# ISOBOND SR 7200 HTG / SD 710X

## Epoxy Structural adhesive Tg 70 °C

**ISOBOND SR 7200 HTG - SD 710X** system has been specially formulated for thick and thin bonding from 0.1 mm to few cm. It exhibit high fatigue strength (excellent resistance against microcracks propagation) with Tg max around 70 °C

| | | SD 7106 | SD 7105 | SD 7103 |
|---|---|---|---|---|
| Reactivity level | | Fast | Standard | Slow |
| Initial viscosity (mPa.s) | 20 °C | 1 750 000 | 3 100 000 | 1 310 000 |
| | 30 °C | 1 252 000 | 1 640 000 | 978 000 |
| Pot Life (500 g) | 20 °C | 18 min | 27 min | 01 h 23 |
| | 30 °C | 9 min | 11 min | 28 min |
| Mixing ratio | | | | |
| | By weight | 100 / 40 | 100 / 40 | 100 / 40 |
| | By volume | 100 / 50 | 100 / 50 | 100 / 50 |
| Shear strength | $N/mm^2$ | 40 | 41 | 36 |
| % Elongation at max strength | % | 3,7 | 3,7 | 4 |
| Gel Time (1 mm) | 20 °C | 05 h 10 | 05 h 40 | 13 h 05 |
| | 30 °C | 02 h 50 | 03 h 40 | 05 h 15 |
| Time to reach 400 mPa.s | 20 °C | 4 min | 4 min | 4 min |
| | 30 °C | 4 min | 4 min | 4 min |
| Demold time | 20 °C | 07 h 00 | 10 h 00 | 20 h 00 |
| | 30 °C | 04 h 00 | 06 h 00 | 12 h 00 |

**ISOBOND SR 7200 TH - SD 710X** system has been specially formulated for thick and thin bonding
from 0.1 mm to few cm. It exhibit high fatigue strength (excellent resistance against microcracks propagation).

- High performance adhesive with Tg max around 70 °C
- Adheres to most materials
- Specifically designed for composite structural bonding
- Excellent resistance against microcracks propagation (high GIc)
- Gel texture easy to apply and mix
- Outstanding wettability of surfaces

Application on nonporous surface material is possible. The hand mixing for quantities greater than 200 or 300 grams can be complicated and induce significant risks of inhomogeneous mixture in production. A machine of dosing and mixing may then be considered and become essential in order to avoid any difference in quality.

## Epoxy resin ISOBOND SR 7200 HTG

| | | |
|---|---|---|
| Appearance | | gel |
| Color | | blue |
| Viscosity (mPa.s) | 15 °C | 150000 ± 30000 |
| | 20 °C | 89200 ± 17800 |
| | 25 °C | 61300 ± 12300 |
| | 30 °C | NC ± NC |
| | 40 °C | NC ± NC |
| Density | 20 °C | 1,19 |
| Storage (months) | 23 °C | 24 |

## Hardener(s)

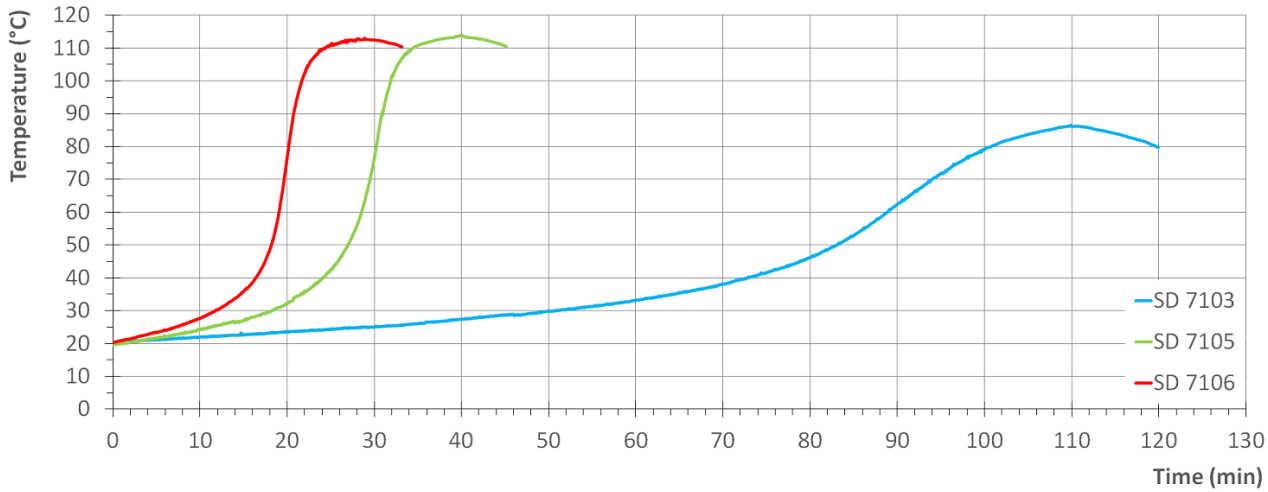
| | | SD 7106 | SD 7105 | SD 7103 |
|---|---|---|---|---|
| Appearance | | gel | gel | gel |
| Color | | black | yellow-orange | red |
| Reactivity level | | Fast | Standard | Slow |
| Viscosity (mPa.s) | 15 °C | 53000 ± 10600 | 47010 ± 16710 | 40300 ± 8050 |
| | 20 °C | 35000 ± 7000 | 36310 ± 13610 | 30150 ± 6050 |
| | 25 °C | 23000 ± 4600 | 29470 ± 11570 | 24000 ± 4800 |
| | 30 °C | NC ± NC | NC ± NC | NC ± NC |
| | 40 °C | NC ± NC | NC ± NC | NC ± NC |
| Density | 20 °C | 1,07 | 1,02 | 1,02 |
| Storage (months) | 23 °C | 18 | 18 | 18 |

## Mixe(s) ISOBOND SR 7200 HTG / SD 710X

| | | SD 7106 | SD 7105 | SD 7103 |
|---|---|---|---|---|
| Appearance | | gel | gel | gel |
| Color | | Noir Vert | green | purple |
| Mixing ratio | | | | |
| By weight | | 100 / 40 | 100 / 40 | 100 / 40 |
| By volume | | 100 / 50 | 100 / 50 | 100 / 50 |
| Initial viscosity (mPa.s) | 20 °C | 1 750 000 | 3 100 000 | 1 310 000 |
| Density | 20 °C | | 1,17 | |
| | 30 °C | 1 252 000 | 1 640 000 | 978 000 |

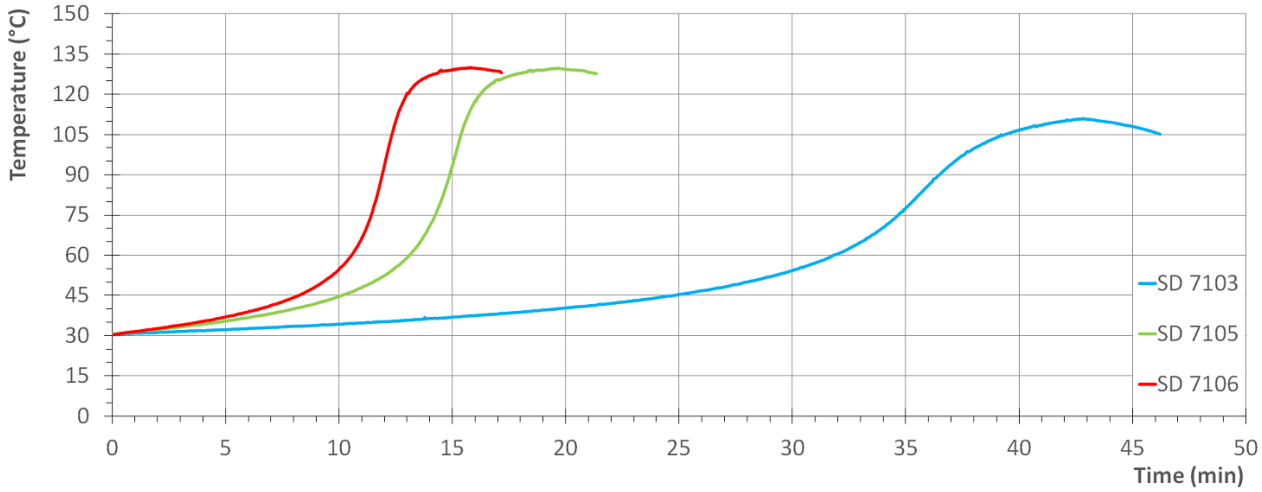
## Reactivity 20 °C for 500 g ISOBOND SR 7200 HTG / SD 710X

| | SD 7106 | SD 7105 | SD 7103 |
|---|---|---|---|
| Exothermic temperature (°C) | 113 | 114 | 89 |
| Exothermic peak time | 28 min | 39 min | 01 h 48 |
| Time to reach 50 °C | 18 min | 27 min | 01 h 23 |



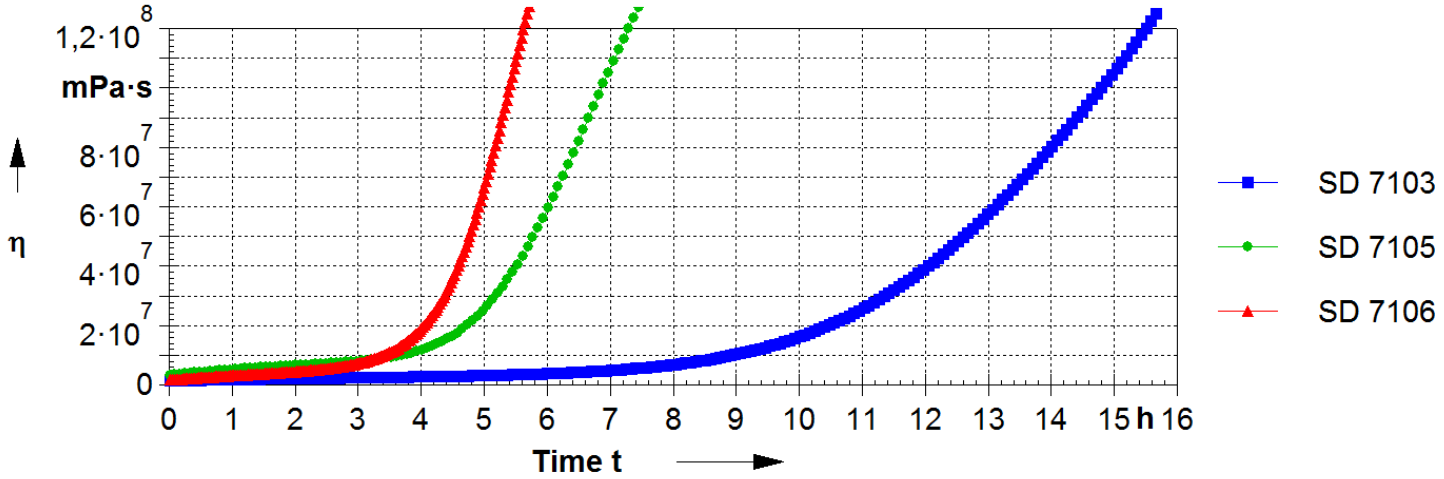
## Reactivity 30 °C for 500 g ISOBOND SR 7200 HTG / SD 710X

| | SD 7106 | SD 7105 | SD 7103 |
|---|---|---|---|
| Exothermic temperature (°C) | 130 | 130 | 111 |
| Exothermic peak time | 15 min | 19 min | 42 min |
| Time to reach 50 °C | 9 min | 11 min | 28 min |

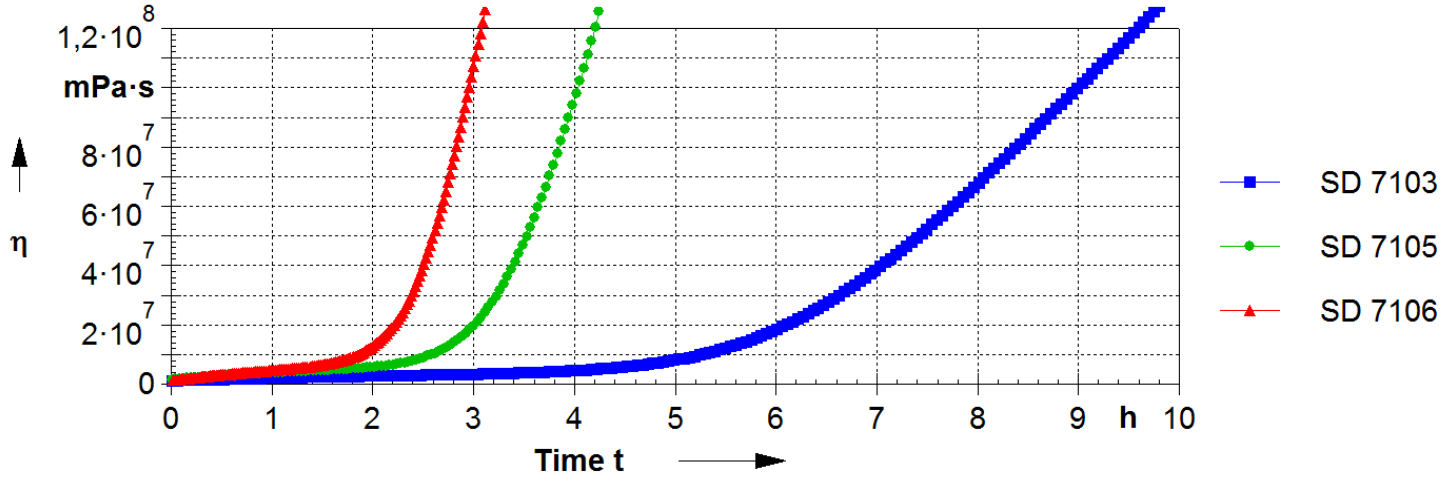



## 1 mm thick layer reactivity

### 20 °C



## 30 °C


1,2·10^8
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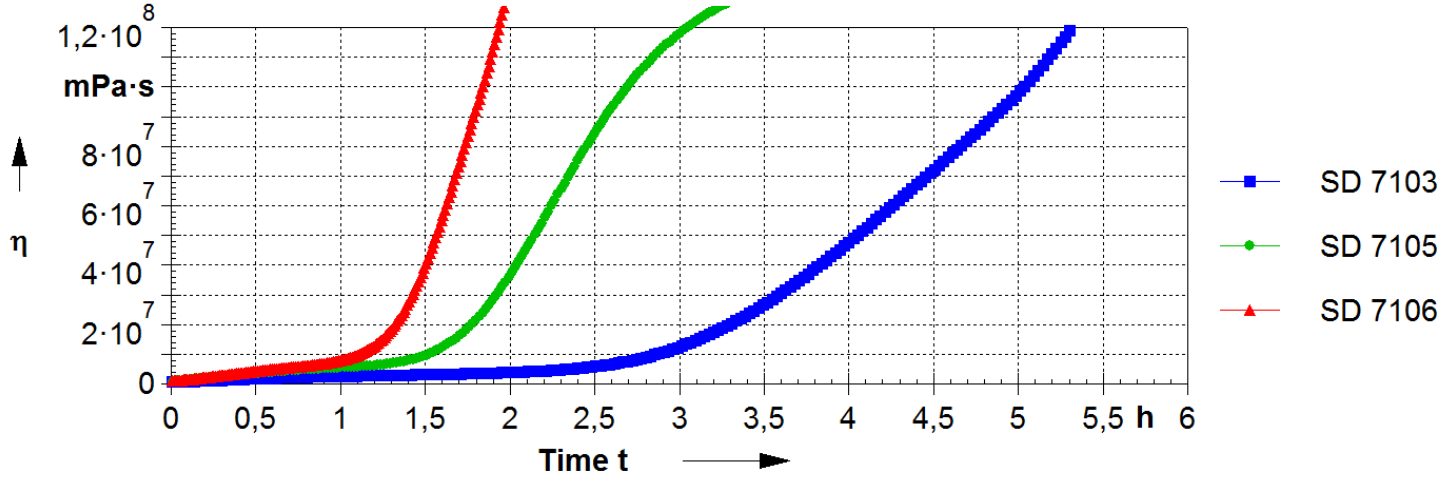
SD 7105
SD 7106

## 40 °C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SD 7103
SD 7105
SD 7106

## Post-curing

The thermomechanical values of an epoxy system can be optimized by implementing a post-curing cycle. The Sicomin laboratory provides several predefined post cure cycles on its data sheets allowing users to compare systems. These experimental cycles are adaptable to your specific applications, taking the following parameters into account:

- Selected epoxy system (Tg max)
- Available heat source
- Room Dimension and Sampling
- Nature of the tooling (thermal conductivity of material)

Many systems can provide good mechanical properties after curing at room temperature and from 18°C for 24 to 48 hours before demolding.
The mechanical properties progress very quickly with a slightly higher temperature of around 40°C for several hours.
Epoxy systems with high Tg and slow and extra-slow hardeners imperatively require post-curing at a higher temperature. It is possible to start the cycle as soon as the exothermic peak passes, but also to start post-curing later after assembly of the various components and before the finishing operations. If the nature of the models and tools is not suitable for high temperatures, we recommend carrying out the first stages up to the maximum admissible temperature then, after cooling and demoulding, continuing the cycle on a suitable former.
For a conventional epoxy system, we recommend carrying out a cycle in steps of 20°C for 4 hours.

Example for an epoxy system Tg max 100°C:
4 hrs at 40°C + 4 hrs at 60°C + 4 hrs at 80°C + cooling to room temperature before unmoulding.

There are many short cycle, high temperature epoxy systems that do not fit into this post-cure scheme (pultrusion, hot press, pre-preg). For these systems, initial curing provides maximum thermomechanical performance without post-curing.

We invite you to contact our technical department for your questions on this subject.

## Mechanical properties on cast resin :

| | | ISOBOND SR 7200 HTG / SD 7106 | | | ISOBOND SR 7200 HTG / SD 7105 | | |
|---|---|---|---|---|---|---|---|
| | | 7 J TA | 24 h TA + 8 h 60°C | 24 h TA + 8 h 60°C + 8 h 80° C | 7 J TA | 24 h TA + 8 h 60°C | 24 h TA + 8 h 60°C + 8 h 80° C |
| **Tensile** | | | | | | | |
| Modulus | $N/mm^2$ | 2 690 | 2 890 | 3 090 | 2 640 | 2 880 | 2 970 |
| Maximum strength | $N/mm^2$ | 43 | 50 | 55 | 43 | 50 | 52 |
| Breaking Strength | $N/mm^2$ | 42 | 45 | 54 | 41 | 49 | 51 |
| Elongation at max strength | % | 3 | 3,4 | 3,7 | 2,8 | 3 | 3,7 |
| Elongation at break | % | 3,5 | 6,4 | 4,7 | 3,6 | 3,2 | 5,2 |
| **Flexion** | | | | | | | |
| Modulus | $N/mm^2$ | 2 410 | 2 690 | 2 680 | 2 020 | 2 660 | 2 620 |
| Maximum strength | $N/mm^2$ | 72 | 92 | 96 | 67 | 92 | 89 |
| Breaking Strength | $N/mm^2$ | | 79 | 75 | | 60 | 54 |
| Elongation at max strength | % | 4,5 | 5,2 | 5,4 | 4,5 | 5,4 | 5,8 |
| Elongation at break | % | 15 | 6,4 | 11,1 | > 15 | 13,1 | 13,6 |
| **Compression** | | | | | | | |
| Yield strength | $N/mm^2$ | 78 | 81 | 84 | 74 | 82 | 82 |
| **Shear strength** | | | | | | | |
| On pure resin | $N/mm^2$ | 33 | 39 | 40 | 31 | 38 | 41 |
| Alu / Alu bonding | $N/mm^2$ | 16,3 | 17,7 | 26,7 | 14,2 | 16,3 | 26,9 |
| Steel / Steel bonding | $N/mm^2$ | 28,8 | 28,3 | 31,4 | 25,7 | 30,7 | 26,1 |
| Stainless / Stainless bonding | $N/mm^2$ | 28,9 | 35 | 36,5 | 22,5 | 31,3 | 34,3 |
| Wood / Wood bonding | $N/mm^2$ | LFT | LFT | LFT | LFT | LFT | LFT |
| GRP/GRP bonding | $N/mm^2$ | 32,2 | 26,2 | 25,5 | 31 | 25,5 | 25,7 |
| **Toughness** | | | | | | | |
| G1c interlaminar ($J/m^2$-CBT) | | | | | | | |
| **DSC glass transition** | | | | | | | |
| Tg onset | °C | 52 | 58 | 72 | 50 | 58 | 70 |
| Tg max onset | °C | | | 69 | | | 62 |

These curing cycles are applied after a 24-hour hardening period at room temperature, allowing the reaction to freeze and exotherm bevond.

## Mechanical properties on cast resin :

| | | ISOBOND SR 7200 HTG / SD 7103 | | |
|---|---|---|---|---|
| | | 7 J TA | 24 h TA + 8 h 60°C | 24 h TA + 8 h 60°C + 8 h 80° C |
| **Tensile** | | | | |
| Modulus | N/mm² | 2 060 | 2 430 | 2 570 |
| Maximum strength | N/mm² | 35 | 43 | 48 |
| Breaking Strength | N/mm² | 33 | 41 | 48 |
| Elongation at max strength | % | 3,1 | 3,4 | 4 |
| Elongation at break | % | 3,9 | 5,5 | 5 |
| **Flexion** | | | | |
| Modulus | N/mm² | 1 860 | 2 350 | 2 390 |
| Maximum strength | N/mm² | 57 | 79 | 84 |
| Breaking Strength | N/mm² | | 73 | 69 |
| Elongation at max strength | % | 5 | 5,3 | 5,9 |
| Elongation at break | % | > 15 | 8,2 | 11,2 |
| **Compression** | | | | |
| Yield strength | N/mm² | 62 | 71 | 71 |
| **Shear strength** | | | | |
| On pure resin | N/mm² | 29 | 36 | 36 |
| Alu / Alu bonding | N/mm² | 23,2 | 30,4 | 30,1 |
| Steel / Steel bonding | N/mm² | 28,7 | 30,6 | 30,2 |
| Stainless / Stainless bonding | N/mm² | 29,3 | 33,6 | 34,7 |
| Wood / Wood bonding | N/mm² | LFT | LFT | LFT |
| GRP/GRP bonding | N/mm² | 32,2 | 30,2 | 24,1 |
| **Toughness** | | | | |
| G1c interlaminar (J/m²-CBT) | | | | |
| **DSC glass transition** | | | | |
| Tg onset | °C | 48 | 59 | 71 |
| Tg max onset | °C | | | 64 |

These curing cycles are applied after a 24-hour hardening period at room temperature, allowing the reaction to freeze and exotherm bevond.

***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,* |
| *Bonding Strength Double lap shear:* | *ASTM D3528-96*<br>*ADH = adhesive failure*<br>*COH = cohesive failure*<br>*TLC = thin-layer cohesive failure*<br>*FT = fiber-tear failure.*<br>*LFT = light-fiber-tear failure* |
| ***Thermal tests:*** | |
| *Glass transition DSC:* | *NF EN ISO 11357-2:2014 -5°C to 180 °C under nitrogen gas*<br>*$T_{G1}$ or Onset: 1st scan at 20 °C/min*<br>*$T_{G1}$ 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*<br>*NF EN ISO 11357-1:2016 $T_G$ onset G'*<br>*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* |
| ***TA:*** | *Ambient temperature (20 to 25 °C)* |
| ***NC:*** | *No information Communicated* |
| ***NB:*** | *No Breaking (maximum flexion deformation : 15 %)* |

*Table 1st page:*

| | |
|---|---|
| *Pot Life:* | *Time to reach 50 °C or time limit for use* |
| *Gel time:* | *Intersection of tangents on the viscosity curve of 1 mm thick layer* |
| *Release time:* | *Time required to obtain sufficient mechanical strength to release* |
| *Minimum Vacuum Time:* | *Time in which vacuum can be applied (25000 mPa.s)* |
| *Maximum Vacuum time:* | *Limit time below which a vacuum can be applied (G'G " crossing)* |
| *Optimum Infusion time:* | *Time to reach 400 mPa.s* |
| *Max Infusion Time:* | *Time to reach 25000 mPa.s* |
| *Vacuum cut-off time:* | *Time to reach G'G " crossover + 20%* |

***LEGAL NOTES:***
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## Mix

| ISOBOND SR 7200 HTG | Resin part + Hardener part (kg) | Resin part (kg) | Hardener part (kg) |
|---|---|---|---|
| **SD 7106** | | | |
| **SD 7105** | | | |
| **SD 7103** | | | |