



ARM
African Rainbow Minerals
We do it better

BRMO Scaler Investigations:

BRMO SCALER INVESTIGATION PROGRESS:

- **User Requirements for the Scaler:**
 - ❖ Scale up to 6m
 - ❖ Bar,face preparation and back lash to expose footwall
 - ❖ Dimensions :2.6m high,and +_2.5m width
 - ❖ Failsafe Brakes
 - ❖ Boom movement during scaling and back lashing

Current Scaler:

- ❖ Bar, and Face preparation, no back lashing mechanisms
- ❖ Whole machine movement, straining the engine, resulting in poor unavailability

Action Plans to date:

■ So far we had engaged the following suppliers:

1. Getman
2. Jama
3. Normet
4. Aard
5. Barloworld
6. Maclean

Current Scalers on the Market:

GETMAN

SCALER S320

MECHANICAL SCALER

PURPOSE-BUILT MINING EQUIPMENT



GETMAN

SCALER S3120

MECHANICAL SCALER



PURPOSE-BUILT MINING EQUIPMENT



normet
Scamec 2000 M

Technical data sheet
100029347
02.07.2012



Pictured machine may include options and additional equipment.



Scamec LC Thor

Battery-powered for a fossil-free mine

SBU 8000E

- Fossil-free environmental choice
- Performance independent of operating height
- High availability
- Unique ergonomics
- Smart investment



With the SBU 8000E, Jama launches the world's first battery-powered-scraping machine. It has exactly the same characteristic properties as the market-leader SBU 8000B: productivity, safety and ergonomics. What's more, it's taking the mining industry into a fossil-free future.

PRODUCTS

SCALING MACHINE

JMS 7000



Robust, safe and tailor-made for scaling

[Read more](#)

SCALING MACHINE

SBU 8000E



Battery-powered for a fossil-free mine

[Read more](#)

SCALING MACHINE

SBU 8000B



On top of the world for a reason

[Read more](#)



Scaler from Cat: Barloworld (next 2 slides):

Still under design:

432 BHL

Backhoe Loader

Versatility and speed for ever-changing applications.

Digging trenches for base camp infrastructure, loading materials and working around rock and rubble - the Cat® 432 Backhoe Loader (BHL) is built for every task engineers encounter. Operators are not only able to safely and efficiently perform the work, but also quickly exchange loader or backhoe work tools without additional support. The 432 BHL keeps combat engineering operations moving forward.

Worksite safety and efficiency begins in the cab.

- **Ergonomic Operator Station:** Remain productive and comfortable all day long with tilt steering column, excellent 360-degree visibility and ample leg room.
- **Joystick Controls:** Precise control with low effort. Ergonomically designed joysticks deliver convenient auxiliary functionality.
- **Ride Control System:** Reduce operator fatigue and improve material retention with a smoother ride for all conditions.
- **Pattern Selector Switch:** Operators can easily change from an excavator to a backhoe control pattern simply by pressing a button.
- **Gauge Cluster:** LED indicator lights and audible alarms allow operators to effectively maintain awareness of the machine's controls.

Powerful and flexible front loader.

The 432 BHL front loader arms deliver optimum reach and dump height. Its loader linkage provides maximum breakout forces with parallel lift for high efficiency loading and material handling.

Ensuring the machine is always ready to switch from task to task, the machine's loader is equipped with a convenient quick coupler allowing operators to change between a wide variety of work tools in less than 30 seconds. The electronic loader controls enable programmable loader kickout and return to dig.

Loader Control

Load sensing piston pump provides full hydraulic lifting and digging forces at any engine speed. A variable flow pump matches hydraulic power to work demands.

Loader Lever

Provides additional machine control by offering the Forward, Neutral and Reverse control switch at the operator's fingertips.

Military Modifications

- Armored cab
- Reduced height cab for C-130 air transportability
- MIL-STD-209K lift and tie downs
- JP8 compatible
- 24V starting and charging with 75 Amp alternator
- Auxiliary hydraulic hand tool circuit
- NATO start receptacle
- Large diameter fuel filler (2.9 in / 75 mm)
- Cab rifle bracket
- Hydraulic adjustable pallet forks
- Custom military paint
- Fire extinguisher mount
- Keyless ignition



420 ADL Air-Deployable Loader



Powerful and flexible front loader.

The 420 ADL front loader arms deliver optimum reach and dump height. Its loader linkage provides maximum breakout forces with parallel lift for high efficiency loading and material handling.

Ensuring the machine is always ready to switch from task to task, the machine's loader is equipped with a convenient quick coupler allowing operators to change between a wide variety of work tools in less than 30 seconds. The electronic loader controls enable programmable loader kickout and return to dig.

Cat Loader Work Tools

General Purpose (GP) Bucket

Multi Purpose (MP) Bucket

Side Dump Bucket

Brooms

Rakes

Forks

Material Handling Arms

Snow Plows

Hydraulic Adjustable Forks

Scaler from Maclean: (next 3 slides):

With different pick designs to enable back lashing

TECHNICAL SPECIFICATIONS



RS3 SCALER





Fletcher - Scaler - N3224-AD

Standard Equipment

- Four Wheel Drive
- Narrow Articulating Carrier
- High Pressure and Return Filters
- Fire Suppression System
- Front Stabilizers
- Rock Deflectors Mounted on Boom
- High Temperature/Low Oil Shutdown
- Power shift transmission for higher tram speeds
- Enclosed, certified cab design with pressurized
- and filtered heating and air system

• Boom Specifications

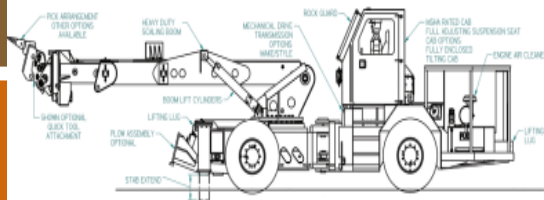
- Boom Lift 24' (7.3m) maximum
- Boom Extend 8' (2.5m)
- Boom Weight 15,000 lbs



Fletcher - Scaler - N3224-AD

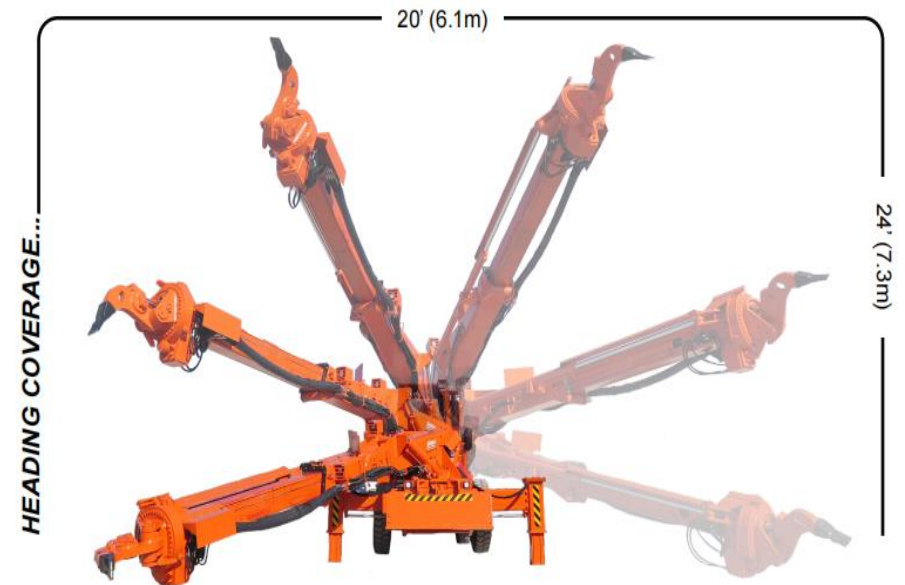
Highlighted Options

Tool options: pick, hydraulic breaker or cutter drum
Hydrostatic drive system
Foam filled tires
24V electric fill pump for hydraulic oil
Ansul checkfire automatic fire suppression system
Wiggins no spill fueling system receiver
Tier IV engine



Specifications

Engine	Cummins 3.3, Tier III
Height	9' 7" (2.92m)
Overall Width	7' 1" (2.16m)
Length - Overall	35' 10" (10.92m)
Weight (complete)	49,250 lbs (22,339.4 kg)
Underclearance	12" (300mm)
Wheel base	11' (3.35m)
Turning Radius	19' 1" outside (5.81m) 11' 5" inside (3.48m)
Min. Operating Height	9' 10" (3m)
Max. Operating Height	24' (7.3m)
Fuel Tank	40 Gallon (151.4 L)
Hydraulic Tank	40 Gallon (151.4 L)
Filters - Return	5 Micron
Filters - Pressure	5 Micron
Tires	12.00 x 20 -28 pneumatic



Summary

Fletcher model 3224-AD is a diesel powered, 4-wheel drive articulated scaling vehicle. Engineered with a turntable mounted swinging, lifting, and extending high-strength boom. The machine has a roof scaling coverage from 3 to 7m, and a rib scaling coverage of 1 to 7m. Designed with 270° tool rotation and the ability to accommodate multiple tools, including: pick, hydraulic breaker or cutter drum. All scaling is performed from a stabilized carrier using telescoping stab jacks, which aid in eliminating bounce and vibration of the operator's cab. The ergonomically designed cab is center mounted with tilt for optimum comfort and visibility, allowing full view of the scaling area. Fletcher scalers are purpose built to withstand the rigors of underground mining, increasing both safety and productivity

Outcomes from Suppliers:

- All meet the Technical specifications in terms of :dimensions ,turning radius and scaling
- None of the suppliers had a scaler which can do back lashing
- Undertook an underground visit to Gloria with Aard, and visited Kgalagadi Mine to check Aard's scaler in operation on the 14th March 2024
- Whoever we are going to select, some modifications needs to be done in order for the scaler to suit BRMO requirements:
 - ❖ Face preparation
 - ❖ Barraging
 - ❖ Back lashing to +_1.5m to expose footwall

BRMO and Aard Team visited Kalagadi Mine to view the Aard Scaler in Operation.

Outcomes from Suppliers:

- ❖ All the above scalers in their current state are not fit for BRMO User requirements
- ❖ The recommendations are:
 - BRMO needs a scaler which can bar and back lash material to expose the footwall
 - We can use any of the above companies provided they design the pick to be flat like the one on our current Scaler in use.
 - Other designs recommended are shown below:



ASSMANG
MANGANESE

BLACK ROCK MINE OPERATIONS

Recommendations

- ❖ All the above scalers except from Barloworld are similar
- ❖ Non meet all BRMO's user requirements at this stage
- ❖ Planning a visit to view the Normet Scaler at Wessels
- ❖ Normat scaler: they have units in South Africa- Wessels and Finch Diamond Mine-Technical Support available
- ❖ Barloworld with their footprint in South Africa- Technical Support Available

Recommendations

- ❖ Aard, and Jama will depend on Epiroc for Technical support(with current service from Epiroc-I don't recommend buying any equipment linked to Epiroc services)
- ❖ Maclean-Little Technical Support in South Africa
- ❖ Team to decide on Normat and Barloworld Scaler(my opinion and recommendations)
- ❖ End users to make final decision.

