

# Stepan Polyester Polyols for Rigid Foam Polyisocyanurate (PIR) and Polyurethane (PUR)



Increasing energy efficiency through improved insulation

Stepan is the global leader in the production and sale of aromatic polyester polyols for use in rigid polyisocyanurate and polyurethane foams. The largest end use for Stepan rigid aromatic polyester polyols is in applications where insulation, flammability, and structural performance are most important. These polyols contain innovative Stepan technology that improves foam processing and insulating performance to create value in end use applications. Stepan's aromatic polyester polyol business uses a vertical integration model, world-class manufacturing and a global supply chain to deliver high quality products reliably.



### **SPRAY INSULATION**

Stepan's unique chemistry leads to superior insulation and flammability resistance, critical requirements in the construction industry. Spray formulations containing STEPANPOL® or TERATE® polyols are also easier to process due to low polyol viscosity and improved blowing agent solubility.



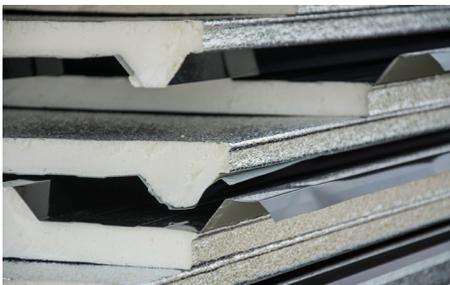
### **FLEX FACED PIR BOARDS**

PIR foams made with STEPANPOL or TERATE polyester polyols deliver superior insulating performance, applied economics and reliability. This results from the combination of our proprietary technology, application expertise, and world-class manufacturing practices.



### **APPLIANCE INSULATION**

STEPANPOL and TERATE polyols produce PUR foams with finer cell structures and improved flow. This enables manufacturers to increase insulating value while reducing cost.



### **METAL PANEL**

STEPANPOL and TERATE polyester polyols are good for both continuous and discontinuous manufacturing (and methods). Benefits include process flow, insulation value, and fire performance. Common applications include cold storage, insulated wall panels and roof panels.



### **BUNSTOCK**

STEPANPOL and TERATE polyester polyols provide thermal stability. Foams made with Stepan polyols provide smoother cutting info fabrication for the final shape and machine well for improved fabrication of parts.



### **POUR IN PLACE**

STEPANPOL and TERATE polyester polyols are used in a multitude of applications where an insulated void is required. Benefits include improved flow and low exotherm. Common uses are coolers, antennas, buoys and military applications.

APPLICATIONS							PERFORMANCE FEATURES	TYPICAL CHEMICAL PROPERTIES <sup>1</sup>				
STEPANPOL®	Flex Faced PIR Board	Metal Panel	Spray Foam	Appliance	Bunstock	Pour-in-Place		 <sup>2</sup> VALIDATED	Viscosity (caPs, 25°C)	Average Molecular Weight	Hydrolyl Value (mg-KOH/1g)	Functionality
RE-1202			•		•	•	NPE-free reactive emulsifier, improves B-side compatibility	— <sup>3</sup>	180	940	120	2.0
PS-1992	•	•					Improves flammability resistance	—	2,800	540	208	2.0
PS-2352	•	•		•			Promotes good flow, enhances compatibility with HC	50%	3,000	470	240	2.0
PS-2352 TD	•	•		•			Promotes good flow, enhances compatibility with HC, improves low temperature R-value	—	3,000	470	240	2.0
PS-2412	•	•					Improves green strength, enhances compatibility with HC	50%	3,000	470	240	2.0
PS-2492**	•	•		•			Improves flammability, improves low temperature R-value	—	2,000	470	240	2.0
PS-2502A		•		•		•	Increases insulating ability, promotes good flow	50%	3,000	470	240	2.0
PS-2602	•	•		•			Increases insulation and flow	—	4,400	430	260	2.0
PS-3152			•		•	•	Increases insulation ability	55%	2,800	350	315	2.0
PS-3422			•		•	•	Promotes good flow, improves green strength, improves flammability	—	7,500	350	350	2.2

APPLICATIONS							PERFORMANCE FEATURES	TYPICAL CHEMICAL PROPERTIES			
TERATE®	Flex Faced PIR Board	Metal Panel	Spray Foam	Appliance	Bunstock	Pour-in-Place		Viscosity (caPs, 25°C)	Average Molecular Weight *	Hydrolyl Value (mgKOH/1g)	Functionality*
HT 5100			•		•	•	Good compressive strength, good flammability performance	5,500	430	295	2.25
HT 5150					•		Improved trimer conversion and mechanical properties, good flammability performance	5,500	430	295	2.25
HT 5258**				•			Good flowability	1,500	470	240	2.0
HT 5345			•		•	•	Good mechanical properties and flammability performance at a lower viscosity	5,250	450	305	2.4
HT 5360			•		•	•	Good mechanical properties, good flammability performance and low smoke	10,750	450	305	2.45
HT 5500	•	•		•		•	For halogenated and non halogenated systems, good flammability performance	4,500	480	235	2.0
HT 5502	•	•					FR-containing, good flammability performance	2,250	520	215	2.0
HT 5502.15	•	•					FR-containing, good flammability performance	1,750	550	205	2.0
HT 5503	•	•				•	For halogenated and non halogenated systems, good flammability performance	3,500	480	235	2.0
HT 5510		•					For halogenated and non halogenated systems, good flammability performance	4,500	430	257	2.0
HT 5511	•	•					FR-containing, good flammability performance	3,100	480	235	2.0

<sup>1</sup>Property values are typical and based on product concentration and/or mathematical and statistical calculations.

<sup>2</sup>Contains a minimum percentage of post-industrial recycled content as reflected in the chart above. UL.COM/ECV

<sup>3</sup>Not tested

\*All functionality and average molecular weight calculated with FR (Flame Retardant)

\*\* Commercial product, but not currently in production. Production would require commercial review of opportunity.

Wt% of blowing agent soluble in polyol

<5%

5-15%

>15%

Polyol	N-pentane	Cyclo- pentane	80/20 cyclo/iso pentane	HFC-365 mfc (93/7 blend)	HFC-245fa	HFO-1233zd	HFO- 1366mzz-Z
STEPANPOL PS-1992	5-15%	5-15%	5-15%	<5%	>15%	>15%	>15%
STEPANPOL PS-2352	5-15%	>15%	5-15%	>15%	>15%	>15%	>15%
STEPANPOL PS-2412	<5%	5-15%	<5%	5-15%	>15%	>15%	5-15%
STEPANPOL PS-2492	<5%	<5%	<5%	5-15%	5-15%	5-15%	<5%
STEPANPOL PS-2502A	5-15%	5-15%	5-15%	>15%	>15%	>15%	>15%
STEPANPOL PS-2602	<5%	<5%	<5%	5-15%	>15%	5-15%	5-15%
STEPANPOL PS-3152	5-15%	5-15%	5-15%	5-15%	5-15%	5-15%	5-15%
STEPANPOL PS-3422	<5%	5-15%	<5%	5-15%	>15%	>15%	>15%

Polyol	N-pentane	Cyclo- pentane	80/20 cyclo/iso pentane	HFC-365 mfc (93/7 blend)	HFC-245fa	HFO-1233zd	HFO- 1366mzz-Z
TERATE HT 5500	<5%	<5%	<5%	5-15%	>15%	>15%	5-15%
TERATE HT 5502	<5%	<5%	<5%	5-15%	>15%	>15%	5-15%
TERATE HT 5503	<5%	<5%	<5%	5-15%	>15%	>15%	5-15%
TERATE HT 5150	<5%	<5%	<5%	5-15%	>15%	>15%	>15%
TERATE HT 5100	<5%	<5%	<5%	5-15%	>15%	>15%	>15%
TERATE HT 5360	<5%	<5%	<5%	5-15%	>15%	>15%	5-15%

<sup>1</sup> Property values are typical and based on product concentration and/or mathematical and statistical calculations.

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# Stepan Polyol Manufacturing Plants

**Wilmington, NC, USA**  
Production Plant  
R&D Center

**Brzeg Dolny, Poland**  
Production Plant  
R&D Center

**Elwood, IL, USA**  
Production Plant  
Pilot Reactors

**Columbus, GA, USA**  
Production Plant  
Powder R&D Center

**Wesseling, Germany**  
Production Plant

**Vlissingen, Netherlands**  
Production Plant

**Nanjing, China**  
Production Plant  
R&D Center  
Esterification Pilot Reactor  
Propoxylation Pilot Reactor

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