

FRT - FLAME RETARDANT CABLE AND CONDUIT TAGS

Flame Retardant Cable Tags are made of a thermoplastic polyether-polyurethane material, which is a halogen free, flame retardant, hydrolysis and microorganism resistant material. These tags are constructed in a one material make-up, making them extremely durable and able to hold up to most elements. They are used for identification of cables, conduits and wires. The tags are supplied on a roll with a perforated carrier for easy removal.

FEATURES

- RoHS compliant
- Tear resistant
- Raw material fulfills UL94-V0

COLORS

- White
- Yellow
- Orange
- Red
- Green
- Other colors available



MATERIAL

- Thermoplastic Polyether- Polyurethane (PUR)

OPERATING TEMP

- -50°C up to +100°C. Peak +125°C / -58°F up to 212°F. Peak 257°F

SPECIFICATIONS

- Adherence: MIL81531 (SAEAS81531-1998 Clause 3.4.2/4.6.2)
- Resistance to solvents:
- MIL-STD-202G test method 215(2002)
- (MIL81531/SAE-AS81531-1998 Clause 3.4.3.)

STORAGE

- Cool and dry in original packaging

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Technical Data

DIMENSIONAL DATA

Product Code	Part Number	Color	Size	Qty/Roll
522	FRT 047 x 236-W	White	0.47" x 2.36"	1000
523	FRT 050 x 300-W	White	0.50" x 3.00"	1000
524	FRT 100 x 300-W	White	1.00" x 3.00"	500
522	FRT 047 x 236-Y	Yellow	0.47" x 2.36"	1000
523	FRT 050 x 300-Y	Yellow	0.50" x 3.00"	1000
524	FRT 100 x 300-Y	Yellow	1.00" x 3.00"	500

PHYSICAL DATA

Properties	Test Method	Typical Value
Hardness	DIN 53505	58 Shore D
Density	DIN 53479	1.27 g/cm ³
Tensile Strength	DIN 53504	30 MPa
Elongation at break	DIN53504	400%
Stress at 20% elongation	DIN 53504	13 MPa
Stress at 100% elongation	DIN 53504	19 MPa
Stress at 300% elongation	DIN 53504	33 MPa
Tear Strength	DIN 53515	110 N/mm
Abrasion Loss	DIN 53516	30 mm ³
Compression set at room temperature	DIN EN ISO 815	30%
Compression set at 70° C	DIN EN ISO 815	45%
Tensile Strength after storage in water at 80° C for 42 days	DIN 53504	20 MPa
Elongation at break after storage in water at 80° C for 42 days	DIN 53504	400%
Notched impact strength (Charpy) +23° C	DIN EN ISO 179	50 kJ/m ²
Notched impact strength (Charpy) - 30° C	DIN EN ISA 179	3 kJ/m ²

The indicated values are representative values.

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THERMAL DATA

Properties	Test Method	Typical Value
Glass transition temperature, 10°C/min	ISO 11357-1/-2	-44° C
Burning behaviour at 0.75 mm nom thickness	UL94	Class V-2
Burning behavior at 3.0 mm thickness	UL94	Class V-0
Oxygen Index	ISO 4589-1/-2	24%

UV STABILITY DATA

Results of accelerated aging testing are as a result of artificial lighting/illumination in a laboratory. Duration of test is 500 hours, which equals 10 years of exposure.

Properties	Test Method	Typical Value
UV-A 340 nm 500 hours Light 60 ° irradiation 0.76 W/m ² power duration 8 hours - Spray duration 15 min. - Condensation 50 ° duration 3,45 hour.	Visual Inspection	No creasing or cracking
	Mark Adherence	Good contrast and visibility

Properties	Test Method	Typical Value
TEST with XENON lamp, 500 hours XENON (340nm) - Light 65 ° c irradiation 0.50 W/m ² duration 1,42 hours - Light + Spray duration 0.60 W/m ² duration 18 min	Visual Inspection	No creasing or cracking
	Mark Adherence	Good contrast and visibility

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Chemical Properties

CHEMICAL RESISTANCE

Solvents Resistance

No degradation of the CMX TPU products occurs, however, according to the solvent class a variable degree of swelling and consequent reduction in tensile strength (after evaporation of the solvents, the tensile strength recovers approx. its original value).

Methanol should be considered more as a chemical reagent than as a solvent. TPU is soluble in some solvents. As test procedure, 5A test rods (DIN EN ISO 527-2) were immersed in the solvent for three weeks at 23° C, and tested for tensile strength are rounded values.

Code	Test Fluid	Swelling	Reduction of Tensile Strength %
Aliphatic	Pentan	10	20
Hydrocarbons	Cyclohexan	22	10
	Isooctan	7.5	none

Impact, Inc.'s polyether-polyurethane FRT tags behave similarly in other aliphatic and cyclo-aliphatic hydrocarbons such as methane, ethane, propane, butane, hexane, octane, petroleum ether, paraffin oil, diesel oil and kerosine (although additives can present problems).

Aromatic Hydrocarbons	Toulene	65	50
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Other aromatic hydrocarbons such as benzene and xylene have a similar affect.

Aliphatic Esters	Ethyl Acetate	70	75
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Other short-chained esters such as butyl acetate and amy acetate have a similar affect.

Aliphatic Ketones	Methyl Ethyl Ketone	130	90
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Other short-chained aliphatic ketones such as acetone and methyl isobutyl ketone = MIBK have a simiar affect

Aliphatic	MethylEthyle Chloride	190	95
Halogenated	Chloroform		Practically dissolved
Hydrocarbons	Tetrachloroethylene	75	54
1 C-atom			
1 C- atom and higher	Trichloroethane*		

* Other aliphatic halogenated hydrocarbons with 2 C-atoms and higher have a similar affect.

Aromatic	Chlorobenzene	110	60
Halogenated			
Hydrocarbons			

Other aromatic halogenated hydrocarbons have a similar affect.

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Code	Test Fluid	Swelling	Reduction of Tensile Strength %
ASTM - Oils acc. to ASTM D 471-06**	IRM 901 at 100 °C 500h	1	6
	IRM 901 at 100 °C 1000h	1	14
	IRM 902 at 100 °C 500h	9	4
	IRM 902 at 100 °C 1000h	10	5
Agents Dissolving TPU	IRM 903 at 100 °C 500h	18	8
	IRM 903 at 100 °C 1000h	20	30
	Tetrahydrofurane Dimethyl Formamide (DMF)	dissolved dissolved	dissolved dissolved
Alcohols and Fuels	Dimethyl Acetamide N-Methyl Pyrrolidone (NMP)	dissolved dissolved	dissolved dissolved
	Dimethyl Sulphoxide (DMSO) Pyridine	dissolved dissolved	dissolved dissolved
	Methanol Ethanol	28 33	6 14
FAM Test Fluids acc. to DIN 51 604*	Iso-Propanol Benzyl Alcohol	30 not measureable	4 partly dissolved
	Ethylen Glycol Glycerine	4 none	15 none
	Test Fluid A Test Fluid B Test Fluid C	67 68 43	60 74 70
Diesel Fuel Biodiesel Fuel RME @ 60°C	Diesel Fuel Biodiesel Fuel	11 27	none 21

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Code	Test Fluid	Swelling	Reduction of Tensile Strength %
Fuel Types ASTM D 471	Fuel A = Iso-Octane	7.5	none
	Fuel B = Iso-Octane Toluene 70% / 30%	25	36
	Fuel C = Iso-Octane Toluene 50% / 50%	38	44
	Fuel D = Iso-Octane Toluene 60% / 40%	31	44

* DIN 51 604, 03.1984, is the standard, established by FAM to assess the resistance of plastic materials to automotive fuels.

** The IRM reference oils are mineral oils with different paraffin and aromatics contents. The formerly used ASTM oils 1, 2 and 3 were replaced by the IRM oils 1, 2 and 3 owing to health risks, and are no longer available. The IRM oils 1, 2 and 3 are very similar in terms of their characteristics, but not identical. (FAM = Fachausschuß Mineral- und Brennstoffnormung-Professional committee for standardization of fuel stuffs) (ASTM = American Society for Testing and Materials)

Test fluid A consists of:
50.0 % by volume toluene
30.0 % by volume iso-octane
15.0 % by volume di-isobutylene
5.0 % by volume ethanol

Test fluid B consists of:
42.0 % by volume toluene
25.5 % by volume iso-octane
13.0 % by volume di-isobutylene
15.0 % by volume methanol
4.0 % by volume ethanol
0.5 % by volume water

Test fluid C consists of:
20.0 % by volume toluene
12.0 % by volume iso-octane
6.0 % by volume di-isobutylene
58.0 % by volume methanol
2.0 % by volume ethanol
2.0 % by volume water



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