R.STAT/S fibres:
security and heat resistance in textiles

Stainless steel is well-known for its electrical conductive properties as well as for its optimal thermal behaviour (resists to very high temperatures).

The problems

Electrostatic discharges

Static electricity is generated at the surface of two substances when they are separated thus creating severe separation of positive and negative charges accumulated at their surface. It creates a wellknown "discharge", the degree of which is dependent on speed, pressure, moisture content and temperature.

This discharge creates a spark whose effects are:

- **uncomfortable electrical shocks** when changing clothes, when getting out of the car, when holding a door knob after walking on a carpet…)
- **electronic device malfunctions** involving further maintenance costs (computers, on board flight electronic devices…)
- **fires** (in « dry material » environment such as paper pulp, sawmills…) and even **explosions** in explosive environments (grain silos, petrol stations, flour mills, industries…)

Making material sufficiently conductive with the adding of antistatic/conductive fibres is the solution to neutralize static electricity.

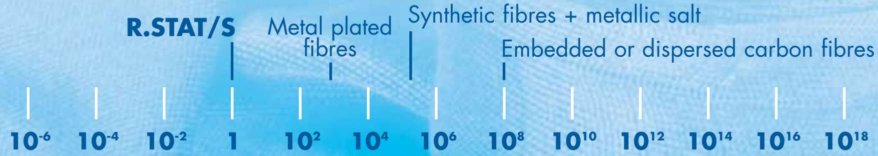
Heat resistance

Some end-uses demand that textile materials resist to very high temperature while not altering the quality of production. Glass industry for example (car windows or glass articles) uses woven or knitted fabrics exclusively composed of stainless steel (moulds or gripping pliers are covered with stainless steel fabrics). Stainless steel fabrics are preferred to fibre glass fabrics: they resist to a higher temperature and offer an optimal glass quality while lasting longer.

The solution

Ultra thin stainless steel fibres (8µ to 22µ) with a high level of conductivity. The fineness of these fibres make them suitable for textiles. The most common type is alloy AISI 316L but other alloys are possible on request.
AISI 316L alloy (main constituants): Fe 68 % Cr 18 % Ni 12 % Mo 2 %.

Linear electrical conductivity (in Ω/cm):



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R.STAT/S product range

R.STAT/S fibres should be blended at a low rate that will be determined according to the construction of the textile material, according to its conditions of process and use and to the degree of static protection level expected. When an antistatic/conductive continuous yarn is used, the rate of introduction is of less importance than the way the antistatic/conductive yarn is introduced.
For thermal application, stainless steel is used in pure (glass industry) or blended with other heat resistant fibres (meta-aramid).

	dTex	Electrical conductivity in Ω/cm	Tensile strength in cN	Elongation
R.STAT/S 8µ	4	150-170	7,5 +/- 10 %	1 %
R.STAT/S 12µ	9	60-80	18 +/- 10 %	1 %
R.STAT/S 22µ	30	10-30	55 +/- 10 %	1 %

R.STAT/S is available (other product types on request)**:**

Broken staple fibre	Broken slivers	Spun yarns	Continuous filaments
100 % steel 12µ 50 % steel 12µ – 50 % PET	2 to 6 gr/m 100 % steel blends + steel on request	Nm 8 to Nm 15 100 % steel blends on request	35 to 40 µ / 1 F 12 µ 275 F x 2 other on request




Behaviour (indicative, only for fibre and not guaranted for the finished product)**:**

Dyeing	No contra-indication according to our experience
Washing	> 50 on fibre
Temperature	600°C
Sweat	No alteration in contact with alkali nor acid pH
Special care	Chlorine and sulfuric acid are prohibited
Remark	AISI 316L alloy complies with 94/27/CE guideline (the more the alloy contains nickel, the more the passive layer is insulating and the less nickel is released)

Applications

- industrial non-wovens (filtration),
- protective clothing,
- smart textiles (heating, communicating…),
- electromagnetic shielding,
- carpets,
- glass industry (carglass, glassware…),
- burners, gaskets…

These examples are not exhaustive. Do not hesitate to inquire about your project and we'll find for you the most suitable solution.

Examples of products:

Composition	Product	Surface resistivity in Ω	Cross resistance in Ω
98 % PET – 2 % R.STAT/S	Shoe insole / DIN 54345	10^3	10^2
50 % viscose – 30 % wool 19 % PET – 1 % R.STAT/S	Protective clothing EN 1149	10^3	10^3
95 % PET – 5 % R.STAT/S	Filter felt / DIN 54345	10^3	10^2

Norms

Textile material including a suitable content of R.STAT/S fibres can pass the following norms:
- **EN 1149** parts 1 (surface resistivity) and 2 (cross resistance): electrostatic properties for protective clothing.
- **DIN 54345**: electrostatic properties of textiles (floorings, non-wovens, fabrics), included part 5 (electrostatic properties of non-wovens for filter media).

These values are non contractual and just indicative. We reserve the right to complement or amend them. More information, based on assimilated experience, is available on request. The given examples are only guidelines for you to design your own products. Information will be given on the basis of your own specifications that must have been supplied to R.STAT and is not a guarantee by R.STAT. Control, certification and validation of products (under their final commercial form and under real conditions of use) including R.STAT's technology lies with every user of R.STAT products.

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