

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

2012

## Test 2032A: Challenger MT595B

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 2032A: Challenger MT595B" (2012). *Nebraska Tractor Tests*. 2463.  
<https://digitalcommons.unl.edu/tractormuseumlit/2463>

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 2032A - SUMMARY 826A

## CHALLENGER MT595B TECHSTAR DIESEL

### CONTINUOUSLY VARIABLE TRANSMISSION

#### 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—1082 rpm)</b>					
196.63 (146.63)	2201	12.02 (45.48)	0.431 (0.262)	16.36 (3.22)	
<b>Standard Power Take-off Speed (1000 rpm)</b>					
215.27 (160.52)	2034	12.44 (47.07)	0.408 (0.248)	17.31 (3.41)	
<b>Maximum Power (1 Hour)</b>					
217.30 (162.04)	2002	12.47 (47.22)	0.405 (0.246)	17.42 (3.43)	
<b>VARYING POWER AND FUEL CONSUMPTION</b>					
196.63 (146.63)	2201	12.02 (45.48)	0.431 (0.262)	16.36 (3.22)	Air temperature
165.80 (123.64)	2220	10.58 (40.06)	0.450 (0.274)	15.67 (3.09)	80°F (27°C)
124.55 (92.88)	2228	8.52 (32.26)	0.483 (0.294)	14.61 (2.88)	Relative humidity
83.40 (62.19)	2238	6.26 (23.70)	0.530 (0.322)	13.32 (2.62)	63%
42.40 (31.62)	2248	4.02 (15.21)	0.669 (0.407)	10.55 (2.08)	Barometer
3.90 (2.91)	2257	2.10 (7.95)	3.803 (2.313)	1.86 (0.37)	28.48" Hg (96.44 kPa)
Maximum Torque - 690 lb.-ft. (936 Nm) at 1400 rpm					
Maximum Torque Rise - 47.3%					
Torque rise at 1800 engine rpm - 31%					
Power increase at 2002 rpm - 10.5%					

#### 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)
<b>Maximum Power—4.7 mph (7.5 km/h)</b>									
162.36 (121.07)	13560 (60.32)	4.49 (7.23)	2200	4.1	0.531 (0.323)	13.30 (2.62)	189 (87)	68 (20)	28.86 (97.73)
<b>75% of Pull at Maximum Power—4.7 mph (7.5 km/h)</b>									
122.50 (91.35)	10098 (44.92)	4.55 (7.32)	2222	2.6	0.582 (0.354)	12.13 (2.39)	186 (86)	74 (23)	28.87 (97.77)
<b>50% of Pull at Maximum Power—4.7 mph (7.5 km/h)</b>									
83.17 (62.02)	6774 (30.13)	4.61 (7.41)	2234	1.7	0.638 (0.388)	11.07 (2.18)	182 (83)	75 (24)	28.87 (97.77)
<b>75% of Pull at Reduced Engine Speed—4.7 mph (7.5 km/h) (Auto mode)</b>									
123.08 (91.78)	10127 (45.04)	4.56 (7.33)	1477	2.6	0.470 (0.286)	15.01 (2.96)	187 (86)	78 (26)	28.86 (97.73)
<b>50% of Pull at Reduced Engine Speed—4.7 mph (7.5 km/h) (Auto mode)</b>									
82.53 (61.54)	6697 (29.79)	4.62 (7.44)	1318	1.6	0.476 (0.290)	14.82 (2.92)	176 (80)	78 (26)	28.86 (97.73)

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

**Dates of tests:** June 20 - 22, 2012

**Manufacturer:** AGCO Corporation, 4205 River Green Parkway, Duluth, Georgia, 30096 USA.

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8475 Fuel weight 7.057 lbs/gal (0.846 kg/l) Oil SAE 15W40 API service classification CH-4 Transmission and hydraulic lubricant AGCO Power Fluid 821 XL fluid Front axle lubricant AGCO Gear Lube 715 SAE 80W90 Total time engine was operated 19.0 hours

**ENGINE:** Make Sisu Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. W23823 Crankshaft lengthwise Rated engine speed 2200 Bore and stroke 4.252" x 5.276" (108.0 mm x 134.0 mm) Compression ratio 17.5 to 1 Displacement 449 cu in (7365 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 final drive oil, radiator for transmission oil Fuel filter two paper elements and water separator Muffler vertical Cooling medium temperature control one thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS:** Fuel rate: 84.0 - 87.7 lb/h (38.1 - 39.8 kg/h) High idle: 2225 - 2275 rpm Turbo boost: nominal 21.0 - 23.2 psi (145 - 160 kPa) as measured 22.1 psi (152 kPa)

**CHASSIS:** Type front wheel assist Serial No. B012038 Tread width rear 60.6" (1540 mm) to 119.9" (3045 mm) front 60.9" (1548 mm) to 88.8" (2256 mm) Wheelbase 118.4" (3007 mm) Hydraulic control system direct engine drive Transmission CVT. A combination of mechanical and hydrostatic sections allow an infinite speed adjustment within the ranges noted. The transmission has two mechanical ranges. Nominal travel speeds mph (km/h) forward: Low range 0-18 (0-30), high range 0-31 (0-50) reverse: Low range 0-13 (0-21), high range 0-17 (0-28) Clutch a foot pedal controls the hydrostatic oil flow Brakes wet multiple disc hydraulically actuated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 2063 engine rpm or 1000 rpm at 2034 engine rpm Unladen tractor mass 17685 lb (8022 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**MAXIMUM POWER AT SELECTED SPEEDS**

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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
131.71 (98.21)	17584 (78.22)	2.81 (4.51)	2218	10.4	3.1 mph(5.0 km/h) 0.581 (0.353)	12.15 (2.39)	183 (84)	62 (16)	28.84 (97.66)
155.64 (116.06)	16958 (75.43)	3.45 (5.54)	2200	8.5	3.7 mph(6.0 km/h) 0.555 (0.338)	12.71 (2.50)	188 (87)	62 (17)	28.84 (97.66)
161.89 (120.72)	14566 (64.79)	4.17 (6.71)	2200	4.9	4.3 mph(7.0 km/h) 0.534 (0.325)	13.22 (2.60)	187 (86)	66 (19)	28.85 (97.70)
162.36 (121.07)	13560 (60.32)	4.49 (7.23)	2200	4.1	4.7 mph(7.5 km/h) 0.531 (0.323)	13.30 (2.62)	189 (87)	68 (20)	28.86 (97.73)
162.17 (120.93)	12599 (56.04)	4.83 (7.77)	2200	3.6	5.0 mph(8.0 km/h) 0.531 (0.323)	13.28 (2.62)	190 (88)	71 (22)	28.87 (97.77)
162.12 (120.89)	11104 (49.39)	5.48 (8.81)	2200	2.7	5.6 mph(9.0 km/h) 0.531 (0.323)	13.29 (2.62)	193 (89)	78 (26)	28.55 (96.68)
160.47 (119.66)	9862 (43.87)	6.10 (9.82)	2200	2.3	6.2 mph(10.0 km/h) 0.536 (0.326)	13.17 (2.59)	194 (90)	78 (25)	28.56 (96.72)
159.94 (119.27)	8919 (39.67)	6.73 (10.82)	2200	2.0	6.8 mph(11.0 km/h) 0.540 (0.328)	13.08 (2.58)	195 (90)	77 (25)	28.56 (96.72)
159.75 (119.13)	8114 (36.09)	7.39 (11.89)	2200	1.8	7.5 mph(12.0 km/h) 0.535 (0.326)	13.18 (2.60)	192 (89)	80 (26)	28.56 (96.72)
156.02 (116.34)	7199 (32.02)	8.13 (13.08)	2201	1.6	8.2 mph(13.2 km/h) 0.549 (0.334)	12.87 (2.53)	199 (93)	81 (27)	28.54 (96.65)

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

**NOTE 1:** The data on this summary was obtained from testing conducted on the Massey Ferguson 7499 Diesel.

**NOTE 2:** The performance figures on this report are the result of replacing the electronic engine control module of the Massey Ferguson 7497 with the Massey Ferguson 7499 module.

**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 140°F (60°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. **2032A**, Nebraska Summary 826A, September 8, 2012.

Roger M. Hoy  
Director

M.A. Hanna  
P.J. Jasa  
J.D. Luck  
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load - 4.6 mph (7.5 km/h)(engine - 2250 rpm)	68.0	68.0
At no load - 4.6 mph (7.5 km/h)(engine - 1240 rpm)	64.3	64.0
Bystander in Rabbit range	--	82.5

**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

**Tested Without Ballast**

Two 480/80R46;\*\*\*; 14 (95)  
Two 420/90R30;\*\*\*; 14 (95)  
23.5 in (595 mm)  
10595 lb (4806 kg)  
7265 lb (3295 kg)  
17860 lb (8101 kg)

## DRAWBAR PERFORMANCE AT 2000 ENGINE RPM

### UNBALLASTED - FRONT DRIVE ENGAGED MAXIMUM POWER AT SELECTED SPEEDS

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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.1 mph (5.0 km/h)									
132.37 (98.71)	17633 (78.44)	2.82 (4.53)	2218	10.3	0.582 (0.354)	12.12 (2.39)	183 (84)	61 (16)	28.84 (97.67)
3.7 mph (6.0 km/h)									
155.75 (116.14)	17018 (75.70)	3.44 (5.53)	2200	8.7	0.554 (0.337)	12.74 (2.51)	188 (87)	62 (17)	28.84 (97.67)
4.3 mph (7.0 km/h)									
168.40 (125.57)	15310 (68.10)	4.13 (6.64)	2139	5.5	0.524 (0.318)	13.48 (2.66)	188 (87)	67 (19)	28.85 (97.70)
4.7 mph (7.5 km/h)									
167.95 (125.24)	14113 (62.78)	4.47 (7.19)	2151	4.5	0.520 (0.316)	13.57 (2.67)	189 (87)	70 (21)	28.87 (97.77)
5.0 mph (8.0 km/h)									
171.20 (127.66)	13374 (59.49)	4.80 (7.72)	2037	4.0	0.504 (0.306)	14.02 (2.76)	192 (89)	73 (23)	28.87 (97.77)
5.6 mph (9.0 km/h)									
173.44 (129.33)	11861 (52.76)	5.48 (8.82)	2000	3.0	0.486 (0.295)	14.53 (2.86)	193 (89)	78 (26)	28.56 (96.72)
6.2 mph (10.0 km/h)									
173.09 (129.07)	10594 (47.12)	6.13 (9.86)	2000	2.5	0.486 (0.296)	14.53 (2.86)	195 (90)	77 (25)	28.56 (96.72)
6.8 mph (11.0 km/h)									
171.90 (128.19)	9538 (42.43)	6.76 (10.88)	2000	2.2	0.492 (0.299)	14.33 (2.82)	195 (91)	78 (26)	28.56 (96.72)
7.5 mph (12.0 km/h)									
169.76 (126.59)	8633 (38.40)	7.38 (11.87)	2001	1.9	0.508 (0.309)	13.90 (2.74)	199 (93)	81 (27)	28.55 (96.68)
8.2 mph (13.2 km/h)									
169.04 (126.05)	7817 (34.77)	8.11 (13.05)	2000	1.7	0.509 (0.309)	13.88 (2.73)	200 (93)	82 (28)	28.54 (96.65)

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: None

OECD Static test

Maximum force exerted through whole range: 14283 lbs (63.5 kN)

Pump size: 29.0 GPM (110 l/min) 39.0 GPM (150 l/min)

**two outlet sets combined** **three outlet sets combined**

i) Sustained pressure at compensator cutoff: 2916 psi (201 bar) 2889 psi (199 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 30.0 GPM (113.6 l/min) 43.5 GPM (164.5 l/min)

iii) Pump delivery rate at maximum hydraulic power: 29.5 GPM (111.7 l/min) 40.2 GPM (152.1 l/min)  
Delivery pressure: 2730 psi (188 bar) 2596 psi (179 bar)  
Power: 47.0 HP (35.0 kW) 60.8 HP (45.4 kW)

**single outlet set** **single outlet set**  
ii) Pump delivery rate at minimum pressure and rated engine speed: 29.1 GPM (110.2 l/min) 26.5 GPM (100.1 l/min)

iii) Pump delivery rate at maximum hydraulic power: 27.5 GPM (104.1 l/min) 26.4 GPM (99.9 l/min)  
Delivery pressure: 2433 psi (168 bar) 2432 psi (168 bar)  
Power: 39.0 HP (29.1 kW) 37.4 HP (27.9 kW)

## HITCH DIMENSIONS AS TESTED - NO LOAD

	SAE TEST		OECD TEST	
	inch	mm	inch	mm
A	30.3	768	29.7	754
B	14.0	355	14.0	355
C	13.7	347	13.7	347
D	12.0	305	12.0	305
E	12.6	321	12.6	321
F	10.0	255	10.0	255
G	34.2	870	34.2	870
H	2.4	60	2.4	60
I	18.7	476	18.7	476
J	24.2	615	24.2	615
K	27.2	690	27.2	690
L	46.3	1175	46.3	1175
M	26.2	665	26.2	665
N	40.6	1030	40.6	1030
O	8.0	203	9.0	230
P	46.2	1173	51.2	1300
Q	37.3	947	39.5	1003
R	29.9	759	29.3	744

## THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar) 2850 (197)

Location: lift cylinder

Hydraulic oil temperature: °F (°C) 148 (64)

Location: hydraulic sump

Category: III

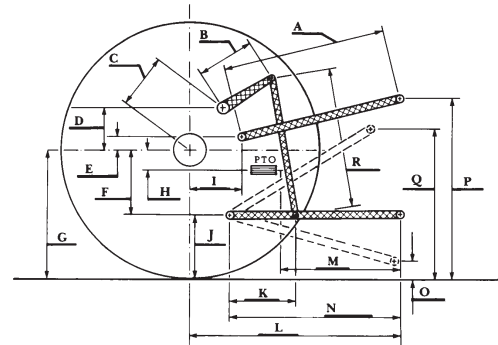
Quick attach: None

**SAE Static Test**—System pressure 2665 psi (177 Bar)

Hitch point distance to ground level in. (mm) 8.2 (208) 14.4 (366) 20.8 (528) 27.2 (691) 33.6 (853) 40.0 (1016)

Lift force on frame lb 19719 17748 17721 18009 17874 16992

" " " " " " (kN) (87.7) (78.9) (78.8) (80.1) (79.5) (75.6)



CHALLENGER MT595B Diesel