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Test 1535: Hesston 180-90DT and 180-90 Turbo Diesels 16-Speeds

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1535—HESSTON 180-90 DT TURBO FIAT DIESEL ALSO HESSTON 180-90 TURBO FIAT DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption		Temperature ° (°C)			Air dry bulb	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			
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed — Two hours (PTO Speed—1061 rpm)									
162.87 (121.45)	2200	9.388 (35.534)	0.402 (0.244)	17.35 (3.418)	177 (80.8)	67 (19.3)	75 (24.0)	29.34 (99.08)	
Standard Power Take-off Speed (1000 rpm) — One Hour									
158.66 (118.31)	2075	8.881 (33.614)	0.390 (0.237)	17.86 (3.520)	178 (80.8)	67 (19.3)	75 (24.0)	29.31 (98.98)	
VARYING POWER AND FUEL CONSUMPTION — Two Hours									
143.17 (106.76)	2275	8.501 (32.178)	0.414 (0.252)	16.84 (3.318)	175 (79.2)	66 (18.9)	74 (23.3)	..... .....
0.00 (0.00)	2440	2.729 (10.329)	..... .....	..... .....	175 (79.2)	66 (18.9)	76 (24.2)	..... .....
74.53 (55.58)	2370	5.604 (21.213)	0.524 (0.319)	13.30 (2.620)	175 (79.4)	65 (18.3)	74 (23.3)	..... .....
164.00 (122.30)	2201	9.430 (35.697)	0.401 (0.244)	17.39 (3.426)	177 (80.3)	67 (19.2)	75 (23.6)	..... .....
37.76 (28.16)	2400	4.115 (15.576)	0.760 (0.462)	9.18 (1.808)	175 (79.4)	66 (18.9)	75 (23.9)	..... .....
109.90 (81.95)	2328	7.093 (26.850)	0.450 (0.274)	15.49 (3.052)	176 (79.7)	67 (19.2)	76 (24.2)	..... .....
Av Av	88.23 (65.79)	2335	6.245 (23.641)	0.493 (0.300)	14.13 (2.783)	175 (79.5)	66 (18.9)	75 (23.8)	29.28 (98.86)

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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 (III-2) Gear											
137.22 (102.32)	9916 (44.11)	5.19 (8.35)	2200	7.34	9.261 (35.057)	0.470 (0.286)	14.82 (2.919)	178 (80.8)	44 (6.4)	56 (13.3)	29.28 (98.87)
75% of Pull at Maximum Power — Ten Hours 8th (III-2) Gear											
112.14 (83.62)	7568 (33.66)	5.56 (8.94)	2296	4.98	7.869 (29.789)	0.489 (0.298)	14.25 (2.807)	177 (80.8)	48 (8.7)	62 (16.4)	29.09 (98.24)
50% of Pull at Maximum Power — Two Hours 8th (III-2) Gear											
78.20 (58.31)	5046 (22.45)	5.81 (9.35)	2361	3.39	6.363 (24.087)	0.567 (0.345)	12.29 (2.421)	177 (80.6)	51 (10.6)	61 (16.1)	28.95 (97.74)
50% of Pull at Reduced Engine Speed — Two Hours 12th (III-4) Gear											
78.21 (58.32)	5046 (22.44)	5.81 (9.35)	1575	3.30	5.086 (19.253)	0.453 (0.276)	15.38 (3.029)	176 (80.0)	56 (13.3)	69 (20.6)	28.93 (97.69)
MAXIMUM POWER IN SELECTED GEARS											
127.48 (95.06)	14713 (65.44)	3.25 (5.23)	2245	14.80	4th (I-4) Gear			178 (81.1)	47 (8.3)	55 (12.8)	28.94 (97.73)
133.35 (99.44)	13850 (61.61)	3.61 (5.81)	2200	12.67	5th (II-1) Gear			177 (80.3)	36 (2.2)	42 (5.6)	29.35 (99.11)
137.07 (102.22)	12453 (55.39)	4.13 (6.64)	2199	10.01	6th (III-1) Gear			177 (80.3)	38 (3.3)	45 (7.2)	29.35 (99.11)
138.39 (103.19)	11241 (50.00)	4.62 (7.43)	2200	8.62	7th (II-2) Gear			177 (80.3)	38 (3.3)	46 (7.8)	29.36 (99.14)
139.90 (104.33)	10091 (44.88)	5.20 (8.37)	2201	7.26	8th (III-2) Gear			177 (80.6)	42 (5.6)	53 (11.7)	29.32 (99.01)
140.09 (104.46)	9187 (40.86)	5.72 (9.20)	2202	6.49	9th (II-3) Gear			176 (80.0)	39 (3.9)	47 (8.3)	29.36 (99.14)
140.45 (104.73)	8225 (36.58)	6.40 (10.31)	2201	5.54	10th (III-3) Gear			177 (80.6)	39 (3.9)	48 (8.9)	29.35 (99.11)
139.17 (103.78)	7245 (32.23)	7.20 (11.59)	2201	4.90	11th (II-4) Gear			177 (80.6)	40 (4.4)	49 (9.4)	29.34 (99.08)
138.58 (103.34)	6467 (28.77)	8.04 (12.93)	2200	4.25	12th (III-4) Gear			177 (80.6)	40 (4.4)	50 (10.0)	29.33 (99.04)

Department of Agricultural Engineering

Dates of Test: September 25 to October 4, 1984

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

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F (15/15°C)** 0.8371 **Fuel weight** 6.970 lbs/gal (0.835 kg/l) **Oil** SAE 15W-40 **API service classification** SE, SF, CC, CD **To motor** 4.006 gal (15.163 l) **Drained from motor** 3.310 gal (12.530 l) **Transmission and final drive lubricant** API 303 hydraulic fluid **Total time engine was operated** 41.0 hours.

ENGINE: Make Fiat/IVECO Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 8365.25*502*755336* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.528" × 5.118" (115 mm × 130 mm) **Compression ratio** 15.5 to 1 **Displacement** 494 cu in (8102 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, engine coolant heat exchanger for transmission oil **Fuel filter** one paper cartridge, one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist with duals **Serial No.** 180-90DT/IS*263130* **Tread width** rear 60" (1524 mm) to 129" (3277 mm) front 64" (1625 mm) to 92" (2337 mm) **Wheel base** 113.8" (2890 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 37.2" (946 mm) Vertical distance above roadway 42.5" (1080 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 2.1 (3.3) second 2.5 (4.0) third 3.0 (4.9) fourth 3.8 (6.1) fifth 4.2 (6.7) sixth 4.6 (7.4) seventh 5.1 (8.2) eighth 5.6 (9.1) ninth 6.1 (9.9) tenth 6.8 (11.0) eleventh 7.6 (12.3) twelfth 8.4 (13.6) thirteenth 10.4 (16.8) fourteenth 12.7 (20.5) fifteenth 15.4 (24.8) sixteenth 19.1 (30.7) reverse 1.6 (2.6), 2.0 (3.2), 2.4 (3.9), 3.0 (4.8), 3.4 (5.5), 3.7 (5.9), 4.0 (6.5), 4.5 (7.3), 4.9 (7.9), 5.5 (8.8), 6.1 (9.8), 6.8 (10.9), 8.1 (13.1), 10.2 (16.4), 12.3 (19.8), 15.3 (24.6) **Clutch** double dry disc hydraulically 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

LUGGING ABILITY IN 8th (III-2) GEAR

Crankshaft Speed rpm	2201	1981	1760	1540	1313	1084
Pull—lbs (kN)	10091 (44.88)	10639 (47.32)	11058 (49.19)	12340 (54.89)	12232 (54.41)	9748 (43.36)
Increase in Pull %	0	5	10	22	21	-3
Power—Hp (kW)	139.90 (104.33)	131.87 (98.34)	121.19 (90.37)	116.58 (86.93)	98.57 (73.51)	66.66 (49.70)
Speed—Mph (km/h)	5.20 (8.37)	4.65 (7.48)	4.11 (6.61)	3.54 (5.70)	3.02 (4.86)	2.56 (4.13)
Slip %	7.26	7.87	8.17	9.80	9.80	7.26

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	78.5	78.5
75% of Pull at Maximum Power—Ten Hours		78.5
50% of Pull at Maximum Power—Two Hours		78.5
50% of Pull at Reduced Engine Speed—Two Hours		75.5
Bystander in 16th (IV-4) gear		86.0

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

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 (III-2) Gear											
137.82 (102.78)	9697 (43.13)	5.33 (8.58)	2200	5.90	9.232 (34.949)	0.467 (0.284)	14.93 (2.941)	178 (80.8)	45 (7.2)	59 (14.7)	29.23 (98.71)

MAXIMUM POWER IN SELECTED GEARS

124.54 (92.87)	17507 (77.87)	2.67 (4.29)	2258	14.86	3rd (I-3) Gear			178 (80.8)	45 (7.2)	52 (11.1)	28.94 (97.73)
140.48 (104.76)	9876 (43.93)	5.33 (8.58)	2200	5.98	8th (III-2) Gear			177 (80.6)	41 (5.0)	52 (11.1)	29.33 (99.04)

TIRES, BALLAST AND WEIGHT

Rear Tires		With Ballast		Without Ballast	
Ballast	—No. size, ply & psi (kPa) —Liquid (each inner) —Cast Iron (each)	Four 20.8-38; 8; 16 (110) 1150 lb (522 kg) None		Four 20.8-38; 8; 16 (110) None None	
Front Tires		With Ballast		Without Ballast	
Ballast	—No. size, ply & psi (kPa) —Liquid (each) —Cast Iron (each)	Two 16.9-28; 6; 18 (125) None 65 lb (29 kg)		Two 16.9-28; 6; 18 (125) None None	
Height of Drawbar		22.5 in (570 mm)		22.5 in (570 mm)	
Static Weight with Operator—Rear		13975 lb (6339 kg)		11675 lb (5296 kg)	
		5750 lb (2608 kg)		5620 lb (2549 kg)	
		19725 lb (8947 kg)		17295 lb (7845 kg)	

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2400	16550
Location	remote	
Hydraulic oil temperature °F (°C)	190	88
Location	pump inlet	
QUICK ATTACH CATEGORY	Maximum Lift Capacity	
	no II	Lift Capacity for Transport
LOAD lbs (kg)	**12234	5549
TIME sec	3.34	
HITCH POINT MOVEMENT in (mm)		
Lowest position	10.1	257
Top of timed range	34.1	867
Highest position	36.0	914
LOAD CG MOVEMENT in (mm)		
Lowest position	10.8	273
Top of timed range	33.3	846
Highest position	35.4	900

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

**Manufacturers advertised capacity was 13450 lb (6100 kg).

applied) right 225" (5.72 m) left 225" (5.72 m) (on concrete surface without brake) right 265" (6.72 m) left 265" (6.72 m) **Turning space diameter** (on concrete surface with brake applied) right 467" (11.87 m) left 467" (11.87 m) (on concrete surface without brake) right 546" (13.87 m) left 546" (13.87 m) **Power take-off** 1000 rpm at 2075 engine rpm **Unladen tractor mass** 15520 lb (7040 kg).

REPAIRS AND ADJUSTMENTS: During the hydraulic lift test, an "O" ring in the hydraulic pump failed. The hydraulic pump and filter were replaced and test continued.

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 134° (56.6°C). Nine 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 No. 1535, December 10, 1984.

LOUIS I. LEVITICUS

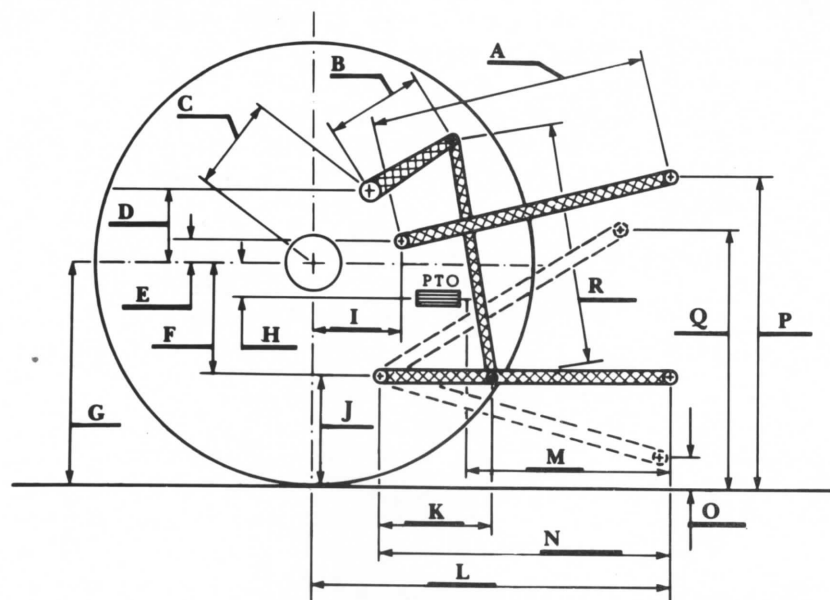
Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	31.4	797
B	10.8	275
C	16.9	430
D	16.1	409
E	9.0	229
F	11.0	280
G	33.0	839
H	2.5	64
I	16.7	425
J	22.0	559
K	21.5	546
L	48.5	1232
M	26.2	665
N	40.0	1016
O	8.0	203
P	41.0	1041
Q	36.6	930
R	34.9	886



Hesston 180-90DT Diesel