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Test 1294: Fiat 780 Diesel 12 and 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1294 — FIAT 780 DIESEL

ALSO HESSTON 780 FIAT DIESEL

16 SPEED ALSO 12 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—606 rpm)								
70.36 (52.46)	2500	4.674 (17.691)	0.460 (0.280)	15.05 (2.966)	197 (91.9)	59 (14.9)	75 (23.9)	28.927 (97.681)
Standard Power Take-off Speed (540 rpm)—One Hour								
66.30 (49.44)	2228	4.303 (16.289)	0.449 (0.273)	15.41 (3.035)	197 (91.5)	58 (14.4)	75 (23.8)	28.910 (97.625)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
61.84 (46.12)	2586	3.709 (14.042)	0.415 (0.253)	16.67 (3.284)	182 (83.1)	58 (14.4)	75 (23.9)	..... .....
0.00 (0.00)	2714	1.153 (4.363)	..... .....	..... .....	167 (75.0)	55 (12.8)	75 (23.9)	..... .....
31.55 (23.53)	2638	2.336 (8.842)	0.513 (0.312)	13.51 (2.661)	174 (78.6)	55 (12.8)	75 (23.9)	..... .....
70.38 (52.48)	2500	4.736 (17.929)	0.466 (0.283)	14.86 (2.927)	195 (90.6)	56 (13.1)	76 (24.2)	..... .....
15.96 (11.90)	2668	1.725 (6.529)	0.748 (0.455)	9.25 (1.823)	169 (76.1)	58 (14.4)	75 (23.9)	..... .....
46.73 (34.85)	2605	2.964 (11.220)	0.439 (0.267)	15.77 (3.106)	180 (81.9)	54 (12.2)	75 (23.9)	..... .....
Av Av	37.74 (28.15)	2618 (10.487)	2.770 (0.508)	13.62 (0.309)	178 (80.9)	56 (13.3)	75 (23.9)	28.897 (97.580)

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 12th (4N) Gear											
62.88 (46.89)	4579 (20.37)	5.15 (8.29)	2498	3.84	4.514 (17.087)	0.497 (0.302)	13.93 (2.744)	184 (84.4)	53 (11.7)	64 (17.5)	29.080 (98.199)
75% of Pull at Maximum Power—Ten Hours 12th (4N) Gear											
50.24 (37.46)	3509 (15.61)	5.37 (8.64)	2594	3.16	3.546 (13.424)	0.489 (0.297)	14.17 (2.791)	171 (77.4)	44 (6.6)	46 (7.8)	29.300 (98.942)
50% of Pull at Maximum Power—Two Hours 12th (4N) Gear											
34.52 (25.74)	2349 (10.45)	5.51 (8.87)	2623	1.96	2.763 (10.457)	0.554 (0.337)	12.50 (2.462)	168 (75.3)	53 (11.4)	64 (17.8)	29.100 (98.266)
50% of Pull at Reduced Engine Speed—Two Hours 14th (2H) Gear											
34.32 (25.60)	2337 (10.40)	5.51 (8.86)	1419	2.00	2.311 (8.749)	0.466 (0.284)	14.85 (2.926)	176 (80.0)	48 (8.9)	54 (11.9)	29.220 (98.672)
MAXIMUM POWER IN SELECTED GEARS											
47.46 (35.39)	7776 (34.59)	2.29 (3.68)	2594	14.65	9th (1N) Gear			172 (77.5)	41 (5.0)	42 (5.6)	29.240 (98.739)
62.40 (46.53)	7522 (33.46)	3.11 (5.01)	2499	8.35	10th (2N) Gear			179 (81.7)	51 (10.6)	62 (16.7)	29.140 (98.401)
64.43 (48.05)	5949 (26.46)	4.06 (6.54)	2499	5.01	11th (3N) Gear			183 (83.9)	51 (10.6)	62 (16.7)	29.060 (98.131)
64.30 (47.95)	4673 (20.79)	5.16 (8.30)	2499	3.56	12th (4N) Gear			184 (84.4)	50 (10.0)	61 (16.1)	29.040 (98.064)
64.04 (47.76)	3267 (14.53)	7.35 (11.83)	2500	2.50	13th (1H) Gear			184 (84.4)	52 (11.1)	63 (17.2)	29.060 (98.131)
61.40 (45.79)	2369 (10.54)	9.72 (15.64)	2501	1.78	14th (2H) Gear			182 (83.1)	53 (11.7)	65 (18.3)	29.070 (98.165)

Department of Agricultural Engineering

Dates of Test: October 19 to November 1, 1978

Manufacturer: FIAT TRATTORI S.p.A., Via Pico della Mirandola, 72-41100, Modena, Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 50.4 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° (15°/15°) 0.8315 Fuel weight 6.923 lbs/gal (0.832 kg/l) Oil SAE 20W-40 API service classification MIL-L-2104 B EP To motor 2.465 gal (9.330 l) Drained from motor 2.480 gal (9.387 l) Transmission lubricant SAE 20W-40 Final drive lubricant API 303 Total time engine was operated 40.5 hours.

ENGINE: Make Fiat Diesel Type 4 cylinder vertical Serial No. 740726 Crankshaft lengthwise Rated rpm 2500 Bore and stroke 4.055" x 4.33" (103 mm x 110 mm) Compression ratio 17.0 to 1 Displacement 224 cu in (3666 ml) Cranking System 12 volt Lubrication pressure Air cleaner two paper elements Oil filter one full flow paper cartridge Fuel filter two paper elements Muffler vertical Cooling medium temperature control thermostat.

CHASSIS: Type Standard Serial No. *864897* Tread width rear 55.1" (1400 mm) to 82.7" (2100 mm) front 55.5" (1410 mm) to 75.2" (1910 mm) Wheel base 89.2" (2265 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 27.3" (695 mm) Vertical distance above roadway 38.2" (970 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 0.3 (0.5) second 0.4 (0.6) third 0.5 (0.8) fourth 0.6 (1.0) fifth 0.9 (1.4) sixth 1.2 (1.9) seventh 1.4 (2.3) eighth 1.8 (2.9) ninth 2.6 (4.1) tenth 3.4 (5.4) eleventh 4.2 (6.8) twelfth 5.2 (8.4) thirteenth 7.5 (12.0) fourteenth 9.8 (15.8) fifteenth 12.4 (19.9) sixteenth 15.5 (24.9) reverse 0.3 (0.5), 0.8 (1.4), 2.5 (4.0), 6.7 (10.8) Clutch double dry disc operated by foot pedal Brakes single wet disc hydraulically operated by two foot pedals which can be locked together Steering hydrostatic Turning radius (on concrete surface with brake applied) right 128" (3.26 m) left 126" (3.19 m) (on concrete surface without brake) right 147" (3.74 m) left 152" (3.86 m) Turning space diameter (on concrete surface with brake applied) right 265" (6.74 m) left 260" (6.60 m) (on concrete surface without brake) right 303" (7.70 m)

LUGGING ABILITY IN 12th (4N) GEAR

Crankshaft Speed rpm	2499	2254	1995	1757	1502	1255	997
Pull—lbs (kN)	4673 (20.79)	4941 (21.98)	5132 (22.83)	5231 (23.27)	5445 (24.22)	5551 (24.69)	5180 (23.04)
Increase in Pull %	0	6	10	12	17	19	11
Power—Hp (kW)	64.30 (47.95)	61.17 (45.61)	56.13 (41.85)	50.31 (37.51)	44.66 (33.30)	37.83 (28.21)	28.26 (21.07)
Speed—Mph (km/h)	5.16 (8.30)	4.64 (7.47)	4.10 (6.60)	3.61 (5.80)	3.08 (4.95)	2.56 (4.11)	2.05 (3.29)
Slip %	3.56	3.70	4.12	4.12	4.40	4.67	4.12

TRACTOR SOUND LEVEL WITH CAB dB(A)

Maximum Available Power—Two Hours	84.0
75% of Pull at Maximum Power—Ten Hours	84.0
50% of Pull at Maximum Power—Two Hours	83.5
50% of Pull at Reduced Engine Speed—Two Hours	81.0
Bystander in 16th (4H) gear	89.5

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4R 30; 6; 20 (140)	Two 18.4R 30; 6; 20 (140)
Ballast	—Liquid (each)	580 lb (263 kg)	None
	—Cast Iron (each)	225 lb (102 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 7.50-18; 6; 36 (250)	Two 7.50-18; 6; 36 (250)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	610 lb (277 kg)	None
Height of Drawbar		19.5 in (495 mm)	19.5 in (495 mm)
Static Weight with Operator—Rear		6710 lb (3043 kg)	5100 lb (2313 kg)
	—Front	3520 lb (1597 kg)	2300 lb (1043 kg)
	—Total	10230 lb (4640 kg)	7400 lb (3356 kg)

left 313" (7.94 m) **Power take-off** 540 rpm at 2228 engine rpm and 1000 rpm at 2411 engine rpm.

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 155°F (68.3°C). Six gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1294**.

L. I. LEVITICUS
Engineer-in-Charge

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



Fiat 780 Diesel