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## Test 1439: International 3488 Hydro Diesel Hydrostatic

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1439 — INTERNATIONAL 3488 HYDRO DIESEL

## POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption		Hp.hr/gal (kW.h/l)	Cooling medium	Temperature °F (°C)		Barometer inch Hg (kPa)
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)			Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1158 rpm)								
112.56 (83.94)	2400	7.971 (30.174)	0.494 (0.300)	14.12 (2.782)	196 (91.1)	59 (15.1)	75 (23.8)	29.030 (98.030)
Standard Power Take-off Speed (1000 rpm)—One Hour								
107.11 (79.87)	2072	7.008 (26.528)	0.456 (0.278)	15.28 (3.011)	197 (91.4)	59 (15.1)	75 (23.7)	29.030 (98.030)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
99.31 (74.06)	2490	7.348 (27.815)	0.516 (0.314)	13.51 (2.663)	192 (88.6)	60 (15.3)	75 (23.9)	.....
0.00 (0.00)	2623	3.278 (12.409)	.....	.....	169 (76.1)	58 (14.7)	74 (23.6)	.....
50.97 (38.01)	2562	5.193 (19.658)	0.710 (0.432)	9.82 (1.934)	178 (81.1)	59 (15.0)	75 (23.9)	.....
113.18 (84.40)	2400	8.020 (30.359)	0.494 (0.301)	14.11 (2.780)	196 (90.8)	59 (15.0)	76 (24.4)	.....
25.98 (19.37)	2598	4.229 (16.009)	1.135 (0.691)	6.14 (1.210)	176 (79.7)	58 (14.7)	74 (23.6)	.....
75.62 (56.39)	2530	6.238 (23.613)	0.575 (0.350)	12.12 (2.388)	184 (84.2)	59 (15.0)	76 (24.2)	.....
Av 60.84 Av (45.37)	2534	5.718 (21.645)	0.655 (0.399)	10.64 (2.096)	182 (83.4)	59 (14.9)	75 (23.9)	29.050 (98.098)
DRAWBAR PERFORMANCE								

## DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F (°C)	Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)					
Maximum Available Power—Two Hours, Speed Setting—6.20 MPH Hi Range											
80.50 (60.03)	4848 (21.56)	6.23 (10.02)	2399	3.01	8.049 (30.468)	0.697 (0.424)	10.00 (1.970)	197 (91.4)	60 (15.6)	70 (21.1)	28.970 (97.827)
75% of Pull at Maximum Power—Ten Hours, Speed Setting—6.20 MPH Hi Range											
69.15 (51.56)	3761 (16.73)	6.89 (11.10)	2514	2.25	7.106 (26.899)	0.717 (0.436)	9.73 (1.917)	188 (86.7)	62 (16.7)	70 (20.9)	28.938 (97.719)
50% of Pull at Maximum Power—Two Hours, Speed Setting—6.20 MPH Hi Range											
50.15 (37.40)	2507 (11.15)	7.50 (12.07)	2558	1.45	5.952 (22.529)	0.827 (0.503)	8.43 (1.660)	183 (83.6)	61 (15.8)	74 (23.1)	28.960 (97.794)
50% of Pull at Reduced Engine Speed—Two Hours, Speed Setting—9.55 MPH Hi Range at 2400 Engine RPM											
50.17 (37.41)	2507 (11.15)	7.50 (12.08)	1720	1.41	5.127 (19.407)	0.713 (0.433)	9.79 (1.928)	198 (91.9)	62 (16.4)	76 (24.2)	28.915 (97.642)
MAXIMUM POWER AT SELECTED SPEEDS											
75.59 (56.37)	12152 (54.05)	2.33 (3.75)	2400	14.62	The infinitely	Lo R.	185 (84.7)	57 (13.9)	61 (16.1)		28.970 (97.827)
77.28 (57.63)	7130 (31.71)	4.06 (6.54)	2401	4.71	variable drive	Lo R.	202 (94.2)	59 (15.0)	77 (25.0)		29.040 (98.064)
75.65 (56.41)	6252 (27.81)	4.54 (7.30)	2400	4.02	control was	Lo R.	203 (94.7)	59 (15.0)	77 (25.0)		29.040 (98.064)
75.55 (56.34)	5663 (25.19)	5.00 (8.05)	2399	3.48	set to give	Lo R.	201 (93.6)	59 (15.0)	77 (25.0)		29.040 (98.064)
76.62 (57.14)	5242 (23.32)	5.48 (8.82)	2402	3.17	the travel	Hi R.	202 (94.4)	59 (15.0)	77 (25.0)		29.050 (98.097)
80.05 (59.70)	4977 (22.14)	6.03 (9.71)	2401	3.01	speeds shown	Hi R.	199 (92.8)	59 (15.0)	75 (23.9)		29.050 (98.097)
82.90 (61.82)	5014 (22.30)	6.20 (9.98)	2401	3.25		Hi R.	195 (90.6)	58 (14.4)	66 (18.9)		28.980 (97.861)
83.43 (62.21)	4815 (21.42)	6.50 (10.46)	2401	2.85		Hi R.	198 (92.2)	57 (13.9)	73 (22.8)		29.070 (98.165)
82.65 (61.63)	4357 (19.38)	7.11 (11.45)	2400	2.62		Hi R.	204 (95.6)	60 (15.6)	78 (25.6)		29.020 (97.996)
82.85 (61.78)	4130 (18.37)	7.52 (12.11)	2400	2.46		Hi R.	200 (93.3)	58 (14.4)	74 (23.3)		29.060 (98.131)
1.66 (0.89)	3745 (16.66)	8.18 (13.16)	2399	2.14		Hi R.	201 (93.9)	58 (14.4)	74 (23.3)		29.060 (98.131)

Department of Agricultural Engineering

Dates of Test: June 8-14, 1982

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

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 46.6 (rating taken from oil company's inspection data) Specific gravity converted to 60°/60° (15°/15°) 0.8375 Fuel weight 6.973 lbs/gal (0.836 kg/l) Oil SAE 30 API service classification CD/SE To motor 3.008 gal (11.385 l) Drained from motor 2.395 gal (9.066 l) Transmission and final drive lubricant I.H. Hytran fluid Total time engine was operated 51.0 hours.

**ENGINE:** Make International Diesel Type six cylinder vertical Serial No. 466DT2U055252\* Crankshaft lengthwise Rated rpm 2400 Bore and stroke 4.30" × 5.35" (109.2 mm × 135.9 mm) Compression ratio 15.7 to 1 Displacement 466 cu in (7636 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements with aspirator Oil filter two full flow cartridges Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter two paper cartridges Muffler underhood Exhaust vertical Cooling medium temperature control one thermostat.

**CHASSIS:** Type standard with duals Serial No. 2560002U000698\* Tread width rear 66" (1680 mm) to 114.5" (2910 mm) front 60" (1524 mm) to 84" (2134 mm) Wheel base 104.8" (2662 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 28.0" (711 mm) Vertical distance above roadway 40.7" (1034 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 variable displacement pump and motor. A range transmission provides Hi and Lo range Advertised speeds mph (km/h) Lo Range—0 to 8.0 (12.8): Hi Range—0 to 17.8 (28.7); reverse Lo Range—0 to 3.0 (4.8), Hi Range—0 to 7.4 (11.9) Clutch none-hydrostatic drive can be controlled by foot pedal Brakes wet multiple disc hydraulically power actuated and operated by two foot pedals which can be locked together Steering hydrostatic Turning radius (on concrete surface with brake applied) right 141" (3.58 m) left 141" (3.58 m) (on concrete surface without brake) right 172" (4.37 m) left 172" (4.37 m) Turning space diameter (on concrete surface with brake applied) right 291" (7.39 m) left 291" (7.39 m) (on concrete surface without brake) right 354" (8.99 m) left 354" (8.99 m) Power take-off 540 rpm at 2106 engine rpm and 1000 rpm at 2072 engine rpm.

**REPAIRS and ADJUSTMENTS:** The fuel line to number two injector was replaced during preliminary PTO tests.

# **LUGGING ABILITY FROM SPEED SETTING—6.20 MPH Hi Range**

Crankshaft Speed rpm	2401	2157	1921	1682	1439	1200
Pull—lbs (kN)	5014 (22.30)	5451 (24.25)	5662 (25.19)	5902 (26.25)	6126 (27.25)	5941 (26.43)
Increase in Pull %	0	9	13	18	22	18
Power—Hp (kW)	82.90 (61.82)	78.53 (58.56)	70.56 (52.62)	61.60 (45.94)	50.82 (37.90)	38.96 (29.05)
Speed—Mph (km/h)	6.20 (9.98)	5.40 (8.69)	4.67 (7.52)	3.91 (6.30)	3.11 (5.01)	2.46 (3.96)
Slip %	3.25	3.56	3.71	3.87	4.02	4.02

<b>TRACTOR SOUND LEVEL WITH CAB</b>	<b>dB(A)</b>
Maximum Available Power—Two Hours	83.5
75% of Pull at Maximum Power—Ten Hours	86.5
50% of Pull at Maximum Power—Two Hours	85.0
50% of Pull at Reduced Engine Speed—Two Hours	82.0
Bystander in Hi Range	89.5

<b>TIRES, BALLAST AND WEIGHT</b>		<b>With Ballast</b>	<b>Without Ballast</b>
<b>Rear Tires</b>	—No., size, ply & psi (kPa)	Inner Two 18.4-38; 8; 12 (85)	Inner Two 18.4-38; 8; 12 (85)
		Outer Two 18.4-38; 6; 12 (85)	Outer Two 18.4-38; 6; 12 (85)
		250 lb (114 kg)	None
<b>Ballast</b>	—Liquid (each inner)	75 lb (34 kg)	None
	—Test Equip (each)		None
<b>Front Tires</b>	—No., size, ply & psi (kPa)	Two 11L-15; 6; 32 (220)	Two 11L-15; 6; 32 (220)
	—Test Equip (each)	85 lb (39 kg)	None
	—Cast Iron (each)	45 lb (20 kg)	None
<b>Height of Drawbar</b>		21.5 in (545 mm)	21.5 in (545 mm)
<b>Static Weight with Operator—Rear</b>		10160 lb (4608 kg)	9360 lb (4245 kg)
		3780 lb (1715 kg)	3520 lb (1597 kg)
		13940 lb (6323 kg)	12880 lb (5842 kg)

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 173°F (78.3°C). Eleven travel speeds 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 **1439**.

LOUIS I. LEVITICUS  
Engineer-in-Charge

K. VON BARGEN  
W. E. SPLINTER  
L. L. BASHFORD  
Board of Tractor Test Engineers



**International 3488 Hydro Diesel**

The Agricultural Experiment Station  
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University of Nebraska—Lincoln  
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