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Test 1301: Ford TW-10 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1301 — FORD TW-10 DIESEL

16 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	Air		
						wet bulb	dry bulb		

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours (PTO Speed—1199 rpm)									
110.24 (82.20)	2300	7.722 (29.231)	0.488 (0.297)	14.28 (2.812)	195 (90.8)	57 (13.9)	75 (24.0)	29.030 (98.030)	

Standard Power Take-off Speed—One Hour (PTO Speed—1000 rpm)									
101.09 (75.38)	1918	6.804 (25.754)	0.469 (0.285)	14.86 (2.927)	196 (91.2)	57 (13.7)	75 (23.8)	29.020 (97.996)	

VARYING POWER AND FUEL CONSUMPTION—Two Hours									
100.27 (74.77)	2464	7.256 (27.466)	0.504 (0.307)	13.82 (2.722)	188 (86.4)	56 (13.6)	76 (24.2)	.....	.....
0.00 (0.00)	2564	2.541 (9.617)	.....	.....	180 (82.5)	54 (12.5)	75 (23.9)	.....	.....
51.05 (38.07)	2508	4.586 (17.360)	0.626 (0.381)	11.13 (2.193)	185 (85.0)	56 (13.3)	75 (23.9)	.....	.....
110.76 (82.60)	2300	7.764 (29.389)	0.488 (0.297)	14.27 (2.810)	194 (90.0)	57 (13.9)	75 (23.9)	.....	.....
25.83 (19.26)	2537	3.617 (13.692)	0.976 (0.593)	7.14 (1.407)	182 (83.3)	56 (13.3)	75 (23.9)	.....	.....
75.91 (56.61)	2486	5.873 (22.233)	0.539 (0.328)	12.92 (2.546)	186 (85.6)	56 (13.3)	75 (23.9)	.....	.....
Av 60.64 Av (45.22)	2476	5.273 (19.959)	0.606 (0.368)	11.50 (2.266)	186 (85.5)	56 (13.3)	75 (23.9)	29.020 (97.996)	

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 8th (5PD) Gear											
94.34 (70.35)	6761 (30.08)	5.23 (8.42)	2300	4.85	7.751 (29.340)	0.572 (0.348)	12.17 (2.398)	191 (88.1)	46 (7.5)	54 (11.9)	28.750 (97.084)
75% of Pull at Maximum Power—Ten Hours 8th (5PD) Gear											
80.12 (59.75)	5242 (23.32)	5.73 (9.22)	2480	3.37	6.728 (25.469)	0.585 (0.356)	11.91 (2.346)	186 (85.6)	31 (-0.7)	37 (2.5)	29.222 (98.678)
50% of Pull at Maximum Power—Two Hours 8th (5PD) Gear											
54.74 (40.82)	3499 (15.56)	5.87 (9.44)	2515	2.44	5.365 (20.307)	0.683 (0.415)	10.20 (2.010)	185 (85.0)	39 (3.6)	44 (6.7)	28.850 (97.422)
50% of Pull at Reduced Engine Speed—Two Hours 11th (6PD) Gear											
54.84 (40.89)	3500 (15.57)	5.88 (9.46)	1625	2.20	4.127 (15.621)	0.524 (0.319)	13.29 (2.618)	185 (84.7)	39 (3.9)	46 (7.8)	28.770 (97.152)

MAXIMUM POWER IN SELECTED GEARS

82.39 (61.44)	12006 (53.41)	2.57 (4.14)	2462	14.91	3rd (2PD) Gear		186 (85.3)	33 (0.6)	36 (2.2)	28.900 (97.591)
91.55 (68.27)	10661 (47.42)	3.22 (5.18)	2300	9.34	4th (3PD) Gear		190 (87.8)	45 (7.2)	54 (12.2)	28.760 (97.118)
90.58 (67.54)	10221 (45.46)	3.32 (5.35)	2300	8.51	5th (2DD) Gear		191 (88.1)	44 (6.7)	53 (11.7)	28.770 (97.152)
92.96 (69.32)	8110 (36.08)	4.30 (6.92)	2300	5.98	6th (3DD) Gear		191 (88.1)	43 (6.1)	51 (10.6)	28.800 (97.253)
95.42 (71.15)	8006 (35.61)	4.47 (7.19)	2300	5.83	7th (4PD) Gear		191 (88.1)	43 (6.1)	51 (10.6)	28.810 (97.287)
97.35 (72.59)	6984 (31.07)	5.23 (8.41)	2300	5.08	8th (5PD) Gear		191 (88.1)	43 (6.1)	51 (10.6)	28.820 (97.321)
93.05 (69.38)	5966 (26.54)	5.85 (9.41)	2298	4.09	9th (4DD) Gear		191 (88.1)	43 (6.1)	51 (10.6)	28.800 (97.253)
96.58 (72.02)	5312 (23.63)	6.82 (10.97)	2300	3.47	10th (5DD) Gear		191 (88.1)	43 (6.1)	51 (10.6)	28.790 (97.220)
97.24 (72.51)	4420 (19.66)	8.25 (13.28)	2300	2.92	11th (6PD) Gear		191 (88.1)	45 (7.2)	52 (11.1)	28.770 (97.152)

Department of Agricultural Engineering

Dates of Test: March 22 to April 9, 1979

Manufacturer: FORD MOTOR CO.-FORD
TRACTOR OPER., 2500 E. Maple Rd., Troy,
Michigan 48084

FUEL, OIL AND TIME: Fuel No. 2 Diesel
Cetane No. 49.0 (rating taken from oil company's
typical inspection data) **Specific gravity converted**
to 60°/60° (15°/15°) 0.8368 **Fuel weight** 6.967 lbs/
gal (0.835 kg/l) **Oil SAE 30 API service classifi-**
cation SB/SE-CA/CD To motor 4.383 gal (16.591
l) **Drained from motor** 3.916 gal (14.822 l)
Transmission and final drive lubricant Ford
M2C-53-A **Total time engine was operated** 57.0
hours.

ENGINE: Make Ford Diesel **Type** Six cylinder
vertical **Serial No.** *G347581* **Crankshaft**
lengthwise **Rated rpm** 2300 **Bore and stroke** 4.4"
× 4.4" (112 mm × 112 mm) **Compression ratio** 16.3
to 1 **Displacement** 401 cu in (6572 ml) **Cranking**
System 12 volt **Lubrication** pressure **Air cleaner**
two paper elements with centrifugal precleaner
Oil filter one full flow paper element **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.

CHASSIS: **Type** standard with duals **Serial No.**
G-580930 **Tread width** rear 60.0" (1524 mm) to
112.0" (2845 mm) front 60.0" (1524 mm) to 84.0"
(2134 mm) **Wheel base** 109.7" (2785 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 31.8" (808 mm) Vertical
distance above roadway 42.8" (1087 mm) Horizontal
distance from center of rear wheel tread 0.2" (5
mm) to the left **Hydraulic control system** direct
engine drive **Transmission** selective gear fixed
ratio with partial (2) range operator controlled
power shift **Advertised speeds mph (km/h)** first
1.8 (2.9) second 2.4 (3.8) third 2.8 (4.5) fourth 3.5
(5.7) fifth 3.6 (5.8) sixth 4.6 (7.3) seventh 4.7 (7.6)
eighth 5.5 (8.8) ninth 6.1 (9.8) tenth 7.0 (11.3)
eleventh 8.5 (13.6) twelfth 10.7 (17.2) thirteenth
10.9 (17.5) fourteenth 13.7 (22.1) fifteenth 14.2
(22.9) sixteenth 18.3 (29.4) reverse 2.0 (3.2), 2.5
(4.1), 5.9 (9.5), 7.6 (12.2) **Clutch** single dry disc
operated by foot pedal **Brakes** single wet disc op-
erated hydraulically by two foot pedals which can
be locked together **Steering** hydrostatic **Turning**
radius (on concrete surface with brake applied)
right 158" (4.01 m) left 160" (4.06 m) (on concrete
surface without brake applied) right 178" (4.52 m)
left 180" (4.57 m) **Turning space diameter** (on
concrete surface with brake applied) right 330"
(8.38 m) left 334" (8.48 m) (on concrete surface
without brake) right 370" (9.40 m) left 374" (9.50
m) **Power take-off** 1000 rpm at 1918 engine rpm
and 540 rpm at 1873 rpm.

LUGGING ABILITY IN 8th (5PD) GEAR

Crankshaft Speed rpm	2300	2069	1831	1607	1375	1144
Pull—lbs (kN)	6984 (31.07)	7556 (33.61)	7994 (35.56)	8183 (36.40)	8260 (36.74)	8048 (35.80)
Increase in Pull %	0	8	14	17	18	15
Power—Hp (kW)	97.35 (72.59)	94.31 (70.32)	87.82 (65.49)	78.75 (58.73)	67.96 (50.67)	55.20 (41.16)
Speed—Mph (km/h)	5.23 (8.41)	4.68 (7.53)	4.12 (6.63)	3.61 (5.81)	3.09 (4.97)	2.57 (4.14)
Slip %	5.08	5.53	5.83	5.98	6.28	5.98

TRACTOR SOUND LEVEL WITH CAB

dB(A)

Maximum Available Power—Two Hours	81.5
75% of Pull at Maximum Power—Ten Hours	82.5
50% of Pull at Maximum Power—Two Hours	83.0
50% of Pull at Reduced Engine Speed—Two Hours	82.0
Bystander in 16th (8DD) gear	89.5

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4-38; 8; 16 (110)	Four 18.4-38; 8; 16 (110)
Ballast	—Liquid (each inner)	748 lb (339 kg)	None
	—Cast Iron (each)	170 lb (77 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 11.00-16; 6; 32 (220)	Two 11.00-16; 6; 32 (220)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	75 lb (34 kg)	None
Height of Drawbar		21.5 in (545 mm)	21.5 in (545 mm)
Static Weight with Operator—Rear		11760 lb (5334 kg)	9585 lb (4348 kg)
Front		3430 lb (1556 kg)	3280 lb (1488 kg)
Total		15190 lb (6890 kg)	12865 lb (5836 kg)

REPAIRS and ADJUSTMENTS: During the limber up period the transmission low pressure warning switch failed. A new switch was installed and test continued. The new switch failed during the Maximum Drawbar Power Test in 5th (2DD) Gear and was replaced with a pipe plug. During preliminary PTO test a loss of power was observed. All injectors were removed and cleaned. One new injector was installed and fuel pump timing advanced one degree. During the Ten Hour Test the differential lock spool retaining clip broke, causing engagement of differential lock. This clip was replaced and was test run again.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump was 176°F (79.8°C). Nine gears were chosen between 15% and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1301.

L. I. LEVITICUS

Engineer-in-Charge

G. W. STEINBRUEGGE

W. E. SPLINTER

K. VON BARGEN

Board of Tractor Test Engineers



Ford TW-10 Diesel