

# Maritime Connecting Solutions



# Range of applications



## NORMA® FGR

- Black and grey water
- Fresh water
- Ballast lines
- Bilge water
- Sprinkler systems
- Discharge lines
- Charged air lines
- Lubrication lines



## NORMA® TORRO®

- Hydraulic lines
- Lubrication lines
- Cooling lines
- Compressed air lines



## NORMA® First-Aid Repair Clamp

Repairs all kinds of damage on all kinds of pipes transporting liquid media and non-flammable gases up to 115 °C.



## ABA Original SMO

- Cooling lines
- Technical water



## NORMA® RSGU

- Supply lines
- Communication wires



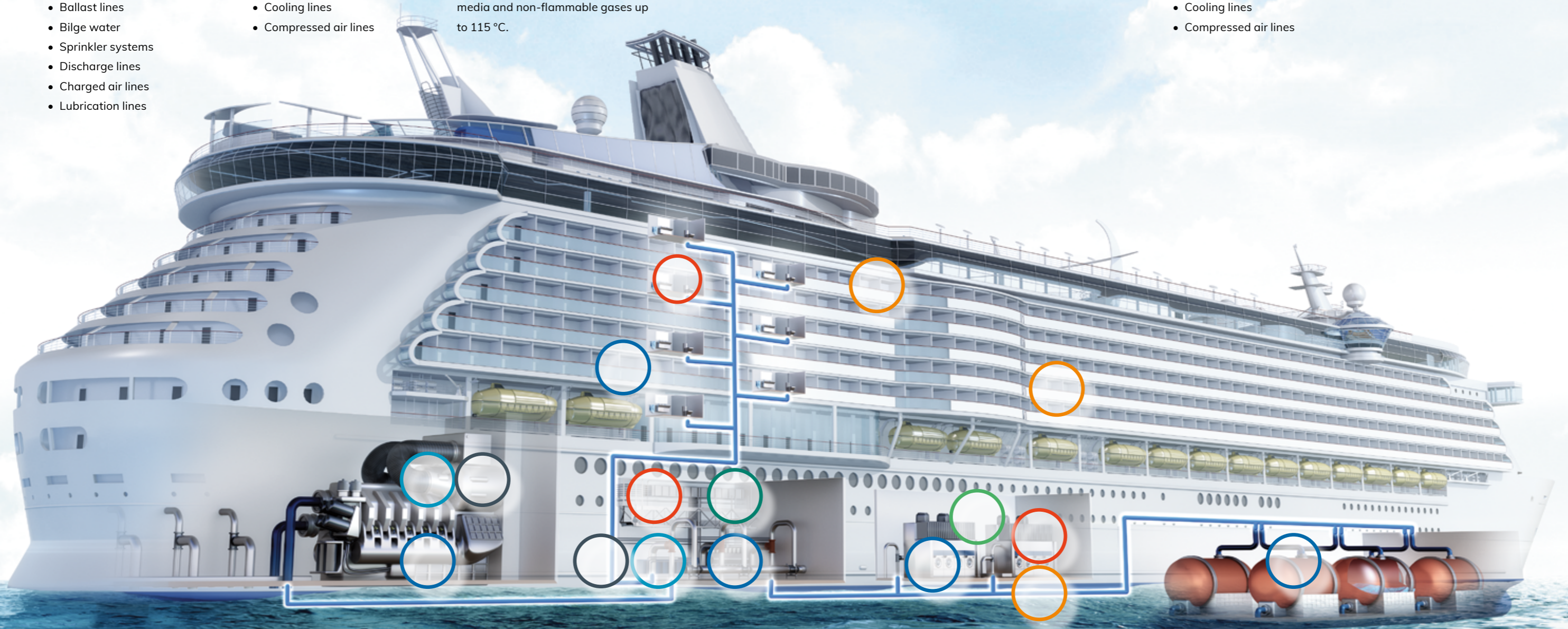
## NORMA® GBS

- Hydraulic lines
- Lubrication lines
- Cooling lines
- Compressed air lines



## NORMA® Stainless Steel Ties

- General fixing



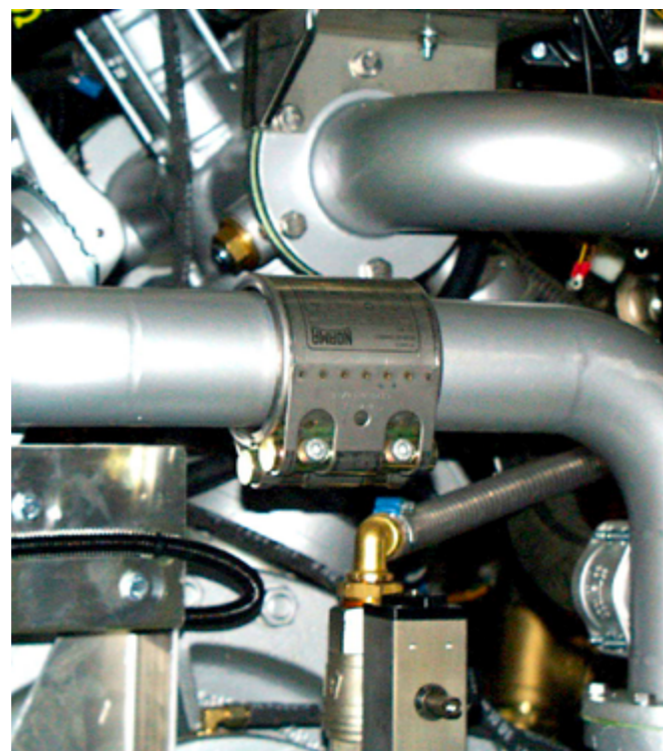
# Superior connecting solutions for shipbuilding NORMACONNECT® FGR pipe couplings

For decades, Norma has been a well-known partner for connecting solutions in the shipbuilding business for cargo vessels, container ships, RoRo-boats, passenger vessels and special supply and navy ships.

Our best-selling product range in this industry, FGR, provides the perfect coupling for all kind of welding free connections with a versatile choice of pipes (black steel, stainless steel, plastic, copper and copper nickel) meeting the international standards for shipbuilding according to IACS and other national approval authorities. FGR couplings guarantee compensations of pipe tolerances and dampens vibrations.

FGR pipe couplings are a compact, economical and reliable means for connecting plain-ended pipes. They are suitable for joining plastic and metal pipes and especially pipes made from stainless steel.

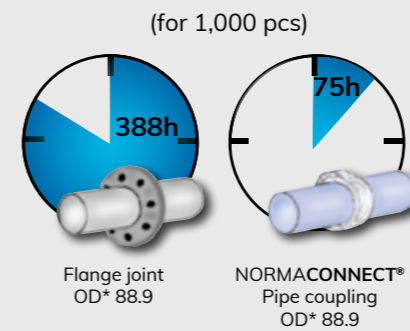
Supply pipes as well as exhaust pipes for solid, liquid or gaseous media can be joined easily and safely in a very short period of time even in narrow spaces. Thanks to the wide range of various types and sizes they are suitable for use both in standard and specialized applications.



# Compact, economical and reliable range NORMACONNECT® FGR benefits

## ✓ Time saving

- No welding
- No necessity for prior pipe alignment or treatment of pipe ends
- Up to 80% time saving
- Cost effective alternative



## ✓ Compensation of pipe tolerances

- Compensates for pipe gaps up to 65 mm
- Compensates for axial movements up to 7.5 mm
- Compensates for misalignment up to 3 mm

## ✓ Angular deflection

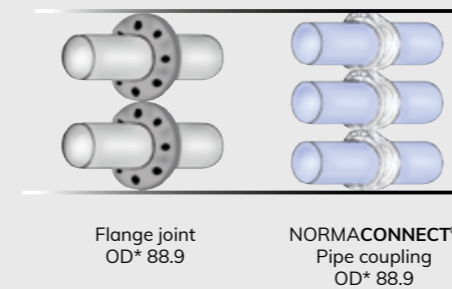
Compensates for angular deflection up to +/- 2° in total

## ✓ Practical use

- Detachable connection
- Re-usable

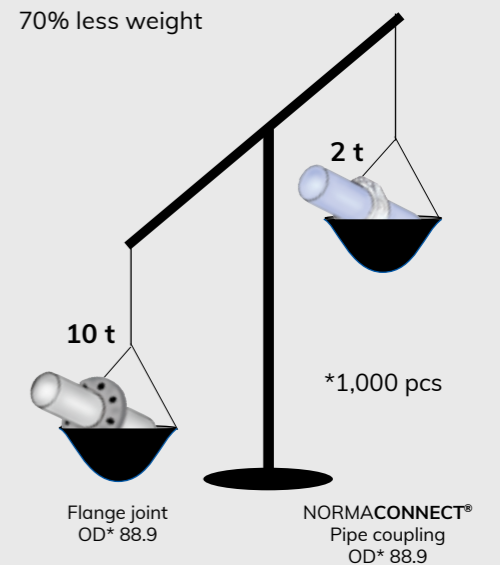
## ✓ Space saving

- Requires less space than conventional joining methods like flanges
- Can be installed in areas which are hard to access













## ✓ Weight saving









70% less weight




# Excellent coupling for all kinds of welding free connections

Connected pipes		Metal + metal	Plastic + plastic	Metal + plastic	Repair of metal or plastic
<b>Axial non restraint</b>					
Type	<b>Flex</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 1219.2 mm	26.9 - 168.3 mm	180.0 - 1219.2 mm
Material sealing sleeve	EPDM, NBR	16 bar	16 - 3 bar	16 / 10 bar	16 / 10 - 4 bar
Type	<b>Flex E</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 1219.2 mm	26.9 - 168.3 mm	180.0 - 1219.2 mm
Material sealing sleeve	EPDM, NBR	16 bar	13.5 - 2 bar	16 / 10 bar	16 / 10 - 4 bar
Type	<b>FlexGrip**</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 406.0 mm	26.9 - 168.3 mm	180.0 - 406.0 mm
Material sealing sleeve	EPDM, NBR	16 bar	16 - 3 bar	16 / 10 bar	16 / 10 - 4 bar
Type	<b>FlexGrip E**</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 406.0 mm	26.9 - 168.3 mm	180.0 - 406.0 mm
Material sealing sleeve	EPDM, NBR	16 bar	10 - 2 bar	16 bar	16 / 10 - 4 bar
Type	<b>Rep E</b>				
Material	W5				35.0 - 1219.2 mm
Material sealing sleeve	EPDM, NBR				16 - 4 bar
Type	<b>FARC</b>				
Material	W4				59.0 - 407.0 mm
Material sealing sleeve	EPDM, NBR				16 - 10 bar

RA	RA 26,9 - 168,3 mm	RA >180 mm
EPDM	-30 °C - +125 °C	-20 °C - +80 °C
NBR	-20 °C - +80 °C	-20 °C - +80 °C

Connected pipes		Metal + metal	Plastic + plastic	Metal + plastic	Repair of metal or plastic
<b>Axial restraint</b>					
Type	<b>Grip</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 406.0 mm		
Material sealing sleeve	EPDM, NBR, FKM	16 bar	16 - 4.5 bar		
Type	<b>Grip E</b> 				
Material	W2, W4, W5	26.9 - 168.3 mm	180.0 - 406.0 mm		
Material sealing sleeve	EPDM, NBR	16 bar	10 - 2.5 bar		
Type	<b>Combi Grip</b>				
Material	W5				200.0 - 406.0 mm
Material sealing sleeve	EPDM, NBR				16 - 6 bar
Type	<b>Combi Grip E</b>				
Material	W5				38 - 168.3 mm
Material sealing sleeve	EPDM, NBR				16 / 10 bar
Type	<b>Plastic Grip</b>				
Material	W5				200.0 - 406.4 mm
Material sealing sleeve	EPDM, NBR				16 - 6 bar
Type	<b>Plastic Grip E</b>				
Material	W5				40.0 - 168.3 mm
Material sealing sleeve	EPDM, NBR				16 / 10 bar

 Flame protection available

\* See type approvals for maximum dimension and pressure ratings

\*\* Metal = Grip side, Plastic = Flex side

## Available certifications



# Maritime Connecting Solutions

During the last few years the shipbuilding industry has become more and more important as both the transportation of goods (3.5 billion tons per year) and sea tourism (350 Mio passengers per year) has witnessed significant growth.

Shipyards world wide are using Norma products for applications such as ballast lines, freshwater, seawater, oil, scupper and lubrication lines.

[Discover more: normagroup.com](https://www.normagroup.com)

NORMA Group is a global market and technology leader in engineered joining technology, offering more than 40,000 product solutions for diverse applications (automotive, shipbuilding, aviation, infrastructure, etc.). As a listed company, NORMA Group has its headquarters in Maintal near Frankfurt/Main, with 9,100 employees serving customers in over 100 countries. In 2018, the company generated sales of more than EUR 1 billion.