

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

1-1-1981

## Test 1383: Case 1690 Manual Diesel 12-Speed

Nebraska Tractor Test Lab

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

---

Nebraska Tractor Test Lab, "Test 1383: Case 1690 Manual Diesel 12-Speed" (1981). *Nebraska Tractor Tests*. 1703.

<https://digitalcommons.unl.edu/tractormuseumlit/1703>

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 TRACTOR TEST 1383 — CASE 1690 MANUAL DIESEL 12 SPEED (WITH MECHANICAL FRONT WHEEL DRIVE)

## POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption		Temperature °F (°C)				Barometer inch Hg (kPa)	
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1123 rpm)									
90.39 (67.40)	2300	5.803 (21.967)	0.450 (0.274)	15.58 (3.068)	188 (86.4)	59 (14.8)	75 (23.8)	28.777 (97.174)	
Standard Power take-off Speed (1000 rpm)—One Hour									
87.76 (65.44)	2048	5.500 (20.820)	0.439 (0.267)	15.95 (3.143)	194 (90.2)	60 (15.5)	75 (24.1)	28.815 (97.304)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
78.07 (58.22)	2340	4.829 (18.280)	0.434 (0.264)	16.16 (3.185)	182 (83.1)	60 (15.6)	75 (23.6)	..... .....	
0.00 (0.00)	2448	1.336 (5.057)	..... .....	..... .....	177 (80.6)	60 (15.6)	75 (23.9)	..... .....	
39.99 (29.82)	2390	2.847 (10.777)	0.499 (0.303)	14.05 (2.767)	179 (81.7)	60 (15.6)	75 (23.9)	..... .....	
91.22 (68.02)	2300	5.900 (22.334)	0.453 (0.276)	15.46 (3.046)	187 (86.1)	60 (15.6)	75 (23.9)	..... .....	
20.19 (15.06)	2413	2.059 (7.794)	0.715 (0.435)	9.81 (1.932)	178 (81.1)	60 (15.6)	75 (23.9)	..... .....	
59.18 (44.13)	2368	3.725 (14.101)	0.441 (0.268)	15.89 (3.130)	180 (82.2)	60 (15.3)	74 (23.3)	..... .....	
Av Av	48.11 (35.88)	2377	3.449 (13.056)	0.502 (0.306)	13.95 (2.748)	180 (82.4)	60 (15.5)	75 (23.8)	28.853 (97.433)

## DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Cool- ing med	Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)		Air wet bulb	Air dry bulb		
Maximum Available Power—Two Hours 7th (3-2) Gear												
72.55 (54.10)	6302 (28.03)	4.32 (6.95)	2299	6.39	5.495 (20.801)	0.531 (0.323)	13.20 (2.600)	198 (92.2)	59 (15.0)	66 (18.9)	28.775 (97.170)	
75% of Pull at Maximum Power—Ten Hours 7th (3-2) Gear												
61.80 (46.09)	5145 (22.89)	4.50 (7.25)	2368	5.01	4.578 (17.328)	0.519 (0.316)	13.50 (2.660)	194 (90.2)	45 (7.3)	56 (13.4)	29.400 (99.270)	
50% of Pull at Maximum Power—Two Hours 7th (3-2) Gear												
42.73 (31.86)	3430 (15.26)	4.67 (7.52)	2405	2.93	3.479 (13.169)	0.570 (0.347)	12.28 (2.419)	182 (83.3)	50 (10.0)	52 (11.1)	28.975 (97.840)	
50% of Pull at Reduced Engine Speed—Two Hours 10th (3-3) Gear												
42.57 (31.75)	3419 (15.21)	4.67 (7.51)	1392	2.89	2.926 (11.076)	0.481 (0.293)	14.55 (2.866)	183 (83.9)	52 (11.1)	54 (12.2)	28.935 (97.710)	
MAXIMUM POWER IN SELECTED GEARS												
67.41 (50.27)	10536 (46.87)	2.40 (3.86)	2311	14.95	4th (3-1) Gear			187 (86.1)	54 (12.2)	56 (13.3)	28.810 (97.290)	
69.76 (52.02)	9382 (41.73)	2.79 (4.49)	2298	11.11	5th (1-3) Gear			192 (88.9)	55 (12.8)	60 (15.6)	28.830 (97.350)	
74.23 (55.35)	8503 (37.82)	3.27 (5.27)	2300	9.90	6th (2-2) Gear			206 (96.7)	43 (6.1)	55 (12.8)	29.530 (99.720)	
78.08 (58.22)	6855 (30.49)	4.27 (6.87)	2299	7.18	7th (3-2) Gear			204 (95.6)	45 (7.2)	57 (13.9)	29.540 (99.750)	
77.09 (57.49)	5457 (24.27)	5.30 (8.53)	2298	5.37	8th (4-1) Gear			202 (94.4)	43 (6.1)	53 (11.7)	29.570 (99.850)	
76.13 (56.77)	4768 (21.21)	5.99 (9.64)	2300	4.51	9th (2-3) Gear			203 (95.0)	45 (7.2)	57 (13.9)	29.550 (99.790)	
77.24 (57.60)	3775 (16.79)	7.67 (12.35)	2301	3.49	10th (3-3) Gear			206 (96.7)	43 (6.1)	55 (12.8)	29.530 (99.720)	
75.21 (56.08)	3163 (14.07)	8.92 (14.36)	2300	2.89	11th (4-2) Gear			206 (96.7)	43 (6.1)	55 (12.8)	29.520 (99.680)	

Department of Agricultural Engineering

Dates of Test: March 27-April 21, 1981

Manufacturer: J. I. CASE COMPANY, Racine,  
Wisconsin 53404

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel  
Cetane No. 46.3 (rating taken from oil company's  
inspection data) **Specific gravity converted to 60°/  
60° (15°/15°)** 0.8416 **Fuel weight** 7.007 lbs/gal  
(0.840 kg/l) **Oil SAE 30 API service classifica-  
tion CD-SE To motor** 3.552 gal (13.446 l)  
**Drained from motor** 2.638 gal (9.986 l) **Trans-  
mission lubricant** Case TFD fluid **Final drive  
lubricant** Case ETHB fluid **Front axle lubricant**  
Case FDL SAE 90 **Total time engine was oper-  
ated** 53.0 hours.

**ENGINE Make** Case Diesel **Type** six cylinder  
vertical **Serial No.** 330001 11450442 **Crankshaft**  
lengthwise **Rated rpm** 2300 **Bore and stroke**  
3.939" × 4.500" (100 mm × 114.3 mm) **Compress-  
ion ratio** 16 to 1 **Displacement** 329 cu in (5393  
ml) **Starting system** 12 volt **Lubrication pressure**  
**Air cleaner** two sets of two paper elements in pa-  
rallel with centrifugal precleaner **Oil filter** one  
full flow cartridge **Fuel filter** two paper elements  
with sediment bowl and screen **Muffler** vertical  
**Cooling medium temperature control** one ther-  
mostat.

**CHASSIS: Type** front wheel assist **Serial No.**  
1690/18/11210359 **Tread width** rear 60.75" (1543  
mm) to 85" (2159 mm) front 59" (1499 mm) to 71"  
(1803 mm) **Wheel base** 100.5" (2553 mm) **Center  
of gravity** (without operator or ballast, with mini-  
mum tread, with fuel tank filled and tractor serv-  
iced for operation) Horizontal distance forward  
from center-line of rear wheels 40.4" (1026 mm)  
Vertical distance above roadway 32.7" (831 mm)  
Horizontal distance from center of rear wheel  
tread 0" (0 mm) to the right/left **Hydraulic control  
system** direct engine drive **Transmission** selec-  
tive gear fixed ratio **Advertised speeds mph (km/  
h)** first 1.0 (1.7) second 1.7 (2.8) third 2.1 (3.4)  
fourth 2.7 (4.3) fifth 3.0 (4.8) sixth 3.5 (5.6)  
seventh 4.4 (7.0) eighth 5.3 (8.6) ninth 6.0 (9.6)  
tenth 7.6 (12.1) eleventh 8.7 (14.1) twelfth 15.1  
(24.3) reverse 1.8 (2.8), 3.5 (5.7), 4.5 (7.2), 8.9  
(14.3) **Clutch** single dry disc hydraulically oper-  
ated by foot pedal **Brakes** multiple wet disc hyd-  
raulically operated by two foot pedals which can  
be locked together and hand lever **Steering**  
hydrostatic **Turning radius** (on concrete surface  
with brake applied) right 166" (4.22 m) left 166"  
(4.22 m) (on concrete surface without brake) right  
213" (5.41 m) left 213" (5.41 m) **Turning space  
diameter** (on concrete surface with brake applied)  
right 347" (8.81 m) left 347" (8.81 m) (on concrete  
surface without brake) right 441" (11.20 m) left  
441" (11.20 m) **Power take-off** 1000 rpm at 2048  
engine rpm and 540 rpm at 2077 engine rpm.

### LUGGING ABILITY IN 7th (3-2) GEAR

Crankshaft Speed rpm	2299	2076	1840	1609	1375	1150
Pull—lbs (kN)	6855 (30.49)	7596 (33.79)	7989 (35.54)	8311 (36.97)	8390 (37.32)	8250 (36.70)
Increase in Pull %	0	11	17	21	22	20
Power—Hp (kW)	78.08 (58.22)	77.24 (57.60)	71.49 (53.31)	64.68 (48.23)	55.70 (41.54)	45.86 (34.20)
Speed—Mph (km/h)	4.27 (6.87)	3.81 (6.13)	3.36 (5.41)	2.92 (4.70)	2.49 (4.01)	2.08 (3.35)
Slip %	7.18	8.13	8.93	9.45	9.58	9.45

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	97.0	96.5
75% of Pull at Maximum Power—Ten Hours	99.5	
50% of Pull at Maximum Power—Two Hours	95.0	
50% of Pull at Reduced Engine Speed—Two Hours	90.5	
Bystander in 12th (4-3) gear		88.0

### DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Available Power—Two Hours 7th (3-2) Gear</b>											
70.30 (52.42)	6344 (28.22)	4.16 (6.69)	2299	8.63	5.477 (20.733)	0.546 (0.332)	12.84 (2.529)	201 (93.9)	55 (12.8)	72 (22.2)	28.900 (97.570)

### MAXIMUM POWER IN SELECTED GEARS

63.06 (47.02)	8785 (39.08)	2.69 (4.33)	2336	14.68	5th (1-3) Gear			195 (90.6)	55 (12.8)	66 (18.9)	28.860 (97.460)
76.29 (56.89)	6944 (30.89)	4.12 (6.63)	2300	9.35	7th (3-2) Gear			203 (95.0)	45 (7.2)	57 (13.9)	29.530 (99.720)
76.75 (57.23)	5602 (24.92)	5.14 (8.27)	2300	7.10	8th (4-1) Gear			201 (93.9)	44 (6.7)	56 (13.3)	29.560 (99.820)

### TIRES, BALLAST AND WEIGHT

Rear Tires		With Ballast		Without Ballast	
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Cast Iron (each)	Two 18.4-34; 6; 16 (110) 1190 lb (540 kg) 642 lb (291 kg)		Two 18.4-34; 6; 16 (110) None None	
Front Tires		With Ballast		Without Ballast	
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Cast Iron (each)	Two 13.6-24; 6; 18 (125) None 25 lb (11 kg)		Two 13.6-24; 6; 18 (125) None None	
Height of drawbar		20.5 in (520 mm)		20.5 in (520 mm)	
Static Weight with Operator—Rear		8915 lb (4044 kg)		5250 lb (2381 kg)	
Front		3555 lb (1612 kg)		3505 lb (1590 kg)	
Total		12470 lb (5656 kg)		8755 lb (3971 kg)	

**REPAIRS and ADJUSTMENTS:** During preliminary PTO tests, two injectors were replaced and all injectors were readjusted for proper pressure. The fuel transfer pump was replaced during preliminary drawbar tests. New injectors were installed after the 10 hour test.

**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 was 155°F (68.3°C). Eight gears were chosen between 15% slip and 10 mph (16.1 km/h). The performance figures on this report apply to those models equipped with mechanical front wheel drive. The exhaust valves of No. 1 and No. 6 cylinders were pitted.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1383.

LOUIS I. LEVITICUS  
Engineer-in Charge

K. VON BARGEN  
W. E. SPLINTER  
L. L. BASHFORD

Board of Tractor Test Engineers



Case 1690 Manual Diesel

The Agricultural Experiment Station  
Institute of Agriculture and Natural Resources  
University of Nebraska—Lincoln  
Roy G. Arnold, Director