

What is PF CP 206 (Hp 2062.8)

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Punchable phenolic paper laminate (phenolic resin/paper) per DIN 7735 / EN 60893

PF CP 206 (Hp 2062.8) is a punchable phenolic-paper grade within the Liedtke range of phenolic-resin hard paper laminates (PF CP 201 to PF CP 206). As NEMA type XXXP, it belongs to the classic punching materials of the electrical insulation industry and is the more robust of the two pure punching grades in this family.

Classification and basic character

PF CP 206 (Hp 2062.8) belongs to the phenolic paper laminate family per DIN 7735 / EN 60893: thermoset laminates made from several layers of cellulose paper, impregnated with phenol-formaldehyde resin and pressed under heat and pressure into a solid, homogeneous sheet. The result is a brown, electrically insulating, mechanically stable and economical engineering material.

Within the PF-CP-201-to-206 family, PF CP 206 (Hp 2062.8) is designated NEMA type XXXP – a grade specifically designed for punching. The resin system and paper impregnation are tuned so that parts can be punched cleanly from the sheet at room temperature without edge cracking, distinguishing these grades from the standard types of the family that are not specifically punch-optimised.

Differentiation within the punching grades: PF CP 206 (Hp 2062.8) compared to PF CP 205

Within the PF-CP family there are two pure punching grades: PF CP 205/Hp 2062.9 and PF CP 206 (Hp 2062.8). Both are designed for punching at room temperature, but they differ noticeably in their mechanical properties. PF CP 205/Hp 2062.9 has the lowest basic mechanical properties of the entire family, while PF CP 206 (Hp 2062.8) is noticeably more robust with a compressive strength perpendicular to the laminations of 120 MPa and a documented impact strength of 8 kJ/m². PF CP 206 (Hp 2062.8) is thus the more resilient of the two punching grades and is better suited to parts that, in addition to punchability, also require higher mechanical loading in service.

For further context: PF CP 201/Hp 2061 is the economical standard type, PF CP 202/Hp 2061.5 the electrically improved grade (highest test voltage, up to 40 kV), PF CP 203/Hp 2061.6 the hot-punchable grade with the lowest water absorption, and PF CP 204/Hp 2063 the flame-retardant grade ("FR-2"). PF CP 206 (Hp 2062.8) occupies the position of the mechanically stronger, cold-punchable grade.

How PF CP 206 (Hp 2062.8) is manufactured and processed

Cellulose paper webs are impregnated with phenol-formaldehyde resin, dried and pressed in multiple layers under high pressure and high temperature into sheets; cross-linking of the thermoset resin produces a dimensionally stable, no-longer-meltable material with the somewhat tougher resin formulation typical of punching grades. At Liedtke, PF CP 206 (Hp 2062.8) is subsequently machined and punched to customer specification – sawn, milled, drilled and punched with carbide-tipped and sharp tools respectively – with good dust extraction, since fine, fibre-containing dust is generated.

Mechanical, electrical and thermal properties

With a flexural strength of 80 MPa, an impact strength of 8 kJ/m² and a notched impact strength (Charpy) of 2.5 kJ/m², PF CP 206 (Hp 2062.8) shows solid mechanical values for a punching grade. Compressive strength parallel to the laminations is 120 MPa, cleavage strength 2000 N, and modulus of elasticity 7000 MPa.

Electrically, the material impresses with an insulation resistance of 10¹⁰ Ω (24h/23°C), electric strengths of 25 kV (parallel) and 30 kV (perpendicular to the laminations), a dissipation factor of 0.08 at 50 Hz, and a comparative tracking index (CTI) of 100. For other characteristics such as tensile strength, permittivity, thermal conductivity, coefficient of linear expansion, exact limiting temperature and thermal class, no separately documented values are available for PF CP 206 (Hp 2062.8); the continuous service temperature for the PF-CP material family is typically given as approx. 110–120 °C.

When PF CP 206 (Hp 2062.8) is the right choice

PF CP 206 (Hp 2062.8) is well suited whenever a punchable, mechanically robust electrical insulation material is needed.

- Punched insulating parts subject to higher mechanical loading in service than the standard punching grade PF CP 205/Hp 2062.9
- Components in electrical and switchgear engineering that require punchability at room temperature
- Applications where good electrical insulation and documented impact strength are both required
- An economical alternative to hot-punchable or higher-grade laminates where cold punchability is sufficient
- Insulating parts in mechanical engineering with medium to higher mechanical loading

When PF CP 206 (Hp 2062.8) is NOT the right choice

In the following cases, a different material is better suited:

- Direct food contact – PF CP 206 (Hp 2062.8) is not declared suitable for this
- Applications requiring flame retardancy – PF CP 204/Hp 2063 (UL94 V-0, "FR-2") is the right choice here
- Highest electrical loading with elevated test-voltage requirements – the electrically improved grade PF CP 202/Hp 2061.5 (up to 40 kV) is preferable here
- Hot-punching processes requiring particularly low water absorption – PF CP 203/Hp 2061.6 is intended for this
- Simple, uncritical applications without particular mechanical requirements – the more economical standard grade PF CP 201/Hp 2061 is usually sufficient here

What does PF CP 206 (Hp 2062.8) cost?

PF CP 206 (Hp 2062.8) sits in the mid-range of the phenolic paper laminate family price-wise: somewhat above the simple standard grade PF CP 201/Hp 2061, but well below specialty and high-performance laminates. Exact prices depend on sheet thickness, dimensions and order quantity – we are happy to provide an individual quotation.

Machining at Liedtke

Liedtke Kunststofftechnik manufactures precision-cut, punched and formed parts from PF CP 206 (Hp 2062.8) sheets to customer drawing – sawn, milled, drilled or punched. Our quality management system, certified to DIN EN ISO 9001 since 2015, ensures consistent production quality.

Advantages and disadvantages at a glance

Advantages

- Punchable at room temperature (NEMA XXXP)
- The more robust of the family's two pure punching grades
- Good electrical insulating properties
- Good machinability (sawing, milling, drilling, punching)
- Economical compared to specialty and high-performance laminates

Disadvantages

- Not declared suitable for direct food contact
- Not flame-retardant
- Absorbs a small amount of moisture, which may cause slight changes in electrical properties
- Inferior to the electrically improved grade PF CP 202/Hp 2061.5 at very high electrical test voltages
- Certain characteristics (including exact limiting temperature, thermal class, water absorption) not separately documented for this grade

Practical tip: If a punchable phenolic paper laminate with higher mechanical load-bearing capacity than the standard punching grade PF CP 205/Hp 2062.9 is needed, PF CP 206 (Hp 2062.8) is usually the right choice. If flame retardancy is also required, PF CP 204/Hp 2063 should be considered instead.

Typical Properties

Product Examples

Typical Industries

- Punchable grade (NEMA XXXP)
- Higher compressive strength perpendicular to laminations
- Documented impact strength
- Good electrical insulating properties
- Brown colour
- Punched insulating parts in switchgear engineering
- Support plates and spacers
- Punched insulating parts in equipment manufacturing
- Electrical and switchgear engineering
- Electrical industry (insulating parts)
- Punched-parts manufacturing
- Mechanical engineering

	Test Method	Unit	Value
Mechanical			
Density	DIN 53479	g/cm ³	1.4
Flexural strength 23°C	DIN 53452	MPa	80
Impact strength	DIN 53453	kJ/m ²	8
Notched impact strength (Charpy)	DIN 53453	kJ/m ²	2.5
Compressive strength to laminations	DIN 53454	MPa	120
Cleavage strength	DIN 53463	N	2000
Modulus of elasticity	DIN 53457	MPa	7000
Electrical			
Insulation resistance 24h/23°C	DIN 53482	Ω	10 ¹⁰
Electric strength to laminations	DIN 53481	kV	25
Electric strength ⊥ to laminations	DIN 53481	kV	30
Dissipation factor 50Hz	DIN 53483	–	0.08
Comparative tracking index CTI	IEC 112	–	100
General			
Colour			brown

PF CP 206 (Hp 2062.8) is a phenolic paper laminate (phenolic resin/paper) per DIN 7735 / EN 60893. The values stated are typical properties, researched from common, publicly available data-sheet information for this product type, partly supplemented by analogy with comparable grades of the family (in particular the limiting temperature); they serve as an aid for material selection and are not a legally binding guarantee of specific properties. Actual values may vary slightly depending on manufacturer and sheet thickness. PF CP 206 (Hp 2062.8) is not declared suitable for direct food contact.