EN

Preliminary Technical Data Sheet

# Elan-tech®

## EC 360/W 222

100:45

2K Unfilled epoxy system

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## Product description

- 2K unfilled epoxy system
- Very low viscosity
- Slow reactivity hardener
- Good filler wettability
- Can be filled with low-weight materials like EF 31-C

## Areas of application

Highly filled but low density mass casting; low weight back-filling. Reinforcement of molds and patterns.

## Processing methods

Manual or machine mixing; manual or supported by power tools, addition of light fillers to reach the limit of casting application.

## Curing/Post-curing

Post-curing is always advisable for Room Temperature curing system in order to stabilize the component and/or to reach the best properties. It is necessary when the component works at high temperature. Recommended post curing ramp-up: 10°C/hour. Cool it down slowly. The rate of heating and the indicated post-curing time are referred to laboratory specimen size. Users should evaluate the best conditions of curing or post-curing depending on the component size and shape. For big size components it is advisable to decrease the thermal gradient and increase the post-curing time.

## Storage and stability

Unfilled epoxy resin and its amine based hardener can be stored for two years in the original sealed containers stored in a cool, dry place. The hardener is moisture sensitive, therefore it is good practice to close the container immediately after each use.

## Handling precautions

Refer to the safety data sheet and comply with regulations relating to industrial health and waste disposal.

## Sales specifications

### EC 360

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 400 ÷ 700 | mPa·s |

### W 222

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 60 ÷ 120 | mPa·s |

## Typical product properties

### EC 360

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Colour | | -- | Pale yellow | |
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 450 ÷ 650 | mPa·s |
| Density | 25 °C | IO-10-51 (ASTM D 1475) | 1,13 ÷ 1,17 | g/ml |

### W 222

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Colour | | -- | Colourless | |
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 60 ÷ 120 | mPa·s |
| Density | 25 °C | IO-10-51 (ASTM D 1475) | 0,97 ÷ 0,99 | g/ml |

## Typical system properties

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Mix Ratio by weight | | -- | 100 : 45 | g |
| Mix Ratio by volume | | -- | 100 : 53 | ml |
| Colour | | -- | Pale Yellow | |
| Initial mixture viscosity | 25 °C | IO-10-50 (ISO 3219) | 370 ÷ 570 | mPa·s |
| Exothermic peak | 25 °C - 80 mm - 1000 ml | IO-10-53 (*) | 105 ÷ 115 | °C |
| Pot life | 25 °C - 80 mm - 1000 ml | IO-10-53 (*) | 4 ÷ 6 | hrs |
| Gel time (Tack Start/End) | 25 °C - 6 mm - Tack Start | IO-10-88 (ASTM D 5895-03) | 15 ÷ 17 | hrs |
| | 25 °C - 6 mm - Tack End | | 20 ÷ 22 | hrs |
| Demoulding time | 25 °C - 15 ml - 6 mm | (*) | 36 ÷ 48 | hrs |
| Maximum recommended thickness | | -- | 40 ÷ 60 | mm |
| Suggested curing cycles | | (**) | 24 h at RT + 15 h at 60 °C | |

## Typical system properties (filled system)

| Properties | Conditions | Test Method | Value | Value | Value | U/M |
|---|---|---|---|---|---|---|
| Filled System | | | **(EC360:W222:EF18T)** | **(EC360:W222:EF31)** | **(EC360:W222:EF31)** | |
| Mix ratio by weight | | | 100 : 45 : 40 | 100 : 45 : 40 | 100 : 45 : 75 | g |
| Mix ratio by volume | | | 100 : 53 : 150 | 100 : 53 : 66 | 100 : 53 : 150 | ml |
| Initial mixture viscosity | 25 °C | IO-10-50 (ISO 3219) | 10.000 – 16.000 | 1.100 – 1.700 | 6.200 – 9.400 | mPa·s |
| Exothermic peak | 25 °C – 80 mm 1000 ml | IO-10-53 (*) | 40 - 50 | 45 - 75 | 40 - 60 | °C |
| Pot life | 25 °C – 80 mm 1000 ml | IO-10-53 (*) | 3 - 5 | 2 - 4 | 3 - 5 | hrs |
| Gel time (Tack Start/End) | 25 °C – 6 mm Tack Start | IO-10-88 (ASTM D5895-03) | 14 - 16 | 11 - 13 | 17 - 19 | hrs |
| | 25 °C – 6 mm Tack End | IO-10-88 (ASTM D5895-03) | 18 - 20 | 14 - 16 | 21 - 23 | hrs |
| Demoulding time | 25 °C | (*) | 36 - 48 | 36 - 48 | 36 - 48 | hrs |
| Suggested curing cycle | | | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | |

## Typical cured system properties

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Specimens curing cycle | | -- | 24 h at RT + 15 h at 60 °C | |
| Density (solid) | 25 °C | IO-10-54 (ASTM D 792) | 1,14 ÷ 1,18 | g/ml |
| Hardness | 25 °C | IO-10-58 (ASTM D 2240) | 80 ÷ 84 | Shore D/15 |
| Glass Transition (Tg) | | IO-10-69 (ASTM D 3418) | 55 ÷ 60 | °C |
| Maximum Tg | | IO-10-69 (ASTM D 3418) | 57 ÷ 63 | °C |
| Water absorption (24 h RT) | | IO-10-70 (ASTM D 570) | 0,14 ÷ 0,20 | % |
| Water absorption (2 h 100 °C) | | IO-10-70 (ASTM D 570) | 0,87 ÷ 1,07 | % |
| Linear thermal exp. (Tg -10 °C) | | IO-10-71 (ASTM E 831) | 66 ÷ 74 | ppm/°C |
| Heat deflection temperature (HDT) | 24 h at RT + 15 h at 60 °C | ISO 75 | 45 ÷ 50 | °C |
| Max recommended operating temperature | | (***) | 45 | °C |

## Typical cured system properties (filled system)

| Properties | Conditions | Test Method | Value | Value | Value | U/M |
|---|---|---|---|---|---|---|
| Filled System | | | (EC360:W222:EF18T) | (EC360:W222:EF31) | (EC360:W222:EF31) | |
| Mix ratio by weight | | | 100 : 45 : 40 | 100 : 45 : 40 | 100 : 45 : 75 | g |
| Mix ratio by volume | | | 100 : 53 : 150 | 100 : 53 : 66 | 100 : 53 : 150 | ml |
| Specimen curing cycle | | -- | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | |
| Density | 25 °C | | 0,54 – 0,58 | 1,02 – 1, 08 | 0,75 – 0,85 | g/ml |
| Hardness | 25 °C | IO-10-58 (ASTM D 2240) | 61 - 65 | 77 - 81 | 79 - 83 | Shore D/15 |
| Glass Transition | | IO-10-69 (ASTM D 3418) | 37 - 43 | 46 - 52 | 48 - 54 | °C |
| Maximum Tg | 16 h 100 °C | IO-10-69 (ASTM D 3418) | 37 - 43 | 46 - 52 | 54 - 60 | °C |
| Water absorption (24 h RT) | | IO-10-70 (ASTM D 570) | 0,18 – 0,26 | 0,07 – 0,11 | 0,003 – 0,008 | % |
| Water absorption (2 h 100 °C) | | IO-10-70 (ASTM D 570) | 1,5 – 1,8 | 0,42 – 0 52 | 0,04 – 0,08 | % |
| Linear thermal exp. (Tg -10 °C) | | IO-10-71 (ASTM E 831) | 42 - 50 | 50 - 58 | 43 - 50 | ppm/°C |
| Linear thermal exp. (Tg +10 °C) | | IO-10-71 (ASTM E 831) | 92 - 112 | 168 - 198 | 115 - 145 | ppm/°C |
| Heat deflection temperature | | ISO 75 | 32 - 38 | 40 - 46 | 44 - 50 | °C |
| Max recommended operating temperature | | | 32 | 40 | 44 | °C |

## Typical mechanical properties in cured condition

| Properties | Conditions | Test Method | Value | M/U |
|---|---|---|---|---|
| Specimens curing cycle | | -- | 24 h at RT + 15 h at 60 °C | |
| Flexural strength | 25 °C | IO-10-66 (ASTM D 790) | 85 ÷ 95 | MN/m² |
| Strain at maximum stress | 25 °C | IO-10-66 (ASTM D 790) | 9,5 ÷ 13,5 | % |
| Strain at break | 25 °C | IO-10-66 (ASTM D 790) | 22 ÷ 32 | % |
| | 25 °C | | 8,3 ÷ 12,4 | % |
| Flexural elastic modulus | 25 °C | IO-10-66 (ASTM D 790) | 2600 ÷ 3200 | MN/m² |
| Tensile strength | 25 °C | IO-10-63 (ASTM D 638) | 62 ÷ 70 | MN/m² |
| Nominal strain at break | 25 °C | IO-10-63 (ASTM D 638) | 4,5 ÷ 7,5 | % |
| Compressive strength | 25 °C | IO-10-72 (ASTM D 695) | 60 ÷ 70 | MN/m² |

## Mechanical properties in cured conditions (filled system)

| Properties | Conditions | Test Method | Value | Value | Value | U/M |
|---|---|---|---|---|---|---|
| Filled System | | | **(EC360:W222:EF18T)** | **(EC360:W222:EF31)** | **(EC360:W222:EF31)** | |
| Mix ratio by weight | | | 100 : 45 : 40 | 100 : 45 : 40 | 100 : 45 : 75 | g |
| Mix ratio by volume | | | 100 : 53 : 150 | 100 : 53 : 66 | 100 : 53 : 150 | ml |
| Specimen curing cycle | | -- | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | 24 h RT + 15 h 60 °C | |
| Flexural strength | 25 °C | IO-10-54 (ASTM D790) | 20,0 – 23,0 | 50,0 – 56,0 | 35,0 – 44,0 | MN/m² |
| Strain at maximum stress | 25 °C | IO-10-54 (ASTM D790) | 1,18 – 1,78 | 1,6 – 2,4 | 0,9 – 1,4 | % |
| Strain at break | 25 °C | IO-10-54 (ASTM D790) | 1,18 – 1,78 | 1,6 – 2,4 | 0,9 – 1,4 | % |
| Flexural elastic modulus | 25 °C | IO-10-54 (ASTM D790) | 1.700 – 2.100 | 3.500 – 4.300 | 3.700 – 4.500 | MN/m² |
| Tensile strength | 25 °C | IO-10-70 (ASTM D638) | 16,5 – 18,5 | 31,0 – 35,0 | 24,0 – 29,0 | MN/m² |
| Nominal strain at break | 25 °C | IO-10-70 (ASTM D638) | 0,90 – 2,0 | 1,5 – 2,3 | 0,7 – 1,1 | % |
| Compressive strength | 25 °C | IO-10-72 (ASTM D695) | 21,0 – 24,0 | 58,0 – 65,0 | 40,0 – 50,0 | MN/m² |

IO-00-00 = Elantas Europe internal test method. The correspondent international method is indicated whenever possible; nd = not determined; na = not applicable; RT = TA = laboratory room temperature (23±2°C); conversion units: 1 mPas = 1 cPs 1MN/m2 = 10 kg/cm2 = 1 MPa

(*) for larger quantities pot life is shorter and exothermic peak increases; (**) the brackets mean optionality; (***) the maximum operating temperature is given on the basis of laboratory information available being it function of the curing conditions used and of the type of coupled materials. For further possible information see post-curing paragraph.

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