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Test 1337: International Hydo 86 Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1337 — INTERNATIONAL HYDRO 86 DIESEL

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—652 rpm)									
70.89 (52.86)	2400	5.298 (20.055)	0.526 (0.320)	13.38 (2.636)	194 (90.2)	67 (19.3)	75 (23.8)	28.917 (97.647)	
Standard Power Take-off Speed (540 rpm)—One Hour									
66.64 (49.69)	1988	4.700 (17.791)	0.497 (0.302)	14.18 (2.793)	200 (93.5)	67 (19.5)	75 (23.7)	28.900 (97.591)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
63.81 (47.58)	2542	4.994 (18.904)	0.551 (0.335)	12.77 (2.517)	193 (89.2)	68 (20.0)	75 (23.9)	..... .....
0.00 (0.00)	2669	2.135 (8.082)	..... .....	..... .....	179 (81.7)	68 (19.7)	75 (23.9)	..... .....
32.89 (24.53)	2620	3.426 (12.969)	0.733 (0.446)	9.60 (1.891)	185 (85.0)	68 (20.0)	75 (23.9)	..... .....
70.83 (52.82)	2400	5.301 (20.066)	0.527 (0.321)	13.36 (2.632)	196 (90.8)	69 (20.3)	76 (24.2)	..... .....
16.62 (12.39)	2649	2.766 (10.470)	1.172 (0.713)	6.01 (1.183)	181 (82.8)	69 (20.6)	75 (23.9)	..... .....
48.62 (36.26)	2582	4.134 (15.649)	0.599 (0.364)	11.76 (2.317)	189 (87.2)	70 (20.8)	76 (24.4)	..... .....
Av Av	38.79 (28.93)	2577	3.793 (14.358)	0.688 (0.419)	10.23 (2.015)	187 (86.1)	68 (20.2)	75 (24.1)	28.843 (97.400)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)				
					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	Barom. inch Hg (kPa)	
Maximum Available Power—Two Hours, Speed Setting — 4.0 MPH Lo Range												
52.49 (39.14)	4868 (21.65)	4.04 (6.51)	2399	6.37	5.291 (20.029)	0.710 (0.432)	9.92 (1.954)	198 (91.9)	69 (20.3)	75 (23.6)		28.750 (97.084)
75% of Pull at Maximum Power—Ten Hours, Speed Setting—4.0 MPH Lo Range												
44.13 (32.91)	3780 (16.81)	4.38 (7.05)	2551	4.65	4.620 (17.489)	0.737 (0.448)	9.55 (1.882)	196 (90.9)	72 (22.1)	85 (29.3)		28.658 (96.774)
50% of Pull at Maximum Power—Two Hours, Speed Setting—4.0 MPH Lo Range												
31.47 (23.46)	2524 (11.23)	4.67 (7.52)	2589	3.11	3.817 (14.451)	0.854 (0.520)	8.24 (1.624)	191 (88.3)	72 (22.2)	83 (28.1)		28.695 (96.899)
50% of Pull at Reduced Engine Speed—Two Hours, Speed Setting—8.42 MPH Hi Range at 2400 Engine RPM												
31.50 (23.49)	2525 (11.23)	4.68 (7.53)	1358	3.25	2.770 (10.485)	0.619 (0.377)	11.37 (2.240)	191 (88.1)	61 (15.8)	68 (19.7)		28.915 (97.642)

MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

48.06 (35.83)	8815 (39.21)	2.04 (3.29)	2403	14.97	The infinitely		Lo R.	192 (88.6)	58 (14.4)	61 (16.1)		28.890 (97.557)
52.66 (39.27)	6546 (29.12)	3.02 (4.86)	2399	8.71	variable drive		Lo R.	196 (91.1)	59 (15.0)	67 (19.4)		28.830 (97.354)
53.69 (40.03)	5662 (25.19)	3.56 (5.72)	2400	7.32	control was set		Lo R.	196 (91.1)	58 (14.4)	66 (18.9)		28.840 (97.388)
54.10 (40.34)	5039 (22.41)	4.03 (6.48)	2398	6.44	by the		Lo R.	196 (91.1)	57 (13.9)	65 (18.3)		28.850 (97.422)
53.88 (40.17)	4430 (19.71)	4.56 (7.34)	2399	5.68	manufacturer		Lo R.	197 (91.4)	60 (15.6)	69 (20.6)		28.830 (97.355)
53.41 (39.83)	3960 (17.61)	5.06 (8.14)	2399	4.91	to give the		Lo R.	196 (91.1)	62 (16.7)	70 (21.1)		28.820 (97.321)
52.26 (38.97)	3524 (15.68)	5.56 (8.95)	2398	4.34	travel speeds		Lo R.	196 (91.1)	62 (16.7)	70 (21.1)		28.820 (97.321)
51.12 (38.12)	3155 (14.03)	6.08 (9.78)	2400	3.91	shown.		Hi R.	197 (91.4)	62 (16.7)	70 (21.1)		28.820 (97.321)
52.02 (38.79)	2959 (13.16)	6.59 (10.61)	2398	3.69			Hi R.	196 (91.1)	63 (17.2)	71 (21.7)		28.810 (97.287)
52.64 (39.25)	2815 (12.52)	7.01 (11.29)	2399	3.54			Hi R.	196 (91.1)	64 (17.8)	71 (21.7)		28.800 (97.253)
53.27 (39.72)	2643 (11.76)	7.56 (12.16)	2399	3.33			Hi R.	196 (90.8)	65 (18.3)	71 (21.7)		28.790 (97.220)
53.68 (40.03)	2484 (11.05)	8.10 (13.04)	2399	2.88			Hi R.	196 (91.1)	66 (18.9)	71 (21.7)		28.780 (97.186)

Department of Agricultural Engineering

Dates of Test: March 27 to September 17, 1980

Manufacturer: INTERNATIONAL HARVESTER COMPANY, 401 North Michigan Avenue, Chicago, IL 60611.

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 47.9 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8455 **Fuel weight** 7.040 lbs/gal (0.844 kg/l) **Oil SAE 30 API service classification** CA/CD-SC/SE **To motor** 4.995 gal (18.906 l) **Drained from motor** 4.813 gal (18.217 l) **Transmission and final drive lubricant** I.H. Hy-Tran Fluid **Total time engine was operated** 73.5 hours

ENGINE Make International Diesel **Type** 6 cylinder vertical **Serial No.** 310DT2D095469* **Crankshaft lengthwise Rated rpm** 2400 **Bore and stroke** 3.875" × 4.375" (98.4 mm × 111.1 mm) **Compression ratio** 15.1 to 1 **Displacement** 310 cu in (5080 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** one paper element **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat

CHASSIS: **Type** standard **Serial No.** 2680028U009039* **Tread width** rear 50" (1270 mm) to 96" (2438 mm) front 56" (1422 mm) to 82" (2082 mm) **Wheel base** 103" (2616 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 32.3" (820 mm) Vertical distance above roadway 35.5" (902 mm) Horizontal distance from center of rear wheel tread 0" (0 mm) to the right/left **Hydraulic control system** direct engine drive **Transmission** infinitely variable hydrostatic using a variable displacement pump and motor. A range transmission provides Hi and Lo range **Advertised speeds mph (km/h)** Lo range 0—8.0 (0—12.9); Hi range 0—21.6 (0—34.8); reverse Lo range 0—3.6 (0—5.9), Hi range 0—9.8 (0—15.8) **Clutch** none-hydrostatic drive can be controlled by foot pedal **Brakes** double dry disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 144" (3.66 m) left 144" (3.66 m) (on concrete surface without brake) right 165" (4.19 m) left 165" (4.19 m) **Turning space diameter** (on concrete surface with brake applied) right 298" (7.57 m) left 298" (7.57 m) (on concrete surface without brake) right 339" (8.61 m) left 339" (8.61 m) **Power take-off** 540 rpm at 1988 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs. Fuel adjusted as shown below.

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 return was 145°F (62.8°C). Twelve travel speeds were chosen between 15% slip and 10 mph (16.1

LUGGING ABILITY IN SPEED SETTING—4.0 MPH Lo Range

Crankshaft Speed rpm	2398	2158	1918	1677	1440	1202
Pull—lbs (kN)	5039 (22.41)	5582 (24.83)	5926 (26.36)	5939 (26.42)	6086 (27.07)	6063 (26.97)
Increase in Pull %	0	11	18	18	21	20
Power—Hp (kW)	54.10 (40.34)	53.29 (39.74)	49.35 (36.80)	43.23 (32.24)	37.75 (28.15)	31.35 (23.38)
Speed—Mph (km/h)	4.03 (6.48)	3.58 (5.76)	3.12 (5.03)	2.73 (4.39)	2.33 (3.74)	1.94 (3.12)
Slip %	6.44	7.25	7.79	7.92	8.45	8.19

TRACTOR SOUND LEVEL WITHOUT CAB dB(A)

Maximum Available Power—Two Hours	98.0
75% of Pull at Maximum Power—Ten Hours	97.5
50% of Pull at Maximum Power—Two Hours	96.0
50% of Pull at Reduced Engine Speed—Two Hours	95.0
Bystander in Hi Range	90.5

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires		
—No., size, ply & psi (kPa)	Two 18.4-34; 6; 16 (110)	Two 18.4-34; 6; 16 (110)
Ballast	1273 lb (577 kg)	None
—Liquid (each inner)	None	None
—Cast Iron (each)	None	None
Front Tires		
—No., size, ply & psi (kPa)	Two 9.5L-15; 6; 36 (250)	Two 9.5L-15; 6; 36 (250)
Ballast	None	None
—Liquid (each)	None	None
—Cast Iron (each)	None	None
Height of drawbar	19 in (485 mm)	19 in (485 mm)
Static Weight with Operator—Rear	8220 lb (3729 kg)	5675 lb (2575 kg)
Front	2490 lb (1129 kg)	2490 lb (1129 kg)
Total	10710 lb (4858 kg)	8165 lb (3704 kg)

km/h). Drawbar horsepower did not meet manufacturer's claim upon completion of first test sequence. The fuel rate was readjusted, the oil changed at 39 hours and the test repeated.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1337**.

LOUIS I. LEVITICUS
Engineer-in Charge

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



International Hydro 86 Diesel