Chemical Resistance Chart
For Protectowire XCR & CTI-X Jacket Material

Protectowire XCR and CTI-X detector jackets demonstrate excellent overall chemical resistance. In general only a few species are known to chemically attack the jacket and significantly swell the polymer causing damage to the jacket material.

The XCR and CTI-X fluoropolymer jacket is especially resistant to:

- most acids and acid mixtures,
- weak bases,
- salts, aliphatic hydrocarbons, alcohols,
- strong oxidants and halogens.

However, some chemicals can attack and swell the jacket, particularly at high temperature:

- esters, aromatic hydrocarbons, amines, gaseous fluorine,
- ethers, ketones, amides, partially halogenated solvents and certain halogenated compounds.

Chemical attack and jacket swelling are very complex phenomena. A partial list of factors affecting chemical suitability of all Protectowire Linear Heat Detector jacket materials for chemical applications is as follows:

- Specific chemical or mixture composition,
- Temperature and temperature variation,
- Concentration of the attacking chemical which may be a complex completely different than the individual components,
- Exothermic heat or mixing pressure due to the effect of pressure on a reactive gas,
- Time of exposure, velocity, or material thickness.

The recommended procedure to determine suitability of Protectowire jacket materials is as follows:

- Determine as accurately as possible the chemicals in the application in question,
- Determine the maximum temperature and the normal operating temperature,
- Review the chemical effect ratings including the maximum recommended temperature from the charts provided.

The maximum recommended temperatures listed in the XCR/CTI-X Chemical Resistance Chart refer to the point at which the chemicals indicated would damage the jacket material. These temperatures have no relationship to the alarm temperature of the Detector, but should be referenced to determine if limitations to the maximum recommended ambient temperature for the Detector is necessary in chemical environments. Any breach or adverse chemical effect on the integrity of the Protectowire jacket, will lead to premature detector failure and a reduced service life for the product.

The Protectowire Company, Inc.
60 Washington Street, Pembroke, MA 02359-1833 U.S.A.
781-826-3878; Fax 781-826-2045;
Web site: www.protectowire.com; E-Mail: pwire@protectowire.com

Manufacturer of Special Hazard Fire Detection Systems

Chemical Resistance Chart
For Protectowire XCR & CTI-X Jacket Material

This chemical resistance chart cannot predict the effect on the jacket of complex chemical mixtures. The appropriate chemical resistance tests using a representative sample of the chemical(s) or a trial installation of the Protectowire Linear Heat Detector should be performed to determine acceptable product performance.

Chemical	Formula	Concentration	Max. Temp. [°C]
Acids			
Hydrochloric	HCl	37%	135
Hydrofluoric	HF	40%	120
Nitric	HNO_3	11 - 70%	65
Phosphoric	H_3PO_4	<85%	135
Sulphuric	H_2SO_4	93 - 98%	65
Bases			
Ammonium hydroxide	$NH_4(OH)$	100%	135
Calcium hydroxide	$CA(OH)_2$	100%	120
Sodium hydroxide	NaOH	<10%-stabilized at pH13.5	25
Sodium hypochlorite	NaClO	5%	110
Hydrocarbons			
n-Hexane	$CH_3(CH_2)_4CH_3$	100%	135
Toluene	$C_6H_5CH_3$	100%	80
Alcohols and Ethers			
Methyl alcohol		100%	135
Ethanol	CH_3CH_2OH	100%	110
Organic Acids, Esters and Ketones			
Acetic acid	CH_3COOH	100% 50%	50 95
Acetone	CH_3COCH_3	10%	40
Formic acid	HCO_2H	100%	120
Ethyl formate	$C_3H_6O_2$	100%	25
Solvents			
Benzene	C_6H_6	100%	75
Methylene chloride	CH_2Cl_2	100%	40
Ethylene dichloride	$C_2H_4Cl_2$	100%	120
Halogenated Solvents			
Chlorobenzene	C_6H_5Cl	100%	75
Chloroform	$CHCl_3$	100%	50
Amines and Nitriles			
Acetonitrile	CH_3CN	100%	40
Aniline	$C_6H_5NH_2$	100%	40
Dimethyl amine	$(CH_3)_2NH$	100%	Not resistant
Peroxides			
Hydrogen peroxide	H_2O_2	30%	95
Automotive Fluids			
Crude Oil		100%	135
Motor Oil		100%	135
Gasoline		100%	135
Diesel Fuels		100%	135
Mineral Oil		100%	135

The Protectowire Company, Inc.
60 Washington Street, Pembroke, MA 02359-1833 U.S.A.
781-826-3878; Fax 781-826-2045;
Web site: www.protectowire.com; E-Mail: pwire@protectowire.com

Manufacturer of Special Hazard Fire Detection Systems