Ultra Insulate HR

PRODUCT DESCRIPTION

Ultra Insulate HR is a series of insulating powder coatings specially designed as mid-coat for 3 layer coating system for battery packs to prolong the safe time without occurrence of fire penetration against external or internal fire.

The product provides excellent electrical insulation, heat insulation and flame resistance properties to protect key components from damage under thermal runway propagation.

The product is also tested in accordance to UL 94 requirements for flame retardant properties.

Application areas

Typical application areas:
Upper cover of battery pack
Battery and module enclosure
Busbar
Structural parts
Heat insulation plate
Other equipment parts with flame retardancy and flame resistance requirements

POWDER PROPERTIES

Property	Standard	Result
Specific gravity	Calculated	Typically 1.4 ± 0.2 g/cm^3

Storage

Keep in a dry cool area. Maximum temperature 25 °C. Maximum relative humidity 60 %. If stored longer than 3 months a quality test must be performed.

APPLICATION

Pretreatment

The overall performance of the coating system is largely dependent on the nature of the substrate and the type and quality of the pretreatment. For optimal results, it is recommended to follow the pretreatment supplier's instructions and recommendations.

Powder application

Curing schedule	Object temperature	Time
Ultra Insulate HR	170 °C	10 minutes

Other curing schedules can be created upon technical approval.

Recommended film thickness (µm): ≥320

Equipment

Suitable for Corona or Tribo charging equipment.

APPEARANCE

Colour Black

Finish Smooth and Fine Texture

PERFORMANCE

The technical data provided below are typical for this product when applied as follows:
Substrate Nano-technology (Silane) treated cold rolled steel panels
Substrate thickness (mm) 0.8
Film thickness (µm) ≥320
Typical values when tested.

Property	Standard	Result
Prohibited substances	RoHS ELV	Meet all requirements*#
Adhesion	ISO 2409 GB/T 9286	Rating Gt 0*#
Film hardness	ISO 15184 GB/T 6739	≥HB*#
Impact resistance	GB/T 1732	After 3J direct impact, no cracking and no spalling*#
Tensile strength	ISO 6922 GB/T 6329	≥8mPA*#
Shear strength	ISO 4587 GB/T 7124	≥8mPA*#
Surface energy	Internal Method (Dyne Pen test)	≥30 mN/m*#
Flame retardancy	UL 94	Rating V-0*#
Flame resistance test**	Internal Method (1200˚C open flame exposure from coated side and then check surface temperature of the opposite side)	After 30 minutes of exposure, the surface temperature is ≤400°C#
Insulation resistance	Internal Method (DC 1000V, 60s)	≥ 10 GΩ#
Voltage resistance	Internal Method (DC 3800V, 60s)	Leakage current <1 mA#
Neutral salt spray resistance	ISO 9227 GB/T 1771	No blistering, no wrinkle and no cracking after 1680 hrs#
High temperature resistance**	ISO 3248 GB/T 1735 (130°C, 720 hrs)	No blistering, no cracking, no peeling off and no loss of adhesion.# Passes requirements of dual exposure test
Cyclic temperature test**	ISO 6469-1 Modified GB 38031 Modified (-40°C~85°C, 1000 cycles)	No blistering, no cracking, no peeling off, no loss of adhesion Cross-cut adhesion rating Gt0# Passes requirements of dual exposure test

Acid and Alkaline resistance **	ISO 2812-1 GB/T 9274 (5% HCl-2Hrs & 5% NaOH-2 Hrs)	No blistering, no wrinkling, no cracking, no peeling off and no loss of adhesion# Passes requirements of dual exposure test
Water resistance**	ISO 2812-2 GB/T 1733 (25°C, 168Hrs)	No blistering, no cracking, no peeling off and no loss of adhesion.# Passes requirements of dual exposure test
Hydrothermal ageing**	IEC 60068-2-67 GB/T 2423.50 (85°C and 85% RH for 1000 hours)	No blistering, no cracking, no peeling off and no loss of adhesion.# Passes requirements of dual exposure test

**System 1: Single layer of Ultra Insulate HR (300 µm)*

#System 2: (Flame resistance coating): Guard Insulate HR S (100 µm) + Ultra Insulate HR (300 µm) + Guard Insulate HR S (200 µm). Total film thickness ~600 µm.

*** Dual exposure test - after exposure to the specific environment, a flame resistance test is performed*

Sustainability

Powder coating is applied in air-and-powder mix in a strictly controlled factory process using electrostatic gun and a high temperature curing oven to create film. Virtually no VOCs are released in the process compared to traditional liquid paints. Unused or oversprayed powder can be recycled with minimal wastage. In addition, all Jotun Powder Coatings' products do not contain intentionally added lead.

Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.