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2014

## Test 2089: Challenger MT775E

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 2089—SUMMARY 938

## CHALLENGER MT775E DIESEL

### 16 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption Gal/hr (l/h)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1060 rpm)						
334.69 (249.58)	2099	20.79 (78.68)	0.436 (0.265)	16.10 (3.17)	0.76 (2.87)	
Standard Power Take-off Speed (1000 rpm)						
363.92 (271.37)	1980	21.30 (80.61)	0.411 (0.250)	17.09 (3.37)	0.79 (2.99)	
Maximum Power (1 hour)						
374.43 (279.21)	1701	20.15 (76.29)	0.378 (0.230)	18.58 (3.66)	0.71 (2.69)	

#### VARYING POWER AND FUEL CONSUMPTION

334.69 (249.58)	2099	20.79 (78.68)	0.436 (0.265)	16.10 (3.17)	0.76 (2.87)	Air temperature
291.00 (217.00)	2144	18.86 (71.38)	0.455 (0.277)	15.43 (3.04)	0.66 (2.51)	75°F (24°C)
220.40 (164.35)	2165	14.39 (54.47)	0.458 (0.279)	15.32 (3.02)	0.43 (1.62)	Relative humidity
147.39 (109.91)	2175	10.37 (39.24)	0.494 (0.300)	14.22 (2.80)	0.37 (1.39)	60%
73.77 (55.01)	2182	7.29 (27.58)	0.693 (0.422)	10.13 (1.99)	0.32 (1.20)	Barometer
3.21 (2.39)	2188	4.27 (16.16)	9.327 (5.673)	0.75 (0.15)	0.29 (1.11)	28.68" Hg (97.12 kPa)

Maximum torque - 1325 lb.-ft. (1797 Nm) at 1201 rpm

Maximum torque rise - 58.5%

Torque rise at 1681 engine rpm - 39%

Power increase at 1701 engine rpm - 11.9%

#### 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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th Gear										
297.83 (222.09)	19938 (88.69)	5.60 (9.01)	2100	2.7	0.491 (0.299)	14.29 (2.81)	0.021 (0.013)	190 (88)	66 (19)	28.71 (97.22)
75% of Pull at Maximum Power—8th Gear										
232.10 (173.07)	14929 (66.41)	5.83 (9.38)	2158	1.5	0.514 (0.313)	13.65 (2.69)	0.020 (0.012)	189 (87)	75 (24)	28.71 (97.22)
50% of Pull at Maximum Power—8th Gear										
157.02 (117.09)	9966 (44.33)	5.91 (9.51)	2171	0.7	0.547 (0.333)	12.83 (2.53)	0.021 (0.013)	189 (87)	80 (27)	28.69 (97.16)
75% of Pull at Reduced Engine Speed—11th Gear										
232.12 (173.09)	14882 (66.20)	5.85 (9.41)	1517	1.5	0.428 (0.260)	16.39 (3.23)	0.019 (0.012)	185 (85)	75 (24)	28.70 (97.19)
50% of Pull at Reduced Engine Speed—11th Gear										
157.21 (117.23)	9959 (44.30)	5.92 (9.53)	1524	0.7	0.458 (0.278)	15.34 (3.02)	0.019 (0.012)	184 (84)	81 (27)	28.68 (97.12)

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

**Dates of tests:** May 22 to June 9, 2014

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

**CONSUMABLE Fluids, OIL and TIME: Fuel** No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8429 **Fuel weight** 7.018 lbs/gal (0.841 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 15W-40 API service classification** CJ-4 **Transmission and hydraulic lubricant** AGCO Permatran 821 XL fluid **Total time engine was operated:** 24.5 hours

**ENGINE: Make** AGCO **Power Diesel Type** seven cylinder vertical with two turbochargers, water to air intercooler, air to air intercooler and D.E.F. (diesel exhaust fluid) technology **Serial No.** \*Y22796\* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.370" x 5.709" (111.0 mm x 145.0 mm) **Compression ratio** 16.7 to 1 **Displacement** 599 cu in (9822 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** one paper element and water separator **Fuel cooler** radiator for pump return fuel **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 137.6 - 148.8 lb/h (62.4 - 67.5 kg/h) **High idle:** 2150 - 2200 rpm **Turbo boost:** nominal 37.0 - 40.0 psi (255 - 275 kPa) as measured 38.7 psi (267 kPa)

**CHASSIS: Type** tracklayer-rubber tracked **Serial No.** \*AGCC0775HENDD1005\* **Track width** 88.0" (2235 mm) to 119.5" (3035 mm) **Length of track on ground** 102.4" (2600 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 1.66 (2.67) second 2.11 (3.40) third 2.66 (4.28) fourth 3.38 (5.44) fifth 4.03 (6.49) sixth 4.54 (7.31) seventh 5.12 (8.24) eighth 5.76 (9.27) ninth 6.48 (10.43) tenth 7.29 (11.73) eleventh 8.22 (13.23) twelfth 9.26 (14.90) thirteenth 11.02 (17.73) fourteenth 14.00 (22.53) fifteenth 17.72 (28.52) sixteenth 24.64 (39.65) at 2300 rpm, reverse 1.33 (2.14), 3.22 (5.18), 3.63 (5.84), 8.82 (14.19) **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated by foot pedal **Steering** electro-hydraulic differential steering controlled by steering wheel **Power take-off** 1000 rpm at 1980 engine rpm **Unladen tractor mass** 33730 lb (15300 kg)

**DRAWBAR PERFORMANCE**

**Unballasted at 2100 RPM**

**DRAWBAR 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)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th Gear										
250.33 (186.67)	31204 (138.80)	3.01 (4.84)	2097	10.9	0.547 (0.333)	12.83 (2.53)	0.021 (0.013)	190 (88)	67 (20)	28.59 (96.82)
5th Gear										
282.97 (211.01)	28468 (126.63)	3.73 (5.99)	2100	7.4	0.514 (0.313)	13.65 (2.69)	0.021 (0.013)	190 (88)	68 (20)	28.59 (96.82)
6th Gear										
293.64 (218.97)	25575 (113.76)	4.31 (6.93)	2100	5.1	0.497 (0.303)	14.11 (2.78)	0.020 (0.012)	190 (88)	67 (20)	28.73 (97.29)
7th Gear										
293.83 (219.11)	22329 (99.32)	4.94 (7.94)	2100	3.5	0.497 (0.302)	14.11 (2.78)	0.021 (0.013)	190 (88)	66 (19)	28.71 (97.22)
8th Gear										
297.83 (222.09)	19938 (88.69)	5.60 (9.01)	2100	2.7	0.491 (0.299)	14.29 (2.81)	0.021 (0.013)	190 (88)	66 (19)	28.71 (97.22)
9th Gear										
298.25 (222.40)	17622 (78.38)	6.35 (10.21)	2101	2.0	0.491 (0.298)	14.30 (2.82)	0.021 (0.012)	190 (88)	68 (20)	28.74 (97.33)
10th Gear										
299.52 (223.35)	15643 (69.58)	7.18 (11.56)	2100	1.4	0.486 (0.295)	14.45 (2.85)	0.021 (0.013)	190 (88)	68 (20)	28.75 (97.36)
11th Gear										
295.64 (220.46)	13655 (60.74)	8.12 (13.07)	2100	1.2	0.493 (0.300)	14.24 (2.81)	0.021 (0.013)	191 (88)	68 (20)	28.78 (97.46)

**REPAIRS AND ADJUSTMENTS:** The water pump failed during PTO testing. This was replaced and testing continued.

**Note:** This tractor has a driveline protection system that limits the maximum engine torque in gears 1 through 4.

**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 95°F (35°C). The performance figures on this summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2089**, Nebraska Summary 938, December 19, 2014.

Roger M. Hoy  
Director

M.F. Kocher  
P.J. Jasa  
J.D. Luck  
Board of Tractor Test Engineers

**TRACTOR SOUND LEVEL WITH CAB** **dB(A)**

At no load in 6th gear	70.7
Bystander in 16th gear	89.8

<b>TIRES, BALLAST AND WEIGHT</b>	<b>With Ballast</b>	<b>Without Ballast</b>
<b>Track width</b>	25.0 in (635 mm)	25.0 in (635 mm)
<b>Ballast</b> - Cast iron(front end)	2750 lb (1247 kg)	None
- Cast iron(front idlers)	2345 lb (1064 kg)	None
<b>Height of Drawbar</b>	21.0 in (535 mm)	20.5 in (520 mm)
<b>Static Weight with operator</b>	39000 lb(17690 kg)	33905 lb(15379 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 lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
236.23 (176.16)	31914 (141.96)	2.78 (4.47)	2001	13.9	4th Gear 0.541 (0.329)	12.96 (2.55)	0.020 (0.012)	189 (87)	66 (19)	28.59 (96.82)
288.71 (215.29)	30651 (136.34)	3.54 (5.69)	2042	9.8	5th Gear 0.514 (0.313)	13.66 (2.69)	0.021 (0.013)	190 (88)	68 (20)	28.60 (96.85)
306.32 (228.42)	29514 (131.28)	3.90 (6.27)	1968	8.4	6th Gear 0.490 (0.298)	14.32 (2.82)	0.020 (0.012)	190 (88)	69 (21)	28.59 (96.82)
312.69 (233.17)	28269 (125.74)	4.15 (6.68)	1839	7.6	7th Gear 0.470 (0.286)	14.92 (2.94)	0.018 (0.011)	191 (88)	69 (21)	28.59 (96.82)
322.23 (240.28)	25843 (114.96)	4.68 (7.52)	1800	5.3	8th Gear 0.451 (0.274)	15.57 (3.07)	0.017 (0.010)	191 (88)	66 (19)	28.71 (97.22)
324.90 (242.27)	24310 (108.13)	5.02 (8.07)	1700	4.3	9th Gear 0.437 (0.266)	16.05 (3.16)	0.017 (0.011)	191 (88)	68 (20)	28.74 (97.33)
329.40 (245.63)	21632 (96.22)	5.71 (9.19)	1700	3.2	10th Gear 0.431 (0.262)	16.30 (3.21)	0.018 (0.011)	191 (88)	68 (20)	28.77 (97.43)
328.06 (244.63)	18913 (84.13)	6.51 (10.47)	1700	2.3	11th Gear 0.433 (0.263)	16.23 (3.20)	0.017 (0.011)	192 (89)	68 (20)	28.78 (97.46)
331.59 (247.27)	16896 (75.15)	7.36 (11.84)	1701	1.8	12th Gear 0.428 (0.260)	16.41 (3.23)	0.018 (0.011)	192 (89)	68 (20)	28.77 (97.43)
331.46 (247.17)	14101 (62.72)	8.82 (14.19)	1701	1.2	13th Gear 0.428 (0.260)	16.40 (3.23)	0.018 (0.011)	192 (89)	69 (20)	28.75 (97.36)

**DRAWBAR PERFORMANCE**  
**(Ballasted at 1700 Engine 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)	Consumption Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th Gear										
236.04 (176.02)	33280 (148.04)	2.66 (4.28)	1786	7.9	0.466 (0.284)	15.06 (2.97)	0.018 (0.011)	188 (86)	68 (20)	28.53 (96.61)
5th Gear										
307.24 (229.11)	32825 (146.01)	3.51 (5.65)	1978	7.7	0.490 (0.298)	14.33 (2.82)	0.020 (0.012)	190 (88)	69 (21)	28.54 (96.65)
6th Gear										
321.21 (239.52)	31553 (140.35)	3.82 (6.15)	1891	6.7	0.463 (0.282)	15.15 (2.98)	0.019 (0.011)	191 (88)	69 (21)	28.56 (96.71)
7th Gear										
321.61 (239.82)	29728 (132.24)	4.06 (6.53)	1762	5.8	0.448 (0.273)	15.66 (3.08)	0.016 (0.010)	192 (89)	69 (21)	28.57 (96.75)
8th Gear										
327.36 (244.11)	27603 (122.78)	4.45 (7.15)	1700	4.9	0.433 (0.264)	16.19 (3.19)	0.016 (0.010)	192 (89)	71 (22)	28.58 (96.78)
9th Gear										
328.16 (244.71)	24299 (108.09)	5.07 (8.15)	1699	3.6	0.432 (0.263)	16.26 (3.20)	0.017 (0.010)	192 (89)	73 (23)	28.60 (96.85)
10th Gear										
332.58 (248.00)	21704 (96.54)	5.75 (9.25)	1699	2.9	0.425 (0.259)	16.50 (3.25)	0.016 (0.010)	191 (88)	75 (24)	28.59 (96.82)
11th Gear										
328.23 (244.76)	18845 (83.82)	6.53 (10.51)	1700	2.1	0.431 (0.262)	16.30 (3.21)	0.017 (0.010)	192 (89)	75 (24)	28.60 (96.85)
12th Gear										
330.02 (246.09)	16766 (74.58)	7.38 (11.88)	1700	1.7	0.428 (0.261)	16.39 (3.23)	0.017 (0.010)	187 (86)	77 (25)	28.61 (96.88)
13th Gear										
331.91 (247.50)	14094 (62.69)	8.83 (14.21)	1701	1.3	0.424 (0.258)	16.55 (3.26)	0.017 (0.011)	189 (87)	78 (25)	28.61 (96.88)

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: yes

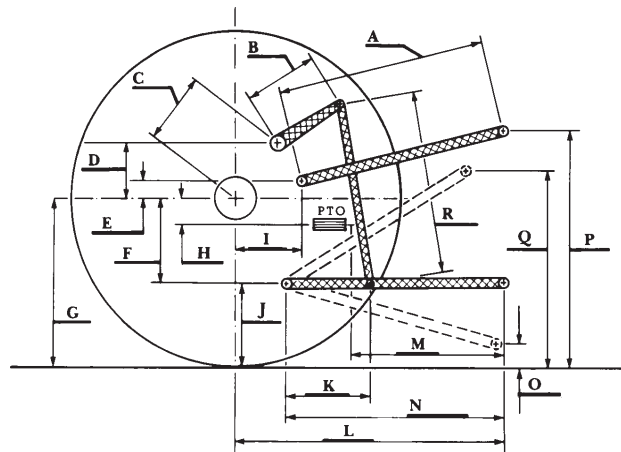
OECD Static test

Maximum force exerted through whole range: 17263 lbs (76.8 kN)

**Standard pump**      **High flow pump**  
3 outlet sets combined

i) Sustained pressure at compensator cutoff:	2903 psi (202 bar)	2888 psi (199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	59.4 GPM (224.9 l/min)	85.2 GPM (322.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	56.0 GPM (212.0 l/min)	80.2 GPM (303.4 l/min)
Delivery pressure:	2836 psi (196 bar)	2739 psi (189 bar)
Power:	92.7 HP (69.1 kW)	128.1 HP (95.5 kW)
<b>single outlet set</b>		
i) Sustained pressure at compensator cutoff:	2871 psi (198 bar)	2892 psi (199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	37.7 GPM (142.5 l/min)	39.8 GPM (150.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	34.6 GPM (130.8 l/min)	36.8 GPM (139.2 l/min)
Delivery pressure:	2384 psi (164 bar)	2368 psi (163 bar)
Power:	48.1 HP (35.8 kW)	50.8 HP (37.9 kW)

## HITCH DIMENSIONS AS TESTED—NO LOAD



	inch	mm
A	27.6	702
B	21.7	550
C	23.5	596
D	23.0	583
E	11.4	290
F	11.8	300
G	33.4	849
H	1.3	34
I	16.7	425
J	21.6	549
K	27.1	688
L	48.4	1230
*L'	52.2	1325
M	27.9	709
N	39.6	1005
O	9.0	230
P	48.6	1234
Q	40.2	1022
R	42.5	1079

\*L' to Quick Attach ends



**CHALLENGER MT775E DIESEL**

Institute of Agriculture and Natural Resources  
University of Nebraska–Lincoln