



# SANHO CHEMICAL CO., LTD.

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## TOHMIDE 235-S

TOHMIDE 235-S is an epoxy curing agent of polyaminoamide type with medium viscosity for epoxy resins, designed for structural adhesives, and grout applications in the construction works. A mixture resin of TOHMIDE 235-S with epoxy resin provide good compatibility and give the cured products with toughness physical characteristics.

### 1. SALES SPECIFICATION

Appearance	: Brown viscous liquid
Viscosity (25°C)	: 4,500 ~ 9,000
Colour	: 10 Max.
Amine Value(JIS)	: 385 ± 15
Specific Gravity (25°C)	: 0.97
Flash point	: 232°C

### 2. THE STANDARD MIXING RATIO

40 ~ 70 parts to 100 parts of Bisphenol-A type epoxy resin whose epoxy equivalent weight is about 190.

### 3. CURING CHARACTERISTICS

Epoxy resin	: bisphenol-A type liquid epoxy resin whose epoxy equivalent weight is about 190.
Total mass	: 100g
Room temperature	: 23°C

Epoxy / TOHMIDE 235-S	70 / 30	60 / 40	50 / 50
Peak Exothermic Time (minutes)	180	185	170
Peak Exothermic Temperature (°C)	36	44	52
Gelling Time (approx. minutes)	240	190	160

### 4. MECHANICAL/PHYSICAL PROPERTIES

The cured properties of the same mixed resin of epoxy and Tohmide 235-S was measured as follow after curing them at 23°C for 7 days.



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Epoxy / TOHMIDE #235-S		70 / 30	60 / 40	50 / 50
Tensile Strength	(kgf/mm <sup>2</sup> )	6.0	5.5	4.6
Flexural Strength	(kgf/mm <sup>2</sup> )	9.3	8.0	6.2
Flexural Modulus	(kgf/mm <sup>2</sup> )	1.3×10 <sup>2</sup>	2.1×10 <sup>2</sup>	1.9×10 <sup>2</sup>
Compressive Strength	(kgf/mm <sup>2</sup> )	8.7	7.2	6.4
Izod Impact Strength	((kgf-cm/cm)	1.7	1.8	1.8
Rockwell Hardness	(M Scale)	76	66	5.
Heat Distortion Temperature	(°C)	55	57	46

## 5. LAP SHEAR STRENGTH

The resin mix of TOHMIDE 235-S and the same epoxy resin as employed above was applied to hold mild steel plates at 22-23°C, whose surface were treated by sand-blast. LAP SHEAR STRENGTH was measured as follow after leaving the bonded steel plates at 22-23°C for 7 days.

Epoxy / TOHMIDE 235-S	70 / 30	60 / 40	50 / 50
Lap Shear Strength ( kgf/cm <sup>2</sup> )	190	167	167

## 6. CHEMICAL RESISTANCE OF THE CURED PRODUCTS

Percentage increase in weight of the cured products of TOHMIDE 235-S and the same epoxy resin as employed above were measured as follow after curing them at an ambient temperature for 7 days, and immersing into following chemical substances.

Immersion time (days)	1 day			7 days			30 days		
	7 / 3	6 / 4	5 / 5	7 / 3	6 / 4	5 / 5	7 / 3	6 / 4	5 / 5
Epoxy / TOHMIDE 235-S (Mixing Ratio by weight)									
Tap Water	0.2	0.2	0.3	0.6	0.7	1.0	1.4	1.6	2.2
5% solution of Salt	0.2	0.2	0.3	0.6	0.7	1.0	1.4	1.5	1.5
10% solution of Caustic soda	0.2	0.2	0.2	0.6	0.6	0.7	1.1	1.3	1.5
10% solution of Ammonia	0.2	0.2	0.3	0.6	0.7	0.8	1.3	1.6	2.0
5% solution of Sulfuric Acid	0.3	1.4	5.6	0.8	3.3	14.3	1.6	6.4	31.0
5% solution of Hydrochloric Acid	0.2	0.6	3.1	0.6	1.8	8.0	1.3	3.8	17.4
Kerosene	0.0	0.1	0.2	0.1	0.2	0.5	0.3	0.4	1.1
Isopropylalcohol	0.9	1.4	2.6	1.7	3.1	6.4	2.2	5.2	13.0
Methylisobutylketone	9.3	5.4	3.1	25.5	13.8	9.5	--	22.9	--