

**HIGH TEMPERATURE  
RESISTANT  
SILICA & QUARTZ FIBERS**

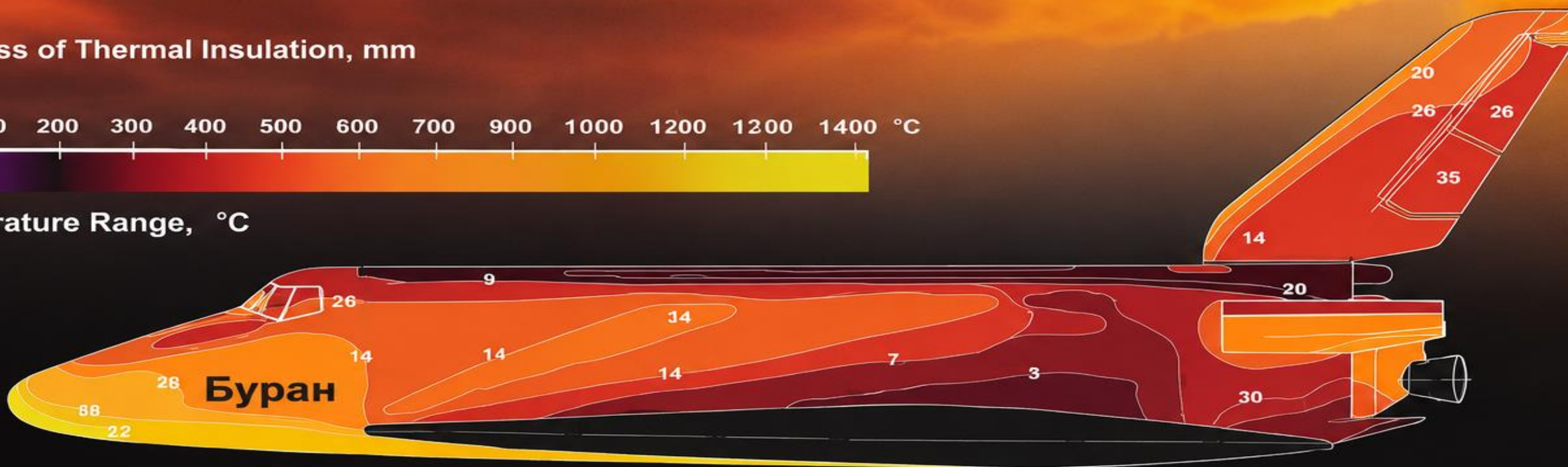


Space crafts protection from exposure to high temperature was the principle incentive to development of quartz and silica fiber materials industry. Over 50 years ago NPO Stekloplastic, an R&D institute, for the first time in Russia has developed the technology and mastered production of these materials. Our company is still one of the leading institutions in this field of activity.

Thickness of Thermal Insulation, mm

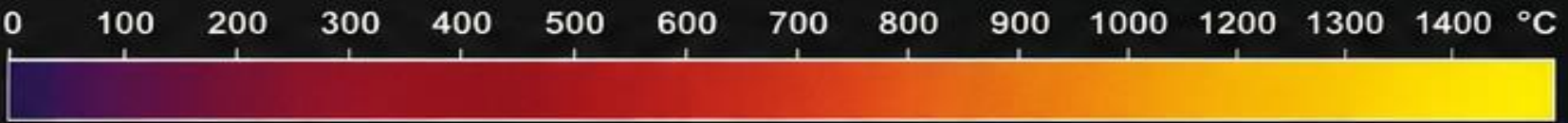


Temperature Range, °C



We produce a wide variety of materials based on quartz and silica fibers (**yarns, fabrics, meshes, sleeves, rovings, tapes, ropes, sew-knit sheets, chopped fibers etc.**).

Together with space application, these materials find a wide range of use in **other sectors of industry**. First and foremost it is variety of thermal protection: fire resistant curtains, protective outer garments for firemen, rescuers; heat insulation for power generating plants including nuclear power stations. More and more quartz and silica fiber materials are used in metallurgy as ferrous and non-ferrous melt fine filters as well as for filtering out aggressive solvents and gases.



|                                                           |          |
|-----------------------------------------------------------|----------|
| - SiO <sub>2</sub> content, %, by mass, no less than..... | 99.95    |
| - Fiber diameter, μm:                                     |          |
| continuous.....                                           | 10-11    |
| discrete.....                                             | 1-2; 5-6 |
| - Tensile strength, GPa:                                  |          |
| untouched.....                                            | 6.0      |
| from a bobbin.....                                        | 3.6      |

- CCCP

We make quartz fiber materials in the form of discrete and chopped fibers, yarns and rovings, fabrics and tissues.

Silica fibers are Yess with a 2ch content ( over 95%) of  $\text{SiO}_2$ . Material based on these fibers possess a unique complex of properties. Combination of exceptionally high (over 1000 °C) temperature resistance, high elasticity, preserves chemical resistance and, high radiation resistance thus provide wide applications of silica fiber in various sectors of industry.

Materials based on silica fibers are made by way of chemical leaching of glass fibers in acid solution. As a result, the amount of  $\text{SiO}_2$  in the fiber considerably increases. The content decrease of out of fiber detrimental alkali oxide imparts them acid-resistance made by other producers is an optimum relation of chemical composition of various oxide  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$  which are a high-temperature melting ones. It is because that our specially developed glass fibers to resist it very temperature, give other producers least the traditional Silica.

### Chemical Composition of Initial Glass Fibers and Silica Fibers Based on Them Manufactured by various Producers

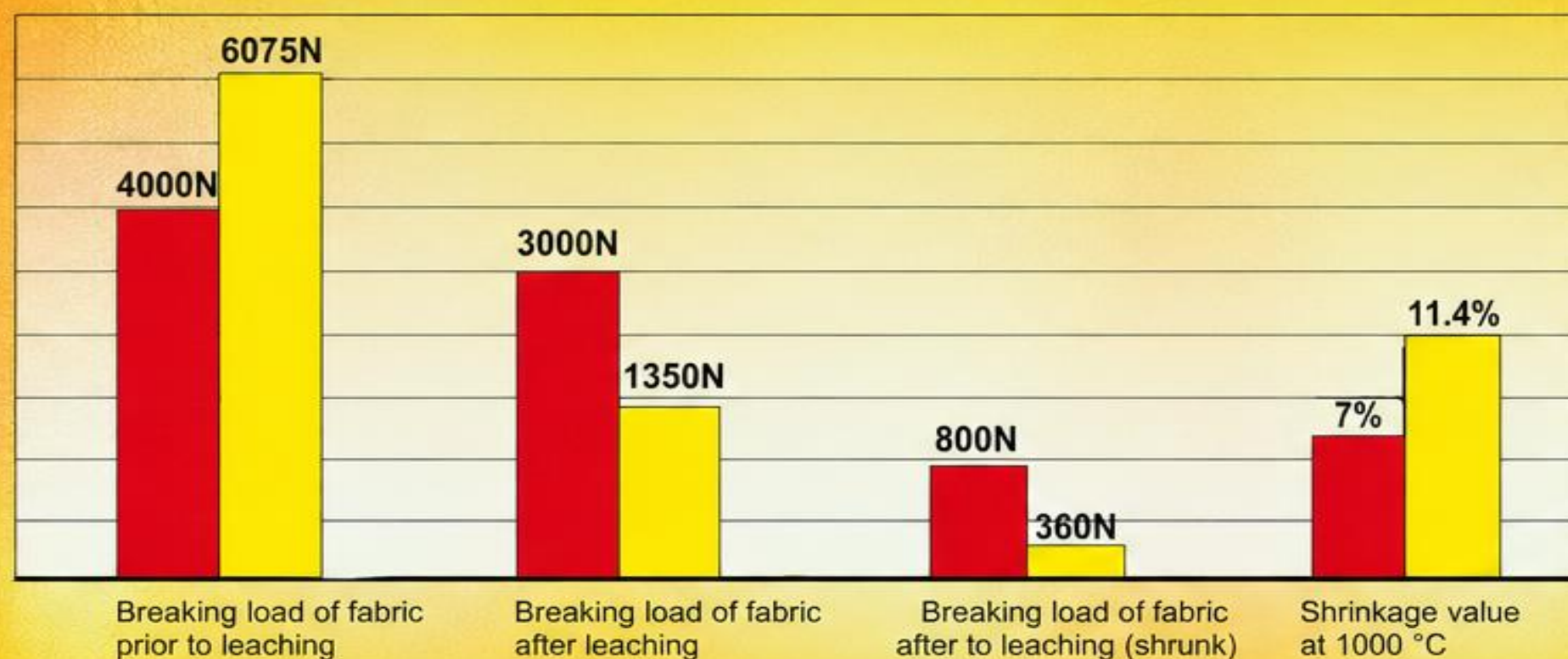
| Producer            | Fiber                   | Content of components, % by weight |                         |                        |              |              |                       |
|---------------------|-------------------------|------------------------------------|-------------------------|------------------------|--------------|--------------|-----------------------|
|                     |                         | $\text{SiO}_2$                     | $\text{Al}_2\text{O}_3$ | $\text{B}_2\text{O}_3$ | $\text{MgO}$ | $\text{CaO}$ | $\text{Na}_2\text{O}$ |
| NPO<br>Tekloplastic | Initial glass fiber     | 76-77                              | 3-4                     | —                      | —            | —            | 2-3                   |
|                     | Silica fiber            | 94-95                              | 3-4                     | —                      | —            | —            | —                     |
| Other<br>producers  | Initial glass (E-glass) | 52-55                              | 12-16                   | 5-10                   | 0.6          | 16-20        | 0-1                   |
|                     | Silica fiber            | $95 \leq \text{Si}$                | —                       | —                      | —            | —            | —                     |



According to our process, in the course of leaching of glass fibers in  $H_2SO_4$  solution, not more than 20% of oxides with a low melting temperature transfer to the solution. This allows to keep at least 50% of silica fiber's initial strength, and the size of the pores, in this case, is not more than 0.3 nm.

In the alternative case, about 50% of the initial oxides are leached in HCl solution, which results in 4-5 times less of strength of the silica fiber in comparison with the initial one, and size of the pores accounts for 0.9 - 1.1 nm.

### Comparative Characteristics of Silica Fabrics from Different Producers

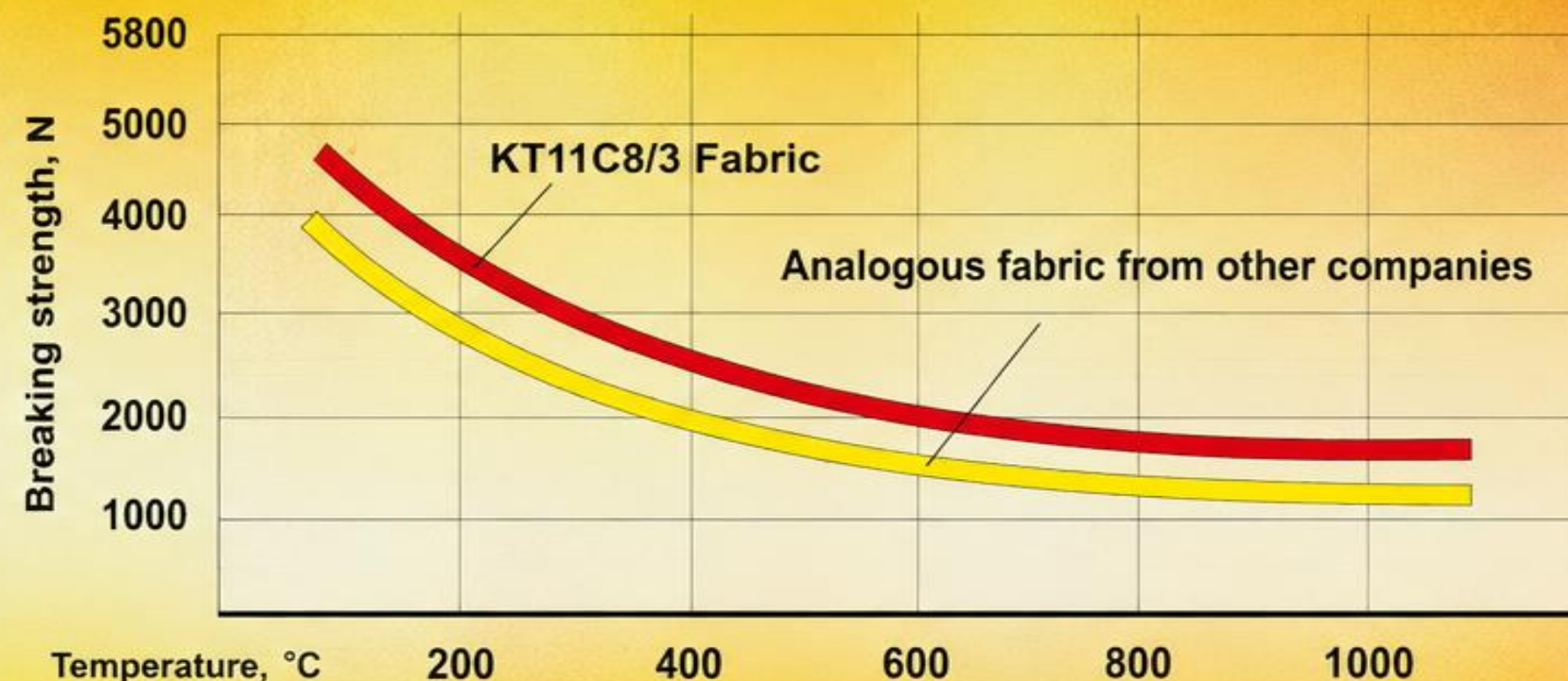


NPO Stekloplastic's fabric



Analogous fabric from other companies

### Effect of Temperature on the Strength of Silica Fibers



Structures of the fabrics compared are the same: satin 8/3; thickness is 0.6 mm; surface density is  $0.61 \text{ kg/m}^2$ .

Today, we produce practically all the range of silica materials, i.e. fabrics, needle felts, meshes, stitched-bonded sheets, tapes, yarns, chopped fibers, etc.

### Silica Fabrics

| Fabric designation | Width, mm | Thickness, mm | Surface density, g/m <sup>2</sup> | Weave | Linear shrinkage at 1000° C, % |
|--------------------|-----------|---------------|-----------------------------------|-------|--------------------------------|
| KT-3-115-TO        | 850       | 0.115         | 95                                | plain | 1                              |
| KT-5-11            | 880       | 0.17          | 180                               | satin | 7                              |
| KT-5-11-TO         | 850       | 0.20          | 180                               | satin | 1                              |
| KT-11-39/0.2       | 880       | 0.20          | 180                               | plain | 7                              |
| KT11-39-230-TO     | 850       | 0.23          | 180                               | plain | 1                              |
| KT-11              | 880       | 0.35          | 300                               | plain | 7                              |
| KT-11-TO           | 820       | 0.41          | 290                               | plain | 1                              |
| KT-11-CC8/3        | 920       | 0.53          | 610                               | satin | 7                              |
| KT-11-CC8/3-TO     | 860       | 0.67          | 610                               | satin | 1                              |
| KT11-Tp-11         | 880       | 1.00          | 960                               | plain | 7                              |
| KT11-Tp-11-TO      | 850       | 1.10          | 960                               | plain | 1                              |

TO is for heat treated fabrics

### Silica Yarns

| Yarn designation        | Linear density, tex | Number of twists per 1m |
|-------------------------|---------------------|-------------------------|
| K11C6-45                | 45                  | 150                     |
| K11C6-90(K11C6-90-5A)   | 90 (90)             | 150                     |
| K11C6-180(K11C6-170-5A) | 180 (170)           | 150                     |
| K11C6-270(K11C6-250-5A) | 270 (250)           | 150                     |
| K11C6-540(K11C6-510-5A) | 540 (510)           | 200                     |
| K11C6-450(K11C6-450-5A) | 450 (450)           | 200                     |

5A is for sized heat treated yarns

### Silica Meshes

| Mesh designation | Mesh size, mm | Surface density, g/m <sup>2</sup> | Weave | Width, mm |
|------------------|---------------|-----------------------------------|-------|-----------|
| KC-11-ЛA         | 1.7 x 1.7     | 530                               | Leno  | 880       |
| KC-11-ЛA-2       | 2.0 x 2.0     | 430                               | Leno  | 880       |

## Silica Sleeves

| Sleeve designation                        | Inner diameter, mm | Weight, g/m |
|-------------------------------------------|--------------------|-------------|
| Hollow sleeves                            | 1-50               | 17-98.0     |
| Sleeves filled with heat resistant tissue | 10-50              | 30-600      |
| Sleeves filled with silica yarn           | 5-22               | 19-405      |

## Silica Tapes

| Tape designation | Width, cm | Thickness, mm | Weight, g/m |
|------------------|-----------|---------------|-------------|
| КЛ-11-1.5        | 1.5       | 0.28          | 5           |
| КЛ-11-3.5        | 3.5       | 0.28          | 10          |
| КЛ-11-5.0        | 5.0       | 0.28          | 14          |
| КЛ-11-8.2        | 8.2       | 0.35          | 28          |
| КЛ-11-9.4        | 9.4       | 0.35          | 32          |
| КЛ-11-290-ТО     | 29.0      | 0.35          | 100         |

## Silica stitched-bonded sheets

| Sew-knit sheets | Width, cm | Thickness, mm |
|-----------------|-----------|---------------|
| ПВП-КТ11-2П     | 85        | 1.0           |
| ПВП-КТ11-3П     | 85        | 1.5           |
| ПВП-КТ11-4П     | 85        | 2.0           |
| ПВП-КТ11-6П     | 85        | 3.0           |

Upon customers special request, NPO Stekloplastic produces heat insulating materials from super-thin and ultra-thin silica fibers of 1.5 - 2.0  $\mu\text{m}$  and 0.8 - 1.0  $\mu\text{m}$  diameter.



**WE ARE ALWAYS PLEASED TO COOPERATE WITH OUR PARTNERS AND MEET ALL THEIR REQUIREMENTS, WHICH MAY OCCUR IN THE COURSE OF DEVELOPING NEW TYPES OF HEAT PROTECTION ON THE BASE OF SILICA MATERIALS.**

# HIGH TEMPERATURE RESISTANT SILICA & QUARTZ FIBERS

India Office :  
Tel: +91 120 4460697  
Mobile:  
+918929505072

[info@soltex.in](mailto:info@soltex.in)  
[export@soltex.in](mailto:export@soltex.in)  
[www.soltex.in](http://www.soltex.in)

In India, Represent by Soltex Trade Private Limited

