

What Is UP GM 203 (Hm 2471)

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UP GM 203 acc. EN 60893 / Hm 2471 acc. DIN 7735 – glass-mat reinforced unsaturated polyester hard laminate ("hartmatte"), NEMA equivalent GPO-3

UP GM 203 (Hm 2471) is a glass-mat reinforced hard laminate made of unsaturated polyester resin ("hartmatte") – the NEMA equivalent GPO-3. It consists of polyester resin reinforced with glass-fibre mats and combines high electrical insulation performance with good resistance to arc tracking and creepage, at a limiting temperature of 130 °C.

Classification and Basic Character

Glass-mat hard laminates ("hartmatte", UP GM) belong to the family of industrial laminates: glass-fibre mats are impregnated with a thermoset resin and pressed under heat and pressure into sheets or rods. In UP GM 203 (Hm 2471), the reinforcing material is a glass-fibre mat and the bonding resin is an unsaturated polyester resin (UP resin). Unlike thermoplastics, the cured thermoset does not melt but remains dimensionally stable, hard and mechanically resilient. The colour is white (natural).

UP GM 203 (Hm 2471) and UP GM 204 (Hm 2472) Compared

Within the glass-mat hard laminate family, UP GM 203 (Hm 2471) represents the standard grade with a limiting temperature of 130 °C: high electrical insulation performance and solid mechanical values at a good price-performance ratio. The mechanically upgraded grade UP GM 204 (Hm 2472) offers, on the same basic construction, higher flexural and tensile strength as well as a higher limiting temperature of 155 °C (thermal class F) – for applications with elevated continuous thermal load or higher mechanical requirements. For general electrical insulation and structural applications up to 130 °C, UP GM 203 (Hm 2471) is the more economical choice.

How UP GM 203 (Hm 2471) Is Manufactured and Processed

UP GM 203 (Hm 2471) is produced by pressing resin-impregnated glass-fibre mats into sheets or rods. From these semi-finished products we machine precision parts – sawing, milling, drilling and turning can be carried out cleanly and accurately with sharp, carbide-tipped tools. Because of the abrasive glass-fibre content, increased tool wear should be expected and adequate dust extraction must be ensured.

Mechanical, Electrical and Thermal Properties

UP GM 203 (Hm 2471) achieves typical values of 200 MPa compressive strength, 130 MPa flexural strength and 70 MPa tensile strength, with a flexural modulus of elasticity of 8000 MPa and a density of 1.8 g/cm³. Electrically, the material offers a high comparative tracking index (CTI 600) and an electric strength of 27 kV (⊥, 3 mm) or 35 kV (||, 25 mm). The limiting temperature for continuous use is 130 °C.

When UP GM 203 (Hm 2471) Is the Right Choice

UP GM 203 (Hm 2471) is worthwhile whenever a highly insulating, mechanically resilient structural material is needed for applications up to 130 °C – for example:

- Insulating and separating parts in low- and medium-voltage switchgear engineering
- Components requiring arc- and tracking-resistance (CTI 600)
- Support insulators and busbar holders
- Structural parts in electrical machine and transformer engineering
- General electrical insulating parts up to 130 °C continuous service temperature

When UP GM 203 (Hm 2471) Is Not the Right Choice

Equally important are the limits of the material:

- Direct food contact – UP GM 203 (Hm 2471) is not declared suitable for this
- Continuous use above approx. 130 °C – UP GM 204 (Hm 2472) (limiting temperature 155 °C) is the better choice
- Applications with particularly high mechanical loading – UP GM 204 (Hm 2472) is also more suitable here
- Permanently damp/wet environments without additional protection
- Applications requiring non-machining forming or welding (thermoset)

What Does UP GM 203 (Hm 2471) Cost?

UP GM 203 (Hm 2471) falls in the mid-price segment of technical insulating laminates. Component price is determined mainly by sheet thickness or rod diameter, dimensions, material utilisation (offcut), machining effort and batch size. We are happy to quote binding prices on request based on your drawing.

Machining at Liedtke

UP GM 203 (Hm 2471) machines well – sawing, milling, drilling and turning can be carried out cleanly and accurately with sharp, carbide-tipped tools. Because of the abrasive glass-fibre content we use wear-resistant tools and ensure adequate dust extraction. This allows us to reliably produce high-quality insulating and structural parts – from single items to series production.

Advantages and Disadvantages at a Glance

An honest assessment – and how the disadvantages can be mitigated in practice:

Advantages

- High electrical insulation performance
- Good resistance to arc tracking and creepage (CTI 600)
- Thermoset, dimensionally stable
- Good machinability
- Self-extinguishing (UL 94 V-0)

Disadvantages

- Not declared suitable for direct food contact
- Continuous use limited to approx. 130 °C
- Glass-fibre content is abrasive, increased tool wear
- Cannot be formed or welded (thermoset)
- Mechanically less resilient than UP GM 204 (Hm 2472)

Practical tip: UP GM 203 (Hm 2471) is the right choice for electrical insulating and structural parts with high requirements for tracking and arc resistance up to 130 °C continuous service temperature. If a higher limiting temperature or higher mechanical strength is required, UP GM 204 (Hm 2472) is the better choice.

Typical Properties

- Glass-mat reinforced polyester hard laminate ("hartmatte")
- NEMA equivalent GPO-3
- High electrical insulation performance
- Good resistance to arc tracking and creepage (CTI 600)
- Thermoset laminate (dimensionally stable)
- Good machinability
- Self-extinguishing (UL 94 V-0)
- Colour white (natural)

Product Examples

- Insulating and separating parts in switchgear
- Support insulators and busbar holders
- Components for transformers and electric motors
- Test and fixture components
- Spacers and mounts in electrical equipment

Typical Industries

- Electrical engineering and switchgear construction (LV/MV)
- Power supply and transformer engineering
- Mechanical and plant engineering
- Jig, fixture and tool making
- Test and measurement technology
- General mechanical component manufacturing

	Test Method	Unit	Value
Mechanical			
Flexural Strength	ISO 178	N/mm ²	130
Tensile Strength	ISO 527	N/mm ²	70
Compressive Strength	ISO 604	N/mm ²	200
Modulus of Elasticity	ISO 178	N/mm ²	8000
Electrical			
Comparative Tracking Index CTI	IEC 112	–	600
Electric Strength	IEC 243-1	kV / 25 mm	35
General			
Density	ISO 1183	g/cm ³	1.8
Limiting Temperature	IEC 216	°C	130
Colour			white (natural)

UP GM 203 (Hm 2471) is a glass-mat reinforced polyester hard laminate ("hartmatte") to DIN 7735 / EN 60893. The values stated are typical properties, researched from publicly available market datasheet information for this product type; they serve as an aid to material selection and do not constitute a legally binding guarantee of specific properties. Actual values may vary slightly depending on manufacturer and sheet thickness. UP GM 203 (Hm 2471) is not declared suitable for direct food contact.