

ASLAN™ 200

CARBON FIBER REINFORCED POLYMER (CFRP) BAR FOR STRUCTURAL STRENGTHENING

PHYSICAL & MECHANICAL PROPERTIES

Nominal Diameter			Nominal Area		f _{tu} * Guaranteed Tensile Strength		Ultimate Tensile Load		E _t Tensile Modulus of Elasticity		Ultimate Strain
Size	mm	in	mm ²	in ²	MPa	ksi	kN	kips	GPa	psi 10 ⁶	%
2	6	1/4	32	0.049	2241	325	70	15.92	124	18	1.81%
3	10	3/8	71	0.110	2172	315	154	34.65	124	18	1.75%
4*	13	1/2	127	0.196	2068	300	261	58.80	124	18	1.67%

*We reserve the right to make improvements in the product and/or process which may result in benefits or changes to some physical-mechanical characteristics. The data contained herein is considered representative of current production and is believed to be reliable and to represent the best available characterization of the product as of July 2011. Tensile tests per ASTM D7205. #2 (6mm) & #3 (10mm) diameter bars are available in coils in continuous lengths up to 500ft (152m) upon request and with appropriate lead-time. Typical stock length is 250ft (76m). #4 (13mm) diameter is available only in straight lengths as too much energy is contained in the coiled diameter. Maximum available length is 40ft (12m).

DESIGN TENSILE & MODULUS PROPERTIES per ASTM D7205-06

The area used in calculating the tensile strength is the nominal cross sectional area. The "Guaranteed Tensile Strength", f_{tu}^{*}, is as defined by ACI 440.1R as the mean tensile strength of a given production lot, minus three times the standard deviation or $f_{tu}^* = f_{tu,ave} - 3\sigma$. The "Design or Guaranteed Modulus of Elasticity is as defined by ACI 440.1R as the mean modulus of a production lot or $E_t = E_{t,ave}$.

MATERIAL CERTS

Available for any production lot of Aslan™ 200 bar, traceable by stock order and production date.

CROSS SECTIONAL AREA TOLERANCE -0% / +20%

Design properties are determined using "Nominal" diameters and equivalent calculated cross sectional areas. Surface undulations and sand coatings that facilitate bond are accommodated for in ASTM D7205, section 11.2.5, with a tolerance of minus zero, plus 20% as determined by the Archimedes method of volume displacement in a fluid.

NSM GROOVE DIMENSIONS ≥ 1.5DB

DENSITY

Size	Nominal Diameter		Unit Weight/length	
	mm	in	kg/m	lbs/ft
2	6	1/4	0.052	0.035
3	10	3/8	0.112	0.075
4	13	1/2	0.186	0.125

ASLAN™ 200 PRODUCT NSM "SYSTEM" ~ Suggested Adhesives

The following high strength structural adhesives have been used successfully.

- > Hilti RE 500
- > Pilgrim Magmaflow CF
- > BASF Concessive 1420 & Concessive LPL
- > DeNeef Enforce CFL Gel
- > Unitex Pro-poxy 400



ASLAN™ 200 CFRP BAR

GLASS TRANSITION TEMPERATURE OF RESIN $T_g > 230^\circ\text{F}$ (110°C) per DSC method

ASLAN™ 250 TENDON & ANCHORAGE ~ MECHANICAL LOAD RATINGS

Size		Diameter		Area		Ultimate Load		Jacking Load = $0.65 f_{pu}$		Prestress Load	
Imp.	SI	(in)	(mm)	in ²	mm ²	kips	kN	kips	kN	kips	kN
#3	10	0.375	9.5	0.110	71	34.65	154	22.49	100	17.15	76
#4	13	0.500	12.7	0.196	127	58.80	262	38.22	170	29.10	129

Ultimate Load rating defined as in ACI440.1R-06 & 440.4R-04 f_{pu}^* = guaranteed ultimate tensile strength (as measured by ASTM D7205 test methods) $\times C_e = 0.85$ environmental degradation factor. Sustained Load ratings based on ACI440.1R-06 guidance: $f_{tu}^* \times C_e \times 0.55$ Creep Rupture Strain limits. Material lot test reports available upon request.

RELAXATION Relaxation losses (REL) of the Aslan™ 250 tendon are negligible at Jacking Loads.

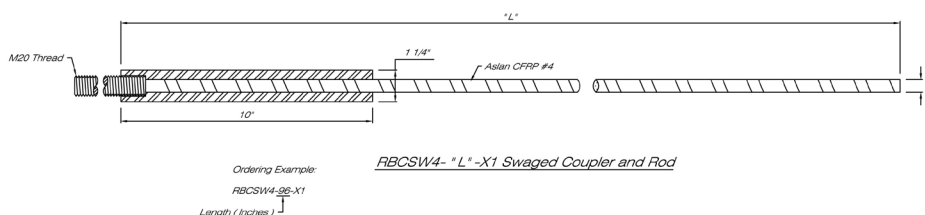
HANDLING & PLACEMENT

Authoritative guidance for the specifier, in mandatory language, is given in ACI 440.5-08 "Specification for Construction with FRP Bars", which details submittals, material delivery, storage, handling, permitted damage tolerances, bar supports, placement tolerances, concrete cover, tie-wire, field cutting and more. In general, the field handling and placement of FRP bars is similar to coated steel rebar (epoxy or galvanized), but with the benefit of weighing one-fourth the weight of steel.

Do Not Shear FRP bars. When field cutting of FRP bars is necessary, use a fine blade saw, grinder, carborundum or diamond blade. Sealing the ends of FRP bars is not necessary. Support chairs are required at two-thirds the spacing of steel rebar. Plastic coated tie wire is the preferred option for most projects. Carbon bars are semi-conductive and NOT appropriate for non-magnetic applications.

For specific handling, use and installation instructions for Near Surface Mount strengthening, see the Aslan™ 200 product brochure.

For specific handling and use requirements for Aslan™ 250 series tendons (250 series designates a factory applied anchorage is furnished with the bar), see the Aslan™ 200 product brochure. Aslan™ 250 tendons are furnished with a proprietary anchorage affixed at the factory. The tendon can be stressed by means of a high strength threaded connection on the end or by wedge grips applied directly the barrel of the anchorage itself. Note that the tensile strength of the Aslan™ 250 tendon is typically much stronger than available high strength bolts. Often is it desirable to have a transition box from the stressing rod in the tendon to the more traditional steel strand chucks.



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