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2012

## Test 2017A: Case IH Magnum 235

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 2017A—SUMMARY 816A

## CASE IH MAGNUM 235 DIESEL

### 18 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	D.E.F. Consumption Gal/hr (l/h)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1109 rpm)					
198.86 (148.29)	2000	11.09 (41.97)	0.392 (0.239)	17.93 (3.53)	0.67 (2.54)
Standard Power Take-off Speed (1000 rpm)					
233.95 (174.46)	1803	12.07 (45.68)	0.363 (0.221)	19.39 (3.82)	0.91 (3.43)
Maximum Power (1 hour)					
233.95 (174.46)	1803	12.07 (45.68)	0.363 (0.221)	19.39 (3.82)	0.91 (3.43)

#### VARYING POWER AND FUEL CONSUMPTION

198.86 (148.29)	2000	11.09 (41.97)	0.392 (0.239)	17.93 (3.53)	0.67 (2.54)	Air temperature
176.85 (131.88)	2094	10.21 (38.64)	0.406 (0.247)	17.33 (3.41)	0.58 (2.19)	73°F (23°C)
133.80 (99.77)	2117	8.24 (31.18)	0.433 (0.263)	16.25 (3.20)	0.46 (1.75)	Relative humidity
90.20 (67.26)	2146	6.42 (24.29)	0.500 (0.304)	14.06 (2.77)	0.32 (1.21)	36%
45.85 (34.19)	2171	4.40 (16.64)	0.674 (0.410)	10.43 (2.05)	0.12 (0.51)	Barometer
2.40 (1.79)	2204	2.81 (10.63)	8.229 (5.006)	0.85 (0.17)	0.00 (0.00)	28.73" Hg (97.29 kPa)

Maximum torque - 791 lb.-ft. (1072 Nm) at 1450 rpm

Maximum torque rise - 51.3%

Torque rise at 1599 engine rpm - 45%

Power increase at 1800 engine rpm - 17.6%

#### 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)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th Gear									
172.71 (128.79)	14854 (66.07)	4.36 (7.02)	2000	2.7	0.454 (0.276)	15.51 (3.06)	186 (86)	60 (16)	28.71 (97.22)
75% of Pull at Maximum Power—7th Gear									
137.26 (102.35)	11128 (49.50)	4.63 (7.44)	2102	1.9	0.488 (0.297)	14.41 (2.84)	184 (84)	65 (18)	28.71 (97.22)
50% of Pull at Maximum Power—7th Gear									
92.97 (69.32)	7412 (32.97)	4.71 (7.57)	2124	1.2	0.563 (0.342)	12.50 (2.46)	183 (84)	65 (18)	28.71 (97.22)
75% of Pull at Reduced Engine Speed—10th Gear									
137.38 (102.44)	11107 (49.40)	4.64 (7.47)	1389	1.8	0.418 (0.254)	16.82 (3.31)	186 (85)	64 (18)	28.71 (97.22)
50% of Pull at Reduced Engine Speed—10th Gear									
92.74 (69.16)	7364 (32.76)	4.73 (7.60)	1406	1.2	0.464 (0.282)	15.16 (2.99)	185 (85)	65 (18)	28.70 (97.19)

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

**Dates of tests:** April 4 - 18, 2012

**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)** 0.8448 **Fuel weight** 7.034 lbs/gal (0.843 kg/l) **Diesel Exhaust Fluid (DEF)** 30% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 15W40 API service classification** CI-4 **Transmission and hydraulic lubricant** Case IH Hy-tran Ultra fluid **Front axle lubricant** SAE 85W-140 API GL-5 **Total time engine was operated:** 20.5 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.** A11H0021498 **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 **Muffler** vertical **Cooling medium temperature control** thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS:** **Fuel rate:** 75.7 - 80.2 lb/h (34.3 - 36.4 kg/h) **High idle:** 2200-2250 rpm **Turbo boost:** nominal 18.9 - 21.8 psi (130 - 150 kPa) as measured 20.6 psi (140 kPa)

**CHASSIS: Type** front wheel assist **SerialNo.** \*ZCRC02473\* **Tread width** rear 64.0" (1626 mm) to 129.0" (3277 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 120.3" (3050 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 1.96 (3.15) second 2.24 (3.61) third 2.58 (4.16) fourth 2.96 (4.77) fifth 3.41 (5.48) sixth 3.90 (6.28) seventh 4.55 (7.33) eighth 5.23 (8.41) ninth 6.02 (9.69) tenth 6.91 (11.12) eleventh 7.92 (12.75) twelfth 9.09 (14.63) thirteenth 11.33 (18.23) fourteenth 12.99 (20.91) fifteenth 14.98 (24.11) sixteenth 17.19 (27.66) seventeenth 19.72 (31.73) eighteenth 22.61 (36.39) reverse 2.81 (4.53), 3.23 (5.20), 6.56 (10.55), 7.52 (12.10) **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** 540 rpm at 1808 engine rpm or 1000 rpm at 1803 engine rpm **Unladen tractor mass** 23050 lb (10455 kg)

**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)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
148.31 (110.59)	21648 (96.30)	2.57 (4.14)	2038	13.6	0.520 (0.316)	13.53 (2.67)	184 (84)	50 (10)	28.89 (97.83)
5th Gear									
164.89 (122.95)	19692 (87.59)	3.14 (5.05)	2000	6.2	0.475 (0.289)	14.80 (2.92)	184 (84)	51 (10)	28.88 (97.80)
6th Gear									
167.23 (124.71)	16932 (75.32)	3.71 (5.96)	2000	3.6	0.468 (0.285)	15.01 (2.96)	185 (85)	53 (12)	28.88 (97.80)
7th Gear									
172.71 (128.79)	14854 (66.07)	4.36 (7.02)	2000	2.7	0.454 (0.276)	15.51 (3.06)	186 (86)	60 (16)	28.71 (97.22)
8th Gear									
170.52 (127.15)	12709 (56.53)	5.03 (8.10)	2000	2.1	0.461 (0.280)	15.27 (3.01)	184 (84)	56 (13)	28.70 (97.19)
9th Gear									
169.71 (126.55)	10947 (48.69)	5.81 (9.35)	1999	1.8	0.461 (0.280)	15.26 (3.01)	184 (84)	56 (13)	28.70 (97.19)
10th Gear									
166.88 (124.41)	9336 (41.53)	6.71 (10.79)	2000	1.5	0.469 (0.285)	15.00 (2.96)	185 (85)	56 (13)	28.71 (97.22)
11th Gear									
165.08 (123.10)	8029 (35.71)	7.71 (12.41)	2000	1.2	0.475 (0.289)	14.82 (2.92)	185 (85)	58 (14)	28.71 (97.22)
12th Gear									
160.84 (119.93)	6808 (30.28)	8.86 (14.26)	2000	1.0	0.484 (0.294)	14.54 (2.86)	185 (85)	58 (14)	28.71 (97.22)

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

**NOTE:** The data on this summary was obtained from testing conducted on the New Holland T8.275 Diesel.

**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 104°F (40°C). This tractor did not meet the manufacturer's 3 point lift claim of 14900 lbs (6758 kg). The manufacturer's 3 point hitch lift claim of 16550 lbs (7507 kg), with lift cylinders 1 x 95 mm and 1 x 105 mm, was not verified. The performance results on this summary were taken from OECD tests conducted under the Code 2 Test Code Procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2017A**, Nebraska Summary 816A, May 17, 2012.

Roger M. Hoy  
Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 7th gear	67.0	67.0
Bystander in 18th gear		83.8

**TIRES, BALLAST AND WEIGHT**

**Rear Tires** -No., size, ply & psi (kPa)

**Ballast** - Duals (total)

- Cast Iron (total)

**Front Tires** -No., size, ply & psi (kPa)

**Ballast** - Liquid (total)

- Cast Iron (total)

**Height of Drawbar**

**Static Weight with operator** - Rear

- Front

- Total

**With Ballast**

Four 520/85R42;\*\*,10(70)

1950 lb (885 kg)

1060 lb (481 kg)

Two 420/90R30;\*\*,18(125)

None

440 lb (200 kg)

20.5 in (520 mm)

17570 lb (7970 kg)

9105 lb (4130 kg)

26675 lb (12100 kg)

**Without Ballast**

Two 520/85R42;\*\*,18(125)

None

None

Two 420/90R30;\*\*,18(125)

None

20.0 in (510 mm)

14725 lb (6679 kg)

8500 lb (3855 kg)

23225 lb (10534 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)	Temp.°F cool- ing med	(°C) Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
146.77 (109.44)	21718 (96.60)	2.54 (4.08)	2035	14.7	0.526 (0.320)	13.38 (2.64)	184 (84)	50 (10)	28.89 (97.83)
5th Gear									
169.48 (126.38)	20904 (92.99)	3.04 (4.89)	1967	7.6	0.474 (0.288)	14.84 (2.92)	184 (84)	52 (11)	28.88 (97.80)
6th Gear									
182.64 (136.19)	19499 (86.73)	3.52 (5.66)	1931	5.5	0.455 (0.277)	15.46 (3.05)	185 (85)	54 (12)	28.88 (97.80)
7th Gear									
195.54 (145.81)	17927 (79.74)	4.09 (6.58)	1911	4.4	0.443 (0.269)	15.88 (3.13)	187 (86)	61 (16)	28.71 (97.22)
8th Gear									
201.09 (149.95)	16890 (75.13)	4.47 (7.19)	1800	3.5	0.426 (0.259)	16.50 (3.25)	185 (85)	56 (13)	28.71 (97.22)
9th Gear									
202.09 (150.70)	14574 (64.83)	5.20 (8.37)	1800	2.5	0.420 (0.256)	16.73 (3.30)	184 (84)	56 (13)	28.69 (97.16)
10th Gear									
200.54 (149.54)	12562 (55.88)	5.99 (9.63)	1801	2.1	0.425 (0.258)	16.57 (3.26)	185 (85)	57 (14)	28.71 (97.22)
11th Gear									
198.95 (148.35)	10822 (48.14)	6.90 (11.10)	1800	1.7	0.429 (0.261)	16.38 (3.23)	186 (85)	59 (15)	28.71 (97.22)
12th Gear									
195.13 (145.50)	9172 (40.80)	7.98 (12.84)	1809	1.4	0.436 (0.265)	16.13 (3.18)	187 (86)	59 (15)	28.71 (97.22)

**DRAWBAR PERFORMANCE AT 1800 ENGINE RPM**  
**BALLASTED - 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)	Temp.°F cool- ing med	Temp.°C Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
146.89 (109.53)	24930 (110.89)	2.21 (3.56)	2026	14.0	0.526 (0.320)	13.38 (2.64)	184 (84)	51 (10)	28.97 (98.10)
4th Gear									
165.41 (123.35)	23398 (104.08)	2.65 (4.26)	1975	7.9	0.483 (0.294)	14.57 (2.87)	185 (85)	53 (11)	28.97 (98.10)
5th Gear									
180.76 (134.79)	22758 (101.23)	2.98 (4.79)	1916	6.9	0.466 (0.284)	15.09 (2.97)	186 (85)	56 (13)	28.98 (98.14)
6th Gear									
188.98 (140.92)	21129 (93.99)	3.36 (5.40)	1840	4.9	0.452 (0.275)	15.56 (3.06)	186 (85)	58 (14)	28.98 (98.14)
7th Gear									
195.48 (145.77)	18868 (83.93)	3.89 (6.25)	1800	3.4	0.435 (0.265)	16.16 (3.18)	186 (86)	61 (16)	28.98 (98.14)
8th Gear									
198.92 (148.33)	16556 (73.64)	4.51 (7.25)	1800	2.4	0.430 (0.262)	16.36 (3.22)	187 (86)	63 (17)	28.98 (98.14)
9th Gear									
197.06 (146.94)	14150 (62.94)	5.22 (8.40)	1800	1.9	0.433 (0.263)	16.26 (3.20)	188 (86)	64 (18)	28.97 (98.10)
10th Gear									
195.68 (145.92)	12191 (54.23)	6.02 (9.69)	1800	1.5	0.438 (0.266)	16.07 (3.17)	187 (86)	65 (18)	28.97 (98.10)
11th Gear									
192.31 (143.40)	10411 (46.31)	6.93 (11.14)	1801	1.2	0.443 (0.269)	15.89 (3.13)	188 (87)	65 (18)	28.97 (98.10)
12th Gear									
187.77 (140.02)	8792 (39.11)	8.01 (12.89)	1809	1.0	0.450 (0.274)	15.63 (3.08)	189 (87)	67 (19)	28.96 (98.07)

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: Yes

OECD Static test

Maximum force exerted through whole range:	14812 lbs (65.9 kN) (2 x 9.5 mm cylinders)	
	<b>Standard pump</b>	<b>High flow pump</b>
	<u>three outlet sets combined</u>	
i) Sustained pressure at compensator cutoff:	2890 psi (199 bar)	2899 psi (200 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	45.0 GPM (170.3 l/min)	60.0 GPM (226.9 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	43.3 GPM (163.8 l/min)	59.7 GPM (226.0 l/min)
Delivery pressure:	2663 psi (184 bar)	2569 psi (177 bar)
Power:	67.2 HP (50.1 kW)	89.5 hp (66.7 kW)
	<u>single outlet set</u>	
i) Sustained pressure at compensator cutoff:	2884 psi (199 bar)	2890 psi (199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.9 GPM (166.1 l/min)	44.9 GPM (170.0 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	34.0 GPM (128.6 l/min)	38.7 GPM (146.6 l/min)
Delivery pressure:	2411 psi (166 bar)	2170 psi (150 bar)
Power:	47.8 HP (35.6 kW)	49.0 hp (36.6 kW)

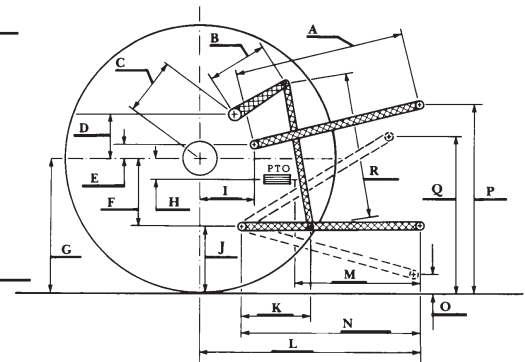
## HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	25.0	634
B	20.5	520
C	22.9	581
D	20.7	525
E	10.5	266
F	15.7	400
G	36.6	930
H	3.5	90
I	20.9	530
J	20.9	530
K	30.2	768
L	51.0	1295
*L'	55.9	1420
M	25.0	636
N	43.1	1095
O	9.0	230
P	47.8	1215
Q	37.3	948
R	40.4	1025

\*L' to Quick Attach ends

## TwinFlow system

	<u>Main pump</u>	<u>TwinFlow pump</u>
i) Sustained pressure at compensator cutoff:	3090 psi (213 bar)	2935 psi (202 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.6 GPM (164.9 l/min)	33.5 GPM (126.7 l/min)
Combined flow:	77.1 GPM (291.6 l/min)	
iii) Pump delivery rate at maximum		
hydraulic power:	36.3 GPM (137.4 l/min)	34.5 GPM (130.7 l/min)
Delivery pressure:	2797 psi (193 bar)	2764 psi (191 bar)
Power:	59.2 HP (44.1 kW)	55.7 Hp (41.5 kW)



**CASE IH MAGNUM 235 DIESEL**