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January 2003

## Test 1817: John Deere 7420 Powrquad Diesel 20-Speed

Nebraska Tractor Test Lab

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

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# NEBRASKA OECD TRACTOR TEST 1817-SUMMARY 394

## JOHN DEERE 7420 POWRQUAD DIESEL

### 20 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
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#### MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—(PTO speed—1003 rpm)					
116.56 (86.92)	2101	6.74 (25.53)	0.404 (0.246)	17.29 (3.41)	
Maximum Power (2 hours)					
127.38 (94.99)	1801	6.81 (25.79)	0.373 (0.227)	18.70 (3.68)	

#### VARYING POWER AND FUEL CONSUMPTION

116.56 (86.92)	2101	6.74 (25.53)	0.404 (0.246)	17.29 (3.41)	Air temperature
102.37 (76.34)	2175	6.10 (23.10)	0.416 (0.253)	16.78 (3.31)	75°F (24°C)
78.17 (58.29)	2204	5.07 (19.19)	0.453 (0.275)	15.42 (3.04)	Relative humidity
52.77 (39.35)	2232	4.08 (15.45)	0.540 (0.329)	12.93 (2.55)	47%
26.58 (19.82)	2250	3.09 (11.71)	0.813 (0.494)	8.59 (1.69)	Barometer
2.04 (1.52)	2250	2.11 (7.97)	7.189 (4.373)	0.97 (0.19)	29.29" Hg (99.19 kPa)

Maximum Torque - 414 lb.-ft. (561 Nm) at 1398 rpm

Maximum Torque Rise - 41.9%

Torque rise at 1702 engine rpm - 33%

#### 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 cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B3) Gear									
102.86 (76.70)	8738 (38.87)	4.41 (7.10)	2101	3.68	0.458 (0.279)	15.25 (3.00)	183 (84)	64 (18)	29.10 (98.54)
75% of Pull at Maximum Power—7th (B3) Gear									
81.30 (60.63)	6566 (29.21)	4.64 (7.47)	2187	2.65	0.494 (0.300)	14.14 (2.79)	181 (83)	63 (17)	29.03 (98.31)
50% of Pull at Maximum Power—7th (B3) Gear									
55.53 (41.41)	4380 (19.48)	4.75 (7.65)	2219	1.76	0.573 (0.348)	12.19 (2.40)	173 (78)	67 (19)	29.03 (98.31)
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
81.57 (60.82)	6572 (29.23)	4.65 (7.49)	1648	2.57	0.440 (0.267)	15.88 (3.13)	181 (83)	66 (19)	29.03 (98.31)
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
55.60 (41.46)	4381 (19.49)	4.76 (7.66)	1670	1.68	0.492 (0.299)	14.20 (2.80)	172 (78)	68 (20)	29.03 (98.31)

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

**Dates of Test:** May 20-June 2, 2003

**Manufacturer:** John Deere Waterloo Works, P.O. Box 270, Waterloo Ia, USA, 50704

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8386 Fuel weight 6.982 lbs/gal (0.837 kg/l) Oil SAE 15W-40 API service classification CF-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant SAE 85W-140 API GL-5 Total time engine was operated: 30.0 hours

**ENGINE:** Make John Deere Diesel Type six cylinder vertical with turbocharger and intercooler Serial No. \*PE6068H242646\* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke 4.19" x 5.00" (106.5 mm x 127.0 mm) Compression ratio 17.0 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 returned fuel Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS:** Fuel rate: 46.5 - 48.3 lb/h (21.1 - 21.9 kg/h) High idle: 2245 - 2265 rpm Turbo boost: nominal 7.1 - 11.5 psi (49 - 79 kPa) as measured 10.4 psi (72 kPa)

**CHASSIS:** Type front wheel assist Serial No. \*RW7420R001882\* Tread width rear 60.0" (1524 mm) to 100.3" (2548 mm) front 59.4" (1510 mm) to 88.0" (2235 mm) Wheelbase 104.3" (2650 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (4) range operator controlled power shift Nominal travel speeds mph (km/h) first 1.50 (2.41) second 1.80 (2.90) third 2.16 (3.48) fourth 2.65 (4.26) fifth 3.18 (5.11) sixth 3.83 (6.16) seventh 4.58 (7.37) eighth 5.06 (8.14) ninth 5.61 (9.03) tenth 6.09 (9.80) eleventh 7.29 (11.74) twelfth 8.94 (14.38) thirteenth 9.36 (15.06) fourteenth 11.27 (18.14) fifteenth 13.50 (21.72) sixteenth 13.53 (21.78) seventeenth 16.30 (26.23) eighteenth 16.54 (26.61) nineteenth 19.52 (31.41) twentieth 23.91 (38.48) reverse 1.57 (2.52), 1.88 (3.03), 2.26 (3.63), 2.77 (4.45), 3.13 (5.33), 3.99 (6.42), 4.78 (7.69), 5.28 (8.49), 5.85 (9.42), 6.35 (10.22), 7.61 (12.25), 9.32 (15.00), 9.77 (15.72), 11.76 (18.92), 14.09 (22.67), 14.12 (22.73), 17.01 (27.37), 17.26 (27.77), 20.37 (32.78), 24.94 (40.15)

**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)	Temp. °F (°C) cool- ing med	Barom. inch Hg (kPa)		
4th(A4)Gear									
81.51 (60.78)	12802 (56.95)	2.39 (3.84)	2173	12.75	0.538 (0.327)	12.98 (2.56)	178 (81)	55 (13)	29.03 (98.31)
5th(B1)Gear									
93.44 (69.68)	12368 (55.01)	2.83 (4.56)	2134	12.17	0.504 (0.307)	13.84 (2.73)	181 (83)	59 (15)	29.03 (98.31)
6th(B2)Gear									
101.42 (75.63)	10541 (46.89)	3.61 (5.81)	2101	5.74	0.466 (0.283)	14.99 (2.95)	183 (84)	66 (19)	29.10 (98.54)
7th(B3) Gear									
102.86 (76.70)	8738 (38.87)	4.41 (7.10)	2101	3.68	0.458 (0.279)	15.25 (3.00)	183 (84)	64 (18)	29.10 (98.54)
8th(C1)Gear									
102.67 (76.56)	7866 (34.99)	4.89 (7.88)	2098	2.97	0.459 (0.279)	15.22 (3.00)	182 (83)	64 (18)	29.10 (98.54)
9th(B4)Gear									
101.62 (75.78)	6963 (30.97)	5.47 (8.81)	2101	2.65	0.466 (0.283)	15.00 (2.95)	183 (84)	63 (17)	29.11 (98.58)
10th(C2)Gear									
102.24 (76.24)	6470 (28.78)	5.93 (9.54)	2099	2.57	0.460 (0.280)	15.18 (2.99)	183 (84)	67 (19)	29.08 (98.48)
11th(C3)Gear									
102.31 (76.29)	5386 (23.96)	7.12 (11.46)	2094	2.00	0.461 (0.281)	15.13 (2.98)	183 (84)	68 (20)	29.08 (98.48)
12th(C4)Gear									
98.77 (73.65)	4214 (18.74)	8.79 (14.15)	2099	1.43	0.475 (0.289)	14.70 (2.90)	183 (84)	69 (21)	29.06 (98.41)

**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 1995 engine rpm or 1000 rpm at 2093 engine rpm **Unladen tractor mass** 12890 lb (5847 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. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 113°F(45°C). The pull in 4<sup>th</sup>(A4) gear(unballasted tractor) was limited to avoid excessive tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1817**, Nebraska Summary 394, July 1, 2003.

Leonard L. Bashford  
Director

M.F. Kocher  
V.I. Adamchuk  
W.P. Campbell  
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 7th (B3) gear	71.8	71.6
Transport speed-no load- 20th(E4) gear		74.6
Bystander in 20th (E4) Gear		82.4

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Two 480/80R38;**,16(110)	Two 480/80R38;**,12(85)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	1950 lb (885 kg)	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Two 380/85R28;**,15(105)	Two 380/85R28;**,10(70)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	640 lb (290 kg)	None
<b>Height of Drawbar</b>	21.5 in (545 mm)	20.0 in (510 mm)
<b>Static Weight with operator</b> - Rear	10080 lb (4572 kg)	8330 lb (3778 kg)
- Front	5575 lb (2529 kg)	4735 lb (2148 kg)
- Total	15655 lb (7101 kg)	13065 lb (5926 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED (1800 RPM)**  
**MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
4th(A4)Gear									
82.98 (61.88)	12928 (57.50)	2.41 (3.87)	2172	12.04	0.531 (0.323)	13.14 (2.59)	175 (79)	55 (13)	29.03 (98.31)
5th(B1)Gear									
93.52 (69.74)	12389 (55.11)	2.83 (4.56)	2132	12.17	0.502 (0.305)	13.91 (2.74)	181 (83)	59 (15)	29.03 (98.31)
6th(B2) Gear									
106.03 (79.07)	11896 (52.92)	3.34 (5.38)	2004	8.22	0.461 (0.280)	15.15 (2.98)	183 (84)	61 (16)	29.03 (98.31)
7th(B3) Gear									
109.71 (81.81)	10783 (47.96)	3.82 (6.14)	1876	6.78	0.438 (0.267)	15.93 (3.14)	183 (84)	66 (19)	29.09 (98.51)
8th(C1)Gear									
110.41 (82.33)	10016 (44.55)	4.13 (6.65)	1807	4.84	0.433 (0.263)	16.14 (3.18)	184 (84)	77 (25)	28.52 (96.58)
9th(B4)Gear									
111.67 (83.27)	9055 (40.28)	4.62 (7.44)	1802	3.83	0.427 (0.260)	16.33 (3.22)	184 (84)	65 (18)	29.10 (98.54)
10th(C2)Gear									
112.53 (83.91)	8362 (37.20)	5.05 (8.12)	1800	3.36	0.423 (0.257)	16.50 (3.25)	182 (83)	64 (18)	29.10 (98.54)
11th(C3)Gear									
112.20 (83.67)	6935 (30.85)	6.07 (9.76)	1798	2.81	0.423 (0.257)	16.51 (3.25)	184 (84)	68 (20)	29.08 (98.48)
12th(C4)Gear									
110.36 (82.30)	5528 (24.59)	7.49 (12.05)	1798	2.09	0.431 (0.262)	16.20 (3.19)	184 (84)	69 (21)	29.01 (98.24)
13th(D1)Gear									
109.94 (81.99)	5253 (23.36)	7.85 (12.63)	1796	1.84	0.433 (0.263)	16.12 (3.18)	184 (84)	70 (21)	29.06 (98.41)
14th(D2)Gear									
108.02 (80.55)	4262 (18.96)	9.50 (15.30)	1798	1.60	0.440 (0.268)	15.87 (3.13)	184 (84)	71 (22)	29.05 (98.37)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE DISENGAGED**  
**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 cool- ing med	(°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B3)Gear									
101.20 (75.47)	8768 (39.00)	4.33 (6.97)	2099	4.91	0.465 (0.283)	15.02 (2.96)	183 (84)	64 (18)	28.99 (98.17)
75% of Pull at Maximum Power—7th(B3) Gear									
80.42 (59.97)	6583 (29.28)	4.58 (7.37)	2187	3.60	0.501 (0.305)	13.92 (2.74)	182 (83)	70 (21)	28.99 (98.17)
50% of Pull at Maximum Power—7th (B3)Gear									
55.08 (41.08)	4386 (19.51)	4.71 (7.58)	2218	2.26	0.577 (0.351)	12.10 (2.38)	176 (80)	73 (23)	28.99 (98.17)
75% of Pull at Reduced Engine Speed—10th(C2) Gear									
80.23 (59.83)	6575 (29.24)	4.58 (7.36)	1646	3.68	0.448 (0.273)	15.57 (3.07)	181 (83)	72 (22)	28.99 (98.17)
50% of Pull at Reduced Engine Speed—10th(C2) Gear									
54.93 (40.96)	4384 (19.50)	4.70 (7.56)	1665	2.18	0.498 (0.303)	14.03 (2.76)	175 (79)	72 (22)	28.99 (98.17)
MAXIMUM POWER IN SELECTED GEARS									
5th(B1) Gear									
82.92 (61.83)	11153 (49.61)	2.79 (4.49)	2171	14.65	0.539 (0.328)	12.95 (2.55)	180 (82)	63 (17)	29.07 (98.44)
6th(B2) Gear									
97.05 (72.37)	10526 (46.82)	3.46 (5.56)	2101	9.11	0.488 (0.297)	14.31 (2.82)	183 (84)	67 (19)	29.07 (98.44)
7th(B3) Gear									
101.20 (75.47)	8768 (39.00)	4.33 (6.97)	2099	4.91	0.465 (0.283)	15.02 (2.96)	183 (84)	64 (18)	28.99 (98.17)
8th(C1)Gear									
101.19 (75.46)	7860 (34.96)	4.83 (7.77)	2102	4.22	0.464 (0.282)	15.05 (2.96)	183 (84)	62 (17)	28.99 (98.17)
9th(B4)Gear									
100.22 (74.73)	6971 (31.01)	5.39 (8.68)	2099	3.29	0.471 (0.286)	14.83 (2.92)	183 (84)	61 (16)	28.99 (98.17)
10th (C2)Gear									
101.29 (75.53)	6472 (28.79)	5.87 (9.45)	2098	2.97	0.465 (0.283)	15.00 (2.96)	184 (84)	58 (14)	28.98 (98.14)
11th(C3)Gear									
100.88 (75.23)	5349 (23.79)	7.07 (11.38)	2099	2.58	0.468 (0.284)	14.93 (2.94)	183 (84)	59 (15)	28.98 (98.14)
12th (C4)Gear									
98.04 (73.11)	4223 (18.78)	8.71 (14.01)	2098	1.94	0.484 (0.294)	14.43 (2.84)	183 (84)	60 (16)	28.98 (98.14)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE ENGAGED (1800 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
89.97 (67.09)	14629 (65.07)	2.31 (3.71)	2138	14.46	4th(A4)Gear 0.524 (0.319)	13.33 (2.63)	178 (81)	60 (16)	29.05 (98.37)
102.44 (76.39)	13523 (60.15)	2.84 (4.57)	2054	8.65	5th(B1)Gear 0.468 (0.285)	14.91 (2.94)	183 (84)	65 (18)	29.07 (98.44)
109.85 (81.91)	12656 (56.29)	3.26 (5.24)	1920	6.92	6th(B2)Gear 0.442 (0.269)	15.80 (3.11)	184 (84)	69 (21)	29.07 (98.44)
111.94 (83.47)	11275 (50.15)	3.72 (5.99)	1803	5.44	7th(B3)Gear 0.427 (0.259)	16.37 (3.22)	183 (84)	64 (18)	28.99 (98.17)
112.34 (83.77)	10142 (45.11)	4.15 (6.69)	1801	4.15	8th(C1)Gear 0.425 (0.259)	16.43 (3.24)	184 (84)	63 (17)	28.99 (98.17)
112.58 (83.95)	9074 (40.36)	4.65 (7.49)	1803	3.51	9th(B4)Gear 0.424 (0.258)	16.45 (3.24)	184 (84)	61 (16)	28.99 (98.17)
113.40 (84.56)	8395 (37.34)	5.07 (8.15)	1804	3.27	10th(C2)Gear 0.422 (0.257)	16.53 (3.26)	184 (84)	63 (17)	28.99 (98.17)
112.50 (83.89)	6908 (30.73)	6.11 (9.83)	1802	2.40	11th(C3)Gear 0.424 (0.258)	16.48 (3.25)	183 (84)	59 (15)	28.98 (98.14)
110.48 (82.38)	5510 (24.51)	7.52 (12.10)	1801	1.99	12th(C4)Gear 0.432 (0.263)	16.18 (3.19)	183 (84)	60 (16)	28.98 (98.14)
110.37 (82.30)	5223 (23.23)	7.92 (12.75)	1809	1.75	13th(D1)Gear 0.431 (0.262)	16.20 (3.19)	184 (84)	60 (16)	28.98 (98.14)
107.88 (80.45)	4244 (18.88)	9.53 (15.34)	1801	1.67	14th(D2)Gear 0.443 (0.270)	15.75 (3.10)	183 (84)	60 (16)	28.98 (98.14)

## THREE POINT HITCH PERFORMANCE (OECD Static Test)

### CATEGORY: II

Quick Attach: None

Maximum Force Exerted Through Whole Range: 7911 lbs (34.6 kN) (2x80 mm)  
8967 lbs (39.9 kN) (2x85 mm)

### CATEGORY: IIIN

Quick Attach: None

Maximum Force Exerted Through Whole Range: 7961 lbs (35.4 kN) (2x80 mm)  
8960 lbs (39.9 kN) (2x85 mm)

i) Opening pressure of relief valve:	NA	
Sustained pressure at compensator cutoff:	2930 psi (202 bar)	
ii) Pump delivery rate at minimum pressure and rated engine speed:	<b>1 outlet set</b> 29.6 GPM (112.0 l/min)	<b>2 outlet sets combined</b> 30.0 GPM (113.6 l/min)
iii) Pump delivery rate at maximum hydraulic power:	29.1 GPM (110.2 l/min)	30.4 GPM (115.1 l/min)
Delivery pressure:	2309 psi (159 bar)	2504 psi (173 bar)
Power:	39.2 Hp (29.2 kW)	44.4 HP (33.1 kW)

## THREE POINT HITCH PERFORMANCE - SAE TEST

Observed Maximum Pressure psi. (bar)	2910 (201)
Location:	lift cylinders
Hydraulic oil temperature: °F (°C)	140 (60)
Location:	hydraulic sump
Category:	II, IIIN
Quick attach:	No

### Category II—80 mm cylinders - System pressure 2545 psi (175 Bar)

Hitch point distance to ground level in. (mm)	7.9 (200)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	11901	10993	10190	9420	8354
" " " " " " (kN)	(52.9)	(48.9)	(45.3)	(41.9)	(37.2)

### Category II—85 mm cylinders - System pressure 2545 psi (175 Bar)

Hitch point distance to ground level in. (mm)	7.9 (200)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	11787	12467	11544	10635	9503
" " " " " " (kN)	(60.1)	(55.5)	(51.4)	(47.3)	(42.3)

### Category IIIN—80 mm cylinders - System pressure 2545 psi (175 Bar)

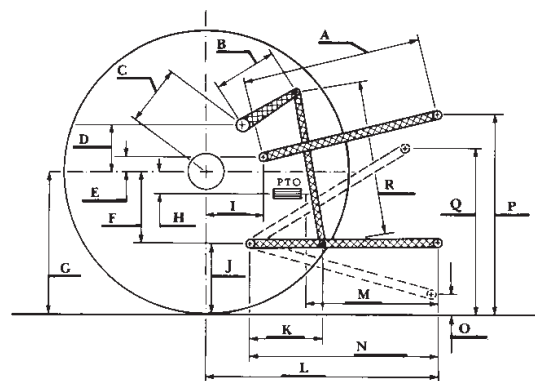
Hitch point distance to ground level in. (mm)	7.9 (200)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	11787	10948	10144	9254	7830
" " " " " " (kN)	(52.4)	(48.7)	(45.1)	(41.2)	(34.8)

### Category IIIN—85 mm cylinders - System pressure 2545 psi (175 Bar)

Hitch point distance to ground level in. (mm)	7.9 (200)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	13393	12433	11485	10297	8913
" " " " " " (kN)	(59.6)	(55.3)	(51.1)	(45.8)	(39.6)

## HITCH DIMENSIONS AS TESTED—NO LOAD Category II

	SAE TEST		OECD TEST	
	inch	mm	inch	mm
A	26.0	660	27.6	700
B	15.7	400	15.7	400
C	21.8	554	21.8	554
D	20.6	523	20.6	523
E	8.6	218	8.6	218
F	9.8	250	9.8	250
G	32.3	820	32.3	820
H	3.1	80	3.1	80
I	18.1	461	18.1	461
J	22.5	570	22.5	570
K	21.5	547	21.5	547
L	44.9	1140	44.9	1140
M	20.5	520	20.5	520
N	38.6	980	38.6	980
O	8.0	203	8.0	203
P	41.5	1054	46.5	1180
Q	34.8	883	34.8	883
R	34.6	880	34.6	880



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