

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

8-29-1984

Test 1533: Hesston 140-90DT and 140-90 Turbo Diesels 12-Speeds

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 1533: Hesston 140-90DT and 140-90 Turbo Diesels 12-Speeds" (1984). *Nebraska Tractor Tests*. 1844.

<https://digitalcommons.unl.edu/tractormuseumlit/1844>

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 1533—HESSTON 140-90DT TURBO FIAT DIESEL ALSO HESSTON 140-90 TURBO FIAT DIESEL 16 SPEED

Department of Agricultural Engineering

Dates of Test: August 29-September 7, 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) 0.8377 Fuel weight 6.975 lbs/gal (0.836 kg/l) Oil SAE 15W-40 API service classification SE, SF, CC, CD To motor 3.471 gal (13.139 l) Drained from motor 3.252 gal (12.310 l) Transmission and final drive lubricant API 303 hydraulic fluid Total time engine was operated 42.5 hours.

ENGINE: Make Fiat/IVECO Diesel Type six cylinder vertical with turbocharger Serial No. 8065.25*000-004695* Crankshaft lengthwise Rated rpm 2500 Bore and stroke 4.094" × 4.527" (104 mm × 115 mm) Compression ratio 16.5 to 1 Displacement 358 cu in (5861 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and centrifugal precleaner Oil filter two full flow cartridges Oil cooler engine coolant heat exchanger for crankcase oil Fuel filter two paper cartridges and sediment bowl Muffler vertical Cooling medium temperature control one thermostat.

CHASSIS: Type front wheel assist with duals Serial No. 160-90DT/I3*259142* Tread width rear 60" (1524 mm) to 129" (3277 mm) front 64" (1625 mm) to 92" (2337 mm) Wheel base 105.1" (2670 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 34.6" (880 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 1.9 (3.1) second 2.4 (3.8) third 2.9 (4.6) fourth 3.5 (5.7) fifth 3.9 (6.3) sixth 4.3 (6.9) seventh 4.8 (7.7) eighth 5.3 (8.6) ninth 5.8 (9.3) tenth 6.5 (10.4) eleventh 7.2 (11.6) twelfth 7.9 (12.7) thirteenth 9.8 (15.8) fourteenth 12.0 (19.3) fifteenth 14.5 (23.3) sixteenth 18.0 (29.0) reverse 1.5 (2.4), 1.9 (3.0), 2.3 (3.7), 2.8 (4.6), 3.1 (5.0), 3.5 (5.6), 3.9 (6.2), 4.2 (6.8), 4.7 (7.5), 5.2 (8.3), 5.8 (9.3), 6.4 (10.3), 7.9 (12.7), 9.6 (15.5), 11.6 (18.7), 14.4 (23.2) Clutch single 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 applied) right 202" (5.14 m) left 204" (5.18 m) (on

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °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—1017 rpm)								
123.35 (91.98)	2500	7.295 (27.610)	0.412 (0.251)	16.91 (3.332)	188 (86.9)	64 (17.9)	75 (24.0)	28.96 (97.80)

Standard Power Take-off Speed (1000 rpm) — One Hour								
122.83 (91.60)	2459	7.173 (27.149)	0.407 (0.248)	17.12 (3.374)	189 (86.9)	63 (16.9)	75 (24.1)	28.95 (97.76)

VARYING POWER AND FUEL CONSUMPTION - Two Hours

108.67 (81.03)	2590	6.834 (25.870)	0.439 (0.267)	15.90 (3.132)	186 (85.3)	61 (16.1)	75 (23.9)	.....
0.00 (0.00)	2748	2.473 (9.362)	.....	.....	178 (81.1)	61 (16.1)	75 (23.6)	.....
56.23 (41.93)	2682	4.692 (17.762)	0.582 (0.354)	11.98 (2.361)	184 (84.2)	61 (16.1)	75 (23.6)	.....
122.89 (91.64)	2501	7.282 (27.564)	0.413 (0.251)	16.88 (3.325)	190 (87.8)	62 (16.7)	76 (24.2)	.....
28.42 (21.19)	2709	3.566 (13.497)	0.875 (0.532)	7.97 (1.570)	179 (81.7)	62 (16.7)	76 (24.4)	.....
82.79 (61.73)	2632	5.755 (21.784)	0.485 (0.295)	14.39 (2.834)	188 (86.7)	63 (16.9)	76 (24.4)	.....
Av 66.50 Av (49.59)	2643	5.100 (19.306)	0.535 (0.325)	13.04 (2.568)	184 (84.4)	62 (16.4)	75 (24.0)	28.94 (97.71)

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											
104.17 (77.68)	7737 (34.42)	5.05 (8.13)	2500	5.89	7.233 (27.380)	0.484 (0.295)	14.40 (2.837)	190 (87.8)	61 (15.8)	73 (22.8)	29.11 (98.30)
75% of Pull at Maximum Power — Ten Hours 8th (III-2) Gear											
84.02 (62.65)	5889 (26.20)	5.35 (8.61)	2600	4.15	6.384 (24.167)	0.530 (0.322)	13.16 (2.592)	192 (88.6)	64 (17.7)	83 (28.3)	28.61 (96.63)
50% of Pull at Maximum Power — Two Hours 8th (III-2) Gear											
57.74 (43.06)	3926 (17.46)	5.52 (8.88)	2644	2.86	5.190 (19.646)	0.627 (0.381)	11.13 (2.192)	189 (86.9)	61 (16.1)	79 (26.1)	28.54 (96.36)
50% of Pull at Reduced Engine Speed — Two Hours 12th (III-4) Gear											
57.73 (43.05)	3926 (17.46)	5.51 (8.87)	1762	2.78	3.900 (14.762)	0.471 (0.287)	14.80 (2.916)	188 (86.7)	63 (17.2)	84 (28.9)	28.57 (96.46)

MAXIMUM POWER IN SELECTED GEARS

86.51 (64.51)	12687 (56.43)	2.56 (4.12)	2593	14.67	3rd (I-3) Gear	190 (87.5)	60 (15.6)	76 (24.4)	28.52 (96.31)
100.47 (74.92)	11803 (52.50)	3.19 (5.14)	2500	10.81	4th (I-4) Gear	189 (87.2)	54 (12.2)	59 (15.0)	29.16 (98.47)
103.10 (76.88)	10734 (47.74)	3.60 (5.80)	2500	9.06	5th (II-1) Gear	189 (87.2)	55 (12.8)	60 (15.6)	29.16 (98.47)
104.53 (77.94)	9674 (43.03)	4.05 (6.52)	2499	7.54	6th (III-1) Gear	189 (87.2)	56 (13.3)	63 (17.2)	29.16 (98.47)
105.24 (78.48)	8762 (38.98)	4.50 (7.25)	2499	6.65	7th (II-2) Gear	189 (87.2)	56 (13.3)	64 (17.8)	29.16 (98.47)
105.81 (78.90)	7852 (34.93)	5.05 (8.13)	2500	5.81	8th (III-2) Gear	190 (87.8)	59 (15.0)	70 (21.1)	29.14 (98.40)
104.90 (78.23)	7086 (31.52)	5.55 (8.93)	2501	5.12	9th (II-3) Gear	190 (87.8)	58 (14.4)	68 (20.0)	29.14 (98.40)
104.92 (78.24)	6348 (28.24)	6.20 (9.97)	2501	4.50	10th (III-3) Gear	190 (87.8)	57 (13.9)	65 (18.3)	29.15 (98.44)
103.85 (77.44)	5596 (24.89)	6.96 (11.20)	2501	3.94	11th (II-4) Gear	189 (87.2)	57 (13.9)	65 (18.3)	29.15 (98.44)
102.31 (76.29)	4947 (22.00)	7.76 (12.48)	2500	3.47	12th (III-4) Gear	189 (87.2)	58 (14.4)	66 (18.9)	29.15 (98.44)
101.73 (75.86)	3954 (17.59)	9.65 (15.53)	2501	2.82	13th (IV-1) Gear	190 (87.5)	58 (14.4)	67 (19.4)	29.14 (98.40)

LUGGING ABILITY IN 8th (III-2) GEAR

Crankshaft Speed rpm	2500	2254	1998	1755	1495	1246
Pull—lbs (kN)	7852 (34.93)	8361 (37.19)	9333 (41.52)	10179 (45.28)	10388 (46.21)	9672 (43.02)
Increase in Pull %	0	6	19	30	32	23
Power—Hp (kW)	105.81 (78.90)	101.00 (75.31)	98.93 (73.77)	93.76 (69.92)	81.20 (60.55)	63.58 (47.41)
Speed—Mph (km/h)	5.05 (8.13)	4.53 (7.29)	3.97 (6.40)	3.45 (5.56)	2.93 (4.72)	2.47 (3.97)
Slip %	5.81	6.35	7.39	8.41	8.70	7.83

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	78.5	78.0
75% of Pull at Maximum Power—Ten Hours		78.5
50% of Pull at Maximum Power—Two Hours		79.5
50% of Pull at Reduced Engine Speed—Two Hours		77.0
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											
105.52 (78.68)	7682 (34.17)	5.15 (8.29)	2500	4.43	7.226 (27.353)	0.478 (0.291)	14.60 (2.877)	190 (87.8)	61 (15.8)	74 (23.3)	29.06 (98.11)

MAXIMUM POWER IN SELECTED GEARS

87.82 (65.49)	15559 (69.21)	2.12 (3.41)	2589	14.78	2nd (I-2) Gear	189 (86.9)	58 (14.4)	75 (23.9)	28.52 (96.31)
106.65 (79.53)	8676 (38.59)	4.61 (7.42)	2499	5.06	7th (II-2) Gear	189 (87.2)	57 (13.9)	64 (17.8)	29.15 (98.44)
107.15 (79.90)	7800 (34.70)	5.15 (8.29)	2500	4.51	8th (III-2) Gear	189 (87.2)	59 (15.0)	69 (20.6)	29.14 (98.40)

concrete surface without brake) right 241" (6.12 m) left 241" (6.12 m) **Turning space diameter** (on concrete surface with brake applied) right 419" (10.65 m) left 423" (10.73 m) (on concrete surface without brake) right 497" (12.63 m) left 497" (12.63 m) **Power take-off** 540 rpm at 2261 engine rpm and 1000 rpm at 2459 engine rpm **Unladen tractor mass** 14565 lbs (6607 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 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 140°F (60.0°C). Eleven gears were chosen between 15% slip and 10 mph (16.1 km/h). During final inspection, longitudinal scratches were found on cylinders number one and three.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1533**, December 10, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD

Board of Tractor Test Engineers

TIRES, BALLAST AND WEIGHT

Rear Tires	—No., size, ply & psi (kPa)
Ballast	—Liquid (each)
	—Test Equip (each)
Front Tires	—No., size, ply & psi (kPa)
Ballast	—Liquid (each)
	—Test Equip (each)

With Ballast
Four 18.4-38; 8; 14 (95)
None
72 lb (33 kg)
Two 14.9-28; 6; 20 (140)
None
43 lb (19 kg)
21.5 in (545 mm)
11050 lb (5012 kg)
5375 lb (2438 kg)
16425 lb (7450 kg)

Without Ballast
Four 18.4-38; 8; 14 (95)
None
None
Two 14.9-28; 6; 20 (140)
None
None
21.5 in (545 mm)
10760 lb (4880 kg)
5290 lb (2400 kg)
16050 lb (7280 kg)

Height of Drawbar

Static Weight with Operator—Rear

—Front

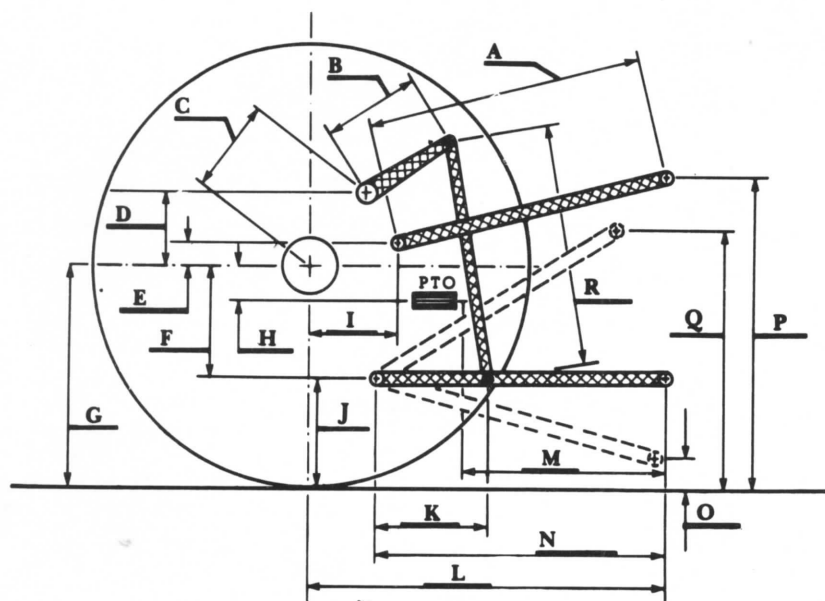
—Total

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2400	16550
Location	remote	
Hydraulic oil temperature °F (°C)	199	93
Location	pump inlet	

	Maximum Lift Capacity	Lift Capacity for Transport
QUICK ATTACH	no	
CATEGORY	II	*not measured
LOAD lbs (kg)	7042	3194
TIME sec	2.06	
HITCH POINT MOVEMENT in (mm)		
Lowest position	12.0	305
Top of timed range	36.0	913
Highest position	36.5	927
LOAD CG MOVEMENT in (mm)		
Lowest position	11.8	298
Top of timed range	34.5	875
Highest position	35.1	891

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



Hitch Dimensions as Tested — No Load

	inch	mm
A	32.0	813
B	10.8	275
C	16.9	430
D	16.1	409
E	9.0	229
F	11.0	279
G	32.3	819
H	2.5	64
I	16.7	425
J	21.3	540
K	21.5	546
L	48.5	1232
M	26.2	665
N	40.0	1016
O	8.0	203
P	40.3	1022
Q	36.8	933
R	34.4	873



Hesston 140-90DT Turbo Diesel

**The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
Irvin T. Omtvedt, Dean and Director**