

DURATEK 2400

MEDIUM VISCOSITY EPOXY BASED FIBRE LAMINATION RESIN

- Mainly designed for centrifugal casting and filament winding processes, but it is also suitable for hand lay-up and vacuum assisted processes under certain conditions;
- Pot life span and viscosity values are optimised for the best wetting of the fibers during centrifugal casting and filament winding;
- Room temperature curing system;
- High temperature resistance for a room temperature curing system;
- Tg > 120°C can be obtained with appropriate postcuring;
- Mechanical properties can be maximised with post curing;
- Highly elastic.

DESCRIPTION

DURATEK 2400 System consists of one resin (**DTE 1000**) and two hardeners (**DTS 4004** and **DTS 4010**).

System is suitable for the centrifugal casting and filament winding production techniques. Pipes and tubes, automotive drive shafts, pressure vessels and containers, light masts and similar products can be produced at high rates with an automated process. Very high fibre/resin ratios can be obtained.

PHYSICAL PROPERTIES

	Unit	DTE 1000 + DTS 4004	DTE 1000 + DTS 4010
Density	kg / lt	1,10 ± 0,05	1,10 ± 0,05
Viscosity	mPas	700 ± 150	800 ± 150
Pot Life (@23°C, 100 ml)	Minutes	160 ± 25	250 ± 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 1000 / DTS 4004	DTE 1000 / DTS 4010
By Weight	79 / 21	79 / 21
By Volume	75 / 25	76 / 24

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.

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 the 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 must be followed and recorded.

If the laminates' initial curing is completed, their mechanical properties can be maximised by post curing. Post curing is especially important for slow and extra slow systems. Generally, longer post curing periods and / or post curing at higher temperatures provide better properties.

Laminates produced with **DT 2400** can be removed from the mold after completing the initial curing. Post curing can be applied on demolded parts. However, if the parts are too heavy and large, or if they are produced with slow or extra slow hardeners, post curing should take place before demolding. If demolding is needed before post curing, all necessary supports must be placed into the laminates to prevent any deforming. Supports can be removed after the parts are cooled down.

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 initial 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.

Gel coat compatibility must be tested by the end user. Do not add any filler, solvent, etc. into the system.

MECHANICAL PROPERTIES OF THE CAST RESIN

SYSTEM: DTE 1000 + DTS 4004			CURING: 2 Hours @ 70°C +			
Property	Unit	Standard	3h @ 120°C	1h @ 140°C	2h @ 140°C	2h @ 150°C
Tensile Strength	N / mm ²	ISO 527 – 2	58 – 63	55 – 60	-	54 – 59
Elongation @Max. Str.	%	ISO 527 – 2	2,8 – 3,3	2,5 – 3,0	-	2,4 – 2,9
Tensile E – Module	kN / mm ²	ISO 527 – 2	2,7 – 3,2	2,8 – 3,3	-	2,8 – 3,3
Flexural Strength	N / mm ²	EN ISO 178	80 – 85	97 – 102	-	88 – 93
Flexural E – Module	kN / mm ²	EN ISO 178	2,0 – 2,5	2,3 – 2,8	-	2,4 – 2,9
HDT	°C	ISO 75 – 2	115 – 120	112 – 117	-	115 – 120
Tg	°C	ISO 11357-1/2	-	-	127 – 132	-
Shore D		ASTM D 2240	80 – 85	81 – 86	-	80 – 85

SYSTEM: DTE 1000 + DTS 4010			CURING: 2 Hours @ 70°C +			
Property	Unit	Standard	3h @ 120°C	1h @ 140°C	2h @ 140°C	2h @ 150°C
Tensile Strength	N / mm ²	ISO 527 – 2	68 – 73	69 – 74	-	65 – 70
Elongation @Max. Str.	%	ISO 527 – 2	4,0 – 4,5	4,0 – 4,5	-	2,7 – 3,2
Tensile E – Module	kN / mm ²	ISO 527 – 2	2,5 – 3,0	2,7 – 3,2	-	2,5 – 2,9
Flexural Strength	N / mm ²	EN ISO 178	99 – 104	100 – 105	-	101 – 106
Flexural E – Module	kN / mm ²	EN ISO 178	2,3 – 2,8	2,5 – 3,0	-	2,3 – 2,8
HDT	°C	ISO 75 – 2	110 – 115	110 – 115	-	110 – 115
Tg	°C	ISO 11357-1/2	-	-	-	-
Shore D		ASTM D 2240	80 – 85	81 – 86	-	80 – 85

THINNER

DO NOT ADD ANY THINNER!

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 CO₂ 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.

**Duratek**[®]

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