

Compressive Strength, Working Stress Recommendations

Compressive strength (kPa) is an important design property when resistance to compressive load is required of FOAMULAR in an application such as under load bearing concrete slabs. Recommended compressive stress limits are derived from ultimate compressive strength. For compressive load, the published 'minimum' compressive strength also represents the 'ultimate' compressive strength.

Recommended compressive stress limits are set to insure that long term creep¹ from dead load will not exceed 2%, and that total load (live + dead) will not exceed approximately $\frac{1}{3}$ of the proportional limit for FOAMULAR products. FOAMULAR compressive strength proportional limit is equal to or greater than the published minimum compressive resistance value. By limiting stress as recommended, the designer is assured that FOAMULAR, acting as a structural material, is functioning with approximately a 2x factor of safety.

For FOAMULAR products, Owens Corning recommends the compressive stress live and dead load maximums listed in the following table based on the concepts described above:

Dead Load² – 1/3 of the published minimum compressive strength

Live Load³ – 1/5 of the published minimum compressive strength

Definitions:

1. Long term creep: Deformation in thickness of foam plastic layer over time while under constant live and/or dead load.
2. Dead Load: Static load typically acting downward comprised of the weight of the concrete on top of the foam board or other permanent structural load on top of the concrete slab.
3. Live Load: The moveable weight of the material on top of the concrete; i.e. people, furniture, equipment, vehicles etc.



FOAMULAR METRIC PHYSICAL PROPERTIES

25mm THICKNESS

No.	Property	Unit	FM250	FM300	FM350	FM450
1.	Compressive Strength Minimum (V)	kPa	250	300	350	450
2.	Compressive Modulus Minimum (V)	kPa	7000	8000	9200	1150
3.	Tensile Strength Minimum (V)	kPa	360	386	400	420
4.	Tensile Modulus Minimum (V)	kPa	10000	10600	11000	11500
5.	Shear Strength Minimum (V)	kPa	238	252	265	282
6.	Shear Modulus Minimum (V)	kPa	3200	3380	3560	3900
7.	Flexural Strength Minimum (V)	kPa	930	1020	1090	1215
8.	Flexural Modulus Minimum (V)	kPa	32000	37500	42000	49000
9.	Water Absorption Maximum	% by volume	0.05	0.05	0.05	0.05
10.	Water Vapour Permeance Maximum	ng.s ⁻¹ m ² .Pa ¹	63	63	63	63
11.	Coefficient of Linear Expansion	m/m/°C	4.9 x 10 ⁻⁵	4.9 x 10 ⁻⁵	4.9 x 10 ⁻⁵	4.9 x 10 ⁻⁵
12.	<i>Recommended Safe Loads</i>					
	Dead	kPa	83	100	117	150
	Live	kPa	50	60	70	80
	Total	kPa	133	160	187	240
13.	<i>Foundation Modulus</i>					
	25mm Thickness	kPa/mm	270	315	357	445
	50mm Thickness	kPa/mm	230	265	300	365
	75mm Thickness	kPa/mm	178	195	215	250
	100mm Thickness	kPa/mm	160	180	200	235

Notes:

- Values listed are at a 90% confidence interval
- Properties designated with (V) are measured in the vertical direction and (E) designates extrusion direction