



Engineered Systems



LOADING SYSTEMS

OPW Engineered Systems, part of the OPW Fluid Transfer Group, provides expert solutions for the safe handling, transfer, monitoring, measuring and protection of hazardous bulk products worldwide.



OPW Engineered Systems specializes in the engineering, designing and manufacturing of systems for the safe and efficient loading and unloading of critical hazardous materials: loading systems, swivel joints, instrumentation, quick and dry disconnect systems and safety breakaways



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OVERVIEW

OPW Engineered Systems offers the most complete line of equipment available to meet today's bulk loading and unloading requirements. Whether your application involves...

- Tank Trucks • Rail Cars • Drums

...we can work with you to develop the right equipment for your application. Whether you're transferring petroleum products, liquefied gases, asphalt, solvents, or hazardous, corrosive chemicals, OPW loading systems help streamline your operation.

Proven Experience in Transfer Applications

Keeping your operation running smoothly means having dependable equipment and systems to handle your bulk loading and unloading requirements. Versatility is a hallmark of our comprehensive product offerings. Our system designs meet the modest demands of drum filling applications as well as the high-volume loading and unloading needs of major chemical and petroleum facilities throughout the world.

For more than 60 years, OPW Engineered Systems has provided innovative solutions for some of the most challenging liquid handling applications. We pioneered the development of systems designed to load and unload petroleum products for rail car and tank truck applications. Today, the company also manufactures custom-designed loading and unloading systems to safely and efficiently handle aggressive/critical chemicals and by-products.

Quality Control for Dependable Operation

Our manufacturing and testing procedures meet or exceed industry standards. All loading arm assemblies are rigorously tested to ensure high quality. CNC equipment is used to machine all critical dimensions within precise tolerances to ensure that each product meets our rigid engineering specifications. As with every other part of our product, welding is an important quality factor.

Our welders are certified to ASME Boiler and Pressure Vessel Code, Section IX.

Additional testing, including radiography as well as material certifications, can be provided to meet your specific requirements. Special exterior surface preparation and painting are also available.

Innovative Products Designed for Safety

OPW Engineered Systems can design and build arms that conform to your specifications, no matter how unique they might be. Our design efforts are supported by a state-of-the-art CAD system for faster, more accurate responses to your technical requests. With such features as fully adjustable torsion spring-balance mechanisms and precision-machined ball bearing swivel joints, OPW loading systems are durable, reliable, and easy to operate and maintain. Available in stainless steel, carbon steel, aluminum and other materials, we meet your most demanding specifications. Our special capabilities include heat traced and jacketed arms, vapor recovery, automatic shut-off special valving, by-pass systems, lined and coated loaders, pneumatic/hydraulic arms and drum fillers.

Rely on OPW Engineered Systems Service and Support

We provide in-depth technical assistance and work with you in designing and selecting the best system for your application. Our sales representatives are knowledgeable about our products and skilled in coordinating the steps involved in solving your transfer problems. This personalized professional service ensures your satisfaction. Support personnel are also available to assist you with site evaluation to determine first-hand which system design is best suited for your application.

OPW continually strives to maintain a leadership position in the industry by responding to your needs and supplying the high-quality, dependable systems you require.





SYSTEM DESIGN

Design Considerations

Transferring liquid product into tank trucks and rail cars involves moving product from a fixed pipeline riser to various sizes of vehicles and containers that may be parked in a variety of angles and positions.

The logical solution is a loading arm assembly. The advantages include:

Transfer Efficiency - a loading arm is a section of pipeline capable of handling high flows and line pressures and can be moved both vertically and horizontally.

Ease of Operation - there is no cookie-cutter approach when it comes to loading arm assemblies. Each assembly is built to meet specific application requirements, such as flexibility, physical limitations, personal preference, operating experience, environmental requirements, and sizes and types of vehicles to be loaded or unloaded. And, a wide range of components can be added to a loading arm to enhance its capabilities, including valves, couplings, high level sensing devices, and vapor recovery attachments to name a few.

Improved Environment and Personnel Safety - loading arms, by design, are:

- **Self-Organizing** - self-contained, space-efficient.
- **Environmentally-Friendly** - they retract out of the way when not in use, thereby eliminating potential environmental hazards due to hose run-overs.
- **Health-Friendly** - since they are self-supported on a base with precision engineered swivels and torsion springs, loading arms do not require strenuous lifting or moving. They can be moved effortlessly in a variety of directions, even under fluid loads.

Anatomy of a Loading Arm Assembly

Swivel Joints - provide flexibility, movement and leak-free operation.

Pipe or Tubing - sometimes used in conjunction with hose; of suitable size and length to handle the flow and reach the compartment(s).

Counterbalance System - to support and distribute the weight of the assembly, making it easy to maneuver.

Best Efficiency

Loading arm assemblies are available in many configurations and sizes. Selection of the most suitable design for a specific application will ensure that you are getting an easy operating, low-cost, low maintenance, high-value solution. The best design also provides flexibility to permit efficient operation and still fit within all physical limitations of the installation. The following characteristics are designed into every OPW Engineered Systems Loading Arm assembly:

Ease of Operation

Can be easily handled by one operator without heavy pushing, pulling or lifting.

- Can easily be extended to the furthest fill connection.
- Have a vertical movement with a built-in mechanical force that will handle most of the load when raising or lowering the loader.
- Can be equipped with a mechanical lock that will hold it in the down position.
- Have a loading valve that can be opened and then held open easily.

Adequate Horizontal and Vertical Range

- The ideal loader has sufficient range to reach all compartments of the longest vehicle at the rack without re-spotting the vehicle.
- It will have sufficient vertical movement and drop tube length to give sub-surface loading on the lowest vehicles.
- Should have at least a 5° downward slope toward the outboard end when filling the highest vehicle.
- Tight connections to vehicles may require additional swivel planes of rotation to accommodate easy alignment of couplings and good connections.

Rack Design

At the design stage, consideration must be given to riser pipe spacing, roof height, headroom, operation of gangways or access equipment, location of support columns, obstructions that could interfere with the loading operation, and storage.





SYSTEM DESIGN

Adequate Capacity Without Excessive Pressure Drop / Line Size

- Typically, the loading arm assembly is the same size as the plant piping on which it is installed.
- Must be capable of handling the design capacity without excessive pressure drop.
- Pump size and loader pipe diameter must be given consideration in order to ensure economic advantages.
- As a general rule, it is recommended that the line velocity not exceed 15-20 ft./sec. (4.6 to 6.1 m./sec.).

LINE SIZE	MAXIMUM FLOW RATE BY LINE VELOCITY	
	15 Ft. Per Sec.	20 Ft. Per Sec.
2"	150 GPM	200 GPM
3"	350 GPM	450 GPM
4"	600 GPM	800 GPM
6"	1350 GPM	1800 GPM

Ease of Maintenance

- Consideration should be given to the operation and maintenance facilities at the point of use.
- The addition of excessive mechanical features mean additional service requirements.

Product Being Handled / Material Construction

- The loader must be designed and constructed to handle the required products.
- Metals, seals and gaskets must be chemically compatible with the products being handled, as well as their transfer temperatures and prevailing climatic conditions.

Top or Bottom Loading

Bottom loading offers:

- Personnel safety advantages – personnel remain on the ground.
- Reduction in static build-up during loading.
- Reduction in vapors.
- Improved loading times.
- Cost savings relative to loading rack construction.

Standard plant practice, personnel preference, safety and environmental requirements, the nature of the product, and how vehicles are equipped will determine whether top or bottom loading is used.

Balancing Method

Torsion Spring

- Is self-contained and space efficient.
- Can be adjusted to make the vertical lifting action of the arm respond in virtually any manner desired.
- Lowering the arm winds the spring tighter so that when the arm is released after loading, the spring unwinds and effortlessly lifts the arm upward.

Counterweights

- Can be used to balance arm, but are rarely used today.
- Requires larger space behind arm to accommodate both horizontal swing and vertical movement.

Pneumatic and Hydraulic Cylinders

- Can be used on specialized applications to balance and operate arms.

Moment Load

Moment load is the overturning force exerted at a particular point and is caused by a weight whose center of gravity is located at some distance from that point. The importance of this is that adding or reducing weight on an arm will affect its balance and operation. The addition of components, such as insulation, tracing, valves and even retained product must be given consideration in the design stage since they will affect the weight and balance of the arm and may require changing the spring balance unit and adding swivels to the arm design.



BOTTOM LOADING OVERVIEW



OPW Engineered Systems Bottom Loading Systems offer numerous benefits over conventional top loading:

- Safety of the person operating the loading arm is the prime advantage since the operator remains on the ground, not on top of the vehicle where falls are a common threat.
- Connections are made more quickly so overall loading time is reduced.
- Bottom loading systems create less turbulence in the tank, reducing the danger of generating static electricity.
- Bottom loading not only reduces vapors, which can be an environmental hazard,

but this system can also be easily adapted to fully recover vapors displaced during loading.

- Speed is a key advantage of bottom loading because tanks can be filled faster and a number of compartments can be loaded simultaneously.
- Bottom loading islands are simpler and cheaper to build than top loading racks. You can realize more savings because you'll safely load more material in a shorter time with less spillage and vapor loss.

OPW Engineered Systems offers a complete line of equipment for efficiently loading and unloading petroleum products, chemicals, and liquefied gases.

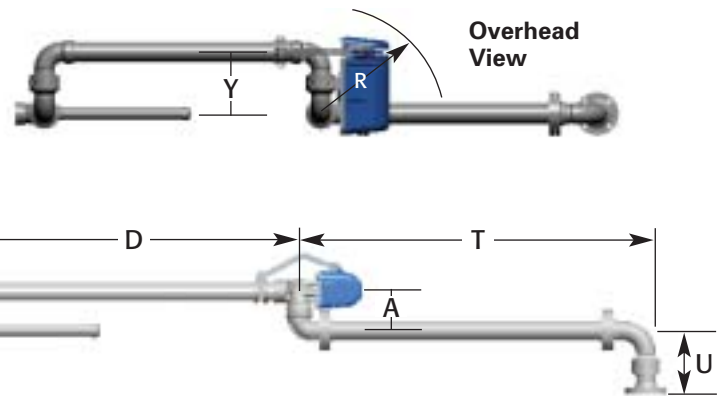
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Unsupported Boom Type Bottom Loader

Designed to provide flexible long-range operation, this heavy-duty configuration is both reliable and easy to use. A minimum of five swivel planes of rotation offer complete flexibility in making tight connections for loading and unloading rail cars and tank trucks, and servicing aviation refuelers. The outboard swivel and arm adjusts for any changes in elevation or tilting that may result as the vehicle is loaded or unloaded.

The unsupported boom type loader is extremely versatile and many variations are possible. It can be equipped with dry disconnect coupler, union, quick coupling, or other customer specified end fitting to make connections on the side, at the rear, or underneath the vehicle. The intermediate swivel is often inverted to achieve the low profile and clearances needed to connect to the underside of a rail car.

Typically installed at or near ground level, arms of varying lengths can be mounted on staggered risers to achieve crossover and neat compact storage of multiple arms in a confined space.



Benefits

- Easy to operate/maneuver
- Accommodates changes in elevation
- Can be safely stored to provide for safe clearance of vehicles
- Easy to connect under the vehicle
- Very flexible to compensate for vehicle misplacement
- Scissor-back storage means no wasted space

Features

- Low profile
- Long Reach
- A minimum of five planes of rotation
- Compact storage
- Torsion Spring Balanced
- Outboard two-plane swivel joint
- Available in 2", 3", 4" and 6"
- Available in steel, stainless steel, aluminum, and specialty alloys
- Choice of flanged, threaded or all-welded construction

Dimensions*

Size	A		D		T		U		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	8-1/8	206	66	1676	42	1067	8-5/8	219	17	432	8-1/8	206
3"	76	10-3/4	273	66	1676	42	1067	10-1/2	267	18 1/2	470	10-3/4	273
4"	102	12-3/4	324	66	1676	42	1067	11-3/4	298	20	508	12-3/4	324
6"	152	21-1/2	546	66	1676	42	1067	19	483	24-3/4	629	18-1/2	470

*Custom dimensions also available.

“A” Frame Loader M-32-F

The “A”-frame is one of the more popular loading arm configurations. It provides good flexibility, long reach, and is convenient and easy to use. It adjusts for any changes in the elevation or tilting of the vehicle during loading or unloading. The arm stores neatly in the upright, near vertical position allowing it to swing around easily for loading from either side of the island.

The “A”-frame’s compact storage envelope also allows these arms to be installed relatively close together, often on risers that are approximately the same height as the vehicle connection. They can also be mounted next to one another on staggered risers to achieve arm crossover for simultaneous loading of multiple compartment trucks.

Commonly used for tank truck bottom loading, “A”-frame arms can also be used in top loading and unloading installations. They are generally equipped with a dry disconnect coupling, union, or other tight-fill fitting.

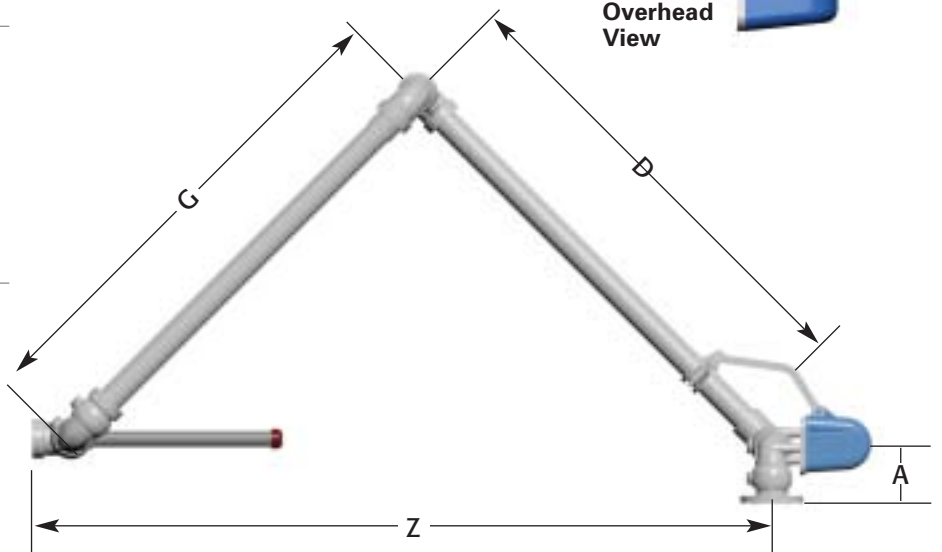
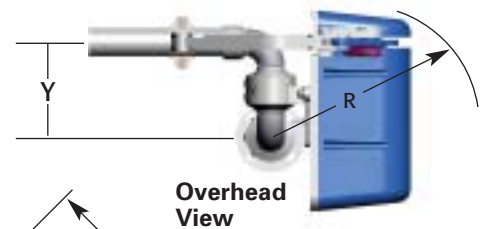
Inlet flange and seamless piping are suitable for handling liquefied petroleum gases, including propane and butane.

Benefits

- Easily stored away from vehicles
- For multiple product applications, it can be mounted close to another arm
- Can be safely stored to provide for safe clearance of vehicles
- Crossover can easily be achieved

Features

- Low riser mounting height
- Available in 2”, 3” and 4”
- Available in steel, stainless steel, aluminum, and specialty alloys
- Choice of flanged, threaded or all welded construction
- LPG service arms (LPG-32-F) - all welded construction
- Welded assemblies in steel and stainless steel with 300 lb. flanges



Dimensions*

Size	A		D		G		Z		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	8-5/8	219	60	1524	60	1524	90	2286	17	432	8-1/8	206
3"	76	10-1/2	267	60	1524	60	1524	90	2286	18-1/2	470	10-3/4	273
4"	102	11-3/4	298	60	1524	60	1524	90	2286	20	508	12-3/4	324

*Custom dimensions also available.

"A" Frame Hose Loader AFH-32-F

This spring balanced hose loader offers the same advantages as the conventional "A"-frame arm except flexible hose is used instead of rigid piping on the secondary arm.

Mounting heights for this style arm are shorter than those required for other hose loaders. This arm can be staggered to achieve crossover and conformance to the API envelope requirements. "A"-frame hose loaders are normally stored in an upright, near vertical position making it possible to load from both sides of the island.

In addition to bottom loading, the "A"-frame-hose loader is often used as a vapor arm in fuel terminals and can be adapted for use in top loading and unloading applications.

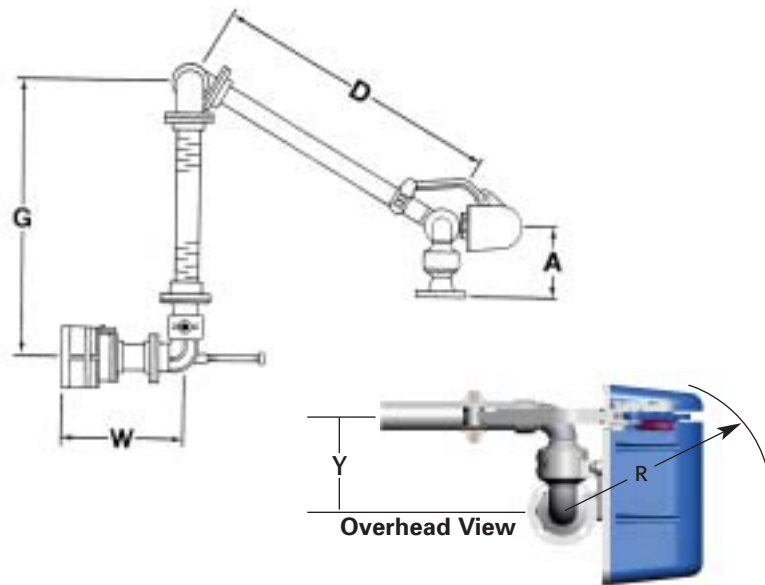
Minimum recommended drop hose length is approximately 60".

Benefits

- Use as a vapor arm
- Easily stored away from vehicles
- For multiple product applications it can be mounted close to another arm
- Can be safely stored to provide for safe clearance of vehicles
- Crossover can easily be achieved

Features

- Low riser mounting height
- Available in 2", 3" and 4"
- Available in steel, stainless steel, aluminum, and specialty alloys
- Choice of flanged, threaded or all welded construction



Dimensions*

Size	A		D		G		W		R		Y			
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
2"	51	1300	8-5/8	219	60	1524	72	1829	15	381	17	432	8-1/8	206
3"	76	1930	10-1/2	267	60	1524	72	1829	21	533	18-1/2	470	10-3/4	273
4"	102	2590	11-3/4	298	60	1524	72	1829	21	533	20	508	12-3/4	324

*Custom dimensions also available.

CWH Series Counterweighted Hose Loader

Installation and operation is simple and efficient with OPW Engineered Systems hose loaders. Adjustable counterweights mounted on a pair of horizontal rails are simply moved until the desired balance point is located. This design provides for efficient handling and coupling to the tank adaptors.

This popular hose loader features a flange-by-flange base swivel joint for reliable performance and ease of maintenance. A heavy-duty Endura™ split flange base swivel joint is standard on 4" arms. Construction is carbon steel with a drop hose for maximum flexibility and easy handling. Composite hose (standard) and stainless steel hoses are available. Outboard swivel joint, spacer spool, and API coupler are aluminum on the standard model.

Standard horizontal reach is 114" to fully cover the API RP-1004 bottom loading envelope with up to four loading arms spaced 18" apart. Each loader should be mounted successively higher; 16" stagger is recommended to provide maximum crossover capability for efficient simultaneous compartment loading.

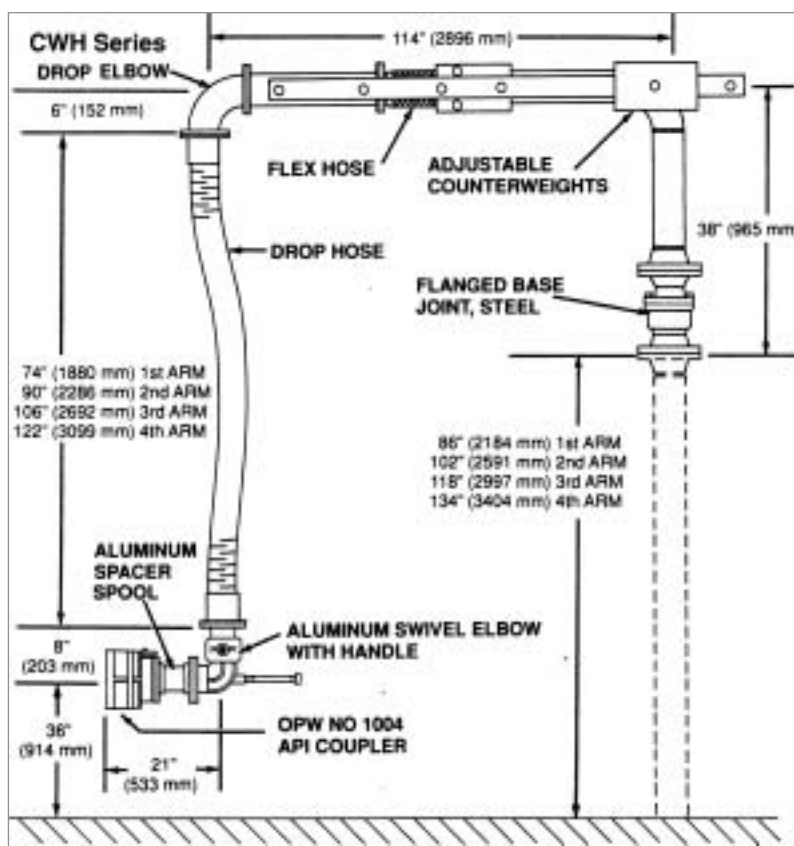
Optional reaches of 66", 78", 90", and 102" are also available, but full coverage of the API envelope may require moving the truck. Minimum recommended drop hose length is approximately 60".

Benefits

- Easily meets envelope requirements
- Counter balance adjustment is smooth and easy
- Multiple compartment loading capability saves time
- Simple rugged construction

Features

- Crossover capability to meet API envelope
- Rugged construction
- Long reach
- Available in 4" and 6" x 4" sizes



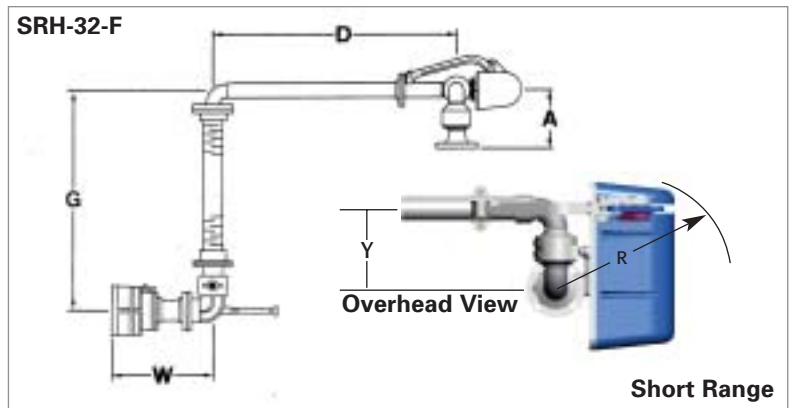
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Spring Balanced Hose Loader

Short Range SRH-32-F Long Range LRH-32-F

OPW Engineered Systems spring balanced hose loaders are available in both short-range and long-range versions. The short-range model has the torsion spring mounted back at the riser, while on the long-range units the spring is located a short distance out on the arm. Like counterweighted hose loaders, spring balanced hose loaders are generally stored at horizontal and only slightly upward or downward movement is required to align the coupler with the tank truck adaptor.

This type of arm, in the 4" size, is used in exactly the same manner as the counterweighted hose loader. An exception: the counterbalance mechanism is a torsion spring rather than weights. Four long-range hose loaders with a 114" reach spaced 18" apart will fully cover the API RP-1004 bottom loading envelope. The short-range loader with a 52" reach conforms to the API envelope with three arms installed 24" apart.



Dimensions*

Size	A		D		G		W		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	8-5/8	219	52	1321	104	2642	15	381	17	432	8-1/8	206
3"	76	10-1/2	267	52	1321	104	2642	21	533	18-1/2	470	10-3/4	273
4"	102	11-3/4	298	52	1321	104	2642	21	533	20	508	12-3/4	324

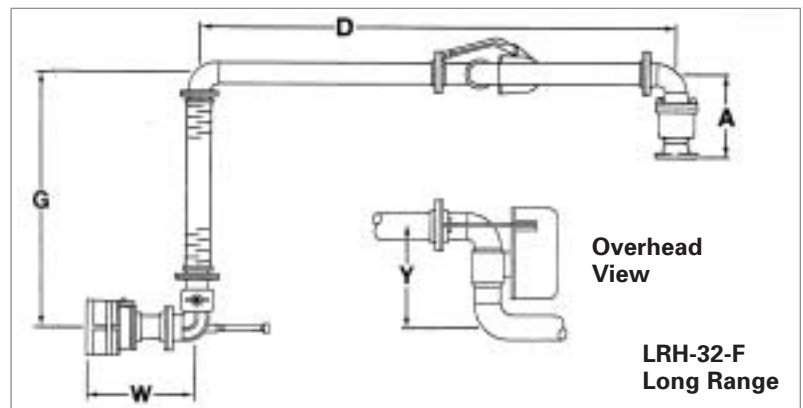
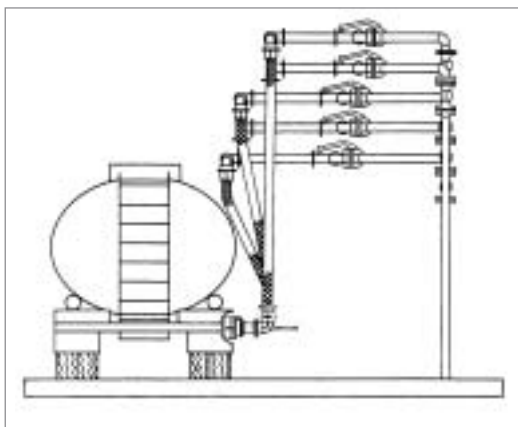
*Custom dimensions also available.

Benefits

- Easily adjustable torsion spring
- Makes loading simple
- Easy to handle and move
- Easily meets API envelope requirements

Features

- Available in 2", 3" and 4"
- Available in carbon steel, stainless steel and aluminum
- Choice of flanged, threaded or all-welded construction



Dimensions*

Size	A		D		G		W		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
3"	76	10-1/2	267	114	2896	104	2642	21	533	20-1/2	521
4"	102	18-1/8	460	114	2896	104	2642	21	533	20-1/2	521

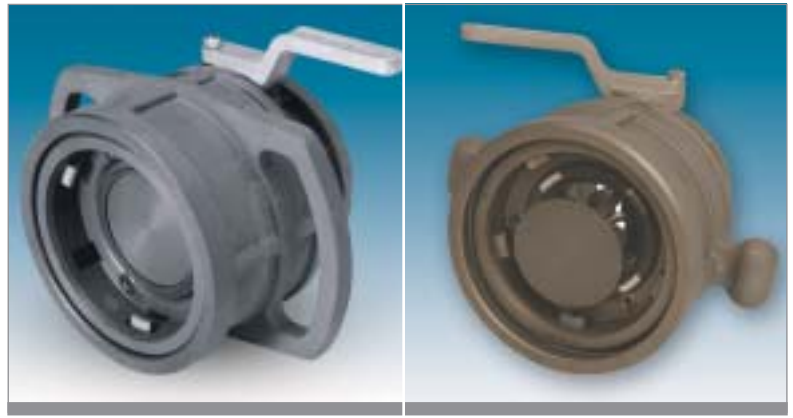
*Custom dimensions also available.

1004D2/1005E API Coupler

The OPW Engineered Systems 1004D2 is the standard in “drip-less” bottom loading couplers and a proven performer at major oil terminals worldwide. The 1004D2 mates with all 4” bottom loading adaptors built in accordance with API RP-1004 requirements to significantly reduce liquid loss at disconnect in gasoline applications.

Benefits

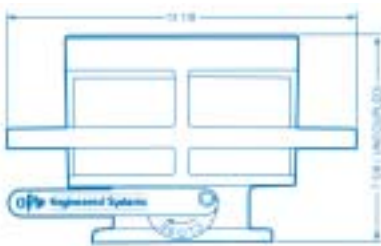
- **Designed to effectively handle all fuels** – high performance Viton® seals are standard, providing excellent wear and fuel resistance. Compatible with gasoline with up to 20% MTBE content. Suitable for use at service temperatures as low as -10°F. Other seals include Buna-N, Chemraz®, and Kalrez®.
- **Designed for “less mess” at your loading rack** – the new, easy, self-aligning 5-Cam design ensures a tight connection to truck adaptor and resists side forces. The 1004D2 cannot be opened unless it is properly connected to an API adaptor nor can it be disconnected when the poppet is open.
- **Eliminates risk of nose seal “blow out”** – beveled for superior sealing, the new high retention nose seal is specifically designed to eliminate the risk of seal “blow out” due to line over-pressurization and thermal expansion.
- **Long-life performance** – extended wear operating lever has a built-in roller bearing to provide smoother operation and extended life.
- **Smoother, easier operation** – the built-in roller bearing handle and Teflon® impregnated poppet and cylinder provide for smoother, easier movement.
- **Easy to grasp, even with gloves** – large handles provide for easy handling.
- **Easy and inexpensive to maintain** – seal and conversion kits available
- **Lightweight** – only 8.5 lbs.
- **Easy-to-change nose seal** – simply pull out over the poppet without disassembly.
- **Dependable parts** – all wetted parts are stainless steel or hard-coated anodized aluminum; internal linkage parts are hardened stainless steel.



Features

- **Heavy-duty body**
- **Heavy-duty internal components** – stainless steel and Teflon® impregnated hard-coat anodized aluminum internal parts
- **High retention nose seal** – beveled for superior sealing
- **Heavy-duty sleeve**
- **Rugged operating handle** – with built-in roller bearing for smooth operation
- **Large, convenient grasp handles**
- **Available seals include** – Teflon®, Viton®, Buna-N, Kalrez® and Chemraz®
- **Coupler available in 4” size only**
- **Secure cylinder** – series of three retainers prevent the cylinder from inadvertently coming out of the coupler body
- **Shaft Seal** – simple and reliable, consisting of a single heavy cross-section O-ring
- **300 psi (20 bar) pressure rating** – reinforced internal parts minimize effects of thermal expansion
- **Seal Kits** – include everything needed to change out all seals in the 1004D2 Bottom Loading Coupler. Available in high-performance Viton® (1004D2SRK) and Buna-N (1004D2SRK-0401)
- **Conversion Kits** – available to convert a 1004 to a 1004D2. Includes poppet, cylinder and beveled nose seal, shaft seal, cylinder seal and other items included in all OPW coupler repair kits. High performance Viton® (1004D2CK-0402) or Buna-N (1004D2CK-0401)

Ordering Specifications



NUMBER	DESCRIPTION	SIZE	CONSTRUCTION	SEALS	WT.
1004D2-0401	High Pressure Drip-Less API Bottom Coupler	4"	Aluminum	Buna-N	18.5 lbs.
1004D2-0402	High Pressure Drip-Less API Bottom Coupler	4"	Aluminum	Viton®	18.5 lbs.
1005E-0401	5-Cam API Coupler with Grasp Knobs – 350 PSI	4"	Aluminum	Buna-N	19.0 lbs.
1005E-0402	5-Cam API Coupler with Grasp Knobs – 350 PSI	4"	Aluminum	Viton®	19.0 lbs.

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TOP LOADING OVERVIEW

Top Loading railcars and trucks continues to provide an efficient and cost effective method to load and unload in many situations.

A loading system should have sufficient horizontal range to reach the farthest compartment without re-spotting the vehicle. Sufficient vertical movement and drop-pipe lengths to service vehicles of varying heights is also necessary. A properly designed top loading system can achieve this requirement. Top loading can also be used for tight-fill and vapor recovery applications when used with specially designed and engineered components, such as vapor plates, tapered hatch plugs, and inflatable hatch seals.

The 7300 IHS Inflatable Hatch Seal is a device for sealing different hatch openings on tank trucks and railcars, preventing the release of vapors into the atmosphere.

Special top loading designs can also be supplied with a wide range of valves, fittings, and instrumentation equipment.

OPW Engineered Systems has a long established reputation in the petroleum, chemical and food industries for providing effective loading and unloading systems for the safe and efficient handling of liquids. We work closely with you to design the best system for your application.

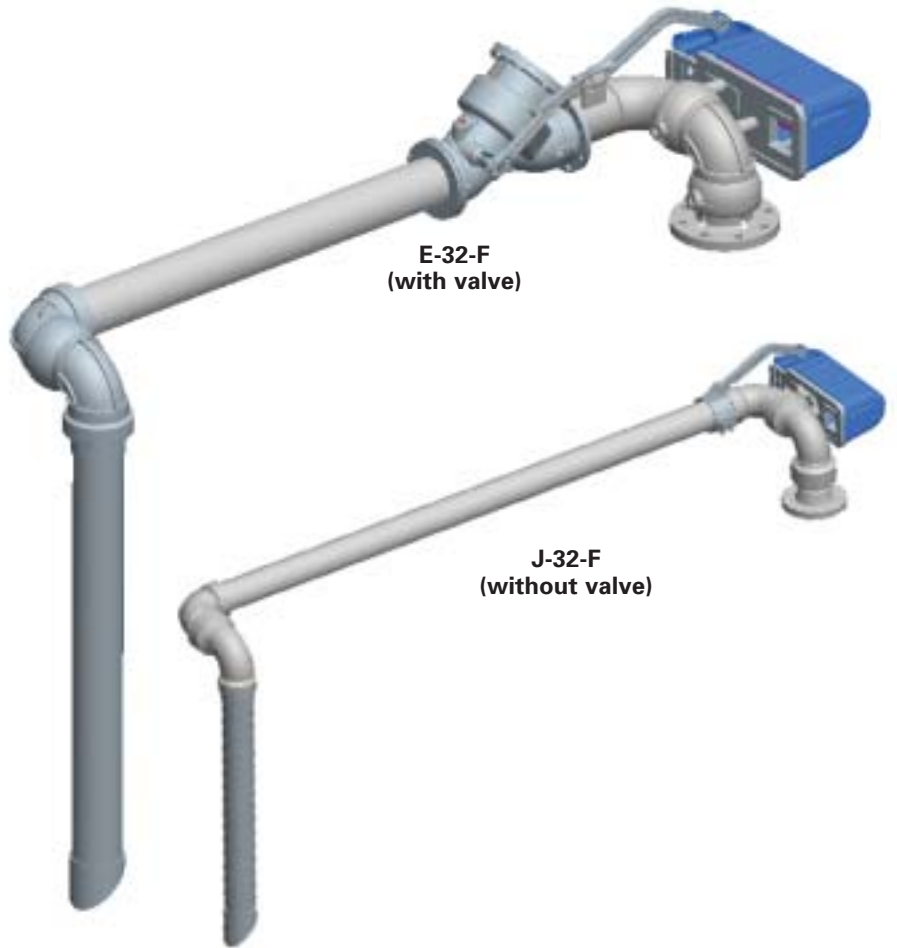
Single Arm Fixed Reach E-32-F, J-32-F

Primarily used to load and unload railcars through open domes in installations where the cars can be accurately spotted. The single arm configuration can also be used for tank truck applications. Some allowance for mis-spotting is possible with the single arm and increases as the diameter of the hatch opening increases.

This simple arm incorporates only three swivel planes of rotation and is designed for use in top loading installations where the vehicle is located at a fixed distance from the riser pipe. The two swivel planes at the inlet permit both up-and-down and side-to-side movement of the assembly, and the third swivel plane allows the drop pipe to remain vertical.

Valves can be located inboard or outboard to facilitate loading. With a valve located outboard, drippage of viscous products after loading can be minimized.

The single arm loader is adaptable to tight fill or closed system loading when equipped with additional swivel planes of rotation and/or drop hose, along with required outboard coupling, union or fitting.

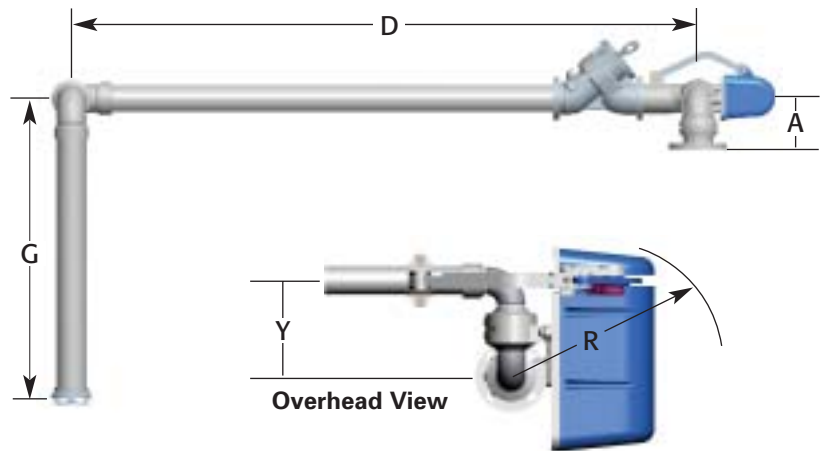


Benefits

- Adaptable to tight-fill or closed system loading when equipped with additional swivel planes of rotation and/or drop hose; along with required outboard coupling, union or fitting
- Rail or truck applications
- Smooth, easy operation

Features

- Available in 2", 3" and 4"
- Available in carbon steel, stainless steel, aluminum and special alloys
- Choice of flanged, threaded or all-welded construction



Dimensions*

Size	A		D		G		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	8-5/8	219	120	3048	48	1219	17	432	8-1/8	206
3"	76	10-1/2	267	120	3048	48	1219	18-1/2	470	10-3/4	273
4"	102	11-3/4	298	120	3048	48	1219	20	508	12-3/4	324

*Custom dimensions also available.

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Scissor Type Arm C-32-F, H-32-F

Commonly used to handle high flow rates and withstand rough usage in tank truck loading applications, the scissor arm is also an excellent choice for railcar loading installations where cars are frequently mis-spotted.

This versatile arm is designed specifically for top loading installations where a variable operating range is required. The secondary arm rotates 360 degrees in the horizontal plane, providing a spotting allowance of up to twice its length.

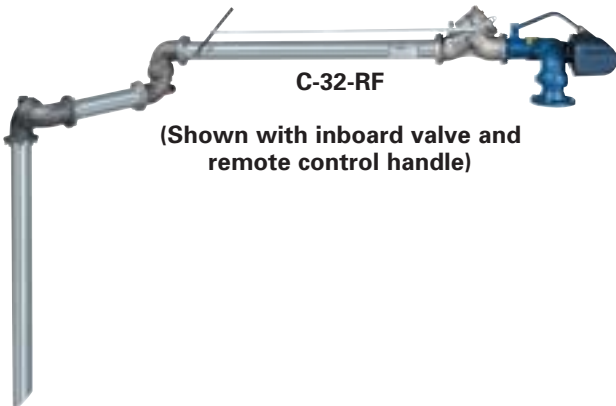
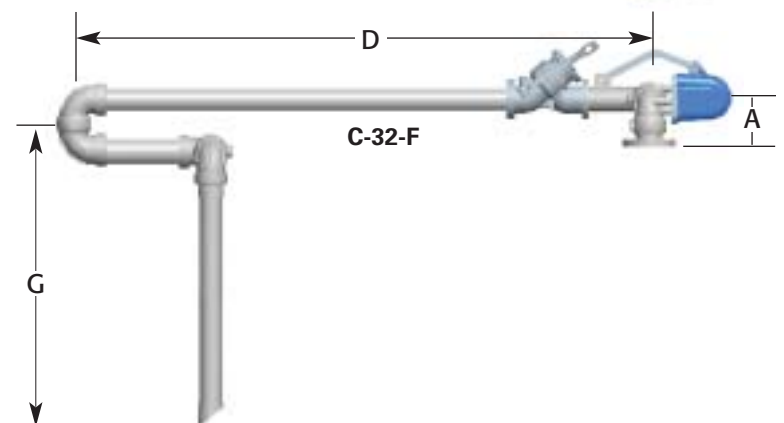
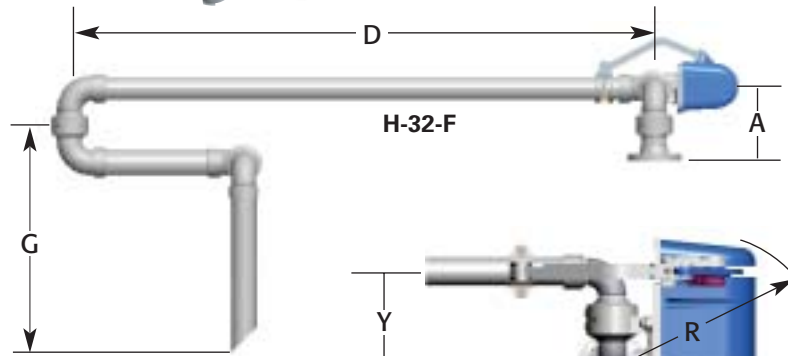
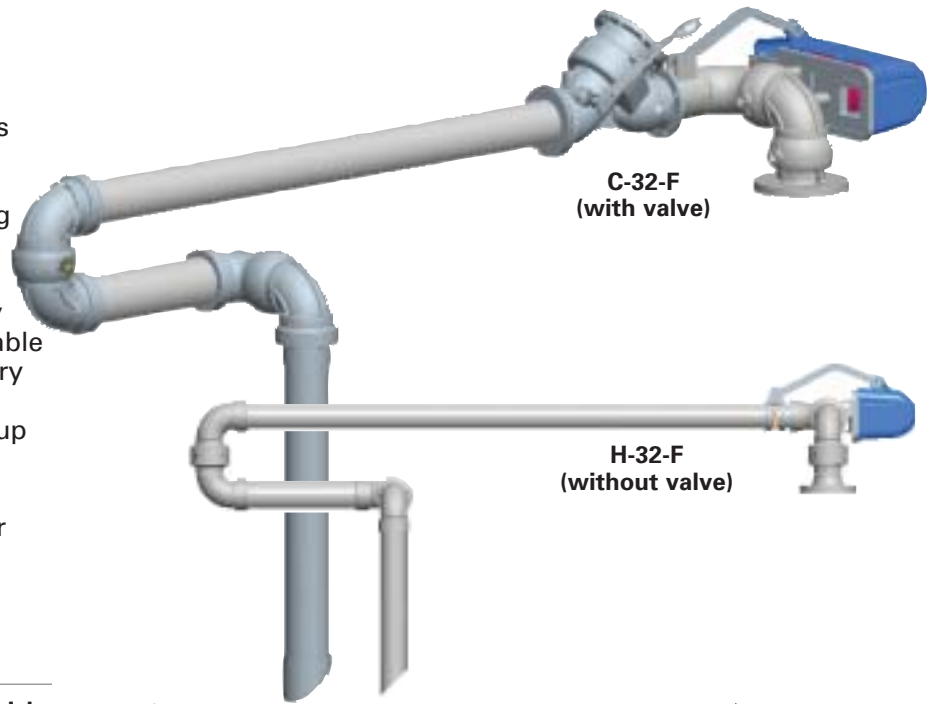
Note: The scissor arm configuration is not recommended in 6" size in all steel or stainless steel due to the difficulties an operator would have handling the heavy outboard components.

Benefits

- Ideal for applications where spotting the vehicle is variable
- Adaptable to tight-fill or closed system loading when equipped with additional swivel planes of rotation and/or drop hose; along with required outboard coupling, union or fitting.

Features

- Available in 2", 3" and 4"
- Available in carbon steel, stainless steel and aluminum
- Choice of flanged, threaded or all-welded construction



Dimensions*

Size	A		D		G		K		M		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	8-5/8	216	84	2134	48	1219	8-1/8	206	24	610	17	432	8-1/8	206
3"	76	10-1/2	267	84	2134	48	1219	10-3/4	273	24	610	18-1/2	470	10-3/4	273
4"	102	11-3/4	298	84	2134	48	1219	12-3/4	324	24	610	20	508	12-3/4	324

*Custom dimensions also available.

Supported Boom Arm

B-32-F

This style arm provides dependable, low maintenance service in high usage installations. Due to the boom-mounted design, no heavy loads are placed on the swivel components, so wear is minimized.

In simplest terms, the supported boom arm loader consists of a single-arm loader mounted on a swiveling boom that is attached to a permanent structure with either a pillow block or flange bearing for added strength and support. This configuration provides maximum flexibility for mis-spotting and longer reaches from the loading rack to the railcar or tank truck. Both the boom and the arm can be folded back against the rack for convenient, compact storage away from the traffic flow.

A variety of boom designs and configurations are available to meet the needs of virtually any installation. Used for tank truck and railcar open dome loading, supported boom arms can be modified for closed system loading and unloading.

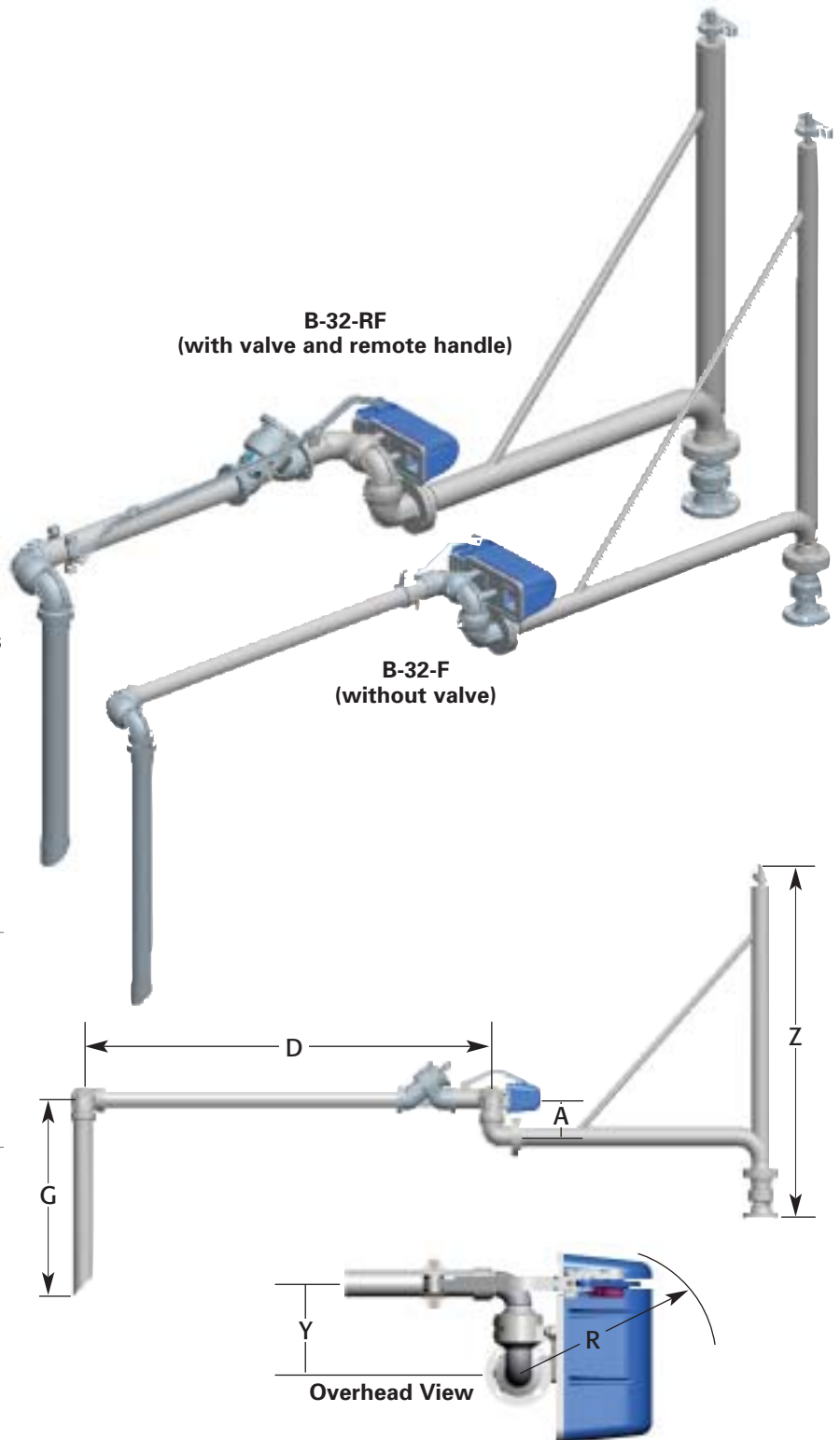
Optional valves, such as dry disconnect, ball, butterfly or loading, can be used because of the boom support.

Benefits

- Long reach
- Design flexibility means it can be used for any application
- Folded back on itself, it can be easily stored
- Optional valve and remote

Features

- Available in 2", 3" and 4"
- Available in carbon steel, stainless steel, aluminum and specialty alloys
- Choice of flanged, threaded or all-welded construction



Dimensions*

Size	A		D		G		T		Z		R		Y		
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
2"	51	14-1/4	362	78	1981	48	1219	78	1981	84	2134	17	432	8-1/8	206
3"	76	17-3/4	451	78	1981	48	1219	78	1981	84	2134	18-1/2	470	10-3/4	273
4"	102	20-3/4	527	78	1981	48	1219	78	1981	84	2134	20	508	12-3/4	324

*Custom dimensions also available.

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Unsupported Boom Arm GT-32-F

The unsupported boom arm is an excellent alternative for variable reach applications, especially in larger sizes where the outboard components are relatively heavy. It can be modified for closed system loading and unloading, and is available in various design configurations to meet the needs of virtually any installation.

This popular style loader is designed for those installations where it is undesirable or impractical to mount a supported boom arm. For example, many railcar sites have no support columns or overhead structures to which a supported boom can be attached.

The unsupported boom arm offers the same advantages as the supported boom arm, but maximum reach is somewhat less. It provides good flexibility for mis-spotting, and can be folded back against the rack for convenient, compact storage. When necessary, increasing the size of the base joint, or using a heavy-duty split flange swivel at the inlet, can extend total reach.

Benefits

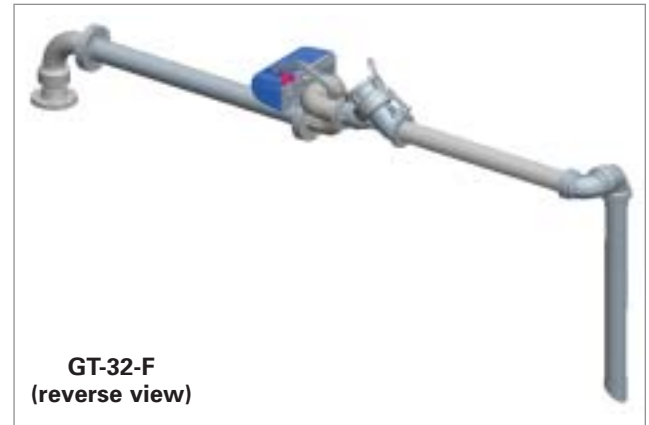
- Optional valving allows liquid to be held in the line
- Long reach compensates for mis-spotting
- Compact storage

Features

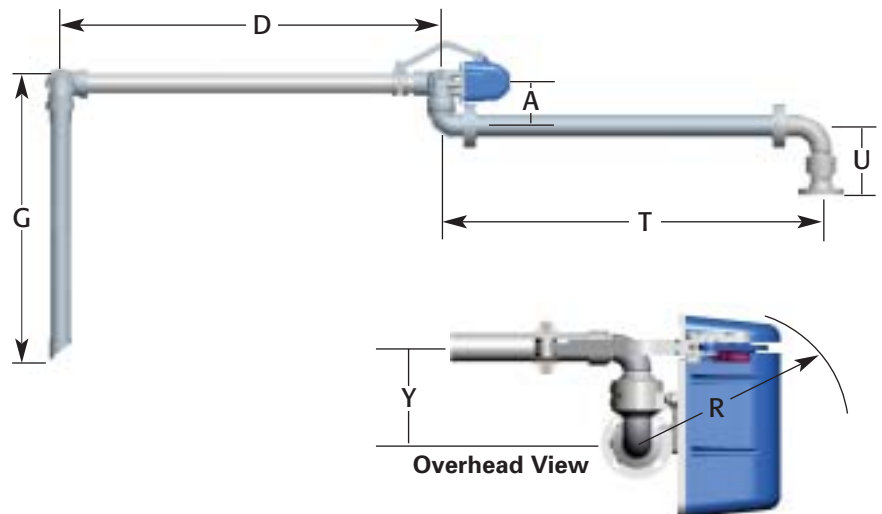
- Available in 2", 3" and 4"
- Available in carbon steel, stainless steel, aluminum and specialty alloys
- Choice of flanged, threaded or all-welded construction



G-T-32-F



GT-32-F
(reverse view)



Dimensions*

Size		A		D		G		T		U		R		Y	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
2"	51	8-1/8	206	78	1981	48	1219	48	1219	8-5/8	219	17	432	8-1/8	206
3"	76	10-3/4	273	78	1981	48	1219	48	1219	10-1/2	267	18-1/2	470	10-3/4	273
4"	102	12-3/4	324	78	1981	48	1219	48	1219	11-3/4	298	20	508	12-3/4	324

*Custom dimensions also available.

Slide Sleeve Arm A-32-F

The slide sleeve type of arm incorporates a slide sleeve assembly that telescopes in and out to adjust for variations in the distance from the loading rack to the hauling vehicle. It is used primarily in small bulk plants and terminals for top loading gasoline, fuel oil, or other petroleum products. This durable, dependable and cost effective loading arm is time tested as a practical method of locating the drop tube accurately and easily.

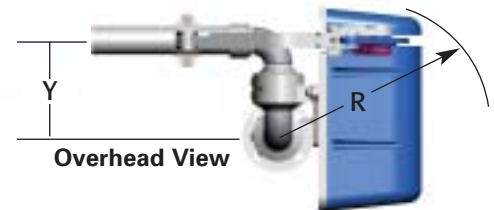
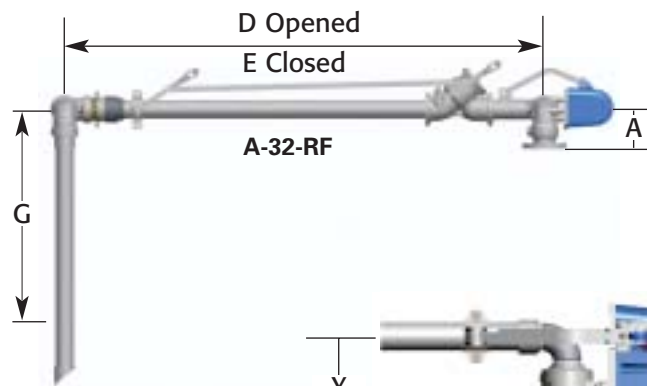
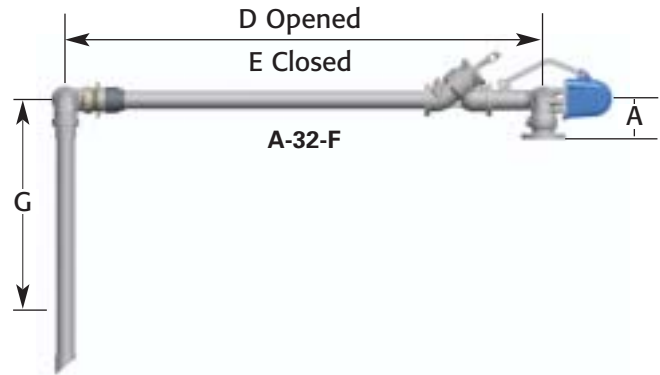
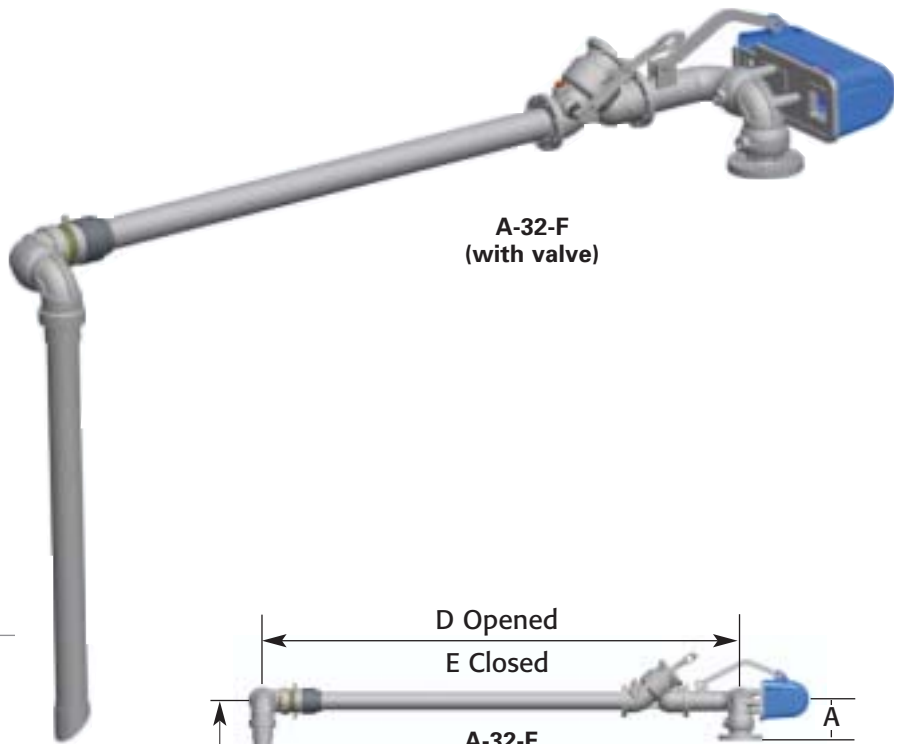
The slide sleeve is a medium duty unit designed for flow rates up to 15 ft/sec (4.5m/sec). Higher flow rates may tend to push the inner tube out beyond the loading point.

Benefits

- Good for applications where the vehicle type varies
- Telescoping primary arm
- Deadman-type loading valve

Features

- Typically supplied with female threaded inlet connections in 2" size (A-32), with 150lb. ASME flanged inlet in 3" and 4" sizes (A-32-F)
- Both torsion spring balanced and counter-weighted slide sleeve arms are available
- Available in 2", 3", and 4" sizes



Dimensions*

Size	A		D		E		G		R		Y		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2"	51	5-5/8	143	126	3200	78	1981	48	1219	15-1/4	387	6-1/8	156
3"	76	6-7/8	175	131	3327	83	2108	48	1219	16	406	7-5/8	194
4"	102	8-1/8	206	135	3429	87	2210	48	1219	17-3/4	451	9-1/4	235

*Custom dimensions also available.

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TOP LOADING VAPOR RECOVERY OVERVIEW

The challenge of designing and manufacturing a vapor recovery loading arm depends greatly on the information provided by the customer. We have many tools in our arsenal to recover vapors.

Material compatibility and functional components in the system make up a good portion of the design considerations. Volume of vapors, sensing equipment location and weights are some of the other considerations.

Our custom-design and production capabilities give us the versatility to respond to all your needs, from the simple to the most complex and, because we serve a broad spectrum of industries including petrochemical, petroleum, refining, distilling, brewing, pharmaceutical, paint, and waste treatment, we are just as adept at designing and producing a high-volume, aggressive chemical loading system as we are at creating a more modest drum filling system.

We use state-of-the-art CAD (Computer Aided Design) systems together with our substantial knowledge and experience to optimize your vapor recovery loading or unloading system.

Our manufacturing and testing procedures meet or exceed industry standards, and all of our loading arm assemblies are rigorously tested to ensure high quality. We use CNC equipment to machine all critical dimensions within precise tolerances to ensure that each product meets our rigid engineering specifications. As with every other part of our product, welding is an important quality factor. Our welders are certified to ASME Boiler and Pressure Vessel Code, Section IX.

Additional testing, including radiography as well as material certifications, can be provided to meet your specific requirements. Special exterior surface preparation and painting is also available.

Vapor recovery systems consist of two flow passage lines, one to convey the product and the other to recover and transfer the product vapors. Separate product and vapor arms can be installed at the loading rack but systems that incorporate the product and vapor lines into a single system are preferred because both connections can then be conveniently moved out to the transporter simultaneously. Two basic designs with many variations are available:

The OPW Engineered Systems “piggyback” style arm is simple in design yet very functional. It has the vapor line welded to the product arm. This versatile arm can also serve as an unloader by using the “vapor” line to pressurize a railcar or tank truck equipped with a permanent deep pipe.

The Dual Arm or Siamese configuration is the most widely used style vapor recovery assembly. It features separate arms for product and vapor that are joined together at the inner boom structure. One of the more popular variations of this design also has the two counterbalance swivels and the outer arms joined together in a side-by-side arrangement to minimize the overall vertical dimension of the outboard assembly. On most dual arm designs the product line feeds from beneath and the vapor line from overhead.

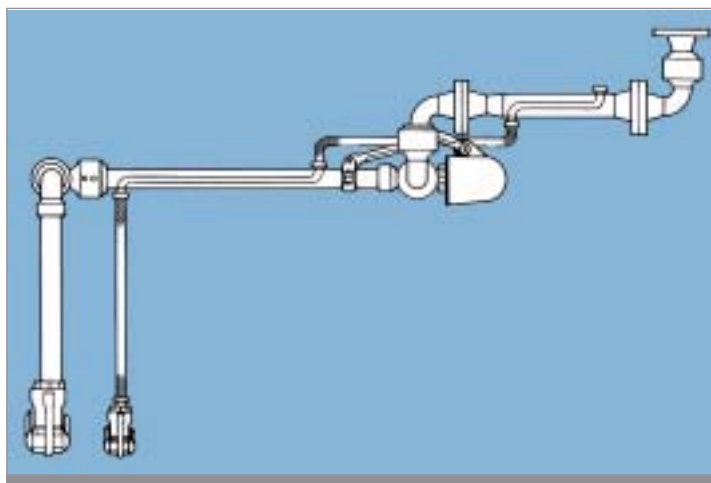
When loading tank trucks and railcars that are equipped with permanent product and vapor connections, the end fittings on the loading arm are typically quick disconnect couplings, dry disconnect couplings, unions, or flanges.

A variety of vapor recovery components are available for those applications where loading takes place through an open dome. These include cover plates, tapered hatch plugs/cones, and the OPW inflatable hatch seal.

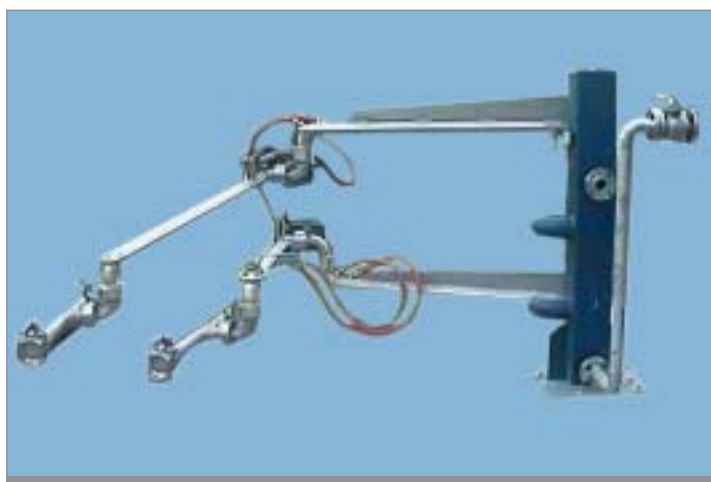
Vapor recovery loading and unloading systems can be steam jacketed or traced, equipped with automatic shut-off controls, or outfitted with whatever additional equipment might be needed for your particular application.

OPW Engineered Systems vapor recovery assemblies are available in 2”, 3”, 4”, and 6”. They are also available in steel, stainless steel, aluminum, and specialty alloys.

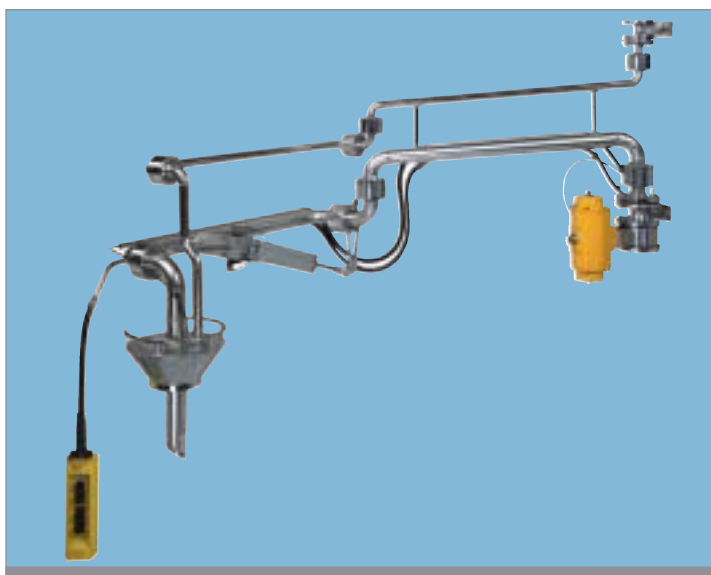
Please consult the factory with your specifications and we will design a vapor recovery loading system to meet your needs.



“Piggyback” Arm



Dual Arm Configuration



Pneumatically Actuated Arm

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Vapor Recovery Components Inflatable Hatch Seal

OPW Engineered Systems developed the 7300IHS Inflatable Hatch Seal specifically for applications where loading is done through an open hatch where a vapor-tight seal is needed in the opening. The OPW 7300IHS provides a reliable means of sealing off different size and depth hatch openings on tank trucks and railcars to prevent the release of vapors into the atmosphere. As the seal is inflated, it expands outward, centering itself and forming a tight seal against the inner wall of the hatch.

Benefits

- Effective in hatches from 15" to 24" in diameter with tank pressures up to 2 psig.
- Requires no downward force to achieve a seal, so it can be used accurately on scale-equipped racks
- Fits around the inside perimeter of the hatch for a tighter seal than tapered hatch plugs can provide
- Available in EPDM, PTFE coated nitrile and fluorosilicone for a wide range of chemical compatibility
- Can be used on loading arms or for conventional hose loading
- Requires only a supply of dry compressed air or nitrogen for operation

Features

- Stainless steel construction
- Available in various elastomeric seals
- Comes complete with a pneumatics/nitrogen package that is preset at the factory for a maximum inflation pressure of 5 psig.
- Core assemblies are customized with the pipe sizes, lengths, and connections required for each specific application
- Optional lockdown mechanism available

Tapered Plug

Tapered plugs are an economical means of closing off hatches of different sizes in order to recover vapors or keep debris out. There is no need to have a compressed air or gas line run to the loading point. Additional sensors and connections can be added to the tapered plug seal.

Features

- Made of steel, stainless steel, or aluminum
- Adaptable to many fitting configuration
- Can be fitted with dry break couplings

Hatch Cover Vapor Plates

Hatch cover vapor plates are used to retain and recover harmful vapors and avoid excessive splashing (especially on tank wash arms). They also are used to prevent dirt, moisture, insects, and foreign objects from entering the tank.



Inflated Hatch Seal



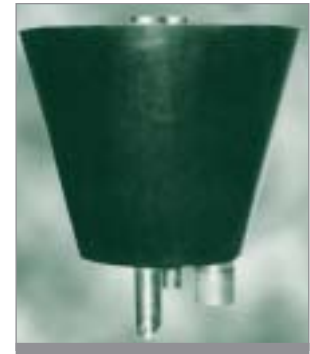
Flat Hatch Seal



Inflated Hatch Seal



Hatch Cover Vapor Plates



Tapered Hatch Seal

Most vapor plates are manufactured with locking mechanisms or hold-down clamps, and can accommodate liquid sensing devices or overflow protection instrumentation.

Features

- Can be configured many ways, including dry break couplings
- Made of steel, stainless steel or aluminum
- Can be added to the arm when needed
- Long-lasting, durable construction

This AFH-32-F spring balanced hose loader is ideal for vapor recovery. Stage I vapor recovery requires truck transports to off-load vapors while loading fuels. OPW Engineered Systems is a leader in environmentally safe products.



Here a G-32-F is attached to a riser located at ground level. It offers an easy way to bottom unload a rail car. While not in use you can see how it is easily “parked” outside the railroad envelope. Further down the tracks you can see a hose attached to a riser, inside the envelope and perilously close to the rail.

The illustration to the right shows a by-pass loading arm. In this application, the loading arm is not carrying product but is carrying the load of the pipes above it. This application is typical of a situation where the customer wanted to use components that were compatible with the liquid and needed the arm to act as a support, holding the load while making it easy to manipulate and control loading.



The photo to the left shows how loading arms can be made to crossover each other to facilitate loading of various compartments in a tanker truck. Note the canopy. It’s height limited the vertical travel of the loading arms. Design considerations like this are very important. Your OPW sales representative will be glad to make an on-site evaluation of your loading area.

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CUSTOM APPLICATIONS OVERVIEW

OPW Engineered Systems takes pride in its ability to custom-design and manufacture loading arms for specialized applications. With our extensive experience it's likely our engineers have already solved most situations you may encounter. However, with the many varying factors that impact fluid dynamics, there are no hard-and-fast rules for determining exactly what type of loader must be used in each installation. Personal preference, operating experience and methods, safety requirements and local customs all warrant consideration.

In order to design a loading arm for your application, we consider the following:

- Liquid product to be handled (Temperature & Pressure)
- Type of tank or container to be used
- Flow rate
- Adequate capacity without excessive pressure drop

- Physical facility dimensions and limitations
- Adequate horizontal and vertical range
- Ease of operation
- Ease of maintenance
- Special requirements
- Cost

Within the limits of design and functionality, nothing is too special. As industries have become more aware and responsive to environmental issues, loading systems offer a sound solution to the extremely critical process of transferring hazardous products from bulk storage tanks to rail or road vehicles.

All units can be factory pre-assembled and tested, and all OPW Engineered Systems products are built to the highest quality standards.

The systems shown are some of the more popular configurations. Many others are available and can be tailored to meet your specific requirements.

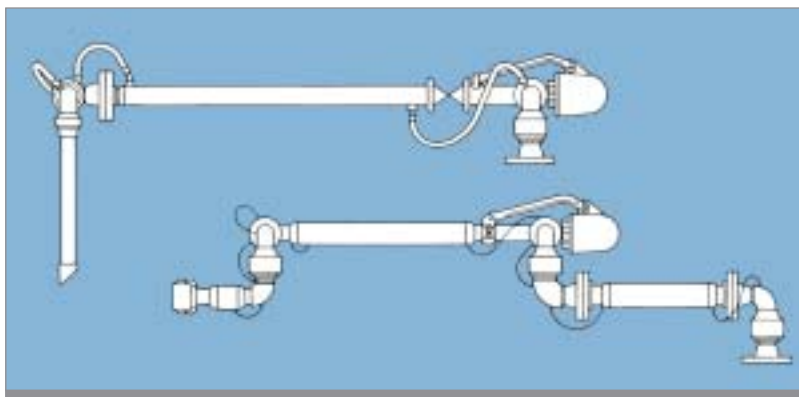
Steam Jacketed Loading Arms

OPW Engineered Systems top and bottom loaders can be fully or partially jacketed/ traced for efficient handling of asphalt, molten sulfur, waxes, resins, and other products that are highly viscous or tend to solidify at ambient temperatures.

OPW steam jacketed loading arms incorporate a “pipe in a pipe” design and are used to handle products that need to be transferred at elevated temperatures. The inner pipe conveys the product being handled, while the outer pipe or jacket contains the steam. With these arms, the product can be heated very quickly and uniformly.

In some cases, customers specify the use of heat transfer fluids. The same principles apply in terms of loading arm design.

We also manufacture, for less demanding applications, hollow core steam trace elements that are clamped and bonded to the straight sections of piping in the loading arm.



All OPW Engineered Systems steam jacketed loading arms are custom designed to specifications depending upon the product being handled, temperature, and overall reach and flexibility requirements. Please consult the factory with your specifications and application requirements.

Benefits

- Rugged construction
- Custom made to your specifications
- Durable for many years of service life

Features

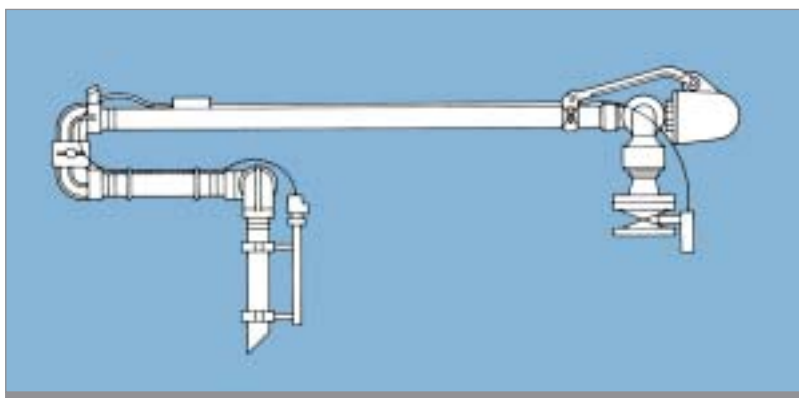
- Assemblies are supplied with all necessary steam jumper hoses
- Threaded, flanged, and welded construction are available
- Available in 2", 3", 4" and 6" sizes
- Available in steel, stainless steel, and aluminum

Automatic Shut-Off Systems

Virtually any OPW Engineered Systems top loader can be equipped with an automatic shut-off feature to help prevent spillage and overfills that can result when working with a remote valve.

The automatic shut-off feature allows an operator to load using multiple arms to make the loading operation more efficient and safer.

Both electrical and pneumatically operated shut-off systems are available. An adjustable level sensor mounted on the drop tube or vapor recovery plate works in conjunction with an actuated valve to stop flow when the predetermined fill level is reached. Electrical systems with multiple sensing points can be used to trigger a number of actions such as closing a valve, slowing down a pump, or sounding an alarm.



Benefits

- Provides for a faster, safer loading operation
- Allows for loading with more than one arm at a time without compromising safety
- Prevents overfills
- Safe controlled filling
- Signals the operator or shuts down the system
- Prevents spillage

Features

- Electrical or pneumatic instruments available
- Adjustable lever sensor detects changes in liquid levels to stop flow at predetermined levels
- Can be configured to activate valves or alarms

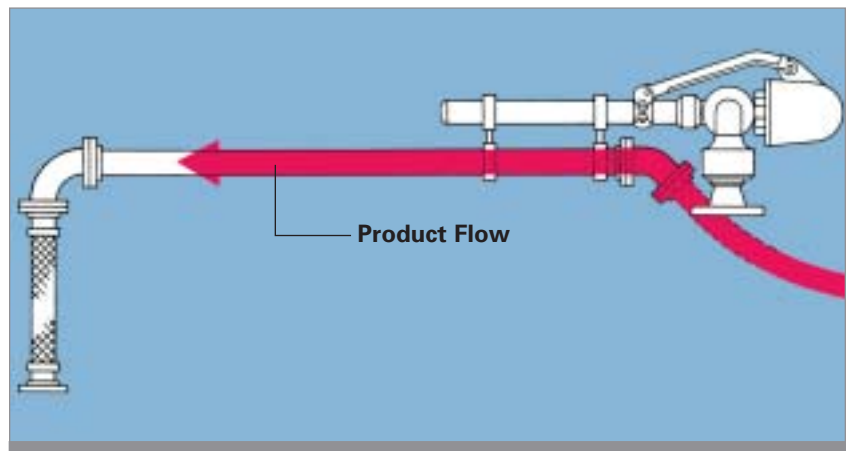
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By-Pass Loading Arms

OPW By-Pass Loading Arms are designed as a low-cost alternative to arms constructed of Hastelloy®, Alloy 20®, and other specialty metals used to transfer hydrochloric acid and other corrosive chemicals.

This unique design offers:

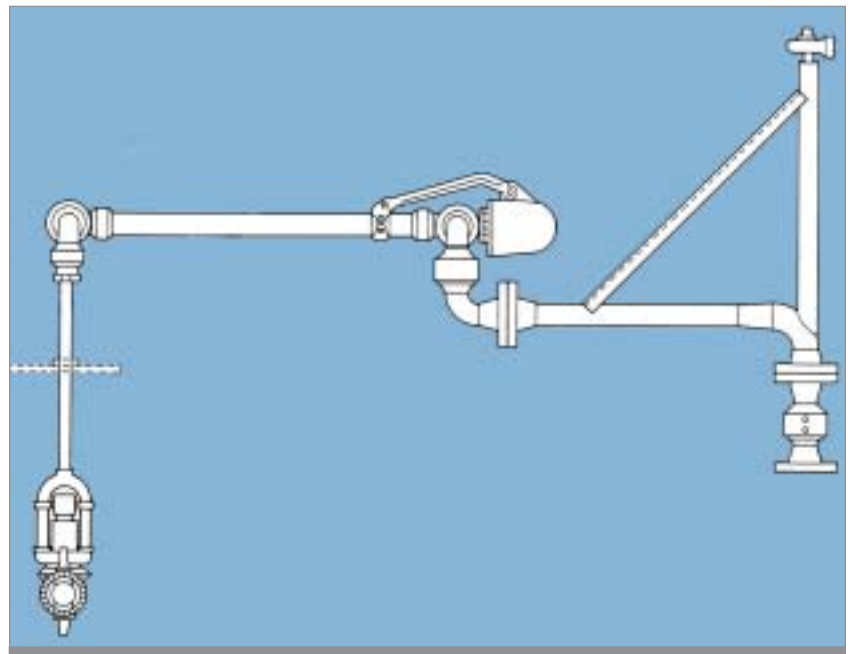
- All the ease of operation and handling advantages of conventional spring balance loaders
- Liquid by-pass of steel swivel – no liquid passes through the base swivel
- Base swivel, in conjunction with torsion spring serves as a support and carrying mechanism only
- Flow passage – consists of lined pipe, plastic pipe, and a hose suspended from the support arm
- Available in 2", 3", and 4" sizes in a variety of configurations



Wash Arms

OPW Wash Arms eliminate the chore of manually carrying cumbersome, heavy hose and spray attachments to the rail car or tanker.

- Completely supports all other washing system components
- Folds into a conveniently stored position, out of the way of normal operations

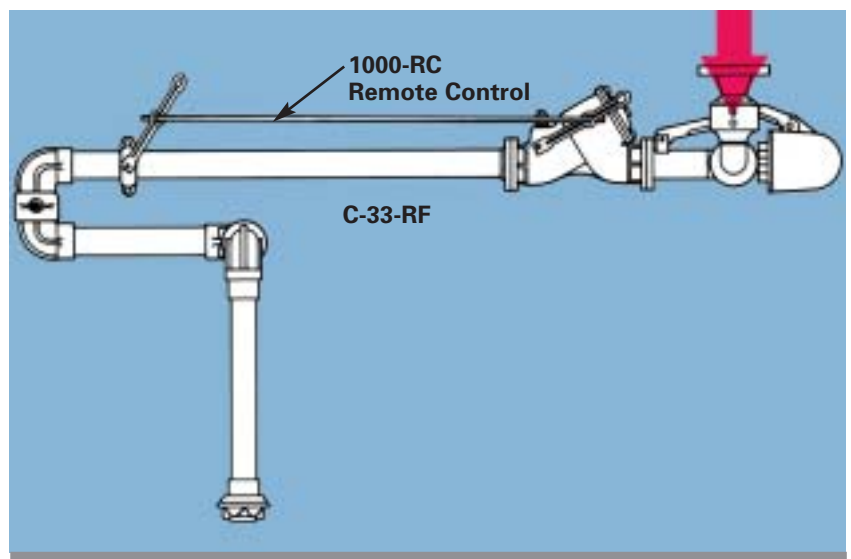


C-33-RF Scissor Arm with Downfeed Loading

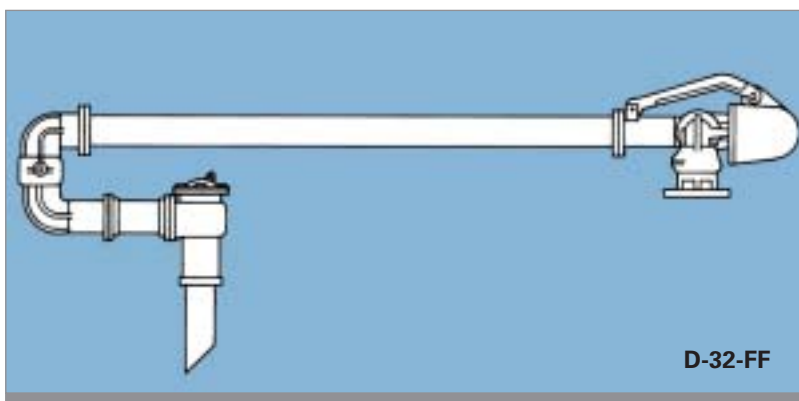
- Deadman loading valve with remote control operating lever and outlet deflector

Remote Control Unit (1000-RC)

The OPW 1000-RC remote control unit provides convenient control of the loading valve from the outboard end of the loading arm. The 1000-RC consists of an arm clamp, lever handle and connection rod. Available for all OPW Type A, B, C, and E liquid loaders.

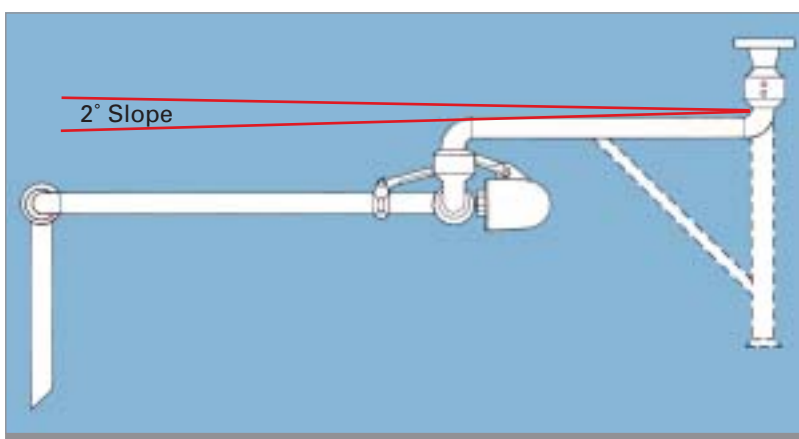


D-32-FF Scissor Arm With Valve Outboard For Viscous Products



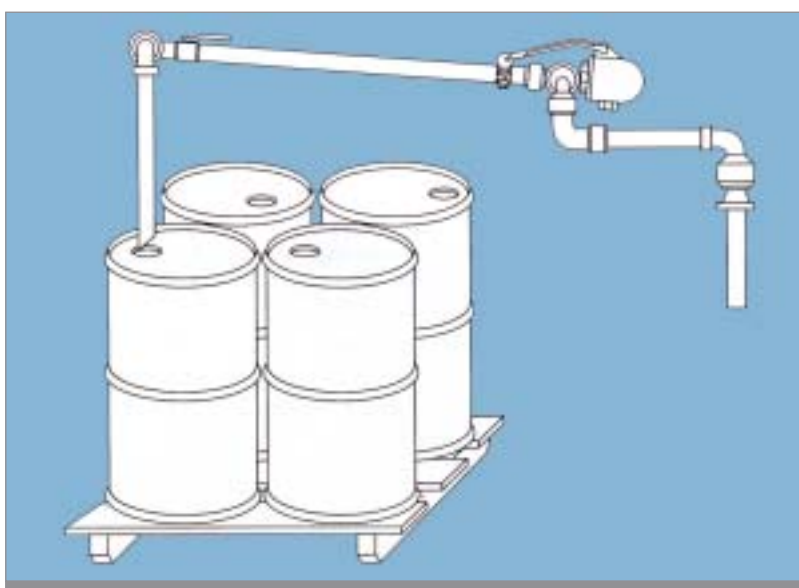
Boom-Type Loader With Self-Draining Configuration

(Note: The primary arm section is angled down for drainage)



Drum Filling Arms

- Make it easy to load both open drums and those with small bung openings
- Designed to provide the range of flexibility needed for loading drums at any orientation on pallet
- Easy operation ensures faster loading



Mongoose™ Fluid Transfer System

The OPW Engineered Systems Mongoose™ Fluid Transfer System is specifically designed to help companies improve worker safety and performance by replacing hose-based “snake pit” operations with an organized system of self-balanced, articulating fluid transfer arms. The Mongoose™ system is neat and organized, which improves productivity and dramatically reduces the tripping, heavy lifting and moving hazards of the traditional “snake pit” caused by the use of hoses.

The Mongoose™ system is particularly beneficial in blending operations and drum filling operations where finished product manifold and raw material manifold systems use multiple transfer lines and hoses.

Because every snake pit operation is unique, every Mongoose™ system is designed to meet customer-specific application requirements. This requires design collaboration between your company and OPW’s design and engineering team to ensure creation of the most effective system possible.



OPW applies a regimented design process that begins with a complete site analysis. This site analysis identifies the project’s objectives and provides an in-depth evaluation of connectivity requirements and percentages, structural restrictions, and existing conditions. Once the site analysis is complete, a system recommendation is provided along with potential project costs.

A Mongoose™ system can be developed to improve virtually any type of existing snake pit or transfer system that uses multiple destinations and connections, including rotary, horizontal and vertical drop configurations. With the Mongoose™, the snake pit is cleaned-up and out of the way. No more lifting or time-consuming sorting of hoses to find the right hose for the fitting connection. And, all OPW loading arms can be designed to be piggable, so line clean-up is quick and efficient.

Benefits

- Improves safety and productivity by eliminating the cumbersome loose hoses typical of “snake pit” operations
- Provides for a neat, clean and organized working environment
- Can be used for drum filling or blending operations where multiple source-to-destination connections and manifolds are used
- Individually designed to meet specific application requirements using advanced technology and collaborative teamwork

Features

- Available in carbon steel, aluminum, and stainless steel
- Torsion spring design provides for smooth and easy operation and positioning
- High quality design, engineering and construction – built to the same rigid global standards of all OPW Engineered Systems loading arms and products

Before Traditional “Snake Pit” Operation

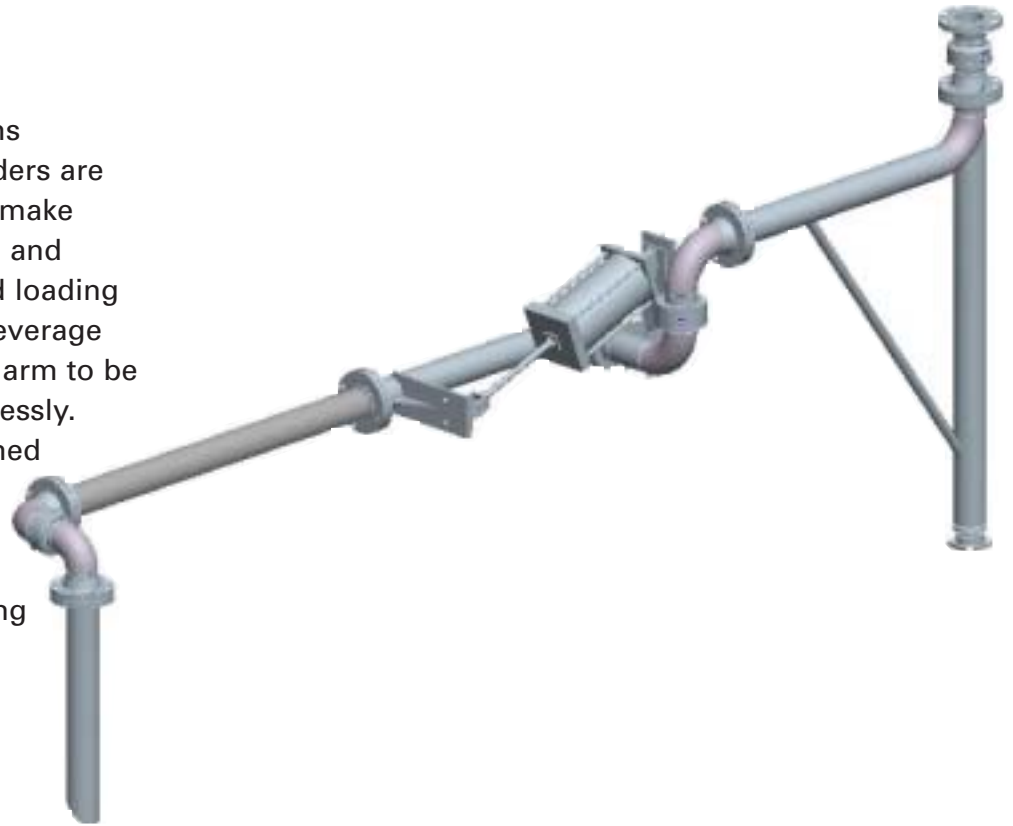


After the Mongoose™ Has Killed the “Snake Pit” Operation Mongoose™ Fluid Transfer System



Pneumatically Controlled Loaders

The OPW Engineered Systems pneumatically controlled loaders are designed specifically to help make operations more simple, safe and efficient. Pneumatic actuated loading systems utilize air to create leverage points that allow the loading arm to be moved and positioned effortlessly. And, because they are designed for precision control, the loader can be easily handled by one operator without heavy pushing, pulling and lifting. Strenuous lifting or moving by the operator is eliminated.



Benefits

- **Easy to Operate/Maneuver – air controlled actuation eliminates strenuous pushing, pulling or lifting**
- **Long range design to compensate for vehicle misplacement**
- **Easily stores away from vehicles**
- **Safely stores outside the envelope of clearance**
- **Available in both bottom and top loader configurations**

Features

- **Available in 2", 3", 4" and 6"**
- **Available in steel, stainless steel, aluminum and specialty alloys**
- **Choice of flanged, threaded or all-welded construction**

Internal Tank Floating Suction Assemblies 764, 765, 766 Series

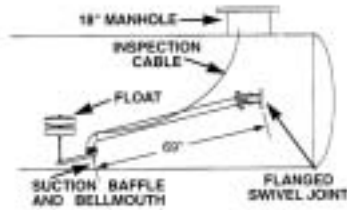
OPW Engineered Systems manufactures floating suction assemblies for use in horizontal or vertical, above or below ground storage tanks where little or no contamination can be tolerated, such as aircraft jet fuel. Since the fuel near the top is least likely to contain water or foreign particles, these assemblies are designed to float near the top of the liquid surface and draw from this near-surface, contamination-free liquid. Our floating suctions are engineered for long, trouble-free life.

Benefits

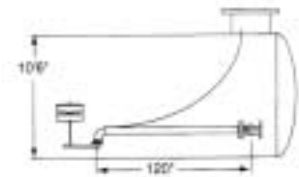
- Maintenance free
- Easy movement in the liquid
- Increases efficiency and decreases maintenance of filter separators

Features

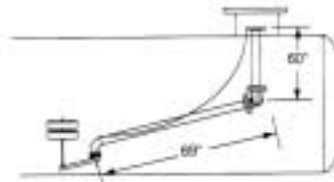
- Permanently lubricated dual race swivel joints
- Triple sealed swivel joints for submerged service
- Suction baffle and stop lag maintains minimum intake level of 8" above tank bottom (or as specified)
- Aluminum 150 lb. flat-faced flanges are standard; steel and stainless steel are available



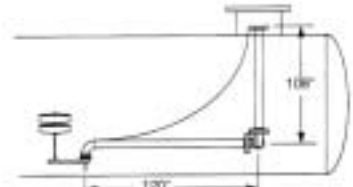
763
No Vertical Pipe



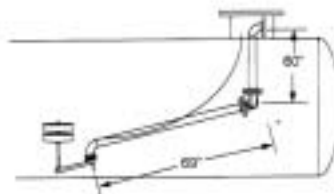
764
Swivel Joint Near Bottom
No Vertical Pipe



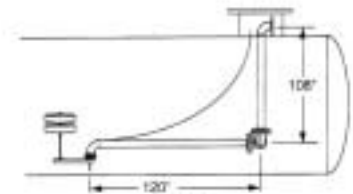
763V
Straight Outlet
and Vertical Pipe



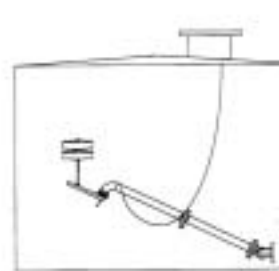
764V
Straight Outlet
and Vertical Pipe



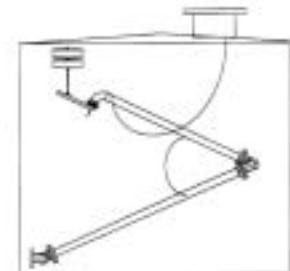
763VE
Elbow Outlet
and Vertical Pipe



764VE
Elbow Outlet
and Vertical Pipe

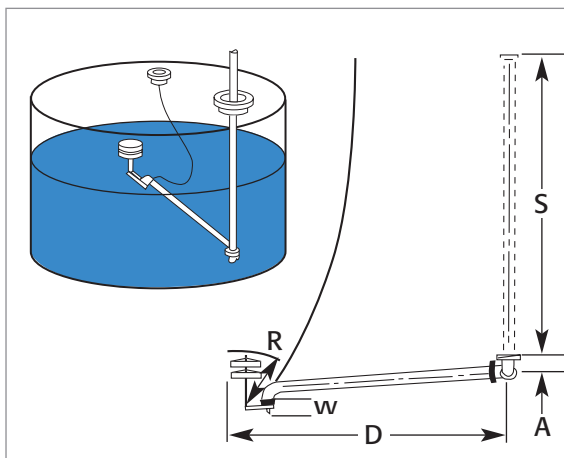


765
Single Pipe,
Extended Reach
Cone Roof Tanks



766
Scissor Style
Vertical Tanks

Assembly Arm for models 765 and 766 can be designed to fit any tank.



Dimensions*

Size		A		D		R		W		S (optional)	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
2"	51	5-1/2	140	121-1/4	3080	28-1/2	714	6-1/2	165	108	2743
3"	76	5	127	121-1/4	3080	28-1/2	714	6-1/4	159	108	2743
4"	102	6-1/16	154	121-1/4	3080	28-1/2	714	6-1/2	165	108	2743
6"	152	7-3/4	197	120-1/8	3051	28-1/2	714	6-3/4	171	108	2743

*Custom dimensions also available.

Internal Tank Floating Roof Drain Assemblies

OPW Engineered Systems Floating Roof Drains are designed to provide a better solution to these types of articulated piping. By combining the flexibility of submerged service swivel joints with rigid piping, the system effectively provides positive roof drainage with maintenance-free and worry-free operation. The result is basically a steel pipe drain system with flexible joints that withstand a wide range of service conditions.

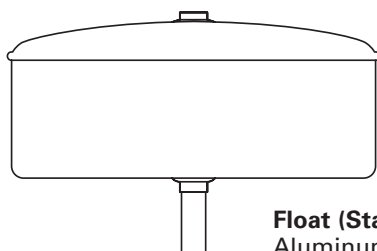
Benefits

- Trouble-free service life with no kinking hose
- No bottom damage due to scraping action
- Ease of operation with sealed swivel joints
- No maintenance due to sediment traps
- No interference with roof legs or other internals

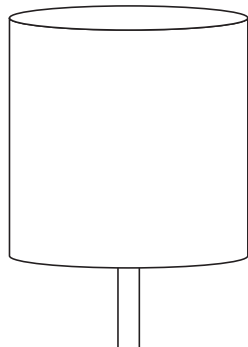
Features

- Continuous slope design
- 100% aromatic-resistant components
- Small operating area
- Available in sizes 2" and up
- Steel or stainless steel design available
- High operating pressures
- Standard design includes four swivel joints

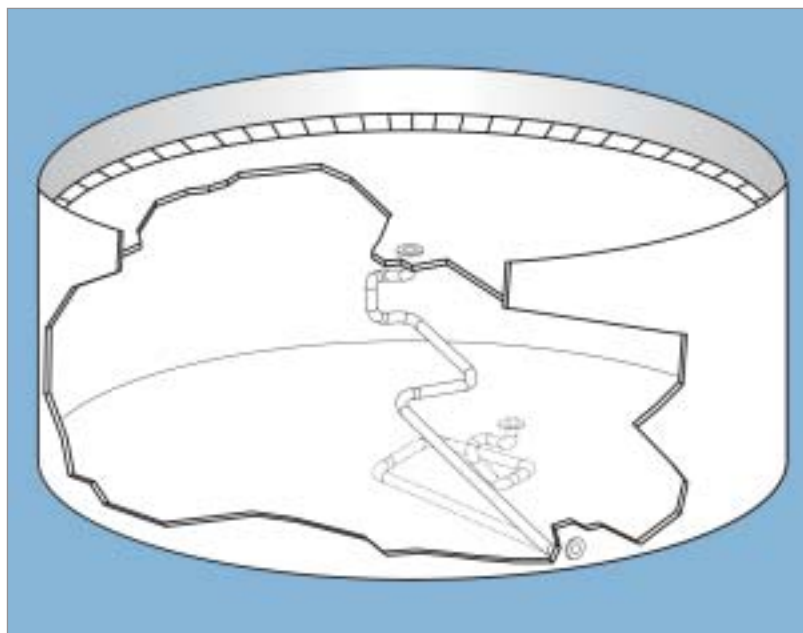
Floats



Float (Standard)
Aluminum Cased,
Pressure Tested
Size: 14" Diameter



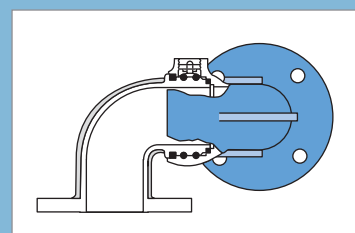
Barrel Float
Stainless Steel
Size: 14-1/4" Diameter



Submerged Service Swivel Joints



Style 30FJ
Material: Aluminum, Steel,
Stainless Steel
Seals: Buna-N
Flanges: 150 lb. Raised Face



Triple Seal



Style 40FJ
Material: Aluminum, Steel,
Stainless Steel
Seals: Buna-N
Flanges: 150 lb. Raised Face



Style 50FJ
Material: Aluminum, Steel,
Stainless Steel
Seals: Buna-N
Flanges: 150 lb. Raised Face

Torsion Spring-Balance Units

790 Series – EZ Adjust

The OPW Engineered Systems 790 Series EZ Adjust Loading Arm Spring-Balance permits any one of a full range of spring balance adjustments with a simple turn of the wrench. The 790 is the ultimate user-friendly solution to spring adjustment. With this technology, you no longer have to have the loading arm in the vertical position to make adjustments. In most cases, adjustments can be made from any position.

Benefits

- Affords users easy, precise spring balance adjustments
- Guaranteed spring-balance performance
- Safe performance
- Eliminates labor-intensive steps

Features

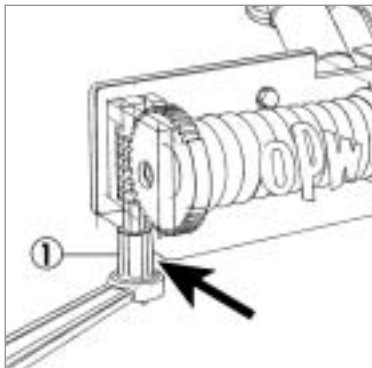
- EZ one-nut adjustment
- Wide range of motion
- Fully adjustable upward/downward travel stops
- Integral spring containment safety feature
- No special tools required
- Available in right-hand and left-hand configurations
- Available with optional automatic engaging lockdown
- 5-year warranty
- Patent pending



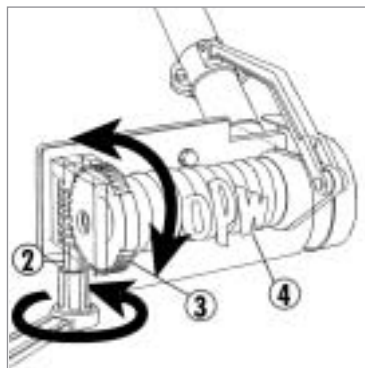
5-YEAR WARRANTY

The OPW 790 Series 5-Year Warranty: OPW Engineered Systems warrants that this product is free from defects in materials and workmanship under normal use and service for which this product was designed for a period of 60 months after shipment from factory. If this product should fail through defect in workmanship or material within the warranty period, OPW Engineered Systems will either repair or replace the defective product without charge.

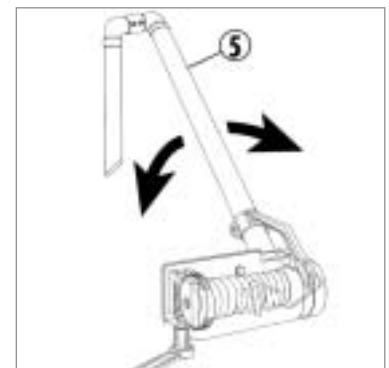
A FULL RANGE OF SPRING-BALANCE ADJUSTMENTS WITH THE TURN OF A WRENCH! GUARANTEED!



1. Place 5/8" socket wrench on worm gear hex drive (Under high load conditions, it may be necessary to raise loading arm to 45 degrees above horizontal).



2. Turn worm gear hex drive... which...
3. Turns gear... which...
4. Winds or unwinds spring.



5. Winding action produces the necessary torque (lifting action) required to counterbalance the loading arm.

Torsion Spring-Balance Units 788 and 789 Series

Considered the “workhorse” of the industry, the OPW Engineered Systems 788 and 789 Series Torsion Spring-Balance Units are designed for precise, automatic control. These robust units are available in four sizes, depending on the load to be lifted. Each unit consists of a torsion spring made from high tensile alloy steel with excellent fatigue-resistant properties. The spring winds tight as the arm is lowered, providing a counter torque, which balances the arm. The units are available in right-hand or left-hand versions. The turning radius range is a minimum of 15” on a 2” arm; and a maximum of 25” on a 6” arm.

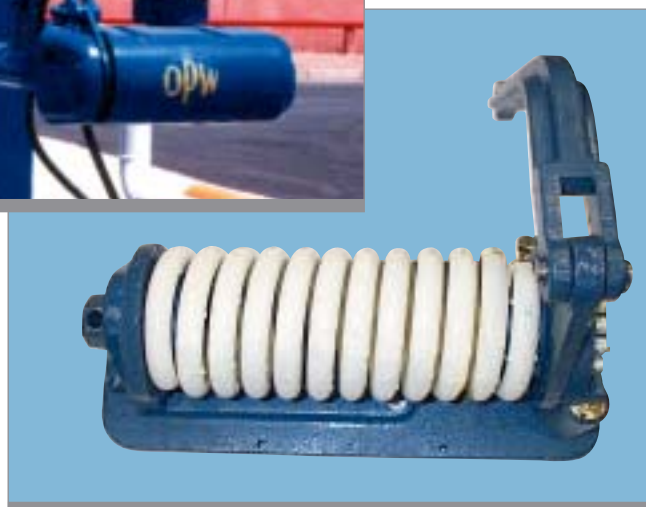
Key Design Features

- Torsion springs constructed of specialty treated, high tension alloy steel
- Each assembly is fully adjustable within its operating range
- Major parts are cast in high strength ductile iron: Includes spring housing and other structural components
- Oil-impregnated bronze bearing carries spring load: Eliminates ferrous-to-ferrous contact, minimizes wear, ensures smooth operation
- Lifting lever pivots at each end on stainless steel pins: Prevents corrosion build up and allows arm to move freely
- Special adjustment prevents excessive downward travel of loading arm
- Seven separate adjustment positions limit upward travel of loading arm: Operator sets at desired position to prevent arm from hitting overhead obstructions
- Protective, unbreakable plastic cover keeps dirt and foreign objects from main spring: Prevents tampering and allows for ease of inspection/adjustment
- Lockdown unit, (788-L and 788-LLH) secures arm in down position during loading: This optional unit prevents jetting of liquid when drop tube is lifted from tank. Locks in any of three positions between horizontal and 15-degree below horizontal

Caution: Do not use torsion spring-balance assemblies in overloaded or underloaded conditions. Please consult factory before modifying a loading arm to ensure spring unit has proper lifting capacity for your application.



OPW 788



OPW 789 (Cover Removed)

788 Torsion Spring-Balance Unit

The 788 Torsion Spring-Balance Unit is designed for lighter lifting applications such as drum filling. This compact, yet strong unit is ideal for smaller diameter pipe and can be used to support hoses, especially lightweight vapor type. While the 788 is designed for lighter duty, it is still manufactured of the same high quality, long-lasting components as the 789. It has the treated, high tension alloy steel spring, bronze bearings and ductile iron housing. Built to handle a wide range of light duty lifting.

789 Torsion Spring-Balance Unit

The 789 is available in a model “A”, “B”, and “C” depending on the lift and balance requirements. Designed for precise automatic control, the 789 has seven separate adjustment positions. The lockdown unit secures the arm in the down position in three positions between horizontal and 15 degrees below horizontal.

Spring Capacity	Lifting Moment	
	Inch-Pounds	Meter-Kilograms
Low	2000 to 3800	23 to 44
Medium	3800 to 6400	44 to 74
Medium-High	6400 to 8600	74 to 99
High	8600 to 13,000	99 to 155

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SWIVEL JOINTS

OPW Engineered Systems fabricated and cast ball bearing swivel joints allow you to construct a metal piping system that permits easy movement in any direction. Moveable, flexible and reliable, OPW Engineered Systems swivels are designed and built to the highest quality standards, including precision machining and 100% penetration welding, with special design features that include:

1) Tight Seals

- O-Rings provide a tight seal without hindering swivel action
- Accurately machined and micro-finished grooves provide for minimal seal wear
- Available in Buna-N, Viton®, EPT, Neoprene, Kalrez® and other seal materials as required
- Teflon® seals are available as spring energized or silicone/Viton® encapsulated

2) True Ball Bearing Race Alignment

- Body and tail sections are locked together by a double row of ball bearings
- Raceways are machined to precise tolerances
- Double raceway design assures proper alignment and prevents binding caused by temperature changes and heavy radial loads
- Carbon steel swivels have hardened races to maximize load-carrying capability

3) Protected Bearing Chamber

- Protective inner O-ring seal prevents product from entering bearing chamber
- Outer seal keeps rain, dirt, and other contaminants out
- Both seals hold in lubrication.

4) Long-Life Bearings

- Ball bearings are hardened, precision-ground steel
- Stainless steel swivels have stainless steel bearings
- All OPW swivels are available with stainless steel bearings on special order

5) Easy Lubrication

- All OPW swivels are pre-lubricated at the factory
- All 3/4", 1", and submerged swivels are permanently lubricated
- A grease fitting between races that accepts a standard grease gun is available for swivels that require field lubrication
- Non-lubricating swivels are available on special order

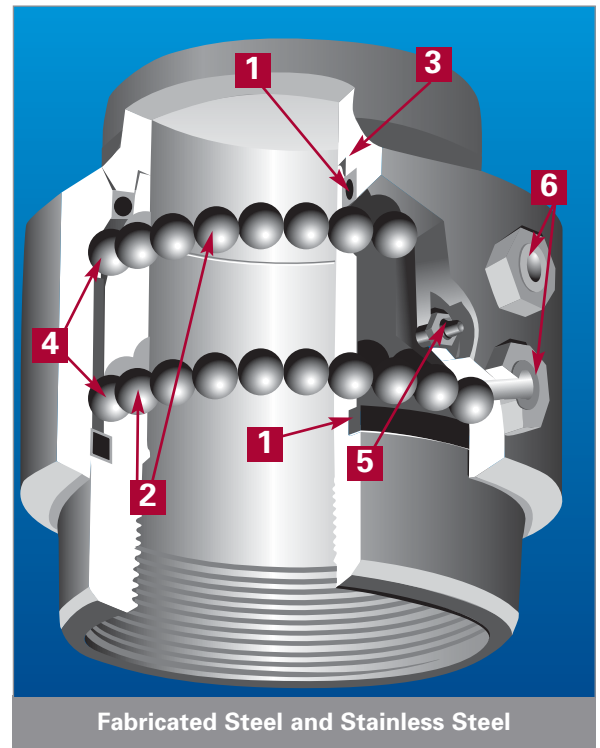
6) No Field Adjustment Necessary

- Balls are held in place by factory-installed plugs that never need to be adjusted to maintain bearing performance

Convenience of Choice

- Available in a variety of sizes beginning at 3/4" and up
- Available in threaded, flanged, and butt welded ends
- Steam jacketed and split flange swivels are also available

For more information on OPW's complete swivel line, refer to the OPW Engineered Systems Swivel Joints Catalog.



ENDURA™ DUAL SPLIT FLANGE SWIVELS (8400 AND 8900 SERIES)

The OPW Engineered Systems ENDURA™ swivel line represents leading innovation in swivel technology. Specifically designed for the transfer of hazardous materials such as LPG, acids, solvents, petrochemicals and other toxic fluids, ENDURA™ sets the industry standard in swivel performance and cost-effective operation. Featuring heavy-duty flanged construction and available in a variety of materials.

Benefits

Endurance – heavy-duty construction and unique design features result in long-life, hassle-free performance.

Smooth, Easy Operation – the sealed, one-piece deep-groove dual ball bearing assembly ensures smooth and easy rotation.

Improves Uptime Performance – the simple, three-piece design allows for the quickest and easiest disassembly and repair in the industry, which means less downtime, less labor, and less cost.

Lowest Overall Cost of Ownership – heavy-duty construction ensures long-life reliability while the unique design features allow for cost-effective preventive maintenance servicing and the easiest, most cost effective seal and bearing replacement of any swivel. Optimized performance, downtime prevention, and reduced maintenance time and costs make this the best overall swivel value in the industry.

Features

360° Rotation – full range of motion for ease of use.

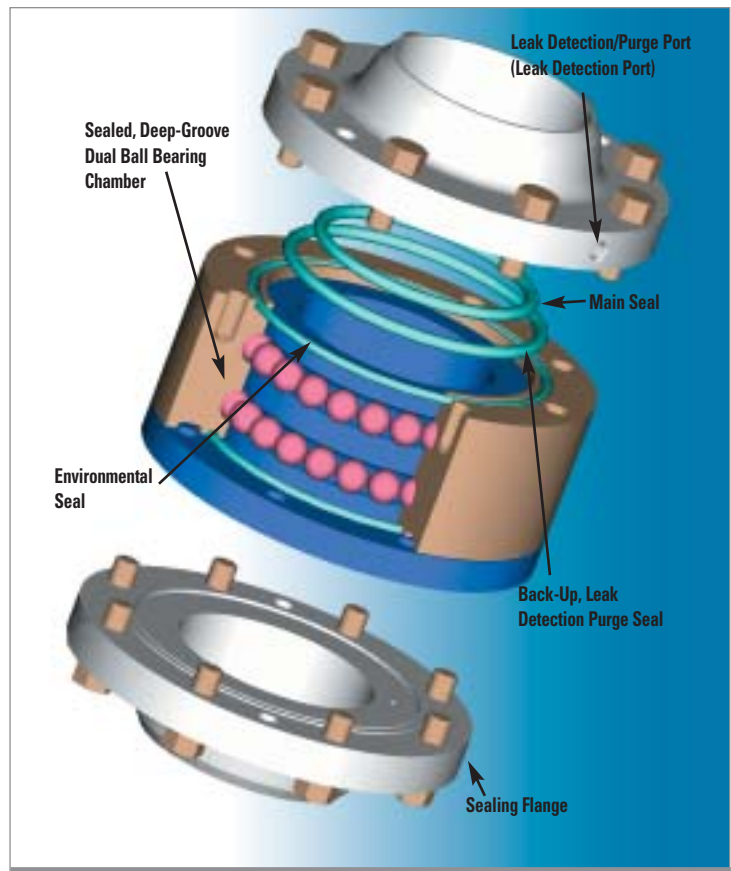
Deep-Groove Replaceable Dual Ball Bearing Technology – a precision-engineered, one-piece ball bearing assembly means there are no individual balls to deal with. If required, bearing replacement is quick and easy; simply replace the old bearing chamber with a new one. The ENDURA™ DSF 8900 Series features a 316 Stainless Steel replaceable dual ball bearing chamber.

Redundant Seal System - incorporates a main seal, back-up seal, environmental seal and leak detection. If the main seal ever leaks due to normal wear, the back-up seal contains the fluid. Leakage is then channeled to a leak detection port in the side of the swivel to provide a visual indicator that service is required so the seals can be replaced. The environmental seal provides a third layer of protection, preventing liquid from entering the environment. Seal materials include Buna-N, Viton®, EPT, Kalrez®, Chemraz®, Silicone, and Food Grade.

Built-In Leak Detection – a visual indicator, in the form of a leak detection port in the side of the swivel provides a quick and easy way to monitor seal leakage so preventive maintenance can be performed before a problem arises. The leak detection port can also serve as a purge port, permitting use of an inert blanket of gas to prevent product from escaping into the environment.

Versatility – available in 2", 3" and 4" sizes, and in a variety of construction materials, including carbon steel, stainless steel, Hastelloy®, Alloy20®, Monel® and other exotics.

500 PSI Pressure Rating



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Loading Valves

OPW Engineered Systems Loading Valves are designed to shut off the flow without causing damaging shock in the pipeline. Pipeline shock, or "hammer," causes problems with pipe joints and instruments in the line. Fast, shockless closing is assured by use of an adjustable needle valve, and a dashpot. Air cannot be trapped in the valve so the valve does not open after closure. This variable closure rate controls shock with minimum afterflow. Loading valves are available in several styles to fill almost any liquid transfer requirement where versatility and ease of operation are desired.



**6400 Series
Horizontal Valve**

6400 Series

The 6400 series horizontal loading valve, made in cast aluminum, is "soft closing" in order to reduce line shock. The valve connections are tank-truck (TTMA) flanges. The sturdy valve has a "deadman" feature that requires the operator to hold the handle in the open position while loading. The trim inside the body is stainless steel, which means this valve can be used for a variety of chemicals and fuels. Available seals are Buna-N, Ethylene Propylene or Viton® for versatility in handling a wide range of fluids within the parameters of the body and trim limits. Available in 3" and 4" sizes.

4600 Series (Not Pictured)

The 4600 series horizontal loading valve, made in cast aluminum, has bronze trim inside the body, making this valve a good value when handling less aggressive liquids. Available seals are Buna-N or Viton® for fluid compatibility. End connection configurations are threaded. It has the "deadman" feature that requires the operator to hold the handle in the open position while loading. Available in 2" only.



**6500 Series
90° Valve**

6500 Series

The 6500 series angle loading valve, made in cast aluminum, allows fluid to be held in the line out to the end of the loading arm. The aluminum body is constructed with stainless steel trim for a range of fluid handling capabilities. It has the "deadman" feature that requires the operator to hold the handle in the open position while loading. End connections are female pipe thread by TTMA flange. Available in 3" and 4".

5600 Series (Not Pictured)

The 5600 series angle loading valve, made in cast aluminum with bronze trim, handles petroleum products easily while providing many years of service life. It allows fluid to be held in the line out to the end of the loading arm. It has the "deadman" feature that requires the operator to hold the handle in the open position while loading. End connections are female pipe threads. Available in 2" with Buna-N or Viton® seals.

Vacuum Breakers

OPW Engineered Systems Vacuum Breakers for high-pressure applications permit quick, positive evacuation of the arm after the loading operation is complete. A three-hole quill extends into the liquid passage, forcing the flow pressure to hold the poppet closed while loading. This prevents aeration of the product and leakage during loading. Liquid trapped in the arm would add extra weight to the arm, causing it to move slowly. The 476SA model is available in aluminum with stainless steel internal parts. The 489 model is stainless steel for severe applications and tough liquids.



- Aluminum – Viton®
- SST – Metal Seats

Dry Disconnects

OPW Engineered Systems dry disconnect couplings prevent spillage from both routine and accidental disconnects. A dry disconnect consists of a built-in valve in the coupler and a spring-loaded poppet in the mating adaptor that automatically closes when disconnected. OPW Engineered Systems offers the most complete line of dry disconnect and quick disconnect products in the industry. OPW's line of dry disconnect products include Drylok™ and the economical cam-and-groove coupler Kamvalok®. Both Drylok™ and Kamvalok® are suitable for a broad range of hazardous liquid transfer applications.

DRYLOK™

Drylok™ is designed to safely transfer hazardous corrosive, volatile liquids such as acids, solvents and petrochemicals. An interlocking handle averts accidental spills by preventing uncoupling while the valve is open. And the unit's flat face minimizes fluid loss, further reducing exposure to risk during operation. Drylok™ is ideal for all kinds of hazardous fluids where product loss is a problem, such as high-pressure lines, high flow rates, slurries, and gases.



Benefits:

- **Driest disconnect in the industry** – less than 1-cc of fluid loss from a 3" unit.
- **Unprecedented safety** – meets or exceeds all of today's stringent emission and worker safety requirements set by EPA, OSHA, and others. Drylok™ cannot be uncoupled while the valve is open.
- **Ideal for high-pressure line applications** – rated at 300 psi in the open and flowing position.
- **Can be opened and closed against 150 psi maximum head pressure.**
- **Optimum flow rate** – less obstruction in easy-flow interior optimizes the flow rate in high-pressure or high-viscosity applications.
- **Ease of use** – simple lever action connects valve to coupler and opens and closes the flow. 360° orientation ensures proper seating and alignment. No clamps, clips, loops or tabs that can cause operator error.

Features:

- Available in 1", 2" and 3" sizes
- Standard O-ring seals for longevity and economy
- Adjustable packing nut with V-type material – provides a continuous compression, emission-free seal on handle shaft
- Available in 316 Stainless Steel, Alloy 20® or Hastelloy® C with NPT, BSP, ASME Flanged, BW, and SW end connections
- AAR Approved and CRN Approved.

KAMVALOK®

OPW Kamvalok® Dry Disconnect Couplings are considered the standard of the industry. Used at liquid transfer points where product loss could occur, OPW Kamvaloks® provide a reliable solution to prevent spillage during connection or disconnection.



OPW Kamvalok® Dry Disconnect Couplings are used by manufacturers of paint, lacquers, inks, adhesives, fatty acids, pharmaceuticals, liquid soaps, and many other liquid products. They are particularly well suited for handling petroleum products, solvents, Ag-chemicals, vegetable oils, detergents and many acids and caustics.

Benefits

- **Spill Protection** – Helps to reduce the hazards involved in the connection/disconnection process of transferring hazardous materials.
- **Provides For Total Closed-Loop Loading Capabilities** – When used with the OPW 2173N Vapor Recovery Dry Disconnect Coupling protects people and property from dangerous and potentially costly exposure by keeping hazardous liquids and vapors in-line and out of the environment.
- **Dual Protection** – OPW Kamvaloks® provide automatic closure from both directions – the coupler and the adaptor.
- **Ease of Use** – The simple connection and disconnection design and lever actuated internal poppet configuration makes this the first choice of liquid transfer operations.

1004D2 API Coupler 1005E European Bottom Loading Coupler

The 1004D2 API Coupler is a "Drip-Less" dry disconnect coupler that can be used with any API Adaptor built in accordance with API RP-1004. See page 12 for complete details on this product.



See OPW Engineered Systems Dry Disconnect Catalog for detailed information on Dry Disconnect products.

GT SERIES SAFETY BREAKAWAY

The OPW Engineered Systems Safety Breakaway Coupling is designed specifically to provide protection of equipment and people in the event of a drive-away/pull-away event.

Utilizing an innovative double-poppet design, the OPW Safety Breakaway shuts off the flow of liquid in both directions when separated, providing optimum safety during the transfer of hazardous products such as LPG, acids, solvents, petrochemicals, gasses, and other toxic liquids.

Benefits

- **Added Protection of People, Equipment and the Environment** – Double-poppet design automatically shuts off both ends of fluid flow when separated, and since it is designed to separate at any angle when subjected to a designated pull force, the breakaway saves expensive equipment from damage.
- **Durable and Reusable** – Available in a variety of materials, this rugged breakaway can be rebuilt for continued use after a separation.
- **High Flow Rate** – Utilizing a straight-line design, the OPW Safety Breakaway provides minimum flow restriction or pressure drop to deliver the ideal solution for high-flow applications.

Features

- **Available in a variety of sizes in 316L Stainless Steel, Aluminum, Alloy 20® and Hastelloy® C.**
- **Choice of End Connections** – NPT, BSP, ASME, Flange, and Butt Weld.
- **Order To Specification** – Designed to absorb normal line shock from external overload, shear bolts can be supplied in a variety of sizes and materials to meet specific pressure and load requirements.
- **Rebuild Kits Available** – Coupling can be rebuilt, reset and returned to operation.



Styles may vary by size and material



US Patent #5,699,823; EU Patent #0764809; German Patent #69620525-68

Ordering Specifications

SERIES DESIGNATION	CONSTRUCTION MATERIALS	BREAK DIAMETER	END CONNECTIONS	SIZE	SEAL
GT	Body 6 – Aluminum 7 – 316 Stainless Steel 8 – Alloy 20® 9 – Hastelloy C® Studs 6 – Aluminum 7 – 316 Stainless Steel 8 – Alloy 20® 9 – Hastelloy C®	Example: 120 (.120 in.) 130 (.130 in.) 150 (.150 in.)	A – ASME Flange 150 lbs. B – Female BSP D – DIN Flange N – Female NPT T – ASME Flange 300 lbs. W – Butt Weld Ends AN – 150 FlangeX Female NPT (Specify Each End)	020 – 2"	B – Viton®-B C – Viton®-E E – EPDM V – Viton®-A Y – Kalrez® 4079 Z – Kalrez® 6375

Example: **GT 7 7 120 N A 020 V**

Deflectors

To prevent static build-up, foaming, impingement on the bottom of the tank, and to keep the drop pipe from rising, OPW Engineered Systems manufactures both T-style and cone-type deflectors. Available in 2" through 6" sizes, the standard product is made of aluminum. Other materials of construction are available to meet the needs of more corrosive chemicals.



OPW-ES 363 – Cast aluminum with female threads for 2" or 6" liquid loaders used on gravity discharge lines. Available in 2" and 6".



OPW-ES 463 – Cast aluminum with female threads for 3" or 4" liquid loaders. Vertical wing ribs help drop tube from rising when filling. Accelerates discharge and prevents roiling of product when used on pressure discharge line. Available in 3" and 4".



OPW-ES 464 – Cast aluminum tee with female threads. Especially designed for handling jet fuel. Prevents high velocity impingement on bottom of tank to reduce possibility of ignition of jet fuel. Available in 3" and 4".

Strainers

OPW strainers are used on suction lines when unloading tank cars to prevent scale and other foreign objects from being sucked into the line. This aluminum cast product is designed with legs on the outlet to keep the inlet off the bottom of the tank. It has a galvanized screen which is 4-mesh steel. The inlet is standard internal pipe threads. Available in 3" and 4" sizes.



OPW-ES 341

Visi-Flo® Sight Flow Indicators

OPW Engineered Systems offers a complete line of sight flow indicators, including the popular Visi-Flo® series, full-view series, and sight windows.

OPW's sight flow indicators provide a quick, reliable and inexpensive way to verify flow rate and direction, and monitor color and clarity in fluid lines.

Available in a variety of sizes, styles and materials for a wide range of industrial applications, all OPW sight flow indicators carry ASME ratings to ensure maximum reliability in harsh operating conditions.



Rack Monitors

OPW Engineered Systems supplies a complete line of CIVACON™ brand rack monitors used in loading and unloading operations. The monitors can detect the type of sensor, the state of liquid in the tank, an overflow situation and verify the grounding condition.

8580 Diagnostic Opti-Therm

- Automatically recognizes the type of overflow system (optic or thermistor signal technology)
- Diagnostic capabilities including ground verification, permissive status and compartment identification. The mode of operation appears on the L.E.D. screen
- The 8580 high-tech system limits the possibility of errors
- Can be used on systems that include up to twelve optic and eight thermistor sensors
- Superior flexibility and safety because of separate output relays for overflow and ground verification
- Easy to read high-resolution 3" x 5" LED diagnostic display
- Monitors overflow status and signals terminal automation system to shut down



SPECIFICATIONS – 8580 DIAGNOSTIC OPTI-THERM

Operating Temperature:
- 40°F to 140°F (-40°C to 60°C)

Input Requirements:
120 VAC 60 Hz, 15VA (Standard)
240 VAC available

Output Relay Contacts:
240 VAC – 5A DPDT

Response Time: 0.5 seconds maximum,
dry to wet transition

Electrical Connections:
Internal Terminal Strips

Enclosure: NEMA 4 explosion proof,
Class 1, Div. 1, Group D

Housing Material:
Aluminum

Approximate Weight:
Model 8580 – 43 lbs.

Approvals:
UL, CUL (Canada); CENELEC (Europe)

8460 Opti-Therm

The 8460 Opti-Therm Overflow Detection System recognizes the signal technology, optic or thermistor type on the transport, verifies grounding, and communicates with the terminal automation system (T.A.S.). The system enables maximum flexibility at the loading terminal without compromising safety.

SPECIFICATIONS – 8460 SERIES OPTI-THERM

Operating Temperature:
-40°F to 158°F (-40°C to 70°C)

Input Requirements:
120 VAC 60 Hz, 15VA (Standard)
120 VAC available

Output Relay Contacts:
240 VAC – 5A DPDT

Response Time: 0.5 seconds
maximum, dry to wet transition

Electrical Connections:
Internal Terminal Strips

Enclosure:
NEMA 7 explosion proof

Housing Material: Aluminum

Approximate Weight:
8460 – 32 lbs.

Approvals:
Factory Mutual, CSA



8460SRC Opti-Therm / Scully® Replacement Chassis

The 8460SRC Opti-Therm is a direct replacement chassis for upgrading Scully® ST-6 or BICLOPS® rack monitors with CIVACON™ Opti-Therm technology; automatic switching and internal ground verification for API optic and thermistor technology, all in one box. Can be used with as many as eight optic or thermistor liquid-level type sensors.



SPECIFICATIONS 8460SRC OPTI-THERM

Operating Temperature:
-40°F to 158°F (-40°C to 70°C)

Input Requirements:
120 VAC 60 Hz, 15VA (Standard)

Output Relay Contacts:
Ground Verified: 240 VAC – 5A DPDT
Overflow Permissive: 240 VAC – 5A DPDT

Response Time: 0.5 seconds maximum,
dry to wet transition

Electrical Connections:
Convenient Terminal Strips

Housing Material:
Aluminum & Lexan

8300 Series Thermistor Rack Monitors

The 8300 Series provides automatic warning of product overflow at predetermined levels and warn of pending overflow conditions.

- Uses the standard thermistor signal format to communicate with an onboard control monitor or straight thermistor system on transports.
- Can be used with as many as six (available option of eight) thermistor liquid-level sensors or onboard monitors
- Monitors two-wire Thermo-optic Quick Start™ replacement sensors

The 8300 Series is available in two models:

8340

Explosion-proof Thermistor Monitor with permissive and non-permissive status lights with keyed by-pass switch

8360

Explosion-proof Thermistor Monitor with permissive and non-permissive status lights with keyed bypass switch and ground verification.

In the 8360 monitor, the overflow detection and ground verification are signaled to the pump control system separately.

SPECIFICATIONS – 8300 SERIES THERMISTOR RACK MONITORS

<p>Operating Temperature: -40°F to 158°F (-40°C to 70°C)</p> <p>Input Requirements: 120 VAC 60 Hz, 10 VA (Standard) 240 VAC version available</p> <p>Output Relay Contacts: 240 VAC – 5A DPDT</p>	<p>Response Time: 0.5 seconds maximum, dry to wet transition</p> <p>Electrical Connections: Internal Terminal Strips</p> <p>Enclosure: NEMA 7 explosion proof</p> <p>Housing Material: Aluminum</p>	<p>Approximate Weight: 8340 – 32 lbs 8360 – 32 lbs.</p> <p>Approvals: Factory Mutual, CSA</p>
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8130 Series Optic Rack Monitors

The 8130 Series Optic Rack Monitor can be used with up to eight compatible optic liquid-level sensors or onboard monitors to monitor the status of liquid in transports or other storage tanks.

The 8130 Series uses industry standard optic signal format. A unique pulsed and intrinsically safe electrical signal is generated by the control panel and transmitted to the sensors via a coiled cord and optic format plug.

8130

Explosion-proof Optic Monitor with status lights and by pass switch and ground verification. On the 8130, the overflow detection and ground verification are signaled to the pump control system separately.



SPECIFICATIONS – 8100 SERIES OPTIC RACK MONITORS

<p>Operating Temperature: -40°F to 158°F (-40°C to 70°C)</p> <p>Input Requirements: 120 VAC 60 Hz, 10 VA (Standard) 240 VAC version available</p> <p>Output Relay Contacts: 240 VAC – 5A DPDT</p>	<p>Response Time: 0.5 seconds maximum, dry to wet transition</p> <p>Electrical Connections: Internal Terminal Strips</p> <p>Enclosure: NEMA 7 explosion proof</p>	<p>Housing Material: Aluminum</p> <p>Approximate Weight: 8130 – 32 lbs.</p> <p>Approvals: Factory Mutual, CSA</p>
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IMPORTANT: OPW products should be used in compliance with applicable federal, state, provincial, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and materials to be handled. OPW MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR USE. All illustrations and specifications in this literature are based on the latest product information available at the time of publication. OPW reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.

8030 Series Ground Verification Monitor

The CIVACON™ model 8030 Ground Verification Monitor is compatible with today's transport ground systems. The monitor is 5 amperage, 240 volt relay output for control of terminal automation systems (TAS) or pump control devices when used as a stand-alone system. The monitor is equipped to provide a permissive signal to allow load rack operation and, if ground is lost, to indicate a non-permissive signal and shut down the loading operation.

ORDERING SPECIFICATIONS

8030-120 Ground verification monitor with indicator lamps – 120V
 8030-240 Ground verification monitor with indicator lamps – 240V

OPTIONAL ACCESSORIES

7620-7620 Ground verification plug, dual ball with 30 ft. straight cord
 7690-7690 Ground verification plug, dual ball with 30 ft. straight cord & junction box
 7720-7720 Ground verification clamp with 30 ft. straight cord
 7790-7790 Ground verification clamp with 30 ft. straight cord & junction box



SPECIFICATIONS – 8030 SERIES GROUND VERIFICATION MONITORS

<p>Operating Temperature: -40°F to 158°F (-40°C to 60°C)</p> <p>Input Requirements: 120 VAC 60 Hz, 10 VA (Standard) 240 VAC version available</p>	<p>Output Relay Contacts: 240 VAC – 5A</p> <p>Electrical Connections: Internal Terminal Strips</p> <p>Enclosure: NEMA 4 explosion proof aluminum housing</p>	<p>Approximate Weight: 8030 – 13 lbs. (6 KG)</p> <p>Approvals: UL/CUL Class I, Division I, Groups C&D</p>
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CIVACON™ Cane Probe

Cane probes are used to provide overfill detection where a permanent sensor cannot be properly affixed to a tank or rail car. They provide a portable, flexible solution to varying overfill requirements for safe top loading. Cane probes utilize modern, instant-on optic principles. Adjusting the sensor position in the tank easily sets the sensing point. This is accomplished with a large adjustment knob on the cane probe clamp.



Universal Clamp

Clamp-Type

Kamlok-Type

Plug and Cord Sets

CIVACON™ brand plugs and cords are used with junction boxes to connect the overfill detection monitor to the tank transport at the terminal. Basically, there are two types of systems: optic (blue, 6-pin) and thermistor (green, 8-pin).



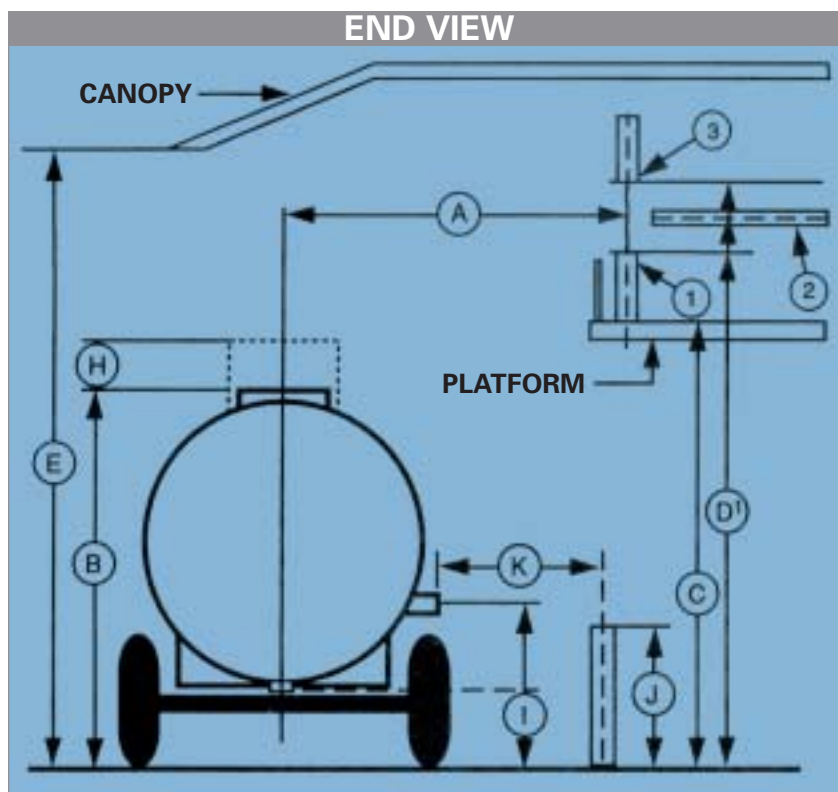
Midland Valve Actuators

OPW Engineered Systems Valve Actuators are state-of-the-art technology for safe and efficient control of loading and unloading. They provide fast, automated emergency shut-off of loading and unloading valves for handling very hazardous chemicals, such as chlorine or ethylene oxide. When connected to external warning sensors such as chemical leak detectors, emergency stop switches or vibration and motion sensors, the actuators can immediately (less than 3 seconds) minimize operator exposure and EPA/DOT-reportable releases in the event of a leak in the transfer connections. Automated opening and closing of transfer valves keep workers a safe distance from hazardous loadings at all times.



LIQUID LOADER DESIGN INFORMATION

Project: _____ Date: _____
 Location (city, state, zip): _____
 Distributor: _____
 Phone: _____
 Contact: _____



Type of Requirement

Rack Identification _____

Quantity _____

Top Loading Bottom Loading Vapor Recovery

Tank Trucks Rail Cars

Will the product be: Splash-loaded Sub-surface or Tight-fill

If Tight-fill, specify connection _____

Materials to be Transferred

Product to be handled _____ Viscosity _____ SSU

Temperature _____ °F, Concentration (if applicable) _____

Special Characteristics _____

Sizes & Capacities

Inlet connection type? _____

Inlet Pipe Size 2" 3" 4" 6" Vapor Pipe Size 1" 2" 3" 4"

Max. PSIG _____ Working PSIG _____

Discharge Rate _____ GPM

Desired Materials of Construction:

1) Metals: Carbon Steel Aluminum 316 Stainless Steel
 Other

2) Desired Seals: BUNA VITON® TEFLON® Neoprene
 EPT Other

Features

Loading Arms to be: Right Hand Left Hand

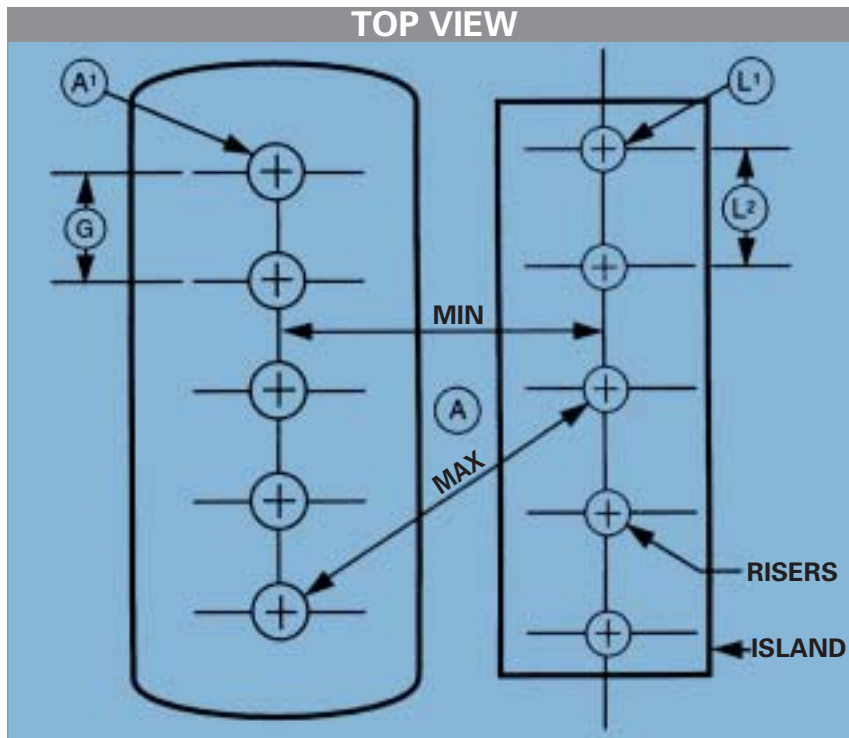
Is Shut-off Valve Required? Yes No

Will Arm Retain Product? Yes No

Location of valve on arm _____

Desired Type of Valve _____

Will Valve be Used to Shut Down Line? Yes No



Will Additional Equipment be Added by Others?

(Specify Weight & Location)

- Electrical Tracing _____ lbs/ft
- Insulation _____ lbs/ft
- Hose _____
- Valve/Fitting _____
- Other _____

Other Desired Features: _____

Dimensional Data: Top Loading/Unloading

- A CL of Riser to CL of Tank Opening:
Max. _____ Min. _____
- A¹ Number of Openings _____
- B Ground Level of Top of Tank _____
- C Ground Level to Top of Platform _____
- D Ground Level to Riser _____

Riser Configuration: 1 2 3

- E Ground Level to Overhead Obstruction _____
- H Top of Tank to Top of Safety Rail _____
- L₁ Number of Risers _____
- L₂ Distance Between Risers _____
- Distance Between Openings _____

Bottom Loading/Unloading

- I Ground Level to CL Tank Connection _____
- J Ground Level to Top of Riser _____
- K CL of Riser to Tank Fitting: _____
Max. _____ Min. _____
- L₁ Number of Risers _____
- L₂ Distance Between Risers _____

What Current Metals and Sealing Materials are being used in this application (Pump, Valves and Meters)?

Metals _____

Seals _____

BULGARIA

OPW-HSL-4"
Bottom loading arms
with OPW-VSL Vapor loading arms and 8500-E.
(Liberty Overfill and Grounding monitor)



SPAIN

OPW Complete platform
with: B32RF SS
toploader - Foldingstair and Grounding monitor.



HUNGARY

OPW Bottom loading
arms and Liberty Overfill
and Grounding monitor.

ITALY

OPW-HSL-4" - Bottom loading arms with OPW-VSL-4" Vapor loading arm with OPW 8500-E Overfill and Grounding monitor mounted on OPW-Skid. *(Tanktruck loading)*



UNITED ARAB EMIRATES

OPW-C32RF-4" Top loading.

(Tanktruck loading)



POLAND

OPW-G32F-4" - Bottom loader stainless steel with electrical tracing and B13F 4" Stainless steel top loading arms *(Railcar loading and unloading)*



TURKEY

OPW-CWH-4”
Bottom loading
arms with counter-
weights.

(Tanktruck loading)



UNITED KINGDOM

OPW-V64F-4” - Stainless steel
jacketed top loading arm
with 3” vapor recovery. *(Chemical tanktruck loading)*



SAUDI ARABIA

OPW-LPG set -
Steel 3” liquid line
and 2” vapor line. *(Tanktruck loading)*



THE NETHERLANDS

OPW-B13F-3" - Steel top loading arm with OPW platform including OPW folding stair and safety cage.

(Bitumen loading)



FRANCE

OPW-J12F-4"
Steel jacketed loading arm.

(Sulphur Truck loading)

PAKISTAN

OPW-E32F-3"
Aluminium loading arm.

(Railcar loading)



OPW Engineered Systems is a leading manufacturer of systems and components for fluid handling. They are part of OPW Fluid Transfer Group (OPW-FTG) which is comprised of five market-leading operating companies, each dedicated to designing, manufacturing, and distributing world-class solutions for the safe handling and transport of hazardous bulk products. OPW-FTG has manufacturing plants in North America, Europe, Brazil, and India; and sales offices in the United Kingdom, Singapore, Russia, and China. OPW-FTG is part of Dover Corporation (NYSE:DOV).

Throughout the world, OPW-FTG companies are hard at work ensuring the safe transportation of hazardous products and safeguarding against costly petroleum and chemical spills, tank overfills and fugitive vapor emissions. Whether your need is in the chemical plant, at the terminal loading rack, or outfitting a fleet of rail tank cars, cargo tanks or dry-bulk trailers, OPW-FTG systems set the standard for safety, performance and peace-of-mind assurance in the most rigorous and demanding applications. If the safe, profitable handling of hazardous liquids and dry bulk commodities such as gasoline and diesel, chlorine, chlor-alkali products, LPG, acids, cement, flour and starch, among others, is your concern, trust OPW-FTG.

Expert Solutions for the Safe Handling and Transport of Hazardous Bulk Products

	Applications	Processing	Loading	Transport		Unloading
PETROLEUM	<ul style="list-style-type: none"> Gasoline Alcohols Fuel Oil LPG 	<ul style="list-style-type: none"> Bellow Sealed Valves Sample Valves Lined Ball Valves Lined Butterfly Valves Industrial Valves ISO Rings Site Flow Indicators Globe Valves Swivels 	<ul style="list-style-type: none"> Loading Arms Couplers Rack Monitors Dry Disconnects API Coupler Swivels 	Cargo Tanks <ul style="list-style-type: none"> Manholes Vapor Vents Electronics Internal Valves API Adaptors Sealed Parcel Pneumatic Controls Manifold Systems 	Rail Tank Cars <ul style="list-style-type: none"> Pressure Relief Valves Plug Valves Ball Valves Level Measurement Autoloks Kamvaloks Dryloks Rupture Disc Devices Angle Valves 	<ul style="list-style-type: none"> Drylok Couplers Adaptors Delivery Elbows Vapor Recovery Elbows Swivels
CHEMICALS	<ul style="list-style-type: none"> Chlorine Acids & Bases Amines Anhydrous Ammonia Propylene Butadiene Hazardous Liquids 	<ul style="list-style-type: none"> Bellow Sealed Valves Sample Valves Lined Ball Valves Lined Butterfly Valves Industrial Valves ISO Rings Site Flow Indicators Globe Valves Swivels Dry Disconnect Quick Disconnect 	<ul style="list-style-type: none"> Loading Arms Autoloks Kamvaloks Dryloks Loading Manholes Valves Actuators Swivels 	Cargo Tanks <ul style="list-style-type: none"> Manholes Vapor Vents Electronics Internal Valves Sealed Parcel 	Rail Tank Cars <ul style="list-style-type: none"> Safety Valves Plug Valves Ball Valves Level Measurement Autoloks Kamvaloks Dryloks Rupture Disc Devices Angle Valves 	<ul style="list-style-type: none"> Loading Arms Autoloks Kamvaloks Dryloks Valves Actuators Safety Breakaways Swivels
DRY BULK	<ul style="list-style-type: none"> Cement Flour/Starch Pharmaceuticals 	<ul style="list-style-type: none"> Industrial Valves Sight Flow Indicators Butterfly Valves Swivels 	<ul style="list-style-type: none"> Loading Arms Aerators Hatch Covers Swivels 	Cargo Tanks <ul style="list-style-type: none"> Manholes Check Valves Hopper Tees Butterfly Valves Aerators Weld Rings 	Rail Cars <ul style="list-style-type: none"> Manholes Hatches Access Ports Check Valves Hopper Tees Butterfly Valves Aerators Pressure Vacuum Valves 	<ul style="list-style-type: none"> Aerators Butterfly Valves Tank Hatches Pressure Relief Vacuum Relief Temperature Monitoring

Rail Car Market Unit

- Pressure & General Purpose Rail Tank Cars
- Dry Bulk Rail Cars

Cargo Tank Market Unit

- Gasoline & Diesel
- Chemical
- Dry Bulk

Chemical & Industrial Processing Market Unit

- Chemical Plants
- Petroleum Loading Stations
- Steel Processing, Pulp & Paper
- Waste Water Treatment
- Pharmaceutical



2726 Henkle Drive
Lebanon, OH 45036 USA
Telephone: +1 513 696 1500
Fax: +1 513 932 9845
www.opw-es.com



7733 Gross Point Road
Skokie, IL 60077 USA
Telephone: +1 847 677 0333
Fax: +1 847 677 0138
www.midlandmfg.net



11172 State Highway O
Mineral Point, MO 63660 USA
Telephone: +1 573 438 5000
Fax: +1 573 438 4853
www.suresealinc.com

Specializes in designing and manufacturing products for safe and efficient loading and unloading of critical hazardous chemicals: loading arms, swivel joints, sight flow indicators, quick and dry disconnect couplers, and breakaway valves.

Specializes in products used on pressure and general purpose rail tank cars, chemical cargo tanks, barges and ISO containers for the safe handling of toxic materials: bottom and top loading/unloading valves, pressure relief valves, level gauge devices, and monitoring equipment.

Specializes in components for pneumatic tank trailers, rail cars, chemical and pharmaceutical plants and any application requiring the movement and storage of dry bulk or liquid materials: butterfly valves, lined ball valves, actuators, aeration systems, relief valves, hopper tees, couplers, and sanitary valves.



4304 Mattox Road
Riverside, MO 64150 USA
Telephone: +1 816 741 6600
Fax: +1 816 741 1061
www.civaicon.com

OPW FLUID TRANSFER GROUP - INDIA
36 Marol Co-op. Ind. Est. Ltd.
2nd Floor, M.V. Rd., Marol
Andheri (E), Mumbai - 400 059
Telephone: +91 22 2851 72 96 / 2851 73 55
Fax: +91 22 2851 73 33



Boekweitstraat 1, P.O. Box 32,
2150 AA Nieuw-Vennep, Netherlands
Telephone: +31 252 660 300
Fax: +31 252 687 258
www.opw-ftg.nl

Specializes in products for petroleum, chemical and dry bulk cargo tanks that help safeguard against spills, overfills, and fugitive emissions: access ports, manholes, weld rings, hatches, fill covers, swing check valves, pressure vacuum hatches, pressure relief valves, vapor valves, bottom loading equipment, delivery elbows, overfill detection devices, and vapor recovery adaptors.

OPW FLUID TRANSFER GROUP - BRAZIL
Rua Manuel Augusto de Alvarenga, 155
São Paulo, São Paulo, Brazil
CEP 04402-050
Telephone/Fax: +55 11 5564 6466

OPW Fluid Transfer Group Europe B.V. is a leading manufacturer of a full range of loading arms, and subsequent fluid handling equipment and a major provider of cargo tank products and an extensive package of bulk handling fittings for markets in Europe, the former Soviet Union, Africa, the Middle East, and Asia as far as Pakistan.



2726 Henkle Drive
Lebanon, OH 45036 USA
Telephone: 513-696-1500
Toll Free: 800-547-9393
Fax: 513-932-9845
www.opw-es.com



The Experts in Tank Storage and Process Safety

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