NORAC

# PRODUCT MANUAL

The world's leading manufacturer and supplier
of marine interior systems



SHIP INTERIOR SYSTEMS

DESIGN • ENGINEERING • SUPPLY

# NORAC

## A LEADING SUPPLIER OF INTERIOR SYSTEMS

Norac is a leading supplier of interior systems for cruise ships, ferries, commercial vessels and offshore installations. Headquartered in Norway, the company manufactures and distributes fire-rated walls, ceiling systems, doors, prefabricated wet units, floating floors, windows and furniture, making Norac a "one-stop shop" for high-quality, afford-able interior systems for the maritime industry. Norac products are manufactured with only first-class materials in compliance with the most exacting rules and regulations and Norac's own strict quality control system.

MANUFACTURER & SUPPLIER OF

MARINE INTERIOR SYSTEMS

NORAC MARINE INTERIOR SYSTEMS

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*NOTE:*
*Norac reserves the right to make changes to the specifications without prior notice.*
*All drawings in this catalogue are illustrations and guidelines only.*



SHIP INTERIOR SYSTEMS

DESIGN • ENGINEERING • SUPPLY

# COMPANY HISTORY

Our company was established in a fast growing Norwegian Oil- and Offshore Market. Our founder, Fred Olsen & Co, was an initiator for the construction of semisubmersible drilling rigs and built offshore installations at Aker Vindholmen Ship Yard in Arendal, Norway. The need for fireproof panels cleared the path for establishing a factory for production of marine interior wall panels – Aker Panels.

**1973**

## ESTABLISHMENT

Aker Panel was established in 1973 and made the products and the brand name "Aker Panel" well known in the fast growing Norwegian offshore market. Since the early 1970s our panel systems were recognized as "Aker Panel", and by some it still is.

**1982**

## NEW NAME

In 1982 the company expanded under the new name Norwegian Accomodation Systems – NORAC. At that time our products were introduced to the international market as Norac Marine Interior Systems.

**1990**

## NEW MARKETS

As a consequence of the "Scandinavian Star" tragedy, new safety initiatives were taken, and Norac quickly became a leading supplier of interior systems for cruise ships, ferries and commercial vessels.

**1991**

## MEYER WERFT

Norac had the first large delivery of wall and ceiling panels to the Meyer Werft in Germany. This was the introduction to a long lasting co-operation very much thanks to our efficiency and logistics in supplying high quality parts and products on time.

# COMPANY HISTORY

Since the early 1990s Norac became the largest supplier of Marine Interior Systems for cruise and ferries, and the company has through the years supplied accommodation materials to more than 8000 ships worldwide.

**1995**

## TURNKEY DELIVERIES

Norac offers turnkey deliveries of complete interior systems including floating floors, wet units, carpets, furniture – even cutlery and sets if wanted.

**2001**

## CHINA

Norac established Norac Suzhou in China. The aim was to cover the Asian market.

**2006**

## ESTABLISHED UAB NORAC

When Norac established its fully-owned subsidiary UAB Norac in Lithuania in 2006, the business quickly grew into an efficient production company, which currently has approx. 400 employees.

**2015**

## EXPANDING

Norac has expanded into other industrial areas, but our core business is still Marine Interior Systems.

**2019**

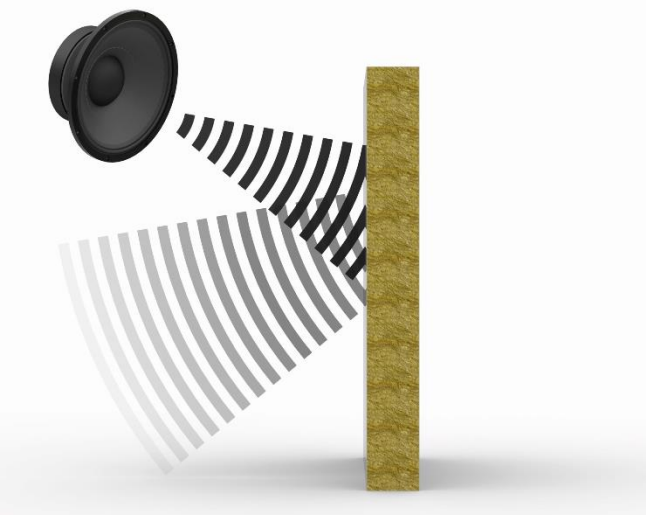
## CARBON MANAGEMENT

In 2019 Norac started assessing and compensating for emissions related to the organization and panel production.

# ACOUSTIC INSULATION

In the marine and offshore industry, the acoustics insulation properties of the interior systems are of high importance. The acoustic insulation standards on board, especially in passenger ships, are continuously rising. At Norac we are therefore working hard to be able to deliver products that can satisfy the high standards for acoustic insulation.

When we talk about acoustic insulation properties, we normally separate between sound absorption and sound reduction.

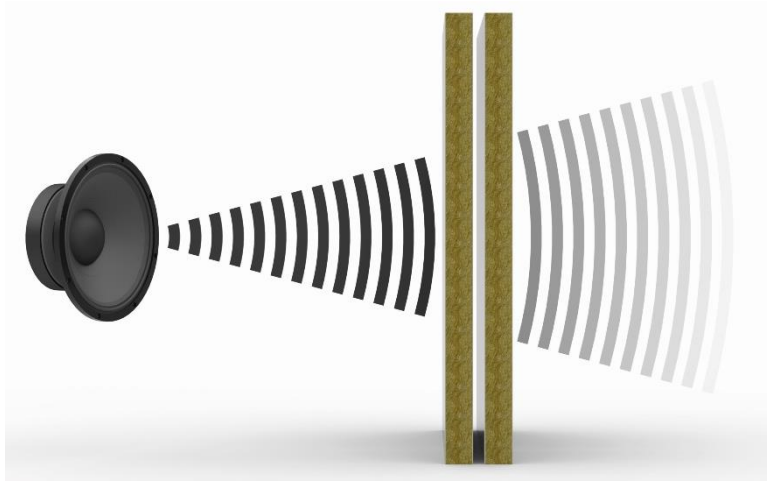


**Sound absorption:**
Sound absorption is a material property which describes how well sound waves are absorbed in a material, thereby preventing sound from bouncing around the room.

For acoustic insulation requirements, sound absorption is relevant when considering noise levels within the same space as the noise source. The ability of the walls, floor and ceiling of a room to absorb noise will be important in reducing noise reflected back from the surfaces into the room, creating echoes.

A material's sound absorbing properties are expressed by the sound absorption coefficient, α (alpha), as a function of the frequency. The alpha (α) ranges from 0 to 1.00, where 0 is total reflection and 1.00 is total absorption.

# ACOUSTIC INSULATION



**Sound reduction:**
When it comes to sound reduction, we talk about the reduction of sound through an element of construction (wall, floor, door, or ceiling). For acoustic insulation requirements, the sound reduction value is relevant when considering noise levels in a space separated form the noise source, for example between cabins.

The sound reduction for any construction will vary with the frequency of the sound source. Although the sound reduction for a construction is measured at various frequencies, an overall single value is used to express the sound reduction property. This value is called the "weighted sound reduction" or "sound transmission loss" value (Rw) and the unit of measure is decibel (dB). The higher sound transmission loss of a construction, the better it functions as a barrier to the passage of unwanted noise.

The method of measurement and analysis of sound absorption and sound transmission loss of Norac products are conducted at certified laboratories in accordance to the following standards:

- ISO 354:2005
- ISO 11654:1997
- ISO 10140-2:2011
- ISO 717-1:2013
- ISO 354:2005

# WALLS FIRE PROTECTION

The shipbuilding and offshore industries set very high requirements for safety on board. Products and construction to be used for fire protection must be tested for their fire resistance, in accordance with the rules and regulation set by the International Maritime Organization (IMO). Based on the approved test result, the Classification Institutes and National Marine Authorities grant the required approval.

IMO has developed a code for application of fire test procedures, called 2010 FTP Code. It provides the international requirements for laboratory testing, type-approval and fire test procedures for products referenced under SOLAS chapter II-2, which includes regulation on fire protection.

A part of the 2010 FTP Code describes the test procedures and performance criteria for "A" and "B" class divisions (IMO 2010 FTP Code part 3 of annex 1), which are applicable for Norac's fire-rated products. The products are tested at certified laboratories, where they are mounted to a furnace and exposed to heat on one side. The heat follows a given temperature curve, which will reach temperatures of 600 °C after only 5 minutes.

The test duration is 60 minutes for an "A" class division and 30 minutes for a "B" class division.

There are two main performance criteria for "A" and "B" class divisions, insulation and integrity.

# WALLS FIRE PROTECTION

**Integrity:**
For all "A" and "B" class divisions, including "A" and "B" doors, there should be no flaming on the unexposed side during the test duration. A cotton-wool pad can be used to assist the evaluation of flaming. It shall during the test period, be no openings in the division large enough for a gap gauge to be passed through the test specimen.

**Insulation:**
A test specimen is equipped with thermocouples measuring the temperature rise on the unexposed side. Both the average temperature rise, and the maximum temperature rise is measured. For both "A" and "B" class divisions, the average unexposed-face temperature rise shall not be more than 140 °C. The maximum temperature rise recorded by any of the individual unexposed-face thermocouples shall not be more than 180°C for "A" class divisions and 225 °C for "B" class divisions during the periods given below for each classification:

- A-0 class 00 min
- A-15 class 15 min
- A-30 class 30 min
- A-60 class 60 min
- B-0 class 00 min
- B-15 class 15 min

# CARBON FOOTPRINT


Over the past two decades the effects of climate change have accelerated. Considerable evidence exists proving climate change has been exacerbated by human activity. Changes in our post-industrial lifestyles have altered the chemical composition of the atmosphere, generating a build-up of greenhouse gases – primarily carbon dioxide, methane, and nitrous oxide levels – raising the average global temperature.

The consequences of inaction will be disastrous. Sea level will continue to rise and local climate conditions to be altered causing an increase in extreme weather events, affecting forests, crop yields, and water supplies. It will also affect human health, accelerate species extinction, and disrupt many ecosystems.

Climate Change is a global threat which will impact the lives of everyone on the planet. Hence, it is vital that all individuals, businesses, organizations and governments work towards the common goal of reducing greenhouse gas emissions.

We have therefore adopted a comprehensive approach to addressing our climate impact and taking care of our carbon footprint.

This means:

- Assessing our organizational emissions and the product footprint of our panels through a transparent and comprehensive Life Cycle Analysis (LCA) from cradle-to-gate. This includes the process from the extraction and processing of virgin raw materials, the production, packaging, the transport of these components to our factory and product distribution.
- Reducing our own carbon footprint through efficiency measures and reviewing our whole production process.
- Compensating emissions by planting Mangrove trees in collaboration with the Thor Heyerdahl climate park in Myanmar.

# OUR PRODUCTS

# WALL SYSTEMS

Norac's wall systems are designed to meet the following criteria: quality, flexibility, fire, sound, weight and ease of installation. Based on new requirements for improved acoustic insulation, Norac has developed a series of acoustic walls, which offer documented sound reduction properties of up to 54 dB RW.

# WALLS
# CONTENTS

# WALLS K-600

K-600 is designed with integrated joint profiles for rapid installation, leaving a flush surface with single seam joints. Available in standard or modular system.

Approved B-15 available for several wall types.

The system have been shock tested. More information available on request.

K-panels are also available in aluminium construction in B-15 with considerable weight savings.

See technical descriptions below.


All **weights** are based on system weight, including all profiles

| DESCRIPTION | K-600 / 50 | K-600 / 100 | K-600 / 25 | A-585 / 50** | A-585/25* |
|---|---|---|---|---|---|
| Fire class | B-15 | B-30 | B-15 | B-15 | C |
| Standard width | 600 mm | 600 mm | 600 mm | 585 mm | 600 mm |
| Module length | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm |
| Thickness | 50 mm | 100 mm | 25 mm | 50 mm | 25 mm |
| Weight | 19.2 kg/m² | 25.2 kg/m² | 13.8 kg/m² | 12.3 kg/m² | 11,7 kg/m² |
| Sound reduction | Rw=32 dB | NA | Rw=27 dB | Rw=24 dB | NA |
| Thermal isolation | U=0.65 W/m² K | U=0.34 W/m² K | U=1.16 W/m² K | U=0.65 W/m² K | U=1,16 W/m² K |
| Application | Partition and Lining | Partition | Partition and Lining | Partition and Lining | Lining |

* Alu/Steel ** Alu/Alu.

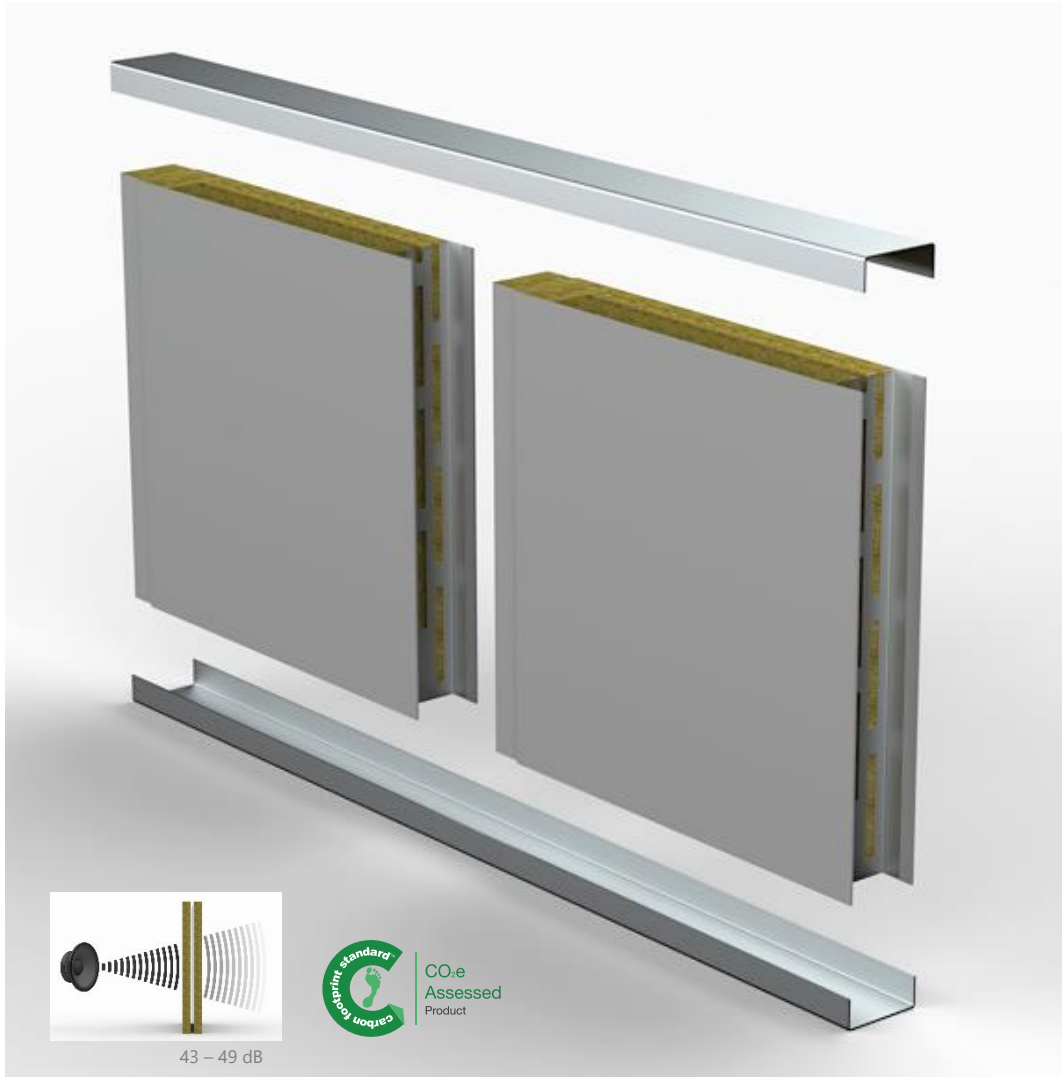
# WALLS Q-600 / CF-600

Q-600 is acoustic wall system of sandwich construction with an excellent sound reduction quality.

Q-600 is a rigid system with integrated joint profiles which allows for easy and rapid installation.

Flush surface with single seam joints. Available as a modular system.
50 mm panels available with vertical cable ducts in B-15.

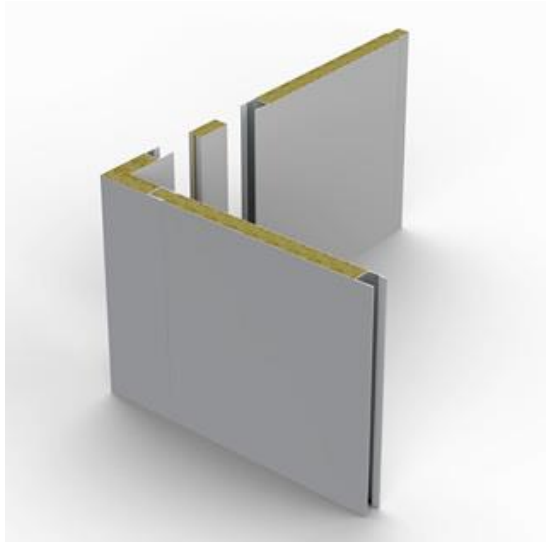
70 mm panels have the possibility to draw cables horizontal and vertical.



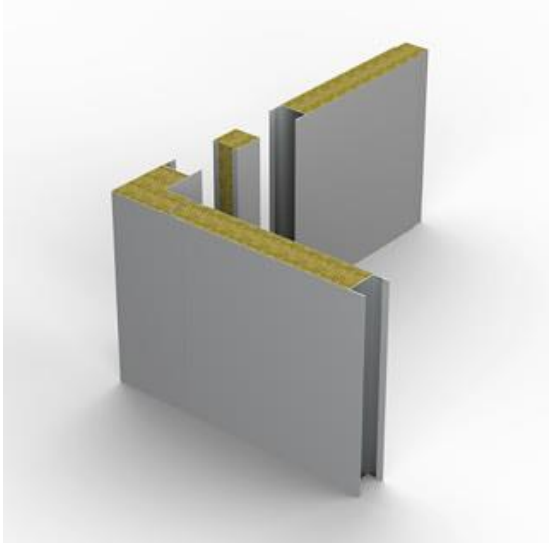

All **weights** are based on system weight, including all profiles

| DESCRIPTION | Q-600 / 50, 43 dB | Q-600 / 50, 46 dB | Q-600 / 70 | CF-600 / 50 | CF-600 / 70 |
|---|---|---|---|---|---|
| Fire class | B-15 | B-15 | B-15 | B-15 | B-15 |
| Standard width | 600 mm | 600 mm | 600 mm | 600 mm | 600 mm |
| Module length | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm |
| Thickness | 50 mm | 50 mm | 70 mm | 50 mm | 70 mm |
| Weight | 19.8 kg/m² | 21.4 kg/m² | 19.98 kg/m² | 25.8 kg/m² | 26.2 kg/m² |
| Sound reduction | Rw=43 dB | Rw=46 dB | Rw=45 dB | Rw=47 dB | Rw=49 dB |
| Thermal isolation | U=0.64 W/m² K | U=0.64 W/m² K | U=0.64 W/m² K | U=0.64 W/m² K | U=0.64 W/m² K |
| Application | Partition | Partition | Partition | Partition | Partition |

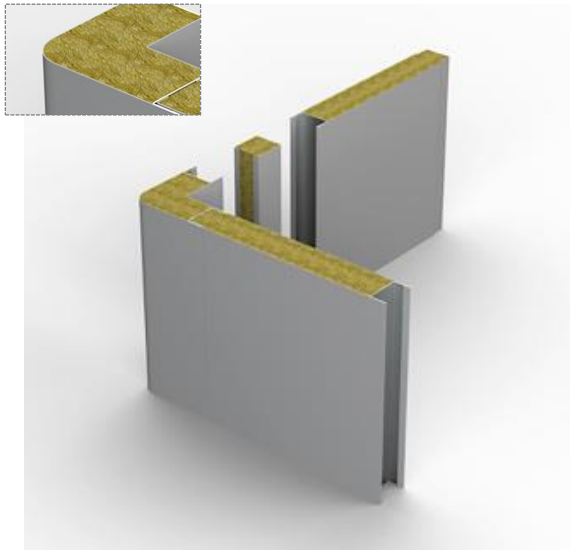
# WALLS K / CONNECTING DETAILS



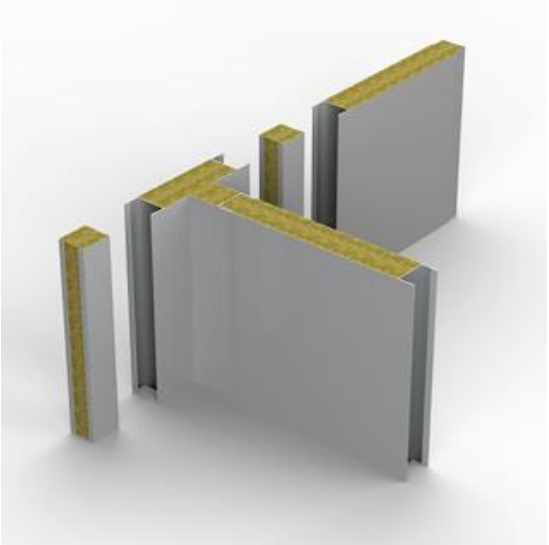
Flush corner connection with stud 25 mm



Flush corner connection with stud 50 mm



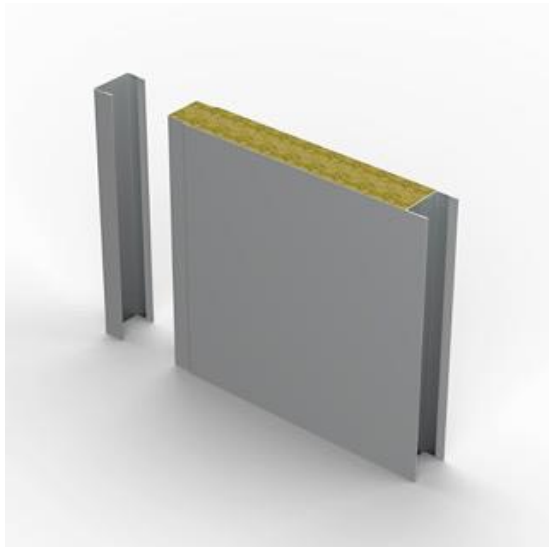
Rounded corner with stud



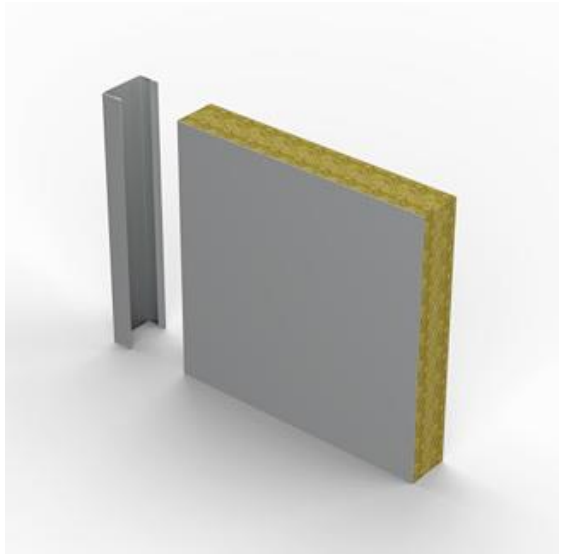
Flush T-connection with panels and studs

NOTE: Norac systems are delivered with a wide variety of connecting elements/profiles to obtain the best solutions. Corners may be delivered in stainless steel finish.

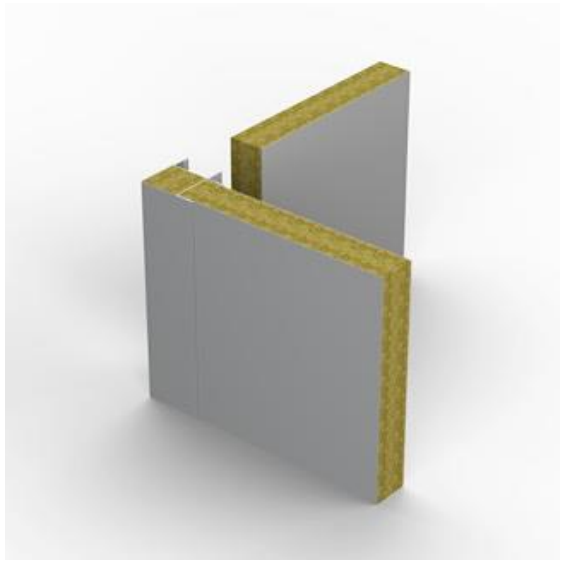
# WALLS K / CONNECTING DETAILS



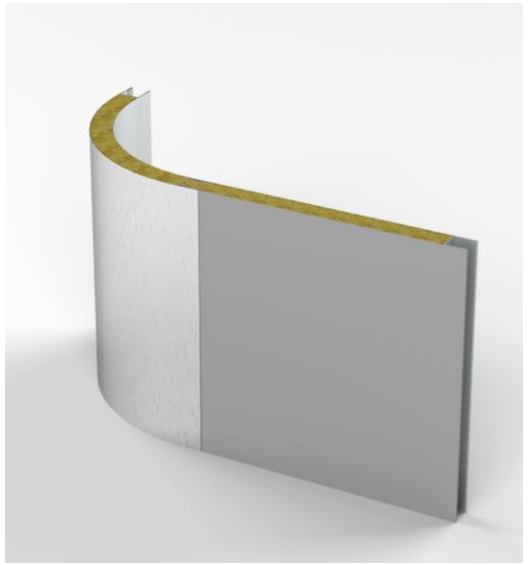
Flush U-profile



Profile for cut mounting



Corner for cut mounting



Rounded corner

NOTE: Norac systems are delivered with a wide variety of connecting elements/profiles to obtain the best solutions. Corners may be delivered in stainless steel finish.

# WALLS C-600 / CS-600

C-600 is an acoustic double wall system with two independent wall elements installed in the same profile system.

Available as standard or modular system.

Allows installation of electrical cables before completing assembly (in 70 mm version).

The wall elements are special stiffened and approved according to High Speed Code (HSC) for 30 minutes non-load bearing.

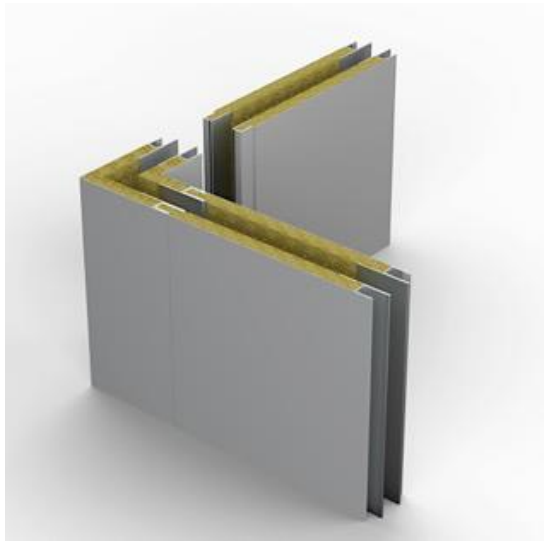

45 – 49 dB

All **weights** are based on system weight, including all profiles

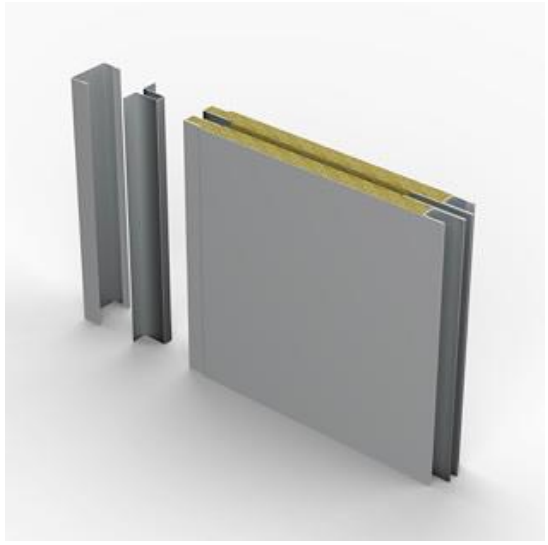
| DESCRIPTION | C-600 / 20 | C-600 / 50 | C-600 / 70 | CS-600 / 50 | CS-600 / 70 |
|---|---|---|---|---|---|
| Fire class | C-class | B-15 | B-15 | B-15 | B-15 |
| Standard width | 600 mm | 600 mm | 600 mm | 600 mm | 600 mm |
| Module length | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm | up to 3000 mm |
| Thickness | 20 mm | 50 mm | 70 mm | 50 mm | 70 mm |
| Weight | 12.4 kg/**m²** | 27 kg/**m²** | 27.2 kg/**m²** | 33.2 kg/**m²** | 33.4 kg/**m²** |
| Sound reduction | Rw=N/A | Rw=45 dB | Rw=46 dB | Rw=48 dB | Rw=49 dB |
| Thermal isolation | U=1.18 W/m² K | U=0.59 W/m² K | U=0.69 W/m² K | U=0.72 W/m² K | U=0.69 W/m² K |
| Application | Lining | Double wall | Double wall | Double wall | Double wall |

# WALLS C / CONNECTING DETAILS

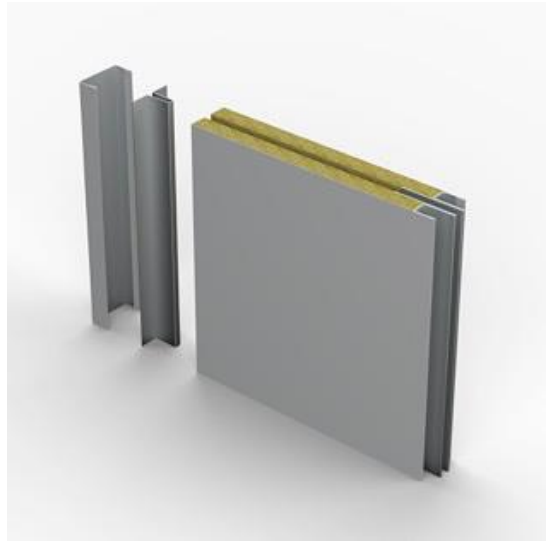
Flush corner connection C-600 / 50 panel system



Flush corner connection C-600 / 70 panel system



U-profile connection flush mounted



U-profile connection cut mounted

NOTE:
Norac systems are delivered with a wide variety of connecting elements/profiles to obtain the best solutions.
Corners may be delivered in stainless steel finish.

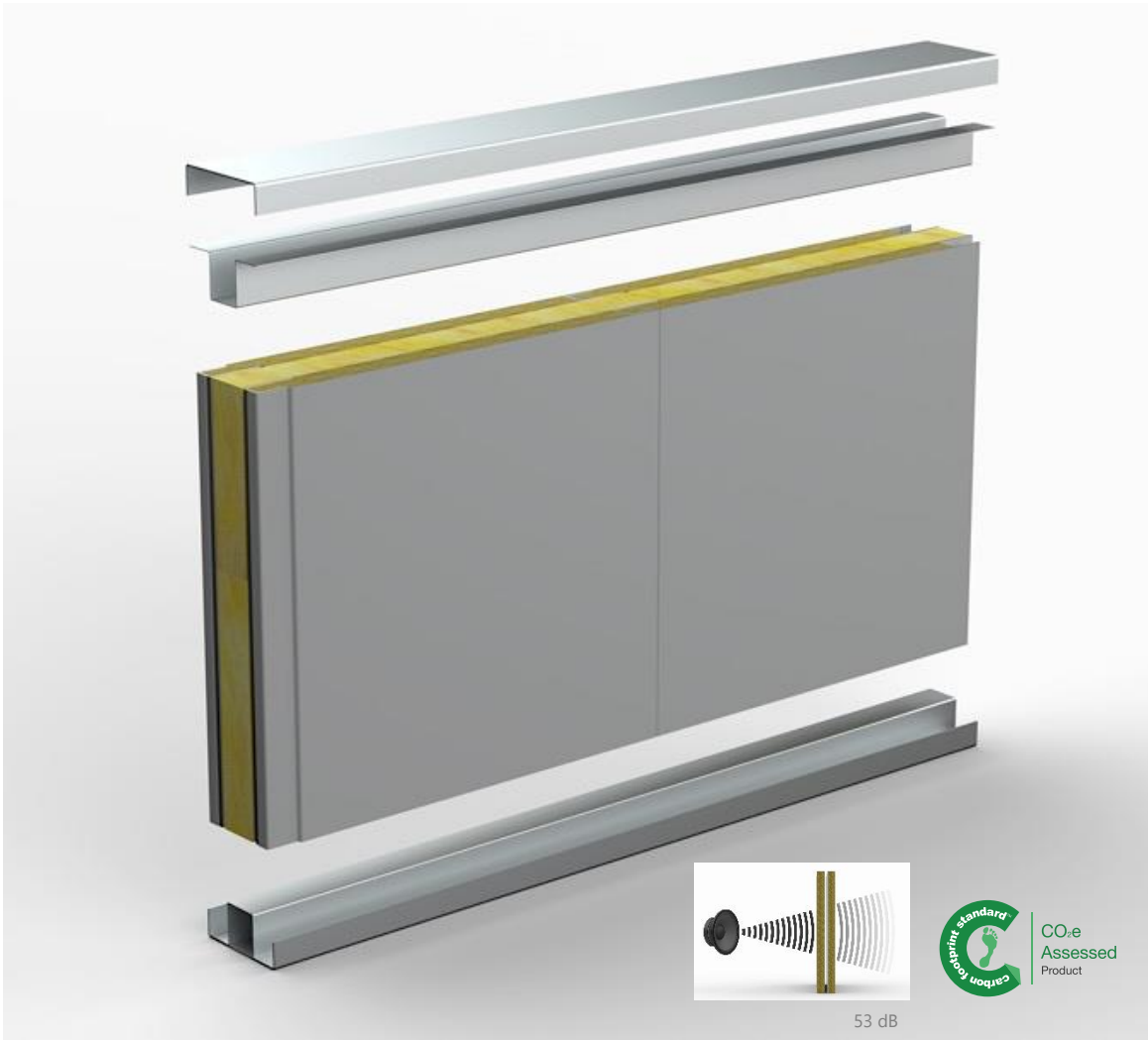
# WALLS CSG-600 / 70

The use of additional insulation between the two panels of a CS-600/70 wall improves the sound reduction by an amazing 4dB compared to the CS system
on page 15.

Note that building thickness is not more than 70 mm.

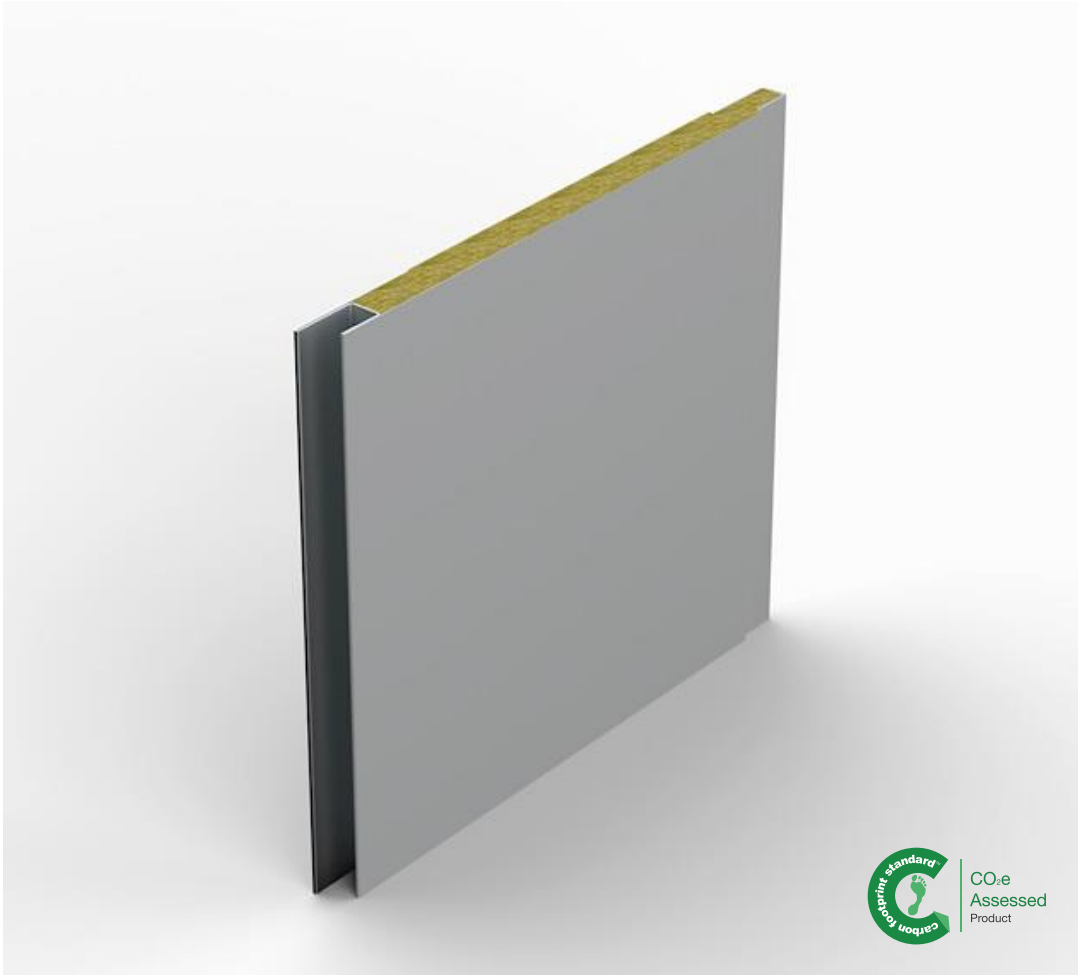
All **weights** are based on system weight, including all profiles

| DESCRIPTION | CSG-600 / 70 |
|---|---|
| Fire class | B-15 |
| Standard width | 600 mm |
| Module length | up to 3000 mm |
| Thickness | 70 mm |
| Weight | 34.4 kg/**m²** |
| Sound reduction | Rw=53 dB |
| Thermal isolation | U=0.64 W/m² K |
| Application | Partition |



# WALLS ADDITIONAL PANEL CONCEPT

Additional panel concept for installation on existing walls. Ideal for refurbishing purposes, and where a better sound reduction between cabins is required.
Thickness 20 mm only.




All **weights** are based on system weight, including all profiles

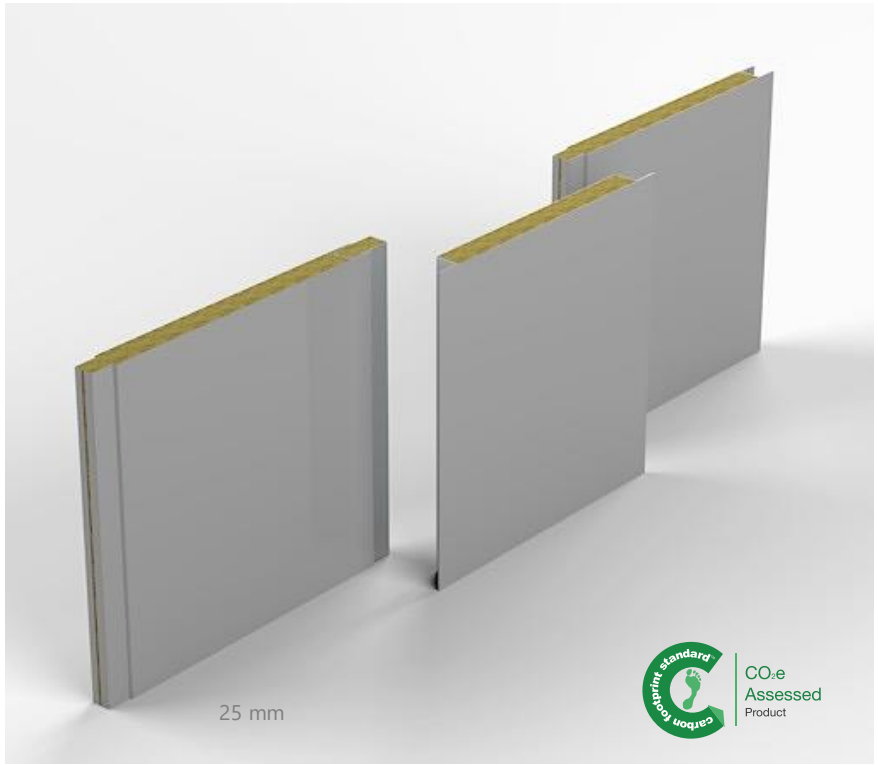
| DESCRIPTION | C-600 / 20 |
|---|---|
| Fire class | C-class |
| Standard width | 600 mm |
| Module length | up to 3000 mm |
| Thickness | 20 mm |
| Weight | 12.4 kg/m² |
| Sound reduction * | 42 up to 51 dB |
| Thermal insulation ** | U=1.18 W/m² K |
| Application | Lining |

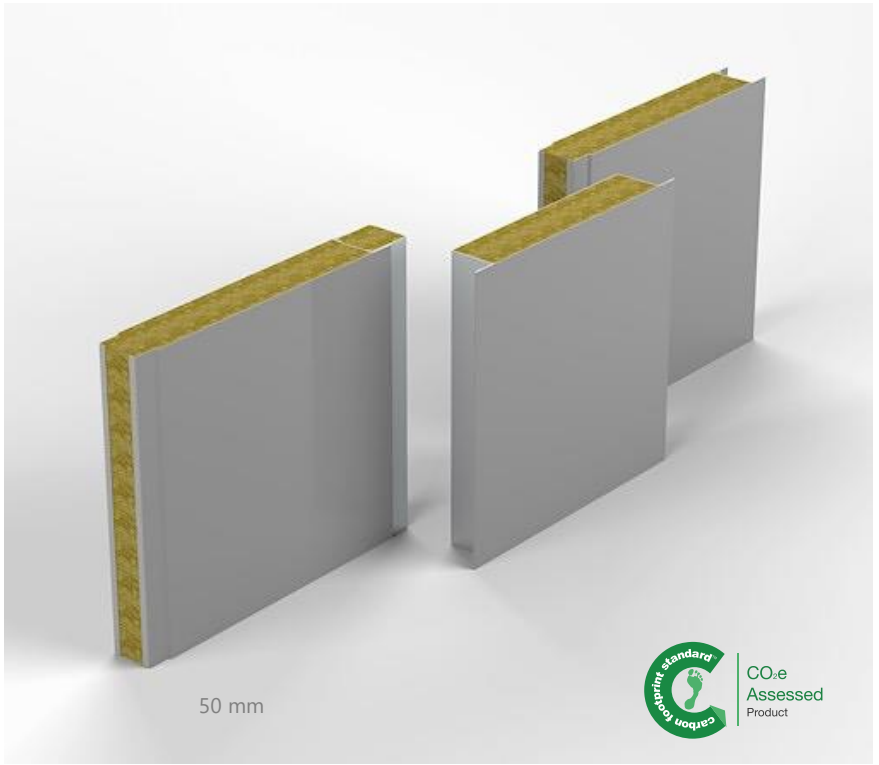
* Achieved as additional insulation on 28 dB wall

** Depends on existing wall

# WALLS REMOVABLE PANELS

To be used where access is required.
C-class.

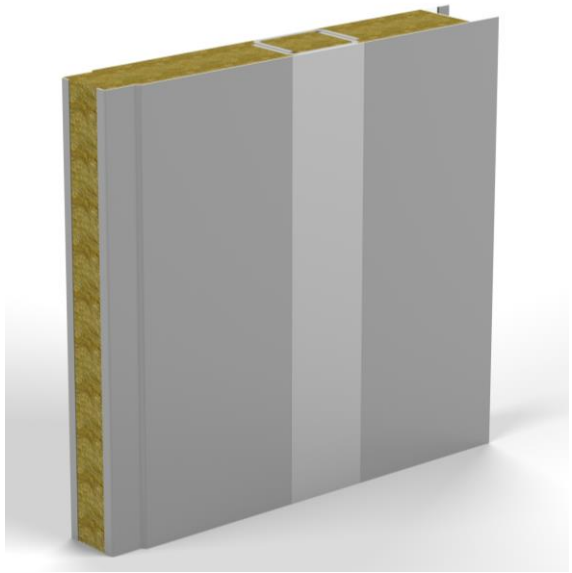


# WALLS REINFORCEMENT

Built in reinforcements to accommodate heavy wall hung equipment, such as wash basins, TV-brackets, pullman beds etc can be delivered upon request. Various solutions available.

Special reinforcement for Pullman beds, single or double



Standard reinforcement for other wall hung equipment

# WALLS LOADBEARING CAPACITY

STRENGTH OF HAND RAILS ATTACHED TO WALL PANELS

The tongue and groove system allow fixing of heavy objects to the wall without special reinforcement.

Both K-600/25 mm and K-600/50 mm are qualified according to the SOLAS regulation:
*"Strength test for B-class panels to which handrails are attached on RO-RO passenger ships".*

The result can be transferred to other Norac panel types. The full report is available on request.

GENERAL STRENGTH PROPERTIES

Norac have performed several series of other tests on strength properties. More information is available on request.

The below fixing methods and specifications will not impair the fire integrity of the panel types subject to the delivery.

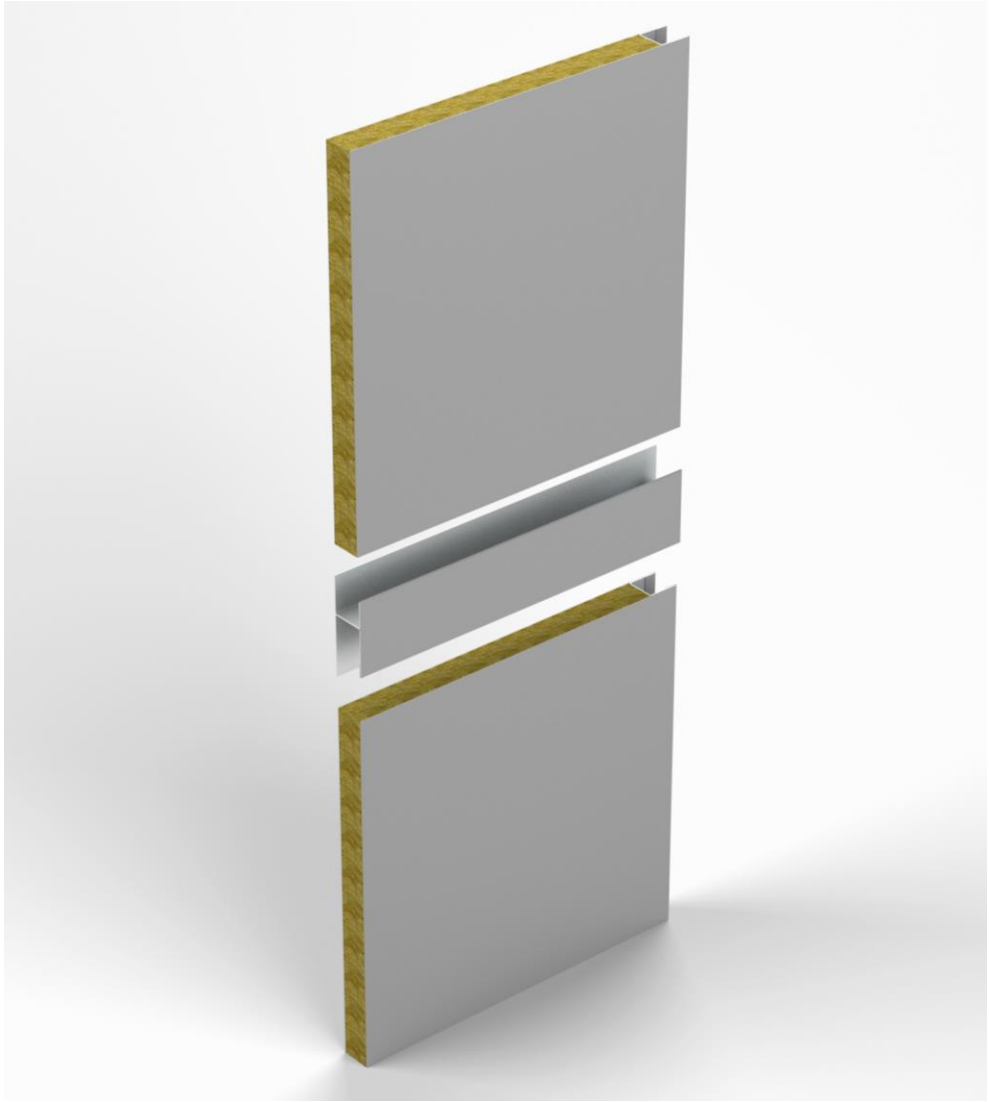
| ATTACHMENT WEIGHT (MAX PER PANEL PER FACE) [KG] | EQ TO BE INSTALLED BY... | FIXING METHOD | FIXING ITEMS AND DRIL HOLES |
|---|---|---|---|
| W < 20<br>CoG of EQ < 150 mm<br>From wall surface | Mechanically attached directly to the wall without reinforcement. | Fix with screws with bonded washer.<br>Min. 4 screws separated from each other by minimum 250 mm. | **On face sheet:**<br>Drill Holes = 3.0 mm<br>Screw size = D5x30 and Fisher A5 dowels<br><br>**On vertical joints:**<br>Drill holes = 2.7 mm<br>Screw size = D5x30 |
| 20 ≤ W ≤ 80<br>CoG of EQ < 150 mm<br>From wall surface | Mechanically attach directly to reinforced wall.<br>Reinforcement to be provided to the wall by NORAC.<br>Wall elevation with EQ location to be issued to NORAC | Fix with screws with bonded washer.<br>Min. 4 screws separated from each other by minimum 250 mm. | **On face sheet:**<br>Drill Holes = 3.0 mm<br>Screw size = D5x30 and Fisher A5 dowels<br><br>**On vertical joints:**<br>Drill holes =2.7 mm |
| W > 80 | Item should not be attached to the wall.<br>Separate stand to be provided. | TBD item by item | TBD item by item |

Equipment attached to B-rated wall

# WALLS HORIZONTAL JOINT

For areas where ceiling height exceeds 3000 mm.
Used for linings only.

Connection to steel bulkhead is yard's supply.

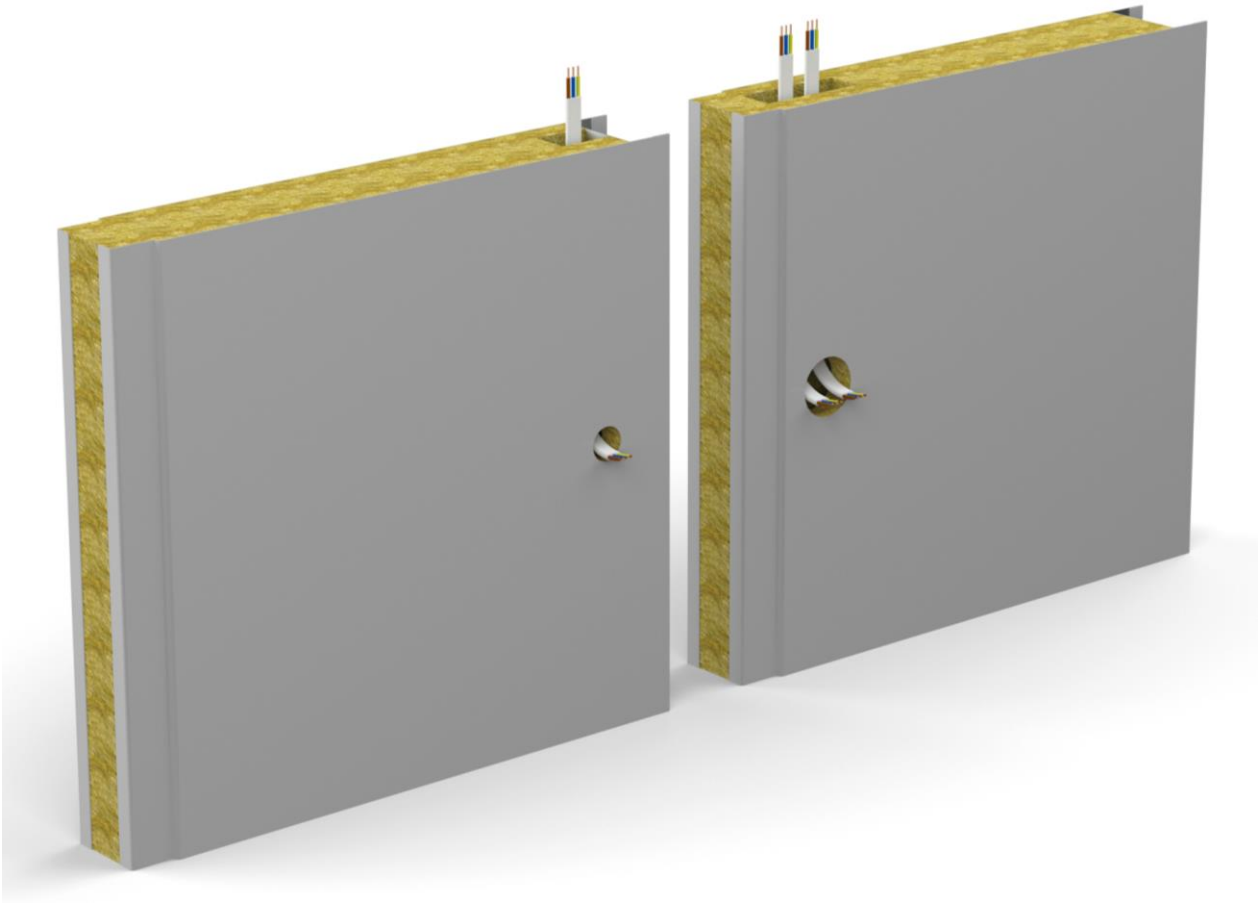


# WALLS CABLE DUCTING

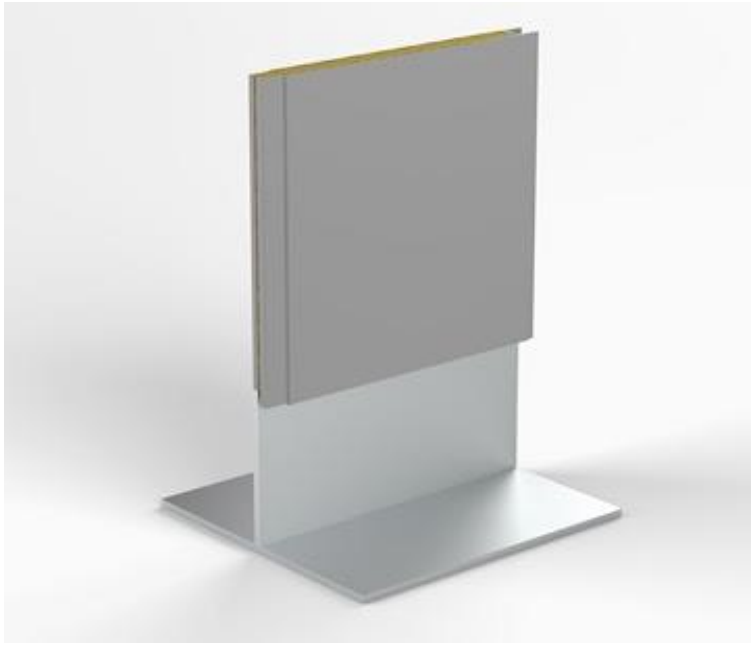
Pre-arranged duct and cut-outs for cables and sockets can be delivered upon request. Tested with up to 10 ducts per 600 mm panel as B-15 class.

**Standard size of conduit:**

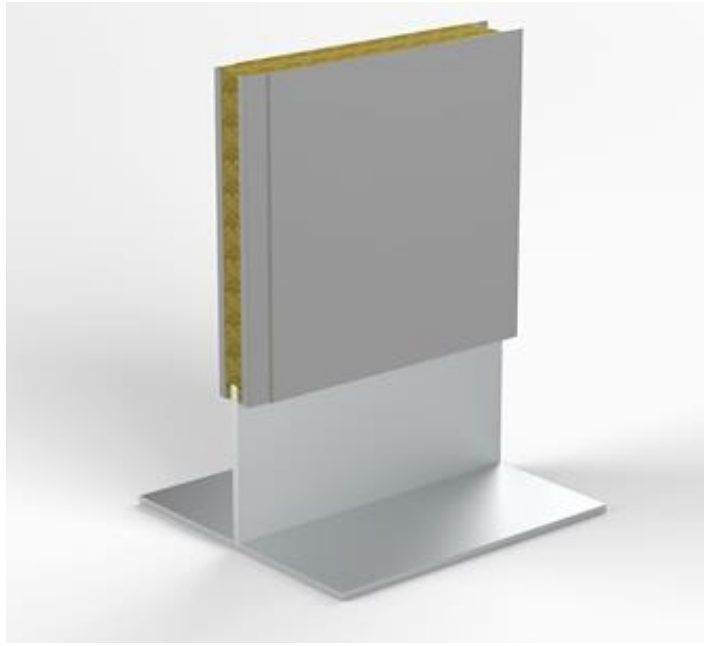
- Single 20x30 mm
- Double 20x60 mm



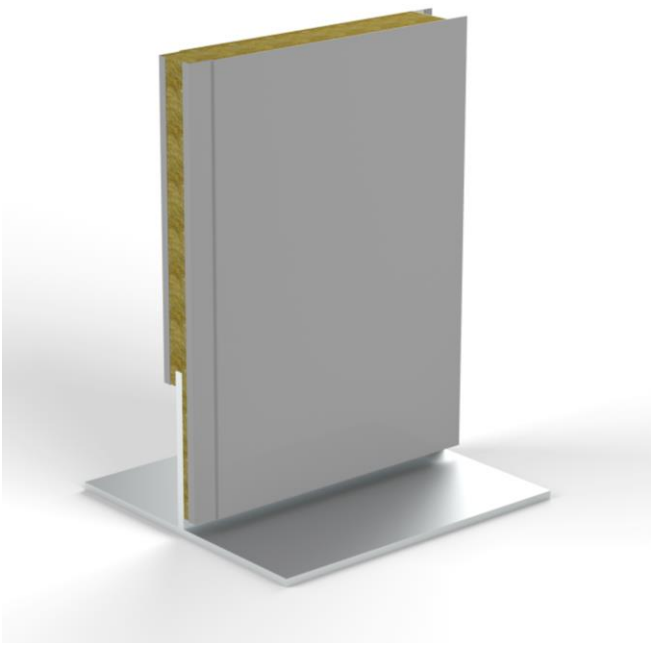
# WALLS PANELS FOR WET SPACES



Detail for wet room – 25 mm lining only



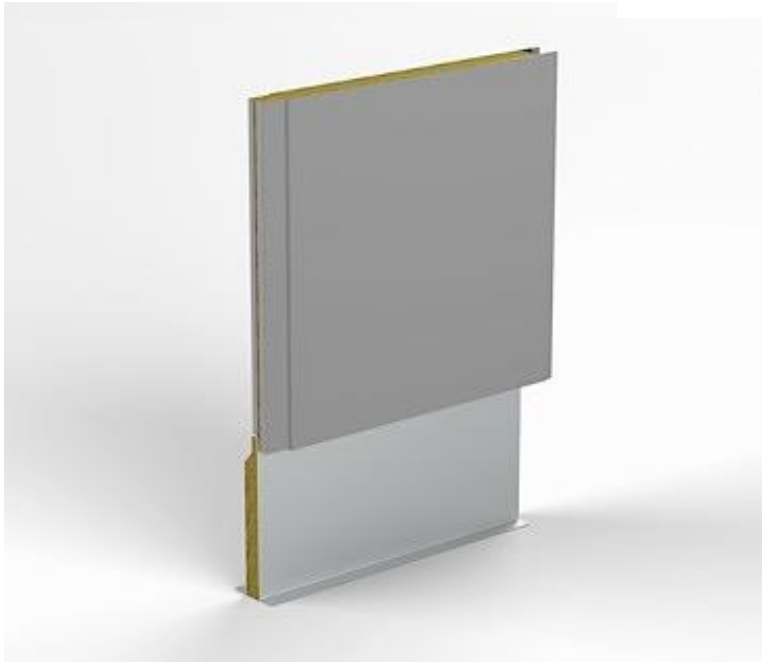
50 mm panels with symmetric finish



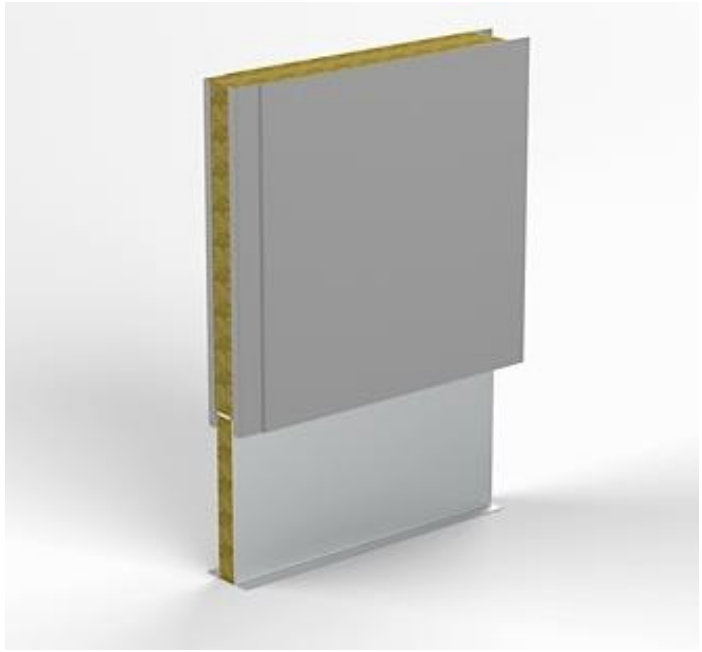
50 mm panels with asymmetric finish

Mounted on flat bar supplied by yard. Standard thickness of flat bar 8 mm.

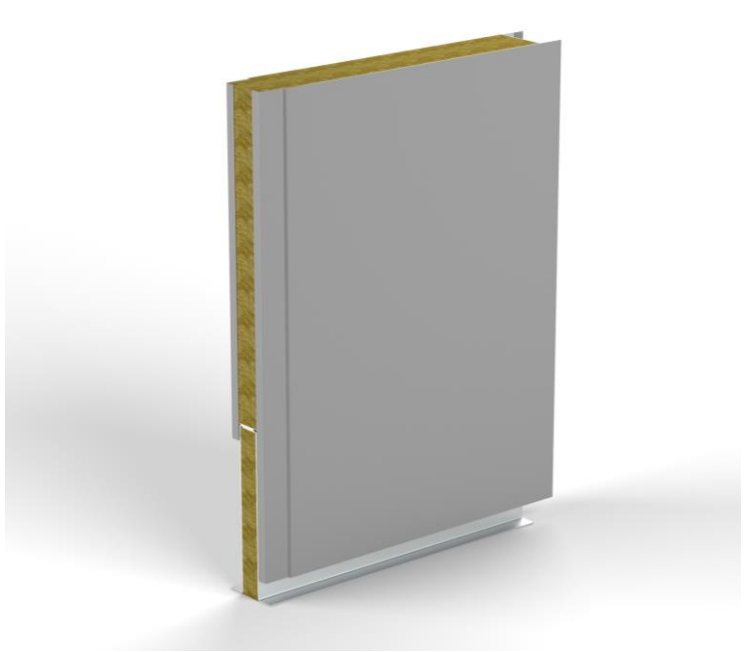
# WALLS WET COAMING



Coaming for 25 mm wet panel



Coaming for 50 mm panels wet / wet



Coaming for 50 mm panels wet / dry (asymmetric)

A specially designed wet coaming used on top of floating floors in wet areas. The coaming is a fully insulated galvanized steel profile. It is secured to the floor with self tapping screws or rivets. Height of coaming according to customer request. Can be delivered in galvanized steel and stainless steel.

# WALLS INSPECTION DOORS AND HATCHES

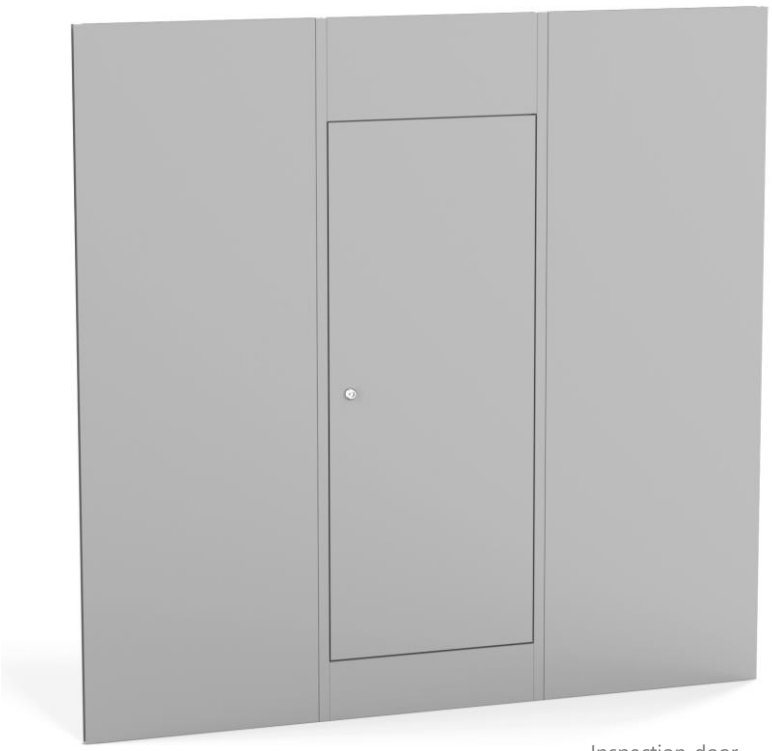
For quick access to technical spaces such as pipe connection, electrical boxes etc.

The surface is normally the same as the wall to give a discreet finish.

Square key-lock or handle is optional.

| DESCRIPTION | INSPECTION DOORS | WALL HATCH |
|---|---|---|
| Fire class | B-15 | B-15 |
| Surface | PVC, paint, stainless steel | PVC, paint, stainless steel |
| Core material | Rockwool | Rockwool |
| Max clear opening | 900 x 1850 mm | 500 x 1500 mm |
| Thickness | 20 mm | 20 mm |
| Weight | 19 kg/m$^2$-approx | 19 kg/m$^2$-approx |
| Lock | 3-point square lock* | 3-point square lock |

Inspection hatch

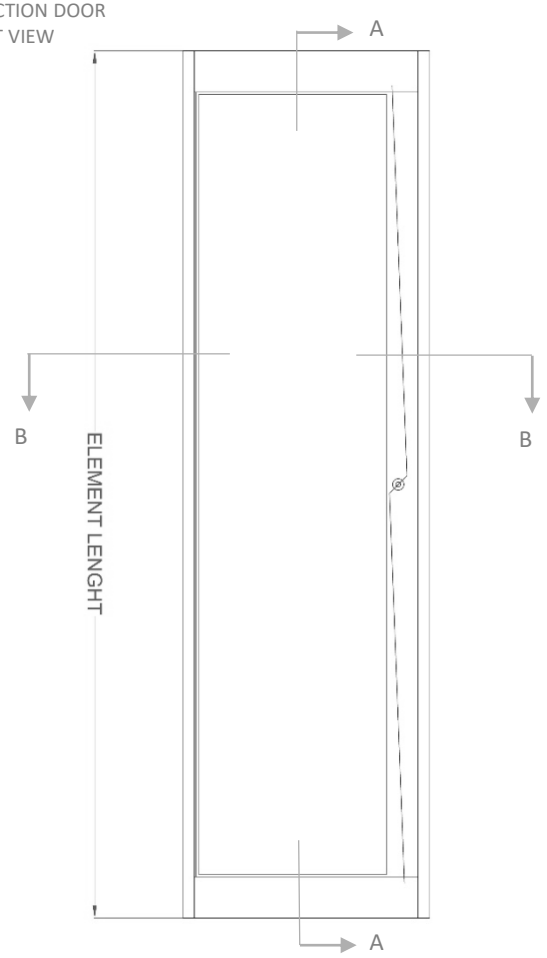


Inspection door

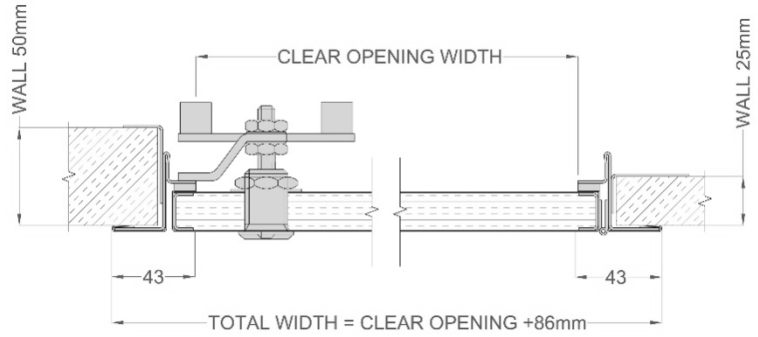
* Can be delivered also in triangle lock and recessed ring handle

# WALLS INSPECTION DOOR / TECHNICAL DETAILS

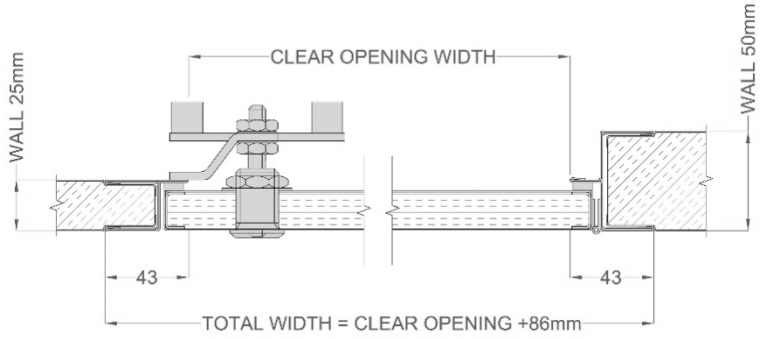
INSPECTION DOOR
FRONT VIEW



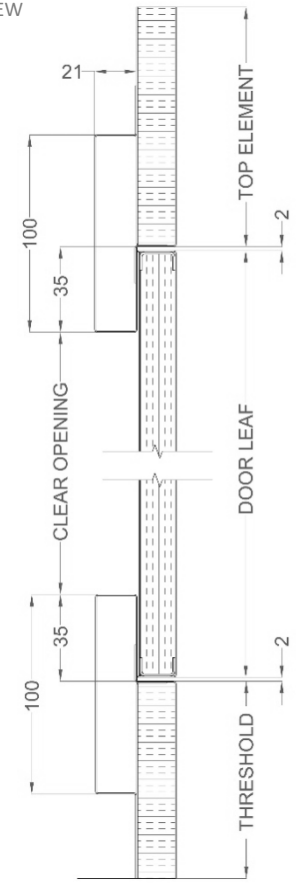

SECTION B - B INSPECTION DOOR CUT OUT




SECTION B – B INSPECTION DOOR FLUSH MOUNTED

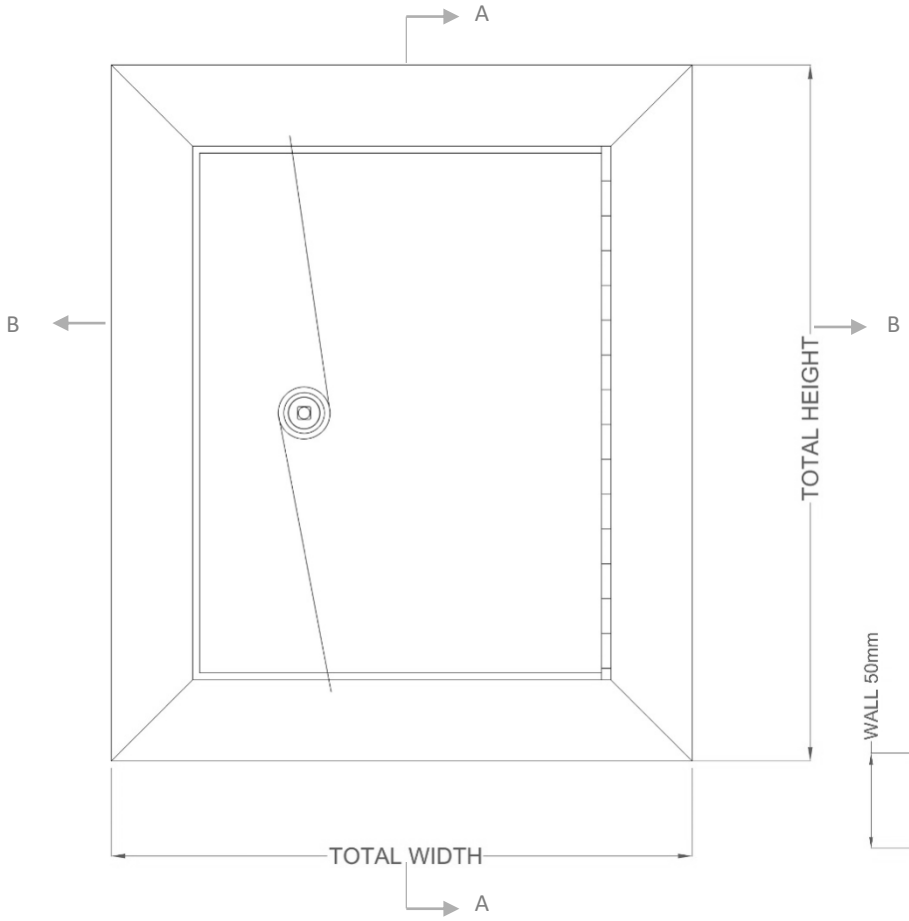



SECTION A - A
INSPECTION DOOR SIDE VIEW

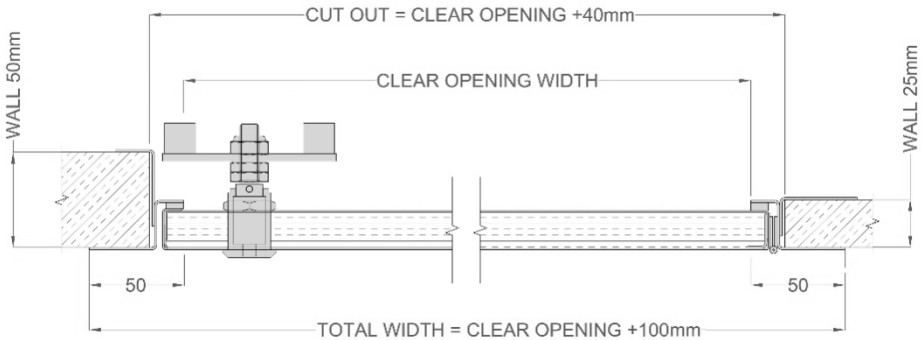



SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

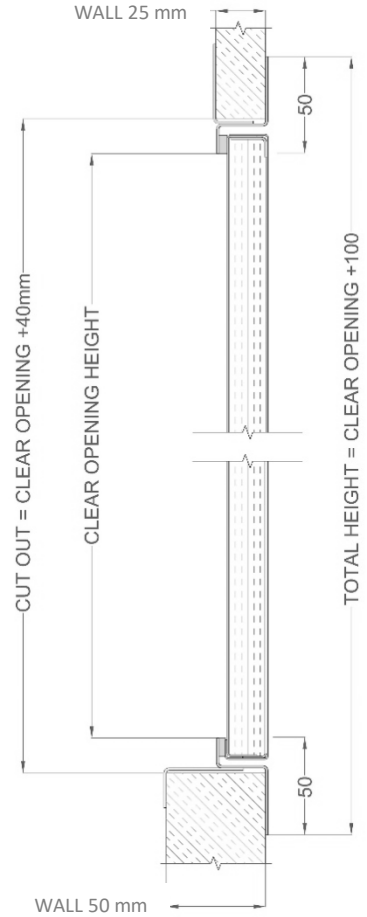
# WALLS INSPECTION HATCH / TECHNICAL DETAILS




SECTION B – B HATCH TOP VIEW



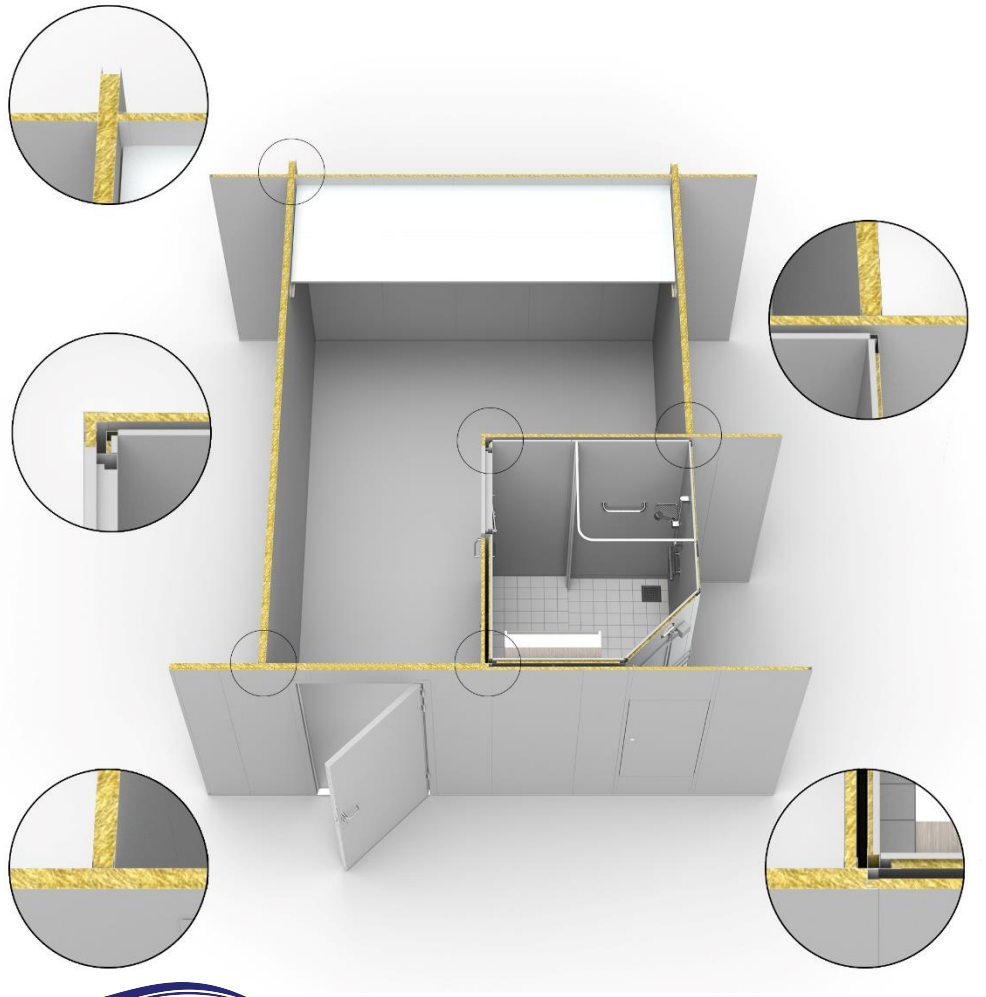

SECTION A – A HATCH SIDE VIEW



# WALLS EXAMPLE OF STANDARD SYSTEM

A standard system is a flexible system allowing adjustments onboard the vessel during construction. The panels are delivered In one standard size and are cut to fit according to the on site measurements with use of standard profiles.

Profiles are designed to leave as few visible screws/rivets as possible.

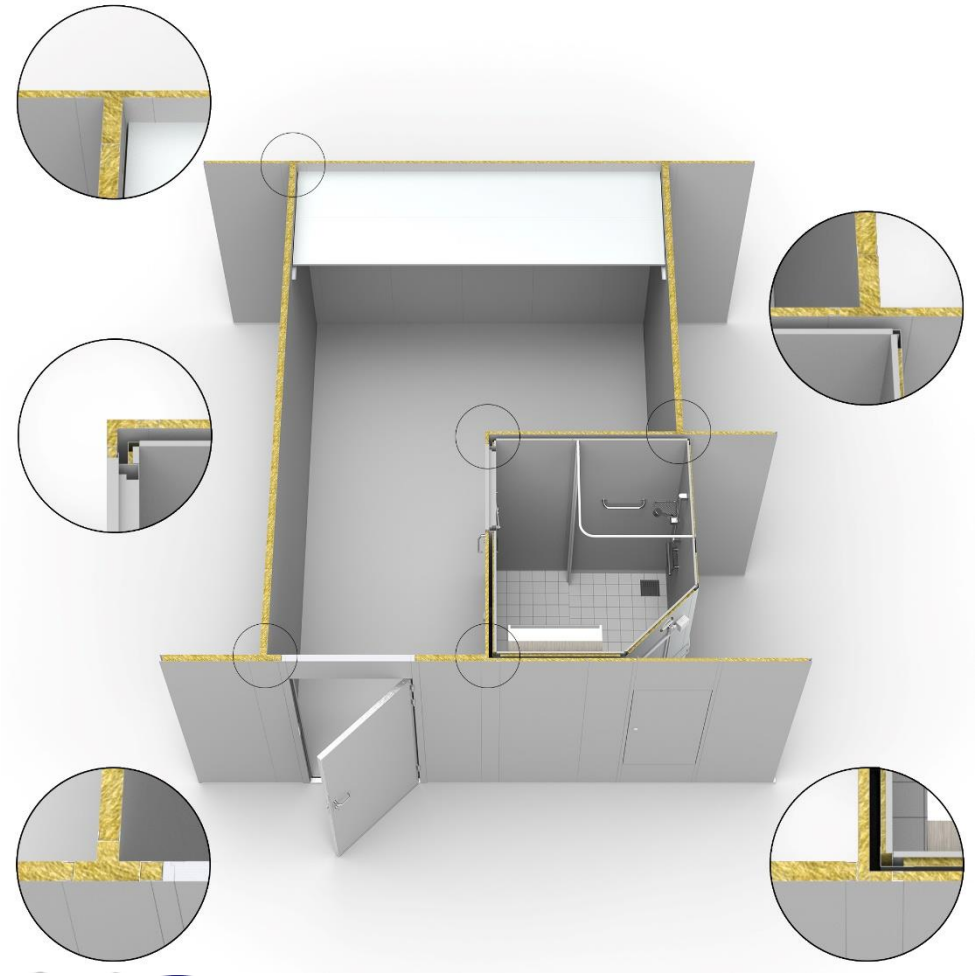


# WALLS EXAMPLE OF MODULAR SYSTEM

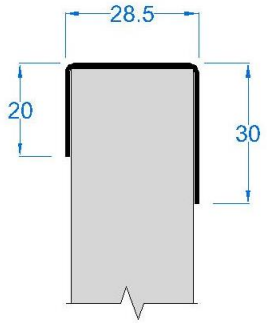
A modular system is a fully tailor-made system to avoid adjustments and cutting onboard vessels. These systems reduce the installation time for the yard and more importantly reduces costs.

A modular system leaves a smooth finish with no external profiles, no visible screws/rivets.

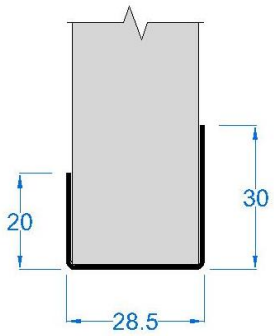
It is appreciated just as much for commercial vessels and offshore rigs as it is for cruise vessels.



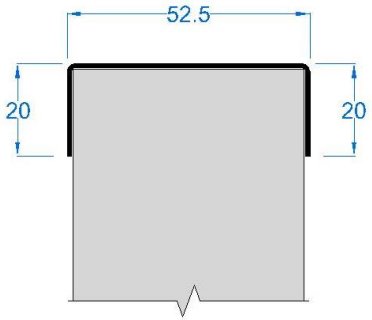
# WALLS PROFILES



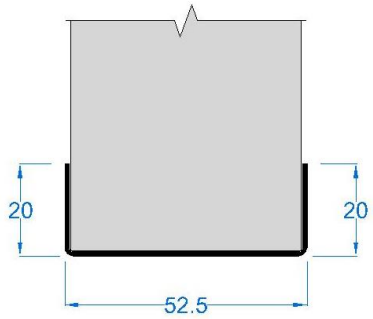

No: K-625310
Standard 25 mm top profile



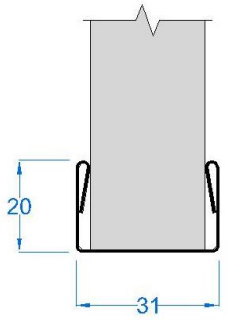

No: K-625410
Standard 25 mm floor profile




No: K-650300
Standard 50 mm top profile

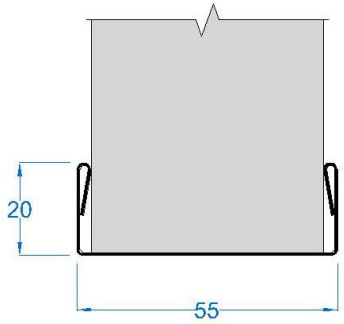



No: K-650400
Standard 50 mm floor profile

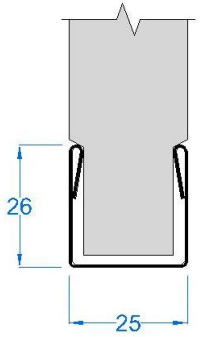



No: K-625401
25 mm visible floor profile

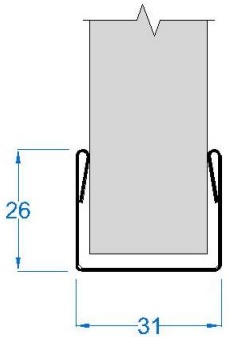
# WALLS PROFILES



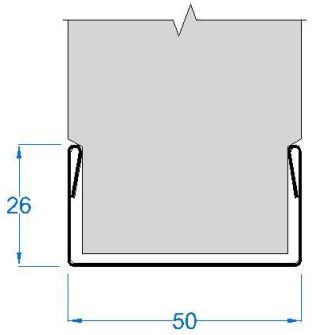

No: K-650401
50 mm visible floor profile



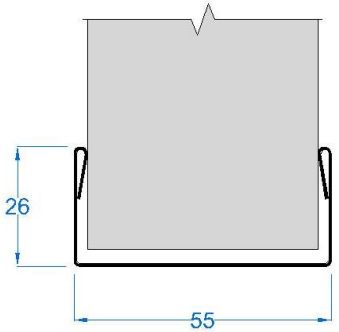

No: K-625010
Standard 25 mm adjustment profile flush




No: K-625032
Standard 25 mm profile cut

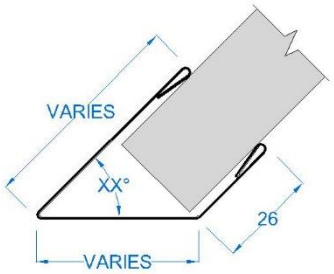



No: K-650010
Standard 50 mm adjustment profile flush

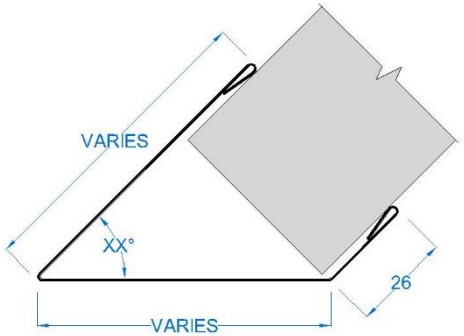



No: K-650032
Standard 50 mm adjustment profile cut

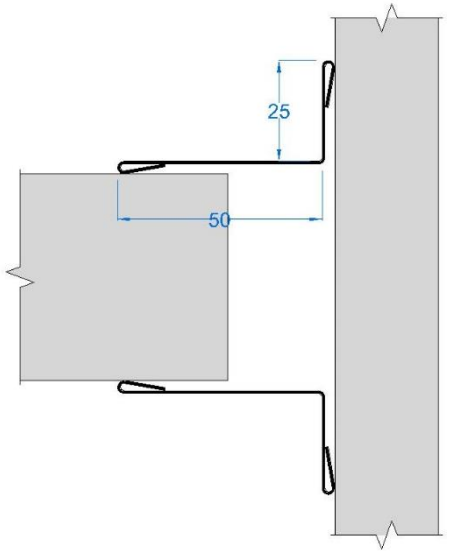
# WALLS PROFILES



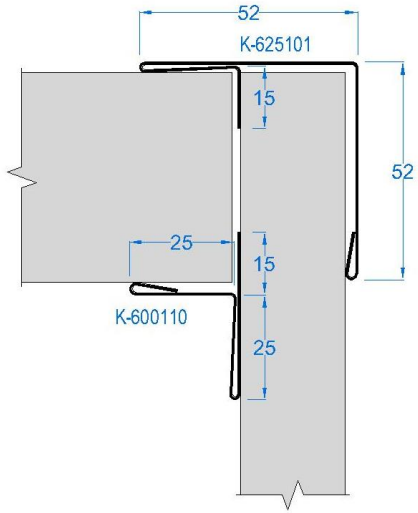

No: K-6258xx
25 mm bent adjustment profile cut



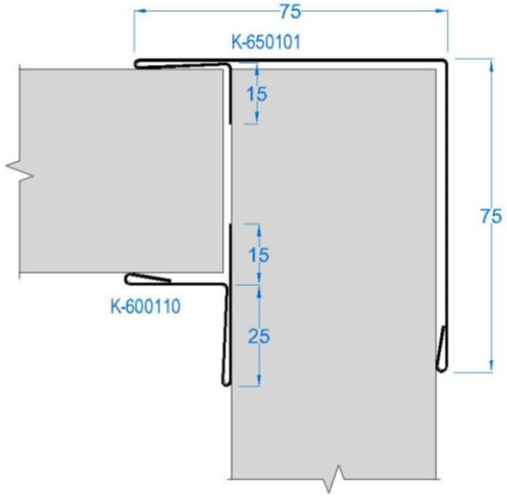

No: K-6508xx
50 mm bent adjustment profile cut




No: K-600020
Start/stop profile

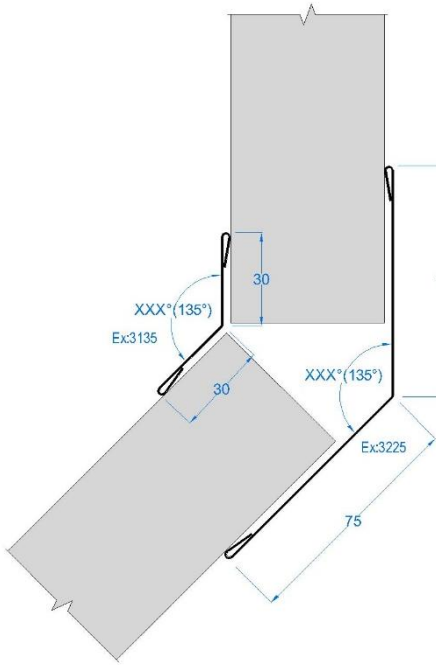



No: K-600110 / K-625101
Inside / outside corner profile
For concealed blind rivert/screws

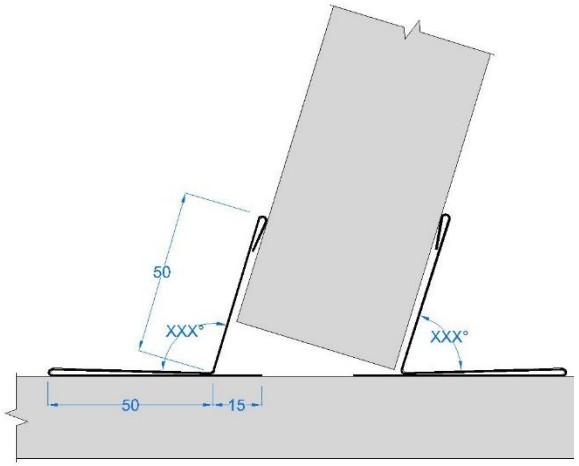



No: K-600110 / K-650101
Inside / outside corner profile
For concealed blind rivets/screws

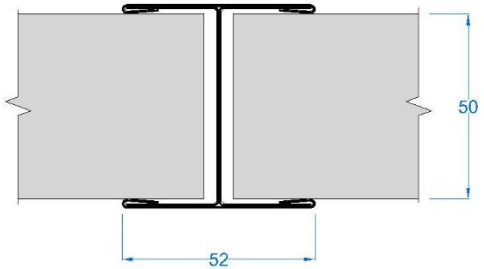
# WALLS PROFILES



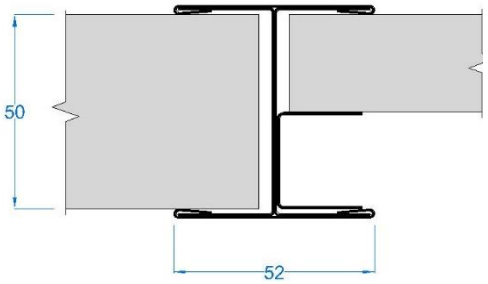

No: 3xxx
Inside / outside bent corner profile



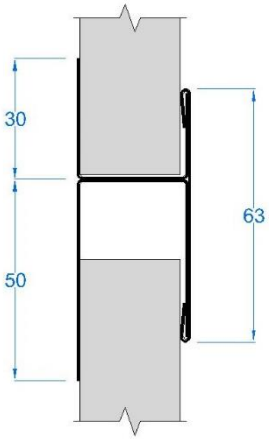

No: 4xxx
Inside corner profile




No: K-625070
Vertical joint profile
50 mm for cut

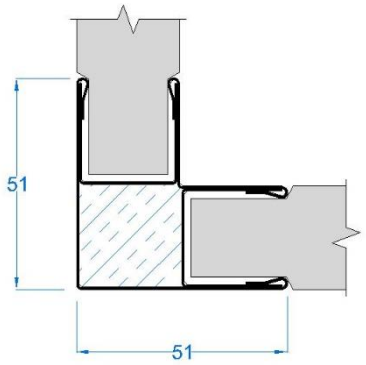



No: K-650074
Vertical joint profile
50/25 mm for cut

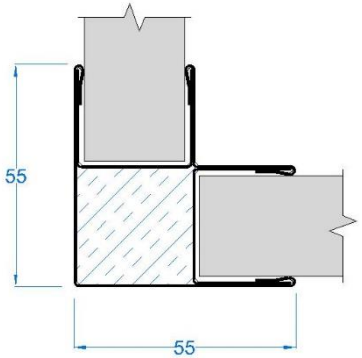



No: K-625072
Horizontal joint profile
25 mm for cut

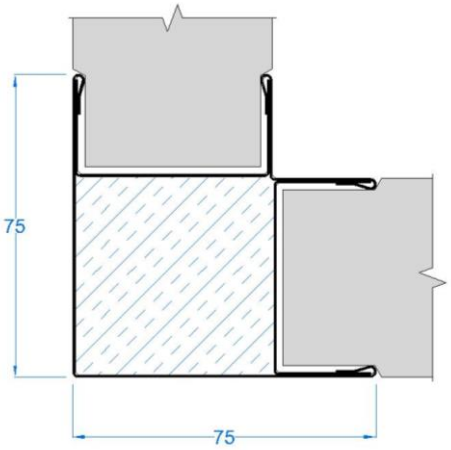
# WALLS PROFILES



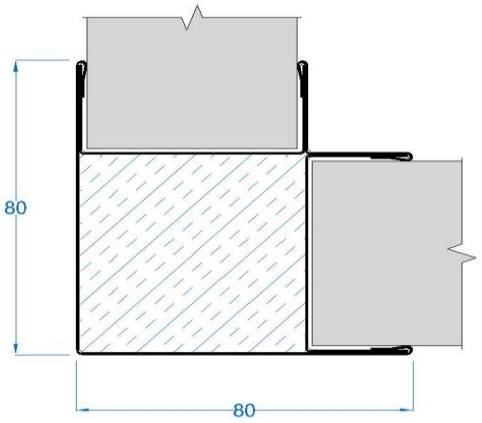

No: K-625051
25 mm corner element flush



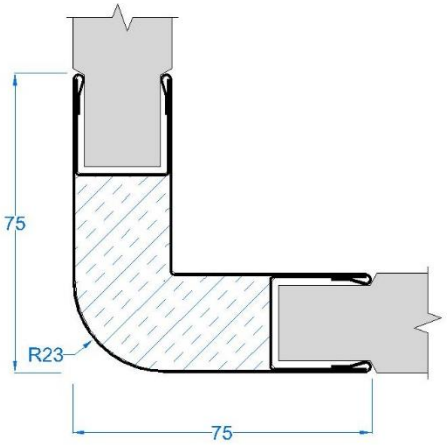

No: K-625052
25 mm corner element cut




No: K-650051
50 mm corner element flush

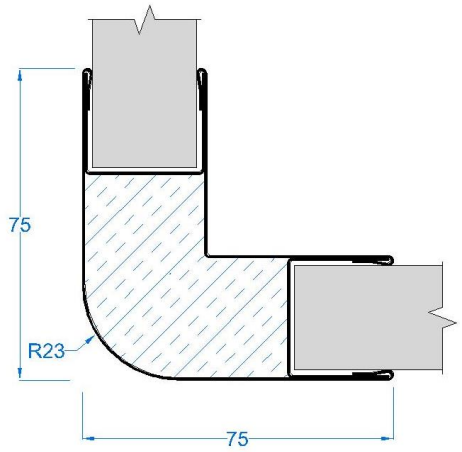



No: K-650052
50 mm corner element cut

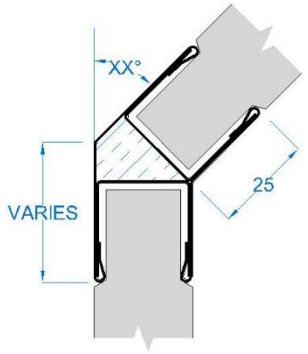



No: K-625061
25 mm rounded corner element flush

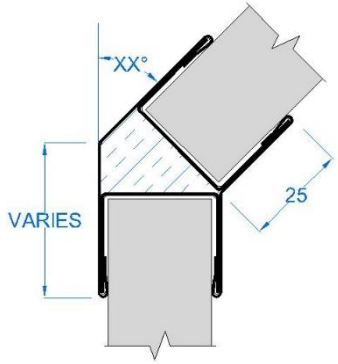
# WALLS PROFILES



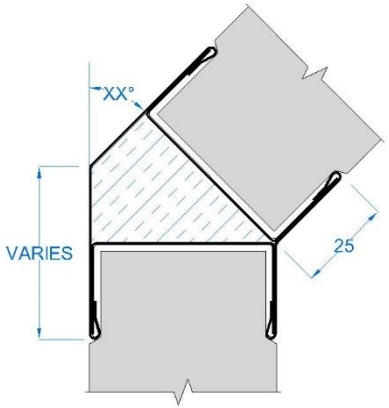

No: K-625062
25 mm rounded corner element cut



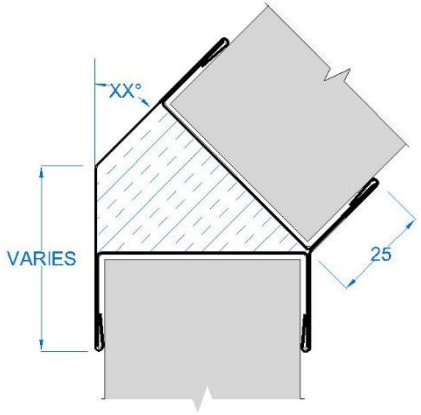

No: K-6257xx
25 mm bent corner element flush




No: K-6256xx
25 mm bent corner element cut




No: K-6507xx
50 mm bent corner element flush




No: K-6506xx
50 mm bent corner element cut

# CEILING SYSTEMS

Norac manufactures and supplies both suspended and self suspended ceiling solutions. The ceiling systems are recognized throughout the industry for both their superior acoustic and absorption properties and ease of installation. The self-suspended ceiling modules have been designed to avoid structural borne noise and to reduce safety risks associated with loose fire insulation.

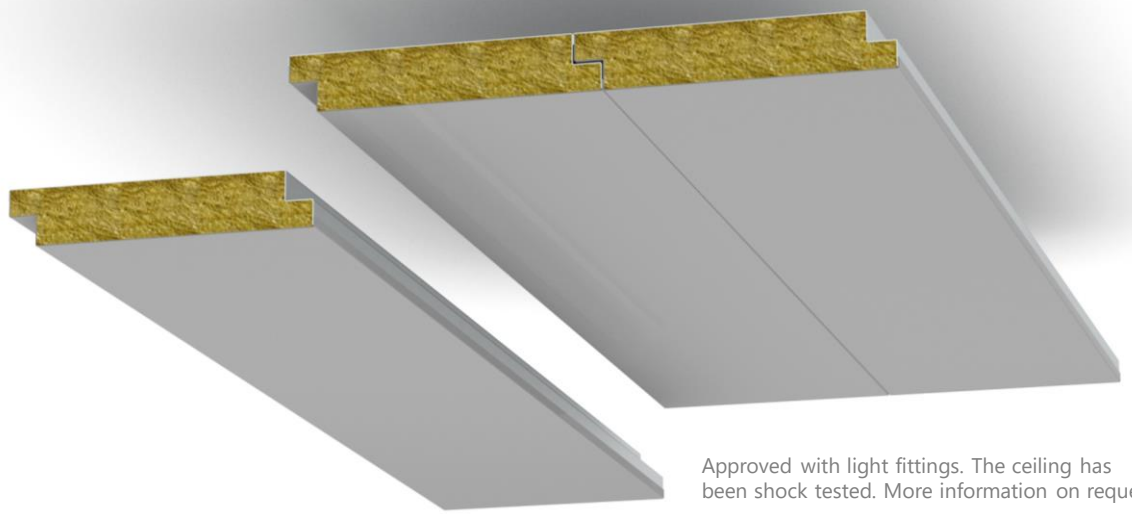
# CEILINGS
# CONTENTS

# CEILINGS B-500 / 52

B-500/52 is a self suspended ceiling of sandwich construction and designed for easy and rapid installation with no connecting profiles.

No additional (loose) insulation required to maintain fire class.

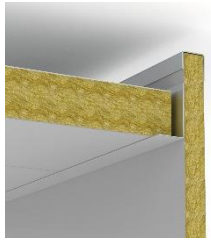
Self suspended up to 3000 mm.



Approved with light fittings. The ceiling has been shock tested. More information on request

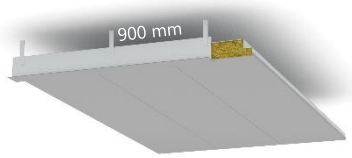
All **weights** are based on system weight, including all profiles

| DESCRIPTION | B-500 / 52 | B-500 / 52 | B-500 / 52 perf. |
|---|---|---|---|
| Fire class | B-15 / A-30 | B-15 / A-60 | B-15 / A-30 |
| Panel length | up to 3000 mm | up to 2400 mm | up to 2750 mm |
| Standard module width | 500 mm | 500 mm | 500 mm |
| Thickness | 52 mm | 52 mm | 52 mm |
| Weight | 19.2 kg/m² | 21.7 kg/m² | 18,2 kg/m² |
| Sound reduction | On request | On request | On request |
| Thermal isolation | U=0.64 W/m² K | U=0.64 W/m² K | U=0.64 W/m² K |
| Application | Self suspended ceiling | | |
| Sound absorption coefficient | NA | NA | 0,5 – 0,85$\alpha$ |

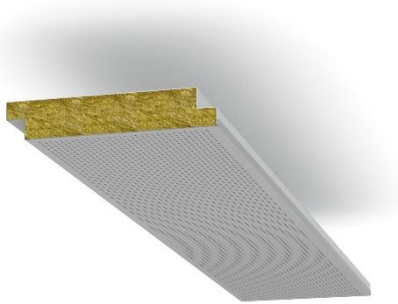


Reinforced suspension angle

Steel strips to deck above, yard supply




Joint profile. For rooms exceeding 2500/3000 mm



Available as perforated ceiling

CO₂e Assessed Product

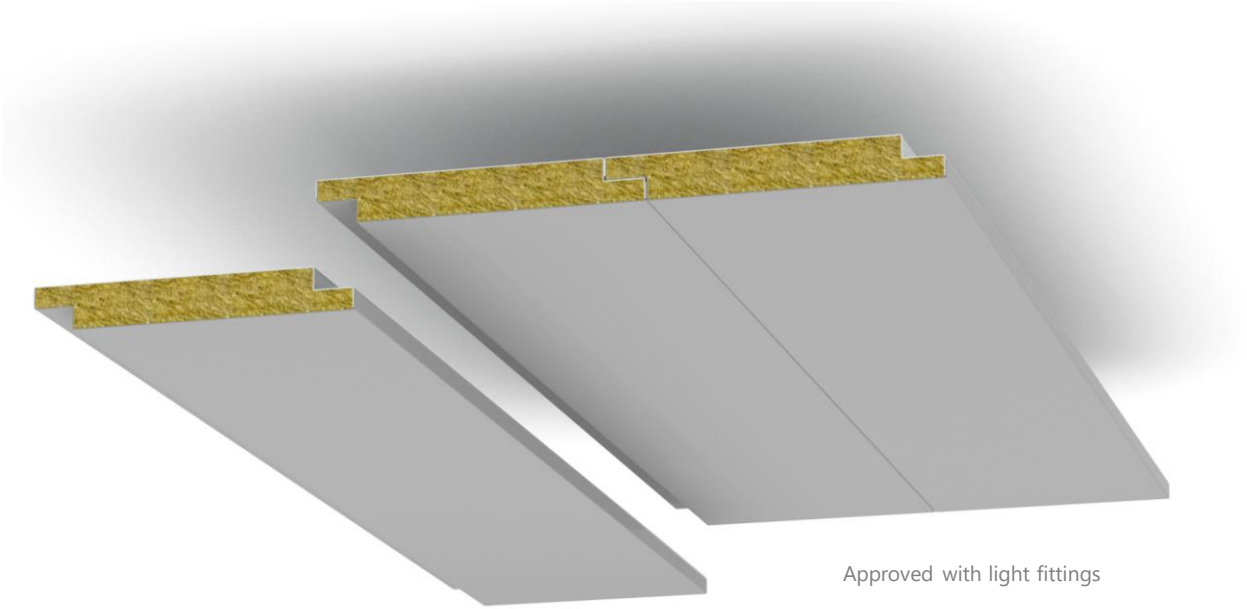
# CEILINGS B-600 / 40

B-600/40 is a self suspended ceiling of sandwich construction and designed for easy and rapid installation with no connecting profiles.

Self suspended up to 2715 mm.

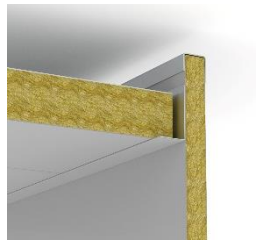
Note: For preassembled cabins only.

All **weights** are based on system weight, including all profiles



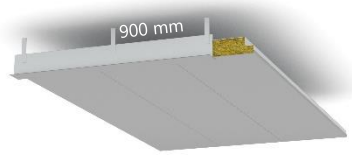
Approved with light fittings

| DESCRIPTION | B-600 / 40 |
|---|---|
| Fire class | B-15 / A-30 |
| Panel length | up to 2715 mm |
| Standard module width | 600 mm |
| Special module width | 100 - 700 mm |
| Thickness | 40 mm |
| Weight | 18.1 kg/m² |
| Sound reduction | On request |
| Thermal insulation | U=0.66 W/m² K |
| Application | Self suspended ceiling |

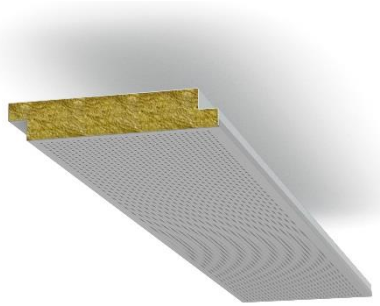


Reinforced suspension angle

Steel strips to deck above, yard supply




Joint profile. For rooms exceeding 2500/3000 mm



Available as perforated ceiling

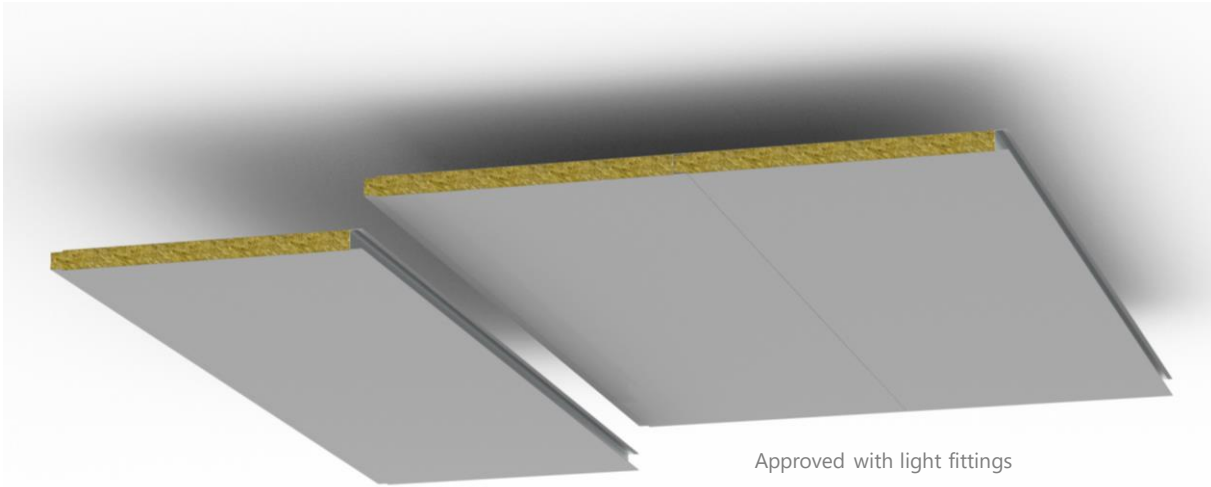
CO₂e Assessed Product

# CEILINGS T-600 / 40 / 30

T-600/40 is a self suspended ceiling of sandwich construction and designed for easy and rapid installation with no connecting profiles.

Self suspended up to 2715 mm (T-600/40).
Self suspended up to 3015 mm (T-600/30).

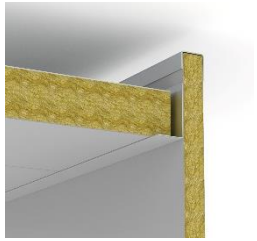
All **weights** are based on system weight, including all profiles



Approved with light fittings

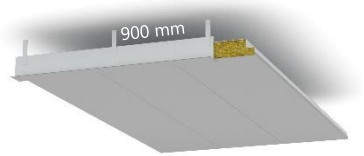
| DESCRIPTION | T-600 / 40 | T-600 / 40 Perf. | T-600 / 30 |
|---|---|---|---|
| Fire class | B-15 / A-30 | B-15 / A-30 | B-15 / A-30* |
| Panel length | up to 2715 mm | up to 2715 mm | up to 3015 mm |
| Standard module width | 600 mm | 600 mm | 600 mm |
| Thickness | 40 mm | 40 mm | 30 mm |
| Weight | 18.8 kg/m² | 17.2 kg/m² | 16.6 kg/m² |
| Sound reduction | On request | On request | On request |
| Thermal insulation | U=0.66 W/m² K | U=0.66 W/m² K | U=1.16 W/m² K |
| Application | Self suspended ceiling | | |

* Fire gasket (16 x 2 mm) in the groove.



Reinforced suspension angle

Steel strips to deck above, yard supply



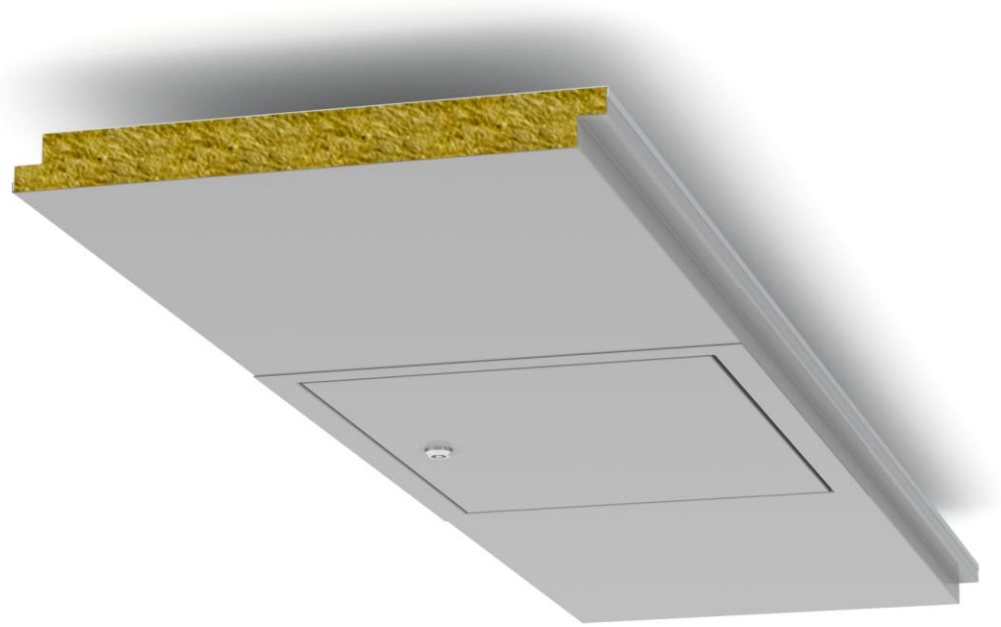

Joint profile. For rooms exceeding 2500/3000 mm

CO₂e Assessed Product

# CEILINGS INSPECTION HATCH

For quick access to technical spaces above the ceiling such as ventilation, electrical wiring etc. Surface is normally the same as the ceiling to make a discreet finish.

The hatch is supplied with frame / counter frame for cut out, 3-point espagnolette lock and piano hinge.

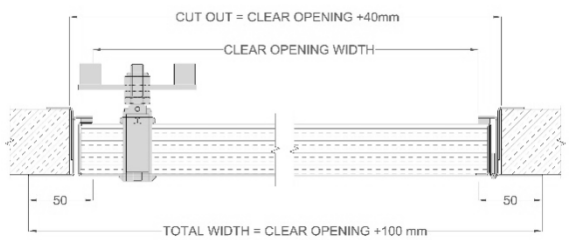


NOTE: If the width of the frame exceeds the width of the ceiling panel, extra support (steel strips) are needed.

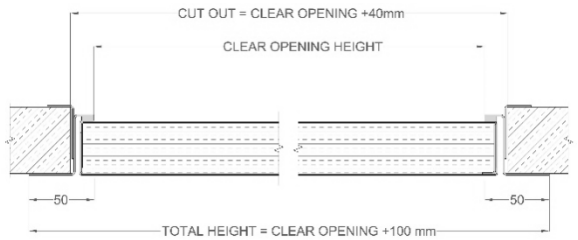
| DESCRIPTION | INSPECTION HATCH FOR CEILING |
|---|---|
| Fire class | B-0 / B-15 |
| Surface leaf | 0.6 mm steel sheets |
| Frame | Painted or stainless steel |
| Core material | Rockwool |
| Thickness | 39 mm |
| Weight | Approx 18 kg |
| Lock | 3-point espagnolette |
| Clear opening | Width: up to 400 mm<br>Length: up to 600 mm |

| CEILING TYPE | CLEAR OPENING |
|---|---|
| B-500/52 | Up to 400 x 600 |
| B-600/40 | Up to 400 x 500 |
| T-600/30 | Up to 560 x 560 |
| T-600/40 | Up to 500 x 500 |

TOP VIEW:




SIDE VIEW:



# EQUIPMENT ATTACHED TO B-RATED CEILING

| ATTACHMENT WEIGHT (MAX PER PANEL PER PANEL) [KG] | EQ TO BE INSTALLED BY... | FIXING METHOD | FIXING ITEMS AND DRIL HOLES |
|---|---|---|---|
| **W < 5** | Mechanically attached directly to the ceiling panel without reinforcement. | Fix with screws with bonded washer. Min. 4 screws separated from each other by minimum 250 mm. | **On face sheet:** Drill Holes = 3.0 mm Screw size = D5x30 |
| **5 ≤ W ≤ 20** | Mechanically attach directly to reinforced ceiling panel. Reinforcement to be provided to the panel by NORAC. Wall elevation with EQ location to be issued to NORAC. | Fix with screws with bonded washer. Min. 4 screws separated from each other by minimum 250 mm. | **On face sheet:** Drill Holes = 3.0 mm Screw size = D5x30 |
| **W > 20** | Item should not be attached to the ceiling panel. Separate support from deck above to be provided. | TBD item by item | TBD item by item |

# DOORS

Norac manufactures and supplies a wide range of high-quality internal A and B classified doors for the maritime industry. Our doors are tested to satisfy the industry's strict requirements for both fire safety and sound reduction. They are all certified by international classification societies and authorities.

We deliver standard doors and custom-built doors within the limitations of our certificates.

# DOORS
# CONTENTS

# DOORS B-RATED MB / ML / MC / CD / MLDD / SLIDING

Norac has a complete range of B-doors designed for all kind of applications, from a lightweight all-round door for corridors and public areas to a cabin door with sound reduction value (Rw) of 44 dB. The doors are easy to install and supplied complete with integrated top element (option), frame, counter frame, door leaf, hardware and stainless-steel threshold.

All B-doors can be delivered with painted, stainless steel or PVC coated surface, and they are all certified as fire class B-15.

| DESCRIPTION | MB | ML | MC | CD | MLDD | SD |
|---|---|---|---|---|---|---|
| Fire class | B-0/B-15 | B-15 | B-15 | B-15 | B-15 | B-15 |
| Surface doorleaf | Painted, stainless steel or PVC coated | Painted, stainless steel or PVC coated | Painted, stainless steel or PVC coated | Painted, stainless steel or PVC coated | Painted, stainless steel or PVC coated | Painted, stainless steel or PVC coated |
| Frame (and top element) | Painted* or stainless steel | Painted* or stainless steel | Painted* or stainless steel | Painted* or stainless steel | Painted* or stainless steel | Painted* or stainless steel |
| Thickness doorleaf | 39 mm | 39 mm | 39 mm | 50 mm | 39 mm | 39 mm |
| Weight | 37 kg** | 60 kg** | 75 kg** | 80 kg** | 100 kg** | Approx. 125 kg |
| Core material | Rockwool | Ceramic wool | Rockwool | Rockwool | Ceramic wool | |
| Clear opening | Width: Standard up to 1000 mm Height: Max up to 2100 mm | Width: Standard up to 1000 mm Height: Max up to 2100 mm | Width: Max up to 1000 mm Height: Max up to 2100 mm | Width: Max up to 800 mm Height: Max up to 2050 mm | Width: Max up to 1600 mm Height: Max up to 2050 mm | Width: Max up to 1200 mm Height: Max up to 2150 mm |
| Element height | NA | Up to 2500 mm | Up to 2500 mm | Up to 2500 mm | Up to 2500 mm | NA |
| Sound reduction | NA | RW= 35 dB | RW=43 dB | RW=44 dB | NA | NA |
| Standard specification | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba | TrioVing/Stuv/helm |
| Application | Internal doors | Internal doors | Internal doors | Internal doors | Internal doors | Internal doors |

* According to NCS & RAL colors

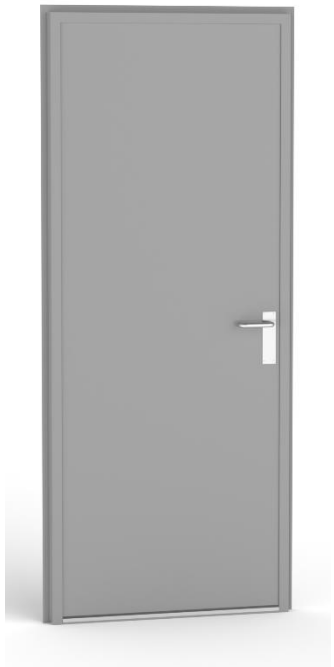
** Weight is based on a door with clear opening 700 x 2000 mm

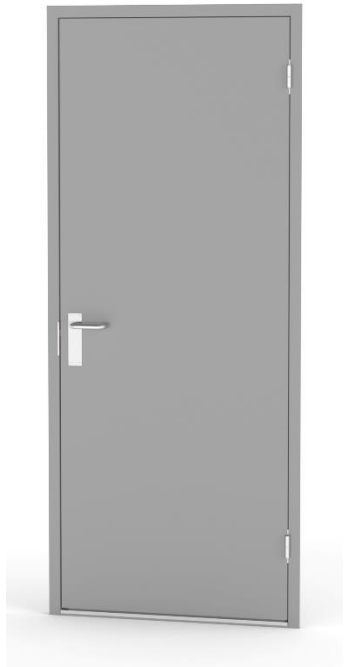
*** Weight is based on a door with clear opening 1200 x 2150 mm

| OPTIONS | MB | ML | MC | CD | MLDD | SD |
|---|---|---|---|---|---|---|
| Vision panel | | ✓ | ✓ | ✓ (Peep hole) | ✓ | |
| Ventilation louvre | | ✓ | ✓ (Z-ventilation) | | ✓ | |
| Kick-out | | ✓ | ✓ | | ✓ | |
| Dropdown treshold | | ✓ | ✓ | ✓ | | |
| Door closer | ✓ | ✓ | ✓ | ✓ | | |
| Lead cover for hardware | | ✓ | ✓ | ✓ | ✓ | |

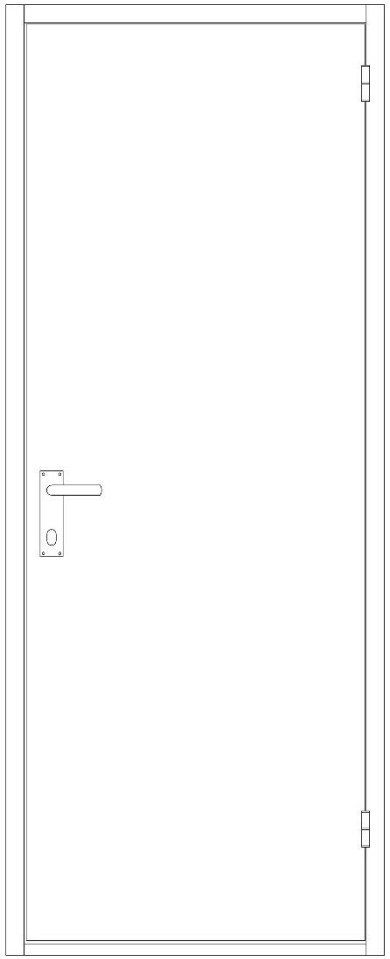
# DOORS B-RATED MB

The MB door has been developed to function as a basic door with a wide field of application. It is normally used in areas where there are no special requirements other than to function as a B class division.

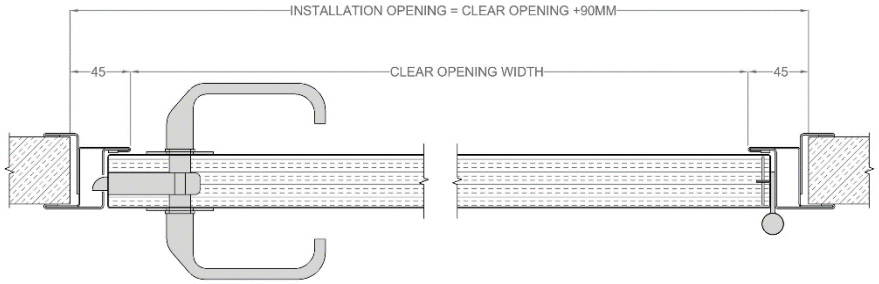




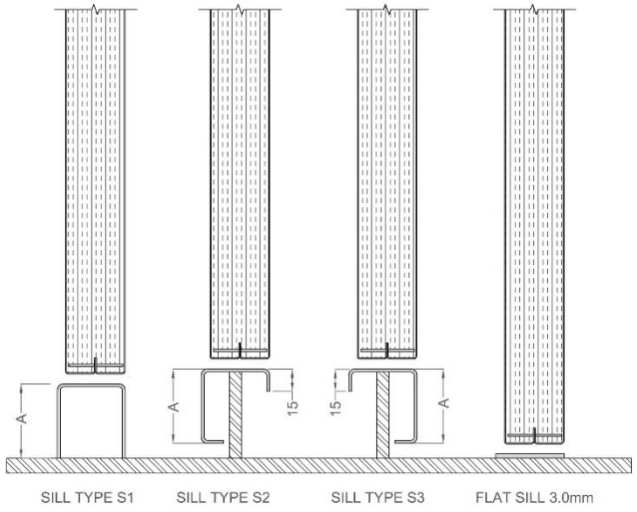
# DOORS / TECHNICAL DETAILS B-RATED MB



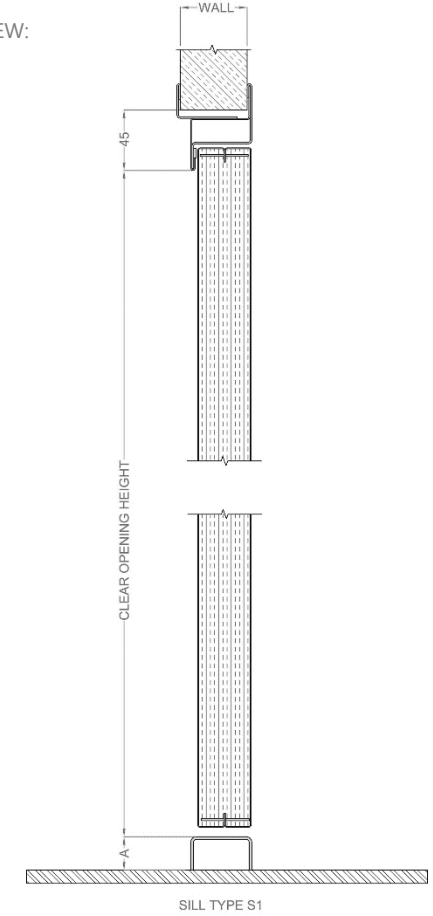
TOP VIEW:




SILL TYPES:



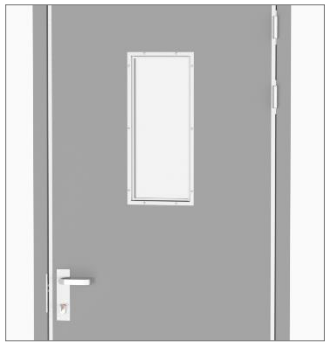

SIDE VIEW:



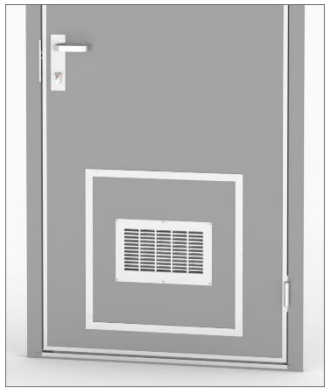
# DOORS B-RATED ML

The ML door is a lightweight door with a wide field of application. Typical applications can be corridors, WC and other public areas.

The door can be delivered with or without top panel and be equipped with vision panel, kick-out, ventilation louvre and door closer.

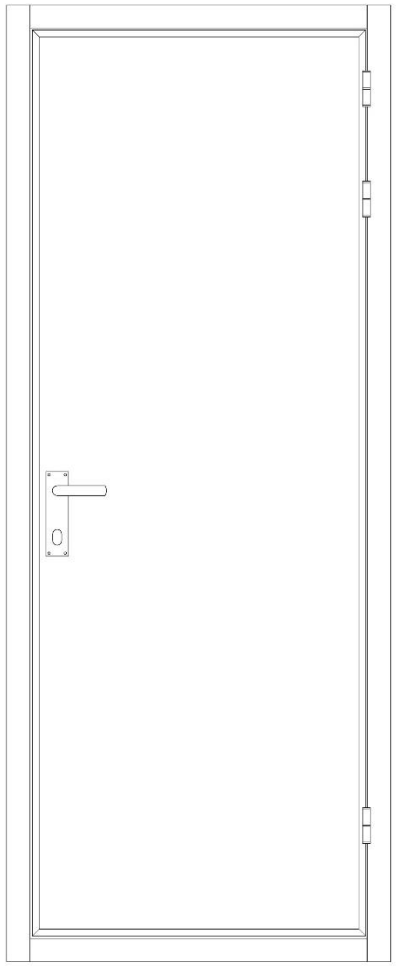


Available with vision panel

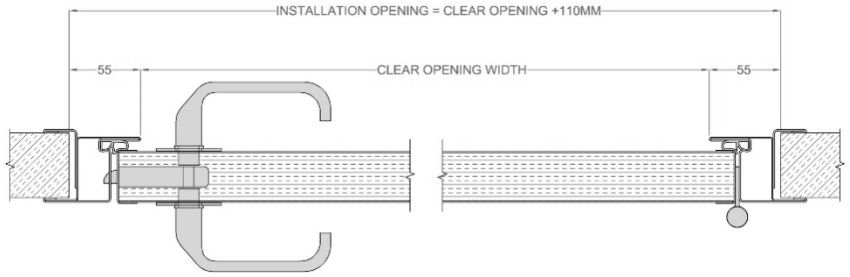


Available with kick out and ventilation louvre

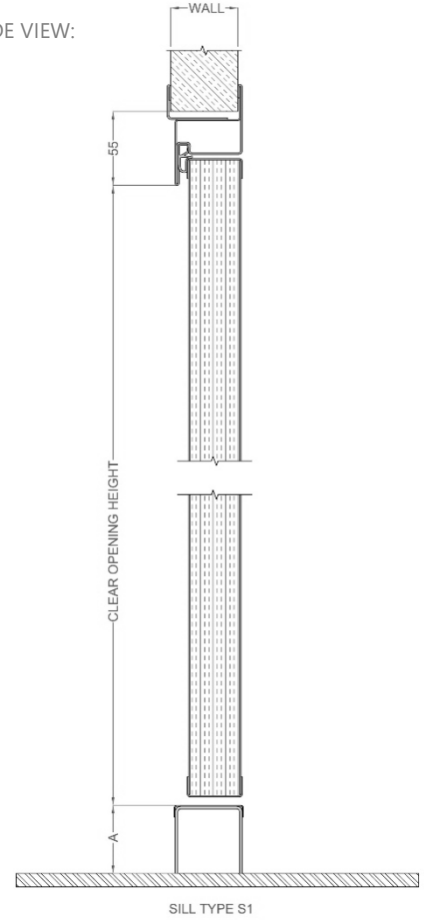
# DOORS / TECHNICAL DETAILS B-RATED ML



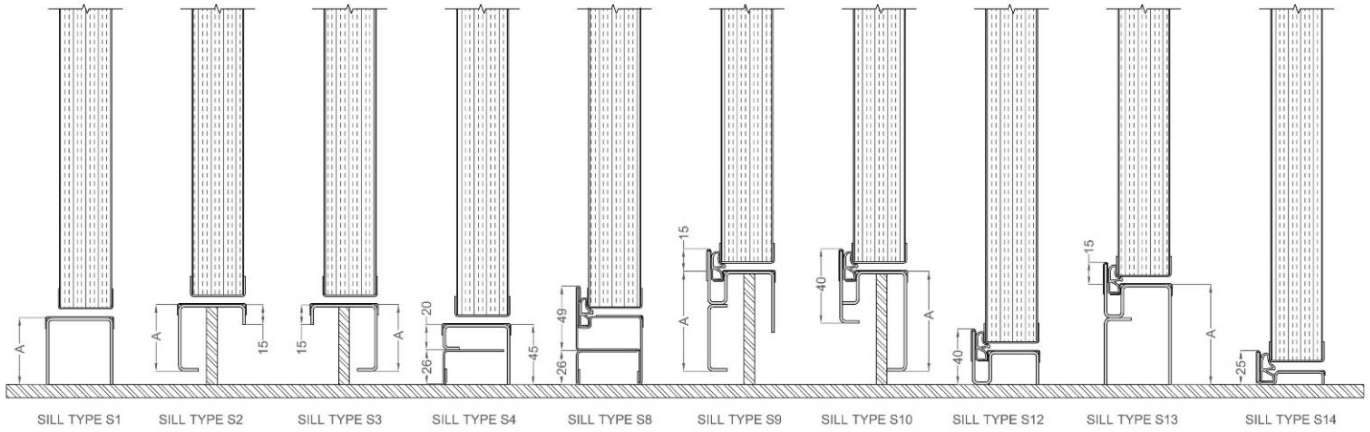
TOP VIEW:




SIDE VIEW:



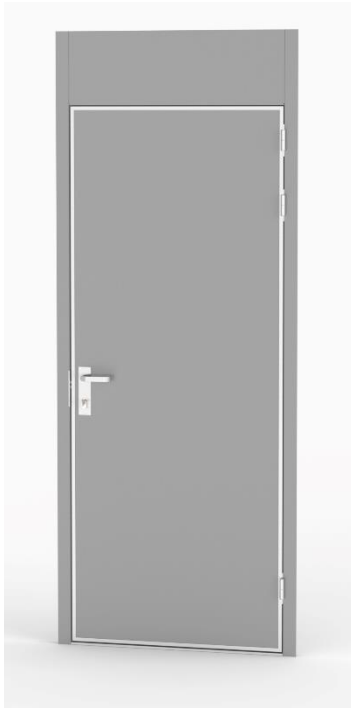

SILL TYPES:



# DOORS B-RATED MC

The MC door is an acoustic door with a sound reduction value (Rw) of 43 dB. Typical application can be cabins and offices with high requirements for sound reduction.

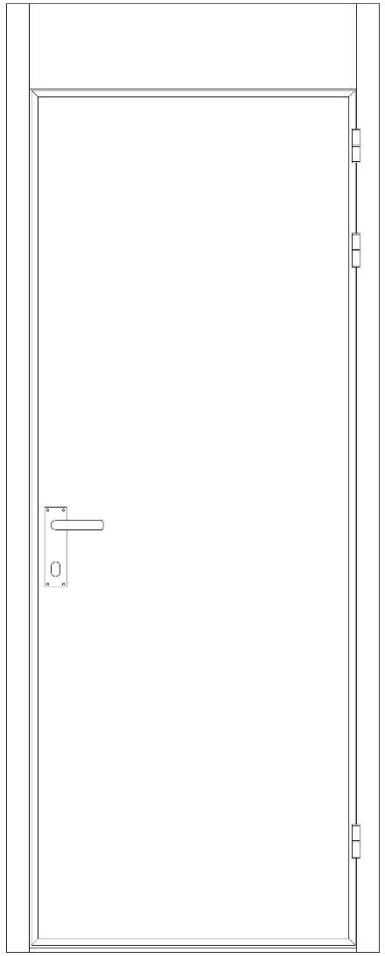
The door can be equipped with vision panel, kick-out, z-ventilation and door closer.



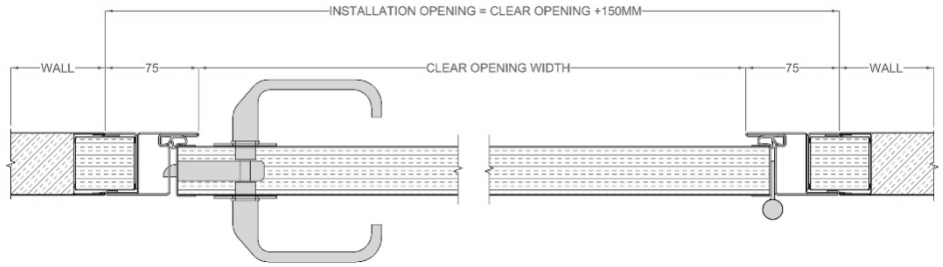
Available with vision panel

Available with kick out and Z-ventilation louvre

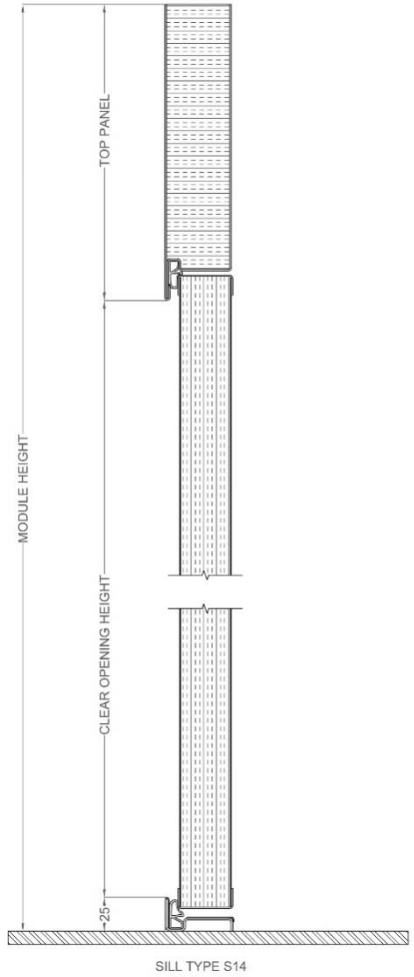
# DOORS / TECHNICAL DETAILS B-RATED MC



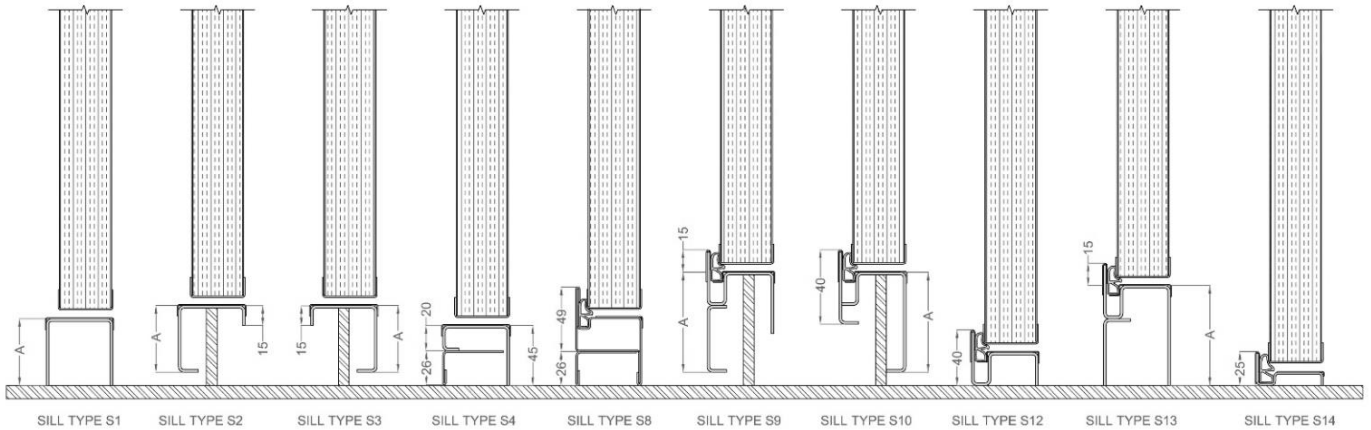
TOP VIEW:




SIDE VIEW:



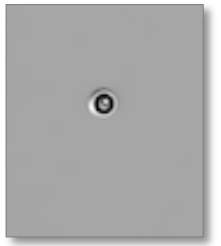

SILL TYPES:



# DOORS B-RATED CD

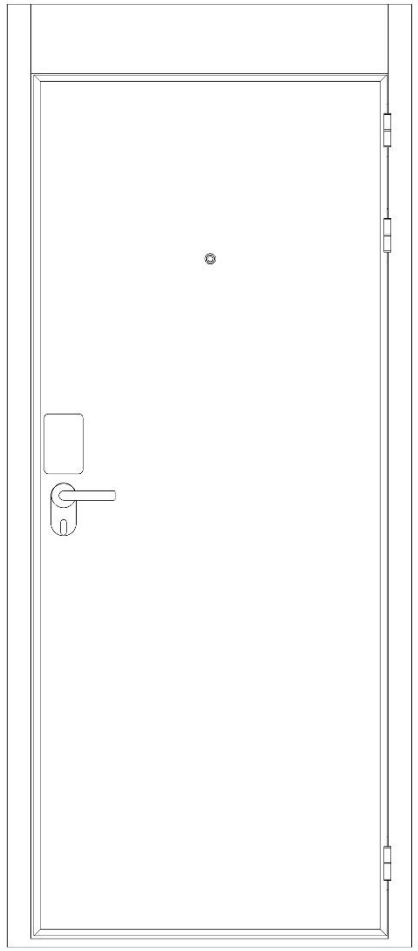
The CD door is specially designed as entry doors for cabins on cruise vessels. It has a high sound reduction value (Rw) of 44 dB and can be equipped with a RFID door lock system, door viewer and door closer.

The functionality and durability of the CD door has been tested according EN1191:2012, where it exceeded 200 000 opening and closing cycles.

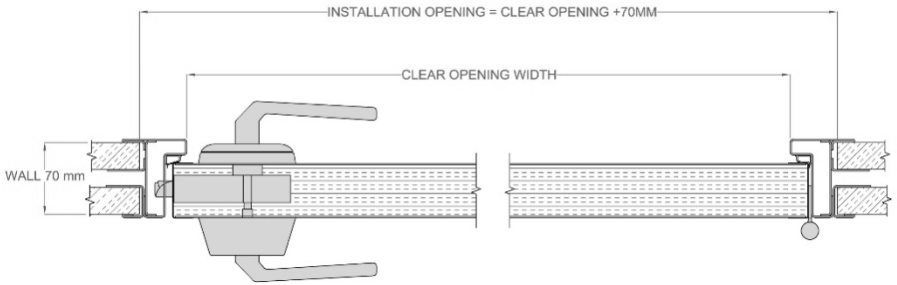


Available with peep hole

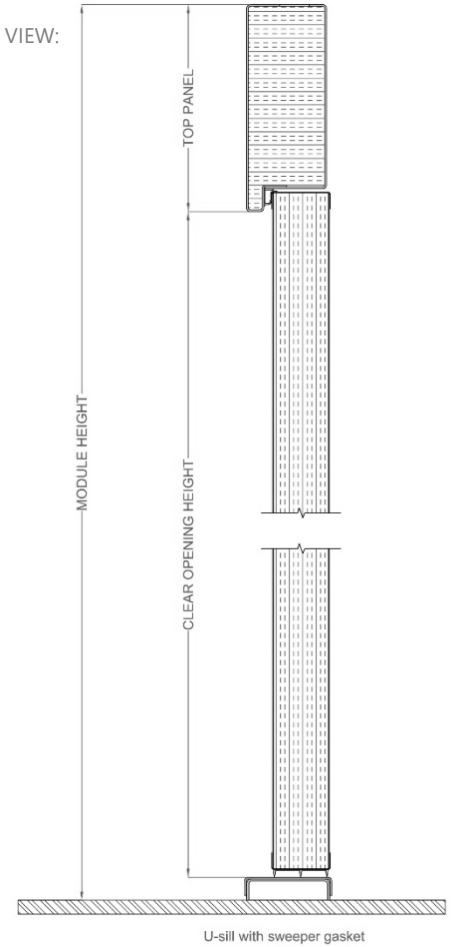
# DOORS / TECHNICAL DETAILS B-RATED CD



TOP VIEW:



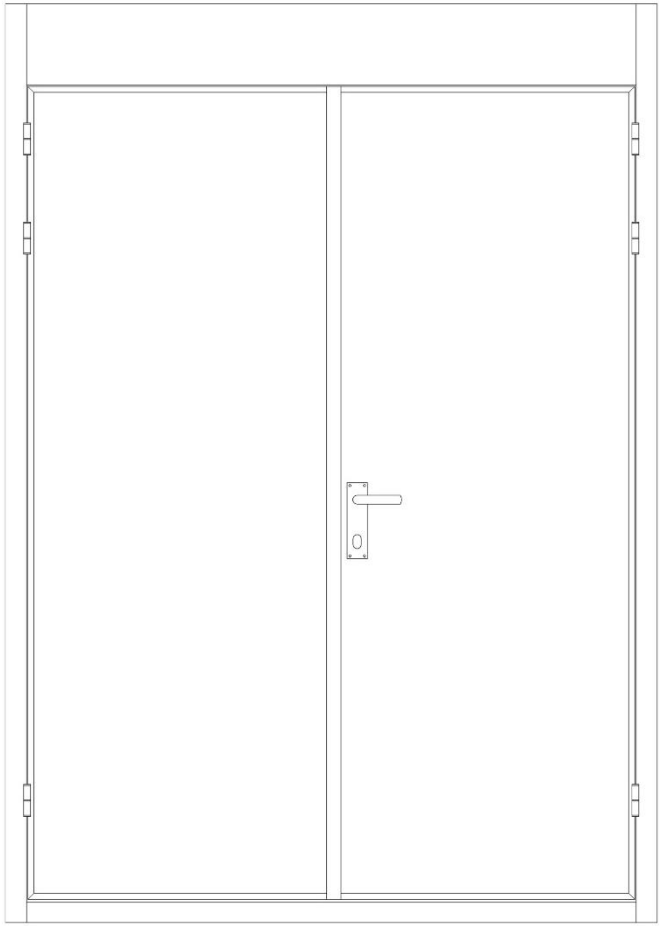

SIDE VIEW:



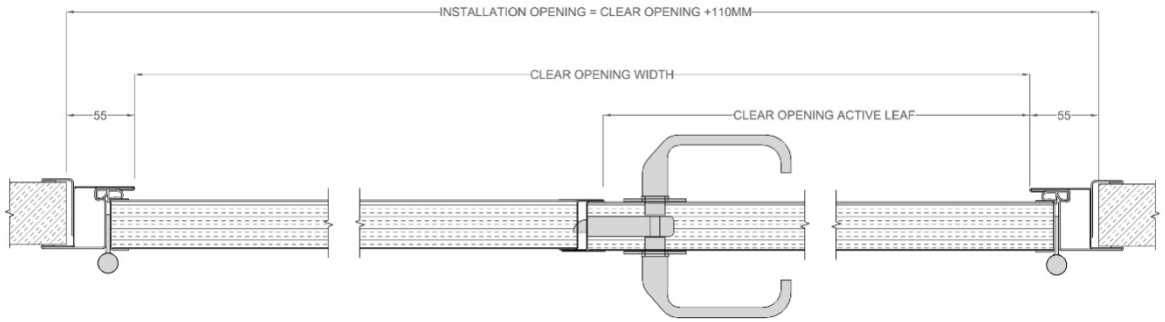
# DOORS B-RATED MLDD

The MLDD is a double leaf door with a wide field of application. It can be used for area's with requirements of large clear opening width up to 1600 mm.

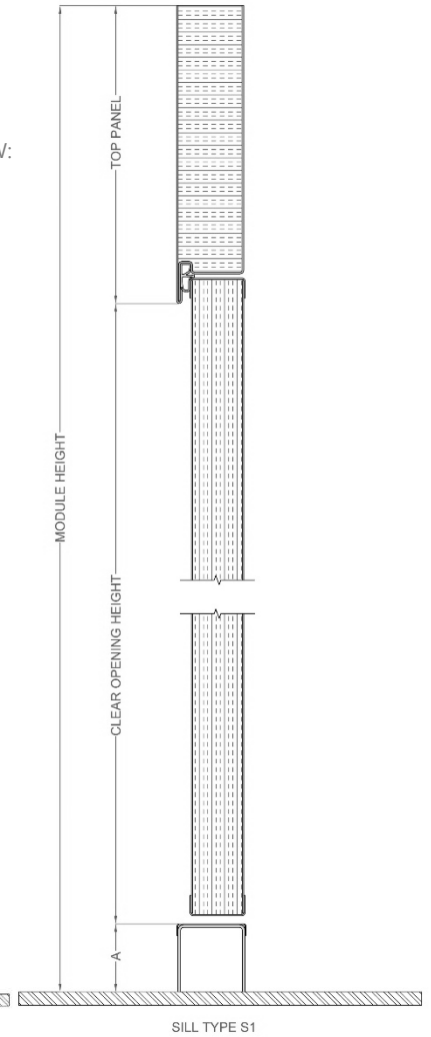
# DOORS / TECHNICAL DETAILS B-RATED MLDD



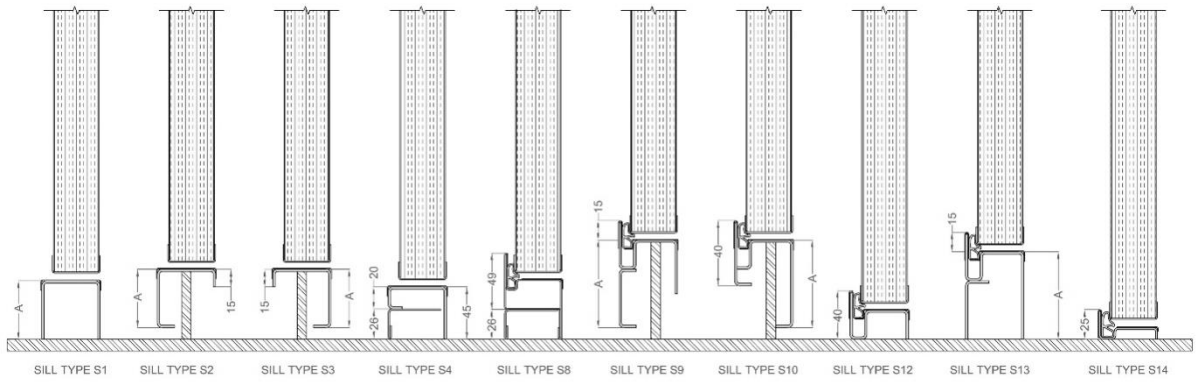
TOP VIEW:




SIDE VIEW:




SILL TYPES:

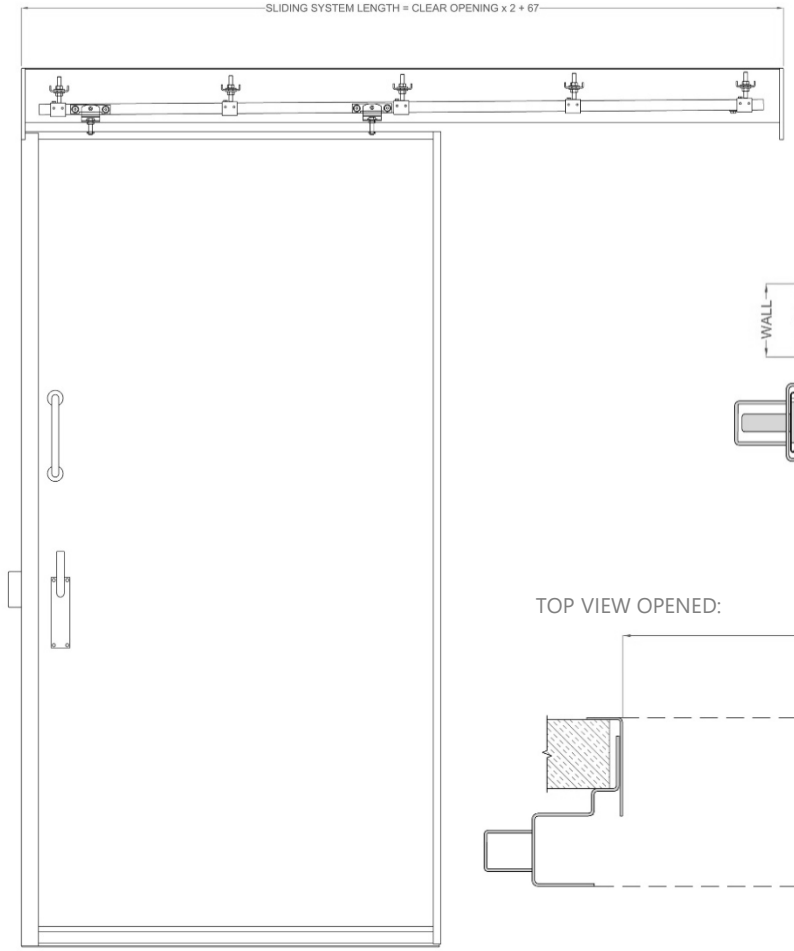


# DOORS B-RATED SD

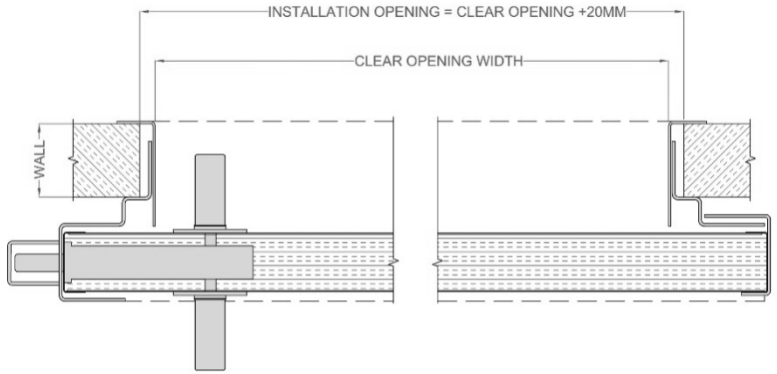
Norac's SD door is a sliding door that can be used in areas where a hinged door would have little room to completely swing open.

The door can be delivered as a manual operated door or with electric operated door drive system.

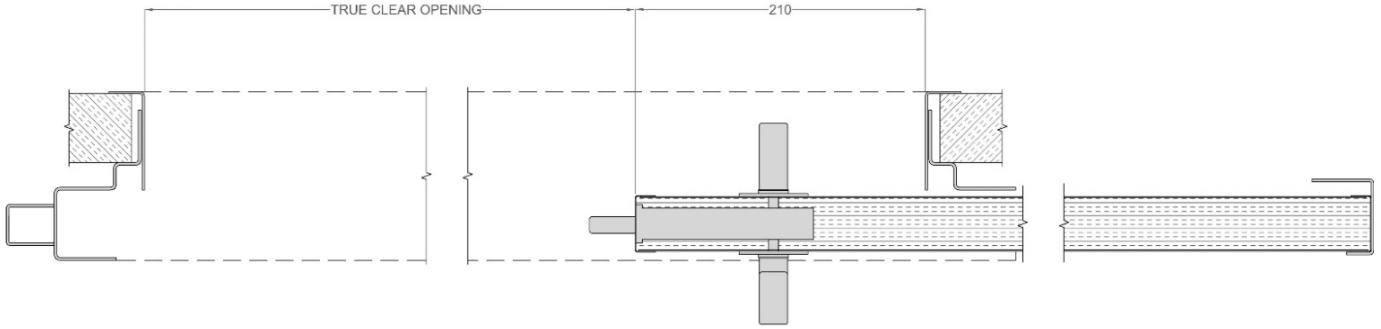
# DOORS / TECHNICAL DETAILS B-RATED SD



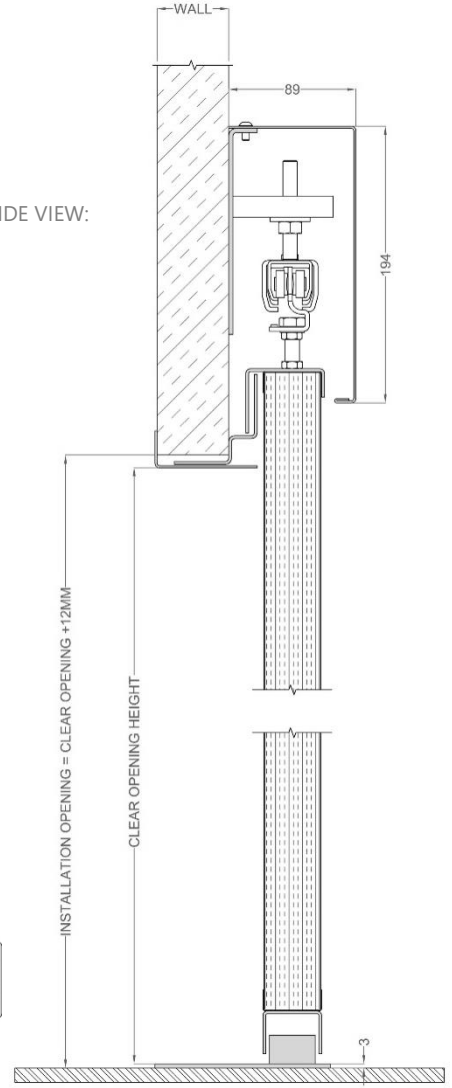

TOP VIEW:




TOP VIEW OPENED:




SIDE VIEW:



# DOORS A-RATED

Norac are developing a complete range of A-rated marine interior doors.
The doors are easy to install and can be bolted or welded to the bulkhead.

All A-doors can be delivered with painted, stainless steel or PVC coated surface.

| DESCRIPTION | A-30 | A-60 | A-60 DD (under development) |
|---|---|---|---|
| Fire class | A-0/A-30 | A-60 | A-60 |
| Surface doorleaf | Painted, stainless steel or PVC coated or laminated | Painted, stainless steel or PVC coated or laminated | Painted, stainless steel or PVC coated or laminated |
| Frame (and top element) | Painted* or stainless steel | Painted* or stainless steel | Painted* or stainless steel |
| Thickness doorleaf | 49 mm | 63 mm | 63 mm |
| Weight | 90 kg** | | |
| Core material | Ceramic wool | Rockwool | |
| Clear opening | Width: Standard up to 1000 mm<br>Height: Max up to 2100 mm | Width: Standard up to 1000 mm<br>Height: Max up to 2100 mm | |
| Sound reduction | Rw= 36 dB | Rw= 40 dB | NA |
| Standard specification | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba | TrioVing/Schwepper/Dormakaba |
| Application | Internal doors | Internal doors | Internal doors |

| OPTIONS | | | |
|---|---|---|---|
| Vision panel | ✓ | ✓ | |
| Hose port | ✓ | ✓ | |
| Door closer | ✓ | ✓ | |

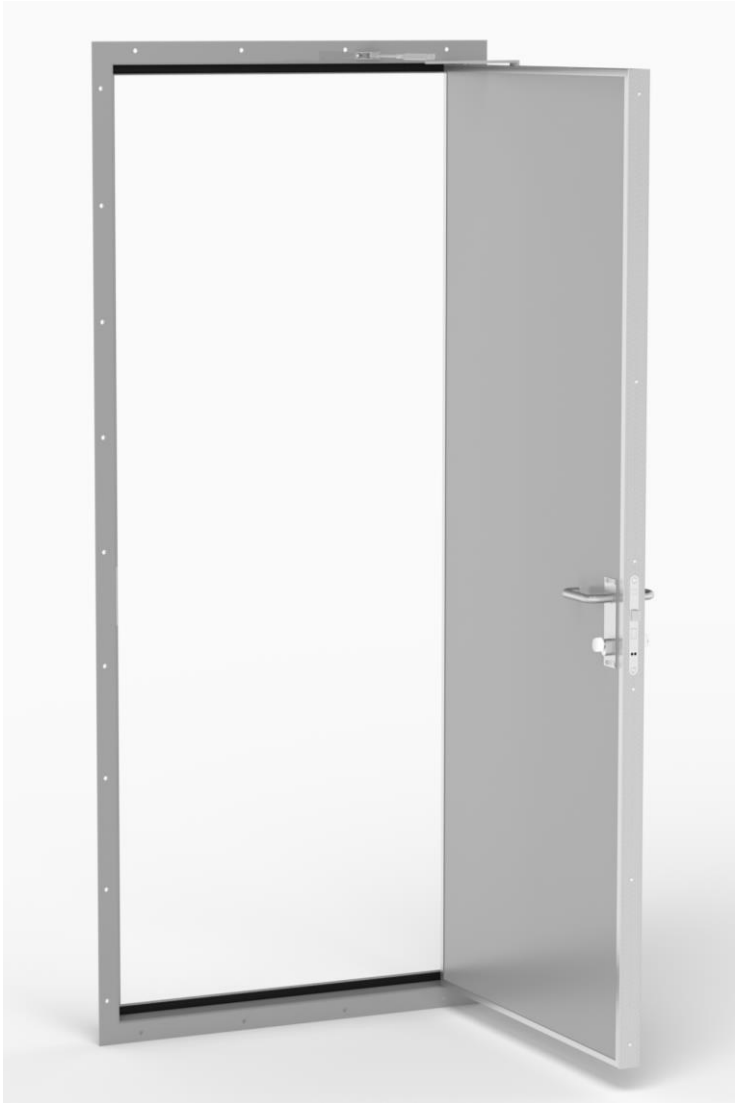
* According to NCS & RAL colors

** Weight is based on a door with clear opening 1000 x 2000 mm

# DOORS A-RATED A30

The A30 door is a solid, lightweight door to be used in A-0 or A-30 fire rated bulkheads.

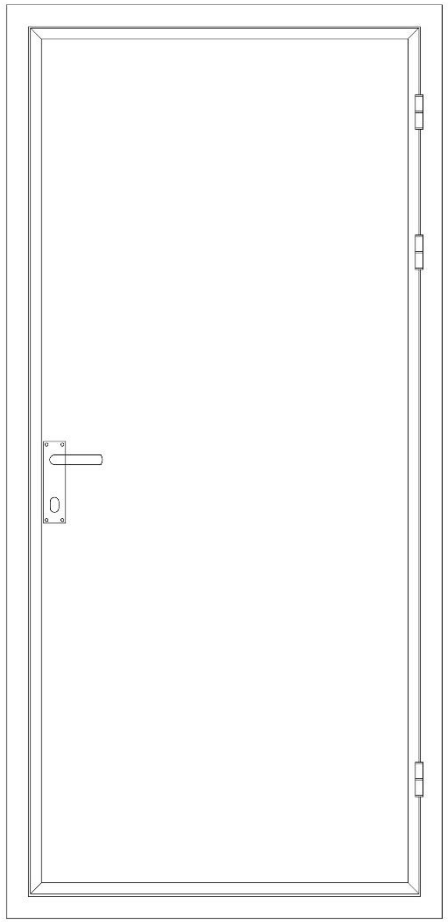
The door can be equipped with vision panel, hose port and door closer.



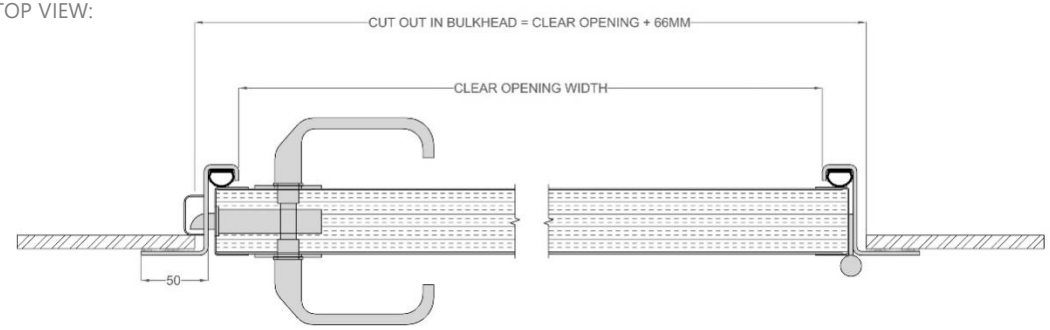
Available with vision panel

Available with hose port

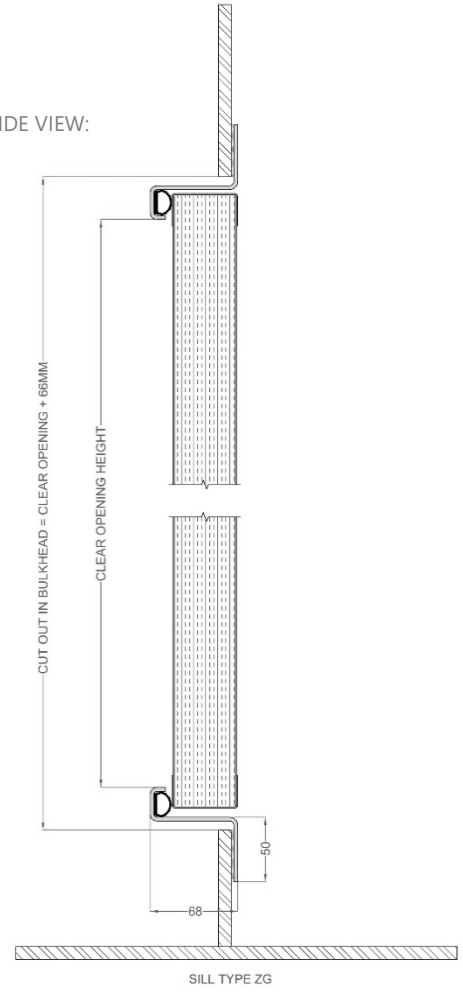
# DOORS / TECHNICAL DETAILS A-30 DOORS



TOP VIEW:




SIDE VIEW:

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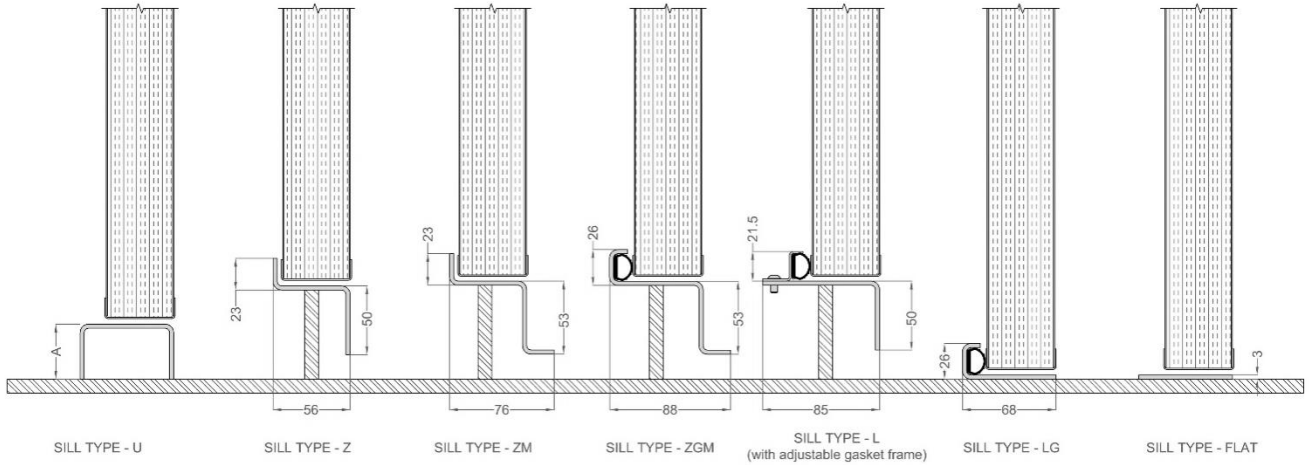


# DOORS A-RATED A-60

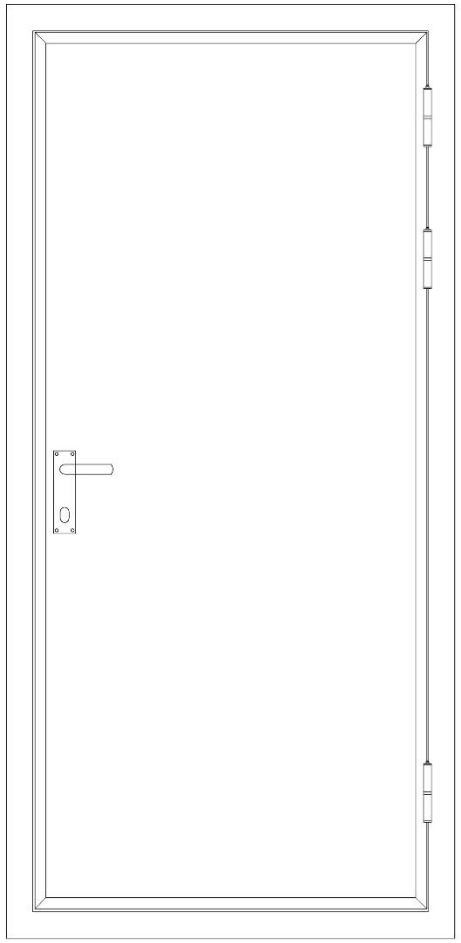
The A60 door is a solid door to be used in A60 fire rated bulkheads. The door leaf can be delivered in stainless steel, laminated, painted or PVC coated steel.

The door can be equipped with vision panel, hose port and door closer.

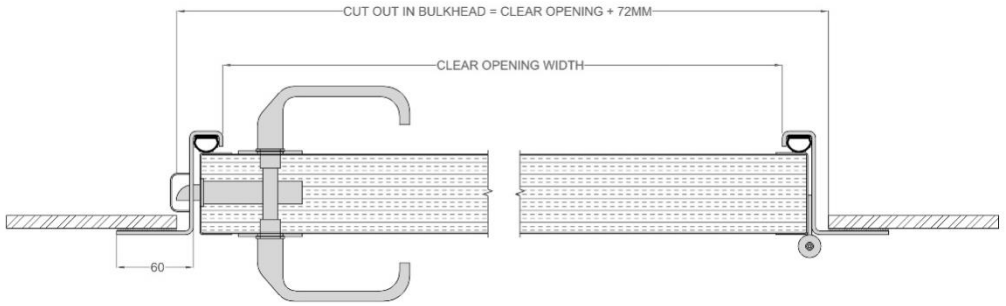
Available with vision panel

Available with hose port

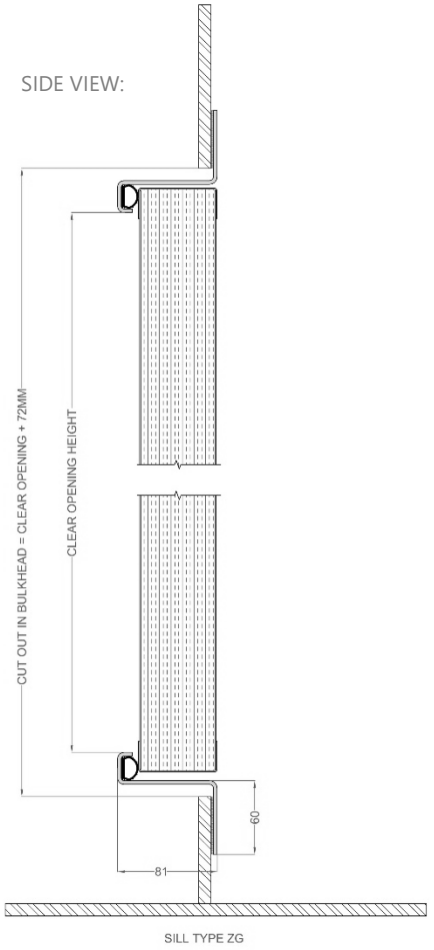
# DOORS / TECHNICAL DETAILS A-60 DOORS



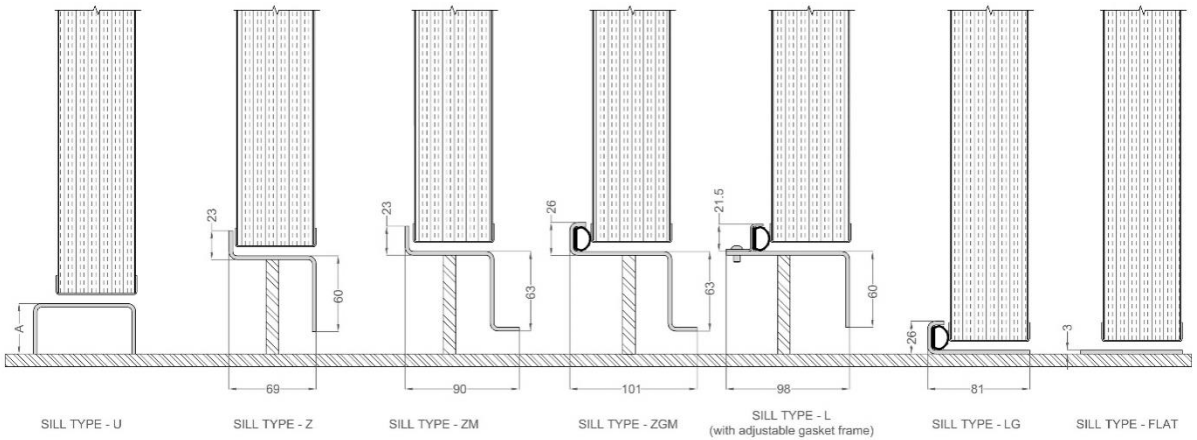
TOP VIEW:




SIDE VIEW:




SILL TYPES:



# WET UNITS

Building on decades of experience and specialized competence, Norac offers fully fitted wet units. The Norac modular wet units are ideal for marine accommodations from cruise ships to offshore installations.

# WET UNITS
# CONTENTS

# NOTES

# WET UNITS PREFABRICATED

With many years of experience and specialized competence, Norac offers fully fitted wet units. The Norac modular wet units are ideal for marine accommodations, from cruise ships to offshore installations.

The Norac wet units, whether standard or custom made, are manufactured according to the strictest rules and regulations and are fabricated from only first class materials.

In our design the emphasis is on using durable solutions to ensure maximum quality, comfort and well-being of our customers, whether being a ship owner, ship yard or end user.

The units are manufactured with great deal of consideration given to the ease of handling and installation.

Throughout the production process the units are subjected to strict quality control to ensure that all of our supplies conform to our policy of supplying only first class quality.

ALUMINIUM CONSTRUCTION:
Prefabricated modular wet units for all types of marine accommodations also available in light weight, non-corrosive aluminium - B15 class. Weight reduction as much as 20-25%.

# WET UNITS TYPICAL DESIGN

Type 1 (1120 x 1240 mm)
A-module

Type 2 (1420 x 1720 mm)
B-module

Type 3 (1720 x 2020 mm)
C-module

Type 4 (1200 x 2000 mm)
B-module

Type 5 (1500 x 1600 mm)
B-module

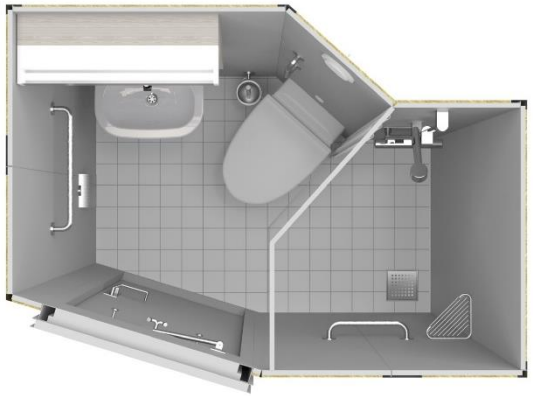
Type 6 (1600 x 1185 mm)
A-module

Wet units can, upon request, be delivered in "knock down" execution.

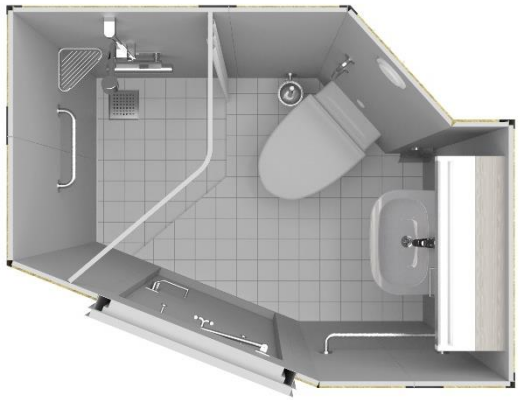
A = Toilet module
B = Shower module
C = Bath module

These units are for guidance only.
We deliver units according to customer specification and design.

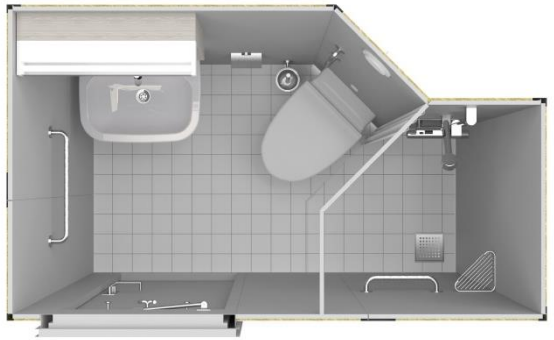
# WET UNITS TYPICAL DESIGN



Type 7 (1650 x 1180 mm)
B-module



Type 8 (1660 x 1250 mm)
B-module



Type 9 (1925 x 1125 mm)
B-module

Wet units can, upon request, be delivered in "knock down" execution.

A = Toilet module
B = Shower module
C = Bath module

These units are for guidance only.
We deliver units according to customer specification and design.

| TYPICAL STANDARD DETAILS | |
|---|---|
| Scupper | Stainless steel. PE, GRP |
| Outlet greywater | PEH, stainless steel |
| Fresh water pipe | Cu-pipe, Prisol , Alupex |
| Connection | B.S.P ½ " |
| Electrical cable | 3 x 1,5 $mm^2$ |
| Conduit pipe | Flexible |
| Door hinges | Stainless steel |

# WET UNITS TECHNICAL DETAILS

Norac wet units can be delivered with different draining systems according to our customer's specification.

Norac wet units are delivered with walls and ceilings manufactured in a sandwich construction with no open/visible insulation.

Bottom tray can be supplied in mild steel, stainless steel, aluminium and GRP.

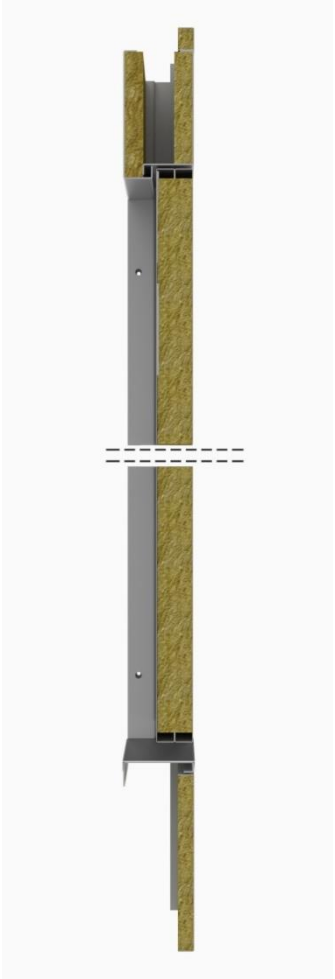
The floor pan is fully tested water tight, blasted and primed before application of finish.

Bottom tray with scupper and wall detail

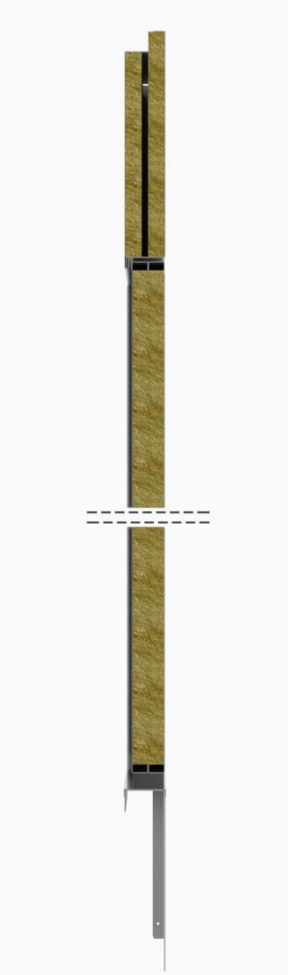
Bottom tray with tiled scupper and wall details with tiles

# DOORS TECHNICAL DETAILS

Doors top section view.



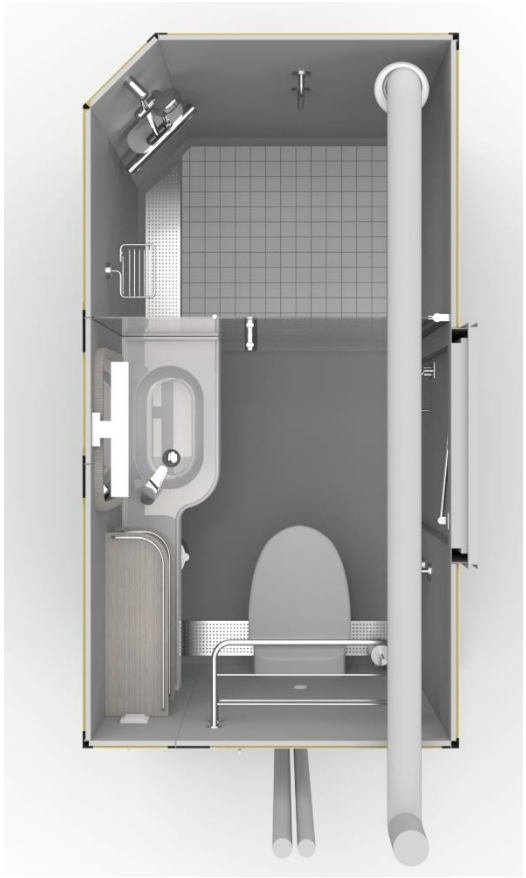
Doors side section double wall.



Doors side section single wall.

# WET UNITS DETAILS

Typical connection onboard.



# WET UNITS INSTALLATION

The standard units are delivered each with four square tubes for easy lifting and locating on board. A specially designed lifting frame is used for hoisting by crane.

After lifting on board, transportation wheels are fitted into the tubes. The units are then jacked up and transported to their final position.

All units are delivered with one adjustable leg at each corner to allow for levelling.

Norac wet units are so complete when delivered that after fixing them to the deck you only need connect the water, drainage and electricity to use them.

Norac wet units have been successfully installed on numerous vessels throughout the world, whether they are on a luxury cruise liner, commercial vessel or offshore platform.

Adjusting height of bathroom unit – option
1 pc placed on the corner of bathroom unit (normally 5 pcs on each unit)

Norac wet units are easy to handle and to locate on board

# WET UNITS STANDARD EQUIPMENT / ASSESSORIES

These are samples. Different brands can be provided.

# WET UNITS STANDARD EQUIPMENT / ASSESSORIES


These are samples. Different brands can be provided.

# WET UNITS CUSTOM MADE FOR NORAC

# WET UNITS CUSTOM MADE FOR NORAC

# FLOATING FLOORS

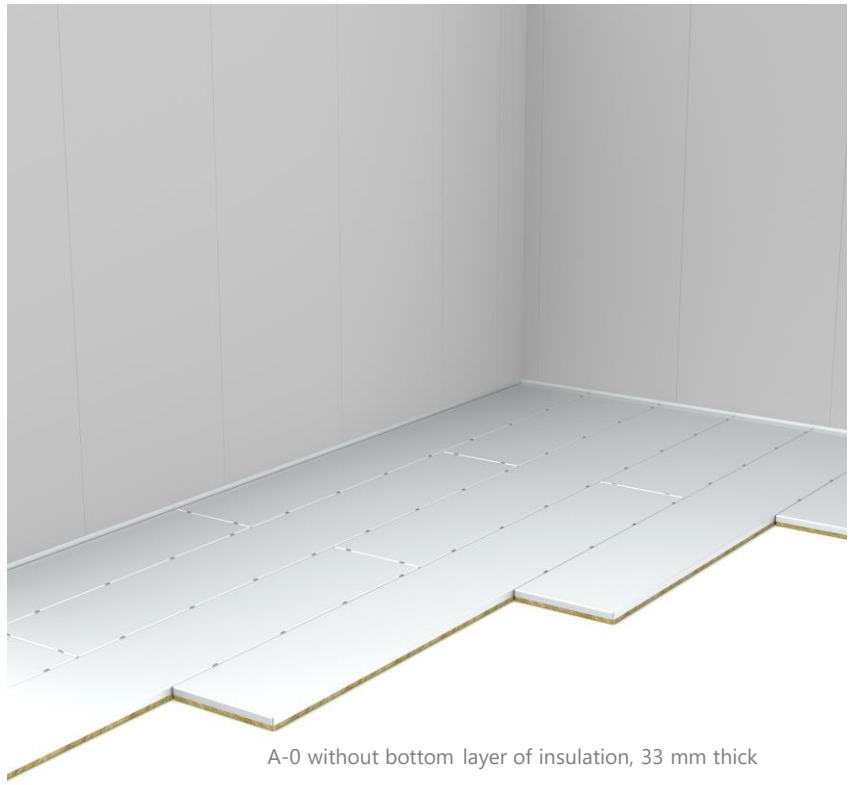
Norac manufactures and supplies floating floor systems designed for strength, safety, ease of installation and sound reduction properties. The floor system is constructed of galvanized steel cassettes of 3 mm thickness, but is easy to transport and install.

# FLOATING FLOORS / F-300 A-0/A-60

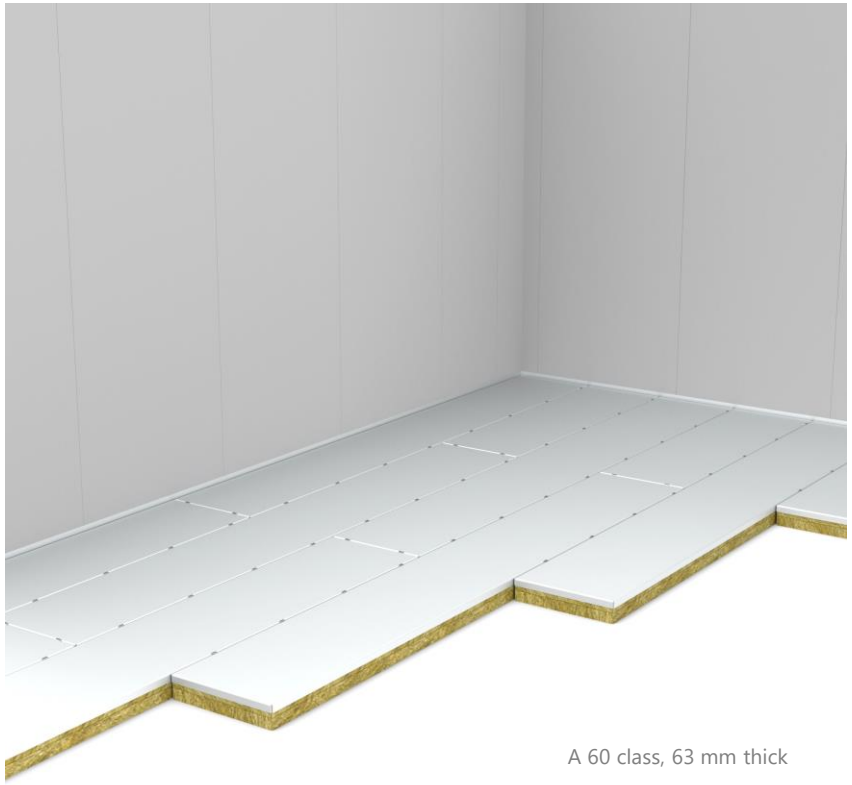
Galvanized steel casettes og 3 mm thickness.

All 4 edges are bent for maximum strength.

| DESCRIPTION | FLOATING FLOOR |
|---|---|
| Fire class | A-0 / A-60 |
| Dimensions | With 300 mm<br>Length 1970 mm |
| Weight | A-0: 33,6 kg/m$^2$<br>30 mm insulation<br>A-60: 46,3 kg/m$^2$<br>60 mm insulation |
| Steel | 3 mm galvanized |



A-0 without bottom layer of insulation, 33 mm thick



A 60 class, 63 mm thick

# TRADING

Here at Norac, we do our utmost to help out our customers as much as possible. In addition to our own products, Norac also has a wide range of sub-suppliers that can offer all kinds of accommodation equipment. For turn-key projects, Norac can include Furniture, Galley equipment, Freezer rooms, Helm chairs, Screed, Insulation and whatever is needed in a complete package to our customers. For more information on what we can offer, contact our sales department.

# BD SYSTEMS
# INTERNAL A-WALLS

Norac is manufacturing specialized internal and external firewalls on behalf of and in cooperation with BD Systems, UK. BD Systems are the largest UK provider of internal and external fire rated modular architectural systems. BD Systems deliver innovative fire and blast solutions to the Marine and Offshore industries worldwide. Utilising the strength of composite structures BD Systems have developed a range of products from A0 to H120 both decorative lightweight non load bearing systems and high strength blast resistant structures.

Collaboration between BD Systems and Norac AS for many years has enhanced the market position of both companies by being able to supply full turnkey project solutions covering cost, engineering and project management.

# BD SYSTEMS

# HEAVY DUTY WALLS / BD CIS 50 A-30

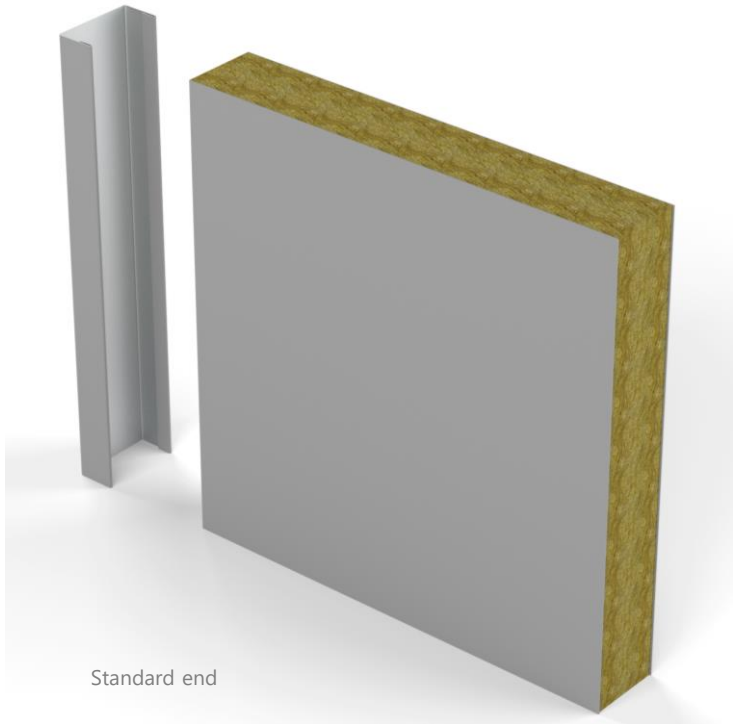
**C.I.S Panels**
Standing for "Clip In System". It is the ease and speed with which the CIS panel systems are installed and demounted that makes this system the most popular and widely used system in the market place today. All panels within the CIS range are rigid in strength and extremely flexible in cutting and installing. Available as a standard system.

**Details**
Non-load bearing composite firewalls for the offshore and marine industries.

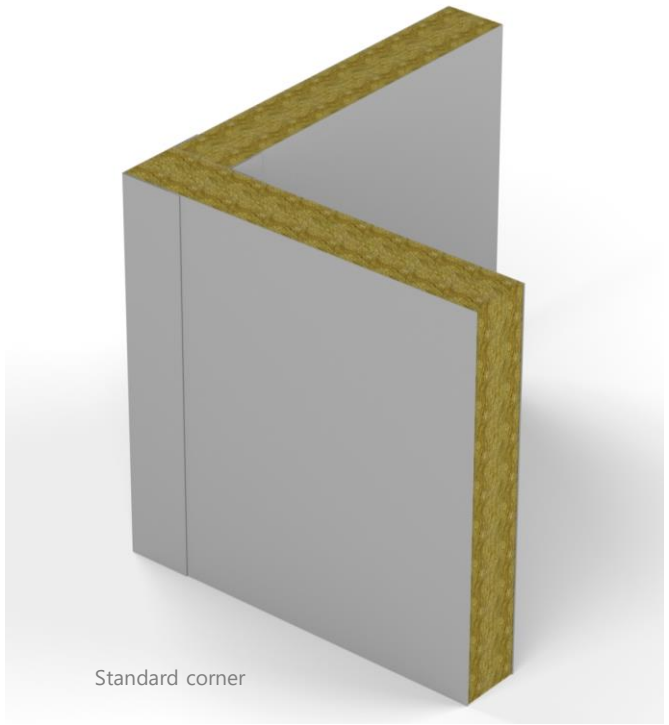
All weights shown are for the fully installed system and include all profiles.

| DESCRIPTION | CIS - 50 |
|---|---|
| Fire class | A0 – A30 / 1 hour |
| Standard width | 575 mm |
| Module length | up to 3000 mm |
| Thickness | 52 mm |
| Weight | 19,35 kg/$m^2$ |
| Sound reduction | Rw=32 dB |
| Thermal isolation | U=0.61 W/$m^2$ K |
| Application | Partition |

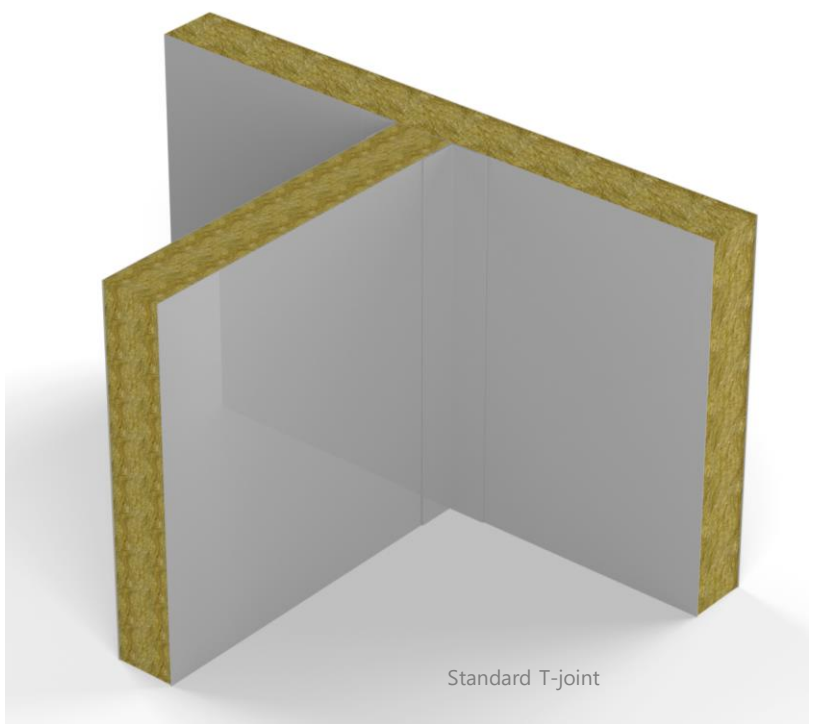
# HEAVY DUTY WALLS / BD CIS 50



Standard end

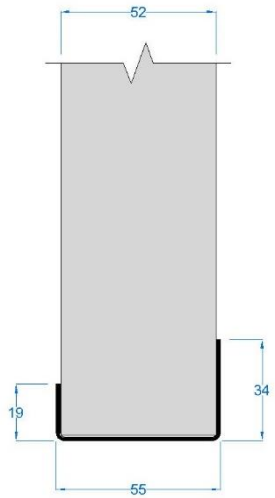


Standard corner

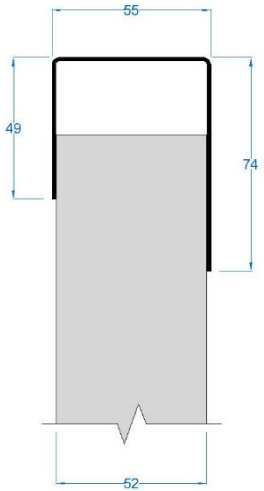


Standard T-joint

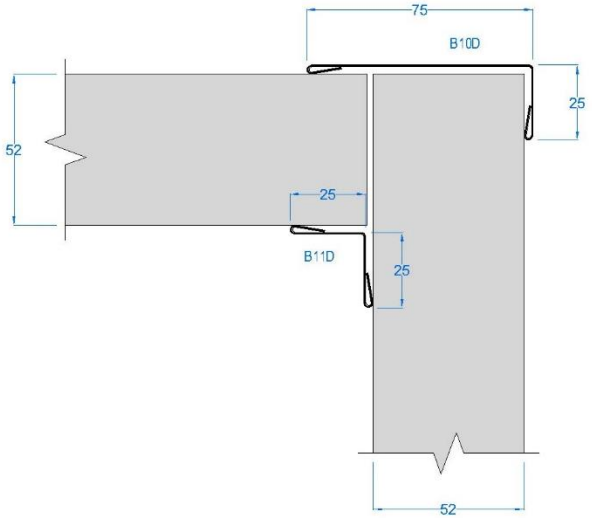
# BD CIS 50 / CONNECTING PROFILES



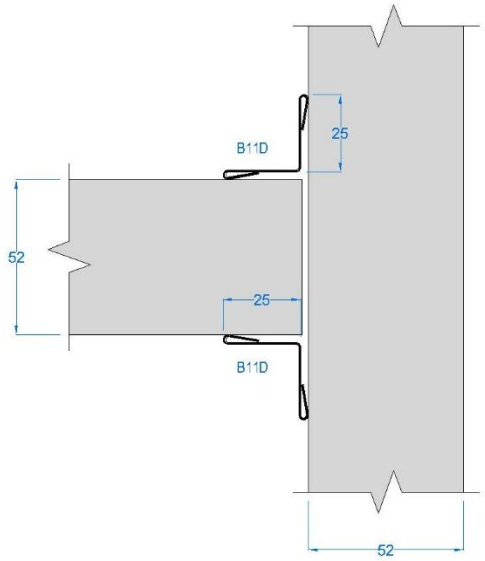

No: B7
Standard bottom profile



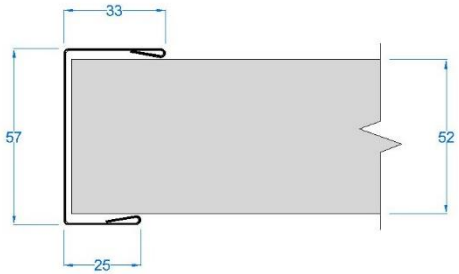

No: B2
Standard top profile




No: B10D / B11D
External/internal decorative angle profiles




No: 2 x B11D
Internal decorative angle profiles




No: B9D
Decorative U-profile 52 mm

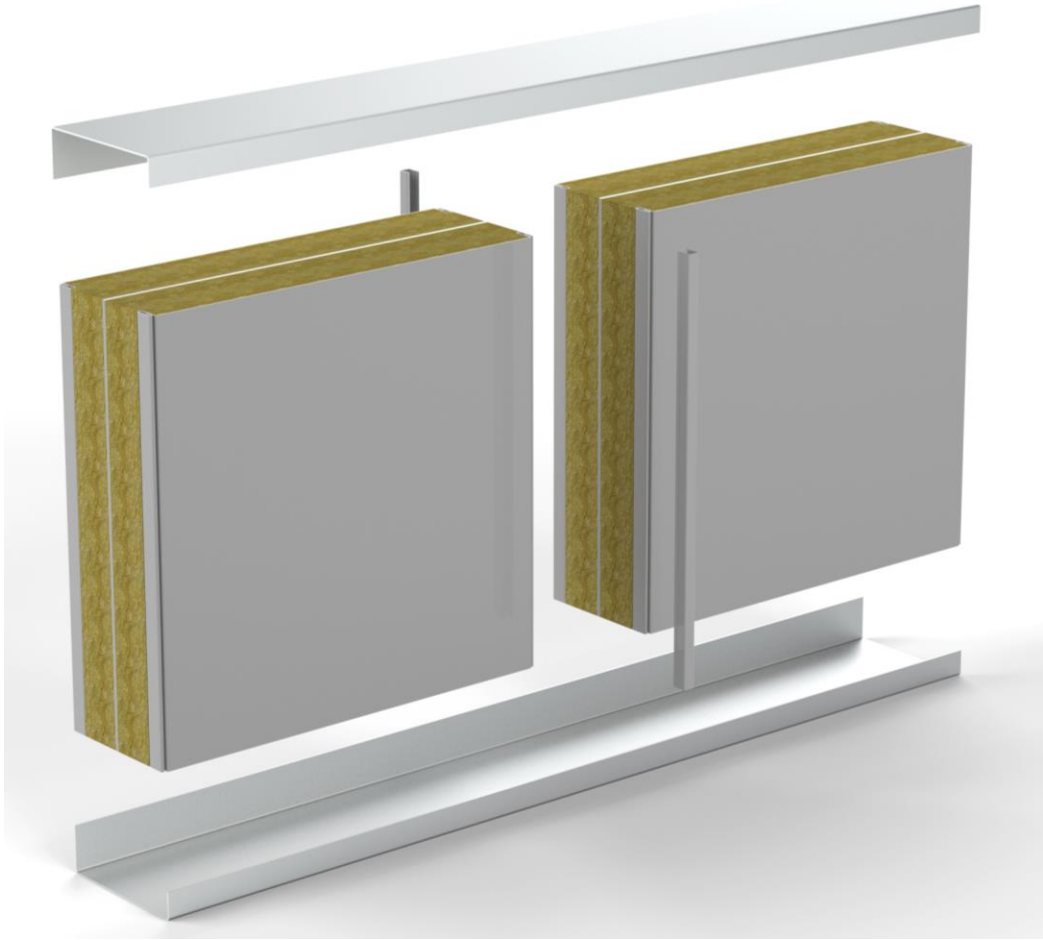
# HEAVY DUTY WALLS / BD CIS 100 A-60

**C.I.S Panels**
Standing for "Clip In System". It is the ease and speed with which the CIS panel systems are installed and demounted that makes this system the most popular and widely used system in the market place today. All panels within the CIS range are rigid in strength and extremely flexible in cutting and installing. Available as a standard system.

**Details**
Non-load bearing composite firewalls for the offshore and marine industries.

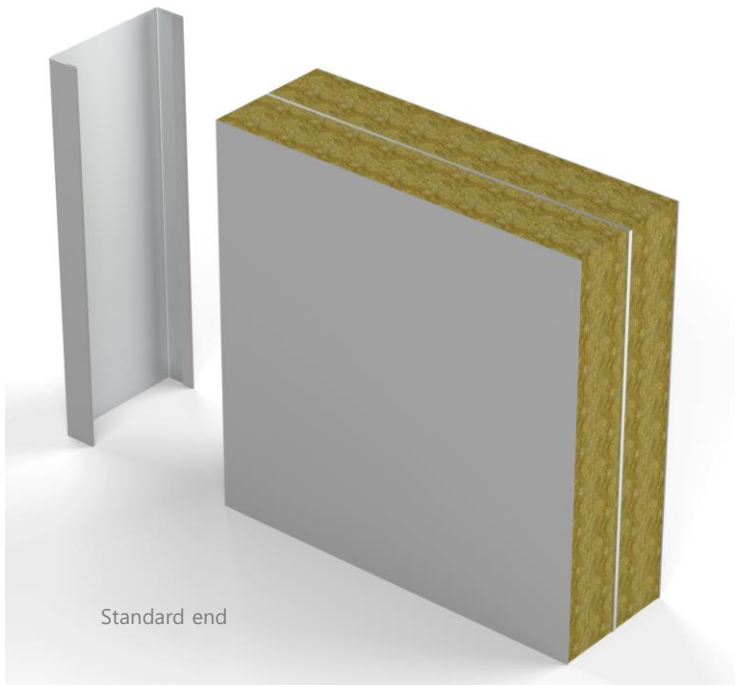
The A60 CIS-100A wall doubles as the BD special acoustic partition system giving a good sound reduction of 46 dB. The system is certified for use with perforated steel to either one or both panel faces.

All weights shown are for the fully installed system and include all profiles.
Standard Conduit Raceways size 20 x 30mm.

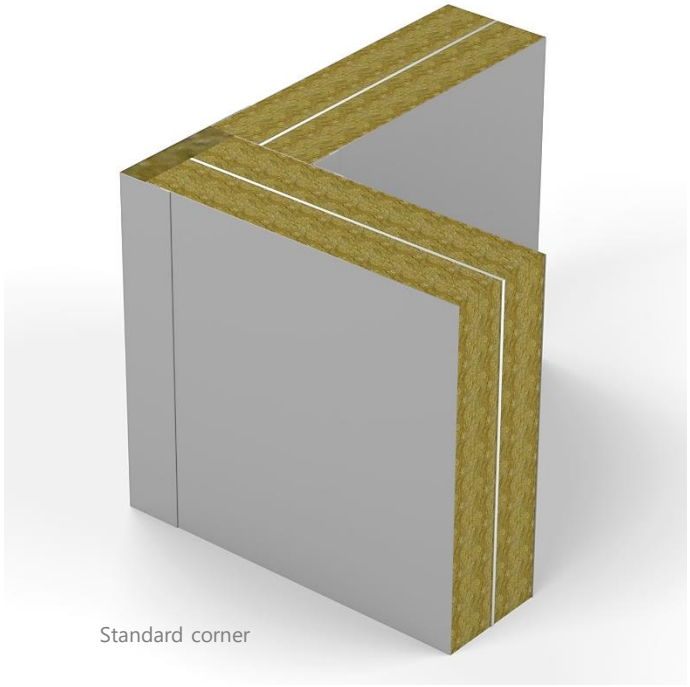


| DESCRIPTION | CIS - 100 | CIS – 100A |
|---|---|---|
| Fire class | A-60 / 1 hour | A-60 / 1 hour |
| Standard width | 575 mm | 575 mm |
| Module length | up to 3000 mm | up to 3000 mm |
| Thickness | 102 mm | 102 mm |
| Weight | 26.20 kg/$m^2$ | 30.62 kg/$m^2$ |
| Sound reduction | Rw=35 dB | Rw=46 dB |
| Thermal isolation | U=0.32 W/$m^2$ K | U=0.32 W/$m^2$ K |
| Application | Partition | Partition |

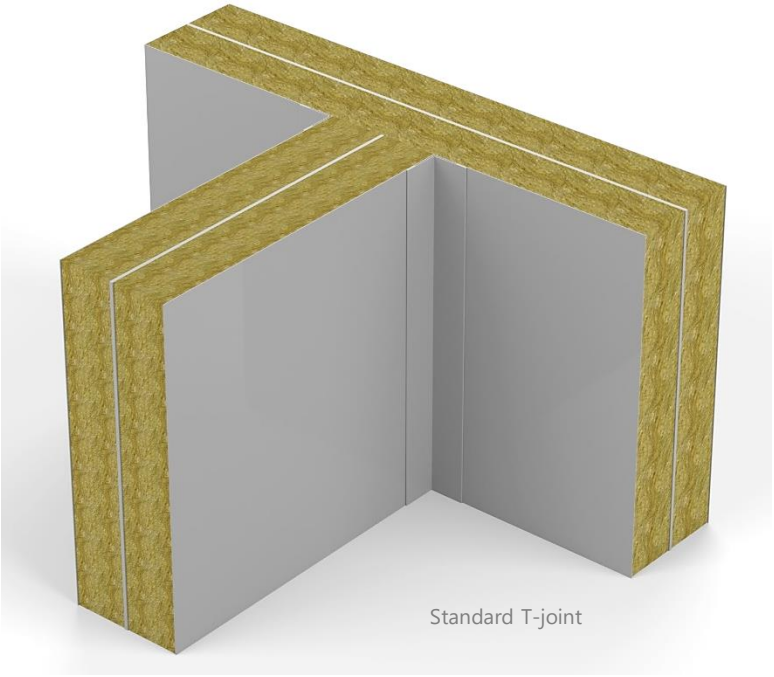
# HEAVY DUTY WALLS / BD CIS 100



Standard end

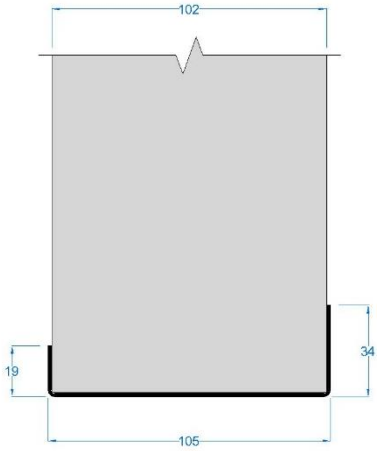


Standard corner

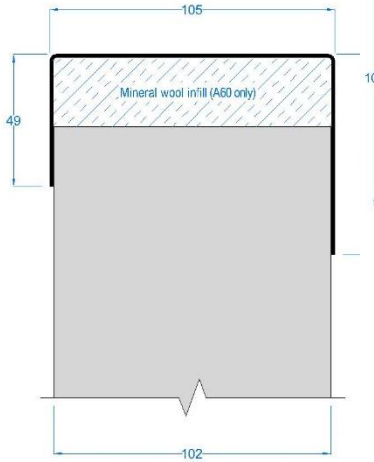


Standard T-joint

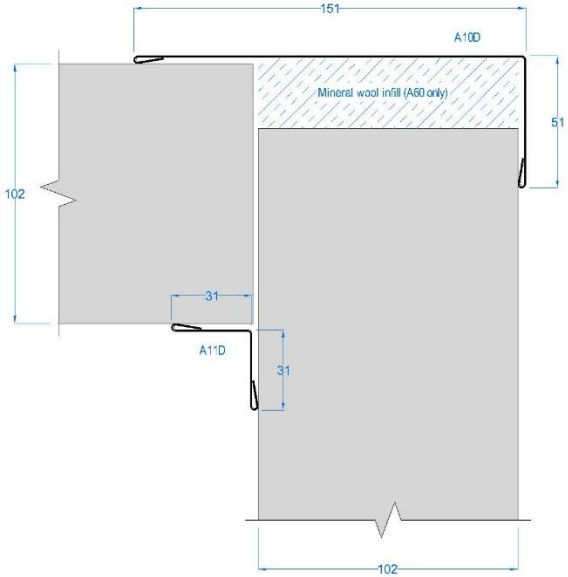
# BD CIS 100 / CONNECTING PROFILES



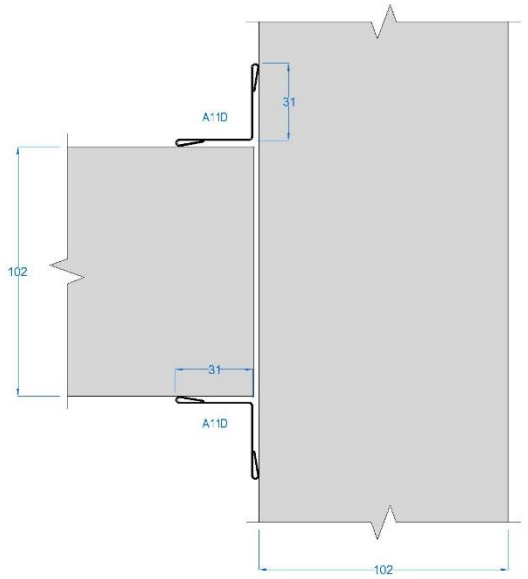

No: A7
Standard bottom profile



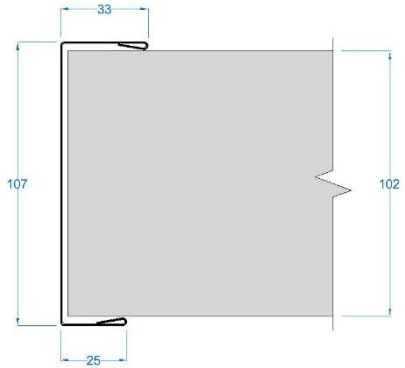

No: A2
Standard top profile




No: A10D / A11D
External/internal decorative angle profiles




No: 2 x A11D
Internal decorative angle profiles




No: A9D
Decorative U-profile 102 mm

# EXTERNAL / INTERNAL / BD HD100 A-60

A totally new and revolutionary concept in composite panel manufacturing.

- A fully mechanically fixed system
- Lightweight construction
- Wind and blast resistant

External
Non load-bearing stainless steel panels will replace conventional heavy steel plate cladding. No need for added insulation or decorative liners.

Internal
Non load-bearing decorative panels will replace conventional steel plate bulkheads with added insulation and decorative liners. Typically for use around Galley's, Laundry's and Plant Rooms.

| DESCRIPTION | HD 100 |
|---|---|
| Fire class | A-60 / 1 hour |
| Standard width | 1000 mm |
| Module length | up to 3000 mm |
| Thickness | 102 mm |
| Weight | 32 kg/$m^2$ |
| Sound reduction | Rw=40dB |
| Thermal isolation | U=0.32 W/$m^2$ K |
| Application | Partition |

# SOME REFERENCES

# REFERENCES
# ROALD AMUNDSEN

**CLIENT**
Kleven Verft/NMI

**OWVNER**
Hurtigruten
Handed over 2019

**DELIVERY**
Wall panels
Wet Units


ROALD AMUNDSEN

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS

DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# COLOR HYBRID

**CLIENT**
Ulstein Verft/R&M Ship Interior

**OWVNER**
Color Line
BN 311

**DELIVERY**
Doors
Wet Units
Wall panels


COLOR HYBRID

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# NORWEGIAN BLISS

**CLIENT**
Meyer Verft
EMS PreCab

**OWVNER**
NCL
Handed over 2018

**DELIVERY**
Wall panels
Ceilings
Wall hatches
Ceiling hatches


S 707
NORWEGIAN BLISS

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# WORLD DREAM

**CLIENT**
Meyer Verft
EMS PreCAB

**OWVNER**
Star Cruises
Handed over 2017

**DELIVERY**
Wall panels
Ceiling panels
Wall hatches
Ceiling hatches

S 712
WORLD DREAM

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# NORWEGIAN JOY

**CLIENT**
Meyer Verft
EMS PreCAB

**OWVNER**
NCL
Handed over 2017

**DELIVERY**
Wall panels
Ceiling panels
Wall hatches
Ceiling hatches


S 694
NORWEGIAN JOY

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# QUANTUM OF THE SEAS

**CLIENT**
Meyer Verft
EMS PreCAB

**OWVNER**
NCL
Handed over 2015

**DELIVERY**
Wall panels
Ceiling panels
Wall hatches
Ceiling hatches


S 697
QUANTUM OF THE SEAS

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# STAVANGERFJORD

**CLIENT**
Bergen Group Fosen

**OWVNER**
Fjordline

**DELIVERY**
Wall panels
Ceiling panels
Doors
Wet Units


## STAVANGER FJORD

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS
DESIGN • ENGINEERING • SUPPLY

# REFERENCES
# MAERSK MASTER

**CLIENT**
Kleven

**OWVNER**
Maersk
BN 382, 383, 384, 385, 386, 387

**DELIVERY**
Doors
Wet Units
Wall panels
Hatches


MAERSK MASTER

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS

DESIGN • ENGINEERING • SUPPLY

REFERENCES

# EDISON CHOUEST OFFSHORE TUGS

**CLIENT**
GulfShip / TampaShip/LAShip/North American Shipbuilding

**OWVNER**
Edison Chouest Offshore
BN 311, 312, 314, 315, 316, 317, 318, 320, 321, 324, 325, 326

**DELIVERY**
Wall panels
Doors


ELRINGTON

NORAC MARINE INTERIOR SYSTEMS

SHIP INTERIOR SYSTEMS

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# REFERENCES

# ESBERN SNARE / ABSALON

**CLIENT**
Odense

**OWVNER**
Danish navy
BN 191, 192

**DELIVERY**
Turnkey
Ceiling panels
Doors
Wet Units
Wall panels
Furnitures
Galley
Etc.

HDMS ESBERN SNARE

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# REFERENCES

# OLIVIA O

**CLIENT**
Ulstein Verft

**OWVNER**
Private Yacht
BN 307

**DELIVERY**
Wet Units

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OLIVIA O

# REFERENCES
# AMERICA'S FINEST

**CLIENT**
Dakota Creek Industries

**OWVNER**
Fishermen's Finest
BN63

**DELIVERY**
Wall panels
Doors
Wet Units

AMERICA'S FINEST

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# REFERENCES

# USNS SPEARHEAD

**CLIENT**
US Navy

**OWVNER**
US Navy

**DELIVERY**
A-class Walls

USNS SPEARHEAD

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# REFERENCES
# VIKABAS

**CLIENT**
Viknaslipen

**OWVNER**
Vikahav AS
BN 44

**DELIVERY**
Doors
Wall panels
Ceiling panels


VIKABAS

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# REFERENCES

# JOHAN SVERDRUP LQ

**CLIENT**
Apply Leirvik

**OWVNER**
Statoil/Equinor

**DELIVERY**
Doors
Wall panels
Ceiling panels
Hatches

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# REFERENCES
# IVAR AASEN

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**OWVNER**
Equinor/Det Norske

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