

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

January 1996

Test 1649/1: Buhler Versatile 2145 Diesel

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Applied Mechanics Commons](#)

"Test 1649/1: Buhler Versatile 2145 Diesel" (1996). *Nebraska Tractor Tests*. 356.

<https://digitalcommons.unl.edu/tractormuseumlit/356>

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 TEST 1649/1-NEBRASKA SUMMARY 218A

BUHLER VERSATILE 2145 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
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1103 rpm)					
147.6 (110.1)	2100	9.05 (34.27)	0.436 (0.265)	16.29 (3.21)	
Standard Power Take-off Speed (1000 rpm)					
163.7 (122.1)	1903	9.24 (34.96)	0.401 (0.244)	17.72 (3.49)	
Maximum Power (2 hours)					
167.6 (125.0)	1800	9.15 (34.65)	0.388 (0.236)	18.32 (3.61)	

VARYING POWER AND FUEL CONSUMPTION					
147.6 (110.1)	2100	9.05 (34.27)	0.436 (0.265)	16.29 (3.21)	Air temperature
129.5 (96.6)	2168	8.32 (31.49)	0.457 (0.278)	15.58 (3.07)	68°F (20°C)
98.8 (73.7)	2203	6.80 (25.75)	0.490 (0.298)	14.52 (2.86)	Relative humidity
66.9 (49.9)	2240	5.26 (19.91)	0.558 (0.340)	12.72 (2.51)	64%
33.9 (25.3)	2272	3.99 (15.09)	0.835 (0.508)	8.51 (1.68)	Barometer
4.8 (3.6)	2297	2.77 (10.50)	4.120 (2.506)	1.73 (0.34)	28.78" Hg (97.46 kPa)

Maximum Torque - 550.0 lb.-ft. (745.7 Nm) at 1416 rpm
 Maximum Torque Rise - 48.9%
 Torque rise at 1700 engine rpm - 36%

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—9th Gear									
132.1 (98.5)	8415 (37.44)	5.89 (9.47)	2102	2.6	0.489 (0.298)	14.52 (2.86)	187 (86)	74 (23)	29.30 (99.23)
75% of Pull at Maximum Power—9th Gear									
103.9 (77.5)	6315 (28.08)	6.17 (9.93)	2187	1.8	0.531 (0.323)	13.40 (2.64)	187 (86)	74 (23)	29.30 (99.23)
50% of Pull at Maximum Power—9th Gear									
71.1 (53.0)	4205 (18.70)	6.34 (10.20)	2230	1.2	0.615 (0.374)	11.57 (2.28)	184 (84)	74 (23)	29.30 (99.23)
75% of Pull at Reduced Engine Speed—10th Gear									
103.4 (77.1)	6305 (28.05)	6.15 (9.90)	1866	1.8	0.472 (0.287)	15.08 (2.97)	185 (85)	77 (25)	29.27 (99.12)
50% of Pull at Reduced Engine Speed—10th Gear									
70.9 (52.9)	4195 (18.67)	6.34 (10.20)	1909	1.1	0.533 (0.324)	13.35 (2.63)	182 (83)	77 (25)	29.27 (99.12)

Location of Test: Prairie Agricultural Machinery Institute (PAMI), Portage La Prairie, Manitoba, Canada

Dates of Test: July - August 1996.

Manufacturer: Buhler Versatile Inc., 1260 Clarence Ave., Winnipeg, Manitoba, Canada R3C 4E8

FUEL and OIL: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8543 Fuel weight 7.113 lbs/gal (0.8525 kg/l) Oil SAE 15W40 API service classification CF-4 Transmission and hydraulic lubricant ESN-M2C134 fluid Front axle lubricant ESN-M2C134 fluid

ENGINE: Make New Holland Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. VT518827 Crankshaft lengthwise Rated engine speed 2100 Bore and stroke 4.40" x 5.00" (111.8 mm x 127.0 mm) Compression ratio 17.5 to 1 Displacement 456 cu in (7480 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 cartridge Muffler underhood Exhaust vertical Cooling medium temperature control thermostat and variable speed fan

CHASSIS: Type front wheel assist Serial No. D408516 Tread width rear 60.0" (1524 mm) to 124.0" (3150 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) Wheelbase 118.3" (3005 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled powershift Nominal travel speeds mph (km/h) first 1.65 (2.66) second 1.96 (3.15) third 2.29 (3.68) fourth 2.62 (4.22) fifth 3.10 (4.99) sixth 3.63 (5.84) seventh 4.27 (6.87) eighth 4.99 (8.03) ninth 5.90 (9.49) tenth 6.90 (11.11) eleventh 7.90 (12.72) twelfth 9.34 (15.03) thirteenth 10.93 (17.59) fourteenth 12.87 (20.71) fifteenth 15.21 (24.47) sixteenth 17.79 (28.63) reverse 2.24 (3.60), 2.64 (4.25), 3.09 (4.97), 3.54 (5.70), 4.18 (6.73), 4.90 (7.88), 5.76 (9.27), 6.80 (10.95), 7.97 (12.82) Clutch multiple wet disc electro-hydraulically operated by foot pedal Brakes multiple wet disc hydraulically actuated by two foot pedals that can be locked together Steering hydrostatic Power take-off 540 rpm at 1878 engine rpm or 1000 rpm at 1903 engine rpm Unladen tractor mass 16805 lb (7622 kg)

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)
129.4 (96.5)	17385 (77.34)	2.79 (4.49)	1858	15.0	6th Gear 0.515 (0.313)	13.83 (2.73)	185 (85)	72 (22)	29.16 (98.75)
139.3 (103.9)	15234 (67.76)	3.43 (5.52)	1801	8.3	7th Gear 0.472 (0.287)	15.10 (2.98)	186 (86)	75 (24)	29.29 (99.20)
144.7 (107.9)	13055 (58.06)	4.16 (6.69)	1802	6.0	8th Gear 0.459 (0.279)	15.53 (3.06)	186 (86)	75 (24)	29.30 (99.22)
148.9 (111.0)	11215 (49.88)	4.98 (8.01)	1800	3.8	9th Gear 0.444 (0.270)	16.01 (3.15)	185 (85)	74 (23)	29.30 (99.23)
146.0 (108.9)	9315 (41.45)	5.68 (9.46)	1801	2.8	10th Gear 0.449 (0.273)	15.84 (3.12)	187 (86)	71 (22)	29.31 (99.25)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

NOTE: The data on this summary was obtained from OECD report 1649/1 conducted on the New Holland 8670 Diesel.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. The optional hydraulic flow rate claim of 55.0 GPM (208 lpm) was not tested for verification. 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 Report No. **1649/1**, Nebraska Summary 218A, September 1, 2004.

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 75% load in 10th gear	75.0
Bystander	--

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires -No., size, ply & psi (kPa)	Four 20.8R38;**, 8 (55)	Two 20.8R38;**, 18 (124)
Ballast - Duals (total)	1735 lb (788 kg)	None
- Cast Iron (total)	765 lb (347 kg)	None
Front Tires -No., size, ply & psi (kPa)	Two 14.9R28;**, 20 (138)	Two 14.9R28;**, 16 (110)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	825 lb (374 kg)	None
Height of Drawbar	19.8 in (504 mm)	20.1 in (510 mm)
Static Weight with operator - Rear	13200 lb (5988 kg)	10990 lb (4984 kg)
- Front	7095 lb (3218 kg)	5980 lb (2713 kg)
- Total	20295 lb (9206 kg)	16970 lb (7697 kg)

DRAWBAR PERFORMANCE
(Ballasted - 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)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F cool- ing med	Temp. °C Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—9th Gear									
130.1 (97.0)	8270 (36.78)	5.90 (9.49)	2101	1.6	0.500 (0.304)	14.24 (2.81)	187 (86)	81 (27)	29.00 (98.19)
75% of Pull at Maximum Power—9th Gear									
101.4 (75.6)	6205 (27.60)	6.13 (9.86)	2176	1.3	0.546 (0.332)	13.05 (2.57)	187 (86)	81 (27)	28.99 (98.16)
50% of Pull at Maximum Power—9th Gear									
69.1 (51.5)	4130 (18.38)	6.27 (10.09)	2218	0.8	0.626 (0.381)	11.37 (2.24)	185 (85)	81 (27)	28.99 (98.16)
75% of Pull at Reduced Engine Speed—10th Gear									
101.1 (75.4)	6200 (27.57)	6.12 (9.85)	1858	1.1	0.475 (0.289)	14.97 (2.95)	187 (86)	81 (27)	28.99 (98.16)
50% of Pull at Reduced Engine Speed—10th Gear									
69.4 (51.8)	4145 (18.43)	6.28 (10.11)	1898	0.7	0.538 (0.327)	13.25 (2.61)	183 (84)	81 (27)	28.99 (98.16)
MAXIMUM POWER IN SELECTED GEARS									
4th Gear									
120.7 (90.0)	21495 (95.62)	2.11 (3.39)	1958	15.0	0.542 (0.330)	13.12 (2.59)	187 (86)	79 (26)	29.02 (98.29)
5th Gear									
129.5 (96.6)	20840 (92.69)	2.33 (3.75)	1801	13.5	0.508 (0.309)	14.01 (2.76)	185 (85)	79 (26)	29.02 (98.29)
6th Gear									
142.0 (105.9)	17810 (79.22)	2.99 (4.81)	1800	5.3	0.467 (0.284)	15.23 (3.00)	187 (86)	81 (27)	29.00 (98.19)
7th Gear									
145.2 (108.3)	15210 (67.66)	3.58 (5.76)	1799	3.5	0.454 (0.276)	15.68 (3.09)	187 (86)	81 (27)	29.00 (98.19)
8th Gear									
147.8 (110.2)	13040 (58.00)	4.25 (6.84)	1799	3.1	0.446 (0.271)	15.99 (3.15)	189 (87)	81 (27)	29.00 (98.19)
9th Gear									
147.9 (110.3)	11045 (49.13)	5.02 (8.08)	1800	2.2	0.444 (0.270)	16.01 (3.15)	187 (86)	79 (26)	29.01 (98.25)
10th Gear									
145.1 (108.2)	9235 (41.07)	5.89 (9.48)	1798	1.7	0.452 (0.275)	15.73 (3.10)	187 (86)	79 (26)	29.01 (98.25)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum Force Exerted

Through Whole Range: 11285 lbs (50.2 kN) (4" lift cylinders)

- i) Opening pressure of relief valve: NA
- Sustained pressure of the open relief valve: 2770 psi (191 bar)
- ii) Pump delivery rate at minimum pressure: 33.2 GPM (125.6 l/min)
- iii) Pump delivery rate at maximum
 - hydraulic power: 30.7 GPM (116.2 l/min)
 - Delivery pressure: 2350 psi (162 bar)
 - Power: 42.1 HP (31.4 kW)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi.(bar)	2770(191)
Location:	lift cylinder
Hydraulic oil temperature: °F(°C)	150(65)
Location:	hydraulic sump
Category:	III
Quick attach:	none

SAE Static Test—System pressure 2500 psi (172 Bar) (4" lift cylinders)

Hitch point distance to ground level in. (mm)	8.0(203)	13.4(340)	21.3(540)	29.1(740)	34.5(877)
Lift force on frame lb	14010	14420	14920	14840	13320
" " " " " " (kN)	(62.3)	(64.2)	(66.3)	(66.0)	(59.2)

ASAE Static Test—System pressure 2700 psi (186 Bar) (4" lift cylinders)

Hitch point distance to ground level in. (mm)	8.0(203)	13.4(340)	21.3(540)	29.1(740)	34.5(877)
Lift force on frame lb	15170	15610	16150	16070	14420
" " " " " " (kN)	(67.5)	(69.4)	(71.9)	(71.5)	(64.2)

HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	mm	inch	mm
A	30.3	769	30.2	766
B	15.0	380	15.0	380
C	17.4	443	17.4	443
D	15.6	395	15.6	395
E	7.9	200	7.9	200
F	12.4	315	12.4	315
G	33.7	855	33.7	855
H	2.4	62	2.4	62
I	19.9	505	19.9	505
J	21.3	540	21.3	540
K	18.3	465	18.3	465
L	48.8	1240	48.8	1240
M	25.6	650	25.6	650
N	36.0	915	36.0	915
O	9.1	230	8.0	203
P	48.2	1225	43.3	1100
Q	39.0	990	37.3	947
R	33.0	837	33.5	850

