

Mark Q

Strong and innovative reefer container



The Mark Q is used all over the world to take care of customers' produces and cargo. These include producers, shippers, smaller specialist lines as well as some of the world's largest shipping lines.



Integrated reefer unit



The Mark Q design and box features are similar regardless of whether you prefer a reefer with integrated reefer unit or the traditional picture frame reefer unit.

Picture frame reefer unit

Mark Q – the game changer

Ever since its introduction, the Mark Q reefer has evolved continuously from customer feedback relating to cargo care and repair costs, and our commitment to always have the best reefer design on the market.

The Mark Q design has not spelled the end of customised designs, rather it has become the platform from which customers' preferences develop, much like car manufacturers who use a common platform to make different models of cars. The Mark Q is therefore still MCI's reefer container platform today.

Mark Q continues to evolve

Because the Mark Q was never intended to be a final design, it has evolved over the years – it

is a "living design"; optimised through constant dialogue with customers regarding design improvements. "No detail is too small, no effort is too great" is a useful motto when the task is to optimise an already outstanding design to lower M&R costs.

In addition, our focus on making the Mark Q the least bacteria-prone container in the industry has recently intensified.

Lead requirements for the Mark Q design:

Optimal cargo care

Focus on creating optimal condition for cargo.

Lowest TCO (Total Cost of Ownership)

Focus on low M&R costs during lifetime.

Industrial production

Focus on streamline production to ensure a consistently high quality and efficiency.



The constant development work of the Mark Q includes testing of alternative materials. The EPDM drain pipe is an example which will reduce risk of cracks irrespective of which design customer chooses.

Kazoo drain

Auto drain

Our baffle plate design is rounded in shape, which helps guide air and protects against fork lift damage. We have now achieved an incremental improvement in a different optional material choice (aluminium or RPVC).



Mark Q design - based on hard facts!

Access to detailed repair statistics is a key component.

Continuous analysis of repair statistics is one way to extract damage patterns. This is valuable information for the development process, as it highlights the damage prone areas in need of redesign. Redesigning traditionally means adding material. At MCI it means both adding and removing material, to improve the box without adding weight or reducing insulation values – that's value engineering.

One remarkable example is the "raised base" Mark Q design. Removing material eliminates cone damages as well as bottom side rail damages. Adding material in another part of the base (7 cross/load members) makes the whole construction much stronger. The load member design is also less sensitive to delamination because all strength is moved from the foam to the steel construction, a point confirmed by plenty of feedback from customers.

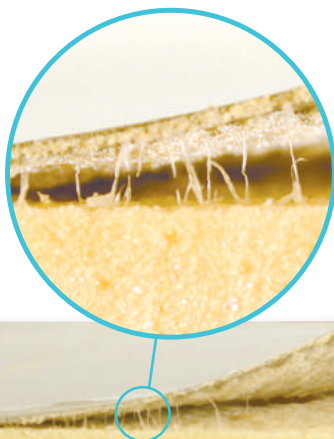


What you see is not all you get

There is more to Mark Q than meets the eye. Internal reinforcements, combined with the use of foam bonding primers and special glues, ensure the optimum delamination protection possible.

The perfect grip

The use of hot melt glue as foam bond provides a superior foam adhesion.

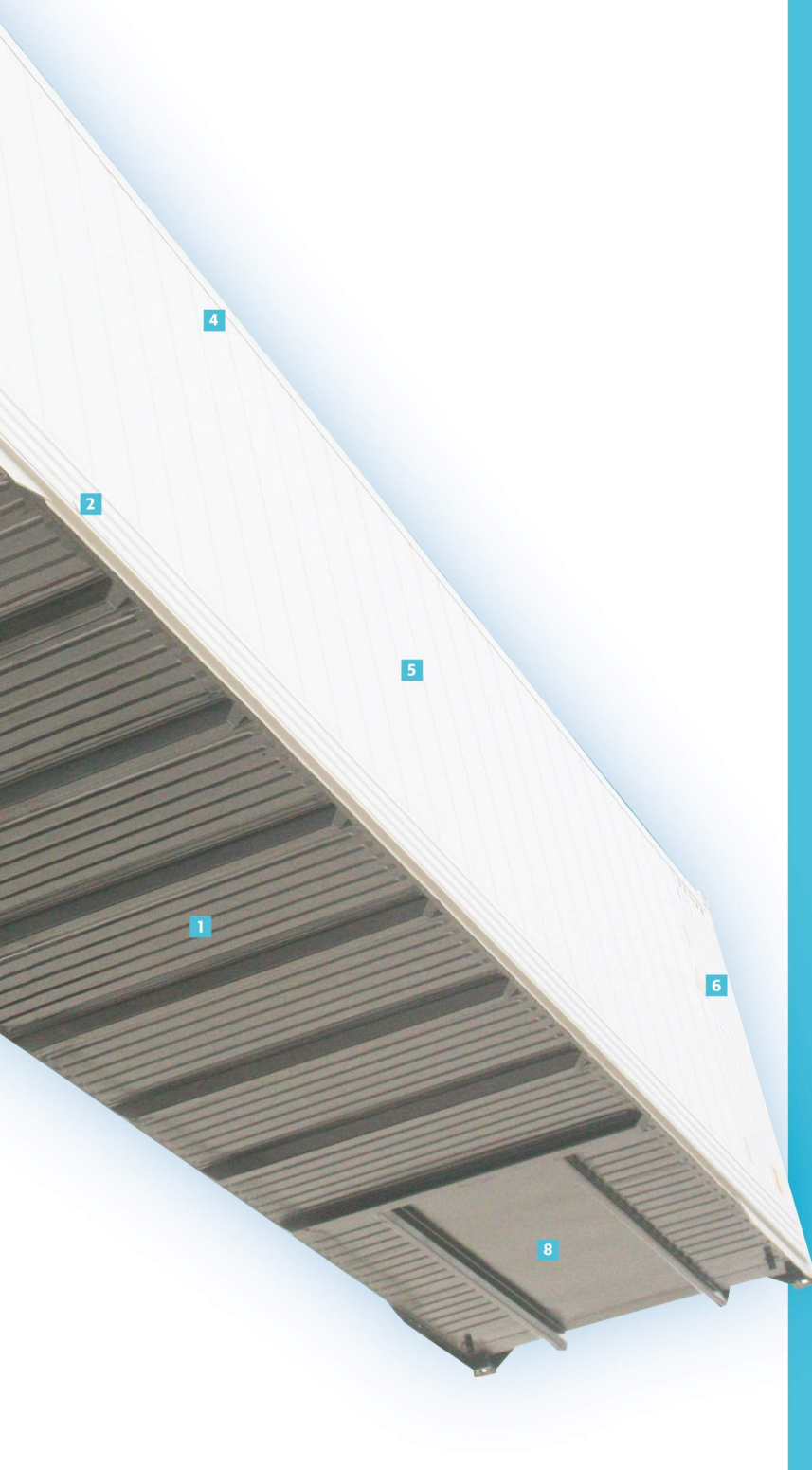


Zinc protection is applied prior to main assembly through a hot-spray metalising process and includes both the hidden areas as well the surface area on the container frame.

■ Zinc metalised



Pretreatment, metalising and paint application of all the corten steel parts (base cross members, gooseneck, frames and rails) is standard at MCI. It extends the useful life of the Mark Q and maintains a proper appearance, as touch-up of the paintwork during the container's lifetime is kept to a minimum.



1 Raised base with load members and flat panels

- Strongest base construction available
- Less vulnerable to impact damage
- Simple to repair



2 Outer scuff plate

- Reduces risk of panel delamination
- Resistant against scratch damage
- Lowers M&R costs
- Extends useful life
- Better appearance = a higher resale value



3 Aluminium scufflining

- Extends the container lifespan
- Dramatically reduces inside repairs
- Improves the (hygienic) interior appearance
- Increases resale value
- Limits water ingress into the foam



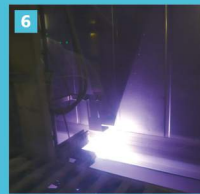
4 Internal reinforcements

- High number of stringers and posts in doors and panels
- Reduces risk of delamination
- Limits the spread of delamination
- Ensures strength and lower M&R



5 SuPoTec® insulation

- Environmentally friendly foaming technology
- Non ozone depleting
- Much reduced carbon footprint



6 Zinc protection

- Last the full lifetime
- Eliminates time-consuming paint maintenance of frame/base areas
- Improves appearance



7 Rivet and sealant free door design with strong internal frame

- Less prone to damage
- Reduces repair costs
- Hygienic & watertight
- Superior appearance over entire lifetime



8 Reinforced gooseneck

- Stringer reinforcements in the outriggers for strength
- Thicker gooseneck rail against impact damage
- High inertia = high stiffness
- High moment of resistance = low material stress



9 Rear sill design

- Unique round bar eliminates impact damage
- Thicker end panel against punctures
- Fully welded sill & base panel for ultimate strength



The Mark Q clean and germ-free container interior.



The T-floor now features an even sturdier and stronger protector while the gap between the T-board end and the door has been reduced.



Q Liner® is an optional strong light weight lining made of polypropylene. This attracts even less bacteria and is even easier to clean than the normal high grade stainless steel material.

Hygiene is a key factor

Optimal cargo care requires attention to hygiene inside the reefers. The Mark Q interior is easy to clean and is less prone to scratches and impacts, which normally attract bacteria.

Hygiene is a key factor, regardless of the commodity transported. The reefer container interior must be clean and germ-free to the greatest extent possible, while water ingress into the foam must be avoided at all times. Therefore, the Mark Q is designed to be the most hygienic container available for cargo owners while reducing M&R costs for container owners.

Scufflining offers multiple hygienic benefits

The side lining is prone to scratchmarks and rust traces from cargo and strapping material, especially at the lower part. Bacteria attaches to rust and grooves. The strong inner scufflining makes the side lining less prone to this. The welded connection with the T-floor prevents residual bacteria after the container has been steam cleaned and also prevents water ingress in the foam.

Unfortunately, sealant attracts dirt and bacteria and, even worse, it is prone to damage and is cut loose during steam-cleaning of the container, leaving room for bacteria growth in the resulting cavity. Over time, this will also increase the risk of water ingress into the foam. "Re-sealing" is therefore one of the most frequent repair items, adding a steady flow of expenses to annual M&R costs - just on sealants.

Constant efforts aimed at creating a "sealant-free" container interior have resulted in a redesign of the interior and removal of visible sealant while maintaining the caulking properties. Another focus of constant care is the reduction of another critical bacteria growth and rust-prone area: the riveted joints. Redesign has resulted in more surfaces now devoid of visible rivets.

The inner scufflining makes the lining less prone to impacts and reduces the need for repair inside the reefer.



The connection between the lining and the scufflining is without visible sealant.

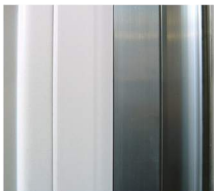


The intention is to make the reefer interior totally rivet and visible sealant free - just like your refrigerator at home.

Sealant free reefer interior

During the manufacturing process, sealants are needed for caulking purposes to ensure that water does not penetrate into the foam.

Mark Q design without visible sealant and rivets:



Jamb post without visible sealant

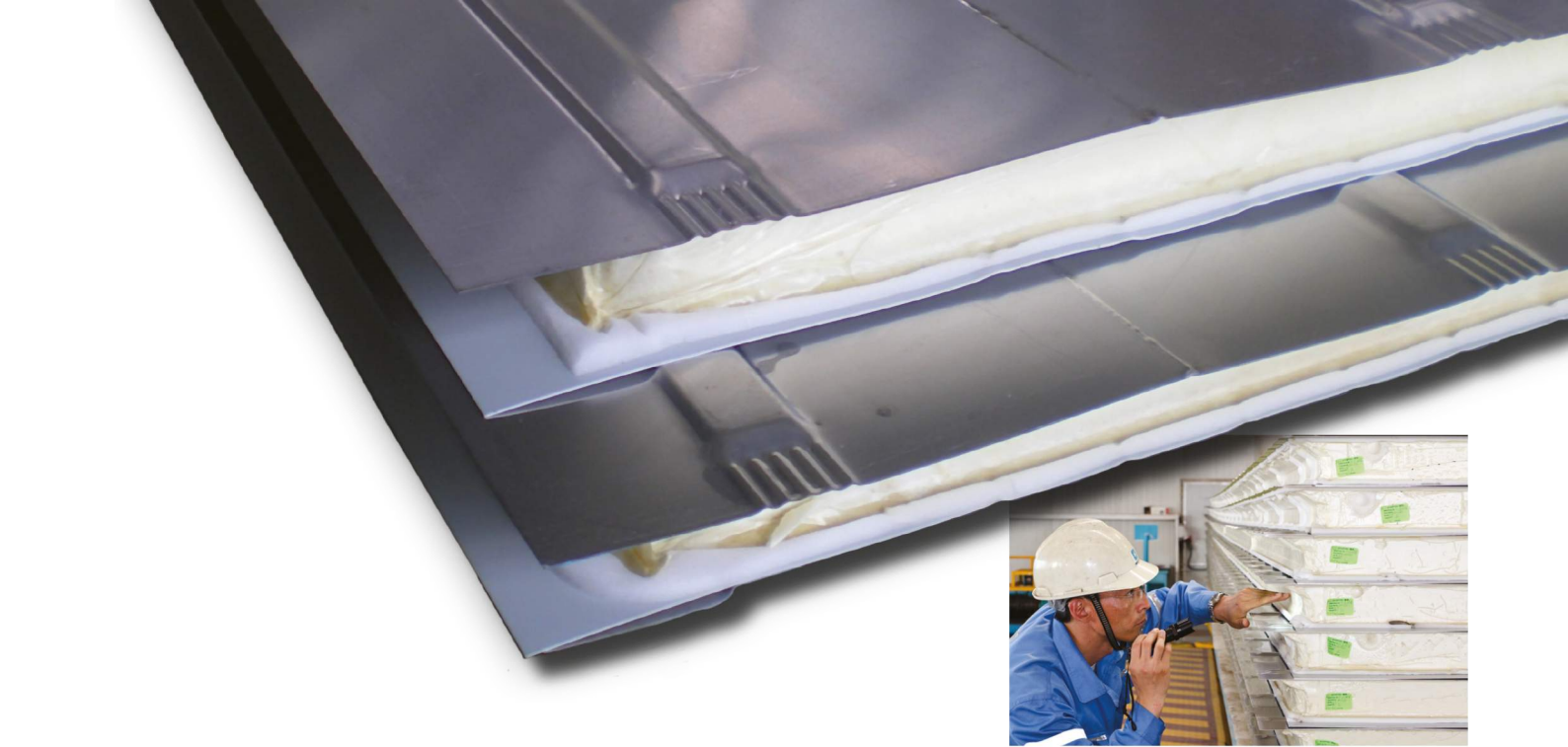


Rear sill header without rivets



No visible sealant inside the doors





SuPoTec® - environmentally friendly insulation

The Mark Q container is foamed using non-HCFC foam technology (SuPoTec®) making it the greenest container on the market, in compliance with all regulations governing foam cell gas.

SuPoTec® was originally developed by MCI in conjunction with research institutes and the polyurethane industry in 2002, ahead of the phase-out deadline in Europe.

The challenge

- the search for a viable alternative

Everytime you change foam cell gas, you risk losing insulation properties. If the insulation capability of the container deteriorates, the reefer machine must work extra hard to maintain the temperature. This will be detrimental to the goals of the substitute:

- A performance similar to that of HCFC 141b
- With zero Ozone Depletion Potential (ODP) and minimal Global Warming Potential (GWP)

The suitable alternatives have some drawbacks:

- CO₂ (water) significant lower insulation properties
- HFC blends – costly, higher GWP
- HC (hydrocarbons like Cyclopentane) - reduced insulation properties

MCI's patented solution improves the thermal result of the traditional Cyclopentane method. We call it: SuPoTec® (Sustainable Polyurethane Technology).

	HCFC-141b	SuPoTec®	HFC 227/245/365	CO ₂
Ozone Depletion Potential ¹⁾	0.11	0	0	0
Global Warming Potential (GWP) ²⁾ (KG CO ₂)	725	<25	950	1

¹⁾ Ozone Depletion Potential of a chemical compound is the relative amount of degradation to the ozone layer it can cause, with trichlorofluoromethane (R-11 or CFC-11) being fixed at an ODP of 1.0.

²⁾ Global Warming Potential (GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale which compares the gas in question to that of same mass of carbon dioxide (whose GWP is by definition 1).

With SuPoTec® we all avoid the detrimental impact on the ozone layer of traditional blowing agents while reducing future Global Warming Potential CO₂ emissions:

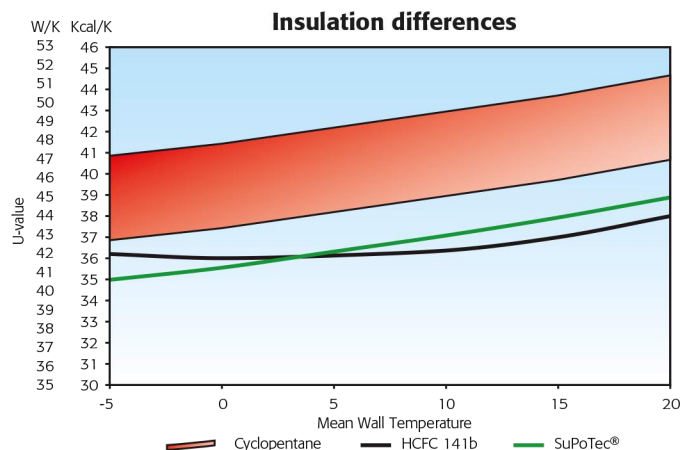
- A 40' HC Reefer container with HCFC 141b - has a GWP of approx. 27,400 kg CO₂
- A 40' HC Reefer container with SuPoTec® - has a GWP of approx. 250 kg CO₂

This means a reduction of CO₂ emissions during its lifetime of approx. 27 tonnes per 40'HC container purchased.

EU regulation - ozone depleting substances

EU regulations (EC 2037/2000 updated in 2009 by EC 1005/2009) ban the "placing on the market of products and equipment containing controlled substances". Therefore, import of reefers manufactured after 2004 using HCFC 141b is not permitted in the EU - that includes sale into secondary use to markets in Europe.

The graph illustrates the difference in heat loss through a reefer wall using foams blown with traditional Cyclopentane, SuPoTec® and HCFC141b. In real-life conditions the insulation power of SuPoTec® and HCFC141b foams is very similar, and way ahead of the insulation power of traditional Cyclopentane solutions.



Mark Q - since 2007 and stronger than ever



The purchase price is only a fraction of the true cost of owning and operating a reefer.

Reducing the Total Cost of Ownership (TCO) for MCI containers involves many different aspects.

Your TCO will be reduced by choosing the Mark Q through:

- Higher re-sale value
- Damage resistance
- Less down-time
 - higher utilisation
- M&R costs kept to a minimum
- Superior cargo protection
- SuPoTec®

Dimensions						
	20'			40'HC		
	External	Internal	Door opening	External	Internal	Door opening
Length (mm)	6,058	5,451	-	12,192	11,585	-
Width (mm)	2,438	2,290	2,290	2,438	2,290	2,290
Height (mm)	2,591	2,263	2,252	2,896	2,545	2,557
Cargo access height	-	-	2,228	-	-	2,510
Internal cubic capacity	28.3 m ³			67.5 m ³		
Max gross weight	30,480 kg (67,200 lbs)			34,000 kg (74,960 lbs)*		
Tare weight	incl. Star Cool (390 kg) 2,890 kg (6,370 lbs) Integrated Star Cool 2,840 kg (6,260 lbs)			incl. Star Cool (390 kg) 4,490 kg (9,900 lbs) Integrated Star Cool 4,420 kg (9,740 lbs)		
Max. payload	27,600 kg (60,940 lbs)			29,510 kg (65,220 lbs)		
Stacking test load	102,375 kg (225,690 lbs)			102,375 kg (225,690 lbs)		
Heat leakage, U-value (U10)	24 W/K (21 kcal/hr. deg.C max.) Integrated SC 23 W/K (20 kcal/hr. deg.C max.)			43 W/K (37 kcal/hr. deg.C max.) Integrated SC 42 W/K (36 kcal/hr. deg. C max.)		
Air leakage	3.0 m ³ /h (at 25.4 mm H ₂ O)			3.0 m ³ /h (at 25.4 mm H ₂ O)		

*) MGW specs up to 38,500 kg available

Cladding				
	20'		40'HC	
	External	Internal	External	Internal
Side	MGSS 1.0/1.2 mm	HGSS 0.7 mm	MGSS 0.8/1.2 mm	HGSS 0.7 mm
Roof	MGSS 0.8 mm	P.P white Al. 0.8 mm	MGSS 0.8 mm	P.P white Al. 0.8 mm
Base	MGSS 0.8 mm	40 mm high Al. T-floor	MGSS 0.8 mm	63.5 mm high Al. T-floor
Door	MGSS 1.6 mm	HGSS 0.7 mm	MGSS 1.6 mm	HGSS 0.7 mm

Frames				
	20'		40'HC	
	External	Internal	External	Internal
Front corner posts	Outer corten 6.0 mm; Inner corten 2.0 mm		Outer corten 6.0 mm; Inner corten 2.0 mm	
Rear corner posts	Outer corten 6.0 mm; Inner corten 8.0 mm		Outer corten 6.0 mm; Inner corten 8.0 mm	
End rails	Corten 4.0 mm		Corten 4.0 mm	
Side top rail	Corten 4.0 mm		Corten 4.0 mm	
Side bottom rail	Corten 4.0/3.0 mm		Corten 4.0/3.0 mm	

Options

- Integrated reefer design
- Q Liner® thermoplastic lining
- Ultra light box design



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