

# CLEANCUT Cuttings Collection and Transportation System



## APPLICATIONS

Offshore and onshore drilling projects where large amounts of oil-, synthetic- and water-base drill cuttings and drill solids must be collected, handled and stored prior to shipment for treatment.

## PROBLEMS

In vulnerable environments, under increasingly stringent regulations dictating zero or near-zero discharge of drill solids, and with increased concerns of personnel safety, operators have had to rethink the way in which cuttings contaminated with oil- and synthetic-base drilling fluids are handled.

## SOLUTIONS

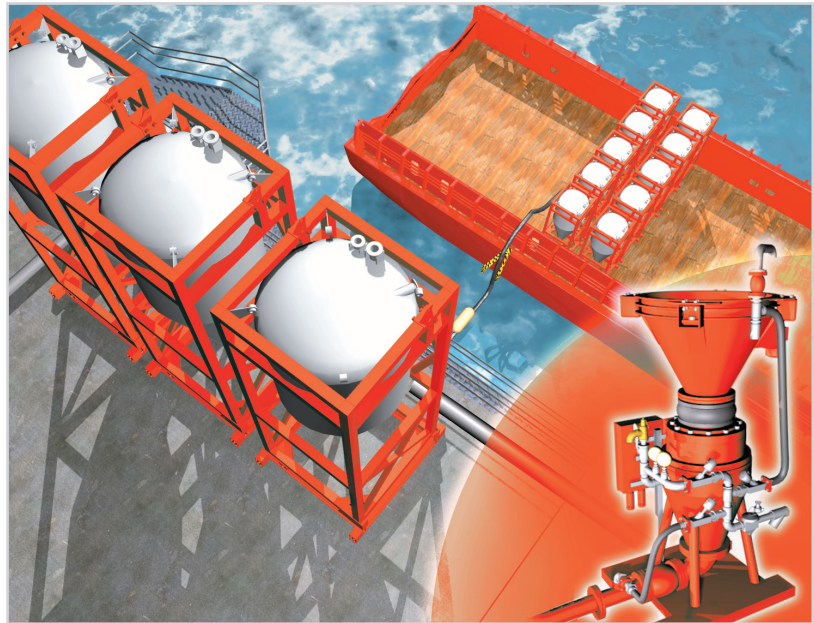
The CLEAN CUT\* process provides a complete field-proven method for containing, handling, temporarily storing and transporting drill cuttings within a *totally enclosed and protected environment*. Our experienced engineers and technical personnel ensure that you get the exact system you need.

## ECONOMICS

The CLEAN CUT system can handle cuttings generated at high ROP, reducing and even eliminating downtime caused by overloaded processing equipment. The flexible configuration can be engineered to fit rig layouts with small equipment footprints.

## ENVIRONMENTAL

The totally enclosed system design prevents exposure of personnel and the environment to contaminated wastes, even in extreme arctic and tropical conditions.



In addition to deeper water depths, complex logistics and hostile environments, offshore operators face another challenge — zero, or near-zero, discharge of drill solids. With increasing environmental regulations, operators have had to rethink the way in which cuttings contaminated with oil- and synthetic-base drilling fluids are handled.

## New thinking solves an old problem

It's not that other companies haven't tried to remediate the

cuttings disposal situation; they have. Skip-and-ship, slurrification and re-injection are just some of the methods devised for coping with this situation.

In contrast, the CLEAN CUT process is the comprehensive, economical solution that is borne of three decades of proven M-I SWACO materials handling and worldwide waste-management expertise. The result is a complete field-proven method that has secured our customer total reliability in several hundred wells and operations all over the world for containing,

## Features and Benefits

### Safety

- Crane lifts are minimized, improving offshore safety
- Conveying is fully enclosed and automated, with minimum involvement of personnel

### Ease of Use

- Flexible installation to suit rig layout with small equipment footprints
- The system can transfer raw cuttings at high rates
- Cuttings are pumped to the supply boat through a quick-connect flexible hose
- The ISO-PUMP unit is certified by DNV for shipping worldwide as a standard container

### Reliability

- Dense phase conveying technology, now proven in oilfield service, has been proven in three decades of tough service in a range of industries
- All equipment is built and certified to DNV standards

### Environmental Protection

- Totally enclosed system
- No addition to waste stream
- Can encompass the entire cuttings supply chain
- The first total solution from shaker to process plant

handling and transporting drill cuttings. By looking at the problem of cuttings disposal from the operator's perspective, we have developed a *totally enclosed system* for pneumatically blowing cuttings

from shaker to storage on the installation, to storage on the boat and then from boat to a receiving station onshore prior to processing. The hose can be supplied with a full-bore safety breakaway

coupling to reduce environmental exposure and eliminate any spills.

The increase in safety and reduction of environmental exposure is obvious to even the casual observer.

## How it works

The CLEANCUT system uses two main pieces of equipment:

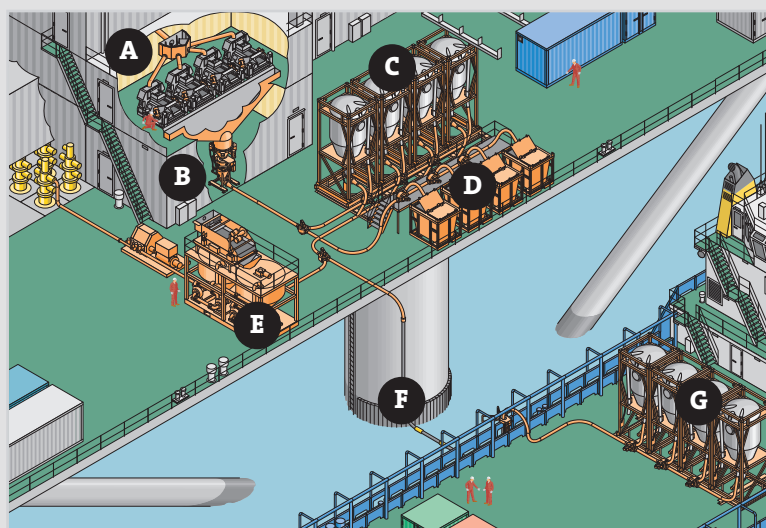
- The CLEANCUT Cuttings Blower (CCB\*) conveys cuttings from the shakers into the system
- The ISO-PUMP unit is a combination storage vessel and conveying device built within standard, 20-ft (6.1-m) ISO container dimensions. Because each pump is an independent conveying unit, a high degree of backup is integral to any multiple-unit installation.
- The ISO-PUMP component can also be transported fully laden with cuttings by road or rail to a discharge location

The CLEANCUT blower is the prime mover of cuttings, whether to ISO-PUMP units or directly to cuttings boxes, dryers, Waste Injection (WI) installations or other destinations. Cuttings feed into the CCB unit on a batch basis, controlled by timer or hopper-level probe. In operation, the unit is filled, sealed and pressurized; the outlet is opened, and positive air pressure conveys the material to its destination. The cycle is repeated as frequently as required to match the rate of cuttings production.

When introduced into the cuttings-handling system, ISO-PUMP units provide buffering for skip loading, WI, drilling operations

with controlled process rates, equipment downtimes or logistics issues related to cuttings disposal. Each ISO-PUMP unit can discharge its contents back into any of the processes from which it receives the cuttings.

Bulk transfer is the optimal solution for taking cuttings safely and reliably from shaker ditch to shore for recycling or disposal. ISO-PUMP units on the rig discharge directly to ISO-PUMP units on the supply vessel through a flexible hose. On return to harbor, the cuttings are discharged from the boat ISO-PUMP units to shore reception, which may be a thermal desorption plant or other recycling facility, or to land transport.



### A Shakers

Drill cuttings are discharged from the shakers into the CCB.

### B CCB

The CCB unit loads and discharges cuttings on a batch basis.

### C ISO-PUMP units

Drill cuttings are pumped from the CCB unit to the ISO-PUMP storage tanks,

each with a capacity of 95 bbl/530 ft<sup>3</sup>. Each ISO-PUMP unit stands on a weigh-frame to indicate load status. Special diverter valves are used to select the destination of the cuttings.

### D Skip-Loading Station

Cuttings boxes can be filled directly by the cuttings blower or by cuttings discharged from the ISO-PUMP units.

### E Cuttings Waste Injection Unit

A WI installation can be fed directly by the CCB unit. ISO-PUMP units serve as buffer storage for cuttings production above the injection rate and enable maintenance timeouts.

### F Transfer Hose

A flexible hose is used for bulk transfer of drill cuttings from the rig ISO-PUMP units to identical ISO-PUMP units mounted on the supply vessel. The hose can be supplied with a full-bore safety breakaway coupling to reduce environmental exposure and eliminate any spills.

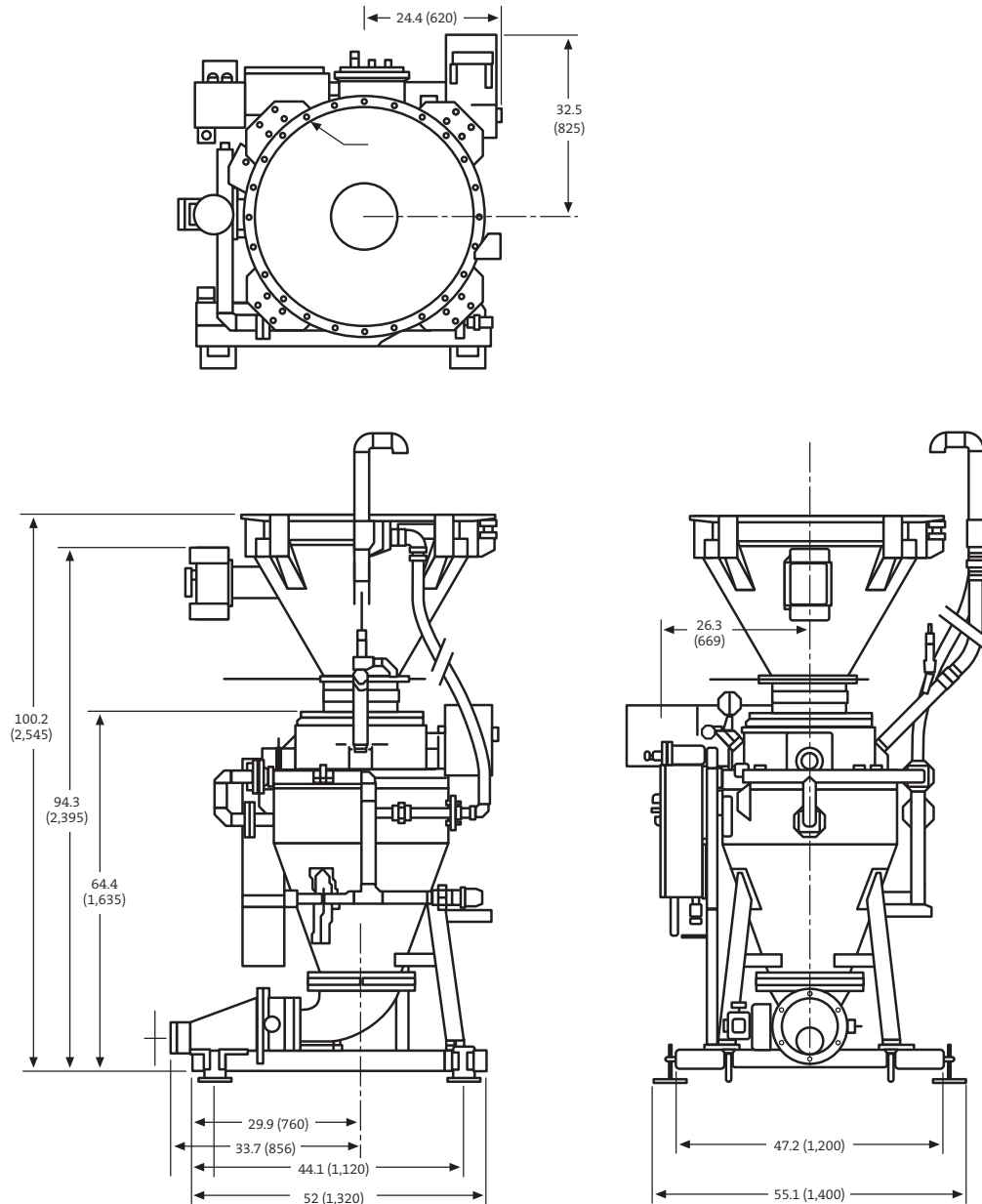
### G ISO-PUMP units on Supply Vessel

ISO-PUMP units are mounted vertically or horizontally on the supply vessel deck using a dedicated frame system. The supply vessel can be used to transport the cuttings to shore for disposal, or for offshore interfield transfer. The supply vessel can sail to a WI facility offshore, where a flexible hose is used to pneumatically convey the cuttings up to identical ISO-PUMP units on deck, prior to slurrication in the WI unit. Alternatively, the vessel returns to harbor and the cuttings are discharged in bulk through a hose into the shore reception facility, or lifted onto a truck and transported by road to a treatment facility.

# CLEANCUT Cuttings Collection and Transportation System

## ARRANGEMENT DRAWING: CLEAN CUT CUTTINGS BLOWER (CCB M8)

All dimensions are expressed in inches (millimeters).



### Specifications

- Weight 1.65 tons (1.5 tonnes) empty  
2.5 tons (2.3 tonnes) full
- Length 55.1 in. (1,400 mm)
- Width 52 in. (1,320 mm)
- Height 100.2 in. (2,545 mm), including feed hopper

### Working Volume

- 1.4 bbl/8 ft<sup>3</sup> (0.227 m<sup>3</sup>)

### Power

- 3-phase, 440V, 60 Hz, 10A supply

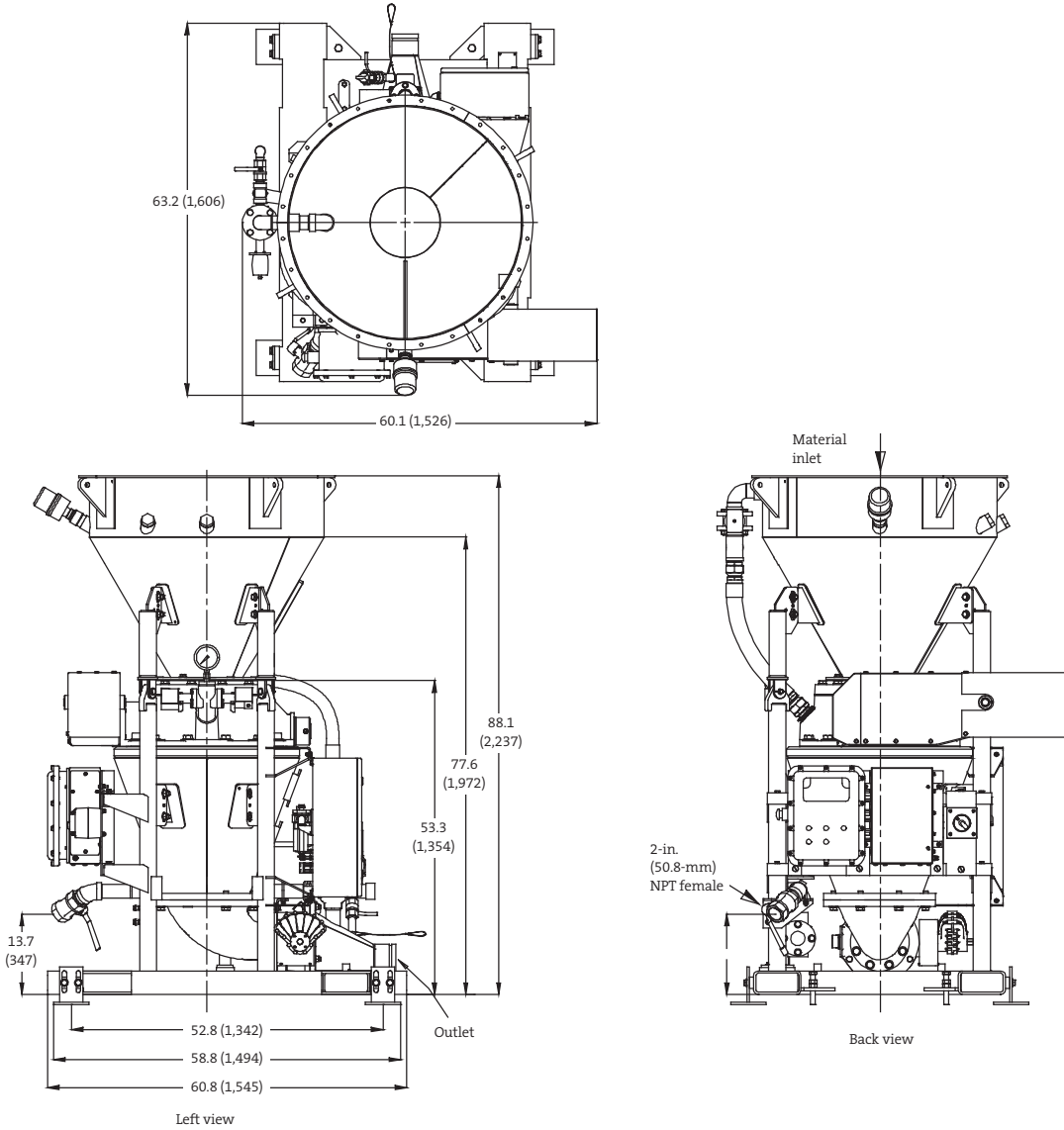
### Air Supply

- 116 psi 750 cfm (8 bar 21 m<sup>3</sup>/min)



**ARRANGEMENT DRAWING: CLEAN CUT CUTTINGS BLOWER (CCB M4)**

All dimensions are expressed in inches (millimeters).



**Specifications**

- Weight 2,835 lb (1,286 kg) empty  
4,158 lb (1,886 kg) full
- Length 55.1 in. (1,400 mm)
- Width 61.4 in. (1,560 mm)
- Height *Model 4:* 88.1 in. + 2 in. (2,237 mm + 50 mm) for jacking  
*Model 8:* 100.2 in. + 2 in. (2,545 mm + 50 mm) for jacking

**Working Volume**

- 0.75 bbl/4 ft<sup>3</sup> (0.12 m<sup>3</sup>)

**Power**

- Model 4:*
  - 1-phase, 110 to 220V, 50 to 60 Hz, 2A supply
- Model 8:*
  - 1-phase, 110 to 220 V, 50 to 60 Hz, 2A supply

**Air Supply**

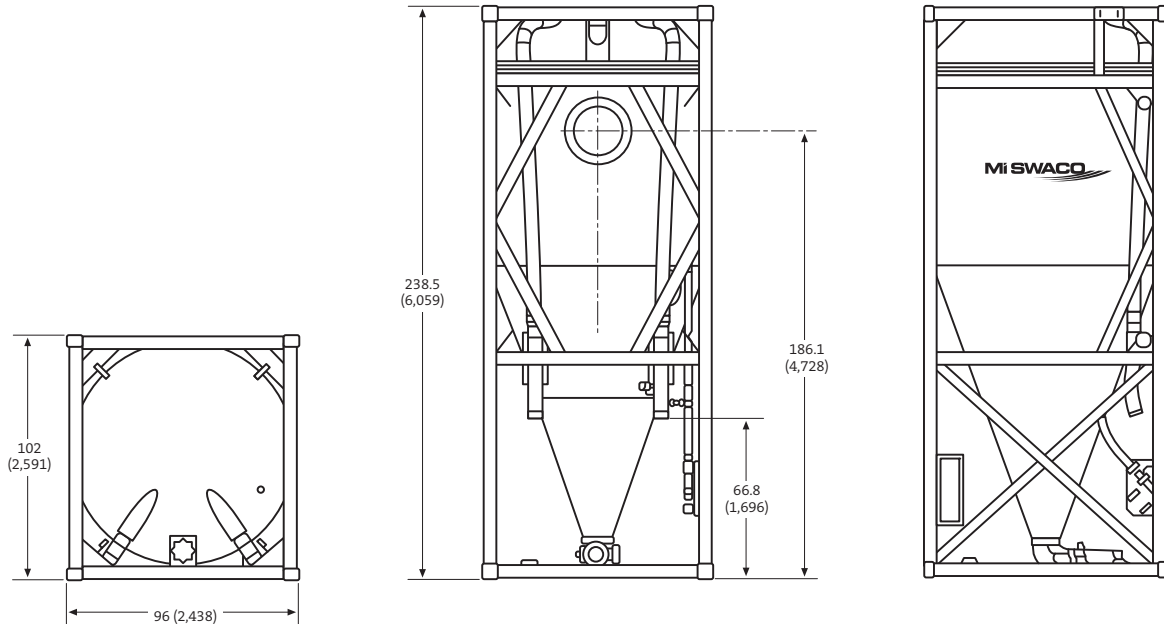
- Model 4:*
  - 500 cfm @ 116 to 150 psi (14 m<sup>3</sup>/min @ 8 to 10 bar)
- Model 8:*
  - 750 cfm @ 116 to 150 psi (21 m<sup>3</sup>/min @ 8 to 10 bar)



# CLEANCUT Cuttings Collection and Transportation System

## ARRANGEMENT DRAWING: CLEAN CUT ISO-PUMP

All dimensions are expressed in inches (millimeters).



### Specifications

- Weight 6.6 tons (6 tonnes) empty  
Up to 35.8 tons (32.5 tonnes) full
- Length 96 in. (2,438 mm)
- Width 102 in. (2,591 mm)
- Height 238.5 in. (6,059 mm)

### Working Volume

- Approx. 95 bbl/530 ft<sup>3</sup> (15 m<sup>3</sup>)

### Air Supply

- 116 psi 750 cfm (8 bar 21 m<sup>3</sup>/min)



## Success stories

### North Sea:

### CLEANCUT ISO-PUMP UNITS PROVIDE TEMPORARY MUD STORAGE; SAVE VALUABLE RIG TIME IN HEAVY SEAS

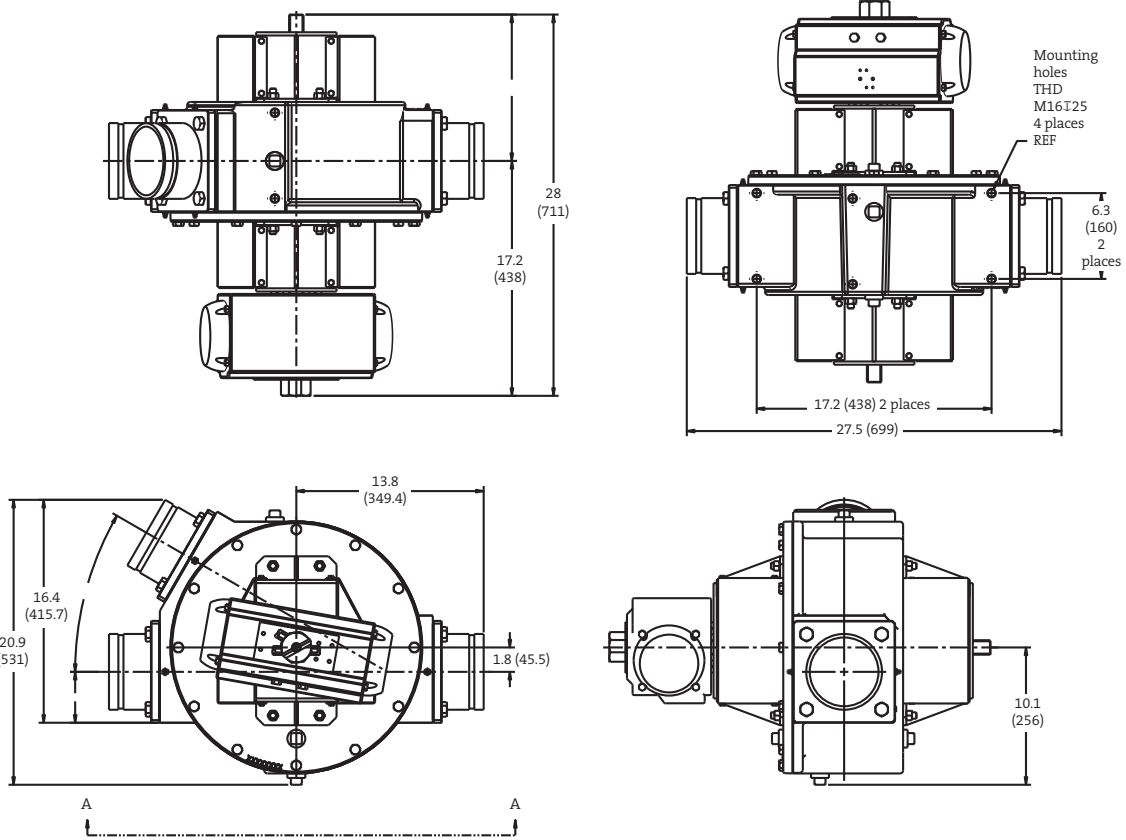
North Sea storms often prevented the Platform Supply Vessel (PSV) from sitting alongside this operator's rig for taking on spent mud and cuttings. The operator wanted a contingency plan for the bulk storage of fluids and interfaces while carrying out well displacements to and from oil-base mud, especially during bad weather.

M-I SWACO helped configure a system that would allow OBM to be transferred to the ISO-PUMP system for temporary storage prior to the well being displaced, and then pumped back to the pits.

- The operator could keep the extra fluid onboard during displacement and then continue drilling with no downtime.
- During bad weather, the ISO-PUMP units temporarily stored 642 bbl of oil-base mud. Without this extra capacity, there would have been insufficient mud on the rig for drilling to recommence.
- Over the first two wells, 1,782 bbl of oil-base mud were successfully stored within the ISO-PUMP units prior to being transferred to the PSV.
- In the completion phase of the second well, the rig was able to carry out the displacement of the well from OBM to brine without the PSV alongside the rig, as had been the case in previous wells.

**ARRANGEMENT DRAWING: CLEAN CUT R-VALVE**

All dimensions are expressed in inches (millimeters).



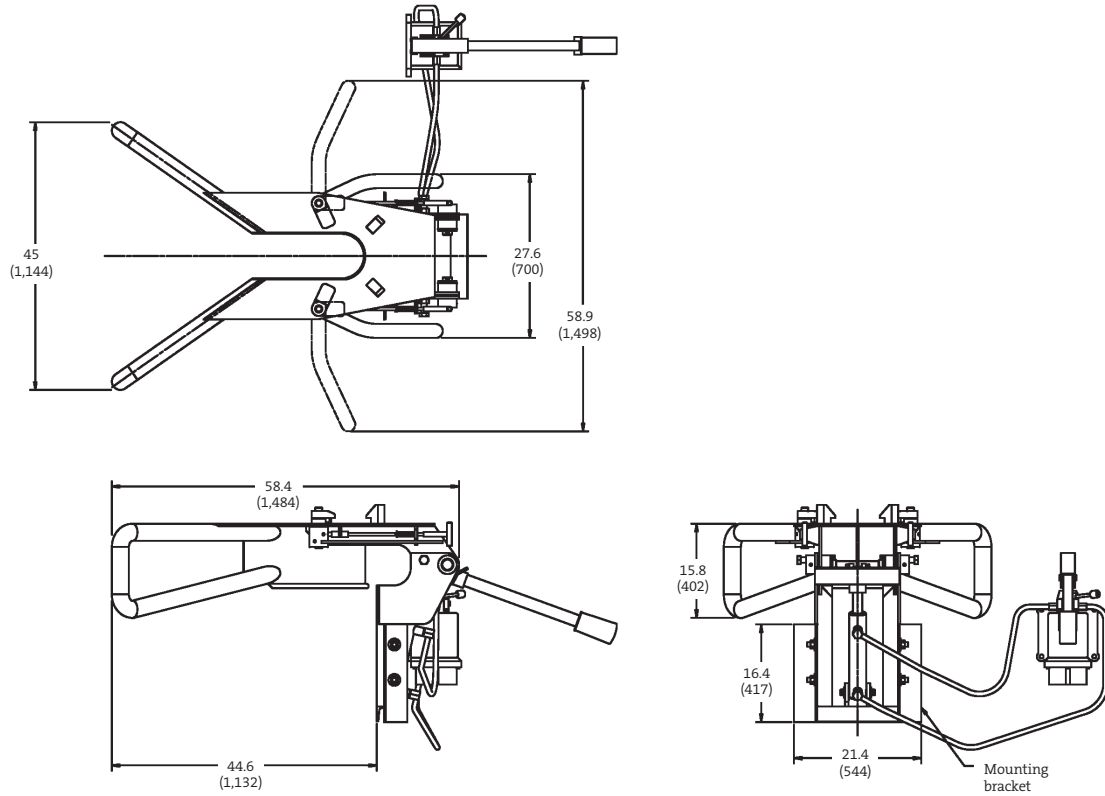
**Specifications**

- Weight 413.2 lb (187.4 kg)
- Length 27.5 in. (699 mm)
- Width 28 in. (711 mm)
- Height 20.9 in. (531 mm)
- Control Air Pressure 6.0 bar

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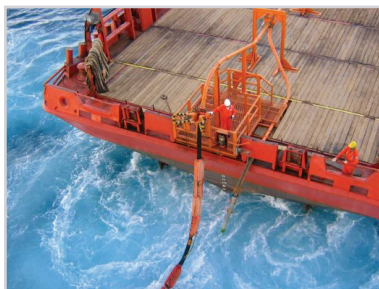
## ARRANGEMENT DRAWING: CLEANCUT TILT TABLE

All dimensions are expressed in inches (millimeters).

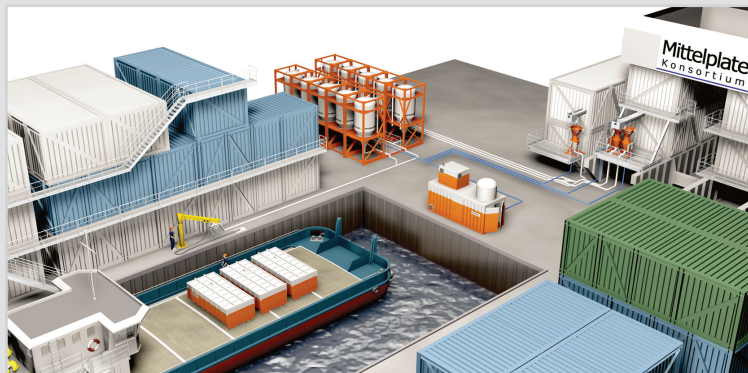


### Specifications

- Weight 407.9 lb (185 kg)
- Length 58.4 in. (1,484 mm)
- Width 58.9 in. (1,498 mm)
- Height 36.5 in. (926 mm)



### CLEANCUT key performance indicators since 2000



- 732 well sections handled
- 1.054 million barrels of cuttings collected
- 3.327 million feet of hole drilled
- 85,000 operating hours
- 99.79% uptime on CLEAN CUT equipment

