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August 27, 2014

Mr. John Steffenino  
Tensar International Corporation  
421 Southfield Drive  
Greensburg, PA

Reference: TX196FR and TX206FR

Dear John:

Attached are the material property data sheets for Tensar mining grid products TX196FR and TX206FR. Please note that these products do meet the MSHA CFR 30, Part 7 flame resistance criteria determined from vertical and horizontal flame tests in accordance with the MSHA method.

In addition to the material property data sheets, the stress strain curves for TX196FR and TX206FR are enclosed.

Sincerely,



W.S. Shelton

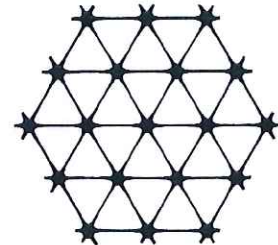
Vice President – Morrow Operations

## Product Specification - TriAx® TX196 FR Mining Grid

Tensar International Corporation reserves the right to change its product specifications at any time. It is the responsibility of the specifier and purchaser to ensure that product specifications used for design and procurement purposes are current and consistent with the products used in each instance. Please contact Tensar International Corporation at 800-836-7271 for assistance.

Tensar TriAx® Geogrid

Product Type: Integrally Formed Triaxial Geogrid  
 Polymer: Polypropylene  
 Load Transfer Mechanism: Positive Mechanical Interlock  
 Primary Applications: Underground Mine and Tunnel Applications  
 (Roof and Rib Control,  
 Soft Bottom Reinforcement)



### Product Properties

Index Properties	Units	MD Values <sup>1</sup>	Diagonal Values <sup>1</sup>	Transverse Values <sup>1</sup>
<ul style="list-style-type: none"> <li>Polypropylene Polymer</li> </ul>		Group 1/Class 1/Grade 2 per ASTM D4101		
<ul style="list-style-type: none"> <li>Rib Pitch<sup>2</sup></li> </ul>	mm (in)	60 (2.4)	60 (2.4)	
<ul style="list-style-type: none"> <li>Mid-Rib Thickness<sup>2</sup></li> </ul>	mm (in)			
<ul style="list-style-type: none"> <li>Radial Stiffness @ 0.5% strain<sup>3</sup></li> </ul>	kN/m (lb/ft)	350 (24,000)	350 (24,000)	350 (24,000)
<ul style="list-style-type: none"> <li>Rib Shape is Rectangular</li> <li>Aperture Shape is Triangular</li> </ul>				
<b>Structural Integrity</b>				
<ul style="list-style-type: none"> <li>Junction Efficiency<sup>4</sup></li> </ul>	%	93	93	93
<ul style="list-style-type: none"> <li>Flexural Stiffness<sup>5</sup></li> </ul>	mg-cm	1,000,000		1,000,000
<b>Flammability Resistance</b>				
Flame Propagation <sup>6</sup>	m (ft)	1.2 (4.0)	1.2 (4.0)	1.2 (4.0)
<ul style="list-style-type: none"> <li>Average Duration of Burning For Test Set<sup>6</sup></li> </ul>	min	1.0	1.0	1.0
<ul style="list-style-type: none"> <li>Duration of Burning for Single Test<sup>6</sup></li> </ul>	min	2.0	2.0	2.0

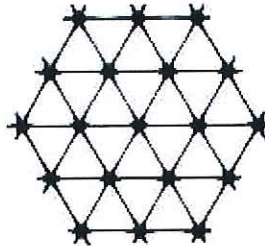
### Notes

- Unless indicated otherwise, values shown are minimum values or minimum average roll values determined in accordance with ASTM D4759. Brief descriptions of test procedures are given in the following notes. Complete descriptions of test procedures are available on request from Tensar International Corporation.
- Nominal Dimensions.
- Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637-10.
- Load transfer capability, determined in accordance with ASTM D6637-10 and ASTM D7737-11, expressed as a percentage of ultimate tensile strength.
- Resistance to bending force determined in accordance with ASTM D7748-12.
- Flammability resistance determined from vertical and horizontal flame tests in accordance with 30 CFR, Part 7, Subpart A & B and ASTP5011 - Standardized Small Scale Flame Test Procedure for the Acceptance of Roof-Rib Grid.

## Product Specification - TriAx<sup>®</sup> TX206 FR Mining Grid

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Tensar TriAx<sup>®</sup> Geogrid



Product Type: Integrally Formed Triaxial Geogrid  
 Polymer: Polypropylene  
 Load Transfer Mechanism: Positive Mechanical Interlock  
 Primary Applications: Underground Mine and Tunnel Applications (Roof and Rib Control, Soft Bottom Reinforcement)

### Product Properties

Index Properties	Units	MD Values <sup>1</sup>	Diagonal Values <sup>1</sup>	Transverse Values <sup>1</sup>
• Polypropylene Polymer		Group 1/Class 1/Grade 2 per ASTM D4101		
• Rib Pitch <sup>2</sup>	mm (in)	60 (2.40)	60 (2.40)	
• Radial Stiffness @ 0.5% strain <sup>3</sup>	kN/m (lb/ft)	350 (24,000)	350 (24,000)	350 (24,000)
• Rib Shape is Rectangular				
• Aperture Shape is Triangular				

### Structural Integrity

• Junction Efficiency <sup>4</sup>	%	93	93	93
• Flexural Stiffness <sup>5</sup>	mg-cm	1,200,000		1,200,000

### Flammability Resistance

Flame Propagation <sup>6</sup>	m (ft)	1.2 (4.0)	1.2 (4.0)	1.2 (4.0)
• Average Duration of Burning For Test Set <sup>6</sup>	min	1.0	1.0	1.0
• Duration of Burning for Single Test <sup>6</sup>	min	2.0	2.0	2.0

### Notes

1. Unless indicated otherwise, values shown are minimum values or minimum average roll values determined in accordance with ASTM D4759. Brief descriptions of test procedures are given in the following notes. Complete descriptions of test procedures are available on request from Tensar International Corporation.
2. Nominal Dimensions.
3. Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637-10.
4. Load transfer capability determined in accordance with ASTM D6637-10 and ASTM D7737-11 and expressed as a percentage of ultimate tensile strength.
5. Resistance to bending force determined in accordance with ASTM D7748-12.
6. Flammability resistance determined from vertical and horizontal flame tests in accordance with 30 CFR, Part 7, Subpart A & B and ASTP5011 - Standardized Small Scale Flame Test Procedure for the Acceptance of Roof-Rib Grid.

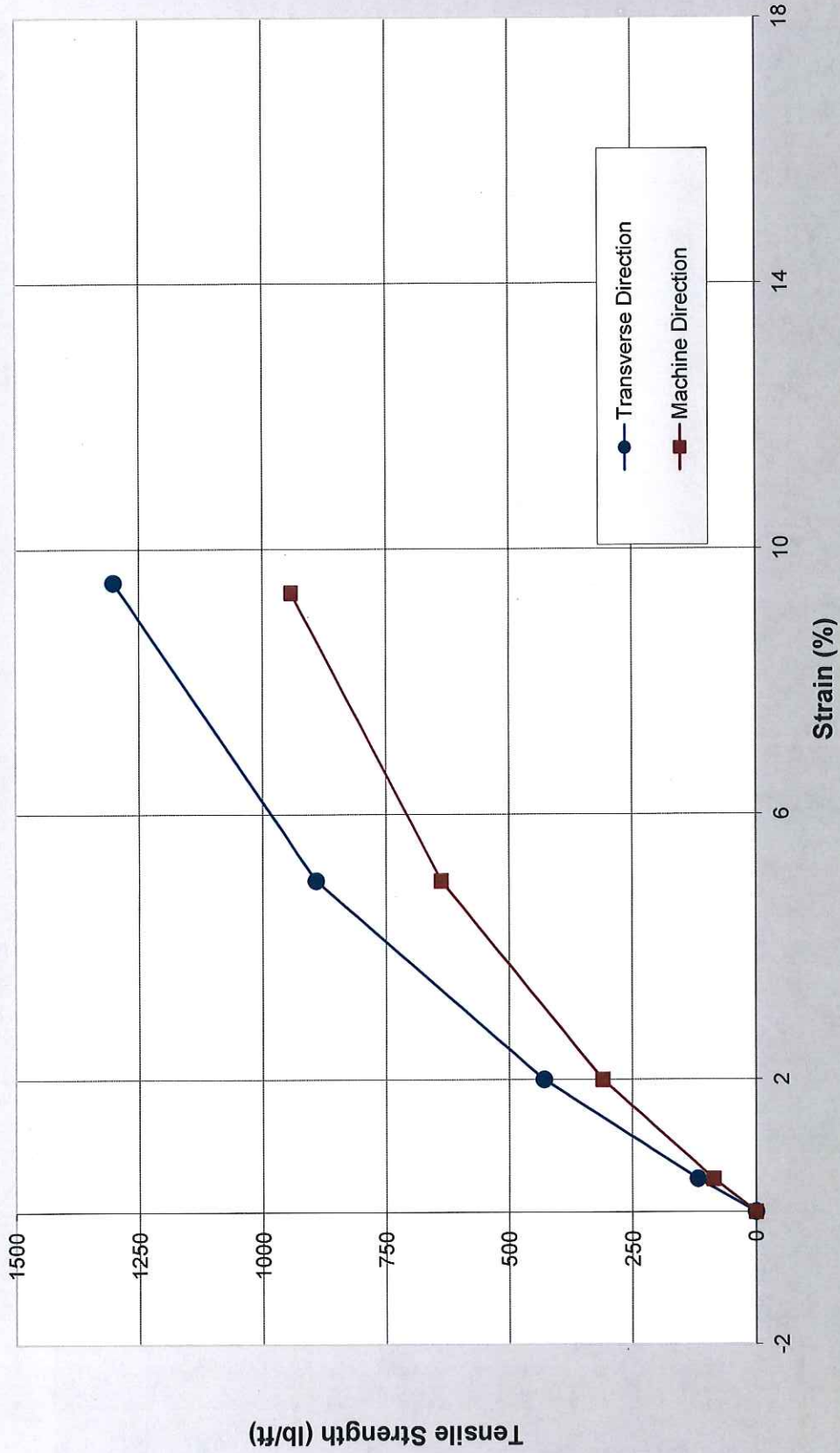
Tensar International Corporation  
 2500 Northwinds Parkway, Suite 500  
 Alpharetta, Georgia 30009  
 Phone: 800-TENSAR-1  
 www.tensar-international.com

This specification supersedes any and all prior specifications for the product designated above and is not applicable to any product shipped prior to August 1, 2014. Tensar and TriAx are trademarks of Tensar International Corporation or its affiliates in the US and many other countries. TriAx<sup>®</sup> geogrid and the use thereof are protected by U.S. Patent No. 7,001,112. Patents or patent applications also exist in other countries. Final determination of the suitability of the above-mentioned information or product for the use contemplated, and its manner of use are the sole responsibility of the user. Tensar International Corporation disclaims any and all express, implied or statutory warranties, including but not limited to, any warranty of merchantability or fitness for a particular purpose regarding this product or the Company's other products, technologies or services. The information contained herein does not constitute engineering advice.



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# TX196FR Average Tensile Strength Values



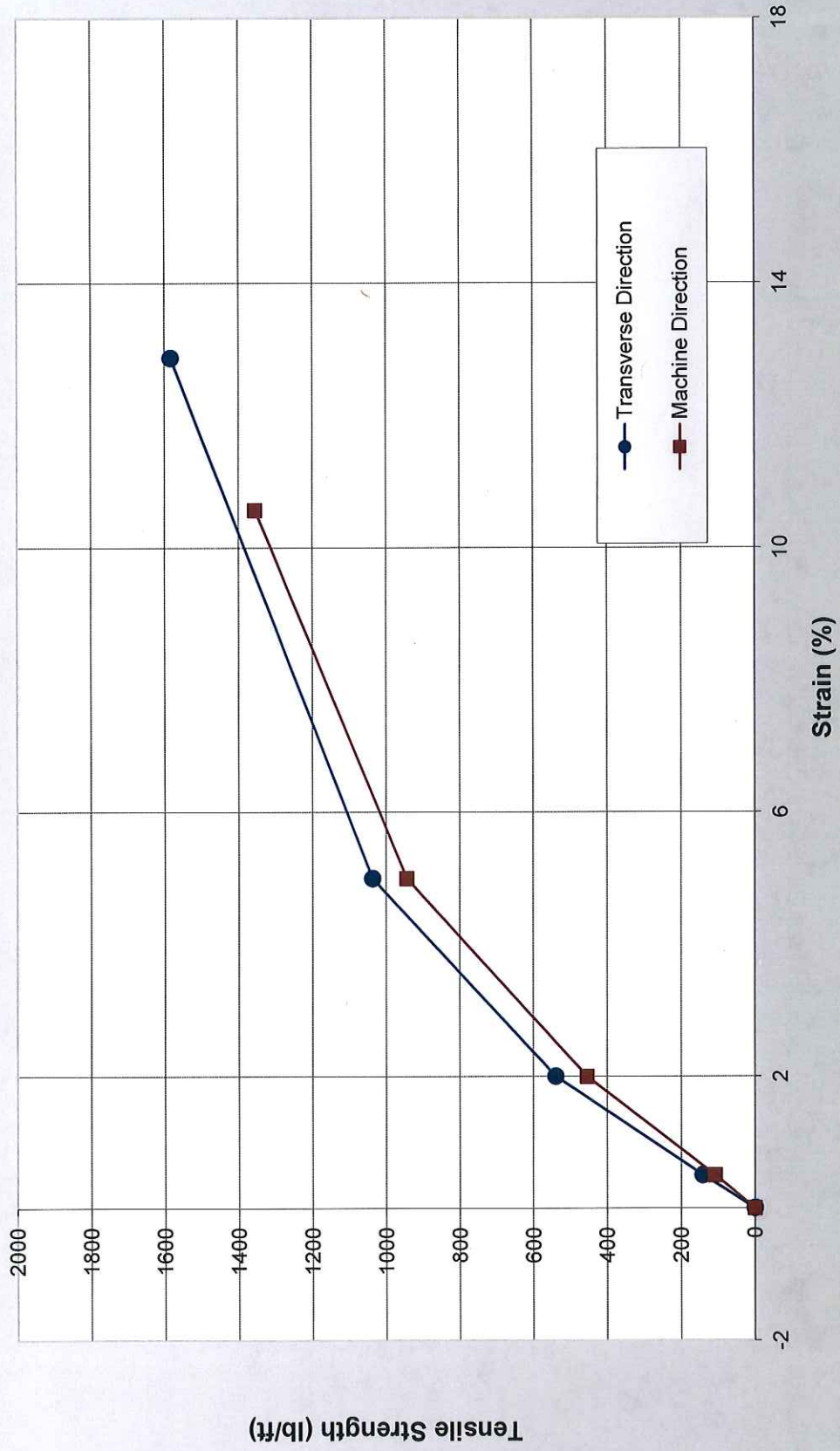
TX196FRstrs/strn2014avg



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# TX206FR

## Average Tensile Strength Values



TX206FRstrs/strn2014avg