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Test 2069: Case IH Steiger 350 Rowtrac

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2069 - SUMMARY 887

CASE IH STEIGER ROWTRAC 350 DIESEL

16 SPEED

POWER TAKE-OFF PERFORMANCE

| Power HP (kW) | Crank shaft speed rpm | Diesel Consumption Gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | D.E.F. Consumption Gal/hr (l/h) | Mean Atmospheric Conditions |
|---|--------------------------------|--|-----------------------|-----------------------|--|--------------------------------|
| MAXIMUM POWER AND FUEL CONSUMPTION | | | | | | |
| Rated Engine Speed—(PTO speed—1001 rpm) | | | | | | |
| 306.42 (228.49) | 2000 | 16.48 (62.38) | 0.378 (0.230) | 18.60 (3.66) | 1.34 (5.06) | |
| Standard Power Take-off Speed (1001 rpm) | | | | | | |
| 306.42 (228.49) | 2000 | 16.48 (62.38) | 0.378 (0.230) | 18.60 (3.66) | 1.34 (5.06) | |
| Maximum Power (1 hour) | | | | | | |
| 346.42 (258.32) | 1800 | 17.99 (68.11) | 0.365 (0.222) | 19.25 (3.79) | 1.42 (5.37) | |

VARYING POWER AND FUEL CONSUMPTION

| | | | | | | |
|--------------------|------|------------------|--------------------|-----------------|----------------|-----------------------|
| 306.42 (228.49) | 2000 | 16.48 (62.38) | 0.378 (0.230) | 18.60 (3.66) | 1.34 (5.06) | Air temperature |
| 272.69 (203.34) | 2095 | 15.06 (57.01) | 0.388 (0.236) | 18.11 (3.57) | 1.23 (4.64) | 73°F (23°C) |
| 206.39 (153.90) | 2112 | 12.11 (45.82) | 0.412 (0.251) | 17.05 (3.36) | 0.99 (3.75) | Relative humidity |
| 138.60 (103.36) | 2129 | 9.27 (35.11) | 0.470 (0.286) | 14.94 (2.94) | 0.65 (2.47) | 51% |
| 69.89 (52.12) | 2145 | 6.60 (24.97) | 0.663 (0.403) | 10.60 (2.09) | 0.45 (1.70) | Barometer |
| 1.50 (1.12) | 2160 | 3.96 (12.65) | 18.571 (11.296) | 0.38 (0.07) | 0.09 (0.33) | 29.01" Hg (98.24 kPa) |

Maximum torque - 1179 lb.-ft. (1598 Nm) at 1401 rpm

Maximum torque rise - 46.4%

Torque rise at 1600 engine rpm - 37%

Power increase at 1800 engine rpm - 13.0%

DRAWBAR PERFORMANCE

FUEL CONSUMPTION CHARACTERISTICS

| Power Hp (kW) | Drawbar pull lbs (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Temp. °F (°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|--------------------------------------|--------------------|-------------------------------|
| Maximum Power—4th Gear | | | | | | | | | |
| 261.07 (194.68) | 21129 (93.98) | 4.63 (7.45) | 2000 | 3.5 | 0.446 (0.272) | 15.75 (3.10) | 195 (91) | 70 (21) | 28.74 (97.33) |
| 75% of Pull at Maximum Power—4th Gear | | | | | | | | | |
| 207.30 (154.58) | 15802 (70.29) | 4.92 (7.92) | 2092 | 2.0 | 0.475 (0.289) | 14.79 (2.91) | 185 (85) | 76 (25) | 28.66 (97.05) |
| 50% of Pull at Maximum Power—4th Gear | | | | | | | | | |
| 141.54 (105.54) | 10562 (46.98) | 5.03 (8.09) | 2116 | 1.1 | 0.545 (0.332) | 12.89 (2.54) | 180 (82) | 77 (25) | 28.65 (97.02) |
| 75% of Pull at Reduced Engine Speed—8th Gear | | | | | | | | | |
| 207.92 (155.04) | 15829 (70.41) | 4.93 (7.93) | 1378 | 2.1 | 0.430 (0.262) | 16.35 (3.22) | 197 (91) | 76 (25) | 28.66 (97.05) |
| 50% of Pull at Reduced Engine Speed—8th Gear | | | | | | | | | |
| 141.76 (105.71) | 10591 (47.11) | 5.02 (8.08) | 1392 | 1.1 | 0.470 (0.286) | 14.94 (2.94) | 182 (83) | 77 (25) | 28.64 (96.99) |

Location of tests: Nebraska Tractor Test Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of tests: September 16 -24, 2013

Manufacturer: CNH America LLC, 700 State St. Racine, Wi. 53404 USA

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8442 **Fuel weight** 7.029 lbs/gal (0.842 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 15W40 API service classification** CJ-4 **Transmission lubricant** Hytran Ultra Action fluid **Hydraulic and axle lubricant** Hytran Ultra Action fluid **Total time engine was operated:** 19.0 hours

ENGINE: Make F.P.T. Diesel **Type** six cylinder vertical with turbocharger, air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** *12H00023188* **Crankshaft** lengthwise **Rated engine speed** 2000 **Bore and stroke** 4.606" x 5.315" (117.0 mm x 135.0 mm) **Compression ratio** 15.9 to 1 **Displacement** 531 cu in (8704 ml) **Starting system** 24 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and front and rear axle, radiator for transmission oil **Fuel filter** two paper elements **Fuel cooler** radiator for pump return fuel **Muffler** vertical **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 113.8 - 122.0 lb/h (51.6 - 55.3 kg/h) **High idle:** 2100 - 2200 rpm **Turbo boost:** nominal 24.7 - 27.6 psi (170 - 190 kPa) as measured 26.9 psi (185 kPa)

CHASSIS: Type Tracklayer - rubber tracked **Serial No.** *ZCF130599* **Track width** rear 88.0" (2235 mm) front 88.0" (2235 mm) **Trackbase** 160.0" (4064 mm) **Length of track on ground** 29.4" (748 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.72 (4.37) second 3.27 (5.27) third 3.95 (6.35) fourth 4.76 (7.66) fifth 5.46 (8.79) sixth 6.00 (9.66) seventh 6.58 (10.59) eighth 7.23 (11.63) ninth 7.95 (12.79) tenth 8.73 (14.05) eleventh 9.57 (15.40) twelfth 10.51 (16.92) thirteenth 12.07 (19.43) fourteenth 14.54 (23.40) fifteenth 17.57 (28.27) sixteenth 21.16 (34.05) reverse 4.11 (6.62), 9.09 (14.63) **Clutch** multiple wet disc electrohydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1999 engine rpm **Unladen tractor mass** 51905 lb (23544 kg)

DRAWBAR PERFORMANCE AT 2000 ENGINE RPM MAXIMUM POWER IN SELECTED GEARS

| Power Hp (kW) | Drawbar pull lbs (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr (kg/kW.h) | Consumption Hp.hr/gal (kW.h/l) | Temp. °F (°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|--------------------------------------|--------------------------------------|--------------------|-------------------------------|
| 234.55 (174.90) | 35234 (156.73) | 2.50 (4.02) | 2004 | 9.2 | 1st Gear 0.475 (0.289) | 14.79 (2.91) | 176 (80) | 74 (23) | 28.55 (96.68) |
| 255.66 (190.65) | 31109 (138.38) | 3.08 (4.96) | 2001 | 6.7 | 2nd Gear 0.454 (0.276) | 15.47 (3.05) | 187 (86) | 77 (25) | 28.55 (96.68) |
| 259.54 (193.54) | 25599 (113.87) | 3.81 (6.12) | 2000 | 4.6 | 3rd Gear 0.447 (0.272) | 15.71 (3.10) | 203 (95) | 78 (26) | 28.55 (96.68) |
| 261.07 (194.68) | 21129 (93.98) | 4.63 (7.45) | 2000 | 3.5 | 4th Gear 0.446 (0.272) | 15.75 (3.10) | 195 (91) | 70 (21) | 28.74 (97.33) |
| 260.34 (194.14) | 18199 (80.95) | 5.37 (8.63) | 2000 | 2.7 | 5th Gear 0.448 (0.272) | 15.69 (3.09) | 194 (90) | 68 (20) | 28.77 (97.43) |
| 261.14 (194.73) | 16542 (73.58) | 5.92 (9.53) | 2000 | 2.3 | 6th Gear 0.445 (0.271) | 15.78 (3.11) | 194 (90) | 70 (21) | 28.74 (97.33) |
| 255.63 (190.62) | 14702 (65.40) | 6.52 (10.49) | 1999 | 1.8 | 7th Gear 0.455 (0.277) | 15.45 (3.04) | 192 (89) | 71 (22) | 28.71 (97.22) |
| 255.27 (190.35) | 13326 (59.27) | 7.19 (11.56) | 2000 | 1.5 | 8th Gear 0.456 (0.277) | 15.43 (3.04) | 196 (91) | 72 (22) | 28.71 (97.22) |
| 249.26 (185.87) | 11812 (52.54) | 7.92 (12.74) | 1999 | 1.3 | 9th Gear 0.464 (0.282) | 15.14 (2.98) | 192 (89) | 72 (22) | 28.70 (97.19) |
| 247.41 (184.49) | 10653 (47.39) | 8.71 (14.02) | 1999 | 1.1 | 10th Gear 0.467 (0.284) | 15.05 (2.97) | 196 (91) | 74 (24) | 28.69 (97.16) |

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

Note: This tractor has a driveline protection system that limits the maximum engine torque in gears 1 through 3.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the primary fuel filter was maintained at 110°F (43°C). The performance figures on this Summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2069**, Nebraska Summary 887, December 2, 2013.

Roger M. Hoy
Director

M.F. Kocher
P.J. Jasa
J.D. Luck
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB

| | dB(A) |
|------------------------|-------|
| At no load in 4th gear | 74.7 |
| Bystander in 16th gear | 87.5 |

TIRES, BALLAST AND WEIGHT

Rear tracks - no & size
Front tracks - no & size
Height of drawbar
Static weight with operator- Rear
- Front
- Total

Tested without ballast

2 x 16.0 in (406 mm)
2 x 16.0 in (406 mm)
21.0 in (535 mm)
23925 lb (10852 kg)
28155 lb (12771 kg)
52080 lb (23623 kg)

DRAWBAR PERFORMANCE AT 1800 ENGINE RPM

MAXIMUM POWER IN SELECTED GEARS

| Power Hp (kW) | Drawbar pull lbs (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr (kg/kW.h) | Consumption Hp.hr/gal (kW.h/l) | Temp. °F(°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|--------------------------------------|-------------------------------------|--------------------|-------------------------------|
| 1st Gear | | | | | | | | | |
| 209.89 (156.51) | 34993 (155.66) | 2.25 (3.62) | 1805 | 9.3 | 0.466 (0.284) | 15.07 (2.97) | 175 (79) | 73 (23) | 28.54 (96.65) |
| 2nd Gear | | | | | | | | | |
| 241.23 (179.89) | 33001 (146.79) | 2.74 (4.41) | 1800 | 7.9 | 0.453 (0.275) | 15.53 (3.06) | 178 (81) | 75 (24) | 28.55 (96.68) |
| 3rd Gear | | | | | | | | | |
| 287.78 (214.60) | 32394 (144.09) | 3.34 (5.37) | 1800 | 7.2 | 0.440 (0.268) | 15.97 (3.15) | 205 (96) | 79 (26) | 28.54 (96.65) |
| 4th Gear | | | | | | | | | |
| 292.76 (218.31) | 26888 (119.60) | 4.08 (6.57) | 1800 | 5.6 | 0.435 (0.264) | 16.17 (3.18) | 200 (93) | 70 (21) | 28.74 (97.33) |
| 5th Gear | | | | | | | | | |
| 295.04 (220.01) | 23286 (103.58) | 4.75 (7.64) | 1799 | 4.2 | 0.431 (0.262) | 16.29 (3.21) | 200 (93) | 68 (20) | 28.75 (97.36) |
| 6th Gear | | | | | | | | | |
| 297.44 (221.80) | 21198 (94.29) | 5.26 (8.47) | 1799 | 3.5 | 0.427 (0.260) | 16.47 (3.24) | 203 (95) | 70 (21) | 28.73 (97.29) |
| 7th Gear | | | | | | | | | |
| 293.73 (219.03) | 18970 (84.38) | 5.81 (9.35) | 1799 | 2.8 | 0.431 (0.262) | 16.31 (3.21) | 202 (94) | 70 (21) | 28.73 (97.29) |
| 8th Gear | | | | | | | | | |
| 295.47 (220.33) | 17274 (76.84) | 6.42 (10.32) | 1800 | 2.3 | 0.428 (0.261) | 16.41 (3.23) | 200 (93) | 71 (22) | 28.71 (97.22) |
| 9th Gear | | | | | | | | | |
| 291.59 (217.44) | 15458 (68.76) | 7.07 (11.38) | 1799 | 2.0 | 0.432 (0.263) | 16.27 (3.21) | 196 (91) | 73 (23) | 28.69 (97.16) |
| 10th Gear | | | | | | | | | |
| 291.59 (217.44) | 14025 (62.39) | 7.80 (12.55) | 1799 | 1.7 | 0.431 (0.262) | 16.31 (3.21) | 199 (93) | 75 (24) | 28.69 (97.16) |
| 11th Gear | | | | | | | | | |
| 282.18 (210.42) | 12337 (54.88) | 8.58 (13.81) | 1800 | 1.3 | 0.447 (0.272) | 15.72 (3.10) | 202 (94) | 76 (24) | 28.68 (97.12) |

HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range: 21903 lbs (97.4 kN)

Three outlet sets combined

| | Standard pump | High flow pump |
|--|------------------------|------------------------|
| i) Sustained pressure of the open relief valve: | 2877 psi (198 bar) | 2829 psi (195 bar) |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 41.7 GPM (157.7 l/min) | 57.1 GPM (216.2 l/min) |
| iii) Pump delivery rate at maximum hydraulic power: | 43.3 GPM (163.7 l/min) | 59.8 GPM (226.4 l/min) |
| Delivery pressure: | 2526 psi (174 bar) | 2331 psi (161 bar) |
| Power: | 63.7 HP (47.5 kW) | 76.4 Hp (57.0 kW) |

Single outlet set

| | | |
|--|------------------------|------------------------|
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 41.0 GPM (155.2 l/min) | 44.1 GPM (166.8 l/min) |
| iii) Pump delivery rate at maximum hydraulic power: | 42.7 GPM (161.6 l/min) | 42.9 GPM (162.5 l/min) |
| Delivery pressure: | 2024 psi (139 bar) | 2074 psi (143 bar) |
| Power: | 50.4 HP (37.6 kW) | 52.0 Hp (38.7 kW) |

TwinFlow system

Two outlet sets combined

| | Standard pump | TwinFlow pump |
|--|------------------------|------------------------|
| i) Sustained pressure at compensator cutoff: | 2877 psi (198 bar) | 2855 psi (197 bar) |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 41.7 GPM (157.7 l/min) | 54.6 GPM (206.8 l/min) |
| Combined flow: | 96.3 GPM (364.5 l/min) | |
| iii) Pump delivery rate at maximum hydraulic power: | 43.3 GPM (163.7 l/min) | 56.4 GPM (213.6 l/min) |
| Delivery pressure: | 2526 psi (174 bar) | 2479 psi (171 bar) |
| Power: | 63.7 HP (47.5 kW) | 81.6 Hp (60.9 kW) |

Two outlet sets combined

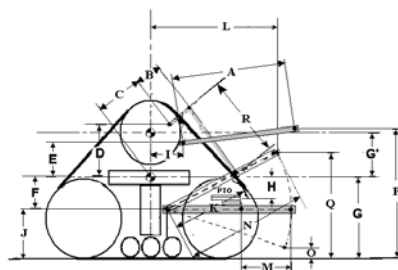
| | High flow pump | TwinFlow pump |
|--|-------------------------|------------------------|
| i) Sustained pressure at compensator cutoff: | 3014 psi (208 bar) | 2855 psi (197 bar) |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 58.2 GPM (220.1 l/min) | 54.6 GPM (206.8 l/min) |
| Combined flow: | 112.8 GPM (426.9 l/min) | |
| iii) Pump delivery rate at maximum hydraulic power: | 57.3 GPM (216.8 l/min) | 56.4 GPM (213.6 l/min) |
| Delivery pressure: | 2539 psi (175 bar) | 2479 psi (171 bar) |
| Power: | 84.8 HP (63.3 kW) | 81.6 Hp (60.9 kW) |

HITCH DIMENSIONS AS TESTED - NO LOAD

| | inch | mm |
|-----|------|------|
| A | 39.0 | 990 |
| B | 30.7 | 780 |
| C | 28.8 | 731 |
| D | 27.9 | 709 |
| E | 14.9 | 378 |
| F | 14.9 | 379 |
| G | 34.0 | 864 |
| *G' | 14.9 | 378 |
| H | 1.2 | 30 |
| I | 22.8 | 578 |
| J | 19.1 | 485 |
| K | 30.5 | 775 |
| L | 60.1 | 1527 |
| *L' | 67.4 | 1711 |
| M | 30.4 | 771 |
| N | 43.0 | 1093 |
| O | 6.3 | 160 |
| P | 49.8 | 1265 |
| Q | 43.7 | 1111 |
| R | 39.4 | 1000 |

*G' to undercarriage pivot point

*L' to Quick coupler ends



CASE IH Steiger Rowtrac 350 Diesel

Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln