



# Kuriyama of America, Inc.

## Hoses and Accessories for Handling Petroleum Products and Alternative Fuels

Featuring



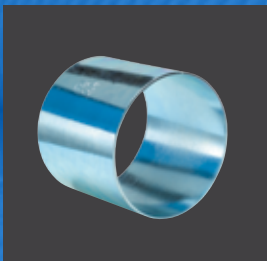
Look for this logo for select



NDH - Series Rubber Drop Hose



TDH - Series Polyurethane Drop Hose



### New! Kuriyama-Couplings™ - Couplings & Accessory Products

Edition 0111





# Table of Contents

What are  **Biofuel Friendly** PRODUCTS™ ..... Page 3



## Industrial Hoses & Accessories

Tigerdrop™ Clear Drop Hose	
Series TDH .....	4
Tigerdrop™ NDH Drop Hose	
Series NDH.....	<b>NEW PRODUCT!</b> 5
Tigervapor™ Vapor Recovery Hose	
Series TV .....	6
Tigervapor HD™ Vapor Recovery	
Hose Series TVHD.....	7
Banding Coils — Rigid PVC Coils .....	8
Banding Sleeves — Flexible PVC.....	9
Oil Vac™ Heavy Duty Smooth OD	
Polyurethane Hose Series OV .....	10
Series ORV™ Heavy Duty Smooth OD	
Oil Resistant PVC Hose.....	11
Series WOR™ Heavy Duty Convuluted OD	
Oil Resistant PVC Hose.....	12



## Industrial Rubber Hoses

T605AA 150 PSI Black Petroleum Suction Hose .....	13
T605AH 150 PSI Red Petroleum Suction Hose .....	14
T650AH 150 PSI Oil Discharge Hose .....	15
T620AA 300 PSI Black Fuel & Oil	
Suction & Delivery Hose.....	<b>NEW PRODUCT!</b> 16
T629AA 150 PSI Biofuel Petroleum Suction	
& Delivery Hose .....	17



## Kuriyama - Couplings™ Fuel Industry Products

HD Aluminum Part C	
Female Coupler x Hose Shank.....	<b>NEW PRODUCT!</b> 18
Standard Part C	
Female Coupler x Hose Shank .....	18
Part DP Dust Plug.....	18
Part DC Dust Cap.....	19
Aluminum Vapor Recovery Coupler x Hose Shank .	19
Aluminum Vapor Recovery Coupler x Adapter.....	19
Aluminum Vapor Recovery Coupler x	
Female Thread.....	19
Part E Adapter x Hose Shank .....	19
API Aluminum Dust Cap.....	20
API Aluminum Coupler x Adapter.....	20
API Aluminum Coupler x Coupler.....	20
Gaskets and Bands .....	20
EZ-Seal Leak Resistant Coupling	
Female Coupler x Hose Shank.....	<b>NEW PRODUCT!</b> 21
Male Adapter x Hose Shank.....	<b>NEW PRODUCT!</b> 21
Replacement Shank Bands .....	<b>NEW PRODUCT!</b> 21
Kuri-Clamp™ Center Punch Clamps .....	<b>NEW PRODUCT!</b> 22
Kuri-Krimp™ Crimp Sleeves .....	<b>NEW PRODUCT!</b> 23

## Other

Tigerflex™ Hose Assembly Coupling Installation	
Suggestions.....	24
Technical Bulletin.....	25-26
Chemical Resistant Chart.....	27
Cautionary Statement & Limited Warranty .....	28

The "Tigerflex" design trademarks contained in this publication are trademarks of Tigers Polymer Corporation.  
 The trademarks used in connection with the Alfagomma product lines contained in this publication are trademarks of Alfagomma, S.p.A.  
 The trademarks "Biofuel Friendly Products" and "Kuriyama-Couplings" are trademarks of Kuriyama of America, Inc.  
 Other trademarks contained in this publication are trademarks of Kuriyama of America, Inc.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**

# What are Biofuel Friendly Products?



**The Biofuel Friendly Products logo indicates products which have compatible chemical resistance with all four types of fuels:**

**New alternative biofuels:**

**Ethanol\* (up to E98)**

**Biodiesel\* (up to B100)**

**And traditional petroleum-based fuels:**

**Gasoline**

**Diesel**

\*Meeting ASTM D5798, D4806 or D6751 criteria.

The absence of the Biofuel Friendly Products logo by products in this catalog indicates those products are chemically compatible with traditional petroleum based fuels or oils, but not necessarily chemically compatible with the higher percentage blends of the new alternative biofuels. Refer to the Chemical Resistance Chart near the back of this catalog for more information by product series.

## **Changing Fuels Create Challenges**

As we look to reduce our dependence on foreign petroleum based fuels, as well as reduce greenhouse gas emissions, the use of alternative biofuels such as ethanol and biodiesel continues to grow. This creates challenges in the fuel industry, as many existing petroleum transfer products were not designed with these alternative biofuels in mind.

That's why Kuriyama is proud to introduce **Biofuel Friendly Products**, a complete package of revolutionary fuel transfer hoses, couplings and accessories. **Biofuel Friendly Products** are specially engineered to resist the added strain caused by the ever-widening market use of the new high-percentage blends of biofuels – ethanol and biodiesel – while maintaining superior reliability transferring traditional petroleum based fuels – gasoline and diesel.

Look for the **Biofuel Friendly Products** logo. Whenever you see it you can be confident that you are providing the best fuel transfer solutions!

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Tigerdrop™ Clear

## Drop Hose

### Series TDH

Clear - "See-the-flow"



**General Applications:** Tank truck gravity drop fuel transfer  
**Construction:** Polyurethane (TPU) tube with polyester fabric reinforcement, rigid PVC helix and embedded grounding wire.  
**Service Temperature:** -40°F (-40°C) to 140°F (+60°C)\*

#### Features and Benefits:

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol\*\*, diesel and biodiesel\*\* ... and still keeps all the other great features and benefits!
- **Non-permeable polyurethane construction** – won't swell or become stiff like conventional TPR/rubber hoses. Long life reduces operating costs.
- **Lightweight** – much lighter than conventional TPR/rubber hoses.
- **Superior flexibility** – especially in sub-zero weather!
- **"See-the-flow" construction** – for visual confirmation fuel is flowing.
- **Durable Construction** – Designed with high tensile strength polyester yarn fabric reinforcement.
- **Grounding Wire** – Durable multi-strand copper wire dissipates static electricity. Physically extract wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Easy Slide Helix** – Rigid counter clockwise helix design protects hose tube from cover wear; allows hose to slide easily over rough surfaces.



#### Nominal Specifications

Series	ID (in.)	OD <sup>^</sup> (in.)	Working Pressure (psi @ 68° F)	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
TDH303	3.03	3.78	65	6	100/20	1.2
TDH404	4.04	4.82	65	8	100/57/20	1.7

\* Actual service temperature range is application-dependent.

\*\* Meeting ASTM D5798, D4806 or D6751 criteria.

<sup>^</sup> OD measured over helix.

† Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

Note: Service life may vary depending on operating conditions and type of fuels being conveyed.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Tigerdrop™ NDH

## Drop Hose

### Series NDH

*Black, opaque static dissipating tube*

**General Applications:** Tank truck gravity drop fuel transfer

**Construction:** Specially blended nitrile (NBR) rubber tube with rigid PVC helix and embedded grounding wire.

**Service Temperature:** -10°F (-23.3°C) to 150°F (+65.5°C)\*

#### Features and Benefits:

- **Specialty Rubber Compounds** – Designed to handle gasoline, diesel, ethanol\*\* and biodiesel.\*\*
- **Durable Construction** – Designed with high tensile strength polyester yarn fabric reinforcement.
- **Easy to Handle** – Lighter weight and greater flexibility than conventional rubber drop hoses.‡
- **Grounding Wire** – Durable multi-strand copper wire dissipates static electricity. Physically extract wire

from the rigid helix and bond to the metal coupling (or by other means) to ground.†

- **Static Dissipating Tube** – Specially formulated to help prevent the build-up of static electricity for added safety.
- **Easy Slide Helix** – Rigid clockwise helix design protects hose tube from cover wear; allows hose to slide easily over rough surfaces.



Made In USA

#### Nominal Specifications

Series	ID (in.)	OD <sup>^</sup> (in.)	Working Pressure (psi @ 68° F)	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
NDH202	2.02	2.60	75	5	100/20	0.80
NDH303	3.03	3.69	60	6	100/20	1.24
NDH404	4.04	4.78	50	8	100/57/20	2.00

\* Actual service temperature range is application-dependent.

\*\* Meeting ASTM D5798, D4806 or D6751 criteria.

<sup>^</sup> OD measured over helix.

† Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

‡ Based on Tigerflex force to bend test data @ 68°F.

Note: Service life may vary depending on operating conditions and type of fuels being conveyed.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Tigervapor™

## Vapor Recovery Hose

### Series TV



**General Applications:** Tank truck vapor recovery  
**Construction:** Polyurethane (TPU) tube with rigid PVC helix and embedded grounding wire.  
**Service Temperature:** -40°F (-40°C) to 140°F (+60°C)\*

#### Features and Benefits:

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol\*\*, diesel and biodiesel\*\* vapors... and still keeps all the other great features and benefits!
- **Non-permeable polyurethane construction** – won't swell or become stiff like conventional TPR/rubber hoses. Long life reduces operating costs.
- **Lightweight** – much lighter than conventional TPR/ rubber hoses.
- **Superior flexibility** – especially in sub-zero weather!
- **“See-through” construction** – for visual confirmation if fuel backs up into the vapor recovery system.
- **Grounding Wire** – Durable multi-strand copper wire dissipates static electricity. Physically extract wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Easy Slide Helix** – Rigid counter clockwise helix design protects hose tube from cover wear; allows hose to slide easily over rough surfaces.



Made In USA

#### Nominal Specifications

Series	ID (in.)	OD <sup>^</sup> (in.)	Working Pressure (psi @ 68° F)	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
TV202	2.02	2.46	17	3	100/60	0.51
TV303	3.03	3.57	11	3.5	100/60	0.78
TV404	4.04	4.61	9	4.5	100/60	1.1

\* Actual service temperature range is application-dependent

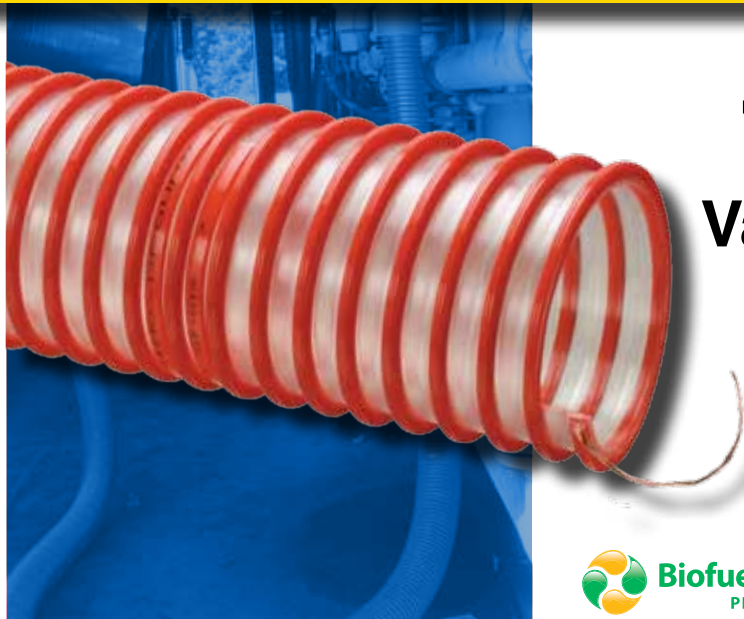
\*\* Meeting ASTM D5798, D4806 or D6751 criteria.

<sup>^</sup> OD measured over helix.

† Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

Note: Service life may vary depending on operating conditions and type of fuels being conveyed.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Tigervapor HD™

## Vapor Recovery Hose

### Series TVHD

**HEAVY DUTY!**



**General Applications:** Tank truck vapor recovery

**Construction:** Polyurethane (TPU) tube with rigid PVC helix and embedded grounding wire.

**Service Temperature:** -40°F (-40°C) to 140°F (+60°C)\*

**Features and Benefits:**

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol\*\*, diesel and biodiesel\*\* vapors... and still keeps all the other great features and benefits!
- **Heavy duty construction** – thicker wall for longer hose life.
- **Non-permeable polyurethane construction** – won't swell or become stiff like conventional TPR/rubber hoses. Long life reduces operating costs.
- **Lightweight** – much lighter than conventional TPR/rubber hoses.
- **Superior flexibility** – especially in sub-zero weather!
- **“See-through” construction** – for visual confirmation if fuel backs up into the vapor recovery system.
- **Grounding Wire** – Durable multi-strand copper wire dissipates static electricity. Physically extract wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Easy Slide Helix** – Rigid counter clockwise helix design protects hose tube from cover wear; allows hose to slide easily over rough surfaces.



Nominal Specifications						
Series	ID (in.)	OD <sup>^</sup> (in.)	Working Pressure (psi @ 68° F)	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
TVHD303	3.03	3.54	13	4.5	100/60	0.95
TVHD404	4.04	4.61	11	5.5	100/60	1.27

\* Actual service temperature range is application-dependent

\*\* Meeting ASTM D5798, D4806 or D6751 criteria.

<sup>^</sup> OD measured over helix.

† Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

Note: Service life may vary depending on operating conditions and type of fuels being conveyed.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**

# Banding Coils

## Rigid PVC Coils

- Easy assembly.
- Provides smoother surface for banding behind coupler.
- Packaged singly: One piece to make one complete hose assembly coupled at each end.
- Cut one piece in half into two equal pieces; thread between hose helix.
- Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

### For TDH Drop and Transfer Hoses

#### Nominal Specifications

Part No.	Fits Hose	Color	Weight (lbs/ea.)
BCCF3	3.03	Clear	0.60
BCCF4	4.04	Clear	0.90

### For TV & TVHD Vapor Recovery Hoses

#### Nominal Specifications

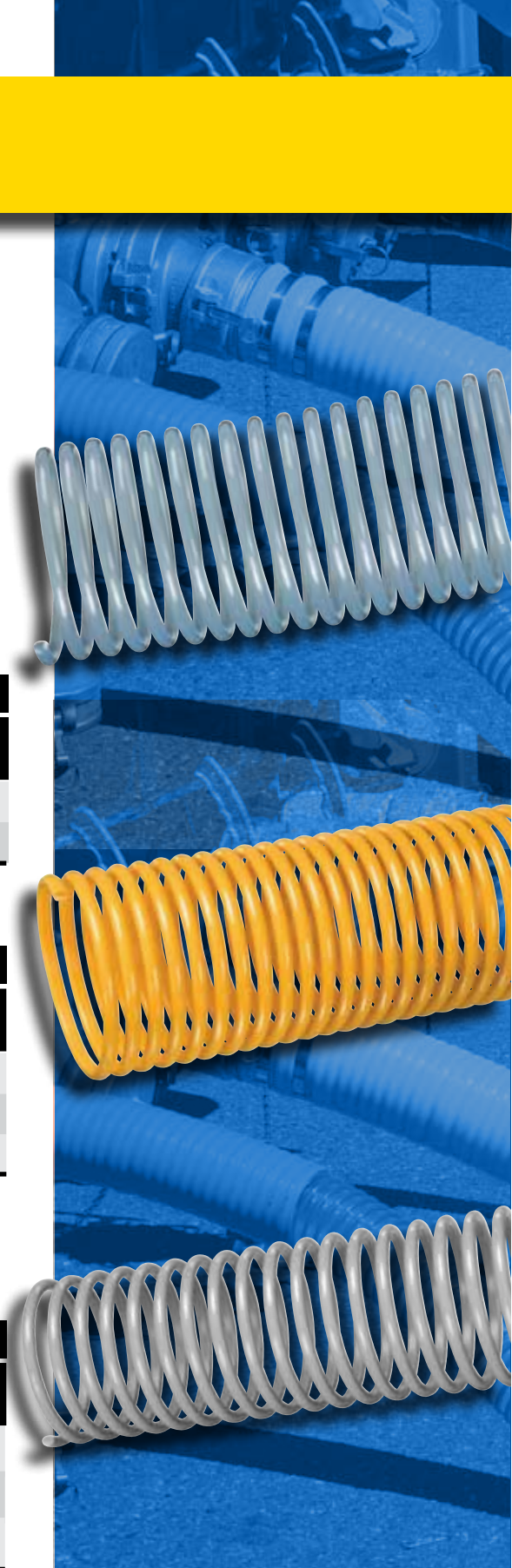
Part No.	Fits Hose	Color	Weight (lbs/ea.)
BCYL2	2.02	Yellow	0.25
BCYL3	3.03	Yellow	0.45
BCYL4	4.04	Yellow	0.75

### For NDH Drop and Transfer Hoses

**NEW PRODUCT!**

#### Nominal Specifications

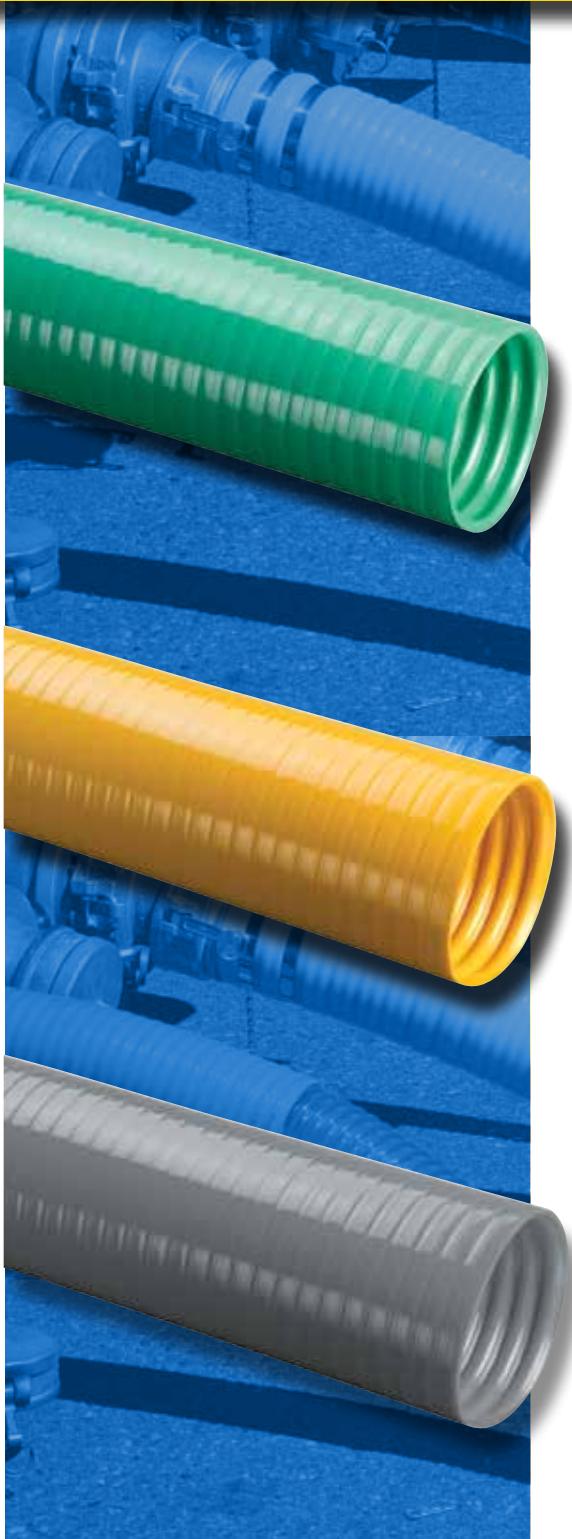
Part No.	Fits Hose	Color	Weight (lbs/ea.)
BCRT2	2.02	Grey	0.30
BCRT3	3.03	Grey	0.60
BCRT4	4.04	Grey	0.90



Made In USA

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.





## Banding Sleeves

### Flexible PVC Sleeves

- Helps prevent overbending behind the coupler.
- Cut into approximately 12-inch lengths; screw onto hose.
- Refer to Hose Assembly Coupling Installation Suggestions and Technical Bulletin in this catalog.

#### For TDH Drop and Transfer Hoses

##### Nominal Specifications

Part No.	Fits Hose	Color	Standard Length (ft.)	Weight (lbs/ea.)
SLV-DRP3X3	3.03	Green	3	3.06
SLV-DRP4X3	4.04	Green	3	4.29

#### For TV & TVHD Vapor Recovery Hoses

##### Nominal Specifications

Part No.	Fits Hose	Color	Standard Length (ft.)	Weight (lbs/each)
SLV-VAP2X3	2.02	Yellow	3	1.80
SLV-VAP3X3	3.03	Yellow	3	3.09
SLV-VAP4X3	4.04	Yellow	3	4.20

#### For NDH Drop and Transfer Hoses

**NEW PRODUCT!**

##### Nominal Specifications

Part No.	Fits Hose	Color	Standard Length (ft.)	Weight (lbs/each)
SLV-NDH2X3	2.02	Grey	3	1.83
SLV-NDH3X3	3.03	Grey	3	3.06
SLV-NDH4X3	4.04	Grey	3	4.29



Made In USA

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.



# Oil Vac™ Heavy Duty Smooth OD Polyurethane Hose Series OV



**General Applications:** Heavy duty suction and light discharge of oil, fuel and grease  
**Construction:** Polyurethane (TPU) tube with rigid PVC helix  
**Service Temperature:** -40°F (-40°C) to 150°F (+65.5°C)\*

### Features and Benefits:

- **Handles most fuels and oils** – excellent resistance to gasoline, diesel, ethanol blends (up to E30), biodiesel (up to B100).
- **Lightweight** – much lighter than conventional TPR/ rubber hoses.
- **Superior flexibility** – especially in sub-zero weather!
- **“See-the-flow” construction** – for visual confirmation fuel is flowing.
- **Smooth cover** – for ease of coupling.



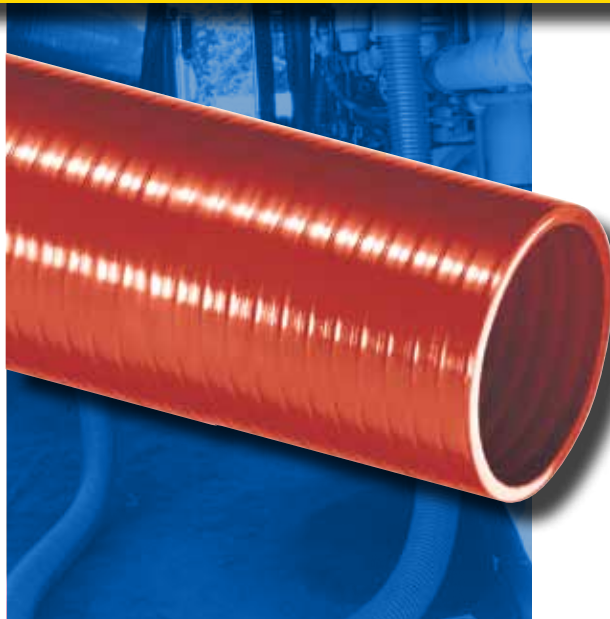
### Nominal Specifications

Series	ID (in.)	ID (mm)	OD <sup>^</sup> (in.)	OD <sup>^</sup> (mm)	Working Pressure (psi)		Vacuum Rating (in. Hg)		Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
					68° F	104° F	68° F	104° F			
OV100	1	25.4	1.26	32.0	85	60	28	26	3	100	0.23
OV125	1 1/4	31.7	1.49	37.8	85	60	28	24	5	100	0.30
OV150	1 1/2	38.1	1.76	44.6	70	50	28	24	5	100	0.35
OV200	2	50.8	2.32	59.0	65	45	28	24	7	100	0.55
OV300	3	76.2	3.41	86.7	65	40	28	22	10	100	1.09

\* Actual service temperature range is application-dependent  
<sup>^</sup> OD measured over helix.

Note: For coupling suggestions, refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Series ORV™

## Oil Resistant Heavy Duty Smooth OD PVC Hose

**General Applications:** Heavy duty suction of light oils and oil slurries; oil skimming; light duty hydrocarbon emissions.

**Construction:** Oil resistant PVC tube with rigid PVC helix

**Service Temperature:** 5°F (-15°C) to 150°F (+65.5°C)\*

### Features and Benefits:

- Oil Resistant PVC – made with special oil resistant compounds which exhibit medium resistance to oil and other hydrocarbons.

- Lightweight – much lighter than conventional TPR/ rubber hoses.
- Smooth cover – for ease of coupling.



Made In USA

### Nominal Specifications

Series	ID (in.)	ID (mm)	OD <sup>^</sup> (in.)	OD <sup>^</sup> (mm)	Working Pressure (psi)		Vacuum Rating (in. Hg)		Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
					68° F	104° F	68° F	104° F			
ORV075	3/4	19.0	1.01	25.6	100	60	28	26	3	100	0.19
ORV100	1	25.4	1.26	32.0	80	50	28	24	3	100	0.24
ORV150	1 1/2	38.1	1.76	44.6	60	40	28	24	5	100	0.35
ORV200	2	50.8	2.32	59.0	60	40	28	24	7	100	0.55
ORV300	3	76.2	3.41	86.7	65	40	28	22	10	100	1.09

\* Actual service temperature range is application-dependent.

<sup>^</sup> OD measured over helix.

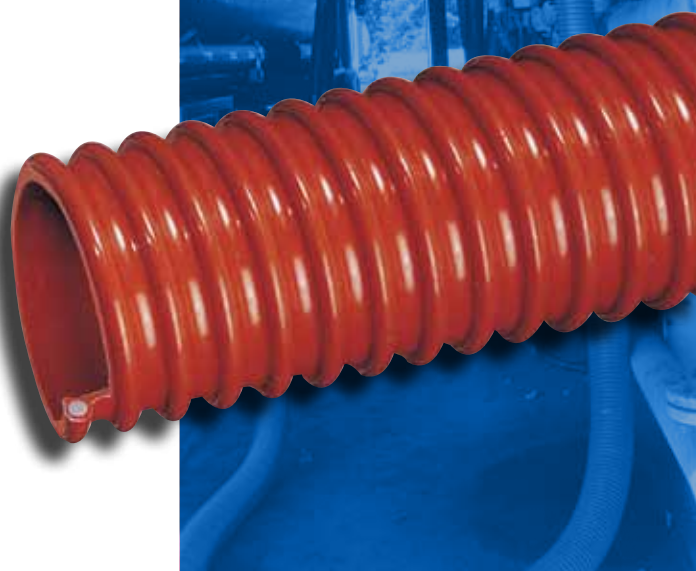
Note: For coupling suggestions, refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Series WOR™

## Oil Resistant Heavy Duty Convolute OD PVC Hose



**General Applications:** Heavy duty suction of light oils and oil slurries; oil skimming; light duty hydrocarbon emissions.

**Construction:** Oil resistant PVC tube with rigid PVC helix

**Service Temperature:** 5°F (-15°C) to 150°F (+65.5°C)\*

### Features and Benefits:

- **Oil Resistant PVC** – made with special oil resistant compounds which exhibit medium resistance to oil and other hydrocarbons.
- **Lightweight** – much lighter than conventional TPR/ rubber hoses.
- **Flexible** – convoluted cover allows greater flexibility.



Made In USA

### Nominal Specifications

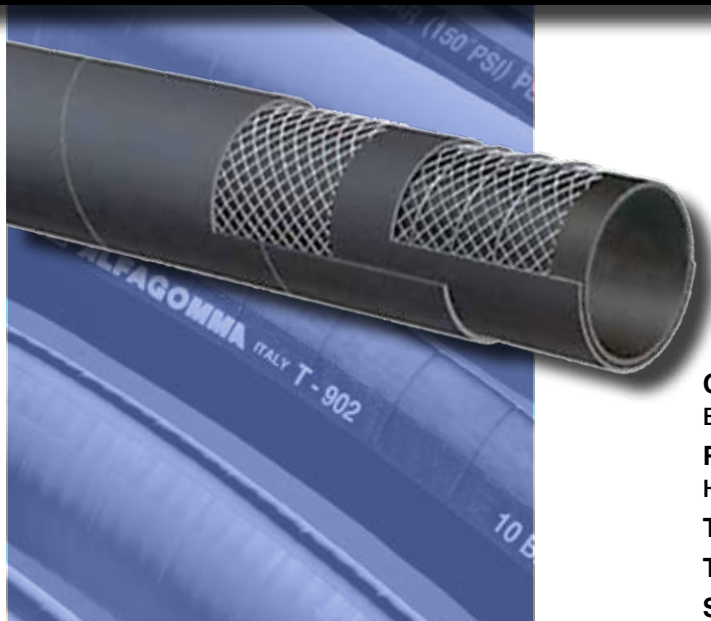
Series	ID (in.)	ID (mm)	OD <sup>^</sup> (in.)	OD <sup>^</sup> (mm)	Working Pressure (psi)		Vacuum Rating (in. Hg)		Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
					68° F	104° F	68° F	104° F			
WOR150	1 1/2	38.1	1.92	48.8	50	25	28	26	3	100	0.31
WOR200	2	50.8	2.40	61.0	40	20	28	24	4	100	0.50
WOR300	3	76.2	3.64	92.5	40	20	28	24	6	100	1.17
WOR400	4	101.6	4.72	119.9	35	18	28	22	10	100	1.74

\* Actual service temperature range is application-dependent.

<sup>^</sup> OD measured over helix.

Note: For coupling suggestions, refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# T605AA 150 PSI Black Petroleum Suction Hose

#### COVER

Black CR – abrasion and ozone resistant.

#### REINFORCEMENT

High tensile textile cords and steel helix wires.

**TUBE** Black conductive NBR.

**TEMPERATURE RANGE** -22°F (-30°C) to 176°F (+80°C)

#### STANDARD LENGTH

100 feet: 3/4" through 6", 20 feet: 6", 8"

**WORKING PRESSURE** Constant Pressure 150 PSI

#### BRANDING

ALFAGOMMA – ITALY T605 – 10 BAR (150 PSI)

PETROLEUM – S & D (in red letters)

#### APPLICATION

For suction and discharge applications in truck and tank car transfer of gasoline, oil and other petroleum-based products with up to 50% aromatic content.

### Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Min. Bending Radius (in. @ 68° F)	Weight (lbs/ft.)
T605AA075	3/4	19	1.14	29	3	0.40
T605AA100	1	25	1.38	35	4	0.50
T605AA125	1 1/4	32	1.65	42	5	0.60
T605AA150	1 1/2	38	1.89	48	6	0.69
T605AA200	2	51	2.40	61	8	0.89
T605AA250	2 1/2	63	2.95	75	10	1.40
T605AA300	3	76	3.46	88	12	1.67
T605AA400	4	102	4.57	116	16	2.28
T605AA600	6	152	6.69	170	24	4.81
T605AA800	8	203	8.86	225	32	7.82

#### COUPLING SUGGESTIONS

★ T605 is not recommended for use on a reel.

Quick-Acting, combination nipples attached with bands or clamps or internally expanded couplings with gasket seal attached with ferrules.

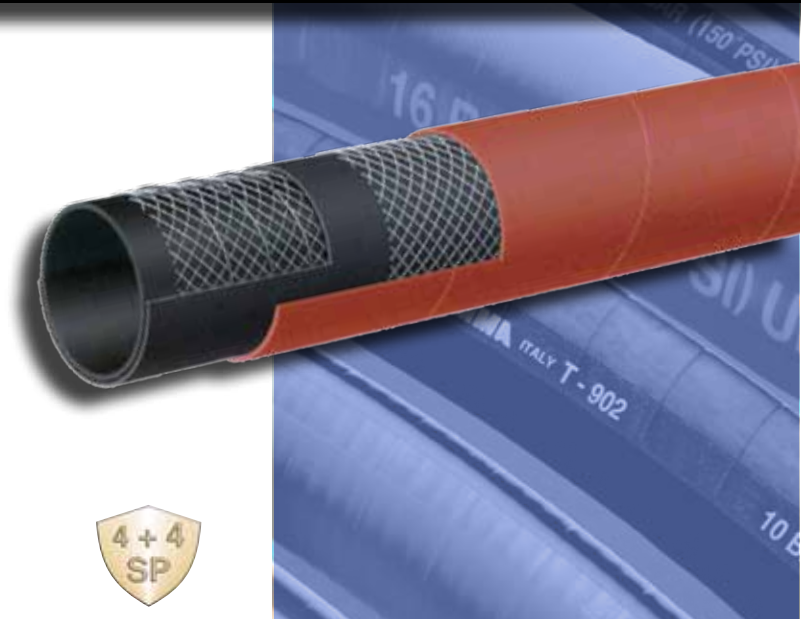
★ Kuriyama offers a full line of Quick-Acting couplings, pin lug shank couplings and combination nipples. Refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**

# T605AH

## 150 PSI

### Red Petroleum Suction Hose



#### APPLICATION

For suction and discharge applications in truck and tank car transfer of gasoline, oil and other petroleum-based products with up to 50% aromatic content.

#### COVER

Red CR — abrasion and ozone resistant.

#### REINFORCEMENT

High tensile textile cords and 4 highly flexible steel helix wires.

#### TUBE

Black conductive NBR.

#### TEMPERATURE RANGE

-22°F (-30°C) to 176°F (+80°C)

#### STANDARD LENGTH

100 feet

#### WORKING PRESSURE

Constant Pressure 150 PSI

#### BRANDING

ALFAGOMMA – ITALY T-605 – 10 BAR (150 PSI)  
 PETROLEUM – S & D (in yellow letters)

### Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Min. Bending Radius (in. @ 68° F)	Weight (lbs/ft.)
T605AH150	1 1/2	38	1.89	48	6	0.71
T605AH200	2	51	2.40	61	8	0.92
T605AH300	3	76	3.46	88	12	1.71
T605AH400	4	102	4.57	116	16	2.34

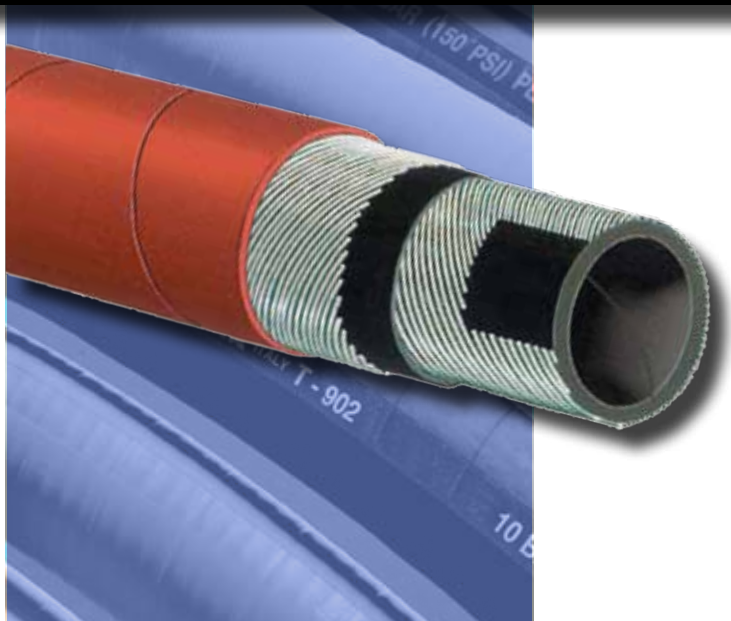
★ T605 is not recommended for use on a reel.

#### COUPLING SUGGESTIONS

Quick-Acting, combination nipples attached with bands or clamps or internally expanded couplings with gasket seal attached with ferrules.

★ Kuriyama offers a full line of Quick-Acting couplings, pin lug shank couplings and combination nipples. Refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.



# T650AH

## 150 PSI Oil Discharge Hose

### APPLICATION

Oil discharge hose designed for use on trucks, docks or barges where a soft wall hose is required.

### COVER

Red CR — abrasion and ozone resistant.

### REINFORCEMENT

Spiralled high tensile textile cords with embedded grounding wire.

### GROUNDING WIRE

Physically extract the ground wire from the hose and bond to the metal coupling, or by other means, to ground.

### TUBE

Black Nitrile rubber for 50% aromatics.

### TEMPERATURE RANGE

-22°F (-30°C) to 176°F (+80°C)

### STANDARD LENGTH

100 feet

### WORKING PRESSURE

Constant Pressure — 10 Bar (150 PSI)

### BRANDING

ALFAGOMMA – ITALY T650 10 BAR (150 PSI) – PETROLEUM DELIVERY (in yellow letters)

### Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Min. Bending Radius (in. @ 68° F)	Weight (lbs/ft.)
T650AH150	1 1/2	38	1.89	48	0	0.62
T650AH200	2	51	2.40	61	0	0.81
T650AH300	3	76	3.46	88	0	1.42
T650AH400	4	102	4.49	114	0	1.92

### COUPLING SUGGESTIONS

Quick-Acting or combination nipples attached with bands or clamps.

★ Kuriyama offers a full line of Quick-Acting couplings, pin lug shank couplings and combination nipples. Refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**

# T620AA

## 300 PSI

### Black Fuel & Oil Suction & Delivery Hose

*(Replaces T609)*

**NEW  
PRODUCT!**



#### APPLICATION

Fuel and oil suction and discharge for up to 50% aromatic content. Designed for heavy duty applications.

#### COVER

Black conductive CR – abrasion, ozone and hydrocarbon resistant.

#### REINFORCEMENT

High tensile textile cords, steel helix wires and static wire.

#### TUBE

Black conductive NBR.

#### TEMPERATURE RANGE

-22°F (-30°C) to 158°F (+70°C)

#### STANDARD LENGTH

100 feet: 2" through 6"

20 feet: 6"

#### WORKING PRESSURE

Constant Pressure — 20 Bar (300 PSI)

#### BRANDING

ALFAGOMMA – ITALY T620 – 20 BAR (300 PSI)

PETROLEUM – S & D (in red letters)

### Nominal Specifications

Series No.	Nominal Id		Nominal Od		Approx. Wt. Lbs./100 Ft.	Min. Bend Radius (In.)
	(in.)	(mm)	(in.)	(mm)		
T620AA200	2	51	2.48	63	112	8
T620AA300	3	76	3.54	90	178	12
T620AA400	4	102	4.57	116	241	16
T620AA600	6	152	6.69	170	516	24

★ Not recommended for use on a reel.

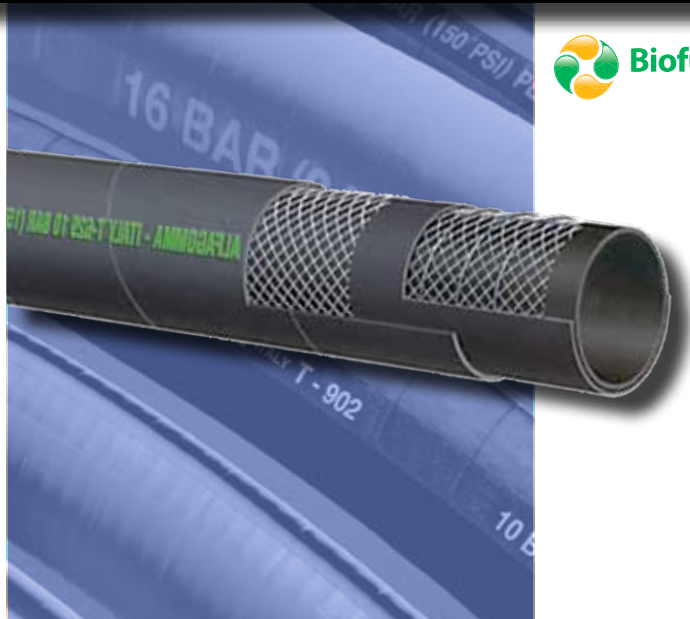
#### COUPLING SUGGESTIONS

Quick-Acting, combination nipples attached with bands or clamps or internally expanded couplings with gasket seal attached with ferrules.

★ Kuriyama offers a full line of Quick-Acting couplings, pin lug shank couplings and combination nipples. Refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**





# T629AA

## 150 PSI Black Biofuel Petroleum Suction Hose

### APPLICATION

For suction and discharge applications in truck and tank car transfer of gasoline, oil and Biofuels - up to E98 and B100\* with up to 60% aromatic content at ambient temperature.

\*Applies to Biodiesels which meet the ASTM D6751 criteria

### COVER

Black specially-blended neoprene - added resistance against abrasion, ozone and hydrocarbons.

### REINFORCEMENT

High tensile textile cords and steel helix wires.

**TUBE** Black conductive synthetic rubber.

### TEMPERATURE RANGE

-22°F (-30°C) to 176°F (+80°C)

**STANDARD LENGTH** 100 feet: 3/4" through 4"

**WORKING PRESSURE** Constant Pressure 150 PSI

**BRANDING** - ALFAGOMMA – ITALY T629 – 10 BAR (150 PSI) BIOFUEL Ω (in green letters)

### Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Min. Bending Radius (in.)	Weight (lbs/100ft.)
T629AA075	3/4	19	1.14	29	3	41
T629AA100	1	25	1.38	35	4	51
T629AA125	1 1/4	32	1.65	42	5	60
T629AA150	1 1/2	38	1.89	48	6	70
T629AA200	2	51	2.40	61	8	91
T629AA250	2 1/2	63	2.95	75	10	142
T629AA300	3	76	3.46	88	12	169
T629AA400	4	102	4.57	116	16	234

★ T629 is not recommended for use on a reel.

### COUPLING SUGGESTIONS

Quick-Acting, combination nipples attached with bands or clamps or internally expanded couplings with gasket seal attached with ferrules.

★ Kuriyama offers a full line of Quick-Acting couplings, pin lug shank couplings and combination nipples. Refer to current Kuriyama-Couplings™ and Accessories Catalog for type and pricing.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



**HEAVY DUTY!**



**Heavy Duty Aluminum Part C Female Coupler x Hose Shank**  
(with BUNA gasket & forged brass handles)

Part Number	Size	Weight Each (lbs.)	Standard Carton
TCC-300-A	3"	2.65	15
TCC-400-A	4"	3.70	15

## Tank Truck Couplings and Accessories

Kuriyama - Couplings™ and Accessories include specially-designed Quick-Acting couplings and adapters, dust plugs...



**304 Stainless Steel and 316 Stainless Steel are BIOFUEL FRIENDLY PRODUCTS.**



**Standard Part C Female Coupler x Hose Shank**

Part Number	Size	Weight Each (lbs.)	Standard Carton
-------------	------	--------------------	-----------------

**Aluminum**  
(with BUNA gasket & forged brass handles)

AL-C200	2"	0.98	40
AL-C300	3"	2.20	15
AL-C400	4"	3.16	15

**304 Stainless Steel**  
(with BUNA gasket & SS304 handles)

SS304-C200	2"	2.30	20
SS304-C300	3"	4.12	8
SS304-C400	4"	6.98	6

**316 Stainless Steel**  
(with BUNA gasket & SS304 handles)

SS-C200	2"	2.30	20
SS-C300	3"	4.12	8
SS-C400	4"	6.98	6



**304 Stainless Steel and 316 Stainless Steel are BIOFUEL FRIENDLY PRODUCTS.**



**Part DP Dust Plug**

Part Number	Size	Weight Each (lbs.)	Standard Carton
-------------	------	--------------------	-----------------

**Aluminum**

AL-DP200	2"	0.38	60
AL-DP300	3"	0.74	50
AL-DP400	4"	1.22	25

**304 Stainless Steel**

SS304-DP200	2"	0.96	20
SS304-DP300	3"	1.94	8
SS304-DP400	4"	3.36	6

**316 Stainless Steel**

SS-DP200	2"	0.96	20
SS-DP300	3"	1.94	8
SS-DP400	4"	3.36	6

Note: For additional Coupling Products refer to Kuriyama's separate full line Couplings and Accessories Catalog.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



## Tank Truck Couplings and Accessories

...vapor recovery coupling with probes, dust caps...

### Aluminum Vapor Recovery Coupling with Probe; Coupler x Hose Shank

(with BUNA gasket & forged brass handles)



Part Number	Size	Weight Each (lbs.)	Standard Carton
VRP-A4030	4" x 3"	3.04	4

### Aluminum Vapor Recovery Coupling with Probe; Coupler x Adapter

(with BUNA gasket & forged brass handles)



Part Number	Size	Weight Each (lbs.)	Standard Carton
DAP-4030	4" x 3"	3.54	4

### Aluminum Vapor Recovery Coupling with Probe; Coupler x Female Thread

(with BUNA gasket & forged brass handles)



Part Number	Size	Weight Each (lbs.)	Standard Carton
CGDP-A4030	4" x 3"	3.08	4
CGDP-A4040	4" x 4"	3.8	4



304 Stainless Steel and 316 Stainless Steel are **BIOFUEL FRIENDLY PRODUCTS**.

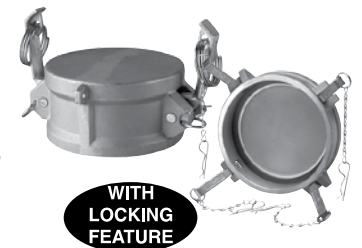


### Part E Male Adapter x Hose Shank

Part Number	Size	Weight Each (lbs.)	Standard Carton
<b>Aluminum</b>			
AL-E200	2"	0.60	50
AL-E300	3"	1.32	18
AL-E400	4"	2.10	20
<b>304 Stainless Steel</b>			
SS304-E200	2"	1.98	20
SS304-E300	3"	3.90	8
SS304-E400	4"	6.38	6
<b>316 Stainless Steel</b>			
SS-E200	2"	1.98	20
SS-E300	3"	3.90	8
SS-E400	4"	6.38	6



304 Stainless Steel and 316 Stainless Steel are **BIOFUEL FRIENDLY PRODUCTS**.



### Part DC Dust Cap

Part Number	Size	Weight Each (lbs.)	Standard Carton
<b>Aluminum (with BUNA gasket &amp; forged brass handles)</b>			
AL-DC200	2"	0.80	60
AL-DC300	3"	1.44	30
AL-DC400	4"	2.34	15
<b>304 Stainless Steel (with BUNA gasket &amp; SS304 handles)</b>			
SS304-DC200	2"	1.78	20
SS304-DC300	3"	3.04	8
SS304-DC400	4"	5.02	6
<b>316 Stainless Steel (with BUNA gasket &amp; SS304 handles)</b>			
SS-DC200	2"	1.78	20
SS-DC300	3"	3.04	8
SS-DC400	4"	5.02	6

Note: For additional Coupling Products refer to Kuriyama's separate full line Couplings and Accessories Catalog.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



## Tank Truck Couplings and Accessories

**API Aluminum Coupling, Coupler x Adapter**  
(with API-BUNA gasket & forged brass handles)



Part Number	Size	Weight Each (lbs.)	Standard Carton
TCDA-A4030	4" x 3"	4.25	4
TCDA-A4040	4" x 4"	4.50	4

**API Aluminum Coupling, Coupler x Coupler**  
(with API-BUNA gasket & forged brass handles)



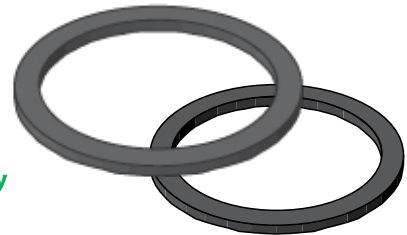
Part Number	Size	Weight Each (lbs.)	Standard Carton
TCDD-A4040	4" x 4"	6.00	2

**API Aluminum Dust Cap,**  
(with API-BUNA gasket & forged brass handles)



Part Number	Size	Weight Each (lbs.)	Standard Carton
TCDC-A400	4"	3.00	6

...API couplings and replacement gaskets for tank trucks...



### Gaskets

Part Number	Size	Weight Each (lbs.)	Standard Carton
<b>BUNA</b>			
BUNA200	2"	0.022	10
BUNA300	3"	0.042	10
BUNA400	4"	0.066	10
<b>Viton®</b>			
VITON200	2"	0.022	10
VITON300	3"	0.042	10
VITON400	4"	0.066	10
<b>API</b>			
TCG-400	4"	0.07	1

Note: API Gaskets are made of BUNA material; dimensionally to fit API couplings.

Viton is a registered trademark of DuPont Performance Elastomers.

Note: For additional Coupling Products refer to Kuriyama's separate full line Couplings and Accessories Catalog.

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.

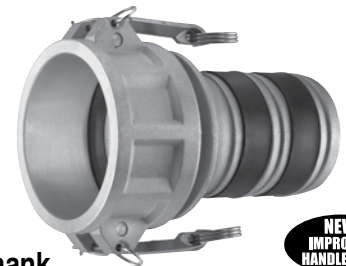
# Tank Truck Couplings and Accessories

...EZ-Seal™  
Leak Resistant Couplings...

## EZ-Seal™ Leak Resistant Couplings

- Rubber Seals - helps prevent leakage.
- Versatile - Suitable for use with PVC, TPU and Rubber Hoses.

Note: To insure proper sealing attach band clamps directly over rubber seals.



**NEW  
PRODUCT!**

### Part C Coupler x Hose Shank

**NEW  
IMPROVED  
HANDLE PINS**

Part Number	Size	Weight Each (lbs.)	Standard Carton
AL-CLF150	1 1/2"	0.77	30
AL-CLF200	2"	0.98	40
AL-CLF300	3"	1.98	15
AL-CLF400	4"	2.87	15

**NEW  
PRODUCT!**



### EZ-Seal™ Replacement Shank Bands

Part Number	Size	Weight Each (lbs.)	Standard Carton
<b>NBR</b>			
NBR-LF150	1 1/2"	0.004	10
NBR-LF200	2"	0.009	10
NBR-LF300	3"	0.029	10
NBR-LF400	4"	0.040	10

**NEW  
PRODUCT!**



### Part E Male Adapter x Hose Shank

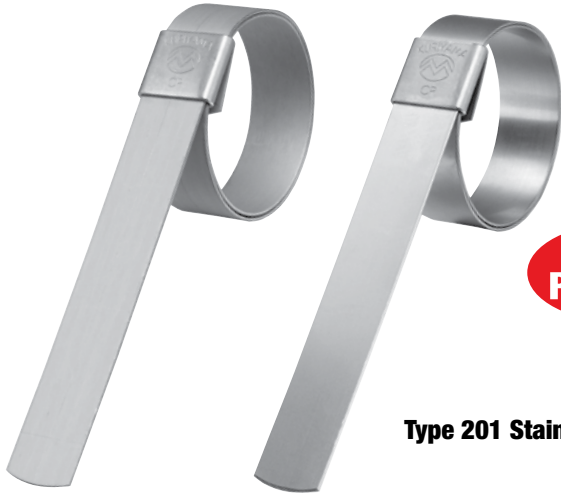
Part Number	Size	Weight Each (lbs.)	Standard Carton
AL-ELF150	1 1/2"	0.44	40
AL-ELF200	2"	0.64	50
AL-ELF300	3"	1.38	18
AL-ELF400	4"	2.51	20

Note: For additional Coupling Products refer to Kuriyama's separate full line Couplings and Accessories Catalog.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



## Galvanized Carbon Steel



**NEW  
PRODUCT!**

**Type 201 Stainless Steel**

## Tank Truck Couplings and Accessories

**Kuri-Clamp™  
...Center Punch Clamps...**

Part Number		Size	Pieces Per Box	Weight Per Box (lbs.)	Standard Box*
Carbon Steel	Stainless Steel				
<b>BAND WIDTH - 3/8"</b>					
CPCS03	CPSS03	13/16"	100	3.60	1
CPCS31	CPSS31	1 3/8"	100	4.60	1
<b>BAND WIDTH - 5/8"</b>					
CPCS04	CPSS04	1"	100	8.30	1
CPCS05	CPSS05	1 1/4"	100	8.70	1
CPCS06	CPSS06	1 1/2"	100	9.70	1
CPCS07	CPSS07	1 3/4"	100	10.60	1
CPCS08	CPSS08	2"	100	11.50	1
CPCS09	CPSS09	2 1/4"	100	12.60	1
CPCS10	CPSS10	2 1/2"	50	6.80	1
CPCS11	CPSS11	2 3/4"	50	7.30	1
CPCS12	CPSS12	3"	50	7.70	1
CPCS14	CPSS14	3 1/2"	50	8.70	1
CPCS16	CPSS16	4"	25	4.90	1
CPCS18	CPSS18	4 1/2"	25	5.50	1
CPCS20	CPSS20	5"	25	5.90	1
CPCS24	CPSS24	6"	25	6.80	1
CPCS26	CPSS26	6 1/2"	25	7.10	1
CPCS28	CPSS28	7"	25	7.40	1
CPCS32	CPSS32	8"	25	8.20	1

\* Clamps are sold in box quantities ONLY.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# Tank Truck Couplings and Accessories

... and Kuri-Krimp™ Crimp Sleeves.



### Kuri-Krimp™ Plated Steel Crimp Sleeves

Part Number	Hose ID Size	Sleeve ID	Weight Each (lbs.)	Standard Carton
CRS-CS10108	1"	1.50	0.19	200
CRS-CS10109	1"	1.56	0.20	200
CRS-CS15200	1 1/2"	2.00	0.25	128
CRS-CS15202	1 1/2"	2.12	0.26	128
CRS-CS20209	2"	2.56	0.37	80
CRS-CS20210	2"	2.62	0.40	80
CRS-CS20211	2"	2.68	0.40	80
CRS-CS25302	2 1/2"	3.12	0.52	60
CRS-CS25304	2 1/2"	3.25	0.54	60
CRS-CS30310	3"	3.62	1.19	40
CRS-CS30312	3"	3.75	1.21	40
CRS-CS30313	3"	3.81	1.23	40
CRS-CS30400	3"	4.00	1.30	40
CRS-CS40411	4"	4.68	1.61	30
CRS-CS40412	4"	4.75	1.63	30
CRS-CS40413	4"	4.81	1.65	30
CRS-CS40500	4"	5.00	1.72	30

### Kuri-Krimp™ 304 Stainless Steel Crimp Sleeves

Part Number	Hose ID Size	Sleeve ID	Weight Each (lbs.)	Standard Carton
CRS-SS10108	1"	1.50	0.20	200
CRS-SS10109	1"	1.56	0.21	200
CRS-SS15200	1 1/2"	2.00	0.27	128
CRS-SS15202	1 1/2"	2.12	0.29	128
CRS-SS20209	2"	2.56	0.40	80
CRS-SS20210	2"	2.62	0.43	80
CRS-SS20211	2"	2.68	0.43	80
CRS-SS25302	2 1/2"	3.12	0.56	60
CRS-SS25304	2 1/2"	3.25	0.58	60
CRS-SS30310	3"	3.62	1.29	40
CRS-SS30312	3"	3.75	1.31	40
CRS-SS30313	3"	3.81	1.33	40
CRS-SS30400	3"	4.00	1.40	40
CRS-SS40411	4"	4.68	1.74	30
CRS-SS40412	4"	4.75	1.76	30
CRS-SS40413	4"	4.81	1.78	30
CRS-SS40500	4"	5.00	1.86	30

Note: For additional Coupling Products refer to Kuriyama's separate full line Couplings and Accessories Catalog.

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.

# Hose Assembly Coupling Installation Suggestions

for Tigerflex™ Series TDH™ & NDH™ Gasoline Drop Hoses & Series TV™ & TVHD™ Gasoline Vapor Recovery Hoses using Tigerflex™ Banding Sleeves or Banding Coils



**WARNING!**

Failure to properly couple a hose or ensure continuity can result in property damage and serious or life-threatening injury!

Kuriyama of America, Inc. shall not be liable if you do not follow the procedures outlined below.

For safety, Kuriyama of America, Inc. strongly suggests that any hose assembly used to transfer gasoline or gasoline vapors be bonded to ground before being put into service\*.

Tigerflex™ Hose Series TDH™, NDH™, TV™ and TVHD™ are manufactured with a stranded copper wire in the rigid PVC helix. The wire is to be physically extracted from the helix and bonded (connected)

to ground through the metal coupler/fitting, or by other means. A properly bonded/grounded hose assembly should measure less than 10 ohms.

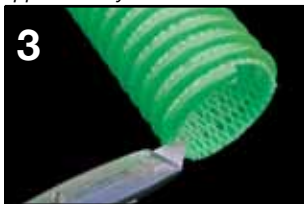
The person assembling the couplings to the hose should know how to check the hose assembly for continuity by properly using a continuity meter and/or an ohmmeter. Contact Kuriyama for training information.

**Note: Visual inspections should be conducted on a regular basis to ensure the hose assembly's continued safety.**

Step 1 — Prior to coupling, check the grounding/bonding wire in the cut length of hose with a continuity meter or ohmmeter (ohmmeter should read less than 10 ohms).



Step 2 — Using a sharp knife, cut the flex around the circumference of the hose approximately 2".



Step 3 — Using the knife, make a light cut around the entire circumference of the hose's rigid helix. Be careful not to cut too deeply into the helix, to avoid damaging the grounding wire. TIP: Cut all the way through the urethane (TDH, TV or TVHD) or nitrile (NDH) flex, but only score the underside of the helix.



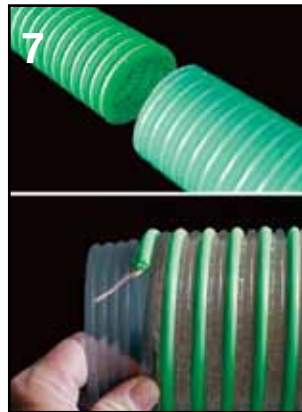
Step 4 — Grasp the end of the hose's helix and carefully bend it back and forth until the helix snaps off. Be careful not to break the copper grounding wire.



Step 5 — Gently pull the broken end of the hose's helix off the copper wire. TIP: Pull with the curve of the helix.



Step 6 — Twist the copper grounding wire strands together and tuck the wire inside the hose.



Step 7 — Screw approximately 12" of banding sleeve onto the hose (use appropriate lubricant as needed). Or, thread the banding coil between the helices onto the hose. Slip the banding clamps onto the hose. TIP: When using banding coils tighten clamps in a clockwise direction for TDH, TV and TVHD and counterclockwise direction for NDH, to better tighten down the hose on the coupling shank.



Step 8 — Insert the coupler's barbed shank into the hose, twisting counterclockwise for TDH, TV and TVHD and clockwise for NDH as it enters. For ease of installation, an appropriate lubricant may be used.



Step 9 — Insert the coupler into the hose until the hose seats against the bottom of the coupler.

Step 10 — Check continuity/ohmmeter reading again, between the fittings on each end.



Step 11 — Install two hose clamps over the hose end above the coupling. When using banding coils, be sure to tighten clamps in a clockwise direction for TDH, TV and TVHD, and a counterclockwise direction for NDH, so the banding coils tighten down on the hose.

Step 12 — Check continuity/ohmmeter reading again, between the fittings on each end of the hose assembly. The resistance should measure less than 10 ohms.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**



# 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.

**BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.**

# Technical Bulletin

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

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.

# Chemical Resistance Guide for Tigerflex™ and Alfagomma® Fuel Transfer Hoses

	TDH		NDH		TV & TVHD		OV		ORV/WOR		T605AA/AH	T609AA	T629AA	T650AH
	68°F	104°F	68°F	104°F	68°F	104°F	68°F	104°F	68°F	104°F	68°F	68°F	68°F	68°F
ASTM Fuel #1 Oil	E	E	E	G	-	-	E	E	G	L	E	E	E	E
ASTM Fuel #3 Oil	E	E	E	L	-	-	E	E	E	G	E	E	E	E
ASTM Fuel A	E	E	E	G	X	X	G	G	-	-	E	E	E	E
ASTM Fuel B	G	L	G	L	X	X	G	L	-	-	E	E	L	E
ASTM Fuel C	G	L	L	U	X	X	G	L	-	-	E	E	L	E
Benzene	L	U	X	X	-	-	L	U	U	U	U	U	X	U
Biodiesel Liquid Fuel (B20) **	E	E	G	L	X	X	G	G	-	-	L	L	E	L
Biodiesel Liquid Fuel (B100) **	E	E	G	L	X	X	G	G	-	-	L	L	E	L
Biodiesel Vapor (B20)	E	E	E	G	E	E	G	L	G	L	L	L	E	L
Biodiesel Vapor (B100)	E	E	E	G	E	E	G	L	G	L	L	L	E	L
Butane	E	E	G	L	-	-	E	E	E	E	E	E	E	E
Castor Oil	G	G	G	L	-	-	G	L	G	U	-	-	E	-
Coconut Oil	E	E	G	L	-	-	E	E	L	U	E	E	E	E
Gasoline Liquid Fuel (Conventional, Oxygenated & Reformulated)	E	E	E	G	X	X	G	G	-	-	E	E	E	E
Gasoline Vapor (Conventional, Oxygenated & Reformulated)	E	E	E	G	E	E	G	G	G	G	E	E	E	E
Core Oil	E	E	-	-	-	-	E	E	E	E	-	-	-	-
Corn Oil	-	-	G	L	-	-	-	-	E	G	E	E	E	E
Cottonseed Oil	E	E	G	L	-	-	E	E	G	L	L	L	E	L
Crude Oil - Sour	E	E	G	L	-	-	E	E	E	E	-	-	L	-
Crude Oil - Sweet	E	E	G	L	-	-	E	E	E	E	G	G	L	G
Cyclohexane	E	E	X	X	-	-	-	-	L	U	G	G	E	G
Diesel Liquid Fuel *	E	E	E	E	X	X	G	G	-	-	E	E	E	E
Diesel Oil	-	-	G	L	-	-	-	-	L	U	E	E	E	E
Diesel Vapor	E	E	E	G	E	E	G	G	E	G	E	E	E	E
Dynamo Oil	-	-	G	L	-	-	-	-	E	G	-	-	-	-
Ethanol Liquid Fuel (E85) **	E	E	G	G	X	X	L	L	-	-	L	L	E	L
Ethanol Liquid Fuel (E98) **	G	L	G	L	X	X	L	L	-	-	L	L	E	L
Ethanol Vapor (E85) *	E	E	G	G	E	G	L	L	G	U	L	L	E	L
Ethanol Vapor (E98) *	G	L	G	L	G	L	L	L	G	L	L	L	E	L
Ethyl Alcohol (E100)	G	G	G	G	-	-	G	L	L	L	L	L	E	L
Ethyl Tertiary Butyl Ether (ETBE)	G	G	L	U	-	-	L	L	L	U	-	-	-	-
Fuel Oil	E	E	G	L	-	-	-	-	-	-	-	-	E	-
Gas Oil	-	-	G	L	-	-	-	-	E	G	-	-	-	-
Grease	-	-	G	L	-	-	-	-	E	L	E	E	E	E
Isomerate	E	E	G	L	-	-	E	G	-	-	-	-	-	-
Iso-octane	E	E	E	G	-	-	E	G	G	L	E	E	E	E
Isopropyl Alcohol	-	-	G	L	-	-	-	-	E	G	L	L	L	L
Jet Fuels	G	L	G	L	X	X	-	-	-	-	E	E	L	E
Kerosene	E	G	G	L	X	X	E	G	U	U	E	E	E	E
Kerosene Vapor	E	G	E	G	E	G	E	G	G	L	E	E	E	E
Ketones	-	-	X	X	-	-	-	-	U	U	L	L	L	L
Lacquer Thinners	G	-	X	X	-	-	G	-	L	U	U	U	X	U
Lard Oil	E	G	G	L	-	-	E	G	E	G	E	E	E	E
Lubricating Oil	E	E	G	L	-	-	E	E	E	L	-	-	L	-
Linseed Oil	E	E	G	L	-	-	E	E	E	E	G	G	E	G
Machine Oil	E	E	G	L	-	-	E	G	E	G	-	-	-	-
Methanol (M85)	G	G	G	L	-	-	G	L	U	U	-	-	L	-
Methyl Alcohol	L	U	G	L	-	-	L	U	L	U	E	E	E	E
Methyl Ethyl Ketone (MEK)	L	U	X	X	-	-	L	U	U	U	U	U	X	U
Methyl Tertiary Butyl Ether (MTBE)	G	G	L	U	-	-	L	L	L	U	U	U	-	U
Mineral Oils	E	E	G	L	-	-	E	E	E	G	E	E	E	E
Mineral Spirits	-	-	L	U	-	-	-	-	-	-	G	G	L	G
Napthalene	-	-	X	X	-	-	-	-	L	U	U	U	X	U
Napthas	E	E	G	L	-	-	E	E	U	U	U	U	L	U
Natural Gas	E	E	G	L	-	-	E	E	E	E	G	G	E	G
Oils and Fats	E	E	G	L	-	-	E	E	E	G	-	-	-	-
Petrol *	E	E	E	E	X	X	G	G	U	U	E	E	E	E
Petroleum Ether	-	-	G	L	-	-	-	-	L	L	G	G	E	G
Petroleum Oils	E	E	G	L	-	-	E	E	E	G	E	E	X	E
Sour Gasoline *	E	G	L	U	X	X	G	G	-	-	-	-	-	-
Soy Bean Oil	G	G	G	L	-	-	G	L	G	U	E	E	E	E
Soya Oil	-	-	G	L	-	-	-	-	E	G	-	-	-	-
Spindle Oil	-	-	G	L	-	-	-	-	E	L	-	-	-	-
Tall Oil	-	-	L	U	-	-	-	-	U	U	E	E	E	E
Tertiary Amyl Methyl Ether (TAME)	-	-	L	U	-	-	L	L	L	U	-	-	-	-
Toluene	L	U	X	X	-	-	L	U	U	U	U	U	X	U
Train Oil	-	-	-	-	-	-	-	-	E	U	-	-	-	-
Transformer Oil	-	-	-	-	-	-	-	-	-	-	G	G	L	G
Transmission Fluid	G	G	G	L	-	-	G	G	E	L	E	E	E	E
Turbine Oil	-	-	G	L	-	-	-	-	E	L	-	-	-	-
Turpentine	E	G	X	X	-	-	E	G	L	U	U	U	E	U
Ultra Low Sulfur Diesel *	E	E	G	G	X	X	G	G	-	-	-	-	-	-
Vegetable Oil	-	-	E	G	-	-	-	-	E	L	-	-	E	-
White Gasoline *	E	G	G	G	X	X	G	G	-	-	-	-	-	-

E = Excellent G = Good L = Limited U = Unsatisfactory X - Not Recommended \* Aromatic content not exceeding 50% \*\* ASTM D5798, D4806 or D6751

BECAUSE WE CONTINUALLY EXAMINE WAYS TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO ALTER SPECIFICATIONS WITHOUT PRIOR NOTICE.

# Cautionary Statement

All Products sold and distributed by Kuriyama of America, Inc. are in the nature of commodities and they are sold by published specifications and not for particular purposes, uses or applications. Purchaser shall first determine their suitability for the intended purposes, uses or applications and shall either conduct its own engineering studies or tests, or retain qualified engineers, consultants or testing laboratories and consult with them before determining the proper use, suitability or propriety of the merchandise or Products for the intended purposes, uses or applications.

Kuriyama of America, Inc. ("Seller") does not recommend the Products for any particular purpose, use or application, and the Purchaser or user thereof shall assume full responsibility for the suitability, propriety, use and application of the Products. Purchaser shall follow all instructions contained in Seller's catalogs, brochures, technical bulletins and other documents regarding the Products. The Products, including but not limited to, hose, tubing or couplings, may fail due to the use or conveyance of substances at elevated or lowered temperatures or at excessive pressure, the conveyance of abrasive, injurious, flammable, explosive or damaging substances.

Hose or tubing used in bent configurations will be subjected to increased abrasion. Hose clamps or couplings may loosen after initial installation and all sections of hose and tubing including connections, couplings, clamps, conductivity and bonding should be inspected frequently, regularly and consistently, and should be replaced, adjusted or re-tightened for the avoidance of leakage, for the prevention of injuries or damages, and for general safety purposes. Except as indicated in its Limited Warranty, Seller shall not be liable or responsible for direct or indirect injuries or damages caused by or attributed to the failure or malfunction of any Products sold or distributed by it.

Purchasers or users of the Products should frequently and consistently undertake inspections and protective measures with respect to the use and application of Products, which should include the examination of tube and cover, conditions of the hose or tubing, and the identification, repair or replacement of sections showing cracking, blistering, separations, internal and external abrasions, leaking or slipped couplings or connections and make proper proof tests.

## Limited Warranty

The Products sold or distributed by Seller are warranted to its customers to be free from defects in material and workmanship at the time of shipment by us, subject to the following provisions. ALL WARRANTY CLAIMS SHALL BE MADE WITHIN SIX (6) MONTHS AFTER SELLER SHIPPED THE PRODUCTS. SELLER'S LIABILITY HEREUNDER IS LIMITED AT SELLER'S EXCLUSIVE DISCRETION, TO 1) THE PURCHASE PRICE OF ANY PRODUCTS PROVING DEFECTIVE; 2) REPAIR OF ANY DEFECTIVE PRODUCT OR PART THEREOF; OR 3) REPLACEMENT OF ANY DEFECTIVE PRODUCT OR PART UPON ITS AUTHORIZED RETURN TO SELLER.

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE CREATED UNDER APPLICABLE LAW INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SELLER OR THE MANUFACTURER OF THE PRODUCT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFITS, WHETHER OR NOT CAUSED BY OR RESULTING FROM THE NEGLIGENCE OF SELLER AND/OR THE MANUFACTURER OF THE PRODUCT, UNLESS SPECIFICALLY PROVIDED HEREIN. IN ADDITION, THIS WARRANTY SHALL NOT APPLY TO ANY PRODUCTS OR PORTIONS THEREOF WHICH HAVE BEEN SUBJECTED TO ABUSE, MISUSE, IMPROPER INSTALLATION, MAINTENANCE, OR OPERATION, ELECTRICAL FAILURE OR ABNORMAL CONDITIONS, AND TO PRODUCTS WHICH HAVE BEEN TAMPERED WITH, ALTERED, MODIFIED, REPAIRED, REWORKED BY ANYONE NOT APPROVED BY SELLER, OR USED IN ANY MANNER INCONSISTENT WITH THE PROVISIONS OF THE "CAUTIONARY STATEMENT" ABOVE OR ANY INSTRUCTIONS OR SPECIFICATIONS PROVIDED WITH OR FOR THE PRODUCT.

09/2005

Distributed by:



**Kuriyama of America, Inc.**

Headquarters, Sales Office and Stocking Location

360 E. State Parkway, Schaumburg, IL 60173-5335

Phone: (847) 755-0360 • Toll-free FAX: (800) 800-0320

International FAX: (847) 885-0996

Web Site: <http://www.kuriyama.com>

E-Mail: [sales@kuriyama.com](mailto:sales@kuriyama.com)

## SALES OFFICES — CONTACT THE LOCATION BELOW WHICH SERVES YOUR AREA

**SOUTHWEST WAREHOUSE**  
KURIYAMA OF AMERICA, INC.  
HOUSTON  
8919 MARKET ST.  
HOUSTON, TX 77029  
Phone: (713) 674-8212  
Toll Free Phone: (800) 501-6808  
FAX: (713) 674-5214  
Toll Free FAX: (800) 800-5214

**WESTERN WAREHOUSE**  
KURIYAMA OF AMERICA, INC.  
SANTA FE SPRINGS  
10749 SHOEMAKER AVENUE  
SANTA FE SPRINGS, CA 90670-4039  
Phone: (562) 941-4507  
FAX: (562) 941-8940  
Toll-Free FAX: (800) 326-8940

**SOUTHEAST WAREHOUSE**  
FORTNEY SALES CO., INC.  
1580 BIG SHANTY DR NW  
KENNESAW, GA 30144-7040  
Phone: (770) 427-6528  
FAX: (770) 423-9249  
Toll Free FAX: (800) 423-9249  
Web Site: [www.fortneysales.com](http://www.fortneysales.com)  
E-Mail: [sales@fortneysales.com](mailto:sales@fortneysales.com)

**EASTERN WAREHOUSE**  
EASTERN RUBBER & PLASTICS CO., INC.  
RT. 537 – PLUMSTED INDUSTRIAL PARK  
NEW EGYPT, NJ 08533-0248  
Phone: (609) 758-0100  
FAX: (609) 758-0102  
Toll Free FAX: (800) 445-7138  
Web Site: [www.easternrubber.com](http://www.easternrubber.com)  
E-Mail: [sales@easternrubber.com](mailto:sales@easternrubber.com)

### IN MEXICO:

KURIYAMA DE MEXICO, S. DE R.L. DE C.V.  
CARRETERA MIGUEL ALEMÁN KM. 14.8  
PARQUE INDUSTRIAL HASNA  
APODACA (MONTERREY), N.L., 66600, MEXICO  
Phone: (81) 1086-1870 O 71  
Toll-Free: (within Mexico) 01-800-822-52-00  
FAX: (81) 1086-1869  
Internet: [www.kuriyama.com](http://www.kuriyama.com)  
Correo Electronico: [ventas@kuriyama.com](mailto:ventas@kuriyama.com)

Visit us  
[www.kuriyama.com](http://www.kuriyama.com)  
on the Web!

Printed in U. S. A.