Frontline®
Chemical/FR Protection

NFPA 1990 (1991) Apparel For Chemical Flash-Fire Protection.

- Single suit provides three-way protection – chemical, flash-fire and radiant heat.
- Provides excellent "survivability" performance – 0% body burn in Pyroman Thermal Manikin testing.
- Provides economical NFPA alternative to expensive reusable suits.
- AntiFog Expanded-View Visor System.
- Highly flexible Aquaseal® gas-tight zipper makes donning, doffing and pressure testing much easier *(photo bottom right)*.
- Applications: Hazmat response and chemical handling situations with potential for chemical flash-fire.
- For details on consolidation of NFPA 1991 into NFPA 1990 visit kappler.com/NFPA1990.

Comparison shows AntiFog vs. Standard Visor.

Frontline 500

ASTM F1001 Chemical Test Battery*

Chemical	Minutes
Acetone	>480
Acetonitrile	>480
Carbon Disulfide	>480
Dichloromethane	253
Diethylamine	>480
Dimethylformamide	>480
Ethyl Acetate	>480
n - Hexane	>480
Methyl Alcohol	>480
Nitrobenzene	>480
Sodium Hydroxide	>480
Sulfuric Acid	>480
Tetrachloroethylene	>480
Tetrahydrofuran	>480
Toluene	>480
Gases	
Ammonia Gas	>480
1,3 Butadiene Gas	>480
Chlorine Gas	>480
Ethylene Oxide Gas	>480
Hydrogen Chloride Gas	>480
Methyl Chloride Gas	>480

Chemical Warfare Agent Data**

Chemical Agent	Minutes	Criteria
Bis (2-chloroethyl) sulfide (Mustard:HD)	>480	4.0 ug/cm2
Isopropyl methylfluorophosphonate (Sarin:GB)	>480	1.25 ug/cm2
Chlorovinyl arsinedichloride (Lewisite:L)	>240	4.0 ug/cm2
O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate (Nerve:VX)	>480	1.25 ug/cm2

* Industrial chemical testing was conducted in accordance with ASTM F 739 with normalized breakthrough times reported in minutes. **Chemical Warfare Agent testing was conducted in accordance with MIL-STD-282 and/or NFPA 1990 (1991) with breakthrough times reported based on total cumulative permeation.

Note: These tests were performed in accordance with ASTM or other appropriate testing methods by independent laboratories. This data is derived from tests performed on material samples only, not finished garments, with exception of Pyroman full-body manikin test. For a complete list of chemicals tested and additional tech data visit kappler.com.

WARNING: The information contained herein is based on technical data that Kappler believes to be reliable. It is subject to revision as additional knowledge and experience are gained. Please visit our website at www.Kappler.com ("Kappler Website") for the most up-to-date product information and specifications. All pamphlets, brochures or other literature or printed material may contain information that is not as current as the information on Kappler's website. Additionally, there are uses, environments and chemicals for which Kappler products, garments and/or fabrics are unsuitable. The user has the responsibility to review all available data and verify the product, garment and/or fabric is appropriate for the intended use and meets all specified government and/or industry standards for such use. The user should review all available information on the Kappler Website, product labels and QR codes to understand the appropriate uses and limitations of Kappler products, garments and fabrics.
CAUTION: These garments are designed for protection of personnel against short duration thermal exposures. Do not use for firefighting applications. Minimize exposure to open flame or intense heat.

Frontline 500 fabric does not contain PFAS Chemistry. PFAS found in FEP lens at this time.

Kappler's AntiFog Expanded-View Visor is standard on all gas-tight suits including NFPA-certified styles.

Frontline® 500

Shown above are typical garment types for this fabric. View standard styles at kappler.com or call Customer Service for custom options.

Our labels work harder, and smarter. *Kappler's unique SMART™ label makes sizing easy to see, and a quick QR code scan provides complete chemical data plus extensive suit details.*

Removable Nomex outer glove, plus field-replaceable 2N1® Glove System which eliminates the problem of inner glove inversion.

48" gas-tight Aquaseal® zipper facilitates easier donning, doffing and pressure testing.

Frontline 500 Heat, Flame and Thermal Test Data

Frontline 500 has been tested for thermal protective performance (TPP) in accordance with ISO 17492, Clothing for Protection Against Heat and Flame, and showed a TPP value of 32.

Frontline 500 meets the requirements for flame resistance in accordance with ASTM F1358.

Frontline 500 meets requirements of NFPA 1990 (1991), including base requirements plus optional Flash-Fire and Liquified Gas requirements.

Frontline 500 has been tested in accordance with ASTM F 1930 Standard Test Method for Evaluation of Flame Resistant Clothing for Protection Against Flash Fire Simulations Using an Instrumented Manikin. The Frontline 500 ensemble garment indicated 0% body burn after a six-second burn test.

Frontline garments are designed for chemical flash-fire protection FOR ESCAPE ONLY in the event of a chemical flash fire.

For details on consolidation of NFPA1991 into NFPA 1990 visit kappler.com/nfpa-1990-consolidation or scan this QR code.

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