

Multi Hazard GORE-TEX® PYRAD® Garments manufactured by PIP Global Safety 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 from 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 garments designed to improve safety of industrial workers against the potential multiple hazardous exposures in the working environment. Compliant with high visibility safety apparel requirement (ANSI 107 / CSA Z96).

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.

**MULTI HAZARD GORE-TEX® PYRAD® FABRIC
LIQUID CHEMICAL PENETRATION DATA**

CHEMICAL	CONCENTRAITION	CAS #	PENETRATION RESULT
Acetic Acid	Reagent Grade	64-19-7	Pass
Acetone	> 99,9%	67-64-1	Pass
Acetonitrile*	Reagent Grade	75-05-8	Pass
Acrylonitrile	100%	107-13-1	Pass
Adiponitrile	Reagent Grade	111-69-3	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

PRODUCT DATA

**CHEMICAL PENETRATION AND HOT LIQUID SPLASH RESISTANCE
DATA FOR MULTI HAZARD GORE-TEX® PYRAD® GARMENTS**



CHEMICAL	CONCENTRAITION	CAS #	PENETRATION RESULT
Calcium Hypochlorite	Saturated solution	7778-54-3	Pass
Chloroacetic Acid	Reagent Grade	79-11-8	Pass
Citric Acid	50%	77-92-9	Pass
Dimethylformamide*+	>95 %	68-12-2	Pass
Diesel Fuel #2	Reagent Grade	68476-34-6	Pass
Ethanol	100%	64-17-5	Pass
Ethyl Acetate	Reagent Grade	141-78-6	Pass
Ethylene Glycol	Reagent Grade	107-21-1	Pass
Ethylene Oxide (liquid)	100%	75-21-8	Failed
Ferric Chloride	37-42%	7705-08-0	Pass
Ferric Sulfate (50%) / Sulfuric Acid (1 - 3%) / Water (47 - 49%)	Mixture		Pass
Formic Acid	85%	64-18-6	Pass
Fuel H + (42.5% toluene, 42.5% isooctane and 15% denatured ethanol v/v)	Mixture		Pass
Hexamethylenediamine	Reagent Grade	124-09-4	Pass
Hexane	Reagent Grade	110-54-3	Pass
Hydrobromic Acid	48%	10035-10-6	Pass
Hydrogen Peroxide	50%	7722-84-1	Pass
Hydrogen Peroxide	70%	7722-84-1	Pass
Isopropyl Alcohol +	>91%	67-63-0	Pass
JP8 Jet Fuel	Neat Mixture	86290-81-5	Pass
Methanol	>99%	67-56-1	Pass
Methyl Isobutyl Ketone (MIK)+	>95%	108-10-1	Pass
Motor Oil	Reagent Grade	64742-65-0	Pass
Nitric Acid	21%	7697-37-2	Pass
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	9/9/75	Pass
Sodium Chlorite	Saturated Solution	7758-19-2	Pass
Sodium Hydroxide*+	50%	1310-73-2	Pass
Sodium Hypochlorite +	10%	7681-52-9	Pass
Sodium Hypochlorite	12.50%	7681-52-9	Pass
Sodium Hypochlorite	19%	7681-52-9	Pass
Sulfuric Acid*+	93.10%	7664-93-9	Pass

CHEMICAL	CONCENTRAITION	CAS #	PENETRATION RESULT
Sulfuric Acid	99.50%	7664-93-9	Pass
Toluene*	Reagent grade	108-88-3	Pass
Turpentine	1	9005-90-7	Pass
Black Liquor**	Neat	66071-92-9	Pass
Green Liquor**	Neat	68131-30-6	Pass
White Liquor**	Neat	68131-33-8	Pass
Xylene	Reagent grade	130-20-7	Pass

+ Chemical listed in NFPA 1990, liquid splash protection for 1992

* Liquid chemical listed in ASTM F1001, Standard for Test Chemicals to Evaluate Protective Clothing Materials

** Consult a trained professional in industrial safety or hygiene to determine if application is acceptable for your use

MULTI HAZARD GORE-TEX® PYRAD® FABRIC 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. 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.

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
Boiler Ash	Neat	As Received	0.1 Kg @ 1500°F	16.0/10.5	No Burn
Light Mineral Oil	>99%	8042-47-5	0.2 kg @ 300°F	5.7 / 5.5	No Burn
Lime Seed	Neat	As Received	0.25 Kg @ 1500°F	10.9/4.8	No Burn
Molten Sulfur	>99%	7704-34-9	0.5 kg @ 300°F	6.2 / 7.7	No Burn
Peanut Oil	>99%	3/7/02	0.2 kg @ 450°F	10.4 / 10.5	No Burn
Molten Aluminum	>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	As Received	0.25 kg @ 1500°F	14.4 / 22.4	No Burn
Zinc	Neat	As Received	1.0 Kg @ 850°F	11.7/11.5	No Burn

MULTI HAZARD GORE-TEX® PYRAD® FABRIC 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 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

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.

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