

TECHNOPOL UPR		723.30	720.30	780.50	732.03	733.90	752.05	720.04	716.00	733.91	733 TAR	750.04	817.02	814.02	818.01	818.03	736.01 WAT	723.03	754.09	718.04	733.02	755.08	788.01	VE 305	733.01 TAI	781.01 AI	752.48	752.49	733.04	716.09	754.03	785.04	VE 303	700.01	716.00	717.02	728.01	729.01	712.03	TECHNOPOL UPR										
MAIN APPLICATIONS		General purpose			Sanitary		Polymer concrete	Breton process	Solid surface	RTM			SMC/BMC	SMC		SMC/BMC	Sanitary	Industrial sheet			Profiles					Boats		Vehicle parts		Pipe, tanks					Grinding medium	Base resin		Specially formulated		Flexible resin	MAIN APPLICATIONS									
METHOD OF APPLICATION		Hand lay up, spray up			Casting				Resin injection			High pressure moulding				Spray up laminating	Continuous/discontinuous lamination			Pultrusion				Vacuum infusion		RIM	Filament winding					Pigment concentrates	Gel coats		Putties		Blending resin	METHOD OF APPLICATION												
APPLICATIONS	BOATS	○	○	○																						○	○																	BOATS						
	GEL-COATS																																														GEL-COATS			
	PANELS, SHEETS, BUILDING																																														PANELS, SHEETS, BUILDING			
	CHEMICAL INDUSTRY			○			○	○	○					○	○	○	○																															CHEMICAL INDUSTRY		
	ELECTRIC INDUSTRY										○	○	○	○	○	○	○																															ELECTRIC INDUSTRY		
	INDUSTRIAL LAMINATES										○	○	○																																		○	INDUSTRIAL LAMINATES		
	DECORATION	○	○		○	○																																										DECORATION		
	CONTAINERS	○		○																																												CONTAINERS		
	PIPES - TANKS	○	○	○							○	○	○																																				PIPES - TANKS	
	VEHICLE BODIES																																															VEHICLE BODIES		
METHOD OF USE	HAND LAY UP	○	○	○																																													HAND LAY UP	
	SPRAY UP	○	○	○																																														SPRAY UP
	INJECTION MOULDING										○	○	○																																					INJECTION MOULDING
	VACUUM MOULDING											○	○														○	○																					VACUUM MOULDING	
	COLD MOULDING																											○	○																				COLD MOULDING	
	HOT MOULDING																																																HOT MOULDING	
	SHEET MOULDING																																																SHEET MOULDING	
	FILAMENT WINDING																																																	FILAMENT WINDING
	PULTRUSION																																																	PULTRUSION
	CONTINUOUS PROCESS																																																	CONTINUOUS PROCESS
CASTING AND INCLUSION										○	○	○																																				○	CASTING AND INCLUSION	
TYPICAL PROPERTIES	CHEMICAL NATURE	DCPD	ORTHO-PHTHALIC	ISOPHTHALIC	DCPD	DCPD	ORTHO-PHTHALIC	ORTHO-PHTHALIC	ISO / NPG	DCPD	DCPD	ORTHO-PHTHALIC	ORTHO-PHTHALIC	MALEIC	MALEIC	MALEIC	DCPD	DCPD	ORTHO-PHTHALIC	MIXED ACIDS	DCPD	ORTHO-PHTHALIC	ISOPHTHALIC	VINYLESTER	DCPD	ISO / NPG	ORTHO-PHTHALIC	DCPD	DCPD	ISO / NPG	ORTHO-PHTHALIC	ISOPHTHALIC	VNILESTER	MALEIC	ISO / NPG	ISOPHTHALIC	DCPD	DCPD	ISO / AA							CHEMICAL NATURE				
	REACTIVE MONOMER CONTENT %	38	43	44	34	32	34	35	33	34	40	40	35	31	35	35	38	36	35	34	35	35	41	35	40	41	37	37	32	43	35	40	45	FREE	33	33	37	35	24								REACTIVE MONOMER CONTENT %			
	VISCOSITY AT 25°C (BROOK-FIELD, #2/10 rpm) [mPa.S]	900	1200	900	400	320	420	600	1100	300	120	140	1400	3000	1900	180	200	250	500	400	350	700	250	600	120	250	220	200	400	320	850	400	450	350	1100	1250	500 [20°C]	700 [20°C]	750									VISCOSITY AT 25°C (BROOK-FIELD, #2/10 rpm) [mPa.S]		
	GEL TIME AT 25°C (min) CURING SYSTEM [%Co Acc.1% / %MEKP - 50]	VARIOUS [0/1]	VARIOUS [0/1]	VARIOUS [0/1.5]	20 [1/1]	8 [0.5/2]	8 [0.5/2]	VARIOUS	10 [1/2]	12 [0.8/1]*	18 [0/1]	10 [1.2/1.5]	N.M.	N.M.	N.M.	N.M.	16 [0/2]	18 [1/1]	VARIOUS	VARIOUS	8 [2 BP]	6 [2BP]	8.5 [2 BP]	12 [2 BP]	50 [0/1]	90 [0/1.5]	9 [0.8/1]*	9 [0.8/1]*	VARIOUS	VARIOUS	14 [1/1]	VARIOUS	VARIOUS	10 [1/2]	8 [1/2]	10 [2 BP]	10 [2 BP]	20 [1/1]								GEL TIME AT 25°C (min) CURING SYSTEM [%Co Acc.1% / %MEKP - 50]				
	ELONGATION AT BREAK [%]	1.5	1.5	3.5	3.0	2.5	2.5	2.0	2.0	2.5	2.5	3.0	1.5	1.5	1.5	2.0	2.5	3.5	3.5	5.0	2.5	3.0	2.5	4.5	2.5	3.0	3.5	3.5	4.0	4.5	3.5	4.0	5.0														80	ELONGATION AT BREAK [%]		
	TENSILE STRENGTH [MPa]	55	55	85	70	60	80	65	90	60	70	70	70	70	60	35	40	60	60	75	65	60	70	75	80	70	65	80	80	75	60	75	90	80															TENSILE STRENGTH [MPa]	
HEAT DISTORTION TEMPERATURE °C	80	70	85	80	100	105	65	105	90	70	75	120	120	125	130	85	80	95	85	95	100	100	105	70	80	90	90	85	90	90	100	100																HEAT DISTORTION TEMPERATURE °C		
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Services

TECHNOBELL is a long-standing engineering company specialising in process and project design. In the field of unsaturated polyester resin we supply our clients with the know-how, recipes for UPRs, technology and equipment/machinery for process lines as well as turnkey plant, including engineering, procurement, construction, training, commissioning and the initial assistance in marketing.

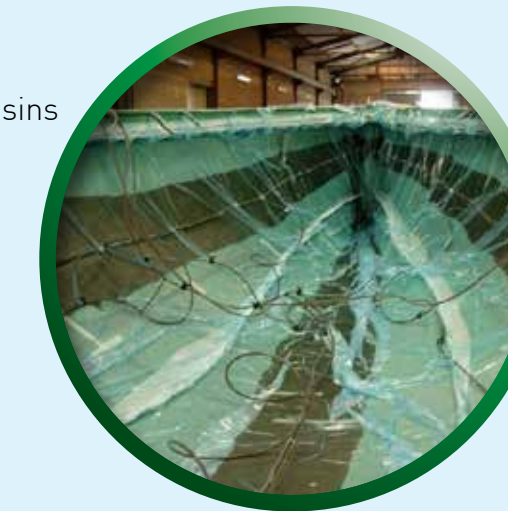


Main advantages of Technobell resin production process:

- Stable quality:**
 Highly accurate control of both the time/temperature diagram of the reactor and of the difference in temperature between the reactor and the heating fluid obtains the best possible results from the resin and avoids the formation of by-products.
- Low raw material costs:**
 Based on raw material price changes, Technobell can vary the raw material composition for each type of UPRs to reach the highest product performance parallel with the lowest available raw material costs.
- Low alcohols (glycols) excess:**
 The specially designed column enables us to operate with low glycol excess. This excess is in range of 2-3 wt% in the reaction water (depending on resin recipe) while older processes involve glycols excess of 5-6%. The benefit of reducing the amount of glycols in circulation is the reduction of resin production costs, and waste water pollution. Overall UPR production yield reaches 99.9 wt% (excluding reaction water formation).

Technobell uses its know-how/ technology to produce more than 90 different types of UPRs based on its own recipes including the following applications:

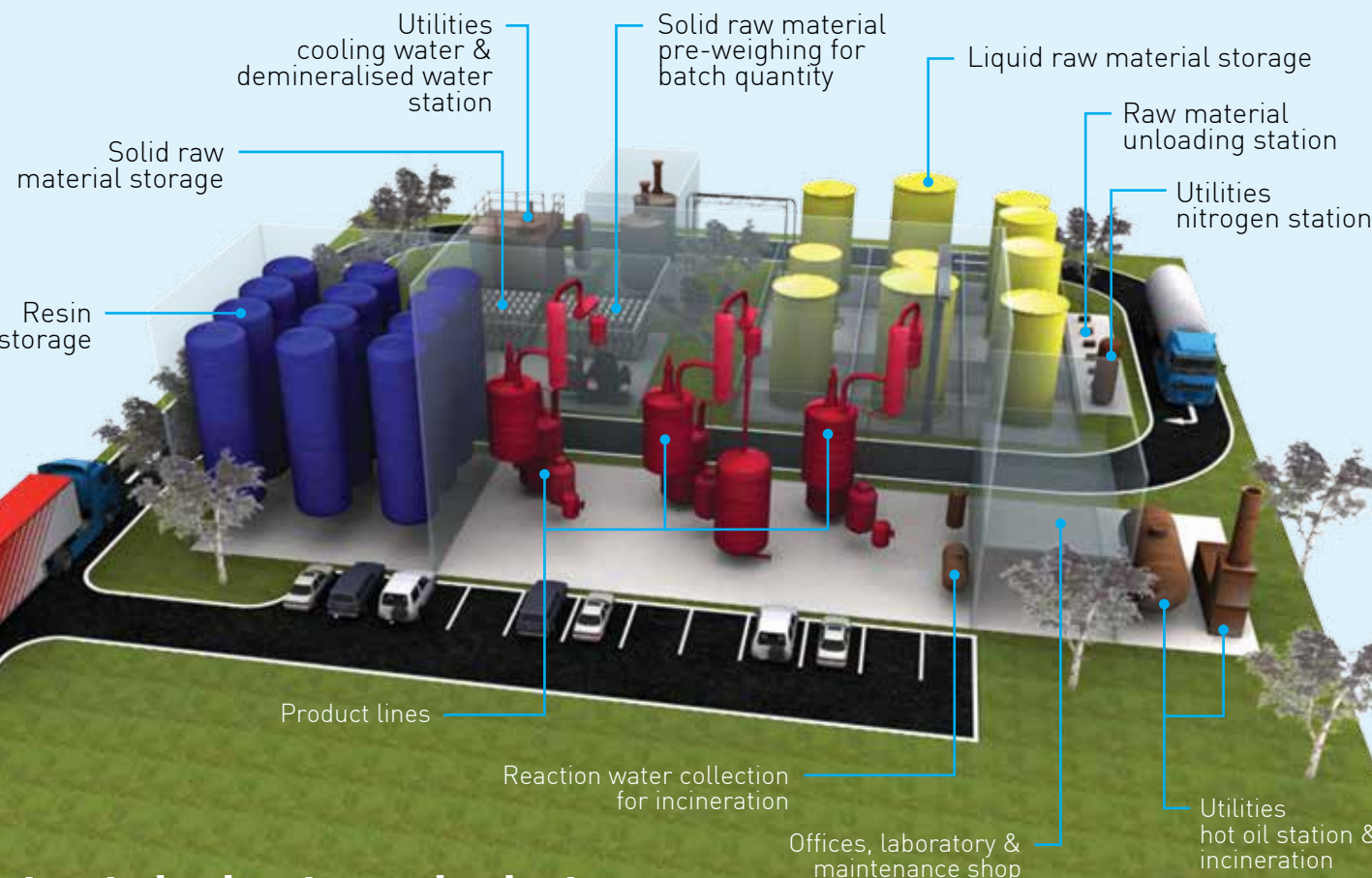
- Casting type resins
- Chemical resistant resins
- Clear casting type resins
- Cold press type resins
- Continuous laminating resins
- Filament winding resins
- Flame retardant resins
- General purpose resins
- Gloss resins
- GRP type resins
- Hand lay-up resins
- Hot press BMC resins
- Hot press SMC resins
- Infusion type resins
- Low styrene emission (LSE)
- Ncs type Breton resins
- Plasticizing flexible resins
- Pultrusion type resins
- Putty resins
- Resins for electric motors
- Resins for mould production
- RTM light type resins
- RTM type resins
- Sewer rehabilitation-renewing resins
- Solid surface resins
- Spray-up resins
- Translucent resins
- Vacflo resins
- Vacuum bagging resins
- Vacuum injection resins, etc.



Technobell is a producer of tailor-made orthophthalic, isophthalic and vinylester resins.



Unsaturated polyester resins are most commonly used in composite materials. Innovation relating to these materials is driving the plastics industry into exciting new applications, most notably in the aerospace and construction markets.



Unsaturated polyester resin plant

