

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 1412: Steiger Cougar III ST-280 and Cougar IV CM-280 Diesel 20-Speed

Nebraska Tractor Test Lab

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](#)

Nebraska Tractor Test Lab, "Test 1412: Steiger Cougar III ST-280 and Cougar IV CM-280 Diesel 20-Speed" (1981). *Nebraska Tractor Tests*. 1728.

<https://digitalcommons.unl.edu/tractormuseumlit/1728>

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 1412

STEIGER COUGAR III ST-280 CATERPILLAR DIESEL

ALSO STEIGER COUGAR IV CM-280 DIESEL

20 SPEED

DRAWBAR PERFORMANCE AT 2100 RPM

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 10th Gear											
238.27 (177.68)	12586 (55.99)	7.10 (11.43)	2097	2.67	16.044 (60.734)	0.464 (0.282)	14.85 (2.926)	180	35 (81.9)	41 (1.4)	29.325 (99.026)
75% of Pull at Maximum Power—Ten Hours 10th Gear											
192.43 (143.50)	9715 (43.21)	7.43 (11.95)	2182	2.11	13.985 (52.938)	0.501 (0.305)	13.76 (2.711)	177	31 (80.4)	37 (-0.8)	29.363 (99.154)
50% of Pull at Maximum Power—Two Hours 10th Gear											
130.94 (97.64)	6484 (28.84)	7.57 (12.19)	2221	1.96	11.204 (42.411)	0.590 (0.359)	11.69 (2.302)	177	37 (80.3)	39 (2.8)	28.770 (97.152)
50% of Pull at Reduced Engine Speed—Two Hours 15th Gear											
130.57 (97.36)	6504 (28.93)	7.53 (12.12)	1175	1.88	8.448 (31.980)	0.446 (0.271)	15.46 (3.045)	178	40 (80.8)	42 (4.2)	28.720 (96.983)

MAXIMUM POWER IN SELECTED GEARS

206.62 (154.08)	32099 (142.79)	2.41 (3.88)	2149	14.48	2nd Gear			178 (80.8)	33 (0.6)	39 (3.9)	28.780 (97.180)
228.65 (170.51)	30484 (135.60)	2.81 (4.53)	2098	10.27	3rd Gear			178 (80.8)	34 (1.1)	40 (4.4)	28.780 (97.186)
230.90 (172.18)	26431 (117.57)	3.28 (5.27)	2099	7.23	4th Gear			180 (82.2)	40 (4.4)	50 (10.0)	29.260 (98.807)
239.16 (178.34)	23661 (105.25)	3.79 (6.10)	2099	5.78	5th Gear			180 (82.2)	40 (4.4)	50 (10.0)	29.260 (98.807)
241.40 (180.01)	20996 (93.40)	4.31 (6.94)	2099	4.69	6th Gear			180 (82.2)	40 (4.4)	50 (10.0)	29.270 (98.840)
243.31 (181.44)	18458 (82.11)	4.94 (7.96)	2100	3.97	7th Gear			180 (82.2)	41 (5.0)	51 (10.6)	29.260 (98.807)
243.06 (181.25)	16289 (72.46)	5.60 (9.01)	2098	3.32	8th Gear			181 (82.8)	40 (4.4)	48 (8.9)	29.260 (98.807)
246.13 (183.54)	14686 (65.33)	6.28 (10.11)	2100	3.00	9th Gear			181 (82.5)	40 (4.4)	48 (8.9)	29.260 (98.800)
245.50 (183.07)	12957 (57.64)	7.11 (11.43)	2099	2.67	10th Gear			180 (82.2)	38 (3.3)	45 (7.2)	29.310 (98.975)
241.51 (180.10)	11177 (49.72)	8.10 (13.04)	2099	2.34	11th Gear			181 (82.8)	40 (4.4)	48 (8.9)	29.260 (98.807)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2099	1889	1677	1472	1258	1046	840
Pull—lbs (kN)	12957 (57.64)	15173 (67.49)	16883 (75.10)	18111 (80.56)	18754 (83.42)	18913 (84.13)	17028 (75.74)
Increase in Pull %	0	17	30	40	45	46	31
Power—Hp (kW)	245.50 (183.07)	257.39 (191.94)	253.23 (188.83)	237.73 (177.28)	209.85 (156.48)	175.87 (131.15)	127.82 (95.31)
Speed—Mph (km/h)	7.11 (11.43)	6.36 (10.24)	5.62 (9.05)	4.92 (7.92)	4.20 (6.75)	3.49 (5.61)	2.81 (4.53)
Slip %	2.67	3.16	3.49	3.65	3.97	4.13	3.65

TRACTOR SOUND LEVEL WITH CAB

	1700 RPM dB(A)	2100RPM dB(A)
Maximum Available Power—Two Hours	77.0	77.5
75% of Pull at Maximum Power—Ten Hours		78.0
50% of Pull at Maximum Power—Two Hours		77.5
50% of Pull at Reduced Engine Speed—Two Hours		76.0
Bystander in 18th gear		99.0

Department of Agricultural Engineering

Dates of Test: October 19-30, 1981

Manufacturer: STEIGER TRACTOR, INC.,
1701 Westview Drive, Fargo, North Dakota
58103

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°) 0.8281 Fuel weight 6.895 lbs/gal (0.826 kg/l) Oil SAE 15W-40 API service classification CC, CD, SE To motor 7.684 gal (29.087 l) Drained from motor 6.504 gal (24.621 l) Transmission and hydraulic lubricant SAE 10 hydraulic oil Final drive lubricant SAE 85W90 Total time engine was operated 45.0 hours.

ENGINE: Make Caterpillar Diesel Type six cylinder vertical with turbocharger Serial No. 90U 15983 Crankshaft lengthwise Rated rpm 1700 to 2100 Bore and stroke 5.4" × 6.5" (137 mm × 165 mm) Compression ratio 14.5 to 1 Displacement 893 cu in (14634 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements with aspirator Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic oil, radiator for transmission and transfer case oil Fuel filter one paper cartridge and prestrainer Muffler none Cooling medium temperature control one thermostat.

CHASSIS: Type four wheel drive with duals Serial No. 111-00005 81 Tread width rear 79.0" (2007 mm) to 136.4" (3464 mm) front 79.0" (2007 mm) to 136.4" (3464 mm) Wheel base 128" (3251 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 76.8" (1950 mm) Vertical distance above roadway 45.5" (1156 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 Advertised speeds mph (km/h) first 2.3 (3.8) second 2.6 (4.2) third 3.0 (4.8) fourth 3.4 (5.4) fifth 3.8 (6.2) sixth 4.3 (7.0) seventh 4.9 (7.9) eighth 5.5 (8.9) ninth 6.2 (10.0) tenth 7.0 (11.2) eleventh 7.9 (12.7) twelfth 8.9 (14.3) thirteenth 10.2 (16.5) fourteenth 11.5 (18.6) fifteenth 13.1 (21.1) sixteenth 14.7 (23.7) seventeenth 16.0 (25.7) eighteenth 18.0 (28.9) nineteenth 20.5 (33.0) twentieth 23.1 (37.1) reverse 2.3 (3.8), 2.6 (4.2), 3.0 (4.8), 3.4 (5.4) Clutch dual dry disc hydraulically operated by foot pedal Brakes multiple dry disc hydraulically operated by foot pedal or mechanically by hand lever Steering hydrostatic and articulated Turning radius (on concrete surface without brake) right 283" (7.19 m) left 288" (7.32 m) Turning space diameter (on concrete surface without brake) right 590" (14.99 m) left 600" (15.24 m) Power take-off none.

DRAWBAR PERFORMANCE AT 1700 RPM

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)
Maximum Available Power—Two Hours 10th Gear											
247.27 (184.39)	16278 (72.41)	5.70 (9.17)	1700	3.65	15.065 (57.028)	0.420 (0.256)	16.41 (3.233)	180 (82.2)	44 (6.7)	49 (9.4)	28.950 (97.760)

MAXIMUM POWER IN SELECTED GEARS

228.98 (170.75)	32462 (144.40)	2.65 (4.26)	1849	14.93			4th Gear	179 (81.7)	36 (2.2)	42 (5.6)	28.770 (97.152)
237.45 (177.07)	30378 (135.13)	2.93 (4.72)	1700	10.06			5th Gear	178 (81.1)	35 (1.7)	41 (5.0)	28.770 (97.152)
240.94 (179.67)	26510 (117.92)	3.41 (5.49)	1701	7.08			6th Gear	181 (82.8)	40 (4.4)	50 (10.0)	29.270 (98.840)
245.69 (183.21)	23397 (104.08)	3.94 (6.34)	1701	5.47			7th Gear	181 (82.8)	41 (5.0)	51 (10.6)	29.260 (98.807)
247.19 (184.33)	20701 (92.08)	4.48 (7.21)	1702	4.77			8th Gear	182 (83.1)	40 (4.4)	48 (8.9)	29.260 (98.807)
251.93 (187.86)	18755 (83.43)	5.04 (8.11)	1700	4.13			9th Gear	182 (83.1)	40 (4.4)	48 (8.9)	29.260 (98.807)
252.69 (188.43)	16638 (74.01)	5.70 (9.17)	1699	3.49			10th Gear	180 (82.2)	39 (3.9)	48 (8.9)	29.270 (98.840)
253.72 (189.20)	14609 (64.99)	6.51 (10.48)	1700	3.00			11th Gear	182 (83.1)	40 (4.4)	48 (8.9)	29.260 (98.807)
250.67 (186.93)	12763 (56.77)	7.36 (11.85)	1698	2.67			12th Gear	180 (82.2)	40 (4.4)	50 (10.0)	29.270 (98.840)
252.09 (187.99)	11163 (49.66)	8.47 (13.63)	1701	2.42			13th Gear	180 (82.2)	41 (5.0)	51 (10.6)	29.260 (98.807)

TIRES, BALLAST AND WEIGHT

Rear Tires		With Ballast	Without Ballast
—No., size, ply & psi (kPa)		Four 23.1-34; 8; inner 14 (95) outer 12 (85)	Four 23.1-34; 8; inner 14 (95) outer 12 (85)
Ballast		None	None
—Liquid (each)		81 lb (37 kg)	None
—Test Equip. (each)		None	None
Front Tires		With Ballast	Without Ballast
—No., size, ply & psi (kPa)		Four 23.1-34; 8; inner 14 (95) outer 12 (85)	Four 23.1-34; 8; inner 14 (95) outer 12 (85)
Ballast		1190 lb (540 kg)	None
—Liquid (each inner)		None	None
—Cast Iron (each)		None	None
Height of Drawbar		17.5 in (445 mm)	17.5 in (445 mm)
Static Weight with Operator—Rear		12585 lb (5708 kg)	12260 lb (5561 kg)
—Front		20760 lb (9417 kg)	18380 lb (8337 kg)
—Total		33345 lb (15125 kg)	30640 lb (13898 kg)



Steiger Cougar III ST-280 Caterpillar Diesel

REPAIRS and ADJUSTMENTS: During preliminary drawbar tests, the fuel shut off system malfunctioned. Test continued after repair.

REMARKS: All test results were determined from observed data obtained in accordance with current SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 140°F (60.0°C). Ten gears were chosen between 15% slip and 10 mph (16.1 km/h).

NOTE: Supplemental permit for Cougar IV CM-280 granted October, 1983.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1412.**

LOUIS I. LEVITICUS
Engineer-in-Charge

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

Board of Tractor Test Engineers