SILIONNE GLASS YARN

S 2

1 - GENERAL POINTS

Textile glass is widely used to reinforce organic resins as it represents a very favourable cost / performance balance at the level of composites materials, compared to other existing reinforcing materials.
The type of yarn which is mostly used to reinforce plastic materials is glass E.
It is a borosilicate which hardly contains any alkaline oxides. This particularity entails very good electrical properties but the temperatures of transformation have to be high (around 1600 °C), considering the consequences both from the technical and the economical point of view.

The other categories of yarn used as reinforcement fibres are :
- Glass A, has a high content of alkali.
- Glass D, gives high dielectric properties.
- Glass C, is used for anti - corrosion applications.
- Glass R, (also called glass S in USA) allows to have a very good mechanical resistances. This yarn contains a very light content in Boron oxide.

- The average diameter of base fibre is : GLASS "E" = 8 microns - GLASS "C" = 11 microns.
- The length of fibres is : GLASS "E" or "C" = 5 to 15 cm about.

2 - CHARACTERISTICS

Components in %		Glass E	Glass C	Glass D	Glass R	Glass S
- Silica	Si O2	52-56	64-68	72-75	56-60	64-66
- Calcium oxide	Ca O	16-25	11-15	0-1	8-15	0-0.2
- Aluminium oxide	AL2 O3	12-16	3-5	0-1	23-26	24-26
- Boron oxide	B2 O3	5-10	4-6	21-24	0-0.3	0-0.1
- Fluorine	F2	0-1	-	-	0-0.1	-
- Sodium oxide + Potassium oxide	Na 2O + K2 O	0-2	7-10	0-4	0-1	0-0.3
- Magnesium oxide	Mg O	0-5	2-4	-	4-7	9.5-10.3
- Barium oxide	Ba O	-	0-1	-	0-0.1	-

- If there is some Magnesium oxide, it has to be deducted from calcium oxide : If 21/22 - 4 = 17/18 % of calcium.
- Glass E : no trace of : Titane oxide - Steel - Zyrconium. - Glass C : yes.
- These compositions have to be compared with the sodo-calcical glass (used for windows or bottles).
(Silica : 73 % - Alumina : 1,5 % - Lime : 8 % -Magnesia : 4 % - Sodium oxide : 14 %)

3 - PROPRIETES

Caractéristics		Glass E	Glass C	Glass D	Glass R	Glass S
Density	g/cm^3	2.58	2.52	2.12	2.54	2.48
Dielectric constant at 1 MHz		6.4	6.9	3.8	6.4	5.3
Young's modulus	GPa	73	69	52	86	87
Strain Point	°C	610	520	470	730	760
Tensile Strenght	MPa	3400	3300	2400	4100	4900

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