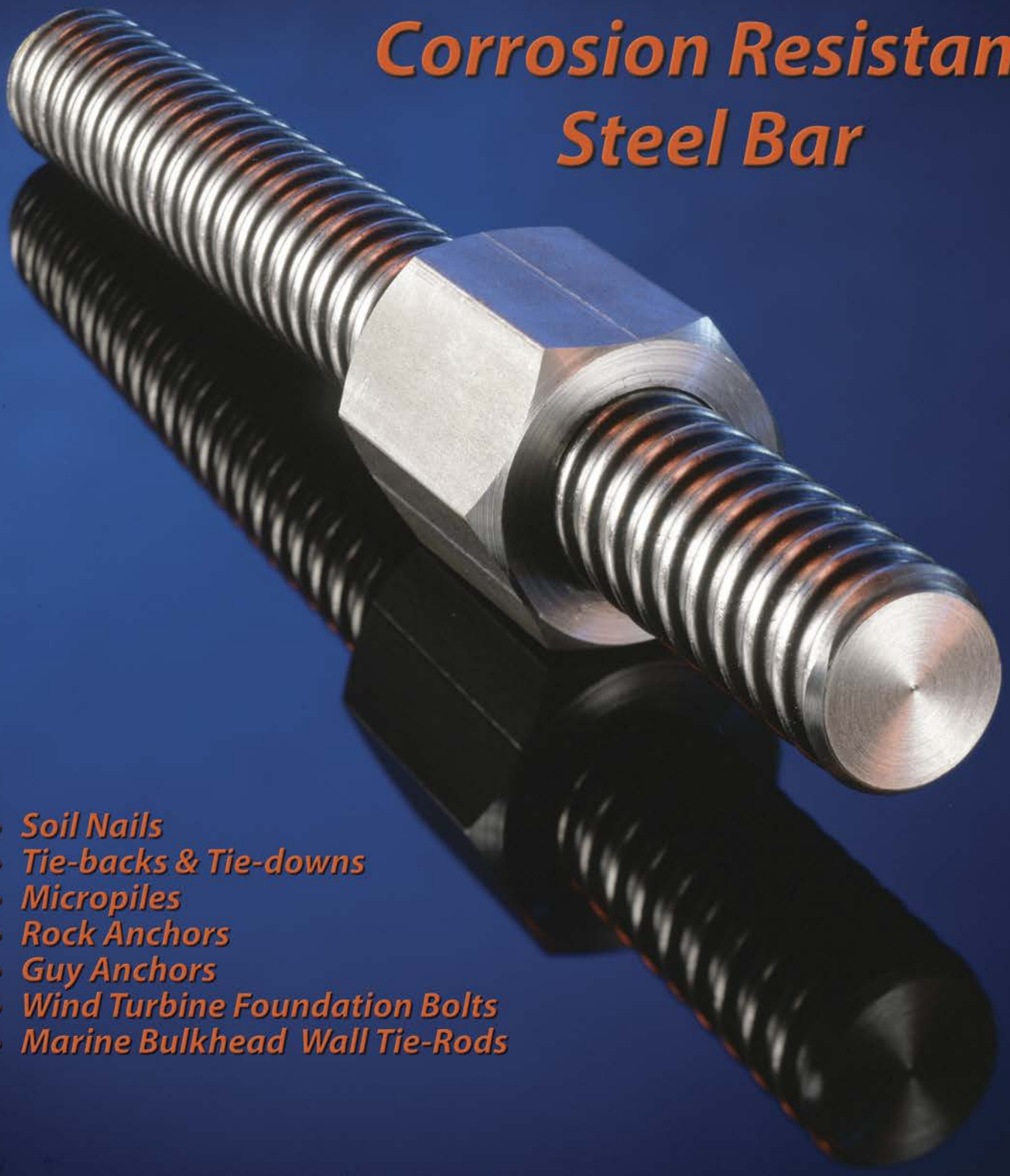
WILLIAMS FORM ENGINEERING CORP.

MMFX STEEL

Uncoated Corrosion Resistant Steel Bar



- Soil Nails
- Tie-backs & Tie-downs
- Micropiles
- Rock Anchors
- Guy Anchors
- Wind Turbine Foundation Bolts
- Marine Bulkhead Wall Tie-Rods

No. 713

Uncoated Corrosion Resistant Steel Bar

Williams Form Engineering is proud to bring to the civil engineering market the most technologically advanced corrosion resistant steel utilizing the MMFX Steel technology. MMFX steel supplied by Williams conforms to ASTM A1035 Grade 120 with tensile and yield strengths of 150 ksi and 120 ksi respectively. Additionally, it is provided with the Williams Form Engineering proprietary thread form that conforms to the deformation pattern requirements of ASTM A615. This thread form is currently used in many civil engineering applications around the globe.

The technology of MMFX steel is specially formulated out of a low carbon, chromium alloy steel that lacks the typical grain boundaries of carbides and ferrites found in conventional carbon steel. It is this matrix of carbides and ferrites which cause a “battery like” effect and corrodes conventional steel from the inside out. Steel produced from MMFX nanotechnology minimizes the formation of a corrosive current and at least a four-fold increase in longevity is realized over conventional carbon reinforcing steels when encased in concrete. The resulting MMFX steel provides high strength, good ductility and provides corrosion resistance without the use of coatings.

R41 MMFX Steel All-Thread-Bar - ASTM A1035

Bar Designation Nominal Diameter	Minimum Net Area Thru Threads	Minimum Ultimate Strength	Minimum Yield Strength	Nominal Weight	Approximate Thread Major Diameter	Part Number
#6 - 3/4" (19 mm)	0.44 in^2 (284 mm^2)	66 kips (245 kN)	52.8 kips (196 kN)	1.5 lbs./ft. (2.36 Kg/M)	7/8" (22.2 mm)	R41-06
#7 - 7/8" (22 mm)	0.60 in^2 (387 mm^2)	90 kips (400 kN)	72 kips (320 kN)	2.0 lbs./ft. (3.04 Kg/M)	1" (25.4 mm)	R41-07
#8 - 1" (25 mm)	0.85 in^2 (549 mm^2)	128 kips (567 kN)	102 kips (454 kN)	3.09 lbs./ft. (4.6 Kg/M)	1-1/8" (28.6 mm)	R41-08
#9 - 1-1/8" (29 mm)	1.00 in^2 (645 mm^2)	150 kips (667 kN)	120 kips (534 kN)	3.4 lbs./ft. (5.06 Kg/M)	1-1/4" (31.8 mm)	R41-09
#10 - 1-1/4" (32 mm)	1.25 in^2 (807 mm^2)	188 kips (834 kN)	150 kips (667 kN)	4.51 lbs./ft. (6.71 Kg/M)	1-7/16" (36.5 mm)	R41-10
#11 - 1-3/8" (36 mm)	1.58 in^2 (1019 mm^2)	237 kips (1054 kN)	190 kips (843 kN)	5.71 lbs./ft. (8.50 Kg/M)	1-9/16" (39.7 mm)	R41-11
#14 - 1-3/4" (43 mm)	2.60 in^2 (1664 mm^2)	390 kips (1735 kN)	312 kips (1388 kN)	9.06 lbs./ft. (13.48 Kg/M)	2" (50.8 mm)	R41-14

Advantages of MMFX Steel

- High Strength + Corrosion Resistance = Lower Costs (100+ year service life)
  The high strength of MMFX Steel allows the use of smaller bar sizes to provide equivalent strength when traditional reinforcing steel is used in design.
- Mitigates future repair costs since MMFX Steel is more than four times more corrosion resistant than traditional carbon steel.
- No coatings required – MMFX Steel technology eliminates the need for coatings that are used on conventional reinforcing steel, reducing coating costs, procurement time and eliminating the need for costly coating inspection and repair prior to steel installation.
- Material handling issues – Since no coating is required with MMFX Steel, no special handling is required to protect coatings from damage.
- All-Thread Bar – Versatile and robust thread form allows unlimited field splicing and end attachment possibilities.
- Provides lower costs and higher strengths compared to stainless steels.
- Cost competitive with ASTM A722 galvanized bar.
- Meets the mechanical properties of ASTM A722.
- Material and weight savings as compared to sacrificial steel corrosion protection designs.
- MMFX Steel conforms to the ductility requirements of conventional ASTM A615 Grade 75 reinforcing steel.

Fasteners

R42 Stop-Type Coupling - ASTM A29

Bar Desig. & Nominal Dia.	Outside Diameter	Overall Length	Part Number
#6 - 3/4" (19 mm)	1-1/4" (31.8 mm)	3-1/4" (82.5 mm)	R42-06
#7 - 7/8" (22 mm)	1-7/16" (36.5 mm)	3-3/4" (95.3 mm)	R42-07
#8 - 1" (25 mm)	1-3/4" (44.5 mm)	4-1/4" (108 mm)	R42-08
#9 - 1-1/8" (29 mm)	2" (50.8 mm)	4-3/4" (121 mm)	R42-09
#10 - 1-1/4" (32 mm)	2-1/4" (57.2 mm)	5-1/4" (133 mm)	R42-10
#11 - 1-3/8" (36 mm)	2-1/2" (63.5 mm)	5-3/4" (146 mm)	R42-11
#14 - 1-3/4" (43 mm)	3" (76.2 mm)	8-1/2" (216 mm)	R42-14

R43 Hex Nut - ASTM A29

Bar Desig. & Nominal Dia.	Across Flats	Across Corners	Thickness	Part Number
#6 - 3/4" (19 mm)	1-1/4" (31.8 mm)	1.44" (36.6 mm)	1-1/2" (38.2 mm)	R43-06
#7 - 7/8" (22 mm)	1-7/16" (36.5 mm)	1.66" (42.2 mm)	1-3/4" (44.5 mm)	R43-07
#8 - 1" (25 mm)	1-3/4" (44.5 mm)	2.02" (51.3 mm)	2" (50.8 mm)	R43-08
#9 - 1-1/8" (29 mm)	2" (50.8 mm)	2.31" (58.7 mm)	2-1/4" (57.2 mm)	R43-09
#10 - 1-1/4" (32 mm)	2-1/4" (57.2 mm)	2.6" (66.0 mm)	2-1/2" (63.5 mm)	R43-10
#11 - 1-3/8" (36 mm)	2-1/2" (63.5 mm)	2.89" (73.4 mm)	2-3/4" (69.9 mm)	R43-11
#14 - 1-3/4" (43 mm)	3" (76.2 mm)	3.46" (87.9 mm)	3-1/2" (88.9 mm)	R43-14

R9F Hardened Washers - ASTM F436

Bar Desig. & Nominal Dia.	Outside Diameter	Inside Diameter	Thickness	Part Number
#6 - 3/4" (19 mm)	1-3/4" (44.5 mm)	15/16" (23.8 mm)	5/32" (3.97 mm)	R9F-07-436
#7 - 7/8" (22 mm)	2" (50.8 mm)	1-1/8" (28.6 mm)	5/32" (3.97 mm)	R9F-08-436
#8 - 1" (25 mm)	2-1/4" (57.2 mm)	1-1/4" (31.8 mm)	5/32" (3.97 mm)	R9F-09-436
#9 - 1-1/8" (29 mm)	2-1/4" (57.2 mm)	1-1/4" (31.8 mm)	5/32" (3.97 mm)	R9F-09-436
#10 - 1-1/4" (32 mm)	2-3/4" (69.9 mm)	1-1/2" (38.1 mm)	5/32" (3.97 mm)	R9F-11-436
#11 - 1-3/8" (36 mm)	3" (76.2 mm)	1-5/8" (41.3 mm)	5/32" (3.97 mm)	R9F-12-436
#14 - 1-3/4" (43 mm)	3-3/4" (95.3 mm)	2-1/8" (54.0 mm)	7/32" (5.56 mm)	R9F-16-436

R43-JN Jam Nuts - ASTM A29

Bar Desig. & Nominal Dia.	Across Flats	Thickness	Part Number
#6 - 3/4" (19 mm)	1-1/4" (31.8 mm)	1/2" (12.7 mm)	R43-06JN
#7 - 7/8" (22 mm)	1-7/16" (36.5 mm)	1/2" (12.7 mm)	R43-07JN
#8 - 1" (25 mm)	1-3/4" (44.5 mm)	1/2" (12.7 mm)	R43-08JN
#9 - 1-1/8" (29 mm)	2" (50.8 mm)	5/8" (15.9 mm)	R43-09JN
#10 - 1-1/4" (32 mm)	2-1/4" (57.2 mm)	5/8" (15.9 mm)	R43-10JN
#11 - 1-3/8" (36 mm)	2-1/2" (63.5 mm)	11/16" (17.5 mm)	R43-11JN
#14 - 1-3/4" (43 mm)	3" (76.2 mm)	7/8" (22.2 mm)	R43-14JN

These Jam Nuts can not be substituted for full strength nuts and can not be used on bars other than MMFX Steel of the same diameter.

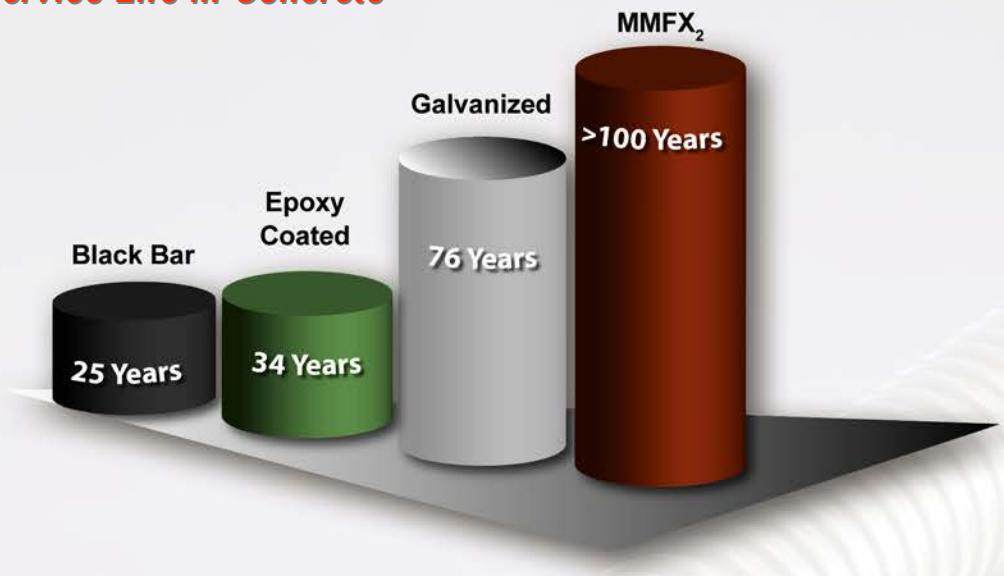
R8M Beveled Washers - ASTM A47 or ASTM A536

Bar Desig. & Nominal Dia.	Degree of Bevel	Outside Diameter	Inside Diameter	Maximum Thickness	Minimum Thickness	Part Number
#6 - 3/4" (19 mm)	9°	2" sq. (50.8 mm)	1" (25.4 mm)	17/32" (13.5 mm)	15/64" (5.95 mm)	R8M-07
#7 - 7/8" (22 mm)	9°	2" (50.8 mm)	1-3/16" (30.2 mm)	9/16" (14.3 mm)	1/4" (6.35 mm)	R8M-09
#8 - 1" (25 mm)	10°	2-27/32" (72.2 mm)	1-7/16" (36.5 mm)	7/8" (22.2 mm)	3/8" (9.52 mm)	R8M-08-150
#9 - 1-1/8" (29 mm)	15°	5-1/4" (133 mm)	1-21/32" (42.1 mm)	1-41/64" (41.7 mm)	19/64" (7.54 mm)	R8M-10-150
#10 - 1-1/4" (32 mm)	15°	5-1/4" (133 mm)	1-21/32" (42.1 mm)	1-41/64" (41.7 mm)	19/64" (7.54 mm)	R8M-10-150
#11 - 1-3/8" (36 mm)	15°	5-1/4" (133 mm)	1-25/32" (45.2 mm)	1-41/64" (41.7 mm)	19/64" (7.54 mm)	R8M-11-150
#14 - 1-3/4" (43 mm)	10°	5-1/2" (140 mm)	2-1/2" (63.5 mm)	1-23/32" (43.7 mm)	3/4" (19.0 mm)	R8M-14-150

Hardware dimensions shown are for standard carbon steel and can be provided galvanized or uncoated. MMFX steel fasteners are available upon request for a further enhanced corrosion resistant system. All Williams' fasteners are designed to provide 100% of the guaranteed ultimate strength of the bar and meet ACI 318 Section 12.14.3.2 for mechanical rebar connections.

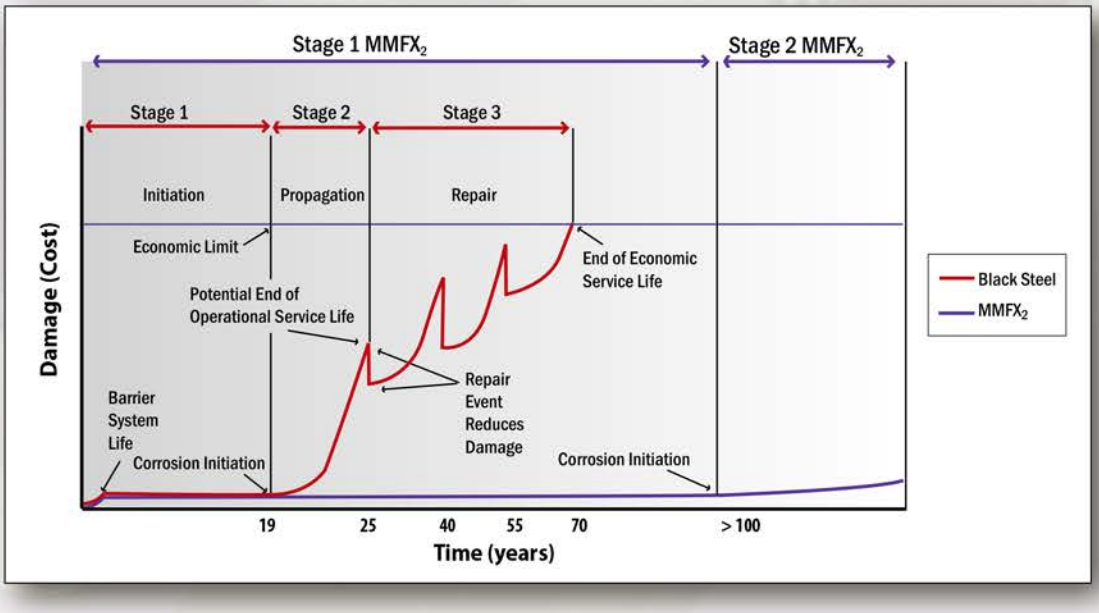
Corrosion Data

Operational Service Life in Concrete



Stages of Corrosion Damage Over Time

MMFX steel extends the operational service life and need for repair beyond 100 years by delaying corrosion initiation with a higher chloride threshold and slowing propagation due to a lower corrosion rate, making MMFX steel the most economical for all applications.



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