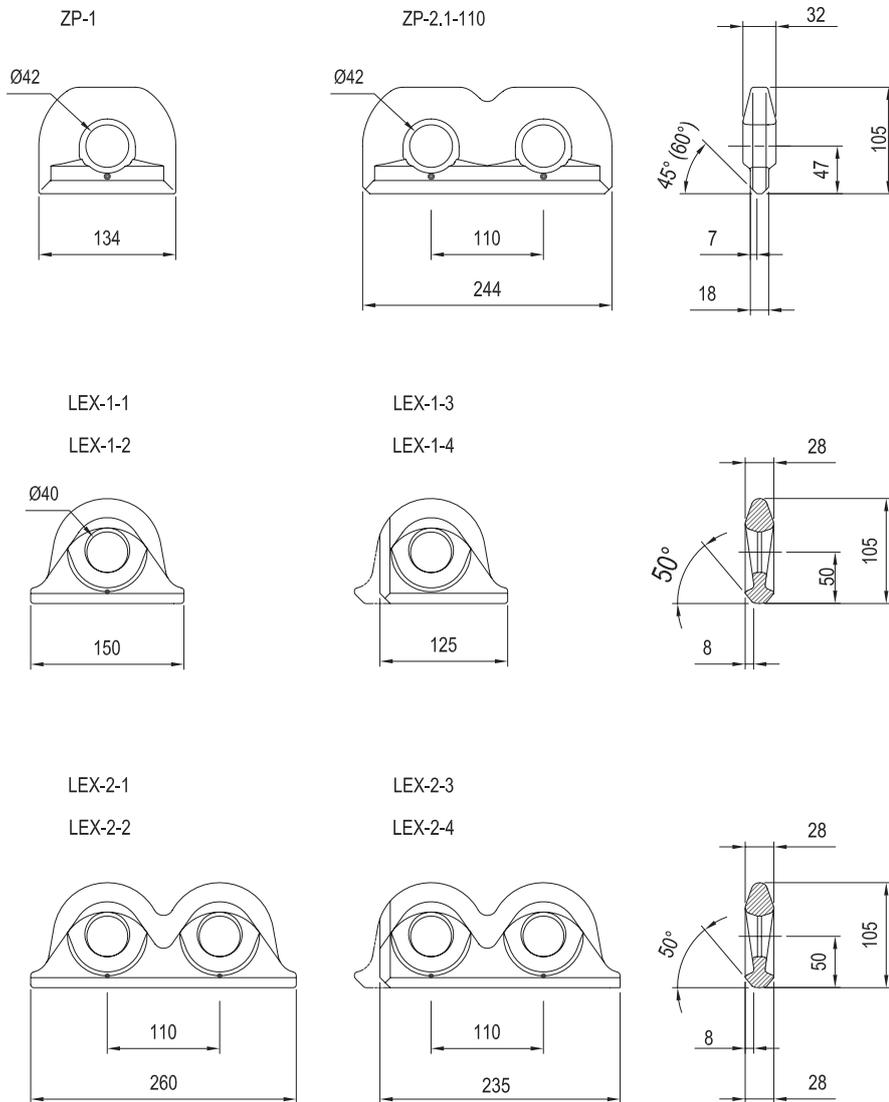


ZA

| Product | Material | Treatment | Safe Working Load Tension, kN | Details | Counter part | Design |
|--------------|-------------------------------|-------------------------|-------------------------------|----------------------------|--------------|-----------|
| ZA-7/3 | High tensile structural steel | Shot blasted and primed | 490 | /. | Turnbuckle | MacGregor |
| ZA-7/1-25-RH | High tensile structural steel | Shot blasted and primed | 490 | Other radii also available | Turnbuckle | MacGregor |
| ZA-7/1-25-LH | High tensile structural steel | Shot blasted and primed | 490 | Other radii also available | Turnbuckle | MacGregor |

Lashing plates

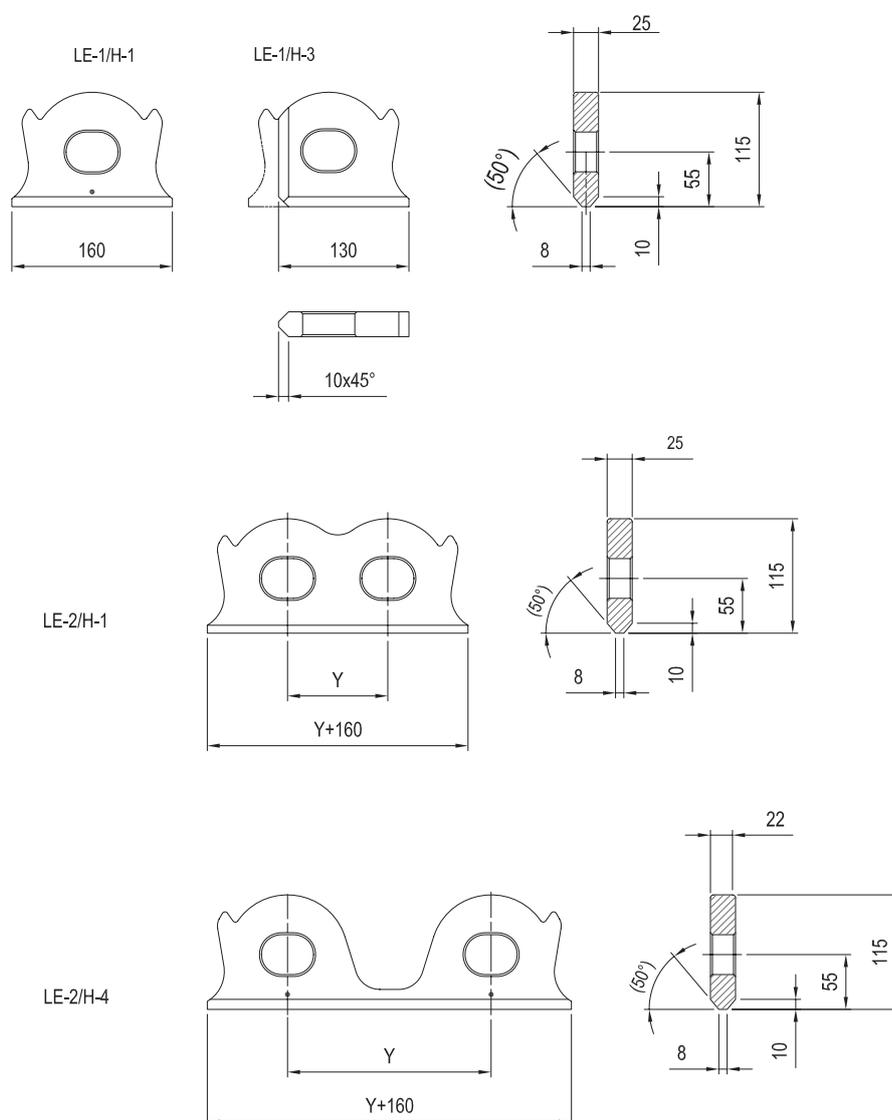
ZP, LEX



ZP, LEX

| Order number | Product | Weld preparation | Weight kg | Material | Treatment | SWL Tension kN | Counter part | Design |
|--------------|--------------|------------------|-----------|--------------------|-------------------------|----------------|--------------|-----------|
| 1105832 | ZP-1-1 | 45° | 1.8 | High Tensile steel | Shotblasted and primed | 245 | Turnbuckle | MacGregor |
| 1093326 | ZP-1-2 | 60° | 1.8 | High Tensile steel | Shotblasted and primed | 245 | Turnbuckle | MacGregor |
| 1167463 | ZP-1-3 | 45° | 1.8 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| 1100201 | ZP-1-4 | 60° | 1.8 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| 1105830 | ZP-2.1-110-1 | 45° | 3.4 | High Tensile steel | Shotblasted and primed | 245 | Turnbuckle | MacGregor |
| 1082054 | ZP-2.1-110-2 | 60° | 3.5 | High Tensile steel | Shotblasted and primed | 245 | Turnbuckle | MacGregor |
| 1105831 | ZP-2.1-110-3 | 45° | 3.6 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| 1100202 | ZP-2.1-110-4 | 60° | 3.7 | High Tensile steel | Hot-dip galvanised | 245 | Turnbuckle | MacGregor |
| | LEX-1-1 | 50° | 1.8 | High Tensile steel | Shotblasted and primed | 320 | Turnbuckle | Allset |
| | LEX-1-2 | 50° | 1.8 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| | LEX-1-3 | 50° | 1.6 | High Tensile steel | Shotblasted and primed | 320 | Turnbuckle | Allset |
| | LEX-1-4 | 50° | 1.6 | High Tensile steel | Shot blasted and primed | 250 | Turnbuckle | Allset |
| | LEX-2-1 | 50° | 3.3 | High Tensile steel | Shotblasted and primed | 320 | Turnbuckle | Allset |
| | LEX-2-2 | 50° | 3.3 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| | LEX-2-3 | 50° | 3.2 | High Tensile steel | Shotblasted and primed | 320 | Turnbuckle | Allset |
| | LEX-2-4 | 50° | 3.2 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |

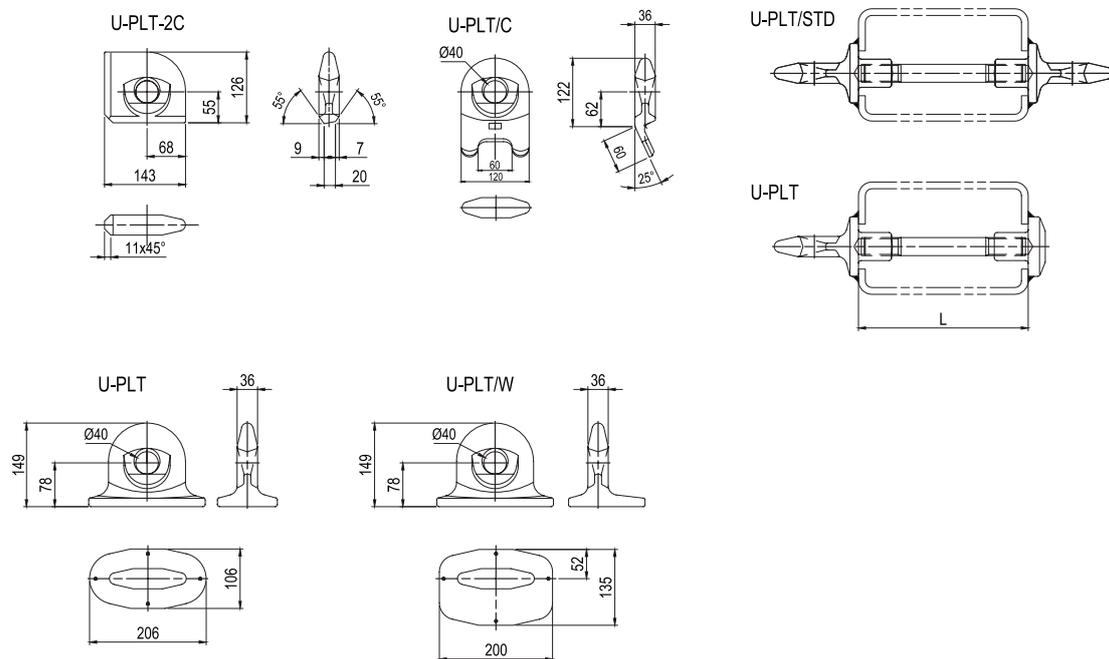
LE-1H, -2H



LE-1H, -2H

| Product | Weld preparation | Distance Y mm | Material | Treatment | SWL Tension kN | Counter part | Design |
|--------------|------------------|---------------|--------------------|------------------------|----------------|--------------|--------|
| LE-1/H-1 | 50° | | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-1/H-3 | 50° | | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-1-110 | 50° | 110 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-1-150 | 50° | 150 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-4-203 | 50° | 203 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-4-216 | 50° | 216 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-4-260 | 50° | 260 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| LE-2/H-4-280 | 50° | 280 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |

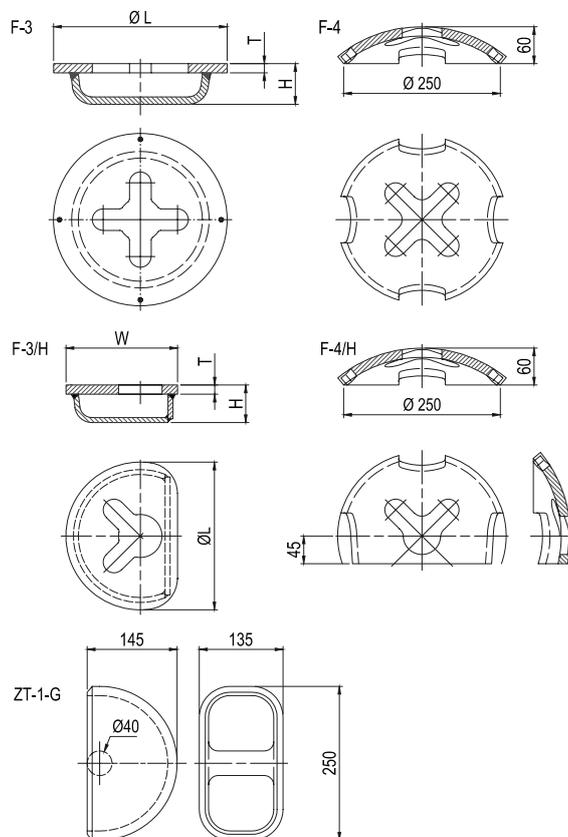
U-PLT



U-PLT

| Order number | Product | Material | Treatment | SWL Tension kN | Counter part | Design |
|--------------|-------------------|--------------------|------------------------|----------------|--------------|--------|
| 1222770 | U-PLT-2C-RH-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1222769 | U-PLT-2C-LH-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1160202 | U-PLT/C | High Tensile steel | Shotblasted and primed | 320 | Turnbuckle | Allset |
| 1222771 | U-PLT/C1 | High Tensile steel | Shotblasted and primed | 250 | Turnbuckle | Allset |
| 1222768 | U-PLT-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1222772 | U-PLT/W-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1160199 | U-PLT-300-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1222774 | U-PLT-400-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1160201 | U-PLT/STD-300-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |
| 1222773 | U-PLT/STD-400-HDG | High Tensile steel | Hot-dip galvanised | 373 | Turnbuckle | Allset |

F-type, ZT-type

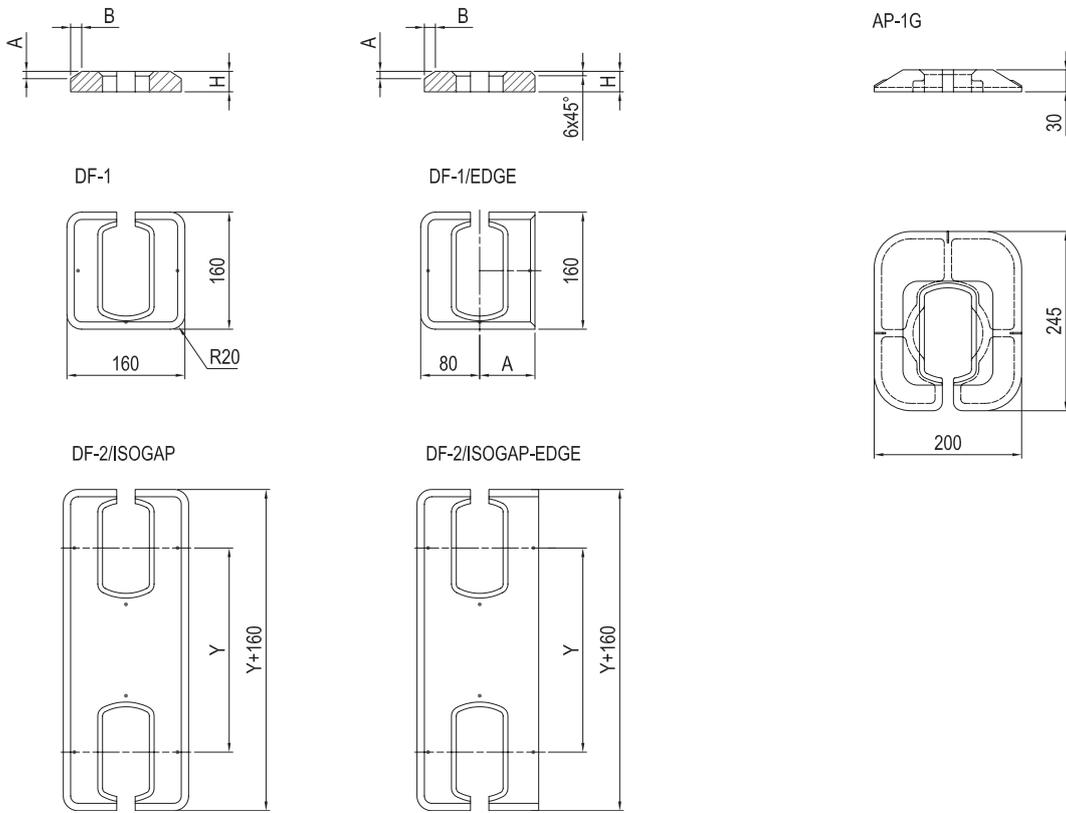


F-type, ZT-type

| Order number | Product | Weight kg | Material | L x W x H, mm | Treatment | Safe Working Load Tension, kN | Details | Counter part | Design |
|--------------|------------|-----------|-------------------------------|---------------|-------------------------|-------------------------------|--|------------------------------------|-----------|
| | F-3-1-15-T | 5.6 | High tensile structural steel | Ø220x62 | Shot blasted and primed | 200 | Other topplates, chamfer preparations also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1084852 | F-3/H | 5.9 | High tensile structural steel | 240x280x62 | Shot blasted and primed | 200 | Other topplates, chamfer preparations also available | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1013103 | ZT-1G | 11.2 | Cast steel | 135x145x250 | Shot blasted and primed | 180 | ./. | Hook, jaw, shackle, chain, webbing | MacGregor |
| 1013102 | F-4 | 5.0 | High tensile structural steel | Ø272x60 | Shot blasted and primed | 200 | ./. | Elephant foot | MacGregor |
| 1007322 | F-4/H | 3.8 | High tensile structural steel | 272x181x60 | Shot blasted and primed | 200 | ./. | Elephant foot | MacGregor |

Doubling plates

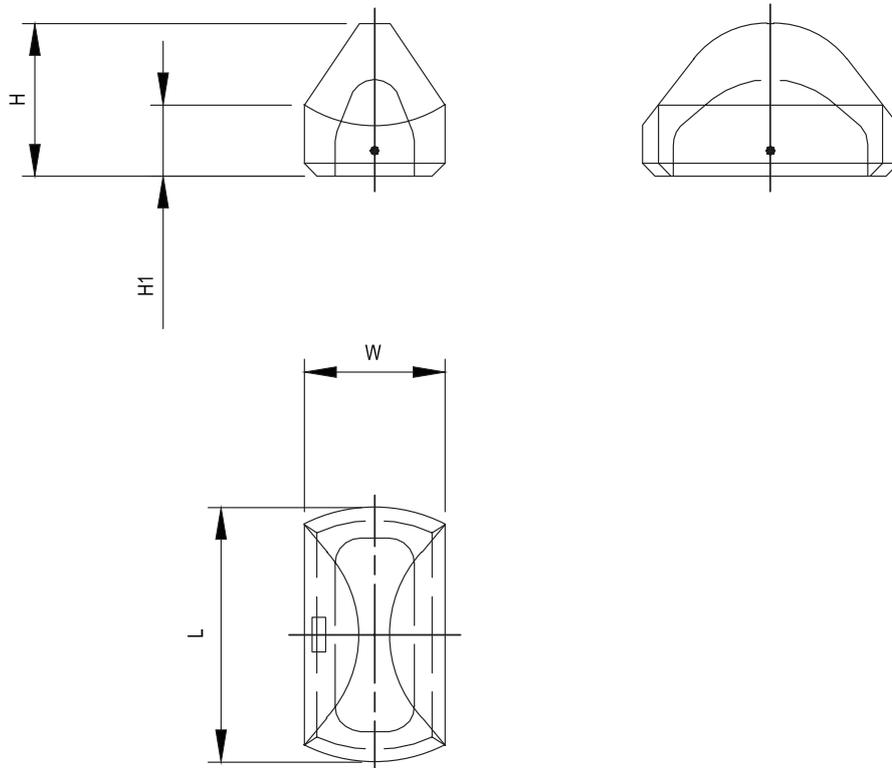
DF



DF

| Product | Height H mm | Distance Y mm | Material | Treatment | SWL Tension kN | Details | Counter part | Design |
|--------------------|-------------|--|--------------------|------------------------|----------------|--------------------------|------------------|-----------|
| DF-1-1 | 25-45 | | High Tensile steel | Shotblasted and primed | 210 | other chamfers available | Container corner | MacGregor |
| DF-1/EDGE-1 | 25-45 | | High Tensile steel | Shotblasted and primed | 210 | other chamfers available | Container corner | MacGregor |
| DF-2/ISOGAP-1 | 25-45 | 279, other hole distances Y also available | High Tensile steel | Shotblasted and primed | 420 | other chamfers available | Container corner | MacGregor |
| DF-2/ISOGAP-EDGE-1 | 25-45 | 279, other hole distances Y also available | High Tensile steel | Shotblasted and primed | 420 | other chamfers available | Container corner | MacGregor |

12-1, 2 & 40

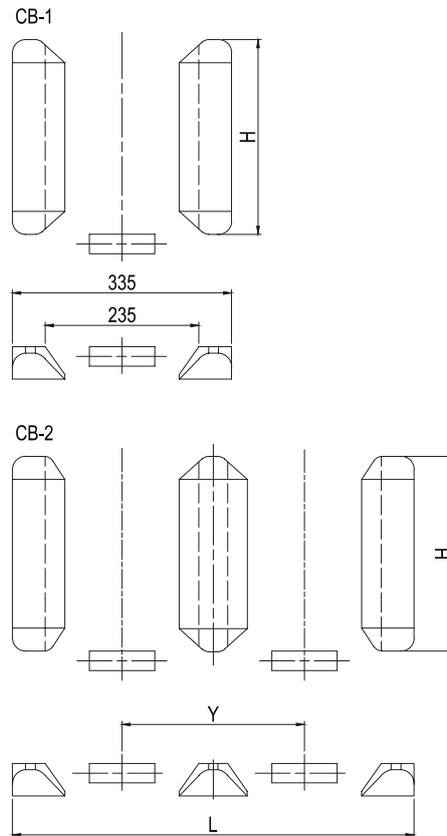


12-1, 2 & 40

| Order number | Product | Weight kg | Material | L x W x H, mm | Treatment | Safe Working Load Shear, kN | Details | Counter part | Design |
|--------------|-----------|-----------|--|---------------|----------------------------|-----------------------------|---|---------------------|-----------|
| 1109150 | TYPE 12-1 | 1.8 | High tensile structural/ cast steel | 100x55x60 | Shot blasted and primed | 210 | Other chamfer preparations also available | Container corner | MacGregor |
| 1235129 | TYPE 12-2 | | High tensile structural/ cast steel | 100x55x90 | Shot blasted and primed | 210 | | Container corner | MacGregor |
| 1130042 | TYPE 40 | 1.2 | High tensile structural/ cast steel | 100x40x60 | Shot blasted and primed | 210 | | Container corner | MacGregor |

Counter bearings

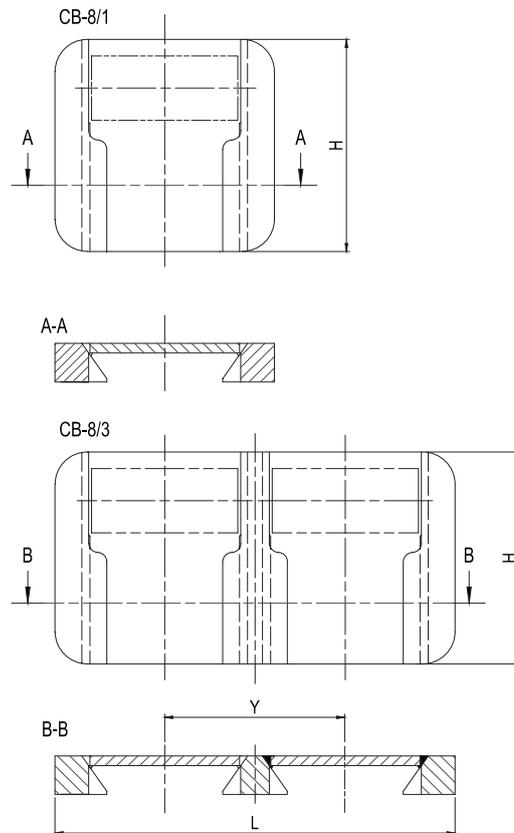
CB-1, CB-2



CB-1, CB-2

| Order number | Product | Weight kg | Length, mm | Width, mm | Eye range, mm | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Pressure, kN | Details | Counter part | Related system | Design |
|--------------|--------------|-----------|------------|-----------|---------------|-------------------------------|-------------------------|-------------------------------|--------------------------------|--|--------------------------|---------------------------------------|-----------|
| 1013245 | CB-1-300 | 14.1 | 300 | 335 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1013246 | CB-1-600 | 27.6 | 600 | 335 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007807 | CB-1-900 | 43.4 | 900 | 335 | | High tensile structural steel | | 850 | 850 | Other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1013254 | CB-2-235-300 | 24.5 | 300 | 614 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Raised (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1013255 | CB-2-235-600 | 47.9 | 600 | 614 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Raised (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007816 | CB-2-235-900 | 69.5 | 900 | 614 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Raised (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |

CB-8



CB-8

| Order number | Product | Weight kg | Length, mm | Width, mm | Eye range, mm | Material | Treatment | Safe Working Load Tension, kN | Safe Working Load Pressure, kN | Details | Counter part | Related system | Design |
|--------------|-------------|-----------|------------|-----------|---------------|-------------------------------|-------------------------|-------------------------------|--------------------------------|---|--------------------------|---------------------------------------|-----------|
| 1007835 | CB-8/1-330 | 27.5 | 330 | 339 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush, other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007839 | CB-8/1-635 | 53.2 | 635 | 339 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush, other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007842 | CB-8/1-940 | 81.2 | 940 | 339 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush, other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007843 | CB-8/1-1245 | 107.7 | 1245 | 339 | | High tensile structural steel | Shot blasted and primed | 850 | 850 | Other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007846 | CB-8/3-330 | 46.1 | 330 | 618 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007849 | CB-8/3-635 | 89.9 | 635 | 618 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007850 | CB-8/3-940 | 135.6 | 940 | 618 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Flush (ISO-GAP), other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |
| 1007851 | CB-8/3-1245 | 179.4 | 1245 | 618 | 279 | High tensile structural steel | Shot blasted and primed | 850 | 850 | Other lengths also available | Tension pressure element | Block stowage tension pressure system | MacGregor |

Stack splitter

Maximising cargo hold potential

The MacGregor Stack splitter is a device used for supporting containers in a cargo hold. This easy-to use device allows improved flexibility for loading arrangements:

- Special cargo can be carried beneath containers supported by Stack Splitters.
- The Stack Splitters can be used for splitting container stacks, thus allowing bigger stackweights from the Stack Splitter upwards - and a more profitable overall container stackweight distribution.
- Stack Splitters can be used to simulate a 20' container and therefore enable 40' containers to be loaded onto 'monkey rocks' when no 20' containers are available. 'Monkey rocks' are flat platforms typically designed to be used in conjunction with 20' containers. They are located in the tapering forward and aft holds of container vessels to allow containers to be loaded in these irregular spaces.

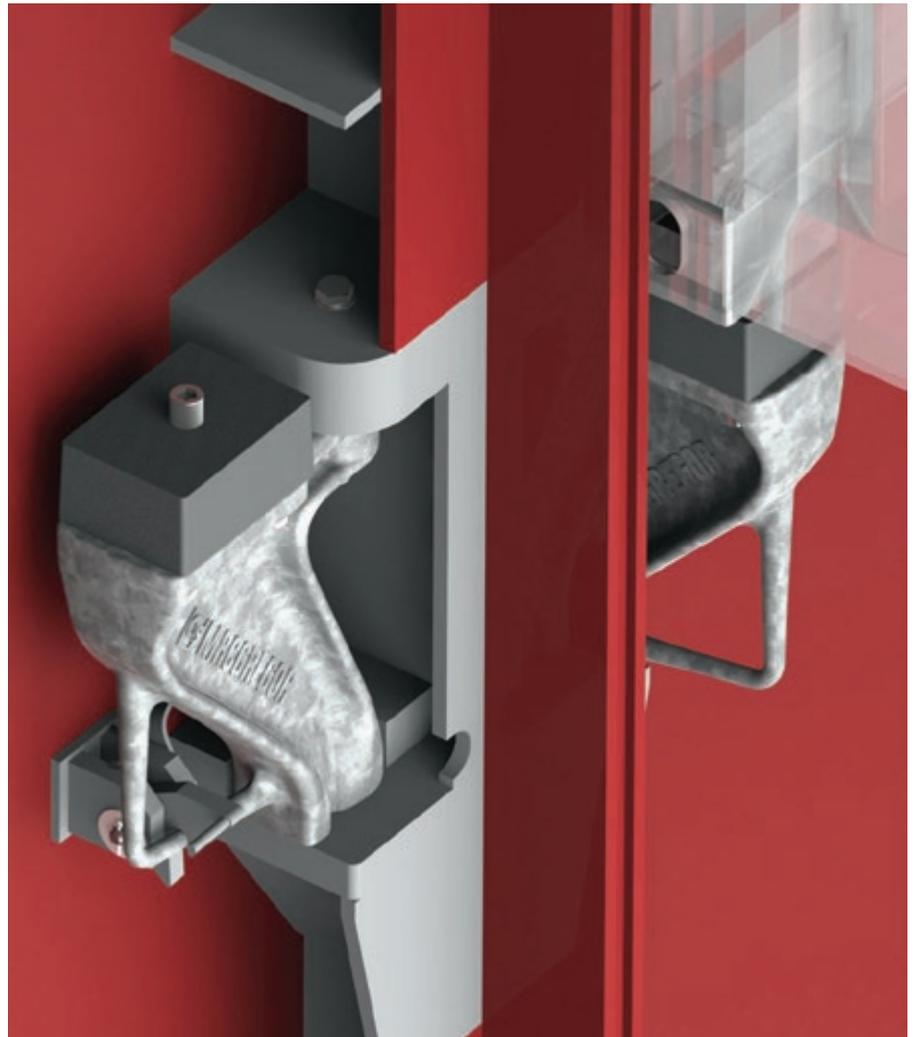
The Stack Splitters are integrated in the cell guides at pre-designated heights when the cargo hold is being built. Supporting structures need to be considered in the bulkhead design, and therefore it is important to contact MacGregor at an early stage of the ship project.

Raiser pads with a fixing hole are available for adjusting the stack splitter damper pad surface height at installation; range 10mm - 120mm.

The unit's unique geometry and high-quality materials provide strength in a compact size.

No recesses in bulkheads are needed. The supporting structures are delivered by the shipyard, while the brackets and hooks can be delivered either by MacGregor or by the shipyard.

The MacGregor Stack Splitter comes in one size.

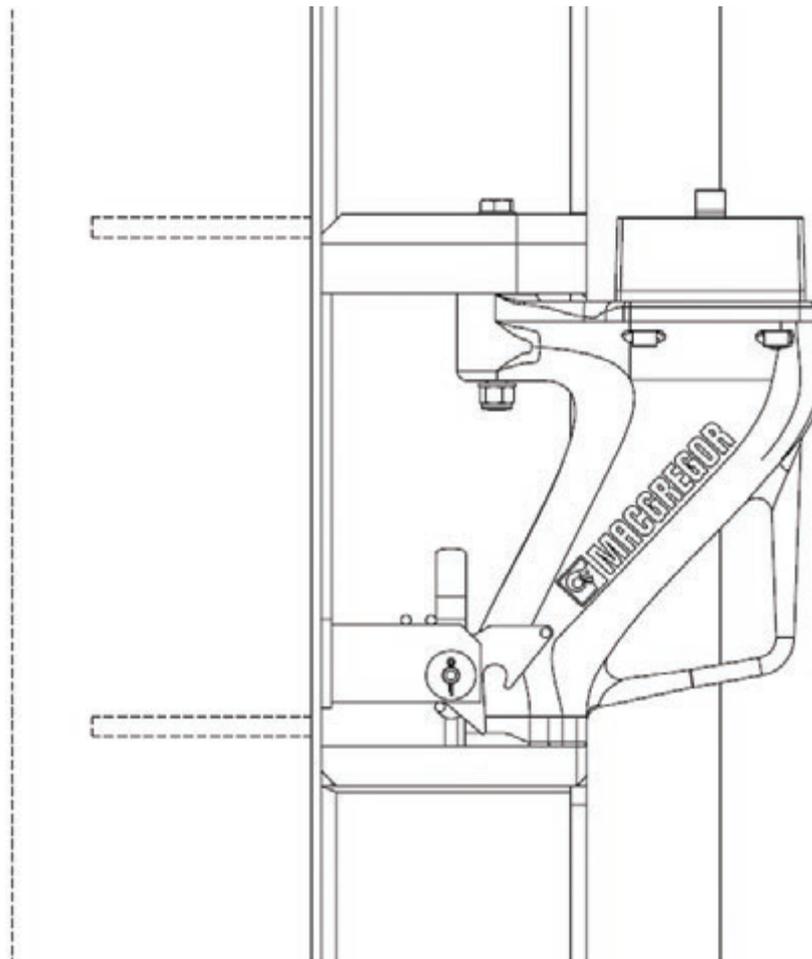


MacGregor Stack Splitters are hinged so that they can be swung out to support all four corners of the container lowered onto them. A damper pad absorbs minor container movements at sea.

When not in use, the Stack Splitters are moved into a stowed position along the bulkhead, allowing containers and any other cargo, to slide along the cell guides to the cargo area below.

Stack Splitters can be operated from the tank top with a MacGregor OR-W operating rod or by a remote operating arrangement from the coaming area.

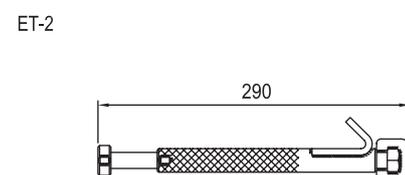
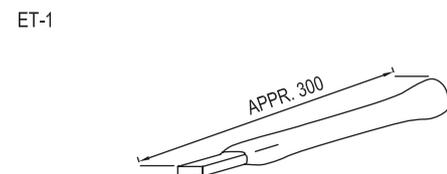
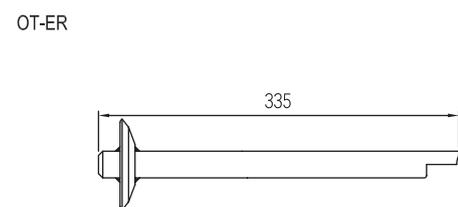
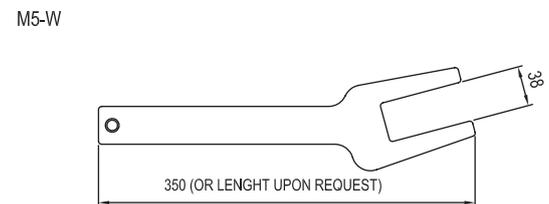
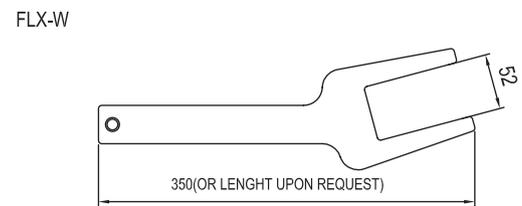
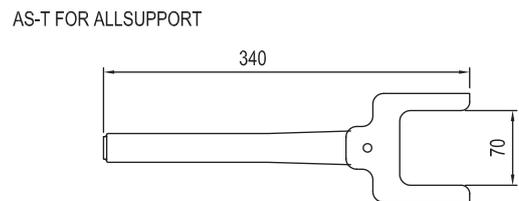
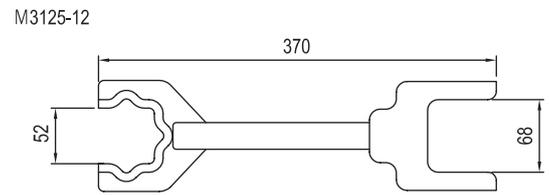
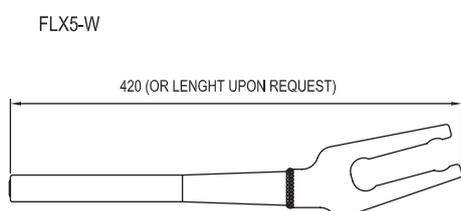
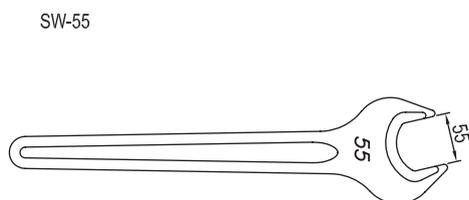
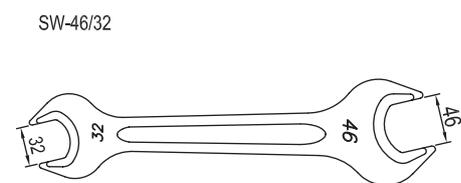
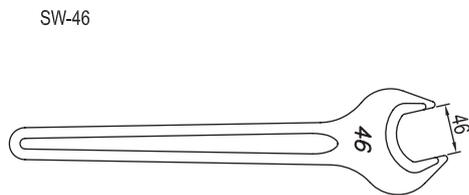
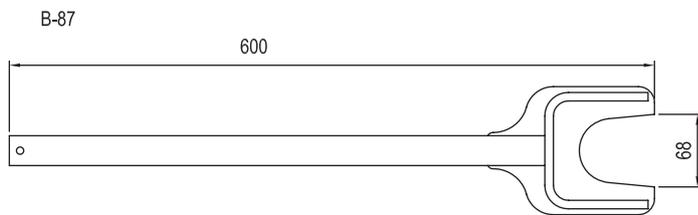
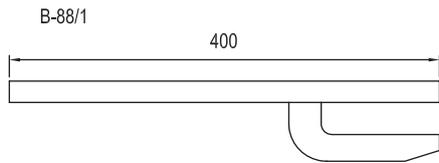
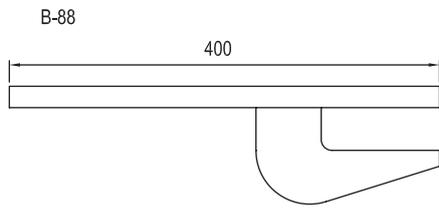
Because no significant force is needed, one person can carry out the operation.



Stack splitter

| Product | Weight kg | Housing material | Damper pad material | Treatment | Safe Working Load SWL, tonnes | Counter parts | Related items |
|----------------|--------------------------------|----------------------|-------------------------|--------------------|-------------------------------|---------------------------|---|
| Stack splitter | 50kg (including damper pad) | Precision cast steel | Steel-reinforced rubber | Hot-dip galvanised | 100 tonnes | Container corner castings | OR-W Operating rod Raiser pad (if needed for installation) |

Tools



Tools

| Order number | Product | Weight kg | Jaw Width, mm | Length, mm | Material | Treatment | Details | Counter part | Design |
|--------------|-----------------------------|-----------|---------------|------------|----------|--------------------|--|-----------------------|-----------|
| 1004085 | SPANNER B-87 | | | | | | | | MacGregor |
| 1009984 | SPANNER B-88 | 2.0 | | 400 | Steel | Hot-dip galvanised | For operating the flat bar body TBS-3G turnbuckles | TBS-3G round bar body | MacGregor |
| 1065091 | SPANNER B-88/1 | 1.3 | | 400 | Steel | Hot-dip galvanised | For operating the round bar body TBS-3G turnbuckles | TBS-3G flat bar body | MacGregor |
| 1003861 | SPANNER SW-46 | | 46 | | Steel | Hot-dip galvanised | Spanner with 46mm jaw | | MacGregor |
| 1007372 | SPANNER SW-55 | | 55 | | Steel | Hot-dip galvanised | Spanner with 55mm jaw | | MacGregor |
| 1010436 | SPANNER SW-1/8 | | | | Steel | Hot-dip galvanised | | | MacGregor |
| 1065795 | SPANNER SW-46/32 | | 46/32 | | Steel | Hot-dip galvanised | Double spanner with 46mm & 32mm jaw for operating of bridge fitting BF-1 | BF-1 bridge fitting | MacGregor |
| 1131107 | SPANNER, M3125-12 | | 52 | | Steel | Hot-dip galvanised | For operating the Maersk-type turnbuckles | | Allset |
| 1131007 | SPANNER AS-T FOR ALLSUPPORT | | | | Steel | Hot-dip galvanised | For operating the Allsupport system | Allsupport | Allset |
| 1131104 | SPANNER FLX-W | 1.0 | 52 | | Steel | Hot-dip galvanised | For operating the FLX turnbuckles | FLX turnbuckles | Allset |
| 1131105 | SPANNER M5-W | 1.0 | 38 | | Steel | Hot-dip galvanised | For operating the M5 turnbuckles | M5 turnbuckles | Allset |
| 1010428 | OPERATING TOOL OT-ER | 1.4 | | | Steel | Painted | For emergency operation of semi-automatic twistlocks. Front operation. | C5AM-DF, CV-15, CV-20 | MacGregor |
| 1120561 | EMERGENCY TOOL ET-1 | 0.2 | | | Wood | Painted | For emergency operation of semi-automatic twistlocks. Front operation. | C5AM-DF, CV-15, CV-20 | Allset |
| 1120562 | EMERGENCY TOOL ET-2 | 0.7 | | | Steel | Painted | For emergency operation of semi-automatic twistlocks. Side operation. | C5AM-DF, CV-15, CV-20 | Allset |
| 1120560 | TURNBUCKLE WRENCH FLX5-W | | | | Steel | Hot-dip galvanised | For operating the FLX5 turnbuckles | FLX5 turnbuckles | Allset |
| 1042085 | HAMMER | 1.0 | | | Steel | | | | MacGregor |

Wherever needed, you can rely on our support.



MacGregor shapes the offshore and marine industries by offering world-leading engineering solutions and services with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes and Triplex brands. Shipbuilders, owners and operators are able to optimise the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor solutions and services for handling marine cargoes, vessel operations, offshore loads, crude/LNG transfer and offshore mooring are all designed to perform with the sea. www.macgregor.com

MacGregor is part of Cargotec. Cargotec's (Nasdaq Helsinki: CGCBV) sales in 2015 totalled approximately EUR 3.7 billion and it employs almost 11,000 people. www.cargotec.com

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Lloyd's Register Quality Assurance certifies that the Quality Management System for MacGregor is ISO 9001:2008 compliant.