

## Introduction

This documents lists standardised water vapour transport properties from EN 12524:

- Table 1: General building materials
- Table 2: Thermal insulation materials and masonry materials
- Table 3: Foils

This material database is accessible in TRISCO via Colour → Load Material... → EN 12524.

**Table 1 - General in building applications**

Material group or application		Water vapour resistance factor $\mu$ (-)		Density (kg/m <sup>3</sup> )	
		dry	wet		
<b>Asphalt</b>		50 000	50 000	2 100	
<b>Bitumen</b>	Pure	50 000	50 000	1 050	
	Felt / sheet	50 000	50 000	1 100	
<b>Concrete (a)</b>					
	Medium density	100	60	1 800	
		100	60	2 000	
		120	70	2 200	
	High density	130	80	2 400	
		Reinforced (with 1 % of steel)	130	80	2 300
		Reinforced (with 2 % of steel)	130	80	2 400
<b>Floor coverings</b>					
	Rubber	10 000	10 000	1 200	
	Plastic	10 000	10 000	1 700	
	Underlay, cellular rubber or plastic	10 000	10 000	270	
	Underlay, felt	20	15	120	
	Underlay, wool	20	15	200	
	Underlay, cork	20	10	< 200	
	Tiles, cork	40	20	> 400	
	Carpet, textile flooring	5	5	200	
	Linoleum	1 000	800	1 200	
<b>Gases</b>					
	Air	1	1	1,23	
	Carbon dioxide	1	1	1,95	
	Argon	1	1	1,70	
	Sulphur hexafluoride	1	1	6,36	
	Krypton	1	1	3,56	
	Xenon	1	1	5,68	
<b>Glass</b>					
	Soda lime (incl. "float glass")	∞	∞	2 500	
	Quartz	∞	∞	2 200	
	Glass mosaic	∞	∞	2 000	
<b>Metals</b>					
	Aluminium alloys	∞	∞	2 800	
	Bronze	∞	∞	8 700	
	Brass	∞	∞	8 400	
	Copper	∞	∞	8 900	
	Iron, cast	∞	∞	7 500	
	Lead	∞	∞	11 300	
	Steel	∞	∞	7 800	
	Stainless steel	∞	∞	7 900	
	Zinc	∞	∞	7 200	

Table 1 (continued)

Material group or application	Water vapour resistance factor		Density (kg/m <sup>3</sup> )
	dry	wet	
<b>Plastics, solids</b>			
Acrylic	10 000	10 000	1 050
Polycarbonates	5 000	5 000	1 200
Polytetrafluoroethylene (PTFE)	10 000	10 000	2 200
Polyvinylchloride (PVC)	50 000	50 000	1 390
Polymethylmethacrylate (PMMA)	50 000	50 000	1 180
Polyacetate	100 000	100 000	1 410
Polyamide (nylon )	50 000	50 000	1 150
Polyamide 6.6 with 25 % glass fibre	50 000	50 000	1 450
Polyethylene / polythene, high density	100 000	100 000	980
Polyethylene / polythene, low density	100 000	100 000	920
Polystyrene	100 000	100 000	1 050
Polypropylene	10 000	10 000	910
Polypropylene with 25 % glass fibre	10 000	10 000	1 200
Polyurethane (PU)	6 000	6 000	1 200
Epoxy resin	10 000	10 000	1 200
Phenolic resin	100 000	100 000	1 300
Polyester resin	10 000	10 000	1 400
<b>Rubber</b>			
Natural	1 0000	10 000	910
Neoprene (polychloroprene)	1 0000	10 000	1 240
Butyl, (isobutene), solid / hot melt	200 000	200 000	1 200
Foam rubber	7 000	7 000	60 - 80
Hard rubber (ebonite), solid	∞	∞	1 200
Ethylene propylene diene monomer (EPDM )	6 000	6 000	1 150
Polyisobutylene	10 000	10 000	930
Polysulfide	10 000	10 000	1 700
Butadiene	100 000	100 000	980
<b>Sealant materials, weather stripping and thermal breaks</b>			
Silica gel (dessicant)	0	0	720
Silicone, pure	5 000	5 000	1 200
Silicone, filled	5 000	5 000	1 450
Silicone foam	10 000	10 000	750
Urethane / polyurethane (thermal break)	60	60	1 300
Polyvinylchloride (PVC) flexible, with 40 % softener	100 000	100 000	1 200
Elastomeric foam, flexible	10 000	10 000	60 - 80
Polyurethane (PU) foam	60	60	70
Polyethylene foam	100	100	70
<b>Gypsum</b>			
Gypsum	10	4	600
Gypsum	10	4	900
Gypsum	10	4	1 200
Gypsum	10	4	1 500
Gypsum plasterboard (b)	10	4	900
<b>Plasters and renders</b>			
Gypsum insulating plaster	10	6	600
Gypsum plastering	10	6	1 000
Gypsum plastering	10	6	1 300
Gypsum, sand	10	6	1 600
Lime, sand	10	6	1 600
Cement, sand	10	6	1 800
<b>Soils</b>			
Clay or silt	50	50	1 200 - 1 800
Sand and gravel	50	50	1 700 - 2 200

Table 1 (continued)

Material group or application	Water vapour resistance factor $\mu$ (-)		Density (kg/m <sup>3</sup> )
	dry	wet	
<b>Stone</b>			
Natural, crystalline rock	10 000	10 000	2800
Natural, sedimentary rock	250	200	2600
Natural, sedimentary rock, light	30	20	1500
Natural, porous, e.g, lava	20	15	1600
Basalt	10 000	10 000	2700-3000
Gneiss	10 000	10 000	2400-2700
Granite	10 000	10 000	2500-2700
Marble	10 000	10 000	2800
Slate	1 000	800	2000-2800
Limestone, extra soft	30	20	1600
Limestone, soft	40	25	1800
Limestone, semi-hard	50	40	2000
Limestone, hard	200	150	2200
Limestone, extra hard	250	200	2600
Sandstone (silica)	40	30	2600
Natural pumice	8	6	400
Artificial stone	50	40	1750
<b>Tiles (roofing)</b>			
Clay	40	30	2000
Concrete	100	60	2100
<b>Tiles (other)</b>			
Ceramic/porcelain	∞	∞	2300
Plastic	10 000	10 000	1000
<b>Timber (c)</b>			
	50	20	500
	200	50	700
<b>Wood-based panels (c)</b>			
Plywood (d)	150	50	300
Plywood (d)	200	70	500
Plywood (d)	220	90	700
Plywood (d)	250	110	1000
Cement-bonded particleboard	50	30	1200
Particle board	50	10	300
Particle board	50	15	600
Particle board	50	20	900
Oriented strand board (OSB)	50	30	650
Fibreboard, including MDF (e)	5	2	250
Fibreboard, including MDF (e)	10	5	400
Fibreboard, including MDF (e)	20	12	600
Fibreboard, including MDF (e)	30	20	800

NOTE 1 For computational purposes the ∞ value may have to be replaced with an arbitrarily large value, e.g. 10<sup>16</sup>.

NOTE 2 Water vapour resistance factors are given as dry cup and wet cup values, see prEN ISO 12572:1999,

Hygrothermal performance of building materials and products – Determination of water vapour transmission properties.

(a) The density for concrete is the dry density.

(b) The thermal conductivity includes the effect of the paper liners.

(c) The density for timber and wood-based products is the density in equilibrium with 20 °C and 65 % relative humidity.

(d) As an interim measure and until sufficient significant data for solid wood panels (SWP) and laminated veneer lumber (LVL) are available, the values given for plywood may be used.

(e) MDF: Medium Density Fibreboard, dry process.

**Table 2 - Thermal insulation materials and masonry materials**

Material	Density kg/m <sup>3</sup>	Water vapour resistance factor, $\mu$ (-)	
		dry	wet
Expanded polystyrene	10 - 50	60	60
Extruded polystyrene foam	20 - 65	150	150
Polyurethane foam, rigid	28 - 55	60	60
Mineral wool	10 - 200	1	1
Phenolic foam	20 - 50	50	50
Cellular glass	100 - 150	∞	∞
Perlite board	140 - 240	5	5
Expanded cork	90 - 140	10	5
Wood wool board	250 - 450	5	3
Wood fibreboard	150 - 250	10	5
Urea-formaldehyde foam	10 - 30	2	2
Spray applied polyurethane foam	30 - 50	60	60
Loose-fill mineral wool	15 - 60	1	1
Loose-fill cellulose fibre	20 - 60	2	2
Loose-fill expanded perlite	30 - 150	2	2
Loose-fill exfoliated vermiculite	30 - 150	3	2
Loose-fill expanded clay	200 - 400	2	2
Loose-fill expanded polystyrene beads	10 - 30	2	2
Fired clay	1 000 - 2 400	16	10
Calcium silicate	900 - 2 200	20	15
Concrete with no other aggregate than pumice	500 - 1 300	50	40
Dense aggregate concrete and manufactured stone	1 600 - 2 400	150	120
Concrete with polystyrene aggregates	500 - 800	120	60
Concrete with no other aggregate than expanded clay	400 - 700	6	4
Concrete with expanded clay as predominant aggregate	800 - 1 700	8	6
Concrete with more than 70 % expanded blastfurnace slag aggregate	1 100 - 1 700	30	20
Concrete with the predominant aggregate derived from pyropro- cessed colliery material	1 100 - 1 500	15	10
Autoclaved aerated concrete	300 - 1 000	10	6
Concrete with other lightweight aggregates	500 - 2 000	15	10
Mortar (masonry mortar and rendering mortar)	250 - 2 000	20	10

1) The values given are generally not exceeded.

**Table 3 - Water vapour diffusion-equivalent air layer thickness (Water vapour resistance) for foils**

Product/material	Water vapour diffusion - equivalent air layer thickness $\mu d$ (m)
Polyethylene 0,15 mm	50
Polyethylene 0,25 mm	100
Polyester film 0,2 mm	50
PVC foil	30
Aluminium foil 0,05 mm	1 500
PE-foil (stapled) 0,15 mm	8
Bituminous paper 0,1 mm	2
Aluminium paper 0,4 mm	10
Breather membrane	0,2
Paint - emulsion	0,1
Paint - gloss	3
Vinyl wallpaper	2

NOTE The water vapour diffusion - equivalent air layer thickness of a product is expressed as the thickness of a motionless air layer with the same water vapour resistance as the product. The thickness of the products in Table 3 is not normally measured and they can be regarded as infinitely thin products with a water vapour resistance. The table quotes nominal thickness values as an aid to the identification of the product.