

## HARDNESS

<b>Method</b>	ASTM 2240
<b>Exposure</b>	Direct reading from surface of sample
<b>Results</b>	Shore D: 333 Shore DO: 74 Testing performed by: St. Louis Testing

## IMPACT RESISTANCE

<b>Method</b>	ASTM D2794
<b>Exposure</b>	Direct impact from 2 inch steel ball dropped from height of 10 feet Impact equal to 20 ft-lb of force
<b>Results</b>	Pass Maximum impact indentation cross section diameter: 1.17 inches No cracking or splitting observed Testing performed by: St. Louis Testing

## DENSITY

<b>Method</b>	ASTM E605
<b>Exposure</b>	Bead Displacement Method
<b>Results</b>	40 lbs/ft <sup>3</sup> (640 kg/m <sup>3</sup> ) Testing performed by: St. Louis Testing

## BOND STRENGTH

<b>Method</b>	ASTM E736
<b>Exposure</b>	Over unprimed steel
<b>Results</b>	8739 psf (418 kPa) Testing performed by: St. Louis Testing

## FLEXURAL STRENGTH

<b>Method</b>	ASTM D790
<b>Exposure</b>	Instron with Bluehill soft water Span length of 6 inches with a crosshead speed of 0.02 in/min
<b>Results</b>	Average Flexural Strength: 256 psi (1.7 MPa) Maximum Strain: 0.0046 in/in Testing performed by: St. Louis Testing

**COMPRESSIVE STRENGTH**

<b>Method</b>	ASTM E736
<b>Exposure</b>	Satec Universal Testing Machine
<b>Results</b>	502 psi (3.4 MPa) Testing performed by: St. Louis Testing

**DEFLECTION**

<b>Method</b>	ASTM E759
<b>Exposure</b>	Subjected to deflection and evaluates spalling and delamination under bending stress. Is indication of the ability of SFRM to remain in place and resist removal during anticipated service conditions.
<b>Results</b>	Pass Testing performed by: St. Louis Testing

**BOND IMPACT**

<b>Method</b>	ASTM E760
<b>Exposure</b>	Subjected to shock loading and evaluates adhesion and resistance to spalling, cracking, and delamination. It is an indication of the ability of SFRM to remain in place and resist removal during anticipated service conditions.
<b>Results</b>	Pass Testing performed by: St. Louis Testing

**INSULATION K FACTOR**

<b>Method</b>	ASTM C177
<b>Results</b>	1.06 BTU in/hr ft <sup>2</sup> - °F @ 75°F (24°C) Testing performed by: St. Louis Testing

**COEFFICIENT OF THERMAL EXPANSION**

<b>Method</b>	ASTM E228
<b>Results</b>	5.8 x 10 <sup>-6</sup> (inch/inch °F) Testing performed by: St. Louis Testing

**SPECIFIC HEAT**

<b>Method</b>	
<b>Results</b>	0.36 (BTU / lb / °F) Testing performed by: Carboline R&D

## CORROSION

<b>Method</b>	ASTM E937
<b>Exposure</b>	This test method evaluates the relative corrosion of steel induced by SFRM and determines whether the presence of SFRM increases, decreases, or has no effect on the corrosion characteristics of steel exposed to salt water.
<b>Results</b>	0.00 g/mm <sup>2</sup> (No effect) Testing performed by: St. Louis Testing

## SURFACE BURNING

<b>Method</b>	ASTM E84
<b>Exposure</b>	Nominal 24-ft (7.32-m) long by 20-in. (508-mm) wide specimen subjected to flaming fire exposure intended to provide comparative measurements of surface flame spread and smoke density measurements with that of select grade red oak and fiber-cement board
<b>Results</b>	Flame Spread: 0 (Class A) Smoke Development: 10 (Class A) Testing performed by: Underwriter's Laboratories

## EXPLOSION RESISTANCE

<b>Method</b>	Baker Risk Engineering Shock Tube Testing
<b>Exposure</b>	8 foot tall columns exposed to blast at 3 different angles with flange edges at 45° angle to blast load. Corresponds to a peak loading on the column surface facing the blast of 3 bar
<b>Results</b>	Pass Testing performed by: Baker Risk Engineering

## HOSE STREAM RESISTANCE

<b>Method</b>	NFPA 58 Annex H Torch / Hose Stream Test
<b>Exposure</b>	Procedure exposes systems to a torching fire environment combined with a high pressure hose stream to simulate firefighting measures to ensure that materials can remain intact and perform intended function. <ul style="list-style-type: none"> <li>- Torch fire environment for 20 minutes duration</li> <li>- Concurrent torch fire and hose stream 10 minutes duration</li> <li>- Torch fire environment for 20 minutes duration</li> <li>- 50 minute total duration</li> </ul>
<b>Results</b>	Pass Testing performed by: Intertek

## CRYOGENIC RESISTANCE

<b>Method</b>	Immersion and splash & spill cryogenic exposures
<b>Exposure</b>	Tested in accordance to "Specification for Cryogenic Protection of Structural Members" dated March 2006 from South Hook LNG Terminal Company Ltd. Immersion and additional splash and spill testing performed at varying flow rates of liquid nitrogen
<b>Results</b>	Up to 60 minute cryogenic protection Testing performed by: Carboline R&D, witnessed by Underwriter's Laboratories

**CELLULOSIC FIRE RESISTANCE**

<b>Method</b>	ASTM E119 UL 263 NFPA 251
<b>Exposure</b>	Cellulosic fire exposure according to ASTM E119 fire curve
<b>Results</b>	Up to 4 hour fire protection UL 1709: XR705, XR706, XR707 Testing performed by: Underwriter's Laboratories

**HYDROCARBON FIRE RESISTANCE**

<b>Method</b>	UL 1709
<b>Exposure</b>	Hydrocarbon fire exposure according to UL 1709 and BS 476 fire curves
<b>Results</b>	Up to 4 hour fire protection UL 1709: XR705, XR706, XR707 Testing performed by: Underwriter's Laboratories

**JET FIRE RESISTANCE**

<b>Method</b>	ISO 22899-1
<b>Exposure</b>	Jet fire exposure according to ISO 22899-1 fire curve
<b>Results</b>	Up to 2 hour jet fire protection Testing performed by: Intertek, witnessed by Lloyd's Register

**ENVIRONMENTAL RESISTANCE**

<b>Method</b>	UL 1709 Environmental Program
<b>Exposure</b>	Environmental Exposures <ul style="list-style-type: none"> <li>- Industrial Atmosphere: 30 days CO<sub>2</sub> / SO<sub>2</sub> atmosphere</li> <li>- High Humidity: 180 day 100% humidity</li> <li>- Wet / Freeze / Thaw Cycling: 12 one week cycles of 72 hrs. rain / 24 hrs. at -40°F (-40°C) / 72 hrs at 140°F (60°C)</li> </ul>
<b>Results</b>	Up to 2 hour jet fire protection Testing performed by: Intertek, witnessed by Lloyd's Register

**NOTE**

The technical data presented in this document is accurate to the best of Carboline's knowledge based on laboratory testing of the product(s) or system(s) described. Actual results in the field may vary depending on field conditions and application methods. The performance characteristics stated do not constitute a guarantee or warranty that the products will meet the stated results under all circumstances. Contact Carboline technical staff with questions.