Highly sophisticated products Various applications

Structural material for Aircrafts

Structural material for high-speed trains

Improve thermal resistance for electrical products

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X-超美斯™

SRO GROUP (CHINA) LIMITED X-FIPER™ Aramid·Insulation·Paper

X-超美斯™

X-FIPER™
Aramid·Insulation·Paper

Non-toxicity and flame retardant ○ Thermal stability ○ Dielectric strength ○
Other characters ○ Chemical compatibility ○ Mechanical strength ○

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Technology Leading the Future

SRO GROUP (CHINA) LIMITED

>> SRO Group (China) Ltd. is a high technology professional company manufactures X-FIPER™ insulation paper and meta-aramid fibers along with its derivatives. It focuses on the creation and development of new materials as well as the new application development of these new materials. It has its headquartered in Hong kong while productions, research and development bases, sales and marketing capabilities spread around areas including Shanghai, Guangzhou, Wuxi, and Suzhou.

>> SRO Group owes many patent related to new materials invention. We have won the 2nd Prize in the National Science & Technology Progress Award from China National Education Board in 2008, second prize Chinese Ministry of Education advance in technology in the same year, as well as First Prize from China National Textile & Apparel Council (CNTAC) in 2009.

>> SRO Group is the first company in China which industrialized the production of insulation paper, and it is also the second company in the world which has the ability to industrialize the production of insulation paper.

>> SRO Group has major breakthroughs in aramid honeycomb application in aeronautical, high speed train and ship making etc.

Fill up *40* years' technology gap of China

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X-FIPER™ aramid insulation paper mass production in Mar. 16, 2007.

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Technology Leading the Future

Outstanding advantages of X–FIPER™ aramid paper

>> Dielectric strength

- Calendered X-FIPER™ paper has good dielectric strength higher than 10kV/mm, can improves the products' dielectric strength when further varnish or resin treated.

>> Thermal stability

- The dielectric property and mechanical property of X-FIPER™ paper will keeps unchanged under the environment temperature lower than 200℃. It's been tested that properties of the X-FIPER™ sustain under 220℃.

>> Non-toxicity and flame retardant E320646

- X-FIPER™ paper is flame retardant with UL 94(E320646) approved. Established on the inner molecular structure's characters, the paper is non-toxic to human and animals, in accordance with environmental protection requirements.

>> Mechanical strength

- Calendered X-FIPER™ paper is smooth with good wear resistance, high tensile strength and tear strength, easy to shape and further process.

>> Chemical compatibility

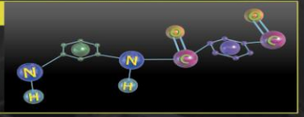
- X-FIPER™ paper products remain stable in most of common solvents, acids, alkali, ketone, mellow and corrosive environment. They are compatible with all types of varnish, adhesives, transformer oils and other electrical equipment parts.

>> Other characters

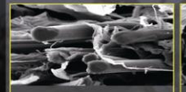
- Moisture resistant, low-temperature resistant and radiation resistant etc.

Meta–Aramid Fiber

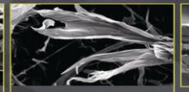
- Nontoxic and flame retardant
- High temperature resistant
- Chemical stability



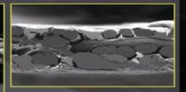
>> Aramid paper composition



X-FIPER™
Meta- aramid short cut fiber
provide the mechanical strength



X-FIPER™
Meta- aramid fibrid
provide the dielectric strength and extensibility



X-FIPER™
Meta- aramid paper SEM

X-FIPER™
Aramid·Insulation·Paper

Non-toxicity and flame retardant ○ Thermal stability ○ Dielectric strength ○
Other characters ○ Chemical compatibility ○ Mechanical strength ○

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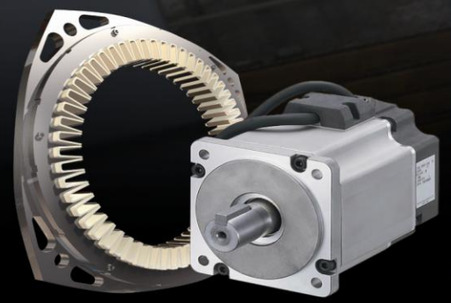
Technology Leading the Future

Application



Electrical Insulation Application

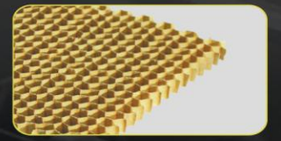
Electrical Insulation · X-FIPER™

X-FIPER™ aramid paper and it's other derivative products can be widely used in transformers, motors and other electrical devices, provide stable electric insulation. Also used for high temperature resistant application, such as PCB.

For aramid honeycomb application

Aramid Honeycomb · X-FIPER™

Honeycomb core made from X-FIPER™ aramid paper can be widely used in space, aviation, high-speed trains and sports gear fields.



Structural material for aircrafts

Inner material for ski

Structural material for high-speed trains

X-FIPER™
Aramid·Insulation·Paper

Non-toxicity and flame retardant ○ Thermal stability ○ Dielectric strength ○
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High–temperature resistant aramid insulation paper

Outstanding performance

- Flexible composite materials made from X-FIPER™ aramid paper and polyester or polyimide film, AMA™or AHA™ flexible laminates are widely used as insulation layers in transformers and motors etc.
- Flexible composite materials reach Class H level;
- High temperature resistant, high mechanical strength and easy shaping;
- Insulation protection for electrical devices;
- Used in insulation systems at 220℃

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X-FIPER™ 316

High-temperature resistant aramid insulation paper

Product description

X-FIPER™316 meta-aramid paper possess outstanding characters of high temperature resistant, dialectical strength, mechanical strength and flame retardant, get UL94 approval.

Product features

> X-FIPER™ aramid paper provide high temperature protection for composite materials.
> X-FIPER™ aramid paper provide protection from tearing and mechanical damage for composite materials.
> Wide thickness range of Composite materials made from X-FIPER™ aramid paper.
> Composite materials made from X-FIPER™ aramid paper possess high temperature resistant, anti-electrical breakdown, abrasion resistant, flexible and easy to process and shape.

Typical application

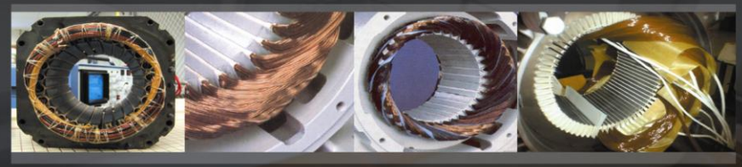
X-FIPER™ 316 is used for flexible laminates materials, which are made of polyester or polyimide film, widely used in F and H class transformers and other electrical equipments, already used in the system of 220℃ high temperature insulation system.

> Typical applications in electric equipments

- slot insulation
- layer insulation
- phase insulation
- slot wedge

> Typical application in transformers

- Layer insulation
- Turn to turn insulation
- screen insulation



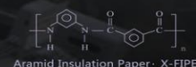
Datasheet

Aramid Insulation Paper· X-FIPER™

X-FIPER™ 316

Thickness		1.5 mil 0.04mm	2 mil 0.05mm	3 mil 0.08mm	5 mil 0.13mm	
Test Item	Unit	Typical value	Typical value	Typical value	Typical value	Test standards
Typical thickness	mm	0.04	0.05	0.08	0.13	ASTM D374
Basic weight	g/m²	28	41	63	116	ASTM D646
MD tensile strength	N/cm	17.6	30.9	50.1	100.1	ASTM D828
CD tensile strength	N/cm	8.5	17.8	22.9	54.6	ASTM D828
MD elongation	%	5.2	6.3	8.4	9.8	ASTM D828
CD elongation	%	4.3	5.3	5.9	6.5	ASTM D828
Dielectric strength	kV/mm	8.5	8.5	8.5	8.5	ASTM D149

Note: All above data are typical values or average values, pls inquire technical service rep. for details.



Aramid Insulation Paper· X-FIPER™

X-FIPER™
Aramid·Insulation·Paper

Non-toxicity and flame retardant ○ Thermal stability ○ Dielectric strength ○
Other characters ○ Chemical compatibility ○ Mechanical strength ○

High–temperature resistant aramid insulation paper

Outstanding performance

- Widely used in dry type transformers;
- High temperature resistant, high strength, tear resistant, puncture resistant, abrasion resistant and easy processing;
- UL94 approval;
- X-FIPER™ aramid paper will not give out poisonous smoke and harmful substances under fire condition;
- Save production cost, minimize transformer size, reduce weight, and effectively extend service life.

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X-FIPER™ 630

High-temperature resistant aramid insulation paper

Product description

X-FIPER™ 630 meta-aramid paper, get UL94 approval; 2mil 3mil,5mil are ready. More products with different thickness are coming to serve electric power industry.

Product features

> Outstanding electrical insulation
> Mechanical protection from punching, tearing and wearing
> Varnish compatibility
> Moisture resistant and good heat conductivity
> Outstanding heat stability

Typical application

X-FIPER™ 630 is mainly used for wire wrapping and other sheet form insulations, also can be worked into laminates materials and various shaped products, widely used in insulation fields of transformers and electrical equipments.

> Dry type transformer
- Layer insulation
- Turn to turn insulation
- Lead insulation
- screen insulation

> Rotating equipment
- Slot insulation
- Layer insulation
- Phase insulation
- Slot wedge

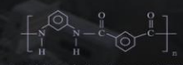
> Battery insulation partition and heat protection in PCB.

Datasheet

Aramid Insulation Paper· X-FIPER™

X-FIPER™ 630

Norminal Thickness	mil mm	2 0.05	3 0.05	5 0.13	7 0.18	Test standards
Typical thickness	mil mm	2.2 0.06	3.1 0.08	5.2 0.13	7.2 0.18	ASTM D374
Basic weight	g/m^2	41	63	116	175	ASTM D646
Density	g/cc	0.71	0.81	0.87	0.96	
MD tensile strength	N/cm	35	52	128	185	ASTM D828
CD tensile strength	N/cm	15	20	45	95	
MD elongation	%	5.5	5.5	8.5	10	ASTM D828
CD elongation	%	4.5	5.5	6.5	8.5	
MD Initial Tear	N	9.5	15	25	35	ASTM D1004
CD Initial Tear	N	5	7	11	20	
Dielectric strength -AC rapid rise	V/mil	250	260	270	236	ASTM D149
	kV/mm	8.5	9.5	9.5	9	
Volume resistivity	ohm.cm	2×10^{16}	1×10^{16}	1×10^{16}	1×10^{16}	ASTM 257
Dielectric constant at 50HZ		1.3	1.5	1.9	2.3	ASTM D150
Dissipation factor at 50HZ×(10^{-3})		6	6	7	10	
Thermal conductivity	mw/m.k	90	95	121	122	ASTM E1530



Aramid Insulation Paper· X-FIPER™

X-FIPER™
Aramid·Insulation·Paper

Non-toxicity and flame retardant ○ Thermal stability ○ Dielectric strength ○
Other characters ○ Chemical compatibility ○ Mechanical strength ○

High–temperature resistant aramid insulation paper

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X-FIPER™ 611

High-temperature resistant aramid insulation paper

Product description

X-FIPER™ 611 is the uncalendered precursor of X-FIPER™ 630. It is available in five thickness 5 to 23mil(0.13 to 0.58mm).With the density of 0.3 and correspondingly lower electrical and mechanical properties.

Product features

X-FIPER™ 611 has lower electrical and mechanical properties.X611 offers good impregnability and satruability when using in cast resin applications as turn and layer insulation.

Typical application

X611 can be used in application such as motor phase insulation and transformer coil end filler, where high bulk and conformability are required.

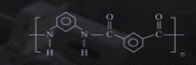
Datasheet

Aramid Insulation Paper· X-FIPER™

X-FIPER™ 611

Norminal Thickness	mil mm	5 0.13	7 0.18	10 0.25	15 0.38	23 0.58	Test standards
Typical thickness	mil mm	5.5 0.14	8.1 0.2	10.2 0.26	16.8 0.43	26 0.66	ASTM D374
Basic weight	g/m^2	42	57	82	134	205	ASTM D646
Density	g/cc	0.3	0.31	0.31	0.31	0.31	
MD tensile strength	N/cm	30	35	50	105	110	ASTM D828
CD tensile strength	N/cm	11	16	18	39	43	
MD elongation	%	6.4	6.3	4.5	6	6	ASTM D828
CD elongation	%	5.5	6.8	5.5	11	13	
MD Initial Tear	N	10	12	11	27	30	ASTM D1004
CD Initial Tear	N	3.5	6.7	5.5	11	13	
Dielectric strength -AC rapid rise	V/mil	240	192	150	150	150	ASTM D149
	kV/mm	8	7	6	6	6	
Volume resistivity	ohm.cm	2×10^{17}	2×10^{17}	2×10^{17}	2×10^{17}	2×10^{16}	ASTM 257
Dielectric constant at 50HZ		1.1	1.1	1.1	1.2	1.2	ASTM D150
Dissipation factor at 50HZ×(10^{-3})		3	4	4	5	5	
Thermal conductivity	mw/m.k	54	57	57	57	59	ASTM E1530
MD shrinkage at 240℃,40min	%	0.4	0.4	0.3	0.2	1.2	
CD shrinkage at 240℃,40min	%	0.0	0.3	0.2	0.3	1.5	

Note: All above data are typical values or average values, pls inquire technical service rep. for details.



Aramid Insulation Paper· X-FIPER™