

# VOLVO BM 3500



## *Specification Volvo BM 3500 Motor Grader*

### PRODUCTIVE

The Volvo BM 3500 Motor Grader's extremely long reach on both sides, and its deep grader blade, mean that the really tough jobs, such as sloping and ditching, can be finished quickly and efficiently. The machine's capacity is further boosted by articulated bogie steering, which allows the 3500 to operate in the crab position, compensating for lateral drift and allowing the machine to work with full blade load through a curve. Articulated bogie steering also gives the 3500 a high degree of flexibility and manoeuvrability when working on confined work sites, particularly in urban areas.

The 3500's high horsepower-to-weight ratio enables it to work effectively under the most difficult conditions.

### ECONOMICAL

The 3500 is built from time-tested components, guaranteeing a long service life and high machine availability.

The Volvo engine, combined with Volvo transmission, provides a unique range of speeds and tractive powers coupled with very low fuel consumption.

The safety clutch controlling the blade's rotation and simple to replace components, keep servicing and downtime costs due to wear-and-tear, to a minimum.

The time required for daily maintenance is also reduced since the machine has a small number of easily accessible service points.

### SAFETY AND COMFORT

The ROPS-tested cab complete with tinted windows (as standard) offers the operator a secure and comfortable workplace.

Good visibility and a low sound level, both inside and outside the cab, enable the operator to maintain full control over his machine in every situation. It also enables him to stay in close contact with the outside world.

The result is a working environment in which the operator can carry out his duties with greater speed and precision.





## ENGINE

Volvo TD 70

Flywheel rating<sup>1)</sup>: 136 kW at 38.5 rev/s  
(185 hp at 2300 rev/min)  
 Engine rating<sup>2)</sup>: 154.5 kW at 38.5 rev/s  
(210 hp at 2300 rev/min)  
<sup>1)</sup> DIN (standard 70020)  
<sup>2)</sup> SAE gross (standard 70020)

Torque: 627 Nm at 26.5 rev/s DIN  
(462 ft/lb at 1600 rev/min DIN)  
692 Nm at 26.5 rev/s SAE  
(511 ft/lb at 1600 rev/min SAE)

Cylinder diameter: 104.77 mm (4.12 in)  
 Stroke: 130 mm (5 in)  
 Number of cylinders: 6  
 Displacement: 6.73 litres (411 in<sup>3</sup>)

The Turbocharged 4-stroke diesel engine has six in-line cylinders with direct-injection, overhead valves and replaceable wet cylinder linings. The cyclonic action air cleaner with highly efficient paper filter is fitted with a pressure drop indicator and pilot lamp.



## ELECTRICAL SYSTEM

Voltage: 24 V  
 Alternator: 1080 W (45 A)  
 Batteries: 2 x 12 V, 135 Ah  
 Starter Motor: 4.4 kW (6 hp)

The electrical system is designed for reliability. The alternator guarantees ample charging, even at low engine revolutions, and the powerful starter motor gives easy starts, even at low temperatures. Driving and working lights are big and powerful for efficient night-working. Fuses are conveniently located inside the cab.



## TORQUE CONVERTER

Type: Single-stage with freewheel stator and lock-up clutch  
 Torque conversion ratio: 2.21  
 Alt. 1 Automatic engagement of direct clutch (1700 rev/min)  
 Alt. 2 Continuous torque conversion

Operation:



## CLUTCH

Type: Double-disc dry plate clutch  
 Diameter/friction surface: 15"/2650 cm<sup>2</sup>

Operation:

Electro-pneumatic via button on gear lever and fully-pneumatic via pedal with smooth start function.



## GEARBOX

Type: Fully-synchronized forward gears. Single-lever-operated. Clutch brake for reverse gears.

Number of gears forward/reverse: 8/2

Gear

Forward Speed

1	4.5 km/h ( 2.8 mph)
2	6.4 km/h ( 4.0 mph)
3	9.2 km/h ( 5.0 mph)
4	12.1 km/h ( 7.5 mph)
5	17.7 km/h (11.0 mph)
6	25.3 km/h (15.7 mph)
7	36.0 km/h (22.4 mph)
8	47.7 km/h (30.0 mph)

Reverse

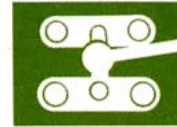
1	4.9 km/h ( 3.0 mph)
2	19.3 km/h (12.0 mph)



## DROP-BOX

Make: Volvo BM  
 Ratio: 34/35

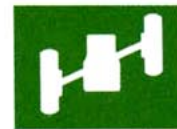
Can be equipped with wheel-dependent power take-off and emergency steering.



## REAR AXLE & TANDEM

Make: Volvo BM  
 Fully floating with differential, equipped with air-operated differential lock.

Tandem housing  
 Dimensions: height x width x gauge: 576 x 128 x 20 mm  
 (22.7 x 5.0 x 0.8 in)  
 Tandem drive: Gear transmission



## FRONT AXLE

Ground clearance: 580 mm (22.8 in)  
 Oscillation: ± 15°  
 Wheel lean: ± 18°

V-shaped box construction. Designed for heavy front attachments.



## STEERING SYSTEM

Type: Hydrostatic, wheel operated  
 Pump, type: Gear pump  
 Capacity: 17 l/min (4.5 US gal/min)  
(3.7 Imp.gal/min)

Working pressure: 90 bar  
 Steering angle: ± 48°  
 Steering wheel: Fully adjustable

Articulated bogie steering: Bogie rotates on ball bearing race between rear axle casing and rear frame members. Turning is effected by means of two crossed double-acting hydraulic cylinders.

Diameter of ball bearing race: 750 mm (30.0 in)

Steering angle: ± 15°

Operation: Lever with steering angle indicator

Minimum turning radius with maximum front wheel lean, bogie steering and differential: 7.5 m (25 ft).



## BRAKES

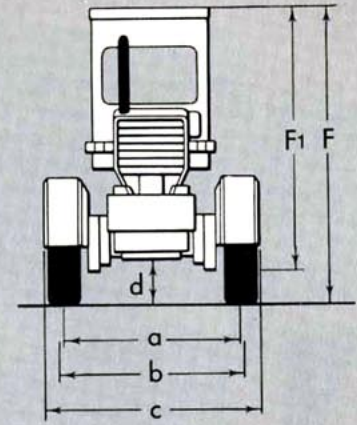
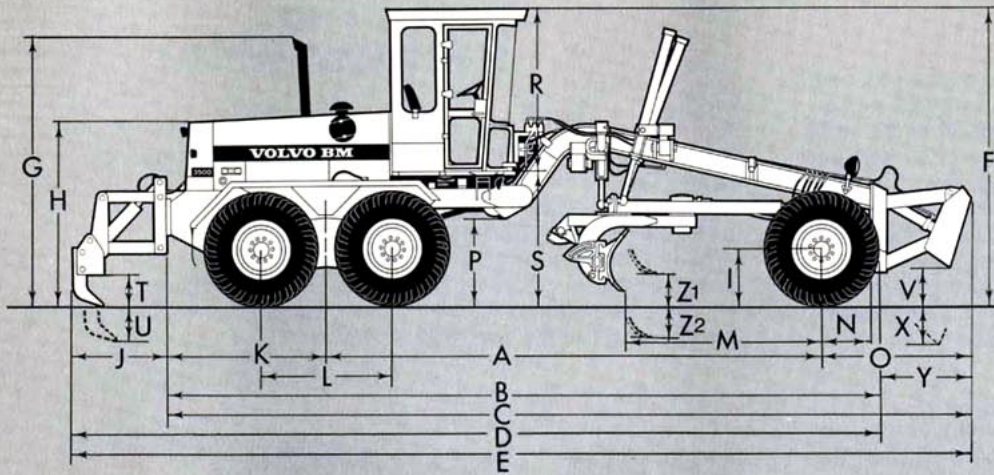
Air-mechanical drum brakes. For maximum safety, the brakes are divided into two independent circuits, one circuit for the rear bogie wheels and one for the front bogie wheels. The parking brake acts mechanically on the front bogie wheels. Locking force is applied by coil spring, released pneumatically.



## VOLUMES

Engine, including filter	17 l (4.5 US gal)	(3.7 Imp.gal)
Gearbox	12.5 l (3.25 US gal)	(2.7 Imp.gal)
Hydraulic system	160 l (42.3 US gal)	(35 Imp.gal)
Hydraulic tank	90 l (23.8 US gal)	(19.8 Imp.gal)
Fuel tank	224 l (59 US gal)	(49 Imp.gal)
Cooling system	38 l (10 US gal)	(8.4 Imp.gal)
Rear axle casing — centre gear	25 l (6.6 US gal)	(5.5 Imp.gal)
Bogie box, each	15 l (4.0 US gal)	(3.3 Imp.gal)
Drop-box	5.0 l (1.3 US gal)	(1.1 Imp.gal)
Worm gear — rotation circle	1.5 l (0.4 US gal)	(0.3 Imp.gal)
Safety clutch	1.5 l (0.4 US gal)	(0.3 Imp.gal)





## DIMENSIONS

A	5800 mm (228 in)	H	2105 mm (83 in)	O	1900 mm (75 in)	Y	1235 mm (49 in)
B	8330 mm (328 in)	I	600 mm (24 in) (min.)	P	940 mm (37 in)	Z <sub>1</sub>	530/550 mm (21/22 in) max. (flat/dished steel)
C	9565 mm (377 in)	J	1200 mm (46 in)	R	1810 mm (71 in) (int. in cab)	Z <sub>2</sub>	270/270 mm (11/11 in) min. (flat/dished steel)
D	9530 mm (375 in)	J <sub>1</sub>	2040 mm (80 in)	S	1510 mm (59 in)	a	1990 mm (78 in) (front wheels)
D <sub>1</sub>	10370 mm (408 in) (with windrow eliminator)	K	1865 mm (73 in)	T	325 mm (13 in) (with extended teeth, 675 mm — 27 in)	b	2030 mm (80 in) (rear wheel)
E	10765 mm (424 in)	L	1530 mm (60 in)	U	350 mm (14 in)	c	2450 mm (96 in)
F	3400 mm (134 in)	M	2215—2650 mm (87—104 in) (flat steel)	V	555 mm (22 in)	d	400 mm (16 in) (min.)
F <sub>1</sub>	3090 mm (122 in) (without wheels)	N	600 mm (24 in)	X	260 mm (10 in)		
G	3380 mm (133 in)						



## TYRES

Standard:	14.00—24/12 SGG
	16.00—24/12 SGG
Alternative:	20.5—25/12 SGG



## HYDRAULIC SYSTEM

Pump, type:	twin pump
Capacity:	2 x 97.8 l/min (2 x 25.8 US gal/min) (2 x 21.5 Imp.gal/min) at 2700 rev/min

Working pressure: 140 bar

Dual circuit system, with independent control of functions on left-hand and right-hand sides of machine. These circuits can be interconnected by means of a valve operated by a foot pedal. Each circuit has a floating position section for attachments which must follow the ground level. Hydraulic lock for lift cylinders.



## CONTROLS

There are nine valves, including one with floating position as standard. The controls are tightly grouped and very easy to operate. To make the operator's work even simpler, each lever has a distinctively different knob for easy recognition. Lever movements are logical; if the blade is to be shifted to the right, the lever is moved to the right and vice versa. Another special feature, double command, enables both sides of the blade to be raised or lowered using only the right hand, leaving the left hand free for other functions.



## ROTATION CIRCLE

Welded box section, diameter 1486 mm (59 in)., hardened steering and wear surfaces, with six adjustable points of attachment to drawbar. Hydraulically driven, with self-inhibiting worm gear and overload protection (safety clutch). 360° rotation.



## GRADER BLADE

Alt. I (12' Int. std.) Alt. II (13' Int. std.)

Blade length:	3657 mm (144 in)	3690 mm (156 in)
Blade height with cutting edge:	638 mm (25.1 in)	638 mm (25.1 in)
Solid section, L x W x t:	3340 x 100 x 30 mm (131 x 39 x 1.2 in)	3563 x 100 x 30 mm (140 x 39 x 1.2 in)
Blade thickness:	22 mm (0.9 in)	22 mm (0.9 in)
Cutting edge, H x t x L:	200 x 10 x 1219 mm (79 x 0.4 x 48 in)	6" x 5/8" x 6' 3 Sections
Hydraulic side shift:	1320 mm (52.0 in)	1440 mm (56.7 in)
Maximum reach beyond wheels:	2850 mm (112 in)	3050 mm (120 in)
Replaceable side shift guides:	2	



## DRAWBAR

Solid A-shape beam with six adjustable guide shoes to fix the rotation circle in the right position. All ball joints are easy to replace without welding. Section dimensions: 150 x 70 mm (6 x 2.8 in).



## FRAME

Front sec: Welded box-section construction from front plate to rear frame members. Top and bottom plates width x gauge = 240 x 30 mm (9.4 x 1.2 in). Side plates, height x gauge = 205 x 20 mm (8.0 x 0.8 in). Weight of section = 184 kg/m (124 lb/ft).  
Rear sec: Rear frame made of two solid members. Height x gauge = 220 x 80 mm (8.7 x 3.1 in). Weight of section = 2 x 138 kg/m (2 x 92 lb/ft)



## STANDARD EQUIPMENT *cont.*



### COMFORT

The cab frame which is of welded construction and conforms to ROPS regulations, has doors equipped with safety locks

on both sides. The top window on each door can be opened and locked in position. The operator's station is ergonomically designed with a fully adjustable seat, that includes adjustment for operator's weight, plus an adjustable steering wheel. The cab is equipped with an efficient heating and ventilation system, and tinted windows as standard. The complete construction is mounted on rubber pads and with the efficient sound insulation, gives the 3500 cab a first-class working environment.



### WEIGHTS

Working weight, including oils, coolant, full fuel tank, operator, 13' hydraulic side shift blades, blade tilt and 14.00-24/12 tyres.

Weight on front axle	4000 kg (8800 lb)
Weight on rear axle	10400 kg (22880 lb)
Total weight	14400 kg (31680 lb)
Max. blade cutting pressure	7000 kg (15430 lb)
Total weight of machine equipped as above plus 8 foot grader blade	



### ATTACHMENTS

Window eliminator	Weight	500 kg (1100 lb)
Rear-mounted ripper		1000 kg (2200 lb)
Hydraulically operated dozer, blade, 8 ft		900 kg (1985 lb)
Hydraulically operated dozer, blade, 9 ft		1040 kg (2290 lb)

## STANDARD EQUIPMENT



### SAFETY & COMFORT

Two external rear-view mirrors  
Lights: main headlights bright/dim/parking, front working beams (2), rear working beams (2), sidelights, brakelights, tail-lights, cab lighting, instrument illumination.  
Mounting for seat belt  
Utility basket in cab  
Impact-tested safety cab  
Cab heater with fresh air intake and defroster  
Extra defroster for front window and rear door windows

Instrument panel, front and right-hand side, with symbol markings  
Direction indicators  
Air brakes. Pressure gauge.  
All windows tinted  
Ring pumping (crane take-off)  
Horn  
Sun visor  
Safety start  
Tool kit  
Front windshield wipers  
Rear windshield wiper  
Passenger seat  
Windshield washers



### ENGINE AND ELECTRICAL SYSTEM

Fuel gauge  
Master switch  
Indicator for air cleaner filter  
Pilot lights for working beams front and rear, charging, high beam, direction indicators, transmission oil pressure; transmission temperature, engine oil

pressure, parking brake, air brakes  
Hand lamp outlet  
Cold start device  
Central warning  
Thermometer, engine  
Hour counter  
Alternator



### TRANSMISSION

Differential lock  
Pilot lights for: transmission oil pressure, transmission temperature

Torque converter with lock-up clutch  
8 forward gears: 2 reverse gears



### HYDRAULIC SYSTEM

Control valve (nine sections, including one with floating position)

Dual-circuit hydraulic system: separate circuit for control of functions on each side of the machine. These circuits can be interconnected to obtain maximum high-speed control of important functions, e.g. side shifts of blade.

## EXTRA EQUIPMENT

3 extra hydraulic valves (2 with floating position)  
Tube for rear attachment  
Hydraulic lock for wheel lean  
Emergency steering pump  
Tube for front attachment  
Tyres  
Fenders  
Engine heater with branch connection for cab heater  
Boarding steps  
Electrically heated rear-view mirrors  
Position indicator for bogie steering  
Seat belt  
Cigarette lighter and ashtray  
Rotating warning beacon  
Hazard flashers

Trailer socket  
Tail light connection to rear working lights  
Time-delay relay for starter element  
Grader blade reflectors  
Rear hitch  
Extra sound insulation — hood  
Tyres and blow-cleaning equipment  
Special tyres  
Internal rear-view mirror  
Electrically heated food box  
Adjustable armrests on operator's seat  
Quick-mounting device for grader blade cutting edge  
Corner teeth

# VOLVO BM

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