ASTRAL PIPES

INDIA'S NO.1 PIPE BRAND*



*For more details visit astralpipes.com

ASTRAL PIPES

CIN NO: L25200GJ1996PLC029134
Registered & Corporate Office: Astral Limited
207/1, 'Astral House', B/h Rajpath Club, Off S. G. Highway, Ahmedabad - 380059.
Ph: +91-79 6621 2000 | Fax: +91-79 6621 2121 | E-mail: info@astralltd.com | Website: www.astralltd.com
For Export Inquiries: export@astralltd.com

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ASTRAL TOLL FREE 1800 233 7957
Please get in touch with us between 10 AM to 6 PM between Monday to Friday and the last Saturday of the month. We will remain closed on Public Holidays.

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ASTRAL PIPES

ASTRAL CHEMFLOW®

PPH INDUSTRIAL PIPING SYSTEM

PRODUCT CATALOGUE



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1st TO INTRODUCE CPVC IN INDIA

1st TO INTRODUCE UPVC LEAD FREE PIPES IN INDIA

1st TO INTRODUCE LOW NOISE PP DRAINAGE PIPES IN INDIA

1st TO INTRODUCE FOAMED PVC DRAINAGE PIPES IN INDIA



1st TO INTRODUCE LEAD FREE COLUMN PIPES IN INDIA

1st TO INTRODUCE POLYMER BASED INDUSTRIAL PIPING SYSTEM IN INDIA

1st TO INTRODUCE NSF APPROVED SOLVENT CEMENT IN INDIA

1st TO INTRODUCE CPVC PIPING FOR AUTOMATIC FIRE SPRINKLER SYSTEM IN INDIA

ASTRAL, INDIA'S PROGRESSIVE BUILDING MATERIALS COMPANY

Established in 1996 with the aim to manufacture best-in-globe plastic piping systems, Astral Pipes fulfils emerging piping needs of millions of houses and adds extra mileage to India's developing real estate fraternity with the hallmark of unbeaten quality and innovative piping solutions. Keeping itself ahead of the technology curve, Astral has always been a front runner in the piping category by bringing innovation and getting rid of old, primitive and ineffective plumbing methods. Bringing CPVC in India, and pioneering in this technology, have set Astral apart and its highest quality enabled it to obtain NSF approval for its CPVC pipes and fittings. Astral went beyond the category codes by launching many industry firsts, like launching India's first lead-free uPVC pipes for plumbing as well as for stream water, just to name a few.

Astral Pipes offers the widest product range across this category when it comes to product applications. Astral Pipes is equipped with production facilities at Santej and Dholka in Gujarat, Hosur in Tamil Nadu, Ghiloth in Rajasthan, Sangli & Aurangabad in Maharashtra, Cuttack in Odisha, Kanpur in Uttar Pradesh and Sitarganj in Uttarakhand, Guwahati in Assam, Hyderabad in Telangana to manufacture plumbing systems, drainage systems, agriculture systems, fire sprinkler piping systems, industrial piping and electrical conduit pipes with all kinds of necessary fittings.

Astral Pipes' Infrastructure division offers a comprehensive product range including corrugated piping for drainage and cables, polyolefin cable channels, sewage treatment plants, plastic sheathing ducts, suction hoses, and sub-surface drainage systems. This range helps Astral to establish a strong foothold in infrastructure and agriculture sector in the constantly evolving business of piping.

In 2014, Astral forayed into the adhesives category by acquiring UK-based Seal It Services Ltd. and Kanpur based Resinova Chemie Ltd., which manufacture adhesives, sealants and construction chemicals. With five manufacturing facilities now in this business segment, Astral has strengthened its presence in the category and made rapid inroads.

In the year 2020, Astral has expanded its product portfolio and entered into the Water Tanks Segment. The water tank segment is an expanded domain of plumbing and water supply with a huge nationwide potential. Astral Pipes manufactures water tanks from its Santej, Aurangabad, Cuttack, Hosur & Ghiloth manufacturing facilities. A wide range of water storage tanks has helped Astral to become a versatile player in the industry.

Extending the product portfolio further, in the year 2022 Astral forayed into the categories of Faucets and Sanitaryware, followed by acquisition of Bangalore based Gem Paints to enter in the Paints category. This expansion will help Astral march firmly towards becoming a holistic building materials company.

PIPING

- Plumbing Pipes & Fittings
- Sewerage Drainage Pipes & Fittings
- Agriculture Pipes & Fittings
- Industrial Pipes & Fittings
- Fire Sprinklers Pipes & Fittings
- Conduit & Cable Protection
- Ancillary Products
- Urban Infrastructure
- Ducting

ADHESIVES

- Epoxy Adhesives & Putty
- Silicone Sealants
- Construction Chemicals
- PVA
- Cyanoacrylate
- Solvent Cements
- Tapes
- Polymeric Filling Compound
- Anaerobic Adhesives
- Industrial Adhesives
- Instant Hand Sanitizer
- Surface Cleaning Products

WATER TANKS

PAINTS

FAUCETS

SANITARYWARE





INNOVATION & RECOGNITIONS

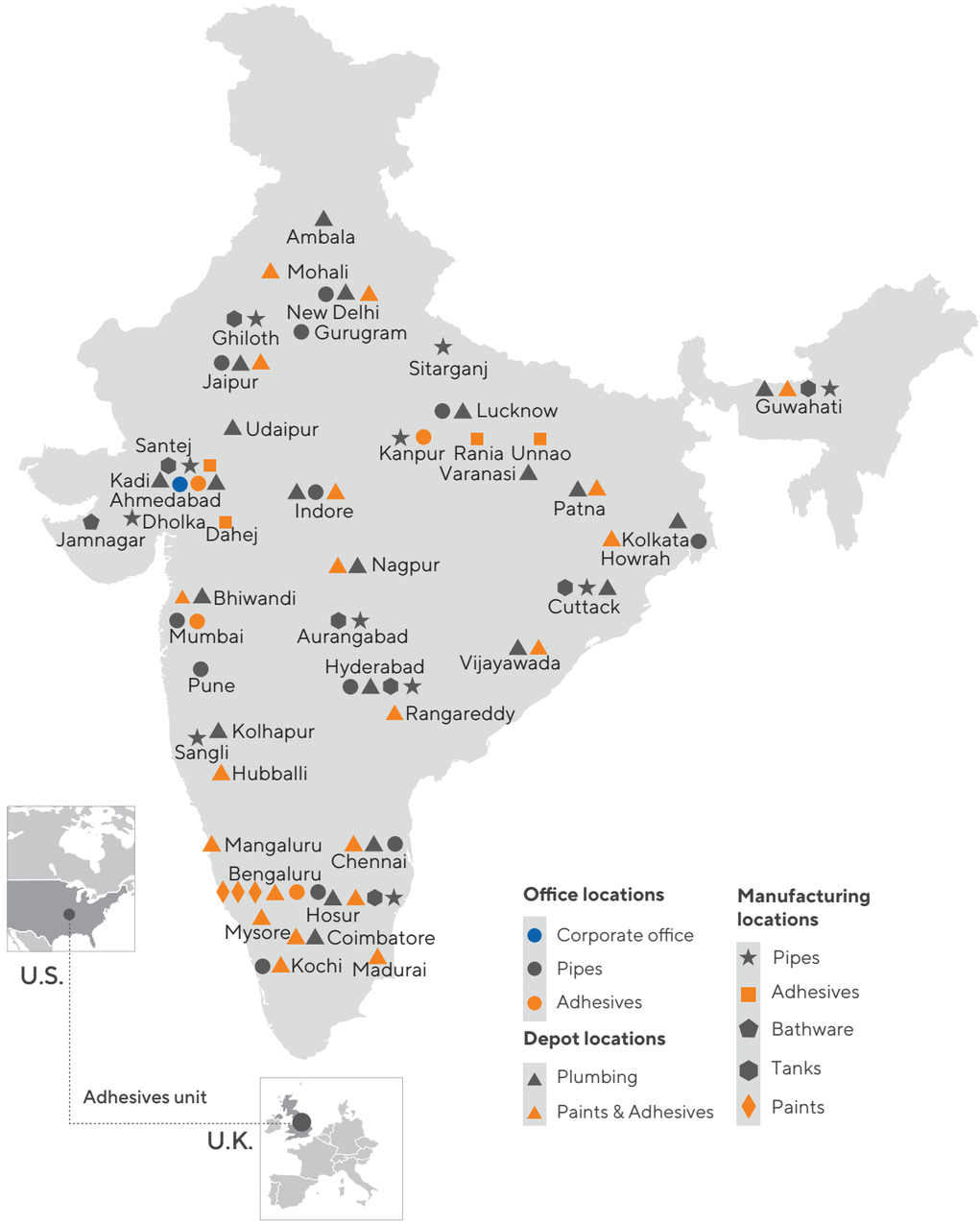
- First to introduce CPVC piping system in India (1999)
- First to launch lead free uPVC piping system in India (2004)
- Corp Excel- National SME Excellence Award (2006)
- First to get NSF Certification for CPVC piping system in India (2007)
- First to launch lead-free uPVC column pipes in India (2012)
- Enterprising Entrepreneur of the year (2012-13)
- Business Standard Star SME of the year (2013)
- Inc. India Innovative 100 for Smart Innovation under category of 'Technology' (2013)
- India's Most Trusted Pipe Brand Award (2016, 2019, 2020 & 2022)
- Fortune India 500 Company (2016)
- India's Most Desired Pipe Brand Award (2022)
- Consumer Validated Superbrands India for the Last Seven Consecutive Years

AWARDED Superbrands INDIA Consumer Validated 2025

INDIA'S MOST TRUSTED BRAND* Power of Trust 2025 *Pipes Category: TRA Brand Trust Report 2025

MARKETING NETWORK

Astral has a marketing network of more than 800 distributors and 30,000 dealers spread all over India with branch offices at Mumbai, Pune, Delhi, Bengaluru, Chennai, Hyderabad, Jaipur, Lucknow and Kochi. Apart from that Astral has its own warehouses at Vijaywada, Hyderabad, Delhi, Kolhapur, Kolkata, Nagpur, Indore, Patna,Varanasi, Jaipur, Hosur & Guwahati to deliver the material as quick as possible. More than 400 techno marketing professionals and administrative personnel are on the board to coordinate with architects, plumbing contractors and plumbers to utilize the best plumbing techniques and to get the best from the products.

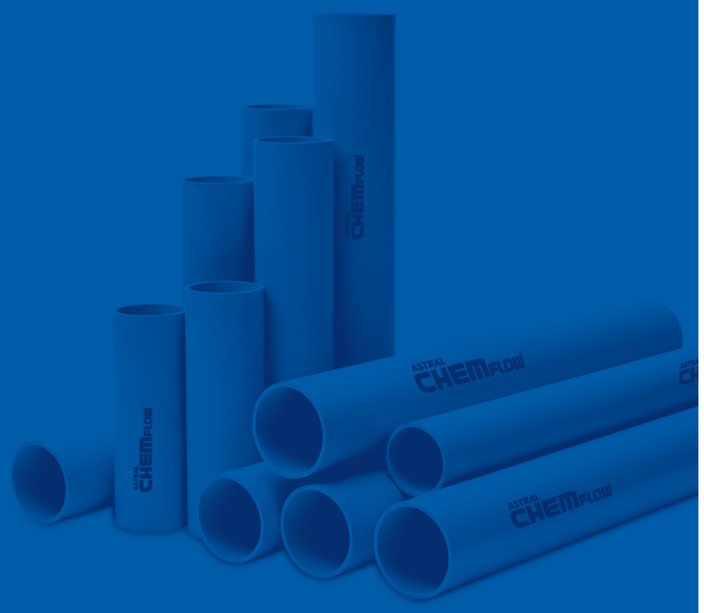


ABOUT CHEMFLOW®

Polypropylene Homopolymer (PP-H) piping system is ideal for industrial applications requiring high chemical resistance, durability, and ease of installation. With the growing demand for advanced thermoplastic solutions, Astral has launched its PP-H piping systems to cater to sectors like chemical processing, effluent treatment, and utilities. This new range offers a corrosion-free, long-lasting, and cost-effective alternative to conventional piping materials, strengthening Astral's presence in the industrial piping segment.

APPLICATIONS

- Chemical Processing & Transfer Lines
- Effluent & Wastewater Treatment Plants
- Metal Finishing & Electroplating Industries
- Power Plants & Cooling Water Systems
- Pharmaceutical & Biotechnology Plants
- Pulp & Paper Industries
- Food & Beverage Processing Units
- Desalination & Water Treatment Plants
- Fertilizer & Agrochemical Industries
- Mining & Mineral Processing



KEY PROPERTIES

EXCELLENT CHEMICAL RESISTANCE

PP-H pipes withstand a wide range of acids, alkalis, and aggressive chemicals, making them ideal for industrial and process applications. Their resistance ensures reliable performance in harsh operating environments.

LOW THERMAL CONDUCTIVITY

The material's inherent low thermal conductivity minimizes heat loss, improving energy efficiency and reducing insulation requirements in hot or chilled fluid systems.

HIGH TEMPERATURE ENDURANCE UP TO 95°C

PP-H pipes are designed to handle hot chemical fluids up to 95°C, making them ideal for transferring heated chemicals in industrial processes without losing structural integrity.

SMOOTH BORE WITH LOW FRICTION LOSS

The inner surface of PP-H pipes is smooth, preventing deposits and scaling. This ensures minimal pressure drop, higher flow efficiency, and reduced pumping costs.

CORROSION-FREE & LONG SERVICE LIFE

Unlike metal pipes, PP-H pipes are immune to rust, pitting, and scaling. This ensures a longer service life with consistent flow characteristics over time.

NON-TOXIC & ENVIRONMENT FRIENDLY

PP-H pipes are manufactured from hygienic materials that are safe for human use. Being fully recyclable, they also contribute to sustainable and eco-friendly installations.

LIGHTWEIGHT & EASY INSTALLATION

Being much lighter than metal alternatives, PP-H pipes are easy to transport, handle, and install. This reduces labour costs and speeds up project execution.

MAINTENANCE-FREE OPERATION

Thanks to durability, chemical resistance, and corrosion-free nature, PP-H pipes require little to no maintenance, lowering overall lifecycle costs.

HIGH IMPACT STRENGTH

PP-H pipes offer excellent toughness and durability, withstanding mechanical stress and impact loads during handling and operation without cracking.

APPLICABLE STANDARD

DIN 8077: Polypropylene (PP) pipes – PP-H, PP-B, PP-R, PP-RCT – Dimensions
DIN 8078: Polypropylene (PP) pipes – PP-H, PP-B, PP-R, PP-RCT – General quality requirements and testing

PHYSICAL PROPERTIES

Sr No.	Property	Test Method	Unit	Typical Value
1	Colour	-	-	Grey
2	Density	ISO 1183	g/cm^3	0.90-0.91
3	Flexural Modulus	ISO 178	MPa	1700
4	Tensile Stress at Yield (50 mm/min)	ISO 527-2	MPa	38
5	Charpy Impact Strength, notched (23°C)	ISO 179/1eA	kJ/m^2	33
6	Izod Impact Strength, notched (23°C)	ASTM D256	J/m	250
7	Heat Deflection Temperature (0.45MPa)	ISO 75-2	°C	105
8	Mean Coefficient of linear thermal expansion	DIN 53752	$K^{-1} \times 10^{-4}$	1.5
9	Thermal Conductivity	DIN 52612-1	$W/m^{-1}/K^{-1}$	0.23
10	Surface Resistivity	DIN IEC 60093	Ω	>1012

PIPE DIMENSIONS

Nominal Size	Mean OD		Wall Thickness			
			Pipe Series S 8		Pipe Series S 5	
			SDR 17.6		SDR 11	
			PN 6		PN 10	
	Min.	Max.	Min.	Max.	Min.	Max.
20	20.0	20.3	-	-	1.9	2.3
25	25.0	25.3	-	-	2.3	2.8
32	32.0	32.3	1.8	2.2	2.9	3.4
40	40.0	40.4	2.3	2.8	3.7	4.3
50	50.0	50.5	2.9	3.4	4.6	5.3
63	63.0	63.6	3.6	4.2	5.8	6.6
75	75.0	75.7	4.3	5.0	6.8	7.7
90	90.0	90.9	5.1	5.9	8.2	9.3
110	110.0	110.9	6.3	7.2	10.0	11.2
125	125.0	126.2	7.1	8.1	11.4	12.8
140	140.0	141.3	8.0	9.0	12.7	14.2
160	160.0	161.5	9.1	10.3	14.6	16.3
180	180.0	181.7	10.2	11.5	16.4	18.3
200	200.0	201.8	11.4	12.8	18.2	20.3
225	225.0	227.1	12.8	14.3	20.5	22.8
250	250.0	252.3	14.2	15.9	22.5	25.2
280	280.0	282.5	15.9	17.7	25.4	28.2
315	315.0	317.5	17.9	19.9	28.6	31.7
355	355.0	358.2	20.1	22.4	32.2	35.7
400	400.0	403.6	22.7	25.2	36.3	40.2

* All Dimensions are in mm
# Sizes above 160 mm to be introduced shortly.

PRODUCT RANGE

Size (cm)	Size (mm)	Pipe Series S 8	Pipe Series S 5
		SDR 17.6	SDR 11
		PN 6	PN 10
		Product Code	Product Code
2.0	20	-	M751100501
2.5	25	-	M751100502
3.2	32	M751060503	M751100503
4.0	40	M751060504	M751100504
5.0	50	M751060505	M751100505
6.3	63	M751060506	M751100506
7.5	75	M751060507	M751100507
9.0	90	M751060508	M751100508
11.0	110	M751060509	M751100509
12.5	125	M751060510	M751100510
14.0	140	M751060511	M751100511
16.0	160	M751060512	M751100512
18.0	180	M751060513	M751100513
20.0	200	M751060514	M751100514
22.5	225	M751060515	M751100515
25.0	250	M751060516	M751100516
28.0	280	M751060517	M751100517
31.5	315	M751060518	M751100518
35.5	355	M751060519	M751100519
40.0	400	M751060520	M751100520

Pipes available in 5 mtr length.

THERMAL EXPANSION IN PP-H PIPING SYSTEMS

General Consideration

PP-H (Polypropylene Homopolymer), like other thermoplastics, exhibits significantly higher thermal expansion and contraction than metals. When PP-H pipes are installed above ground, along walls, or within ducts—particularly in areas subject to temperature fluctuations—thermal expansion must be managed to avoid stress and potential damage to the system.

To accommodate changes in pipe length due to thermal expansion, the following methods are typically used:

- a) Flexible Sections
- b) Expansion Compensators

Among these, flexible sections are the most widely used because they offer a simpler and more cost-effective solution. Therefore, this method is the focus of design and installation guidance.

Design Fundamentals

PP-H has a low modulus of elasticity, which allows it to naturally flex and absorb changes in length when properly supported. This inherent flexibility can be utilized through deliberate layout design, where support points are strategically placed to permit controlled movement.

The key factors influencing the design of flexible sections include:

- Pipe Diameter
- Expected Thermal Expansion (based on temperature difference)

To simplify the design process, the pipe wall temperature is typically not factored into standard calculations. This is reasonable because most PP-H piping systems are installed in environments where ambient temperatures range between 5 °C and 25 °C, leading to relatively predictable thermal behaviour.

Flexible sections naturally occur at any branching points or changes in direction within a PP-H pipeline. The movement of these flexible sections, caused by a change in length ΔL due to thermal expansion, must be allowed to move freely. This movement must not be restricted by fixed pipe supports, wall protrusions, girders, or other obstacles.

CALCULATION OF THERMAL LENGTH CHANGE AND FLEXIBLE SECTIONS FOR PP-H PIPES

Thermal Expansion Length Change

The change in length of a PP-H pipe due to temperature variation can be calculated using the formula:

$\Delta L = L \times \Delta T \times \alpha$

where:

- ΔL = change in length (mm)
- L = original pipe length (m)
- ΔT = temperature difference (K or °C)
- α = coefficient of linear expansion (mm/m·K)
- PP (including PP-H) coefficient of linear expansion α (mm/m·K) = 0.16 – 0.18

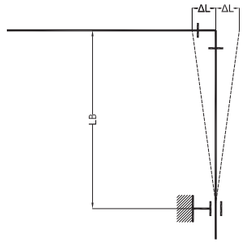
CALCULATING THE LENGTH OF THE FLEXIBLE SECTION

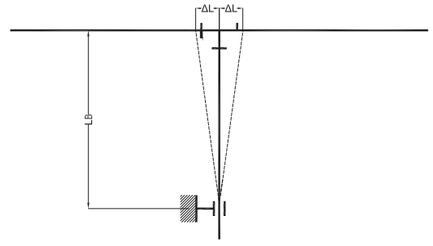
The length of the flexible section LB required to absorb the thermal expansion can be calculated as:

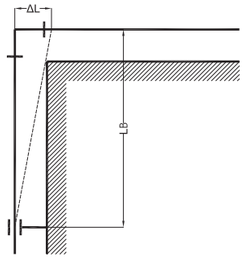
$$L_B = \sqrt{\frac{3 \cdot d_a \cdot \Delta L \cdot E_{cm}}{\sigma_b}}$$

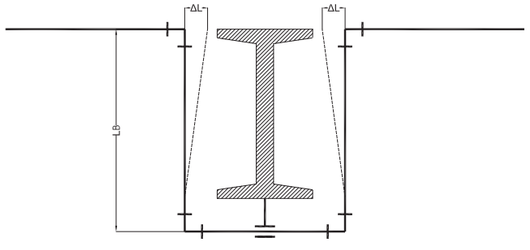
where:

- da = pipe outside diameter (mm)
- ΔL = thermal length change (mm)
- Ecm = average bending creep modulus at 25 °C (N/mm²)
- σb = permitted bending stress at 25 °C (N/mm²)









INSTALLATION PROCEDURE FOR PP-H PIPES

1. PREPARATION

- Cut pipe square, chamfer, and peel as needed.
- Clean pipe exterior and fitting interior thoroughly with recommended solvents (e.g., alcohol, trichloroethane)
- Mark insertion length and align longitudinal reference lines on pipe and fitting to prevent rotation.

2. HEATING SETUP

- Fit the correct female and male bushes to the heating plate.

3. HEATING PROCESS

- Set the temperature of the heating element to 210 °C. Check the temperature. The fusion temperature should be between 200 °C and 220 °C.
- Insert pipe into female bush (up to peeling length) and fitting into male bush (to stop).
- Heat for the minimum time specified in the welding time table.

4. JOINING

- Quickly remove parts from bushes and insert pipe fully into fitting (to marked length) without rotating.
- Align reference marks perfectly.

5. COOLING

- Hold joint steady for the "changeover time" (approx. 15 seconds).
- Let cool at ambient temperature—no forced air or water cooling.



QUALITY INSPECTION OF WELDED JOINTS

The quality of welded joints can be evaluated using either non-destructive or destructive testing methods. Destructive testing typically requires specialized equipment, whereas a basic visual inspection can also provide a reliable assessment of weld quality.

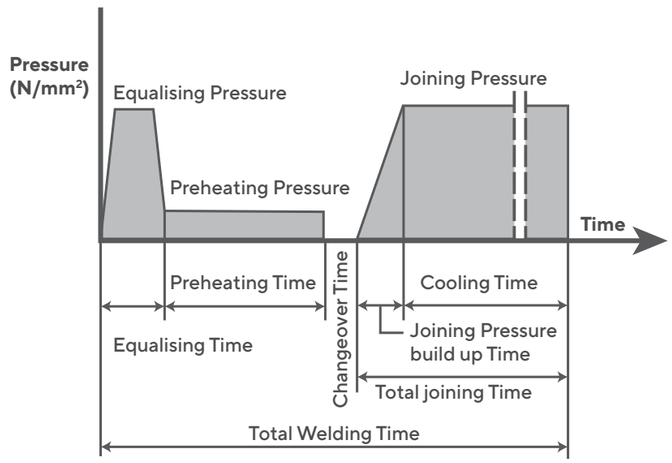
During visual inspection, the following criteria should be checked:

- **Uniformity:** The weld bead must be continuous and consistent around the entire joint circumference.
- **Bead Profile:** The central ridge of the weld bead should remain above the outer diameter of the connected components.
- **Surface Quality:** The bead surface must be free from porosity, dust, or any other visible contamination.
- **Surface Integrity:** There should be no signs of cracking, splitting, or surface defects.
- **Appearance:** A highly reflective or glossy finish on the bead may indicate overheating and should be avoided.
- **Alignment:** Axial misalignment between joined parts should not exceed 10% of the wall thickness.

WELDING PROCESS

The joining of PP-H (Polypropylene Homopolymer) piping systems should be carried out following established guidelines for welding thermoplastics. These guidelines outline general requirements for safe, high-quality welding processes, ensuring long-term performance of the piping system. Approved welding methods for PP-H include socket fusion, butt fusion, and electrofusion, each applied based on the application and pipe dimensions. Prior to welding, all materials must be inspected for damage, cleaned thoroughly, and prepared appropriately — including cutting, chamfering, and, if necessary, scraping of surfaces to remove oxidation. The welding must be performed in a clean, dry environment, ideally at ambient temperatures between +5°C and +40°C, using calibrated tools and machines.

During the joining process, correct alignment, heating time, joining pressure, and cooling time are critical and must follow the specified parameters for each welding method. Welds must not be disturbed during cooling, and forced cooling (e.g., with water or air) is not permitted. Post-welding, joints should be visually inspected for uniformity and absence of defects like cracks, gaps, or burn marks. For systems under pressure or in critical applications, additional testing such as pressure or tensile tests may be required. All welding work must be carried out by trained and qualified personnel, and proper documentation should be maintained, including welding logs, welder identification, environmental conditions, and parameters used.



TYPICAL JOINING TIME

Nominal wall thickness (mm)	Equalizing Bead height on heating element at end of equalizing time (minimum values) (equalizing p=0.15±0.01 N/ mm2) (mm)	Preheating time=10x nominal wall thickness (preheating p≤0.01 N/mm2) (sec)	Changeover time (maximum) (sec)	Jointing pressure build-up time (Maximum time, may be undercut by up to 50%) (sec)
up to 4.5	0.5	up to 53	5	6
4.5 - 7	0.5	53 - 81	5 - 6	6 - 7
7 - 12	1	81 - 135	6 - 7	7 - 11
12 - 19	1	135 - 206	7 - 9	11 - 17
19 - 26	1.5	206 - 271	9 - 11	17 - 22
26 - 37	2	271 - 362	11 - 14	22 - 32
37 - 50	2.5	362 - 450	14 - 17	32 - 43
50 - 70	3	450 - 546	17 - 22	43

TYPICAL COOLING TIME

Nominal wall thickness (mm)	Cooling time (minimum values) at joining pressure p=0.10±0.01 N/mm2 as a function of ambient temperature			
	Up to 15°C (min)	15°C - 25°C (min)	25°C - 40°C Cooling time (min)	Cooling time (minimum values) at pressure welding p= 0.10±0.01 N/mm2 in special conditions* (min)
up to 4.5	4	5	6.5	3.5
4.5 - 7	4 - 6	5 - 7.5	6.5 - 9.5	3.5 - 5
7 - 12	6 - 9.5	7.5 - 12	9.5 - 15.5	5 - 8
12 - 19	9.5 - 14	12 - 18	15.5 - 24	8 - 12
19 - 26	14 - 19	18 - 24	24 - 32	12 - 16
26 - 37	19 - 27	24 - 34	32 - 45	16 - 23
37 - 50	27 - 36	34 - 46	45 - 61	23 - 31
50 - 70	36 - 50	46 - 64	61 - 85	31 - 43

COMMON WELDING DEFECTS AND THEIR CAUSES

Defect	Possible Causes
Irregular weld bead path around the pipe circumference	Poor preparation of pipe ends leading to uneven heat distribution.
Reduced weld bead size	Incorrect welding parameters such as temperature, pressure, or time.
Excessively deep notch in the centre of the bead	Welding temperature or pressure set too low.
Inclusions on the weld bead surface	Inadequate cleaning of pipe ends before welding.
Porosity in the weld bead	Welding performed in humid or damp environmental conditions.
Weld bead surface is overly smooth and shiny	Overheating during the welding process.
Misalignment exceeding 10% of pipe thickness	Poor centering or excessive ovality of the pipe or fitting.

HORIZONTAL & VERTICAL SUPPORTS

When installing thermoplastic pipe systems, it is essential to use support clamps to prevent pipe flexing and the resulting mechanical stresses. The spacing between these clamps depends on several factors, including the pipe material, SDR (Standard Dimension Ratio), surface temperature, and the density of the conveyed fluid. Before installing the support clamps, refer to the recommended spacing values provided in the table below.

These guidelines apply to PP-H (polypropylene homopolymer) pipes conveying liquids with a density of 1 g/cm^3, such as water or other fluids of similar density.

For pipes of SDR 11 / S 5 / PN 10:							
d (mm)	< 20 °C.	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
16	650	625	600	575	550	525	500
20	700	675	650	625	600	575	550
25	800	775	750	725	700	675	650
32	950	925	900	875	850	800	750
40	1100	1075	1050	1000	950	925	875
50	1250	1225	1200	1150	1100	1050	1000
63	1450	1425	1400	1350	1300	1250	1200
75	1550	1500	1500	1400	1350	1300	1250
90	1650	1600	1700	1500	1450	1400	1350
110	1850	1800	1800	1700	1600	1500	1400
125	2000	1950	1900	1800	1700	1600	1500
140	2100	2050	2000	1900	1800	1700	1600
160	2250	2200	2100	2000	1900	1800	1700
180	2350	2300	2200	2100	2000	1900	1800
200	2500	2400	2300	2200	2100	2000	1900
225	2650	2550	2450	2350	2250	2150	2000
250	2800	2700	2600	2500	2400	2300	2150
280	2950	2850	2750	2650	2550	2450	2300
315	3150	3050	2950	2850	2700	2600	2450
355	3350	3250	3150	3000	2850	2750	2600
400	3350	3450	3350	3200	3050	2900	2750

*All Dimensions are in mm

HORIZONTAL & VERTICAL SUPPORTS

For pipes of SDR 17.6 / S 8 / PN 6:							
d (mm)	< 20 °C.	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
16	592	569	546	523	501	478	455
20	637	614	592	569	546	523	501
25	728	705	683	660	637	614	592
32	865	842	819	796	774	728	683
40	1001	978	956	910	865	842	796
50	1138	1115	1092	1047	1001	956	910
63	1320	1297	1274	1229	1183	1138	1092
75	1411	1365	1365	1274	1229	1183	1138
90	1502	1456	1547	1365	1320	1274	1229
110	1684	1638	1638	1547	1456	1365	1274
125	1820	1775	1729	1638	1547	1456	1365
140	1911	1866	1820	1729	1638	1547	1456
160	2048	2002	1911	1820	1729	1638	1547
180	2139	2093	2002	1911	1820	1729	1638
200	2275	2184	2093	2002	1911	1820	1729
225	2412	2321	2230	2139	2048	1957	1820
250	2548	2457	2366	2275	2184	2093	1957
280	2685	2594	2503	2412	2321	2230	2093
315	2867	2776	2685	2594	2457	2366	2230
355	3049	2958	2867	2730	2594	2503	2366
400	3049	3140	3049	2912	2776	2639	2503

*All Dimensions are in mm

Pipe Bracket Spacing for PP-H Pipes Conveying Fluids with Densities Other than 1 g/cm³:

If the fluid being transported has a density different from 1 g/cm³, the bracket spacing values from the previous table should be adjusted by multiplying them with a correction factor. The factors corresponding to various fluid densities are shown in the table below:

Density of the fluid in g/cm³	
1.25	0.96
1.5	0.92

PRESSURE TESTING AFTER INSTALLATION

To verify the integrity and leak-tightness of the polypropylene homopolymer (PP-H) piping system before commissioning.

1. Preparation

- Cleaning: Ensure the piping system is clean, free from debris, and properly installed according to manufacturer's instructions.
- Filling: Fill the system completely with water or an approved test fluid at ambient temperature. No air pockets should remain in the system.
- Temperature: The test should be conducted at ambient temperature unless otherwise specified.

2. Test Pressure

- The test pressure shall be 1.5 times the design operating pressure or 1.5 times the maximum allowable operating pressure (MAOP), but not exceeding the maximum test pressure recommended by the pipe manufacturer.
- The exact pressure depends on the pipe's design pressure (e.g., PN rating).

3 Test Duration

- The test pressure should be held for a minimum duration of 30 minutes.
- Observe for any pressure drop or visible leaks during this time.

4. Acceptance Criteria

- No visible leaks.
- No significant pressure drops during the test period.
- No damage or deformation to the piping system.

5. Additional Notes

- Pressure gauges used should be calibrated and suitable for the pressure range.
- Safety precautions must be observed during testing.
- After completion, the system should be depressurized slowly and drained.
- If leaks or defects are found, repair and retest as necessary.

Pipe Temperature Pressure Derating Factor

Working Temperature (°F)	73	86	104	122	140	158	176	194	203
Working Temperature (°C)	23	30	40	50	60	70	80	90	95
Pipe Derating Factor	1.00	0.87	0.74	0.62	0.55	0.41	0.30	0.22	0.20

STORAGE & HANDLING

Handling & Storage Instructions for PP-H Pipes

Proper handling and storage of PP-H (Polypropylene Homopolymer) pipes are essential to maintain their quality and prevent damage before installation. The following guidelines should be followed:

1. Handling

- Always lift pipes manually or with lifting slings; avoid dragging them on rough surfaces.
- Use non-metallic straps or padded slings to prevent surface damage.
- Avoid dropping pipes or fittings from heights, as this may cause cracks or deformation.
- Use proper support during transport to avoid bending or sagging.

2. Storage

- Store pipes on a flat, clean, and stable surface to prevent warping.
- Stacks should not exceed the maximum recommended height to avoid crushing or deformation (typically not more than 1.5 meters).
- Protect pipes from direct sunlight with covers or by storing them in a shaded area to prevent UV degradation.
- Avoid prolonged exposure to high temperatures and weather conditions.
- Keep pipes and fittings away from chemicals, oils, or solvents that may cause material degradation.
- Ensure good ventilation if stored indoors, especially in humid environments.

DO'S & DON'TS FOR PP-H (POLYPROPYLENE HOMOPOLYMER) PIPES

Do's for PP-H Pipes

- Inspect all pipes and fittings before use for damage or contamination.
- Store pipes on a flat, clean, and shaded surface to prevent bending and UV degradation.
- Use proper tools for cutting, chamfering, and welding.
- Clean pipe ends thoroughly before welding to ensure strong joints.
- Follow correct welding parameters (temperature, pressure, and time) for the selected method.
- Allow natural cooling after welding; keep the joint undisturbed during this time.
- Use trained and certified personnel for all welding and installation work.
- Support pipes adequately along their length to avoid sagging.
- Allow for thermal expansion in the design and layout.
- Document all welding activities, including parameters and personnel involved.

Don'ts for PP-H Pipes

- Don't drag pipes across rough surfaces — it may cause scratches or cracks.
- Don't expose pipes to prolonged direct sunlight — it can lead to material degradation.
- Don't use metal chains or sharp tools that may damage the pipe surface.
- Don't weld in dirty, wet, or windy conditions — it affects joint quality.
- Don't overheat or underheat during welding — it can lead to weak or failed joints.
- Don't force cooling of welded joints using water or air.
- Don't install pipes without considering thermal expan sion allowances.
- Don't stack pipes excessively high — it may deform the lower layers.
- Don't use damaged or visibly deformed pipes or fittings.
- Don't ignore misalignment — ensure proper cantering before welding.

COMPARISON WITH METAL PIPES

Parameter	Chem Flow PP-H Pipes	Metal Pipes
Corrosion Resistance	Excellent resistance to a wide range of chemicals, acids, and bases. No rust formation even in aggressive environ-ments. Ideal for corrosive media.	Susceptible to corrosion (rust, scaling) unless treated or alloyed. Requires coatings or linings in corrosive environ-ments.
Weight	Very lightweight (about 1/9th the weight of steel), making it easy to handle, transport, and install without lifting equipment	Heavy, often requiring cranes or special handling equipment. Increases trans-portation and installation costs.
Thermal Conductivity	Very low (approx. 0.22 W/m·K), reduces heat loss. Often does not require insulation for many applications.	High (e.g., steel ~50 W/m·K), leading to heat loss or heat gain — insulation usually required.
Chemical Resistancet	Highly resistant to aggressive chemicals, including most acids, alkalis, and salts. Excellent for chemical industries and wastewater.	Limited chemical resistance; prone to pitting or corrosion in contact with acids or chlorides.
Installationt	Quick and easy using fusion welding (butt, socket, or electrofusion). No heavy equipment or open flames needed.	Labor-intensive; requires welding, threading, flanging, and sometimes special safety precautions (e.g., hot work permits).
Maintenance	Low maintenance — smooth inner surfaces reduce scaling, blockages, and biofilm formation. No corrosion means fewer replacements.	Requires regular inspection for corro-sion, leaks, and scaling. Maintenance can be costly and time-consuming.
Durability & Longevity	Long service life (up to 50 years) under normal conditions.	Long-lasting when properly protected from corrosion. Better suited for outdoor, exposed environments.
Cost (Material + Install)	Lower material cost and significantly reduced installation labour. Less downtime. Lower total cost of owner-ship.	Long-lasting when properly protected from corrosion. Better suited for outdoor, exposed environments.
Service Temperature	Suitable for continuous use up to 90–100°C, with short-term peaks up to 110°C depending on pressure and support.	Can withstand much higher tempera-tures — up to 400°C for carbon steel and higher for special alloys.
Environmental Impactt	Fully recyclable. Lower embodied energy in production. Chemical resistance reduces need for harsh cleaning chemicals.	Metal production is energy-intensive. Recyclable, but corrosion may lead to material loss over time.

CHEMICAL RESISTANCE CHART

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
2-Propen-1-ol	96	20	r
	96	60	r
Acetaldehyde + acetic acid	90/10	20	–
Acetaldehyde, aqueous	40	40	r
Acetaldehyde, concentrated	100	20	–
Acetate ether	100	20	–
Acetic acid, aqueous	up to 25	40	r
	up to 25	60	r
	25–60	60	r
	80	40	r
Acetic acid, concentrated	95	40	–
Acetic anhydride	100	20	r
	100	40	cr
	100	60	cr
Acetone	100	20	r
	100	60	r
Acetone, aqueous	traces	20	r
Acronal dispersions	com. avail.	20	–
Acronal solutions	com. avail.	20	–
Acrylic acid ethyl ester	100	20	–
Adipic acid, aqueous	saturated	20	r
	saturated	60	–
Aluminium chloride	diluted	40	r
	diluted	60	r
	saturated	60	r
Aluminium sulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Alums, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Ammonia, gas	100	60	r
Ammonia, liquid	100	20	r
Ammonium chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Ammonium Fluoride, aqueous	up to 20	20	r
	up to 20	60	r
Ammonium hydroxide	warm sat.	40	r
	warm sat.	60	r
Ammonium nitrate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Ammonium sulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Ammonium sulfide, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
Aniline hydrochloride, aqueous	saturated	20	r
	saturated	60	r
Aniline, aqueous	saturated	20	r
	saturated	60	r
Aniline, pure	100	20	r
	100	60	r
Animal glue	custom. co	20	r
	custom. co	60	r
Anthraquinonesulfonic acid, aqueosuspension 30			r
Antiformin, aqueous	2	20	–
Antimony chloride, aqueous	90	20	r
Arsenic acid, aqueous	diluted	40	r
	diluted	60	r
	80	40 r	
	80	60 r	
Beef tallow emulsion, sulphonated	com. avail.	20	–
Beer	com. avail.	20	r
Beer colourinzzg agent	com. avail.	60	r
Benzaldehyde, aqueous	0,1	60	–
Benzene	100	20	cr
Benzoic acid, aqueous	any	20	r
	any	40	r
	any	60	r
Bisulphite solution, w/ SO	warm sat.	50	r
Bleaching liquour, containing 12.5 % active chlorine	usage conc.	40	–
	usage conc.	60	cr
Borax, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Boric acid, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Brandy	com. avail.	20	r
Bromine fumes	minimal	20	nr
Bromine, liquid	100	20	nr
Butadiene	100	60	–
Butane, gaseous	50	20	r
Butanediol	up to 100	20	–
Butanediol, aqueous	up to 10	20	r
	up to 10	40	r
	up to 10	60	r
Butanol	up to 100	20	r
	up to 100	40	r
	up to 100	60	cr
Butyl acetate	100	20	cr
Cider	com. avail.	20	r

TABLE LEGEND **r = resistant | cr = conditionally resistant | nr = not resistant | - = not tested**

CHEMICAL RESISTANCE CHART

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
Citric acid, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Clophene	com. avail.	20	–
	com. avail.	60	–
Coconut fat alcohol	100	20	r
	100	60	cr
Copper Fluoride, aqueous	2	50	r
Copper sulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60 r	
Cresol, aqueous	up to 90	45	–
Crotonaldehyde	100	20	r
Cyclohexanol	100	20	r
Cyclohexanone	100	20	r
Cyclohexanone	100	20	r
Densodrin W	com. avail.	60	–
Dextrin, aqueous	saturated	20	r
	18	60	r
Diethylether	100	20	cr
Diglycol acid, aqueous	30	60	r
	saturated	20	r
Dimethyl sulfate, aqueous	up to 50	20	r
	up to 50	40	r
	100	40	–
	100	60	–
Dimethylamine, liquid	100	30	–
Disulfuric acid	10	20	nr
Ethanol (fermentation mash)	common	40	r
	common	60	–
Ethanol, aqueous	any	20	r
	96	60	r
Ethanol, denatured (with 2 % tolulene) Ethanol+ acetic acid (fermentation mash)	96	20	cr
	common	20	r
Ethyl acetate	100	20	cr
	100	60	nr
Ethylene chloride	100	20	nr
Ethylene oxide, liquid	100	20	–
Exhaust gas, w/COH	any	60	r
Exhaust gas, w/ HF	traces	60	r
Exhaust gas, w/ NOX	traces	60	r
	higher	60	–
Exhaust gases, w/S O7H	lower	20	–
	higher	20	nr
Exhaust gases, w/SOH, moist	any	60	r
Exhaust gases, w/ HCl	any	60	r
Exhaust gases, w/ SO	lower	60	r

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
	50	50	–
Fatty acids	100	60	cr
Ferric chloride, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Fertilizer salts, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Fluorsilicic acid, aqueous	up to 32	60	–
Formaldehyde, aqueous	diluted	40	r
	diluted	60	r
	40	30	r
Formic acid	100	20	r
	100	60	cr
Formic acid, aqueous	up to 50	40	r
	50	60	r
Frigen	100	20	cr
Fruit pulp	custom. conc	20	r
Glucose, aqueous	saturated	20	r
	saturated	60	r
Glycerine, aqueous	any	60	r
Glycine, aqueous	10	40	r
Glycol, aqueous	com. avail.	60	r
Glycolic acid, aqueous	37	20	r
Hexantriol	com. avail.	60	r
Hydrobromic acid, aqueous	up to 10	40	r
	up to 10	60	r
	48	60	r
Hydrochloric acid, aqueous	up to 30	40	r
	up to 30	60	r
	over 30	20	r
	over 30	60	r
Hydrofluoric acid, aqueous	up to 40	20	r
	40	60	r
	60	20	r
	70	20	r
Hydrogen	100	60	r
Hydrogen peroxide, aqueous	up to 30	20	r
	up to 20	50	r
Hydrogen phosphide	100	20	–
Hydrogen sulfide, dry	100	60	r
Hydrogen sulfide, aqueous	warm sat.	40	r
	warm sat.	60	r
Hydrosulfite, aqueous	up to 10	40	r
	up to 10	60	r
Hydroxylamine sulfate, aqueous	up to 12	35	r
Lactic acid, aqueous	up to 10	40	r
	up to 10	60	r
	90	60	r

CHEMICAL RESISTANCE CHART

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
Lead acetate, aqueous	warm sat.	50	r
Butylene, liquid	100	20	–
Butylphenol	100	20	r
Butynediol	up to100	40	–
Butyric acid, aqueous	20	20	r
	concentr.	20	r
Calcium chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60 r	
Calcium nitrate, aqueous	50	40	r
Carbolineum, aqueous	usage conc.	20	–
Carbon dioxide, aqueous under 8 atmospheric pressures	saturated	20	–
Carbon dioxide, dry	100	60	r
Carbon dioxide, moist	any	40	r
	any	60	r
Carbon disulfide	100	20	cr
Carbon tetrachloride, technical	100	20	nr
Caustic potash solution, aqueous	up to 40	40	r
	up to 40	60	r
	50/60	60	r
Caustic soda, aqueous	up to 40	40	r
	up to 40	60	r
	50/60	60	r
Chloramine, aqueous	diluted	20	–
Chloric acid, aqueous	1	40	–
	1	60	–
	10	40	–
	10	60	–
	20	40	–
	20	60	–
Chlorine water	saturated	20	cr
Chlorine, gaseous, dry	100	20	nr
Chlorine, gaseous, moist	0,5	20	nr
	1	20	nr
	5	20	nr
Chlormethyl	100	20	–
Chloroacetic acid (mono)	100	40	r
	100	60	–
Chloroacetic acid (mono) aqueous	85	20	r
Chlorosulfonic acid	100	20	nr
Chromic acid, aqueous	up to 50	40	–
	up to 50	60	cr
Chromic acid/Sulphuric acid/ Water	50/15/35	40	nr
	50/15/35	60	nr
	diluted	40	r
	diluted	60	r
	saturated	60	r
Lead tetraethyl	100	20	r
Magnesium chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60 r	
Magnesium sulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Maleic acid, aqueous	saturated	40	r
	saturated	60	r
	35	40 r	
Malic acid, aqueous	1	20	r
Mersol D	custom. conc	40.	–
Methanol	100	40	r
	100	60	r
Methyl amine	32	20	r
Methylene chloride	100	20	nr
Milk	com. avail.	20	r
Mixed acid	48/49/3	20	nr
(Sulfuric acid/Nitric acid/Water)	48/49/3	40	nr
	50/50/0	20	nr
	50/50/0	40	nr
	10/20/70	50	cr
	10/87/3	20	nr
	50/31/19	30	nr
Molasses	custom. conc	20	r
	custom. conc	60	r
Molasses wort	custom. conc	60	r
Mowilith D	com. avail.	20	–
Nekal, BX, aqueous	diluted	40	–
	diluted	60	–
Nickel sulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60 r	
Nicotine compounds, aqueous	usage conc.	20	–
Nicotine, aqueous	usage conc.	20	–
Nitric acid, aqueous	up to 30	50	r
	30/50	50	nr
	98	20	nr
	98	60	nr
Nitrous gasses	concentr.	20	r
	concentr.	60	–
Oils and greases	com. avail.	60	cr
Oleic acid	com. avail.	60	cr
Oleum vapour	lower	20	cr
	higher	20	nr
Oxalic acid, aqueous	diluted	40	r
	diluted	60	r

TABLE LEGEND **r = resistant | cr = conditionally resistant | nr = not resistant | - = not tested**

CHEMICAL RESISTANCE CHART

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
	saturated	60	r
Oxygen	any	60	–
Ozone	100	20	cr
	10	30	r
Palm kernel oil acid	100	60	–
Paraffin emulsions	com. avail.	20	–
	com. avail.	40	–
Perchloric acid, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	–
Petrol	100	60	nr
Petrol-benzene mixture	80/20	20	cr
Phenol, aqueous	up to 90	45	r
	1	20	-
Phenylhydrazine	100	20	cr
	100	60	–
Phenylhydrazine hydrochloride, aqueous	saturated	20	–
	saturated	60	–
Phosgene, aqueous	100	20	nr
Phosgene, gaseous	100	20	cr
	100	60	cr
Phosphoric acid, aqueous	up to 30	40	r
	up to 30	60	r
	40	60	r
	80	20 r	
	80	60 r	
Phosphorous pentoxide	100	20	r
Phosphorous trichloride	100	20	r
Photographic developers	com. avail.	40	r
Photographic emulsions	any	40	–
Photographic fixers	com. avail.	40	r
Picric acid, aqueous	1	20	r
Potash, aqueous	saturated	40	–
Potassium borate, aqueous	1	40	r
	1	60	r
Potassium bromate, aqueous	up to 10	40	r
	up to 10	60	r
Potassium bromide, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Potassium chlorate, aqueous	1	40	r
	1	60	r
Potassium chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Potassium chromate, aqueous	40	20	r
Potassium cyanide, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Potassium dichromate, aqueous	40	20	r
Potassium ferrocyanide	diluted	40	r
Potassium ferrocyanide, aqueous	diluted	60	r
	saturated	60	r
Potassium nitrate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Potassium permanganate, aqueous	up to 6	20	r
	up to 6	40	r
	up to 6	60	r
	up to 18	40	–
Potassium persulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	40 r	
	saturated	60 r	
Propane, gaseous	100	20	–
Propane, liquid	100	20	–
Propargyl alcohol, aqueous	7	60	r
Pure acetic acid	100	20	r
	100	40	r
Ramasite	com. avail.	20	–
	com. avail.	40	–
Roaster gases, dry	any	60	r
Seawater	–	40	r
	–	60	r
Silicic acid, aqueous	any	60	r
Silver nitrate, aqueous	up to 8	40	r
	up to 8	60	r
Soap solution, aqueous	concentrated	20	r
	concentrated	60	r
Soda, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Sodium benzoate, aqueous	up to 10	40	r
	up to 10	60	r
	36	60	r
Sodium chlorate, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Sodium chlorite, aqueous	50	20	r
	diluted	60	nr
Sodium hydrosulfate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Sodium hypochlorite, aqueous	diluted	20	r
Sodium sulfide, aqueous	diluted	40	r

CHEMICAL RESISTANCE CHART

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
	diluted	60	r
	saturated	60	r
Spirits	com. avail.	20	r
Starch syrup	custom. conc	60	r
Starch, aqueous	any	40	r
	any	60	r
Stearic acid	100	60	cr
Sulphur dioxide, aqueous under 8 atmospheric pressures	saturated	20	–
Sulphur dioxide, liquid	100	–10	–
	100	20	r
	100	60	r
Sulphur dioxide, moist and aqueousany	40	r	
	50	50	r
	any	60	r
Sulphur dixode, dry	any	60	r
Sulphuric acid, aqueous	up to 40	40	r
	up to 40	60	r
	70	20	r
	70	60	cr
	80–90	40	cr
	96	20	r
	96	60	nr
Table salt, aqueous	diluted	40	r
	diluted	60	r
	saturated	60 r	
Tallow	100	20	r
	100	60	r
Tanigan extra A, aqueous	any	20	–
Tanigan extra B, aqueous	any	20	–
Tanigan extra D, aqueous	saturated	40	–
	saturated	60	–
Tanigan F, aqueous	saturated	60	–
Tanigan U, aqueous	saturated	40	–
	saturated	60	–
Tanning extracts, cellul.	common	20	r

Chemical	Concentr, %	Temp. °C	Chem Flow PPH
Tanning extracts, natural	common	20	r
Tartaric acid, aqueous	up to 10	40	r
	up to 10	60	r
	saturated	60	r
Thionyl chloride	100	20	nr
Tin (II) chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Toluene	100	20	nr
Trichloroethylene	100	20	nr
Triethanolamine	100	20	r
Trilone	com. avail.	60	–
Trimethylolpropane, aqueous	up to 10	40	–
	up to 10	60	–
	com. avail.	40	r
	com. avail.	60	r
Urea, aqueous	up to 10	40	r
	up to 10	60	r
	33	60	r
Urine	normal	40	r
	normal	60	r
Vinegar (wine vinegar)	com. avail.	40	r
	com. avail.	50	r
	com. avail.	60	r
Vinyl acetate	100	20	r
Water	100		r
	100		r
Wax alcohol	100	60	cr
Wine, red and white	com. avail.	20	r
Xylene	100	20	nr
Yeast wort	custom. con	40	r
	custom. con	60	r
Zinc chloride, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r
Zinc sulphate, aqueous	diluted	40	r
	diluted	60	r
	saturated	60	r

TABLE LEGEND **r = resistant | cr = conditionally resistant | nr = not resistant | - = not tested**

NOTES

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