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## Test 1259: Allis-Chalmers 7020 Power Shift Diesel

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 1259

## ALLIS-CHALMERS 7020 POWER SHIFT DIESEL

### POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption		Hp.hr/gal (kW.h/l)	Temperature °F (°C)			Barometer inch Hg (kPa)	
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)		Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1021 rpm)									
123.79 (92.31)	2300	7.788 (29.481)	0.436 (0.265)	15.90 (3.131)	191 (88.2)	59 (15.0)	75 (24.0)	29.003 (97.940)	
Standard Power Take-off Speed (1000 rpm)—One Hour									
123.50 (92.10)	2253	7.713 (29.197)	0.433 (0.263)	16.01 (3.154)	191 (88.5)	59 (14.9)	75 (23.9)	29.025 (98.013)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
112.27 (83.72)	2452	7.468 (28.268)	0.461 (0.280)	15.04 (2.962)	188 (86.7)	58 (14.4)	75 (23.9)	..... .....	
0.00 (0.00)	2570	2.543 (9.625)	..... .....	..... .....	178 (81.4)	58 (14.2)	74 (23.3)	..... .....	
57.34 (42.76)	2512	4.968 (18.807)	0.600 (0.365)	11.54 (2.274)	184 (84.7)	58 (14.7)	75 (23.9)	..... .....	
124.04 (92.50)	2300	7.788 (29.481)	0.435 (0.265)	15.93 (3.137)	192 (88.6)	58 (14.7)	76 (24.4)	..... .....	
29.02 (21.64)	2542	3.734 (14.134)	0.891 (0.542)	7.77 (1.531)	180 (82.2)	58 (14.4)	75 (23.9)	..... .....	
85.20 (63.53)	2480	6.250 (23.660)	0.508 (0.309)	13.63 (2.685)	187 (86.1)	58 (14.4)	76 (24.2)	..... .....	
Av Av	67.98 (50.69)	2476	5.458 (20.662)	0.556 (0.338)	12.45 (2.453)	185 (85.0)	58 (14.5)	75 (23.9)	29.013 (97.974)

### DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel gal/hr (l/h)	Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Temp. °F (°C)			Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th (1-F) Gear												
101.89 (75.98)	8199 (36.47)	4.66 (7.50)	2299	7.61	7.779 (29.445)	0.529 (0.322)	13.10 (2.580)	186 (85.6)	48 (8.9)	63 (16.9)	28.925 (97.675)	
75% of Pull at Maximum Power—Ten Hours 5th (1-F) Gear												
85.93 (64.08)	6323 (28.12)	5.10 (8.20)	2457	5.51	7.013 (26.549)	0.565 (0.344)	12.25 (2.414)	183 (83.7)	49 (9.4)	61 (16.1)	28.931 (97.696)	
50% of Pull at Maximum Power—Two Hours 5th (1-F) Gear												
59.53 (44.39)	4218 (18.76)	5.29 (8.52)	2510	3.87	5.757 (21.794)	0.670 (0.408)	10.34 (2.037)	181 (82.8)	41 (5.0)	47 (8.1)	28.930 (97.692)	
50% of Pull at Reduced Engine Speed—Two Hours 7th (2-F) Gear												
59.08 (44.06)	4194 (18.66)	5.28 (8.50)	1815	3.79	4.638 (17.558)	0.544 (0.331)	12.74 (2.509)	180 (82.2)	46 (7.8)	57 (13.9)	28.950 (97.760)	
MAXIMUM POWER IN SELECTED GEARS												
76.15 (56.78)	12001 (53.38)	2.38 (3.83)	2494	14.88	2nd (2S) Gear			182 (83.1)	38 (3.3)	41 (5.0)	28.890 (97.557)	
99.21 (73.98)	9115 (40.55)	4.08 (6.57)	2298	8.69	4th (4S) Gear			188 (86.4)	51 (10.6)	68 (20.0)	28.860 (97.456)	
104.52 (77.94)	8433 (37.51)	4.65 (7.48)	2299	7.87	5th (1F) Gear			188 (86.4)	49 (9.4)	66 (18.9)	28.860 (97.456)	
96.59 (72.02)	6970 (31.00)	5.20 (8.36)	2300	6.34	6th (5S) Gear			187 (86.1)	50 (10.0)	66 (18.9)	28.860 (97.456)	
105.36 (78.56)	5992 (26.66)	6.59 (10.61)	2298	5.24	7th (2F) Gear			186 (85.6)	49 (9.4)	64 (17.8)	28.860 (97.456)	
102.37 (76.34)	4160 (18.50)	9.23 (14.85)	2300	3.71	9th (3F) Gear			186 (85.6)	50 (10.0)	65 (18.3)	28.860 (97.456)	

Department of Agricultural Engineering

Dates of Test: October 10 to 21, 1977

Manufacturer: ALLIS-CHALMERS CORPORATION, P.O. Box 512, Milwaukee, Wisconsin 53201

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 50.8 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8318 **Fuel weight** 6.926 lbs/gal (0.832 kg/l) **Oil SAE 30 API service classification** SE-CD **To motor** 3.281 gal (12.420 l) **Drained from motor** 2.686 gal (10.168 l) **Transmission and final drive lubricant** Allis-Chalmers 821 Power Fluid **Total time engine was operated** 45.5 hours

**ENGINE Make** Allis-Chalmers Diesel **Type** 6 cylinder vertical with turbocharger and inter-cooler **Serial No.** 49-00004 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 3.875" × 4.25" (98.4 mm × 108.0 mm) **Compression ratio** 16.25 to 1 **Displacement** 301 cu in (4928 ml) **Cranking system** 12 volt **Lubrication pressure** **Air cleaner** one paper element **Oil filter** two full flow screw-on paper cartridges and one by-pass element **Oil cooler** engine coolant heat exchanger for crankcase oil and radiator for transmission and hydraulic fluid **Fuel filter** one snap-on paper cartridge **Muffler** vertical **Cooling medium temperature control** 2 thermostats

**CHASSIS: Type** standard **Serial No.** 7020S-1004 **Tread width** rear 64" (1626 mm) to 97" (2464 mm) front 62" (1575 mm) to 90" (2286 mm) **Wheel base** 106" (2692 mm) **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.2" (767 mm) Vertical distance above roadway 39.2" (996 mm) Horizontal distance from center of rear wheel tread 0" (0 mm) to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (6) range operator controlled power shift **Advertised speeds mph (km/h)** first 1.9 (3.1) second 2.6 (4.2) third 3.6 (5.8) fourth 4.5 (7.2) fifth 5.1 (8.2) sixth 5.6 (9.0) seventh 7.0 (11.3) eighth 7.1 (11.4) ninth 9.7 (15.6) tenth 12.2 (19.6) eleventh 15.1 (24.3) twelfth 19.0 (30.6) reverse 3.1 (5.0), 8.2 (13.2) **Clutch** multiple wet disc power actuated and operated by foot pedal **Brakes** multiple wet disc power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 152.5" (3.87 m) left 151.5" (3.85 m) (on concrete surface without brake) right 173.2" (4.40 m) left 172.7" (4.39 m) **Turning space diameter** (on concrete surface with

# LUGGING ABILITY IN RATED GEAR 5th (1F)

Crankshaft Speed rpm	2299	2070	1842	1609	1376	1148
Pull—lbs (kN)	8433 (37.51)	9254 (41.16)	9646 (42.91)	9769 (43.45)	9668 (43.00)	6826 (30.37)
Increase in Pull %	0	10	14	16	15	-19
Power—Hp (kW)	104.52 (77.94)	102.05 (76.10)	94.01 (70.10)	82.91 (61.83)	70.18 (52.33)	42.94 (32.02)
Speed—Mph (km/h)	4.65 (7.48)	4.14 (6.65)	3.65 (5.88)	3.18 (5.12)	2.72 (4.38)	2.36 (3.80)
Slip %	7.87	8.91	9.64	9.78	9.78	6.34

# TRACTOR SOUND LEVEL WITH CAB

dB(A)

Maximum Available Power—Two Hours	78.0
75% of Pull at Maximum Power—Ten Hours	78.5
50% of Pull at Maximum Power—Two Hours	77.0
50% of Pull at Reduced Engine Speed—Two Hours	76.5
Bystander in 11th (5F) gear	89.5

# TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
<b>Rear Tires</b>			
—No., size, ply & psi (kPa)		Two 20.8-38; 8; 18 (120)	Two 20.8-38; 8; 18 (120)
Ballast			
—Liquid (each)		1520 lb (689 kg)	None
—Cast Iron (each)		300 lb (136 kg)	None
<b>Front Tires</b>			
—No., size, ply & psi (kPa)		Two 11.00-16; 8; 40 (280)	Two 11.00-16; 8; 40 (280)
Ballast			
—Liquid (each)		None	None
—Cast Iron (each)		100 lb (45 kg)	None
<b>Height of drawbar</b>		22 in (560 mm)	22 in (560 mm)
<b>Static weight with operator—rear</b>		12050 lb (5466 kg)	8410 lb (3815 kg)
<b>front</b>		3560 lb (1615 kg)	3360 lb (1524 kg)
<b>total</b>		15610 lb (7081 kg)	11770 lb (5339 kg)

brake applied) right 317" (8.05 m) left 315" (8.00 m) (on concrete surface without brake) right 358.5" (9.11 m) left 357.5" (9.08 m) **Power take-off** 1000 rpm at 2253 engine rpm.

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

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump return was 152°F (66.5°C). Six gears were chosen between 15% slip and 15 mph (24.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1259**.

LOUIS I. LEVITICUS  
Engineer-in Charge

G. W. STEINBRUEGGE, Chairman  
W. E. SPLINTER  
K. VON BARGEN  
Board of Tractor Test Engineers



Allis-Chalmers 7020 Power Shift Diesel