



# Spraymec MF 050 VC SD

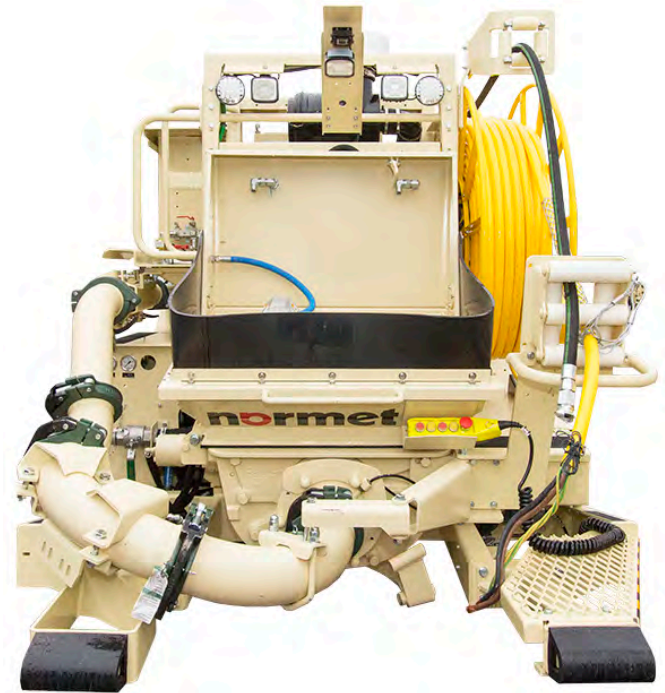


Normet reserves the right to change  
this specification without further notice

Pictures may include options and additional equipment.

## INTRODUCTION

**Spraymec MF 050 VC SD** 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 27 m<sup>3</sup>/h in mains operation.



### LATEST BATTERY-ELECTRIC DRIVE SYSTEM

With the use of a long-life industrial-grade Li-Ion battery (LTO) and a sophisticated battery management system that disconnects the batteries in case of exceeding limit values, Normet delivers the safest and most robust battery technology on the market.

The machine's batteries are charged from the AC grid or fast-charged using CCS compliant charging station.

Two independent electric motors flanged to the standard axles ensure an extremely reliable driveline and allow energy recovery when tramping downhill to charge the batteries and minimize brake wear. Operating costs are much lower than a diesel-driven machine due to lower maintenance costs of the electric drive, reduced ventilation requirements due to the absence of exhaust fumes, and very low heat emissions.

### 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.

### SPRAYING BOOM

The proven spray manipulator with selectable vertical tracking of the upper boom telescope to keep the spraying distance constant is easy to operate. The good protection against rebound, nozzle rotation for better distribution of the spray material, and a high degree of freedom of the manipulator result in a highly effective set-up of a concrete sprayer.

### HIGH VOLUME COMPRESSOR AND CONCRETE DELIVERY SYSTEM

A reliable and high-volume onboard compressor delivers the air volumes required for a high-quality sprayed concrete application.

The conveying and nozzle system with big diameter steel pipes and hoses minimizes the risk of blockages. An optionally available automatic washing system for the nozzle and conveying line reduces personnel to clean the machine.

### RELIABLE CONTROL SYSTEM AND ELECTRICS

The spray manipulator is controlled by 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.

## DRIVERS CAB

The ergonomically located controls in the driver's cabin allow comfortable spraying from the cabin as well as good driving comfort. An LCD multi-information display on the dashboard provides centralized information on the most important operating parameters.



## 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 C

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)

## 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 (mains operation)	3 - 27 m <sup>3</sup> /h
Pumping volume (from drive batteries, external air supply, depending on concrete rheology)	up to 10.5 m <sup>3</sup>
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.

Emptying and flushing the concrete pump from the battery pack.

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
- 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

## COMPRESSOR

Electrically operated screw compressor (only in mains operation)

- 10 m<sup>3</sup>/min 55 kW
- 12 m<sup>3</sup>/min 75 kW

Compressor	Mains voltage at 50 Hz	Mains voltage at 60 Hz
10 m <sup>3</sup> /min	380/400/415 /525/690/1000 V	440/480/600/1000 V
12 m <sup>3</sup> /min	525/690/1000 V	480/600/1000 V

Rated operating pressure 7 bar

Soft start system for 12 m<sup>3</sup>/min compressor (standard up to 600 V)

Connection for external compressed air supply is included on the machine

## 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

## ELECTRICAL SYSTEM

Mains supply voltage:

- 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:

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

Hydraulically driven cable reel:

- Slipping with pilot contact
- Slipping without pilot contact

Hydraulic power pack 75 kW

**Power supply of the truck mixer depending on the supply voltage and compressor output:**

Voltage	Fre-quency	Compressor	Cable size	Power supply to truck mixer
380 V	50 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
400 V	50 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
415 V	50 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
440 V	50 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
525 V	50 Hz	10 m <sup>3</sup> /min	3 x 70 mm <sup>2</sup>	ok
690 V	50 Hz	10 m <sup>3</sup> /min	3 x 50 mm <sup>2</sup>	ok
1000 V	50 Hz	10 m <sup>3</sup> /min	3 x 25 mm <sup>2</sup>	ok
440 V	60 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
460 V	60 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
480 V	60 Hz	10 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	ok
575 V	60 Hz	10 m <sup>3</sup> /min	3 x 70 mm <sup>2</sup>	ok
600 V	60 Hz	10 m <sup>3</sup> /min	3 x 50 mm <sup>2</sup>	ok
1000 V	60 Hz	10 m <sup>3</sup> /min	3 x 25 mm <sup>2</sup>	ok

**Power supply of the truck mixer depending on the supply voltage and compressor output:**

Voltage	Fre-quency	Compressor	Cable size	Power supply to truck mixer
380 V	50 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
400 V	50 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
415 V	50 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
440 V	50 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
525 V	50 Hz	12 m <sup>3</sup> /min	3 x 70 mm <sup>2</sup>	ok
690 V	50 Hz	12 m <sup>3</sup> /min	3 x 50 mm <sup>2</sup>	ok
1000 V	50 Hz	12 m <sup>3</sup> /min	3 x 25 mm <sup>2</sup>	ok
440 V	60 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
460 V	60 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
480 V	60 Hz	12 m <sup>3</sup> /min	3 x 95 mm <sup>2</sup>	n/a
575 V	60 Hz	12 m <sup>3</sup> /min	3 x 70 mm <sup>2</sup>	ok
600 V	60 Hz	12 m <sup>3</sup> /min	3 x 50 mm <sup>2</sup>	ok
1000 V	60 Hz	12 m <sup>3</sup> /min	3 x 25 mm <sup>2</sup>	ok

#### Cable reel capacity:

Cable size	Outer diameter	Max. length on the cable reel
3x35+3G6+2x1x1.5	28,0	150 m
3x50+3G10+2x1x1.5	32,0	130 m
3x70+3G16+2x1x1.5	37,0	100 m
3x95+3G16+2x1x1.5	42,0	100 m

Socket's (2 pcs) supply voltage: 230 V  
 (no UL or AS/NZS approval)

Since not all socket types, voltage levels, pilot wire and high voltage lightning are available in every country, they must be checked on a case-by-case basis.

#### ELECTRIC MOTORS

Two direct drive permanent magnet electric motors

4-wheel drive, no separate transmission

Combined power rating 200 kW

#### PERFORMANCE

Max. tractive effort 99 kN

Tramming speed (horizontal) 20 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.

#### BATTERY

Li-ion battery technology

Nominal voltage 663 V

Energy content 90 kWh

Liquid cooled

Fast charging capability

#### BATTERY CHARGING

25-30 kW on-board 3-phase AC charging system

for up to 2.5 hours of charging time (from 0 to 80%)

CCS type 2 fast-charging socket

to charge batteries from 0-80% in up to 40 min depending on charger

**NOTE:** compatible CCS charging station required with type 2 plug

#### CONTROL SYSTEM

Latest NorSmart 3 control and diagnostic system to control:

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

#### AXLES AND BRAKES

Dana planetary type axles

Fixed load end axle

Suspended engine end axle

Electronic braking: energy recuperation via electric motor braking

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

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

Brake testing possible from cabin

#### 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 +/- 42°

## HYDRAULIC SYSTEM

### Electric power pack 75 kW, 50/60 Hz with 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 350 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

Wireless remote control with 2 joysticks and cable support

- 419 MHz
- 434 MHz
- 458 MHz and tilt switch 22.5°

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

## WATER AND COMPRESSED AIR HOSE REELS COMBINATIONS

	Man. driven	Man. driven	Hyd. driven	Man. driven	Hyd. driven	n/a
Water reel						
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

2 x 12 V deep cycle batteries

24 V battery charger (DC/DC converter)

LED driving and indicator lights

LED work lights on cabin roof (4 pcs)

LED work and reversing lights (6 pcs)

LED work light on hopper (1 pcs)

LED side lights

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

Enclosed cabin with FOPS/ROPS approval and ergonomically placed controls for spray operation on the driver's seat armrests

Driver's seat and seat belt:

- Mechanically 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

Air conditioning and heating

Front facing throttle and brake pedals

Water jet for boot washing

Windscreen and rear window washing

Puddle lights under door steps, on the side of the 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)

Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.



## OTHER

Dry chemical fire extinguisher system

Ansul A-101:

- Checkfire 110
- Checkfire 210

Powder extinguisher:

- 12 kg
- Ansul Sentry

Number of extinguishers:

- 1
- 2

Painting and taping:

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

Reversing camera:

- 3 cameras, 3 displays
- 3 cameras, 3 displays and reversing radar
- 6 cameras, 3 displays. OACR/VCR system recording device with 72 h memory (4 recorded cameras)

Hydraulic front support legs

Front and rear grounding straps:

- Flat cable
- Chain

Electric pump for brake release

Text labels in:

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

Measurements:

- Noise
- Vibration

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
- Hose reel for external air tools including air gun
- Extra display for the dosing system (Nordoser) in cabin
- Spraying condition monitoring system (ambient, concrete, accelerator temperature and air pressure)
- Hot climate kit (extra water/oil-heat exchanger for internal oil system of compressor, required for ambient temperatures above 30°C)
- Hydraulically controlled cleaning gate under the concrete hopper
- 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
- Electric heating element with mixer wheel for accelerator tank, 230 VAC (no UL approval, for 800 l tank only)
- Additional separator in suction line of accelerator
- Accelerator filling pump  
Hydraulic driven filling pump 80 - 110 l/min, impeller type
- Soft start system for 690 V compressor (n/a with 10 m<sup>3</sup>/min compressor)
- Bypass filter kit for oil circuit
  - Filter between pressure line and oil tank
  - Filter unit with electric pump (independent of oil pressure)
    - 110 V
    - 230 V
- Hydraulic oil diagnostic sensor
- Form oil system 24 VDC with hose reel:  
Tank capacity 30 l  
Hose length 20 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
- 3 x 100 W LED working lights on cabin roof (no UL -approval)
- 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 cable guide
- Additional inlet water filter

### CARRIER PRODUCTIVITY

- Accessories for enclosed cabin:
  - Audio system
  - Heated mirrors
- 12 V, 20 A power supply in cabin with socket and connector
- Deutch connector for 24 V, 10 A for external power supply
- Drive battery coolant heater with interior heater and 24 VDC battery charger (230 V)
- Feedthrough for charging of concrete truck
- Remote Driving System (RDS) to move the machine from the remote control
- Fluid evacuation panel with sampling points
- Pump for filling of hydraulic tank
  - Hand pump
  - Electric pump
- Spare rim and tyre
- Toolbox and maintenance tools
- Interior cooling fan
- Wax tape for electric connectors

## SAFETY

- Extra 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
- Direction lights (left/right)
  - Green / Red
  - Red / Green
- Extra warning LED light with battery backup
  - Color
    - Amber
    - Blue
    - Red
    - Green (n/a with rotating light pattern)
    - White (n/a with rotating light pattern)
  - Light pattern
    - Strobe
    - Rotating
- Seat belt interlock switch applies safety brake
- Redundant brake monitoring system
- Methane monitoring system
- Protection guards for tunnel curtains
- Tyre pressure indicators
- Warning triangles
- Flashlight with charger
- Hearing protectors
- Wheel chocks with brackets

## BEV SAFETY FEATURES

- Battery safe box (for transportation and storage)

# 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

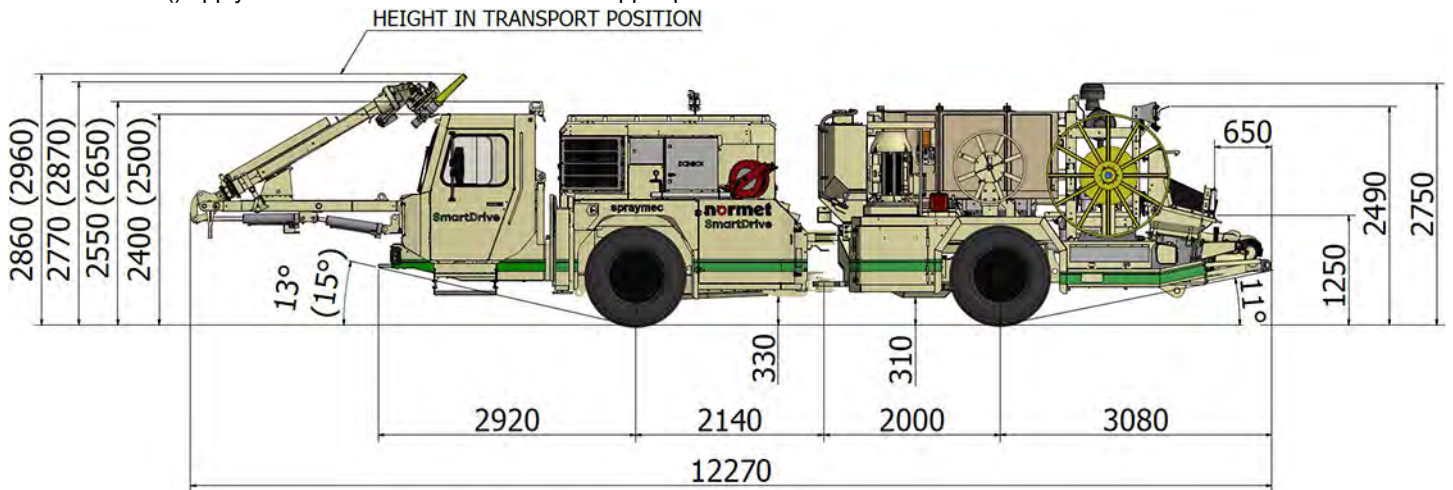
General operation of machines	Basic	Introduction
Symbols of drawings and codes	Basic	Not covered
Understanding hydraulic and electric schematics	Basic	Introduction
Control systems	Basic	Introduction
Function of main components (depending on equipment)	Basic	Introduction
Locations of components in the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

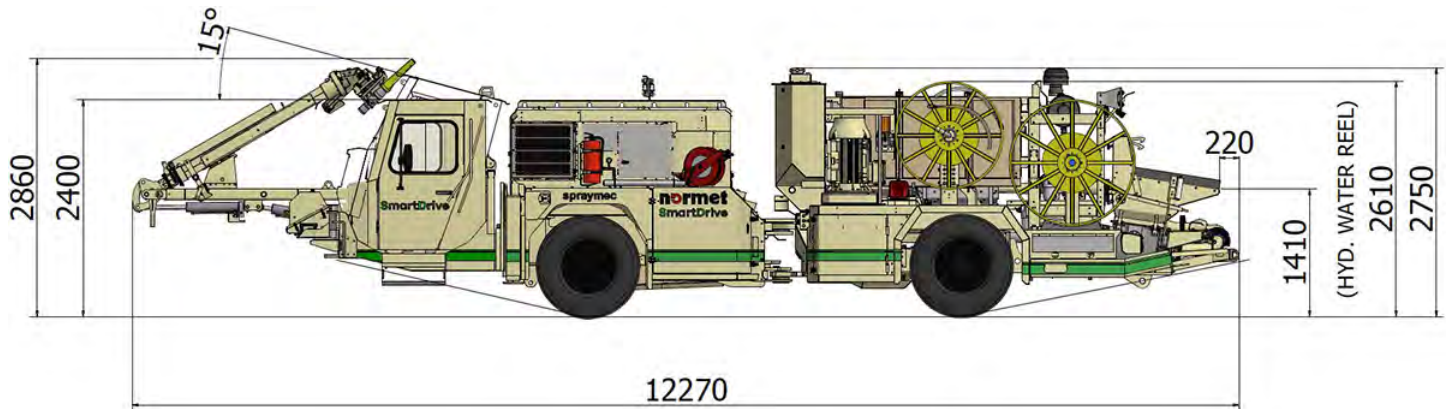
Length	12270 mm	Track	1670 mm
Width	2000 mm	Ground clearance as shown	310 mm
Height	2860 mm	Turning radius outer	8030 mm
Height of cabin	2550 mm	Turning radius inner	4340 mm
Wheel base	4140 mm		

### SIDE VIEW - BASIC MACHINE

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



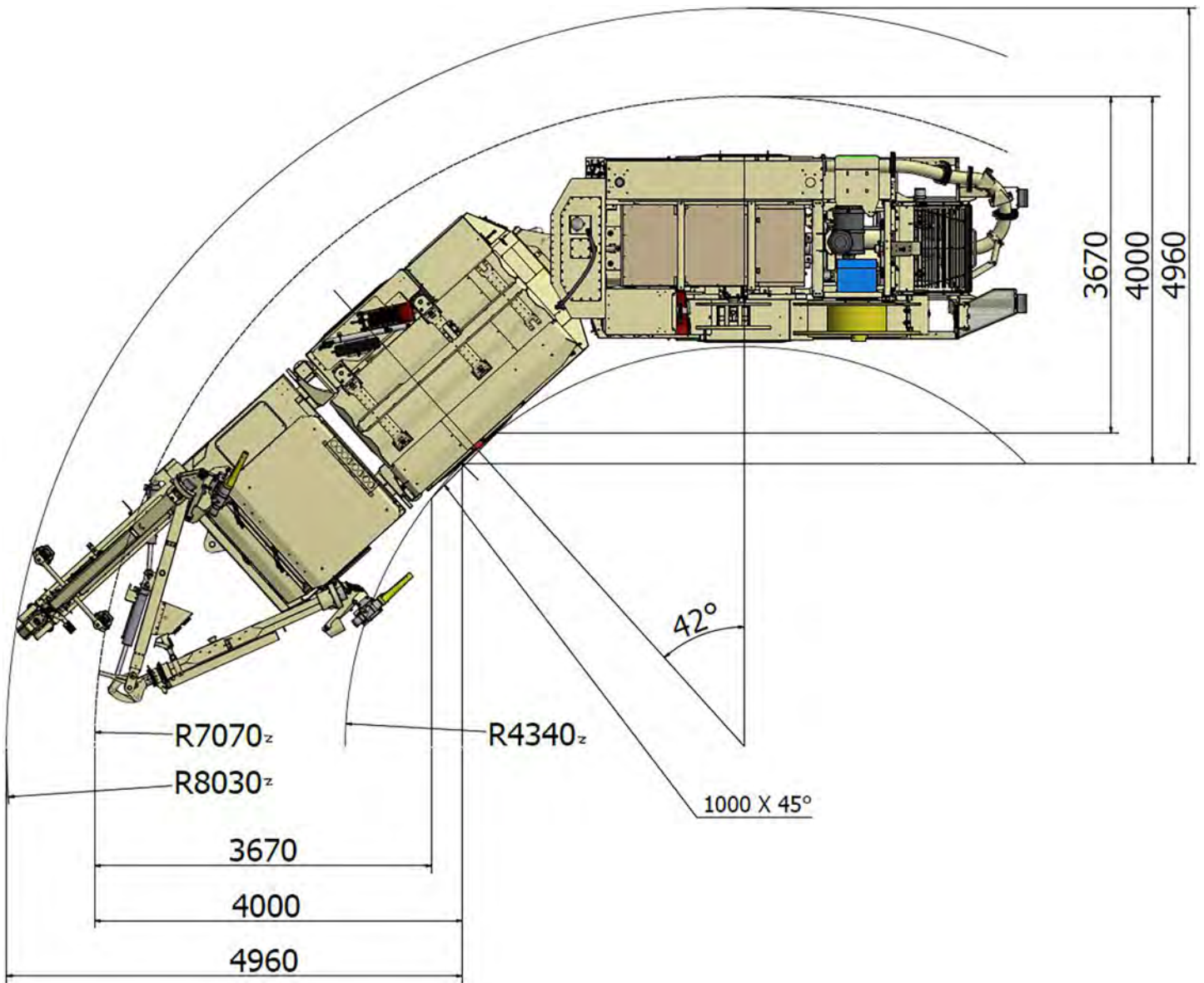
### SIDE VIEW – MACHINE WITH OPTIONS



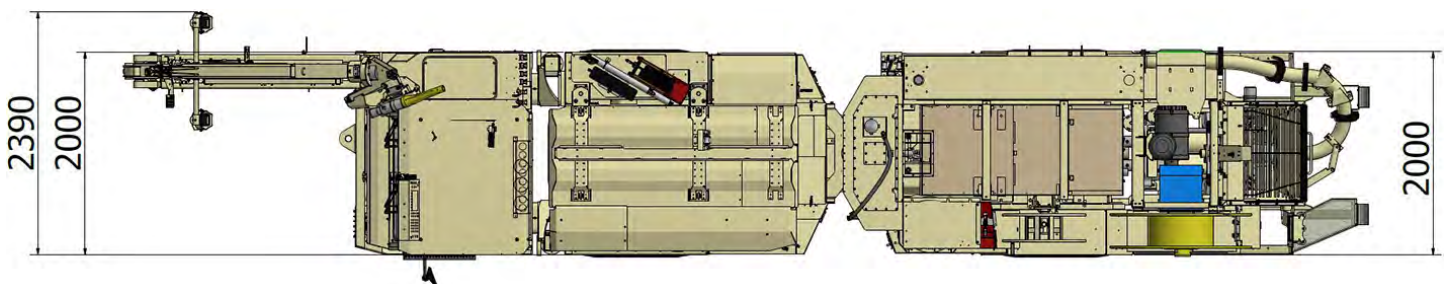
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

**TURNING RADIUS**



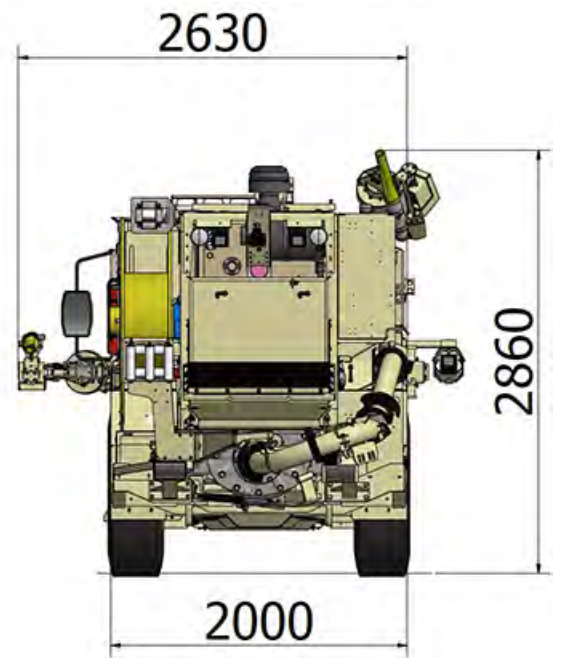
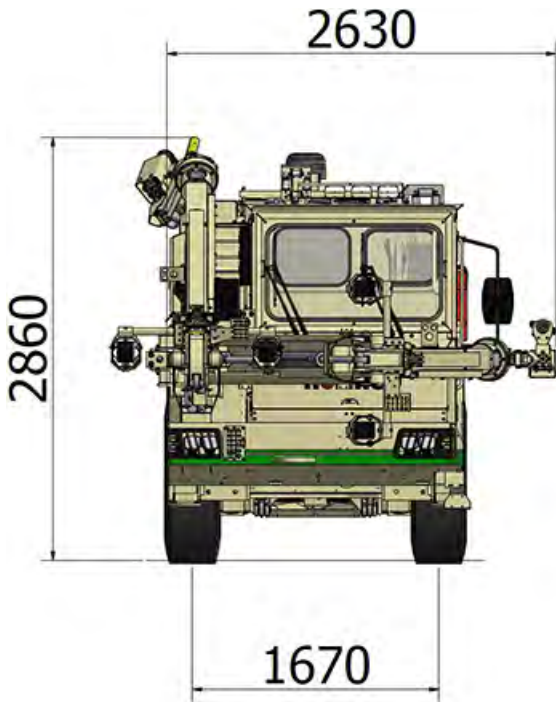
**TOP VIEW**



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

FRONT AND BACK VIEWS

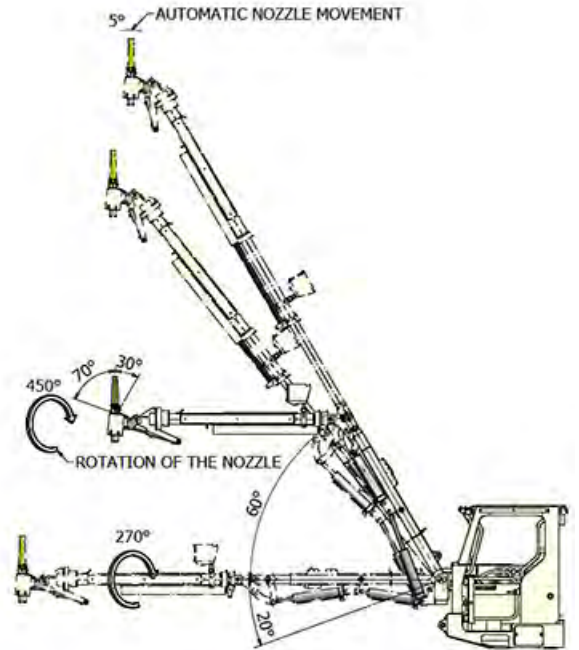
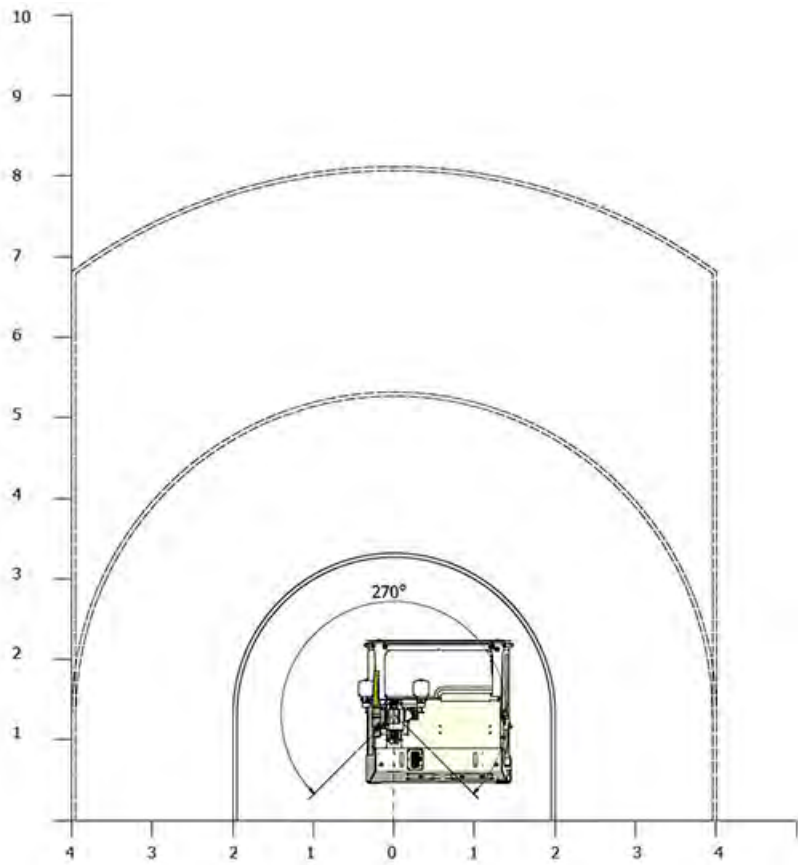


Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.



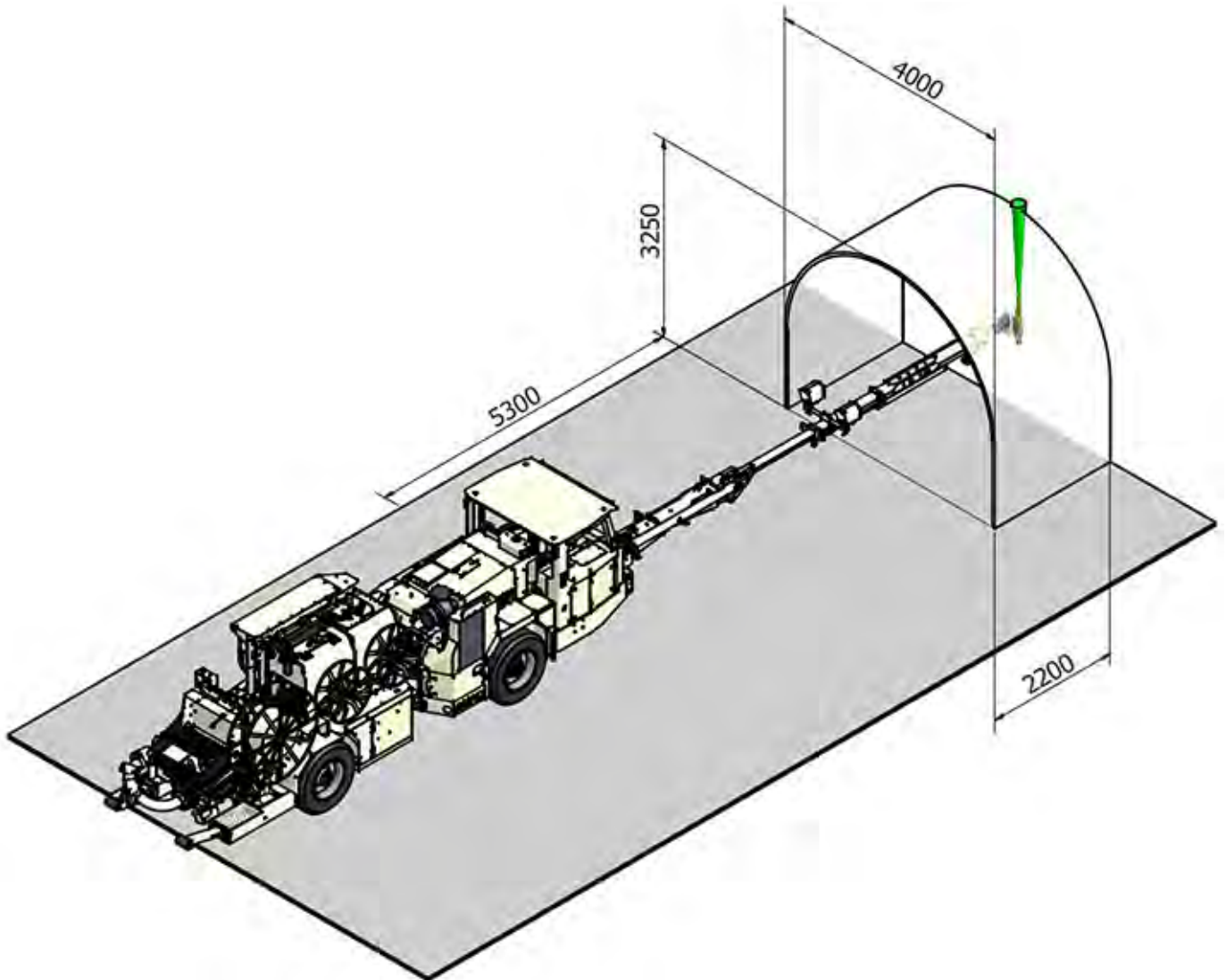
**REACH AREA AND BOOM MOVEMENTS**



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

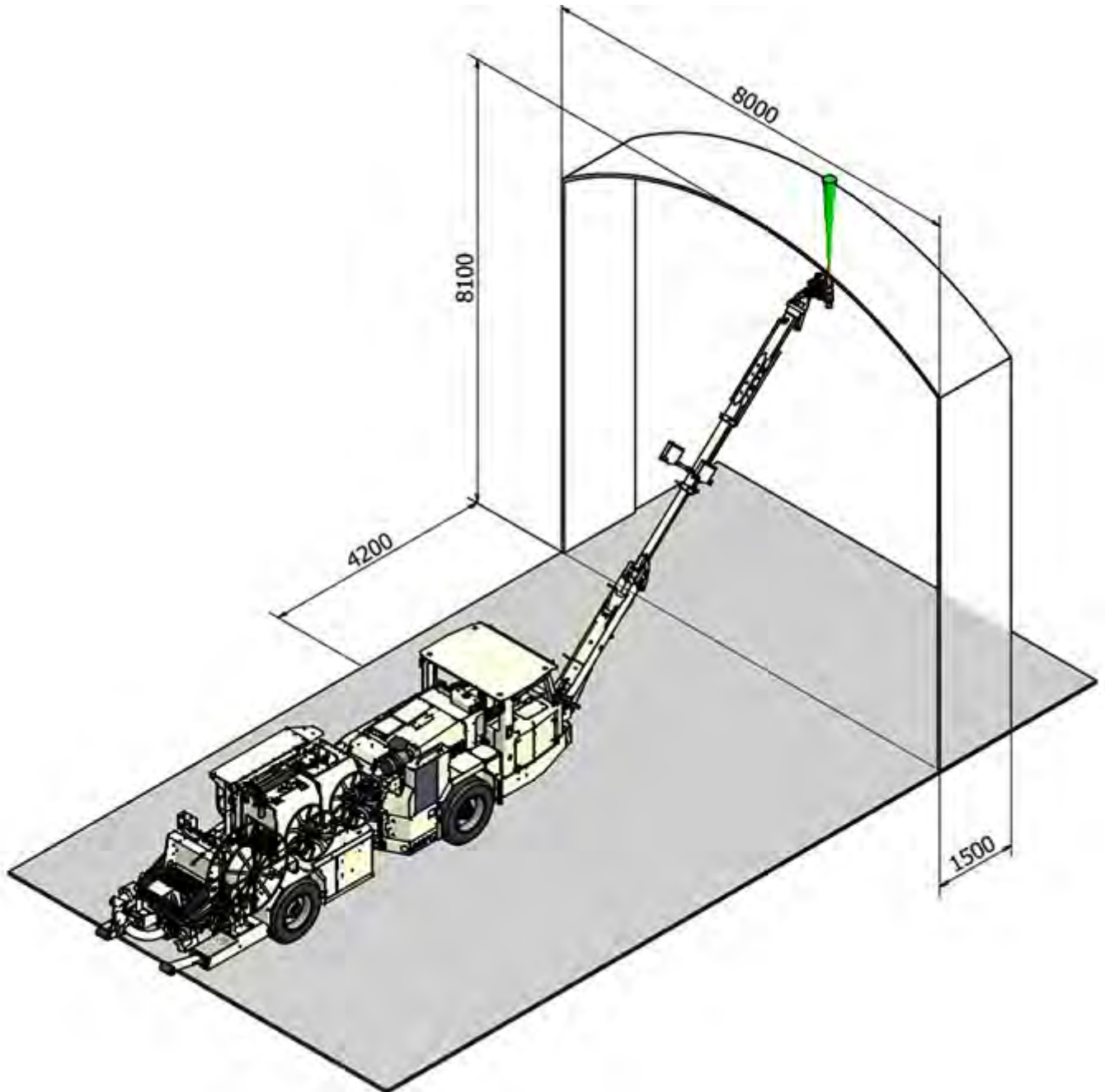
MINIMUM SPRAYING AREA



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

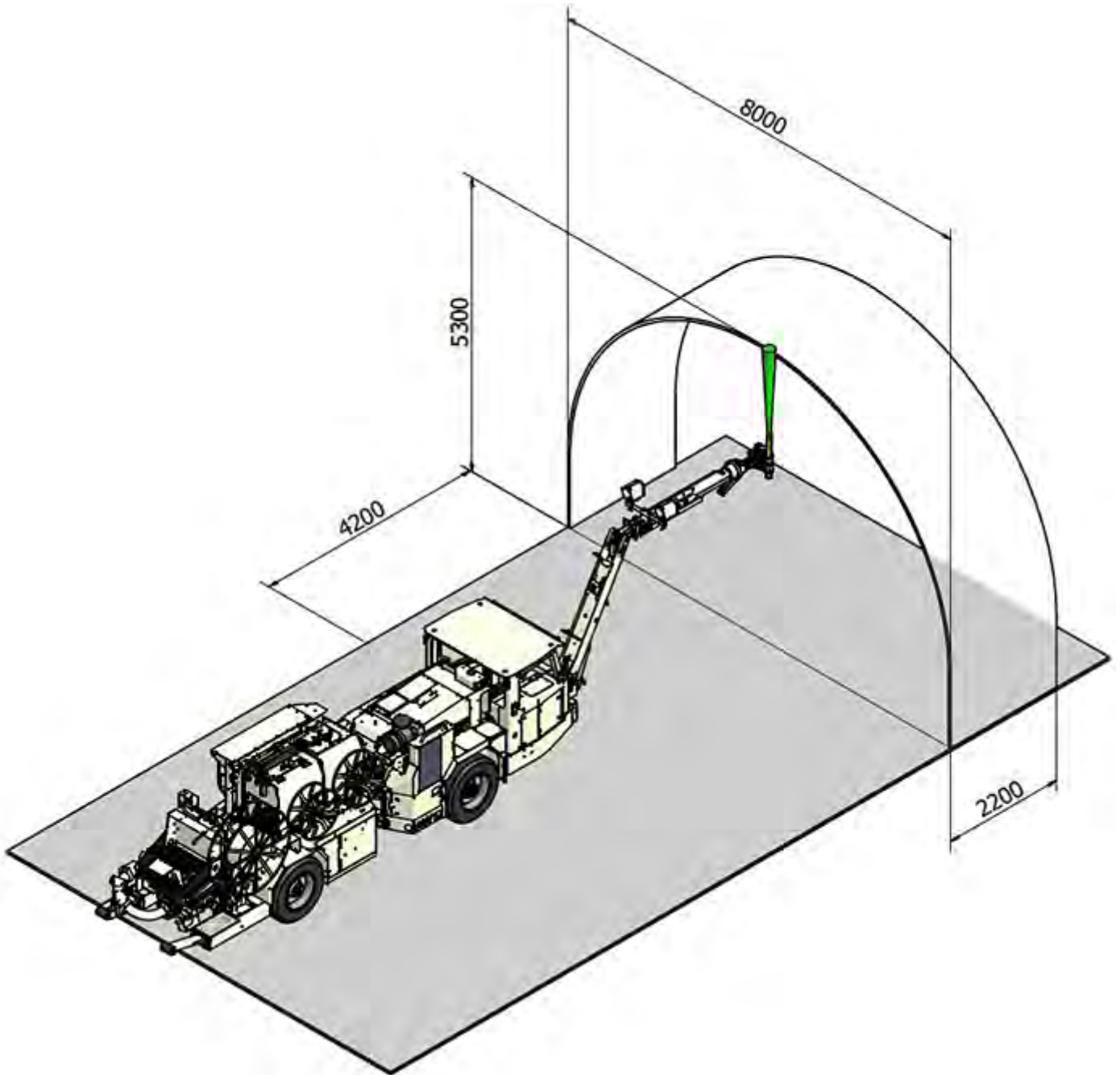
MAXIMUM SPRAYING AREA



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

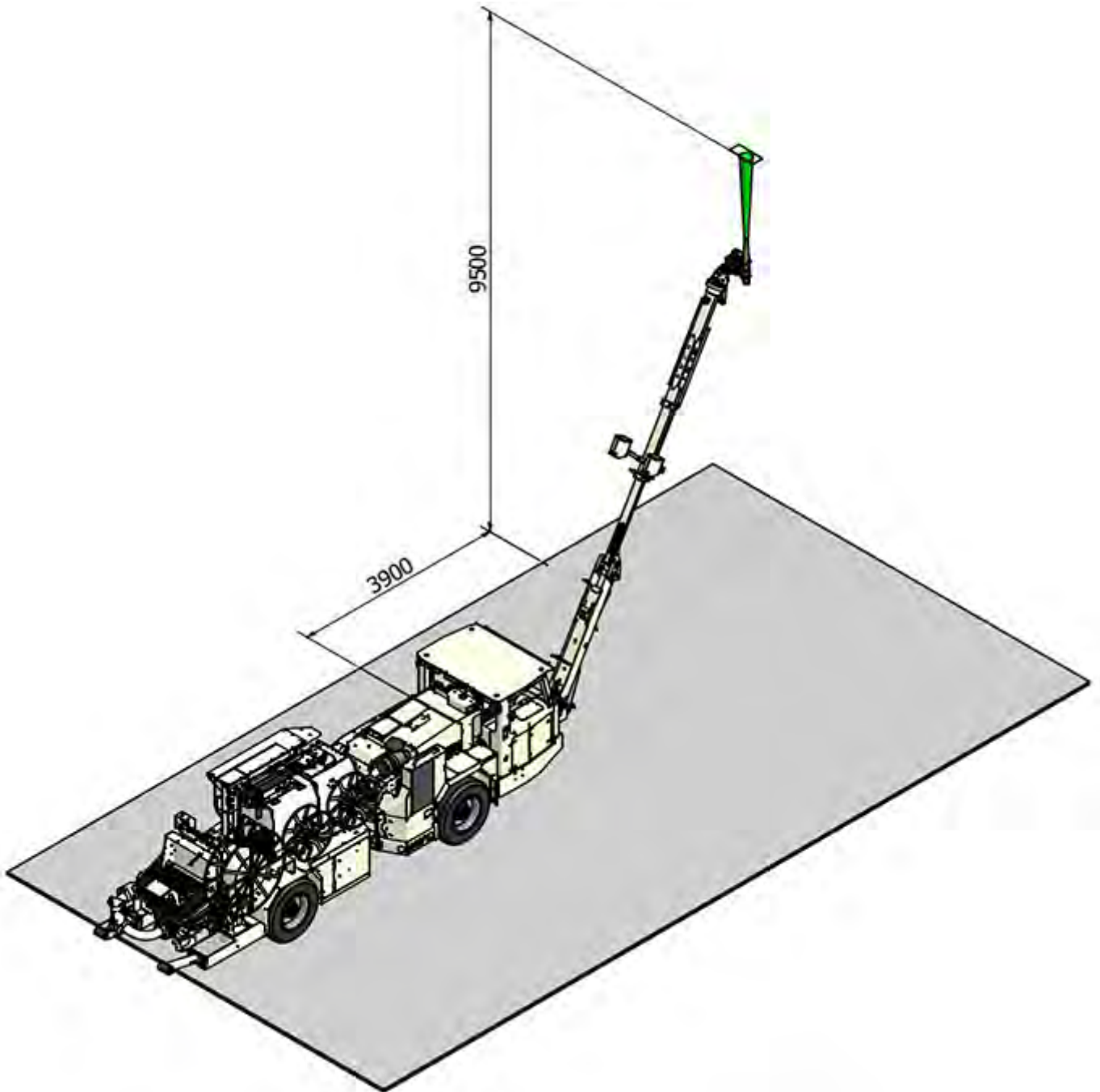
OPTIMAL SPRAYING AREA



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

**SPOT SPRAYING REACH**



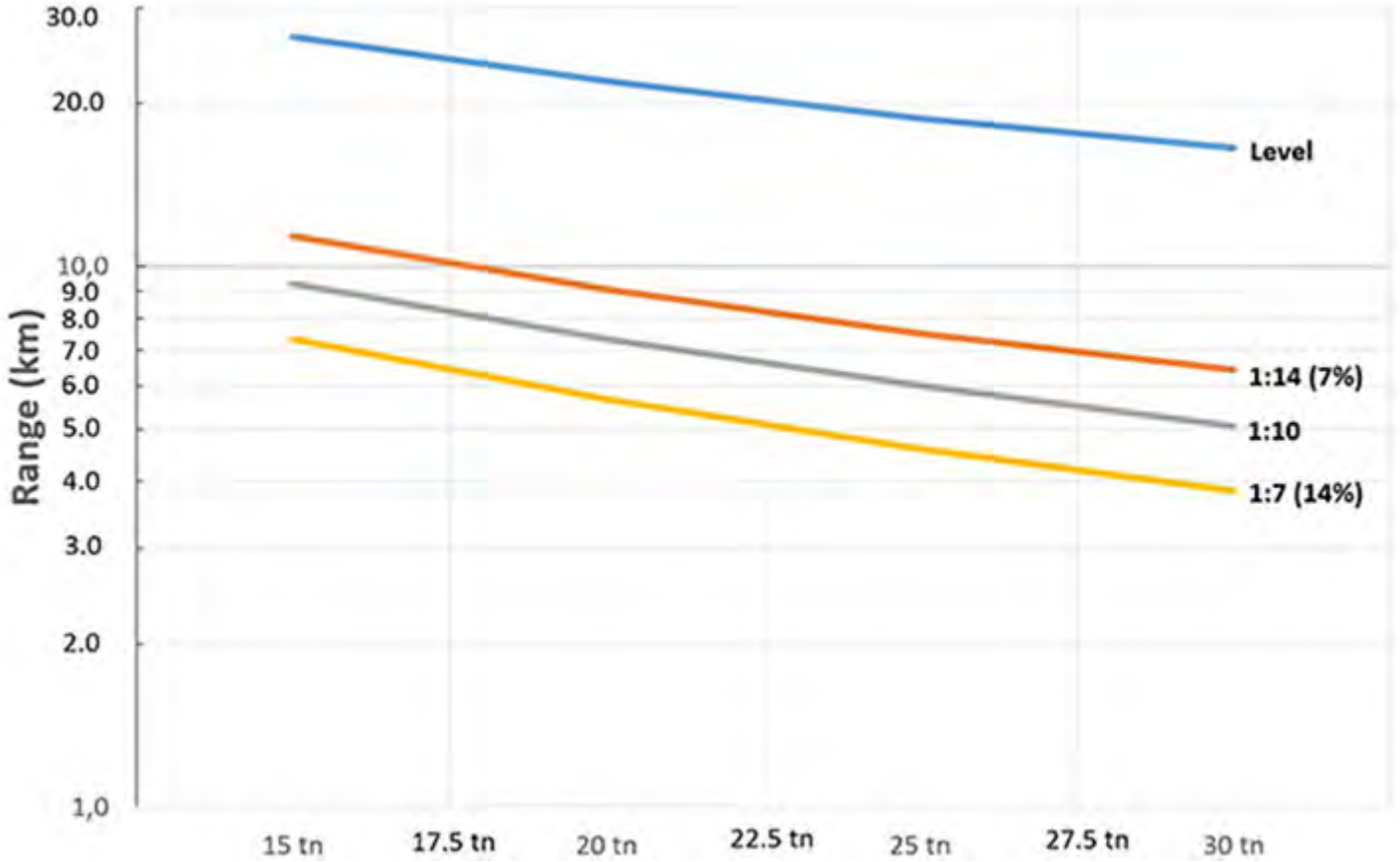
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

# DRIVING RANGE AND TRACTIVE EFFORT

## DRIVING RANGE

Driving range curve: DOC060017



## OPERATING WEIGHT

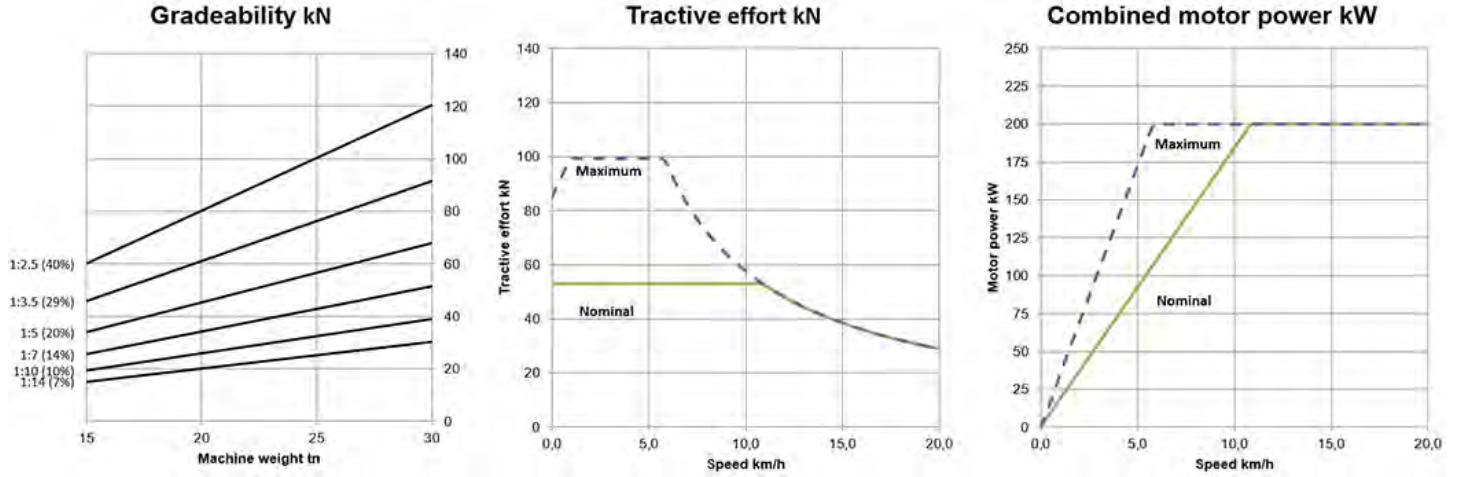
Base machine

21 200 kg

final machine weight variate in agree with selected options

**TRACTIVE EFFORT**

Performance curve: DOC059935



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.