



Skamol A/S
 Østergade 58-60
 DK-7900 Nykøbing Mors
 Denmark
 Tel: +45 9772 1533
 Fax: +45 9772 4975
 insulation@skamol.dk

www.skamol.com

Vermiculite insulating boards

for hot-face and back-up insulation – up to 1150°C (2102°F)

V-1100 (375) · V-1100 (475) · V-1100 (600)
VIP-12

Description

SKAMOL V-1100 and VIP-12 is a range of vermiculite based, high-temperature, energy-saving and cost effective insulating slabs designed for a maximum service temperature of 1100°C (2012°F) and 1150°C (2102°F) respectively. They combine good strength with low thermal conductivity and are highly resistant to thermal shock. The slabs are clean to handle and easy to install. Jointing mortar recommended: SKAMOL FL-06, see separate data sheet "SKAMOL insulating mortars".

The SKAMOL V-1100 vermiculite slabs cover several grades in various combinations of bulk density, insulation properties and compressive strength. Standard grades include:

- V-1100 (375)
- V-1100 (475)
- V-1100 (600)

V-1100 satisfies the criteria of IMO Resolution A.472 (XII) for classification as non-combustible and does not emit smoke.

SKAMOL VIP-12 is a high-density slab characterized by good insulation value and very high mechanical strength.

Standard sizes

SKAMOL V-1100 and VIP-12 slabs are available in the following standard sizes:

Standard sizes		
Metric:		
V-1100 (375)	Length × width: 1000 × 610 mm	Thickness: 25 through 100 mm
V-1100 (475)	1000 × 305 mm	
V-1100 (600)	1000 × 610 mm 1000 × 305 mm	25 through 75 mm
VIP-12	1000 × 305 mm 610 × 305 mm	30-40-50 mm 25-30-40-50- 60-75 mm
US/British:		
V-1100 (375)	Length × width: 36" × 24"	Thickness: 1" through 4"
V-1100 (475)	36" × 12"	
V-1100 (600)	36" × 24" 36" × 12"	1" through 3"
VIP-12	36" × 12" 24" × 12"	1 1/4" - 1 1/2" - 2" 1" - 1 1/4" - 1 1/2" - 2" - 2 1/2" - 3"

The product composition allows for easy cutting and shaping of both slab types on site using ordinary wood-working tools. Derivatives cut from standards and special shapes to meet specific design requirements are made to order. Extensive know-how on special shapes and designs is offered. See separate data sheet "SKAMOLEX customized shapes".

The compression moulding system used in the manufacture of vermiculite slabs allows for supply of slabs to alternative densities up to 600 kg/m³ (37 lbs/cu.ft.).

Dimensional tolerances

Length and width ±2.5 mm (0.10")
 Thickness ±1.0 mm (0.04")

Application

The range of SKAMOL V-1100 and VIP-12 vermiculite insulating slabs is equally suitable for hot-face applications or back-up insulation of all refractory constructions. They will not decompose even when subjected directly to flame. The maximum operating temperature, however, should be taken into consideration. Due to their resistance to carbon monoxide and hydrocarbons the V-1100 and VIP-12 slabs can be used in furnaces with reducing atmospheres. They are practically free from sulphur and hence an ideal choice for furnaces in which nickel alloys are present. Due to its higher density VIP-12 is more wear-resistant as hot-face application than the V-1100 grades.

V-1100

The V-1100 grades have a variety of uses in high-temperature kilns and furnaces, combustion plants, and boilers. They are not attacked by molten aluminium and are highly resistant to cryolite penetration and fluorides. Exhibiting good electrical resistivity and high resistance to thermal shock V-1100 is also very suitable for insulation in several types of domestic heating appliances.

VIP-12

VIP-12 is specially developed as a cryolite resistant refractory insulating slab for intermediate insulation in reduction cell cathodes between the carbon and the more vulnerable bottom insulation. VIP-12 will cause penetrating bath substances to stop and solidify due to chemical reactions that transform the low-melting mixture of sodium fluoride and aluminium fluoride into a solid mixture of magnesium fluorides and silicates of sodium and aluminium (nepheline).



SKAMOL V-1100 and VIP-12 vermiculite insulating boards

for back-up insulation up to 1150°C (2102°F)

Grade		V-1100 (375)	V-1100 (475)	V-1100 (600)	VIP-12	
Maximum service temperature						
	°C	1100	1100	1100	1150	
	°F	2012	2012	2012	2102	
Bulk density, dry						
	kg/m ³	375	475	600	1200	
	lbs/cu.ft.	23.4	29.6	37.5	75	
Compressive strength (EN 1094-5: 1995)						
@ room temperature	MPa	1.3	2.5	4.2	11	
	lbs/sq.in.	189	363	609	1595	
Modulus of rupture (EN 993-6: 1995)						
	MPa	0.5	0.8	1.6	3.6	
	lbs/sq.in.	73	116	232	522	
Total porosity						
	%	85	81	76	55	
Specific heat						
	kJ/(kg×K)	0.94	0.94	0.94	1.1	
	BTU/(lb×°F)	0.224	0.224	0.224	0.27	
Coefficient of reversible thermal expansion (BS 1902: section 5.3: 1990)						
@ 20°C-750°C (68°F-1382°F)	K ⁻¹	11×10 ⁻⁶	11×10 ⁻⁶	11×10 ⁻⁶	12×10 ⁻⁶	
	°F ⁻¹	6.1×10 ⁻⁶	6.1×10 ⁻⁶	6.1×10 ⁻⁶	6.7×10 ⁻⁶	
Resistance to thermal shock (EN 993-11: 1998)						
heating to 950°C (1742°F)	cycles	>10	>10	>10	>30	
Linear reheat shrinkage (EN 1094-6: 1999)						
12 h at 1000°C (1832°F)	%	1.0	1.0	1.0	-	
12 h at 1100°C (2012°F)		-	-	-	1.3	
Pyrometric cone equivalent (ASTM C24-89 ORTON cones)						
	°C	1300	1300	1300	1221	
	°F	2372	2372	2372	2230	
Thermal conductivity (ASTM C-182)						
mean temp.	@ 200°C	W/(m×K)	0.12	0.14	0.15	0.23
	@ 400°C		0.15	0.17	0.17	0.26
	@ 600°C		0.16	0.19	0.19	0.29
	@ 800°C		-	-	-	0.33
	@ 392°F	BTU/(sq.ft.×h×°F/in)	0.83	0.97	1.04	1.59
	@ 752°F		1.04	1.18	1.18	1.80
	@ 1112°F		1.11	1.32	1.32	2.01
	@ 1472°F					2.29
Chemical analysis, typical						
	%					
Silica	SiO ₂	46	46	46	51	
Titanium dioxide	TiO ₂	0.7	0.7	0.7	1.0	
Ferric oxide	Fe ₂ O ₃	5.5	5.5	5.5	3.0	
Alumina	Al ₂ O ₃	7.0	7.0	7.0	20	
Magnesium oxide	MgO	19	19	19	10	
Calcium oxide	CaO	3.5	3.5	3.5	1.0	
Sodium oxide	Na ₂ O	0.2	0.2	0.2	0.1	
Potassium oxide	K ₂ O	10	10	10	7.0	
Loss on ignition 1025°C (1877°F)	LOI	7.0	7.0	7.0	4.0	
Colour		SAND	SAND	SAND	SAND	

Data are average results of tests conducted under standard procedures and are subject to variation. Data contained in this data sheet are supplied in good faith as a technical service and are subject to change without notice. Misprint and errors excepted.

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