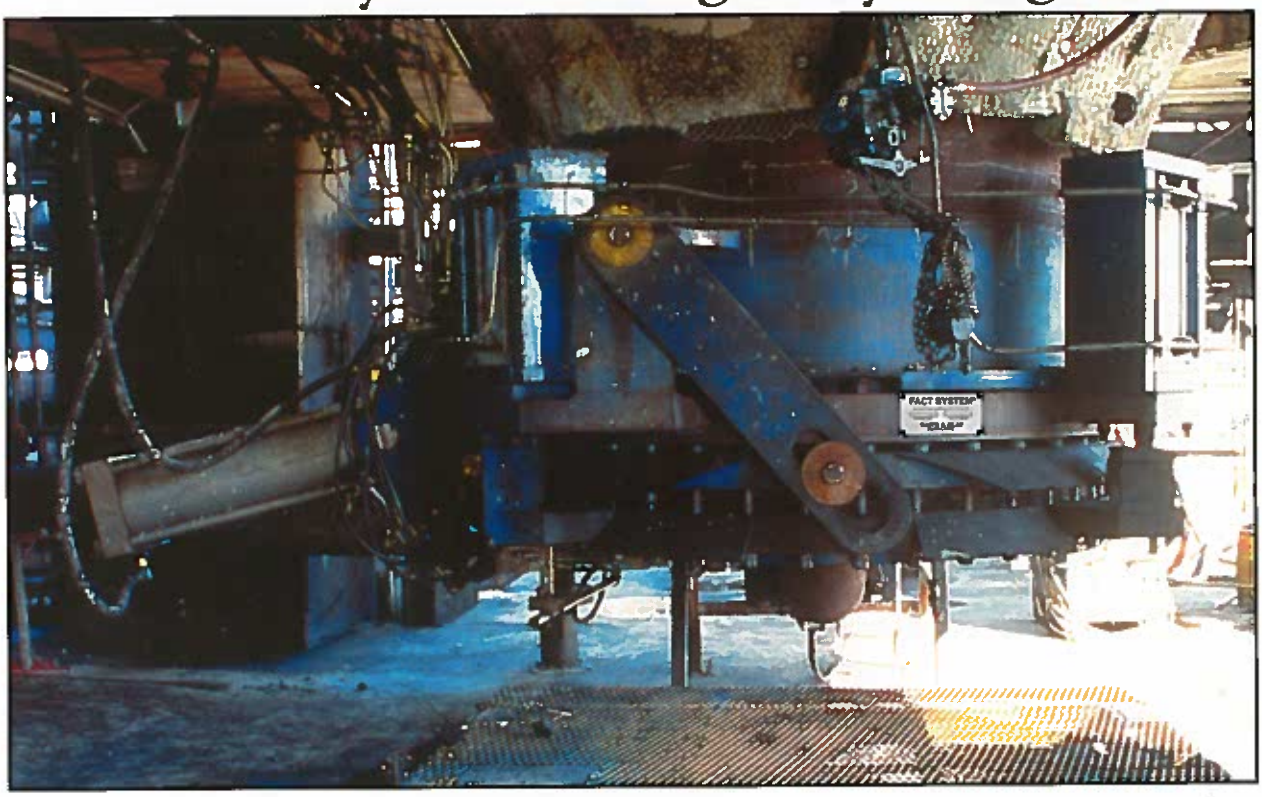
HAHN & CLAY

FACT System®

FACT System® Swing-Away Design

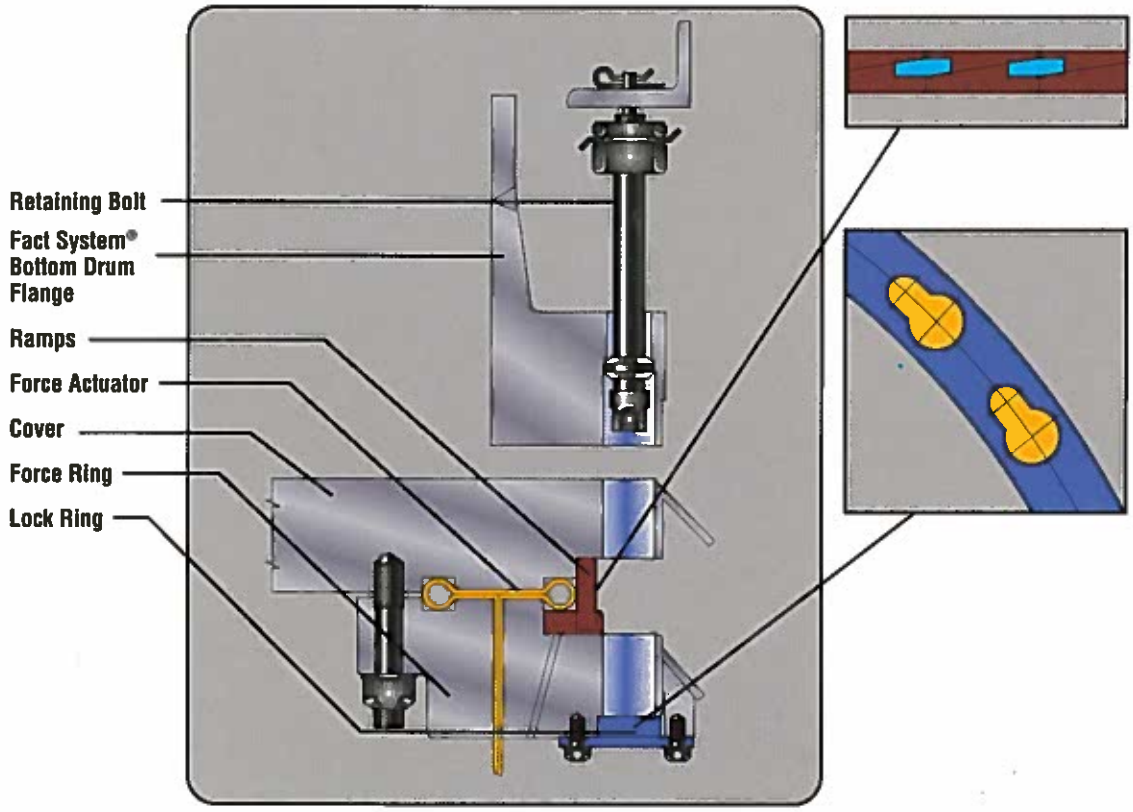


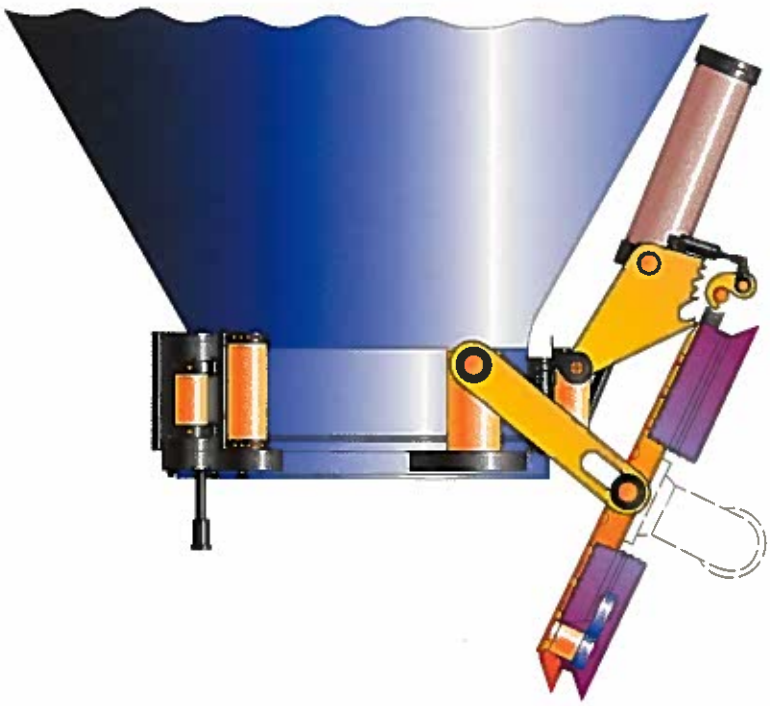
Introduction

Hahn & Clay FACT (Force Actuated Closure Technology) System® provides for the remote operation of vessel closures in hazardous environments. Developed by Hahn & Clay in 1987 and first installed in 1990, this technology frees plant operations personnel from a physically demanding or hazardous task, while significantly reducing the time required for closure opening and closing.

The FACT System® also offers vastly improved sealing technology and bolt torquing methods. By simultaneously tensioning all the bolts utilizing the patented force actuator, uniform loading is transmitted to the gasket. The resulting seal is mechanically locked in place by the patented ramp ring design. This technology brings closure sealing under operating conditions a quantum leap closer to ideal conditions.

Utilizing remotely removable bolting, the entire closure operation can now be accomplished from a control center located a safe distance from the operating unit. This greatly reduces the risk of operator exposure to the dangers of leaks, production processes and operating hazards.





FACT System® Standard Swing-Away Design

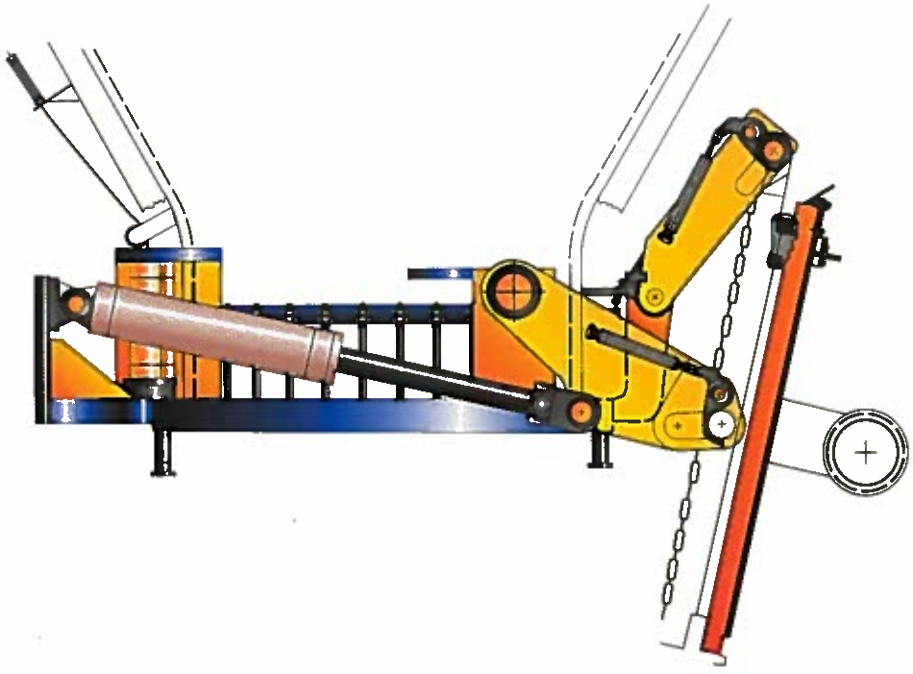
To Close The FACT System®:

- The lift cylinders raise the FACT System® to meet the bottom flange.
- The bolt ring cylinders lower the retaining bolts through the bottom flange cover, force ring, and lock ring.
- The lock ring is rotated to the closed position by the lock ring cylinders so the narrow portion of the keyhole engages the neck of the retaining bolt.
- The pressure source is connected to the force actuator.
- The force actuator is pressurized to 1400 psi. Pressurizing the force actuator causes it to expand, generating over 1,390,000 pounds of force. This force pushes the cover against the bottom drum flange, simultaneously and uniformly loading the gasket. At the same time the force ring is pushed away from the cover, placing all the retaining bolts in tension.
- By hydraulically rotating the ramp ring to the closed position the tension on the retaining bolts is locked into place through the engagement of the ramp segments.
- After closing the ramps the pressure is released from the force actuator and the system is ready for operation.

To Open The FACT System®:

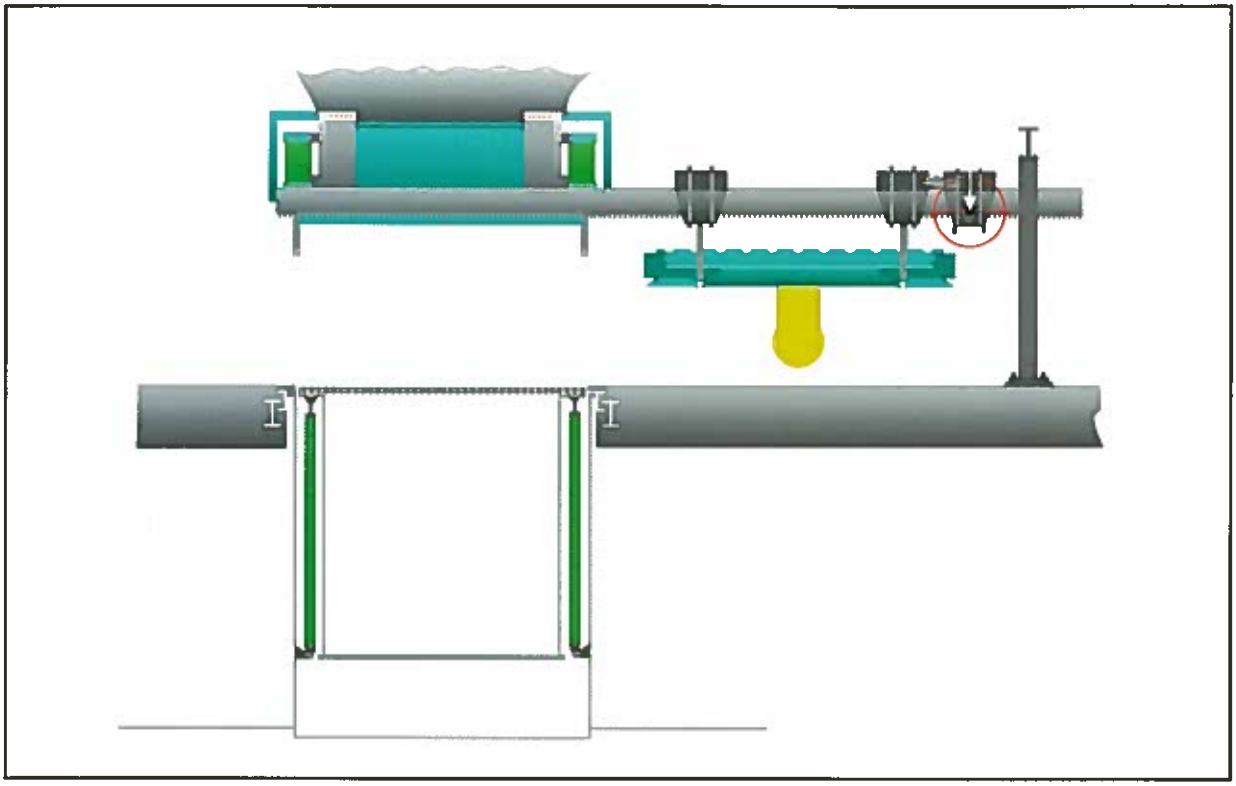
To open the FACT System® the procedure for closing is reversed:

- The force actuator is pressurized.
- The ramps are opened.
- The force actuator pressure is released.
- The lock ring is opened.
- The retaining bolts are raised.
- The FACT System® is lowered.



FACT System® Modified Swing-Away Design

FACT System® Transverse Design



Can be used for Bottom Unheading System or Top Unheading System.

Features

- Remote closure operation
- Improved closure seal
- One man requirement for operation
- Closure opening and closing time reduced by 80%

Benefits

- **SAFETY** - Personnel are isolated from hazardous operation
- **EFFICIENCY** - Reduced leakage benefits process throughput
- **COST SAVINGS** - Manpower requirements and cycle times are reduced

Hahn & Clay Offers Complete Automation Systems

FACT System®
(Bottom Deheading)

Standard Design

Swing-Away

Modified Swing-Away

Transverse Design

Automated Chutes

Automated Chute Covers

Automated Feed Lines

Water/Coke Containment Device

TACT System

Transverse Design Top Automated Closure

Automated Splash Shields

Automated Drilling Systems

Control Systems

Remote Control Panels

Camera Systems

Hydraulic Power Units

Services

Field Service

Complete Installation

Operation and Maintenance

TACT System

(Top Automated Coking Technology)