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2017

## Test 2185: Case IH Steiger 470 RowTrac

Nebraska Tractor Test Lab

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

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# NEBRASKA OECD TRACTOR TEST 2185 - SUMMARY 1116

## CASE IH STEIGER 470 ROWTRAC DIESEL

### 16 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption		Mean Atmospheric Conditions
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Gal/hr (l/h)	
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>						
<b>Rated Engine Speed—(PTO speed—1160 rpm)</b>						
419.16 (312.57)	2101	23.75 (89.92)	0.396 (0.241)	17.65 (3.48)	1.94 (7.36)	
<b>Maximum Power (1 hour)</b>						
472.68 (352.47)	1900	25.05 (94.81)	0.371 (0.225)	18.87 (3.72)	2.31 (8.75)	
<b>Standard Power Take-off Speed (1000 rpm)</b>						
468.77 (349.56)	1811	24.45 (92.56)	0.365 (0.222)	19.17 (3.78)	2.23 (8.43)	
<b>VARYING POWER AND FUEL CONSUMPTION</b>						
419.16 (312.57)	2101	23.75 (89.92)	0.396 (0.241)	17.65 (3.48)	1.94 (7.36)	Air temperature
364.22 (271.60)	2148	21.47 (81.26)	0.412 (0.251)	16.97 (3.34)	1.75 (6.64)	75°F (24°C)
274.52 (204.71)	2157	17.11 (64.77)	0.436 (0.265)	16.04 (3.16)	1.35 (5.11)	Relative humidity
184.24 (137.39)	2170	12.63 (47.82)	0.480 (0.292)	14.58 (2.87)	1.01 (3.81)	38%
92.31 (68.84)	2179	8.65 (32.74)	0.655 (0.399)	10.67 (2.10)	0.61 (2.30)	Barometer
3.44 (2.57)	2189	5.25 (19.87)	10.658 (6.483)	0.66 (0.13)	0.23 (0.88)	28.66" Hg (97.06 kPa)

Maximum torque - 1541 lb-ft (2089 Nm) at 1400 rpm  
 Maximum torque rise - 47.0%  
 Torque rise at 1681 engine rpm - 37%  
 Power increase at 1900 engine rpm - 12.8%

#### DRAWBAR PERFORMANCE 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)	D.E.F. Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
<b>Power at Rated Engine Speed—4th Gear</b>										
364.26 (271.63)	27864 (123.95)	4.90 (7.89)	2100	2.7	0.456 (0.277)	15.34 (3.02)	0.048 (0.029)	203 (95)	44 (7)	28.82 (97.60)
<b>75% of Pull at Rated Engine Speed—4th Gear</b>										
282.83 (210.90)	20837 (92.69)	5.09 (8.19)	2152	1.4	0.482 (0.293)	14.52 (2.86)	0.047 (0.029)	191 (88)	62 (17)	28.82 (97.60)
<b>50% of Pull at Rated Engine Speed—4th Gear</b>										
191.06 (142.47)	13894 (61.80)	5.16 (8.30)	2164	0.7	0.545 (0.331)	12.84 (2.53)	0.055 (0.033)	202 (94)	64 (18)	28.82 (97.60)
<b>75% of Pull at Reduced Engine Speed—8th Gear</b>										
282.34 (210.54)	20855 (92.77)	5.08 (8.18)	1413	1.5	0.408 (0.248)	17.16 (3.38)	0.046 (0.028)	201 (94)	68 (20)	28.82 (97.60)
<b>50% of Pull at Reduced Engine Speed—8th Gear</b>										
191.48 (142.79)	13870 (61.69)	5.18 (8.34)	1430	0.7	0.449 (0.273)	15.56 (3.07)	0.049 (0.030)	197 (91)	69 (21)	28.82 (97.60)

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

**Dates of tests:** October 18 - 23, 2017

**Manufacturer:** CNH Industrial America LLC, 700 State St. Racine, Wi. 53404 USA

**CONSUMABLE Fluids, OIL and TIME: Fuel** No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8400 **Fuel weight** 6.994 lbs/gal (0.838 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 10W40 API service classification CJ-4 Transmission lubricant** Akcela Hy-Tran Ultrraction fluid **Hydraulic and axle lubricant** Akcela Hy-Tran Ultrraction fluid **Total time engine was operated:** 14.0 hours

**ENGINE: Make** F.P.T. Diesel **Type** six cylinder vertical with turbocharger, air to air intercooler, and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** 000029083 **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 5.315" x 5.906" (135.0 mm x 150.0 mm) **Compression ratio** 16.5 to 1 **Displacement** 786 cu in (12880 ml) **Starting system** 24 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, separate radiators for hydraulic and transmission oil **Fuel filter** two paper elements **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst) and SCR (selective catalyst reduction) within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 160.9 - 170.6 lb/h (73.0 - 77.4 kg/h) **High idle:** 2175 - 2225 rpm **Turbo boost:** nominal 23.9 - 26.8 psi (165 - 185 kPa) as measured 26.3 psi (181 kPa)

**CHASSIS: Type** 4WD with rubber tracks **Serial No.** \*ZHF311970\* **Track width** rear 88.0" (2235 mm) front 88.0" (2235 mm) **Trackbase** 160.0" (4064 mm) **Length of track on ground** 29.4" (748 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.86 (4.59) second 3.43 (5.53) third 4.15 (6.67) fourth 5.00 (8.04) fifth 5.73 (9.23) sixth 6.30 (10.14) seventh 6.91 (11.12) eighth 7.59 (12.21) ninth 8.35 (13.43) tenth 9.17 (14.75) eleventh 10.05 (16.17) twelfth 11.04 (17.77) thirteenth 12.67 (20.40) fourteenth 15.27 (24.57) fifteenth 18.45 (29.68) sixteenth 19.00 (30.58) electronically limited reverse 4.31 (6.95), 9.55 (15.37)

**DRAWBAR PERFORMANCE AT 2100 ENGINE RPM**  
**DRAWBAR 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)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
313.39 (233.69)	46761 (208.00)	2.52 (4.05)	2101	12.8	0.505 (0.307)	13.86 (2.73)	0.052 (0.032)	202 (94)	61 (16)	28.67 (97.09)
349.27 (260.45)	40861 (181.76)	3.21 (5.17)	2100	7.5	0.475 (0.289)	14.71 (2.90)	0.048 (0.029)	205 (96)	62 (17)	28.68 (97.12)
359.39 (268.00)	33732 (150.05)	4.00 (6.43)	2099	4.5	0.462 (0.281)	15.14 (2.98)	0.046 (0.028)	202 (94)	63 (17)	28.67 (97.09)
364.26 (271.63)	27864 (123.95)	4.90 (7.89)	2100	2.7	0.456 (0.277)	15.34 (3.02)	0.048 (0.029)	203 (95)	44 (7)	28.82 (97.60)
364.79 (272.02)	24120 (107.29)	5.67 (9.12)	2100	2.0	0.455 (0.276)	15.39 (3.03)	0.047 (0.029)	203 (95)	46 (8)	28.82 (97.60)
364.70 (271.95)	21871 (97.29)	6.25 (10.06)	2099	1.6	0.458 (0.279)	15.27 (3.01)	0.048 (0.029)	202 (94)	52 (11)	28.82 (97.60)
361.30 (269.42)	19689 (87.58)	6.88 (11.07)	2100	1.3	0.462 (0.281)	15.13 (2.98)	0.048 (0.029)	202 (94)	53 (12)	28.82 (97.60)
359.15 (267.81)	17777 (79.08)	7.58 (12.19)	2099	1.1	0.464 (0.282)	15.07 (2.97)	0.048 (0.029)	202 (94)	56 (13)	28.83 (97.63)
352.15 (262.60)	15827 (70.40)	8.34 (13.42)	2100	0.9	0.472 (0.287)	14.82 (2.92)	0.048 (0.029)	201 (94)	62 (16)	28.82 (97.60)

**Clutch** multiple wet disc electrohydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1811 engine rpm **Unladen tractor mass** 54135 lb (24555 kg)

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

**NOTE 1:** This tractor has a driveline protection system that limits the maximum engine torque in gears 1 through 3.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. The performance figures on this Summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2185**, Nebraska Summary 1116, December 11, 2017.

Roger M. Hoy  
Director

M.F. Kocher  
J.D. Luck  
S.K. Pitla  
Board of Tractor Test Engineers

<b>TRACTOR SOUND LEVEL WITH CAB</b>	<b>dB(A)</b>
At no load in 4th gear	73.6
Bystander in 15th gear	90.3

Horizontal distances of drawbar hitch point behind rear wheel axis - 49.2"(1250 mm), 55.1"(1400 mm)

<b>TRACKS AND WEIGHT</b>	<b>Tested Without Ballast</b>
<b>Rear tracks</b> - no & size	2 x 16.0 in (406 mm)
<b>Front tracks</b> - no & size	2 x 16.0 in (406 mm)
<b>Height of drawbar</b>	20.5 in (520 mm)
<b>Static weight with operator- Rear</b>	23885 lb (10834 kg)
- Front	30425 lb (13801 kg)
- Total	54310 lb (24635 kg)

**DRAWBAR PERFORMANCE AT 1900 ENGINE 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)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st Gear										
307.18 (229.06)	46977 (208.96)	2.45 (3.94)	2077	14.4	0.509 (0.309)	13.75 (2.71)	0.054 (0.033)	203 (95)	62 (16)	28.67 (97.09)
2nd Gear										
353.90 (263.90)	44467 (197.80)	2.99 (4.80)	2028	10.8	0.479 (0.292)	14.59 (2.87)	0.053 (0.032)	205 (96)	62 (17)	28.68 (97.12)
3rd Gear										
388.21 (289.48)	42134 (187.42)	3.46 (5.56)	1899	8.8	0.451 (0.274)	15.50 (3.05)	0.051 (0.031)	203 (95)	63 (17)	28.67 (97.09)
4th Gear										
408.19 (304.38)	35163 (156.41)	4.35 (7.00)	1900	4.5	0.430 (0.262)	16.26 (3.20)	0.051 (0.031)	203 (95)	45 (7)	28.82 (97.60)
5th Gear										
410.53 (306.13)	30403 (135.24)	5.07 (8.15)	1900	3.3	0.427 (0.260)	16.39 (3.23)	0.050 (0.030)	202 (94)	48 (9)	28.82 (97.60)
6th Gear										
412.07 (307.28)	27602 (122.78)	5.60 (9.01)	1899	2.6	0.425 (0.259)	16.46 (3.24)	0.049 (0.030)	202 (94)	52 (11)	28.82 (97.60)
7th Gear										
410.80 (306.33)	24955 (111.01)	6.17 (9.93)	1900	2.1	0.426 (0.259)	16.41 (3.23)	0.049 (0.030)	202 (94)	54 (12)	28.82 (97.60)
8th Gear										
410.32 (305.98)	22594 (100.50)	6.81 (10.96)	1900	1.7	0.429 (0.261)	16.32 (3.21)	0.048 (0.029)	201 (94)	58 (15)	28.82 (97.60)
9th Gear										
407.55 (303.91)	20348 (90.51)	7.51 (12.09)	1900	1.4	0.428 (0.261)	16.32 (3.22)	0.049 (0.030)	201 (94)	62 (16)	28.82 (97.60)
10th Gear										
405.74 (302.56)	18388 (81.79)	8.27 (13.31)	1900	1.1	0.431 (0.262)	16.22 (3.19)	0.049 (0.030)	201 (94)	62 (16)	28.82 (97.60)

## HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range:	21903 lbs (97.4 kN)	
	<b>Three outlet sets combined</b>	
	<u>Standard pump</u>	<u>High flow pump</u>
i) Sustained pressure of the open relief valve:	2877 psi (198 bar)	3102 psi (214 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.8 GPM (165.8 l/min)	60.8 GPM (230.0 l/min)
iii) Pump delivery rate at maximum hydraulic power:	43.3 GPM (163.7 l/min)	59.3 GPM (224.3 l/min)
Delivery pressure:	2526 psi (174 bar)	2739 psi (189 bar)
Power:	63.7 HP (47.5 kW)	94.7 Hp (70.6 kW)
	<b>Single outlet set</b>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	42.8 GPM (162.2 l/min)	49.7 GPM (188.2 l/min)
iii) Pump delivery rate at maximum hydraulic power:	42.7 GPM (161.6 l/min)	46.8 GPM (177.0 l/min)
Delivery pressure:	2024 psi (139 bar)	2272 psi (157 bar)
Power:	50.4 HP (37.6 kW)	62.0 Hp (46.2 kW)

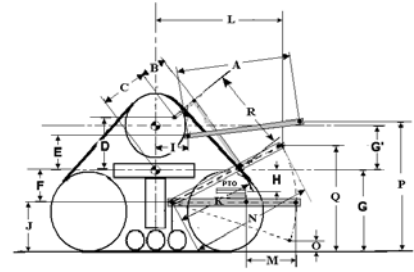
### TwinFlow system

	<b>Two outlet sets combined</b>	
	<u>Standard pump</u>	<u>TwinFlow pump</u>
i) Sustained pressure at compensator cutoff:	2877 psi (198 bar)	2855 psi (197 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.8 GPM (165.8 l/min)	57.3 GPM (217.0 l/min)
Combined flow:	101.1 GPM (382.8 l/min)	
iii) Pump delivery rate at maximum hydraulic power:	43.3 GPM (163.7 l/min)	56.4 GPM (213.6 l/min)
Delivery pressure:	2526 psi (174 bar)	2479 psi (171 bar)
Power:	63.7 HP (47.5 kW)	81.6 Hp (60.9 kW)
	<b>Two outlet sets combined</b>	
	<u>High flow pump</u>	<u>TwinFlow pump</u>
i) Sustained pressure at compensator cutoff:	2993 psi (206 bar)	2855 psi (197 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	61.0 GPM (230.9 l/min)	57.3 GPM (217.0 l/min)
Combined flow:	118.3 GPM (447.9 l/min)	
iii) Pump delivery rate at maximum hydraulic power:	56.7 GPM (214.7 l/min)	56.4 GPM (213.6 l/min)
Delivery pressure:	2517 psi (174 bar)	2479 psi (171 bar)
Power:	83.3 HP (62.1 kW)	81.6 Hp (60.9 kW)

## HITCH DIMENSIONS AS TESTED - NO LOAD

	inch	mm
A	39.0	990
B	30.7	780
C	28.8	731
D	27.9	709
E	14.9	378
F	14.9	379
G	34.0	864
*G'	14.9	378
H	1.2	30
I	22.8	578
J	19.1	485
K	30.5	775
L	60.1	1527
*L'	67.4	1711
M	30.4	771
N	43.0	1093
O	6.3	160
P	49.8	1265
Q	43.7	1111
R	39.4	1000

\*G' to undercarriage pivot point  
\*L' to Quick coupler ends



NTTL.(2017). Nebraska OECD tractor test 2185 for Case IH Steiger 470 Rowtrac Diesel. Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



**CASE IH 470 ROWTRAC Diesel**

Institute of Agriculture and Natural Resources  
University of Nebraska-Lincoln