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2016

## Test 2148: Case IH Magnum 310 Rowtrac

Nebraska Tractor Test Laboratory

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# NEBRASKA OECD TRACTOR TEST 2148—SUMMARY 1011

## CASE IH MAGNUM 310 ROWTRAC DIESEL

### 17 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption		Mean Atmospheric Conditions
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Gal/hr (l/h)	
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>						
<b>Rated Engine Speed—(PTO speed—1109 rpm)</b>						
275.92 (205.75)	2000	14.40 (54.52)	0.366 (0.223)	19.16 (3.77)	1.52 (5.74)	
<b>Standard Power Take-off Speed (998 rpm)</b>						
317.66 (236.88)	1800	16.01 (60.61)	0.353 (0.215)	19.84 (3.91)	1.73 (6.55)	
<b>Maximum Power (1 hour)</b>						
317.66 (236.88)	1800	16.01 (60.61)	0.353 (0.215)	19.84 (3.91)	1.73 (6.55)	

#### VARYING POWER AND FUEL CONSUMPTION

275.92 (205.75)	2000	14.40 (54.52)	0.366 (0.223)	19.16 (3.77)	1.52 (5.74)	Air temperature
246.84 (184.07)	2103	13.34 (50.51)	0.379 (0.230)	18.50 (3.64)	1.30 (4.93)	73°F (23°C)
189.52 (141.33)	2153	10.86 (41.10)	0.402 (0.244)	17.45 (3.44)	0.88 (3.34)	Relative humidity
127.26 (94.90)	2172	8.05 (30.48)	0.443 (0.270)	15.80 (3.11)	0.61 (2.31)	37%
64.84 (48.35)	2210	5.43 (20.57)	0.587 (0.357)	11.93 (2.35)	0.36 (1.36)	Barometer
1.51 (1.13)	2225	3.07 (11.64)	14.233 (8.658)	0.49 (0.10)	0.13 (0.48)	28.90" Hg (97.87 kPa)

Maximum torque - 1077 lb.-ft. (1565 Nm) at 1399 rpm  
 Maximum torque rise - 48.7%  
 Torque rise at 1599 engine rpm - 40%  
 Power increase at 1800 engine rpm - 15.1%

#### DRAWBAR PERFORMANCE

##### UNBALLASTED - FRONT DRIVE ENGAGED 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)	D.E.F. Consumption Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Power at Rated Engine Speed—7th Gear</b>										
227.28 (169.48)	17057 (75.87)	5.00 (8.05)	2000	3.4	0.444 (0.270)	15.77 (3.11)	0.059 (0.036)	213 (101)	56 (14)	28.44 (96.31)
<b>75% of Pull at Rated Engine Speed—7th Gear</b>										
183.07 (136.52)	12796 (56.92)	5.37 (8.63)	2122	2.2	0.478 (0.291)	14.67 (2.89)	0.054 (0.033)	206 (97)	66 (19)	28.44 (96.31)
<b>50% of Pull at Rated Engine Speed—7th Gear</b>										
125.58 (93.65)	8527 (37.93)	5.52 (8.88)	2164	1.3	0.545 (0.332)	12.85 (2.53)	0.051 (0.031)	205 (96)	69 (21)	28.46 (96.38)
<b>75% of Pull at Reduced Engine Speed—9th Gear</b>										
183.01 (136.47)	12772 (56.81)	5.37 (8.64)	1606	2.2	0.441 (0.268)	15.91 (3.13)	0.052 (0.032)	196 (91)	67 (19)	28.45 (96.34)
<b>50% of Pull at Reduced Engine Speed—9th Gear</b>										
125.87 (93.86)	8543 (38.00)	5.53 (8.89)	1636	1.3	0.487 (0.296)	14.40 (2.84)	0.049 (0.030)	208 (98)	70 (21)	28.43 (96.28)

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

**Dates of tests:** April 21 to May 3, 2016

**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)** 0.8417 **Fuel weight** 7.008 lbs/gal (0.840 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil** SAE 10W40 **API service classification** CJ-4 **Transmission and hydraulic lubricant** Case IH Akcela Hy-Tran Ultratractor fluid **Front axle lubricant** SAE 85W-140 API GL-5 **Total time engine was operated:** 17.5 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.** \*15H00120736\* **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** 12 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 transmission oil **Fuel filter** two paper elements **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst) and SCR (selective catalyst reduction) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 98.1 - 104.3 lb/h (44.5 - 47.3 kg/h) **High idle:** 2215 - 2265 rpm **Turbo boost:** nominal 21.0 - 23.8 psi (145 - 165 kPa) as measured 22.4 psi (155 kPa)

**CHASSIS: Type** Half track drive, front wheel assist with rear rubber tracks **Serial No.** \*ZGRF01260\* **Tread width** rear 87.0" (2210 mm) front 68.0" (1725 mm) to 88.0" (2235 mm) **Wheelbase** 124.2" (3155 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 2.23 (3.59) second 2.56 (4.12) third 2.95 (4.75) fourth 3.39 (5.45) fifth 3.88 (6.25) sixth 4.46 (7.17) seventh 5.20 (8.37) eighth 5.97 (9.60) ninth 6.88 (11.07) tenth 7.89 (12.69) eleventh 9.05 (14.56) twelfth 10.38 (16.70) thirteenth 12.93 (20.81) fourteenth 14.83 (23.87) fifteenth 17.11 (27.53) sixteenth 19.01 (30.60) seventeenth 19.01 (30.60) electronically limited reverse 3.21 (5.17), 3.68 (5.93), 7.48 (12.04), 8.58 (13.81)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
					<b>2nd Gear</b>					
192.33 (143.42)	32087 (142.73)	2.25 (3.62)	2068	14.8	0.504 (0.307)	13.90 (2.74)	0.065 (0.039)	205 (96)	53 (11)	28.88 (97.80)
					<b>3rd Gear</b>					
208.17 (155.23)	30316 (134.85)	2.58 (4.14)	1998	12.3	0.486 (0.296)	14.41 (2.84)	0.064 (0.039)	215 (101)	55 (13)	28.41 (96.21)
					<b>4th Gear</b>					
217.27 (162.01)	26220 (116.63)	3.11 (5.01)	1999	7.8	0.466 (0.283)	15.05 (2.96)	0.060 (0.037)	214 (101)	56 (13)	28.46 (96.38)
					<b>5th Gear</b>					
217.98 (162.55)	22431 (99.78)	3.65 (5.87)	2000	5.7	0.463 (0.282)	15.13 (2.98)	0.061 (0.037)	214 (101)	63 (17)	28.46 (96.38)
					<b>6th Gear</b>					
222.86 (166.18)	19701 (87.63)	4.24 (6.82)	2000	4.3	0.453 (0.276)	15.47 (3.05)	0.061 (0.037)	214 (101)	57 (14)	28.44 (96.31)
					<b>7th Gear</b>					
227.28 (169.48)	17057 (75.87)	5.00 (8.05)	2000	3.4	0.444 (0.270)	15.77 (3.11)	0.059 (0.036)	213 (101)	56 (14)	28.44 (96.31)
					<b>8th Gear</b>					
224.72 (167.57)	14593 (64.91)	5.78 (9.29)	2000	2.6	0.448 (0.273)	15.63 (3.08)	0.060 (0.037)	213 (101)	58 (15)	28.47 (96.41)
					<b>9th Gear</b>					
220.40 (164.33)	12339 (54.88)	6.70 (10.78)	1999	2.0	0.458 (0.279)	15.29 (3.01)	0.060 (0.036)	213 (101)	59 (15)	28.47 (96.41)
					<b>10th Gear</b>					
217.44 (162.14)	10570 (47.02)	7.72 (12.42)	1999	1.6	0.467 (0.284)	15.02 (2.96)	0.061 (0.037)	213 (101)	60 (16)	28.47 (96.41)
					<b>11th Gear</b>					
213.17 (158.96)	9001 (40.04)	8.88 (14.29)	2000	1.3	0.474 (0.288)	14.79 (2.91)	0.063 (0.038)	211 (99)	61 (16)	28.47 (96.41)

**Clutch** multiple wet disc electrohydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 1000 rpm at 1803 engine rpm **Unladen tractor mass** 35860 lb (16266 kg)

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. The manufacturer's remote flow claims of 59 GPM (224 l/min), with High flow system, and 75 GPM (282 l/min), with TwinFlow system, were not verified. The performance results 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. **2148**, Nebraska Summary 1011, June 10, 2016.

Roger M. Hoy  
 Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 6th gear	67.3	67.2
Bystander in 15th gear		87.8

**TIRES AND WEIGHT**

**Rear Tracks** - No. & size  
**Front Tires** - No., size, ply & psi (kPa)  
**Height of Drawbar**  
**Static Weight with operator** - Rear  
 - Front  
 - Total

**Tested Without Ballast**  
 2 x 18 in (455 mm)  
 Two 420/85R38;\*\*\*;20(140)  
 22.5 in (570 mm)  
 25405 lb (11523 kg)  
 10630 lb (4822 kg)  
 36035 lb (16345 kg)

**DRAWBAR PERFORMANCE AT 1800 ENGINE RPM**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear										
192.77 (143.75)	32066 (142.63)	2.26 (3.63)	2069	14.5	0.504 (0.306)	13.91 (2.74)	0.065 (0.040)	203 (95)	53 (12)	28.89 (97.82)
3rd Gear										
208.74 (155.65)	31386 (139.61)	2.50 (4.02)	1977	14.1	0.494 (0.300)	14.20 (2.80)	0.066 (0.040)	215 (102)	55 (13)	28.45 (96.34)
4th Gear										
225.06 (167.82)	29549 (131.44)	2.86 (4.60)	1921	11.8	0.477 (0.290)	14.69 (2.89)	0.064 (0.039)	215 (101)	56 (13)	28.44 (96.31)
5th Gear										
240.61 (179.42)	27449 (122.10)	3.29 (5.29)	1875	9.3	0.460 (0.280)	15.24 (3.00)	0.061 (0.037)	215 (101)	56 (13)	28.44 (96.31)
6th Gear										
249.91 (186.35)	25512 (113.48)	3.68 (5.91)	1800	8.0	0.450 (0.274)	15.57 (3.07)	0.061 (0.037)	213 (101)	63 (17)	28.45 (96.34)
7th Gear										
260.34 (194.13)	22174 (98.63)	4.40 (7.08)	1800	5.4	0.432 (0.263)	16.21 (3.19)	0.059 (0.036)	214 (101)	57 (14)	28.44 (96.31)
8th Gear										
262.46 (195.72)	19235 (85.56)	5.12 (8.24)	1800	4.2	0.430 (0.261)	16.32 (3.21)	0.059 (0.036)	213 (101)	59 (15)	28.45 (96.34)
9th Gear										
261.69 (195.14)	16464 (73.24)	5.96 (9.59)	1800	3.1	0.431 (0.262)	16.27 (3.21)	0.059 (0.036)	213 (101)	60 (15)	28.45 (96.34)
10th Gear										
259.59 (193.58)	14137 (62.88)	6.89 (11.08)	1800	2.5	0.433 (0.263)	16.18 (3.19)	0.058 (0.035)	214 (101)	60 (16)	28.45 (96.34)
11th Gear										
256.90 (191.57)	12133 (53.97)	7.94 (12.78)	1800	1.9	0.437 (0.266)	16.03 (3.16)	0.060 (0.036)	214 (101)	61 (16)	28.47 (96.41)
12th Gear										
250.10 (186.50)	10247 (45.58)	9.15 (14.73)	1801	1.5	0.449 (0.273)	15.61 (3.08)	0.061 (0.037)	213 (100)	62 (17)	28.45 (96.34)

## HYDRAULIC PERFORMANCE

CATEGORY: 4N

Quick Attach: Yes

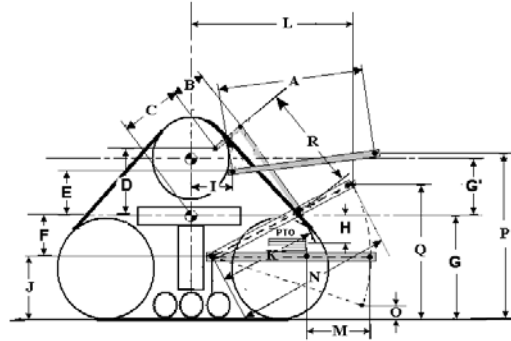
OECD Static test

Maximum force exerted through whole range:	20012 lbs (89.0 kN)
	<b>Standard pump</b>
	<u>three outlet sets combined</u>
i) Sustained pressure at compensator cutoff:	2798 psi (193 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	44.2 GPM (167.4 l/min)
iii) Pump delivery rate at maximum hydraulic power:	44.6 GPM (169.0 l/min)
Delivery pressure:	2587 psi (178 bar)
Power:	67.4 HP (50.3 kW)
	<u>single outlet set</u>
i) Sustained pressure at compensator cutoff:	2790 psi (192 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	42.6 GPM (161.1 l/min)
iii) Pump delivery rate at maximum hydraulic power:	39.9 GPM (151.2 l/min)
Delivery pressure:	2230 psi (154 bar)
Power:	52.0 HP (38.8 kW)

## HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	29.7	755
B	20.5	520
C	22.9	581
D	23.4	595
E	13.2	336
F	11.6	295
G	33.8	860
*G'	14.6	370
H	0.8	20
I	20.9	530
J	22.2	565
K	30.2	768
L	53.1	1350
*L'	60.4	1534
M	27.2	691
N	38.2	970
O	10.4	265
P	49.8	1265
Q	42.3	1075
R	40.7	1035

\*G' to undercarriage pivot point  
\*L' to Quick coupler ends



**CASE IH MAGNUM 310 ROWTRAC DIESEL**