

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

January 2004

Tests 2290 & 2291: Challenger MT445B Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Tests 2290 & 2291: Challenger MT445B Diesel" (2004). *Nebraska Tractor Tests*. 315.

<https://digitalcommons.unl.edu/tractormuseumlit/315>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

SUMMARY OF OECD TESTS 2290 & 2291—NEBRASKA SUMMARY 515 CHALLENGER MT445B DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1100 rpm)					
70.7 (52.7)	2200	4.99 (18.88)	0.501 (0.305)	14.16 (2.79)	
Standard Power Take-off Speed(1000 rpm)					
73.4 (54.7)	2000	4.77 (18.05)	0.460 (0.280)	15.40 (3.03)	
Maximum Power (2 hours)					
75.9 (56.6)	1851	4.71 (17.83)	0.441 (0.268)	16.10 (3.17)	

VARYING POWER AND FUEL CONSUMPTION

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Conditions
70.7 (52.7)	2200	4.99 (18.88)	0.501 (0.305)	14.16 (2.79)	Air temperature
61.4 (45.8)	2252	4.63 (17.53)	0.535 (0.325)	13.26 (2.61)	70°F (21°C)
46.5 (34.7)	2272	3.98 (15.06)	0.607 (0.369)	11.68 (2.30)	Relative humidity
31.1 (23.2)	2283	3.24 (12.28)	0.739 (0.449)	9.60 (1.89)	44%
15.7 (11.7)	2297	2.40 (9.10)	1.090 (0.663)	6.52 (1.28)	Barometer
--	2307	1.75 (6.62)	--	--	29.3" Hg (99.2 kPa)

Maximum Torque -250.7 lb.-ft. (339.9 Nm) at 1303 rpm
Maximum Torque Rise -48.7%
Torque rise at 1750 engine rpm -32%

DRAWBAR PERFORMANCE (Unballasted - Front Drive Engaged)

FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Barom. inch Hg (kPa)
Maximum Power—8th(11C) Gear								
60.5 (45.1)	3690 (16.4)	6.15 (9.89)	2202	4.9	0.580 (0.353)	12.23 (2.41)	189 (87)	59 (15)
75% of Pull at Maximum Power—8th(11C) Gear								
46.8 (34.9)	2770 (12.3)	6.34 (10.20)	2247	3.2	0.674 (0.410)	10.52 (2.07)	189 (87)	59 (15)
50% of Pull at Maximum Power—8th(11C) Gear								
31.5 (23.5)	1840 (8.2)	6.42 (10.33)	2260	2.0	0.872 (0.530)	8.14 (1.60)	189 (87)	59 (15)
75% of Pull at Reduced Engine Speed—10th(11D) Gear								
47.2 (35.2)	2785 (12.4)	6.36 (10.24)	1790	4.7	0.563 (0.343)	12.59 (2.48)	183 (84)	59 (15)
50% of Pull at Reduced Engine Speed—10th(11D) Gear								
32.1 (23.9)	1865 (8.3)	6.46 (10.40)	1797	3.5	0.706 (0.430)	10.04 (1.98)	183 (84)	59 (15)

Location of tests: Groupement d'Antony, Parc de Touvoie, BP 44 Antony, Cedex, France 92163

Dates of tests: September, 2004

Sound tests: January 18, 2006

Manufacturer: AGCOS.A. BP 307, Avenue Blaise Pascal, 60026 Beauvais, France

FUEL and OIL: Fuel No. 2 Diesel Specific gravity converted to 60°/60° F (15°/15°C) 0.852 Fuel weight 7.09 lbs/gal (0.850 kg/l) Oil SAE 15W40 API service classification CH4 Transmission and hydraulic lubricant BP Terrac Tractan 9 fluid Front axle lubricant API GL5 -SAE 85W140

ENGINE: Make Perkins Diesel Type four cylinder vertical with turbocharger Serial No. 0090535J Crankshaft lengthwise Rated engine speed 2200 Bore and stroke 4.134" x 5.00" (105.0 mm x 127.0 mm) Compression ratio 17.5 to 1 Displacement 268 cu in (4400 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper element Muffler vertical Cooling medium temperature control thermostat

CHASSIS: Type 2WD and FWA Serial No. N005101 Tread width rear 59.8" (1518 mm) to 67.0" (1703 mm) front 2WD - 53.0" (1345 mm) to 87.3" (2217 mm), FWA - 53.4" (1357 mm) to 64.8" (1646 mm) Wheelbase 2WD - 97.0" (2463 mm) FWA - 97.0" (2463 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (2) range operator controlled powershift Nominal travel speeds mph (km/h) first 1.63 (2.63) second 2.07 (3.33) third 2.47 (3.98) fourth 3.13 (5.03) fifth 3.66 (5.89) sixth 4.62 (7.44) seventh 4.95 (7.97) eighth 6.13 (9.87) ninth 6.26 (10.07) tenth 7.75 (12.47) eleventh 9.28 (14.93) twelfth 11.71 (18.84) thirteenth 13.71 (22.07) fourteenth 17.34 (27.90) fifteenth 18.57 (29.89) sixteenth 23.45 (37.74) reverse 1.59 (2.56), 2.01 (3.23), 2.40 (3.87), 3.04 (4.89), 3.55 (5.72), 4.50 (7.24), 4.81 (7.74), 5.96 (9.59), 6.08 (9.79), 7.53 (12.12), 9.01 (14.50), 11.38 (18.31), 13.33 (21.45), 16.84 (27.10), 18.05 (29.04), 22.79 (36.67) Clutch multiple wet disc operated by foot pedal Brakes multiple wet disc hydraulically operated by two foot pedals that can be locked together Steering hydrostatic Power take-off 540 rpm at 1980 engine rpm or 1000 rpm at 2000 engine rpm Unladen tractor mass 2WD - 8630 lb (3915 kg), FWA - 9305 lb (4220 kg)

DRAWBAR PERFORMANCE
(Unballasted - Front Drive Engaged)
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel lb/lp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd(2TC)Gear									
51.5 (38.4)	8680 (38.6)	2.22 (3.58)	2233	14.4	0.665 (0.404)	10.67 (2.10)	185 (85)	57 (14)	29.9 (101.3)
4th(2TD)Gear									
60.6 (45.2)	7890 (35.1)	2.88 (4.64)	2142	8.4	0.577 (0.351)	12.28 (2.42)	185 (85)	57 (14)	29.9 (101.3)
5th(3TC)Gear									
62.6 (46.7)	8060 (35.8)	2.91 (4.69)	1858	9.1	0.535 (0.326)	13.25 (2.61)	189 (87)	57 (14)	29.9 (101.3)
6th(3TD)Gear									
64.4 (48.0)	6295 (28.0)	3.84 (6.18)	1856	5.7	0.520 (0.317)	13.63 (2.69)	189 (87)	57 (14)	29.9 (101.3)
7th(4TC) Gear									
64.6 (48.2)	5930 (26.4)	4.09 (6.58)	1848	6.2	0.515 (0.313)	13.77 (2.71)	187 (86)	59 (15)	29.9 (101.3)
8th(1LC) Gear									
65.7 (49.0)	4800 (21.4)	5.13 (8.26)	1855	5.8	0.514 (0.313)	13.81 (2.72)	189 (87)	59 (15)	29.9 (101.3)
9th(4TD) Gear									
65.4 (48.8)	4695 (20.9)	5.23 (8.41)	1847	5.1	0.511 (0.311)	13.89 (2.74)	189 (87)	59 (15)	29.9 (101.3)
10th(1LD)Gear									
64.1 (47.8)	3695 (16.4)	6.51 (10.47)	1846	4.8	0.519 (0.316)	13.65 (2.69)	189 (87)	59 (15)	29.9 (101.3)
11th(2LC)Gear									
62.9 (46.9)	3010 (13.4)	7.84 (12.62)	1853	3.4	0.533 (0.324)	13.30 (2.62)	189 (87)	59 (15)	29.9 (101.3)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE : The test results on this Summary were obtained from tests carried out on the Massey Ferguson 5445 Diesel.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. This tractor did not meet the manufacturer's claims of 26.4 GPM (100 lpm) remote hydraulic flow, nor 72 dB(A) cab sound level. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **2290 & 2291**, Nebraska Summary 515, March 17, 2006.

Leonard L. Bashford
 Director

M.F. Kocher
 V.I. Adamchuk
 J.A. Smith
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	2WD dB(A)	Engaged dB(A)
At no load in 7th (4TC) gear	77.3	77.3
Bystander in 16th (4LD) gear	88.2	--

Tested Without Ballast

TIRES AND WEIGHT

Rear tires - No., size, ply & psi(kPa)

Front tires - No., size, ply & psi(kPa)

Height of Drawbar

Static Weight with operator- Rear

- Front

- Total

Front Wheel Assist

Two 480/70R38; **,16(110)

Two 13.6R28; **,16(110)

20.9 in (530 mm)

5795 lb (2630 kg)

3650 lb (1655 kg)

9445 lb (4285 kg)

2WD

Two 480/70R38; **,16(110)

Two 10.00-16; 8; 32 (220)

33.5 in (850 mm)

5730 lb (2600 kg)

3110 lb (1410 kg)

8840 lb (4010 kg)

DRAWBAR PERFORMANCE
(Unballasted - 2WD)
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—6th(3TD) Gear									
55.8 (41.6)	4745 (21.1)	4.41 (7.10)	2200	8.2	0.561 (0.341)	12.64 (2.49)	187 (86)	55 (13)	30.1 (101.8)
75% of Pull at Maximum Power—6th(3TD) Gear									
43.2 (32.2)	3580 (15.9)	4.52 (7.28)	2231	7.1	0.709 (0.431)	10.00 (1.97)	187 (86)	55 (13)	30.1 (101.8)
50% of Pull at Maximum Power—6th(3TD) Gear									
29.4 (21.9)	2385 (10.6)	4.62 (7.43)	2251	6.1	0.880 (0.536)	8.05 (1.59)	187 (86)	55 (13)	30.1 (101.8)
75% of Pull at Reduced Engine Speed—7th(4TC) Gear									
43.0 (32.1)	3575 (15.9)	4.52 (7.27)	2078	7.0	0.665 (0.405)	10.66 (2.10)	187 (86)	57 (14)	30.1 (101.8)
50% of Pull at Reduced Engine Speed—7th(4TC) Gear									
29.1 (21.7)	2385 (10.6)	4.58 (7.37)	2087	6.1	0.805 (0.490)	8.81 (1.74)	185 (85)	57 (14)	30.1 (101.8)
MAXIMUM POWER IN SELECTED GEARS									
4th (2TD) Gear									
53.5 (39.9)	7255 (32.3)	2.77 (4.45)	2195	14.7	0.655 (0.398)	10.83 (2.13)	185 (85)	55 (13)	30.1 (101.8)
5th (3TC) Gear									
59.0 (44.0)	6900 (30.7)	3.21 (5.16)	2105	11.9	0.591 (0.359)	12.00 (2.36)	185 (85)	55 (13)	30.1 (101.8)
6th (3TD) Gear									
62.1 (46.3)	6405 (28.5)	3.64 (5.85)	1854	10.1	0.534 (0.325)	13.29 (2.62)	189 (87)	55 (13)	30.1 (101.8)
7th (4TC) Gear									
61.4 (45.8)	5890 (26.2)	3.91 (6.30)	1854	9.6	0.542 (0.330)	13.09 (2.58)	187 (86)	57 (14)	30.1 (101.8)
8th (1LC) Gear									
62.6 (46.7)	4790 (21.3)	4.90 (7.90)	1850	8.3	0.532 (0.324)	13.34 (2.63)	189 (87)	57 (14)	30.1 (101.8)
9th (4TD) Gear									
61.6 (45.9)	4615 (20.5)	5.00 (8.05)	1839	8.0	0.539 (0.328)	13.15 (2.59)	189 (87)	57 (14)	30.1 (101.8)
10th (1LD) Gear									
62.1 (46.3)	3730 (16.6)	6.24 (10.04)	1855	7.9	0.519 (0.316)	13.65 (2.69)	189 (87)	57 (14)	30.1 (101.8)
11th (2LC) Gear									
60.8 (45.3)	3035 (13.5)	7.51 (12.09)	1850	7.3	0.546 (0.332)	12.99 (2.56)	187 (86)	57 (14)	30.1 (101.8)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range: 7285 lbs (32.4 kN)

i) Opening pressure of relief valve: NA

Sustained pressure of the open relief valve: one outlet set 2800 psi (193 bar) two outlet sets combined 2800 psi (193 bar)

ii) Pump delivery rate at minimum pressure: 15.6 GPM (59.2 l/min) 15.6 GPM (59.1 l/min)

iii) Pump delivery rate at maximum
 hydraulic power: 14.8 GPM (56.1 l/min) 15.2 GPM (57.6 l/min)
 Delivery pressure: 2295 psi (158 bar) 2305 psi (159 bar)
 Power: 19.8 hp (14.8 kW) 20.5 Hp (15.3 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	25.6	650
B	11.6	295
C	13.9	354
D	13.0	330
E	7.9	200
F	10.2	260
G	30.5	775
H	1.9	48
I	16.3	413
J	20.3	515
K	25.2	640
L	41.2	1046
M	22.5	571
N	37.2	946
O	8.1	205
P	44.3	1125
Q	31.5	801
R	30.1	765

