Isola COMPOSITES
A Von Roll Isola and Isola AG joint-venture

Top Ripple Springs – VETRONITE 64.210 Polyimid

data sheet 1.64.210

Constitution and form

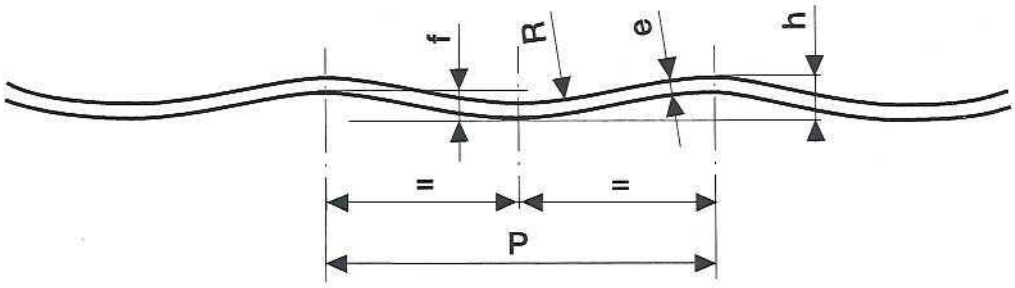
VETRONITE 64.210 is a rippled laminate made of unidirectional glass fabric bonded together with a polyimid resin.

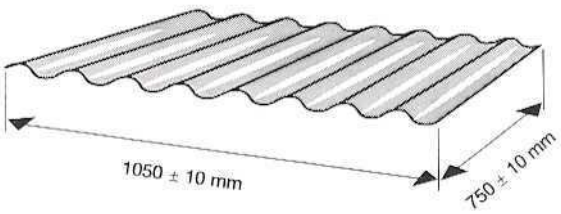
VETRONITE 64.210 is supplied :
- in sheets 1.050 x 750 mm +/- 10 mm
  (packaging : cardbox of 25 sheets wrapped with a plastic film)
- in machined parts according to drawings.

Von Roll Isola group has several well equipped workshops for the production of any machined part.

Form and dimensions

e = thickness of laminate
f = deflection : space available for compression
P = pitch or wave length
R = wave radius
h = height : total space occupied by spring
Dimensions of the spring as received :(measured values)
e = 0,90 +0,15 / -0,05 mm
f = 1,8 +0 / +0,15 mm
P = 30 mm
R = 30 mm





Application

Elastic slot wedging of stators in turbine generators

Properties

This polyimid resin has been selected for its outstanding mechanical properties at elevated temperature (Martens > 200°C).
Unidirectional glass fabric reinforcement provides VETRONITE 64.210 with very high elasticity.

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Characteristics as received

	64.210	Unit
Density	mini 1,9	g/cm^3
Colour	brown	
Glass content	mini 70	%
Maximum temperature use	150	°C

Mechanical characteristics

Measured on test pieces 25 x 154 mm(1 x 6 inch.), ie. 5 waves (graph N°3)

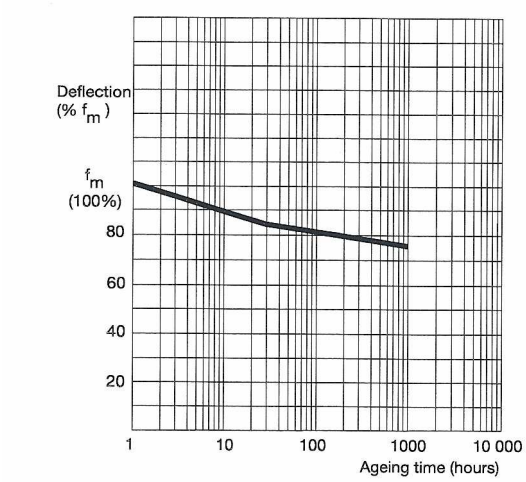
Deflection f_m	1,80 +0,10 / - 0,15	mm
P_{45} = Pressure for a 0,45 mm deflection at 23°C	> 0,70	MPa
P_{45} = Pressure for a 0,45 mm deflection at 150°C	> 0,65	MPa
Stiffness k	> 0,50	MPa/mm

Note : The typical average values shown above are the results of extensive tests run in our laboratories. Isola Composites, however, cannot accept responsibility for the performance of its product in applications over which they have no control. Due to the continuous development of our products, these values can at anytime be changed without previous notice.

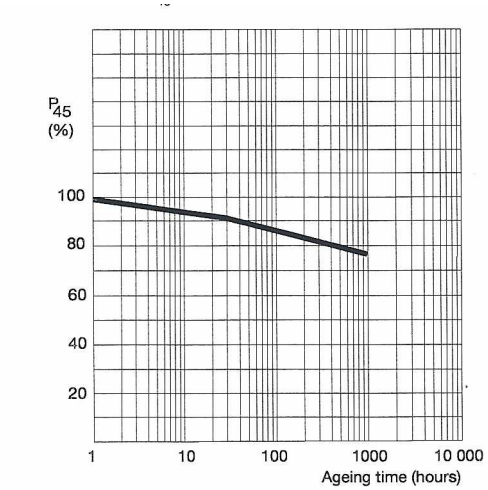
Mechanical characteristics after thermal ageing

Graphs N° 1 and 2 show compression test results carried out at room temperature on samples, which have been aged at different times at 150°C under total compression.

Graph N°1 Evolution of maximum amplitude F_m after ageing at 150°C totally compressed (measured at room temperature.)



Graphs N° 2 Evolution of P_{45} after ageing at 150°C totally compressed (measured at room temperature).



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Test methods

Mechanical properties of the spring after the compression test.
The spring is set between two platens of a compression testing machine. The registration of stresses as a function of height variation (figure 1) provides following characteristics and their evolution after various conditionings :
- The compression stress P is equal to the pressure divided by the surface of the sample.
- The deflection f_m is equal to the difference between the initial free height h_m and the spring height h_p under a pressure of 2,5 MPa.
(After total compression of the spring, the laminate is subject to a compressive stress and the curve stress/variation has an asymptotic shape. It is agreed that a pressure of 2,5 MPa is the pressure at which the laminate itself starts to be compressed. The height of the spring at this stage is very close to the average geometric thickness of the laminate).

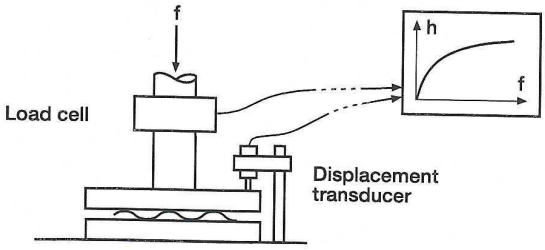
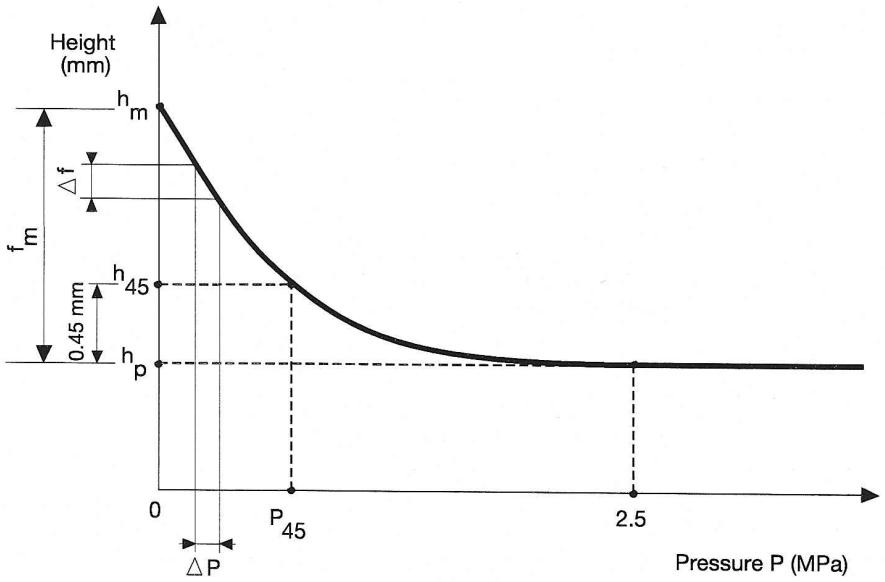


Figure 1

- The Pressure P_{45} for a compression of 0,45 mm measured under the same conditions as f_m. This is the pressure which should be released by the spring when displayed in the slot with an available amplitude of 0,45 mm (This space is equal to the height of the spring, i.e. the compression plus the thickness of the laminate : 0,45 + 0,90 = 1,35 mm).
- The stiffness k in MPa/mm is equal to the tangent of the stress/compression curve in its linear part. It is the ratio between the increased pressure and the corresponding height reduction of the spring.



$$f_m = h_m - h_p$$

$$k = \frac{\triangle P}{\triangle f}$$

Graph N° 3