

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

2017

Test 2179: John Deere 7210R

Nebraska Tractor Test Laboratory

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Laboratory, Nebraska Tractor Test, "Test 2179: John Deere 7210R" (2017). *Nebraska Tractor Tests*. 2586.
<https://digitalcommons.unl.edu/tractormuseumlit/2586>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA OECD TRACTOR TEST 2179 - SUMMARY 1103

JOHN DEERE 7210R DIESEL e23 TRANSMISSION

Chassis Serial numbers 89001 and higher

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)	
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1067 rpm)						
182.22 (135.88)	2099	10.37 (39.24)	0.398 (0.242)	17.58 (3.46)	0.23 (0.88)	Fuel used during active exhaust regeneration-0.61 gal (2.32 l) (see note 1, p.2)
Standard Power Take-off Speed (1000 rpm)						
199.07 (148.45)	1967	11.01 (41.68)	0.387 (0.235)	18.08 (3.56)	0.27 (1.03)	
Maximum Power (1 hour)						
205.32 (153.11)	1702	11.02 (41.70)	0.375 (0.228)	18.64 (3.67)	0.27 (1.03)	

VARYING POWER AND FUEL CONSUMPTION

182.22 (135.88)	2099	10.37 (39.24)	0.398 (0.242)	17.58 (3.46)	0.23 (0.88)	Air temperature
159.05 (118.60)	2153	9.42 (35.65)	0.414 (0.252)	16.89 (3.33)	0.19 (0.71)	73°F (23°C)
119.98 (89.47)	2165	7.52 (28.46)	0.438 (0.267)	15.96 (3.14)	0.15 (0.56)	Relative humidity
80.29 (59.88)	2172	6.00 (22.71)	0.523 (0.318)	13.39 (2.64)	0.11 (0.42)	33%
40.56 (30.25)	2182	4.35 (16.48)	0.751 (0.457)	9.32 (1.83)	0.07 (0.27)	Barometer
1.73 (1.29)	2192	2.63 (9.95)	10.605 (6.451)	0.66 (0.13)	0.09 (0.36)	28.94" Hg (97.99 kPa)

Maximum torque - 673 lb.-ft. (912 Nm) at 1501 rpm
 Maximum torque rise - 47.6%
 Torque rise at 1680 engine rpm - 42%
 Power increase at 1702 engine rpm - 12.7%

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 lb/hp.hr (kg/kW.h)	Temp. °F(°C)	Barom. inch Hg (kPa)
Power at Rated Engine Speed—10th Gear-Manual mode								
170.77 (127.34)	12588 (55.99)	5.09 (8.19)	2099	2.5	0.421 (0.256)	16.60 (3.27)	0.012 (102)	215 (62) 28.97 (98.10)
75% of Pull at Rated Engine Speed—10th Gear-Manual mode								
132.60 (98.88)	9438 (41.98)	5.27 (8.48)	2158	1.8	0.450 (0.274)	15.53 (3.06)	0.011 (0.007)	215 (102) 69 (21) 28.92 (97.93)
50% of Pull at Rated Engine Speed—10th Gear-Manual mode								
89.64 (66.84)	6303 (28.04)	5.33 (8.58)	2169	1.1	0.513 (0.312)	13.63 (2.68)	0.013 (0.008)	215 (102) 69 (21) 28.93 (97.97)
75% of Pull at Reduced Engine Speed—5.3 mph (8.6 km/h)-Auto mode								
132.75 (98.99)	9486 (42.19)	5.25 (8.45)	1400	1.8	0.401 (0.244)	17.45 (3.44)	0.013 (0.008)	215 (102) 68 (20) 28.92 (97.93)
50% of Pull at Reduced Engine Speed—5.3 mph (8.6 km/h)-Auto mode								
89.38 (66.65)	6341 (28.21)	5.29 (8.51)	1224	1.1	0.416 (0.253)	16.79 (3.31)	0.019 (0.012)	214 (101) 71 (22) 28.83 (97.63)

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

Dates of tests: September 5 - 8, 2017

Manufacturer: John Deere Tractor Works, 3500 East Donald Street, P.O. Box 270, Waterloo Ia, 50704-0270

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 15W-40 API service classification** CJ-4 **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere Hy-Gard fluid **Total time engine was operated:** 23.5 hours

ENGINE: Make John Deere **Diesel Type** six cylinder vertical with turbocharger, air to air aftercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** *PE6068U051259* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.19 x 5.00" (106.5 mm x 127.0 mm) **Compression ratio** 17.2 to 1 **Displacement** 414 cu in (6788 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** one paper element and prestrainer **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 67.9 - 73.4 lb/h (30.8 - 33.3 kg/h) **High idle:** 2150 - 2250 rpm **Turbo boost:** nominal 25.4 - 28.3 psi (175 - 195 kPa) as measured 26.7 psi (184 kPa)

CHASSIS: Type front wheel assist with duals **Serial No.** *1RW7210REHS093003* **Tread width** rear 60.0" (1524 mm) to 128.9" (3272 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 115.2" (2925 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled power shift **Nominal travel speeds mph (km/h)** first 1.50 (2.42) second 1.74 (2.80) third 2.01 (3.23) fourth 2.32 (3.73) fifth 2.67 (4.29) sixth 3.08 (4.96) seventh 3.53 (5.68) eighth 4.08 (6.56) ninth 4.66 (7.50) tenth 5.38 (8.66) eleventh 6.21 (10.00) twelfth 7.15 (11.51) thirteenth 8.26 (13.29) fourteenth 9.45 (15.21) fifteenth 10.92 (17.57) sixteenth 12.68

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 2100 ENGINE RPM
DRAWBAR 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)	
5th Gear										
131.97 (98.41)	21510 (95.68)	2.31 (3.71)	2154	13.6	0.494 (0.300)	14.17 (2.79)	0.013 (0.008)	215 (102)	68 (20)	28.87 (97.77)
6th Gear										
148.61 (110.81)	21022 (93.51)	2.65 (4.26)	2124	13.1	0.475 (0.289)	14.71 (2.90)	0.013 (0.008)	216 (102)	53 (12)	28.89 (97.83)
7th Gear										
165.51 (123.42)	19353 (86.08)	3.21 (5.17)	2099	6.4	0.438 (0.266)	15.97 (3.15)	0.011 (0.007)	216 (102)	56 (13)	28.89 (97.83)
8th Gear										
168.99 (126.01)	16683 (74.21)	3.80 (6.12)	2100	4.0	0.429 (0.261)	16.30 (3.21)	0.011 (0.007)	215 (102)	62 (17)	28.89 (97.83)
9th Gear										
169.27 (126.22)	14481 (64.41)	4.38 (7.05)	2100	3.2	0.425 (0.259)	16.46 (3.24)	0.011 (0.007)	216 (102)	59 (15)	28.97 (98.10)
10th Gear										
170.77 (127.34)	12588 (55.99)	5.09 (8.19)	2099	2.5	0.421 (0.256)	16.60 (3.27)	0.012 (0.007)	215 (102)	62 (16)	28.97 (98.10)
11th Gear										
168.52 (125.66)	10705 (47.62)	5.90 (9.50)	2100	2.1	0.427 (0.259)	16.40 (3.23)	0.011 (0.007)	216 (102)	64 (18)	28.97 (98.10)
12th Gear										
169.86 (126.66)	9352 (41.60)	6.81 (10.96)	2100	1.8	0.422 (0.257)	16.56 (3.26)	0.012 (0.007)	216 (102)	64 (18)	28.97 (98.10)
13th Gear										
168.02 (125.29)	7981 (35.50)	7.90 (12.71)	2100	1.6	0.427 (0.260)	16.39 (3.23)	0.011 (0.007)	217 (103)	66 (19)	28.96 (98.07)
14th Gear										
166.37 (124.06)	6889 (30.64)	9.06 (14.57)	2100	1.3	0.430 (0.262)	16.26 (3.20)	0.011 (0.007)	217 (103)	67 (20)	28.96 (98.07)

TRACTOR SOUND LEVEL WITH CAB

	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
At no load in 9th gear	66.9	66.8
Transport speed - no load - 21st gear		69.2
Bystander in 21st gear		83.4

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 420/90R30;***;14(95)
19.5 in (495 mm)
14790 lb (6709 kg)
7675 lb (3481 kg)
22465 lb(10190 kg)

(20.41) seventeenth 14.65 (23.57) eighteenth 16.91 (27.22) nineteenth 19.54 (31.44) twentieth 22.47 (36.17) twenty-first 25.96 (41.78) twenty-second 26.10 (42.00) twenty-third 26.10 (42.00) electronically limited reverse 1.41 (2.27), 1.88 (3.02), 2.50 (4.02), 3.30 (5.31), 3.77 (6.07), 5.03 (8.10), 6.69 (10.76), 8.84 (14.22), 11.86 (19.08), 15.81 (25.45), 18.64 (30.00), 18.64 (30.00) electronically limited **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1763 engine rpm or 1000 rpm at 1967 or 1756 engine rpm **Unladen tractor mass** 22290 lb (10111 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: The manufacturer declares that the average time between active regenerations is 50 hours. A 1% power increase was observed during the active regeneration.

NOTE 2: The performance data on this report applies to tractor with chassis serial numbers that end with 89001 and higher equipped with a single turbo engine.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor fell 1.2% short of meeting the manufacturer's remote hydraulic flow claim of 59 GPM (223.3 l/min) with the 85 cc pump. 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. **2179**, Nebraska Summary 1103, October 17, 2017.

Roger M. Hoy
Director

M.F. Kocher
S.K. Pitla
P.J. Jasa
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - AUTO MODE
(Loads based on 2100 engine rpm manual mode performance runs)
DRAWBAR POWER AT SELECTED TRAVEL SPEEDS

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) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	lb/hp.hr (kg/kW.h)			
3.5 mph (5.6 km/h)										
165.62 (123.50)	18877 (83.97)	3.29 (5.29)	1616	5.5	0.408 (0.248)	17.12 (3.37)	0.014 (0.008)	214 (101)	58 (14)	28.89 (97.83)
4.0 mph (6.4 km/h)										
169.00 (126.02)	16585 (73.77)	3.82 (6.15)	1599	4.0	0.400 (0.243)	17.49 (3.44)	0.015 (0.009)	214 (101)	66 (19)	28.89 (97.83)
4.3 mph (7.0 km/h)										
168.61 (125.73)	14840 (66.01)	4.26 (6.86)	1532	3.3	0.401 (0.244)	17.44 (3.44)	0.012 (0.007)	214 (101)	61 (16)	28.97 (98.10)
5.2 mph (8.4 km/h)										
170.22 (126.93)	12545 (55.80)	5.09 (8.19)	1580	2.5	0.396 (0.241)	17.66 (3.48)	0.012 (0.007)	214 (101)	63 (17)	28.97 (98.10)
6.0 mph (9.6 km/h)										
168.72 (125.81)	10837 (48.20)	5.84 (9.40)	1563	2.1	0.397 (0.241)	17.63 (3.47)	0.013 (0.008)	215 (102)	65 (18)	28.97 (98.10)
6.9 mph (11.2 km/h)										
169.44 (126.35)	9293 (41.34)	6.84 (11.01)	1594	1.8	0.395 (0.240)	17.70 (3.49)	0.014 (0.008)	215 (102)	67 (19)	28.97 (98.10)
8.1 mph (13.0 km/h)										
167.60 (124.98)	7896 (35.12)	7.96 (12.81)	1601	1.5	0.398 (0.242)	17.57 (3.46)	0.014 (0.009)	216 (102)	66 (19)	28.96 (98.07)
9.2 mph (14.8 km/h)										
166.67 (124.28)	6878 (30.59)	9.09 (14.63)	1570	1.1	0.399 (0.243)	17.52 (3.45)	0.011 (0.007)	217 (103)	67 (20)	28.94 (98.00)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 1700 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)	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)
5th Gear										
131.22 (97.85)	21607 (96.11)	2.28 (3.67)	2154	14.5	0.497 (0.302)	14.08 (2.77)	0.013 (0.008)	215 (102)	69 (20)	28.87 (97.77)
6th Gear										
148.91 (111.04)	21015 (93.48)	2.66 (4.27)	2126	13.0	0.475 (0.289)	14.72 (2.90)	0.012 (0.007)	216 (102)	53 (12)	28.89 (97.83)
7th Gear										
167.69 (125.04)	19944 (88.72)	3.16 (5.08)	2078	7.1	0.437 (0.266)	16.00 (3.15)	0.012 (0.007)	215 (102)	60 (15)	28.89 (97.83)
8th Gear										
178.52 (133.12)	18979 (84.42)	3.53 (5.68)	2005	6.3	0.425 (0.259)	16.46 (3.24)	0.012 (0.007)	216 (102)	66 (19)	28.87 (97.77)
9th Gear										
185.89 (138.62)	17915 (79.69)	3.89 (6.26)	1902	5.2	0.419 (0.255)	16.71 (3.29)	0.013 (0.008)	216 (102)	72 (22)	28.87 (97.77)
10th Gear										
190.06 (141.73)	16471 (73.26)	4.33 (6.97)	1816	4.2	0.407 (0.248)	17.18 (3.38)	0.012 (0.007)	216 (102)	73 (23)	28.87 (97.77)
11th Gear										
191.25 (142.62)	15212 (67.66)	4.72 (7.59)	1700	3.4	0.404 (0.246)	17.32 (3.41)	0.012 (0.007)	215 (102)	64 (18)	28.97 (98.10)
12th Gear										
192.34 (143.42)	13204 (58.73)	5.46 (8.79)	1700	2.7	0.400 (0.243)	17.48 (3.44)	0.012 (0.007)	216 (102)	67 (19)	28.97 (98.10)
13th Gear										
191.53 (142.82)	11323 (50.37)	6.34 (10.20)	1700	2.3	0.400 (0.244)	17.47 (3.44)	0.012 (0.007)	217 (103)	66 (19)	28.96 (98.07)
14th Gear										
193.31 (144.15)	9953 (44.27)	7.28 (11.72)	1700	1.9	0.400 (0.243)	17.50 (3.45)	0.013 (0.008)	217 (103)	68 (20)	28.94 (98.00)
15th Gear										
191.71 (142.96)	8515 (37.88)	8.44 (13.58)	1700	1.7	0.403 (0.245)	17.37 (3.42)	0.012 (0.007)	217 (103)	68 (20)	28.94 (98.00)

Shiftable PTO Performance

Economy mode

1003 PTO rpm @ 1763 engine rpm

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)
200.10 (149.21)	1764	10.51 (39.80)	0.367 (0.224)	19.03 (3.75)	0.30 (1.15)
150.25 (112.04)	1764	8.09 (30.62)	0.377 (0.229)	18.57 (3.66)	0.25 (0.94)
99.94 (74.52)	1763	5.77 (21.85)	0.404 (0.246)	17.31 (3.41)	0.16 (0.61)
50.15 (37.40)	1764	3.74 (14.16)	0.522 (0.317)	13.40 (2.64)	0.09 (0.33)
1.39 (1.04)	1762	1.86 (7.04)	9.319 (5.669)	0.75 (0.15)	0.07 (0.27)

Normal mode

1000 PTO rpm @ 1967 engine rpm

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)
199.38 (148.68)	1967	11.01 (41.66)	0.386 (0.235)	18.12 (3.57)	0.28 (1.05)
150.13 (111.95)	1975	8.56 (32.40)	0.399 (0.243)	17.54 (3.46)	0.20 (0.74)
100.00 (74.57)	1972	6.29 (23.80)	0.440 (0.267)	15.91 (3.13)	0.13 (0.48)
50.07 (37.34)	1968	4.19 (15.86)	0.585 (0.356)	11.95 (2.35)	0.08 (0.30)
1.35 (1.00)	1970	2.33 (8.80)	12.070 (7.342)	0.58 (0.11)	0.11 (0.41)

HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: Yes

OECD Static test

Maximum force exerted through whole range:

lift cylinders
12408 lbs (55.2 kN) (2 x 90 mm)
15324 lbs (68.2 kN) (2 x 100 mm)

i) Sustained pressure at compensator cutoff:

45 cc pump 63 cc pump 85 cc pump
2985 psi (206 bar) 2922 psi (201 bar) 2931 psi (202 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed:

three outlet sets combined
34.5 GPM (130.6 l/min) 44.3 GPM (167.7 l/min) 58.3 GPM (220.7 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

33.5 GPM (126.9 l/min) 42.8 GPM (162.2 l/min) 57.5 GPM (217.6 l/min)

Delivery pressure:

2845 psi (196 bar) 2762 psi (190 bar) 2571 psi (177 bar)

Power:

55.6 HP (41.5 kW) 69.0 HP (51.5 kW) 86.2 HP (64.3 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed:

34.1 GPM (129.1 l/min) 36.0 GPM (136.1 l/min) 36.4 GPM (137.9 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

33.3 GPM (126.1 l/min) 34.3 GPM (129.8 l/min) 35.4 GPM (134.0 l/min)

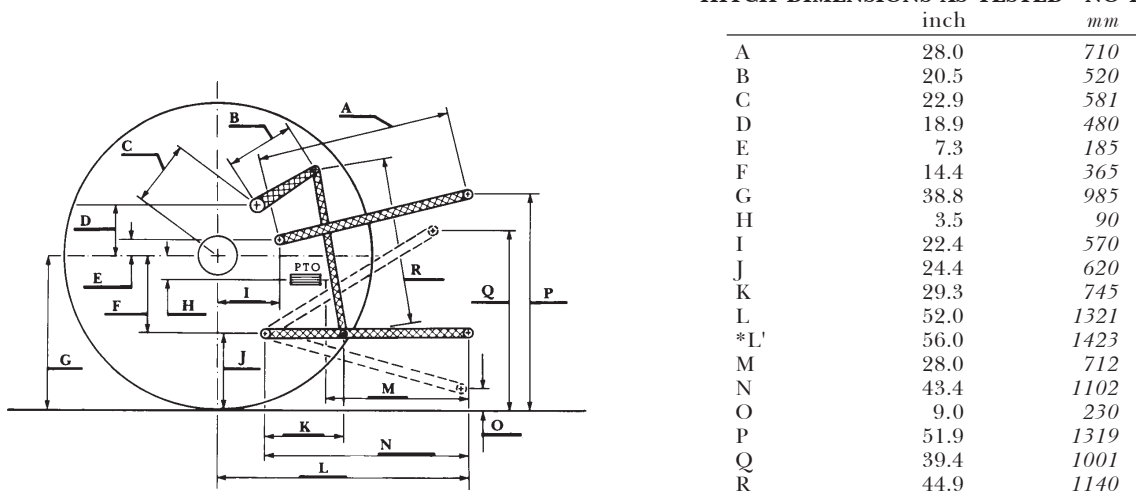
Delivery pressure:

2423 psi (167 bar) 2380 psi (158 bar) 2244 psi (155 bar)

Power:

47.1 HP (35.1 kW) 47.6 HP (35.5 kW) 46.4 HP (34.6 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD



*L' to Quick Attach ends

NTTL.(2017) Nebraska OECD tractor test 2179 for John Deere 7210R e23 Diesel.
Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



JOHN DEERE 7210R DIESEL
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln