

**SPUR HARDEX XPP OPTIMA** is a thermoplastic structured foam made of polypropylene (PP). The structure of the foam is made up of 95-98 % closed cells. It offers excellent mechanical properties in shear and compression, impact strength, and is resistant to fatigue stress. It also offers excellent chemical resistance, water resistance, organic solvents resistance and health safety. It can be produced with higher resistance to burning and emits significantly lower toxic fumes when burning compared to other materials. It can be produced with higher resistance to UV radiation. It can be produced with recycled content and is recyclable.

Compared to materials made from foamed PET or PS, **SPUR HARDEX XPP OPTIMA** offers better mechanical properties.

**SPUR HARDEX XPP OPTIMA** can be used as a core for a composite sandwich structure with excellent mechanical properties combined with low weight. It is used in areas where the lightness and mechanical resistance of the product is required, e.g.: furniture boards, structural boards/profiles, the construction industry, the automotive industry – interior equipment (caravans, trucks, ...). It can be processed and cut similarly to wooden materials and can be joined with screws, nails, and glues, by fusion welding and hot air welding. The material can be processed by thermoforming. Also, the material can be laminated with functional surface layers by reactive or hot-melt glues, or in case of good compatibility without glues by heat only.

## MECHANICAL PROPERTIES

<i>Tensile properties (all values in tolerance ± 7,5%)</i>										
Type of test		Norm	Units							
<b>Bulk Density</b>		<b>EN 1602</b>	<b>kg.m<sup>-3</sup></b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>200</b>
Thickness wise	Strength	ASTM C297	MPa	0,51	0,82	1,15	1,52	1,92	2,58	3,84
	Modulus			6	11	19	29	42	64	111
<i>Compressive properties (all values in tolerance ± 7,5%)</i>										
Thickness wise	Strength	EN 826	MPa	0,04	0,07	0,10	0,14	0,18	0,25	0,38
	Modulus			1,8	2,6	3,3	3,9	4,4	5,1	5,8
<i>Screw retention (all values in tolerance ± 7,5%)</i>										
Resistance to the axial withdrawal of screws		EN 320	N	45	65	95	130	170	210	295
Determination of withdrawal capacity of fasteners		EN 13446	N.mm <sup>-2</sup>	0,9	1,1	1,5	2,1	2,5	3,4	4,7

### THERMAL PROPERTIES

Type of test	Norm	Units							
<b>Bulk Density</b>	<b>EN 1602</b>	<b>kg.m<sup>-3</sup></b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>200</b>
Thermal conductivity	EN 12667	W.m. <sup>-1</sup> K <sup>-1</sup>	0,043	0,043	0,042	0,041	0,040	0,040	0,040
Coefficient of linear thermal expansion	ISO 11359-2	(10 <sup>-5</sup> ) K <sup>-1</sup>	16	14	9,9	5,2	4,1	3,5	1,9
Max. process temperature without thickness loss	-	°C	155						
Short-time operating temperature	-	°C	-40 to +130						
Continuous operating temperature	-	°C	from -30 to +100						
Laminating temperature *	-	°C	Recommended 160-200						
Thermoforming temperature *	-	°C	130-170						

\* During the use of high temperatures above 160 °C, the thickness loss depends on setting, time, and properties of the laminated layer.

### FIRE PROPERTIES

Type of test	Norm							
<b>Bulk Density</b>	<b>EN 1602</b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>200</b>
Fire classification of buildings and constructions	EN 13501-1	Class E, D, C						
	DIN 4102-1	Class B3, B2, B1						
	UL94	Class HBF, HF1, HF2, V0, V1, V2						

### OTHER PROPERTIES

Type of test	Norm	Units							
<b>Bulk Density</b>	<b>EN 1602</b>	<b>kg.m<sup>-3</sup></b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>200</b>
<b>Type of structured foam</b>									
Closed cell content	EN 4590	%	95-98						
Diffusion for water vapor	EN 13469	-	MU 2000						

### DIMENSIONS OF THE PRODUCT\*

Type of test	Norm	Units							
<b>Bulk Density</b>	<b>EN 1602</b>	<b>kg.m<sup>-3</sup></b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>200</b>
Length		mm	2440 ± 10						
Width			1220 ± 10						
Thickness			3 - 40 ± 0,5						

\* at room temperature 23°C