

## What is HM 2472 R (UP GM 205)

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HM 2472 R acc. to DIN 7735 / UP GM 205 acc. to EN 60893 – glass-mat reinforced polyester resin hard laminate

HM 2472 R (UP GM 205) is a special grade within the hard-laminate family made of glass-mat reinforced, unsaturated polyester resin according to DIN 7735 / EN 60893. It is the "R" grade of HM 2472 (UP GM 204), with an identical temperature limit class of 155 °C.

### Classification and basic character

Hard laminates (HM) or glass-mat reinforced polyester resin laminates (UP GM) belong to the large family of thermoset industrial laminates: glass-fibre mats are impregnated with unsaturated polyester resin (UP) and pressed under heat and pressure into sheets, rods or tubes. In HM 2472 R (UP GM 205), the reinforcing material is a glass-fibre mat and the bonding resin is an unsaturated polyester resin. Unlike thermoplastics, the cured thermoset does not melt but remains dimensionally stable, hard and mechanically resilient. The colour is typically white.

### The "R" grade of HM 2472 (UP GM 204)

HM 2472 R (UP GM 205) is the "R" grade of the hard-laminate grade HM 2472 (UP GM 204) and therefore belongs to the same temperature limit class of 155 °C. Despite research, no separate, publicly available numerical data sheet could be found for this specific grade; one manufacturer describes it only qualitatively as a grade with "very good mechanical and electrical properties at a temperature limit of 155 °C" – identical in wording to the temperature limit of HM 2472. The numerical values stated in this document are therefore researched on the basis of the related grade HM 2472 (UP GM 204) and serve as guidance for material selection; a specific, documented additional property attributable to the "R" designation is not substantiated and is not claimed here. Within the hard-laminate family according to DIN 7735 / EN 60893, the grade HM 2471 (UP GM 203) also belongs to the same material family.

### How HM 2472 R (UP GM 205) is manufactured and processed

HM 2472 R (UP GM 205) is produced by pressing polyester-resin-impregnated glass-fibre mats into sheets, rods or tubes. 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 glass fibres are abrasive, increased tool wear should be expected; adequate dust extraction must be ensured during machining (glass-fibre/resin dust).

### Mechanical, electrical and thermal properties

Based on the related grade HM 2472 (UP GM 204), HM 2472 R (UP GM 205) achieves typical values of 200 MPa flexural strength, 124 MPa tensile strength and approximately 200 MPa compressive strength, with a modulus of elasticity of approximately 8000 MPa, a notched impact strength (10 °C) of 150 kJ/m<sup>2</sup> and a density of approximately 1.80 g/cm<sup>3</sup>. Electrically, the material offers a comparative tracking index CTI of 600 and an electric strength of approximately 27 kV (⊥, 3 mm) or 35 kV (||, 25 mm) at a permittivity of approximately 4.5. The temperature limit for continuous use is 155 °C (thermal class F); the burning behaviour is self-extinguishing to UL 94 V-0.

### When HM 2472 R (UP GM 205) is the right choice

HM 2472 R (UP GM 205) is worthwhile whenever a mechanically and electrically high-performance insulating and structural material with an elevated temperature limit is needed – for example:

- Insulating and partition parts in electrical engineering and switchgear construction
- Components requiring flame-retardant behaviour (UL 94 V-0)
- Mechanically highly stressed structural parts in mechanical and plant engineering
- Jig and fixture components
- Applications requiring a temperature limit of up to 155 °C

## When HM 2472 R (UP GM 205) is not the right choice

Equally important are the material's limits:

- Direct food contact – HM 2472 R (UP GM 205) is not declared suitable for this
- Applications that require a documented, manufacturer-confirmed additional property of the "R" grade – no separate numerical data sheet is available for this
- Continuous use above approx. 155 °C
- Applications requiring a transparent or coloured finish – the grade is white

## What does HM 2472 R (UP GM 205) cost?

Component price for HM 2472 R (UP GM 205) is mainly determined by sheet thickness or rod diameter, dimensions, material utilisation (offcuts), machining effort and batch size. We are happy to provide binding prices on request based on your drawing.

## Machining at Liedtke

HM 2472 R (UP GM 205) machines cleanly and accurately with sharp, carbide-tipped tools – sawing, milling, drilling and turning are part of our daily business. We ensure adequate dust extraction during machining. This allows us to reliably manufacture mechanically and electrically resilient 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 viewed in practice:

### Advantages

- High temperature limit of 155 °C (thermal class F)
- Very good mechanical and electrical properties (manufacturer information)
- Flame-retardant (UL 94 V-0)
- Thermoset, dimensionally stable
- Good machinability

### Disadvantages

- No separate, publicly available numerical data sheet for this grade
- Not declared suitable for direct food contact
- Glass-fibre reinforcement increases tool wear during machining
- Only available in white

Practical tip: HM 2472 R (UP GM 205) is the right choice for mechanically and electrically resilient insulating and structural parts with an elevated temperature limit of up to 155 °C. Since no separate numerical data sheet is available for the "R" grade, we recommend consultation on the specific requirements for particularly critical applications.

## Typical Properties

- R grade of the HM 2472 (UP GM 204) hard-laminate grade
- Temperature limit 155 °C (same as HM 2472)
- Very good mechanical and electrical properties (manufacturer information)
- Flame-retardant (UL 94 V-0)
- Thermoset laminate (dimensionally stable)
- Colour white

## Product Examples

- Insulating and partition parts
- Jig and fixture components
- Spacers and brackets
- Components for electrical switchgear
- Mechanically stressed insulating parts

## Typical Industries

- Electrical engineering and switchgear construction
- Mechanical and plant engineering
- Jig, fixture and tool making
- Test and measurement engineering
- General mechanical component making

|                                  | Test Method | Unit                | Value |
|----------------------------------|-------------|---------------------|-------|
| <b>Mechanical</b>                |             |                     |       |
| Flexural strength                | DIN 53452   | MPa                 | 200   |
| Tensile strength                 | DIN 53455   | MPa                 | 124   |
| Compressive strength             | DIN 53454   | MPa                 | 200   |
| Modulus of elasticity            | DIN 53452   | MPa                 | 8000  |
| <b>Electrical</b>                |             |                     |       |
| Comparative tracking index CTI   | IEC 112     |                     | 600   |
| Electric strength $\perp$ (3 mm) | DIN 53481   | kV                  | 27    |
| <b>General</b>                   |             |                     |       |
| Density                          | DIN 53479   | g / cm <sup>3</sup> | ~1.80 |
| Temperature limit                | VDE 0304/2  | °C                  | 155   |
| Colour                           |             |                     | white |

HM 2472 R (UP GM 205) is the R grade of the glass-mat reinforced polyester resin hard laminate HM 2472 (UP GM 204) according to DIN 7735 / EN 60893, with the same temperature limit class of 155 °C. No separate, publicly available numerical data sheet is available for this grade; the values stated are therefore typical properties based on the HM 2472 (UP GM 204) grade, researched from commonly available published manufacturer information; they serve as an aid to material selection and are not a legally binding warranty of specific properties. HM 2472 R (UP GM 205) is not declared suitable for direct food contact.