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2017

Test 2181: CLAAS Axion 840

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2181—SUMMARY 1105

CLAAS AXION 840 DIESEL

CONTINUOUSLY VARIABLE TRANSMISSION

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—1114 rpm)						
217.69 (162.33)	2150	12.02 (45.51)	0.386 (0.235)	18.11 (3.57)	0.81 (3.06)	
Standard Power Take-off Speed (1000 rpm)						
234.45 (174.83)	1930	12.46 (47.16)	0.372 (0.226)	18.82 (3.71)	0.81 (3.07)	
Power at 1850 Engine RPM (1 hour)						
233.51 (174.13)	1851	12.30 (46.57)	0.368 (0.224)	18.98 (3.74)	0.79 (2.98)	

VARYING POWER AND FUEL CONSUMPTION

217.69 (162.33)	2150	12.02 (45.51)	0.386 (0.235)	18.11 (3.57)	0.81 (3.06)	Air temperature
187.83 (140.06)	2182	10.63 (40.22)	0.396 (0.241)	17.68 (3.48)	0.69 (2.62)	73°F (23°C)
140.98 (105.13)	2186	8.32 (31.48)	0.413 (0.251)	16.95 (3.34)	0.54 (2.05)	Relative humidity
94.09 (70.16)	2189	6.16 (23.33)	0.458 (0.279)	15.26 (3.01)	0.40 (1.52)	63%
47.28 (35.26)	2194	4.17 (15.77)	0.616 (0.375)	11.35 (2.24)	0.25 (0.96)	Barometer
1.80 (1.34)	2198	2.24 (8.48)	8.713 (5.300)	0.80 (0.16)	0.16 (0.59)	28.70" Hg (97.19 kPa)

Maximum torque - 744 lb.-ft. (1008 Nm) at 1349 rpm

Maximum torque rise - 39.8%

Torque rise at 1719 engine rpm - 31%

Power increase at 1851 engine rpm - 7.3%

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med bulb	Air dry bulb	Barom. inch Hg (kPa)
Power at Rated Engine Speed—5.6 mph (9.0 km/h)-Manual mode										
188.50 (140.56)	12760 (56.76)	5.54 (9.92)	2150	3.3	0.446 (0.271)	15.68 (3.09)	0.041 (0.025)	194 (90)	55 (13)	29.05 (98.37)
75% of Pull at Rated Engine Speed—5.6 mph (9.0 km/h)-Manual mode										
142.86 (106.53)	9540 (42.43)	5.62 (9.04)	2171	2.7	0.468 (0.285)	14.93 (2.94)	0.044 (0.027)	190 (88)	72 (22)	28.99 (98.17)
50% of Pull at Rated Engine Speed—5.6 mph (9.0 km/h)-Manual mode										
96.35 (71.85)	6358 (28.28)	5.68 (9.14)	2179	1.9	0.509 (0.309)	13.75 (2.71)	0.048 (0.029)	199 (93)	72 (22)	28.99 (98.17)
75% of Pull at Reduced Engine Speed—Auto mode										
142.37 (106.17)	9515 (42.32)	5.61 (9.03)	1295	2.7	0.423 (0.257)	16.52 (3.25)	0.047 (0.029)	212 (100)	72 (22)	28.99 (98.17)
50% of Pull at Reduced Engine Speed—Auto mode										
96.31 (71.82)	6357 (28.28)	5.68 (9.14)	1296	1.9	0.442 (0.269)	15.81 (3.11)	0.046 (0.028)	210 (99)	72 (22)	28.99 (98.17)

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

Dates of tests: September 25 to 29, 2017

Manufacturer: Claas Tractor SAS, 7, rue Dewoitine - BP 92, 78141 Velizy-Villacoublay, Cedex, France

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8400 **Fuel weight** 6.994 lbs/gal (0.838 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 lubricant** Claas Agrishift GA12 fluid **Hydraulic lubricant** Claas Agrishift GA12 fluid **Front axle lubricant** Claas Agrishift BLS 90 API GL-5 **Total time engine was operated:** 22.0 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.** *001484398* **Crankshaft** lengthwise **Rated engine speed** 2150 **Bore and stroke** 4.094" x 5.197" (104.0 mm x 132.0 mm) **Compression ratio** 17.5 to 1 **Displacement** 410 cu in (6728 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: 83.9 - 87.5 lb/h (38.1 - 39.7 kg/h) **High idle:** 2180 - 2220 rpm **Turbo boost:** nominal 18.9 - 21.8 psi (130 - 150 kPa) as measured 19.6 psi (135 kPa)

CHASSIS: Type front wheel assist with duals **Serial No.** *A4102738* **Tread width** rear 61.4" (1560 mm) to 124.0" (3150 mm) front 61.0" (1550 mm) to 88.6" (2250 mm) **Wheelbase** 117.3" (2980 mm) **Hydraulic control system** direct engine drive **Transmission** Infinitely variable with four mechanical ranges and automatic shifting between ranges. **Nominal travel speeds mph (km/h)** forward - 0 - 30.0 mph (0 - 50 km/h), reverse - 0 - 30.0 mph (0 - 50 km/h) **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 1890 engine rpm or 1000 rpm at 1930 or 1594 engine rpm **Unladen tractor mass** 22365 lb (10145 kg)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED

MANUAL MODE - 2150 ENGINE RPM DRAWBAR POWER AT SELECTED TRAVEL SPEED SETTINGS

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2.5 mph (4.0 km/h)										
140.67 (104.89)	22001 (97.87)	2.40 (3.86)	2164	12.9	0.517 (0.314)	13.54 (2.67)	0.049 (0.030)	202 (94)	56 (13)	29.02 (98.27)
3.1 mph (5.0 km/h)										
156.41 (116.63)	19281 (85.77)	3.04 (4.89)	2150	6.2	0.465 (0.283)	15.05 (2.97)	0.044 (0.027)	202 (94)	57 (14)	29.02 (98.27)
3.7 mph (6.0 km/h)										
158.24 (118.00)	16415 (73.02)	3.62 (5.82)	2151	4.7	0.456 (0.277)	15.34 (3.02)	0.044 (0.027)	200 (93)	59 (15)	29.03 (98.31)
4.2 mph (6.8 km/h)										
165.77 (123.61)	15067 (67.02)	4.13 (6.65)	2150	4.3	0.464 (0.282)	15.07 (2.97)	0.044 (0.026)	193 (89)	62 (17)	29.02 (98.27)
4.7 mph (7.5 km/h)										
179.76 (134.05)	14897 (66.26)	4.53 (7.28)	2150	4.0	0.467 (0.284)	14.98 (2.95)	0.043 (0.026)	196 (91)	53 (12)	29.05 (98.37)
5.1 mph (8.2 km/h)										
184.23 (137.38)	13941 (62.01)	4.96 (7.98)	2150	3.6	0.455 (0.277)	15.37 (3.03)	0.042 (0.025)	195 (91)	54 (12)	29.05 (98.37)
5.6 mph (9.0 km/h)										
188.50 (140.56)	12760 (56.76)	5.54 (8.92)	2150	3.3	0.446 (0.271)	15.68 (3.09)	0.041 (0.025)	194 (90)	55 (13)	29.05 (98.37)
6.2 mph (10.0 km/h)										
192.10 (143.25)	11686 (51.98)	6.17 (9.92)	2150	3.0	0.436 (0.265)	16.04 (3.16)	0.040 (0.024)	194 (90)	55 (13)	29.06 (98.41)
6.8 mph (11.0 km/h)										
192.74 (143.72)	10808 (48.08)	6.69 (10.77)	2150	2.8	0.436 (0.265)	16.03 (3.16)	0.040 (0.024)	190 (88)	56 (13)	29.05 (98.37)
7.5 mph (12.0 km/h)										
193.15 (144.03)	9695 (43.13)	7.47 (12.02)	2150	2.5	0.431 (0.262)	16.24 (3.20)	0.040 (0.024)	190 (88)	57 (14)	29.06 (98.41)
8.1 mph (13.0 km/h)										
191.01 (142.43)	8927 (39.71)	8.03 (12.91)	2150	2.3	0.435 (0.265)	16.07 (3.17)	0.040 (0.024)	190 (88)	57 (14)	29.06 (98.41)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load at 4.6 mph (7.5 km/h) engine speed - 2190 rpm	73.4	69.6
At no load at 4.6 mph (7.5 km/h) engine speed - 1110 rpm	68.6	66.1
Bystander		82.7

Horizontal distance of drawbar hitch point behind rear wheel axis - 38.5" (978 mm)

TIRES AND WEIGHT

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

Tested Without Ballast

Four 480/80R46;***;12(85)
Two 380/85R34;***;21(145)
21.0 in (535 mm)
13990 lb (6346 kg)
8550 lb (3878 kg)
22540 lb (10224 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: This engine on this model derates at travel speeds below 4.3 mph (7.0 km/h).

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor fell 3.2% short of meeting the manufacturer's torque rise claim of 43%. This tractor exceeded the 71 dB(A) sound power claim, with front drive engaged, by 73.8% (2.4 dB(A)) at 2190 engine rpm. The manufacturer's hydraulic pump flow claim of 40 GPM was 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. **2181**, Nebraska Summary 1105, December 11, 2017.

Roger M. Hoy
Director

M.F. Kocher
S.K. Pitla
J.D. Luck
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED

AUTOMATIC MODE(Loads based on 2150 engine rpm manual mode performance runs)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		D.E.F. Consumption	Temp.°F(°C)	Barom. inch Hg (kPa)		
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	lb/hp.hr (kg/kW.h)	cool- ing med	Air dry bulb		
156.20 (116.48)	19197 (85.39)	3.05 (4.91)	1597	6.8	3.2mph (5.2 km/h) 0.459 (0.279)		15.25 (3.00)	0.042 (0.026)	197 (91)	69 (21)	29.01 (98.24)
158.25 (118.00)	16361 (72.78)	3.63 (5.84)	1613	4.9	3.7mph (6.0 km/h) 0.445 (0.271)		15.73 (3.10)	0.041 (0.025)	198 (92)	71 (22)	29.00 (98.21)
165.51 (123.42)	14803 (65.84)	4.19 (6.74)	1654	4.3	4.2mph (6.8 km/h) 0.437 (0.266)		16.02 (3.16)	0.040 (0.025)	196 (91)	72 (22)	29.00 (98.21)
179.69 (133.99)	14691 (65.35)	4.59 (7.39)	1551	4.0	4.7mph (7.5 km/h) 0.420 (0.256)		16.64 (3.28)	0.038 (0.023)	200 (93)	62 (17)	29.05 (98.37)
184.10 (137.28)	14015 (62.34)	4.93 (7.93)	1558	3.6	5.1mph (8.2 km/h) 0.413 (0.251)		16.95 (3.34)	0.039 (0.024)	199 (93)	62 (17)	29.04 (98.34)
187.90 (140.12)	12751 (56.72)	5.53 (8.90)	1653	3.3	5.6mph (9.0 km/h) 0.422 (0.257)		16.56 (3.26)	0.037 (0.022)	194 (90)	64 (18)	29.05 (98.37)
191.79 (143.01)	11904 (52.95)	6.04 (9.72)	1654	3.2	6.2mph (10.0 km/h) 0.416 (0.253)		16.82 (3.31)	0.038 (0.023)	192 (89)	65 (18)	29.04 (98.34)
192.20 (143.32)	10870 (48.35)	6.63 (10.67)	1666	2.9	6.8mph (11.0 km/h) 0.419 (0.255)		16.68 (3.29)	0.039 (0.024)	189 (87)	68 (20)	29.03 (98.31)
193.16 (144.04)	9771 (43.46)	7.42 (11.93)	1761	2.6	7.5mph (12.0 km/h) 0.420 (0.256)		16.64 (3.28)	0.040 (0.024)	189 (87)	68 (20)	29.03 (98.31)
191.52 (142.82)	9048 (40.25)	7.94 (12.78)	1728	2.4	8.1mph (13.0 km/h) 0.432 (0.263)		16.18 (3.19)	0.040 (0.024)	190 (88)	68 (20)	29.03 (98.31)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED

MANUAL MODE - 1850 ENGINE RPM

DRAWBAR POWER AT SELECTED TRAVEL SPEED SETTINGS

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)
2.5 mph (4.0 km/h)										
141.10 (105.21)	22061 (98.13)	2.40 (3.86)	2164	12.8	0.520 (0.316)	13.45 (2.65)	0.048 (0.029)	201 (94)	56 (13)	29.02 (98.27)
3.1 mph (5.0 km/h)										
161.35 (120.31)	20808 (92.56)	2.91 (4.68)	2097	8.0	0.476 (0.289)	14.71 (2.90)	0.044 (0.027)	201 (94)	59 (15)	29.02 (98.27)
3.7 mph (6.0 km/h)										
168.46 (125.62)	18378 (81.75)	3.44 (5.54)	2060	5.7	0.451 (0.274)	15.52 (3.06)	0.042 (0.026)	195 (91)	61 (16)	29.02 (98.27)
4.2 mph (6.8 km/h)										
176.95 (131.95)	17204 (76.53)	3.86 (6.21)	2027	5.1	0.459 (0.279)	15.24 (3.00)	0.041 (0.025)	192 (89)	63 (17)	29.02 (98.27)
4.7 mph (7.5 km/h)										
181.41 (135.28)	15980 (71.08)	4.26 (6.86)	2012	4.7	0.456 (0.278)	15.33 (3.02)	0.041 (0.025)	195 (90)	66 (19)	29.02 (98.27)
5.1 mph (8.2 km/h)										
192.80 (143.77)	15830 (70.42)	4.57 (7.35)	1965	4.6	0.438 (0.266)	15.97 (3.15)	0.039 (0.024)	193 (89)	66 (19)	29.02 (98.27)
5.6 mph (9.0 km/h)										
197.90 (147.57)	15278 (67.96)	4.86 (7.82)	1911	4.4	0.430 (0.261)	16.27 (3.21)	0.038 (0.023)	192 (89)	66 (19)	29.02 (98.27)
6.2 mph (10.0 km/h)										
201.22 (150.05)	14390 (64.01)	5.24 (8.43)	1850	4.1	0.425 (0.259)	16.45 (3.24)	0.038 (0.023)	185 (85)	68 (20)	29.02 (98.27)
6.8 mph (11.0 km/h)										
203.74 (151.93)	13180 (58.63)	5.80 (9.33)	1850	3.8	0.418 (0.254)	16.75 (3.30)	0.038 (0.023)	185 (85)	68 (20)	29.01 (98.24)
7.5 mph (12.0 km/h)										
205.43 (153.19)	12054 (53.62)	6.39 (10.28)	1850	3.2	0.417 (0.254)	16.77 (3.30)	0.037 (0.023)	192 (89)	57 (14)	29.06 (98.41)
8.1 mph (13.0 km/h)										
205.03 (152.89)	11211 (49.87)	6.86 (11.04)	1850	2.9	0.422 (0.257)	16.56 (3.26)	0.037 (0.023)	191 (88)	58 (14)	29.05 (98.37)
8.9 mph (14.4 km/h)										
202.43 (150.95)	10072 (44.80)	7.54 (12.13)	1850	2.6	0.423 (0.257)	16.52 (3.25)	0.037 (0.023)	191 (88)	59 (15)	29.06 (98.41)
9.9 mph (16.0 km/h)										
193.71 (144.45)	8521 (37.90)	8.53 (13.72)	1850	2.3	0.442 (0.269)	15.82 (3.12)	0.039 (0.024)	194 (90)	60 (15)	29.05 (98.37)

HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: Yes

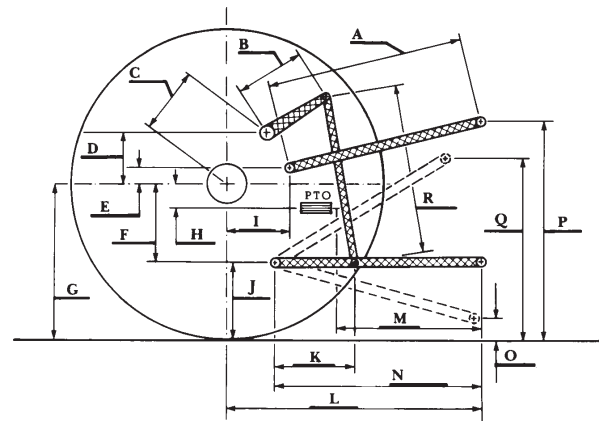
OECD Static test

Maximum force exerted through whole range:	17408 lbs (77.4 kN)
	three outlet sets combined
i) Sustained pressure at compensator cutoff:	2765 psi (191 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	39.7 GPM (150.4 l/min)
iii) Pump delivery rate at maximum hydraulic power:	37.3 GPM (141.1 l/min)
Delivery pressure:	2485 psi (171 bar)
Power:	54.1 HP (40.3 kW)
	single outlet set
i) Sustained pressure at compensator cutoff:	2747 psi (189 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	29.9 GPM (113.2 l/min)
iii) Pump delivery rate at maximum hydraulic power:	28.7 GPM (108.7 l/min)
Delivery pressure:	2270 psi (156 bar)
Power:	38.0 HP (28.4 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	32.7	830
B	15.7	400
C	20.7	525
D	19.1	485
E	11.6	295
F	12.2	310
G	36.4	925
H	2.9	74
I	16.9	430
J	24.2	615
K	25.4	646
L	51.1	1298
*L'	56.6	1438
M	27.6	701
N	40.9	1040
O	9.1	230
P	43.1	1095
Q	39.6	1005
R	37.6	955

*L' to Quick Attach ends



NTTL.(2017). Nebraska OECD tractor test 2181 for Claas Axion 840 Diesel.
Lincoln, NE: Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



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