

Tunnel Boring Machine - Series II



- Fully Sealed Drive System For Cutter Head •
- 3 Point Hydraulic Steering To Maintain Line & Grade •
- Bi-Directional, Variable Speed Cutter Head Rotation •
- Improved Hydraulic Controls For Ease of Operation •



420 TBM Series II

FEATURES

- Tunnel Boring Machines (TBM) are suitable where manned entry is permitted.
- Operator station pilot valves control TBM steering and spoil removal process. Also allows constant monitoring of spoil conditions and line and grade accuracy.
- High torque hydraulic motors capable of 5,000 psi rotate the inner drum and cutter face to excavate soils.
- Three point hydraulic steering control to maintain line and grade.
- Sealed steering joint allows the TBM to be articulated and hydraulically steerable in any direction.
- Target on the face of the TBM provides strict line and grade with laser system (customer supplied).
- Cutter head can be accessed from the front of the TBM and the face of the bore for ease of obstruction removal, changing the cutter head and to perform routine maintenance, all while underground.
- Torque wings provide an anti-roll function.
- Equipped with a methane gas detection system.
- The standard cutter head is the dirt/carbide head for clay, silty sand and soft to medium hard rock conditions.
- Optional cutter attachments: closed face attachment is available for unstable ground conditions; the sand shelves are for loose unstable soil, but not flowing soil.
- Increase kits are available to match specific pipe OD.

SPECIFICATIONS

TBM Model	Wall Thickness	Pipe ID	Machine OD	Cutting Diameter	Drive Motors Two Speed (30 CID)	Torque (Low/High)	Cutting Torque (ft-lbs) @ 3,000 psi	Cutting Torque (ft-lbs) @ 5,000 psi	Cutting Speed** CW & CCW (based on 3,000 psi)
48SC	*	N/A	48"	49.5"	4	Low High	20,000 30,000	33,000 50,000	0-29.3 rpm @ 90gpm 0-19.5 rpm @ 90gpm
420	B	42"	51"	52.5"	4	Low High	21,000 32,000	35,000 53,000	0-27.8 rpm @ 90gpm 0-18.5 rpm @ 90gpm
480	B	48"	58"	59.5"	6	Low High	38,000 57,000	64,000 96,000	0-22.1 rpm @ 120gpm 0-14.7 rpm @ 120gpm
540	B	54"	65"	66.5"	6	Low High	44,000 67,000	74,000 111,000	0-19.0 rpm @ 120gpm 0-12.6 rpm @ 120gpm
600	B	60"	72"	73.5"	6	Low High	51,000 77,000	85,000 128,000	0-16.5 rpm @ 120gpm 0-11.0 rpm @ 120gpm
660	B	66"	79"	80.5"	6	Low High	57,000 86,000	96,000 144,000	0-14.7 rpm @ 120gpm 0-9.8 rpm @ 120gpm
720	B	72"	86"	87.5"	9	Low High	96,000 144,000	160,000 240,000	0-8.9 rpm @ 120gpm 0-5.9 rpm @ 120gpm
780	B	78"	93"	94.5"	9	Low High	105,000 158,000	175,000 263,000	0-8.1 rpm @ 120gpm 0-5.4 rpm @ 120gpm
840	B	84"	96"	97.5"	4	Low High	177,000 265,000	293,000 440,000	^0-6.6 rpm @ 140gpm ^0-4.4 rpm @ 140gpm

* Steel casing wall thickness is typically 1/2"

** When using the 5200 pump unit in the 5,000 psi selection mode, the pump unit supplies 70 gpm. Therefore the listed cutter speeds will be reduced by approximately 60%.

^ With on-board power pack.

Hydraulics

Supply Flow 30 / 60 / 90 / 120 / 140* Gal
Operating Pressure (5000 Series Pump Unit) 3,000 psi
Operating Pressure (Maximum)** 5,000 psi
Filtration..... Two Pressure 10 Micron Filters

* With on-board power pack

** Note: If operating between 3,000 psi - 5,000 psi, the TBM supply lines/hoses MUST be rated at 5,000 psi minimum.

Cutter Head Drive

Rotational Speed Continuously variable in CW or CCW
Drive Motor Horsepower Two Speed, 30 HP

Cutter Head Bearing & Sealing

Bearing Type Three-row roller slewing bearing with integral drive gear
Sealing System TBM lip seals with automated, pressurized grease flushing
Bearing Cavity Oil Capacity (approx. per model) 17.5 - 35 gal (66 L - 132 L)
Lubrication System
..... Fully automated oil circulation system continuously pressurized and filtered
Seal Grease Reservoir 20 lb. (9 kg)

Cutter Head

Standard Dirt/Carbide Cutter Bar
Optional Closed Face, Sand Shelves

TBM Roll Control

Standard Two Hydraulic Torque Wings
Optional..... Hydraulic Torque Wings, Hydraulic CW or CCW Dirt Wings

Safety Circuit

E-Stop Button Control System Shut Down
Conveyor Safety Valve Switch Rotation Shut Down

Steering System

Articulation 3 Degrees
Number of Cylinders (per model) Three or Six
Cylinder Stroke (per model) 4 - 6 in. (102 - 152 mm)
Rated Pressure (per model) 4,100 - 5,000 psi
Operating Pressure 3,000 psi

Gas Detector Methane Gas

Electrical

Power Supply (to Pump Unit) 480VAC, 3 Phase, 60 Hz, 400 Amp
Power Supply (from Pump Unit to TBM) 480VAC, 3 Phase, 60 Hz, 15 Amp
Transformer 24 VDC
Tunnel Cable 10AWG/6C 90°C



Bearing Seal Grease System



TBM Interior



Operator station with pilot operated controls for the inner drum, conveyor, and auxiliary functions.

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