

Compatible Fuels & Applications

NOV Fiber Glass Systems' Red Thread® IIA and Dualoy piping systems, which includes primary and secondary pipe, primary and secondary fittings, coaxial pipe and adhesives are **UL 971 Listed** for the following fuels:

Type A	Type B
100% Reference Fuel #2 (represents Diesel, per UL)	1% HCl
100% Fuel C (represents Unleaded Gasoline, per UL)	1% Nitric Acid
85% Fuel C / 15% MTBE	Sodium Bicarbonate (pH 10)
85% Fuel C / 15% Methanol	Sodium Hydroxide (pH 12)
70% Fuel C / 30% Ethanol	100% Toluene
100% Methanol	
100% Ethanol	
50% Fuel C / 50% Methanol	
50% Fuel C / 50% Ethanol	
100% Premium Leaded Gasoline	
100% Kerosene	

Fuels not specifically tested or UL971 Listed, but **compatible** with Red Thread IIA and Dualoy piping systems, which includes primary and secondary pipe, primary and secondary fittings, coaxial Dualoy and adhesives are as follows:

- E85 (although E85 is not specifically tested, UL did test E30, E50 and E100)
- Biodiesel (all blends)
- Aviation Gas

The 2005 UL 971 Standard, which became effective July 1, 2005, required testing for the following fuel groups:

MV Fuels - Motor Vehicle

Type A - 100% Ref. Fuel #2, 100% Fuel C, 85% Fuel C/15% MTBE, 85% "C"/15% Methanol, 70% "C"/30% Ethanol
 Type B - 1% HCl, 1% Nitric Acid, Sodium Bicarbonate (pH 10), Sodium Hydroxide (pH 12)

CT Fuels - Concentrated

Type A - 100% Methanol and 100% Ethanol

Type B - None

HB Fuels - High Blend

Type A - 50% "C"/50% Methanol and 50% "C"/50% Ethanol

Type B - 100% Toluene

AM Fuels - Aviation and Marine

Type A - 100% Premium Leaded Gas and 100% Kerosene

Type B - None

The applications identified in the 2005 UL 971 Standard are as follows:

PC - Primary Carrier

SC - Secondary Containment

NV - Normal Vent

VR - Vapor Recovery

Red Thread IIA and Dualoy pipe, fittings and adhesives have been tested and UL Listed for all fuels and all applications identified in 2005 UL 971. This includes both the DW Bonded Sump Entry Fitting - termination style, and SW Bonded Sump Entry Fitting.

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NOV Fiber Glass Systems

Dualoy® 3000/LCX Product Data

Applications

Rigid fiberglass coaxial fuel handling systems requiring Underwriters Laboratories Listing for integral primary and containment piping conveying the following fuels:

- Motor Vehicle (MV)
- Aviation and Marine A&M)
- High Blend (HB)
- Bio-Diesel
- Concentrated (CT)
- Diesel Exhaust Fluid

Description

Dualoy 3000/LCX rigid fiberglass coaxial piping is a cost-effective solution for contained piping systems. LCX is used for product delivery lines in underground fuel handling systems to convey fuel from the tank to the dispensers. Dualoy 3000/LCX pipe is UL Listed for use with motor vehicle (MV), high blend (HB), concentrated (CT) and aviation and marine (A&M) fuels. Based on currently known tests, NOV Fiber Glass Systems found this product to be suitable for conveying all blends of biodiesel and ethanol type fuels and the conveyance of DEF.

The LCX pipe is manufactured as an integral unit. The primary is made of chemically inert, non-permeable, fiberglass reinforced epoxy resin which is inherently resistant to deterioration due to water and microbial attack. This layer is covered with a porous layer to provide the small volume interstitial space, which facilitates rapid leak detection. Then, the containment layer, comprised of the same material as the primary, is wound over the primary and porous layers.

The containment system is installed with custom designed clamshell containment fittings. Both the primary and containment systems are bonded for long-term, reliable performance.

- Dualoy 3000/LCX containment fittings are typically bolted in place while the adhesive cures.
- Dualoy 3000/LCX reduces installation and inspection time dramatically, retaining system integrity.
- Dualoy 3000/LCX double wall design significantly improves impact resistance over single wall pipe.
- Dualoy 3000/LCX systems provide true double wall design which permits rapid communication through the interstice.

Listings and Approvals

The rigid fiberglass piping used in Dualoy 3000/LCX is Listed in the United States with Underwriters Laboratories for nonmetallic underground piping for MV, HB, CT and A&M fuels under File No. MH9162. Dualoy 3000/LCX pipe and fittings are also Listed with Underwriters Laboratories of Canada for Petroleum Products and Oxygenated Fuels (File CMH715). Underwriters Laboratories has also approved Dualoy 3000/L and Dualoy 3000/LCX for use with MTBE fluids.

Performance

Primary operating pressures to 200 psig (13.8 bar)

Continuous operating temperature to 150°F (66°C)

Containment system pressures to 50 psig (3.45 bar)

Individual system components may not have the same ratings as the pipe. Refer to the detailed product information for the specific components to determine the pressure rating for the system as a whole.

Composition

Primary pipe: Filament-wound fiberglass reinforced epoxy pipe with integral epoxy liner. When classified in accordance with ASTM D2310 and ASTM D2996, the pipe meets the following cell limits: RTRP 11CF1-5420.

Pipe containment: Filament-wound fiberglass reinforced epoxy pipe.

Interstitial space: Dry, graded glass beads secured in place with adhesive backed tape.

Fittings: Compression molded or filament-wound fiberglass reinforced epoxy primary fittings. Containment fittings are molded.

Adhesive: PSX™ •20 or PSX™ •34 ambient-cure, two-part epoxy for all services (including alcohols and MTBE).

THE UNIVERSITY OF CHICAGO

1950

Department of Chemistry
Chicago, Illinois

Dear Sirs:

I have the pleasure to inform you that your application for admission to the Ph.D. program in Chemistry for the fall semester of 1950 has been approved.

You will receive a letter from the Registrar regarding the registration process.

Very truly yours,
[Signature]

Enclosed are the names of the faculty members who will be your advisors.

Yours sincerely,
[Signature]

Enclosed are the names of the faculty members who will be your advisors.

Very truly yours,
[Signature]

Enclosed are the names of the faculty members who will be your advisors.

Very truly yours,
[Signature]

THE UNIVERSITY OF CHICAGO
Department of Chemistry
Chicago, Illinois