

Manufactured by MST Rebar Inc.

MST Rebar Inc.
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Subject: Submittal Summary of Third-Party testing for CSA S807-19 and ASTM D8505

Note: D8505 is identical to D7957 with much higher limits. If the material will meet 8505 it will definitely pass 7957.

Mechanical Properties:

Property	Size	Mean	Test Method	Specified Limit	
				CSA S807-19	ASTM D8505-23
Longitudinal tensile strength, MPa	#3	1100	CSA S806, Annex C ASTM D7205/D7205M	1000	1000
	#4	1100			1016
	#5	1100			912
	#6	1100			898
	#8	1100			828
Longitudinal tensile modulus, GPa	#3	60	CSA S806, Annex C ASTM D7205/D7205M	60	60
	#4	60			
	#5	60			
	#6	60			
	#8	60			
Longitudinal tensile strain, %	#3	2.0	CSA S806, Annex C ASTM D7205/D7205M	1.20%	1.10%
	#4	2.0			
	#5	2.0			
	#6	2.0			
	#8	2.0			
Bond strength, MPa	#3	25	ASTM D7913/D7913M	10	9.6
	#4	25			9.6
	#5	27			9.6
	#6	27			9.6
	#8	21			7.6
Transverse shear strength, MPa	#3	315.0	ASTM D7617/D7617M	180	152
	#4	210.9			
	#5	232.4			
	#6	211.2			
	#8	197.1			
Apparent horizontal shear strength, MPa	#3	57.3	ASTM D4475	45	37.9
	#4	59.3			
	#5	55			
	#6	55			
	#8	53			
Measured cross-sectional area, mm ²	#3	102	CSA S806, Annex A ASTM D7205/D7205M, subsection 11.2.4.1		67 - 104
	#4	151			119 - 169
	#5	247			186 - 251
	#6	332			268 - 347
	#8	571			476 - 589

Physical Properties:

Property	Size	Mean	Test Method	Specified Limit	
				CSA S807-19	ASTM D8505-23
Fiber mass content, %	#3	77	ASTM D2584 or ASTM D3171	70	
	#4	70			
	#5	80			
	#6	81			
	#8	80			
Moisture absorption in 24 hrs. at 50 °C, %	#3	0.14	ASTM D570	≤ 0.30%	≤ 0.25%
	#4	0.15		≤ 0.30%	
	#5	0.2		≤ 0.25%	
	#6	0.18		≤ 0.25%	
	#8	0.18		≤ 0.25%	
Transverse coefficient of thermal expansion, °C ⁻¹	#3	26 × 10 ⁻⁶	ASTM E831 or ASTM D696	≤ 40 × 10 ⁻⁶	-
	#4				
	#5				
	#6				
	#8				
Degree of cure, %	#3	99-100% For All	CSA S807, Annex A ASTM E2160	95%	
	#4				
	#5				
	#6				
	#8				
Glass transition temperature, °C	#3	125°C > 119°C for All Sizes	ASTM E1356 ASTM D7028	100 °C [212 °F] (DSC)	110 °C [230 °F] (DMA)
	#4				
	#5				
	#6				
	#8				

Durability Properties:

Property	Size	Mean	Test Method	Specified Limit	
				CSA S807-19	ASTM D8505-23
Alkali resistance in high pH (13) solution (without load), % of UTS	#3	88%	ASTM D7705/D7705M, Procedure A	> 85% of UTS	> 80% of UTS
	#4	90%			
	#5	90%			
	#6	86%			
	#8	90%			
Alkali resistance in high pH (13) solution (with load), % of UTS	#3	91% 90%	ASTM D7705/D7705M, Procedure B	> 75% of UTS	> 75% of UTS
	#4				
	#5				
	#6				
	#8				
Longitudinal tensile properties at cold temperature (-40 °C), % of UTS	#3	103% 110%	Conditioned per ASTM D618, and tested per CSA S806, Annex C	> 95% of UTS	-
	#4				
	#5				
	#6				
	#8				

Interlaminar Shear Strength Alkali resistance in high pH (13) solution (without load), % of UTS	#3	96%	ASTM D7705/D7705M, Procedure A	> 80% of UTS	-
	#4	96%			
	#5	96%			
	#6	97%			
	#8	97%			

Bent Bar Properties:

Property	Size	Mean	Test Method	Specified Limit	
				CSA S807-19	ASTM D8505-23
Longitudinal tensile strength of the straight portion of bent bar, MPa	#3			-	-
	#4		CSA S806, Annex C	1000	-
	#5	1100	ASTM D7205/D7205M	1000	-
	#6	1293		900	-
	#8			850	-
Longitudinal tensile modulus of the straight portion of bent bar, GPa	#3			-	-
	#4		CSA S806, Annex C	50	-
	#5	51	ASTM D7205/D7205M	50	-
	#6	54		50	-
	#8			50	-
Strength of GFRP bent bars and stirrups at bend locations, MPa	#3			-	-
	#4		CSA S807, Annex E	450	-
	#5	750		450	-
	#6	853		410	-
	#8			390	-



Instruction for Handling and Safety

1. MSTBAR™ could be crushed or damaged due to improper handling during loading, transportation or offloading.
2. Do not place MSTBAR™ on Sharp edges and directly on the ground, always use beam or timber pallet under the bar package to keep them away from dirt and mud.
3. MSTBAR™ is more elastic than regular steel bar therefore always avoid excessive deflections of the bars. Always use a spreader bar when hoisting bundle of MSTBAR™
4. MSTBAR™ can be damaged by rubbing abrasive material to it; do not drag MSTBAR™ on the ground or sharp edges.
5. MSTBAR™ does not have any Ultra Violent resistance additive therefore MSTBAR™ shall not be stored under direct sunlight, please cover MST-BAR to prevent direct exposure. No more than 30 days in direct sunlight.

6. To cut MSTBAR™ do not use shear force and inappropriate tools. MSTBAR™ can be cut using steel saw, a band saw and or grinder with a diamond blade.
7. MSTBAR™ is not weldable. It can be spliced with overlap of 40 times the diameter of the bar.
8. MSTBAR™ is elastic thus it will not stay bent. If bent too far, it might break or otherwise the built up potential energy will whiplash back and could cause injury.
9. When placing the MSTBAR™ make sure it is free of dust and oil, otherwise it will effect the bond between the bar and concrete.
10. Place MSTBAR™ according to CRSI guidelines for placement of reinforcing bars.
11. Secure MSTBAR™ in the formwork to avoid movement of the bars before placement of concrete.
12. MSTBAR™ should be supported with noncorrosive chairs.
13. Tie MSTBAR™ with stainless steel or nylon tie wire, you may use heavy-duty zip tie.
14. At all time wear gloves to prevent any splinters.

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MATERIAL SAFETY DATA SHEET

Fiberglass Composite Reinforcement Bar MST-BAR®

MST_BAR® GRADE III Rebar

Version 2

Revision Date 09/8/2022

SECTION 1. PRODUCT AND COMPANY INFORMATION

PRODUCT NAME : MST-BAR® GRADE III GFRP
PRODUCT USE DESCRIPTION: Reinforcement Bar

COMPANY : MST Rebar Inc.
200A Hanlan Road , Woodbridge
Ontario, Canada L4L 3P6

COUNTRY : Canada
TELEPHONE : +1(416) 740-0377
WEBSITE : www.mstbar.com
E-MAIL : info@bandbfrp.com

SECTION 2. HAZARDS IDENTIFICATION

FORM : Solid grey
ODOUR : None
CHEMICAL COMPOSITION : -Modified Vinylester (20%)
-Glass fiber (80)
-Pigment, Silica Sand, Mold Release

PRODUCT NAME : MST-BAR® GRADE III GFRP

SECTION 3. PHYSICAL AND CHEMICAL CHARACTERISTICS

SPECIFIC GRAVITY : 2.1
BOILING POINT : N/A
VAPOR DENSITY : Does not apply
VAPOR PRESSURE : Does not apply
SOLUBILITY IN WATER : Insoluble
FREEZING POINT : None
REACTIVITY IN WATER : Does not apply
MELTING POINT : 900 °C

SECTION 4. FIREFIGHTING MEASURES

FLASH POINT : N/A
FLAMMABLE LIMIT : N/A

SUITABLE EXTINGUISHING : Foam, Carbon Dioxide (CO₂) & Water Fog
SPECIAL INSTRUCTION : Burning MST-BAR Will Create An Acrid Black Smoke And Strong Odor That Is Offensive. Firefighter Must Wear Breathing Apparatus.

SECTION 5. HEALTH HAZARD

HEALTH EFFECTS : Non-hazardous Material Under Normal Use
INHALATION : Glass fiber Dust Can Cause Respiratory Irritation and Pulmonary Edema
SKIN CONTACT : Possible Irritation, Always Wear Gloves, Glass Fiber Dust Can Cause Rash, Itching, Conductivities, Coughing And Sneezing. Cleanse Skin With Mild Soap And Running Water Do Not Scratch Affected Area. Have Access To Showers And Eye Wash Stations
EYE CONTACT : Flush Eye With Running Water For At Least 20 Minutes. Always Wear Eye Protection
INGESTION : Non-Toxic, Refer To Nearest Hospital

SECTION 6. STORAGE, SAFETY AND HANDLING INSTRUCTIONS

STORAGE : Keep Out Of Direct Sunlight
HANDLING : Bars Are Flexible Use Spreader Bar To Lift
WASTE DISPOSAL : Scrap Bars Can Be Disposed Of In A Sanitary Landfill In Accordance With Provincial Regulation
SAFETY INSTRUCTIONS : ALWAYS Use Eye Protection When Cutting. Avoid To Inhale Dust And Protect Your Skin, Contact May Cause Irritation. Use Vacuum Cleaner To Clean The Dust, Avoid Dry Sweeping And Compressed Air
CUTTING : Use Diamond Or Grit Blade Or Hacksaw For Cutting, Do Not Use Flame And Do Not Use Shear Cutter