

metastar[®] YT510, a calendered paper, offers excellent dielectric strength, mechanical properties, flexibility and resilience. There are 9 thicknesses, from 2 mil to 30 mil (0.05mm to 0.76mm). YT510 is used in almost every known electrical sheet insulation applications. High temperature resistance YT510 can offer short-term overloading.

Electrical Properties

The typical electrical property values for **metastar**[®] YT510 paper are shown in Table1. The AC Rapid Rise dielectric strength data of Table1, representing voltage stress levels, withstood immediate at a frequency of 50Hz.

Figure 1 shown temperature effect on dielectric capacity (0.08mm, 3mil). As shown in Figure 1, Temperature has a minor effect on electric properties and resistivity versus.

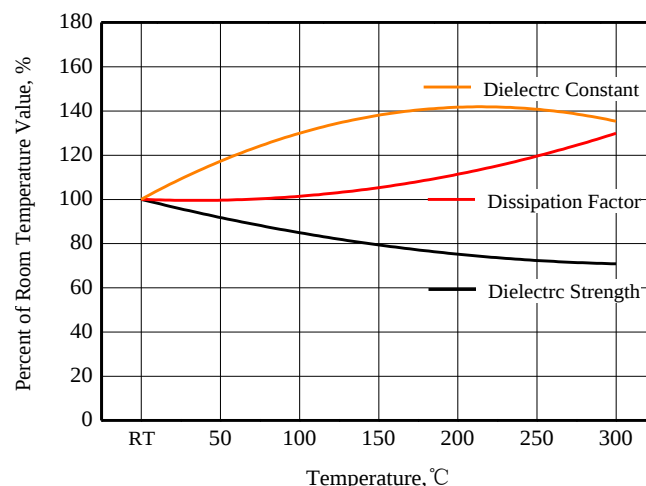


Figure 1-a Effect of Temperature on Electric Properties of Metastar[®] 510 Paper

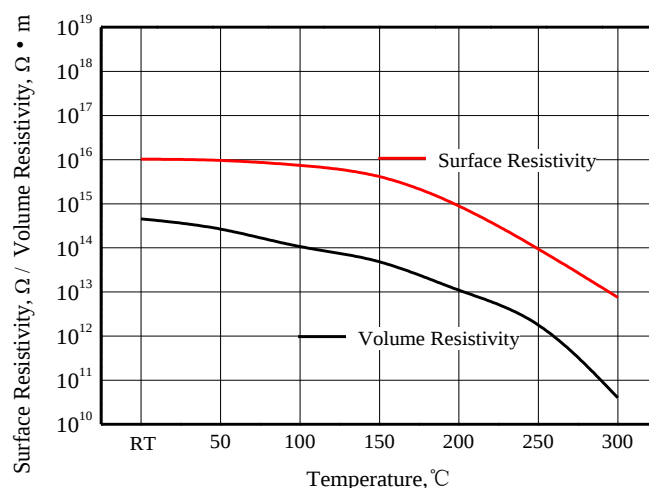


Figure 1-b Effect of Temperature on Resistivity Versus of Metastar[®] 510 Paper

Table 1 Typical Electrical Properties of **metastar**[®] YT510 Aramid Paper

Nominal Thickness	mil	2	3	5	7	10	12	15	20	30
	mm	0.05	0.08	0.13	0.18	0.25	0.30	0.38	0.51	0.76
Dielectric Strength ¹⁾	V/mil	330	355	450	500	550	575	500	450	475
	kV/mm	13	14	18	20	22	23	20	18	19
Dielectric Constant ²⁾	—	1.5	1.5	2.1	2.4	2.5	2.7	3.0	3.1	3.2
Dissipation Factor ²⁾	×10 ⁻³	4	5	6	7	8	8	8	8	8

1) Testing standard GB/T1408.1-2006, using Φ25 mm top electrode and Φ75 mm bottom electrode;

2) Testing standard GB/T1409-2006, using Φ50 mm electrode and 50Hz test frequency.

The effects of moisture (humidity) on the electrical properties of **metastar**® YT510 are shown in Table 2. It shows that it only have minor effect on electrical parameters.

► Table 2 Effect of Humidity on

Resistivity Versus of Metastar® 510 Paper

Relative Humidity	%	OD	50	95
Dielectric Strength	kV/mm	16.4	16.2	15.6
Dielectric Constant	—	2.1	2.1	2.1
Dissipation Factor	$\times 10^{-3}$	5.3	6.0	5.9
Surface Resistivity	$\frac{\Omega}{\times 10^{13}}$	1600	160	0.0025
Volume Resistivity	$\frac{\Omega \cdot m}{\times 10^{13}}$	11	36	0.0330

Mechanical Properties

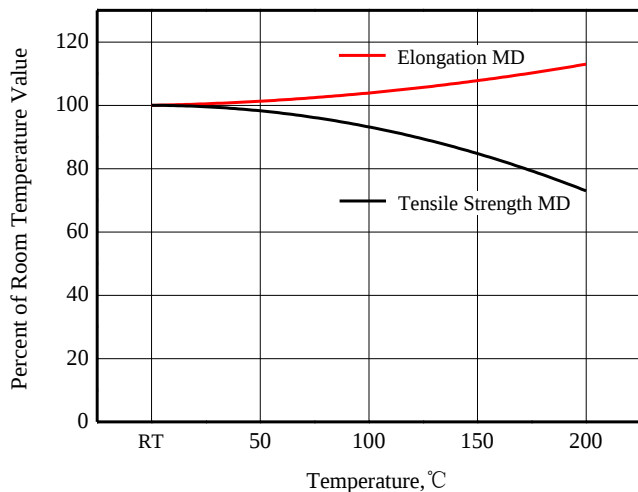
metastar® YT510 have compact structure, smooth surface, stable size and excellent mechanical properties. Table 3 is the typical mechanical properties of YT510.

Figure 2 and 3 reflects the temperature and moisture effect on mechanical properties of **metastar**® YT510 paper. The influence of two factors are similar, like elongation, tear strength and toughness are improved, tensile strength are small decreased. We suggest that the paper should be kept sealed in its protective polyethylene wrapper, to maintain uniform moisture content, until just before use.

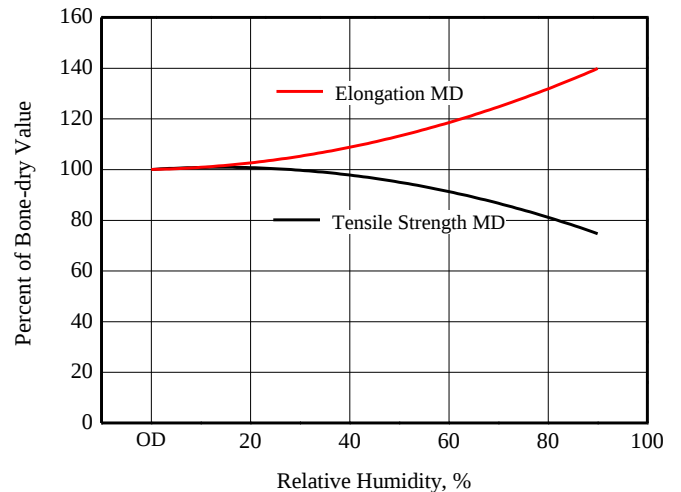
► Table 3 Typical Mechanical Properties of **metastar**® YT510 Aramid Paper

Nominal Thickness	mil	2	3	5	7	10	12	15	20	30	Testing standard
	mm	0.05	0.08	0.13	0.18	0.25	0.30	0.38	0.51	0.76	
Typical Thickness	mm	0.055	0.078	0.13	0.18	0.245	0.29	0.365	0.515	0.755	GB/T451.3-2002
Basis Weight	g/m ²	41	63	116	175	249	309	390	510	690	GB/T451.2-2002
Density	g/cc	0.74	0.80	0.90	0.97	1.01	1.06	1.07	1.00	0.91	
Tensile Strength N/cm	MD	39	66	140	220	255	320	380	500	650	GB/T12914-2008
	CD	15	29	56	105	165	200	260	345	450	
Elongation%	MD	7.0	8.5	10.0	11.0	13.5	16	13	13	13	
	CD	6.5	9.0	11.5	12.5	14.5	15.5	12	13	12	
Tear Strength ³⁾ N	MD	0.65	1.00	2.00	3.50	5.00	6.50	10.00	13	N/A	GB/T455-2002
	CD	1.15	1.70	3.30	4.80	6.00	8.00	13.50	16	N/A	
Shrinkage at 300°C %	MD	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	IEC60819-2:2002
	CD	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	

3) Elmendorf tear strength, MD=Machine direction, CD=Cross direction.



► Figure 2 Temperature Effect on Mechanical properties



► Figure 3 Humidity Effect on Mechanical properties

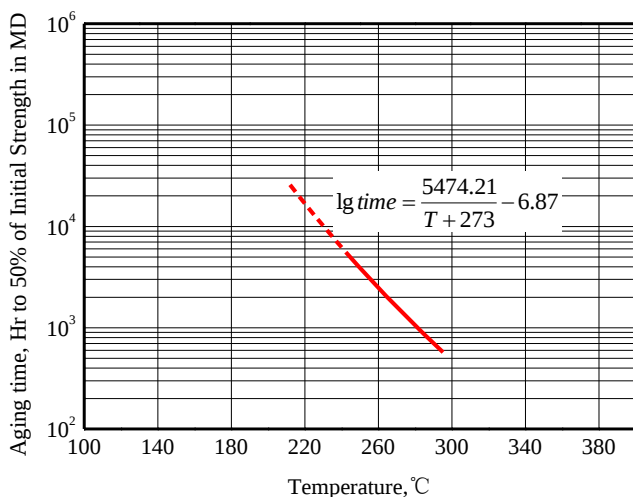
Terminal Property

Terminal property is an important property of aramid paper. it represents the work ability of long-time exposure of paper to high temperature. **metastar**® paper is confirmed as 220°C insulation by UL, and also confirmed by many years' application.

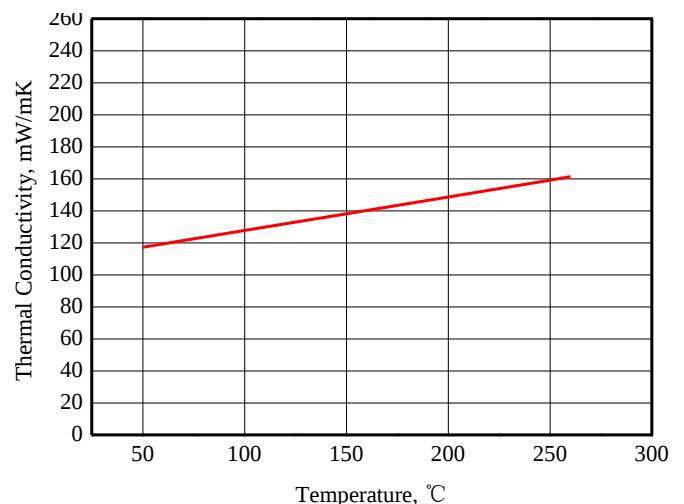
Figure 4 is the relationship between paper's useful life and temperature. Through Arrhenius aging equation, the RTI of YT510's is 215.4°C,

when under 400, it could remain high mechanical properties for 18.1hours.

Terminal conductivity, the thermophysical property of solid materials, represents the ability of conduct terminal about insulation materials. It determines radiating ability of massive structure. The conductivity of **metastar**® paper is closed to fiber paper, and is positively correlated with density, as shown in Figure 5.



► Figure 4 Useful life Versus Temperature
of Metastar® 510-0.05mm (2mil) Paper

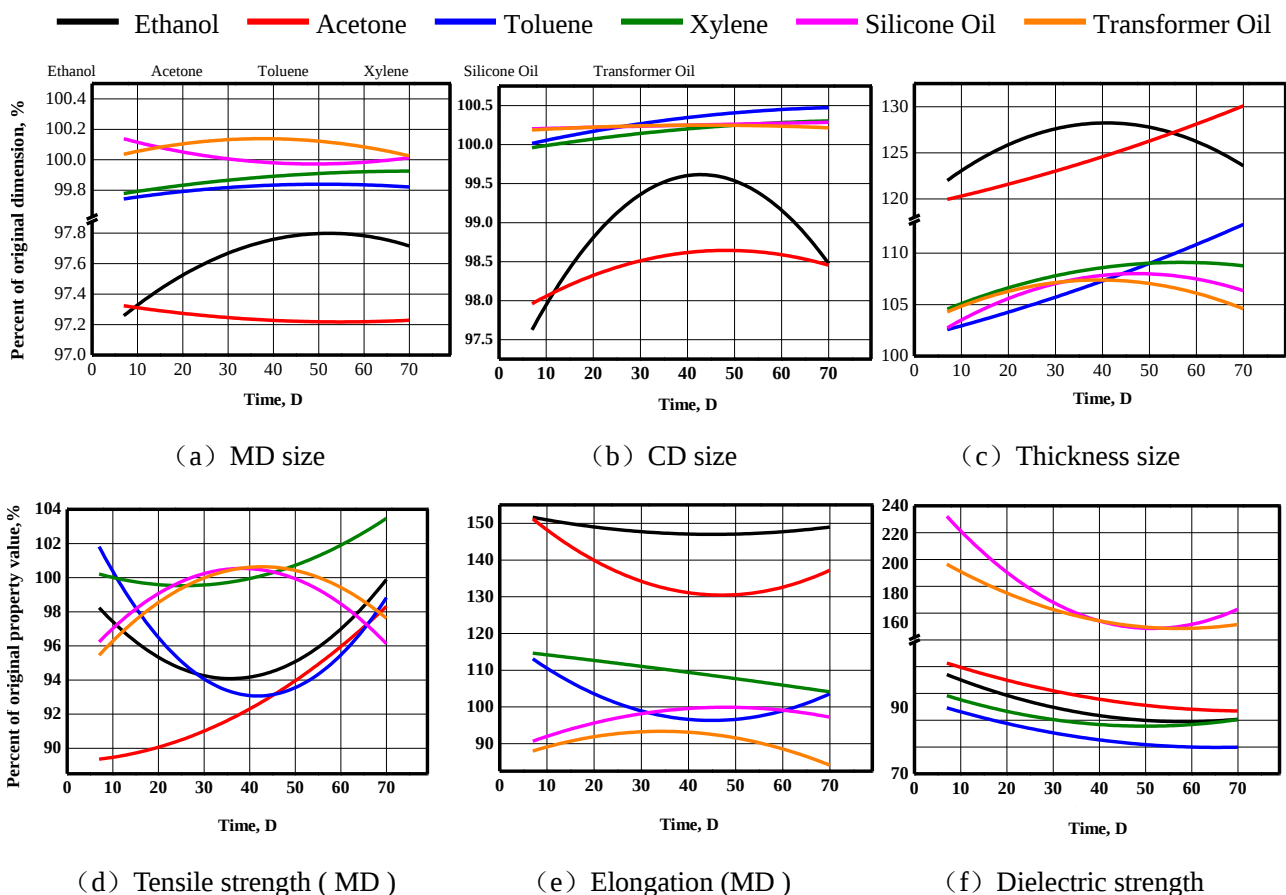


► Figure 5 Thermal Conductivity Versus Temperature
for Metastar® 510-0.25mm (10mil) Paper

Chemical Stability

metastar[®] YT510 have excellent chemical stability. Owing to its stable molecular structure and corrosion resistance, it has a slight softening and swelling effect on paper, like Figure 6. The compatibility of YT510 paper and its pressboard with virtually all classes of electrical varnishes and adhesives, as well as transformer fluids and with lubricating oils and refrigerants is absolutely good.

The limiting Oxygen of **metastar**[®] YT510 is over 28%, it will not support combustion or fusion in the ambient air., It forms thermal insulation protection layer under high temperature in its surface, and own UL94 VTM-0 and V-0 certification, Besides, it has nice outstanding resistance, that let YT510 could use in critical control equipment for high-radiation application.



► Figure 6 Chemical stability of Metastar[®] YT510-0.08mm Paper

metastar

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Please note:

The properties are average values and should not be used as specification limits. All properties were measured in air under 23°C, 50%RH. Metastar[®] papers have machine direction(MD) and cross direction(XD). Please orient the paper in the optimum direction to obtain its maximum potential performance.