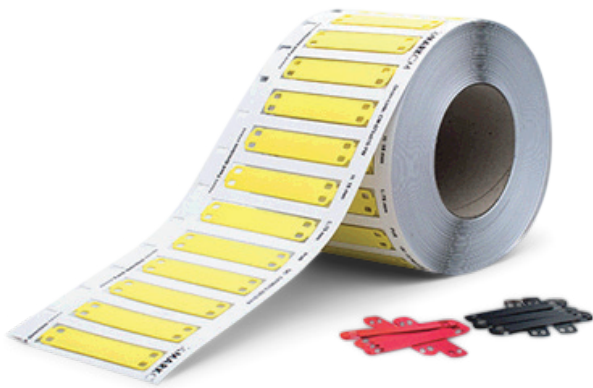


# CM Cable Markers

## Halogen Free, Flame-retardant Polyether based TPU

### TECHNICAL DATA SHEET

Revision Number. 1  
Last Edited 16. september 2019



Cable Markers in extruded from halogen free and flame retardant PUR (Thermoplastic Polyether-Polyurethane) material which is hydrolysis "No break down in water" and micro organism resistant. Its extremely strong with high tear strength, suitable for a variety of in and outdoor applications where durable mark permanence is de facto standard. The labels are fixed to the cable or wire using cable ties at both ends. The product is supplied on a paper liner. The markers are separated for easy picking after printing and supplied on rolls for thermal transfer printing. Many colours available. Get your own logo, part number and batch number printed directly on the liner for customised products.

Inbuilt quality control.

Liner can be retained for QA/supervisor process control where your part and batch number can be printed directly on the liner.

#### UV STABILITY DATA

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

## Industry



Industry



Marine



Wind power



Commercial



Aerospace



Construction



Railway



Military



Electrical installations



Petrochemical



Telecom

### STANDARD COLORS



### OTHER COLORS



### MATERIAL

halogen free, flame retarded polyether based TPU.

### OPERATING TEMPERATURE

-25°C up to +105°C  
(-13F to 176°F)

### COMPLIANCES

Mark Permanence:  
SAE AS-5942.  
Ribbon : FTI-Y black

### RESISTANCE TO SOLVENTS

MIL-STD-202G  
Test method 215  
Ribbon : FTI-Y black

### RECOMMENDED BLACK RIBBON

FTI-Y

### RECOMMENDED WHITE RIBBON

### FLAMMABILITY STANDARD

Class V-0 - UL94  
Not flammable

### UV STABILITY TEST

Test with UV lamp 340nm  
Light @ 60°C irradiation 0.76 W/m<sup>2</sup>  
Duration 8 hours  
Spray duration 15 min.  
Condensation 50°C  
Duration 3,45 hour.

### TEST with XENON (340nm)

Light 65 ° c irradiation 0.50 W/m<sup>2</sup>  
Duration 1,42 hours  
Light + Spray duration 0.60 W/m<sup>2</sup>  
Duration 18 min.

### STORAGE

Cool and dry in original packaging.  
Recommended temperature at +10°C to +25°C and 45-55% relative humidity.

### APPLICATIONS

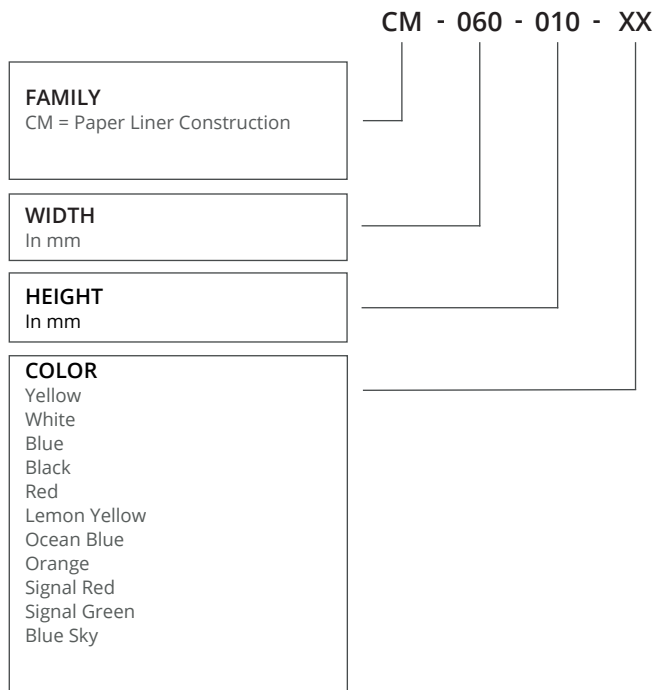
Developed to be used in normal Industry, Wind Power, Commercial, Construction, Electrical and Telecom installations, wire & cable bundling.

# Ordering Info

## PART NUMBER EXAMPLES

PART NUMBER	COLOUR	SIZE	TEXT AREA DIMENSION	MATERIAL	QTY	UOM
CM-060x010-XX	XX	60x10mm	40x10mm	TPU	1000	Roll
CM-075x015-XX	XX	75x15mm	55x15mm	TPU	1000	Roll
CM-075x025-XX	XX	75x25mm	55x25mm	TPU	500	Roll

## Product code



# General Values for TPU Identification Products

## PHYSICAL

PROPERTIES	TEST METHOD	TYPICAL VALUE
Stress at 20 % strain	DIN 53504	13 MPa
Stress at 100 % elongation	DIN 53504	19 MPa
Stress at 300% elongation	DIN 53504	33 MPa
Density	DIN 53479	1,27 g/cm <sup>3</sup>
Tensile Strength	DIN 53504	30 MPa
Elongation @ break	DIN 53504	400 %
Charpy notched impact strength, -30°C	DIN EN ISO 179	3 kJ/m <sup>2</sup>
Charpy notched impact strength, 23°C	DIN EN ISO 179	50 kJ/m <sup>2</sup>
Tensile Strength after storage in water at 80°C for 42 days	DIN 53504	20MPa
Compression set at room temperature, 24h	DIN EN ISO 815	30%
Compression set at 70°C, 24h	DIN EN ISO 815	45 %

## THERMAL

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%

## ENVIRONMENTAL

PROPERTIES	TEST METHOD	TYPICAL VALUE
UV-A 340 nm 1000 hours Light 60 ° irradiation 0.76 W/m <sup>2</sup> power duration 8 hours - Spray duration 15 min. - Condensation 50 ° duration 3,45 hour.	Visual Inspection  Mark Adherence	No creasing or cracking  Good contrast and visibility

PROPERTIES	TEST METHOD	TYPICAL VALUE
TEST with XENON lamp, XENON (340nm) - Light 65 ° c irradiation 0.50 W/m <sup>2</sup> duration 1,42 hours - Light + Spray duration 0.60 W/m <sup>2</sup> duration 18 min	Visual Inspection  Mark Adherence	No creasing or cracking  Good contrast and visibility

## CHEMICAL PROPERTIES

### CHEMICAL RESISTANCE

#### SOLVENTS RESISTANCE

No degradation of the CM 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 Hydrocarbons	Pentan	10	20
	Cyclohexan	22	10
	Isooctan	7.5	none

CMX PUR 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 similar affect.

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

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

Aromatic Halogenated Hydrocarbons	Chlorobenzene	110	60
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Other aromatic halogenated hydrocarbons have a similar affect.

ASTM-Oils acc. to ASTM D 471-06**	IRM 901 at 100 °C	500 h	1	6
	IRM 901 at 100 °C	1000 h	1	14
	IRM 902 at 100 °C	500 h	9	4
	IRM 902 at 100 °C	1000 h	10	5
	IRM 903 at 100 °C	500 h	18	8
	IRM 903 at 100 °C	1000 h	20	30

Agents Dissolving TPU	Tetrahydrofurane	dissolved	dissolved
	Dimethyl Formamide (DMF)	dissolved	dissolved
	Dimethyl Acetamide	dissolved	dissolved
	N-Methyl Pyrrolidone (NMP)	dissolved	dissolved
	Dimethyl Sulphoxide (DMSO)	dissolved	dissolved
	Pyridine	dissolved	dissolved

## CHEMICAL PROPERTIES

### CHEMICAL RESISTANCE

#### SOLVENTS RESISTANCE

CODE	TEST FLUID	SWELLING	REDUCTION OF TENSILE STRENGTH %
Alcohols and Fuels	Methanol	28	6
	Ethanol	33	14
	Iso-Propanol Benzyl Alcohol	30 not measureable	4 partly dissolved
	Ethylen Glycol Glycerine	4 none	15 none
FAM Test Fluids acc. to DIN 51 604*	Test Fluid A	67	60
	Test Fluid B	68	74
	Test Fluid C	43	70
Diesel Fuel Biodiesel Fuel RME @ 60°C	Diesel Fuel	11	none
	Biodiesel Fuel	27	21
Fuel Types ASTM D 471	Fuel A = Iso-Octane	7.5	none
	Fuel B = Iso-Octane Touene 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

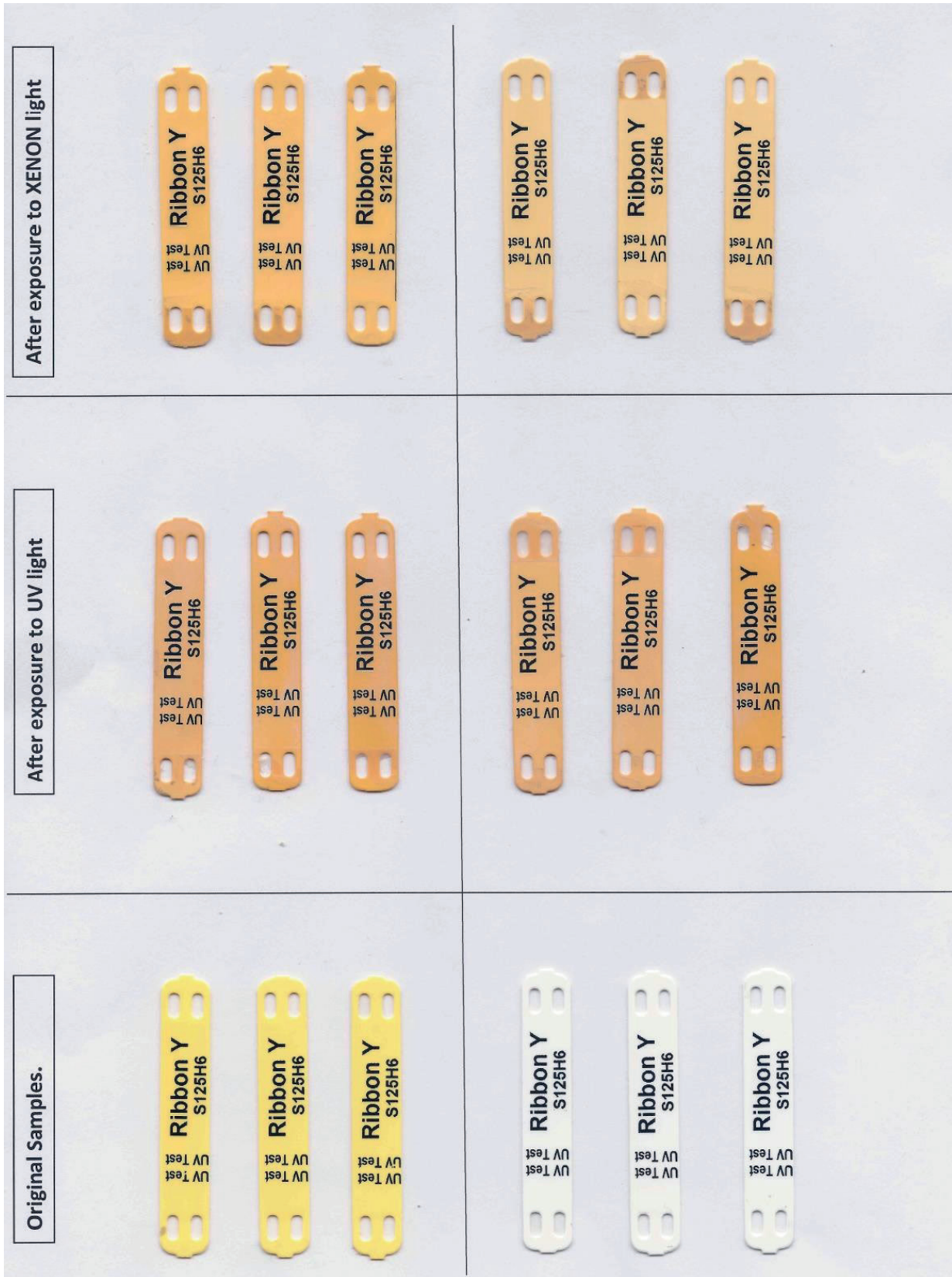
Test fluid B consists of:

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

UV RESISTANCE



This information and data is believed to be accurate and reliable. Although the information and recommendations set forth herein are presented in good faith and believed to be correct as of this date, Link Solutions makes no representations as to the completeness or accuracy thereof. We place at your disposal the technical information necessary for the correct use of our products. As conditions and methods of use are beyond our control, that the person receiving the same will make their own determination as to the suitability for their purpose. We reserve the right to modify characteristics with the aim of improving the product and adapting it to the requirements of the market.