

# RenShape® Tooling Systems

## Product Overview

### Products for Models, Moulds and Tool Making

RenShape®	a) Modelling and Styling Boards b) Tooling Boards
RenPaste™	a) Modelling and Styling Pastes b) Tooling Paste
RenGel™	a) Epoxy Gelcoats/Coupling Coat b) Polyurethane Gelcoats
RenLam™	a) Liquid Laminating Systems b) Laminating Pastes c) Tamping Pastes
RenCast™	a) Epoxy Casting Systems b) Fastcast Polyurethanes c) Resilient Polyurethanes (Tough to Elastic) d) Mass Casting Polyurethanes

### Products for Prototype and Production Parts

RenShape® SL Stereolithography Materials

RenPIM® Injection Grade

RenPIM® Vacuum Grade

### Other

Ancillaries



**RenShape®**  
solutions

## a) Modelling and Styling Boards

Product description		BM 5108	BM 5025	BM 5030	BM 5185	BM 5440	BM 5460	BM 5470
Application		Design studies, program proving, supporting structures	Stylng, master models, data control models, supporting structures, negative moulds for release casting	Styling and design	Styling and master models	Master models, cubing models, patterns etc.	Master models, cubing models, patterns etc.	Master models, cubing models, patterns etc.
Colour		White	Apricot	Siena	Apricot or Brown	Brown	Brown	Brown
Density	g/cm <sup>3</sup>	0.08	0.24	0.3	0.47	0.5	0.7	0.75
Shore-D (ISO 868)		-	-	-	-	55-60	60-65	60-65
Compressive strength (ISO 604)	MPa	-	3.7	6-8	10-15	15-20	20-25	33-38
Compressive modulus (ISO 604)	MPa	-	140	250-300	500-600	600-700	910-960	600-700
Coefficient of thermal expansion (ISO 11359)	10 <sup>-6</sup> K <sup>-1</sup>	-	60-70	60-65	60-65	50-55	50-55	55-60
Deflection temperature (ISO 75)	°C	-	60	60-70	60-70	75-80	75-80	60-70

## b) Tooling Boards

Product description		BM 5055	BM 5172	BM 5272	BM 5273	BM 5112	BM 5166	RS 470	BM 5266
Application		Lay up tools for pre-pregs, vacuum forming moulds	Pattern plates and core boxes, negative moulds and tools	Pattern plates and core boxes, machined negatives/positives, moulds and tools	Foundry pattern plates and core boxes	Hammer forms and flanging tools	Sheet metal forming tools, hammer forms, control fixtures and jigs	Metal forming tools	Metal forming tools
Colour		Green	Green	Olive	Red	Grey	Ivory	Grey/Brown	Dark grey
Density	g/cm <sup>3</sup>	0.72-0.75	1.2	1.4	1.5	1.5	1.7	1.6-1.7	1.7
Shore-D (ISO 868)		75	80	80-85	80-85	80-85	85-90	85-90	85-90
Barcol-Hardness		-	-	10-15	-	-	30-35	35-40	40-45
Compressive strength (ISO 604)	MPa	50-55	60-70	70-80	50-60	50-60	90-100	95-100	125-130
Compressive modulus (ISO 604)	MPa	2300-2400	1900-2000	3300-3500	2400-2800	2400-2800	7000-7500	7000-7500	7000-7500
Coefficient of thermal expansion (ISO 11359)	10 <sup>-6</sup> K <sup>-1</sup>	35-45	80-85	65-70	80-90	95-105	45-50	40-45	45-50
Deflection temperature (ISO 75)	°C	135-140	80-90	80-90	85-90	85-90	75-80	85-90	120-125



## a) Modelling & Styling Pastes

		hand applied		machine applied
Product description	A	SV 427-2	SV 36	SV 4503
	B	HV 427-1	HV 36	HV 4503
Mixing ratio (pbw)	A	100	100	100
	B	100	100	90
Application		Hand applied	Hand applied	Machine applied
Properties		Low density, machinable like wood, cold setting, RT curing	Low density, easily machinable formulation, very good adhesion	No pin holes, seamless application
Physical/mechanical properties				
Application		in 20mm layer thickness	in 40mm layer thickness	in 40mm layer thickness
Appearance/Colour		Brown	Brown	Brown
Density	g/cm <sup>3</sup>	0.6	0.5	0.8
Shore-D-Hardness (ISO 868)		50-55	55-60	60
Coefficient of thermal expansion (ISO 11359)	10 <sup>-6</sup> K <sup>-1</sup>	65-70	40	55-60

## b) Tooling Paste

		machine applied
Product description	A	SV 4569
	B	HV 4569
Mixing ratio (pbw)	A	100
	B	100
Application		Machine applied
Properties		No pin holes, seamless application, metal coloured
Physical/mechanical properties (cure: 7 days/RT)		
Application		in 30mm layer thickness
Appearance/Colour		Aluminium
Density	g/cm <sup>3</sup>	1.6
Shore-D-Hardness (ISO 868)		80
Coefficient of thermal expansion (ISO 11359)	10 <sup>-6</sup> K <sup>-1</sup>	48-52

A = Resin / B = Hardener (Epoxy Systems)



## a) Epoxy Gelcoats

Product description	A B	SW 10		SW 18		SW 56	
		HY 2404	HY 5159	HY 2404	HY 5159	HY 2404	HY 5159
Mixing ratio (pbw)	A B	100 10	100 8	100 20	100 16	100 13	100 10
Properties		Easily machinable, polishable, low odour		Heat resistant, excellent styrene resistance, polishable		Heat resistant, polishable, excellent chemical resistance	
Applications		Negatives, moulds and fixtures		Wet lay-up tools, vacuum forming tools, RTM moulds		Foam and vacuum forming tools, pressure casting moulds (ceramics)	
<b>Processing properties</b>							
Pot life (250ml)	min	20	60	10-15	25	10-15	25-30
Demoulding time	h	12	12	12	12	12	12
<b>Physical/mechanical properties</b>							
Appearance/Colour		White		Green		Caramel	
Density	g/cm <sup>3</sup>	1.5	1.5	1.3	1.3	1.5	1.5
Shore Hardness (ISO 868)	D	85-90	85-90	85-90	85-90	90	90
Deflection temperature (ISO 75)	°C	60-70	80	85	100	100	120

## a) Epoxy Gelcoats

## Coupling Coat

Product description	A B	SW 404		SW 419-1	SW 5200	P 99
		HY 2404	HY 5159	HV 2419	HY 5158	HY 5159
Mixing ratio (pbw)	A B	100 10	100 8	100 13	100 12.5	100 11
Properties		Very hard, abrasion and chemical resistant, very strong edges		Abrasion resistant	High heat resistance	Coupling layer for all systems
Applications		Foundry patterns, copy-milling models		Sheetmetal forming tools, foundry patterns	High temperature tools	Universally applicable on the tacky gelcoat
<b>Processing properties</b>						
Pot life (250ml)	min	15	50	15-20	120	30
Demoulding time	h	12	12	12	7 days RT/ 14 hours 40°C	12
<b>Physical/mechanical properties</b>						
Appearance/Colour		Blue		Black	Black	Grey
Density	g/cm <sup>3</sup>	1.8	1.8	2.3	1.6	1.5
Shore Hardness (ISO 868)	D	85-90	85-90	85-90	90	90
Deflection temperature (ISO 75)	°C	80	100	60-70	160-170	120

A = Resin / B = Hardener (Epoxy Systems)

## b) Polyurethane Gelcoats

Product description	A B	6414		5075	5073
		XB 5153		6424	6424
Mixing ratio (pbw)	A B	100 50	100 72	100 36	100 20
Properties		Excellent abrasion resistance	Excellent abrasion resistance	Abrasion resistant, flexible	Abrasion resistant, flexible
Applications		Pattern plates and core boxes	Core boxes and abrasion protection	Rubberlike parts, abrasion protection, sealing strips/parts	
<b>Processing properties</b>					
Pot life (0.5kg)	min	15-20	15-20	15-20	30-40
Cure		7 days RT or 14h 40°C			
<b>Physical/mechanical properties</b>					
Appearance/Colour		White	Green	Green	Green
Density	g/cm <sup>3</sup>	1.1	1.15	1.1	1.1
Shore-D-Hardness (ISO 868)		D 65/70	D 50/55	A 70/75	A 35/40
Deflection temperature (ISO 75)	°C	Experience has shown that these systems are temperature resistant above 100°C			

A = Isocyanate / B = Crosslinking agent (Polyurea Systems)

## a) Liquid Laminating Systems

Product description	A B	CY 219			LY 113	LY 5210	LY 90
		HY 5160	HY 5161	HY 5162	HY 97	HY 5158	HY 956
Mixing ratio (pbw)	A B	100 50	100 50	100 50	100 32	100 25	100 16
Properties		High mechanical strength, tack-free at RT, multipurpose laminating system with adjustable reactivity: slow/medium/fast			Very low viscosity, excellent RT strength at demould	Partial curing at RT, exceptional heat resistance, long pot life	RT curing, good impregnation, high mechanical strength at RT
Application		Jigs, foundry patterns, backing structures, wet lay-up tools			Wet lay-up laminating Resin infusion technique	Prepreg tools, parts and structures, high temperature	Laminates and backfilling
<b>Processing properties</b>							
Pot life (500ml)	min	80	40	20	80	150	30
Cure		7 days RT/14 hours at 40°C			Cure cycle see data sheet		7 days RT/14 hours at 40°C
<b>Physical/mechanical properties</b>							
Appearance/Colour		Pale yellow	Pale yellow	Pale yellow	Clear pale yellow	Pale yellow	White
Density	g/cm <sup>3</sup>	1.1	1.1	1.1	1.1	1.1	1.3
Deflection temperature (ISO 75)	°C	45-50	50-55	55-60	120	160-170	60

## b) Laminating Pastes

Product description	A	LV 06	LV 10
	B	HY 06	HY 97 blue
Mixing ratio (pbw)	A B	100 15	100 20
Properties		Hand applied	Hand applied
Application		Laminated shells, backing structures for general tool making	Laminated shells and backing structures
<b>Processing properties</b>			
Pot Life (1,000 ml)	min	90	60
Layer thickness		up to 15mm	up to 10mm
<b>Physical/mechanical properties</b>			
Appearance/Colour		Grey-blue	Grey-blue
Density	g/cm <sup>3</sup>	1.1	0.75
Coefficient of thermal expansion (ISO 11359)	10 <sup>-6</sup> /K	32	26
Deflection temperature (ISO 79)	°C	70	125
Flexural strength (ISO 178)	MPa	55	46
Linear shrinkage	mm/m	1	1.4

A = Resin / B = Hardener (Epoxy Systems)

## c) Tamping Pastes

Options	Light	Good compressive strength	Heat resistant	Workable
Mixing ratio (pbw)				
CY 219	100	100	-	100
LY 113	-	-	100	-
HY 5161	50	50	-	50
HY 97	-	-	32	-
Filler DT 081	400	-	-	-
Filler DT 082	-	-	-	620
Quarz sand 0.1-1.5mm	-	1000	-	-
Silica flour	-	250	-	-
Aluminium granules 0.1-1.5mm	-	-	900-1000	-
Properties	Light volume filler	Good compressive strength, not workable	Heat resistant	Workable
Compressive strength ISO 504 (MPa)	10-15	95-100	30	40-45
Density g/cm <sup>3</sup>	0.6	2.1	1.3	1.8

## a) Epoxy Casting Systems

Product description	A	CW 20	CW 61	CW 47	CW 2215	CW 2418-1	
	B	HY 49	HY 97 blue	HY 33	HY 5160 / 5161 / 5162	HY 5160 / 5161 / 5162	HY 5118
Mixing ratio (pbw)	A B	100 5	100 10	100 15	100 20	100 15	100 20
Properties		Good chemical resistance, outstanding mechanical strength, abrasion resistant	Temperature resistant, easily machinable, chemical resistant	Heat resistant up to 210°C, good machinability long pot life, easy to pour	Easily machinable, colourable, cure: slow/medium/fast	Hard, abrasion resistant surfaces, readily machinable, cure: slow/medium/fast	
Application		Foundry patterns, copy-milling models, metal forming tools	Vacuum forming tools, foam moulding tools, temperature resistant tooling	Vacuum forming tools, Injection moulds, tools for manufacturing, prepreg components, foam tooling	Multipurpose casting system with adjustable reactivity	Full and face casting especially for metal forming tools with adjustable reactivity	
<b>Processing properties</b>							
Pot life (1,000ml)	min	110	150	240	120/45/25	120/60/30	80
Viscosity	mPa s	15000	3000	17000	4000/5000/5000	4000/5000/5000	15000
Layer thickness	mm	<30	<40	<100	<80/<20/<10	<80/<20/<10	<40
Cure		cure cycle see data sheets					
<b>Physical/mechanical properties</b>							
Appearance/Colour		Blue	Grey	Grey	Yellow	Black	Black
Density	g/cm <sup>3</sup>	2	1.75	1.85	1.6	2.3	2.2
Shore-D-Hardness (ISO 868)		85-90	90	90	85-90	85-90	85-90
Compressive strength (ISO 604)	MPa	140	135	150 -160	80-90	80-90	80-90
Flexural strength (ISO 178)	MPa	110	95	120	65-75/60-70/60-70	80-90/80-85/80-85	80-85
Deflection temperature (ISO 79)	°C	65-70	110	200-210	50-55/55-60/60-65	50-55/55-60/60-65	60-65

A = Resin / B = Hardener (Epoxy Systems)

## b) Fastcast Polyurethanes

Product description	A	FC 50	FC 51	FC 52	FC 53	FC 54	FC 55
	B C	FC 50	FC 51	FC 52 DT 082	FC 53 DT 082	FC 54	FC 55
Mixing ratio (pbw)	A B C	20 100	100 100	100 100 300	100 100 300	100 100	100 100
Properties		Filled two part system for quick accurate reproduction of finely detailed surfaces	Two part system for general purpose casting of models etc.	Three part system for quick and accurate castings	Three part system for quick accurate reproduction of finely detailed surfaces	Two part system, castable up to 100mm	Two part system for quick accurate reproduction with low viscosity
Application		Prototype models and templates, replicas	Moulds, holding fixtures, foundry patterns, replicas, prototypes	Moulds, holding fixtures, foundry patterns, replicas, prototypes	Prototypes, scale models, templates, rapid impressions, negatives	Replicas, prototypes foundry models, holding templates	Prototypes, scale models, templates
<b>Processing properties</b>							
Pot life (1kg)	min	4-5	4-5	6-7	4-5	5-7	2-3
<b>Physical/mechanical properties (cure: 16h/80°C)</b>							
Appearance/Colour		Off white	Grey	Beige	Beige	Blue	Amber
Density	g/cm <sup>3</sup>	1.6	1.6	1.6-1.7	1.6-1.7	1.6	1.1
Shore-D-Hardness (ISO 868)		85-90	80	75-80	75-80	85-90	80-85
Compressive strength (ISO 604)	MPa	75	65	45-50	45-50	65-70	40
Compressive modulus (ISO 604)	MPa	3500	3000	2500	2500	3000	900-1000
Deflection temperature (ISO 75)	°C	95	80	85-90	85-90	85-90	85

A = Isocyanate / B = Crosslinking agent (Polyurethane Systems)

## c) Resilient Polyurethanes (Tough to Elastic)

Product description	A	6414	6414	5075	5073
	B	6414	5117	6414	6414
Mixing ratio (pbw)	A B	100 64	100 35	100 32	100 18
Properties		Good abrasion resistance, tough and durable, not moisture sensitive	Good abrasion resistance, tough and durable, not moisture sensitive	Abrasion resistant, flexible, not moisture sensitive	Abrasion resistant, flexible, not moisture sensitive
Application		Core boxes, abrasion protection, working models	Pattern plates, core boxes, impact resistant parts and moulds	Working models (ceramics industry), rubberlike parts, abrasion protection	Working models (ceramics industry), rubberlike parts, abrasion protection
<b>Processing properties</b>					
Pot life (1l)	min	15-20	15-20	15-20	30-40
Viscosity	mPas	2000-3000	5000-5500	5000-8000	2000-4000
Layer thickness	mm	20	10	75	100
<b>Physical/mechanical properties</b>					
Appearance/Colour		Caramel	Light beige	Cognac	Cognac
Shore Hardness (ISO 868)		50-55 D	65-70 D	70 A	40 A
Tensile strength (ISO 527)	MPa	16-17	20-30	6-8	4-6
Elongation at break (ISO 527)	%	150-200	100-150	200-250	350-400
Tear propagation strength (DIN 53356)	N/mm	25-30	20-25	15-20	6-8

A = Isocyanate / B = Crosslinking agent (Polyurea Systems)

## d) Mass Casting Polyurethanes

	Standard	Unit	Casting				Paste				Stamping pastes	
			1	2	3	4	5	6	7	8	9	10
			<b>Mixture (pbw)</b>									
RenCast 5146 Isocyanate			80	80	80	80	80	80	80	80	80	80
RenCast 5146 Polyol			100	100	100	100	100	100	100	100	100	100
Filler DT 081				110						200		600
Filler DT 082					330	420	330				600	900
Cast Iron Powder								550				
Aluminium Powder							40					
			<b>Processing properties</b>									
Appearance		Colour	L. Beige	Grey	L. Beige	L. Beige	Grey	D. Grey	Grey	White	Grey	White
Exotherm	a	°C	-	90	45	40	50	60	-	-	-	-
Pot life	a	min	20-25	30-40	30-40	30-40	30-40	30-40	30-40	30-40	30-40	30-40
Min. Curing time		h	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14
			<b>Properties after cure (7 days RT or 14h at 40°C)</b>									
Density		g/cm <sup>3</sup>	1.2	1.9	1.6	1.85	1.8	3.3	0.77	1.8	0.6	1.8
Shore Hardness		D	80	70-75	85	85	85-90	90	70	85	-	85
Compressive strength	ISO 604	MPa	85-90	65	90-95	100-105	95-100	115-120	40-50	75-80	12-15	70-75
E-Modulus	ISO 604	MPa	3000	4500	9500	10500	10000	10000	3500	10000	2500	11000
Coefficient of thermal expansion	RT-60°C	mm x 10 <sup>-6</sup> /K	100	40-50	45	40	45	45-50	35-45	40-45	6-8	25-35
Linear shrinkage	500x70x50 mm	mm/m	2	-	-	-	-	-	0.1	0.1	0	0
Castable layer thickness (Shrinkage < 1mm/m)			20	100	250	300	200	200	-	-	-	-

## Ancillaries

### Ancillaries

Product	Description	Application
<b>RenLease™</b>		
QZ 5101	Mould sealer, water soluble	For sealing of plastic, rubber, wax, etc.
QV 5110	Mould release agent	Paste release agent for cold and warm curing systems
QZ 5111	Mould release agent	Liquid release agent for cold and warm curing systems
<b>Fillers</b>		
DT 5039	Thixotropic agent	Usable at workplace, not dusty
DT 082	White metalloxyd filler	Filler for various applications
DT 081	Grey, light mineral filler	Filler for various applications
DT 077-1	White, soft mineral filler	Filler for various applications
DT 078	Black, soft mineral filler	Filler for various applications
DY 219	Accelerator for aromatic Epoxy hardeners and Polyurea systems	Accelerator
DY 5054	Foaming agent for Epoxy foams	As expansion for Epoxy systems
Freeman® Wax Sheets	Self adhesive wax sheets in different thicknesses	Spacing layers to simulate work piece thickness



## Stereolithography Materials

Product description	SL 5170	SL 5180	SL 5190	SL 5195	SL 5210	SL 5220 <sup>®</sup>	SL 5240	SL 5410	SL 5430	
SLA* system	SLA 190/SLA 250	SLA 500	SLA 350 / SLA 3500	SLA 5000	SLA 190/SLA 250	SLA 190/SLA 250	SLA 190/SLA 250	SLA 500	SLA 500	
Properties	Highly accurate SL material for master patterns	Highly accurate SL material for master patterns	Highly accurate SL material for master patterns	Highly accurate SL material for master patterns	High temperature SL material with excellent water resistance	Fast multi-functional SL material	Durable SL material that simulates polypropylene	Fast multi-functional SL material	High temperature resistant SL material	
<b>Liquid Material</b>										
Viscosity @28°C	cps	220	240	220	220	400	340	350	480	640
Viscosity @35°C	cps	180	190	175	180	305	275	375	370	495
Penetration depth (Dp)	mls	4.8	4.4	4.6	5.2	4.9	5.6	6.7	4.8	5.8
Critical exposure (Ec)	mJ/cm <sup>2</sup>	13.5	13.3	17.7	13.1	5.0	9.0	9.9	50.1	7.3
<b>Post-Cured Material</b>										
Flexural modulus	MPa	2963	2520	2280	1628	1724	2951	1476	2848	3127
Flexural strength	MPa	108	88	83	49	44	94	56	127	112
Tensile modulus	MPa	3948	2520	2200	2050	1455	2703	1627	3095	2513
Tensile strength	MPa	60	65	56	47	15	62	37	72	54
Elongation at Break	%	13	11	9	11	2	8	24	4	4
Impact strength, notched Izod	J/m	32	37	27	84	21	37	48	27	21
HDT @66 PSI / @264 PSI	°C	55 / 49	49 / 42	50 / 43	47 / 43	47 / 46	46 / 42	58 / 50	61 / 55	63 / 52

\* on SLA 8000 system

## Stereolithography Materials

Product description	SL 5440	SL 5510	SL 5530	SL 7510						
SLA* system	SLA 500	Viper x2	SLA 350/3500/6000	SLA 350/3500/5000	SLA 7000	SLA 350/SLA 3500	SLA 5000	SLA 7000	SL 7520	
Properties	Durable SL material that simulates polypropylene	Highly accurate SL material	High temperature resistant SL material	Accurate multi-functional SL material with high throughput	High throughput multi-functional SL material with exceptional surface finish					
<b>Liquid Material</b>										
Viscosity @28°C	cps	350	230	230	270	400	400	400	570	
Viscosity @35°C	cps	280	190	180	210	210	325	325	450	
Penetration depth (Dp)	mls	4.9	4.8	4.1 1/4-3	5.6 1/5-4	5.5	5.8	5.5	5.1	
Critical exposure (Ec)	mJ/cm <sup>2</sup>	6.5	8.9	11.4 1/11-2	9.4 1/8-5	7.5	13.8	10.9	8.3	
<b>Post-Cured Material</b>										
Flexural modulus	MPa	1336	2956	3054	2930	3162	2396	2455	1958	2955
Flexural strength	MPa	47	103	90	75	115	81	62	61	100
Tensile modulus	MPa	1500	2854	3298	3017	2502	2634	2206	2282	3548
Tensile strength	MPa	36	66	77	59	60	57	44	61	84
Elongation at Break	%	20	5	5	4	4	10	14	4	6
Impact strength, notched Izod	J/m	38	26	27	21	21	37	32	27	17
HDT @66 PSI / @264 PSI	°C	60 / 52	54 / 47	62 / 53	78 / 57	68 / 56	58 / 49	51 / 47	51 / 45	54 / 49

## Stereolithography Materials

Product description	SL 7540	SL 7545	SL 7550	H-C 9100R	Y-C 9300R					
SLA* system	Viper x2	SLA 350 / SLA 3500	SLA 5000	SLA 7000	SLA Viper x2 3000/5000/7000	SLA Viper x2 3000/5000/7000	SLA 190/SLA 250	SLA Viper x2 3000/5000/7000		
Properties	Durable SL material that simulates polypropylene		Durable SL material for polypropylene-like parts	White, durable SL material that simulates ABS-like parts	Selectively colorable SL material	Selectively colorable SL material				
<b>Liquid Material</b>										
Viscosity @28°C	cps	360	360	360	430	250	250	-		
Viscosity @35°C	cps	280	279	279	250	250	200	-		
Penetration depth (Dp)	mls	7.2	6.2	6.0	6.6	6.6	3.7	5.2	1030	
Critical exposure (Ec)	mJ/cm <sup>2</sup>	11.0	10.1	8.7	10.9	9.6	6.1	5.4	6.1	8.4
<b>Post-Cured Material</b>										
Flexural modulus	MPa	1124	1467	1407	1262	1475	2582	2500	-	-
Flexural strength	MPa	44	53	50	46	58	83	94	-	-
Tensile modulus	MPa	1510	1700	1600	1486	1700	2500	2500	1389	1315
Tensile strength	MPa	39	40	39	35	38	53	52	50	45
Elongation at Break	%	32	23	22	21	17	13	11	8	7
Impact strength, notched Izod	J/m	44	42	42	41	34	38	36	-	-
HDT @66 PSI / @264 PSI	°C	61 / 50	62 / 50	57 / 49	54 / 49	49 / 46	57 / -	58 / -	-	-

†Average values based on 90 minute UV post-cure. Higher values are obtained with longer UV post-cure times or thermal post-curing.



# RenPIM® Injection Grade

## Polyurethanes processed with dispensing equipment

Product description	A B	S212	S213-1	S214	S215	S216	S217	S218	S219	S220	S221-1
		S212	S213-1	S214	S215	S216	S217	S218	S219	S220	S221-1
Mixing ratio (g/bw)	A B	60 100	65 100	80 100	80 100	80 100	80 100	80 100	80 100	120 100	100 32
Properties		Flexible, simulates ICFE	Flame resistance to UL94 V-0, simulates PFA25	High temperature resistance, pigments, simulates PFA25	High temperature resistance, simulates PFA25	Toughened, high impact resistance, pigments, simulates PFA25	Toughened, high impact resistance, simulates PFA25	High flexural modulus, toughened, simulates PFA25	For adding to faster systems to reduce reaction rate, for casting thicker layers	Temperature resistant to 80°C, for high temperature applications, simulates PFA25	Very high impact material for crash test parts, simulates P.F.E.
Application		Functional prototype parts and shortrun production parts									
<b>Processing properties</b>											
Pot life @ 25°C	sec	100-120	50-70	60-80	40-60	40-60	40-60	100-130	40-60 min	45-70	45-55
Demoulding time at RT	min	15-20	15-30	10-15	10-15	15-20	10-15	20-30	16-18 h	15-20	15-20
Max. layer thickness	mm	4	5	4	4	5	5	4	20	4	4
Recommended cure		See data sheets									
<b>Physical/mechanical properties</b>											
Appearance/Colour											
Shore Hardness (ISO 868)		Neutral	Caramel	Beige	Black	Neutral	Black	Black	Neutral	Black	Black
Deflection temperature (ISO 75)	°C	55-6 D	78-83 D	75-80 D	75-80 D	75-80 D	75-80 D	75-85 D	78-83 D	70-80 D	70-74 D
Impact strength Charpy, double notched (ISO 179)	KJ/m <sup>2</sup>	(80) 90	90	120	130-140	80	85-90	90-100	70-75	up to 184	58
Tensile strength at 25°C (ISO 527)	MPa	11	4	2.5	2.5	3.5	2.8	1.9	3	6	170-100
Elongation at break at 25°C (ISO 527)	%	15-20	30-35	30-40	30-40	30-35	35-40	40-45	60-70	45-50	30-40
E modulus at 25°C (ISO 527)	MPa	35-40	8-12	3-10	5-10	35-40	8-12	18-20	10-14	5-10	160-100
E modulus at 25°C (ISO 527)	MPa	700	1500	1800	1200	1300	1300	1800	3100	1800	300

A = Isocyanate / B = Crosslinking agent (Polyurethane Systems)

# RenPIM® Vacuum Grade

## Polyurethanes processed with vacuum casting equipment

Product description	Isocyanate Polyol	S231-VG	S232-VG	S233-VG	S234-VG	S235-VG	S236-VG	S237-VG	S238-VG	S239-VG	
		S231-VG	S232-VG	S233-VG	S234-VG	S235-VG	S236-1-VG	S237-VG	S238-VG	S239-VG	
Mixing ratio (g/bw)	Isocyanate Polyol	30 100	100 100	100 31	100 30	100 30	100 100	100 70	90 100	115 100	
Properties		Good tear resistance, simulates rubber	Pigmentable, good temperature resistance, good flow characteristics, simulates PC/PP	Pigmentable system, high impact strength, good temperature resistance, simulates PP	Pigmentable system, high temperature resistance, good impact strength, simulates PFA25	High temperature resistance, good impact strength, simulates PFA25	Pigmentable system, high flexural modulus, longer working life, simulates ABS	Black, glass filled system, high flexural modulus, high temperature resistance, simulates ABS	Pigmentable with excellent clarity and optical properties, simulates ABS	Pigmentable, UV stable with excellent clarity and optical properties, simulates ABS	
Application		Rapid prototyping for the production of functional prototype parts									
<b>Processing properties</b>											
Pot life (0.2kg)	min	5	5	6	6	6	20	9	10	11	
Demoulding time 70°C	h	1-2	1-1.5	0.75-1	0.75-1	0.75-1	1.5-2	0.5-1	1-2	1-2	
Max. layer thickness	mm	20	10	5	5	5	12	10	5	5	
Recommended cure		See data sheets									
<b>Physical/mechanical properties</b>											
Appearance/Colour											
Shore Hardness (ISO 868)		Black	Amber	White	White	Black	Light beige	Black	Transparent	Transparent	
Deflection temperature (ISO 75)	°C	65 A	78 D	77 D	79 D	79 D	78 D	81 D	80 D	80 D	
Impact strength Charpy (ISO 179)	KJ/m <sup>2</sup>	--	90	95	95	100	70	115	90	90	
Tensile strength (ISO 527)	MPa	--	35	95	50	50	25	25	95	95	
Elongation at break (ISO 527)	%	5.5-8.5	35	40	45	45	40	45	52	50	
E modulus (ISO 527)	MPa	300-400	15	25	12	12	4	2	5	13	
E modulus (ISO 527)	MPa	-	1400	1630	1760	1740	1700	3000	2000	1600	

\* not measured according to this standard, values are derived from experience, Tg measurements or from torsionsgrams

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