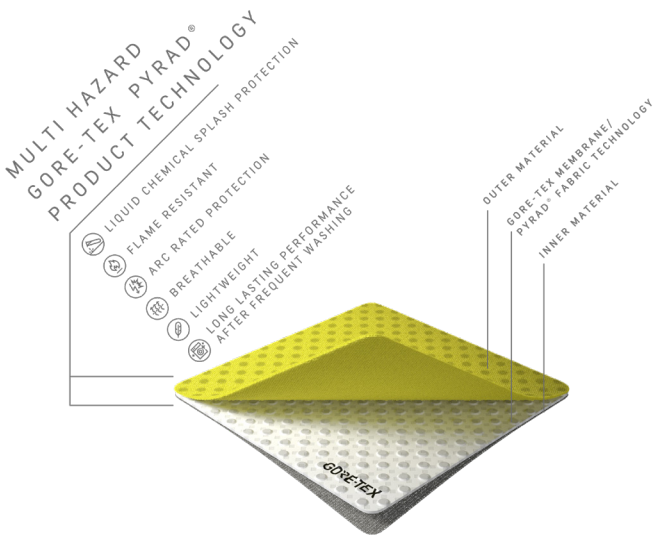
MULTI HAZARD
GORE-TEX PYRAD®
GARMENTS

CHEMICAL PENETRATION AND HOT LIQUID SPLASH RESISTANCE DATA



Multi Hazard GORE-TEX PYRAD® Garments manufactured by our certified manufacturing partners are engineered to the highest manufacturing standards and provide the only breathable and high temperature chemical protection that is certified to the NFPA 1990 Standard. The features and benefits include durable and fully sealed protection form liquid chemical penetration (NFPA 1990/1992 certified chemical splash protection), breathable, minimize risk of thermal injuries caused by incidental exposures to thermal hazards such as hot liquids (ASTM F955), steam and hot water (CAN/CSGB 155.20), flash fire (ASTM F1930) and electric arc flash (ASTM F1506). Durable and light weight solution combined with high visibility orange and yellow (ANSI 107 / CSA Z96) to improve industrial workers safety against the potential multi hazard exposures in the working environment.

CHEMICAL PENETRATION DATA

The following chemical penetration data was generated in accordance with the specific performance requirements of NFPA 1992 liquid chemical splash-protective ensembles and elements, as outlined in the 2022 edition of the NFPA 1990 standard. The Chemical Penetration Data is color coded, as described below, to assist in determining the proper application for protective clothing made with Multi Hazard GORE-TEX PYRAD® Fabric.

GREEN – CHEMICALS PRINTED IN GREEN

Multi Hazard GORE-TEX PYRAD® Fabric passes the penetration performance requirements for these chemicals.
Chemical listed in green, represent liquid splash hazards as defined by NFPA 1992 Standards.

YELLOW – CHEMICALS PRINTED IN YELLOW

These chemicals represent both potential vapor and liquid splash hazards. Multi Hazard GORE-TEX PYRAD® Fabric passes the penetration test for chemicals printed in yellow. Significant amounts of chemical vapor may permeate this fabric.
Use Multi Hazard GORE-TEX PYRAD® Fabric for these chemicals only in controlled situations if vapor exposure is acceptable. Consult a trained professional in industrial safety or hygiene when making this determination. Failure to comply with this warning may result in serious injury or death.

RED – CHEMICALS PRINTED IN RED

Do Not Use. Multi Hazard GORE-TEX PYRAD® Fabric fails the penetration test for these chemicals.

VERSION 12/23

MULTI HAZARD GORE-TEX PYRAD® FABRIC | CHEMICAL PENETRATION DATA

CHEMICAL	CONCENTRATION	CAS #	PENETRATION RESULT
Acetic Acid	Reagant Grade	64-19-7	Pass
Acetone	> 99.9%	67-64-1	Pass
Acetonitrile*	Reagant Grade	75-05-8	Pass
Amonium Hydroxide	30%	1336-21-6	Pass
Amonium Phosphate	Saturated solution	7722-76-1	Pass
Anhydrous Ammonia (Liquid at -34° C)	>99.9 %	7664-41-7	Pass
Butyl Acetate +	>95 %	123-86-4	Pass
Calcium Hydroxide	Saturated Solution	1305-62-0	Pass
Calcium Hypoclorite	Saturated Solution	7778-54-3	Pass
Chloroacetic Acid	Reagant Grade	79-11-8	Pass
Citric Acid	50%	77-92-9	Pass
Dimethylformamide*+	>95%	68-12-2	Pass
Diesel Fuel #2	Reagant Grade	68476-34-6	Pass
Ethanol	100%	64-17-5	Pass
Ethyl Acetate	Reagant Grade	141-78-6	Pass
Ethylene Glycol	Reagant Grade	107-21-1	Pass
Formic Acid	85%	64-18-6	Pass
Fuel H + (42.5% toluene, 42.5% isooctane and 15% denatured ethanol v/v)	Mixture		Pass
Hexane	Reagant Grade	110-54-3	Pass
Hydrogen peroxide	50%	7722-84-1	Pass
Hydrogen peroxide	70%	7722-84-1	Pass
Hydrochloric acid	37%	7647-01-0	Pass
Isopropyl Alcohol +	>91%	67-63-0	Pass
Methanol	>99%	67-56-1	Pass
Methly Isobutyl Ketone (MIK)+	>95%	108-10-1	Pass
Motor Oil	Reagant Grade	64742-65-0	Pass
Nitric Acid	21%	7697-37-2	Pass

MULTI HAZARD GORE-TEX PYRAD® FABRIC | CHEMICAL PENETRATION DATA
(continued)

CHEMICAL	CONCENTRATION	CAS #	PENETRATION RESULT
Nitric Acid	69%	7697-37-2	Pass
Oleum (Fuming Sulfuric Acid)	20% as free SO3	8014-95-7	Pass
Phenol	89%	108-95-2	Pass
Phosphoric Acid	80%	7664-38-2	Pass
Nitrobenzene*+	>95%	98-95-3	Pass
Sodium Chlorate	Saturated Solution	9/9/7775	Pass
Sodium Chlorite	Saturated Solution	7758-19-2	Pass
Sodium Hydroxide*+	50%	1310-73-2	Pass
Sodium Hypochlorite +	10%	7440-23-5	Pass
Sodium Hypochlorite	12.5%	7681-52-9	Pass
Sodium Hypochlorite	19%	7681-52-9	Pass
Sulfuric Acid	99.5%	7664-93-9	Pass
Sulfuric Acid*+	93.1%	7664-93-9	Pass
Tetrachloroethylene*+ (Perchloroethylene)	>95%	127-18-4	Pass
Toluene*	Reagant Grade	108-88-3	Pass
Black Liquor**	Neat	66071-92-9	Pass
Green Liquor**	Neat	68131-30-6	Pass
White Liquor**	Neat	68131-33-8	Pass
Xylene	Reagant Grade	130-20-7	Pass

\+ Chemical listed in NFPA 1990, liquid splash protection for 1992
* Liquid chemical listed in ASTM F1001, Standard for Test Chemiclas to Evaluate Protective Clothing Materials
** Consult a trained professional in industrial safety or hygiene to determine if application is acceptable for your use

HIGH PRESSURE INDUSTRIAL STEAM RESISTANCE DATA

The following data was generated using a modified ASTM F955-15 test method procedure. All testing was conducted with a cotton shirt placed underneath the Multi Hazard GORE-TEX PYRAD® Fabric, that was then placed over the calorimeter sensor board. All tests were conducted with the direct impingement of steam centered on the sensor board's top calorimeter (the bottom calorimeter was approximately 4" below the direct impingement of steam). Temperature measurements were recorded with a National Instruments NI-9211 thermocouple module with two J-type thermocoupled copper calorimeters to evaluate the heat transfer resistant properties of primary PPE for maintenance workers exposed to high pressure steam.

THERMAL HAZARD	STEAM PRESSURE (PSI)	STEAM TEMPERATURE (°F)	EXPOSURE DISTANCE (INCHES)	EXPOSURE TIME (s)	MAX TEMPERATURE INCREASE TOP/BOTTOM CALORIMETER (°C)"	PREDICTED TIME to 2nd DEGREE SKIN BURN (s)
High Pressure Steam	150	366	13,5	10	26.8 / 16.0	No Burn
High Pressure Steam	150	366	13,5	30	37.0 / 24.8	No Burn
High Pressure Steam	150	366	9,5	30	47.5 / 31.0	15,3
High Pressure Steam	150	366	2,75	30	67.1 / 29.4	5,9

HOT LIQUID SPLASH RESISTANCE DATA

The following hot liquid splash resistance data was generated in accordance with the Standard Test Method for Evaluating Heat Transfer through Materials for Protective Clothing (ASTM F955). Testing is typically performed with molten metals but also with other substances such as hot chemicals to evaluate the heat transfer properties through primary PPE of a particular end use.

ASTM F955 – Standard Test Method for Evaluating Heat Transfer through Materials

HOT LIQUID	CONCENTRATION	CAS #	TESTED QUANTITY & TEMPERATURE	TEMPERATURE INCREASE TOP/BOTTOM CALORIMETER (°C)	TIME TO 2ND DEGREE SKIN BURN(S)
White Liquor	Neat	68131-33-8	0.2 kg @ 190°F	2.0 / 2.2	No Burn
Green Liquor	Neat	68131-30-6	0.2 kg @ 190°F	1.6 / 1.5	No Burn
Black Liquor	Neat	6601-92-9	0.2 kg @ 235°F	12.8 / 14.3	No Burn
Light Mineral Oil	> 99%	8042-47-5	0.2 kg @ 300°F	5.7 / 5.5	No Burn
Molten Sulfur	> 99%	7704-34-9	0.5 kg @ 300°F	6.2 / 7.7	No Burn
Peanut Oil	> 99%	8002-03-7	0.2 kg @ 450°F	10.4 / 10.5	No Burn
Molten Aluminium	> 99%	7429-90-5	1.0 kg @ 1400°F	12.4 / 14.6	No Burn
Cement Ash	> 99%	As Received	0.1 kg @ 900°F	4.0 / 2.1	No Burn
Cement Ash	> 99%	As Received	0.1 kg @ 1500°F	6.7 / 4.1	No Burn
Smelt	Neat	AsRreceived	0.25 kg @ 1500°F	14.4 / 22.4	No Burn

Industry workers may be exposed to hot chemical processes that do not match standardized testing methods.
The final decision on using Multi Hazard GORE-TEX PYRAD® must be made by company safety leaders.

Don't see your required chemical listed? Please visit us here for more information.