



Charmec SF404&504 D(V)



Normet reserves the right to change
this specification without further notice

Pictures may include options and additional equipment.

INTRODUCTION

Charmec SF404&504 D(V) has a compact and short knuckle boom construction enabling small turning radius and agile machine able to access less than 4-meter tunnel envelope.



SF 404 basket boom has one telescopic section and SF 504 two sections having more face coverage. Basket boom tram support is utilized to reduce strains and stresses on basket boom and increase machine productivity.

SF 404&504 -series Charmecs are excellent for development charging in narrow mine orebodies having also capability to move production charging when development work is done.

Large variety of process-based options and accessories will increase productivity.



POWER TRAIN

S-series units have powerful 4-cylinder liquid cooled turbo-charged engines, which power range is between 90–96 kW, depending of the selected engine model. Available emission standards are Tier 3 / Stage IIIA that provide clean and efficient operation.

Machine is equipped with Dana hydrodynamic transmission and planetary type axles which have hydraulically powered dual-circuit oil immersed multidisc service brakes. Moreover, axles have spring applied hydraulically released fail-safe -type parking/safety brake.

SAFETY AND USABILITY

Vehicle has an optional front axle suspension system, which improve safety, driving comfort and increases component lifetime.

Normet's FOPS and ROPS approved safety cabin provides superior visibility and comfortable compartment for the driver and the passenger. Cabin controls are easy and ergonomic to use, and the multifunctional display (MID) provides driving information (speed, RPM, temperatures, safety warnings & alarms etc.), which can be recorded for further analysis. Enclosed cabin provides low noise level ensuring safe and comfortable driving.

Emulsion charging system is designed to be safest possible having given extra care to electric current groundings, fire safety and safety when working in vicinity of face wall.

Two handheld fire extinguishers are standard and fire suppression system for diesel engine is automatic or manual having actuating points in all operating places.

Person lifting basket has latest safety features like design according to prevailing standards and safety roofs tested through FOPS level II criteria.

Electric system is designed for harsh underground environment. System consists of self-extinguishing wire harnesses with tinned wires, watertight conduits and all exposed components are minimum IP65 protection class. In addition, vehicle layout allows easy access to all service points, all daily checks can be done from the ground level.

PRODUCTIVITY

Power hose pusher with Normet emulsion charging hoses provides excellent reach to vertical production charging holes.

Direct hydraulic operated hose handling system is simple and reliable and in case exact hose retraction speed is required electrically controlled system can be provided.

Development charging can be mechanized by using face charging hose reel which will extract and retract charging hose mechanically with extreme speed accuracy.

Installation of external emulsion unit can be provided as a service which makes possible customer to receive unit ready to work.

TECHNICAL SPECIFICATION

CHARGING SYSTEM

Process platform on middle of unit

Max. load 4000 kg

Center of gravity shown in the dimensional picture

Process platform size 1060 x 2000 mm

- Readiness for external emulsion unit:
 - Basic upfit for external emulsion charging system
18 x 1,5 mm² cable between charging system and basket
 - Hydraulic hoses for charging system:
pressure 3/4", tank 1", leak 1/4", LS 1/4"
 - 24 VDC supply for charging system
- Readiness according customer specification

Detonator box lining:

- Antistatic rubber lining
- IME SLP 22 lining

NBB BASKET BOOM

Boom:

- NBB435 basket boom (404)
- NBB455 basket boom (504)

Lifting capacity (without optional equipment) 400 kg

Max. lifting height and wall coverage specified in dimensional drawing

Automatic levelling of basket

Start/stop from basket

Battery operated emergency lowering system

Regular basket installation

Basket:

- Short 2-operator square tube basket
- Short 2-operator open profile basket
- One-operator basket

Person lifter safety system:

- Dangerous movement preventing system (mandatory in NAP, NAS, CE area)
- Dangerous movement warning system with overload monitoring
- Dangerous movement warning system without overload monitoring

ENGINE AND TRANSMISSION

- **Deutz TCD 2012 L4, 96 kW/2300 rpm, Tier 3 / Stage IIIA approved**

Catalytic exhaust gas purifier and muffler

Fuel tank capacity 110 l

Dana 20000 series powershift transmission

3 speeds forward and reverse

4-wheel drive

Manual gear selector

- **Mercedes-Benz OM 904 LA, 90 kW/2200 rpm, Tier 3 / Stage IIIA approved**

Catalytic exhaust gas purifier and muffler

Fuel tank capacity 110 l

Dana 20000 series powershift transmission

3 speeds forward and reverse

4-wheel drive

Manual gear selector

PERFORMANCE

Tramming speed (horizontal):

Deutz 27 km/h

Mercedes-Benz 27 km/h

Lateral gradient for tramming (continuous) 4°

Longitudinal gradient for tramming (continuous) 9°

Lateral gradient for operation 3°

AXLES AND BRAKES

Load end axle:

Dana 112 series fixed

Engine end axle:

Dana 112 series

- +/- 8° Oscillation
- Hydro-pneumatic suspension and +/- 8° oscillation

Service brake: hydraulically powered dual-circuit oil immersed multidisc brakes in both axles

Safety/Parking brake: spring applied hydraulically released fail-safe-type brake

TYRES AND RIMS

Tyres:

Nokian Tyres 10.00-20"

Rims:

- Standard rims
- NDT inspected rims

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STEERING

Orbitrol type hydraulic frame steering

Frame articulation +/- 40°

HYDRAULIC SYSTEM

Variable displacement pump system 190 bar at 2200 rpm:

- Single pump for carrier and process 135 l/min
- Separated pumps for carrier 95 l/min and for process 135 l/min

Hydraulic oil tank capacity 115 l

24 VDC ELECTRICAL SYSTEM

Mechanical main switch in battery box

LED driving and indicator lights

LED work lights on cabin

LED work lights in basket

LED side lights (left/right):

- White / White
- Green / Red
- Red / Green

Warning LED light:

Color

- Amber
- Blue
- Red
- Green (n/a with rotating light pattern)
- White (n/a with rotating light pattern)

Light pattern

- Strobe
- Rotating

DRIVER'S COMPARTMENT

Cabin type:

- Open cabin FOPS/ROPS approved
- Enclosed cabin FOPS/ROPS approved with sliding rear window

Driver's seat and seat belt:

- Air suspended T-back seat with 3-point seat belt
- Air suspended heavy duty seat with 3-point seat belt

Seat belt safety interlock for driver:

- Warning indicator in display
- Safety brake application

Cabin door interlock switches with safety brake application

Passenger's seat:

- T-back seat with 3-point seat belt

- Heavy duty seat with 3-point seat belt
- 2 person seat with fixed lap seat belts

Throttle and brake pedal layout:

- Front and side facing pedals with seat swivel
- Front facing pedals

Gear lever side:

- On right side of the steering wheel
- On left side of the steering wheel

MACHINE CONNECTIVITY

- Machine connectivity hardware (WLAN/3G/4G/LTE)
- Data lifetime license (Include connectivity hardware)
- Analytics lifetime license (Include connectivity hardware and data lifetime license)

TECHNICAL DOCUMENTATION

Standard documents:

Instruction manuals, hard copy 2 pcs:

- English
- Russian
- One of destination EU languages

Spare parts manuals, hard copy 2 pcs:

- English
- Russian

PDF manuals on USB-stick 2 pcs, includes instruction and spare parts manuals

Additional documentation:

- Extra hard copies of manuals
- Extra PDF manuals
- LinkOne WebView electronic manuals
- Other than standard language manuals

OTHER

Powder extinguisher:

- 12 kg
- Ansul Sentry

Number of extinguishers:

- 2
- 3

Painting and taping:

- Standard painting and taping
- Painting and taping according to customer specifications

Standard support legs at the load end

Front and rear grounding straps:

- Flat cable
- Chain

Text labels in:

- En/Ru/One of destination EU-languages
- Other language

Measurements:

- Noise
- Vibration
- Emissions

ACCESSORIES

PROCESS PRODUCTIVITY

- Engine end support legs (mandatory if NBB455 basket boom is selected or charging system empty weight less than 900 kg)
- Installation service for external emulsion charging system
 - CE-marking for installation of external emulsion charging system
- Compressed air inlets with water separator on carrier
- Compressed air outlet and oil lubrication unit in basket
- Water inlet with filter and pressure regulator
- Electrically controlled face charging reel and valve with face charging hose 25 x 20 mm, 15 m (n/a with production charging)
- Production charging (n/a with face charging reel, hose reel n/a with electrical system)
 - Direct hydraulic controlled hose pusher
 - Electrically controlled hose pusher and valve

Hose diameter and length (includes 4 pcs of groove pulleys)

- Without hose
- 32 x 23 mm, 50 m
- 40 x 31 mm, 50 m

Additional groove pulleys, 4 pcs

- 28 mm
- 32 mm
- 40 mm

Hose guides

- Hose guide for upward production charging
- Extension for hose upward hose pusher
- Diverting pulley for downward production charging

Charging hose reel material

- Steel
- Stainless steel

Production charging reel coupling size

- 1 ½" rotary coupling and tube
- 1" rotary coupling and tube

- 230 l water tank above the cabin (Increased machine height 200 mm)
- Hydraulically driven pressure washer with hose reel:

Water pressure, max. 180 bar

Water flow, max. 30 l/min

Hose length 20 m

- Standard pressure washer
- Stainless steel reel and rod

- Electrical system:

Main supply voltage

Power supply for the electrical functions

- 50 Hz
 - 380 V (IEC)
 - 400 V (IEC)
 - 415 V (IEC)
 - 525 V (IEC)
 - 690 V (IEC)
 - 1000 V (IEC)
 - 1000 V (AS/NZS)
- 60 Hz
 - 440 V (UL/CSA)
 - 440 V (IEC)
 - 480 V, (460 V) (UL/CSA)
 - 600 V, (575 V) (UL/CSA)
 - 1000 V (UL/CSA)

Robust and abrasion-resistant mains voltage supply cable with PUR outer sheath:

Hydraulically driven reel

Cable in / out reeling function from the cabin and near the reel

- With supply cable (excluding plug)
- Without supply cable (must be sourced and installed locally)

Pilot circuit

- No
- Yes

Hydraulic power pack 22 kW: Single pump for carrier and process 90 l/min at 1500 rpm

Socket supply voltage:

- 220/230/240 V (no UL/CSA or AS/NZS approval)
- 110/120 V

CARRIER PRODUCTIVITY

- Accessories for open cabin:
 - Protective grids
 - Windshield with wipers
- Accessories for enclosed cabin:
 - Audio system
 - Air conditioning with heating
 - Heated mirrors
- 12 V, 18 A power supply in cabin with socket and connector
- Deutsch connector for 24 V, 10 A for external power supply
- Auto engine shutdown during idling
- Engine shutdown delay
- Inlet plug for jump start
- Block heater with interior heater and battery charger 230 V (Interior heater available with enclosed cabin)

- Block heater with interior heater, battery charger, hydraulic oil and filter heaters 400 V (Interior heater available with enclosed cabin)
- Fuel operated pre-heater
- Fast fuel filling system
- Hand pump for filling of hydraulic tank
- Fluid evacuation panel with sampling points
- Automatic lubrication system
- Reversing camera:
 - 1 camera, 1 display
 - 3 cameras, 2 displays
 - 4 cameras, 3 displays.
 OACR/VCR system with recording device with 72 hour memory
- Spare rim and tyre
- Toolbox and maintenance tools
- Stainless steel box for equipments (n/a with electrical system)
- Interior cooling fan
- Wax tape for electric connectors

SAFETY

- Cabin door puddle lights
- Extra warning LED light (From the options below it is possible to choose 1-2 combinations)
 - Color
 - Amber
 - Blue
 - Red
 - Green (n/a with rotating light pattern)
 - White (n/a with rotating light pattern)
 - Light pattern
 - Strobe
 - Rotating
- Fire extinguisher system, 3 point activation (basket, cabin, rear frame)
 - Dry chemical Ansul A-101
 - Manual
 - Automatic, Checkfire 110
 - Liquid agent Fogmaker (Automatic)
- Gear lockout for third gear
- Pump for brake release
 - Electric pump
 - Hand pump
- Redundant brake monitoring system
- Hydraulic pressure monitoring kit
- Methane monitoring system
- Protection guards for tunnel curtains
- Tyre pressure indicators
- Additional wide angle mirrors (n/a with heated mirrors)
- Warning triangles
- Flashlight with charger
- Hearing protectors
- Wheel chocks with brackets

SAFETY BASKET BOOM

- Safety roof or bar on basket
 - Safety bar
 - Safety bar with hydraulic lift Reduces lifting capacity 60 kg
 - Safety roof with hydraulic lift Reduces lifting capacity 100 kg
 - Safety roof with hydraulic lift and slide Reduces lifting capacity 200 kg

NOTE: safety roofs and bar for the basket boom affect to the lifting capacity.

Accessories for basket boom:

- LED working lights on safety roof/bar
- Operator present: Foot pedal switch on basket
- Operator present: Spring loaded valve levers
- 24 V fan in the basket

SERVICES

NORMET SERVICES

Our services cover the whole life cycle of your equipment. They include start-up and commissioning, genuine spare parts, upgrades & modifications, and remanufacturing, as well as rental and leasing offerings, and field services. We also offer improvement services such as operator training and process audits.

SPARE PARTS

Genuine parts from Normet Services ensure that you always have the highest quality parts available to keep your equipment up and running. Depending on your needs, we can offer everything from individual parts to complete parts contracts, and our professionals around the world have the experience to ensure that you have the parts you need when you need them.

Initial spare parts package:

Available for 1000h of use*. Includes periodical service, most common wearing parts and most critical safety parts.

Spare parts packages made for customer needs:

Available based on hours of use*. Includes periodical service, most common wearing parts and most critical safety parts.

* Recommendations are based on average hours – can vary a lot depending on work site conditions.

UPGRADES AND MODIFICATIONS

Our Upgrades and Modifications services are designed to ensure the economical, efficient and purposeful performance of your equipment over its entire life cycle. A service provided by a reliable OEM like Normet ensures the safety and performance of your equipment. Normet Upgrades and Modifications save you both time and money, while delivering the high quality you expect from us.

SERVICE CONTRACTS

With a service agreement, Normet manages your fleet with guaranteed availability and agreed costs, giving you transparency for your life cycle costs, annual operational budget and fleet uptime. This lets you focus on your core operations. Each service agreement is built and customized to meet the individual customer's needs from our portfolio of services. Depending on the level of service agreement you need, you can choose anything from basic technical support for an individual machine all the way up to services for your entire fleet, as well as process performance. The service levels we offer are:

- Parts Availability
- Fleet Support
- Fleet Availability
- Process Performance

The content of a service level can be tailored to meet your particular requirements.

TRAINING SERVICE

Our Training Services are available for you and your operators throughout the equipment lifecycle and they include:

| |  Operation & Maintenance |  Spraying |  Charging |  Scaling |
|---------------------|---|--|---|---|
| ADVANCED | Advanced fault diagnostics & troubleshooting | Concrete chemicals, testing and preparing for EFNARC-certificate test | | |
| INTERMEDIATE | Troubleshooting training Foundations of electrics, hydraulics and mechanics NorSmart | Advanced training in concrete spraying Economics of concrete spraying | Advanced training in explosives Economics of charging | Advanced training in scaling Economics of scaling |
| BASIC | Operation and Maintenance Training Basic Product Training | Basic understanding of concrete spraying | Basic understanding of charging | Basic understanding of scaling |
| LEVEL | SERVICE | PROCESS KNOWLEDGE | | |

START-UP AND COMMISSIONING

1. OPERATOR TRAINING

| | Start-up training | Commissioning |
|---|-------------------|---|
| 1.1 Classroom training | | |
| General introduction and operation of machine | Basic | No classroom training included in commissioning |
| Safety instructions | Basic | |
| Use of manuals | Basic | |
| Technical introduction of equipment | Basic | |
| Hands-on service and pre-operation checks | Basic | |
| Controls and driving (starting, driving, stopping, parking) | Basic | |
| 1.2 Practical training | | |
| Pre-operation checks | Basic | Introduction |
| Driving, starting, stopping, parking | Basic | Introduction |
| Preparing the machine for specific operation conditions | Basic | Not covered |
| Operation | Basic | Introduction |
| Washing the machine | Basic | Introduction |
| Troubleshooting | Basic | Basic |

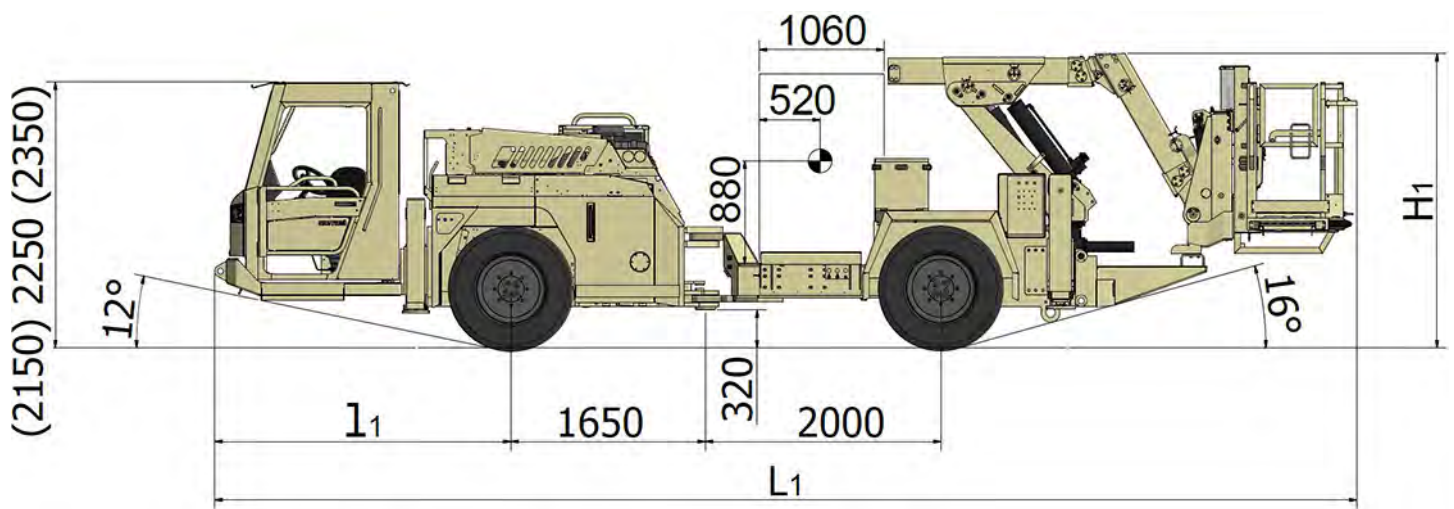
2. MAINTENANCE AND REPAIR TRAINING

| | | |
|--|-------|--------------|
| General operation of machines | Basic | Introduction |
| Symbols of drawings and codes | Basic | Not covered |
| Understanding hydraulic and electric schematics | Basic | Introduction |
| Control systems | Basic | Introduction |
| Function of main components (depending on equipment) | Basic | Introduction |
| Locations of components in the machine | Basic | Not covered |
| Periodical maintenance | Basic | Introduction |
| Troubleshooting | Basic | Not covered |
| Use of manuals | Basic | Introduction |
| Connection of hydraulic and electrical equipment | Basic | Not covered |

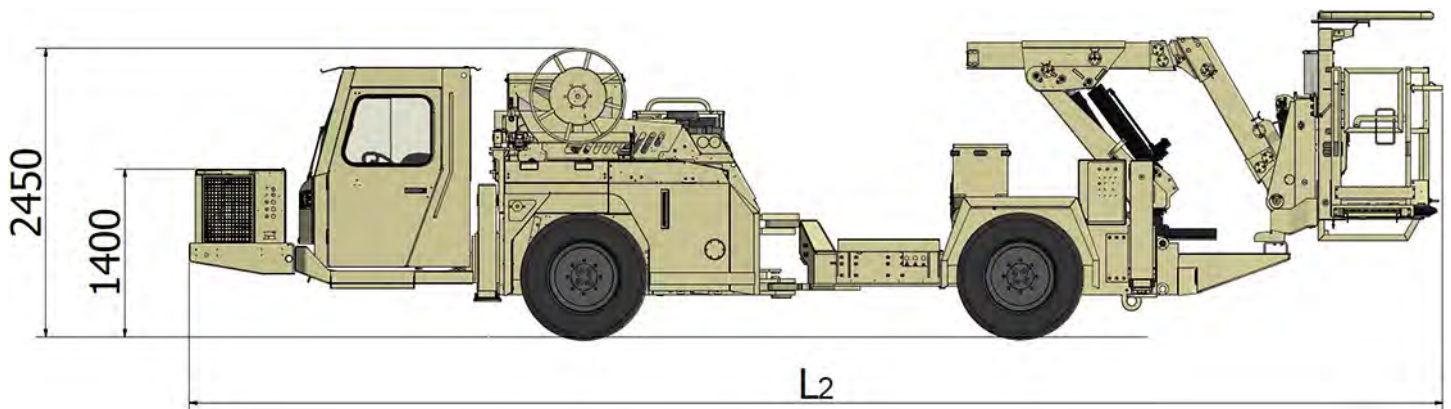
DIMENSIONS

| | SF404 D | SF504 D | | SF404 D | SF504 D |
|----|-----------|-----------|----|---------|---------|
| L1 | 9100 mm | 9700 mm | h4 | 6200 mm | 7500 mm |
| L2 | 10 080 mm | 10 500 mm | R1 | 6620 mm | 6830 mm |
| l1 | 2370 mm | 2520 mm | R2 | 6370 mm | 6460 mm |
| H1 | 2370 mm | 2500 mm | C1 | 3490 mm | 3700 mm |
| h1 | 950 mm | 1030 mm | C2 | 3820 mm | 4030 mm |
| h2 | 2630 mm | 2690 mm | C3 | 3240 mm | 3330 mm |
| h3 | 3920 mm | 5250 mm | C4 | 3570 mm | 3660 mm |

SIDE VIEW – BASIC MACHINE



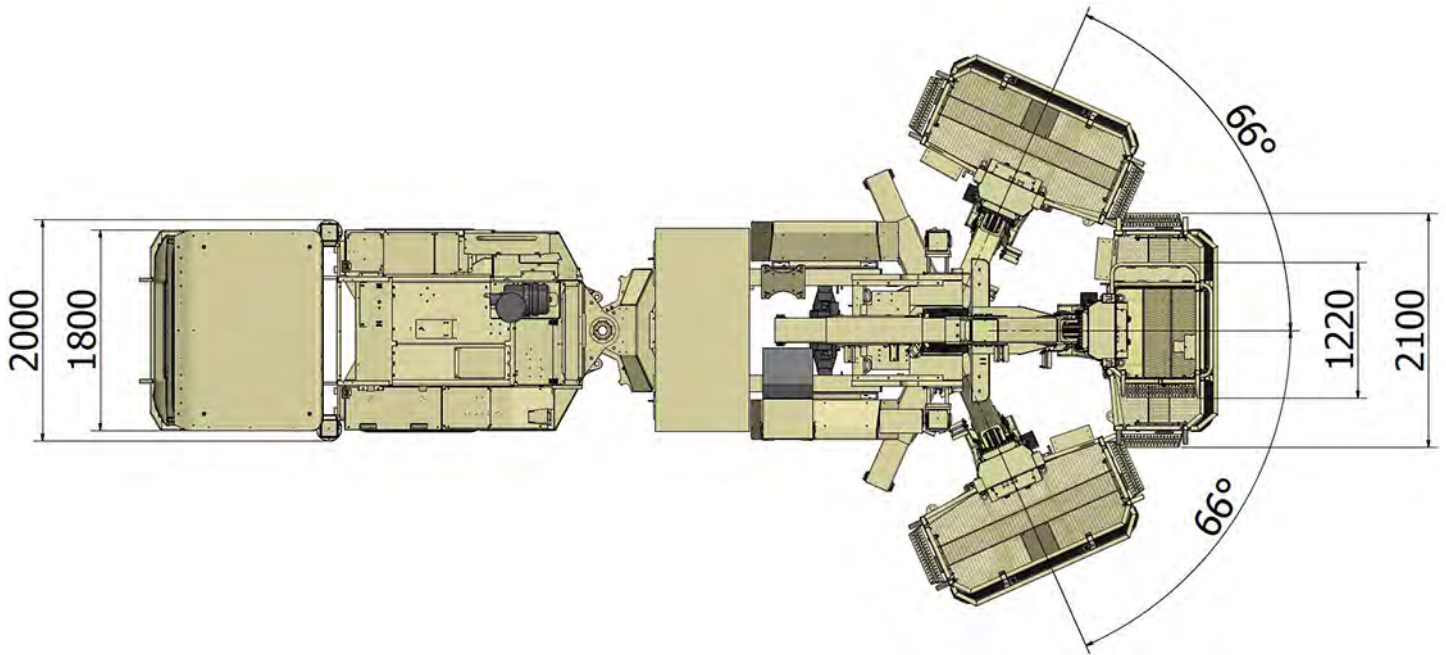
SIDE VIEW – MACHINE WITH OPTIONS



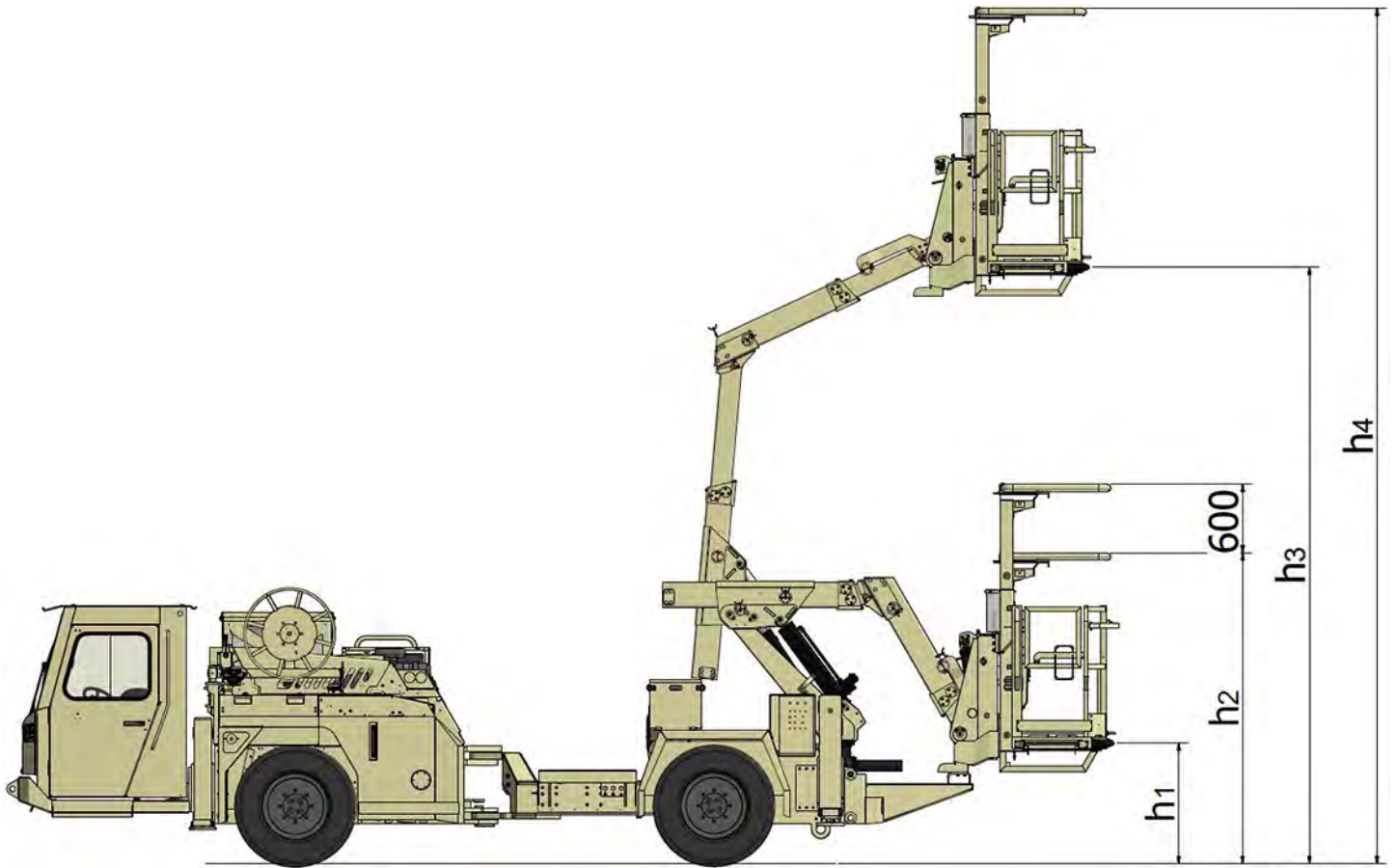
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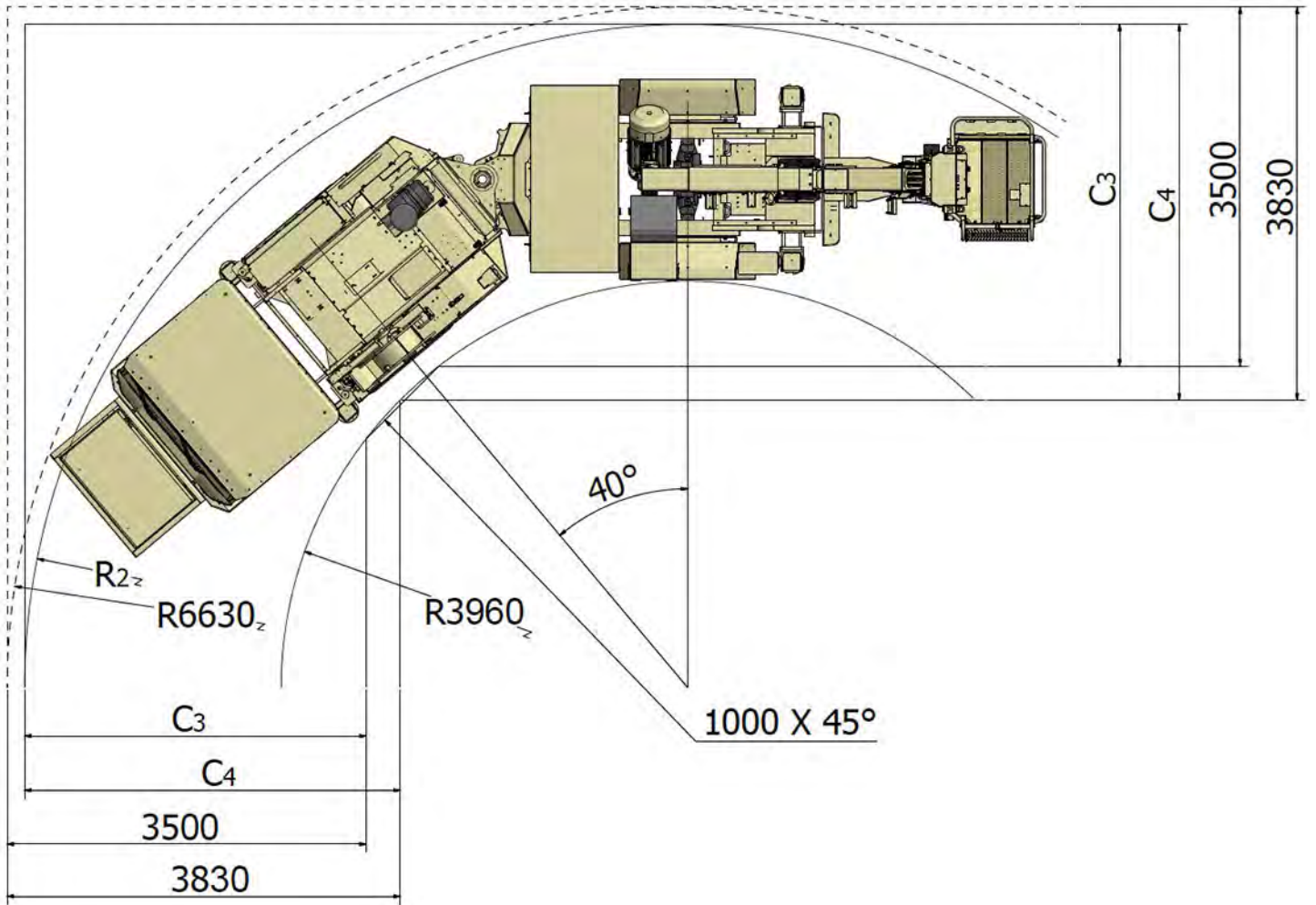
TOP VIEW



BOOM REACH

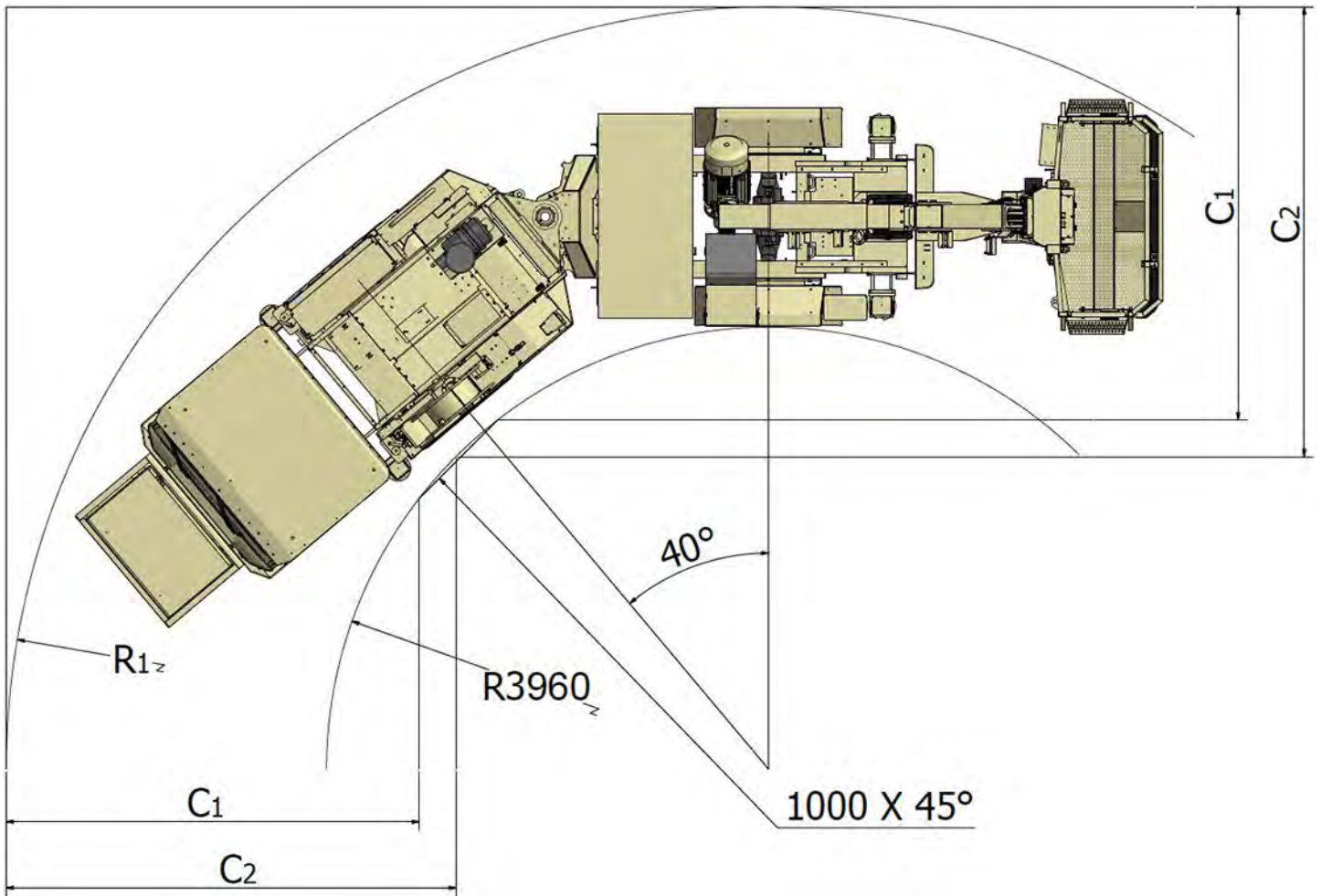


TURNING RADIUS



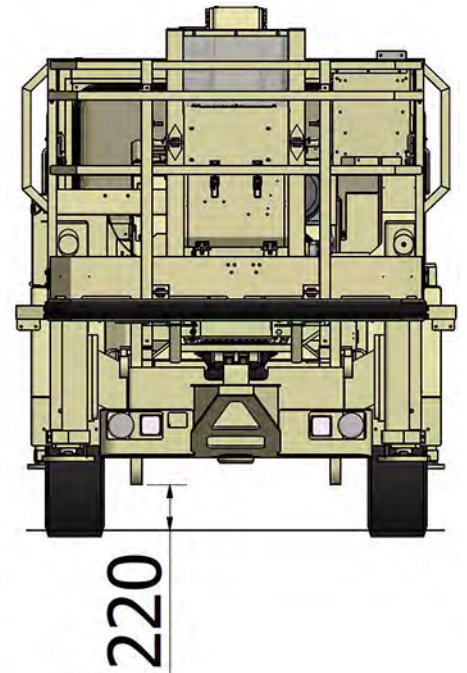
Machine equipped with one man basket

TURNING RADIUS



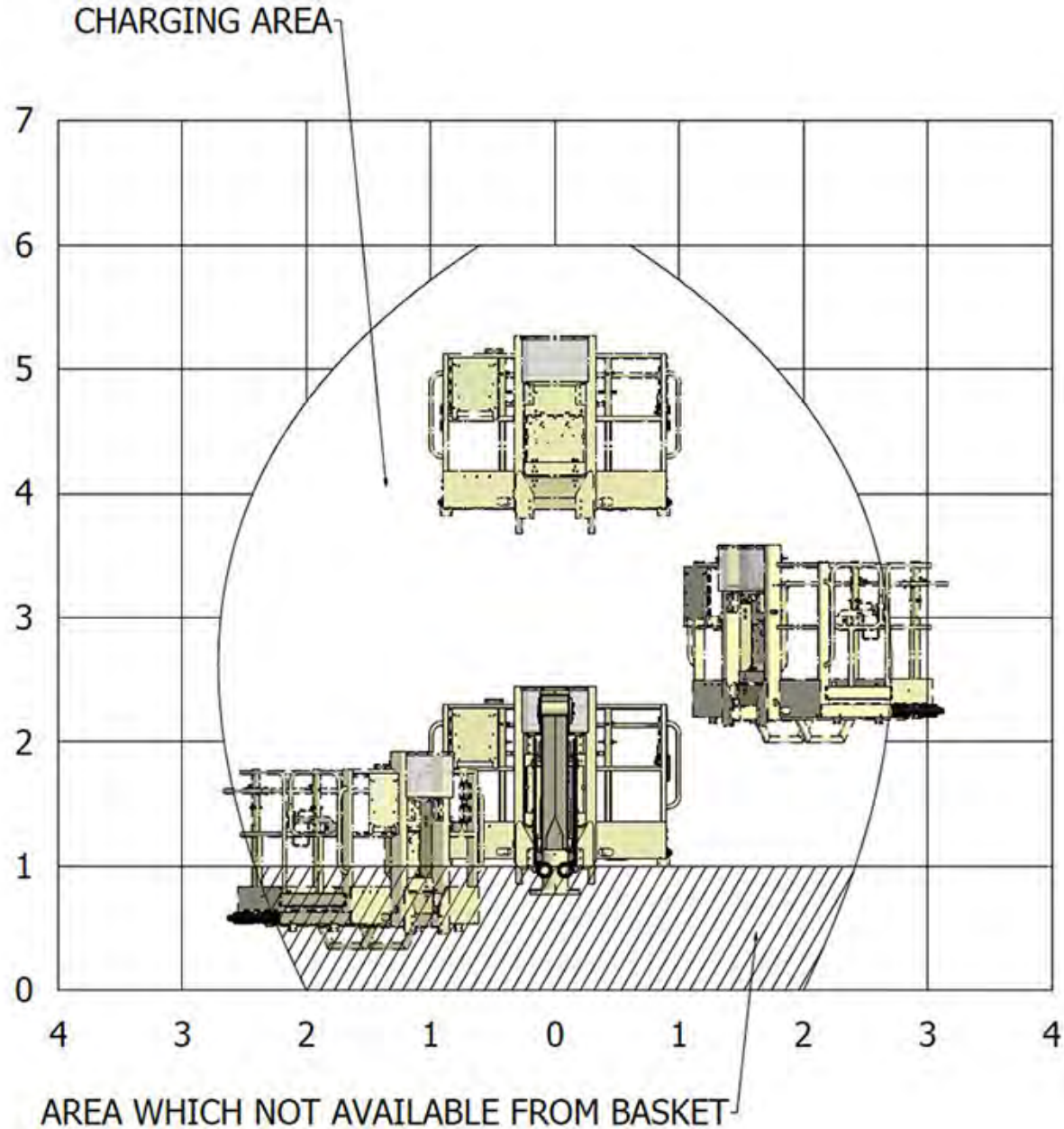
Machine equipped with standard 2-men basket

FRONT AND BACK VIEWS

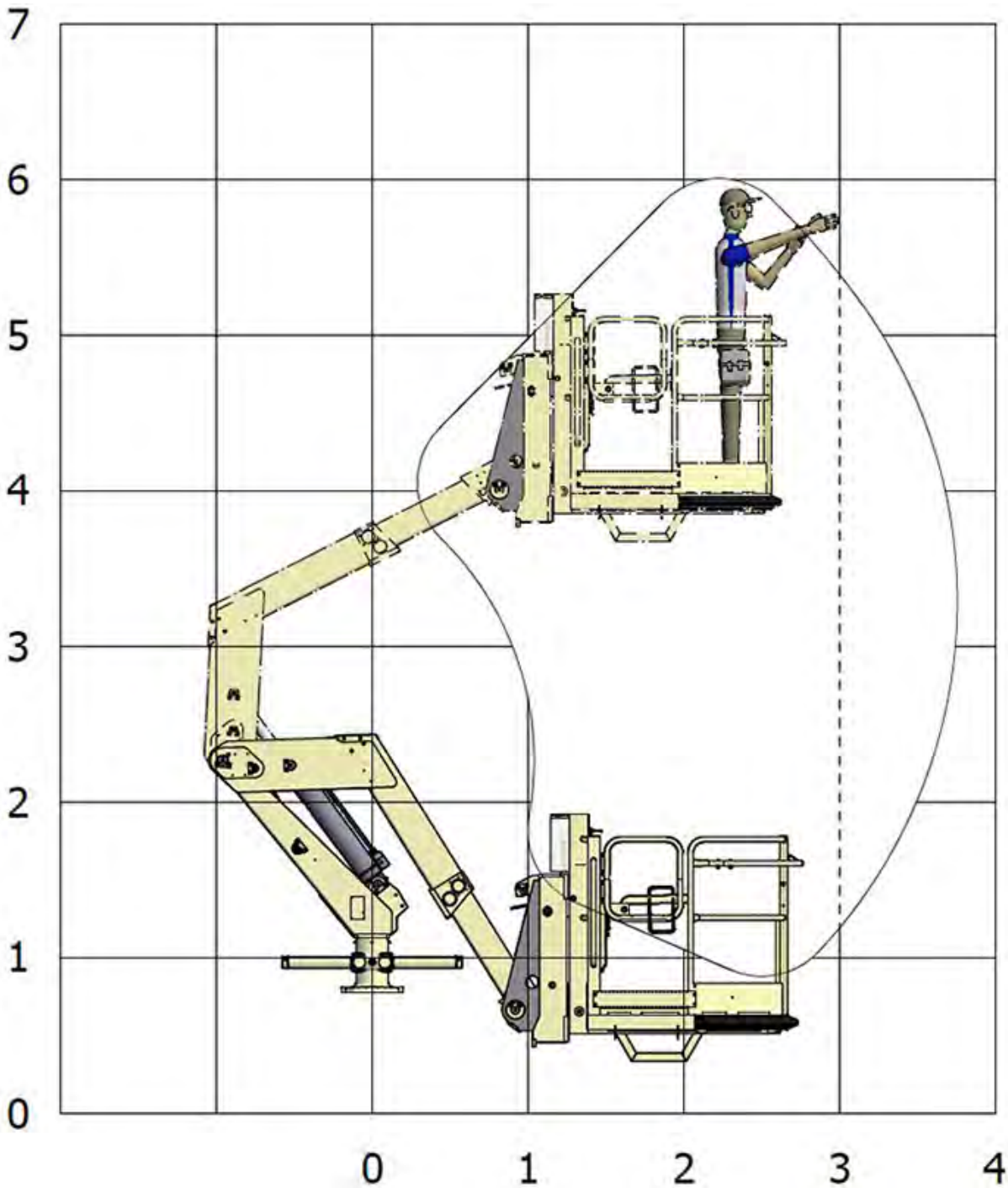


BOOM REACH - NBB435 WITH 66° TURN

Maximized face coverage with single position of machine

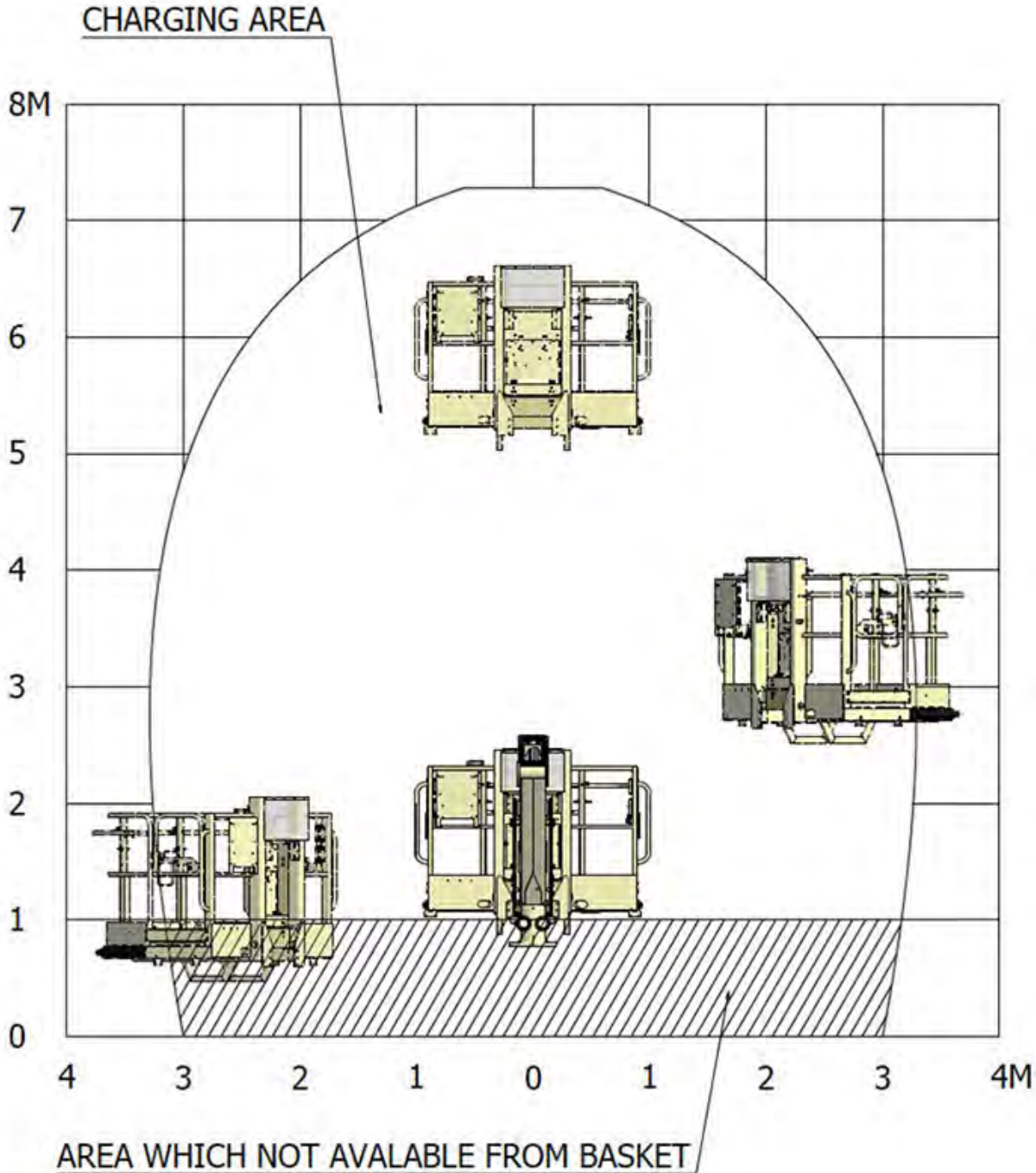


BOOM REACH - NBB435 WITH 66° TURN

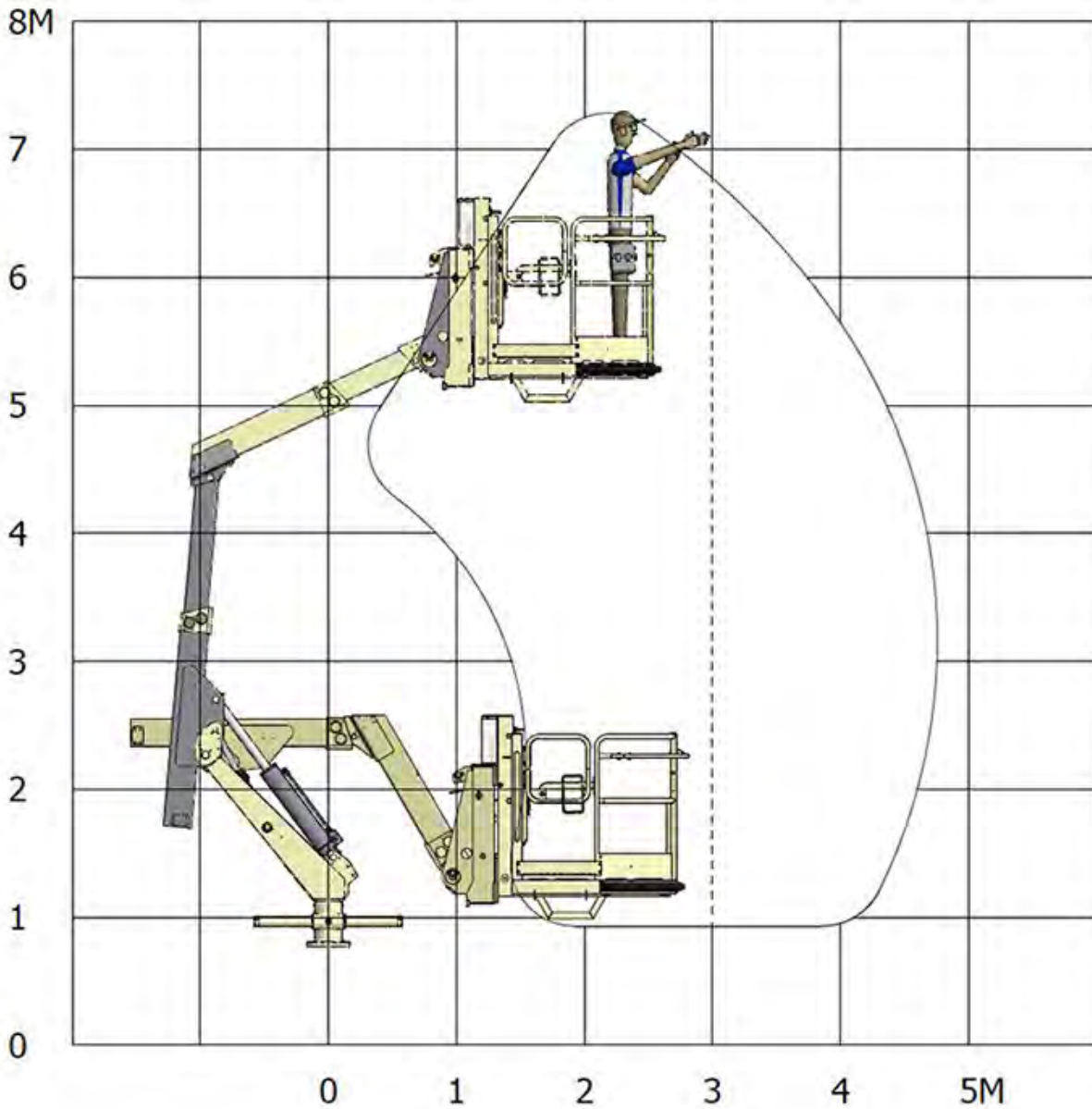


BOOM REACH - NBB455 WITH 66° TURN

Maximized face coverage with single position of machine



BOOM REACH NBB455 WITH 66° TURN



TRACTIVE EFFORTS

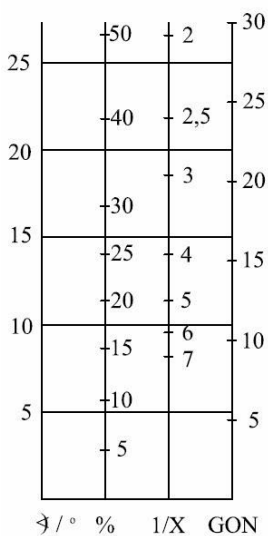
OPERATING WEIGHT

| | |
|-----------------------|-----------|
| Empty (SF 404) | 11 700 kg |
| Fully loaded (SF 404) | 17 000 kg |
| Empty (SF 504) | 12 200 kg |
| Fully loaded (SF 504) | 17 500 kg |

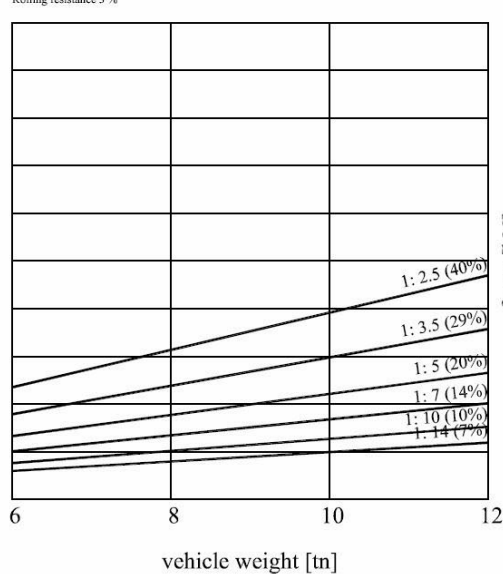
DEUTZ TCD 2012 L4, 96 KW

Performance curve DOC005295

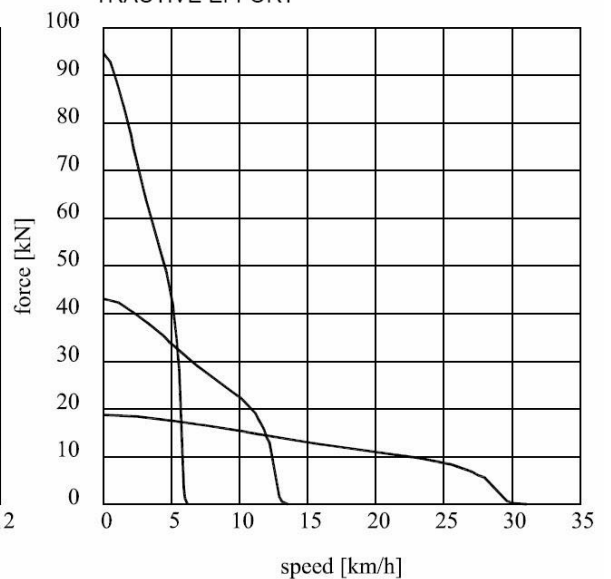
CONVERSION CHART



GRADIENT



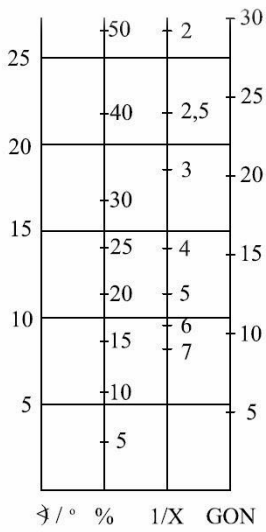
TRACTIVE EFFORT



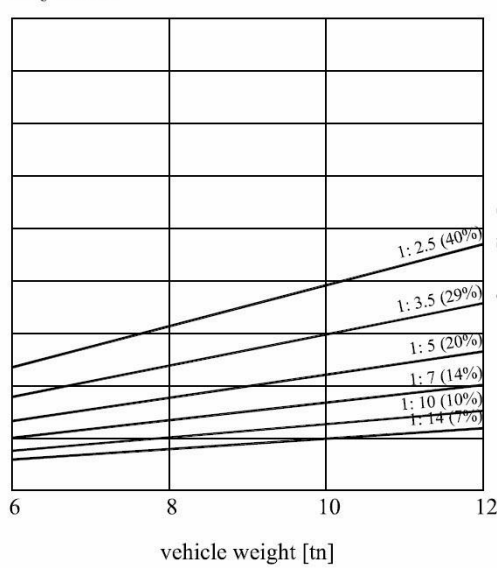
MERCEDES-BENZ OM 904 LA, 90 KW

Performance curve DOC005296

CONVERSION CHART



GRADIENT



TRACTIVE EFFORT

