

## CHEMGUARD® NFF-331 3% $\times$ 3% Non-Fluorinated Foam Concentrate

### Description

CHEMGUARD® NFF-331 3% $\times$ 3% Non-Fluorinated Foam Concentrate is a 3 $\times$ 3 alcohol-resistant non-fluorinated foam concentrate that provides superior fire and vapor suppression performance for Class B polar solvent and hydrocarbon fuel fires. This concentrate proportions in a wide range of equipment including in-line eductors and balanced pressure systems using bladder tanks or foam pumps and is suitable for sprinkler systems and various applications using standard discharge devices. CHEMGUARD NFF-331 Foam Concentrate is intended for forceful or gentle firefighting applications at 3% solution on hydrocarbon fuels and at 3% solution on polar solvent fuels in fresh, salt, hard, and brackish water.

CHEMGUARD NFF-331 Foam Concentrate uses three suppression mechanisms intended for rapid fire knockdown and superior burnback resistance:

- The foam blanket has extended drain times to help block oxygen to the fuel and suppress fuel vapor
- On polar solvent fires, liquid drains from the foam blanket and forms a polymeric membrane that suppresses vapors and seals the fuel surface
- The water content of the foam solution produces a cooling effect for additional fire suppression

**Table 1: Typical physicochemical properties**

Property	Value
Appearance	Viscous yellow liquid
Density	1.12 $\pm$ 0.02 g/ml
Acidity	6.2 pH to 7.2 pH
Refractive index	1.3876 minimum
Viscosity*	3,900 $\pm$ 500 cPs at 77 °F (25 °C) at 30 rpm
Viscosity*	2,450 $\pm$ 250 cPs at 77 °F (25 °C) at 60 rpm
Viscosity**	190/440 at 375/75 s-1 mPas at 68 °F (20 °C)
Freeze point**	15.8 °F (-9 °C)
Storage and operating range	35 °F to 120 °F (2 °C to 49 °C)
<b>Notes:</b> *Brookfield Viscometer Spindle #4	
**In accordance with EN 1568: 2018 protocol	

CHEMGUARD NFF-331 Foam Concentrate is a non-Newtonian fluid that is both pseudoplastic and thixotropic. Due to these properties, dynamic viscosity decreases as shear increases.

CHEMGUARD NFF-331 Foam Concentrate is a non-fluorinated firefighting foam concentrate. This means that it does not have any intentionally added PFAS chemistry and is produced in equipment that has not handled PFAS chemistry. CHEMGUARD NFF-331 Foam Concentrate complies with directives (EU) 2017/1000 on PFOA and 2019/1021 (EU POPs directive). CHEMGUARD NFF-331 Foam Concentrate has been subjected to OECD 301F testing and after 28 days is considered readily biodegradable.



### Approvals, listings, and standards

CHEMGUARD NFF-331 3 $\times$ 3 AR-SFFF Foam Concentrate is designed in accordance with National Fire Protection Association (NFPA) Standard 11 for low-, medium-, and high-expansion foam. The concentrate is approved, listed, qualified under, or meets the requirements of the following specifications and standards:

- UL Standard 162, foam liquid concentrates
  - UL Listed for use with an extensive array of proportioning and discharge equipment, including sprinklers as required by NFPA 11.
  - UL Listed as an alcohol-resistant synthetic fluorine free foam (AR-SFFF) concentrate for use on hydrocarbon and polar solvent fuel fires.
  - Passes UL 162 Type III test protocol on hydrocarbons at design application rate of 0.10 gpm/ft<sup>2</sup> (4.1 Lpm/m<sup>2</sup>). The recommended minimum application rate for spill fire applications is 0.10 gpm/ft<sup>2</sup> (4.1 Lpm/m<sup>2</sup>).
- ULC S564, Category 2 foam liquid concentrate
- EN 1568: 2018
  - Parts 3 and 4
- GreenScreen Certified™ Silver firefighting foam concentrate



### Application

CHEMGUARD NFF-331 Foam Concentrate is intended for use on both types of Class B fires: hydrocarbon fuels with low water solubility, such as crude oils, gasolines, diesel fuels, and aviation fuels; and polar solvent fuels with appreciable water solubility, such as methyl and ethyl alcohol, isopropyl alcohol, acetone, and esters. The concentrate has excellent wetting properties that can effectively combat Class A fires. It can also be used in conjunction with dry chemical agents to provide even greater fire suppression performance.

## Application

CHEMGUARD NFF-331 Foam Concentrate is UL Listed for use with upright and pendent 5.6 k (80), 8.0 k (115), and 11.2 k (160) sprinklers on hydrocarbon and polar fuels. This concentrate can be ideal for fixed and semi-fixed foam systems using sprinklers, nozzles, foam chambers, and other standard discharge devices for applications such as the following examples:

- Industrial chemical and petroleum processing facilities
- Fuel or chemical storage tanks
- Truck or rail loading and unloading facilities
- Flammable liquid containment areas
- Aircraft hangars
- Flammable liquid warehouse storage facilities
- Mobile equipment

## Foaming properties

CHEMGUARD NFF-331 Foam Concentrate requires low energy to foam and the foam solution can be effectively applied with conventional aspirating and non-aspirating discharge devices at the correct dilution with water. Aspirating discharge devices typically produce expansion ratios from 3:1 to 10:1, depending on the type of device and the flow rate. Non-aspirating devices, such as handline water fog/stream nozzles or standard sprinkler heads, typically produce expansion ratios from 2:1 to 3:1.

**Table 2: Typical foam characteristics**

Water	Fresh	Salt
Proportioning rate	3%	3%
Expansion ratio	9.5:1	8.5:1
25% drain time (min:sec)	65:00	65:00
50% drain time (min:sec)	100:00	85:00
<b>Note:</b> In accordance with EN 1568-3: 2018 protocol		

## Proportioning

The recommended operational temperature range for CHEMGUARD NFF-331 Foam Concentrate is 35 °F to 120 °F (2 °C to 49 °C) in accordance with UL 162. This foam concentrate can be correctly proportioned using most conventional, properly calibrated, in-line proportioning equipment such as:

- Balanced and in-line balanced pressure pump proportioners
- Balanced pressure bladder tanks and ratio flow controllers
- Around-the-pump type proportioners
- Fixed or portable in-line venturi type proportioners
- Handline and monitor nozzles with fixed eductor/pick-up tubes

## Materials of construction compatibility

To help avoid corrosion, galvanized pipe and fittings should never be used in contact with undiluted CHEMGUARD NFF-331 Foam Concentrate. Refer to Johnson Controls Technical Bulletin *Acceptable Materials of Construction* for recommendations and guidance regarding compatibility of foam concentrates with common materials of construction in the firefighting foam industry.

## Storage and handling

CHEMGUARD NFF-331 Foam Concentrate should be stored in the original supplied package (HDPE totes, drums, or pails) or in the recommended foam system equipment as outlined in the Johnson Controls Technical Bulletin on the Storage of Foam Concentrates. The concentrate should be maintained within the recommended operational temperature range. Freezing of the product should be avoided.

Factors that affect the foam concentrate's long-term effectiveness include temperature exposure and cycling, storage container characteristics, air exposure, evaporation, dilution, and contamination. The effective life of CHEMGUARD NFF-331 Foam Concentrate can be maximized through optimal storage conditions and correct handling. CHEMGUARD foam concentrates have demonstrated effective firefighting performance with contents stored in the original package under correct conditions for more than 10 years. This product should not be mixed with other types of foam concentrates or other manufacturer's foam concentrates under any circumstances. The use of multiple, separately applied finished foam products for incident response is appropriate.

## Inspection

CHEMGUARD NFF-331 Foam Concentrate should be inspected periodically in accordance with NFPA 11, EN 13565-2, or other relevant standard. A representative concentrate sample should be sent to Johnson Controls Foam Analytical Services or other qualified laboratory for quality analysis in accordance with the applicable standard. An annual inspection and sample analysis is typically sufficient, unless the product has been exposed to unusual conditions.

## Ordering information

CHEMGUARD NFF-331 Foam Concentrate is available in pails, drums, totes, or bulk shipment.

**Table 3: Ordering information**

Part No.	Description gal (L)	Shipping weight lb (kg)
<b>Pails</b>		
A16381HLDV*	5 (19)	49.2 (22.3)
A163822GY6**	5 (19)	49.2 (22.3)
<b>Drums</b>		
A16381HLDY*	55 (208)	536.7 (243.5)
A163822GY7**	55 (208)	536.7 (243.5)
<b>Totes</b>		
A16381HLE1*	265 (1,003)	2,598.8 (1,178.8)
A163822GY8**	265 (1,003)	2,598.8 (1,178.8)
<b>Notes:</b> * Manufactured in the United States of America ** Manufactured in Europe Totes are not UL/ULC Approved packaging.		

Safety Data Sheets (SDS) are available at [www.chemguard.com](http://www.chemguard.com)

**Note:** The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

**Note:** While NFF (also known as SFFF) agents may be compatible with existing AFFF and/or NFF hardware, system contamination from fluorinated agents may exist if hardware and piping is not replaced upon conversion to non-fluorinated agents.

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