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## Test 1380: Case 1390 Manual Diesel 12-Speed

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1380 — CASE 1390 MANUAL DIESEL 12 SPEED

## 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—1075 rpm)								
60.59 (45.18)	2200	3.969 (15.024)	0.459 (0.279)	15.27 (3.007)	212 (99.9)	58 (14.5)	75 (24.0)	28.785 (97.203)

Standard Power Take-off Speed (1000 rpm)—One Hour								
58.40 (43.55)	2047	3.748 (14.188)	0.450 (0.274)	15.58 (3.069)	213 (100.8)	58 (14.4)	75 (23.9)	28.760 (97.118)

VARYING POWER AND FUEL CONSUMPTION—Two Hours								
53.65 (40.01)	2293	3.468 (13.128)	0.453 (0.276)	15.47 (3.048)	196 (90.8)	58 (14.4)	75 (23.9)	.....
0.00 (0.00)	2360	1.028 (3.891)	.....	.....	171 (77.2)	58 (14.2)	75 (23.6)	.....
27.09 (20.20)	2314	2.012 (7.616)	0.520 (0.317)	13.46 (2.652)	176 (80.0)	58 (14.4)	75 (23.9)	.....
60.59 (45.18)	2200	3.977 (15.055)	0.460 (0.280)	15.24 (3.001)	210 (98.6)	58 (14.4)	76 (24.2)	.....
13.69 (10.21)	2342	1.494 (5.655)	0.765 (0.465)	9.16 (1.805)	173 (78.1)	58 (14.4)	76 (24.2)	.....
40.16 (29.95)	2288	2.633 (9.967)	0.460 (0.280)	15.25 (3.005)	179 (81.4)	58 (14.2)	75 (23.6)	.....
<b>Av 32.53</b> <b>Av (24.26)</b>	<b>2300</b>	<b>2.435</b> <b>(9.217)</b>	<b>0.525</b> <b>(0.319)</b>	<b>13.36</b> <b>(2.632)</b>	<b>184</b> <b>(84.3)</b>	<b>58</b> <b>(14.3)</b>	<b>75</b> <b>(23.9)</b>	<b>28.770</b> <b>(96.139)</b>

## DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 8th (4-1) Gear											
50.38 (37.57)	3834 (17.05)	4.93 (7.93)	2200	6.10	3.907 (14.789)	0.543 (0.331)	12.89 (2.541)	208 (97.5)	51 (10.6)	69 (20.6)	28.810 (97.290)
75% of Pull at Maximum Power—Ten Hours 8th (4-1) Gear											
41.23 (30.75)	2978 (13.25)	5.19 (8.35)	2275	4.31	3.115 (11.792)	0.529 (0.322)	13.24 (2.608)	186 (85.6)	53 (11.7)	66 (18.9)	28.600 (96.570)
50% of Pull at Maximum Power—Two Hours 8th (4-1) Gear											
28.35 (21.14)	1988 (8.84)	5.35 (8.61)	2314	3.02	2.408 (9.115)	0.595 (0.362)	11.77 (2.319)	181 (82.8)	50 (10.0)	58 (14.4)	28.750 (97.080)
50% of Pull at Reduced Engine Speed—Two Hours 10th (3-3) Gear											
28.27 (21.08)	1981 (8.81)	5.35 (8.61)	1610	2.88	1.962 (7.428)	0.486 (0.296)	14.40 (2.838)	182 (83.3)	52 (10.8)	64 (17.5)	28.790 (97.220)

## MAXIMUM POWER IN SELECTED GEARS

45.36 (33.82)	7348 (32.69)	2.31 (3.72)	2254	14.19	4th (3-1) Gear			181 (82.8)	45 (7.2)	50 (10.0)	28.690 (96.880)
48.67 (36.29)	7131 (31.72)	2.56 (4.12)	2200	13.72	5th (1-3) Gear			177 (80.6)	46 (7.8)	52 (11.1)	28.700 (96.920)
49.39 (36.83)	6033 (26.84)	3.07 (4.94)	2200	10.39	6th (2-2) Gear			194 (90.0)	48 (8.9)	62 (16.7)	28.940 (97.730)
51.61 (38.49)	4800 (21.35)	4.03 (6.49)	2200	7.59	7th (3-2) Gear			191 (88.3)	48 (8.9)	61 (16.1)	28.950 (97.760)
52.16 (38.90)	3974 (17.68)	4.92 (7.92)	2200	6.19	8th (4-1) Gear			182 (83.3)	44 (6.7)	55 (12.8)	28.990 (97.890)
50.92 (37.97)	3407 (15.16)	5.60 (9.02)	2198	5.19	9th (2-3) Gear			198 (92.2)	48 (8.9)	63 (17.2)	28.930 (97.690)
51.97 (38.75)	2696 (11.99)	7.23 (11.64)	2200	3.97	10th (3-3) Gear			198 (92.2)	49 (9.4)	65 (18.3)	28.920 (97.660)
50.49 (37.65)	2250 (10.01)	8.42 (13.55)	2200	3.31	11th (4-2) Gear			201 (93.9)	50 (10.0)	67 (19.4)	28.900 (97.590)

Department of Agricultural Engineering

Dates of Test: March 25 to April 10, 1980

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 1.789 gal (6.772 l) Drained  
from motor 1.496 gal (5.663 l) Transmission lub-  
ricant Case TFD fluid Final drive lubricant Case  
ETHB fluid Front axle lubricant Case FDL SAE  
90 Total time engine was operated 38.0 hours

**ENGINE** Make Case Diesel Type four cylinder  
vertical Serial No. 220002 11371030 Crankshaft  
lengthwise Rated rpm 2200 Bore and stroke  
3.939" × 4.500" (100 mm × 114.3 mm) Compression  
ratio 17 to 1 Displacement 219 cu in (3590  
ml) Starting system 12 volt Lubrication pressure  
Air cleaner two paper elements 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 thermostat.

**CHASSIS:** Type front wheel assist Serial No.  
1390/18/11121736 Tread width rear 56" (1422  
mm) to 84" (2134 mm) front 60" (1524 mm) to 72"  
(1829 mm) Wheel base 84" (2134 mm) Center of  
gravity (without operator or ballast, with mini-  
mum tread, with fuel tank filled and tractor ser-  
viced for operation) Horizontal distance forward  
from center-line of rear wheels 36.2" (920 mm)  
Vertical distance above roadway 31.3" (795 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 (3.3)  
fourth 2.6 (4.2) fifth 3.0 (4.8) sixth 3.4 (5.5)  
seventh 4.3 (7.0) eighth 5.2 (8.4) ninth 5.9 (9.5)  
tenth 7.5 (12.0) eleventh 8.7 (14.0) twelfth 15.0  
(24.0) reverse 1.7 (2.7), 3.4 (5.4), 4.3 (6.9), 8.6  
(13.8) Clutch single dry disc operated by foot  
pedal Brakes drum and shoe operated by two  
foot pedals which can be locked together and  
hand lever Steering hydrostatic Turning radius  
(on concrete surface with brake applied) right  
138" (3.51 m) left 138" (3.51 m) (on concrete sur-  
face without brake) right 178" (4.52 m) left 178"  
(4.52 m) Turning space diameter (on concrete  
surface with brake applied) right 296" (7.52 m) left  
296" (7.52 m) (on concrete surface without brake)  
right 372" (9.45 m) left 372" (9.45 m) Power take-  
off 1000 rpm at 2047 engine rpm and 540 rpm at  
2077 engine rpm.

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

### LUGGING ABILITY IN 8th (4-1) GEAR

Crankshaft Speed rpm	2200	1978	1756	1540	1312	1094
Pull—lbs (kN)	3974 (17.68)	4228 (18.81)	4451 (19.80)	4452 (19.80)	4540 (20.19)	4352 (19.36)
Increase in Pull %	0	6	12	12	14	10
Power—Hp (kW)	52.16 (38.90)	49.66 (37.03)	46.24 (34.48)	40.46 (30.17)	35.18 (26.23)	28.20 (21.03)
Speed—Mph (km/h)	4.92 (7.92)	4.40 (7.08)	3.90 (6.28)	3.41 (5.49)	2.91 (4.68)	2.43 (3.91)
Slip %	6.19	6.50	6.91	7.11	7.11	6.87

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	99.0	99.0
75% of Pull at Maximum Power—Ten Hours		96.0
50% of Pull at Maximum Power—Two Hours		94.0
50% of Pull at Reduced Engine Speed—Two Hours		93.0
Bystander in 12th (4-3) gear		88.0

### DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

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)	Cool- ing med	Temp. °F (°C) Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Available Power—Two Hours 8th (4-1) Gear</b>											
50.26 (37.48)	3726 (16.57)	5.06 (8.14)	2200	4.71	3.960 (14.991)	0.552 (0.336)	12.69 (2.500)	214 (101.1)	54 (11.9)	73 (22.5)	28.770 (97.140)

### MAXIMUM POWER IN SELECTED GEARS

42.17 (31.45)	8624 (38.36)	1.83 (2.95)	2262	14.71	3rd (2-1) Gear			175 (79.4)	44 (6.7)	49 (9.4)	28.680 (96.850)
52.03 (38.80)	3863 (17.18)	5.05 (8.13)	2200	5.00	8th (4-1) Gear			190 (87.8)	47 (8.3)	60 (15.6)	28.960 (97.790)

### TIRES, BALLAST AND WEIGHT

Rear Tires		With Ballast		Without Ballast	
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Cast Iron (each)	Two 16.9/14-30; 6; 18 (125) 550 lb (249 kg) 1000 lb (454 kg)		Two 16.9/14-30; 6; 18 (125) None None	
Front Tires					
Ballast	—No., size, ply & psi (kPa) —Liquid (each) —Cast Iron (each)	Two 9.5-24; 6; 24 (165) None 30 lb (14 kg)		Two 9.5-24; 6; 24 (165) None None	
Height of drawbar		17.5 in (445 mm)		17.5 in (445 mm)	
Static Weight with Operator—Rear		6940 lb (3148 kg)		3840 lb (1742 kg)	
Front		2840 lb (1288 kg)		2780 lb (1261 kg)	
Total		9780 lb (4436 kg)		6620 lb (3003 kg)	

**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 159°F (70.5°C). Eight gears were chosen between tire tangential pull limit (front wheel disengaged), 15% slip (front wheel drive engaged), and 10 mph (16.1 km/h). During final inspection a single groove was found reaching the top of cylinder wall No. 4.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1380.

LOUIS I. LEVITICUS  
Engineer-in Charge

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

Board of Tractor Test Engineers



Case 1390 Manual Diesel

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