

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 1999

Test 1874 & 1878: Challenger MT 545 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, "Test 1874 & 1878: Challenger MT 545 Diesel" (1999). *Nebraska Tractor Tests*. 325.

<https://digitalcommons.unl.edu/tractormuseumlit/325>

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 1874 & 1878—NEBRASKA SUMMARY 305A

CHALLENGER MT 545 DIESEL

32 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—1098 rpm)					
120.5 (89.8)	2196	7.45 (28.19)	0.437 (0.266)	16.18 (3.20)	
Standard Power Take-off Speed(1000 rpm)					
126.2 (94.1)	2000	7.21 (27.30)	0.406 (0.247)	17.51 (3.45)	

VARYING POWER AND FUEL CONSUMPTION

120.5 (89.8)	2196	7.45 (28.19)	0.437 (0.266)	16.18 (3.20)	Air temperature
105.7 (78.8)	2258	7.02 (26.58)	0.472 (0.287)	15.05 (2.97)	72°F(22°C)
80.1 (59.7)	2279	5.95 (22.51)	0.528 (0.321)	13.45 (2.65)	Relative humidity
53.9 (40.2)	2293	4.78 (18.11)	0.631 (0.384)	11.27 (2.22)	64%
26.9 (20.0)	2303	3.60 (13.61)	0.950 (0.578)	7.48 (1.47)	Barometer
--	2322	1.99 (7.54)	--	--	29.7" Hg(100.6 kPa)

Maximum Torque - 370.0 lb.-ft.(501.7 Nm) at 1450 rpm

Maximum Torque Rise -28.4%

Torque rise at 1800 engine rpm -25%

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 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—13th(4TB) Gear									
113.6 (84.7)	9600 (42.7)	4.44 (7.15)	2202	8	0.484 (0.294)	14.67 (2.89)	187 (86)	61 (16)	30.2 (102.1)
75% of Pull at Maximum Power—13th(4TB) Gear									
91.2 (68.0)	7185 (32.0)	4.76 (7.66)	2274	5	0.518 (0.315)	13.71 (2.70)	192 (89)	57 (14)	29.7 (100.7)
50% of Pull at Maximum Power—13th(4TB) Gear									
63.6 (47.4)	4845 (21.5)	4.92 (7.92)	2293	2	0.593 (0.360)	11.98 (2.36)	190 (88)	57 (14)	29.7 (100.7)
75% of Pull at Reduced Engine Speed—16th(4TC) Gear									
91.7 (68.4)	7195 (32.0)	4.78 (7.69)	1933	5	0.460 (0.280)	15.43 (3.04)	185 (85)	57 (14)	29.7 (100.7)
50% of Pull at Reduced Engine Speed—16th(4TC) Gear									
63.3 (47.2)	4840 (21.5)	4.90 (7.89)	1940	3	0.532 (0.324)	13.35 (2.63)	185 (85)	57 (14)	29.7 (100.7)

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

Dates of Test: October - November, 1999

Manufacturer: AGCO S.A. Z.A.-No.2 BP 60307, Avenue Blaise Pascal, 60026 Beauvais, France

FUEL and OIL: Fuel No. 2 Diesel **Specific gravity converted to 60°/60° F (15°/15°C)** 0.853
Fuel weight 7.10 lbs/gal (0.851 kg/l) **Oil SAE** 10W30 **API service classification** CD/CE
Transmission and hydraulic lubricant BP Terrac Extra 10W/40 **Front axle lubricant** API GL5 -SAE 85W140

ENGINE: Make Perkins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** U668226C **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 3.937" x 5.00"(100.0 mm x 127.0 mm) **Compression ratio** 16.0 to 1 **Displacement** 365 cu in (5985 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** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat and variable speed fan

CHASSIS: Type 2WD and FWA **Serial No.** G140015 **Tread width** rear 66.9" (1699 mm) to 86.6" (2199 mm) front 2WD - 54.3"(1380 mm) to 91.7" (2330 mm), FWA - 61.7"(1566 mm) to 80.9" (2054 mm) **Wheelbase** 106.3"(2699 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.32 (2.13) second 1.55 (2.50) third 1.83 (2.95) fourth 2.14 (3.45) fifth 2.25 (3.62) sixth 2.63 (4.24) seventh 2.96 (4.77) eighth 3.11 (5.01) ninth 3.47 (5.58) tenth 3.64 (5.86) eleventh 4.01(6.45) twelfth 4.09(6.59) thirteenth 4.69 (7.55) fourteenth 4.79 (7.71) fifteenth 4.96 (7.99) sixteenth 5.54 (8.92) seventeenth 5.82 (9.36) eighteenth 6.49 (10.44) nineteenth 6.86 (11.04) twentieth 8.03 (12.92) twenty-first 8.44 (13.58) twenty-second 9.88 (15.90) twenty-third 11.11(17.88) twenty-fourth 11.66(18.76) twenty-fifth 13.00 (20.92) twenty-sixth 13.65 (21.96) twenty-seventh 15.03(24.19) twenty-eighth 15.35 (24.70) twenty-ninth 17.59 (28.31) thirtieth 17.96 (28.91) thirty-first 20.77(33.42) thirty-second 24.31 (39.12) reverse 1.21 (1.94), 1.41(2.27), 1.67(2.68), 1.95 (3.14), 2.05 (3.30), 2.40 (3.86), 2.70 (4.34), 2.83 (4.56), 3.16 (5.08), 3.32 (5.34), 3.65 (5.88), 3.73 (6.00), 4.28 (6.88), 4.36 (7.02), 4.52 (7.28), 5.05 (8.12), 5.29 (8.52), 5.91 (9.51), 6.25 (10.06), 7.31(11.77), 7.69(12.37), 9.00(14.48), 10.12(16.28),

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 Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Barom. inch Hg (kPa)		
106.1 (79.1)	10925 (48.6)	3.64 (5.86)	2212	13	11th(4TA) Gear 0.507 (0.309)	13.99 (2.76)	189 (87)	61 (16)	30.2 (102.1)
106.6 (79.5)	10845 (48.2)	3.69 (5.93)	2198	13	12th(3TC) Gear 0.511 (0.311)	13.91 (2.74)	190 (88)	61 (16)	30.2 (102.1)
115.9 (86.4)	10105 (45.0)	4.30 (6.92)	2153	9	13th(4TB) Gear 0.476 (0.289)	14.92 (2.94)	190 (88)	61 (16)	30.2 (102.1)
116.1 (86.6)	9890 (44.0)	4.40 (7.08)	2151	9	14th(3TD) Gear 0.477 (0.290)	14.87 (2.93)	190 (88)	61 (16)	30.2 (102.1)
118.1 (88.1)	9575 (42.6)	4.63 (7.45)	2144	7	15th(1LA) Gear 0.460 (0.280)	15.43 (3.04)	187 (86)	61 (16)	30.2 (102.1)
115.7 (86.3)	8410 (37.4)	5.16 (8.31)	2114	6	16th(4TC) Gear 0.474 (0.288)	14.97 (2.95)	187 (86)	61 (16)	30.2 (102.1)
118.7 (88.5)	8465 (37.7)	5.26 (8.46)	2060	6	17th(1LB) Gear 0.450 (0.274)	15.76 (3.11)	189 (87)	61 (16)	30.2 (102.1)
115.9 (86.4)	7215 (32.1)	6.02 (9.68)	2079	5	18th(4TD) Gear 0.463 (0.281)	15.35 (3.02)	190 (88)	61 (16)	30.2 (102.1)
117.5 (87.6)	6865 (30.5)	6.42 (10.33)	2089	5	19th(1LC) Gear 0.467 (0.284)	15.23 (3.00)	190 (88)	61 (16)	30.2 (102.1)
116.5 (86.9)	5875 (26.1)	7.43 (11.96)	2048	5	20th(1LD) Gear 0.460 (0.280)	15.53 (3.04)	189 (87)	61 (16)	30.2 (102.1)
117.6 (87.7)	5775 (25.7)	7.64 (12.29)	2003	5	21st(2LA) Gear 0.450 (0.274)	15.79 (3.11)	190 (88)	61 (16)	30.2 (102.1)
115.5 (86.1)	4945 (22.0)	8.76 (14.10)	1992	5	22nd(2LB) Gear 0.453 (0.275)	15.68 (3.09)	189 (87)	61 (16)	30.2 (102.1)

10.62 (17.09), 11.84 (19.06), 12.43 (20.00), 13.69 (22.03), 13.98 (22.49), 16.03 (25.79), 16.36 (26.33), 18.92 (30.44), 22.14 (35.63) **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 1976 engine rpm or 1000 rpm at 2000 engine rpm **Unladen tractor mass** 2WD -10460 lb (4745 kg), FWA -11395 lb (5170 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

NOTE: The data on this summary was obtained from OECD reports 1874 & 1878 conducted on the Massey Ferguson 6290 Diesel(2WD & FWA).

Report reissued: Supplemental sales permit for Challenger MT 545 Diesel, July 2003.

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **1874 & 1878**, Nebraska Summary 305A, June 23, 2003.

Leonard L. Bashford
Director

M.F. Kocher
W.P. Campbell
G.J. Hoffman
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	2WD dB(A)	Front Wheel Drive Engaged dB(A)
At no load in 13th (3TB) gear	78.0	78.0
Bystander	--	--

Tested Without Ballast

TIRES AND WEIGHT	Front Wheel Assist	2WD
Rear tires - No., size, ply & psi(kPa)	Two 20.8R38; **,15 (100)	Two 20.8R38; **,15 (100)
Front tires - No., size, ply & psi(kPa)	Two 16.9R28; **,16 (110)	Two 11.00-16; 8; 36 (250)
Height of Drawbar	25.2 in (640 mm)	33.5 in (850 mm)
Static Weight with operator- Rear	6945 lb (3150 kg)	6845 lb (3105 kg)
- Front	4620 lb (2095 kg)	3780 lb (1715 kg)
- Total	11565 lb (5245 kg)	10625 lb (4820 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—21st(2LA) Gear									
112.4 (83.8)	5105 (22.7)	8.26 (13.30)	2201	5	0.487 (0.297)	14.57 (2.87)	190 (88)	63 (17)	30.3 (102.5)
75% of Pull at Maximum Power—21st(2LA) Gear									
87.8 (65.5)	3800 (16.9)	8.66 (13.93)	2273	3	0.542 (0.330)	13.10 (2.58)	190 (88)	64 (18)	30.2 (102.1)
50% of Pull at Maximum Power—21st(2LA) Gear									
59.9 (44.7)	2540 (11.3)	8.85 (14.24)	2294	2	0.643 (0.391)	11.04 (2.18)	189 (87)	64 (18)	30.2 (102.1)
75% of Pull at Reduced Engine Speed—22nd(2LB) Gear									
87.5 (65.2)	3815 (17.0)	8.60 (13.84)	1927	3	0.471 (0.286)	15.09 (2.97)	187 (86)	64 (18)	30.2 (102.1)
50% of Pull at Reduced Engine Speed—22nd(2LB) Gear									
60.3 (45.0)	2555 (11.4)	8.86 (14.26)	1959	2	0.548 (0.333)	12.96 (2.55)	187 (86)	64 (18)	30.2 (102.1)
MAXIMUM POWER IN SELECTED GEARS									
10th(2TD) Gear									
80.7 (60.2)	9210 (41.0)	3.29 (5.29)	2271	15	0.595 (0.362)	11.93 (2.35)	190 (88)	63 (17)	30.3 (102.5)
11th(4TA) Gear									
89.2 (66.5)	9195 (40.9)	3.64 (5.85)	2254	14	0.560 (0.341)	12.68 (2.50)	190 (88)	63 (17)	30.3 (102.5)
12th(3TC) Gear									
93.1 (69.4)	9195 (40.9)	3.80 (6.11)	2251	12	0.549 (0.334)	12.94 (2.55)	190 (88)	63 (17)	30.3 (102.5)
13th(4TB) Gear									
103.8 (77.4)	9155 (40.7)	4.26 (6.85)	2218	12	0.516 (0.314)	13.76 (2.71)	189 (87)	63 (17)	30.3 (102.5)
14th(3TD) Gear									
106.9 (79.7)	9210 (41.0)	4.35 (7.00)	2200	12	0.507 (0.309)	13.99 (2.76)	189 (87)	63 (17)	30.3 (102.5)
15th(1LA) Gear									
108.4 (80.8)	9015 (40.1)	4.51 (7.25)	2183	11	0.507 (0.309)	13.99 (2.76)	189 (87)	63 (17)	30.3 (102.5)
16th(4TC) Gear									
112.6 (84.0)	8230 (36.6)	5.13 (8.26)	2169	9	0.492 (0.299)	14.43 (2.84)	189 (87)	63 (17)	30.3 (102.5)
17th(1LB) Gear									
114.5 (85.4)	8245 (36.7)	5.21 (8.38)	2110	9	0.479 (0.291)	14.82 (2.92)	190 (88)	63 (17)	30.3 (102.5)
18th(4TD) Gear									
115.8 (86.4)	7445 (33.1)	5.83 (9.39)	2088	9	0.469 (0.286)	15.13 (2.98)	190 (88)	63 (17)	30.3 (102.5)
19th(1LC) Gear									
114.9 (85.7)	6945 (30.9)	6.20 (9.97)	2088	8	0.472 (0.287)	15.04 (2.96)	190 (88)	63 (17)	30.3 (102.5)
20th(1LD) Gear									
117.1 (87.3)	6140 (27.3)	7.15 (11.51)	2032	7	0.455 (0.277)	15.58 (3.07)	190 (88)	63 (17)	30.3 (102.5)
21st(2LA) Gear									
117.3 (87.5)	5775 (25.7)	7.62 (12.27)	2048	6	0.455 (0.277)	15.58 (3.07)	190 (88)	63 (17)	30.3 (102.5)
22nd(2LB) Gear									
116.5 (86.9)	4945 (22.0)	8.84 (14.22)	2010	5	0.451 (0.275)	15.74 (3.10)	190 (88)	63 (17)	30.3 (102.5)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum Force Exerted

Through Whole Range: 9414 lbs (41.9 kN)

- i) Opening pressure of relief valve: NA
 Sustained pressure of the open relief valve: 2890 psi (199 bar)
- ii) Pump delivery rate at minimum pressure and rated engine speed: 28.6 GPM (108.3 l/min)
- iii) Pump delivery rate at maximum hydraulic power: 24.6 GPM (93.1 l/min)
 Delivery pressure: 2750 psi (190 bar)
 Power: 39.5 HP (29.4 kW)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar) 2850 (196)
 Location: lift cylinder
 Hydraulic oil temperature: °F (°C) 149 (65)
 Location: hydraulic sump
 Category: II
 Quick attach: none

SAE Static Test—System pressure 2558 psi (176 Bar)

Hitch point distance to ground level in. (mm)	7.9 (201)	14.9 (378)	21.9 (556)	28.9 (734)	35.9 (912)
Lift force on frame lb	13338	12708	12222	11412	10431
" " " " " (kN)	(59.3)	(56.5)	(54.4)	(52.3)	(46.4)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	26.9	683
B	11.6	295
C	13.9	354
D	13.0	330
E	7.9	200
F	10.2	260
G	32.3	820
H	1.7	43
I	15.0	382
J	22.1	560
K	21.7	550
L	40.9	1040
M	23.2	590
N	37.0	940
O	7.9	200
P	46.1	1170
Q	36.1	918
R	28.3	719

