

A HIGHER STANDARD IN **PRODUCTS.**

# TABLE OF CONTENTS

## GEODESIC DOME

FlowDome™

1

## FLOATING ROOFS

2

Heavy Duty Aluminum Internal Floating Roof (pontoon type)

Hybrid Internal Floating Roof (pontoon type)

Stainless Steel Internal Floating Roof (pontoon type)

Full Contact Internal Floating Roof

Suspended Options

## FLOATING ROOF SEALS

3

Primary Seals

Secondary Seals

Foam Dam

## FLOATING ROOF DRAIN SYSTEM

4

Drain Joints

## FLOATING SUCTION & SKIMMERS

5

SwingMaster™ Joints for Floating Suction Lines

## EMISSIONS CONTROL DEVICES

6

Leg Boot



**MATRIX APPLIED  
TECHNOLOGIES**



# MATRIX APPLIED TECHNOLOGIES

Built on a solid foundation and decades of practical expertise in aboveground storage tanks, Matrix Applied Technologies delivers a stronger resource for products that instill total confidence for protection of your assets.

- FlowDome Geodesic Dome
- Internal Floating Roofs
- Primary and Secondary Seals
- Floating Suction and Skimmer Systems
- SwingMaster Swing Joints
- Floating Roof Drain Systems
- Leg Boots

**A HIGHER STANDARD IN PERFORMANCE**

## FlowDome™

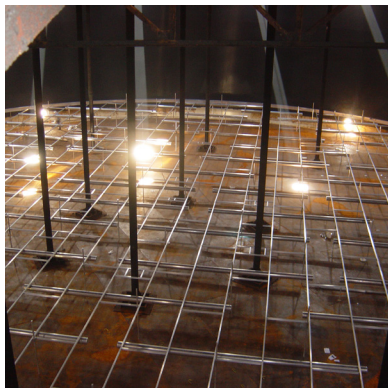
Setting a new standard in quality and performance, Matrix Applied Technologies brings together the very latest in design technology and expertise to provide our customers with the industry-leading geodesic FlowDome™.



Meeting or exceeding standards set in API 650 Appendix G, every aspect of the FlowDome is custom-engineered to your specifications, including design loads, to provide maximum protection and asset life with minimum maintenance expense. The dome and any modules such as platforms, bird screens, skylights or inspection hatches are pre-cut at the factory to ensure precise fit-up, and then packed to ensure fast, easy assembly and installation on-site. The FlowDome can also be installed while the tank is in-service and can be engineered for new tanks or retrofitted.

## Heavy Duty Pontoon Internal Floating Roof

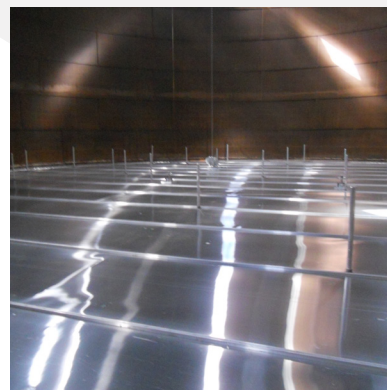
With decades of real-world experience in the design, installation, and maintenance of Internal Floating Roofs (IFRs), our Heavy Duty Pontoon Aluminum IFR provides virtually maintenance-free operation of all main structural elements.



Our IFRs are custom-engineered to provide optimum performance, even in earthquake prone regions or instances where a tank may be subject to sloshing or high fill rates.

## Stainless Steel Internal Floating Roof

When stored product demands the use of stainless steel, and you demand the best value over the life of your IFR, Matrix Applied Technologies Stainless Steel IFR is your answer. Like our Heavy Duty Ponton IFR, our Stainless Steel IFR incorporates durability features designed to provide maintenance-free



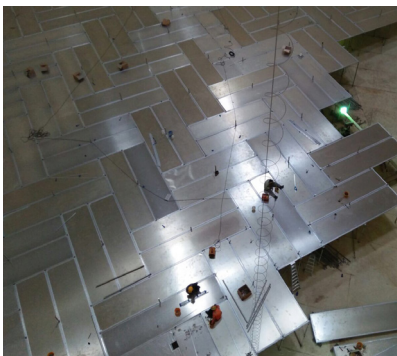
operation of the main structural elements. Additionally, Matrix Applied Technologies can provide a Hybrid IFR with the benefits of aluminum panels and stainless steel or anodized aluminum wetted parts.

For more information  
please contact

**866 367 6879**

[matrixappliedtech.com](http://matrixappliedtech.com)

## Full Contact Honeycomb Internal Floating Roof



Innovative in both form and function, our precision engineered Full Contact Honeycomb IFR eliminates design issues that have historically plagued the industry and still exist with other IFR brands on the market. Unlike other brands,

Matrix Applied Technologies' full contact IFR allows for increased tank capacity, minimal evaporation, improved fire safety, and extended service life with minimal maintenance.

## Primary and Secondary Seals for Floating Roof Tanks

Matrix Applied Technologies offers both primary and secondary seals for floating roof tanks that are second to none. All have been designed for easy and quick installation in the field at a competitive price point. Our Floating Roof Tank primary and secondary seals are engineered for extended life and reduced maintenance costs.

## Floating Suction Lines & Skimmers

Matrix Applied Technologies is the global leader in the design and manufacturing of floating suction lines and skimmers, with more than 800 in service throughout the world. Our Floating Suction and Skimmer systems lead the industry in proven design and quality,



utilizing stainless steel piping and pontoons, and can be custom-designed to meet any tank configuration.

Two main suction line types are offered:

- Suspended, most commonly used for fixed roof tanks
- Roller, for use beneath a steel or aluminium floating roof

All of our floating suction lines systems are designed with level indicators and can incorporate sample lines upon request. Additionally, MAT can design an articulated line for tanks with columns or a tank height greater than the diameter.

## SwingMaster™ Swing Joints

Whether used in conjunction with the Matrix Applied Technologies Floating Suction and Skimmer system, or with a third-party engineered solution, our SwingMaster™ joints are engineered for even the most extreme applications. Built to last, our joints are constructed using rugged cast iron/ductile iron with plain Ni-Resist bearings (copper free) and are internally and externally epoxy painted for Jet-A1 service.

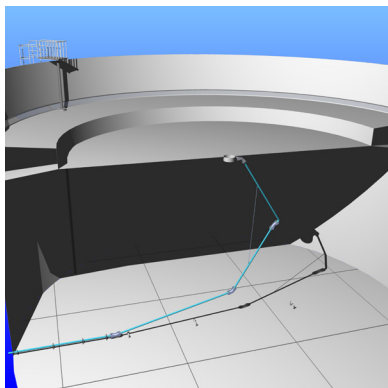


Most sizes are in stock and ready to ship. Our SwingMaster™ joints are available up to a 36 inch diameter and have a standard ANSI 150# Flat Face for up to 24 inches in diameter.

Matrix Applied Technologies SwingMaster joints are designed for a wide range of service applications and Avgas tanks and can be special ordered and fabricated in 304SS, 316SS and 316LSS.

## Floating Roof Drain Systems

When it comes to choosing the right drainage system for removing accumulating rainwater from your floating roof, there is one best solution.



By design, our hard pipe system provides constant positive drainage and eliminates the risk of failure due to frozen product, often associated with alternative hose drains. Additionally, because our system is never in contact with the tank bottom, there is no potential for damage to the tanks coating due to friction.

Providing maintenance-free operation for 15 years or more and with only four drain joints required per Floating Roof Drain System, the Matrix Applied Technologies Floating Roof Drain System is cost effective, simpler, lighter, and easier to install.

## Leg Boot

Matrix Applied Technologies Leg Boot offers a dramatic improvement over other standard options today and delivers an asset life expectancy four times that of leg socks. The Leg Boot is engineered to meet even the most restrictive regulatory requirements, eliminating emissions and offering protection against water, condensation, gas, and corrosion. The most popular sizes are kept in stock and the tool-less design makes install and removal quick and easy.



## About Matrix Applied Technologies

Known for precision engineering and cutting-edge manufacturing, Matrix Applied Technologies products are ready to assemble for installations that deliver total confidence. Matrix Applied Technologies, a division of Matrix Service Company, provides proven products and unparalleled performance for AST operations.

Matrix Applied Technologies is headquartered in Tulsa, Oklahoma with offices in Sydney, Australia and a manufacturing facility in Seoul, South Korea.





**MATRIX APPLIED  
TECHNOLOGIES**

# FLOWDOME™

Setting a new standard in quality and performance, Matrix Applied Technologies brings together the very latest in design technology and decades of real-world experience to provide our customers with the industry-leading geodesic FlowDome™.

Meeting or exceeding standards set in API 650 Appendix G, every aspect of the FlowDome™ is custom-engineered to your specifications, including design loads, to provide maximum protection and asset life with minimum maintenance expense.

The dome and any modules such as platforms, bird screens, skylights or inspection hatches are pre-cut at the factory to ensure precise fit-up, and then packed to ensure fast, easy assembly and installation on-site.

**The FlowDome™ can also be installed while the tank is in-service and can be engineered for new tanks or retrofitted.**

**A HIGHER STANDARD IN PRODUCTS.**

# FLOWDOME™ FEATURES

## Flush Battens

Flush battens and main roof panels mean that sealing around the hub is easier. Water drains away and the dome hub is better able to seal across both the battens and roof panels because they are all on a similar plane.

## Anodized Hub Covers

Anodized hub covers give enhanced corrosion resistance as well as enabling silicone sealing around the hub to more effectively adhere to the hub. The unique hub cover design ensures that the bulk of applied silicone sealing is hidden from the sun and environment.

## Lock Bolts

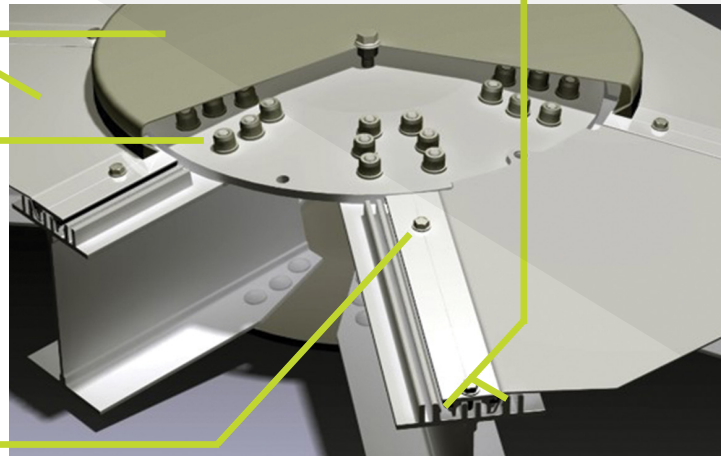
Lock bolts at hub connections ensure a pre-determined uniform tension is applied to all structural connections. These bolts become permanent fasteners.

## Batten Screws

200mm pitch batten screws and deep section battens ensure constant sealing pressure is applied along the main struts thereby giving a leak free panel-to-strut joint.

## Screw Rails

Matrix Applied Technologies' design includes two extra screw rails for secure connection of walkways and other roof top attachments. Other manufacturers make roof appurtenance connections through the central battens which can cause leaking as the walkways or other roof attachments move causing the panel clamping batten to move. Panel sealing may be compromised.





## TANK INFORMATION REQUIRED

Tank Owner:  Location:  Date:

Tank Number:  Tank Ø:  ft Tank Height:  ft

Product Stored:  Stored Product Temperature:  °F

Live Load:  psf Wind Load:  mph Snow Load:  psf

Dome Vent Type:  Free Vent (default) Dome Support Type:  Sliding (default)

Design Pressure (Gas Tight Only): Positive <input type="text"/> inH <sub>2</sub> O Negative <input type="text"/> inH <sub>2</sub> O	Wind Girder: No Walkway <input type="text"/>  IFR: Not Present <input type="text"/>	Rolling Ladder Connection:  None <input type="text"/>
---	---	---

### Dome Accessories & Features

- |  |   |
|--|---|
| <input type="checkbox"/> Dome Sprinkler Support System | - <input type="text"/> Skylight(s)              |
| <input type="checkbox"/> IFR Suspension Cables         | - <input type="text"/> Existing Gauge Pole(s)   |
| <input type="checkbox"/> Center Vent                   | - <input type="text"/> Aluminium Dome Nozzle(s) |
| <input type="checkbox"/> Radial Walkway                | - <input type="text"/> Inspection Hatch         |
| <input type="checkbox"/> Center Platform               | - <input type="text"/> Existing Foam Pourer(s)  |
| <input type="checkbox"/> Operation Platform            | <input type="checkbox"/> Dome Entry Manhole     |

Dome Height Limitation  ft

Available Assembly Location:  Unknown

### COMMENTS

**\*PLEASE PROVIDE PLAN OF TANK NOZZLES & GAUGE POLES**



# HEAVY-DUTY PONTOON INTERNAL FLOATING ROOF

With decades of real-world experience in the design, installation, and maintenance of Internal Floating Roofs (IFRs), Matrix Applied Technologies' Heavy Duty Pontoon Aluminum IFR provides virtually maintenance-free operation of all main structural elements. Our IFRs are custom-engineered to provide optimum performance, even in earthquake-prone regions or instances where a tank may be subject to sloshing or high fill rates.

When it comes to quality, performance, and value over the life of the asset, Matrix Applied Technologies' Heavy Duty Pontoon Internal Floating Roof is unmatched in the industry.

A HIGHER STANDARD IN **PRODUCTS.**

# HEAVY-DUTY PONTOON IFR

## Heavier Construction

Our heavy-duty IFR construction has an integral structure/frame to which the sheeting and pontoons are added, in contrast to other conventional IFR designs where the pontoons are an integral part of the structure. In the event sheeting or pontoons need to be replaced, the process of replacing sheeting or pontoons on a Matrix Applied Technologies IFR is faster and more efficient.

## Leg Connections

Our innovative design eliminates the likelihood of pontoon end cracking, a common phenomenon in lightweight IFRs that results from tank turbulence or landing the floating roof during cycling. We've done so by ensuring our IFR has a proper frame with regularly spaced crossbeams. Legs are not connected to the pontoons, and pontoons are not connected to each other.

## Easy Assembly, Exceptional Fit

Our Heavy-Duty Pontoon IFRs come ready to install, with no field cutting required, reducing both potential safety issues and installation time. All peripheral main beams are angle cut to conform exactly to the tank's inside rim radius. Main beam and crossbeam connection holes within our IFR are pre-punched for fast, easy assembly. Shoe seal mounting holes on the rim are pre-drilled to precise, pre-determined seal shoe spacing and overlaps, and main beam connections to the rim are flush with the top of the rim, which allows proper sheet clamping to the rim. The end result is easy assembly and exceptional fit.

## Load Capacity 1000lb/ft<sup>2</sup>

API 650 Appendix H requires that IFRs be capable of withstanding a concentrated load of 500lb/ft<sup>2</sup>. MAT has confirmed, through testing, that our heavy-duty IFR can withstand 1000 lb/ft<sup>2</sup>, and accordingly, we guarantee our IFRs meet this standard.



## Stainless Steel Fasteners

Matrix Applied Technologies'

IFRs use only high-quality stainless steel fasteners which provide exceptional resistance to corrosion, durable strength, and stiffness. Our stainless steel fasteners are also coated in liquid Teflon to prevent "galling" when tightening during installation.

## Suspending Options

Matrix Applied Technologies' IFRs can be suspended using either cable or chain, providing significant operational advantages over conventional IFRs with legs. Suspending the IFR by either cable or chain allows for floor scanning; easier floor repair, free of leg interference; adjustment of high and low leg positions from outside the tank while the tank is in service; and increased tank working volume.

## Extruded Rim

Matrix Applied Technologies IFRs utilize a heavy-duty aluminum extruded rim, making it better able to resist deformation caused by wave action in the tank as the result of turbulence caused by pumping or use of mixers and gas slugs. This extruded rim also allows for easy fitting of a shoe seal without rim reinforcement.

## Hybrid IFR

When product storage requires the use of an IFR made from other than aluminum wetted parts, Matrix Applied Technologies' offers heavy-duty IFRs in a Hybrid design with the wetted parts available in either or both stainless steel or anodized aluminum.

For more information  
please contact

**866 367 6879**  
**matrixappliedtech.com**

**TANK INFORMATION REQUIRED**

Tank Owner: Location: Date:

Tank Number: Tank Ø: ft Tank Height: ft

Product Stored: Stored Product Temperature: °F

Design S.G.: 0.7 (default) Inlet Flow Rate: Bbl/hr Inlet Nozzle Dia.: in

Outlet Flow Rate: Bbl/hr Tank Shell Design: Unknown

	QTY	
Center Column Diameter: in	0	
1 <sup>st</sup> Ring Roof Column Diameter: in	0	Radius: in
2 <sup>nd</sup> Ring Roof Column Diameter: in	0	Radius: in
3 <sup>rd</sup> Ring Roof Column Diameter: in	0	Radius: in
		Distance Between Poles
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in

**PLEASE SELECT SEAL TYPE**

Primary Seal Type: None

Primary Seal Material: 304 Stainless Steel

Primary Fabric Material: Teflon (10mil)

Secondary Seal Type: None

Secondary Seal Material: 304 Stainless Steel

Secondary Fabric Material: Teflon (10mil)

Wiper Seal Type: None

Wiper Material: Polyethylene

**PLEASE SELECT FOAM DAM TYPE**

Foam Dam Options: ▼

**ADDITIONAL SEAL OPTIONS**☐ Wax Scraper ☐ Fabric Supports☐ Shoe Shunts**TANK ACCESSORIES / INFO.**

- ☐ Radar Gauging
- ☐ Vertical Ladder Fitted (roof-to-roof)
- ☐ Tank Roundness / Tilt Report
- ☐ Floating Suction Line
- ☐ N2 Blanketed

**REQUIRED IFR APPURTENANCE(S)**

- ☐ Suspended IFR ☐ Ladder Pad
- ☐ Dip Funnel ☐ Rim Vent
- ☐ Airscoops ☐ Pigging Vent
- ☐ Float Well  Manways(s)

**COMMENTS****\*PLEASE PROVIDE PLAN OF TANK NOZZLES & INTERNAL PIPING**



# STAINLESS STEEL INTERNAL FLOATING ROOF

The Matrix Applied Technologies Stainless Steel Internal Floating Roof (IFR) is the result of more than three decades of practical tank experience in IFR installation, maintenance and design, coupled with the unmatched expertise of our sister companies in the design, construction and maintenance of aboveground storage tanks. Our IFR's are durable and overcome many design problems that exist in other well-known brands on the market today. When stored product demands the use of 304 or 316 stainless steel, and you demand the best value over the life of your IFR, Matrix Applied Technologies Stainless Steel is your answer.

Our Stainless Steel IFR incorporates durability features designed to provide maintenance-free operation of the main structural elements. It is ideally suited for use on tanks in earthquake-prone regions or where tanks are subject to sloshing and/or turbulence due to high fill rates.

**A HIGHER STANDARD IN PRODUCTS.**

## Heavier Construction

Our heavy duty IFR construction has an integral structure/frame to which the sheeting and pontoons are added. In contrast to other conventional IFR designs where the pontoons are an integral part of the structure, in the event sheeting or pontoons need to be replaced, the process of replacing sheeting or pontoons on a Matrix Applied Technologies IFR is faster and more efficient.

## Leg Connections

Our innovative design eliminates the likelihood of pontoon end cracking, a common phenomenon in lightweight IFRs that results from tank turbulence or landing the floating roof during cycling. We've done so by ensuring our IFR has a proper frame with regularly spaced crossbeams. Legs are not connected to the pontoons, and pontoons are not connected to each other.

## Pontoons

Matrix pontoons are fabricated from 1.2mm thick stainless steel to conform to API650 Appendix H standards.

## Easy Assembly, Exceptional Fit

Our Heavy Duty Pontoon IFRs come ready to install, with no field cutting required, reducing both potential safety issues and installation time. All peripheral main beams are angle cut to conform exactly to the tank's inside rim radius. Main beam and crossbeam connection holes within our IFR are pre-punched for fast, easy assembly. Shoe seal mounting holes on the rim are pre-drilled to precise, predetermined seal shoe spacing and overlaps, and main beam connections to the rim are flush with the top of the rim, which allows proper sheet clamping to the rim. The end result is easy assembly and exceptional fit.

## Load Capacity 500lb/ft2

API 650 Appendix H requires that IFRs be capable of withstanding a concentrated load of 500lb/ft2. Matrix Applied Technologies has confirmed, through testing, that our Stainless Steel IFR can withstand 500 lb/ft2, and, accordingly, we guarantee our IFRs meet this standard.

## Stainless Steel Fasteners

Matrix Applied Technologies IFRs use only high quality stainless steel fasteners which provide exceptional resistance to corrosion, durable strength and stiffness. Our stainless steel fasteners are also coated in liquid Teflon to prevent "galling" when tightening during installation.

## Suspending Options

Matrix Applied Technologies IFRs can be suspended using either cable or chain, providing significant operational advantages over conventional IFRs with legs. Suspending the IFR by either cable or chain allows for floor scanning; easier floor repair, free of leg interference; adjustment of

high and low leg positions from outside the tank while the tank is in service; and increased tank working volume.

## Heavy Duty Fabricated Rim

Matrix Applied Technologies IFRs are better able to resist deformation caused by wave action in the tank. This wave action frequently occurs as a result of turbulence caused by pumping, use of mixers, and gas slugs. Our fabricated rim allows for easy fitting of a shoe seal without reinforcement.



# FULL CONTACT HONEYCOMB INTERNAL FLOATING ROOF

Innovative in both form and function, our precision engineered Full Contact Honeycomb Internal Floating Roof (IFR) eliminates design issues that have historically plagued the industry and still exist with other IFR brands on the market today. Unlike other brands, Matrix Applied Technologies' IFR allows for increased tank capacity, minimal evaporation, improved fire safety, and extended service life with minimal maintenance.

When it comes to quality, performance and value over the life of the asset, Matrix Applied Technologies' Full Contact Honeycomb IFR is unmatched in the industry.

**A HIGHER STANDARD IN PRODUCTS.**

# FULL CONTACT IFR

## Premier Performance

Matrix Applied Technologies' Full Contact Honeycomb IFR meets industry standards for low emissions, is designed to allow attachment of a peripheral foam dam system that meets the latest version of fire protection standard NPFA11 and offers a variety of seal options to meet requirements for the product being stored or area regulations.

## Simple Assembly and Maintenance

Shipped in either a 20ft. or 40ft. container, our patent-pending clamping method makes assembly simple and efficient, and our herringbone design provides for added roof strength. All components are designed to pass through a minimum 1500mm x 300mm tank opening.

Each honeycomb panel is equipped with a test plug to perform sniff tests during product leak inspections. And, where other brands bond or weld their honeycomb panels together, if a panel on a Matrix Applied Technologies' IFR is found to be damaged or leaking, it can be replaced without discarding the entire floating roof by simply unbolting and replacing the panel.

## Load Capacity 1000lb/ft<sup>2</sup>

API 650 Appendix H requires that IFRs be capable of withstanding a concentrated load of 500lb/ft<sup>2</sup>. Matrix Applied Technologies has confirmed, through testing, that our Full Contact Honeycomb IFR can withstand 1000 lb/ft<sup>2</sup>, and accordingly, we guarantee our IFRs meet this standard.

## Stainless Steel Fasteners

Matrix Applied Technologies' IFRs use only high-quality stainless steel fasteners which provide exceptional resistance to corrosion, durable strength, and stiffness. Our stainless steel fasteners are also coated in liquid Teflon to prevent "galling" when tightening during installation.

## Suspending Options

Matrix Applied Technologies' IFRs can be suspended using either cable or chain, providing significant operational advantages over conventional IFRs with legs. Suspending the IFR by either cable or chain allows for floor scanning; easier floor repair, free of leg interference; adjustment of high and low leg positions from outside the tank while the tank is in service; and increased tank working volume.

## Extruded Rim

Matrix Applied Technologies IFRs utilize a heavy-duty aluminum extruded rim, making it better able to resist deformation caused by wave action in the tank as the result of turbulence caused by pumping or the use of mixers and gas slugs. This extruded rim also allows for easy fitting of a shoe seal without rim reinforcement.



For more information  
please contact

**866 367 6879**  
**matrixappliedtech.com**

**TANK INFORMATION REQUIRED**

Tank Owner: Location: Date:

Tank Number: Tank Ø: ft Tank Height: ft

Product Stored: Stored Product Temperature: °F

Design S.G.: 0.7 (default) Inlet Flow Rate: Bbl/hr Inlet Nozzle Dia.: in

Outlet Flow Rate: Bbl/hr Tank Shell Design: Unknown

	QTY	
Center Column Diameter: in	0	
1 <sup>st</sup> Ring Roof Column Diameter: in	0	Radius: in
2 <sup>nd</sup> Ring Roof Column Diameter: in	0	Radius: in
3 <sup>rd</sup> Ring Roof Column Diameter: in	0	Radius: in
		Distance Between Poles
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in
Gauge Pole Diameter: in	0	in

**PLEASE SELECT SEAL TYPE**

Primary Seal Type: None

Primary Seal Material: 304 Stainless Steel

Primary Fabric Material: Teflon (10mil)

Secondary Seal Type: None

Secondary Seal Material: 304 Stainless Steel

Secondary Fabric Material: Teflon (10mil)

Wiper Seal Type: None

Wiper Material: Polyethylene

**PLEASE SELECT FOAM DAM TYPE**

Foam Dam Options: ▼

**ADDITIONAL SEAL OPTIONS**☐ Wax Scraper ☐ Fabric Supports☐ Shoe Shunts**TANK ACCESSORIES / INFO.**

- ☐ Radar Gauging
- ☐ Vertical Ladder Fitted (roof-to-roof)
- ☐ Tank Roundness / Tilt Report
- ☐ Floating Suction Line
- ☐ N2 Blanketed

**REQUIRED IFR APPURTENANCE(S)**

- ☐ Suspended IFR ☐ Ladder Pad
- ☐ Dip Funnel ☐ Rim Vent
- ☐ Airscoops ☐ Pigging Vent
- ☐ Float Well  Manways(s)

**COMMENTS****\*PLEASE PROVIDE PLAN OF TANK NOZZLES & INTERNAL PIPING**

# PRIMARY & SECONDARY SEALS FOR FLOATING ROOF TANKS

Drawing on decades of industry leadership and real-world experience by our sister companies in the design, construction and maintenance of aboveground storage tanks, Matrix Applied Technologies offers both primary and secondary seals for floating roof tanks that are second to none in the industry.

All have been designed for easy and quick installation in the field at a competitive price point.

Our floating roof tank primary and secondary seals are engineered for extended life and reduced maintenance costs.

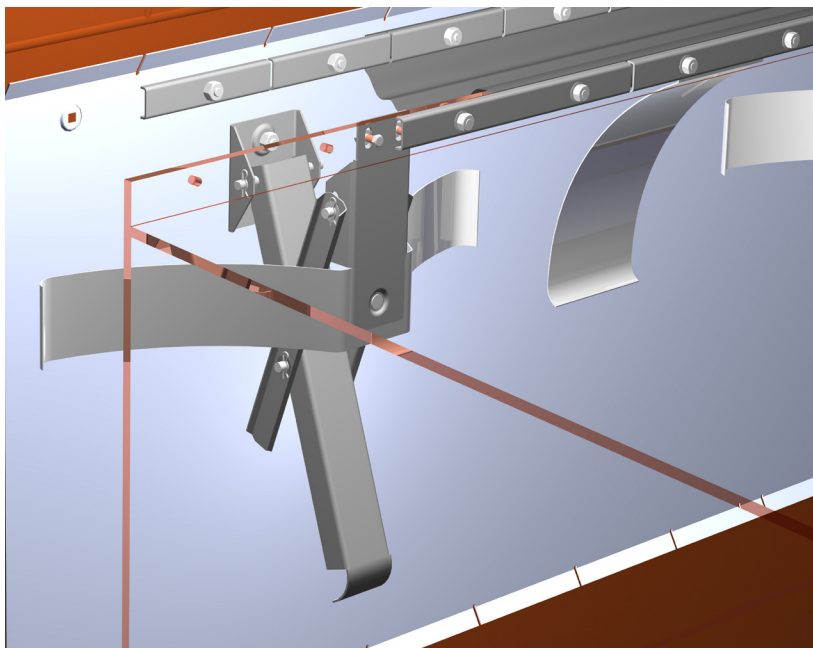
A HIGHER STANDARD IN **PRODUCTS**

# PRIMARY SEALS

## Why use a shoe seal?

Shoe seals have only metal parts in contact with the tank stored product. The vapor barrier fabric can be urethane, PVC/nitrile, or PTFE Teflon. Metal parts can be stainless or galvanized steel. The ability to mix and combine metals and vapor barrier fabrics, allows for the proper shoe seal to be designed for all products stored in tanks.

Historically, shoe seals offer the longest service life of all seal types. With rising costs, tank owners are seeking ways to reduce the maintenance cost of tanks. The Matrix Applied Technologies Pantograph primary shoe seal is the best solution with an expected life-span of an all stainless steel seal in excess of 25 years.



## SS2 pantograph design

With a 30+ year history of proven performance, the Matrix Applied Technologies Pantograph primary shoe seal is designed to accommodate wide rim space and is also available with a proven wax scraper option added for heavier stored products. Our modern design uses the latest manufacturing techniques, resulting in the world's most cost-effective shoe seal design:

- 12 contact points per shoe. Seal is well able to conform to tank shell irregularities.
- 1/4" hard stainless steel leaf springs and spring pusher plates push against the shoes with low cyclic stress giving infinite life.
- 12mm diameter stainless steel pivot pins are used throughout. Stainless steel "R" retaining pins are used allowing quick and easy installation and removal of shoes.
- Adjacent shoe overlap by 50mm which provides the expansion joint.
- A spring pusher plate acts at the shoe lap to ensure the shoes remain in contact with the tank shell at all times at the shoe lap.
- No welding is required. The shoe pantograph hanger assemblies are bolted to the rim. Individual shoes can easily be removed and using proper safety procedures can be repaired or replaced while the tank is in service.
- Adjacent shoes are not bolted together. This means individual shoe can easily be installed or removed by hand using only a 3-man team.

# SECONDARY SEALS

The Matrix Applied Technologies line of secondary seals has been designed to minimize contamination of the stored product and extend the life of the primary seal. With no hot work required, all of our secondary seals have a compression shield and wiper at the tip which can be removed or installed while the tank is in service.

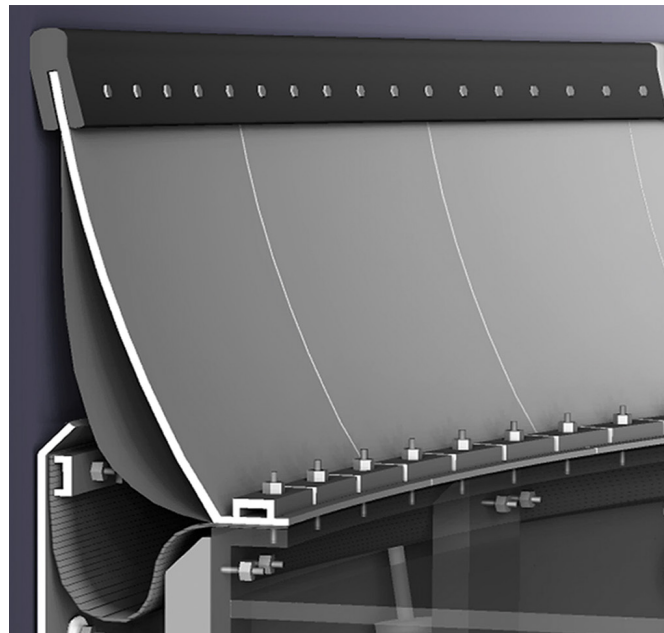
Our seals are custom designed to each tank's parameters to ensure proper fit and compliance with all air quality regulations. Each seal maintains a constant pressure force around the circumference of the floating roof and at each shell contact level, even as the roof travels during normal operation. Each seal is designed to accommodate a plus or minus four inches from the nominal rim space measurement.



## FLEX-A-SEAL®

The Matrix Applied Technologies Flex-A-Seal® uses a patented tip design to reduce contamination due to weather or sand/dust with up to 98% watershed control. The compression plates are not bolted together, allowing each individual area to conform to the contours of the tank shell. The reinforced fabric placed under the compression plates provide a continuous vapor barrier and protect the underside of the plates from corrosion caused by product aromatics.

The PVC Nitrile flexible wiper tip blade is mounted vertically on the end of the compression shield to even further increase the sealing efficiency and virtually eliminates the release of hydrocarbons within the tank.



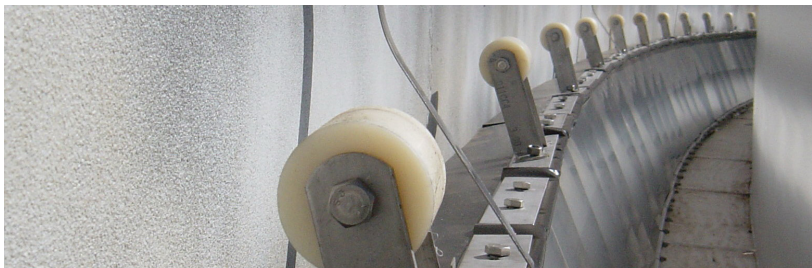
# SECONDARY ROLLER SEAL & LOW PROFILE ROLLER SEAL

## Secondary RollerSeal

The Matrix Applied Technologies Secondary RollerSeal is designed to provide secondary emission control for all floating roof applications. Metal parts can be galvanized or stainless steel with a variety of materials available for wiper tips and vapor barrier fabric. Our standard configuration includes neoprene wiper tips and urethane vapor barrier fabric.

A significant feature of the Matrix Applied Technologies Secondary RollerSeal is its synthetic roller assembly, designed to eliminate seal rollover for old, out-of-round tanks. The corrosion-free roller is also shell-contoured to minimize painted shell marking. The roller assembly allows a shorter support plate height for a given maximum rim space allowing greater tank volume. The roller normally only contacts the shell when the rim space is larger than nominal.

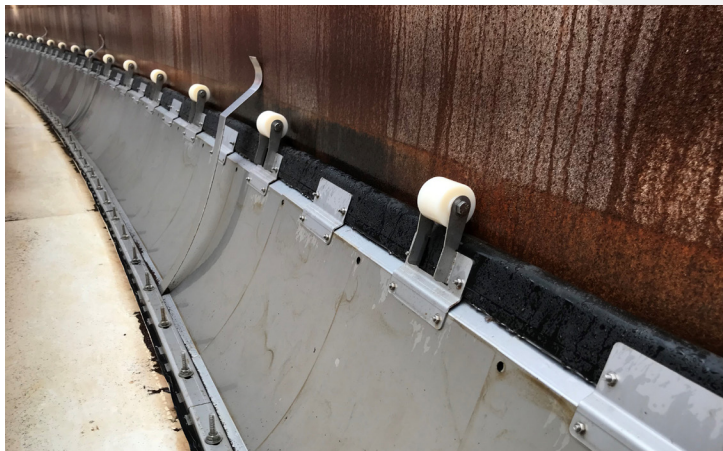
The Matrix Applied Technologies Secondary RollerSeal plates are not bolted together. Support plates can fan out independently of each other easily accommodating rim space changes. Because the seal is very flexible, less tension is required by the support plates to keep the wiper tip in contact with the shell. This results in lower tip wear.



## Low Profile RollerSeal

The Matrix Applied Technologies Low Profile Secondary RollerSeal was specifically designed to allow tank owners to maximize the operation of their tanks. With its low profile design, it increases the capacity of a floating roof tank improving operating efficiency and allowing tank owners to maintain greater competitiveness. Our low profile secondary seal plates are not bolted together. Support plates can fan out independently of each other easily accommodating rim space changes.

As the standard Secondary RollerSeal, a significant feature of this seal is also the special synthetic roller assembly, which is designed to eliminate seal rollover. The corrosion-free roller is shell-contoured to minimize painted shell marking. The roller normally only contacts the shell when the rim space is larger than nominal.





## TANK INFORMATION REQUIRED

Tank Owner:  Location:  Date:

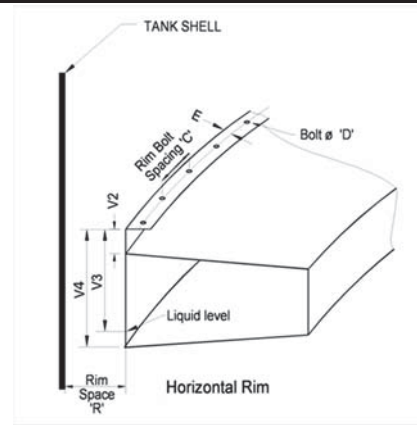
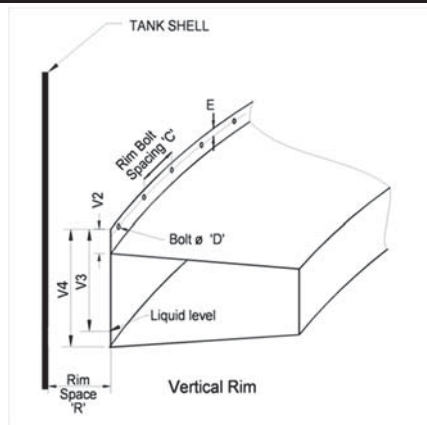
Tank Number:  Tank Ø:  ft Tank Height:  ft

Product height when measuring "R": TANK EMPTY  Product Stored:

*Measure Rim Space ("R") at 8 places (every 45°), starting at the Gauge Pole (0°)*

at 0°, "R"= <input type="text"/> in	at 45°, "R"= <input type="text"/> in	at 90°, "R"= <input type="text"/> in	at 135°, "R"= <input type="text"/> in
at 180°, "R"= <input type="text"/> in	at 225°, "R"= <input type="text"/> in	at 270°, "R"= <input type="text"/> in	at 315°, "R"= <input type="text"/> in
Calculated Average Rim Space= <input type="text"/> 0 in			

## PLEASE SELECT PONTOON RIM TYPE



Rim Height above Pontoon "V2":  in

Top of Rim to Liquid Level "V3":  in

Rim Bolt Edge Distance "E":  in

Rim Depth "V4":  in

Rim Bolt Ø "D":  in

Rim Bolt Spacing "C":  in

## PLEASE SELECT SEAL TYPE

Primary Seal Type: None

Primary Seal Material: 304 Stainless Steel

Primary Fabric Material: Teflon (10mil)

Secondary Seal Type: None

Secondary Seal Material: 304 Stainless Steel

Secondary Fabric Material: Teflon (10mil)

Wiper Seal Type: None

Wiper Material: Polyethylene

PLEASE SELECT FOAM DAM TYPE

Foam Dam Options: None

## ADDITIONAL OPTIONS

- ☐ Rim Clip Adaptor  
(Requires no drilling on site)
- ☐ Wax Scraper
- ☐ Shoe Shunts
- ☐ Fabric Supports

## COMMENTS

# FLOATING ROOF DRAIN SYSTEMS

When it comes to choosing the right drainage system for removing accumulating rainwater from your floating roof, Matrix Applied Technologies makes it an easy decision.

By design, our hard pipe system provides constant positive drainage and eliminates the risk of failure due to frozen product often associated with alternative hose drains. And because our system is never in contact with the tank bottom, there is no potential for damage to the tank's coating due to friction.

The drain line of our Floating Roof Drain System also requires a corridor just 500mm wide between sump and shell nozzle. In tanks above 60m diameter, it is advisable for safety reasons, to place more than one drain system in the tank. As many as five lines have previously been fitted to one large crude oil storage tank.

**Providing maintenance-free operation for 15+ years. With only four drain joints required per floating roof drain system, our system is cost-effective, simpler, lighter, and easier to install.**

**A HIGHER STANDARD IN PRODUCTS.**

# FLOATING ROOF DRAIN SYSTEMS

The MAT drain system requires only a relatively small amount of flexible piping. Our rigid pipes allow our system to be virtually leak-proof in tanks with substantially greater external pressure and highly aromatic liquids. Additionally, our floating roof drain system allows concurrent installation through the provision of a zippered fiberglass jacket that protects the system from potential construction hazards

## Metric Dimensions:

Part No	Dim Size	A (mm)	B (mm)	C (mm)	D (mm)	Set of 4 joints Crated Wt. kg	Set of 4 joints Crated vol. m <sup>3</sup>	Operating temp. 20° C 100° C	Max. Pressure
DM3000	3 inch	620	310	228	195	132	0.295	20° C 100° C	*10.5kg/cm <sup>2</sup>
DM4000	4 inch	750	375	268	235	194	0.449	20° C 100° C	*10.5kg/cm <sup>2</sup>
DM6000	6 inch	950	475	362	312	424	0.848	20° C 100° C	*10.5kg/cm <sup>2</sup>
DM8000	8 inch	1300	650	426	385	682	1.572	20° C 100° C	*7.0kg/cm <sup>2</sup>

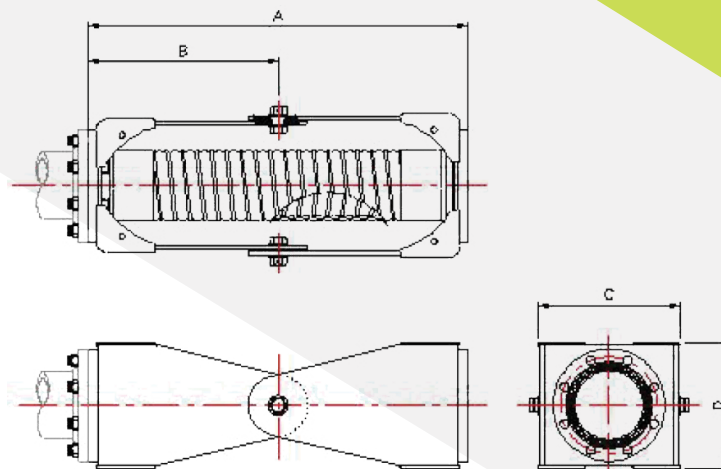
## Inch Dimensions:

Part No	Dim Size	A (in)	B (in)	C (in)	D (in)	Set of 4 joints Crated Wt. lb	Set of 4 joints Crated vol. ft <sup>3</sup>	Operating temp. 4° F 212° F	Max. Pressure
DM3000	3 inch	24.4	12.2	9.0	7.7	290	10.4	4° F 212° F	*150 psi
DM4000	4 inch	29.5	14.8	10.6	9.3	430	15.85	4° F 212° F	*150 psi
DM6000	6 inch	37.4	18.7	14.3	12.3	935	29.95	4° F 212° F	*150 psi
DM8000	8 inch	51.2	25.6	16.8	15.2	1500	55.51	4° F 212° F	*100 psi

\*Maximum Field Test Pressure: 3.5kg/cm<sup>2</sup> (50psi).

## Materials

The standard Matrix Applied Technologies drain joint hose is constructed from layers of polypropylene and polyester film and fabric. Hoses have 316 stainless steel inner and outer wires and are swaged to carbon steel tailpieces with ANSI 150# RF flanges. Flanges can also be in stainless steel or carbon steel. The Matrix Applied Technologies drain joint pivot bolt assembly is stainless steel with main side plates either standard galvanized or stainless steel.



## Features

Each of our drain joints are pressure tested in our manufacturing facility prior to being shipped to ensure superb quality and reliability when reaching the job site for installation. Each Floating Roof Drain System drain joint also comes with a fire-resistant zippered fiberglass jacket wrapped around the hose, providing unmatched protection for the hose should any hot work be done before putting the roof drain in service.

For more information  
please contact  
**866 367 6879**  
[matrixappliedtech.com](http://matrixappliedtech.com)



## TANK INFORMATION REQUIRED

Tank Owner: \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_

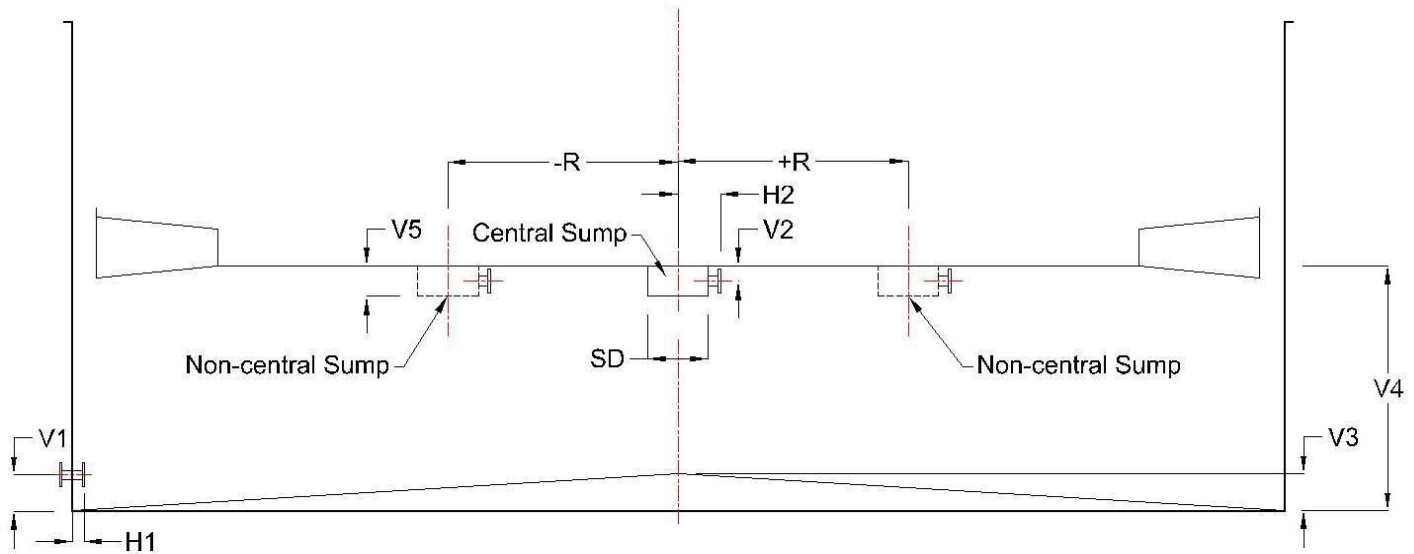
Tank Number: \_\_\_\_\_ Tank Ø: \_\_\_\_\_ ft Tank Height: \_\_\_\_\_ ft

Product Stored: \_\_\_\_\_ Roof Drain Diameter: 3 in

Maximum Product Temperature: \_\_\_\_\_ °F Drain Joint(s) Material: 304 Stainless Steel

Drain Pipe(s) Material: Carbon Steel (Standard)

Roof Type: Single Deck



Shell Nozzle Height (V1): \_\_\_\_\_ in Shell Nozzle Projection (H1): \_\_\_\_\_ in

Sump Nozzle Height (V2): \_\_\_\_\_ in Sump Nozzle Projection (H2): \_\_\_\_\_ in

Rise in Tank Floor (V3): \_\_\_\_\_ in None Sump Diameter (SD): \_\_\_\_\_ in

Roof Height at Low Leg Position (V4): \_\_\_\_\_ ft Sump Depth (V5): \_\_\_\_\_ in

Sump Location (R)\*: \_\_\_\_\_ ft

\*If sump is central, R=0. If Sump is towards shell nozzle, show sump radius as negative (-ve). If sump is away from shell nozzle, show sump radius as positive (+ve).

## COMMENTS

\*PLEASE PROVIDE PLAN OF TANK NOZZLES & INTERNAL PIPING

# FLOATING SUCTION & SKIMMERS

As the global leader in the design and manufacture of floating suction lines and skimmers, and with more than 800 in service throughout the world, Matrix Applied Technologies Floating Suction and Skimmer leads the industry in proven design and quality. The MAT floating suction or skimmer lines can be custom-designed to meet any tank configuration. All piping and pontoons are fabricated from stainless steel for optimized design and operational longevity.

Suction lines are commonly used for aviation facility Jet-A1 and Avgas tanks, as well as in power plants, crude oil collection tanks, or anywhere the quality of the product to exit the tank is an issue.

There are 2 main suction line types:

- Suspended, most commonly used for fixed roof tanks
- Roller, for use beneath a steel or aluminum floating roof

Both are available in diameters of 3 to 36 inches.

**A HIGHER STANDARD IN PRODUCTS.**

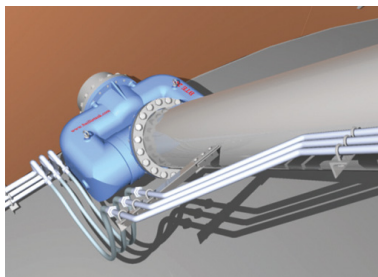
# FLOATING SUCTION & SKIMMERS

## Level Indicator

Designed to provide a visual indication that the suction line is operating properly, our level indicator consists of a cable connected to the suction line. The cable is connected to a weight running up and down guide rods on the outside of the tank shell and, in addition to providing visual indication that the suction line is operating correctly, also indicates the suction line's position. A level indicator is an imperative when the suction line operates beneath a floating roof.

## Sample Lines

Sample lines can be provided on the main suction arm for fuel sampling. Matrix Applied Technologies can provide 3/4 or 1-inch diameter sample lines. Typically, sample points are located at the center of lower third, middle third and upper third of the tank liquid level.



## Roller Type Suction Line

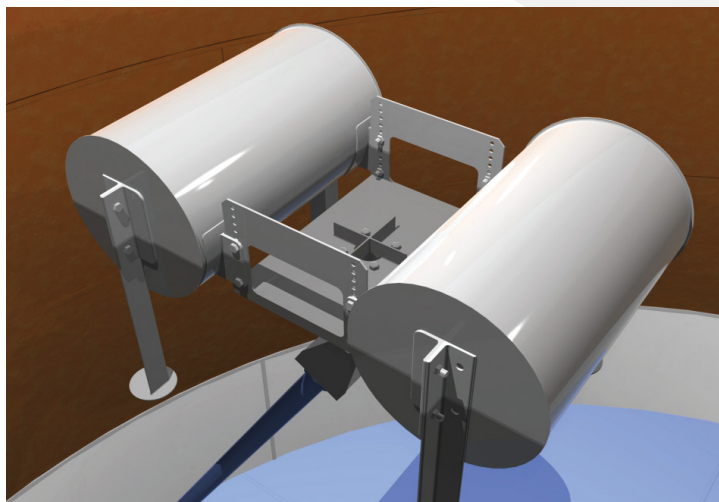
Roller type floating suction lines are fitted with rollers that run along the underside of the steel floating roof. No special track is required and the roller can negotiate plate overlaps. The same suction line can operate beneath an aluminium or stainless steel Internal Floating Roof (IFR), however, in this situation, a track must be added beneath the IFR to accommodate the roller. As an IFR manufacturer, Matrix Applied Technologies can design an appropriate suction line track and provide extra buoyancy for aluminium or stainless steel IFRs when necessary.

## Articulated Lines

When the tank height is greater than tank diameter, a single arm suction line will not reach maximum liquid level height. In this case, a two-arm or articulated suction line is required. A similar articulated configuration can be used for skimmer lines.

## Skimmers

These are designed to skim off a layer of hydrocarbon liquid floating on top of the water. Essentially, a skimmer is designed to remove the top layer of a two-phase liquid stored in a tank. Line sizes are usually 3 or 4 inches in diameter although Matrix Applied Technologies can manufacture larger sizes. Pontoons are designed to float on their centerline at the lowest S.G. tank product. The skimmer plate is located an adjustable distance below.





**TANK INFORMATION REQUIRED**

Tank Owner: Location: Date:

Tank Number: Tank Ø: ft Tank Height: ft

Product Stored:

Product Maximum Temperature: °F

Product S.G. at 60°F (15.6°C):

Suction Nozzle Diameter: in

Suction Nozzle Centerline Height: in

Suction Nozzle Projection Inside Tank: in

Maximum Fill Height (H.L.L.): in

High High Liquid Level (H.H.L.L.): in

Manway or Cleanout Door Size: in

Floor Slope: None

Floor Coating: Unpainted

Welding Permitted: Yes

**EXISTING TANK ACCESSORIES AND INFORMATION**

☐ Roof Columns (Provide Drawing)

☐ Heater Coils (Provide Drawing)

☐ Floating Roof (Provide Drawing)

**SUCTION LINE OPTIONS**

Sample Line(s)

☐ Level Indicator

**COMMENTS**

# SWINGMASTER™ SWING JOINTS

Whether used in conjunction with the Matrix Applied Technologies Floating Suction and Skimmer system, or with a third-party engineered solution, our SwingMaster™ joints are engineered for even the most extreme applications. Built to last, SwingMaster™ central type swing joints are constructed using rugged cast iron/ductile iron with plain Ni-Resist bearings (copper free) and are internally and externally epoxy painted for Jet A1 service.

With most sizes in stock and ready to ship, our SwingMaster™ joints are available in 4 to 36 inch flange diameter. Other sizes are available based on application and need. All SwingMaster™ joints up to 24 inch diameter are ANSI 150# Flat Face. Above 24 inch diameter, flange standards vary.

**Precision engineered and built to last, SwingMaster™ swing joints are designed for a wide range of service applications.**

**A HIGHER STANDARD IN PRODUCTS.**

# SWINGMASTER™ SWING JOINTS FOR FLOATING SUCTION LINES

## METRIC:

Size inch	DIMENSION mm					flange tapped holes N	flange drilled holes O mm	flange bolt circle P.C.D. mm	lifting lug tapped holes E	Rotation Torque kg-m	Weight kg
	A	B	C	D	L						
4	447	180	-	229	295	4 x 5/8" UNC	4+ 8 x 19.0dia	190.50	-	5	51
6	536	232	393	279	371	4 x 3/4" UNC	4+ 8 x 22.4dia	241.30	4 x M10	6.0	66
8	658	281	482	343	449	4 x 3/4" UNC	4+ 8 x 22.4dia	298.45	4 x M12	12.0	114
10	824	338	592	406	538	8 x 7/8" UNC	4+12 x 25.4dia	361.95	4 x M16	15.0	190
12	1007	417	707	483	652	8 x 7/8" UNC	4+12 x 25.4dia	431.80	4 x M16	18.5	296
14	1083	452	779	534	709	8 x 1" UNC	4+12 x 28.6dia	476.20	4 x M16	27.9	349
16	1224	506	885	597	783	8 x 1" UNC	8+16 x 28.6dia	539.70	4 x M16	31.9	495
18	1377	570	996	635	881	8 x 1½" UNC	8+16 x 31.8dia	577.90	4 x M16	35.9	638
20	1410	614	1041	699	940	12 x 1½" UNC	8+20 x 31.8dia	635.00	4 x M20	39.9	838
24	1714	715	1229	813	1090	12 x 1½" UNC	8+20 x 35.0dia	749.30	4 x M24	47.9	1241
26	1932	759	1323	786	1163	16 x 3/4" UNC	20+36 x 22.35dia.	744.47	2 x M24	50.0	1285
30	2078	832	1460	984	1285	16 x 1¼" UNC	12+28 x 35 dia	914.40	2 x M30	64.0	1944
32	2226	888	1600	1060	1376	16 x 1 1/3"UNC	12+28 x 41dia	977.90	2 x M30	80.0	2200
36	2576	984	1780	1057	1513	28 x 7/8" UNC	16+44x25.4dia.	1009.70	2 x M30	105.0	3672

## INCH:

Note: 4" SwingMaster joints are in 316 stainless steel as standard.

Size inch	DIMENSION inch					flange tapped holes N	flange drilled holes O inch	flange bolt circle P.C.D.inch	lifting lug tapped holes E	Rotation Torque ft-lbf	Weight lb
	A	B	C	D	L						
4	17.6	7.087	-	9.0	11.61	4 x 5/8" UNC	4+ 8 x 5/8"dia	7.50	-	36	112
6	21.1	9.134	15.47	10.98	14.61	4 x 3/4" UNC	4+ 8 x 7/8"dia	9.50	4 x M10	43	145
8	25.9	11.06	18.98	13.5	17.68	4 x 3/4" UNC	4+ 8 x 7/8"dia	11.75	4 x M12	87	251
10	32.4	13.31	23.31	16.0	21.18	8 x 7/8" UNC	4+12 x 1"dia	14.25	4 x M16	108	418
12	39.6	16.42	27.83	19.0	25.67	8 x 7/8" UNC	4+12 x 1"dia	17.00	4 x M16	133	651
14	42.6	17.8	30.67	21.0	27.91	8 x 1" UNC	4+12 x 1½"dia	18.75	4 x M16	201	768
16	48.2	19.92	34.84	23.5	30.83	8 x 1" UNC	8+16 x 1½"dia	21.25	4 x M16	230	1089
18	54.2	22.44	39.21	25.0	34.69	8 x 1½" UNC	8+16 x 1¼"dia	22.75	4 x M20	259	1404
20	55.5	24.17	40.98	27.5	37.01	12 x 1½" UNC	8+20 x 1¼"dia	25.00	4 x M20	288	1844
24	67.5	28.15	48.39	32.0	42.91	12 x 1½" UNC	8+20 x 1½"dia	29.50	4 x M24	345	2730
26	76.1	29.88	52.09	30.9	45.79	16 x 3/4" UNC	12+20 x 7/8"dia.	29.31	2 x M24	361	2827
30	81.8	32.76	57.48	38.7	50.59	16 x 1¼" UNC	12+28 x 1½"dia	36.00	2 x M30	462	4277
32	87.6	34.96	62.99	41.8	54.17	16 x 1 1/3"UNC	12+28 x 1 5/8"dia	38.50	2 x M30	577	4840
36	101	38.74	70.08	41.6	59.57	28 x 7/8" UNC	16+44 x 1"dia	39.75	2 x M30	758	8078



# LEG BOOT

Revolutionary in design and performance, the Matrix Applied Technologies Leg Boot offers dramatic improvement over other standard leg seals and leg socks available today. And with an asset life expectancy four times that of leg socks, the Leg Boot is engineered to meet even the most restrictive regulatory requirements, eliminating emissions and offering protection against water, condensation, gas, and corrosion.

As the industry's only tool-less leg boot, installation and removal are also made quick and easy—typically managed by two people in under 10 minutes.

Best of all, with our most popular sizes already in-stock, there is no production lead time,

**Precision engineering, quality materials, and a simple yet secure leg pin guarantee an excellent seal and optimal support.**

**A HIGHER STANDARD IN PRODUCTS.**



## TANK INFORMATION REQUIRED

Tank Owner:	Location:	Date:
Tank Number:	Tank Ø:      ft	Tank Height:      ft
Product Stored:	Stored Product Temperature:      °F	
Leg Quantity:		

### Landing Leg

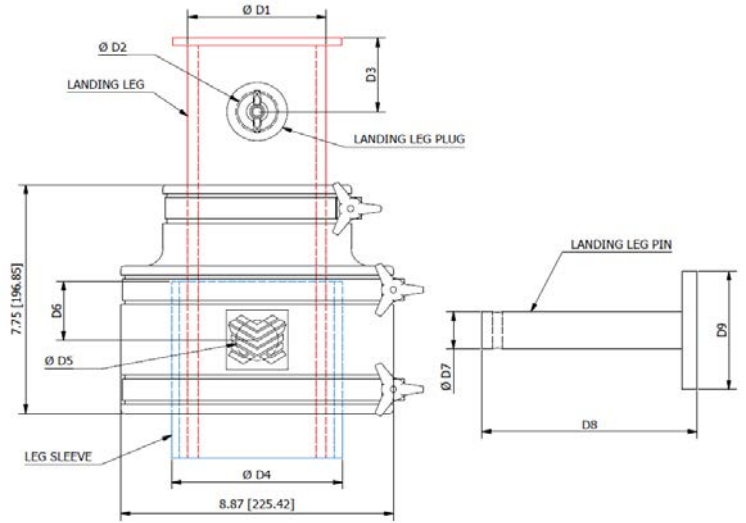
Outer Diameter (D1): -	in
Pin Hole Diameter (D2):	in
Hole Center to Leg Top (D3):	in

### Leg Sleeve

Outer Diameter (D4): -	in
Pin Hole Diameter (D5):	in
Hole Center to Sleeve Top (D6):	in

### Landing Leg Pin

Pin Diameter (D7):	in
Pin Length (D8):	in
Pin Arm Height (D9):	in



## OPTIONS

☐ Leg Plug

☐ Leg Pin

## COMMENTS

\*PLEASE PROVIDE ANY LEG AND SLEEVE TECHNICAL DRAWINGS THAT ARE AVAILABLE.