



Environmental classification of materials for floor insulation.

Thermocushions ecologically very sound

The Netherlands Institute for Building-biology and Ecology (Nibe) has calculated the environmental load of several insulation materials usable for floor insulation in order to make a comparison. Calculations were made according to the TWIN model. In this new model figures from Life Cycle Analysis amongst others are used to give the environmental load with respect to all aspects of the environment. At the end all the scores are added enabling comparison of different materials with the same performance. In this case insulation materials giving 1 m² floor an U-value of 0.3 W/m²K (Rc=3.0) Nibe comes to a stunning conclusion: "TONZON Thermoscushions, when

compared with the other insulation materials, cause a substantially lower environmental load, which can be explained by the extremely small amount of material used by this system to get an U-value of 0.3 W/m²K. Apart from that the Thermocushions have a very low transport volume, which, when compared with the other insulation materials, gives a substantial reduction in use of energy, emission of hothouse gasses and emissions of fertilizing compounds".

In the table opposite the environmental load scores are given without the load caused by transportation. Distance obviously has a significant effect but this has been balanced to allow a comparison to be made, as can be seen in the diagram below where the use of energy is given for 100 km transport (green) beside the energy for production used (red) and the total energy used (production and transport over 100 km). The energy is expressed in MJ/m². (compared with a litre of diesel oil, which contains 37.16 MJ or 1 kWh, which is 3.6 MJ).

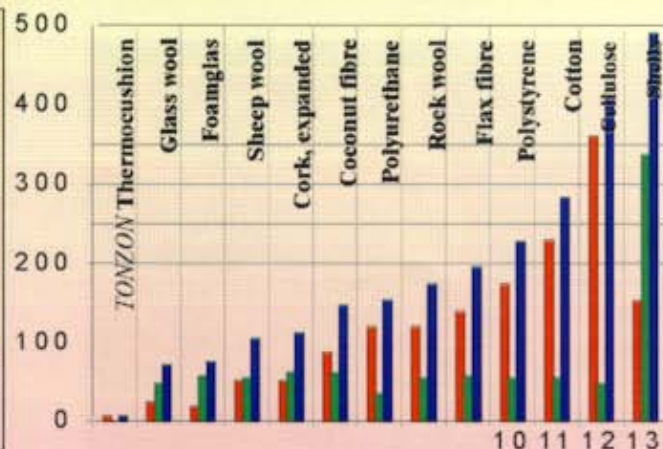
Nibe: Environmental classification of insulation materials for floors

Product	Environmental burden points	Index	environmental-Class
1. TONZON	2,026	100	1 a
2. Cork	4,843	239	1 c
3. Sheep wool	6,334	313	1 c
4. Cellulose	11,027	544	2 b
5. Polystyrene	18,575	917	2 c
6. Glass wool	22,358	1,104	2 c
7. Coconut fibre	37,553	1,854	3 c
8. Flax fibre	49,832	2,490	3 c
9. Foamglass	52,245	2,677	3 c
10. Rock wool	67,943	3,354	4 b
11. Polyurethane	70,339	3,472	4 b
12. Cotton	78,733	3,886	4 b
13. Shells	272,936	13,472	5 c

Use of energy in MJ per m² material to insulate floor with U=0.3

■ Energy for production ■ Transport for 100 km ■ Total energy

1. Thermocushion	6.46	0.01	6.5
2. Glass wool	23.8	47.1	70.9
3. Foamglass	18.3	56.6	74.9
4. Sheep wool	50.7	54.2	104.9
5. Cork	51.0	61.3	112.3
6. Coconut fibre	87.0	60.8	147.8
7. Polyurethane	120.0	33.9	153.9
8. Rock wool	120.0	53.8	173.8
9. Flax fibre	139.0	56.6	195.6
10. Polystyrene	174.0	53.8	227.8
11. Cotton	229.0	53.8	282.8
12. Cellulose	360.0	47.1	407.1
13. Shells	153.0	337.0	490.0



Floor insulation with Thermocushions costs remarkably little energy. No: 2 (glass wool) needs 11 times more energy to produce while transportation costs almost 5,000 times more energy. The preceding table shows that choice of insulation material can save a lot of energy. Take the situation in New Zealand for example, to insulate the 150,000,000 m² uninsulated floors with an U-value of 0.3 W/m²K (Rc=3.0 m²K/W) with glass wool would cost about an equivalent of 286 million litre diesel oil. Using Thermocushion only 26 million litre would be needed (saving 260 million litres of diesel).

The figures regarding the emission of hothouse gasses and fertilizing compounds are even more extreme, as can be seen from the tables opposite production of 1 m² glass wool (Rc=3.0) and transport over 100 km causes 4.27 kilo of hothouse gasses to the atmosphere and 8.32 gram of fertilizing compounds where 1 m² Thermocushion only brings 0.18 kilo of hothouse gasses and only 0.2 gram of fertilizing compounds. These figures explain why Thermocushions cause by far the lowest environmental load. Nibe judges TONZON Thermocushions as 'The best choice for insulating a floor'. Previously the Dutch consumer organisation labelled the Thermocushions as 'The Best Buy'. Many house owners in Holland see the Thermocushions as the only safe insulation for wooden floors because it is the only material which will keep dry in an underfloor situation. In small crawling spaces it will often be the only system which can be applied. Thermocushion have been used in over 100,000 houses and many other projects since 1980.



Emission of hothouse gasses kg/m²

	Transport over 100 km		
	Production		Total
1. Thermocushion	0.17	0.01	0.18
2. Polyurethane	1.02	2.49	3.51
3. Glass wool	0.81	3.46	4.27
4. Foamglass	0.38	4.15	4.53
5. Sheep wool	1.52	3.98	5.50
6. Cotton	2.82	3.94	6.76
7. Polystyrene	3.25	3.94	7.19
8. Cork	2.74	4.50	7.24
9. Flax fibre	3.96	4.15	8.11
10. Rock wool	4.65	3.94	8.59
11. Coconut fibre	5.41	4.46	9.87
12. Cellulose	7.57	3.46	11.03
13. Shells	12.20	24.70	36.90

Emission of fertilizing compounds g/m²

1. Thermocushion	0.20	0.001	0.20
2. Polyurethane	0.94	5.02	5.96
3. Glass wool	1.35	6.97	8.32
4. Foamglass	1.00	8.37	9.37
5. Cork	0.73	9.07	9.8
6. Sheep wool	2.08	8.02	10.1
7. Flax fibre	4.64	8.37	13.0
8. Polystyrene	10.4	.95	18.4
9. Cellulose	14.1	6.97	21.1
10. Coconut fibre	12.7	9.00	21.7
11. Rock wool	44.6	7.95	2.6
12. Shells	3.0	49.80	52.8
13. Cotton	822.0	7.95	829.9

Picture

Cross-section of wooden floor insulated with Thermocushions with three airchambers (Rc=3.3, U=0.28) The soil is covered with TONZON Groundsheet. Note: Clean, light and easy material to work with. A small staplegun is all you need to fix it. Can be installed without special clothing, masks or gloves.