

# Technical Bulletin

## 1 How are Tigerflex™ BIOFUEL FRIENDLY PRODUCTS™ hoses different from other brand hoses?

Tigerflex™ brand hoses are well known for their lightweight, easy-to-handle and long-life features.

Tigerflex™ brand **BIOFUEL FRIENDLY PRODUCTS™** drop and vapor recovery hoses are revolutionary! They are constructed with non-permeable thermoplastic polyurethane (TPU) tubes. Traditional thermoplastics, while providing exceptional lightweight and flexibility features, were not chemically compatible for fuels of more than 30% ethanol blended (E30).

But the new Tigerflex™ brand **BIOFUEL FRIENDLY PRODUCTS™** hoses, utilizing the latest advancements in TPU development, have been lab and field proven to remain crack and leak resistant under the harshest conditions. They easily handle conventional oxygenated and reformulated gasoline blends; ethanol blends (up to E98); ultra low sulfur (ULS) diesel; and bio-diesels (up to B100 which meet ASTM D 6751 criteria). The Tigerflex™ **BIOFUEL FRIENDLY PRODUCTS™** hoses are truly revolutionary!

## 2 What are ethanol blends – E10, E85, E98, E100?

E10 (gasohol) is a fuel blend containing 10% ethanol and 90% gasoline; E85 is 85% ethanol and 15% gasoline; E95 is 95% ethanol and 5% gasoline; and so on. E100 is ethyl alcohol (grain alcohol). Many common plastics and rubbers are chemically compatible with E100. Yet, E100 is almost never used or transported in the U.S. fuel industry because E100 is taxed as alcohol (liquor). Gasoline is added to render the fuel unsuitable for human consumption, and thus not subject to alcohol taxes. Adding gasoline changes the chemical composition whereas materials that are compatible with E100 are not compatible with an E98 fuel blend.

Kuriyama® **BIOFUEL FRIENDLY PRODUCTS™** products can be used with all percentage blends of ethanol fuel.

Metal couplings compatibility: Aluminum (good), Stainless Steel (excellent).

## 3 What is biodiesel – B20, B100?

Biodiesel is a non-fossil fuel alternative to petroleum diesel. ASTM International has developed standard D6751 as the specification standard for 100% biodiesel (B100). Biodiesel is generally used for blending with petroleum diesel. For example, B20 is a fuel blend of approximately 20% biodiesel and 80% traditional petroleum diesel. ASTM D6751 is the specification for biodiesel fuels that needs to be met, irrespective of the feedstock source and/or processing method. Biodiesels which meet the ASTM D6751 criteria have the same chemical compatibilities to hoses and accessories as traditional petroleum diesel.

It is suggested that biodiesel fuels be sourced from accredited BQ-9000 Producers and BQ-9000 Marketers to assure the biodiesel fuel meets the ASTM D6751 criteria.

Kuriyama® **BIOFUEL FRIENDLY PRODUCTS™** hose products can be used with all percentage blends of biodiesels meeting the ASTM D6751 criteria.

Metal couplings compatibility: Aluminum (excellent), Stainless Steel (excellent).

## 4 What type of hose should be used for denatured ethanol (E95-E98) unloading at terminals?

We suggest our Alfagomma® series-T629AA – 150 PSI Black Biofuel Petroleum Suction Hose for bulk ethanol terminals. The Alfagomma® T629AA is a specially blended, heavy duty neoprene hose, well suited for these types of applications.

The Tigerflex™ Tigerdrop™ drop hose is a lightweight, user-friendly hose, designed for tank truck applications. However, it also has been used successfully at well maintained bulk ethanol facilities.

**IMPORTANT:** Extra care must be taken when handling denatured ethanol (E95-E98) – even more so than with traditional petroleum based fuels. The following procedures must be followed to ensure maximum hose service life:

1. Hose should be drained and unhooked from the pump after each use. Properly draining and unhooking the hose will protect it from damaging denatured ethanol vapors. American Petroleum Institute Recommended Practices No. 1007, section 5.4, states that, “When pumping is finished the driver should walk the suction hose to the pump... Place any residual product into approved container.”
2. Hose should be kept in a properly designed, ( U shaped), storage rack when not in use. Use of storage rack will help ensure the hose is properly drained after each use; as well protect the hose from being accidentally run over!
3. Keep hose in a shaded area when in use. Do not expose hose to direct sunlight. Excessive UV exposure can damage any hose.
4. Thoroughly inspect hose before, during and after each use

If the hose is not fully drained after each use the denatured ethanol remaining in the hose can release damaging vapors, this is especially true at high temperatures. When the air temperature exceeds 90° F, the temperature of ground, concrete, asphalt or stone surface upon which the hose may be lying can be in excess of 150° F. At temperatures in excess of 110°F denatured ethanol has been shown to percolate, releasing damaging vapors. These vapors can permeate the hose at a much higher rate than the liquid fuel, and can substantially reduce the service life of the hose. Ethanol vapors are extremely damaging, more so than petroleum based fuel vapors.

## 5 Can I leave gasoline or E85 inside the hoses when not in use?

We strongly recommend that all fuel transfer hoses are fully drained after each use. Per American Petroleum Institute Recommended Practices No. 1007, Section 4, when unloading to underground storage tanks, to “Disconnect the delivery hose at the tank truck and “roll” it to the receiving tank to be sure it is completely drained.” In addition, vapor recovery hoses used in distribution terminal loading racks must be regularly inspected and drained as fuel will tend to collect in the hoses. At high temperatures these fuels can percolate, releasing damaging vapors which can attack the hose and shorten service life.

## 6 Do drop and vapor recovery hose need to be grounded?

For added safety, Kuriyama of America, Inc. strongly suggests that any hose assembly used to transfer fuel or fuel vapors be bonded to ground before being put into service. (Refer to Hose Assembly Coupling Installation Suggestions in the catalog.) Embedded grounding wires should be physically extracted from the hose and bonded (connected) to ground through the metal coupler, or by other means.

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American Petroleum Institute Recommended Practice No. 2003 (API RP-2003) and the National Fire Protection Association (NFPA) Standard No. 385 both state that hoses transferring gasoline to underground storage tanks (UST's) need not be bonded as long as they are used with "closed (tight) connections". API defines "closed connections" as a connection in which before flow starts and is broken after flow is completed. In summary, for gravity drop and vapor recovery applications, the user must make sure the hose assemblies are properly connected before starting the flow. Static dissipating and conductive hose tube material offer an added dimension of safety. Nonetheless, the electrical resistance of any hose transferring gasoline should measure less than 10 ohms (<10Ω).

On all Tigerflex™ **BIOFUEL FRIENDLY PRODUCTS™** hoses:

- a) "USE WITH CLOSED CONNECTIONS" is printed on the layline;
- b) A bright red PVC spiral band imprinted with "WARNING – GROUND HELIX WIRE (LESS THAN 10 OHMS)" is attached to each hose at approximately 10-ft. intervals.

## 7 How do I check a hose or hose assembly for continuity, or "less than 10 ohms"?

A continuity meter is a simple device that shows if a circuit is continuous; the light goes on when the probes are connected to either end of the hose or hose assembly, indicating continuity. Note: smaller continuity meters may be more accurate than larger-sized devices.

A common multimeter can also be used to measure a hose assembly for less than 10 ohms resistance. The less the amount of resistance, the easier the electrons flow through to ground. The electrical symbol for ohms is Ω.

Either of both methods can be used to test whether a hose assembly is "good" to put into service. Either device can be found at hardware stores and home centers. Devices vary, but, in general, with either device, simultaneously touch one probe to each metal coupling on the ends of the hose assembly. A "good" hose assembly will be indicated by either the light going on, or the reading of less than 10 ohms (Ref. API RP-2003; NFPA RP-77). For unassembled hoses, simply touch one probe to the grounding wire at each end of the hose.

The electrical resistance (ohms) of a wire is primarily dependent upon the length, size and type of material of the wire. Copper is the best metal (least ohms resistance). The longer the hose the more wire and thus the greater the electrical resistance of the hose's grounding wire. A typical drop and vapor recovery hose assembly is 20 feet. Tigerflex™ drop and vapor recovery hoses up to 40 feet in length should measure less than 10 ohms.

## 8 Should one use banding sleeves or banding coils?

Screwing on approximately 12-inch length banding sleeves provides both a smooth surface for banding clamps, and also provides support behind the coupling – the most common stress area of a hose assembly. Threading a banding coil between the hose helixes provides a smoother surface for banding. Both have been used quite successfully.

## 9 Care, Maintenance and Storage of Tigerflex™ Hose.

Proper storage conditions and handling procedures can enhance and substantially extend the ultimate life of Tigerflex™ hose.

Hose has limited life and the user must be alert to signs of impending failure. The service life of our hose is dependent upon the user's application. Since we have no control over the way in which the hose is used, we do not warrant our hose for any particular service life.

Tigerflex™ hose should not be subjected to any form of abuse in storage or service. Care should be taken to protect the hose from heavy load factors. Hose should be stored flat on smooth surfaces, and should not be stacked more than six coils high. Stacking hose higher than this could cause the compression load factor on the bottom coil to exceed the hose's design load limitations, causing the bottom coil to flatten out.

Hose should not be stored outdoors due to potential damage from the elements, which may shorten hose life.

Hose should not be stored in an upright manner, as this can cause the round coils to become egg shaped, and that stress can cause a deterioration of the hose.

Hose should not be kinked or run over by any equipment. In the handling of larger ID hose, dollies should be used in transporting whenever possible. Slings or handling rigs, properly placed, should be used to support heavier hose.

### General Chemical Resistance of Alfagomma® Rubber Hose and Kuriyama - Couplings™ Gaskets

Common Name	General Properties
BUNA, BUNA-N, NBR or Nitrile	Excellent oil resistance. Good physical properties.
SBR (Styrene-Butadiene Rubber)	Good physical properties, including abrasion resistance. Not oil resistant.
Viton®	Excellent chemical and heat resistance. Excellent biofuel resistance.

Viton is a registered trademark of DuPont Performance Elastomers.

### General Biofuel Resistance of Kuriyama - Couplings™

#### Aluminum

Biodiesel	Ethanol	Gasoline/Diesel
Excellent	Good	Excellent

#### Stainless Steel

Biodiesel	Ethanol	Gasoline/Diesel
Excellent	Excellent	Excellent

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