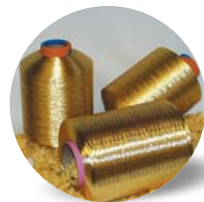
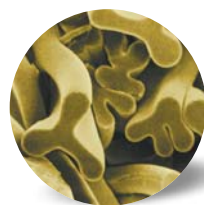


technical data

P84 Polyimide fibre

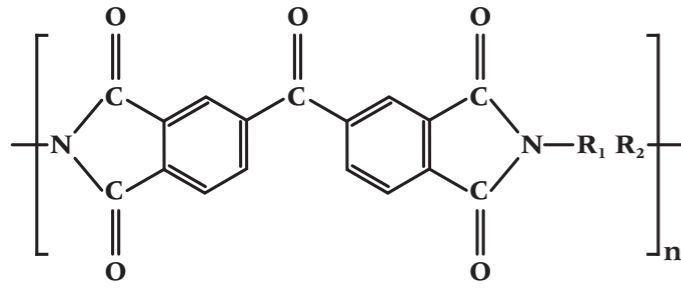
product range

- Unique multilobal cross section
- Non flammable
- No melting point
- Thermal stability up to 260 °C (500 °F)
- Resistant to most organic solvents, acids, fats and fuels
- Excellent insulating behavior



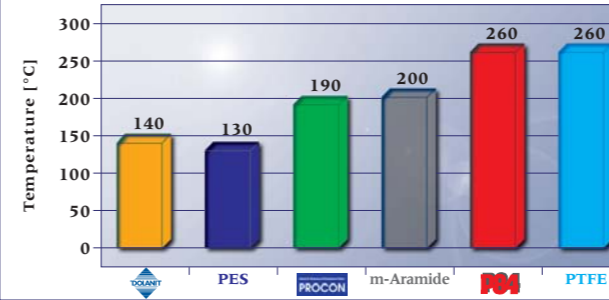
P84

P84 Chemical Structure



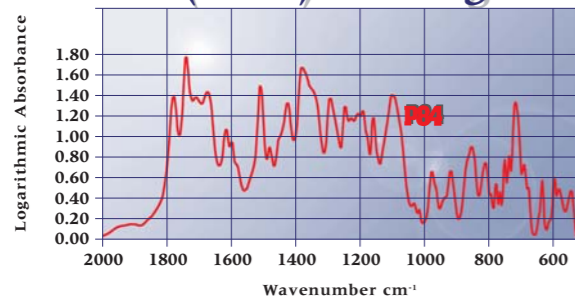
- P84 is composed of aromatic backbone units only. Therefore it is a recommended material for high temperature applications.
- Despite the aromatic, halogen free structure it is classified as non flammable with a limiting oxygen index (LOI) of 38 %.

Maximum Service Temperatures of Fibres



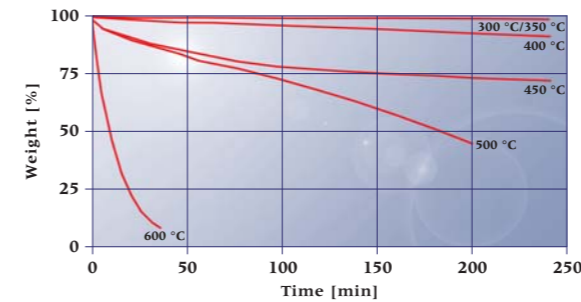
- The chart shows the maximum service temperatures of different fibres.
- The applicable continuous temperatures are lower depending on the environment and the expected life times the fibres are exposed to.

P84 Fourier Transformed Infrared (FTIR) Investigation



- The Fourier Transformed Infrared (FTIR) shows the typical pattern of a P84 polyimide.

Isothermal Weight Loss of P84 Fibre



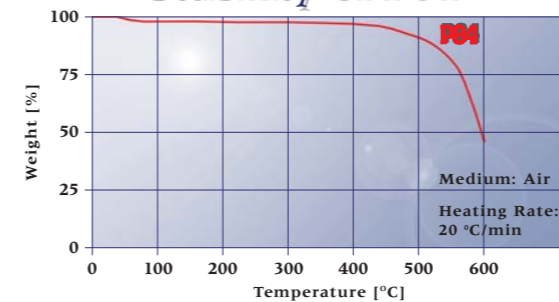
- The weight loss of P84 is recorded versus time at different temperatures.
- Up to a temperature of 350 °C (662 °F) the weight loss is below 3 % and corresponds to the moisture content of the fibre.

P84 Fibre Characteristics

• Tenacity (dry):	38 cN/tex	4,3 g/den
• Elongation:	30 %	
• Shrinkage (@240 °C, 15 min):	< 3 %	
• Density:	1.41 g/cm ³	88 lb/ft ³
• Limiting Oxygen Index (LOI):	38 %	
• Glass Transition Temp. (T _g):	315 °C	599 °F

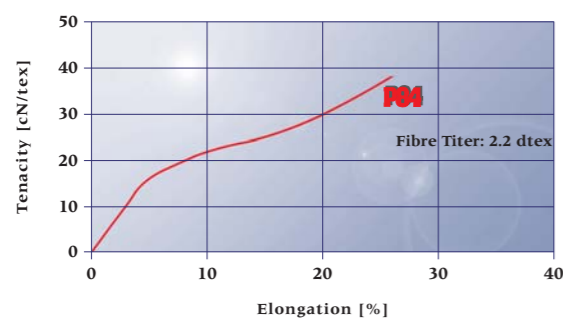
- The shown values together with the shape of the tension/elongation curve (see diagram below) demonstrate that P84 is a typical textile fibre.

Short Term Temperature Stability of P84



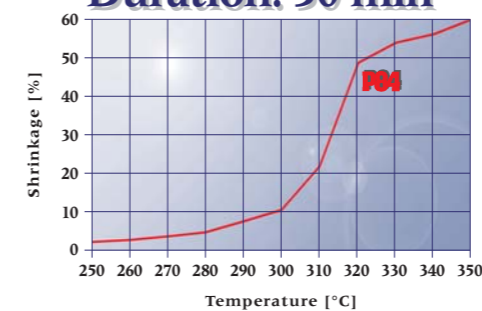
- When subjected to high temperatures, P84 degrades the same way as many other organic polymers leaving a carbon structure. However, the decomposition temperature is extremely high as shown in the diagram.

P84 Tension / Elongation Behavior



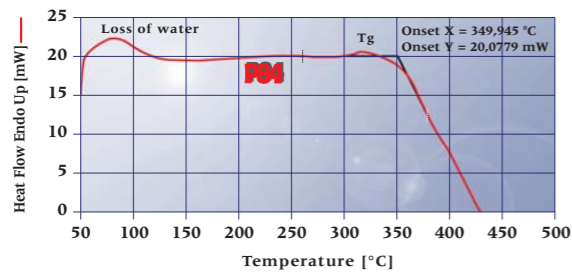
- According to the data, which show a low modulus and a relatively high elongation, P84 is very well suited for textile applications and can be processed with minor adjustments using standard textile equipment. The irregular lobed cross section and the crimp are responsible for the bulkiness and the volume of the fibre.

P84 Fibre Shrinkage Characteristics Duration: 30 min



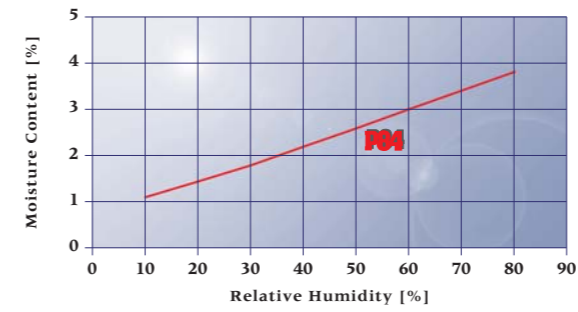
- During the manufacturing process the fibres are stretched and the polymer molecules oriented to a certain extent. When exposing the fibres to temperatures near the glass transition temperatures a reorientation of the molecules takes place and the fibres shrink. The diagram shows the significant increase of the shrinkage after 30 minutes exposure at temperatures at and beyond 315 °C (599 °F).

Differential Scanning Calorimetry (DSC) - Diagram of P84 in Air



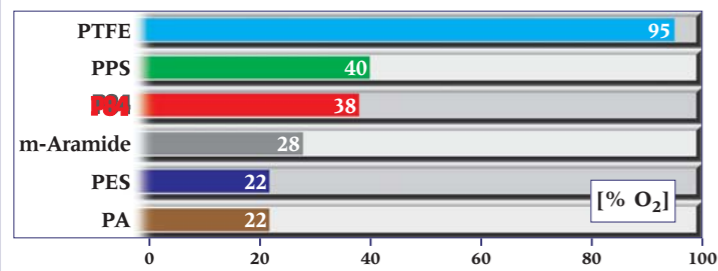
- This diagram shows whether a material consumes or generates thermal energy during a defined temperature program. Especially crystalline modification changes and melting temperatures can be detected using this method. P84 has no peaks indicating crystalline regions or melting behavior, only a glass transition temperature is observed.

Moisture Gain of P84 at 20 °C



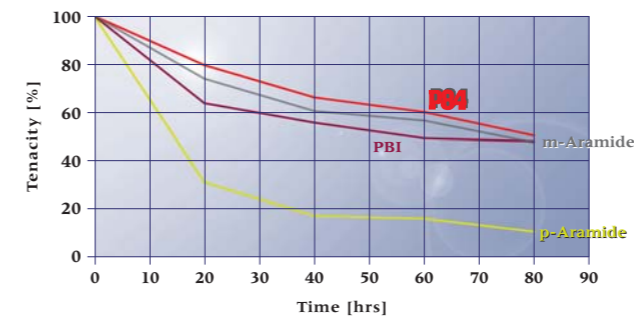
- At standard conditions of 20 °C (68 °F) and 60 % relative humidity, the moisture gain of P84 fibres is 3 % only.

Limiting Oxygen Index (LOI) of Fibres



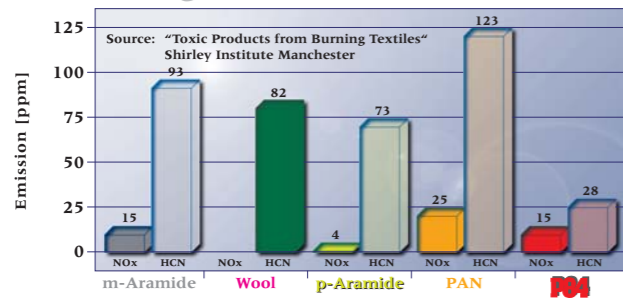
- The LOI indicates the level of oxygen needed to keep the material burning after ignition.
- P84 is classified as non flammable in atmospheric conditions.

UV - Radiation Resistance



- In the UV-radiation test P84 shows a superior performance compared to other aromatic fibres.

Emission of Toxic Gases at Degradation of Fibres



- Gas volume and gas composition are strongly depending on conditions like excess or shortage of oxygen. Under the chosen conditions P84 fibres show the lowest generation of toxic HCN (cyanic acid).

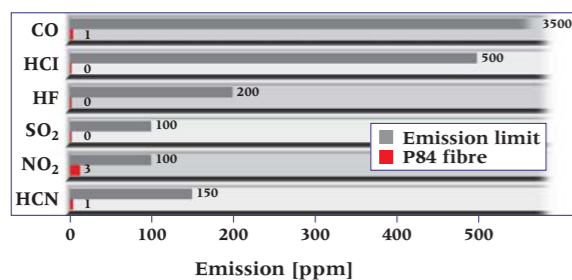
Electrical Properties of P84

Tested on a 50 µm thick film

Test Methods: DIN53481 and 53483

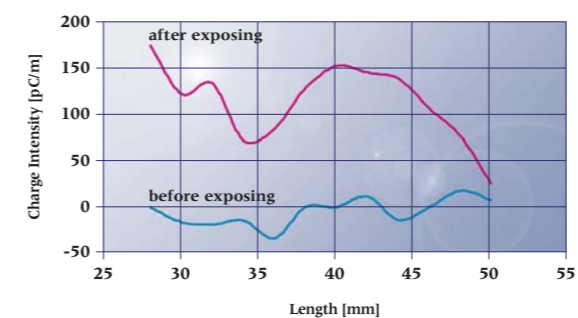
Dielectric Strength	DC	415 V/µm
	AC (50 Hz)	280 V/µm
Dielectric Constant	50 Hz (absolutely dry)	3,5
Dissipation Factor	1 kHz	0,001
Volume Resistivity		10 ¹⁷ Ohm

Toxic Emissions acc. to ATS 1000.001 or BSS 7239



- According to ATS 1000.001 which limits the toxic emissions for aircraft interior, P84 shows excellent performance.

Electric Charge of P84 Fibres



- The diagram shows the electric charge along the length of a P84 fibre before and after exposing to an electric field using a corona charge of 20 kV.

All fibres do have either positive or negative charges due to functional groups of the polymer and electrostatic excess charges. P84 filter media can be charged to improve the filtration performance with special dusts.

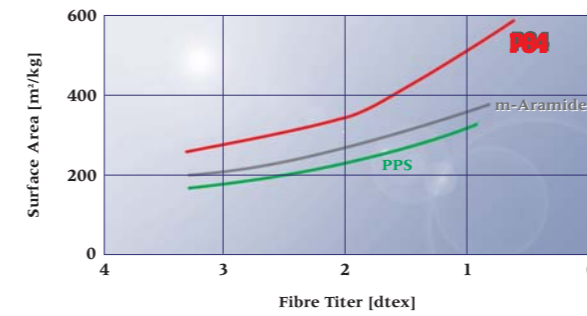
Chemical Properties of P84

Chemicals:	Concentration (%)	Temp. (°C/°F)	Time (hrs.)	Effect on tenacity
Sulphuric acid	10	20/68	100	no
Nitric acid	10	20/68	100	no
Hydrochloric acid	20	50/122	24	minimal
Hydrobromic acid	37	20/68	100	no
Hydrofluoric acid	40	20/68	100	no
Acetone	100	20/68	1000	no
Benzene	100	20/68	1000	no
Perchloroethylene	100	70/158	168	no

no = 0 to 15 % Loss in tenacity, minimal = 16 to 30 % Loss in tenacity

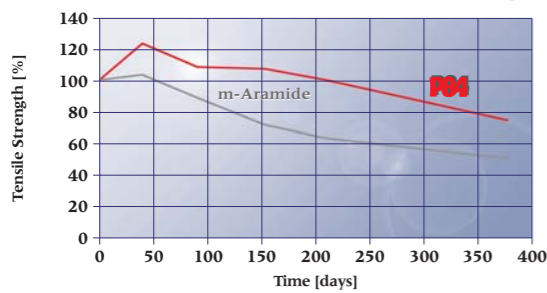
- P84 provides good chemical stability to all common solvents such as alcohols, ketones, chlorinated hydrocarbons and a wide range of other chemicals. It also offers high resistance to fats, oil and fuel. In addition P84 fibres have a proven record of good resistance in a broad range of pH conditions.

Surface Area vs Fibre Titer



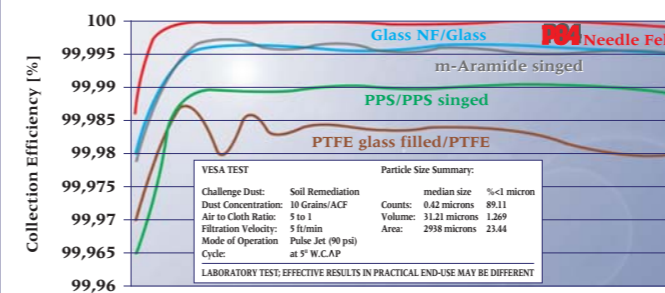
- The large surface area primarily depends on the cross section and on the fibre titer (fineness).
- All other fibres with same titer do not meet the specific surface area values of P84.

Loss of Tensile Strength of Needle Felts due to Oxidative Aging



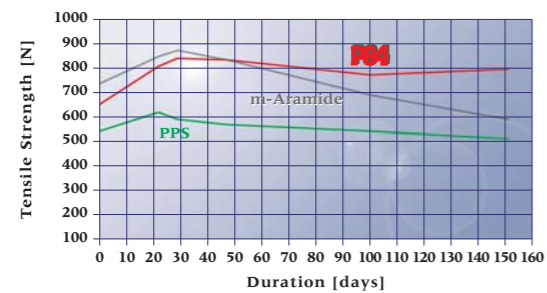
- Fibres exposed to air at high temperatures are deteriorated by oxygen. The experimental results shown in the chart were carried out at 210 °C (410 °F) and show the superior performance of P84 compared to m-aramides.

VESA Test Comparison of Filter Fabrics Fly Ash from a Stoker Boiler



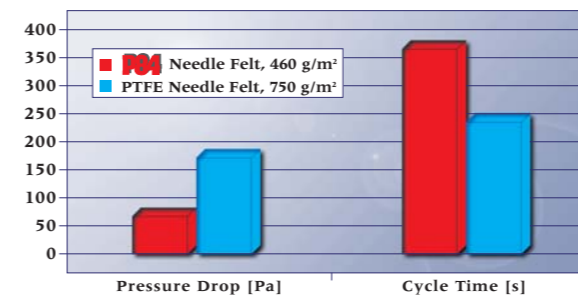
- The VESA test (Variable Environmental Simulation Analysis), developed in Phoenix Arizona, shows the superior filtration efficiency of P84 filter material. The test compares the filtration characteristics of various materials under defined conditions. Dust samples are preselected from existing installations. With an efficiency close to 100 % the toughest emission requirements can be achieved.

Hydrolysis Stability of Filter Fabrics @ 50 vol% Moisture, 170 °C



- Even under extremely high moisture contents, P84 outperforms many of its competitors being available for high temperature filtration applications.

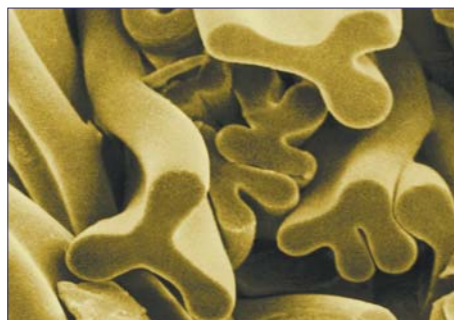
VDI 3926 Filter Performance Test



- The chart shows the results obtained in a filtration efficiency test acc. to VDI 3926 with needle felts manufactured out of PTFE and P84 fibres. The data compared are taken after 30 cleaning cycles at 1000 Pa differential pressure and demonstrate the outstanding filtration performance of P84 compared to PTFE fibres.

Test conditions:
Test dust: Pural NF; $c_s = 5 \text{ g/m}^3$;
A/C = 1,5 m/min; cleaning at 1000 Pa

Cross Section of P84 Fibres



- The unique multilobal cross section offers up to 90 % more surface area compared to conventional round fibres and is the key advantage of P84. This increased surface area results in the highest filtration efficiency of conventional fibres, even for sub micron particles.
- The fibres meet the requirements of all common textile processing steps. Besides standard grades, micro denierfibres are part of the production range.

Standard Fibre Grades and Packaging

Staple Fibres	Titers:	0,6 1,0 1,7 2,2 3,3 5,5 8,0 dtex
	Cut lengths:	50 - 100 mm
	Bales:	100 or 150 kg
Filament Yarn	Titer:	1060 dtex, 480 single threads, 80 t/m
	Boxes:	12 cones à 3,5 kg
Colors	Staple Fibres:	natural golden yellow or spundyed
	Filament Yarn:	natural golden yellow or spundyed

Spundyed Fibres & Filaments available on request

Color	Number
black	601
navy-blue	301
orange	202
brown olive	501
dark gold	703



In the heart of Europe



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