

# System 550D-FR

## DESCRIPTION

**System 550D-FR** is a *fire resistant*, zero VOC, high performance polyurea elastomer. **System 550D-FR** is designed to provide a flame resistant, durable, chemical resistant lining for secondary containment applications and as a surface coating for metal, concrete or wood.

**System 550D-FR** is a fast set system which allows fast “return to service”. It is intended for use with plural component spray equipment with a mix ratio of 1 to 1.

## PROPERTIES

Flame Spread Classification (ASTM E84)	20
Smoke Developed Classification (ASTM E84)	115
Service Temperature	-50 to 200 C
Shore Hardness	50D approx.
Elongation	200%
Tensile Strength	1500-2000 psi

## STORAGE

Store in a cool and dry place for product integrity. Store in tightly sealed containers to protect from moisture and foreign materials.

## PRODUCT SAFETY

For details an MSDS is available from Quantum Coatings.

\*Approximate values only. Should not be considered specifications. This data sheet is intended for general information only. Updated: November 1, 2001

## INSTRUCTIONS

For application use a regulated high-pressure proportioner (1:1) and spray gun system capable of producing 2000 - 2500 psi. Thoroughly mix RESIN for 45 to 60 minutes prior to use. Preheating RESIN may be necessary to achieve uniform mix. Check that no residue is left on bottom of drum after mixing.

Recommended Heat Settings.

Line/Pre-Heaters	150° - 160° F
Hose Heat	150° - 160° F

Apply only to properly prepared substrate. Apply first coat at less than 10 mil and allow to become tack free before continuing. Apply following coats at 20 mil per coat and allow surface to become tack free before application of subsequent coats. Spray with uniform motion and allow 50 to 75% overlap.

## FEATURES

- Flame resistance.
- Excellent abrasion resistance.
- Highly resistant to impact over wide temperature range.
- Resistant to cracking under high flex conditions.
- Remains flexible at low temperature.
- Resistant to water and a wide range of chemicals.

## AVAILABILITY

**System 550D-FR** is packaged in 50 US Gallon drums.

## OTHER

The purchaser of this product must rely on his own judgement in determining suitability for his purpose, and in applying directions as to handling and use. Quantum makes no warranty, expressed or implied, except that if this product proves on inspection to be defective, Quantum will replace it or refund the purchase price. Labour costs and other consequential damages are hereby excluded. No representative or purported agent of Quantum has the authority to change this warranty.

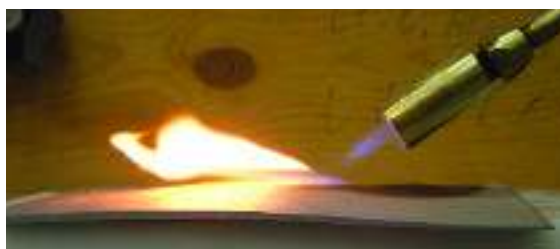
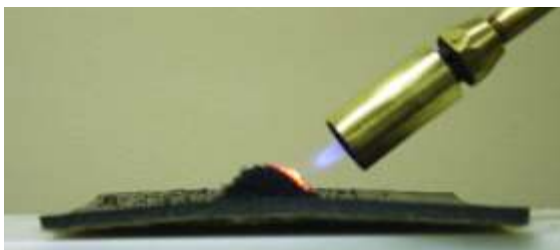
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## Fire Test Results Summary

<b>Critical Heat Flux of Floor Covering Systems</b> <b>ASTM E-648</b> (130 mil on steel plate)		
Maximum Burn Length (inches)		5.93
Average Critical Radiant Flux (W/cm <sup>2</sup> )		0.97+
<b>Heat and Visible Smoke Release Rates</b> <b>ASTM E-1354</b> (50 KW heat flux)		
Time to sustained flame (sec)		13
Peak heat release rate (KW/m <sup>2</sup> )		97.48
Average heat release rate for 300 sec (KW/m <sup>2</sup> )		39.75
Smoke average specific ext. area (m <sup>2</sup> /KG)		65.13
<b>Specific Optical Density of Smoke Developed</b> <b>ASTM E-662</b> (130 mil on steel plate)		
Dm (average)	Non-flaming	173
Dm (average)	Flaming	249
<b>Amount of Toxic Gas Generation BSS 7239</b> <b>Analysis after 4 minute exposure to 2.5 W/cm<sup>2</sup> and in flaming mode</b>		
ppm CO	Non-flaming	5
	Flaming	130
ppm HCN	Non-flaming	0.75
	Flaming	8
ppm HCL	Non-flaming	10
	Flaming	9.5
ppm HF	Non-Flaming	less than 0.5
	Flaming	less than 0.5
ppm SO <sub>2</sub>	Non-Flaming	less than 1.0
	Flaming	less than 1.0
ppm NO <sub>2</sub>	Non-Flaming	less than 2.0
	Flaming	20
<b>Surface Burning Characteristics</b> <b>ASTM E84-05</b> (60 mil on cement board)		
Flame Spread Classification		20
Smoke Developed Classification		115

## New Intumescent Polyurea Lining Offers Fire-Resistant Secondary Containment

It's said that necessity is the mother of invention. In Tony LaGrange's case, necessity resulted from a fire at an oilfield compressor station, which destroyed the structure and its secondary containment lining. In early 2005, LaGrange's Quantum Technical Services Ltd. began developing System 550D-FR, an intumescent polyurea that offers fire protection in addition to chemical resistance. Polyureas are commonly used as secondary containment liners because of their seamless application and rapid cure.



(top) Testing of the intumescent polyurea shows the coating expanding to slow the spread of fire and protect the substrate  
(bottom) Testing on a polyurea not formulated for intumescence shows the flame spreading over the film.  
Photos courtesy of Quantum Technical Services Ltd.

### Early Work

The refinery owner was not able to determine the cause of the fire at the compressor station, but was sure that the flammability of the existing polyurea secondary containment lining could have contributed to its intensity. LaGrange, whose company manufactures polyurea coatings as well as intumescent products, found out about the fire indirectly, when the end user called to ask for advice on removing polyurea linings. The end user had decided to remove the linings from every compressor station at its facility and install steel liners as an alternative, fire-resistant solution. Knowing the extensive costs associated with switching to a metal liner, LaGrange suggested that his company could research ways of protecting the polyurea linings from burning, possibly by coating them with a flexible intumescent product.

After formulating and then subsequently rejecting an intumescent latex because its use would be problematic over potentially contaminated linings, LaGrange's company took a different approach. Instead of creating an intumescent coating that could be applied over the existing polyurea, the company formulated a polyurea with built-in intumescence.

### Formulating and Testing the Intumescent Polyurea

Between August and October 2005, the Edmonton, Alberta-based company went through several formulations of the intumescent polyurea. LaGrange explains that spraying the

initial formulations was difficult due to their heavily filled nature. After solving the application problem through reformulation, the company subjected the four most promising intumescent polyurea coatings to small-scale flame spread testing at its facility. The products' initial performance led to full-scale testing by an independent laboratory.

On October 27, 2005, Intertek Testing Services NA, Ltd. (Coquitlam, BC) evaluated three of the intumescent polyurea formulations using ASTM E84-05, Standard Test Method for Surface Burning Characteristics of

Materials. One of the products (the future System 550D-FR) obtained a flame spread classification of 20 and a smoke developed classification of 115. By comparison, according to Quantum Technologies, a typical polyurea elastomer would have a flame spread classification of 150 to 200 and a smoke developed classification of 300 to 500. The lower the classification number is, the slower (and therefore better) the flame spread rate is.

### Intumescent Polyurea in Use

According to LaGrange, System 550D-FR has the surface hardness, flexibility, and chemical resistance of a sprayed polyurea. Tear strength is slightly lower than regular polyureas. "It seems to have the longevity of polyureas but has really low flammability," he says. And unlike many existing secondary containment liners, the intumescent polyurea does not require covering with sand for fire protection. This feature minimizes disposal issues due to contaminated sand from spills, his company says.

LaGrange notes that the intumescent polyurea requires the use of application equipment with a minimum filter size of 60 mesh to avoid clogging. Because the product is heavily filled, it can wear down spray tips; therefore, it may be necessary to develop hardened tips to prevent wear, he says. The refinery whose problem spawned Quantum Technology's work has specified the new product for all compressor station secondary containments, LaGrange says.