

# Atlas Copco RD20III



## OIL & GAS PROPOSAL/ SPECIFICATIONS PACKAGE

# RD20III

OIL & GAS

## PROPOSAL/ SPECIFICATIONS PACKAGE

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## STANDARD EQUIPMENT

### General

The RD20III is a unique deephole drilling rig designed for applications in the 120,000 lb. (54,446 kg) range.

The heart of the RD20III is the patented carriage feed system. This feed system, plus the derrick structure, provide several customer advantages that previously have not been available on machines in this class.

The two main benefits the RD20III offers the customer are: 1) the RD20III provides an actual 120,000 lb. / 54,446 kg pullback capability, and 2) the RD20III boasts a derrick with clearances under the spindle to handle Range III casing with handling tools.

The carriage feed system eliminates the traveling block and crown sheaves found on competitive machines. On the RD20III, the feed carriage structure is raised and lowered by two cylinders inside the derrick. The carriage carries both pullback and pulldown sheaves so that a single wrap of cable over the sheaves provides the normal two-to-one travel ratio between the rotary head and the feed cylinder stroke. This single wrap of cable on the sheave provides a gain in mechanical efficiency that was unobtainable with traveling blocks and crown sheaves on conventional machines.

An additional gain in mechanical efficiency and safety is achieved by being able to increase the sheave diameter / cable diameter ratio to so that the mechanical losses due to cable bending

and flexing over the sheaves are virtually eliminated. With larger diameter sheaves, the RD20III is able to incorporate anti-friction roller bearings, which provide higher mechanical efficiency and longer feed system life.

Whereas competitive rigs require a longer, larger derrick to support 120,000 lb. / 54,446 kg of pullback, the RD20III is designed with no fixed crown on the derrick, and carriage feed cables anchored in the derrick so that only the lower half of the derrick experiences any pulldown or pullback loads. This feature allows the upper half of the derrick and crown to be substantially reduced structurally, minimizing weight and material in the derrick and on the drill rig. During most drilling functions, the RD20III derrick structure is actually operating in tension rather than in compression as seen when pulling heavy loads in a conventional derrick design.

The carriage feed system in the RD20III provides an overall efficiency in the high-90% range. This is a significant improvement over the 80-85% efficiency seen on most competitive machines. Coupled with efficiency gains, Atlas Copco has simplified the machine by eliminating several major working components and increasing the service life expectancy of primary components currently in the carriage feed system.

### Derrick

#### **Dimensions**

**Length:** 61 ft. 11-1/2 in. ( 18.88 m)

**Width:** 48-1/2 in. (1231.9 mm)

**Depth:** 41 in. (1041.4 mm)

**Top of Table to Spindle:** 51 ft. 6 in. ( 15.70 m)

**Table to Ground (rig sitting on tires):** 44 in. (1117.6 mm)

**Table to Ground (jacks fully extended):** 92 in. (2336.8 mm)

### Derrick Raising Cylinders

Two 6 in. (152 mm) bore x 52-1/2 in. (1334 mm) stroke hydraulic cylinders for raising and lowering of derrick.

## Patented Carriage Feed System

The rotary head is pulled up and down by two hydraulic cylinders, heavy-duty cables and a carriage assembly. Manually engaged regen is standard equipment.

**Hydraulic Cylinders:** 5-3/4 in. ( 146 mm) bore x 288 in. ( 7,315 mm) stroke

**Pulldown:** 30,000 lb. (13,608 kg)

**Pullback:** 120,000 lb. ( 54,446 kg)

**Fast Feed Up (regen. on):** 106 ft/min. (32.29 m/min.)

**Fast Feed Up (regen. off):** 72 ft/min. ( 21.9 m/min.)

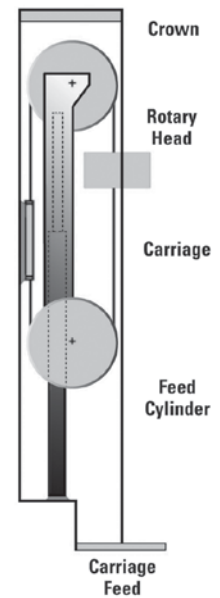
**Fast Feed Down:** 180 ft/min. (54.9 m/min.)

**Drill Feed Rate:** 29 ft/min. ( 8.8 m/min.)

**Pullback Cable:** 1-1/4 in. ( 32 mm) cable

**Pulldown Cable:** 7/8 in. (22 mm) cable

**Carriage Sheaves:** 32 in. (813 mm) dia. lightweight, high strength Nylatron



## Centralizer Table

The unique RD20III centralizer table folds up as the derrick is lowered for travel and is lowered as the derrick is raised for drilling. The centralizer table has two manually operated stabilizer jacks that provide easy leveling and excellent load support. The table has removable pins that allow it to be opened for casing and drill tool handling.

The centralizer features a master bushing similar to an API 17-1/2 in. ( 445 mm) rotary table. The bushing and adapters are removable to gain a 25-1/2 in. ( 648 mm) maximum opening which easily handles a 20 in. ( 508 mm) casing. The drilling platform provides a safe, convenient work area with good, clear access.

## Breakout Wrench

**Type:** Hydraulically powered, self-adjusting

**Rating:** 20,000 ft-lb. (27,120 N-m) torque with torque gauge in console

## Drill Pipe Changer

The hydraulically powered pipe changer holds one 4-1/2 in. (114 mm) drill pipe and one 5-1/2 in. (140 mm) drill collar. The loader is set up to handle 30 ft. (9.14 m) long drill pipe or drill collars.

## Casing Hoist

**Lifting Capacity:** 7,500 lb. ( 3,402 kg) maximum

**Line Speed:** 106 ft/min. (32.3 m/min.) maximum

## Jib Boom and Hoist

**Type:** Hydraulic drum hoist

**Maximum Lifting Capacity:** 4,000 lb. (1,814 kg) bare drum

**Maximum Line Speed:** 225 ft/min. (68.6 m/min.) bare drum

## Rotation

**Model:** 4SF-2-12 spur gear head

**RPM:** 0 to 120

**Torque:** 8,000 ft-lb. (10,848 N-m) maximum

**Swivel:** 3 in. (76-mm) swivel with chevron packing

**Piping:** Circulation piping rated at 1,500 psi (10.3 MPa) working pressure. 3 in. (76 mm) manifold provided for auxiliary compressor and booster connection. Remotely operated main air valve and blowdown valves.

## Power Pack

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The engine, compressor, and hydraulic pumps are mounted on a “floating” power pack. The frame, which is independent from the chassis mainframe, allows the power pack to float, assuring proper alignment of power components.

## Deck Engine

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**Standard:** Cummins QSK-19C

**HP/RPM:** 755 hp / 563 kw @ 1,800 RPM

**Engine Cooling Package:** Rated @ 125°F (52°C) ambient at sea level

**Air Cleaners:** 2-stage, dry type

**Exhaust System:** Silenced and insulated for safety and reduced noise levels

## Compressor

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**Make:** Ingersoll-Rand

**Model:** HR2.5 screw

**Volume:** 1,250 CFM (35.4 m<sup>3</sup>/min.)

**Pressure Range:** 120 psi to 350 psi (827 kPa to 2,413 kPa)

**Operational RPM:** 1,800

**Power Source:** Driven by QSK-19C engine

## Hydraulics

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### Hydraulic Oil Reservoir

**Capacity:** 100 gallons (378.5 L)

**Filtration:** Hydraulic oil filtered to 10-micron

**Pumps:** Mounted on a 4-hole pump-drive gearbox

Engine input at 1,800 RPM increased to 2,490 RPM by pump drive

### Main Piston Pumps (2)

**Output:** 48.5 GPM (183.5 L/min.) each or 97 GPM (367 L/min.) total at 5,000 psi (34.5 MPa) @ 2,490 RPM

**Functions:** Rotary head rotation and fast feed system

### Vane Pump (2-stage)

**Stage 1:** 52.2 GPM (197.6 L/min.) at 1,000 psi to 3,000 psi (6.9 MPa to 20.7 MPa) @ 2,490 RPM

**Function:** Cooler fan

**Stage 2:** 30.3 GPM (114.6 L/min.) at 3,000 psi (20.7 MPa) @ 2,490 RPM

**Function:** Supply 11-spool hydraulic valve to operate:

Leveling jacks	Water injection	Drill string blowdown and regulation
Casing hoist	Pipe changer	Bypass derrick raising cylinder
B/O wrench	Rotation	

### Piston Pump

**Output:** 12.5 GPM (47 L/min.) at 5,000 psi (34.5 MPa) @ 2,490 RPM

**Function:** Drilling feed circuit

### Auxiliary Pump

**Output:** 34 GPM (128.7 L/min.) at 2,500 psi (17.2 MPa) @ 1,980 RPM

**Function:** 2-spool valve supply to operate drum hoist and jib boom

## Cooling Package

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Single side-by-side radiator, hydraulic oil, and compressor oil coolers are mounted on the RD20III and are powered by a hydraulic motor. The cooler package has a 125°F (52°C) ambient rating at sea level.

**Fan Drive:** Hydraulic motor, two speed settings

**Fan Type:** Suction

## Charge Air Cooling

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Turbo Charge Air Cooler installation on drill end of powerpack base, sucks air from the drill end and blows towards the front of the drill, cooling turbo air for EPA Tier 2 Engine requirements.

## Leveling Jacks

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The RD20III utilizes a 7-point leveling system, including five 48 in. (1219 mm) stroke hydraulic leveling jacks and two manually operated stabilizer jacks mounted on the centralizer table.

**One Each:** 4-1/4 in. (108 mm) bore x 48 in. (1219 mm) stroke with 18 in. (457 mm) OD pad located on the front bumper

**Two Each:** 4-1/4 in. / 108 mm bore x 48 in. / 1,219 mm stroke with 18 in. / 457 mm OD pad located behind the front wheels

**Two Each:** 5 in. (127 mm) bore x 48 in. (1219 mm) stroke with 18 in. (457 mm) OD pads located at the drilling end of the unit

**Two Each:** Manually operated stabilization jacks with 18 in. (457 mm) pads mounted on the centralizer table

## Operator Console

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A lockable, aluminum cover protects the operator console from vandals.

## Night Lights

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**Three 70-Watt:** Derrick illumination, centralizer, pipe loader

**One 70-Watt:** Jib boom and single pipe loader controls

**One 70-Watt:** Power pack

**One 70-Watt:** Control console

**One 70-Watt:** Carousel Top

## Tool Cabinet

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**Dimensions Width:** 20 in. (508 mm)

**Height:** 42 in. (1067 mm)

**Depth:** 16-1/2 in. (419 mm)

## Weights and Dimensions

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**Height Derrick Down:** 13 ft. 10 in. (5.76 m)

**Height Derrick Up:** 62 ft. 6 in. (19.05 m)

**Width:** 8 ft. 4 in. (2.51 m)

**Weight:** ≈ 88,000 lb. (40,000 kg) less tooling

## Standard Tools

For 4 1/2 in. (114 mm) OD drill pipe with 2 1/8 (54 mm) IF threads:

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|--|---|
| <ul style="list-style-type: none"> <li>1 - Centralizer Bushing Pipe<br/>[ 5-1/2 in. (139.7 mm) OD Drill ] <b>56963465</b></li> <li>1 - Split Bushing, 4-1/2 in. (114 mm)<br/>change pipe <b>56963473</b></li> <li>1 - Clamp, Rod Locking <b>50248194</b></li> <li>1 - Element — main hydraulic filter <b>54448014</b></li> <li>2 - Element — KF3 filter <b>57336406</b></li> <li>4 - Element — oil filter <b>36860336</b></li> </ul> | <ul style="list-style-type: none"> <li>1 - Fork Chuck, 3.5 flats, 14.5 diameter <b>56963457</b></li> <li>1 - Lifting Bail — 2-7/8 (73 mm) IF <b>52162450</b></li> <li>1 - Adjustable Wrench <b>52230786</b></li> <li>1 - Locking Pin <b>50219955</b></li> <li>1 - Washtube Wrench Kit <b>57400202</b></li> <li>3 - Maintenance/Operation Manuals</li> <li>3 - Parts Books</li> <li>3 - Parts Books on CD</li> </ul> |
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## OPTIONAL EQUIPMENT

### **Deck Engine**

**Make:** Caterpillar

**Model:** C-27, 800 hp (597 kW) @ 1,800 RPM

**Engine Cooling Package:** Rated at 125°F (52°C) ambient at sea level

**Air Cleaners:** 2-stage, dry type

**Exhaust System:** Silenced and insulated for safety and reduced noise levels

### **Deck Engine Disconnect**

**Make:** Atlas Copco

**Description:** Located between the deck engine and compressor. Manually disengages the compressor from the power train. (Available on Cummins engine only.)

### **Hydraulic Table Jacks**

Optional Hydraulic Table Jacks provide foot pads mounted to cylinders with 8 in. (203 mm) stroke to hydraulically support the working table.

### **Collar Handling Package**

The drill-collar handling package includes the following items:

- Drill-collar centralizer bushing
- Fork chuck for drill-collars
- Drill-collar handling tool

### **Drill Pipe Carousel\***

The carousel holds seven pieces of 4-1/2 in. (114 mm) OD x 30 ft. (9.14 m) long drill pipe.

*\* The carousel is mounted outside the derrick and is hydraulically positioned under the tophead for drill pipe loading. A special carousel holding five drill pipe and one collar is also available. Rig cannot be transported with pipe in the carousel.*

### **Water Injection**

**Cat Pump:** Three cylinder

**Capacity:** 0 to 25 GPM (95 L/min.)

**Pressure:** 550 psi (3,792 kPa) maximum (With or without foam injection pulse pump.)

**FMC Pump:** Three cylinder

**Capacity:** 0 to 20 GPM (75.7 L/min.)

**Pressure:** 1,000 psi (6,895 kPa) maximum

### **Step and Storage Area**

This option replaces the small capacity (95 gallon) fuel tank under the cooler.

### **Mud Manifold**

Provides support for an off-board mud pump when no on-board mud pump is supplied.

**Piping:** 3 in. (76.2 mm)

**Capacity:** 1500 psi (10,342 kPa)

### **DHD Lubrication**

Injection lubrication with 60-gallon (227 L) container.

**Type:** Positive displacement pump

**Feed:** Manually adjustable with 3 settings



## Carrier

The RD20III is mounted on a custom-built carrier specifically designed for Atlas Copco.

**Wheelbase:** 281 in. (7137 mm)

**GVWR:** 113,000 lb. (51,364 kg)

**Front:** 44,000 lb. (19,958 kg)

**Rear:** 69,000 lb. (31,364 kg)

**Engine:** CAT C13 380 HP (283kw) w/Jacobs exhaust brake

**Clutch:** 15-1/2 in. (393.7 mm) multi-plate

**Electrical System:** 12-volt Delco-Remy, negative ground

**Transmission:** Fuller RTO-14908LL, 10-speed forward, 3-reverse

**Front Axles:** 22,000 lb. (9,979 kg) capacity each axle. Two steering axles with 44,000 lb. (19,958 kg) total capacity.

**Front Springs:** 44,000 lb. (19,958 kg) capacity leaf type

**Rear Axles:** Eaton DP-451P (46,000 lb. ( 20,865 kg)

**Tandem Suspension:** Hendrickson R-450

**Brake System:** Air 8 wheel, 16-1/2 in. (419 mm) x 6-in. (152 mm) front axles

16-1/2 in. (419 mm) x 7 in. (178 mm) rear axles

Eaton 4-channel ABS

18.7 cubic feet (5295 mm<sup>3</sup>) air compressor

Service Brakes—Dual air brake system on all wheels

Parking Brakes—Spring-loaded brake chambers on rear axles controlled by hand valve

**Drive Lines:** Spicer series 1710 and 1810

**Steering:** Dual TRW TAS-85 integral power steering with booster cylinder on second axle

**Frame:** 16 in. (406 mm) x 57 lb/ft. (84.8 kg/m) wide flange H-Beam with additional steel reinforcement package.

**Fuel Tank:** 60-gallon (227.1 L) capacity

**Exhaust:** Opposite cab side, front up

**Cab:** One man, offset to left, reverse-slope windshield, 32 in. (813 mm) wide

## Standard Carrier Accessories

Air horn

Dual head lights

I.C.C. highway marker lights

Combination brake, turn, and tail lights

Direction lights, front and rear

I.C.C. hazard switch

Aluminum bus-type rear view mirrors  
5 in. x 16 in. (127 mm x 406 mm)

Bostrom seat

Heater and defroster

Electric windshield wiper

Adjustable side windows

Tool kit

Engine Block Heater

Illuminated license bracket

## Standard Instruments

Speedometer      Water temperature gauge      Low air pressure warning buzzer

Amp meter      Oil pressure gauge      Air temperature gauge

## Tires

Front: 425/65R22.5 (20-ply) radials – on / off highway

Rear: 11R22.5 LR (G) (14-ply) - on / off highway

## Disk Wheels

Front: 22-1/2 x 13

Rear: 22-1/2 x 8.25

*These machine specifications are those in effect at the time of this printing. However, Atlas Copco Drilling Solutions Inc. is constantly striving for product improvements and enhancements. Accordingly, the right is reserved to make such changes in specifications and design that the Company considers in conformity with this policy or are due to unavailability of materials or assemblies. Final confirmation of current specifications should be made by contacting Atlas Copco Drilling Solutions, Garland, Texas, USA.*

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