# Zap-Lok™

## Safe, Fast, Cost-Effective Connection Technology


Tuboscope | NOV Wellbore Technologies

# Zap-Lok™

## Unequaled weld-free integrity at lower costs

**For nearly 50 years, Zap-Lok's mechanical connection technology from Tuboscope has remained the global standard for safe, fast and cost-effective pipeline installation. As testimony to the unsurpassed reliability of Zap-Lok, not a single in-service connection-related failure has been recorded since its introduction.**

**With Zap-Lok, your connections, bare or internally coated, deliver unmatched strength and consistency. All this, at a fraction of the time, manpower requirements, risk and costs of welded pipe connections.**

Onshore, offshore, in all terrain, climatic conditions and configurations, Zap-Lok mechanical connection technology is the industry's leading solution to your most challenging applications:

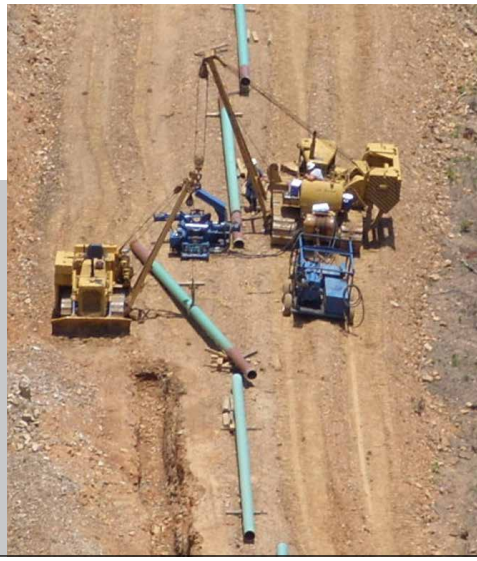
- Oil and Condensate Takeaway
- $CO_2$ and Water Flow Lines
- Corrosive Transmission and Disposal Pipe
- High-Pressure Pipelines
- Sour Gas Service

## The Zap-Lok edge

- Produces fully-rated pipelines from 2 in. to 12 in., up to Schedule 80, X–65–grade *(65,000 psi)*
- Delivers permanent, high-strength connections
- Minimizes in-field welding requirements
- Consistent quality of each connection reduces risk
- Exceeds production schedules
- Supports ASME B–31.4, B–31.3 and B–31.8 standards
- Slashes manpower, infrastructure requirements
- Cuts pipeline installation time, costs
- Reduces HSE footprint, welding-related risks

## Operating personnel

Each of our specially trained Zap-Lok operators must pass an annual re-certification.




### Man hours comparison

As shown on this comparison for a 10 ¾" connection, Zap-Lok reduces skilled man–hours by up to 90% with consistent connections regardless of the pipe schedule.

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# The perfect balance of reliability, speed and economy

As evident in zero reported failures during operation, you never have to sacrifice fast installation time and lower costs for reliability.

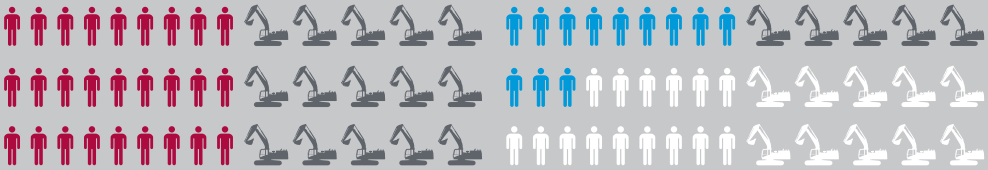
Zap-Lok helps exceed planned production schedules, and in the process, delivers a pipeline that is considerably safer than often-inconsistent welded connections. Quite simply, when it takes five days to install a line, rather than a month, the associated cost savings and reduced HSE exposure are obvious. Add in the comparatively smaller crews, as well as the reduced infrastructure and support facilities required, and the value of your asset rises appreciably, particularly in more remote locations.

The efficiencies and cost savings are especially pronounced offshore, where cutting time on location and the chartering of smaller support vessels can deliver a tremendous bounce to your bottom line. When Zap-Lok connections are externally coated before hand there is no need for a separate station dedicated for covering welded connections to protect them from the marine environment.

As an added bonus, with Zap-Lok you typically do not have to suspend operations during harsh climatic conditions, such as in areas with drought-induced burn bans.

## Installation footprint

Case history



| 8 inch Welded Construction | |
|---|---|
| Welding Crew | 20 people |
| Field Joint Coating Crew | 5 people |
| X-Ray Crew | 2 people |
| Total Pieces of Equipment on-site | 15 pieces |

| 8 inch Zap-Lok™ Construction | |
|---|---|
| Zap-Lok Installation Crew | 12 people |
| Total Pieces of Equipment on-site | 5 pieces |

## Consistent field manufacturing

Case history

| Pipe Diameter | | Pipeline Length *(ft.)* |
|---|---|---|
| Welding | 8 inch | 62,178 *(19 KM)* |
| Zap-Lok | 8 inch | 59,800 *(18.2 KM)* |

| Construction *(days)* | Average Per Day *(ft.)* |
|---|---|
| 15 | 4,144 *(1.3 KM)* |
| 7 | 8,543 *(2.6 KM)* |

# Fast, field-proven installations

**Onshore** – West Texas

The client's project consisted of an 80,000 ft., 6 in. flow line, which was to be installed during one of the extremely dry West Texas seasons. With a total Zap-Lok crew of six, the line was completed and installed, incident-free, in 6 ½ days.

### Speed breakdown

| | |
|---|---|
| **Per Joint** | 1 min. 55 sec. |
| **Avg. Per Joint** | 12,308 ft. / day |
| **Total Time** | 6 ½ days |

**Offshore** – Gulf of Mexico Shelf

The shallow-water project consisted of 28,518 ft. of 3 in. flow line. A Zap-Lok crew of five personnel completed the construction in less than four days, greatly reducing the high costs associated with offshore installation.

### Speed breakdown

| | |
|---|---|
| **Per Joint** | 2 min. 43 sec. |
| **Avg. Per Joint** | 7,605 ft. / day |
| **Total Time** | 3 ¾ days |

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# Our process facilitates safe, consistent connections

Welding is an art, with each pass relying on the skill and experience of the welder to maintain consistency and quality. Adjustments must be made to accommodate different pipe sizes, wall thickness and environmental conditions.

With Zap-Lok, you never have to ***reinvent the weld*** when moving from one connection to the next, or from one size or schedule of pipe to another. Whether you are dealing with 2 in. or 12 in., Schedule 40 or Schedule 80, or X–65–grade pipe, Zap-Lok delivers consistency on every connection.

In the field, the operator simply lines up each joint of pipe in the Tuboscope provided hydraulic press. Within seconds, the two ends are hydraulically pressed together, generating metal-to-metal friction and high compressive forces from the bell-end onto the pin-end. From there, the Zap-Lok press simply rolls to the next connection and repeats the process.

With each connection requiring about 3 min to complete, Zap-Lok delivers average construction rates from 5,000 to 6,000 ft./day *(1,524–1,829 m/day).*

The results are permanent connections that are up to 140% stronger than the specified minimum yield strength *(SMYS)* of the pipe, and compatible with internal inspection, pigging and cathodic protection. Further, the high-strength and flexibility of Zap-Lok connections are sustained during field bending and extended pull sections.

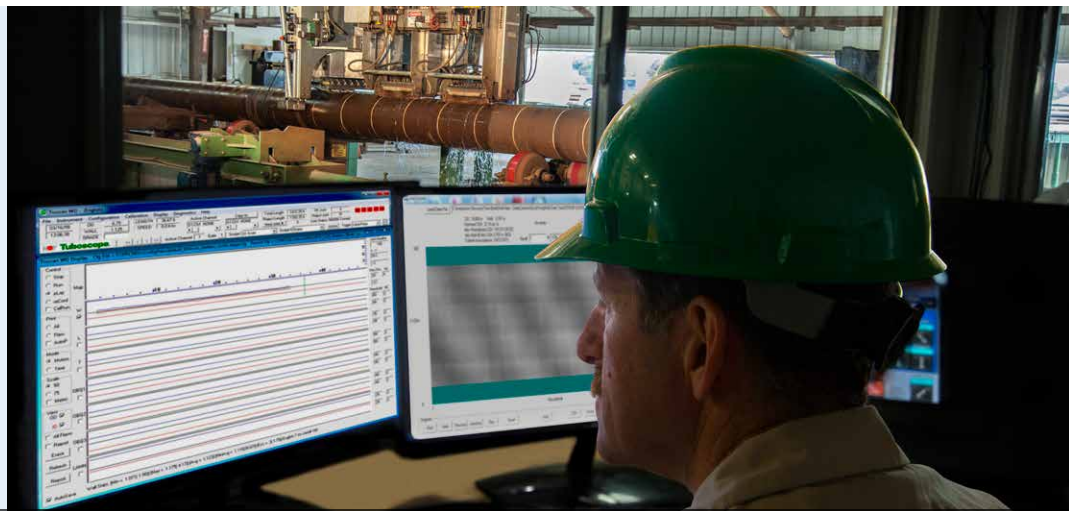
In keeping with our emphasis on QA, after each installation, the Tuboscope provided hydraulic press and the power unit undergo an extensive inspection and maintenance program before they are returned to the field for another pipe lay.

# Catching defects before they go to your location

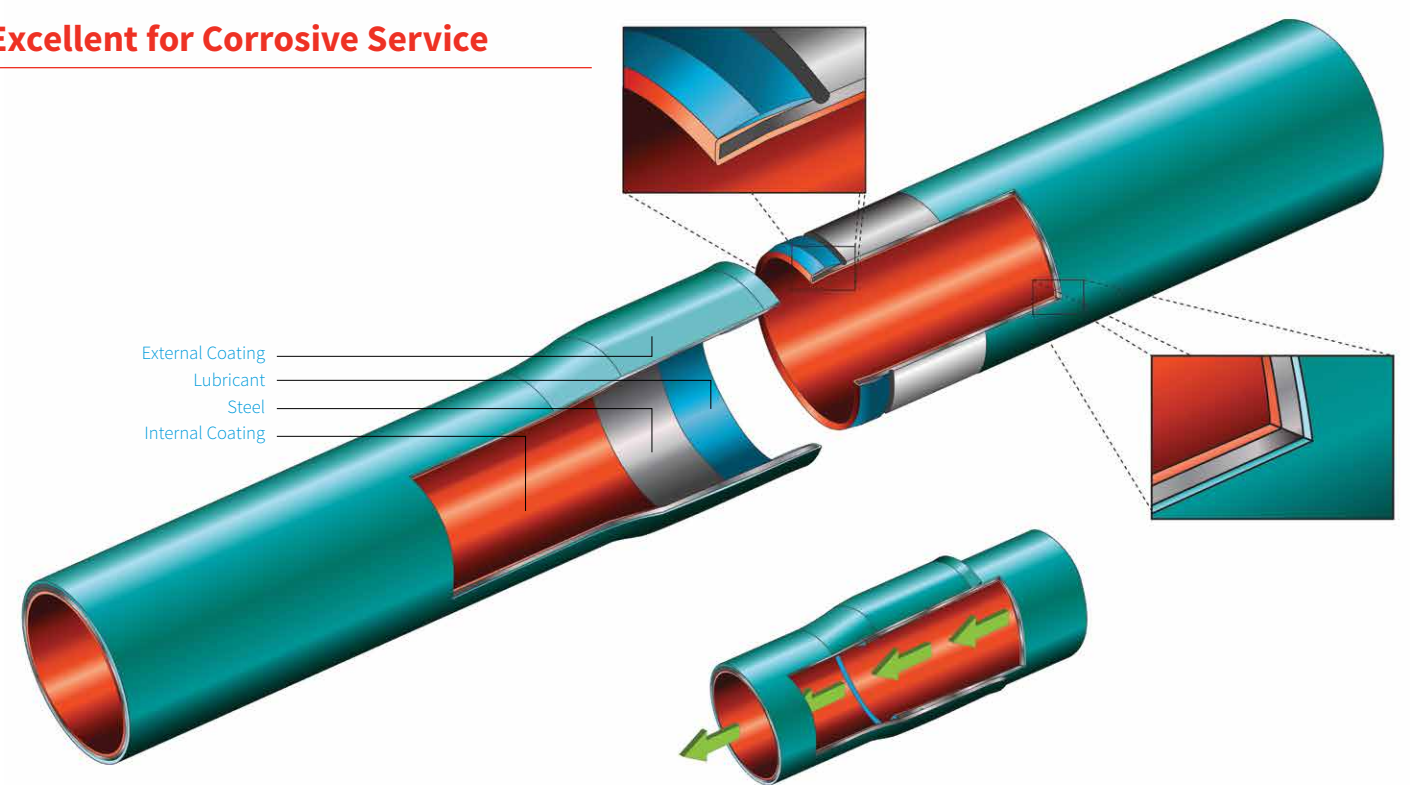
Our in-house Quality Assurance / Quality Control program helps ensure that every joint of pipe meets the demanding Zap-Lok specifications and is ready for field installation. We perform a thorough inspection of each connection to identify material defects or potential defects before the pipe leaves our facility.

**Complementing our extensive pre-job inspection program, at the clients request, Tuboscope also offers a comprehensive package of inspection services.**

- Ultrasonic *(UT)* Wall
- Ultrasonic *(UT)* Shearwave
- Magnetic Particle *(MPI)*
- Ring and Bevel



## Excellent for Corrosive Service




**Zap-Lok Line Pipe Cross-Section**

# Groundbreaking TK™-Coatings provide ultimate protection

With our industry leading line of Tube-Kote™ *(TK™)* internal coatings, Tuboscope sets the standard for preventing corrosion, wear and improving hydraulic efficiency. Before delivery to the field, Zap-Lok connections, as well as custom-fabricated elbows, T's and other pieces, are prepped and internally coated at our facility. Since no welding is required, there are no risks of burning off the internal coating and compromising the in-service integrity. For tie-ins and other accessories, Tuboscope manufactures a custom sleeve that isolates the area during welding to protect the internal coating.

Under our TK umbrella, internal coatings are specially designed to meet all operating conditions, including downhole temperatures with high $H_2S$ concentrations and temperatures up to 400°F *(204°C)*. All of our powder-applied epoxy novolac TK-Coatings include phenolic-based primers to enhance the ability of the coating to maintain adhesion to the steel substrate under the most corrosive and demanding environments.

The combination of Zap-Lok and Tube-Kote coatings provide you unrivaled efficiency and protection.

# The Tuboscope difference

The Zap-Lok mechanical connection technology is but one component in the comprehensive Tuboscope toolbox. For over 75 years, Tuboscope remains the industry leader for providing a comprehensive suite of value-added solutions that consistently improve performance and maximize the lifecyle of oilfield tubulars.

To learn more about how our Zap-Lok mechanical connection technology can optimize the safety and reduce the time and costs of your pipeline installations, contact your nearest Tuboscope representative.

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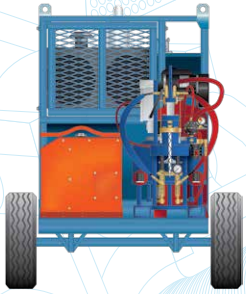
## 8000 All-In-One Hydraulic Power Unit *(HPU)*

*(Includes Generator and Epoxy Mixer)*

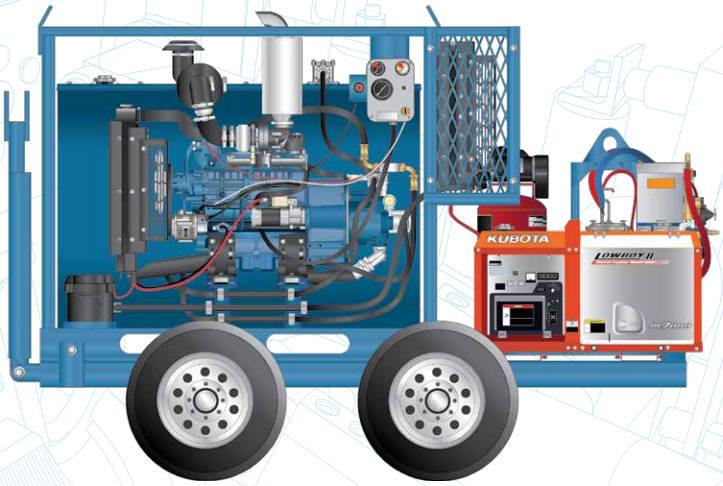
### System Specifications

| | |
|---|---|
| **Weight** | 7,800 lbs *(3.17515 kg)* |
| **Measurements** | |
| **Unit Length** | 135″ *(3.429 m)* |
| **Unit Height** | 85″ *(2.159 m)* |
| **Unit Width** | 33″ *(1.905 m)* |

End View



Side View




## 8000T All-In-One HPU

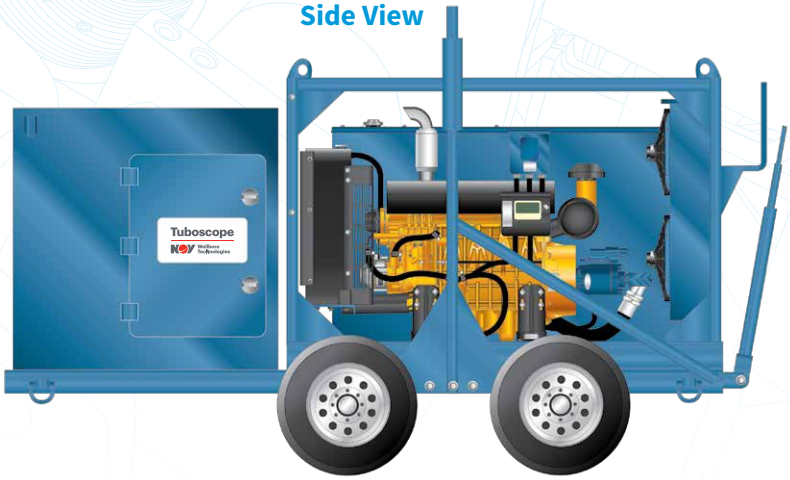
*(Includes Generator and Epoxy Mixer)*

### System Specifications

| | |
|---|---|
| **Weight** | 10,900 lbs *(4,944.16 kg)* |
| **Measurements** | |
| **Unit Length** | 166″ *(4.2164 m)* |
| **Unit Height** | 132″ *(3.3528 m)* |
| **Unit Width** | 94″ *(2.3876 m)* |

End View


Side View



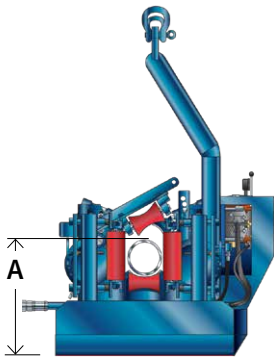

## Model 5500-T

*(For 2″–4″ Diameter)*

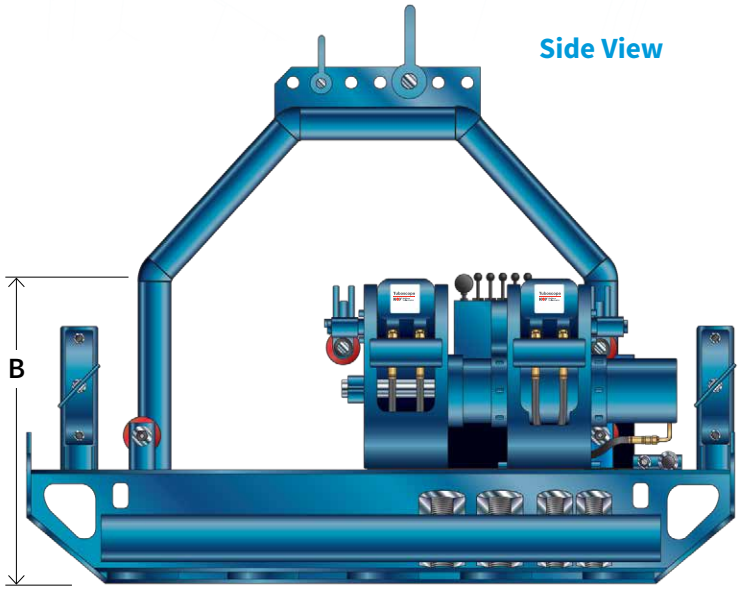
### System Specifications

| | |
|---|---|
| **Weight** | 3,000 lbs *(1.36078 kg)* |
| **Measurements — Closed Position** | |
| **Unit Length** | 77″ *(1.9558 m)* |
| **Unit Height** | 50″ *(1.2700 m)* |
| **Unit Width** | 64″ *(1.6256 m)* |
| **Unit Height** *(from pipe center)* “A” | 20″ *(0.508 m)* |
| **Measurements — Without Arm** | |
| **Unit Height** “B” | 39.25″ *(0.99695 m)* |

End View




Side View



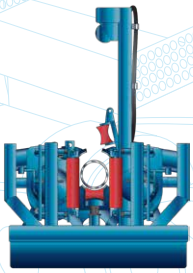
## Model 8000-Z

*(For 6"–8" Diameter)*

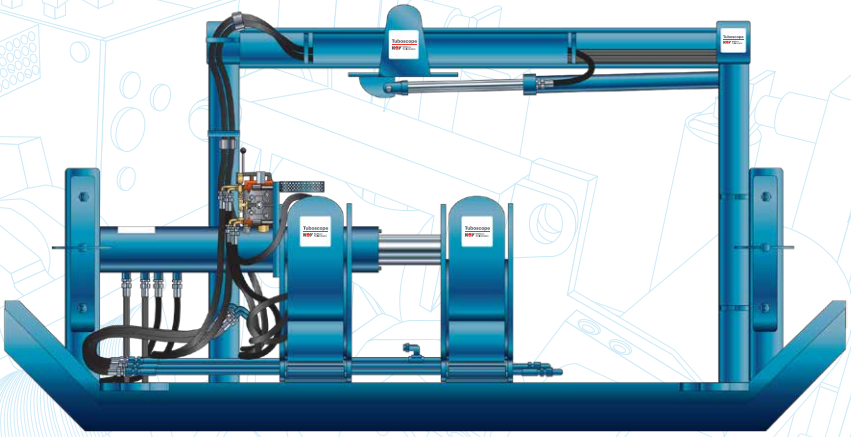
### System Specifications

| | |
|---|---|
| **Weight** | 7,800 lbs *(3.17515 kg)* |
| **Measurements** | |
| **Unit Length** | 135" *(3.429 m)* |
| **Unit Height** | 85" *(2.159 m)* |
| **Unit Width** | 33" *(1.905 m)* |

**End View**



**Side View**



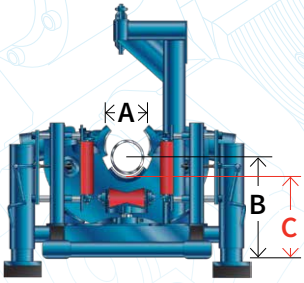
## Model 8000-12 T

*(For 8"–12" Diameter)*

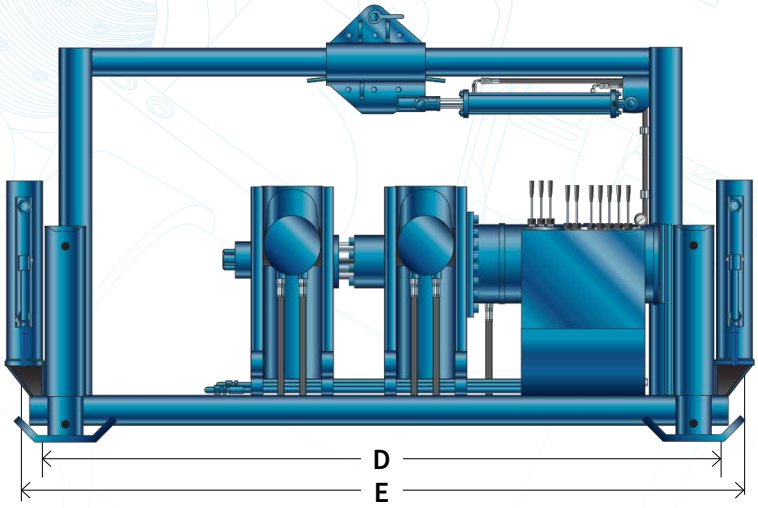
### System Specifications

| | |
|---|---|
| **Weight** | 19,000 lbs *(8.61826 kg)* |
| **Measurements** | |
| **Unit Total Length "E"** | 160" *(4.064 m)* |
| **Unit Frame Length "D"** | 152" *(3.8608 m)* |
| **Unit Height** | 85" *(2.159 m)* |
| **Unit Width** | 78" *(1.9812 m)* |
| **Pipe Slips "A"** | 12.75" *(0.32385 m)* |
| **Height "B"** | 28" *(0.7112 m)* |
| **Height "C"** | 21.625" *(0.549275 m)* |

**End View**




**Side View**



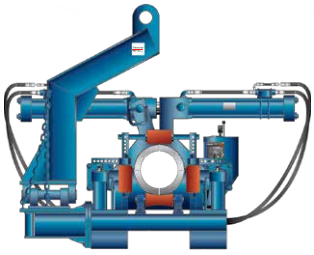

## Model 8000-12 Z

*(For 6"–12" Diameter)*

### System Specifications

| | |
|---|---|
| **Weight** | 10,700 lbs *(4.535924 kg)* |
| **Measurements — Closed Position** | |
| **Unit Length** | 132" *(3.3528 m)* |
| **Unit Height** | 93" *(2.3622 m)* |
| **Unit Width** | 84" *(2.1336 m)* |
| **Measurements — Open Position** | |
| **Unit Width** | 108" *(2.7432 m)* |

**End View** Closed Position



**Side View**




**End View** Open Position

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