

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

6-10-1986

Test 1599: Valmet 980 4WD Turbo Diesel 8-Speed

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, "Test 1599: Valmet 980 4WD Turbo Diesel 8-Speed" (1986). *Nebraska Tractor Tests*. 1910.

<https://digitalcommons.unl.edu/tractormuseumlit/1910>

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 TRACTOR TEST 1599— VALMET 980 4 × 4 TURBO DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption		Temperature °F (°C)			Barometer inch Hg (kPa)		
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb		Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed — Two hours (PTO Speed — 668 rpm)									
88.01 (65.63)	2300	5.328 (20.168)	0.425 (0.258)	16.52 (3.254)	195 (90.3)	69 (20.3)	75 (23.8)	28.81 (97.28)	
Standard Power Take-off Speed (540 rpm) — One Hour									
80.55 (60.06)	1865	4.419 (16.729)	0.385 (0.234)	18.23 (3.590)	192 (88.9)	68 (20.1)	75 (23.8)	28.82 (97.32)	
VARYING POWER AND FUEL CONSUMPTION — Two Hours									
77.61 (57.87)	2394	4.972 (18.822)	0.450 (0.273)	15.61 (3.075)	188 (86.7)	68 (20.0)	75 (23.9)	..... .....
0.00 (0.00)	2538	1.573 (5.956)	..... .....	..... .....	173 (78.1)	68 (20.0)	75 (23.9)	..... .....
40.27 (30.03)	2477	3.283 (12.429)	0.572 (0.348)	12.26 (2.416)	178 (80.8)	68 (19.7)	75 (23.9)	..... .....
88.21 (65.78)	2301	5.306 (20.084)	0.422 (0.257)	16.63 (3.275)	193 (89.2)	68 (20.0)	75 (23.9)	..... .....
20.35 (15.18)	2501	2.475 (9.370)	0.854 (0.519)	8.22 (1.620)	174 (78.9)	68 (20.0)	77 (24.7)	..... .....
59.44 (44.32)	2437	4.143 (15.682)	0.489 (0.297)	14.35 (2.826)	182 (83.3)	68 (19.7)	76 (24.2)	..... .....
Av Av	47.65 (35.53)	2441 (13.724)	3.625 (0.325)	0.534 (2.589)	13.14 (2.589)	181 (82.8)	68 (19.9)	75 (24.1)	28.83 (97.35)

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C)	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two Hours 4th (L4) Gear											
76.38 (56.95)	5917 (26.32)	4.84 (7.79)	2299	5.73	5.323 (20.149)	0.489 (0.297)	14.35 (2.827)	193 (89.2)	70 (21.1)	80 (26.4)	28.81 (97.29)
75% of Pull at Maximum Power — Ten Hours 4th (L4) Gear											
61.88 (46.14)	4483 (19.94)	5.18 (8.33)	2414	4.01	4.691 (17.759)	0.532 (0.324)	13.19 (2.598)	184 (84.7)	70 (20.8)	74 (23.3)	28.76 (97.13)
50% of Pull at Maximum Power — Two Hours 4th (L4) Gear											
42.69 (31.84)	2989 (13.30)	5.36 (8.62)	2469	2.88	3.791 (14.350)	0.623 (0.379)	11.26 (2.219)	183 (83.9)	72 (22.2)	83 (28.1)	28.80 (97.24)
50% of Pull at Reduced Engine Speed — Two Hours 6th (H2) Gear											
42.71 (31.85)	2988 (13.29)	5.36 (8.63)	1301	2.77	2.772 (10.493)	0.455 (0.277)	15.41 (3.036)	187 (85.8)	73 (22.8)	84 (28.6)	28.74 (97.05)
MAXIMUM POWER IN SELECTED GEARS											
71.62 (53.40)	10722 (47.69)	2.50 (4.03)	2336	14.70	2nd (L2) Gear			186 (85.6)	66 (18.9)	72 (22.2)	28.83 (97.35)
77.33 (57.67)	7655 (34.05)	3.79 (6.10)	2299	7.55	3rd (L3) Gear			187 (85.8)	71 (21.7)	77 (25.0)	28.79 (97.22)
77.47 (57.77)	5977 (26.58)	4.86 (7.82)	2303	5.33	4th (L4) Gear			189 (87.2)	71 (21.7)	79 (26.1)	28.77 (97.15)
78.04 (58.20)	4363 (19.41)	6.71 (10.80)	2299	3.76	5th (H1) Gear			187 (86.1)	71 (21.7)	78 (25.6)	28.78 (97.19)
75.06 (55.97)	2962 (13.18)	9.50 (15.29)	2300	2.61	6th (H2) Gear			187 (85.8)	71 (21.7)	78 (25.6)	28.78 (97.19)
LUGGING ABILITY IN 4th (L4) GEAR											
Crankshaft Speed rpm				2303	2067	1839	1598	1376	1137		
Pull—lbs (kN)				5977 (26.58)	6581 (29.27)	6947 (30.90)	7468 (33.22)	7465 (33.21)	6823 (30.35)		
Increase in Pull %				0	10	16	25	25	14		
Power—Hp (kW)				77.47 (57.77)	75.99 (56.67)	71.01 (52.95)	65.84 (49.10)	56.67 (42.26)	43.16 (32.19)		
Speed—Mph (km/h)				4.86 (7.82)	4.33 (6.97)	3.83 (6.17)	3.31 (5.32)	2.85 (4.58)	2.37 (3.82)		
Slip %				5.33	6.20	6.63	7.34	7.34	6.49		

Department of Agricultural Engineering

Dates of Test: June 2 to 10, 1986

Manufacturer: VALMET DO BRASIL S.A., Rua Capitao Francisco de Almeida, 695-Mogi das Cruzes-08700-SP-Brazil

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F (15/15°C)** 0.8427 **Fuel weight** 7.017 lbs/gal (0.841 kg/l) **Oil SAE 30 API service classification** CD-CC-SF-SE **To motor** 2.675 gal (10.125) **Drained from motor** 2.247 gal (8.506 l) **Transmission and hydraulic lubricant** Tractor Oil Universal **Front axle lubricant** SAE 90 GL-5 gear lubricant **Total time engine was operated** 44.0 hours.

ENGINE: Make MWM-Motors Diesel **Type** four cylinder vertical with turbocharger **Serial No.** 0.229.04.00163 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 4.01" × 4.72" (102 mm × 120 mm) **Compression ratio** 15.9 to 1 **Displacement** 239 cu in (3922 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element and one wool element **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** 980.407.00113 **Tread width** rear 59.4" (1510 mm) to 83.5" (2120 mm) front 59.4" (1510 mm) to 79.5" (2020 mm) **Wheel base** 91.5" (2325 mm) **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 39.2" (995 mm) Vertical distance above roadway 38.6" (980 mm) Horizontal distance from center of rear wheel tread 0"(0 mm) to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 2.0 (3.2) second 2.8 (4.5) third 4.0 (6.4) fourth 5.0 (8.0) fifth 6.8 (10.9) sixth 9.4 (15.2) seventh 13.4 (21.6) eighth 16.8 (27.0) reverse 3.2 (5.2), 4.5 (7.2), 6.3 (10.2), 8.0 (12.8) **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 150" (3.8 m) left 157" (4.0 m) (on concrete surface without brake) right 197" (5.0 m) left 189" (4.8 m) **Turning space diameter** (on concrete surface with brake applied) right 313" (7.95 m) left 333" (8.45 m) (on concrete surface without brake) right 412" (10.45 m) left 396" (10.05 m) **Power take-off** 540 rpm at 1865 engine rpm **Unladen tractor mass** 8090 lb (3670 kg).

TRACTOR SOUND LEVEL WITHOUT CAB	Front Wheel Drive	
	Disengaged dB(A)	Engaged dB(A)
Maximum Available Power—Two Hours		95.5
75% of Pull at Maximum Power—Ten Hours		95.5
50% of Pull at Maximum Power—Two Hours		95.0
50% of Pull at Reduced Engine Speed—Two Hours		92.5
Bystander in 8th (H4) gear	85.5	

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-34; 8; 20 (140)	Two 18.4-34; 8; 20 (140)
	—Liquid (each)	790 lb (358 kg)	None
	—Cast Iron (each)	448 lb (203 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 14.9-24; 6; 20 (140)	Two 14.9-24; 6; 20 (140)
	—Liquid (each)	348 lb (158 kg)	None
	—Cast Iron (each)	914 lb (415 kg)	None
Height of Drawbar		22 in (560 mm)	22 in (560 mm)
Static Weight with Operator—Rear		7245 lb (3286 kg)	4770 lb (2164 kg)
	—Front	6020 lb (2731 kg)	3495 lb (1585 kg)
	—Total	13265 lb (6017 kg)	8265 lb (3749 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2550 (17580)	
Location	remote outlet	
Hydraulic oil temperature °F (°C)	178 (81)	
Location	pump inlet	
	Maximum Lift Capacity	Lift Capacity for Transport
QUICK ATTACH	no	
CATEGORY	2	*not measured
LOAD lbs (kg)	5896 (2674)	
TIME sec	3.85	
HITCH POINT MOVEMENT in (mm)		
Lowest position	12.9 (328)	
Top of timed range	35.9 (912)	
Highest position	** 36.1 (917)	
LOAD CG MOVEMENT in (mm)		
Lowest position	13.4 (340)	
Top of timed range	39.0 (991)	
Highest position	39.4 (1001)	

*Implement load capacity for transport purposes not specified by manufacturer.

** The observed power range, 23.2 in. (589 mm) is less than the minimum power range for Cat II, 24 in. (610 mm) specified by ASAE Standard S217.10

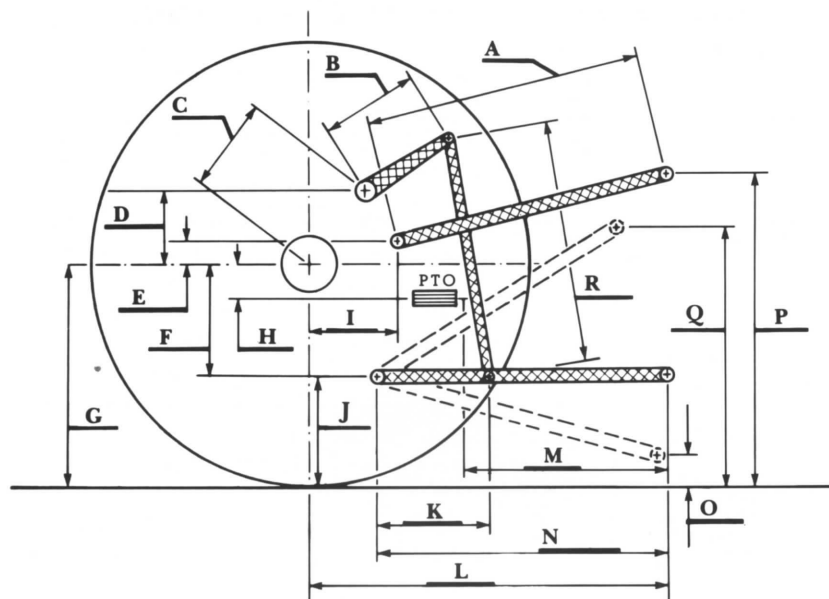
REPAIRS AND ADJUSTMENTS: During preliminary PTO testing, a washer on the rear cylinder head cover had to be replaced. Following the PTO tests, it was necessary to resolder a fuel line. The water manifold hoses were replaced at end of the tests.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 132°F (55.6°C). Five gears were chosen between 15% slip and 10 mph (16.1 km/h). The fuel tank level indicator did not function properly during the test. Oil leaked from the transmission back plate during the hydraulic lift test. One vertical mark was found on the rear cylinder wall during the final inspection.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. 1599, July 8, 1986.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



	inch	mm
A	20.9	530
B	12.2	310
C	11.7	298
D	10.9	278
E	9.4	240
F	10.2	258
G	29.9	758
H	-0.2	-6
I	20.4	519
J	19.7	500
K	15.9	405
L	41.4	1051
M	22.6	574
N	33.7	855
O	8.0	203
P	38.7	983
Q	32.5	826
R	25.3	641

Hitch Dimensions as Tested — No Load



Valmet 980 4 × 4 Turbo Diesel