INDUSTRIAL FOOTWEAR - DEGRADATION CHART

"HYDROCARBONS (OILS & SOLVENTS)"	SUPERPOLY	SUREFLEX	POLYBLEND	ACIFORT	DURAPRO XCP	PUROFORT
ASTM #1 Oil	E	E	E	E	E	E
ASTM #3 Oil	E	E	E	E	E	E
Benzene	P	F	P	P	F	F
Benzyl Chloride	P	F	P	P	F	P
Butane	F	F	F	F	F	G
Carbon Tetrachloride	F	F	F	F	F	ND
Castor Oil	E	E	E	E	E	E
Chloroform	P	P	P	P	P	ND
Coconut Oil	G	G	G	G	G	E
Cottonseed Oil	G	G	G	G	G	E
Cutting Oil	E	E	E	E	E	E
Cyclohexane	G	G	G	G	G	E
Gasoline (Cracked)	G	G	G	G	G	G
Gasoline (SR)	G	G	G	G	G	G
Grease (All Kinds)	E	E	E	E	E	E
Hexane	G	G-E	G	G	G-E	E
Hydraulic Oil	E	E	E	E	E	E
Isooctane	G	E	G	G	E	E
Kerosene (C-T)	G	G	G	G	G	E
Kerosene (PET)	E	G	E	E	G	E
Lard Oil (158 F)	E	E	G	G	E	E
Linseed Oil	G	G	G	G	G	E
Methyl Cellosolve	F	E	G	G	E	P
Methyl Chloride	F	E	F	F	E	ND
Methylene Chloride	P	F	P	P	F	P
Mineral Oil	G	G	G	G	G	E
Naphtha	G	G	G	G	G	E
Nitrobenzene	P	P	P	P	P	P
Olive Oil	E	G	E	E	G	E
Perchloroethylene	F	G	F	F	G	F
Petroleum Oil	G	E	G	G	E	E
Petroleum Solvent	G	G	G	G	G	E
Pine Oil	E	G	E	E	G	E
Propane	F	E	F	F	E	G
Toluene (Toluol)	P	F-G	P	P	F-G	F
Trichloroethylene	F	G	F	F	G	F
Turpentine	G	G	G	G	G	G
Vegetable Oil	G	G	G	G	G	G
Xylene	P	G	P	P	G	G
Coal Tar Solvent	F	F	F	F	F	F
Beef Tallow (158 F)	E	E	G	G	E	F

"KETONES & ALDEHYDES"	SUPERPOLY	SUREFLEX	POLYBLEND	ACIFORT	DURAPRO XCP	PUROFORT
Acetone	P	F	P	P	F	F
Acetaldehyde	P	F	P	P	F	P
Benzaldehyde	P	P	P	P	P	P
Butyraldehyde	P	G	P	P	G	ND
Chloroacetone	P	P	P	P	P	ND
Formaldehyde	E	E	E	E	E	G
Furfural	P	P	P	P	P	ND
Methyl Ethyl Ketone	P	F	P	P	F	F

ALCOHOLS						
Amyl Alcohol	G	G	G	G	G	E
Benzyl Alcohol	F	G	G	G	G	P
Butyl Alcohol	G	G	G	G	G	G
Diacetone Alcohol	F	G	F	F	G	P
Diethanolamine	E	G	E	E	G	E
Ethylene Glycol	E	E	E	E	E	E
Ethyl Alcohol	E	E	E	E	E	G
Glycerine	E	E	E	E	E	E
Methyl Alcohol	G	E	G	G	E	G
Octyl Alcohol	E	G	G	G	G	E
Propyl Alcohol	E	G	E	E	G	F
Triethanolamine	E	E	E	E	E	E

ORGANIC ACIDS						
Acetic Acid	G	G	G	G	G	P
Carbolic Acid (Phenol)	F	F	F	F	F	P
Citric Acid	E	E	E	E	E	E
Formic Acid	F	G	G	G	G	ND
Lactic Acid	E	E	E	E	E	F
Malic Acid	G	E	G	G	E	E
Oleic Acid	E	G	G	G	G	E
Stearic Acid (158 F)	E	G	G	G	G	G
Tannic Acid	E	E	E	E	E	E

INORGANIC ACIDS						
Carbonic Acid	G	E	G	G	E	E
Chlorine Water	G	F	G	G	F	P
Hydrobromic Acid	G	G	G	G	G	G
-38% Hydrochloric Acid Conc	E	E	E	E	E	P
48% - 52% Hydrofluoric Acid	G	G	E	E	G	P
Hydrogen Sulfide	G	G	G	G	G	ND
Nitric Acid - 10%	E	E	E	E	E	G
Nitric Acid Conc - 70%	F	F	G	G	F	P
Perchloric Acid	F	F	G	G	F	ND
Phosphoric Acid Conc - 85%	E	E	E	E	E	P
Sulfuric Acid - 50%	E	E	E	E	E	P
Sulfuric Acid Conc- 93%	P	P	P	P	P	P

SALTS & ALKALIES	SUPERPOLY	SUREFLEX	POLYBLEND	ACIFORT	DURAPRO XCP	PUROFORT
Ammonium Hydroxide	E	E	E	E	E	E
Ammonium Sulfate	E	E	E	E	E	E
Calcium Chloride	E	E	E	E	E	E
Calcium Hypochlorite	E	E	E	E	E	G
Potassium Hydroxide	G	G	G	G	G	E
Copper Chloride	E	G	G	G	G	E
Copper Sulfate	E	E	G	G	E	E
Ferric Chloride	G	E	G	G	E	E
Potassium Dichromate	E	E	E	E	E	ND
Sodium Hydroxide	E	E	E	E	E	E-F

ORGANIC ESTERS						
Amyl Acetate	P	F	P	P	F	F
Butyl Acetate	P	F	P	P	F	F
Dibutyl Phthalate	F	G	F	F	G	
Ethyl Acetate	P	F	P	P	F	P
Ethyl formate	F	F	F	F	F	ND
Methyl Acetate	P	F	P	P	F	ND
Propyl Acetate	P	F	P	P	F	F
Tricresyl Phosphate	G	E	G	G	E	
Zinc Acetate - 10%	E	E	E	E	E	E

MISCELLANEOUS						
Acrylonitrile	F	F	F	F	F	ND
Aniline	P	F	P	P	F	ND
Battery Acid	E	E	E	E	E	P
Butter (158 F)	G	E	G	G	E	G
Buttermilk	E	E	E	E	E	G
Carbon Disulfide	F	G	F	F	G	G
Chlorophenol	F	F	F	F	F	ND
Chlorobenzene	P	F	P	P	F	P
Chlorox	E	E	E	E	E	E
Cresol	P	F	F	F	F	ND
Dichlorobenzen e	P	F	P	P	F	P
Dibenzyl Ether	F	F	F	F	F	ND
Ethyl Ether	F	G	F	F	G	ND
Hydrazine	G	E	G	G	E	ND
Hydrogen Peroxide - 30%	E	E	E	E	E	E
Milk	E	E	E	E	E	E
Monoethanolamine	G	E	G	G	E	E
Morpholine	P	P	P	P	P	ND
Paint Remover	P	F	P	P	F	P
Soaps	E	E	E	E	E	E
Tetrahydrofuran	P	F	P	P	F	P

Key to Degradation Chart:
E - Excellent
F - Fair
G - Good
P - Poor

Actual applications and conditions may vary from our laboratory testing, and therefore the information in the above chart should be used as a guide only.
Users are advised to conduct their own evaluations to determine the suitability of the footwear for each specific application.

NFPA 1991, 2016 EDITION BOOT REQUIREMENTS

NFPA – NATIONAL FIRE PROTECTION ASSOCIATION

To pass the applicable boot requirements for NFPA 1991, 2016 edition, boots are independently tested by ITS to verify compliance. Boots must resist permeation for 1 hour or more against each chemical in the NFPA 1991, 2016 edition battery. The battery consists of 18 chemical liquids and 6 chemical gases. The boots must also pass a flammability resistance test. Hazmax® boots have successfully passed all of these tests.

NFPA 1991, 2016 edition CHEMICAL BATTERY

Hazmax® Material (All tests concluded after 1 hour) [Average of 3 cells]

TABLE 5.3.1.2(A) TEST DATA FOR TECHNICAL DATA PACKAGE				
ENSEMBLE OR ELEMENT	**PERFORMANCE REQUIREMENT**	**TEST METHOD**	**REQUIREMENT**	**RESULT**
BASE REQUIREMENTS				
Footwear Upper Material	Flame Resistance	ASTM F1358 (Section 8.7)	Afterflame time ≤ 2 seconds	1.9
			No melting or dripping	None
	Cut Resistance	ASTM F1790 (Section 8.15)	Blade travel distance > 20 mm at 350 grams	>42.5
	Puncture Resistance	ASTM F1342 (Section 8.16)	Puncture force > 36 N	41.0
Footwear Toe Sections	Impact Resistance	ASTM F2412 (Section 8.31)	Impact resistance ≥ 101.7 J (12.7 mm min. clearance)	22.5
	Compression Resistance	ASTM F2412 (Section 8.31)	Compression resistance ≥ 11,121 N (0.500 inch min. clearance)	0.840
Footwear Soles and Heels	Abrasion Resistance	Iso 4649 (Section 8.19)	Relative volume loss ≤ 250 mm3	215
	Slip Resistance	ASTM F2913 (Section 8.21)	Coefficient ≥ 0.40	Forward Heel- 0.63 Backward Forepart- 0.81
Footwear Puncture Resistant Device	Puncture Resistance	ASTM F2412 (Section 8.30)	No puncture	No Puncture
Footwear Soles or Ladder Shanks	Bending Resistance	Section 8.20	Deflection < 6 mm	3
OPTIONAL FLASH FIRE REQUIREMENT	**PERFORMANCE REQUIREMENT**	**TEST METHOD**	**REQUIREMENT**	**RESULT**
Footwear Material	Heat Transfer Performance	ASTM F2700 (Section 8.18)	HTP Rating ≥ 12 cal/cm2	>30
	Flame Resistance	ASTM F1358 (Section 8.7)	Afterflame time ≤ 2 seconds	1.9
			Burn distance ≤ 100 mm	15

5.3.1.2 (B) CUMULATIVE PERMEATION (Ⲙg/CM2) OVER TEST PERIOD INTERVAL

The 2016 edition of NFPA 1991 uses a new test method in which the cumulative permeation mass replaced the use of breakthrough time as the basis of acceptable material performance. Cumulative permeation mass is the total amount of chemical that permeates through the material in 1 hour. In contrast, breakthrough time was defined as the elapsed time that occurs before the rate of permeation through the material is equal to 0.1 µg/cm²/min.

HAZMAX® 87012 PVC UPPER					
TEST PERIOD INTERVAL	**0-15 MIN**	**15-30 MIN**	**30-45 MIN**	**45-60 MIN**	**1 HOUR TOTAL**
CHEMICAL/ REQUIREMENT	**≤ 2.0**	**≤ 2.0**	**≤ 2.0**	**≤ 2.0**	**≤ 6.0**
Acetone	<0.10	<0.10	<0.10	<0.10	<0.40
Acetonitrile	<0.10	<0.10	<0.10	<0.10	<0.40
Acrolein	<0.10	<0.10	<0.10	<0.10	<0.40
Acrylonitrile	<0.10	<0.10	<0.10	<0.10	<0.40
Anhydrous ammonia (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
1,3-Butadiene (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
Carbon disulfide	<0.10	<0.10	<0.10	<0.10	<0.40
Chlorine (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
Dichloromethane	<0.10	<0.10	<0.10	<0.10	<0.40
Diethyl amine	<0.10	<0.10	<0.10	<0.10	<0.40
Dimethyl formamide	<0.10	<0.10	<0.10	<0.10	<0.40
Dimethyl sulfate	<0.10	<0.10	<0.10	<0.10	<0.40
Ethyl acetate	<0.10	<0.10	<0.10	<0.10	<0.40
Ethylene oxide (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
Hexane	<0.10	<0.10	<0.10	<0.10	<0.40
Hydrogen chloride (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
Methanol	0.12	0.25	<0.10	0.15	0.62
Methyl chloride (gas)	<0.10	<0.10	<0.10	<0.10	<0.40
Nitrobenzene	<0.20	<0.20	<0.20	<0.20	<0.80
Sodium hydroxide, 50% w/w	<0.10	<0.10	<0.10	<0.10	<0.40
Sulfuric acid, 96.1% w/w	0.15	<0.10	<0.10	<0.10	0.45
Tetrachloroethylene	<0.10	<0.10	<0.10	<0.10	<0.40
Tetrahydrofuran	<0.10	<0.10	<0.10	<0.10	<0.40
Toluene	<0.10	<0.10	<0.10	<0.10	<0.40

5.3.1.2 (B) CUMULATIVE PERMEATION (Ⲙg/CM2) OVER TEST PERIOD INTERVAL

HAZMAX® 87012 PVC UPPER					
TEST PERIOD INTERVAL	**0-15 MIN**	**15-30 MIN**	**30-45 MIN**	**45-60 MIN**	**1 HOUR TOTAL**
CHEMICAL WARFARE AGENTS					
Blister Agent Requirements	≤ 1.33	≤ 1.33	≤ 1.33	≤ 1.33	≤ 4.0
Distilled Mustard					<0.2
Nerve Agent Requirements	≤ 0.40	≤ 0.40	≤ 0.40	≤ 0.40	≤ 1.25
Soman					<0.05
Test Period Interval	0-15 min				
Optional Liquefied Gases*	≤ 6.0				
Ammonia (liquefied)	0.07				
Chlorine (liquefied)	<0.20				
Ethylene Oxide (liquefied)	<0.10				

* Liquefied chemical gases are only evaluated over 15-minute exposure period.

ONGUARD Industries, L.L.C. a Dunlop Protective Footwear Company and the Third party testing facility make no warranties or other guarantees regarding the protection afforded by particular footwear as presented. ONGUARD Industries, L.L.C. offers no warranties of merchantability or fitness for a particular use. ONGUARD Industries, L.L.C. hereby disclaims all warranties, express and implied. Actual applications and conditions may vary from our laboratory testing and, therefore, the information contained in the above listing should be used as a guide only. Users are advised to conduct their own evaluations to determine suitability of the footwear for each specific application. All tests were performed under laboratory conditions, not actual use conditions. The chemical permeation tests were performed in accordance with ASTMF-739.

Caution: Do not use this footwear for fire protection. WARNING: Electric shock resistance deteriorates rapidly in a wet environment and with wear.
AVERTISSEMENT: La résistance de décharge électrique détériore rapidement dans un environnement humide et avec l'usage.