

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 2004

Tests 2152 & 2153: Challenger 525B Autopower IV 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 2152 & 2153: Challenger 525B Autopower IV Diesel" (2004). *Nebraska Tractor Tests*. 320.

<https://digitalcommons.unl.edu/tractormuseumlit/320>

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 2152 & 2153—NEBRASKA SUMMARY 504 CHALLENGER MT 525B AUTOPOWER IV 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—1100 rpm)					
96.7 (72.1)	2200	6.71 (25.39)	0.492 (0.299)	14.42 (2.84)	
Standard Power Take-off Speed(1000 rpm)					
109.2 (81.4)	2000	6.65 (25.18)	0.432 (0.263)	16.41 (3.23)	
Maximum Power (2 hours)					
110.9 (82.7)	1852	6.45 (24.41)	0.412 (0.251)	17.21 (3.39)	

VARYING POWER AND FUEL CONSUMPTION

96.7 (72.1)	2200	6.71 (25.39)	0.492 (0.299)	14.42 (2.84)	Air temperature
83.1 (62.0)	2223	5.86 (22.20)	0.500 (0.304)	14.17 (2.79)	68°F (20°C)
62.6 (46.7)	2243	4.92 (18.61)	0.557 (0.339)	12.74 (2.51)	Relative humidity
41.8 (31.2)	2264	3.97 (15.02)	0.672 (0.409)	10.56 (2.08)	70%
21.1 (15.7)	2279	3.05 (11.54)	1.027 (0.625)	6.91 (1.36)	Barometer
--	2297	2.18 (8.26)	--	--	30.2" Hg (102.2 kPa)

Maximum Torque - 355.2 lb.-ft. (481.6 Nm) at 1399 rpm
Maximum Torque Rise - 54.0%
Torque rise at 1750 engine rpm - 42%

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—16th(1LB) Gear									
60.2 (44.9)	3775 (16.8)	5.98 (9.62)	2201	3	0.665 (0.405)	10.66 (2.10)	183 (84)	46 (8)	30.3 (102.5)
75% of Pull at Maximum Power—16th(1LB) Gear									
45.7 (34.1)	2835 (12.6)	6.05 (9.73)	2208	3	0.759 (0.462)	9.34 (1.84)	183 (84)	46 (8)	30.3 (102.5)
50% of Pull at Maximum Power—16th(1LB) Gear									
31.0 (23.1)	1900 (8.4)	6.12 (9.85)	2229	2	0.960 (0.584)	7.39 (1.46)	183 (84)	46 (8)	30.3 (102.5)
75% of Pull at Reduced Engine Speed—18th(1LC) Gear									
45.9 (34.2)	2855 (12.7)	6.02 (9.68)	1864	3	0.643 (0.391)	11.03 (2.17)	181 (83)	48 (9)	30.3 (102.5)
50% of Pull at Reduced Engine Speed—18th(1LC) Gear									
31.1 (23.2)	1915 (8.5)	6.10 (9.82)	1882	3	0.796 (0.484)	8.91 (1.75)	181 (83)	48 (9)	30.3 (102.5)

Location of tests: Groupement d'Antony, Parc de Touvoie, BP 44 Antony, Cedex, France 92163
Dates of tests: February - March, 2004

Manufacturer: AGCO S.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)** 0.851
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** six cylinder vertical with turbocharger and air to air intercooler
Serial No. U093854K **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 3.937" x 5.00" (100.0 mm x 127.0 mm) **Compression ratio** 17.5 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** vertical **Cooling medium temperature control** thermostat and variable speed fan

CHASSIS: **Type** 2WD and FWA **Serial No.** M321014 **Tread width** rear 54.1" (1375 mm) to 86.8" (2205 mm) front 2WD - 65.4" (1660 mm) to 86.2" (2190 mm), FWA - 62.9" (1597 mm) to 80.0" (2033 mm) **Wheelbase** 2WD - 112.1" (2848 mm) FWA - 109.4" (2780 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 1.35 (2.17) second 1.58 (2.54) third 1.86 (2.99) fourth 2.03 (3.27) fifth 2.17 (3.50) sixth 2.37 (3.83) seventh 2.81 (4.52) eighth 3.01 (4.85) ninth 3.29 (5.29) tenth 3.52 (5.67) eleventh 4.16 (6.70) twelfth 4.67 (7.52) thirteenth 4.87 (7.84) fourteenth 5.05 (8.12) fifteenth 5.47 (8.80) sixteenth 5.91 (9.51) seventeenth 6.46 (10.39) eighteenth 6.97 (11.22) nineteenth 7.56 (12.16) twentieth 7.62 (12.27) twenty-first 8.16 (13.13) twenty-second 8.92 (14.36) twenty-third 10.53 (16.95) twenty-fourth 11.28 (18.16) twenty-fifth 12.33 (19.84) twenty-sixth 13.21 (21.26) twenty-seventh 15.60 (25.10) twenty-eighth 17.51 (28.18) twenty-ninth 18.26 (29.38) thirtieth 20.49 (32.97) thirty-first 24.19 (38.93) thirty-second 24.86 (40.00) reverse 1.35 (2.17), 1.58 (2.54), 1.86 (2.99), 2.03 (3.27), 2.17 (3.50), 2.37 (3.83), 2.81 (4.52), 3.01 (4.85), 3.29 (5.29), 3.52 (5.67), 4.16 (6.70), 4.67 (7.52), 4.87 (7.84), 5.05 (8.12), 5.47 (8.80), 5.91 (9.51), 6.46 (10.39), 6.97 (11.22), 7.56 (12.16), 7.62 (12.27), 8.16 (13.13),

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)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
52.7 (39.3)	10160 (45.2)	1.94 (3.13)	2201	15	5th(1TD)Gear 0.741 (0.451)	9.57 (1.89)	181 (83)	39 (4)	30.3 (102.6)
57.4 (42.8)	10095 (44.9)	2.13 (3.43)	2188	14	6th(2TB) Gear 0.697 (0.424)	10.18 (2.01)	181 (83)	41 (5)	30.3 (102.6)
67.1 (50.0)	10005 (44.5)	2.51 (4.05)	2192	14	7th(2TC) Gear 0.672 (0.409)	10.56 (2.08)	183 (84)	41 (5)	30.3 (102.6)
71.9 (53.6)	9960 (44.3)	2.71 (4.36)	2181	13	8th(3TA) Gear 0.635 (0.386)	11.17 (2.20)	183 (84)	41 (5)	30.3 (102.6)
78.4 (58.5)	9890 (44.0)	2.97 (4.79)	2147	12	9th(2TD) Gear 0.624 (0.379)	11.37 (2.24)	183 (84)	41 (5)	30.3 (102.6)
82.5 (61.5)	9805 (43.6)	3.15 (5.07)	2119	11	10th(3TB) Gear 0.587 (0.357)	12.08 (2.38)	183 (84)	43 (6)	30.3 (102.6)
88.5 (66.0)	9445 (42.0)	3.52 (5.66)	1956	10	11th(3TC) Gear 0.538 (0.328)	13.17 (2.60)	183 (84)	43 (6)	30.3 (102.6)
88.9 (66.3)	8670 (38.6)	3.85 (6.19)	1874	8	12th(4TA) Gear 0.519 (0.316)	13.65 (2.69)	183 (84)	45 (7)	30.3 (102.6)
89.8 (67.0)	8455 (37.6)	3.98 (6.41)	1852	7	13th(3TD) Gear 0.514 (0.313)	13.81 (2.72)	183 (84)	43 (6)	30.3 (102.6)
89.8 (67.0)	8105 (36.1)	4.16 (6.69)	1853	7	14th(1LA) Gear 0.514 (0.313)	13.81 (2.72)	185 (85)	46 (8)	30.3 (102.5)
88.9 (66.3)	7365 (32.8)	4.53 (7.29)	1853	6	15th(4TB) Gear 0.521 (0.317)	13.60 (2.68)	181 (83)	45 (7)	30.3 (102.6)
90.3 (67.3)	6890 (30.7)	4.91 (7.91)	1849	6	16th(1LB) Gear 0.512 (0.312)	13.86 (2.73)	185 (85)	46 (8)	30.3 (102.5)
89.3 (66.6)	6215 (27.6)	5.39 (8.67)	1853	5	17th(4TC) Gear 0.519 (0.316)	13.67 (2.69)	181 (83)	45 (7)	30.3 (102.5)
89.3 (66.6)	5730 (25.5)	5.85 (9.41)	1853	5	18th(1LC) Gear 0.514 (0.312)	13.81 (2.72)	183 (84)	46 (8)	30.3 (102.5)
88.1 (65.7)	5160 (23.0)	6.40 (10.30)	1857	4	19th(4TD) Gear 0.519 (0.316)	13.65 (2.69)	183 (84)	46 (8)	30.3 (102.6)
88.9 (66.3)	5190 (23.1)	6.43 (10.34)	1850	5	20th(2LA) Gear 0.519 (0.316)	13.65 (2.69)	183 (84)	48 (9)	30.3 (102.5)
88.5 (66.0)	4835 (21.5)	6.87 (11.06)	1853	4	21st(1LD) Gear 0.522 (0.318)	13.59 (2.68)	185 (85)	46 (8)	30.3 (102.5)
86.8 (64.7)	4315 (19.2)	7.54 (12.13)	1852	4	22nd(2LB) Gear 0.531 (0.323)	13.35 (2.63)	185 (85)	48 (9)	30.3 (102.5)

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 18.4R38; **,15(100)
Two 14.9R28; **,16(110)
22.4 in (570 mm)
7130 lb (3235 kg)
5215 lb (2365 kg)
12345 lb (5600 kg)

2WD

Two 18.4R38; **,15(100)
Two 14L-16.1; 8; 29 (200)
33.1 in (900 mm)
7120 lb (3230 kg)
4000 lb (1815 kg)
11120 lb (5045 kg)

8.92 (14.36), 10.53 (16.95), 11.28 (18.16), 12.33 (19.84), 13.21 (21.26), 15.60 (25.10), 17.51 (28.18), 18.26 (29.38), 20.49 (32.97), 24.19 (38.93), 24.86 (40.00) **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 - 10955 lb (4970 kg), FWA - 12180 lb (5525 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

NOTE: The data on this summary was obtained from OECD reports 2152 and 2153 conducted on the Massey Ferguson 6465 Diesel(2WD and FWA).

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.

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **2152 & 2153**, Nebraska Summary 504, January 20, 2006.

Leonard L. Bashford
Director

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

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 cool- ing med	Temp.°C Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th(4TA) Gear									
55.9 (41.7)	4565 (20.3)	4.59 (7.39)	2200	4	0.669 (0.407)	10.61 (2.09)	183 (84)	57 (14)	30.3 (102.5)
75% of Pull at Maximum Power—12th(4TA) Gear									
42.5 (31.7)	3410 (15.2)	4.68 (7.53)	2215	3	0.781 (0.475)	9.09 (1.79)	183 (84)	59 (15)	30.3 (102.5)
50% of Pull at Maximum Power—12th(4TA) Gear									
29.0 (21.6)	2285 (10.2)	4.76 (7.67)	2235	2	0.967 (0.588)	7.33 (1.44)	183 (84)	59 (15)	30.3 (102.5)
75% of Pull at Reduced Engine Speed—15th(4TB) Gear									
42.2 (31.5)	3385 (15.1)	4.68 (7.53)	1900	4	0.662 (0.403)	10.71 (2.11)	181 (83)	59 (15)	30.3 (102.5)
50% of Pull at Reduced Engine Speed—15th(4TB) Gear									
29.2 (21.8)	2285 (10.2)	4.80 (7.72)	1923	2	0.806 (0.490)	8.80 (1.73)	181 (83)	59 (15)	30.3 (102.5)
MAXIMUM POWER IN SELECTED GEARS									
6th(2TB) Gear									
45.1 (33.6)	8025 (35.7)	2.11 (3.39)	2211	15	0.769 (0.468)	9.23 (1.82)	183 (84)	55 (13)	30.3 (102.5)
7th(2TC) Gear									
52.3 (39.0)	7980 (35.5)	2.46 (3.96)	2198	13	0.731 (0.445)	9.70 (1.91)	183 (84)	55 (13)	30.3 (102.5)
8th(3TA) Gear									
57.1 (42.6)	7870 (35.0)	2.72 (4.38)	2197	12	0.684 (0.416)	10.37 (2.04)	183 (84)	57 (14)	30.3 (102.5)
9th(2TD) Gear									
62.6 (46.7)	7870 (35.0)	2.98 (4.80)	2195	12	0.655 (0.398)	10.83 (2.13)	180 (82)	57 (14)	30.3 (102.5)
10th(3TB) Gear									
65.7 (49.0)	7710 (34.3)	3.20 (5.15)	2184	11	0.644 (0.392)	11.01 (2.17)	183 (84)	57 (14)	30.3 (102.5)
11th(3TC) Gear									
77.6 (57.9)	7575 (33.7)	3.84 (6.18)	2174	9	0.608 (0.370)	11.67 (2.30)	183 (84)	57 (14)	30.3 (102.5)
12th(4TA) Gear									
81.9 (61.1)	7305 (32.5)	4.21 (6.77)	2115	9	0.592 (0.360)	11.98 (2.36)	183 (84)	57 (14)	30.3 (102.5)
13th(3TD) Gear									
85.4 (63.7)	7510 (33.4)	4.26 (6.86)	2059	9	0.570 (0.347)	12.44 (2.45)	185 (85)	59 (15)	30.3 (102.5)
14th(1LA) Gear									
86.0 (64.1)	7170 (31.9)	4.50 (7.23)	2070	8	0.566 (0.344)	12.54 (2.47)	185 (85)	59 (15)	30.3 (102.5)
15th(4TB) Gear									
86.9 (64.8)	7125 (31.7)	4.58 (7.37)	1944	8	0.547 (0.333)	12.97 (2.56)	183 (84)	59 (15)	30.3 (102.5)
16th(1LB) Gear									
87.3 (65.1)	6720 (29.9)	4.87 (7.83)	1909	7	0.534 (0.325)	13.29 (2.62)	185 (85)	61 (16)	30.3 (102.5)
17th(4TC) Gear									
88.0 (65.6)	6250 (27.8)	5.28 (8.49)	1867	7	0.528 (0.321)	13.42 (2.64)	185 (85)	61 (16)	30.3 (102.5)
18th(1LC) Gear									
89.2 (66.5)	5915 (26.3)	5.65 (9.09)	1854	7	0.521 (0.317)	13.60 (2.68)	185 (85)	61 (16)	30.3 (102.5)
19th(4TD) Gear									
88.2 (65.8)	5350 (23.8)	6.18 (9.94)	1855	5	0.527 (0.321)	13.45 (2.65)	185 (85)	61 (16)	30.3 (102.5)
20th(2LA) Gear									
88.5 (66.0)	5305 (23.6)	6.25 (10.06)	1857	6	0.525 (0.320)	13.50 (2.66)	183 (84)	61 (16)	30.3 (102.5)
21st(1LD) Gear									
88.6 (66.1)	4965 (22.1)	6.70 (10.78)	1854	5	0.522 (0.318)	13.58 (2.68)	183 (83)	61 (16)	30.3 (102.5)
22nd(2LB) Gear									
88.0 (65.6)	4495 (20.0)	7.34 (11.81)	1848	4	0.523 (0.318)	13.55 (2.67)	185 (85)	61 (16)	30.3 (102.5)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	2WD dB(A)	Engaged dB(A)
At no load in 12th (4TA) gear	71.0	71.0
Bystander	--	--

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range: 7152 lbs (31.8 kN)

i) Opening pressure of relief valve:	NA	
	<u>one coupler set</u>	<u>two outlet sets combined</u>
Sustained pressure of the open relief valve:	2830 psi (195 bar)	2830 psi (195 bar)
ii) Pump delivery rate at minimum pressure:	28.1 GPM (106.4 l/min)	29.6 GPM (112.0 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	24.2 GPM (91.5 l/min)	27.2 GPM (103.0 l/min)
Delivery pressure:	2045 psi (141 bar)	2090 psi (144 bar)
Power:	28.8 hp (21.5 kW)	33.1 Hp (24.7 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	SAE TEST		OECD TEST	
	inch	mm	inch	mm
A	27.6	702	28.2	716
B	11.6	295	11.6	295
C	13.9	354	13.9	354
D	13.0	330	13.0	330
E	7.9	200	7.9	200
F	10.2	260	10.2	260
G	32.3	820	32.3	820
H	0.3	8	0.3	8
I	15.3	389	15.3	389
J	22.1	560	22.1	560
K	21.5	545	21.5	545
L	40.9	1040	40.9	1040
M	22.2	565	22.2	565
N	37.0	940	37.0	940
O	8.0	203	8.0	203
P	41.1	1043	46.1	1170
Q	36.0	914	36.0	914
R	29.4	748	29.4	748

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar)	2800 (193)
Location:	lift cylinder
Hydraulic oil temperature: °F (°C)	149 (65)
Location:	hydraulic sump
Category:	II
Quick attach:	none

SAE Static Test—System pressure 2520 psi (174 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.1 (384)	22.0 (559)	29.0 (737)	36.1 (917)
Lift force on frame lb	9903	9377	9321	8987	8137
" " " " " " (kN)	(44.0)	(41.7)	(41.5)	(40.0)	(36.2)

