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Test 1299: Ford TW-30 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1299 — FORD TW-30 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 wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)									
163.28 (121.76)	2200	10.351 (39.183)	0.442 (0.269)	15.77 (3.107)	189 (87.1)	59 (15.1)	75 (23.7)	28.650 (96.747)	
Standard Power Take-off Speed—One Hour (PTO Speed—1000 rpm)									
157.04 (117.11)	1918	9.373 (35.480)	0.416 (0.253)	16.76 (3.301)	189 (87.2)	59 (15.2)	75 (24.1)	28.685 (96.865)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
153.00 (114.10)	2428	10.507 (39.772)	0.478 (0.291)	14.56 (2.869)	188 (86.4)	59 (15.0)	75 (23.9)	..... .....
0.00 (0.00)	2467	3.096 (11.720)	..... .....	..... .....	183 (83.9)	58 (14.4)	74 (23.3)	..... .....
77.17 (57.54)	2448	6.640 (25.135)	0.599 (0.365)	11.62 (2.289)	185 (85.0)	59 (15.0)	76 (24.7)	..... .....
163.58 (121.98)	2200	10.416 (39.430)	0.444 (0.270)	15.70 (3.094)	188 (86.9)	60 (15.8)	78 (25.3)	..... .....
38.69 (28.85)	2454	4.728 (17.897)	0.851 (0.518)	8.18 (1.612)	183 (83.9)	58 (14.7)	74 (23.6)	..... .....
115.07 (85.81)	2432	8.453 (31.997)	0.512 (0.311)	13.61 (2.682)	186 (85.8)	59 (15.0)	75 (23.9)	..... .....
Av Av	91.25 (68.05)	2405 (27.658)	7.307 (0.558)	0.558 (0.339)	12.49 (2.460)	186 (85.3)	59 (15.0)	75 (24.1)	28.710 (96.950)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Hp.hr/gal (kW.h/l)	Cool- ing med	Temp. °F (°C)		Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)			Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 8th (5PD) Gear											
142.21 (106.05)	10101 (44.93)	5.28 (8.50)	2200	5.04	10.406 (39.392)	0.510 (0.310)	13.67 (2.692)	190 (87.5)	49 (9.4)	51 (10.6)	28.270 (95.464)
75% of Pull at Maximum Power—Ten Hours 8th (5PD) Gear											
121.22 (90.40)	7672 (34.13)	5.93 (9.54)	2440	3.82	9.635 (36.471)	0.554 (0.337)	12.58 (2.479)	186 (85.6)	37 (2.9)	42 (5.3)	28.884 (97.537)
50% of Pull at Maximum Power—Two Hours 8th (5PD) Gear											
82.63 (61.62)	5138 (22.85)	6.03 (9.71)	2450	2.45	7.661 (29.000)	0.646 (0.393)	10.79 (2.125)	185 (85.0)	35 (1.4)	39 (3.9)	29.125 (98.351)
50% of Pull at Reduced Engine Speed—Two Hours 11th (6PD) Gear											
82.34 (61.40)	5116 (22.76)	6.03 (9.71)	1587	2.37	5.634 (21.326)	0.477 (0.290)	14.62 (2.879)	184 (84.2)	38 (3.3)	44 (6.7)	29.085 (98.216)
MAXIMUM POWER IN SELECTED GEARS											
118.60 (88.44)	16553 (73.63)	2.69 (4.32)	2423	14.50	3rd (2PD) Gear			188 (86.4)	34 (1.1)	37 (2.8)	29.130 (98.368)
134.95 (100.63)	15817 (70.36)	3.20 (5.15)	2199	10.85	4th (3PD) Gear			189 (86.9)	43 (6.1)	51 (10.6)	28.740 (97.051)
135.17 (100.80)	15339 (68.23)	3.30 (5.32)	2199	9.86	5th (2DD) Gear			189 (86.9)	43 (6.1)	51 (10.6)	28.750 (97.084)
139.16 (103.77)	12064 (53.66)	4.33 (6.96)	2201	6.50	6th (3DD) Gear			188 (86.7)	43 (6.1)	51 (10.6)	28.750 (97.084)
141.74 (105.70)	11813 (52.55)	4.50 (7.24)	2201	6.11	7th (4PD) Gear			189 (86.9)	43 (6.1)	51 (10.6)	28.750 (97.084)
143.47 (106.98)	10211 (45.42)	5.27 (8.48)	2199	5.24	8th (5PD) Gear			188 (86.7)	43 (6.1)	51 (10.6)	28.770 (97.152)
140.91 (105.08)	8977 (39.93)	5.89 (9.47)	2199	4.52	9th (4DD) Gear			189 (86.9)	42 (5.6)	50 (10.0)	28.740 (97.051)
143.21 (106.79)	7812 (34.75)	6.87 (11.06)	2201	3.78	10th (5DD) Gear			189 (86.9)	42 (5.6)	50 (10.0)	28.730 (97.017)
144.17 (107.51)	6499 (28.91)	8.32 (13.39)	2200	3.04	11th (6PD) Gear			188 (86.7)	42 (5.6)	50 (10.0)	28.730 (97.017)

Department of Agricultural Engineering

Dates of Test: March 27 to April 11, 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 4.273 gal (16.173
l) Drained from motor 4.184 gal (15.836 l)
Transmission and final drive lubricant Ford
M2C-53-A Total time engine was operated 39.5
hours.

ENGINE: Make Ford Diesel Type Six cylinder
vertical with turbocharger and air-to-air inter-
cooler Serial No. *M347454* Crankshaft
lengthwise Rated rpm 2200 Bore and stroke 4.4"
× 4.4" (112 mm × 112 mm) Compression ratio 15.6
to 1 Displacement 401 cu in (6572 ml) Cranking
System 12 volt Lubrication pressure Air cleaner
two paper elements with aspirator Oil filter two
full flow paper cartridges Oil cooler engine cool-
ant heat exchanger for crankcase oil, radiator for
hydraulic and transmission oil Fuel filter one
paper element Muffler vertical Cooling medium
temperature control two thermostats.

CHASSIS: Type standard with duals Serial No.
C 580929 Tread width rear 60.0" (1524 mm) to
112.0" (2845 mm) front 60.0" (1524 mm) to 84.0"
(2134 mm) Wheel base 110.5" (2807 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 37.4" (950 mm) Vertical
distance above roadway 43.6" (1107 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 (3.0) second 2.4 (3.8) third 2.8 (4.6) fourth 3.6
(5.8) fifth 3.6 (5.9) sixth 4.6 (7.4) seventh 4.8 (7.7)
eighth 5.5 (8.9) ninth 6.1 (9.9) tenth 7.1 (11.4)
eleventh 8.5 (13.7) twelfth 10.8 (17.3) thirteenth
11.0 (17.7) fourteenth 13.8 (22.2) fifteenth 14.4
(23.1) sixteenth 18.4 (29.7) reverse 2.0 (3.2), 2.6
(4.1), 6.0 (9.6), 7.7 (12.3) Clutch single dry disc
operated by foot pedal Brakes power assisted
double wet disc operated hydraulically by two foot
pedals which can be locked together Steering hydro-
static Turning radius (on concrete surface with
brake applied) right 161" (4.09 m) left 164" (4.17 m)
(on concrete surface without brake applied) right
184" (4.67 m) left 185" (4.70 m) Turning space
diameter (on concrete surface with brake applied)
right 340" (8.64 m) left 346" (8.79 m) (on concrete
surface without brake) right 386" (9.80 m) left 388"
(9.86 m) Power take-off 1000 rpm at 1918 engine
rpm.

LUGGING ABILITY IN 8th (5PD) GEAR

Crankshaft Speed rpm	2199	1983	1762	1541	1315	1095
Pull—lbs (<i>kN</i>)	10211 (45.42)	11177 (49.72)	11998 (53.37)	12172 (54.14)	11441 (50.89)	9828 (43.72)
Increase in Pull %	0	9	18	19	12	-4
Power—Hp (<i>kW</i>)	143.47 (106.98)	140.62 (104.86)	133.32 (99.42)	118.07 (88.04)	95.26 (71.03)	68.81 (51.31)
Speed—Mph (<i>km/h</i>)	5.27 (8.48)	4.72 (7.59)	4.17 (6.71)	3.64 (5.85)	3.12 (5.02)	2.63 (4.23)
Slip %	5.24	5.79	6.26	6.42	6.11	5.16

TRACTOR SOUND LEVEL WITH CAB		dB(A)
Maximum Available Power—Two Hours		80.0
75% of Pull at Maximum Power—Ten Hours		82.0
50% of Pull at Maximum Power—Two Hours		81.5
50% of Pull at Reduced Engine Speed—Two Hours		78.5
Bystander in 16th (8DD) gear		90.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (<i>kPa</i>)	Four 20.8-38; 10; 16 (110)	Four 20.8-38; 10; 16 (110)
Ballast	—Liquid (each inner)	1522 lb (690 kg)	None
	—Cast Iron (each)	500 lb (227 kg)	None
Front Tires	—No., size, ply & psi (<i>kPa</i>)	Two 14L-16.1; 8; 36 (250)	Two 14L-16.1; 8; 36 (250)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	80 lb (36 kg)	None
Height of Drawbar		24.5 in (620 mm)	24.5 in (620 mm)
Static Weight with Operator—Rear		15090 lb (6845 kg)	10045 lb (4556 kg)
Front		4740 lb (2150 kg)	4580 lb (2077 kg)
Total		19830 lb (8995 kg)	14625 lb (6634 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

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 161°F (71.8°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. 1299.

L. I. LEVITICUS
Engineer-in-Charge

G. W. STEINBRUEGGE
W. E. SPLINTER
K. VON BARGEN
Board of Tractor Test Engineers



Ford TW-30 Diesel