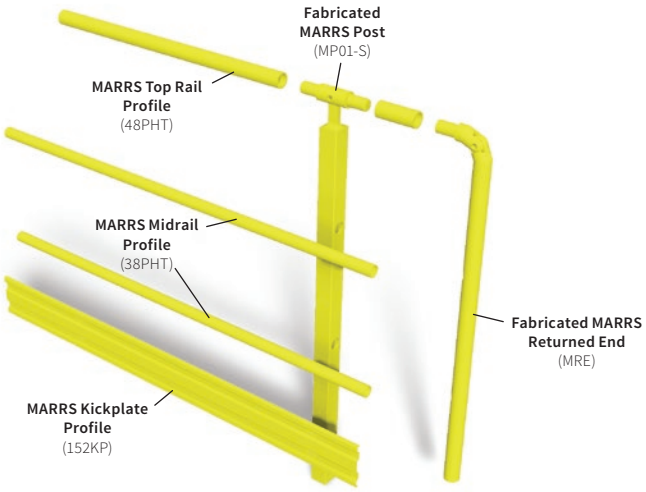
Bondstrand MARRS Offshore FRP Handrail Systems

4.2 kilometres of fire integrity type approved MARRS offshore handrails were installed on BP's Clair Ridge platform, North Sea, UK

Bondstrand™ MARRS™ offshore is a unique fire integrity type approved patented phenolic fiber Reinforced Polymer (FRP) handrail system designed and developed to specifically meet the required strength, toughness, fire reaction performance and safety properties demanded in offshore oil and gas installations.

MARRS offshore is significantly lower weight than steel equivalents and is highly corrosion resistant, with a design life of over 40 years offshore. These benefits provide substantial whole life cost savings, with significant OPEX cost reductions and often CAPEX cost savings.

MARRS offshore is compliant to onerous NORSOK, BS and ASTM standards, is ABS Type Approved and has been awarded Type Examination Certificate by DNV. It is manufactured from proven phenolic FRP materials, comprising patented phenolic FRP connection components and structural profiles. It provides overall risk reduction with through life integrity, continuous handgrip and low heat conduction (to address freeze burn risk).



Further product specification, catalog and PDMS CAD models available

Fire Integrity Type Approval

World first ABS Type Approval permits use in service and locations where fire integrity is required.

Advantages

- Non-conductive
- Lightweight
- Fast to install
- Low maintenance
- Pre-fabricated off-site
- Strong and durable

Product Compliance

Extensive testing has been undertaken to ensure MARRS offshore is capable of withstanding 1.5 kN/m loadings, meeting the following standards:

- ABS Type Approved – Certificate Number: 18-HS1753754-PDA
- DNV Type Examination – Certificate Number: TAK0000133
- NORSOK: N001, N003, C002, M001, S001
- DNV-OS-C501
- BS EN ISO 14122-3
- OSHA 1910 & ASTM E985

MARRS Offshore FRP Handrail Systems

Feature	MARRS Offshore FRP Handrail	Steel Offshore Handrail
Compliance	ABS Fire Integrity Type Approval Certificate Number: 21-2129121-PDA NORSOK Compliant DNV OS C501 Compliant ISO BS EN 14122 Compliant OSHA 1910 Load Compliant ABS Design Assessment Compliance DNV Type Examination Certificate	Compliance as required.
Strength	1.5 kN/m Horizontal Line Load & 1.0 kN Horizontal Point Load (NORSOK). 50 lb/ft Horizontal Line Load & 200 lb Point Load in any direction (OSHA & ASTM E985).	Compliance as required.
Weight	Typically 12 – 15 kg per linear metre depending on handrail configuration.	Typically 40 – 55 kg per linear metre depending on configuration.
Corrosion Resistance	NOV's phenolic FRP is inherently highly corrosion resistant & will not corrode in marine environments. Highly resistant long term to salt water & chemicals, no danger of internal unseen corrosion.	Will rust & suffer galvanic corrosion even in damp environments, especially in salt marine conditions. Will require expensive paint coatings or galvanising to minimise initial corrosion attack.
Safety	Long term structural integrity due to high corrosion resistance. "Warm to touch", even in sub-zero temperatures due to very low thermal conductivity.	Medium term structural integrity risks as corrosion (especially hidden corrosion) takes place. Conductive material, so potential for freeze burns.
Versatility and Field Fabrication	MARRS offshore can be site installed or modified without the need for additional protective coatings. Fully versatile with adjustable post and corner connectors for horizontal corners and stair ways.	Site modification to steel handrail is difficult, requires hot work equipment. Essential that corrosion barrier is properly reinstated once site modifications completed (almost impossible on site).
Installation	Easier to install due to significantly lower weight & only hand tools required.	Installation will likely require special lifting equipment, slowing installation & increasing cost.
Maintenance in Service	Virtually maintenance free, zero corrosion.	Continual maintenance programme, with repainting and corrosion preventative measures required.
Structural Integrity	Visual inspection only required to ensure physical damage has not occurred. Corrosion resistance ensures long term integrity over design life.	Regular careful inspection essential to ensure hidden corrosion (e.g. internal tube surfaces) have not compromised structural integrity.
Conductivity	Poor conductor of heat, minimal risk of freeze or heat burns. Good electrical isolator. No need for earthing or grounding.	Good conductor of heat, leading to potential risk of freeze or heat burns. Good electrical conductor, possible risk in electrical high voltage areas.
Electro Static Discharge	Proven to meet minimal electrostatic discharge requirements to BS EN 13463-1:2009 Group IIB minimum with no earthing required. Non-conductive, so no risk from sparking from dropped metallic object.	Conductive, so will require earthing. Risk of spark from dropped object.

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