

## WIRTH Heavy Duty Roadheader T3.20S



Figures and features

Cutting rate and pick consumption

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DESCRIPTION OF WIRTH T3.20S (E 242)  
BOOM-TYPE ROADHEADING MACHINE

1. The T3.20 (E 242) is designed specifically for tunnelling in medium to hard rock and is capable of cutting a cross-section up to 7,69 m high and 8,96 m wide from a single central position without moving. The telescopic boom allows the machine to be used in conjunction with the New Austrian Tunnelling Method and also permits a further 1075 mm to be cut below the level of the crawler tracks.  
The T3.20S has the same characteristics, but the loading apron and conveyor have been replaced with counter weights.

2. The machine is equipped with a longitudinal rotary cutting head mounted on the end of a boom which can be raised, lowered and slewed from side to side by hydraulic rams. The boom is also telescopic, allowing the cutting head to be extended forward by up to 1,2 m.

The cutting head is driven by a water-cooled electric motor via an epicyclical gearbox and is laced with an array of pick holders. These are suitable for a range of standard point attack picks available throughout the world.

In operation the cutting head is sumped into the face either by means of the crawler tracks or by telescoping the boom and the rock excavated in a milling action by vertical and horizontal movements of the boom.

3. The excavated debris accumulates in the area in front of the machine and must be loaded out by a front end loader or similar. This operation can be carried out simultaneously with and independently of the cutting operation, thus increasing overall cutting time. Furthermore, with no conveyor coming into contact with the debris, wear costs are greatly reduced, especially when operating in abrasive material.
4. The complete structure of the machine consists of a series of welded steel fabrications bolted together in modular form. The main frame of the machine provides the support for all the other main assemblies. The cutting boom and pedestal are connected to the main frame via a special heavy duty slewing ring bearing.

The crawler track frames are an integral part of the main frame. Each track is independently driven by a variable displacement hydraulic axial piston motor giving infinitely variable crawler speed and is fitted with a fail-safe brake.

As standard the crawlers are equipped with triple-web 800 mm wide track plates. Optionally double-web and single-web track plates are available enabling the machine to operate under all floor conditions. For soft ground 1000 mm wide track plates can be fitted.



The crawlers have sufficient power to enable the machine to operate on vertical gradients up to +/- 15 degrees.

7. As an option, two vertical lifting jacks can be installed, one on each crawler frame, for raising the machine for maintenance purposes. Standard, two vertical stabilizing jacks are provided at the rear of the machine.
8. A working platform is installed covering the complete main body of the machine. This serves not only as a base from which to operate the machine with optimum visibility of the working face, but also as a platform for shotcreting, roof bolting, etc. Furthermore it protects the other on-board equipment from concrete or falling objects and can also be used for the fixation of ancillary equipment such as ventilation ducting, roof bolters, etc.
9. With the exception of the cutting head, all the main functions of the machine are operated hydraulically. The power pack comprising tank, three pressure-regulated radial piston pumps, five constant delivery gear pumps, water-cooled electric motor, filters, oil coolers and filler pump is located on the right hand side of the machine. Pre-set level and temperature switches protect the system which is suitable for use with normal mineral oil or HF-B and HF-C fire-resistant fluids.

All the main valves are grouped together in a valve module in the centre of the machine. The valves are linked together by rigid steel piping, hoses only being used to connect the valves to the actuators.

The main valves are solenoid-operated from a portable cable remote control panel which can be plugged into the main control panel at the driver's seat on the working platform on top of the machine or, alternatively, into a number of auxiliary control sockets located around the machine in easy reach from floor level.

Gauges indicating pressure in each circuit, pilot pressure, filter back pressures, oil temperature and cooling water temperature are located in an instrument panel at the driver's seat on top of the machine.

10. The cutter motor, power pack motor and the hydraulic system are all water-cooled. An integrated closed-loop cooling system is installed comprising tank, vane pump and five fan-cooled radiators. The vane pump is electrically driven and the complete circuit operates on a 50/50 water/anti-freeze coolant.

11. As standard the machine is designed for use with an electrical power supply rated 1000 V / 50 Hz. The electrical system can also be modified for use with other voltages and 60 Hz supplies.

The switchgear for all the motors and the main circuit breaker for the incoming supply, are all contained in one single contactor case located on the left hand side of the machine. All motors are protected against both thermal and current overload as well as against short-to-earth.

A control panel with start and stop buttons for all motors as well as ammeters and fault indicator lamps is located at the driver's seat. Emergency stop buttons are provided at several points around the machine. 2 headlamps are installed beside the turret and additional lighting can be provided as an option.

12. The machine can also be supplied with a variety of options and ancillary equipment to suit the customer's specific requirements such as, for example:

- Transversal cutting head.
- Automatic profile guidance system.
- Lifting jacks fitted to the crawler side frames.
- Lifting device fitted to the cutting boom to assist setting of steel arches.
- Integrated hydraulic roof bolting unit.
- 1000 kVA transformer for the main power supply.
- Diesel-hydraulic power pack for moving the machine independently of the electrical power supply.
- Track plates 1000 mm width.
- Air-conditioned operator cabin





## LIST OF TECHNICAL DATA FOR WIRTH T3.20S (E 242) BOOM-TYPE ROADHEADING MACHINE (1000 V/50 Hz)

### 1. Machine Overall

Weight	120 t
Length (boom retracted)	approx.13500 mm
Height (without railing)	3940 mm
Max. cutting height	
- boom extended	7690 mm
- boom retracted	7040 mm
Max. cutting width	
- boom extended	8960 mm
- boom retracted	7600 mm
Conveyor clearance height	3000 mm
Width (excl. apron + lifting jacks)	
- with 1000 mm wide track plates	3600 mm
- with 800 mm wide track plates	3400 mm
Width with lifting jacks	4670 mm
Total installed power (1000 V)	approx. 414 kW

### 2. Undercarriage

Size	B8
Axle spacing	3830 mm
Track plate width	
- standard	800 mm
- optionally	1000 mm
Drive type	variable axial piston motor
Speed	0 – 16,25 m/min



## Average floor pressure

- 1000 mm track plates	15,4 N/cm <sup>2</sup>
- 800 mm track plates	19,2 N/cm <sup>2</sup>

### 3. Cutting Arm

Installed power 300/150 kW

Motor speed 1477 / 730 rev/min

Gearbox ratio 35,85 : 1

Cutting head speed 41,2 / 20,36 rev/min

Ave. pick speed 2,58 / 1,28 m/s

Boom stroke 1200 mm

#### Forces applied at cutting head (boom retracted)

- slew	120 kN
- lower	120 kN
- raise	120 kN

#### Forces applied at cutting head (boom extended)

- slew	100 kN
- lower	120 kN
- raise	90 kN

Sumping force (using telescopic boom) 300 kN

### 4. Hydraulics

Fluid mineral oil

Tank capacity approx. 1200 l

Total system capacity approx. 1400 l

Max. operating pressure 240 bar

Pump motor power 110 kW

Motor speed 1470 rev/min



Cooling	water
No. of pumps	
- pressure regulated	3
- constant delivery	5
Flow rates	2 x (0-180) l/min 1 x (0-40) l/min 2 x 110 l/min 3 x 20 l/min

## 5. Cooling System

Type	closed-loop
Heat exchangers	
- oil cooling	3 x oil/air radiator
- motor cooling	2 x water/air radiator
Cooling tank capacity	60 l
Coolant	50/50 water/anti-freeze
Cooling pump drive	
- installed power	4 kW
- motor speed	2920 rev/min

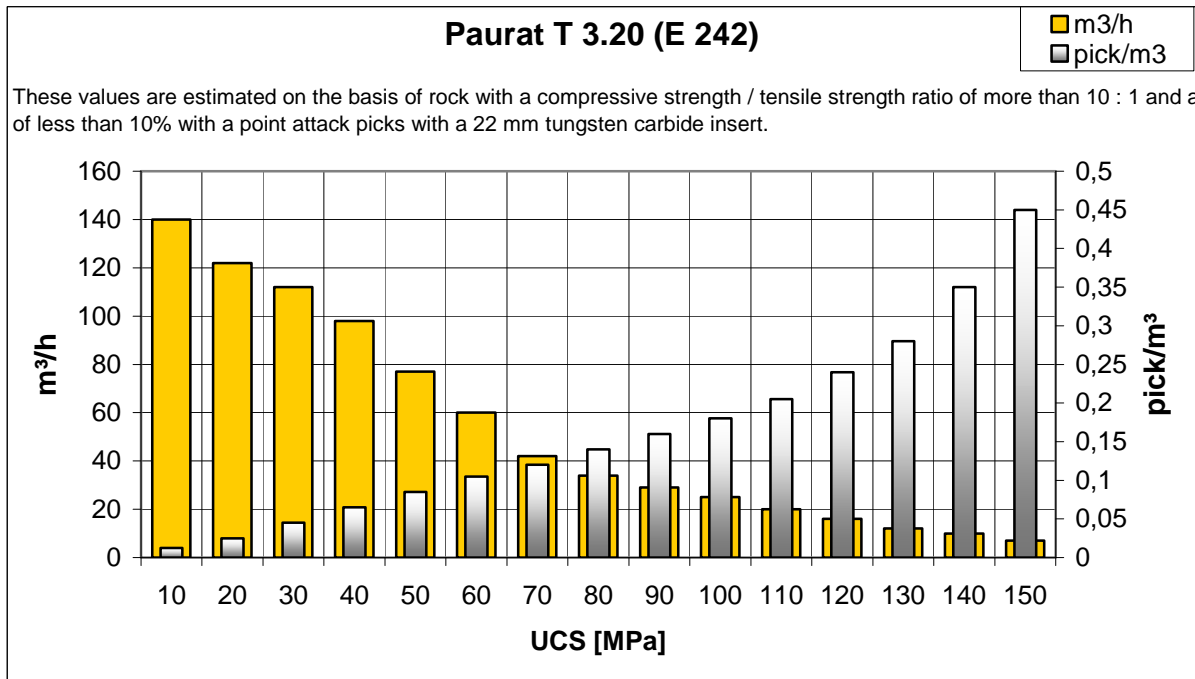
## 6. Electrics

Voltage	1000 V/50 Hz (1000 V/60 Hz)
Switchgear	in accordance with German Standard VDE 0100/0113
Installed powers	
- cutter motor	300/150 kW
- power pack motor	110 kW
- 1 cooling pump motor	4 kW
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Total (approx.)	414 kW

**Note:** As to the 60 Hz version of the machine the gearbox ratio changes.



T3.20 ROADHEADER  
Cutting Rate and Pick Consumption



**These values are estimated on the basis of rock with a compressive strength / tensile strength ratio of more than 10 : 1 and a quartz content of less than 10% with a point attack picks with a 22 mm tungsten carbide insert.**





## General Arrangement Drawing

