

# CM Cable Markers

## Halogen Free, Flame-retardant Polyether based TPU

### TECHNICAL DATA SHEET

Revision Number. 1  
Last Edited 15. september 2023



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

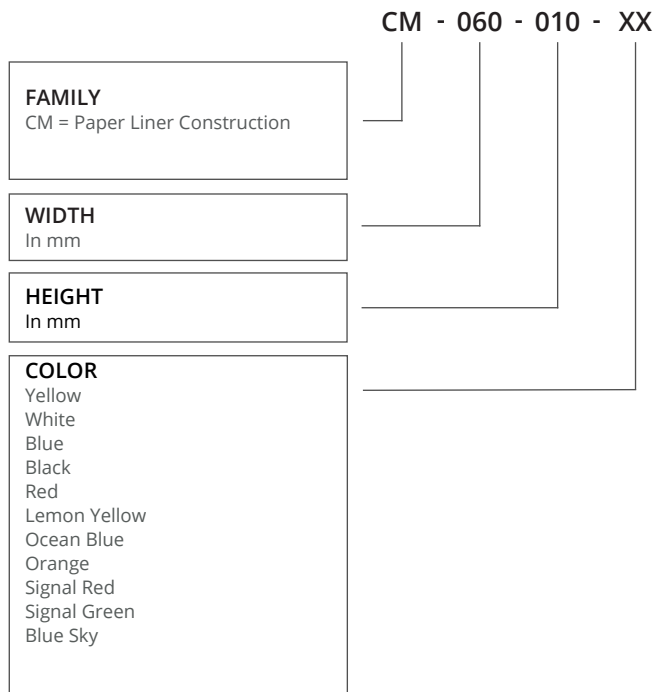
Developed to be used in normal Industry, Wind Power, Commercial, Construction, Electrical and Telecom installations, wire & cable bundling.

# 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<br>0.76 W/m <sup>2</sup> power<br>duration 8 hours<br>- Spray duration 15 min.<br>- Condensation 50 ° duration 3,45 hour. | Visual Inspection<br><br>Mark Adherence | No creasing or cracking<br><br>Good contrast and visibility |

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

Other aromatic hydrocarbons such as benzene and xylene have a similar affect.

|                  |               |    |    |
|------------------|---------------|----|----|
| Aliphatic Esters | Ethyl Acetate | 70 | 75 |
|------------------|---------------|----|----|

Other short-chained esters such as butyl acetate and amy acetate have a similar affect

|                   |                     |     |    |
|-------------------|---------------------|-----|----|
| Aliphatic Ketones | Methyl Ethyl Ketone | 130 | 90 |
|-------------------|---------------------|-----|----|

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            |     | Practically dissolved |
| 1 C-atom and higher                          | Tetrachloroethylene   | 75  | 54                    |
|  | Trichloroethane*      |     |                       |

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

|                                   |               |     |    |
|-----------------------------------|---------------|-----|----|
| Aromatic Halogenated Hydrocarbons | Chlorobenzene | 110 | 60 |
|-----------------------------------|---------------|-----|----|

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<br>Benzyl Alcohol          | 30<br>not measureable | 4<br>partly dissolved           |
|  | Ethylen Glycol<br>Glycerine             | 4<br>none             | 15<br>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<br>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<br>Touene 70% / 30% | 25                    | 36                              |
|  | Fuel C=Iso-Octane<br>Toluene 50% / 50%  | 38                    | 44                              |
|  | Fuel D=Iso-Octane<br>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

