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Test 1419: International 5088 Diesel 18-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1419 — INTERNATIONAL 5088 DIESEL 18 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—1005 rpm) | | | | | | | | | |
| 136.12 (101.50) | 2400 | 8.888 (33.645) | 0.450 (0.274) | 15.32 (3.017) | 185 (85.0) | 53 (11.7) | 75 (23.9) | 28.943 (97.737) | |
| VARYING POWER AND FUEL CONSUMPTION—Two Hours | | | | | | | | | |
| 121.46 (90.57) | 2518 | 8.468 (32.055) | 0.480 (0.292) | 14.34 (2.825) | 184 (84.4) | 53 (11.7) | 75 (23.9) | | |
| 0.00 (0.00) | 2671 | 3.278 (12.409) | | | 182 (83.3) | 53 (11.7) | 75 (23.9) | | |
| 62.66 (46.73) | 2598 | 5.842 (22.114) | 0.643 (0.391) | 10.73 (2.113) | 183 (83.9) | 53 (11.7) | 76 (24.2) | | |
| 136.27 (101.62) | 2400 | 8.890 (33.652) | 0.450 (0.274) | 15.33 (3.020) | 186 (85.6) | 52 (11.1) | 75 (23.9) | | |
| 31.85 (23.75) | 2640 | 4.606 (17.436) | 0.997 (0.606) | 6.91 (1.362) | 182 (83.3) | 52 (10.8) | 74 (23.3) | | |
| 92.61 (69.06) | 2560 | 7.105 (26.895) | 0.529 (0.322) | 13.03 (2.568) | 184 (84.4) | 53 (11.4) | 76 (24.2) | | |
| Av Av | 74.14 (55.29) | 2564 (24.094) | 6.365 (0.360) | 0.592 (0.360) | 11.65 (2.295) | 184 (84.2) | 53 (11.4) | 75 (23.9) | 28.910 (97.625) |

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

| 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 9th (M3) Gear | | | | | | | | | | | |
| 116.19 (86.65) | 8611 (38.31) | 5.06 (8.14) | 2400 | 3.19 | 8.780 (33.234) | 0.521 (0.317) | 13.23 (2.607) | 180 (82.2) | 54 (11.9) | 68 (20.0) | 28.805 (97.270) |
| 75% of Pull at Maximum Power—Ten Hours 9th (M3) Gear | | | | | | | | | | | |
| 97.36 (72.60) | 6748 (30.02) | 5.41 (8.71) | 2547 | 2.66 | 8.083 (30.598) | 0.572 (0.348) | 12.04 (2.373) | 176 (80.1) | 40 (4.3) | 44 (6.4) | 28.887 (97.547) |
| 50% of Pull at Maximum Power—Two Hours 9th (M3) Gear | | | | | | | | | | | |
| 66.78 (49.80) | 4510 (20.06) | 5.55 (8.94) | 2594 | 1.95 | 6.748 (25.544) | 0.696 (0.424) | 9.90 (1.949) | 178 (80.8) | 36 (2.2) | 38 (3.3) | 28.595 (96.560) |
| 50% of Pull at Reduced Engine Speed—Two Hours 13th (H1) Gear | | | | | | | | | | | |
| 66.87 (49.87) | 4517 (20.09) | 5.55 (8.94) | 1559 | 1.95 | 4.861 (18.402) | 0.501 (0.305) | 13.76 (2.710) | 178 (80.8) | 37 (2.8) | 39 (3.9) | 28.610 (96.612) |
| MAXIMUM POWER IN SELECTED GEARS | | | | | | | | | | | |
| 99.26 (74.02) | 14960 (66.55) | 2.49 (4.00) | 2510 | 14.30 | 5th (L5) Gear | | | 178 (81.1) | 45 (7.2) | 55 (12.8) | 28.730 (97.017) |
| 114.17 (85.14) | 14357 (63.86) | 2.98 (4.80) | 2398 | 8.56 | 6th (L6) Gear | | | 178 (81.1) | 45 (7.2) | 54 (12.2) | 28.760 (97.118) |
| 119.92 (89.42) | 12217 (54.34) | 3.68 (5.92) | 2399 | 5.23 | 7th (M1) Gear | | | 180 (81.9) | 51 (10.6) | 62 (16.7) | 28.860 (97.456) |
| 120.49 (89.85) | 10310 (45.86) | 4.38 (7.05) | 2399 | 4.05 | 8th (M2) Gear | | | 180 (81.9) | 50 (10.0) | 60 (15.6) | 28.870 (97.490) |
| 121.17 (90.36) | 8986 (39.97) | 5.06 (8.14) | 2399 | 3.32 | 9th (M3) Gear | | | 180 (81.9) | 52 (11.1) | 64 (17.8) | 28.840 (97.388) |
| 120.56 (89.90) | 7559 (33.63) | 5.98 (9.62) | 2398 | 2.74 | 10th (M4) Gear | | | 180 (82.2) | 52 (11.1) | 63 (17.2) | 28.850 (97.422) |
| 119.01 (88.75) | 6402 (28.48) | 6.97 (11.22) | 2399 | 2.41 | 11th (M5) Gear | | | 179 (81.7) | 46 (7.8) | 54 (12.2) | 28.880 (97.523) |
| 117.22 (87.41) | 5340 (23.75) | 8.23 (13.25) | 2400 | 1.91 | 12th (M6) Gear | | | 179 (81.7) | 48 (8.9) | 57 (13.9) | 28.880 (97.523) |
| LUGGING ABILITY IN 9th (M3) GEAR | | | | | | | | | | | |
| Crankshaft Speed rpm | | | | 2399 | 2159 | 1924 | 1677 | 1432 | 1196 | | |
| Pull—lbs (kN) | | | | 8986 (39.97) | 10381 (46.18) | 11373 (50.59) | 11589 (51.55) | 10894 (48.46) | 10201 (45.38) | | |
| Increase in Pull % | | | | 0 | 16 | 27 | 29 | 21 | 14 | | |
| Power—Hp (kW) | | | | 121.17 (90.36) | 125.10 (93.28) | 121.42 (90.54) | 107.61 (80.25) | 86.79 (64.72) | 68.12 (50.79) | | |
| Speed—Mph (km/h) | | | | 5.06 (8.14) | 4.52 (7.27) | 4.00 (6.44) | 3.48 (5.60) | 2.99 (4.81) | 2.50 (4.03) | | |
| Slip % | | | | 3.32 | 3.97 | 4.45 | 4.76 | 4.29 | 3.97 | | |

Department of Agricultural Engineering

Dates of Test: November 12-December 8, 1981

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

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 46.3 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8276 **Fuel weight** 6.891 lbs/gal (0.826 kg/l) **Oil SAE 30 API service classification** CD/SE **To motor** 4.127 gal (15.622 l) **Drained from motor** 3.775 gal (14.291 l) **Transmission and final drive lubricant** IH Hytran fluid **Total time engine was operated** 73.5 hours.

ENGINE: Make International Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 437TT2U128248* **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.30" × 5.00" (109.2 mm × 127.0 mm) **Compression ratio** 15.4 to 1 **Displacement** 436 cu in (7145 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.** 2540002U000872* **Tread width** rear 62" (1575 mm) to 124" (3150 mm) front 60" (1524 mm) to 84" (2134 mm) **Wheel base** 111.6" (2835 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 27.8" (706 mm) Vertical distance above roadway 39.0" (991 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 with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.4 (2.3) second 1.7 (2.7) third 1.9 (3.1) fourth 2.3 (3.6) fifth 2.6 (4.2) sixth 3.1 (5.0) seventh 3.7 (5.9) eighth 4.3 (7.0) ninth 5.0 (8.0) tenth 5.8 (9.4) eleventh 6.8 (10.9) twelfth 7.9 (12.8) thirteenth 8.2 (13.3) fourteenth 9.7 (15.6) fifteenth 11.1 (17.9) sixteenth 13.1 (21.0) seventeenth 15.2 (24.4) eighteenth 17.8 (28.7) reverse 2.8 (4.4), 3.2 (5.2), 3.7 (6.0), 4.4 (7.0), 5.1 (8.1), 6.0 (9.6) **Clutch** multiple wet disc operated by foot pedal with hydraulic power assist **Brakes** multiple wet disc hydraulically power activated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 145.5" (3.70 m) left 145.5" (3.70 m) (on concrete surface without brake) right 188" (4.78 m) left 188" (4.78 m) **Turning space diameter** (on concrete surface with brake applied) right 302" (7.68 m) left 302" (7.68 m) (on concrete surface without brake) right 387.1" (9.83 m) left 387.1" (9.83 m) **Power take-off** 1005 rpm at 2400 engine rpm and 540 rpm at 2428 engine rpm.

| TRACTOR SOUND LEVEL WITH CAB | Bias dB(A) | Radials 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 | | 78.5 |
| 50% of Pull at Reduced Engine Speed—Two Hours | | 74.5 |
| Bystander in 18th (H6) gear | | 85.0 |

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

| Power Hp (kW) | Drawbar pull lbs (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Cool- ing med | Temp. °F (°C) Air wet bulb | Air dry bulb | Barom. inch Hg (kPa) |
|--|--------------------------------|------------------------|---------------------------------|-----------|-------------------------------------|-----------------------|-----------------------|---------------------|-------------------------------------|--------------------|----------------------------|
| Maximum Available Power—Two Hours 9th (M3) Gear | | | | | | | | | | | |
| 114.14 (85.11) | 9214 (40.99) | 4.65 (7.48) | 2399 | 6.76 | 8.925 (33.784) | 0.539 (0.328) | 12.79 (2.519) | 178 (81.1) | 49 (9.2) | 57 (13.9) | 28.885 (97.540) |

MAXIMUM POWER IN SELECTED GEARS

| | | | | | | | | | | | |
|-------------------|------------------|-----------------|------|-------|----------------|--|--|---------------|-------------|--------------|--------------------|
| 100.42 (74.88) | 13571 (60.37) | 2.77 (4.47) | 2509 | 14.59 | 6th (L6) Gear | | | 177 (80.6) | 40 (4.4) | 52 (11.1) | 28.820 (97.320) |
| 110.88 (82.68) | 12969 (57.69) | 3.21 (5.16) | 2399 | 13.36 | 7th (M1) Gear | | | 179 (81.7) | 36 (2.2) | 42 (5.6) | 29.010 (97.962) |
| 116.41 (86.80) | 10993 (48.90) | 3.97 (6.39) | 2399 | 8.56 | 8th (M2) Gear | | | 178 (81.1) | 37 (2.8) | 43 (6.1) | 28.990 (97.895) |
| 118.46 (88.34) | 9573 (42.58) | 4.64 (7.47) | 2397 | 6.79 | 9th (M3) Gear | | | 178 (81.1) | 39 (3.9) | 44 (6.7) | 28.930 (97.692) |
| 118.17 (88.12) | 7996 (35.57) | 5.54 (8.92) | 2400 | 5.40 | 10th (M4) Gear | | | 177 (80.6) | 38 (3.3) | 45 (7.2) | 28.950 (97.760) |
| 115.84 (86.38) | 6695 (29.78) | 6.49 (10.44) | 2398 | 4.43 | 11th (M5) Gear | | | 176 (79.7) | 39 (3.9) | 45 (7.2) | 28.950 (97.760) |
| 114.88 (85.66) | 5600 (24.91) | 7.69 (12.38) | 2399 | 3.58 | 12th (M6) Gear | | | 178 (81.1) | 39 (3.9) | 45 (7.2) | 28.940 (97.726) |
| 115.45 (86.09) | 5408 (24.06) | 8.00 (12.88) | 2399 | 3.51 | 13th (H1) Gear | | | 175 (79.4) | 39 (3.9) | 44 (6.7) | 28.940 (97.726) |

LUGGING ABILITY IN 9th (M3) GEAR

| | | | | | | |
|----------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|
| Crankshaft Speed rpm | 2397 | 2161 | 1921 | 1688 | 1437 | 1205 |
| Pull—lbs (kN) | 9573 (42.58) | 10962 (48.76) | 12190 (54.22) | 12563 (55.88) | 11823 (52.59) | 11088 (49.32) |
| Increase in Pull % | 0 | 15 | 27 | 31 | 24 | 16 |
| Power—Hp (kW) | 118.46 (88.34) | 120.01 (89.49) | 116.26 (86.70) | 103.02 (76.83) | 84.26 (62.83) | 67.51 (50.34) |
| Speed—Mph (km/h) | 4.64 (7.47) | 4.11 (6.61) | 3.58 (5.76) | 3.08 (4.95) | 2.67 (4.30) | 2.28 (3.67) |
| Slip % | 6.79 | 8.49 | 10.27 | 12.23 | 10.40 | 8.77 |

Radial Ply Tires

TIRES, BALLAST AND WEIGHT

| | | | | |
|---|----------------------|-----------------------------|-------------------------------|-------------------------------|
| Rear Tires | | —No., size, ply & psi (kPa) | With Ballast | Without Ballast |
| Ballast | —Liquid (each inner) | | Inner two 18.4R38; 8; 12 (85) | Inner two 18.4R38; 8; 12 (85) |
| | —Test equip. (each) | | Outer two 18.4R38; 6; 12 (85) | Outer two 18.4R38; 6; 12 (85) |
| | | | 40 lb (18 kg) | None |
| Front Tires | | —No., size, ply & psi (kPa) | Two 10.00-16; 6; 32 (220) | Two 10.00-16; 6; 32 (220) |
| Ballast | —Liquid (each) | | None | None |
| | —Test equip. (each) | | 40 lb (18 kg) | None |
| | | | 20.5 lb (520 mm) | 20.5 in (520 mm) |
| Height of Drawbar | | | | |
| Static Weight with Operator—Rear | | | 12200 lb (5534 kg) | 12040 lb (5461 kg) |
| —Front | | | 4050 lb (1837 kg) | 3970 lb (1801 kg) |
| —Total | | | 16250 lb (7371 kg) | 16010 lb (7262 kg) |

Bias Ply Tires

| | | |
|-------------------------------|-------------------------------|---------------------------|
| With Ballast | | Without Ballast |
| Inner two 18.4-38; 8; 12 (85) | Outer two 18.4-38; 6; 12 (85) | |
| | 355 lb (161 kg) | |
| | 40 lb (18 kg) | |
| Two 10.00-16; 6; 32 (220) | | Two 10.00-16; 6; 32 (220) |
| None | | None |
| 40 lb (18 kg) | | None |
| 19.5 in (495 mm) | | 19.5 in (495 mm) |
| 12490 lb (5665 kg) | | 11620 lb (5271 kg) |
| 4050 lb (1837 kg) | | 3970 lb (1801 kg) |
| 16540 lb (7502 kg) | | 15590 lb (7072 kg) |

REPAIRS and ADJUSTMENTS: The thermostat malfunctioned at the start of the 50% load drawbar test. It was removed, checked and reinstalled and the test rerun.

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 141°F (60.8°C). Eight 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. 1419.

LOUIS I. LEVITICUS
Engineer-in-Charge

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



International 5088 Diesel