# SR 1126
## Fire resistant epoxy laminating system

**Auto extinguishing** laminating epoxy system.
Low smoke of low toxicity.
Bromine and antimony free
Filled and modified epoxy resin
The system expands when exposed to very high temperature or fire, producing a solid char barrier that protects inner materials from heat and flames.
Good temperature resistance

This system complies with:
- UL94 V0 and FAR 25 laminate parts
- AIRBUS and BOEING standards in terms of fumes and fume toxicity.

### Fast hardener SD 8205 / SD 8207
Suitable for manufacturing small to medium parts by hand lay-up, press moulding and vacuum bagging.
Demoulding possible after 24 h at 25 °C
Suitable for parts with service temperature up to 70 °C.
Ultra fast SD 8207 is suitable for low temperature application.

### Slow hardeners SD 8203 / 8202
Suitable for manufacturing medium to large part by hand lay-up, press moulding and vacuum bagging.
Post cure at minimum 40 °C before demoulding. 60 °C post cure is highly recommended
Suitable for parts with service temperature up to 70 °C.

### Ultra slow hardener SD 1305
Suitable for large parts, long pot life, hot process
Tg 1 – onset / DSC = 135 °C
Post cure at 120 °C minimum

### Guidelines
Do not filter resin
Stir and homogenise resin with high shear prior to adding hardener.

## Epoxy resin SR 1126

| | | |
|---|---|---|
| | | Modified epoxy resin with fillers<br>Viscous liquid |
| Appearence | | White |
| Color | | |
| Viscosity | @ 15 °C | 11 700 |
| ( ± 20 % mPa.s ) | @ 20 °C | 7 200 |
| | @ 25 °C | 4 700 |
| | @ 30 °C | 3 200 |
| | @ 40 °C | 1 650 |
| Density | | |
| Pycnomètre ± 0.06 | @ 20 °C | 1.33 |
| Fillers maximum size | µ | 60 |
| Refractive index<br>± 0.002 | @ 25 °C | 1.5527 |

## Hardeners

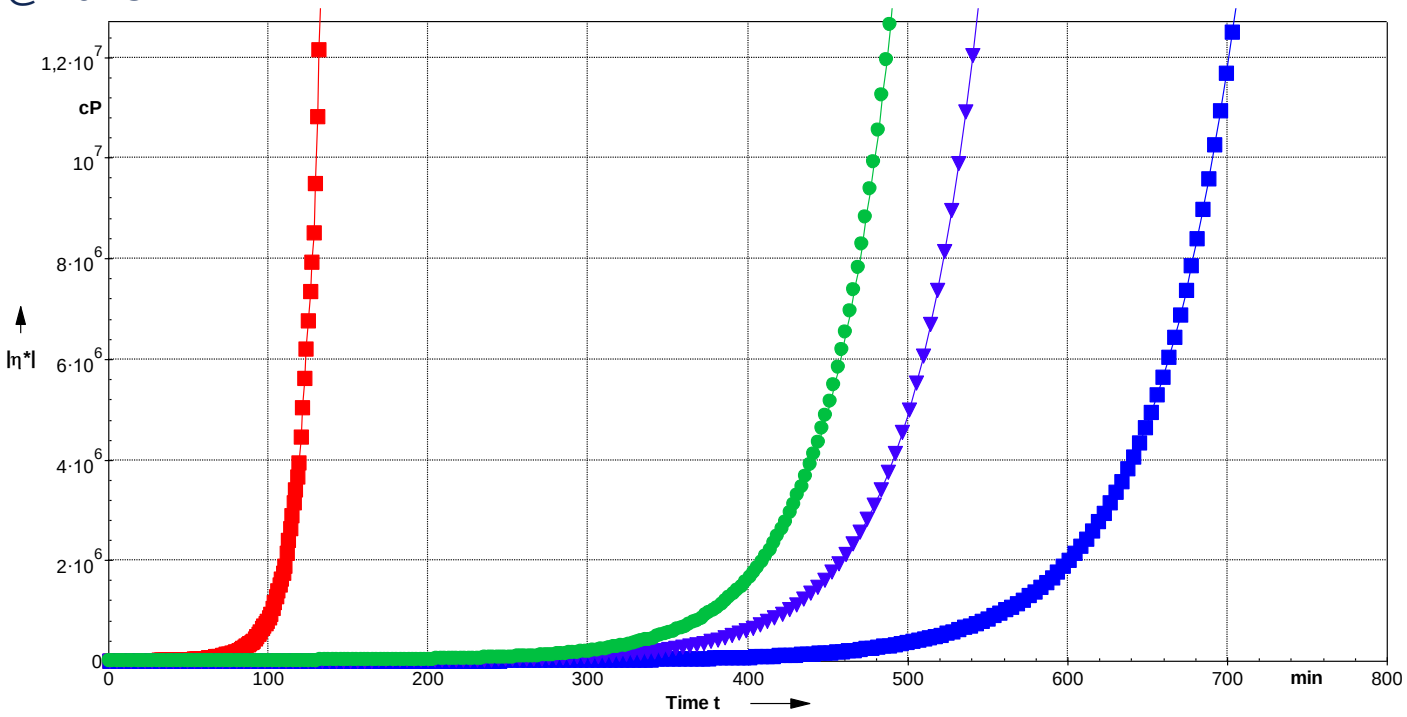
| | | SD 8207<br>*E1715.3* | SD 8205<br>*E1692.1* | SD 8203<br>*E1692.3* | SD 8202<br>*E1692.2* | SD 1305<br>*E1305.1* |
|---|---|---|---|---|---|---|
| Reactivity | | super fast → | | | | Ultra slow |
| Appearence | | Fluid liquids, unfilled | | | | |
| Color | | orange | yellow | yellow | clear to yellow | yellow to red |
| Gardner maximum | | 8 | 5 | 3 | 2 | 10 |
| Pt-Co maximum | | na/ | 800 | 500 | 300 | na |
| Viscosity | @ 15 °C | 69 | 180 | 70 | 45 | 350 |
| ( ± 20 % m.Pas) | @ 20 °C | 51 | 120 | 50 | 30 | 210 |
| | @ 25 °C | 38 | 90 | 35 | 25 | 135 |
| | @ 30 °C | 29 | 60 | 27 | 18 | 92 |
| | @ 40 °C | 19 | 35 | 17 | 12 | 50 |
| Density | @ 20 °C | 0.98 | 0.99 | 0.96 | 0.95 | 0.99 |
| Refractive index | @ 25 °C | 1,5123 | 1.5077 | 1.4941 | 1.4823 | 1.5506 |
| Storage Stability | Hardeners react irreversibly with air (carbon dioxide and moisture), resulting with salt formation.<br>Hardeners needs to be kept in their original closed containers.<br>Avoid any long exposure to air. | | | | | |

## Mixes - Reactivity & Process

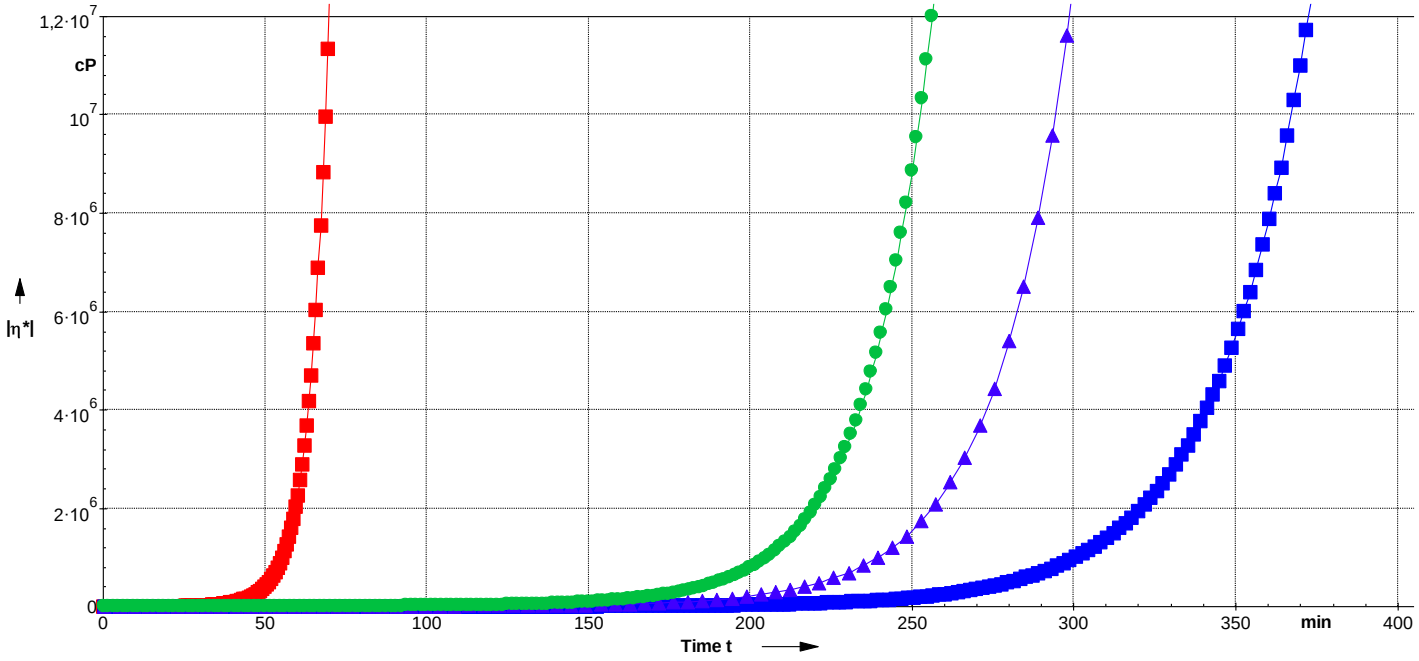
| | | SR 1126 **SD 8207** | SR 1126 **SD 8205** | SR 1126 **SD 8203** | SR 1126 **SD 8202** | SR 1126 **SD 1305** |
|---|---|---|---|---|---|---|
| Weight ratio | | **100 g / 20 g** | | | | 100 g / 18 g |
| Volume ratio | | 100 / 27 | 100 / 27 | 100 / 28 | 100 / 28 | 100 / 24 |
| Viscosity initial mPa.s ± 20 % | @ 20°C<br>@ 30°C<br>@ 40°C | 2000<br>860<br>- | 2 200<br>1 070<br>580 | 1 600<br>830<br>570 | 1100<br>610<br>370 | -<br>1900<br>1100 |
| Time to reach 10 000 cps@ | @ 20°C<br>@ 30°C<br>@ 40°C | 33 min<br>24 min<br>- | 2 h<br>1 hr 30'<br>1 hr | 2 hrs 30'<br>1 hr 45'<br>1 hr 9' | 3 hrs 50'<br>2 hrs 30'<br>1 hr 32' | -<br>4 hr 55'<br>3 h 44' |
| Gel time 1 mm film | @ 20°C<br>@ 30°C<br>@ 40°C | 1 hr 50'<br>1 hr<br>- | 6 hrs 40'<br>3 hrs 25'<br>2 hrs | 7 hrs<br>4 hrs<br>2 h 17' | 10 hrs<br>5 hrs 30'<br>3 hrs | -<br>30 hrs<br>20 hrs |
| Minimum time before handling parts | @ 20°C<br>@ 30°C<br>@ 40°C | 5 hrs 30'<br>3 hrs<br>- | 20 hrs<br>10 hrs 15'<br>6 hrs | 21 hrs<br>12 hrs<br>6 hrs 50' | 30 hrs<br>16 hrs 30'<br>9 hrs | -<br>90 hrs<br>60 hrs |
| Density Helium ± 0.02 After cure @ 60 °C | @ 20°C | 1.33 | | | | |

# Reactivity *SR 1126* / SD 820x on 1 mm film
# Viscosity evolution with temperature

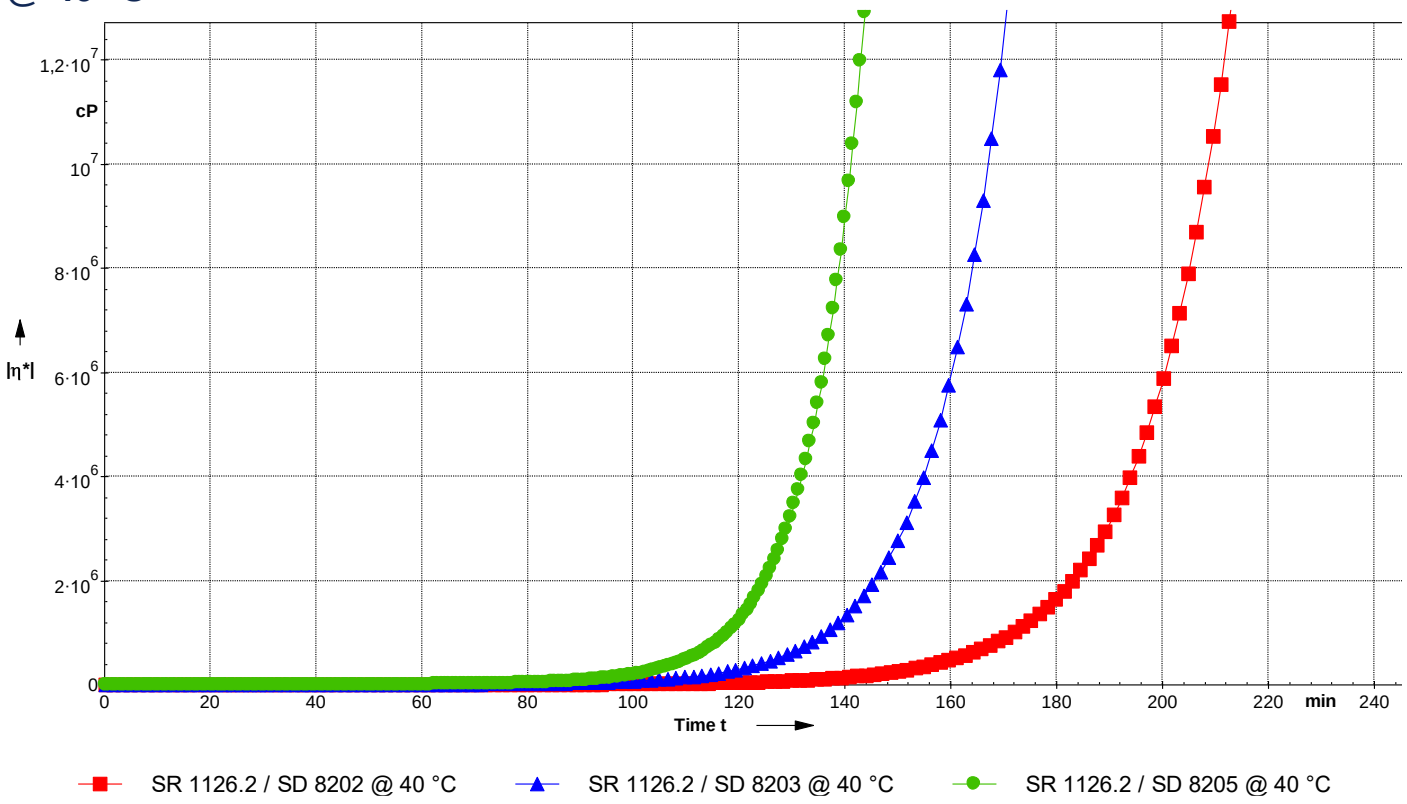
## @ 20 °C



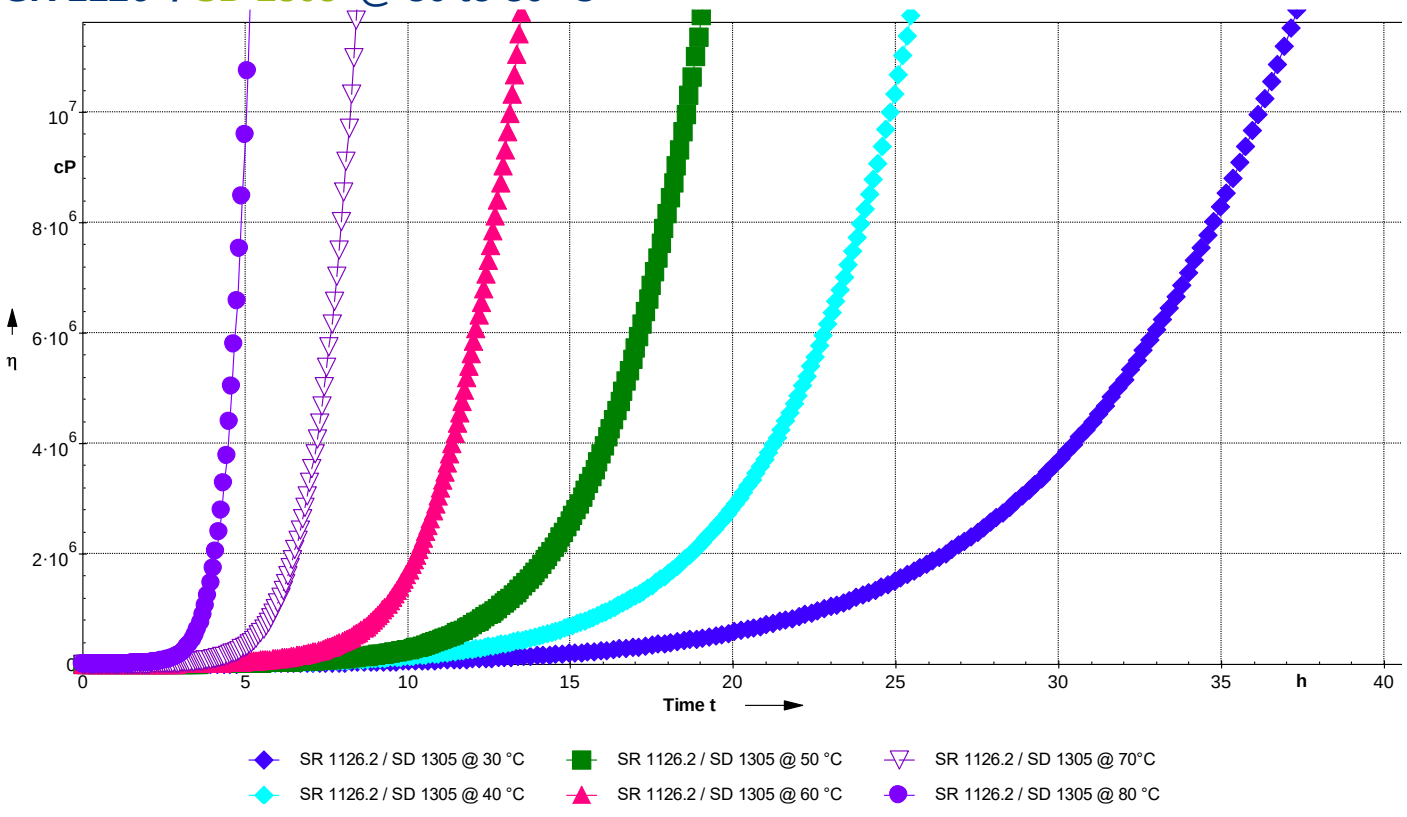

## @ 30 °C



## @ 40 °C




## *SR 1126* / SD 1305 @ 30 to 80 °C



## Mechanical properties on cast resin

### SR 1126 / SD 8207

| Curing cycle → | | 7 days AT | AT + 24 hrs 40 °C | AT + 8 hrs 80 °C |
|---|---|---|---|---|
| **Tension** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4700 | 4800 | 4600 |
| Maximum resistance | $N/mm^2$ | 42 | 44 | 44 |
| Resistance at break | $N/mm^2$ | 42 | 44 | 44 |
| Elongation at max.load | % | 1.1 | 1.2 | 1.2 |
| Elongation at break | % | 1.1 | 1.2 | 1.2 |
| **Flexion** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4600 | 4400 | 4400 |
| Maximum resistance | $N/mm^2$ | 73 | 79 | 78 |
| Elongation at max.load | % | 1.9 | 2.1 | 2.0 |
| Elongation at break | % | 1.9 | 2.1 | 2.0 |
| **Shear strenght** | | | | |
| Maximum resistance | $N/mm^2$ | 40 | 41 | 38 |
| **Compressive** | | | | |
| Compressive yield strength | $N/mm^2$ | 95 | 98 | 102 |
| Offset compressive yield | % | 8.8 | 10.1 | 10.2 |
| **Impact Choc Charpy** | | | | |
| Resilience | $KJ/m^2$ | 8 | 9 | 10 |
| **Glass Transition** | | | | |
| Tg1 onset | **°C** | 60 | 68 | 72 |
| Tg1 onset maximum | **°C** | | | 78 |

# SR 1126 / SD 8205

| Curing cycle → | | AT + 24 hrs 40 °C | AT + 8 hrs 60 °C | AT + 8 hrs 80 °C |
|---|---|---|---|---|
| **Tension** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4700 | 4700 | 4700 |
| Maximum resistance | $N/mm^2$ | 33 | 33 | 36 |
| Resistance at break | $N/mm^2$ | 33 | 33 | 36 |
| Elongation at max.load | % | 0.6 | 0.6 | 0.8 |
| Elongation at break | % | 0.6 | 0.6 | 0.8 |
| **Flexion** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4370 | 4050 | 4000 |
| Maximum resistance | $N/mm^2$ | 60 | 64 | 68 |
| Elongation at max.load | % | 1.5 | 1.7 | 1.9 |
| Elongation at break | % | 1.5 | 1.7 | 1.9 |
| **Shear strenght** | | | | |
| Maximum resistance | $N/mm^2$ | 42 | 42 | 42 |
| **Compressive** | | | | |
| Compressive yield strength | $N/mm^2$ | 92 | 90 | 86 |
| Offset compressive yield | % | 10.3 | 11.3 | 12.4 |
| **Impact Choc Charpy** | | | | |
| Resilience | $KJ/m^2$ | 7 | 8 | 9 |
| **Glass Transition** | | | | |
| Tg1 onset | **°C** | 68 | 79 | 83 |
| Tg1 onset maximum | **°C** | - | - | 84 |

## SR 1126 / SD 8203

| Curing cycle → | | AT + 24 hrs 40 °C | AT + 16 hrs 60 °C | AT + 8 hrs 80 °C |
|---|---|---|---|---|
| **Tension** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4600 | 4400 | 4200 |
| Maximum resistance | $N/mm^2$ | 32 | 33 | 36 |
| Resistance at break | $N/mm^2$ | 32 | 33 | 36 |
| Elongation at max.load | % | 0.7 | 0.8 | 0.8 |
| Elongation at break | % | 0.7 | 0.8 | 0.8 |
| **Flexion** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4400 | 4200 | 4000 |
| Maximum resistance | $N/mm^2$ | 49 | 58 | 66 |
| Elongation at max.load | % | 1.2 | 1.5 | 1.8 |
| Elongation at break | % | 1.2 | 1.5 | 1.8 |
| **Shear strenght** | | | | |
| Maximum resistance | $N/mm^2$ | 39 | 40 | 41 |
| **Compressive** | | | | |
| Compressive yield strength | $N/mm^2$ | 91 | 94 | 95 |
| Offset compressive yield | % | 9.5 | 10.7 | 12.0 |
| **Impact Choc Charpy** | | | | |
| Resilience | $KJ/m^2$ | 5 | 6 | 8 |
| **Glass Transition** | | | | |
| Tg1 onset | **°C** | 67 | 91 | 96 |
| Tg1 onset maximum | **°C** | - | - | 96 |

# SR 1126 / SD 8202

| Curing cycle → | | AT + 3 days 30 °C | AT + 24 hrs 40 °C | AT + 8 hrs 80 °C |
|---|---|---|---|---|
| **Tension** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4700 | 4600 | 4500 |
| Maximum resistance | $N/mm^2$ | 40 | 39 | 42 |
| Resistance at break | $N/mm^2$ | 40 | 39 | 42 |
| Elongation at max.load | % | 1.0 | 1.0 | 1.2 |
| Elongation at break | % | 1.0 | 1.0 | 1.2 |
| **Flexion** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4500 | 4400 | 4200 |
| Maximum resistance | $N/mm^2$ | 64 | 74 | 79 |
| Elongation at max.load | % | 1.6 | 1.9 | 2.2 |
| Elongation at break | % | 1.6 | 1.9 | 2.2 |
| **Shear strenght** | | | | |
| Maximum resistance | $N/mm^2$ | 39 | 40 | 39 |
| **Compressive** | | | | |
| Compressive yield strength | $N/mm^2$ | 92 | 96 | 98 |
| Offset compressive yield | % | 8.6 | 9.5 | 10.7 |
| **Impact Choc Charpy** | | | | |
| Resilience | $KJ/m^2$ | 5 | 6 | 9 |
| **Glass Transition** | | | | |
| Tg1 onset | **°C** | 59 | 70 | 87 |
| Tg1 onset maximum | **°C** | | | 85 |

## SR 1126 / SD 8201 *(E1692.41)*

| **Curing cycle** → | | AT + 3 days 30 °C | AT + 24 hrs 40 °C | AT + 16 hrs 60 °C |
|---|---|---|---|---|
| **Tension** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4400 | 4400 | 4100 |
| Maximum resistance | $N/mm^2$ | 37 | 40 | 41 |
| Resistance at break | $N/mm^2$ | 37 | 40 | 41 |
| Elongation at max.load | % | 0.9 | 1.0 | 1.2 |
| Elongation at break | % | 0.9 | 1.0 | 1.2 |
| **Flexion** | | | | |
| Modulus of elasticity | $N/mm^2$ | 4400 | 4200 | 3900 |
| Maximum resistance | $N/mm^2$ | 61 | 66 | 69 |
| Elongation at max.load | % | 1.5 | 1.7 | 2.0 |
| Elongation at break | % | 1.5 | 1.7 | 2.0 |
| **Shear strenght** | | | | |
| Maximum resistance | $N/mm^2$ | 39 | 39 | 39 |
| **Compressive** | | | | |
| Compressive yield strength | $N/mm^2$ | 90 | 93 | 93 |
| Offset compressive yield | % | 9.1 | 9.7 | 10.9 |
| **Impact Choc Charpy** | | | | |
| Resilience | $KJ/m^2$ | 5 | 6 | 8 |
| **Glass Transition** | | | | |
| Tg1 onset | **°C** | 59 | 70 | 88 |
| Tg1 onset maximum | **°C** | | | 89 |

## SR 1126 / SD 1305

| Curing cycle → | | 8 hrs 80 °C<br>1 hr 100 °C<br>6 hrs 140 °C |
|---|---|---|
| **Tension** | | |
| Modulus of elasticity | $N/mm^2$ | 3700 |
| Resistance at break | $N/mm^2$ | 33 |
| Elongation at max.load | % | 1.2 |
| Elongation at break | % | 1.2 |
| **Flexion** | | |
| Modulus of elasticity | $N/mm^2$ | 3600 |
| Maximum resistance | $N/mm^2$ | 75 |
| Elongation at max.load | % | 2.9 |
| Elongation at break | % | 2.9 |
| **Shear strenght** | | |
| Maximum resistance | $N/mm^2$ | 37 |
| **Compressive** | | |
| Compressive yield strength | $N/mm^2$ | 98 |
| Offset compressive yield | % | 16.7 |
| **Impact Choc Charpy** | | |
| Resilience | $KJ/m^2$ | 9 |
| **Glass Transition** | | |
| Tg1 onset | **°C** | 135 |
| Tg1 onset maximum | **°C** | 135 |

***Tests carried out on samples of pure cast resin, without prior degassing, between steel plates.***
***Measures undertaken according to the following norms:***

***Mechanical tests:***

| | |
|---|---|
| *Tension:* | *NF EN ISO 527-2:2012* |
| *Flexion:* | *NF EN ISO 178:2011* |
| *Compression:* | *NF EN ISO 604:2004 or NF EN ISO 844:2014 (foam product)* |
| *Charpy impact strength:* | *NF EN ISO 179-1:2010* |
| *Shear Strength:* | *ASTM D732–17 (Punch Tool)* |
| *Interlaminar shrinkage strength:* | *ASTM D5528-13* |
| *Toughness (GIC et KIC) :* | *ISO 13586:2000* |

*Water absorption: Internal. Polymerization according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,*

***Thermal tests:***

| | |
|---|---|
| *Glass transition DSC:* | *NF EN ISO 11357-2:2014 -5°C to 180 °C under nitrogen gas* |
| | *$T_{G1}$ or Onset: 1st scan at 20 °C/min* |
| | *$T_{G1}$ maximum or Onset: 2nd scan at 20 °C/min* |
| *Glass transition DTMA:* | *Temperature ramp 0 °C to 180 °C @ 2°C/min under normal atmosphere* |
| | *NF EN ISO 11357-1:2016 $T_G$ onset G'* |
| | *ASTM D4065-12 $T_G$ peak G''* |

***Physical tests:***

| | |
|---|---|
| *Gardner color:* | *NF EN ISO 4630:2016 Visual method* |
| *Refractive index:* | *NF ISO 280:1999* |
| *Viscosity:* | *NF EN ISO 3219:1994 Rheometer 50 mm, shear 10 $s^{-1}$* |
| *Density on liquids:* | *ISO 2811-1:2016 Pycnometer* |
| *Density on solid:* | *NF EN ISO 1183-3:1999 Helium Pycnometer* |
| *Density on foam:* | *NF EN ISO 845:2009* |
| *Gel time: Cross G' G'' Rheometer CP50 - Shear rate 10 $s^{-1}$* | |
| *Green Carbone content:* | *ASTM D6866-16 or XP CEN/TS 16640 Avril 2014* |
| *AT:* | *Ambient temperature (20 to 25 °C)* |

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