

### PRODUCT CHARACTERISTICS

Warmcel® is a unique thermal and acoustic insulation, made using a natural cellulose fibre base. The cellulose insulation raw material is recycled newsprint, which is shredded, milled and impregnated with mineral additives (Boric Acid and Magnesium Sulphate). The product is unattractive to vermin and small organisms and is resistant to mould and mildew. Mineral fire retardants are added to the product in order to provide excellent reaction to fire performance. The advantage is natural ability to balance moisture and to accumulate heat to a much greater extent than synthetically made insulation.

### USE, APPLICATION

Warmcel® is designed for thermal and acoustic insulation in both external and internal building element structures - pitched roofs, attics, ceilings, floors between joists or beams, partition walls, ceilings and others.

Installation is carried out by using blowing machines (dry application or by spraying). Dry insulation application is possible by open blowing (e.g. lofts) or, more commonly by injection filling into prepared cavity walls, roofs or ceilings. The system enables penetrate very easily into the smallest corners and hence provides a full fill installation without any air gaps. Blowing technology ensures quick and easy work. When using the open blowing application is necessary to apply a settlement value of about 10% - 15% (install the product at 10-15% increased depth in order to meet a target settled U value). For dry cavity injection, the manufacturer installation instructions regarding minimum required density should be followed, in order to avoid any settlement.

The damp spray technique can be applied to internal and external wall structures using a fine mist of moisture or glue. For horizontal application the damp spray technique can be used in combination with a suitable glue only.

Density ranges for dry cellulose insulation application:

- open blowing in horizontal surfaces: 30 – 48 kg/m<sup>3</sup>

- volume filling in horizontal, pitched or vertical structures: 34 - 70 kg/m<sup>3</sup>

Volume spray density:

- when spraying with glue: 45 - 90 kg/m<sup>3</sup>

- when spraying with water: 38 - 50 kg/m<sup>3</sup>

### DIMENSIONS

Trade Mark	Weight (kg)
Warmcel®	10 / 12 / 12.5

### TECHNICAL PARAMETERS

Parameter	Measured Value	Unit	Harmonized Technical Specification
<b>THERMAL PROPERTIES</b>			
Thermal conductivity $\lambda_{D(23/50)}$ - dry injection/dry open blowing	0,038 <sup>i</sup>	W·m <sup>-1</sup> ·K <sup>-1</sup>	EN 12667, EN ISO 10456
Thermal conductivity factor $\lambda$ - spraying with moisture (binding agent)	0,039 (0,042)	W·m <sup>-1</sup> ·K <sup>-1</sup>	
Specific heat capacity $c_d$	2020 ± 6%	J·kg <sup>-1</sup> ·K <sup>-1</sup>	EN ISO 8990, EN 675
<b>PHYSICAL PROPERTIES</b>			
Volume weight	30-90 <sup>ii</sup>	kg·m <sup>-3</sup>	EN 1602
Settling rate (open blowing on horizontal surface)	≤10 - 15	%	-
Settling rate (volume filling – ceilings, roofs, partitions)	undetectable (≤1)	%	-
<b>FIRE PROPERTIES</b>			
Reaction to fire – dry material	C-s1, d0	-	CSN EN 13501-1
Reaction to fire – dry material in the cavity under specified conditions	B-s1, d0	-	
Reaction to fire – spraying with the Karsil E01 binding agent	B-s1, d0	-	
Reaction to fire – spraying with the Sokrat 2802A binding agent	D-s2, d0	-	
Flame spread index $i_s$	0,00	mm·min <sup>-1</sup>	CSN 73 0863
Maximum used temperature	80 (105 for short time)	°C	-
<b>OTHER PROPERTIES</b>			
Diffusion resistance factor $\mu$	1,1-3 <sup>ii</sup>	-	CSN EN 12086

<sup>i</sup> Declared  $\lambda_{D(23/50)}$  value given for the mean temperature of 10°C and moisture content equal to the moisture of the material in the equilibrium state at 23°C and the relative humidity of 50%

<sup>ii</sup> Based on the method of application for various structures and their inclination.

November 21, 2016 Based on information valid at the time of publishing. The manufacturer reserves the right to change the given data.

### PACKAGING, TRANSPORT, STORAGE

Warmcel® is packed in PE bags and can be stacked on EUR pallets, UK (industrial) pallets or freely on dry ground in a covered warehouse. For hassle-free transportation, EU or UK pallets are recommended, wrapped by a stretch film. Thermal insulating material is original labeled from the manufacturer with identification data.

The product must be transported in covered vehicles in order to protect from weathering effects.

The product is stored in covered storage areas protected from the weather and from heat sources with temperatures above 80°C. Packaging insulator is not waterproof. When stored outdoors, this fact stated in the order. Delivery for this purpose is possible only on pallets and the pallets are covered by special packaging in the production process. This packaging can be left outdoors for 3 months (UV stabilization bag period) on an elevated site from flooding pallets.

### ADVANTAGES

- *excellent thermal insulation properties*  
( $\lambda_{D(23/50)} = 0.038 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )
- *significant improvement in building acoustics*
- *high value of specific heat capacity of material*  
( $C_d = 2020 \pm 6 \% \text{ J/kg}\cdot\text{K}$ )
- *improving of accumulated properties a reducing the room temperature in summer*
- *low diffusion resistance allowing the realization of structures with open-diffusion construction*
- *perfect completion of all construction details*
- *good fire parameters*
- *resistance to fungi, mold, rodents and insects*
- *application thicknesses in the range from 1 to 100 cm*
- *environmentally friendly product (trademark since 1994)*

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