Kuri Tec Corporation

Hoses and Accessories for Handling Petroleum Products and Alternative Fuels

Featuring

tigerflex®

Look for this logo for select

Biofuel Friendly PRODUCTS™

Edition 0409

NAHAD THE ASSOCIATION FOR HOSE AND ACCESSORIES DISTRIBUTION

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PEI PETROLEUM EQUIPMENT INSTITUTE

TIGERFLEX® ISO 9001:2000 REGISTERED QUALITY M.S.

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Kuriyama - Couplings™ Fuel Industry Products

Other

What are Biofuel Friendly Products?

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

*Applies to biodiesels which meet ASTM 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

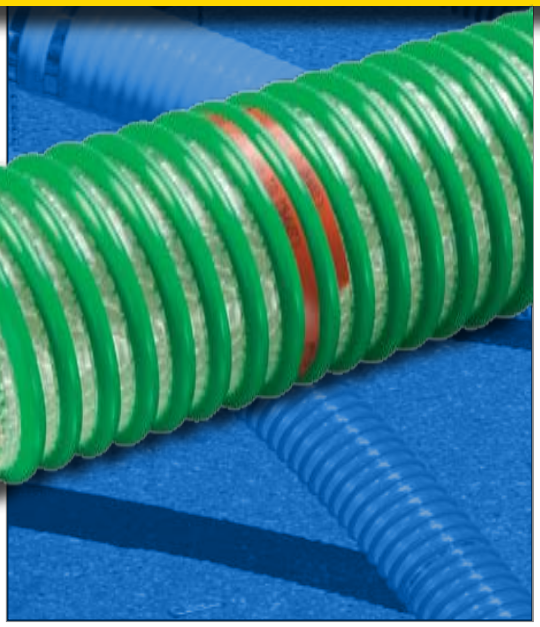
As we look to reduce our dependence on foreign petroleum based fuels, as well as reduce greenhouse gas emissions, the use of alternative biofuels such as ethanol and biodiesel continues to grow. This creates challenges in the fuel industry, as many existing petroleum transfer products were not designed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

Tigerdrop™ Clear Drop Hose Series TDH

Clear - "See-the-flow"



Biofuel Friendly PRODUCTS™

General Applications: Tank truck gravity drop and terminal fuel transfer
Construction: Polyurethane hose with polyester fabric reinforcement and rigid PVC helix
Service Temperature: -40°F (-40°C) to 150°F (+65.5°C)*

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol (up to E98), diesel and biodiesel (up to B100 meeting ASTM D6751 criteria)...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.
- **Reinforced tube** – for liquid fuel transfer applications.
- **Embedded copper grounding wire** – safely dissipates static electricity. Physically extract the copper grounding wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Abrasion resistant helix** – designed to slide easily over rough surfaces and around objects.

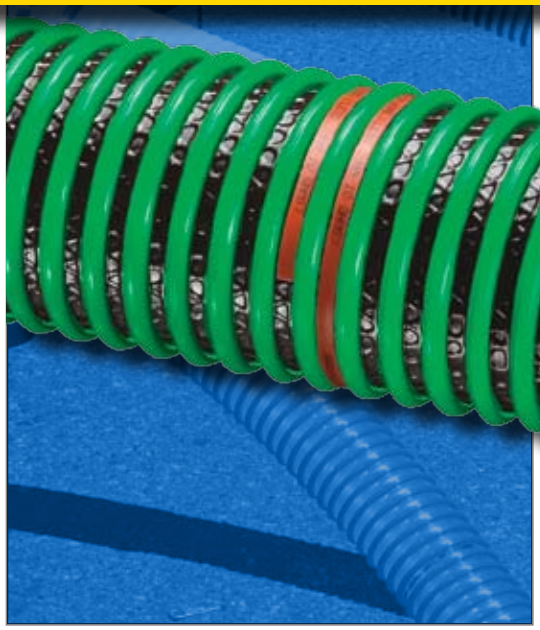
Made In USA

Nominal Specifications

Series	ID (in.)	OD^ (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 ^ 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.



Tigerdrop™ Black Drop Hose Series TDHBK

Black, opaque UV-resistant, static dissipating tube

Biofuel Friendly PRODUCTS™

General Applications: Tank truck gravity drop fuel transfer
Construction: Polyurethane hose with polyester fabric reinforcement and rigid PVC helix
Service Temperature: -40°F (-40°C) to 150°F (+65.5°C)*

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol (up to E98), diesel and biodiesel (up to B100 meeting ASTM D6751 criteria)...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!
- **Reinforced tube** – for liquid fuel transfer applications.
- **Embedded copper grounding wire** – safely dissipates static electricity. Physically extract the copper grounding wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Static dissipating tube** – for added safety.
- **Abrasion resistant helix** – designed to slide easily over rough surfaces and around objects.

Made In USA

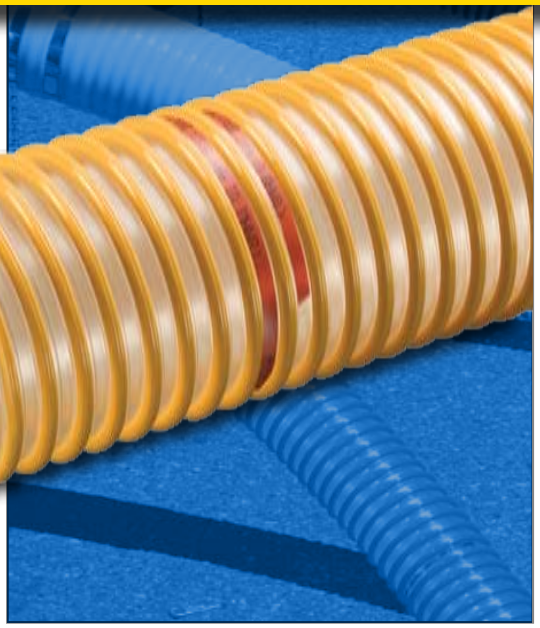
Nominal Specifications

Series	ID (in.)	OD^ (in.)	Working Pressure (psi @ 68° F)	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
TDHBK303	3.03	3.78	65	6	100/20	1.2
TDHBK404	4.04	4.82	65	8	100/20	1.7

* Actual service temperature range is application-dependent ^ 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.

Tigervapor™
Vapor Recovery Hose
Series TV



Biofuel Friendly PRODUCTS™

General Applications: Tank truck and terminal vapor recovery transfer
Construction: Polyurethane hose with rigid PVC helix
Service Temperature: -40°F (-40°C) to 150°F (+65.5°C)*

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol (up to E98), diesel and biodiesel vapors (up to B100 meeting ASTM D6751 criteria)...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.
- **Embedded copper grounding wire** – safely dissipates static electricity. Physically extract the copper grounding wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Abrasion resistant helix** – designed to slide easily over rough surfaces and around objects.

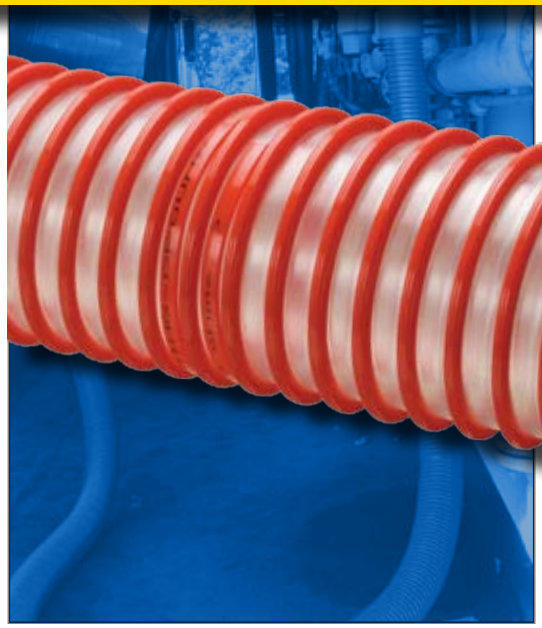
Made In USA

Nominal Specifications

Series	ID (in.)	OD^ (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 ^ 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.



Tigervapor HD™
Vapor Recovery Hose
Series TVHD

Biofuel Friendly PRODUCTS™

HEAVY DUTY!

General Applications: Tank truck and terminal vapor recovery transfer
Construction: Polyurethane hose with rigid PVC helix
Service Temperature: -40°F (-40°C) to 150°F (+65.5°C)*

- **Biofuel Compatible** – Revolutionary polyurethane compound! Specially designed to handle gasoline, ethanol (up to E98), diesel and biodiesel vapors (up to B100 meeting ASTM D6751 criteria)...and still keeps all the other great features and benefits!
- **Heavy duty construction** – thicker wall to handle the added multi-user stresses at tank truck filling terminals.
- **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.
- **Embedded copper grounding wire** – safely dissipates static electricity. Physically extract the copper grounding wire from the rigid helix and bond to the metal coupling (or by other means) to ground.†
- **Abrasion resistant helix** – designed to slide easily over rough surfaces and around objects.

Made In USA

Nominal Specifications

Series	ID (in.)	OD^ (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 ^ 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.

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, TDHBK 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

NEW PRODUCT

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

Banding Sleeves – *Flexible PVC*

- 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 & TDHBK 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/ft.)
SLV-VAP2X3	2.02	Yellow	3	1.80
SLV-VAP3X3	3.03	Yellow	3	3.09
SLV-VAP4X3	4.04	Yellow	3	4.20

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 hose with rigid PVC helix
Service Temperature: -40°F (-40°C) to 150°F (+65.5°C)*

- **Handles most fuels** – 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.

Made In USA

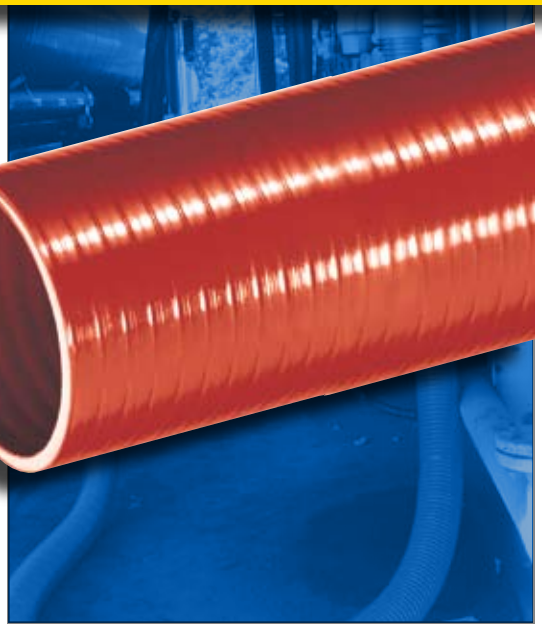
Nominal Specifications

Series	ID (in.)	ID (mm)	OD^ (in.)	OD^ (mm)	Working Pressure (psi) 68° F	Working Pressure (psi) 104° F	Vacuum Rating (in. Hg) 68° F	Vacuum Rating (in. Hg) 104° F	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
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
OV250	2 1/2	63.5	2.87	73.0	65	45	28	24	8	100	0.82
OV300	3	76.2	3.41	86.7	65	40	28	22	10	100	1.09

* Actual service temperature range is application-dependent ^ OD measured over helix.

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

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 hose with PVC helix
Service Temperature: 5°F (-15°C) to 150°F (+65.5°C)*

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

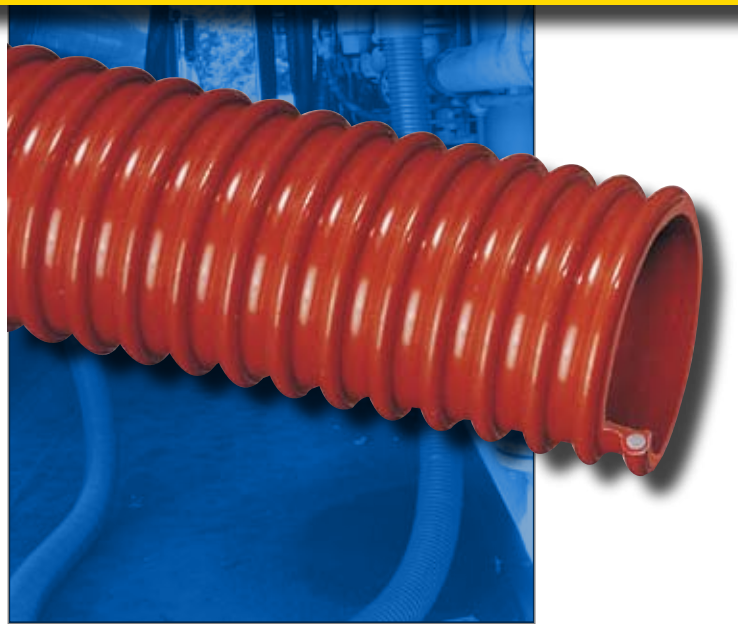
Made In USA

Nominal Specifications

Series	ID (in.)	ID (mm)	OD^ (in.)	OD^ (mm)	Working Pressure (psi) 68° F	Working Pressure (psi) 104° F	Vacuum Rating (in. Hg) 68° F	Vacuum Rating (in. Hg) 104° F	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
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
ORV125	1 1/4	31.8	1.51	38.3	80	50	28	24	4	100	0.30
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 ^ OD measured over helix.

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



Series WOR™ Oil Resistant Heavy Duty Convoluted OD PVC Hose

General Applications: Heavy duty suction of light oils and oil slurries; oil skimming; light duty hydrocarbon emissions.
Construction: Oil resistant PVC hose with PVC helix
Service Temperature: 5°F (-15°C) to 150°F (+65.5°C)*

- **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^ (in.)	OD^ (mm)	Working Pressure (psi) 68° F	Working Pressure (psi) 104° F	Vacuum Rating (in. Hg) 68° F	Vacuum Rating (in. Hg) 104° F	Min. Bending Radius (in. @ 68° F)	Standard Lengths (ft.)	Weight (lbs/ft.)
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 ^ OD measured over helix.

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

Tank Truck Couplings and Accessories

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

HEAVY DUTY!

Heavy Duty Aluminum Part C Female Coupler x Hose Shank

(with BUNA gasket & forged brass handles)

Part Number	Size	Weight Each	Standard Carton
TCC-300-A	3”	2.65	15
TCC-400-A	4”	3.70	15

Biofuel Friendly PRODUCTS™

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

Standard Part C Female Coupler x Hose Shank

Part Number	Size	Weight Each	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

Biofuel Friendly PRODUCTS™

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

Part DP Dust Plug

Part Number	Size	Weight Each	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.

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	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	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	Standard Carton
CGDP-A4030	4" x 3"	3.08	4
CGDP-A4040	4" x 4"	3.8	4

Biofuel Friendly PRODUCTS™

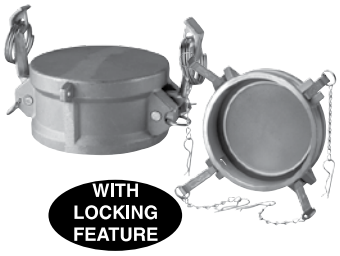
304 Stainless Steel and 316 Stainless Steel are BIOFUEL FRIENDLY PRODUCTS.

Part E
Male Adapter x Hose Shank

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

Biofuel Friendly PRODUCTS™

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



Part DC Dust Cap

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

Tank Truck Couplings and Accessories

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

API Aluminum Coupling, Coupler x Adapter

(with API-BUNA gasket & forged brass handles)

Part Number	Size	Weight Each	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)

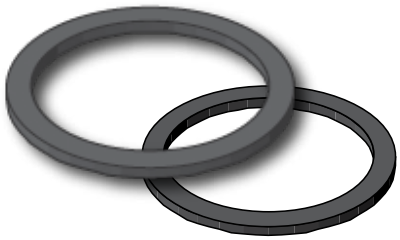
Part Number	Size	Weight Each	Standard Carton
TCDD-A4040	4" x 4"	6.00	2

API Aluminum Dust Cap,

(with API-BUNA gasket & forged brass handles)

Part Number	Size	Weight Each	Standard Carton
TCDC-A400	4"	3.00	6

Biofuel Friendly PRODUCTS™



Gaskets

Part Number	Size	Weight Each	Standard Carton
BUNA			
BUNA200	2"	0.022	10
BUNA300	3"	0.042	10
BUNA400	4"	0.066	10
Viton®			
VITON200	2"	0.022	10
VITON300	3"	0.042	10
VITON400	4"	0.066	10
API			
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.

Hose Assembly Coupling Installation Suggestions

for Tigerflex™ Series TDH™ & TDHBK™ 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™, TDHBK™, 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*.

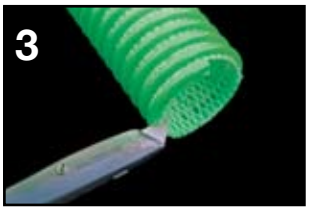
The person assembling the couplings to the hose should know how to check the hose assembly for continuity by properly using a continuity meter and/or an ohmmeter. Contact Kuriyama for training information.

Read the Technical Bulletin on page 16 and 17 of this catalog.

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".

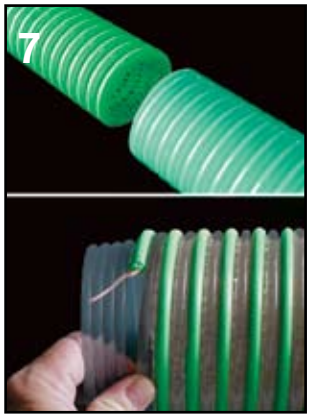


Step 3 — Using the knife, make a light cut around the entire circumference of the hose's rigid helix, including the urethane flex. Note: The copper grounding wire is located in the center of the helix . . . be careful not to cut too deeply into the helix, to avoid damaging the grounding wire. TIP: Cut all the way through the urethane 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 clockwise, 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 helixes onto the hose. Slip the banding clamps onto the hose. TIP: When using banding coils, tighten clamps in a clockwise direction so the banding coil tightens down on the hose.

Step 8 — Insert the coupler's barbed shank into the hose, twisting counterclockwise 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. The clamp buckles should be located 180° apart. When using banding coils, be sure to tighten clamps in a clockwise direction 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.

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?

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, (∩ 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 with 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 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

Chemical Resistance Guide
for Tigerflex™ Fuel Transfer Hoses

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

E = Excellent G = Good L = Limited U = Unsatisfactory X - Not Recommended * Aromatic content not exceeding 50% ** ASTM D 6751

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Notes

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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

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