

Standard Clamp Body Materials



Material Code	PP	PA	AL	SA
Basic Material	Copolymeric Polypropylene	Polyamide	Aluminium AISi12	Thermoplastic Elastomer
Standard Colour	Green	Black	Natural	Black

Mechanical Properties				
Tensile E-Module	1073 N/mm ² (ISO 527)	> 1400 N/mm ² (ISO 527)	> 65000 N/mm ²	113 N/mm ² at +23 °C / +73.4 °F (ASTM D412)
Notch Impact Strength	8 kJ/m ² at +23 °C / +73.4 °F (acc. to Charpy / ISO 179 / 1eU)	> 15 kJ/m ² at 23 °C / +73.4 °F (acc. to Charpy / ISO 179 / 1eU)		
Low Temperature Notch Impact Strength	3 kJ/m ² at -20 °C / -4.0 °F (acc. to Charpy / ISO 179 / 1eU)	> 3 kJ/m ² at -30 °C / -22.0 °F (acc. to Charpy / ISO 179 / 1eU)		
Tensile Strength at Yield (Tensile Strength)	26 MPa (ISO 527-2)	> 55 MPa (ISO 527)	> 240 MPa (ISO EN 10002)	15,9 MPa (ASTM D412)
Ball Indentation Hardness (Brinell Hardness)	45,4 MPa (ISO 2039-1)	> 65 MPa (ISO 2039-1)	> 70 HBS	
Shore Hardness				87 A (ISO 868) <small>Alternative hardnesses are available upon request! Contact STAUFF for details.</small>

Thermal Properties				
Temperature Resistance (Min ... Max)	-30 °C ... +90 °C / -22 °F ... +194 °F	-40 °C ... +120 °C / -40 °F ... +248 °F (Brief exposure up to +140 °C / +284 °F)	up to +300 °C / up to +572 °F	-40 °C ... +125 °C / -40 °F ... +257 °F

Chemical Properties				
Weak Acids	conditionally consistent	conditionally consistent	conditionally consistent	consistent
Solvents	conditionally consistent	conditionally consistent	conditionally consistent	conditionally consistent
Benzine	conditionally consistent	consistent	consistent	conditionally consistent
Mineral Oils	conditionally consistent	consistent	consistent	conditionally consistent
Other Oils	consistent	consistent	consistent	consistent
Alcohols	consistent	consistent	consistent	consistent
Seawater	consistent	consistent	consistent	consistent



Special Clamp Body Materials

Please contact STAUFF for further details on fire-proof clamp body materials, tested and approved according to several international fire-protection standards (such as BS 6853, EN 45545-2, UL 94 and many more).

See pages 156 / 157 for material properties and technical information.

The information for the Polyamide material PA have been determined in a conditioned state according to ISO 1110.
For Aluminium, the tensile strength (under reversed bending stress) and impact bending strength both rise constantly at decreasing temperatures whilst the value for breaking elongation decreases.

STAUFF preserves the right to supply products made from alternative, but comparable materials with matching technical characteristics.



Standard Clamp Insert Materials


 STAUFF Group 4 and 6 (Standard Series)
 STAUFF Group 4S to 6S (Heavy Series)


STAUFF Group 7S to 10S (Heavy Series)

SA	EPDM	Material Code
Thermoplastic Elastomer	Ethylene Propylene Diene Monomer	Basic Material
Black	Black	Standard Colour

		Mechanical Properties
16 N/mm ² at +23 °C / +73.4 °F (ASTM D412)		Tensile E-Module
		Notch Impact Strength
		Low Temperature Notch Impact Strength
8,3 MPa (ASTM D412)	9,0 MPa (DIN 53504)	Tensile Strength at Yield (Tensile Strength)
		Ball Indentation Hardness (Brinell Hardness)
73 A (ISO 868)	70 A (DIN 53505)	Shore Hardness

		Thermal Properties
-40 °C ... +125 °C / -40 °F ... +257 °F	-50 °C ... +120 °C / -58 °F ... +248 °F	Temperature Resistance (Min ... Max)

		Chemical Properties
consistent	consistent	Weak Acids
conditionally consistent	consistent	Solvents
conditionally consistent	conditionally consistent	Benzine
conditionally consistent	conditionally consistent	Mineral Oils
consistent	conditionally consistent	Other Oils
consistent	consistent	Alcohols
consistent	consistent	Seawater


Special Clamp Insert Materials

Please contact STAUFF for further details on fire-proof clamp body materials, tested and approved according to several international fire-protection standards (such as BS 6853, EN 45545-2, UL 94 and many more).

See pages 156 / 157 for material properties and technical information.



Special Clamp Body Materials (Selection)

Preventive Fire Protection



Material Code	PA-V0	PP-DA	PA-GF30-USR
Basic Material	Polyamide	Polypropylene	Polyamide
Standard Colour	Grey / Black	Weiss	Black

Mechanical Properties			
Tensile E-Module	1500 MPa (ISO 527-2)	1614 N/mm ² (ISO 527) bei +23 °C / +73.4 °F: 50 mm/min	8274 MPa (ASTM D638)
Notch Impact Strength	35 kJ/m ² at +23 °C / +73.4 °F (acc. to Charpy / ISO 179 / 1eU)	13 kJ/m ² at +23 °C / +73.4 °F (acc. to IZOD / ISO 179 / 1eA)	15 kJ/m ² (ASTM D256)
Low Temperature Notch Impact Strength		1,5 kJ/m ² at -25 °C / -13.0 °F (acc. to IZOD / ISO 179 / 1eA)	
Tensile Strength at Yield (Tensile Strength)	45 MPa (ISO 527-2)	12,4 MPa (ISO 527) at +23 °C / +73.4 °F: 50 mm/min	131 MPa (ASTM D638)
Ball Indentation Hardness (Brinell Hardness)	100 N/mm ² (ISO 2039-1)		
Shore Hardness			

Thermal Properties			
Temperature Resistance (Min ... Max)	-30 °C ... +120 °C / -22 °F ... +248 °F	-25 °C ... +90 °C / -13 °F ... +194 °F	-30 °C ... +120 °C / -22 °F ... +248 °F

Features			
Approvals / Properties	<p>Tested and approved acc. to UL94 ¹ (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Classification: V-0 (Vertical Burning Test) <p>Tested and approved acc. to EN 45545-2 (material thickness: 3,5 mm)</p> <ul style="list-style-type: none"> Requirements set R22 / R23 / R24 / R26 Hazard level HL1 - HL3 <p>Tested and approved acc. to DIN 5510, Part 2 (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Combustibility classification: S4 Smoke development classification: SR2 Dripping classification: ST2 <p>Tested and approved acc. to NF F 16-101 (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Classification: I3 / F2 <p>Low Smoke Zero Halogen (LSZH)</p>	<p>Tested and approved acc. to UL94 ¹ (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Classification: V-0 (Vertical Burning Test) <p>Tested and approved acc. to Def Stan 07-247</p> <ul style="list-style-type: none"> Assessment: category B <p>Approved by the UK Ministry of Defence (MoD)</p> <p>Low Smoke Zero Halogen (LSZH)</p>	<p>Tested and approved acc. to ASTM D638 (material thickness: 1,5 mm)</p> <ul style="list-style-type: none"> Classification: V-0 (Vertical Burning Test) <p>Tested and approved acc. to NFPA 130 (material thickness: 3 mm)</p> <ul style="list-style-type: none"> no burning dripping <p>Halogen Free Flame Retardant (HFFR)</p>

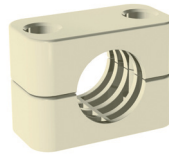
¹ Successful testing and approval according to UL94 (classification V-0) is equivalent to EN 45545-2 (requirements set R26; hazard level HL3). The information for PA-V0 has been determined in a conditioned state according to ISO 1110.

STAUFF preserves the right to supply products made from alternative, but comparable materials with matching technical characteristics.



Special Clamp Body Materials (Selection)

Preventive Fire Protection



PP6853	PP-V0	SA-V0	Material Code
Polypropylene	Polypropylene	Thermoplastic Elastomer	Basic Material
White	Black	Natural	Standard Colour

			Mechanical Properties
1264 MPa (ICE 60811-1-1)		113 N/mm ² at +23 °C / +73.4 °F (ASTM D412)	Tensile E-Module
17 kJ/m ² at +23 °C / +73.4 °F (acc. to IZOD / ISO 179 / 1eA)	5 kJ/m ² at +23 °C / +73.4 °F (acc. to ISO 180/A)		Notch Impact Strength
			Low Temperature Notch Impact Strength
25 MPa (ICE 60811-1-1)	24 MPa (ISO 527)	15,9 MPa (ASTM D412)	Tensile Strength at Yield (Tensile Strength)
			Ball Indentation Hardness (Brinell Hardness)
		86 A (ISO 868)	Shore Hardness

			Thermal Properties
-25 °C ... +90 °C / -13 °F ... +194 °F	-25 °C ... +90 °C / -13 °F ... +194 °F	-55 °C ... +90 °C / -67 °F ... +194 °F	Temperature Resistance (Min ... Max)

			Features
<p>Tested and approved acc. to EN 45545-2 (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Requirements set R22 / R23 / R24 / R26 Hazard level HL1 - HL3 <p>Tested and approved acc. to BS 6853 (Code of practice for fire precautions in the design / construction of passenger carrying trains)</p> <ul style="list-style-type: none"> Assessment: category 1a <p>Compliant to the requirements of London Underground / Metronet (standard 2-01001-002: Fire Safety Performance of Materials)</p> <p>Tested and approved acc. to DIN 5510, Part 2 (material thickness: 25 mm)</p> <ul style="list-style-type: none"> Combustibility classification: S4 Smoke development classification: SR2 Dripping classification: ST2 <p>Tested and approved acc. to Def Stan 07-247</p> <ul style="list-style-type: none"> Assessment: category B <p>Compliant to the requirements of JRMA (Japan Railway Rollingstock & Machinery Association)</p> <ul style="list-style-type: none"> Classification: extremely incombustible <p>Low Smoke Zero Halogen (LSZH)</p>	<p>Tested and approved acc. to UL94¹ (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Classification: V-0 (Vertical Burning Test) 	<p>Tested and approved acc. to UL94¹ (material thickness: 3 mm)</p> <ul style="list-style-type: none"> Classification: V-0 (Vertical Burning Test) 	Approvals / Properties

¹ Successful testing and approval according to UL94 (classification V-0) is equivalent to EN 45545-2 (requirements set R26; hazard level HL3).

