

The logo for DMREO, with 'DM' in black and 'REO' in pink, followed by a trademark symbol (TM).

DMREOTM

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PRODUCT OVERVIEW

| PRODUCT OVERVIEW

Discover the cutting-edge evolution of reinforcement with **DMREO™** FRP Rebar, an innovative solution crafted to redefine construction standards. Leveraging advanced technology, **DMREO™** FRP Rebar introduces a new era of durability, strength, and sustainability in concrete reinforcement.

DMREO™ FRP Rebar is a ribbed, sand coated or spiral-wrapped Structural Reinforcing Rod, meticulously crafted from a combination of fiberglass roving and resin. As a superior alternative to steel in concrete reinforcement, it is the go-to choice for applications requiring a lightweight material with high tensile strength, non-corrosive, and nonconductive properties.

At the heart of **DMREO™ FRP rebar lies the entirety of its reinforcing fibres, constituting a remarkable 70% by weight, strategically aligned along the length of the bar to harness unparalleled strength. During the meticulous production process, a helical recess is ingeniously crafted on the surface of the rebar. This recess, thoughtfully designed, avoids any compromise to the core fibers while attaining a significant depth.**



The intention is twofold: not only to preserve the integrity of the core fibres but also to establish a profound key. This key mechanism serves as a strategic anchor, empowering the concrete to form a robust mechanical grip on the rebar, ensuring a symbiotic and enduring bond between the two materials.



ADVANTAGES OF DMREO™

BENEFITS OF DMREO™ FRP REBARS

Discover the advantages of **DMREO™** FRP Rebars, a cutting-edge alternative to traditional steel rebar, offering a host of benefits that transform construction practices:



NON-CONDUCTIVE MARVEL

Suited for environments with high voltage currents and magnetic fields, **DMREO** FRP Rebar provides a safe and reliable solution.



PRECISION CUTTING

DMREO™ FRP Rebar allows for precise and efficient cutting.



TENSILE PROWESS

With twice the tensile strength of steel, **DMREO™** FRP Rebar stands resilient under heavy loads.



ENHANCED BOND STRENGTH

Elevate rebar spacing with higher bond strength, optimizing structural integrity.



NON-MAGNETIC VERSATILITY

Find applications in hospitals and laboratories, where non-magnetic properties are paramount.



RISK-FREE ALTERNATIVE

Steer clear of accelerated corrosion pitfalls; **DMREO™** FRP Rebar eliminates the risks associated with epoxycoated steel, galvanized rebar, and stainless steel.



SUSTAINABILITY CHAMPION

Boasting a low carbon footprint, **DMREO™** FRP Rebar aligns with ecoconscious construction practices.



FEATHERWEIGHT ADVANTAGE

A mere 25% of steel weight translates to reduced labor, quicker on-site handling, and more cost-effective freight.

FRP VS STEEL REBARS

EXPLORING THE DISTINCTION: FRP VS STEEL REBARS

Concrete, robust in compression but fragile in tension, traditionally leans on steel reinforcement for its strength and cost-effectiveness. Yet, the specter of corrosion haunts steel, burdening governments with hefty maintenance bills and risking structural failure.

FRP gains traction as a steel substitute for its corrosion resistance, feather-light composition, and non-conductive nature. This not only assures durability in corrosive environments but also eases transportation and installation, making it ideal for electrical settings like rail structures.

In environments with thermal fluctuations, FRP stands as the unwavering contender. Its stable properties remain unaffected, offering reliability amidst temperature swings. Contrastingly, steel, with its susceptibility to external temperature impacts, experiences characteristic variations that may compromise its performance.

In the grand tapestry of construction materials, DMREO™ unfolds as a versatile and resilient player, not just reducing logistical burdens but also standing resilient against the impact forces that construction materials inevitably face. It's a story of lightweight triumph and steadfast stability, making FRP a compelling choice in the dynamic landscape of construction innovation.

PROPERTIES	DMREO™	STEEL REBAR
WEIGHT	1/4 of Steel Weight	10mm 0.617kg/m
STRENGTH	206.5 MPa	248.2 MPa
ELECTRICAL CONDUCTIVITY	Non-Conductive	Conductive
THERMAL CONDUCTIVITY	Low	High
CORROSION RESISTANCE	High (Unaffected by Weather)	LOW (Without Expensive galvanization treatment, bars of steel are subject to oxidation)
HEAVY LOAD RESISTANCE	NO PERMANENT DEFORMATION	CAN BE PERMANENTLY DEFORMED
COST	Lower manufacturing, maintenance, and transportation expenses (related to lightweight)	Lower material costs but higher overall cost of production, transportation, installation, and technical maintenance



SPECIFICATION

| SPECIFICATION

MECHANICAL PROPERTIES

NOMINAL BAR DIAMETER (mm) ^a	Design Values ^b		Manufacturing Cross-Sectional Area Limits (mm ²)		Guaranteed Tensile Strength (MPa)	
	DIAMETER (mm)	Cross-Sectional Area (mm ²)	Minimum	Maximum	Grade 46	Grade 60
6	6.3	32	30	55	840	1000
10	9.5	71	67	104	830	1000
12	12.7	129	119	169	740	1000
16	15.9	199	186	186	650	1000
20	19.1	284	268	268	640	1000
22	22.2	387	365	365	620	900
24	25.4	510	476	476	580	900
28	28.7	645	603	603	560	800
32	32.3	819	744	744	560	800

Based on the MOE (Modulus of Elasticity), the FRP rebars can be categorized into 2 grades:

Grade 46: MOE ≥ 46 GPa

Grade 60: MOE ≥ 60 GPa

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES	ASTM	VALUE	UNIT
BAR HARDNESS	D-2583	45	-
24 HOUR WATER ABSORPTION	D-570	0.45	% Max
DENSITY	D-792	1.72 - 1.94	g/cm ³
BAR HARDNESS	D-696	12	10 ⁶ cm/cm/°C

ELECTRICAL PROPERTIES

ELECTRICAL PROPERTIES	ASTM	VALUE	UNIT
ARC RESISTANCE (LW)	D-495	120	seconds
DIELECTRIC STRENGTH (LW)	D-149	1.37	kv/mm
DIELECTRIC STRENGTH (PF)	D-149	200	Volt/mm
DIELECTRIC CONSTANT (PF)	D-150	5	@60Hz

ELECTRICAL PROPERTIES

FLAMMABILITY PROPERTIES	ASTM	VALUE	UNIT
TUNNEL TEST	E-84	<25	FLAME SPREAD
FLAMMABILITY	D-635	NON BURNING	-
UL	94	VO	-
NBS Smoke Chamber	600-700	600-700	SMOKE DENSITY

The properties of **DMREO™** are flexible and can be tailored, enhanced, and customized to meet specific requirements. For additional information, feel free to reach out to our team of experts.

DMREO™ FRP rebars offer the flexibility to be crafted with bends; however, it's essential to note that the tensile strength at the bend is decreased by approximately 50%, and the internal diameter of the bend is four times that of the bar diameter.



APPLICATION

| APPLICATION

Explore the diverse realms where **DMREO™** FRP Rebar emerges as a transformative force, offering unparalleled advantages in applications susceptible to corrosion, challenging environments, and specialized structural needs.

1. Concrete Susceptible to Corrosion:

- **Waste Water Treatment Facilities:** Enhance longevity in corrosive environments.
- **Swimming Pools:** Ensure durability in chlorine-rich settings.

2. Tunneling & Mining:

- **Sequential Excavation or Tunneling:** Provide reliable reinforcement in tunnel construction.
- **Deep Foundation Tunnel Boring Machine "Soft-Eye" Opening:** Optimize launch and reception areas.
- **Temporary Reinforcement:** Address immediate structural needs.
- **Rock Bolts:** Strengthen rock structures securely.

3. Building & Historic Preservation:

- **Historic Preservation - Restoration & Pinning of Stone Elements:** Safeguard architectural heritage.
- **Architecture Concrete Elements:** Elevate the strength of concrete structures.
- **Slabs:** Ensure stability in diverse construction scenarios.

4. Exposure of Concrete to De-Icing Chlorides:

- **Bridges & Railings:** Bolster infrastructure against de-icing agents.
- **Median Barriers:** Enhance safety barriers' resilience.
- **Parking Structures:** Reinforce parking facilities for prolonged life.
- **Approach Slabs:** Fortify road and bridge approaches.
- **Continuously Reinforced Concrete Paving:** Optimize durability for roadways.
- **Precast Elements:** Strengthen precast concrete components.
- **Salt Storage Facilities:** Ensure longevity in corrosive storage environments.

5. Masonry Strengthening:

- **Seismic, Wind or Blast Strengthening of Unreinforced Masonry:** Reinforce masonry structures against external forces.
- **Strengthening for "Event Loading" of Clay & Concrete Masonry:** Provide robust reinforcement for varying load conditions.

6. Exposure of Concrete to Marine Chlorides:

- **Coastal Construction exposed to Salt Spray:** Withstand harsh coastal conditions.
- **Sea Walls, Wharfs & Dry Docks:** Ensure structural integrity in marine environments.
- **Desalinization Intakes:** Optimize reinforcement for desalination facilities.
- **Port Aprons:** Strengthen port infrastructure against marine elements.

7. Exposure of Concrete to High Voltages & Electromagnetic Fields:

- **Light & Heavy Rail:** Ensure electrical insulation in rail environments.
- **High Voltage Substations:** Safeguard against high-voltage challenges.
- **Radio Frequency Sensitive Areas:** Provide non-conductive reinforcement in sensitive zones.
- **Hospital MRI Areas:** Reinforce structures in electromagnetic-sensitive medical environments.
- **Aluminum Smelters & Steel Mills:** Withstand extreme conditions in metal processing.
- **High-Speed Highway Tolling Zones:** Ensure durability in tolling infrastructure.
- **Airport Radio & Compass Calibration Pads:** Reinforce critical areas for aviation navigation.



In every application, **DMREO™** FRP Rebar emerges as a resilient, corrosion-resistant, and versatile solution, revolutionizing the way we approach construction challenges across diverse industries.



INSTALLATION

| INSTALLATION

Embarking on the installation of **DMREO™** FRP Rebars involves a meticulous process that ensures not just placement but longevity and strength in your structures. Let's delve into the detailed and intriguing steps to make this process a seamless success.

Step 1: Craft the Perfect Canvas

Creating a conducive work environment is the first brushstroke in the installation masterpiece:

- Clear the construction canvas of any impediments, be it debris, rocks, or unwelcome vegetation.
- Compact and level the ground, establishing a robust foundation for the FRP rebar.
- Strategically plan the layout and dimensions, aligning with project requirements and design intricacies.

Step 2: Precision Unleashed - Cutting and Positioning

With the canvas prepared, it's time to sculpt the FRP rebar to perfection:

- Measure and mark the required length with precision, using a measuring tape and marker.
- Employ specialized cutting tools crafted for FRP rebar, ensuring clean and accurate cuts.
- Position the cut rebar in predetermined spots, guaranteeing alignment and spacing congruent with project demands.

Step 3: Locking in Stability

Stability is the keystone for the integrity of your structure. Here's how to ensure it:

- Utilize rebar chairs, supports, or tie wire, elevating the rebar from the ground or formwork.
- Fasten the rebar securely, resisting any movement during the concrete pouring ballet.
- Validate alignment and positioning before advancing to the next act.



| INSTALLATION

Step 4: Spacing Symphony and Connection Choreography

For a reinforced concrete symphony, spacing and connection become the dance partners:

- Refer to project specifications or engineering drawings to dictate the required spacing.
- Employ rebar spacers or chairs, maintaining the desired distance between rebar layers.
- Overlap rebar sections according to project requirements, ensuring a seamless connection and uninterrupted flow.

Step 5: The Grand Finale - Pouring and Perfecting Concrete

With the cast ready, it's time for the grand finale – the concrete pour:

- Mix concrete with precision, aligning with project specifications for the perfect blend of consistency and strength.
- Pour the concrete with an artisan's touch, ensuring it envelops and embraces the **DMREO™** FRP Rebar.
- Employ vibrating tools to eliminate air pockets, guaranteeing thorough compaction of the concrete.
- Sculpt the concrete surface to perfection using trowels or other apt tools.
- Allow the concrete to cure and solidify as per recommended timeframes, setting the stage for subsequent construction acts.

In every step of the **DMREO™** FRP Rebar installation, precision, artistry, and structural mastery combine, promising not just durability but an enduring testament to your commitment to excellence.



COMPLIANCE WITH STANDARDS

MEETING STANDARDS AND INTERNATIONAL CODES

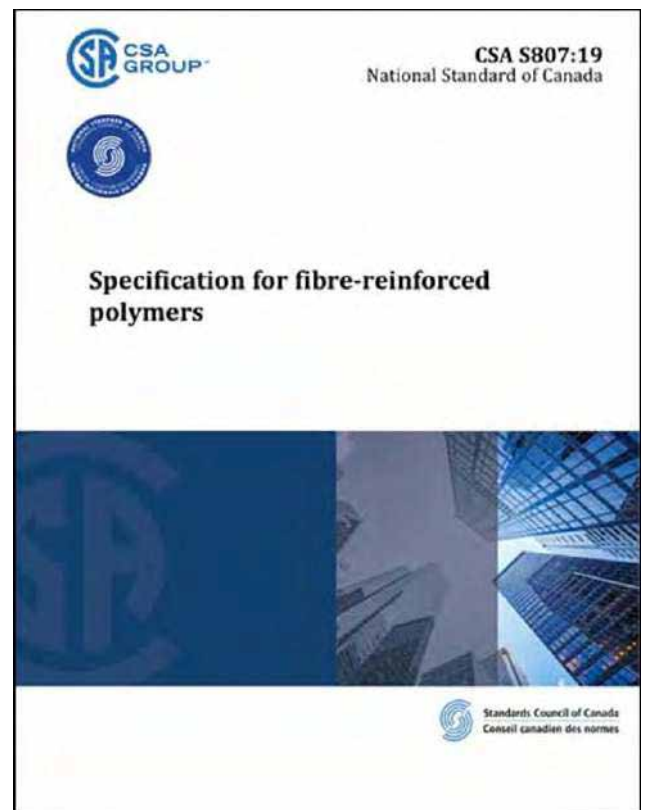


At DM Composites, we take immense pride in presenting our DMREO™ FRP Rebar, a revolutionary solution that not only complies with but surpasses the stringent standards set by AS 5204:2023.

This Australian industry-standard guideline meticulously outlines the criteria for acceptable materials and delineates the minimum physical, mechanical, and durability properties for glass and basalt fiber-reinforced polymer bars utilized in internal and non-prestressed reinforcing concrete, whether in the form of straight or bent bars.

Assumptions in Design:

- The assumption is made that plane sections will retain their planarity after deformation.
- A concrete strain limit of 0.0035 is considered as the ultimate threshold.
- For simplification, the tensile strength of concrete and the compressive strength of FRP are disregarded in the design.
- The assumption is made that the bonding between FRP and concrete is perfect.
- In the stress-strain relationship of FRP, linearity is assumed until the point of failure.
- Loads and load factors are the same as those for steelreinforced element design.



ENVIRONMENTAL IMPACT

DMREO™ FRP Rebar: A Sustainable Structural Solution

In an era where environmental consciousness plays a pivotal role in every industry, **DMREO™** FRP Rebar stands as a beacon of sustainability within the realm of structural reinforcement. This innovative fiber-reinforced polymer rebar not only excels in performance but also significantly reduces the environmental impact associated with traditional materials.

Key Environmental Benefits:

1. Reduced Carbon Footprint:

- **DMREO™** FRP Rebar is inherently eco-friendly, contributing to a substantial reduction in the overall carbon footprint. Its production involves processes that are less energy-intensive compared to traditional alternatives, thereby mitigating environmental strain.

2. Longevity and Durability:

- The exceptional durability of **DMREO™** FRP Rebar translates into extended service life for structures. This longevity minimizes the need for frequent replacements, reducing the demand for raw materials and energy associated with manufacturing new reinforcement components.

3. Lightweight Nature:

- **DMREO™** FRP Rebar's lightweight properties not only simplify handling during installation but also contribute to energy savings in transportation. The reduced weight translates to lower fuel consumption and, consequently, a diminished environmental impact.

4. Zero Rusting and Leaching:

- Traditional steel reinforcement is often associated with rusting and leaching, which can have adverse effects on the surrounding environment. **DMREO™** FRP Rebar, being non-metallic, eliminates these concerns, ensuring a cleaner and environmentally safer construction process.

5. Recyclability:

- **DMREO™** FRP Rebar is designed with an emphasis on recyclability. At the end of its service life, the rebar can be repurposed or recycled, contributing to a circular economy approach and minimizing the generation of construction-related waste.

DMREOTM

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