

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

January 2002

## Test 1814: Challenger MT855 Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto: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 1814: Challenger MT855 Diesel" (2002). *Nebraska Tractor Tests*. 351.  
<https://digitalcommons.unl.edu/tractormuseumlit/351>

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.

# NEBRASKA OECD TRACTOR TEST 1814—SUMMARY 380

## CHALLENGER MT855 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1060 rpm)</b>					
401.36 (299.29)	2100	22.46 (85.04)	0.393 (0.239)	17.87 (3.52)	
<b>Standard Power Take-off Speed - (PTO speed - 1000 rpm)</b>					
428.30 (319.39)	1979	23.10 (87.45)	0.379 (0.230)	18.54 (3.65)	
<b>Maximum Power (2 hours)</b>					
452.31 (337.28)	1700	23.26 (88.04)	0.361 (0.220)	19.45 (3.83)	

#### VARYING POWER AND FUEL CONSUMPTION

401.36 (299.29)	2100	22.46 (85.02)	0.393 (0.239)	17.87 (3.52)	Air temperature
354.60 (264.42)	2182	20.99 (79.44)	0.415 (0.253)	16.90 (3.33)	75°F (24°C)
268.07 (199.90)	2199	17.27 (65.36)	0.452 (0.275)	15.52 (3.06)	Relative humidity
178.96 (133.45)	2199	13.42 (50.80)	0.526 (0.320)	13.33 (2.63)	47%
89.32 (66.61)	2199	9.23 (34.95)	0.725 (0.441)	9.67 (1.91)	Barometer
1.06 (0.79)	2199	5.60 (21.19)	37.157 (22.602)	0.19 (0.04)	28.92" Hg (97.87 kPa)

Maximum Torque - 1581 lb.-ft. (2144 Nm) at 1200 rpm

Maximum Torque Rise - 57.5%

Torque rise at 1700 engine rpm - 40%

#### DRAWBAR PERFORMANCE (Unballasted)

##### 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 cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—6th Gear</b>									
346.83 (258.63)	29166 (129.73)	4.46 (7.18)	2100	2.49	0.458 (0.278)	15.34 (3.02)	182 (83)	45 (7)	28.87 (97.77)
<b>75% of Pull at Maximum Power—6th Gear</b>									
275.81 (205.67)	21836 (97.13)	4.74 (7.62)	2199	1.25	0.502 (0.306)	13.97 (2.75)	181 (83)	49 (9)	28.92 (97.93)
<b>50% of Pull at Maximum Power—6th Gear</b>									
185.21 (138.11)	14573 (64.82)	4.77 (7.67)	2199	0.69	0.602 (0.366)	11.66 (2.30)	180 (82)	52 (11)	28.92 (97.93)
<b>75% of Pull at Reduced Engine Speed—9th Gear</b>									
275.06 (205.11)	21875 (97.30)	4.72 (7.59)	1534	1.25	0.435 (0.265)	16.12 (3.18)	182 (83)	51 (11)	28.92 (97.93)
<b>50% of Pull at Reduced Engine Speed—9th Gear</b>									
185.59 (138.40)	14550 (64.72)	4.78 (7.70)	1546	0.61	0.475 (0.289)	14.78 (2.91)	181 (83)	55 (13)	28.92 (97.93)

**Location of Test:** Nebraska Tractor Test Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832

**Dates of Test:** October 9-November 15, 2002

**Manufacturer:** AGCO Corp, 4205 River Green Parkway, Duluth Ga 30096

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8430 Fuel weight 7.019 lbs/gal (0.841 kg/l) Oil SAE 10W-30 API service classification CH-4 Transmission and hydraulic lubricant Caterpillar MTO fluid Total time engine was operated: 41.0 hours

**ENGINE:** Make Caterpillar Diesel Type six cylinder vertical with turbocharger and air to air aftercooler Serial No.\*A3A00108\* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke 5.402" x 6.500" (137.2 mm x 165.1 mm) Compression ratio 15.8 to 1 Displacement 893 cu in (14646 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter two paper elements and water separator Fuel cooler radiator for returned fuel Muffler vertical Cooling medium temperature control 1 thermostat

**ENGINE OPERATING PARAMETERS:** Fuel rate: 150.6 - 166.0 lb/h (68.3 - 75.3 kg/h) High idle: 2175 - 2225 rpm Turbo boost: nominal 18.1 - 22.5 psi (125 - 155 kPa) as measured 20.5 psi (142 kPa)

**CHASSIS:** Type tracklayer-rubber tracked Serial No.\*AGCMT855ABCC20371\* Track width 100.0" (2540 mm) to 120.0 (3048 mm) Length of track on ground 124.3" (3157 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled power shift Nominal travel speeds mph (km/h) first 1.67 (2.69) second 2.13 (3.43) third 2.68 (4.31) fourth 3.41 (5.48) fifth 4.06 (6.54) sixth 4.58 (7.37) seventh 5.16 (8.31) eighth 5.80 (9.34) ninth 6.53 (10.51) tenth 7.34 (11.82) eleventh 8.29 (13.34) twelfth 9.33 (15.02) thirteenth 11.10 (17.87) fourteenth 14.11 (22.71) fifteenth 17.86 (28.75) sixteenth 24.86 (40.00) at 2300 rpm, reverse 1.34 (2.16), 3.24 (5.22), 3.66 (5.89), 8.89 (14.30) Clutch wet multiple disc hydraulically actuated by foot pedal Brakes wet multiple disc hydraulically actuated foot pedal Steering electro-hydraulic differential steering controlled by steering wheel Power take-off 1000 rpm at 1980 engine rpm Unladen tractor mass 43745 lb (19842 kg)

## DRAWBAR PERFORMANCE

### Unballasted at 2100 RPM

#### 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3th Gear									
274.02 (204.34)	42798 (190.37)	2.40 (3.86)	2175	13.83	0.551 (0.335)	12.73 (2.51)	181 (83)	40 (4)	29.15 (98.71)
4th Gear									
324.61 (242.06)	38266 (170.21)	3.18 (5.12)	2102	6.96	0.491 (0.298)	14.31 (2.82)	182 (83)	40 (4)	29.15 (98.71)
5th Gear									
340.47 (253.89)	32678 (145.36)	3.91 (6.29)	2099	3.85	0.464 (0.282)	15.12 (2.98)	182 (83)	46 (8)	28.87 (97.77)
6th Gear									
346.83 (258.63)	29166 (129.73)	4.46 (7.18)	2100	2.49	0.458 (0.278)	15.34 (3.02)	182 (83)	45 (7)	28.87 (97.77)
7th Gear									
343.64 (256.26)	25457 (113.24)	5.06 (8.15)	2097	1.87	0.460 (0.280)	15.24 (3.00)	182 (83)	48 (9)	28.88 (97.80)
8th Gear									
345.53 (257.66)	22588 (100.47)	5.74 (9.23)	2099	1.17	0.459 (0.279)	15.28 (3.01)	182 (83)	49 (9)	28.89 (97.83)
9th Gear									
336.55 (250.97)	19507 (86.77)	6.47 (10.41)	2099	0.93	0.469 (0.285)	14.97 (2.95)	181 (83)	50 (10)	28.91 (97.90)
10th Gear									
336.04 (250.59)	17269 (76.82)	7.30 (11.74)	2100	0.85	0.471 (0.287)	14.89 (2.93)	182 (83)	51 (11)	28.92 (97.93)
11th Gear									
320.91 (239.30)	14596 (64.92)	8.25 (13.27)	2098	0.53	0.494 (0.300)	14.21 (2.80)	181 (83)	51 (11)	28.92 (97.93)

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 103°F(39°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1814**, Nebraska Summary 380, January 8, 2003.

Leonard L. Bashford  
Director

M.F. Kocher  
V.I. Adamchuk  
W.P. Campbell  
Board of Tractor Test Engineers

#### TRACTOR SOUND LEVEL WITH CAB

dB(A)

At no load in 6th gear	76.4
Bystander	--

#### TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
<b>Track width</b>	36.0 in (915 mm)	36.0 in (915 mm)
<b>Ballast - Cast iron(front end)</b>	3860 lb (1750 kg)	None
<b>- Cast iron(front idlers)</b>	2220 lb (1007 kg)	None
<b>Height of Drawbar</b>	22.0 in (560 mm)	22.0 in (560 mm)
<b>Static Weight with operator</b>	50000 lb(22680 kg)	43920 lb(19922 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted at 1700 RPM)**  
**MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F(°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
3rd Gear									
275.44 (205.40)	43174 (192.05)	2.39 (3.85)	2172	14.01	0.553 (0.336)	12.70 (2.50)	181 (83)	40 (4)	29.15 (98.71)
4th Gear									
327.03 (243.86)	40605 (180.62)	3.02 (4.86)	2055	9.55	0.494 (0.301)	14.20 (2.80)	182 (83)	40 (4)	29.15 (98.71)
5th Gear									
363.57 (271.12)	38890 (172.99)	3.51 (5.64)	1961	7.59	0.455 (0.277)	15.42 (3.04)	182 (83)	40 (4)	29.15 (98.71)
6th Gear									
376.59 (280.82)	37574 (167.14)	3.76 (6.05)	1850	6.75	0.439 (0.267)	15.99 (3.15)	182 (83)	47 (8)	28.88 (97.80)
7th Gear									
383.02 (285.62)	36410 (161.96)	3.94 (6.35)	1703	5.69	0.430 (0.262)	16.32 (3.21)	183 (84)	46 (8)	28.87 (97.77)
8th Gear									
392.46 (292.66)	32536 (144.73)	4.52 (7.28)	1702	4.00	0.420 (0.255)	16.72 (3.29)	183 (84)	49 (9)	28.89 (97.83)
9th Gear									
391.93 (292.26)	28505 (126.80)	5.16 (8.30)	1701	2.57	0.420 (0.256)	16.70 (3.29)	183 (84)	50 (10)	28.90 (97.87)
10th Gear									
393.29 (293.27)	25143 (111.84)	5.87 (9.44)	1702	1.72	0.418 (0.254)	16.79 (3.31)	183 (84)	44 (7)	28.86 (97.73)
11th Gear									
387.92 (289.27)	21801 (96.98)	6.67 (10.74)	1708	1.17	0.423 (0.257)	16.58 (3.27)	183 (84)	51 (11)	28.92 (97.93)
12th Gear									
387.06 (288.63)	19328 (85.97)	7.51 (12.09)	1703	0.85	0.424 (0.258)	16.55 (3.26)	183 (84)	50 (10)	28.92 (97.93)
13th Gear									
381.33 (284.36)	15961 (71.00)	8.96 (14.42)	1703	0.61	0.432 (0.263)	16.26 (3.20)	183 (84)	50 (10)	28.92 (97.93)

**DRAWBAR PERFORMANCE**  
**(Ballasted to 50000 lbs at 1700 RPM)**  
**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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
262.67 (195.87)	50775 (225.86)	1.94 (3.12)	2199	13.01	0.550 (0.334)	12.77 (2.51)	181 (83)	48 (9)	28.59 (96.82)
3rd Gear									
306.40 (228.48)	49706 (221.10)	2.31 (3.72)	2088	13.74	0.516 (0.314)	13.61 (2.68)	181 (83)	47 (8)	28.84 (97.66)
4th Gear									
357.72 (266.75)	46628 (207.41)	2.88 (4.63)	1929	8.44	0.463 (0.282)	15.15 (2.98)	182 (83)	48 (9)	28.83 (97.63)
5th Gear									
377.59 (281.57)	45988 (204.56)	3.08 (4.96)	1723	7.89	0.432 (0.263)	16.24 (3.20)	183 (84)	48 (9)	28.83 (97.63)
6th Gear									
391.70 (292.09)	41685 (185.42)	3.52 (5.67)	1704	5.35	0.417 (0.254)	16.83 (3.32)	183 (84)	47 (8)	28.83 (97.63)
7th Gear									
394.57 (294.23)	36573 (162.68)	4.05 (6.51)	1699	3.27	0.414 (0.252)	16.97 (3.34)	183 (84)	47 (8)	28.83 (97.63)
8th Gear									
400.72 (298.82)	32636 (145.17)	4.60 (7.41)	1700	2.36	0.408 (0.248)	17.19 (3.39)	183 (84)	46 (8)	28.82 (97.60)
9th Gear									
394.86 (294.44)	28371 (126.20)	5.22 (8.40)	1701	1.58	0.410 (0.249)	17.13 (3.38)	184 (84)	46 (8)	28.82 (97.60)
10th Gear									
394.07 (293.86)	25085 (111.58)	5.89 (9.48)	1699	1.19	0.415 (0.253)	16.91 (3.33)	183 (84)	46 (8)	28.81 (97.56)
11th Gear									
387.30 (288.81)	21784 (96.90)	6.67 (10.73)	1701	1.03	0.424 (0.258)	16.57 (3.26)	183 (84)	46 (8)	28.81 (97.56)
12th Gear									
386.57 (288.27)	19273 (85.73)	7.52 (12.10)	1701	0.79	0.423 (0.257)	16.58 (3.27)	183 (84)	47 (8)	28.80 (97.53)
13th Gear									
385.51 (287.48)	16089 (71.57)	8.99 (14.46)	1706	0.55	0.426 (0.259)	16.48 (3.25)	183 (84)	47 (8)	28.80 (97.53)

**DRAWBAR PERFORMANCE**  
**(Ballasted to 53000 lbs at 1700 RPM)**  
**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	Air dry bulb	Barom. inch Hg (kPa)	
2nd Gear									
275.75 (205.63)	53244 (236.84)	1.94 (3.13)	2184	12.43	0.537 (0.326)	13.08 (2.58)	181 (83)	49 (9)	28.95 (98.03)
3rd Gear									
323.44 (241.19)	50699 (225.52)	2.39 (3.85)	2073	10.00	0.490 (0.298)	14.33 (2.82)	181 (83)	52 (11)	28.93 (97.97)
4th Gear									
358.66 (267.46)	48710 (216.67)	2.76 (4.44)	1859	8.80	0.457 (0.278)	15.35 (3.02)	182 (83)	54 (12)	28.91 (97.90)
5th Gear									
377.77 (281.70)	46020 (204.70)	3.08 (4.95)	1706	7.02	0.429 (0.261)	16.35 (3.22)	182 (83)	57 (14)	28.91 (97.90)
6th Gear									
394.21 (293.96)	41704 (185.51)	3.54 (5.70)	1704	4.73	0.414 (0.252)	16.95 (3.34)	183 (84)	59 (15)	28.91 (97.90)
7th Gear									
396.30 (295.52)	36596 (162.78)	4.06 (6.54)	1702	3.16	0.415 (0.252)	16.91 (3.33)	182 (83)	59 (15)	28.91 (97.90)
8th Gear									
402.18 (299.90)	32475 (144.45)	4.64 (7.47)	1713	2.24	0.409 (0.248)	17.18 (3.38)	182 (83)	60 (16)	28.91 (97.90)
9th Gear									
397.06 (296.08)	28576 (127.11)	5.21 (8.39)	1697	1.54	0.413 (0.251)	17.00 (3.35)	183 (84)	60 (16)	28.90 (97.87)
10th Gear									
398.60 (297.24)	25365 (112.83)	5.89 (9.48)	1699	1.22	0.411 (0.250)	17.06 (3.36)	182 (83)	61 (16)	28.90 (97.87)
11th Gear									
391.81 (292.17)	22001 (97.86)	6.68 (10.75)	1703	1.06	0.419 (0.255)	16.74 (3.30)	183 (84)	62 (17)	28.90 (97.87)
12th Gear									
391.73 (292.11)	19511 (86.79)	7.53 (12.12)	1703	0.91	0.419 (0.255)	16.75 (3.30)	183 (84)	63 (17)	28.90 (97.87)
13th Gear									
389.00 (290.08)	16251 (72.29)	8.98 (14.45)	1703	0.51	0.422 (0.256)	16.65 (3.28)	183 (84)	64 (18)	28.90 (97.87)

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Track width</b>	36.0 in (915 mm)	36.0 in (915 mm)
<b>Ballast</b> - Cast iron(front end)	4250 lb (1928 kg)	None
- Cast iron(front idlers)	2220 lb (1007 kg)	None
- Cast iron(side frame)	2660 lb (1206 kg)	None
<b>Height of Drawbar</b>	22.5 in (560 mm)	22.0 in (560 mm)
<b>Static Weight with operator</b>	53050 lb(24063 kg)	43920 lb(19922 kg)

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: IVN

Quick Attach: yes

Maximum Force Exerted Through Whole Range: 20936 lbs (93.1 kN)

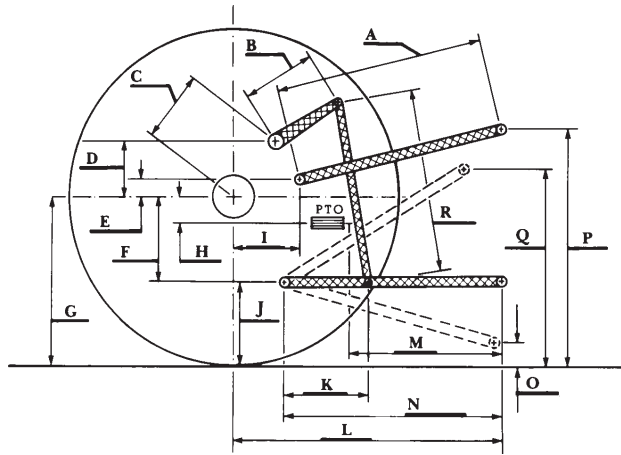
i) Opening pressure of relief valve: NA

Sustained pressure at compensator cutoff: 2930 psi (202 bar)

#### High flow option

ii) Pump delivery rate at minimum pressure and rated engine speed:	43.5 GPM (164.7 l/min)	58.8 GPM (222.5 l/min)
at 2200 engine rpm:	45.6 GPM (172.6 l/min)	60.9 GPM (230.5 l/min)
iii) Pump delivery rate at maximum hydraulic power:	42.2 GPM (159.7 l/min)	54.6 GPM (206.8 l/min)
Delivery pressure:	2755 psi (190 bar)	2674 psi (184 bar)
Power:	67.9 HP (50.6 kW)	85.2 HP (63.5 kW)

#### HITCH DIMENSIONS AS TESTED—NO LOAD



	inch	mm
A	30.2	768
B	21.7	550
C	41.4	1051
D	39.4	1000
E	12.4	315
F	11.8	300
G	35.0	890
H	0.4	10
I	23.0	585
J	23.2	590
K	29.0	737
L	53.9	1369
*L'	60.4	1534
M	26.6	676
N	36.6	929
O	9.0	230
P	50.2	1275
Q	46.5	1181
R	55.9	1421

\*L' to Quick Attach ends



**CHALLENGER MT855 DIESEL**

Agricultural Research Division  
 Institute of Agriculture and Natural Resources  
 University of Nebraska—Lincoln  
 Darrell Nelson, Dean and Director