



# Spraymec MF 050 D

## INTRODUCTION

Spraymec is a self-propelled, mobile concrete sprayer for modern mines with small and medium-sized tunnel profiles. The robust mining carrier is equipped with a proven and very agile spray manipulator and a concrete spraying pump with a capacity of up to 19 m<sup>3</sup>/h.



### DRIVERS CAB

The spacious driver cab offers ergonomic comfortable driving and the possibility to carry out the spraying safely. An LCD multi-information display on the dashboard provides centralized information on the most important operation parameters.



### DOSING SYSTEM AND CONCRETE PUMP

The integrated closed-loop control system monitors the dosage of the liquid accelerators as well as the concrete pump. This provides a very precise dosage of the accelerator as well as the automatic synchronization of the output of the dosing and concrete pump.

As an alternative to the positive cavity pump, the dosing system can be equipped with a low-pulsation peristaltic pump and an additional display in the driver's cab.

A special hydraulic system is available as an option, in which the concrete delivery cylinders can be controlled independently of each other, thus reducing the pulsation of the concrete delivery to an absolute minimum.

### RELIABLE CONTROL SYSTEM AND ELECTRICS

The spray manipulator is controlled by cable or radio remote control.

All exposed control components are IP65 rated, and the industrial-grade CAN bus system allows effortless troubleshooting.

The well-dimensioned lights on the carrier vehicle and the spray boom provide a good view both while driving and during the spraying operation.

### FOCUS ON EASY MAINTENANCE

A special focus has been given to easy access to the maintenance elements and the arrangement of the individual components. The central arrangement of the lubrication points for the carrier vehicle reduces daily maintenance work and ensures that no lubrication point is forgotten, thus avoiding costly repairs.



# TECHNICAL SPECIFICATION

## SPRAY BOOM

### SPRAY BOOM SB 500 B

Selectable vertical tracking of the upper boom telescope to keep the spraying distance constant.

Nozzle nutation for better distribution of the spray material and surface quality

Outer surface boom washing

Boom working range:

Lateral	8.0 m
Vertical max.	9.5 m
Vertical with upper boom horizontal	5.3 m
Nozzle head rotation	420°
Nozzle tilting	105°

Spraying nozzle:

- Fixed nozzle head
  - Rotating nozzle head (nozzle nutation 5°)

Manual lubrication system for carrier and spray boom (n/a for nozzle head)

- Nordoser XIM, Electrical control system for the concrete pump with low pulsation pumping feature and screw pump
- Nordoser XIP, Electrical control system for the concrete pump with low pulsation pumping feature, linear sensor & peristaltic pump

Vibrator with electric drive 24 VDC

The performance of the pump, including the maximum pumping capacity, are based on a theoretical filling rate of 100%.

### DOSING SYSTEM FOR ACCELERATOR NORDOSER

Hydraulically driven dosing pump with electric control

Max. pumping pressure	12 bar
Dosing rate	0.6...16 l/min (36 - 960 l/h)

The accelerator dosage and concrete delivery rate are fully synchronized and can be adjusted from the remote control and from the driver's compartment.

Accelerator tank

- 600 l
- 800 l

Accelerator filling point on the side of the machine

## CONCRETE PUMP AND DOSING SYSTEM

### CONCRETE PUMP NSP 30

Low-wear and low-maintenance double piston pump specially designed for low-pulsation concrete pumping.

Reversing function for concrete pressure relief in case of over-pressure and automatic switching off of the nozzle air supply.

Pump capacity	3 - 19 m <sup>3</sup> / h
Pumping cylinder diameter and stroke	200/600 mm
Pumping pressure, max.	51 bar
Feeding hopper 300 l at height	1250 mm

The high pumping pressure enables the conveying of stiff concrete.

PI control loop for constant concrete delivery even when the rheology of the concrete is changing.

The pump is capable of conveying concrete with an aggregate size of 16 mm (including crushed material) and all types of structural fibres up to a length of 60 mm.

Hydraulically driven agitator in hopper.

Manual lubrication system for concrete pump

Advanced control system (hydraulic and electrical) ensure low-pulsation concrete flow.

- Nordoser XEM, Hydraulic pilot control system for the concrete pump with screw pump
- Nordoser XEP, Hydraulic pilot control system for the concrete pump with peristaltic pump

## CONCRETE LINE

Concrete line assembly side

- Left hand side
  - Right hand side

Concrete output pipes

- Reduction from 5" to 3" including HD couplings
  - Victaulic output flange, pipes not included, must be sourced and installed locally

Concrete hose diameter

- 65 mm (2½")
  - Standard couplings
    - HD couplings
  - 50 mm (2") with HD couplings

Concrete hoses

- Included
  - Not included, must be sourced and installed locally

Concrete output pipes

- Included
  - Not included, must be sourced and installed locally

## ENGINE AND TRANSMISSION

- **Deutz TCD 2013 L4, 120 kW/2300 rpm, Tier 3 / Stage IIIA approved**

Exhaust system for Deutz engine:

- Catalytic exhaust gas purifier and muffler
- Diesel particulate filter (DPF)

Fuel tank capacity 220 l

**Dana 24000 series powershift transmission**

3 speeds forward and reverse

4-wheel drive

Manual gear selector

- **Mercedes-Benz OM 904 LA, 110 kW/2200 rpm, with engine & exhaust brakes, Tier 3 / Stage IIIA approved**

Exhaust system for MB engine:

- Catalytic exhaust gas purifier and muffler
- Diesel particulate filter (DPF)

Fuel tank capacity 220 l

**Dana 24000 series powershift transmission with lock-up**

3 speeds forward and reverse

4-wheel drive

Gear selector:

- Manual
- Automatic

- **Cummins B4.5, 121 kW/2500 rpm with exhaust brake, Stage V approved**

Requires diesel exhaust fluid (DEF) and ultra-low sulphur diesel (ULSD)

Selective catalytic reduction (SCR)

Diesel particulate filter (DPF)

DEF tank capacity: 19 l

Fuel tank capacity: 105 l

**Dana 24000 series powershift transmission with lock-up**

3 speeds forward and reverse

4-wheel drive

Gear selector:

- Manual
- Automatic

## PERFORMANCE

Tramming speed (horizontal):

Deutz 26 km/h

Mercedes-Benz 28 km/h

Cummins 28 km/h

Lateral gradient for tramming (continuous) 4°

Longitudinal gradient for tramming (continuous) 9°

Lateral gradient for operation 4°

Depending of machine configuration, lateral and longitudinal tramming gradient can temporarily be higher.

## CONTROL SYSTEM

Modern NorSmart control and diagnostic system with separate process display on the front of the machine to control:

- Spray boom
- Concrete pump
- Accelerator dosing system
- Carrier functions
- Safety elements
- Fault diagnostics
- Data logging

## AXLES AND BRAKES

Load end axle:

Dana 123 series fixed

Engine end axle:

Dana 123 series

- +/- 8° oscillation and hydraulic lock
- 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 12.00–20"
- Bridgestone 12.00–20"

Rims:

- Standard rims
- NDT inspected rims

## STEERING

Orbitrol type hydraulic frame steering

Frame articulation +/- 40°

## HYDRAULIC SYSTEM

### Diesel powered hydraulic pumps

Variable displacement pump for carrier and sprayboom

Variable displacement pump for concrete pump

Fixed displacement gear pump for agitator and dosing system

Oil tank capacity 400 l

Return oil filtration 10 µm

Oil level and return filter contamination indicator

Oil cooler for concrete and spray boom circuit

Mineral hydraulic oil

## REMOTE CONTROL SYSTEM

Wired remote control:

- 10 m cable control with 2 joysticks
- 10 m cable control with 2 joysticks, tilt switch 22,5° included

Number of wired remote controls:

- 1
- 2

The following machine components can be controlled by radio remote control:

Accelerator dosing rate  
 Accelerator pump ON/OFF  
 Concrete pump output  
 Concrete pump ON/OFF/REVERSE  
 Compressed air supply to spray nozzle ON/OFF  
 Nozzle quick wash ON/OFF  
 Wall washing ON/OFF  
 Vertical levelling of the upper boom telescope ON/OFF  
 Automatic second telescope IN/OUT and ON/OFF  
 Nozzle nutation ON/OFF

## MACHINE WASHING

Water circuit with online strainer of 180 µm.

Hydraulically driven pressure washer with hose reel:

Water pressure, max. 180 bar

Water flow, max. 30 l/min

Hose length 20 m

## WATER HOSE REEL

- Manually operated reel  
 Hose ID 1", length on the reel 40 m, effective length about 35 m\*
- Hydraulically operated reel
  - Hose ID 1", length on the reel 60 m, effective length about 55 m\*
  - Hose ID 1 ¼", length on the reel 80 m, effective length about 75 m\*
  - Hose ID 1 ¼", length on the reel 120 m, effective length about 115 m\* (NOTE! Requires manual guiding during winding so that the entire hose fits on the reel)

\*The effective length vary depending on machine model

Before select the hose reel combination please check the options on the table below

## COMPRESSED AIR HOSE REEL

- Manually operated reel  
 Hose ID 1 ½", length on the reel 40 m, effective length about 35 m\*
- Hydraulically operated reel
  - Hose ID 1 ½", length on the reel 60 m, effective length about 55 m\*
  - Hose ID 1 ¼", length on the reel 80 m, effective length about 75 m\*
  - Hose ID 1 ¼", length on the reel 120 m, effective length about 115 m\* (NOTE! Requires manual guiding during winding so that the entire hose fits on the reel)

\*The effective length vary depending on machine model

Before select the hose reel combination please check the options on the table below



## WATER AND COMPRESSED AIR HOSE REELS COMBINATIONS

Water reel	Man. driven	Man. driven	Hyd. driven	Man. driven	Hyd. driven	n/a
Air reel	Man. driven	Hyd. driven	Hyd. driven	n/a	n/a	Ext. supply
LF 050 DC				X	X	X
LF 050 DV		X	X			
LF 050 VC				X	X	X
MF 050 D	X	X	X			
MF 050 DV		X	X			
MF 050 VC				X	X	X
SF 050 D	X					
SF 050 DV	X					

## 24 VDC ELECTRICAL SYSTEM

Main switch:

- Mechanical switch in battery box
- Electric switch with control in cabin and service switch in battery box
- Electric switch with control in cabin, start isolator and service switch in battery box

LED driving and indicator lights

LED work lights on cabin roof (4 pcs)

LED work and reversing lights  
(6 pcs on enclosed cabin and 4 pcs on open cabin)

LED work light on hopper (1 pcs)

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

Driver's seat and seat belt:

Open cabin FOPS/ROPS approved:

- Air suspended T-back seat
  - 3" retractable lap seat belt with safety switch
  - Fixed lap seat belt
- Air suspended seat
  - 3" retractable lap seat belt with safety switch
  - Fixed lap seat belt

Enclosed cabin FOPS/ROPS approved with spraying control in cabin:

- Mechanical suspended seat
  - 3" retractable lap seat belt with safety switch
  - Fixed lap seat belt
- Air suspended seat
  - 3-point seat belt
  - 3" retractable lap seat belt with safety switch
  - Fixed lap seat belt

Seat belt safety interlock for driver (with 3" seat belt):

- Warning indicator in display
- Safety brake application

Cabin door interlock switch with safety brake application

Front and side throttle and brake pedals with seat swivel

Gear lever side:

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

Water jet for boot washing

Windscreen and rear window washing

Puddle lights under door steps, on the side of the cabin (n/a with open cabin)

## 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:

- 6 kg
- 12 kg
- Ansul Sentry

Number of extinguishers:

- 1
- 2

Front and rear grounding straps:

- Flat cable
- Chain

Painting and taping:

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

Text labels in:

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

Measurements:

- Noise
- Vibration
- Emissions

Standard tool set:

Cleaning plug  
Washing ball  
Hitting tool for nozzle  
Claw coupling  
Hose clamp  
Rubber hose 3/4", 4 m  
Carabiner  
Wrench for spraying nozzles  
Hammer 800 g  
Nozzle tip d45 mm plastic  
Cone and special bolt for concrete piston assembly

## ACCESSORIES

### PROCESS PRODUCTIVITY

- Concrete thickness measurement system  
Normet SmartScan
- Extra display for the dosing system (Nordoser) in cabin
- Spraying condition monitoring system (ambient, concrete, accelerator temperature and air pressure)
- Automatic lubrication system for concrete pump
- Automatic lubrication system for carrier and spray boom (n/a for nozzle head)
- Automatic concrete line washing system including protective cover on hopper
- Additional separator in suction line of accelerator
- Accelerator filling pump  
Hydraulic driven filling pump 80 - 110 l/min, impeller type
- Bypass filter kit for oil circuit  
Filter between pressure line and oil tank
- Hydraulic oil diagnostic sensor
- Form oil system 24 VDC with hose reel:  
Tank capacity 30 l  
Hose length 13 m  
Working pressure 10 bar
- Wireless remote control with 2 joysticks and cable support
  - 419 MHz
  - 434 Mhz
  - 458 Mhz and tilt switch 22.5°

Number of wireless remote controls:

  - 1
  - 2
- Surface preparation  
High-pressure water system for cleaning and pre-wetting of the spray area with water nozzle installed on the spray head:
  - 180 bar, 90 l/min, hydraulic motor drive for water pump (Speck), nozzle holder with 3 nozzles. With the selection of this option, the machine washing is carried out by this water pump.
  - 180 bar, 90 l/min, piston to piston type hydraulic water pump (Dynaset), nozzle holder with 3 nozzles
  - 460 bar, 50 l/min, piston to piston type hydraulic water pump (Dynaset), nozzle holder with 1 nozzle
- Electric winch (24 VDC) to lift the hopper grill
- Feeding hopper chute extension 80 l at height 1400 mm
- Hydraulically operated hose guide
- Additional inlet water filter
- Front support legs (mandatory if hydro-pneumatic suspension is selected)

### CARRIER PRODUCTIVITY

- Accessories for open cabin:
  - Protective grids
- Accessories for enclosed cabin:
  - Audio system
  - Air conditioning with heating
  - Heated mirrors
- 12 V, 18 A power supply in cabin with socket and connector
- Deutch 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 and filter heaters 400 V (Interior heater available with enclosed cabin)
- Fuel operated pre-heater
- Fast fuel filling system
- Pump for filling of hydraulic tank
  - Hand pump
  - Electric pump
- Fluid evacuation panel with sampling points
- Reversing camera
  - 1 camera, 1 display
  - 1 cameras, 1 display. OACR/VCR system recording device with 72 hour memory
  - 3 cameras, 2 displays. OACR/VCR system recording device with 72 hour memory
- Spare rim and tyre
- Toolbox and maintenance tools
- Interior cooling fan
- Wax tape for electric connectors



**SAFETY**

- 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
  - Dry chemical
    - Ansul A-101
      - Manual
      - Automatic, Checkfire 110
  - Liquid agent
    - Fogmaker (Automatic)
- Highest gear locked out
- 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 (n/a with open cabin)
- Hearing protectors
- Wheel chocks with brackets

## 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:

	 <b>Operation &amp; Maintenance</b>	 <b>Spraying</b>	 <b>Charging</b>	 <b>Scaling</b>
<b>ADVANCED</b>	Advanced fault diagnostics & troubleshooting	Concrete chemicals, testing and preparing for EFNARC-certificate test		
<b>INTERMEDIATE</b>	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
<b>BASIC</b>	Operation and Maintenance Training Basic Product Training	Basic understanding of concrete spraying	Basic understanding of charging	Basic understanding of scaling
<b>LEVEL</b>	<b>SERVICE</b>	<b>PROCESS KNOWLEDGE</b>		

# START-UP AND COMMISSIONING

## 1. OPERATOR TRAINING

	Start-up training	Commissioning
<b>1.1 Classroom training</b>		
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	
<b>1.2 Practical training</b>		
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

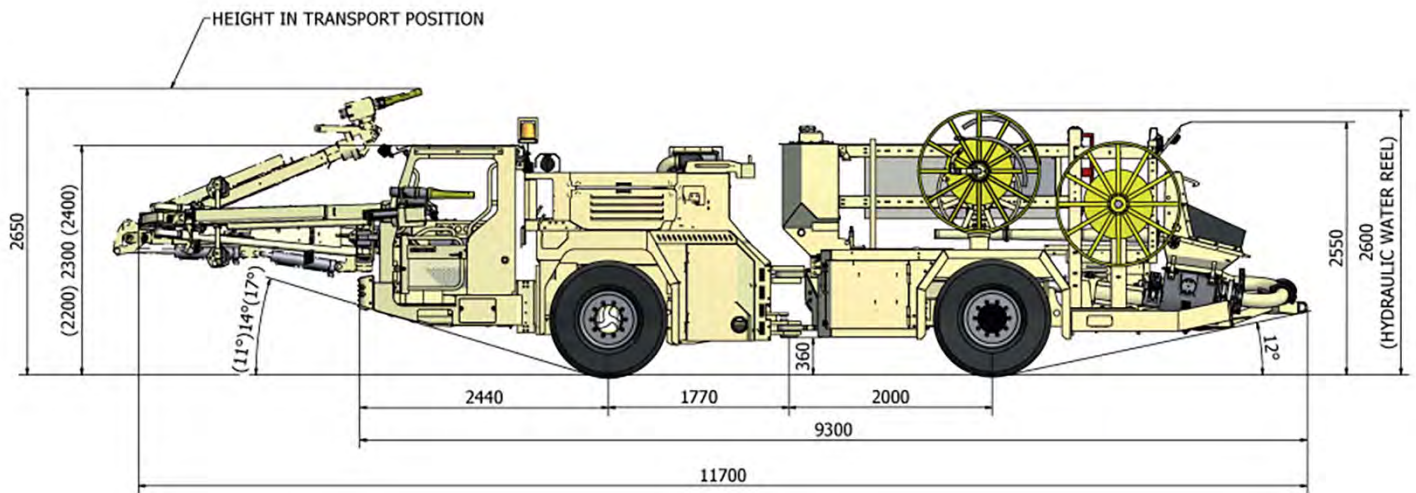
General operation of machines	Basic	Introduction
Symbols of drawings and codes	Basic	Not covered
Understanding hydraulic and electric schematics	Basic	Introduction
Control systems	Basic	Introduction
Function of main components (depending on equipment)	Basic	Introduction
Locations of components in the 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

Length	10 780 mm	Track	1670 mm
Width	2000 mm	Ground clearance as shown	360 mm
Height	2570 mm	Turning radius outer	7870 mm
Height of cabin	2250 mm	Turning radius outer (with 10° boom slew)	7600 mm
Wheel base	3650 mm	Turning radius inner	4480 mm

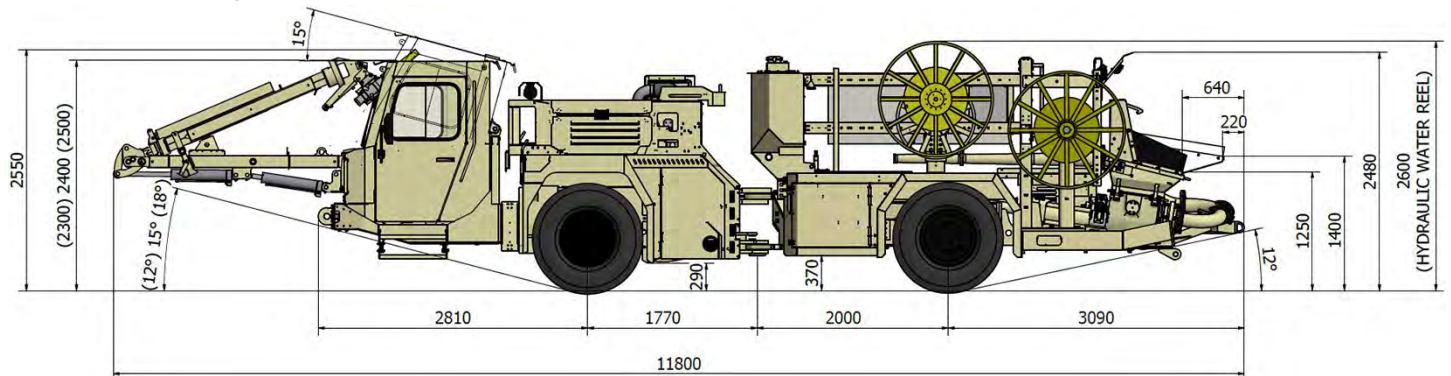
### SIDE VIEW - BASIC MACHINE

Dimensions in ( ) apply when the cabin is installed in the upper or lower position.



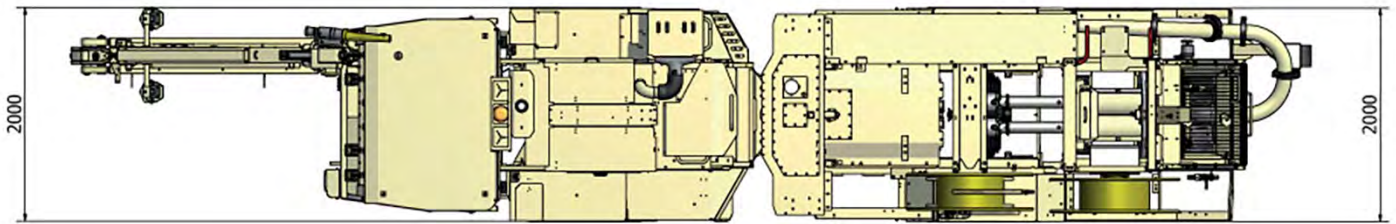
### SIDE VIEW – MACHINE WITH ENCLOSED CABIN

Dimensions in ( ) apply when the cabin is installed in the upper or lower position.

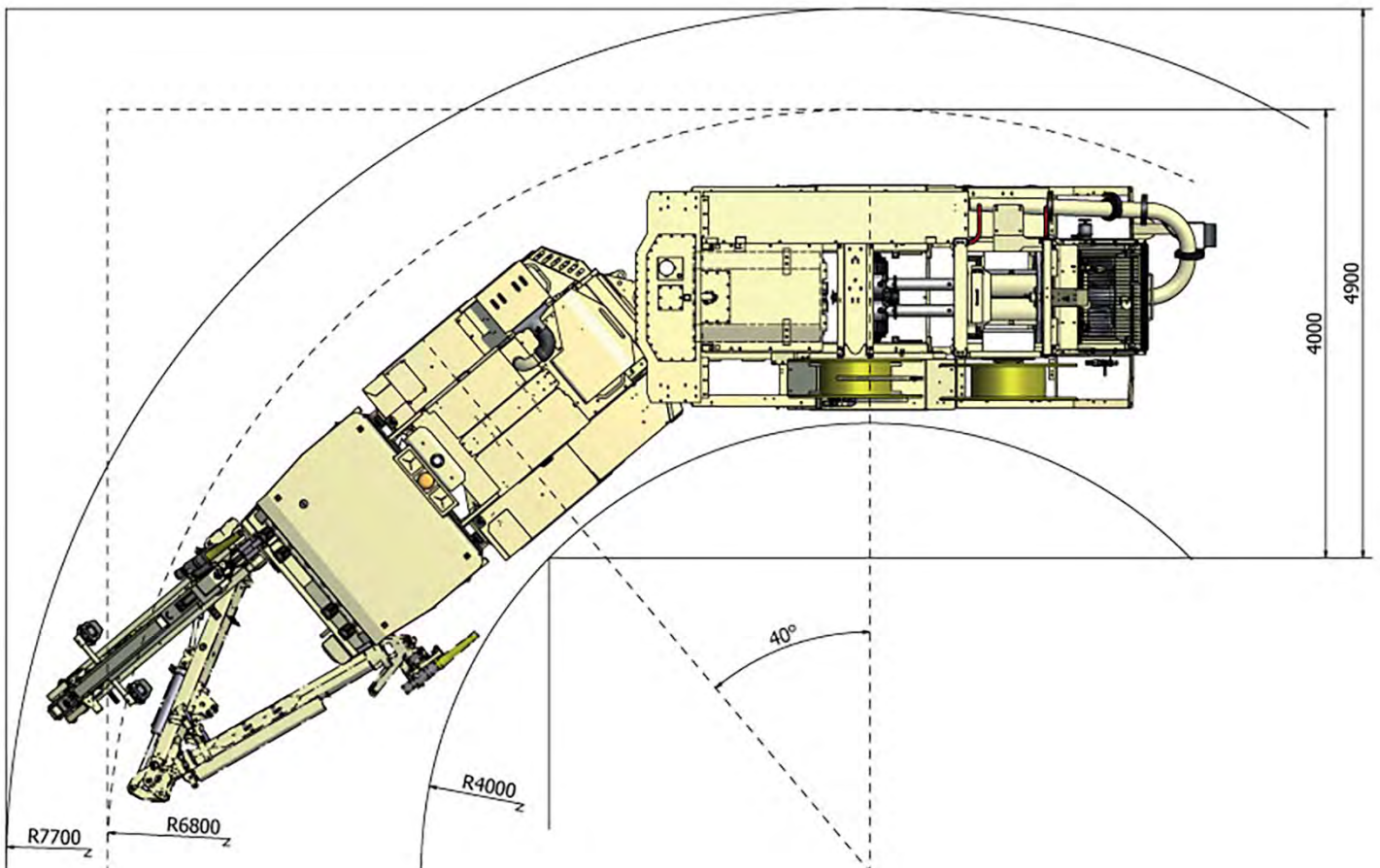




## TOP VIEW

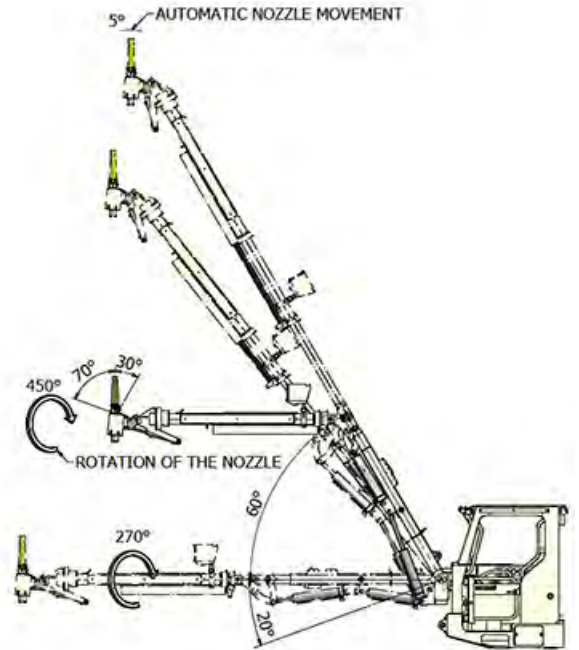
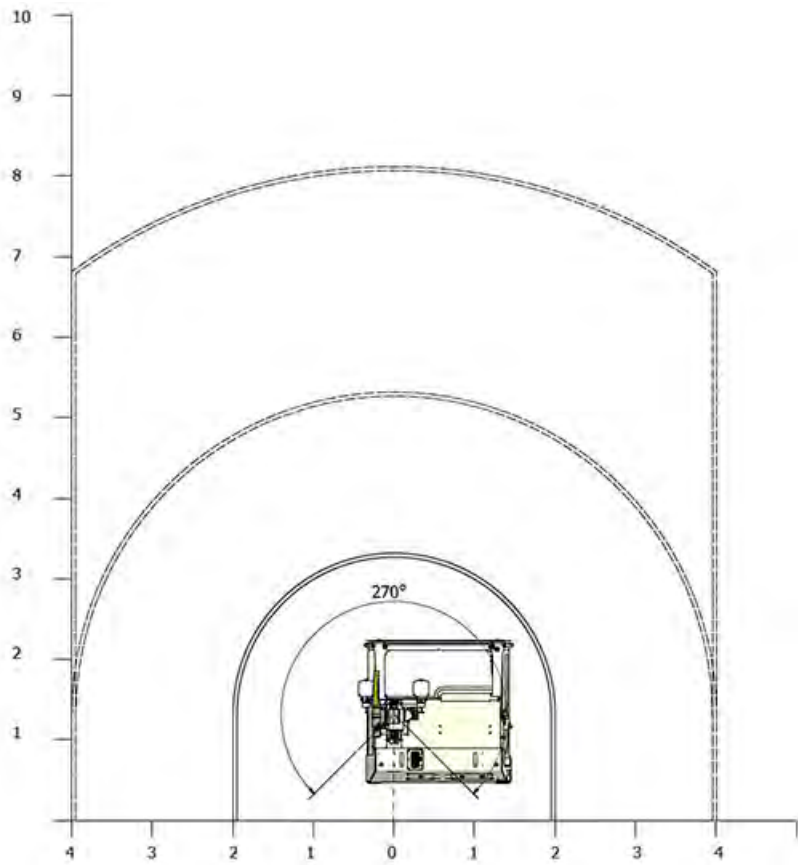


## TURNING RADIUS





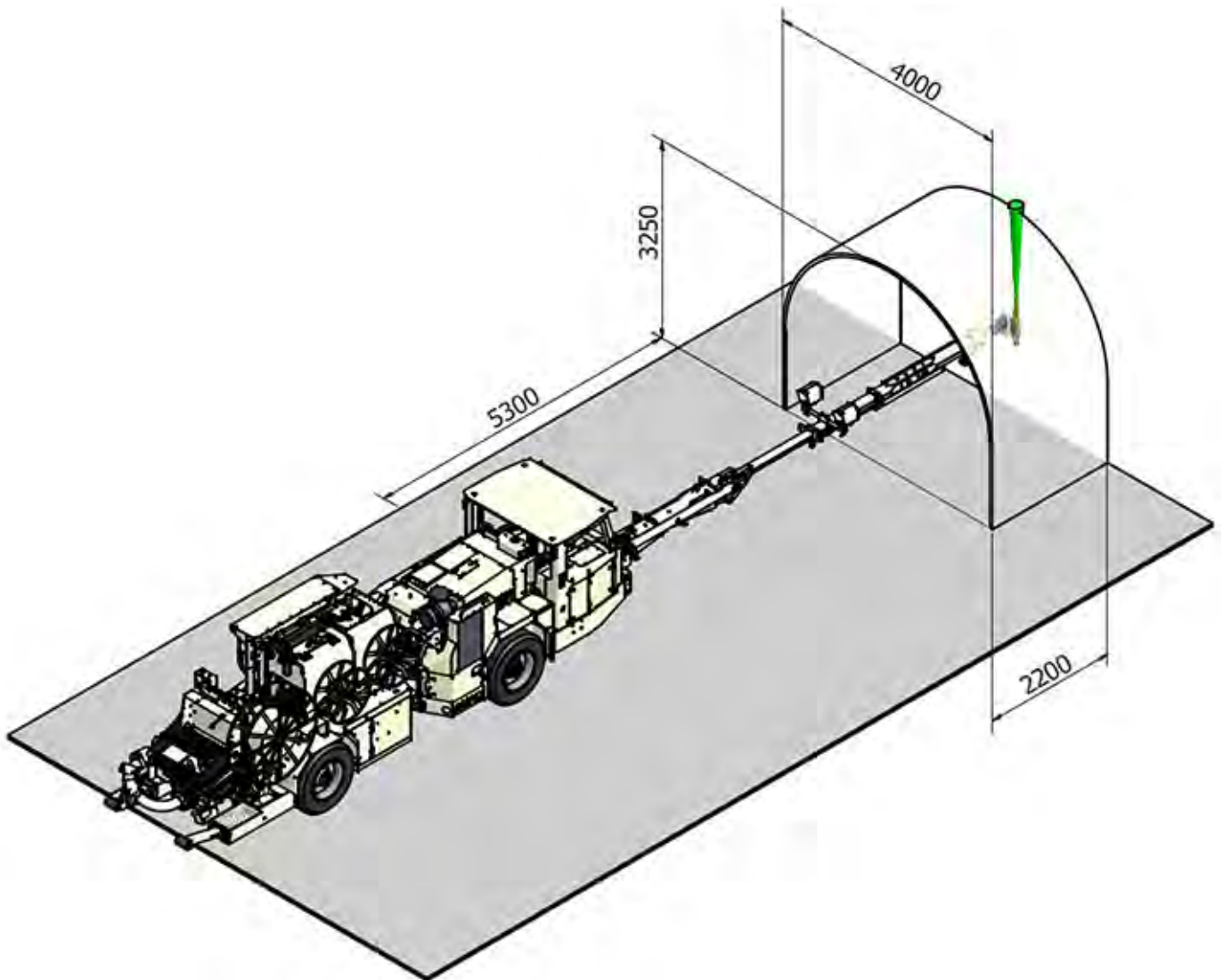
## REACH AREA AND BOOM MOVEMENTS



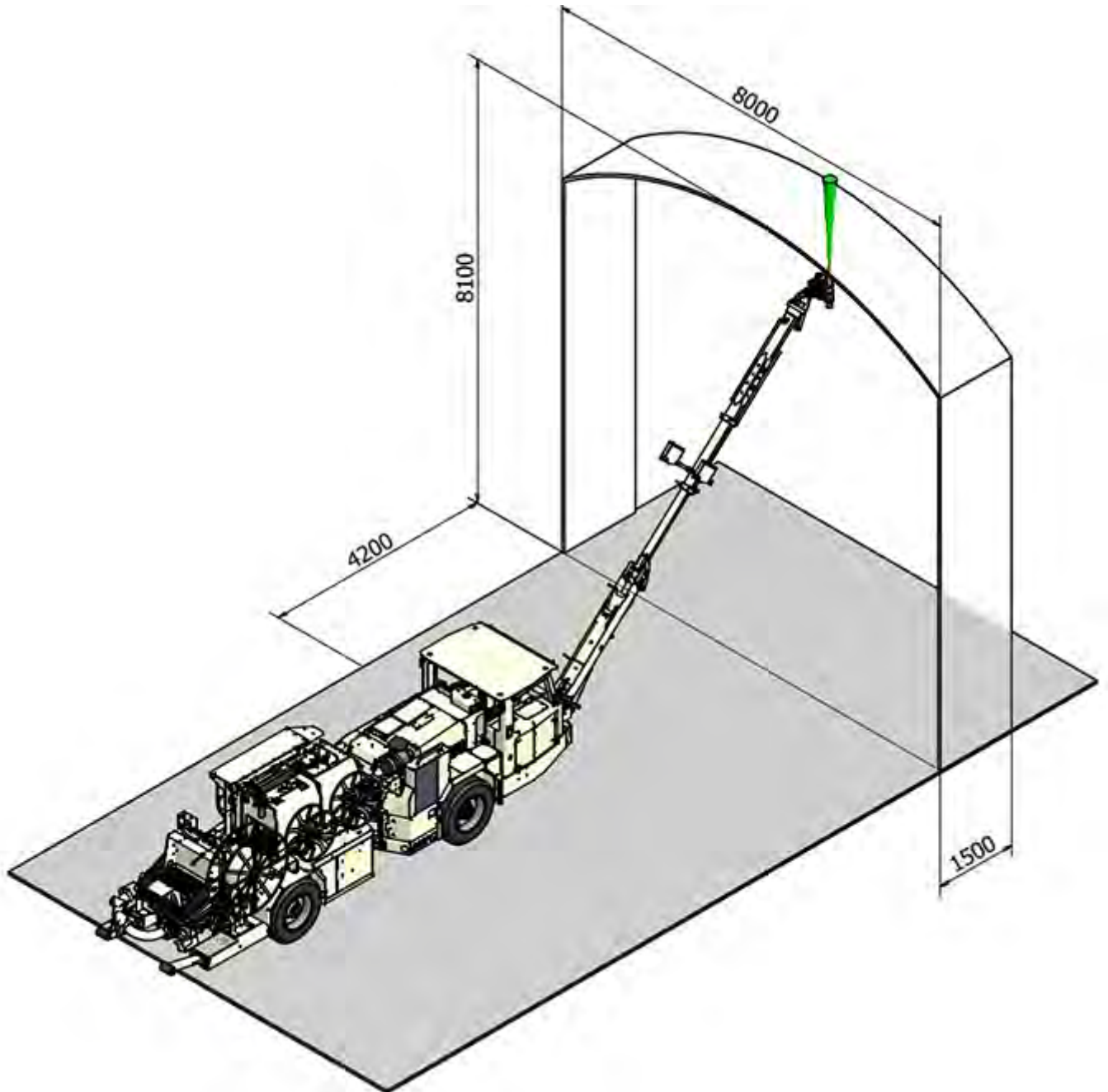
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

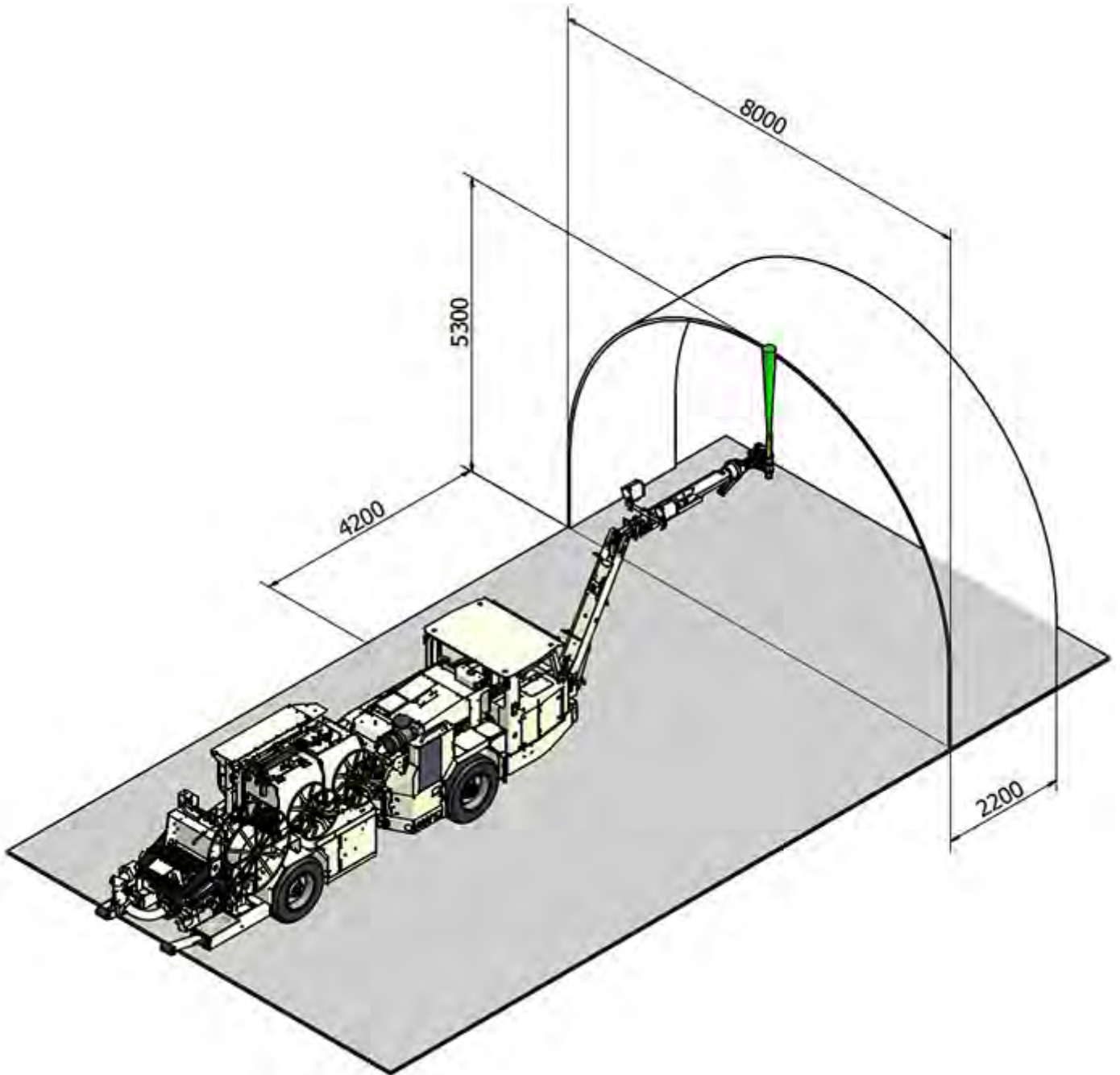
## MINIMUM SPRAYING AREA



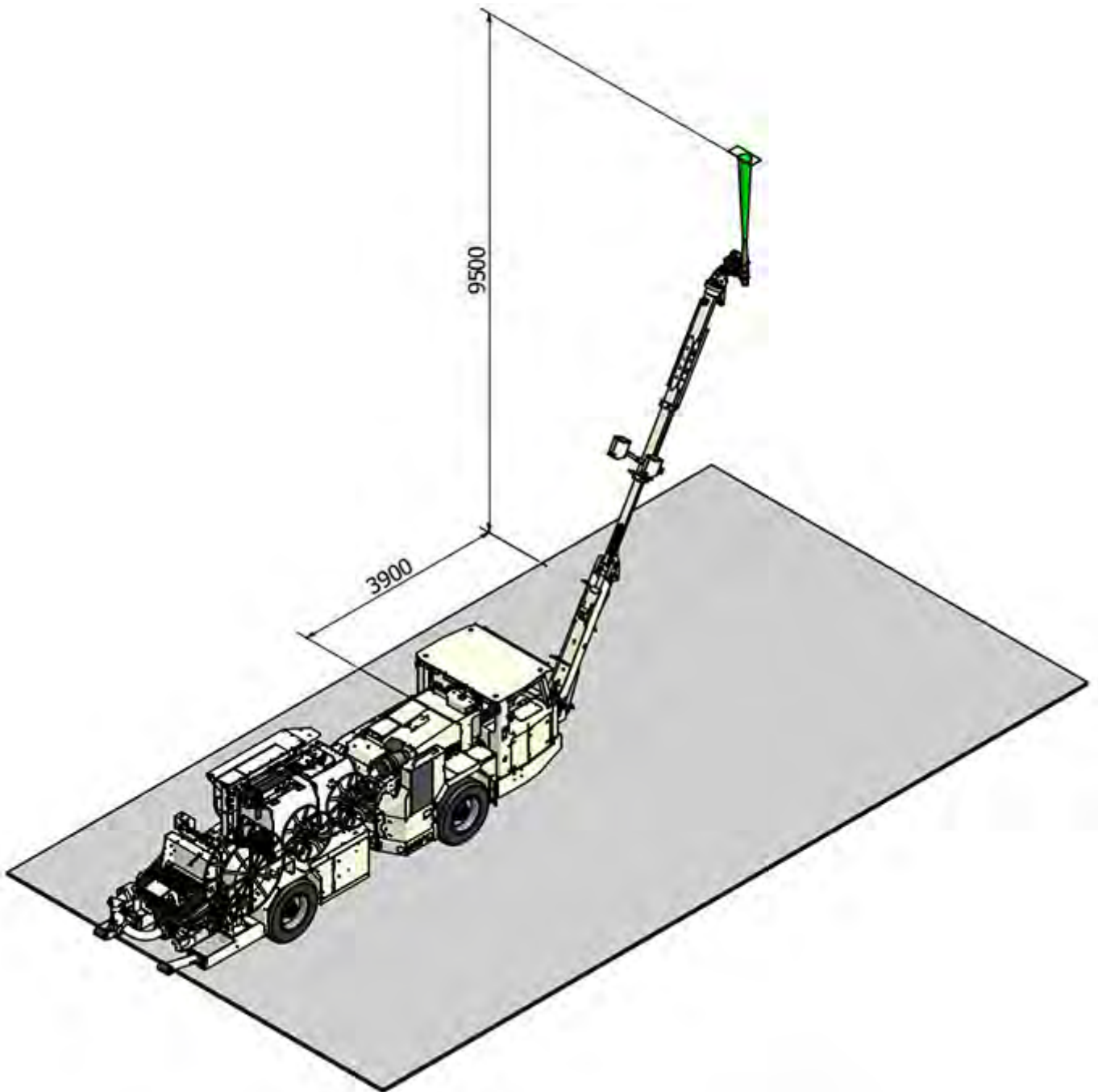
## MAXIMUM SPRAYING AREA



## OPTIMAL SPRAYING AREA



## SPOT SPRAYING REACH



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.



## TRACTIVE EFFORTS

### OPERATING WEIGHT

Base machine

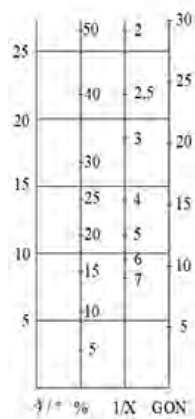
17 700 kg

final machine weight variate in agree with selected options

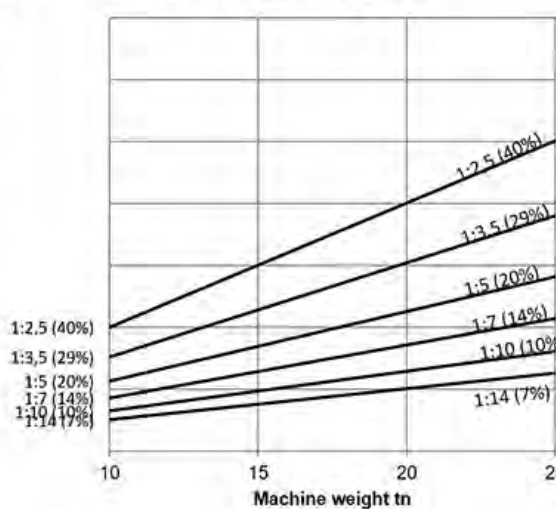
### DEUTZ TCD 2013 L4, 120 KW

Performance curve DOC060005

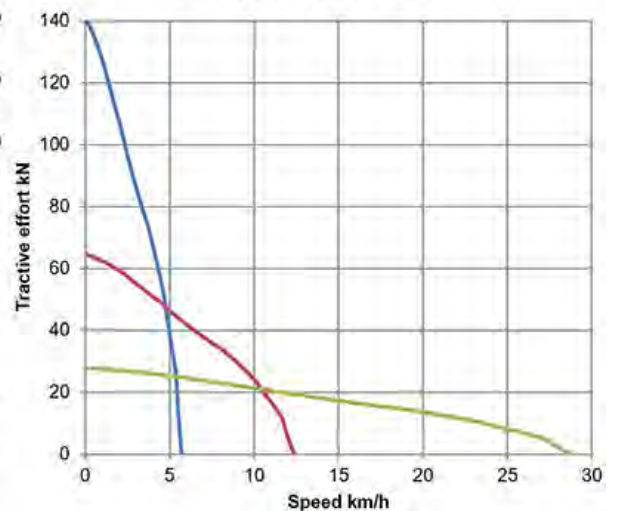
#### Conversion chart



#### Gradeability kN



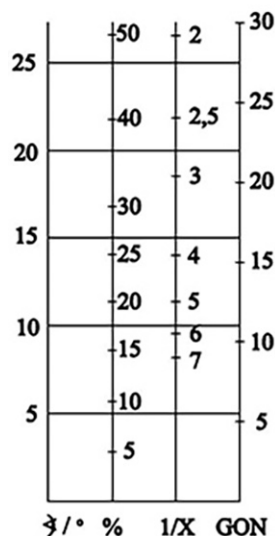
#### Tractive effort kN



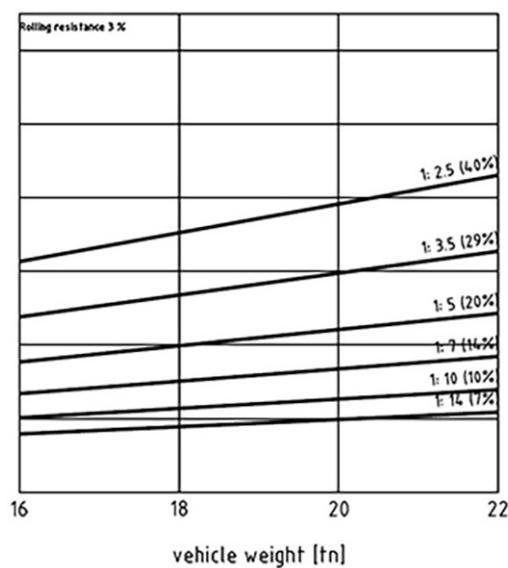
### MERCEDES-BENZ OM 904 LA 110 KW

Performance curve with lock-up 100006272

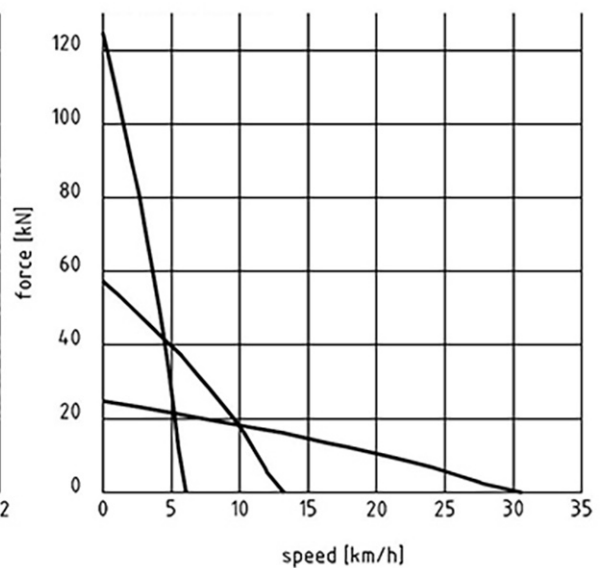
#### CONVERSION CHART



#### GRADIENT



#### TRACTIVE EFFORT



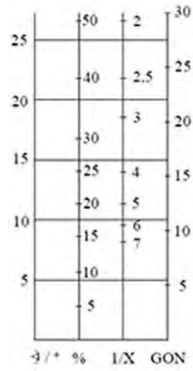
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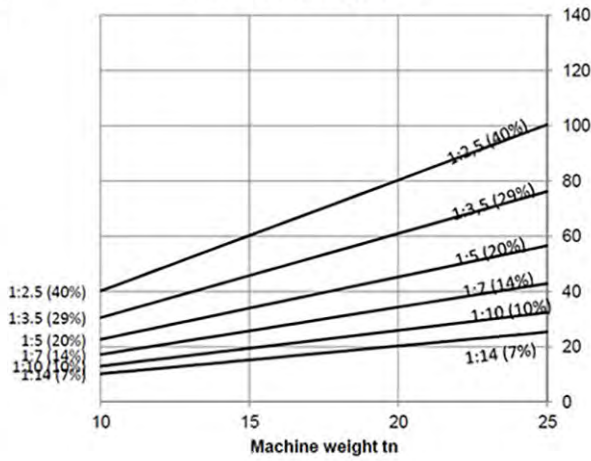
## CUMMINS B 4.5 121 KW

Performance curve with lock-up DOC028557

### Conversion chart



### Gradeability kN



### Tractive effort kN

