



RIGID POLYURETHANE SYSTEMS

IP HARWAL BLENDING SYSTEMS & POLYOL MANUFACTURING

IP Harwal Polymer, a division of Interplast Group, specializes in the manufacture of plastic compounds, recycled polyols from PU / PET / PA waste, and customized blending products such as rigid polyurethane systems to cater to the demands of a growing insulation industry.

Marketed under the brand name Harwal Polyurethane, our rigid polyurethane systems have great insulation and flame-retardant properties. Ip harwal Systems are widely used in insulated panels and further developed with various blowing agents for roof spray insulation. Our high quality Polyurethane systems are well recognized through various certifications.

IP Harwal Polymer has established a regional alliance with global experts and built a multi-functional plant producing PET/PA/PU based polyester polyols. Our multi-functional blending and polyol manufacturing facility in DIP (Dubai Investment Park) guarantees high quality polyurethane products, increases customer benefits, reduces PET and PU waste and help to conserve energy. With a comprehensive product portfolio and a production capacity of 40,000 tons per year IP Harwal Polymer is the preferred supplier of choice for customers in rigid polyurethane industry.

Interplast, a key member of the reputed Harwal Group is a leading manufacturer of plastic resins, plastic compounds catering to different applications such as pipes, fittings, cable insulation, rigid, flexible profiles and more.

Since its commencement in 1981, the company has diversified from conversion of PVC compounds to manufacturing uPVC Conduits, Trunking , Fittings, Switches, Sockets under the brand names DECODUCT, EDISON. Our building materials division produces ALUPEX, a range of Non-Combustible Avminium Composite Panels.

The DECOPACK & DECOFORM range consist of a wide range of industrial and commercial films, bags, flexible packaging, and thermoformed products which are currently exported to over 50 countries across the globe.

Our manufacturing facilities in the UAE can extrude over 33,000 MT of UPVC resin and over 50,000 MT of injection products per annum, making it one of the largest manufacturing facilities in the region.

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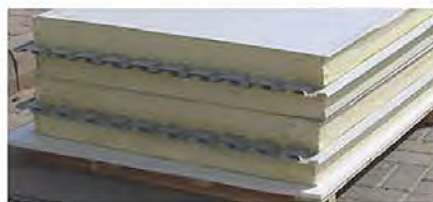
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Research & Development

We at IP Harwal Polymer maintain stringent quality controls and our state-of-the-art laboratory is equipped for analytical and physical testing for base raw materials, blended systems and finished products for end users.

Our testing lab performs various tests on the polyurethane systems and its end products to ensure they meet and exceed international standards for quality, durability, and physical characteristics. This ensures the polyurethanes manufactured at IP Harwal Polymer are not compromised.

Chemical testing:

- Viscosity
- OH values
- Acid and water content
- Reactivity reaction profile of the blended system
- Specific gravity

Foam Mechanical testing:

- Adhesion test
- Compression strength
- Dimension stability
- Density
- Thermal conductivity
- Reaction to fire – Single flame fire test
- Open / Close cell content of the foam
- Additional physical characteristics of the polyurethane products that are tested include
 - o Temperature effect
 - o Overall color
 - o System weight.



Spray Polyurethane Foam Systems

Product Series	Spray Polyurethane Foam Systems HP-SP 3000 series	
Product Series Description	HPSP series are Spray Polyurethane Rigid foam systems with blowing agent HCFC (141b) & water. The HPSP series is widely used in the insulation markets due to its good adhesive strength, K-factor and dimensional stability when they react with pMDI. This system quickly solidifies by spraying and has enough rigidity to bear the weight of the worker.	
Product Series Specification	Core Density : 40-55 kg/m ³ Dimensional Stability (-20 °C, 48hr) : ≤ 1.0 %	Compressive Strength : ≥150 kPa 35° C k-factor : ≤ 22.00 mW/(m*K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Superb insulating performance ■ Good fire properties ■ Excellent compressive strength and dimensional stability 	

Typical Formula	Spray System HPSP3040	Water Based Spray HP-SP-W-3040	Water Based Low Density HP-SP-3040(WLD)	Spray PIR HP-SP-PIR-3040(B2)	Open Cell Form HP-SPWOC-3040
Property					
Viscosity at 25°C cps	200 ± 50	350 ± 50	350 ± 50	200 ± 50	500 ± 50
Water Content (%)	1.00 ± 0.10	1.50 ± 0.20	1.80 ± 0.10	Nil	17.7 ± 0.10
Machine Mix Reactivity					
Component Temperature,0°C	35	35	35	35	35
ISO/Blended Polyol	100/100	100/100	100/100 (1:1.1)	100/100	100/100
Cream Time, sec	< 5	< 5	< 5	< 5	< 5
Gel Time, sec	<10	<12	<10	<10	<10
Free Rise Density` kg/m ³	30 ± 1.0	40 ± 2.0	32 ± 1.0	38 ± 2.0	10 ± 2.0
Typical Physical Properties					
Core Density (kg/m ³)	45 ± 2.0	53 ± 2.0	45 ± 2.0	55 ± 2.0	10 ± 2.0
Compressive Strength (kPa)	250 ± 50	300 ± 50	250 ± 50	300 ± 50	--
Dimensional Stability (-30°C, 48hr), %	<1	<1	<1	<1	<3.8
@23 °C Thermal Conductivity (mW/m.K)	21.0 ± 0.50	25.0 ± 0.50	25.0 ± 0.50	21.0 ± 0.50	26.0 ± 0.50
Flammability	B3	B3	B3	B2	B3
R Value (m ² K/W)	50 mm	2.294	2.000	2.000	1.667
	100 mm	4.587	4.000	4.000	3.333



Applications:

- Residential & Commercial Building
(New & Retrofit)
- Walls & Roofs
- Attics & Small Spaces

Discontinuous Panel Systems – Cold Stores

Product Series	Discontinuous Panel Systems - Cold Stores HP-DCPU	
Product Series Description	<p>HP-DCP series blended polyols are a discontinuous PUR sandwich panels system designed with blowing agent HCFC, Hydrocarbons.</p> <p>They are widely used to produce panels for different applications, such as cold storage, climate-controlled rooms, refrigerated warehouses, Excellent insulation, good flow ability, adhesive strength and compressive strength, are the key features when they react with pMDI. The manufactured foam has good fire-retardant behaviour.</p>	
Product Series Specification	Core Density : 35-45 kg/m ³ Dimensional Stability (-20°C, 48hr) : ≤ 1.0% Dimensional Stability (+80°C, 48hr) : ≤ 1.5%	Compressive Strength: ≥ 150 kPa 35° C k-factor : ≤ 23.00 mW / (m*K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Superb insulating performance 	<ul style="list-style-type: none"> ■ Good fire properties ■ Excellent compressive strength and dimensional stability

Typical Formula	HP-DCPUT 38-25	HP-DCPU 40FS (B2)	HP-DCPU 40-21
Property			
Viscosity at 25°C cPs	300 ± 50	310 ± 50	310 ± 50
Water Content (%)	1.70 ± 0.10	1.00 ± 0.10	1.80 ± 0.10
Machine Mix Reactivity			
Component Temperature, °C	21 ± 1	21 ± 1	21 ± 1
Blended Polyol : ISO	100 : 120	100 : 120	100 : 120
Cream Time, sec	23 ± 3	40 ± 2	33 ± 3
Gel Time, sec	135 ± 20	215 ± 15	230 ± 20
Free Rise Density, kg/m ³	28 ± 2	37 ± 1.0	37 ± 1.5
Typical Physical Properties (Mold temperature at 45°C)			
Core Density (kg/m ³)	35 - 37	38 - 40	38 - 40
Compressive Strength (kPa)	> 100	> 100	> 100
Dimensional Stability (-20°C, 48hr), %	< 1.5	< 1.5	< 1.5
Dimensional Stability (+80°C, 48hr), %	< 1.0	< 1.0	< 1.0
35°C Thermal Conductivity (mW/m*K)	23.00 ± 0.20	23.00 ± 0.20	23.00 ± 0.20



Applications:

- Cold Stores
- Walk-in Cold Rooms
- Skid Mounted Containers
- Reefer Containers

Discontinuous Panel Systems – Refrigerated Trucks & Reefers

Product Series	Discontinuous Panel Systems - Refrigerated Trucks & Reefers HP-DCPT 6000	
Product Series Description	HP-DCPT 6000 is a polyol formulation used to produce insulation for discontinuous panels used in refrigerated truck body panels. It contains all the raw material and auxiliaries necessary for the production of rigid polyurethane foam including blowing agent 141b. The manufactured foam has good fire retardant behavior and is compatible with PUR B2 & B3.	
Product Series Specification	Core Density : 35 - 45kg/m ³ Dimensional Stability (-20°C, 48hr) : ≤ 1.0 % Dimensional Stability (+80°C, 48hr) : ≤ 1.5%	Compressive Strength : ≥150 kPa 35° C k-factor : ≤ 23.00 mW / (m*K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Superb insulating performance 	<ul style="list-style-type: none"> ■ Good fire properties ■ Excellent compressive strength and dimensional stability

Typical Formula	HP-DCPT- 6042	
Property		
Viscosity at 25°C cPs	310 ± 50	
Water Content(%)	1.8 ± 0.10	
Machine Mix Reactivity		
Component Temperature,°C	21 ± 1	
Blended Polyol : ISO	100 : 120	
Cream Time, sec	33 ± 2	
Gel Time, sec	220 ± 15	
Free Rise Density, kg/m ³	37 ± 1	
Typical Physical Properties (Mold temperature at 45°C)		
Core Density (kg/m ³)	42 ± 2	
Compressive Strength (kPa)	> 100	
Dimensional Stability (-20°C, 48hr), %	< 1.5	
Dimensional Stability (+80°C, 48hr), %	< 1.0	
35° C Thermal Conductivity (mW/m*K)	23.00 ± 0.20	



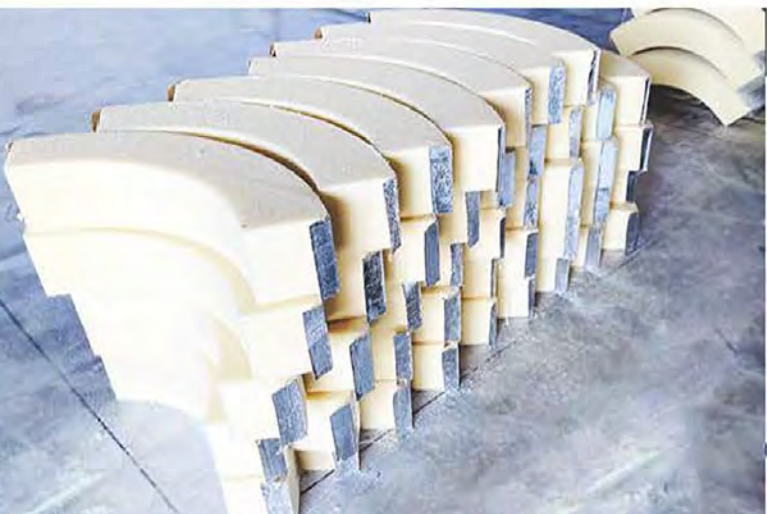
Refrigerators, Water Heaters & Coolers, Blow & Roto Molds

Product Series	Refrigerators, Water Coolers, Water Heaters, Roto Molds Systems HP-DFPU 7000, HP-DWH 5000	
Product Series Description	HP-DFPU 7000, HP-DWH 5000 series blended polyols are designed with HCFC-141 b and water blowing agent, are pale yellow to reddish brown transparent liquid at normal temperature. HP-DFPU 7000 is a formulated polyol used to produce rigid insulation for refrigerators and freezers. While HP-DWH 5000 is a formulated polyol used to produce rigid insulation for waterheaters & roto molds.	
Product Series Specification	Core Density : 38 - 45kg/m ³ Dimensional Stability (-20°C, 48hr) : ≤ 1.0 % Dimensional Stability (+80°C, 48hr) : ≤ 1.5%	Compressive Strength : ≥100 kPa 35°C k-factor : ≤ 23.00 mW/(m*K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Superb insulating performance 	<ul style="list-style-type: none"> ■ Good fire properties ■ Excellent compressive strength and dimensional stability

Typical Formula	HP-DFPU 7242	HP-DWH 5440	HP-DFPU 45-9 Water Blown System
Property			
Viscosity at 25°C cPs	300 ± 50	310 ± 50	300 ± 50
Water Content(%)	2.3 ± 0.10	1.8 ± 0.02	4.0 ± 0.20
Machine Mix Reactivity			
Component Temperature,°C	21 ± 1	21 ± 1	21 ± 1
Blended Polyol : ISO	100 : 130	100 : 130	100 : 150
Cream Time, sec	15 ± 2	15 ± 2	20 ± 2
Gel Time, sec	80 ± 5	95 ± 5	100 ± 10
Free Rise Density, kg/m ³	27.0 ± 1.0	30 ± 1.0	33 ± 2
Typical Physical Properties (Mold temperature at 45°C)			
Core Density (kg/m ³)	40 ± 2	38 ± 2	43 ± 2
Compressive Strength (kPa)	> 100	> 100	> 100
Dimensional Stability (-20°C, 48hr), %	< 1.5	< 1.5	< 1.5
Dimensional Stability (+80°C, 48hr), %	< 1.5	< 1.5	< 1.5
35°C Thermal Conductivity (mW/m*K)	23.00 ± 0.20	23.00 ± 0.20	24.00 ± 0.20



Continuous Block



Discontinuous Block

Continuous PIR Block Foam Systems

Product Series	Continuous PIR Block Foam Systems HP-CPB3 5000 Series
Product Series Description	HP-SCBF-9000 polyol system that meets the DIN 4102 class B2 requirements for the production of continuous pir block foam with pipe in pipe and pipe support for oil and gas cryogenic applications.
Product Series Specification	Core Density: 35-50 kg/m ³ Dimensional Stability (-30°C, 24 hrs) ≤ 1%

Typical Formula	HP-SCBF-9050	HP-SCBF-9035
Property		
Viscosity at 25°C cPs	400 ± 50	300 ± 50
Water Content(%)	0.2 ± 0.1	0.5 ± 0.1
Machine Mix Reactivity		
Blended Polyol: ISO Ratio / Catalyst	100:200	100:200
Blended Polyol: ISO Ratio / Catalyst/CP		
Cream Time, Sec	40 ± 5	40 ± 5
Gel Time, Sec	90 ± 10	90 ± 10
Free Rise Density, kg/m ³	55 ± 2	40 ± 2

Typical Physical Properties (Mold temperature at 45°C)		
Core Density (kg/m ³)	50 ± 2	35 ± 2
Compressive Strength (kPa)	250 KPA	180 KPA
Dimensional Stability (-30°C, 24hr), %	<1	<1
Conductivity (W/m.K)	0.021 W/m.K	0.021 W/m.K
Tensile Strength (kPa)	>80	>80
ODP (Ozone Depletion Potential)	0	0
GWP (Global Warming Potential)	<5	<5

Discontinuous PIR Block Foam Systems

Product Series	Discontinuous PIR Block Foam Systems
Product Series Description	HP-SCBF-9000 polyol system that meets the DIN 4102 class B2 requirements for the production of Discontinuous pir block foam with pipe in pipe and pipe support for oil and gas cryogenic applications.
Product Series Specification	Core Density: 35-50 kg/m ³ Dimensional Stability (-30° C, 24 hrs) ≤ 1%

Typical Formula	HP-SDCBF-9051	HP-SDCBF-9036
Property		
Viscosity at 25°C cPs	400 ± 50	300 ± 50
Water Content(%)	0.2 ± 0.1	0.5 ± 0.1
Machine Mix Reactivity		
Blended Polyol: ISO Ratio / Catalyst	100:180	100:180
Blended Polyol: ISO Ratio / Catalyst/CP		
Cream Time, Sec	80 ± 20	80 ± 20
Gel Time, Sec	220 ± 40	220 ± 40
Free Rise Density, kg/m ³	56 ± 2	40 ± 2

Typical Physical Properties (Mold temperature at 45°C)

Core Density (kg/m ³)	50 ± 2	35 ± 2
Compressive Strength (kPa)	250 KPA	180 KPA
Dimensional Stability (-30°C, 24hr), %	<1	<1
Conductivity (W/m.K)	0.021 W/m.K	0.021 W/m.K
Tensile Strength (kPa)	>80	>80
ODP (Ozone Depletion Potential)	0	0
GWP (Global Warming Potential)	<5	<5

Thermo-Ware, Ice Boxes & Casserole

Product Series	Thermo-Ware, Ice Boxes & Casserole HP-CW 7000 Series	
Product Series Description	HP – CW 7000 is a formulated polyol used to produce rigid insulation for Can coolers and Water heaters. It contains all the raw material and auxiliaries' necessary for the production of rigid polyurethane foam including blowing agent 141b.	
Product Series Specification	Core Density : 35 - 45 kg/m ³ Dimensional Stability (-20°C, 24hr) : ≤ 1.0%	Compressive Strength : ≥100 kPa 35° C k-factor : ≤ 25.0 mW/(m*K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operability and flowability ■ Excellent insulating performance 	<ul style="list-style-type: none"> ■ The manufactured foam with pMDI has good density distribution good adhesion and high compressive strength and low thermal conductivity

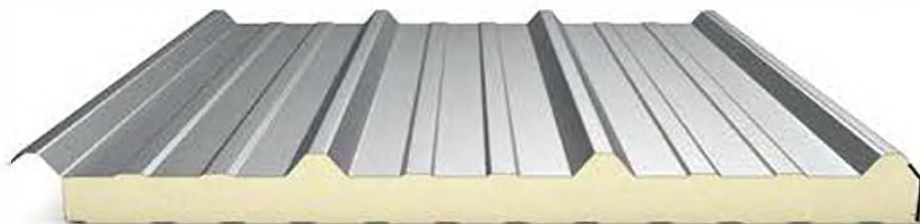
Typical Formula	HP-CW 7005	HP-DFPU 45-9 FG Water Blown System
Property		
Viscosity at 25°C cPs	300 ± 50	500 +/- 50
Water Content(%)	2.20 ± 0.1	4.10 +/- 0.1
Machine Mix Reactivity		
Component Temperature,°C	21 ± 1	21 ± 1
Blended Polyol: ISO Ratio	100 : 120	100 : 150
Cream Time, Sec	15 ± 2	15 ± 2
Gel Time, Sec	100 ± 1. 10	65 ± 5
Free Rise Density, kg/m ³	27 ± 1	32 ± 2
Typical Physical Properties (Mold temperature at 45°C)		
Core Density (kg/m ³)	38 ± 2	42 ± 2
Compressive Strength (kPa)	>100 kPa	>100 kPa
Tensile Strength (kPa)	>80	>80
Dimensional Stability (-20°C, 24hr), %	< 1	< 1
35°C Thermal Conductivity (mW/m*K)	0.02322	0.02520
ODP (Ozone Depletion Potential)	0.66 - 0.90	0
GWP (Global Warming Potential)	870 - 970	1.0



Continuous PUR B3 Panel Systems

Product Series	Continuous PUR B3 Panel Systems HP-CPB3 5000 Series	
Product Series Description	HP-CPB3-5000 series blended polyol are formulated to produce insulation for the continuous lamination of metal faced sandwich panels according EN 14509, for thicknesses from 50mm till 200 mm.	
Product Series Specification	Core Density : 36-44 kg/m ³ Dimensional Stability (-20°C, 24hr) : ≤ 1.0%	Compressive Strength : ≥80 kPa 35° C k-factor : ≤ 25.0 mW/(m ² K)
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operability and flowability ■ Excellent insulating performance 	<ul style="list-style-type: none"> ■ The manufactured foam with pMDI has good density distribution good adhesion and high compressive strength and low thermal conductivity

Typical Formula	HP-CPB3-5442-4P	HP-CPB3-5010-31	HP-CPB3-5310-21
Property			
Viscosity at 25°C cPs	1,000 ± 50	300 ± 50	300 ± 50
Water Content(%)	1.55 ± 0.1	1.55 ± 0.1	1.55 ± 0.1
Machine Mix Reactivity			
Blended Polyol: ISO Ratio / Catalyst		100:157 / 0.65	100:155 / 100
Blended Polyol: ISO Ratio / Catalyst/CP	100:150 / 0.65 / 9.0		100:150 / 0.65 / 9.0
Cream Time, Sec	10 ± 2	10 ± 2	10 ± 2
Gel Time, Sec	48 ± 3	50 ± 3	50 ± 3
Free Rise Density, kg/m ³	33 ± 2	35 ± 2	35 ± 2
Typical Physical Properties (Mold temperature at 45°C)			
Core Density (kg/m ³)	40 ± 4	40 ± 4	40 ± 4
Compressive Strength (kPa)	>100 kPa	>100 kPa	>100 kPa
Dimensional Stability (-20°C, 24hr), %	< 1	< 1	< 1
35°C Thermal Conductivity (mW/m ² K)	< 0.025	< 0.025	< 0.025
Tensile Strength (kPa)	> 80	> 80	> 80
ODP (Ozone Depletion Potential)	0	0.66-0.90	0.66-0.90
GWP (Global Warming Potential)	1	870-970	870-970



Continuous PIR Panel Systems

Product Series	Continuous PIR Panel Systems HP-CPIR 5000	
Product Series Description	HP-CPIR-5000 blended polyol has been especially developed for the continuous lamination of metal faced sandwich panels according EN 14509, for thicknesses from 50mm till 200 mm.	
Product Series Specification	Core Density : 36-44 kg/m ³ Dimensional Stability (-20°C, 24hr) : ≤ 1.0%	Compressive Strength : >100 kPa 35° C k-factor : ≤ 20.50mW/m . K
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Excellent insulating performance 	<ul style="list-style-type: none"> ■ The manufactured foam with pMDI has good density distribution good adhesion and high compressive strength and low thermal conductivity

Typical Formula	HP-CPIR 5628-4P	HP-CPIR 5721-4P	HP-PCPIR MI SP
Property			
Viscosity at 25°C cPs	1300 ± 200	1300 ± 200	1300 ± 200
Water Content(%)	1.55 ± 0.1	1.55 ± 0.1	1.55 ± 0.1

Machine Mix Reactivity

Blended Polyol: ISO Ratio / Catalyst / CP	100:170/ 4.0 / 12	100:180/ 3.0 / 12	100:192/ 4.0+2.7 / 12
Cream Time, Sec	10 ± 2	10 ± 2	10 ± 2
Gel Time, Sec	45 ± 3	45 ± 3	45 ± 3
Free Rise Density, kg/m ³	36 ± 2	36 ± 2	36 ± 2

Typical Physical Properties (Mold temperature at 45°C)

Core Density (kg/m ³)	40 ± 4	40 ± 4	40 ± 4
Compressive Strength (kPa)	100 kPa	100 kPa	100 kPa
Tensile Strength (kPa)	>100	>100	>100
Dimensional Stability (-20°C, 24hr), %	< 1	< 1	< 1
35°C Thermal Conductivity (W/m.K)	< 0.025 W/ (m x K)	< 0.025 W/ (m x K)	< 0.025 W/ (m x K)
ODP (Ozone Depletion Potential)	0	0	0
GWP (Global Warming Potential)	< 5	< 5	< 5



Pipe in Pipe Systems

Product Series	Pipe in Pipe System HPPP 7001	
Product Series Description	HPPP series blended polyols are a pour-in-place polyurethane pipe-in-pipe rigid foam system designed with blowing agent HCFC-141b and hydrocarbons. They are widely used in pipe insulation markets, such as heating pipeline, water pipeline, oil pipeline, etc. Excellent operationality, flowability, adhesive strength, and low water absorption at boiled water are the key features when they react with pMDI. The manufactured foam has good density distribution, high compressive strength and excellent dimensional stability.	
Product Series Specification	Core Density : $\geq 60 \text{ kg/m}^3$ Dimensional Stability (120°C) ≥ 30 years	Compressive Strength: $\geq 330 \text{ kPa}$ 50°C k-factor : $\leq 25.0 \text{ mW/(m}^2\text{K)}$
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent heat insulation performance ■ Good process operationality and flowability ■ Good compressive strength 	<ul style="list-style-type: none"> ■ Excellent heat resistant performance and long-term thermal conditions

Typical Formula	7001-A (Small diameter pipe)	7001-B (Small diameter pipe)
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Property

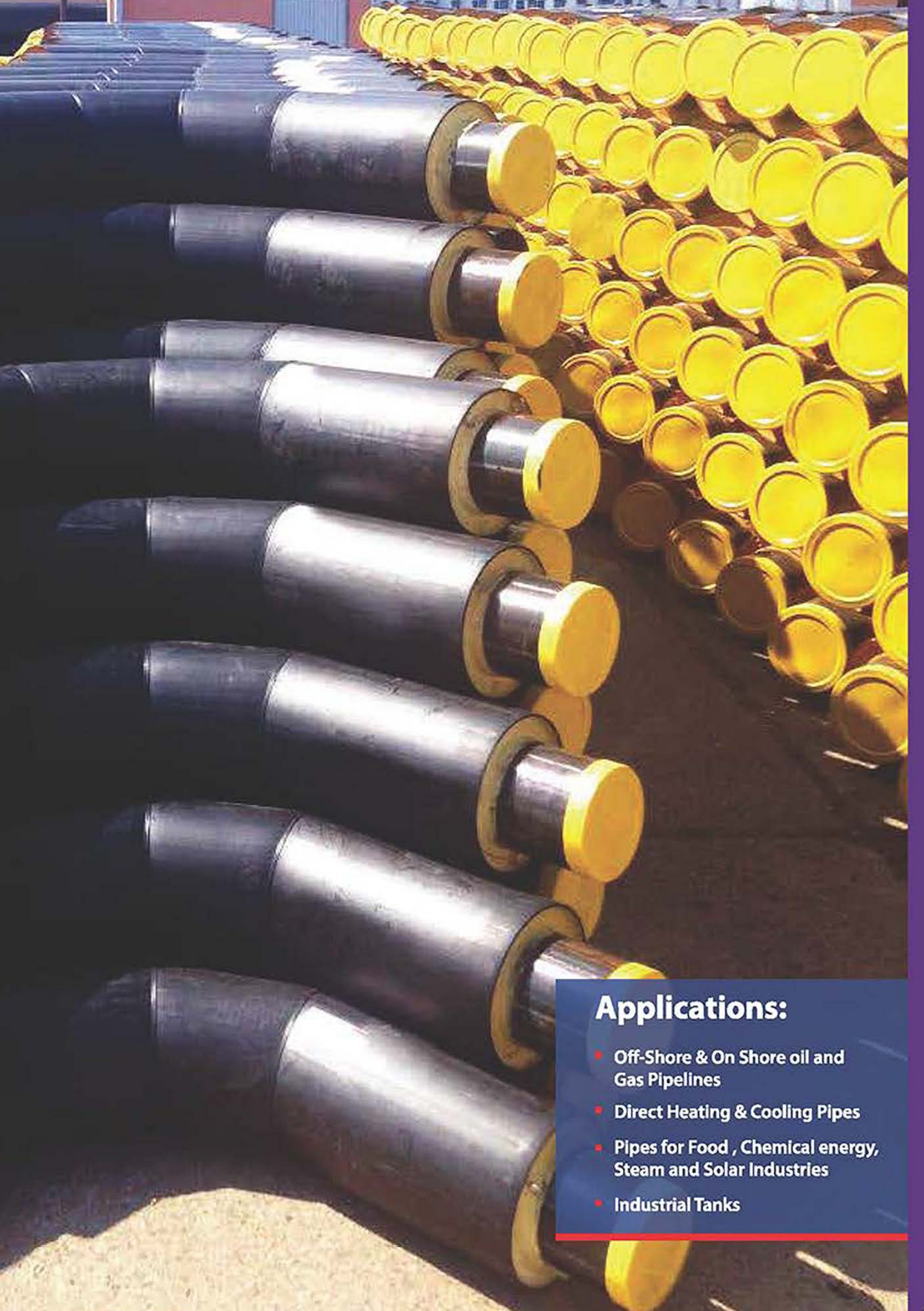
Viscosity at 25°C cPs	500 ± 80	600 ± 100
Water Content(%)	1.78 ± 0.10	1.63 ± 0.10

Machine Mix Reactivity

Component Temperature,°C	21 ± 1	21 ± 1
Iso/Blended Polyol	150/100	150/100
Cream Time, sec	28 ± 4	33 ± 15
Gel Time, sec	180 ± 22	210 ± 25
Free Rise Density, kg/m ³	32.0 ± 1.90	35.0 ± 2.10

Typical Physical Properties (Mold temperature at 45°C)

Core Density (kg/m ³)	60 - 65	60 - 65
Compressive Strength (kPa)	≥ 460	≥ 480
Closed cell content (%)	≥ 94	≥ 94
Water absorption (%)	-6	-6
25°C Thermal Conductivity (mW/m*K)	< 0.025	< 0.025



Applications:

- Off-Shore & On Shore oil and Gas Pipelines
- Direct Heating & Cooling Pipes
- Pipes for Food , Chemical energy, Steam and Solar Industries
- Industrial Tanks

Adhesives – Rockwool Glue Systems

Product Series	Adhesives - Rockwool Glue HP-RWGL 22A	
Product Series Description	HP - RWGL 22 A is a universal two component adhesive for sandwich panel production with rockwool and other purposes. The formulation contains all the necessary raw materials and auxiliaries and it is meant for top/bottom side facer's application. The use of HP-RWGL 22 A on top/bottom side facer is to be decided by the end product manufacturer as per the processing conditions.	
Product Series Specification	Core Density : 50-65 kg/m ³	
Product Series Benefits	<ul style="list-style-type: none"> ■ Excellent storage stability ■ Good process operationality and flowability ■ Excellent insulating performance 	<ul style="list-style-type: none"> ■ The manufactured foam with pMDI has good density distribution good adhesion and high compressive strength and low thermal conductivity

Typical Formula	6001-r141b	6001-WB
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Property

Viscosity at 25°C cPs	800 ± 50	800 ± 50
Water Content(%)	2.55 ± 0.1	2.55 ± 0.1

Machine Mix Reactivity

Component Temperature,°C	21 ± 1	21 ± 1
Blended Polyol: ISO Ratio	100 :130	100 :100
Cream Time, Sec	15 ± 2	35 ± 5
Gel Time, Sec	60 ± 5	120 ± 20
Free Rise Density, kg/m ³	43 ± 3	100 ± 20

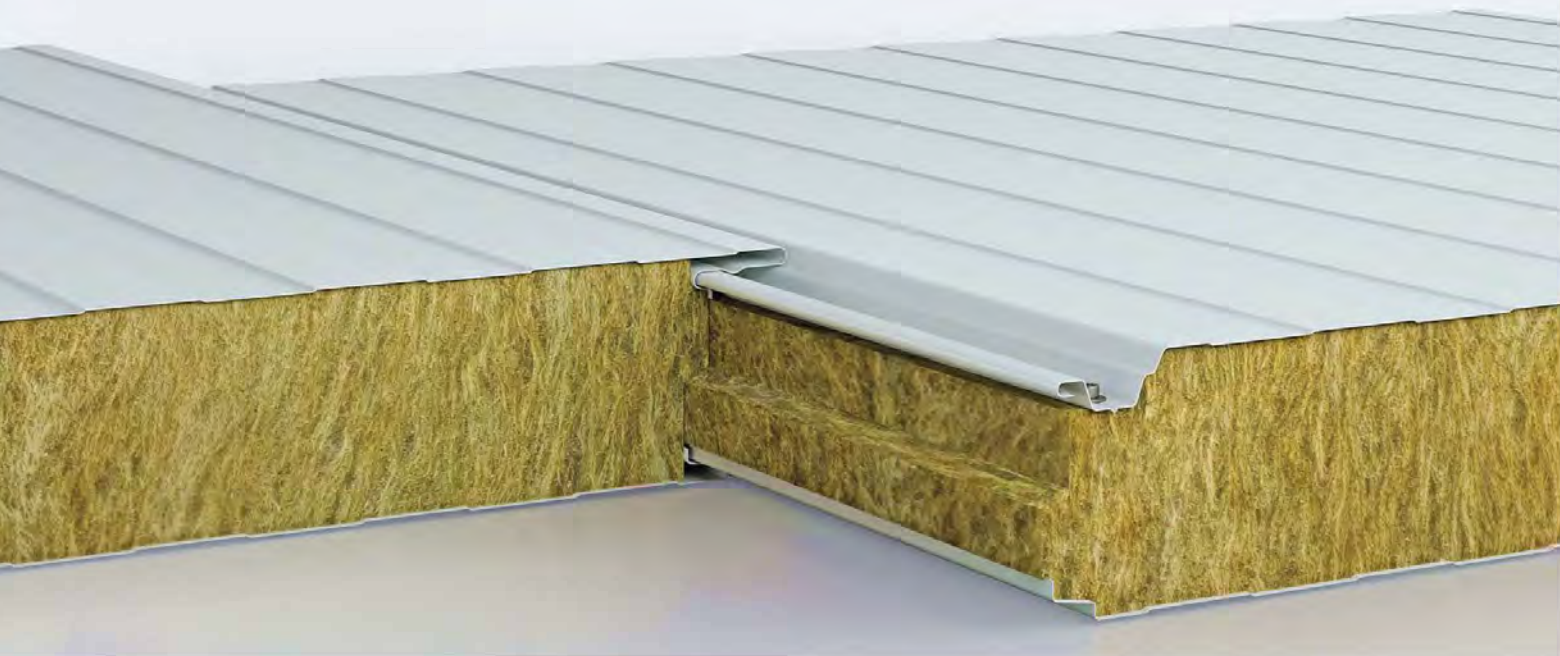
Typical Physical Properties (Mold temperature at 45°C)

Core Density (kg/m ³)	60 ± 2	60 ± 2
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PIR - Glue PIRGL-22P

Product Series	Continuous PIR Block Foam Systems HP-CPB3 5000 Series
Product Series Description	PIRGL-22P is a universal two component adhesive for sandwich PIR panel production and other purposes. The formulation contains all the necessary raw materials and auxiliaries.
Product Series Specification	Core Density: $600 \pm 100 \text{ kg/m}^3$ Dimensional Stability (-30°C , 24 hrs) $\leq 1\%$

Typical Formula	PIRGL – 22P
Property	
Viscosity at 25°C cPs	600 ± 50
Water Content(%)	0.1 ± 0.1
Machine Mix Reactivity	
Blended Polyol: ISO Ratio / Catalyst	100:110
Blended Polyol: ISO Ratio / Catalyst/CP	
Cream Time, Sec	35 ± 5
Gel Time, Sec	110 ± 10
Free Rise Density, kg/m^3	500 ± 100
Typical Physical Properties (Mold temperature at 45°C)	
Core Density (kg/m^3)	600 ± 100
Compressive Strength (kPa)	4000 KPA
Dimensional Stability (-30°C , 24hr), %	<1
Conductivity (W/m.K)	0.021 W/m.K



HARVAL BLENDED POLYOLS[®]

Rigid Systems	Blowing Agent					Applications	Flammability			Density, kg/m
	14 1B HCFC	Water Blown	Pentane	HFC 365/227			B3	B2	PIR	
HP-SP-3040	●					Spray foam insulation for roofing, wall, basements	●			43 - 47
HP-SP-3040 W		●				Spray foam insulation for roofing, wall, basements	●			52 - 58
HP-DCPUT 38-25	●					Insulation for discontinuous and cold store panels	●			36 - 40
HP-DCP 2035LD	●					Insulation for discontinuous and cold store panels	●			36 - 40
HP-DFPU 34-2	●					Insulation for refrigerators	●			38 - 42
HP-DWH 5440	●					Rigid insulation for Thermo ware, Water heaters	●			43 - 45
HP-CWT 7005	●					Rigid insulation for Can coolers and Water heaters	●			36 - 40
HP-DCPT 6042	●					Insulation for discontinuous and refrigeration Truck	●			42 - 44
HP-DFPU 45-9		●				Insulation for Water heater, Boilers, Freezers	●			43 - 45
HP-DFPU 45-9FG		●				Insulation for Water heater, Boilers, Freezers	●			43 - 45
HP-DCP 842FS				●		Insulation for discontinuous and Cold store panels		●		40 - 42
HP-DCPUT 40FS	●					Insulation for discontinuous and Cold store panels		●		40 - 42
HP-RWGL22 Top	●					Adhesive for panel production with Rock wool	●			40 -45 (FRD)
HP-DFPU 7242	●					Insulation for refrigerators	●			38 - 42
HP-DFPU 738FG HFC				●		Insulation for refrigerators and freezers	●			38 - 40
HP-DFPU 738 HFC				●		Insulation for refrigerators and freezers	●			38 - 40
HP-CPB3-5442-4P			●			Continuous lamination metal faced	●			36 - 44
HP-CPB3-5010-31	●					Continuous lamination metal faced	●			36 - 44
HP-CDUI-5031-21	●					Insulation for Ducting board		●		43 - 45
HP-CPIR				●		Continuous lamination metal faced			●	38 - 44

Polyurea Coating

IP Harwal Polymer is the leading manufacturer of customized, high performance Polyurea and Polyurethane coatings. With our strong R&D, state-of-the-art manufacturing plant and quality control procedures, we produce a wide variety of proprietary single-plural component, aromatic-aliphatic polyurea-polyurethane (PU-PUR) coatings designed to protect and waterproof many different types of substrates running the gamut of harsh environmental and service conditions.

We provide high performance spray-applied coatings for Industrial, secondary containments and waterproofing applications. Our coating solutions are designed with the contractor, architect and specifier in mind.

Applications

- Outdoor application sites where water, humidity or low temperature conditions exist
- Floor and wall protection In Industries such as food processing, food storage, veterinary and laboratories.
- Secondary containment as a monolithic, seamless lining for Industrial plant, agriculture, and petrochemical applications.
- Spray-on application creates a monolithic, seamless lining that conforms to any shape and size.
- Excellent for waterproofing such as shower stalls and pool linings.

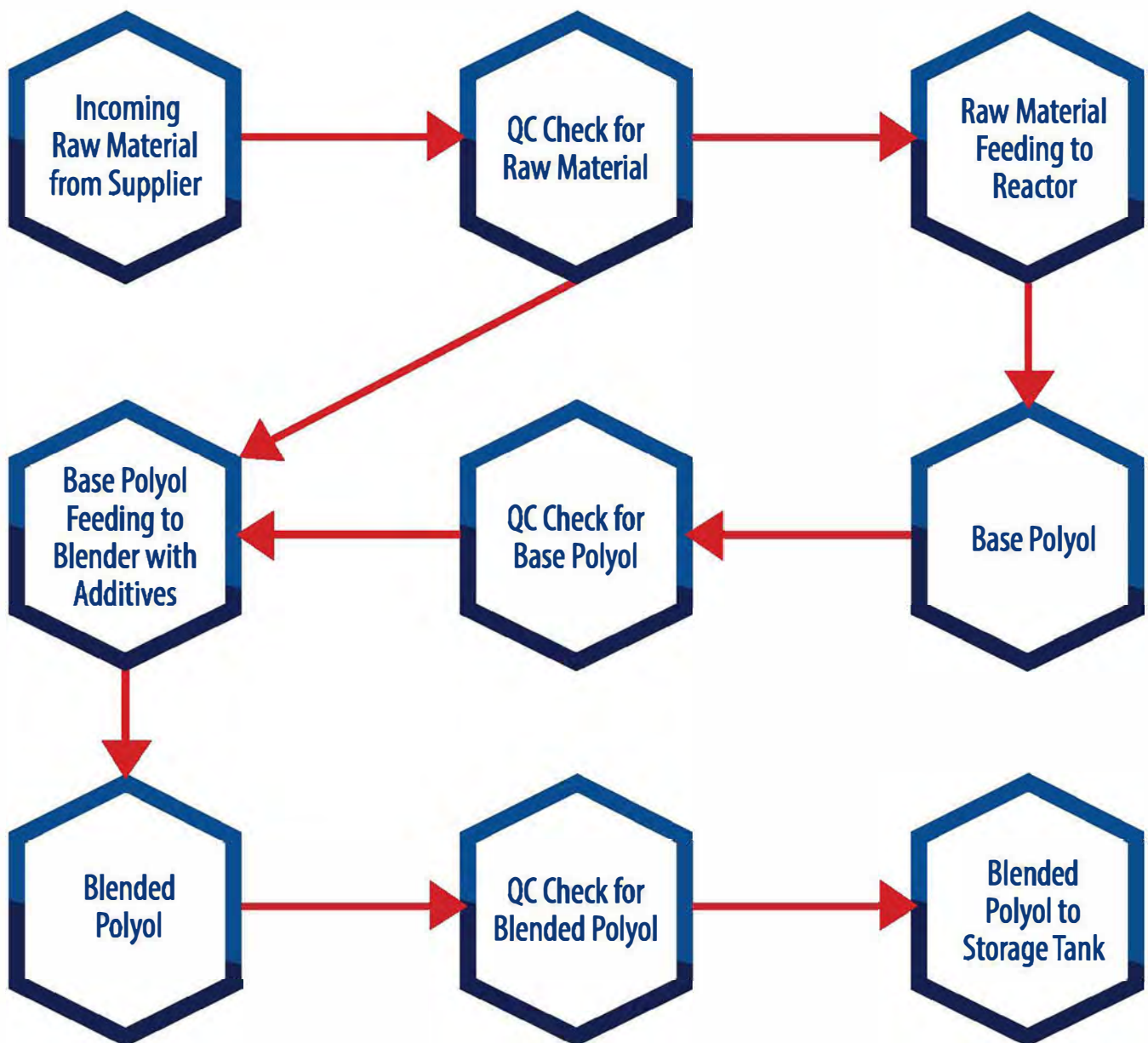


- | | | |
|--------------------------------------|---|-----------------------------|
| 1. Thermal Resistance | 5. Moisture Insensitivity | 9. High Abrasion Resistance |
| 2. Resistance to Atmospheric Attack | 6. Sound Insulation | 10. Colour Fast |
| 3. Superfast Reaction Time | 7. High Chemical Resistance | 11. Impact Resistance |
| 4. Environmentally Friendly Voc-Free | 8. Superior Tensile & Structural Strength | |



Quality Control Process for Blending and in House Polyol Manufacturing

The entire polyol manufacturing process is vertically integrated from polyol manufacturing to polyol blending with strict quality control at every critical stage of the polyol manufacturing and blending process.



Aromatic Polyester Polyols

IP Harwal Polymer is a leading manufacturer of polyester polyols PA / PET / PU / PIR Based. TESSOL polyol chemistry, vertically integrated supply chain and market leading technical service team meet the needs of our global customers.

IP Harwal Polymer polyester polyols have a wide range of applications in both polyurethane and polyisocyanurate applications. We offer a full range of aromatic polyester polyols for use in rigid foam applications. IP Harwal Polymer's comprehensive line of polyester polyols provide excellent insulation and mechanical properties while offering superior fire properties and processability. Our state of the art automated manufacturing plant ensures that you receive polyester polyol of the highest quality and consistency.



Polyols are used by Polyurethane industry to make polyurethane foam. Polyols are compounds with multiple hydroxyl functional groups available for organic reactions.

Polyester polyols are made by the poly condensation reaction of multi-functional carboxylic acids and polyhydroxyl compounds.

Grades	OH Value (mgKOH/g)	Viscosity (cps/25°C)	Acid Value (mgKOH/g)	Water Content (%)	Application	Note
TESSOL 240PA	230-250	2000-4500	2.0 max.	0.15 max	TESSOL 240 PA can be used for production of HCFC-141b-blown, HCFC-141b/water-blown and hydrocarbons-blown PU and PIR rigid foams meeting the requirements for roofing and wall panels.	Aromatic Polyester Polyols based on PA as feedstock.
TESSOL 240PET	230-250	2500-4500	2.4 max.	0.15 max.	TESSOL 240 PET can be used for production of PU and PIR rigid foams meeting the requirements for roofing and wall panels.	Aromatic Polyester Polyol based on PET as feedstock
TESSOL 310PA	300-320	2000-3500	2.0 max.	0.15 max.	TESSOL 310 PA applications include rigid polyurethane foam blown with HCFC-141b/ Water/ HFO & HFC (R-22) or blown with hydrocarbons and modifier copolyol for polyurethane foams for roofing and wall panels.	Aromatic Polyester Polyols based on PA as feedstock.
TESSOL 500 PU/PIR	450-550	5000-9000	5.0 max.	0.50 max.	TESSOL 500 PU/PIR can be used as a copolyol modifier for polyurethane foam production.	Modified Polyester Polyol based on PUR and PIR rigid foam as feedstock



Rigid Foam Production Accessories

■ Gas Pokers

IP Harwal Polymer supplies PU pokers to enhance the quality of PU Foam.

Several components are important in the production of high-quality polyurethane sandwich elements. Besides precision-tuned formulation and efficient plant parameters, the quality of the final product depends on the foam laydown technique. Our efficient Gas Pokers are designed to produce of high-grade PU and PIR sandwich panels.

POKER types for PU/PIR sandwich elements

FIX POKERS - MODELS CHART					
ID	Output Range (kg/min)	Output Range (kg/h)	Diameter per hole (mm)	Number of hols (nos.)	Chemical flow speed (2,0-3,0 m/sec) (m/s)
S-1.5	6.0-9.5	360	1.5	12	2.1
		560	1.5	12	3.4
S-2.0	10.0-16.0	600	2.0	12	2.0
		960	2.0	12	3.2
S-2.5	16.0-23.0	960	2.5	12	2.1
		1380	2.5	12	3.0
S-3.0	23.0-34.0	1380	3.0	12	2.1
		2040	3.0	12	3.0
L-1.5	7.0-11.0	420	1.5	14	2.1
		660	1.5	14	3.4
L-2.0	11.5-18.5	690	2.0	14	2.0
		1110	2.0	14	3.2
L-2.5	18.5-27.0	1110	2.5	14	2.0
		1620	2.5	14	3.0
L-3.0	27.0-39.0	1620	3.0	14	2.1
		2340	3.0	14	3.0
L-3.5	27.0-39.0	2340	3.5	14	2.0
		3300	3.5	14	3.1

L-LONG , S-SHORT



Rigid Foam Production Accessories

■ Gas Pokers

OSCILLATING POKERS - MODELS CHART						
ID	Output Range (kg/min)	Output Range (kg/h)	Output Range (m3/min)	Diameter per hole (mm)	Number of hols (nos.)	Chemical flow speed (2,0-3,0 m/sec) (m/s)
1	5-7	300	4.55	1	35	1.4
		420	6.36	1	35	1.9
1.1	8-11	480	7.27	1.3	35	1.3
		660	10	1.3	35	1.8
1.2	9-12	540	8.18	1.3	39	1.3
		720	10.91	1.3	39	1.8
1.4	12-16	720	10.91	1.5	39	1.3
		960	14.55	1.5	39	1.8
1.6	17-23	1020	15.45	1.8	39	1.3
		1380	20.91	1.8	39	1.8
2.2	9.5-13	570	8.64	1.3	42	1.3
		780	11.82	1.3	42	1.8
2.4	13-18	780	11.82	1.5	42	1.3
		1080	16.36	1.5	42	1.8
2.6	18-25	1080	16.36	1.8	42	1.3
		1500	22.73	1.8	42	1.8
2.8	25-35	1500	22.73	2.1	42	1.3
		2100	31.82	2.1	42	1.8
2.9	32-48	1920	29.09	2.5	42	1.2
		2880	43.64	2.5	42	1.8
3.3	32-48	1920	29.09	2.9	31	1.2
		2880	43.64	2.9	31	1.8





RIGID POLYURETHANE SYSTEMS

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