

# Database of Embodied Energy and Water Values for Materials

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Material	Unit	Embodied energy coefficient (GJ/unit)	Embodied water coefficient (kL/unit)
<i>Aluminium</i>			
virgin	t	252.6	1084.4
reflective foil	m <sup>2</sup>	0.137	0.588
Asphalt	m <sup>3</sup>	3.08	
Bitumen	m <sup>3</sup>	48.39	11.86
<i>Carpet</i>			
wool	m <sup>2</sup>	0.741	2.18
nylon	m <sup>2</sup>	0.683	1.58
<i>Ceramics</i>			
clay bricks (110 mm)	m <sup>2</sup>	0.56	0.672
ceramic tiles	m <sup>2</sup>	0.293	1.12
terracotta roof tiles (20 mm)	m <sup>2</sup>	0.986	1.52
<i>Concrete</i>			
5 MPa concrete	m <sup>3</sup>	2.79	7.48
15 MPa concrete	m <sup>3</sup>	4.03	10.13
20 MPa concrete	m <sup>3</sup>	4.44	10.98
25 MPa concrete	m <sup>3</sup>	5.01	11.80
30 MPa concrete	m <sup>3</sup>	5.44	12.29
32 MPa concrete	m <sup>3</sup>	5.81	13.10
40 MPa concrete	m <sup>3</sup>	6.75	14.62
aerated concrete (200 mm)	m <sup>2</sup>	0.495	1.64
cement	t	16.96	29.91

Material	Unit	Embodied energy coefficient (GJ/unit)	Embodied water coefficient (kL/unit)
concrete block, hollow (200 mm)	m <sup>2</sup>	0.805	2.67
concrete roof tile (20 mm)	m <sup>2</sup>	0.251	0.909
fibre cement sheet (4.5 mm)	m <sup>2</sup>	0.235	0.745
fibre cement sheet (6 mm)	m <sup>2</sup>	0.288	0.883
mortar	m <sup>3</sup>	2.00	10.55
precast	m <sup>3</sup>	4.44	10.98
<i>Glass</i>			
clear float glass (4 mm)	m <sup>2</sup>	1.73	3.42
glass fibre	m <sup>3</sup>	432.1	855.3
toughened glass (6 mm)	m <sup>2</sup>	3.66	8.24
toughened glass (12 mm)	m <sup>2</sup>	7.31	16.49
<i>Insulation</i>			
expanded polystyrene insulation (50 mm)	m <sup>2</sup>	0.361	0.734
fibreglass insulation (80 mm)	m <sup>2</sup>	0.183	0.376
fibreglass insulation (100 mm)	m <sup>2</sup>	0.217	0.429
fibreglass insulation (160 mm)	m <sup>2</sup>	0.348	0.687
<i>Paint</i>			
oil-based paint	m <sup>2</sup>	0.101	0.219
water-based paint	m <sup>2</sup>	0.096	0.212
<i>Plasterboard</i>			
plasterboard (10 mm)	m <sup>2</sup>	0.207	0.627
plasterboard (13 mm)	m <sup>2</sup>	0.232	0.682
<i>Plastics</i>			
general (PVC)	t	156.9	366.4
laminate (1 mm)	m <sup>2</sup>	0.200	0.476
plastic membrane (1 mm)	m <sup>2</sup>	0.514	1.40
polyester	t	156.9	366.4
polystyrene	m <sup>3</sup>	7.04	14.16
PVC water pipe (20 mm)	m	0.212	0.452

Material	Unit	Embodied energy coefficient (GJ/unit)	Embodied water coefficient (kL/unit)
UPVC pipe 100	m	0.266	0.568
UPVC pipe 100 (slotted)	m	0.208	0.443
vinyl flooring (2 mm)	m <sup>2</sup>	0.661	1.72
<i>Sand and stone</i>			
granite	t	0.087	
sand	m <sup>3</sup>	0.617	3.57
screenings	m <sup>3</sup>	0.691	4.43
<i>Steel</i>			
colorbond steel decking	m <sup>2</sup>	0.933	1.34
reinforcement	t	85.46	98.64
stainless steel	t	445.2	649.6
steel	t	85.46	98.64
steel decking	m <sup>2</sup>	0.796	1.12
<i>Timber</i>			
hardwood	m <sup>3</sup>	21.33	16.28
MDF/Particleboard	m <sup>3</sup>	30.35	85.59
softwood	m <sup>3</sup>	10.93	20.14
Oil	m <sup>3</sup>	34	
<i>Other metals</i>			
copper	t	378.9	1188.4

*Note:* These energy and water coefficients were compiled based on an energy and water-based input-output model developed by Prof. Manfred Lenzen at the University of Sydney and Australian process data compiled by Grant (2002), using a Path Exchange Hybrid LCI approach.