



Technical Information

Datasheet

Expiry Date: Dec 2015

FAST WET-OUT, LOW STYRENE EMISSION
GENERAL PURPOSE POLYESTER RESIN

P R E - A C C E L E R A T E D

INSPEC[®] 235-70 LSE

Refer to MSDS Resins Code A

DESCRIPTION

INSPEC[®] 235-70 LSE is a rigid, medium reactivity, thixotropic, low styrene emission orthophthalic unsaturated polyester resin with rapid curing characteristics.

INSPEC[®] 235-70 LSE is designed for hand lay-up and spray applications. This resin is ideal for use in marine applications, automotive components and general industrial mouldings.

INSPEC[®] 235-70 LSE is suitable for filament winding processes and can be applied by brush or roller. The resin is suitable for use in marine and swimming pool applications.

FEATURES	BENEFITS
Low styrene emission	Improves safety by reducing styrene levels in the work place
Excellent interlaminar adhesion	Delays of up to 3 days between consecutive layers
Excellent wet out of glass fibres	Easy to roll out
Thixotropic	Minimal drainage
Non air-inhibited – contains wax	Cures to a tack-free finish
Specially promoted	Predictable geltime and cure rate with low exotherm in thick sections
Blue colour change mechanism	Confirms catalyst addition within minutes

TYPICAL
LIQUID
PROPERTIES

PROPERTY	SPECIFICATION	CDR TEST
Specific Gravity	1,09 - 1,11	
Viscosity @ 25°C, Sp 2 @ 3rpm, cP	3000 - 5500	TM 01
Thixotropic index, ratio	2.5 – 3.0	TM05
ICI @ 25°C, cP	180 – 280	TM 02
Acid value, mg KOH/g	19.5 – 26.0	2
Volatile content, %	38 - 43	TM 04
Geltime @ 25°C, using 2 phr* CUROX M200 MEKP, minutes	30 - 40	TM 03
Styrene Emission after 60 min @ 22°C g/m ²	10	
Liquid appearance	Opaque blue	
Stability in the dark @ 20°C, months	3 minimum	
*phr = parts per hundred resin, by weight		

CURING CHARACTERISTICS

INSPEC® 235-70 LSE requires the addition of catalyst ONLY to start the curing reaction. The Curox M200 must be thoroughly dispersed in the resin. The resin should be allowed to attain workshop temperature (23°C) before being formulated for use.

The ambient temperature and the amount of catalyst and accelerator control the geltime of the resin formulation. This can be approximately determined from the table below which shows the geltime of 100 parts by mass of INSPEC® 235-70 catalysed with 2 phr CUROX M200.

100 Parts INSPEC® 235-70 LSE catalysed with 2 phr CUROX M200 MEKP	Catalysed Gel Time	
Geltime @ 15°C, minutes (approx)	70	± 5
Geltime @ 25°C, minutes (specification)	35	± 5
Geltime @ 35°C, minutes (approx)	17	± 5

Curing is generally not recommended at temperatures below 15°C. Thick laminates are the exception or if post curing is adopted. The minimum recommended catalyst addition is 1 phr.

INTER-LAMINAR ADHESION

INSPEC®235-70 LSE has been tested and found to have good inter-laminar adhesion. When a laminate is built up in stages with intervals that allow intermediate curing, each layer should be finished with the correct resin to glass ratio. Any surface having an excess of resin must be abraded and thoroughly cleaned before further laminating is commenced. During construction, using a normal resin/glass fibre ratio, it has been found that an interval of 3 days is acceptable between laminate layers, provided that suitable control of the environmental conditions as per *Lloyds Register are applied. Beyond this period it is essential to abrade the laminate surface to form a mechanical key prior to continuing.

POST-CURING

Satisfactory laminates for many applications can be made from INSPEC® 235-70 LSE by curing at ambient temperature (but not less than 15°C). When optimum properties and long-term performance are required however, the laminate should be post-cured.

After release from the mould, laminates should be allowed to mature for 24 hours at workshop temperature (23°C). They should then be post-cured for 3 hours at 80°C, although a longer period at a lower temperature will give almost the same result. The post-cure is most effective if it is carried out immediately after the 24 hour maturing period.

For all applications involving foodstuffs, it is essential to follow the recommendations detailed under 'Food Containers'.

FOOD CONTAINERS

After release from the mould, laminates should be allowed to mature for 24 hours at workshop temperature (23°C). They should then be post-cured for a minimum of 3 hours at 85°C. The post-cure is most effective if it is carried out immediately after the 24 hour maturing period. The mouldings must be thoroughly wet-steam cleaned for at least one hour before being put into use. If wet-steam cleaning is not practical, and the moulding is a vessel or of suitable shape, it should be filled with hot water (60° to 80°C) containing non-perfumed detergent and left to stand for 2 hours. It should then be emptied and thoroughly washed in several batches of clean hot water.

These precautions are essential to avoid the tainting of foodstuffs.

PIGMENTS AND FILLERS

The addition of fillers or thixotropic additives may reduce the chemical resistance of INSPEC® 235-70 LSE and is not generally recommended.

The same consideration applies to pigments, but when absolutely necessary, INSPEC® 235-70 LSE may be pigmented by the addition of up to 4% of Pigment Paste.

TYPICAL PHYSICAL PROPERTIES

Typical Properties of Cured INSPEC® 235-70 LSE (unfilled casting)

Post-cured 24 hours at ambient , 2 hours at 55°C and 2 hours at 80 °C

Temperature of deflection - under load (1,80 MPa), °C	65
Water absorption:	
a) Increase in mass after 28 days immersion, mg	100
b) Loss in mass after drying, mg	45
Barcol (GYZJ 934-1) hardness	45
Elongation at Break %	2.0
Tensile strength, MPa	54
Flexural strength, MPa	98
Flexural modulus, GPa	4.1
Compressive strength, MPa	152

STORAGE AND HANDLING

To ensure maximum stability and maintain optimum properties, polyester resin should be stored in closed containers, maintained below 25°C and away from heat sources and sunlight. All storage should conform to local fire and building codes. Drum stock should be kept to a reasonable minimum with first-in, first-out stock rotation.

Where bung-in-head containers are stored outside, it is recommended that these be stored in a horizontal position to avoid the ingress of water.

STANDARD PACKAGE

Non-returnable metal drums.
Returnable IBC's 1000 Kg.

MATERIAL SAFETY DATA SHEET

A Material Safety Data Sheet is available. Please refer to RESINS CODE "A" which will include INSPEC® 235-70LSE. Make certain that you obtain a copy of this guide to the safe handling of unsaturated polyester resins and resin systems.

**PLEASE READ AND UNDERSTAND THE MATERIAL SAFETY
DATA SHEET BEFORE WORKING WITH THIS PRODUCT**

ATTENTION: CARE MUST BE TAKEN TO AVOID DIRECT MIXING OF ANY ORGANIC PEROXIDE (CATALYST) WITH METAL SOAPS, AMINE OR ANY OTHER POLYMERISATION ACCELERATOR OR PROMOTER, AS VIOLENT DECOMPOSITION WILL RESULT!