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2013

Test 2067: Versatile 450

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2067–SUMMARY 885

VERSATILE 450 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—997 rpm)					
364.92 (272.12)	2100	23.35 (88.38)	0.450 (0.274)	15.63 (3.08)	Fuel used during active exhaust regeneration - 0.58 gal (2.19 l) (see Note 1 p.2)
Standard Power Take-off Speed—(PTO speed—997 rpm)					
364.92 (272.12)	2100	23.35 (88.38)	0.450 (0.274)	15.63 (3.08)	
Maximum Power (1 hour)					
425.26 (317.11)	1801	24.00 (90.85)	0.397 (0.241)	17.72 (3.49)	

VARYING POWER AND FUEL CONSUMPTION

364.92 (272.12)	2100	23.35 (88.38)	0.450 (0.274)	15.63 (3.08)	Air temperature
317.15 (236.50)	2149	21.35 (80.80)	0.473 (0.288)	14.86 (2.93)	79°F (26°C)
240.64 (179.44)	2175	19.01 (60.65)	0.555 (0.338)	12.66 (2.49)	Relative humidity
162.02 (120.82)	2199	15.97 (60.45)	0.693 (0.421)	10.15 (2.00)	70%
81.16 (60.52)	2199	11.74 (44.46)	1.017 (0.619)	6.91 (1.36)	Barometer
6.76 (5.04)	2200	7.87 (29.79)	8.176 (4.973)	0.86 (0.17)	28.75" Hg (97.36 kPa)

Maximum Torque - 1493 lb.-ft. (2025 Nm) at 1400 rpm

Maximum Torque Rise - 63.5%

Torque rise at 1680 engine rpm - 45%

Power increase at 1801 engine rpm - 16.5%

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 (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—6th Gear									
345.35 (257.53)	24639 (109.60)	5.26 (8.47)	2100	2.9	0.478 (0.291)	14.71 (2.90)	190 (88)	70 (21)	28.88 (97.80)
75% of Pull at Maximum Power—6th Gear									
268.31 (200.08)	18476 (82.19)	5.45 (8.77)	2158	2.0	0.537 (0.327)	13.08 (2.58)	191 (88)	78 (25)	28.85 (97.70)
50% of Pull at Maximum Power—6th Gear									
183.24 (136.64)	12320 (54.80)	5.58 (8.98)	2194	1.2	0.672 (0.409)	10.45 (2.06)	191 (88)	82 (28)	28.85 (97.70)
75% of Pull at Reduced Engine Speed—9th Gear									
267.60 (199.55)	18459 (82.11)	5.44 (8.75)	1509	2.0	0.432 (0.263)	16.28 (3.21)	191 (88)	79 (26)	28.85 (97.70)
50% of Pull at Reduced Engine Speed—9th Gear									
183.52 (136.85)	12325 (54.82)	5.58 (8.98)	1539	1.2	0.496 (0.302)	14.16 (2.79)	191 (88)	83 (28)	28.85 (97.70)

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

Dates of Test: August 29 - September 9, 2013

Manufacturer: Buhler Versatile, 1260 Clarence Ave
Winnipeg, Manitoba, Canada R3T 1T2

FUEL, OIL and TIME: Fuel No. 2 Diesel
Specific gravity converted to 60°/60°F (15°/15°C)
0.8442 **Fuel weight** 7.029 lbs/gal (0.842 kg/l) **Oil**
SAE 15W-40 API service classification CJ-4
Transmission, hydraulic and final drive lubricant
Hydraul 56 fluid **Total time engine was operated:**
19.0 hours

ENGINE: Make Cummins **Diesel Type** six
cylinder vertical with turbocharger and air to air
intercooler **Serial No.** *79646363* **Crankshaft**
lengthwise **Rated engine speed** 2100 **Bore and**
stroke 5.394" x 6.654" (137.0 mm x 169.0 mm)
Compression ratio 17.1 to 1 **Displacement** 912 cu
in (14948 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 oil, radiator for
transmission, front and rear axle oil **Fuel filter** two
paper cartridges **Fuel cooler** radiator for returned
fuel **Exhaust** regenerative particulate filter
integrated within a vertical muffler **Cooling**
medium temperature control thermostat and
variable pitch fan

ENGINE OPERATING PARAMETERS: Fuel
rate: 158.1 - 174.3 lb/h (71.7 - 79.1 kg/h) **High idle:**
2150 - 2250 rpm **Turbo boost:** nominal 27.6 - 33.4
psi (190 - 230 kPa) as measured 30.8 psi (212 kPa)

CHASSIS: Type four wheel drive with duals
Serial No. *704483* **Tread width** rear 81.0" (2055
mm) and 136.0" (3545 mm), front 81.0" (2055 mm)
and 136.0" (3545 mm) **Wheelbase** 152.2" (3865 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 1.95 (3.14) second
2.48 (3.99) third 3.14 (5.05) fourth 3.98 (6.41) fifth
4.75 (7.64) sixth 5.34 (8.60) seventh 6.03 (9.70)
eighth 6.79 (10.92) ninth 7.62 (12.27) tenth 8.59
(13.82) eleventh 9.69 (15.59) twelfth 10.91 (17.55)
thirteenth 12.99 (20.90) fourteenth 16.49 (26.53)
fifteenth 19.37 (31.18) sixteenth 21.77 (35.03)
electronically limited reverse 1.56 (2.51), 3.80 (6.11),
4.28 (6.88), 10.39 (16.72)

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)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
260.04 (193.91)	44203 (196.62)	2.21 (3.56)	2149	14.5	0.593 (0.361)	11.85 (2.33)	191 (88)	73 (23)	28.91 (97.90)
3rd Gear									
322.93 (240.81)	41363 (183.99)	2.93 (4.72)	2100	8.1	0.512 (0.312)	13.72 (2.70)	191 (88)	77 (25)	28.90 (97.87)
4th Gear									
334.76 (249.63)	32525 (144.68)	3.86 (6.21)	2100	4.4	0.492 (0.299)	14.29 (2.82)	191 (88)	79 (26)	28.90 (97.87)
5th Gear									
340.79 (254.12)	27485 (122.26)	4.65 (7.48)	2100	3.1	0.484 (0.294)	14.53 (2.86)	191 (88)	72 (22)	28.89 (97.83)
6th Gear									
345.35 (257.53)	24639 (109.60)	5.26 (8.47)	2100	2.9	0.478 (0.291)	14.71 (2.90)	190 (88)	70 (21)	28.88 (97.80)
7th Gear									
346.48 (258.37)	21834 (97.12)	5.95 (9.58)	2099	2.4	0.479 (0.291)	14.69 (2.89)	191 (88)	63 (17)	28.84 (97.66)
8th Gear									
347.87 (259.41)	19421 (86.39)	6.72 (10.81)	2099	2.1	0.478 (0.291)	14.71 (2.90)	190 (88)	66 (19)	28.84 (97.66)
9th Gear									
348.16 (259.62)	17242 (76.69)	7.57 (12.18)	2100	1.9	0.476 (0.290)	14.76 (2.91)	192 (89)	74 (23)	28.89 (97.83)
10th Gear									
346.35 (258.27)	15200 (67.61)	8.55 (13.75)	2100	1.5	0.471 (0.287)	14.92 (2.94)	192 (89)	75 (24)	28.88 (97.80)

Clutch wet multiple disc hydraulically actuated by foot pedal **Brakes** single dry caliper per axle hydraulically actuated foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 2105 engine rpm **Unladen tractor mass** 45150 lb (20480 kg)

REPAIRS AND ADJUSTMENTS: The engine oil filter was changed after the PTO tests.

NOTE 1. The manufacturer declares that the average time between active regenerations is 36 hours, while operated in Auto Filter Cleaning Mode, at rated speed, full PTO load, under steady state conditions.

NOTE 2. The as tested unballasted weight exceeded the manufacturer's recommended maximum operating weight of 45000 lbs (20411 kg).

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's remote hydraulic flow claim of 58 GPM (220 l/m) with the standard pump. The manufacturer's remote hydraulic flow claim of 113 GPM (428 l/m), with high flow system, was not verified. For the maximum power tests the fuel temperature at the fuel pump inlet was maintained at 128°F (53°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. **2067**, Nebraska Summary 885, November 25, 2013.

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 5th gear	75.1
Bystander in 14th gear	89.6

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

Four 480/80R46;***;16(110)

Four 480/80R46;***;24(165)

23.0 in (585 mm)

19250 lb (8732 kg)

26075 lb (11827 kg)

45325 lb (20559 kg)

DRAWBAR PERFORMANCE
(Unballasted at 1800 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)	
259.77 (193.71)	44255 (196.85)	2.20 (3.54)	2148	14.7	2nd Gear 0.594 (0.362)	11.83 (2.33)	191 (88)	72 (22)	28.91 (97.90)
323.18 (240.99)	41321 (183.80)	2.93 (4.72)	2100	7.9	3rd Gear 0.512 (0.311)	13.73 (2.71)	190 (88)	76 (25)	28.90 (97.87)
363.58 (271.12)	38857 (172.84)	3.51 (5.65)	1951	6.4	4th Gear 0.471 (0.286)	14.93 (2.94)	192 (89)	82 (28)	28.90 (97.87)
381.22 (284.28)	34064 (151.52)	4.20 (6.76)	1920	4.5	5th Gear 0.451 (0.274)	15.58 (3.07)	191 (88)	73 (23)	28.89 (97.83)
391.07 (291.62)	31592 (140.53)	4.64 (7.47)	1875	3.9	6th Gear 0.438 (0.267)	16.04 (3.16)	191 (88)	72 (22)	28.88 (97.80)
398.64 (297.27)	29623 (131.77)	5.05 (8.13)	1800	3.6	7th Gear 0.424 (0.258)	16.57 (3.26)	191 (88)	65 (18)	28.82 (97.60)
401.52 (299.41)	26379 (117.34)	5.71 (9.19)	1800	3.1	8th Gear 0.421 (0.256)	16.69 (3.29)	191 (88)	68 (20)	28.83 (97.63)
400.74 (298.83)	23340 (103.82)	6.44 (10.36)	1799	2.7	9th Gear 0.420 (0.256)	16.72 (3.29)	192 (89)	74 (23)	28.90 (97.87)
404.13 (301.36)	20821 (92.61)	7.28 (11.72)	1800	2.3	10th Gear 0.418 (0.254)	16.83 (3.32)	192 (89)	74 (24)	28.89 (97.83)
399.63 (298.00)	18206 (80.98)	8.24 (13.25)	1799	1.9	11th Gear 0.423 (0.258)	16.60 (3.27)	192 (89)	75 (24)	28.89 (97.83)

HYDRAULIC PERFORMANCE

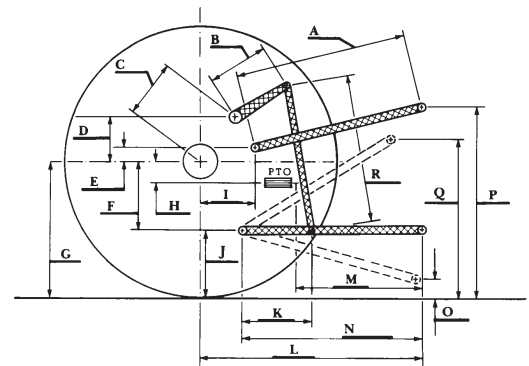
CATEGORY: 4
Quick Attach: Yes
OECD Static test

Maximum force exerted through whole range:	15354 lbs (68.3 kN)
	Standard pump three outlet sets combined
i) Sustained pressure at compensator cutoff:	2874 psi (198 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	53.1 GPM (201.1 l/min)
iii) Pump delivery rate at maximum hydraulic power:	52.1 GPM (197.4 l/min)
Delivery pressure:	2605 psi (180 bar)
Power:	79.3 HP (59.1 kW)
	single outlet set
i) Sustained pressure at compensator cutoff:	2874 psi (198 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	35.4 GPM (134.0 l/min)
iii) Pump delivery rate at maximum hydraulic power:	34.0 GPM (128.7 l/min)
Delivery pressure:	2275 psi (157 bar)
Power:	45.1 HP (33.7 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	29.3	745
B	22.8	580
C	24.9	632
D	20.8	528
E	14.6	370
F	13.8	350
G	36.2	920
H	0.5	13
I	28.7	729
J	22.4	570
K	27.3	693
L	58.8	1493
*L'	65.2	1656
M	28.7	728
N	39.1	992
O	9.1	230
P	52.6	1335
Q	45.3	1150
R	43.7	1110

*L' to Quick Attach ends



VERSATILE 450 DIESEL