

## DURATEK 1300

### MEDIUM VISCOSITY EPOXY BASED FIBRE LAMINATION RESIN

- Mainly designed for filament winding system, but it is also suitable for hand lamination, vacuum bagging, vacuum infusion and RTM techniques under certain conditions;
- Pot life span is long enough for manually replenished resin baths;
- Low exothermic → suitable for the production of thick parts;
- Due to its optimized mixed viscosity, **DURATEK 1300** impregnates the fibres good and does not drain.
- Room temperature curing system, but precuring is necessary before demoulding from the FW fixture.
- Mechanical properties can be maximised at relatively low post curing temperatures.
- High temperature resistance for a room temperature curing system.  $T_g > 100^\circ\text{C}$  can be obtained with appropriate postcuring.

#### DESCRIPTION

**DURATEK 1300 System** consists of one resin (**DTE 1300**) and one hardener (**DTS 1300**).

System is more suitable for the filament winding production technique. Automotive drive shafts, pressure vessels and containers, piping/tubes, light masts and similar products can be produced at high rates with an automated process. Very high rates of fibre can be obtained (appr. 70%).

**DURATEK 1300** can also be used for hand lamination, vacuum bagging, vacuum infusion and RTM techniques under certain conditions; i.e. **DURATEK 1300's** viscosity may be too low for hand lamination, which may cause draining on the vertical and the viscosity may be too high for infusion, if unsuitable fibre type is used or a very thick laminate is intended to be produced, where resin flow is hard.

#### PHYSICAL PROPERTIES

	Unit	DTE 1300 + DTS 1300
Density	kg / lt	1,10 ± 0,05
Viscosity	mPas	750 ± 150
Pot Life (@23°C, 100 ml)	Minutes	300 ± 50

#### MIXING

Hardeners must be mixed with the resin at the given mixing ratios. Correct tools of measurement must be used for mixing; intuitive estimates must be avoided. If one of the components is measured less, system will never cure correctly and maximum mechanical and chemical strengths will never be reached.

#### MIXING RATIO

	DTE 1300	DTS 1300
By Weight	75	25
By Volume	71	29

Measured components must be mixed together using an electrical mixer at low rpm (400 – 500 rev/min). If mixed too fast, air bubbles will be introduced into the mixture. Mixing must continue, till a homogenous mixture is obtained (appr. for 2 – 4 minutes). Material at the hard to reach places of the container (at the sides and bottom of it) must be mixed well. Mixer must be moved vertically and horizontally.

Pot life will be shorter, if mixed in large quantities and / or at high temperatures. Pot life can be extended and / or air bubbles can be removed more easily, if material mixed in a deep container is transferred into a broad and shallow container.

Properly adjusted mixing pumps result in the best and most reliable mixing. Make sure that the dispensing unit is regularly calibrated. Parts produced with machine dispensed resin usually have less void content.

## **APPLICATION**

Properly mixed system as described in the previous section is ready to use. Ambient temperature has to be between 15 – 25°C, relative humidity mustn't exceed 65%. If material is stored in cold storages at poor conditions, or if material is used at poor conditions or on cold surfaces, curing time of the system will be longer, application quality of the system may decrease dramatically due to the increased viscosity, surface may stay tacky and "amine blushing" may occur. It must also be taken into consideration, that material will cure faster at higher temperatures.

It is crucial, that epoxy, ambient temperature and application surface all have the same or approximately the same temperature.

Application surface has to be dry and free of oil, dust and other contaminants. If the application surface is the mold surface, particular attention must be paid to apply the correct mold release properly.

Mixed materials must be consumed, before the pot life is reached. Temperature development within the container and resin bath must be followed and recorded. Special care must be given that there is always sufficient resin in the resin bath to prevent resin starvation during filament winding. If filament winding process is stopped for some reason, resin leftovers in the bath must be emptied and all parts contaminated with resin must be cleaned.

Under normal circumstances, the epoxy consumption for filament winding depends on fibre tension, impregnation method (resin bath or resin impregnation unit), winding speed, resin dispensing or replenishing rate and temperature.

When part's production is finished, it should be kept rotating for precuring at 60°C for 2 hours. (This temperature and exposure time can change for different applications.) If the part is removed directly after production, uncured resin will drain and the part's shape will become irregular. Precured parts must be postcured to reach the maximum mechanical properties. Please check out the "Mechanical Properties Table of the Cast Resin" to determine the postcuring temperature and time.

Temperature's homogenous distribution on the composite part during post curing is essential to prevent local property differences and to ensure equal curing throughout the part. (Ventilated ovens should be preferred.)

Temperature must be kept stable during pre- and post curing. Temperature decrease during curing will increase the actual curing period. If not noticed, laminates' strength will be less than estimated. To spot temperature changes, environment can be followed with thermo couples.

For the other production techniques like hand lay up and vacuum assisted laminations, please consider the related application procedures.

Do not add any filler, solvent, thinner etc. into the system.

## **THINNER**

**DO NOT ADD ANY THINNER!**

## MECHANICAL PROPERTIES OF THE CAST RESIN

SYSTEM: DTE 1300 + DTS 1300			CURING: 48 Hours @ 23°C +			
Property	Unit	Standard	16h @ 50°C	12h @ 60°C	8h @ 80°C	4h @ 100°C
Tensile Strength	N / mm <sup>2</sup>	ISO 527 – 2	73 – 78	73 – 78	75 – 80	74 – 79
Elongation @Max. Str.	%	ISO 527 – 2	3,6 – 4,1	3,7 – 4,2	3,8 – 4,3	4,0 – 4,5
Tensile E – Module	kN / mm <sup>2</sup>	ISO 527 – 2	3,5 – 4,0	3,2 – 3,7	3,2 – 3,7	3,0 – 3,5
Flexural Strength	N / mm <sup>2</sup>	EN ISO 178	108 – 113	105 – 110	108 – 113	107 – 112
Flexural E – Module	kN / mm <sup>2</sup>	EN ISO 178	2,6 – 3,1	2,8 – 3,3	3,4 – 3,9	3,0 – 3,5
HDT	°C	ISO 75 – 2	75 – 80	76 – 81	87 – 92	91 – 96
Water Absorption	mg	EN ISO 175	42 – 47	39 – 44	52 – 57	34 – 39

## SAFETY MEASURES

- In case of contact of the mixed or unmixed components of the material on skin or eyes, wash with plenty of water and seek immediate medical help.
- Do not wash the material contaminants on the skin with solvent. Solvent thins the material. Thinned material can penetrate into the skin easier. Hot water, soft soap and wood dust combination is the best cleaner.
- If clothes are contaminated with the material, they must be changed and washed. Material might contact the skin through the cloth.
- Never get the material into contact with food. Do not eat or swallow contaminated food. In such a case, seek medical assistance.
- Use protective cream or gloves, clothes and goggles. Caution: Operators cannot feel the contamination, if they are wearing gloves. When they touch machine knobs, door handles and similar common use parts with contaminated gloves, other operators without gloves may get into contact with the material! In such a case, follow the procedures described before.
- Working area has to be ventilated.
- Keep the material away from children.

## EQUIPMENT CLEANING

**PR 20** is recommended for cleaning tools. Tools are soaked in **PR 20** and then rinsed under running water.

## PACKAGING

A and B components are provided in separate packages in can, drum or IBC form.

## STORAGE AND SHELF LIFE

System must be kept in its original, unopened package in closed and dry warehouse conditions between 15 – 25 °C. Avoid direct sun light exposure. Shelf life under these conditions is 12 months.

Used but unfinished containers have to be kept in closed and dry warehouse conditions between 15 – 25 °C as well. Containers have to be closed immediately after dispensing to avoid amine blushing due to reaction with CO<sub>2</sub> in the air. Shelf life of unfinished material in opened containers is shorter, therefore they should be consumed as soon as possible.

Material may crystallize, if stored at low temperatures. It should be heated to dissolve crystallization before use. DO NOT USE CRYSTALLIZED MATERIAL! Temperature and time of heating depends on the packaging size. Bigger packages need more temperature and time.

## ATTENTION

- Temperature of the application area must be 15°C – 25°C.
- During application, mixed product must be consumed within the pot life.
- If mixed in large quantities, or if any one of the temperature criteria is too high, pot life will be shorter than expected.

*The facts on this Technical Data Sheet are based on laboratory test results. This data sheet is valid until subsequent issue. Duratek A.S. reserves the right to change the given data without notice.*

***Please consult our technical department for further information.***



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