

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

2016

## Test 2164A: New Holland T9.700

Nebraska Tractor Test Laboratory

*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](#)

---

Laboratory, Nebraska Tractor Test, "Test 2164A: New Holland T9.700" (2016). *Nebraska Tractor Tests*. 2596.

<https://digitalcommons.unl.edu/tractormuseumlit/2596>

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 OECD TRACTOR TEST 2164A - SUMMARY 1045A

## NEW HOLLAND T9.700 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>						
477.00 (355.70)	2101	26.20 (99.19)	0.385 (0.234)	18.20 (3.59)	2.39 (9.04)	
<b>Maximum Power (1 hour)</b>						
539.58 (402.37)	1900	28.02 (106.08)	0.364 (0.221)	19.26 (3.79)	2.49 (9.43)	
<b>Standard Power Take-off Speed (1000 rpm)</b>						
535.05 (398.99)	1811	27.45 (103.90)	0.360 (0.219)	19.49 (3.84)	2.44 (9.23)	

#### VARYING POWER AND FUEL CONSUMPTION

477.00 (355.70)	2101	26.20 (99.19)	0.385 (0.234)	18.20 (3.59)	2.39 (9.04)	Air temperature
412.39 (307.52)	2138	23.43 (88.70)	0.398 (0.242)	17.60 (3.47)	2.09 (7.92)	77°F (25°C)
311.11 (231.99)	2149	18.68 (70.71)	0.421 (0.256)	16.65 (3.28)	1.63 (6.17)	Relative humidity
208.47 (155.45)	2158	13.98 (52.93)	0.470 (0.286)	14.91 (2.94)	1.16 (4.39)	32%
104.55 (77.96)	2169	9.52 (36.04)	0.638 (0.388)	10.98 (2.16)	0.67 (2.53)	Barometer
1.18 (0.88)	2178	5.19 (19.66)	30.976 (18.842)	0.23 (0.04)	0.24 (0.90)	28.75" Hg (97.36 kPa)

Maximum torque - 1766 lb-ft (2394 Nm) at 1400 rpm

Maximum torque rise - 48.1%

Torque rise at 1680 engine rpm - 38%

Power increase at 1900 engine rpm - 13.1%

#### DRAWBAR PERFORMANCE

##### UNBALLASTED

##### 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 lb/hp.hr (kg/kW.h)	Temp. °F (°C)	Barom. inch Hg (kPa)
							cool- ing med	Air dry bulb
<b>Power at Rated Engine Speed—5th Gear</b>								
531.51 (396.34)	36817 (163.77)	5.42 (8.71)	2100	3.2	0.398 (0.242)	17.63 (3.47)	0.049 (0.030)	212 51 29.15 (100) (11) (98.71)
<b>75% of Pull at Rated Engine Speed—5th Gear</b>								
408.74 (304.80)	27618 (122.85)	5.55 (8.93)	2135	2.3	0.422 (0.257)	16.61 (3.27)	0.046 (0.028)	201 67 29.13 (94) (19) (98.65)
<b>50% of Pull at Rated Engine Speed—5th Gear</b>								
276.72 (206.35)	18396 (81.83)	5.64 (9.08)	2155	1.6	0.459 (0.279)	15.26 (3.01)	0.047 (0.028)	195 69 29.12 (90) (20) (98.61)
<b>75% of Pull at Reduced Engine Speed—9th Gear</b>								
408.44 (304.57)	27595 (122.75)	5.55 (8.93)	1469	2.3	0.373 (0.227)	18.80 (3.70)	0.040 (0.024)	201 68 29.14 (94) (20) (98.68)
<b>50% of Pull at Reduced Engine Speed—9th Gear</b>								
276.55 (206.22)	18420 (81.94)	5.63 (9.06)	1479	1.5	0.389 (0.236)	18.04 (3.55)	0.044 (0.027)	185 68 29.12 (85) (20) (98.61)

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

**Dates of tests:** September 27 to October 5, 2016

**Manufacturer:** CNH 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)** 0.8418 **Fuel weight** 7.009 lbs/gal (0.840 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** New Holland Mastertran Ultratractor fluid **Hydraulic and axle lubricant** New Holland Mastertran Ultratractor fluid **Total time engine was operated:** 28.0 hours

**ENGINE: Make** F.P.T. Diesel **Type** six cylinder vertical with two turbochargers, two stage air to water intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** 000007977 **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 5.315" x 5.906" (135.0 mm x 150.0 mm) **Compression ratio** 15.5 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:** 535 engine hp: 180.1 - 191.1 lb/h (81.7 - 86.7 kg/h) 620 engine hp: 206.6 - 219.1 lb/h (93.7 - 99.4 kg/h) **High idle:** 2175 - 2225 rpm **Turbo boost:** nominal 38.4 - 41.3 psi (265 - 285 kPa) as measured 39.8 psi (274 kPa)

**CHASSIS: Type** four wheel drive with duals **Serial No.** \*ZGF308521\* **Tread width** rear 83.4" (2118 mm) and 160.2" (4070 mm) front 83.4" (2118 mm) and 160.2" (4070 mm) **Wheelbase** 154.0" (3911 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 2.82 (4.54) second 3.40 (5.47) third 4.11 (6.61) fourth 4.95 (7.96) fifth 5.68 (9.14) sixth 6.24 (10.04) seventh 6.84 (11.01) eighth 7.52 (12.10) ninth 8.26 (13.30) tenth 9.08 (14.61) eleventh 9.95 (16.02) twelfth 10.94 (17.60) thirteenth 12.55 (20.21) fourteenth 15.12 (24.34) fifteenth 18.27 (29.40) sixteenth 22.00 (35.41) reverse 4.28 (6.88), 8.61 (13.85)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - 2100 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)
					2nd Gear					
426.13 (317.76)	52098 (231.74)	3.07 (4.94)	2136	10.9	0.440 (0.267)	15.95 (3.14)	0.047 (0.028)	206 (96)	50 (10)	29.02 (98.27)
					3rd Gear					
508.67 (379.32)	50995 (226.83)	3.74 (6.02)	2111	8.3	0.418 (0.254)	16.77 (3.30)	0.050 (0.030)	206 (97)	54 (12)	29.02 (97.27)
					4th Gear					
529.20 (394.62)	42412 (188.66)	4.68 (7.53)	2099	4.2	0.401 (0.244)	17.47 (3.44)	0.049 (0.030)	209 (98)	53 (12)	29.17 (98.78)
					5th Gear					
531.51 (396.34)	36817 (163.77)	5.42 (8.71)	2100	3.2	0.398 (0.242)	17.63 (3.47)	0.049 (0.030)	212 (100)	51 (11)	29.15 (98.71)
					6th Gear					
531.97 (396.69)	33451 (148.80)	5.96 (9.59)	2100	2.9	0.399 (0.243)	17.56 (3.46)	0.049 (0.030)	211 (99)	54 (12)	29.19 (98.85)
					7th Gear					
529.98 (395.21)	30314 (134.84)	6.56 (10.55)	2099	2.5	0.399 (0.243)	17.56 (3.46)	0.049 (0.030)	210 (99)	57 (14)	29.19 (98.85)
					8th Gear					
531.47 (396.31)	27610 (122.81)	7.22 (11.62)	2100	2.3	0.399 (0.243)	17.57 (3.46)	0.048 (0.029)	209 (98)	62 (17)	29.17 (98.78)
					9th Gear					
528.83 (394.34)	24945 (110.96)	7.95 (12.79)	2099	2.1	0.402 (0.245)	17.42 (3.43)	0.049 (0.030)	210 (99)	63 (17)	29.18 (98.82)
					10th Gear					
528.33 (393.98)	22634 (100.68)	8.75 (14.08)	2099	1.9	0.402 (0.244)	17.45 (3.44)	0.049 (0.030)	207 (97)	65 (18)	29.16 (98.75)

**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** 53870 lb (24435 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 4.

**NOTE 2:** The performance results on this report were obtained from tests carried out on the Case IH Steiger 620 Diesel.

**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. **2164A**, Nebraska Summary 1045A, December 12, 2016.

Roger M. Hoy  
 Director

M.F. Kocher  
 P.J. Jasa  
 D.R. Keshwani  
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	dB(A)
At no load in 4th gear	74.6
Bystander in 16th gear	87.0

**TIRES AND WEIGHT**

**Rear Tires** -No., size, ply & psi (kPa)  
**Front Tires** -No., size, ply & psi (kPa)  
**Height of Drawbar**  
**Static Weight with operator** -Rear  
 - Front  
 - Total

**Tested Without Ballast**

Four 800/70R38;\*\*\*;10(70)  
 Four 800/70R38;\*\*\*;12(85)  
 22.5 in (570 mm)  
 23275 lb(10557 kg)  
 30770 lb(13957 kg)  
 54045 lb(24514 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)
2nd Gear										
428.58 (319.59)	52328 (232.77)	3.07 (4.94)	2136	10.5	0.440 (0.268)	15.93 (3.14)	0.047 (0.029)	206 (96)	49 (9)	29.01 (98.24)
3rd Gear										
508.96 (379.53)	51072 (227.18)	3.74 (6.02)	2112	8.3	0.416 (0.253)	16.84 (3.32)	0.048 (0.029)	202 (94)	54 (12)	29.02 (98.27)
4th Gear										
566.30 (422.29)	49489 (220.14)	4.29 (6.90)	1982	6.9	0.411 (0.250)	17.06 (3.36)	0.041 (0.025)	210 (99)	56 (13)	29.05 (98.37)
5th Gear										
588.24 (438.65)	45702 (203.29)	4.83 (7.77)	1900	4.6	0.401 (0.244)	17.46 (3.44)	0.037 (0.023)	213 (100)	52 (11)	29.15 (98.71)
6th Gear										
590.28 (440.17)	41405 (184.18)	5.35 (8.61)	1900	3.7	0.400 (0.243)	17.52 (3.45)	0.037 (0.022)	213 (100)	54 (12)	29.17 (98.78)
7th Gear										
591.94 (441.41)	37686 (167.63)	5.89 (9.48)	1900	3.2	0.399 (0.243)	17.56 (3.46)	0.037 (0.022)	212 (100)	58 (14)	29.17 (98.78)
8th Gear										
589.87 (439.86)	34070 (151.55)	6.49 (10.44)	1899	2.9	0.398 (0.242)	17.63 (3.47)	0.037 (0.022)	213 (101)	59 (15)	29.19 (98.85)
9th Gear										
593.27 (442.40)	31074 (138.22)	7.16 (11.52)	1900	2.6	0.396 (0.241)	17.69 (3.49)	0.036 (0.022)	212 (100)	63 (17)	29.16 (98.75)
10th Gear										
591.62 (441.17)	28151 (125.22)	7.88 (12.68)	1899	2.3	0.397 (0.242)	17.65 (3.48)	0.037 (0.022)	212 (100)	64 (18)	29.16 (98.75)
11th Gear										
588.52 (438.86)	25481 (113.34)	8.66 (13.94)	1899	2.1	0.401 (0.244)	17.49 (3.44)	0.037 (0.022)	211 (99)	65 (18)	29.16 (98.75)

NOTE: The following data is valid for New Holland T9.700 HD models with chassis serial numbers ZEF401001 and higher.

**DRAWBAR PERFORMANCE**  
**BALLASTED - 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										
441.23 (329.02)	65077 (289.47)	2.55 (4.10)	2124	9.6	0.435 (0.265)	16.12 (3.17)	0.049 (0.030)	202 (94)	60 (16)	28.68 (97.12)
2nd Gear										
510.81 (380.91)	62139 (276.41)	3.09 (4.96)	2096	7.7	0.418 (0.254)	16.78 (3.31)	0.051 (0.031)	206 (97)	62 (17)	28.72 (97.26)
3rd Gear										
565.26 (421.51)	60180 (267.69)	3.53 (5.67)	1966	6.7	0.411 (0.250)	17.06 (3.36)	0.041 (0.025)	211 (99)	63 (17)	28.70 (97.19)
4th Gear										
584.98 (436.22)	52297 (232.63)	4.20 (6.75)	1900	4.6	0.405 (0.246)	17.31 (3.41)	0.037 (0.023)	207 (97)	64 (18)	28.71 (97.22)
5th Gear										
594.08 (443.01)	45548 (202.61)	4.89 (7.87)	1900	3.1	0.399 (0.243)	17.57 (3.46)	0.037 (0.022)	214 (101)	54 (12)	28.66 (97.05)
6th Gear										
593.32 (442.44)	41244 (183.46)	5.40 (8.68)	1900	2.8	0.400 (0.243)	17.51 (3.45)	0.036 (0.022)	213 (100)	55 (13)	28.68 (97.12)
7th Gear										
593.57 (442.63)	37552 (167.04)	5.93 (9.54)	1899	2.5	0.398 (0.242)	17.60 (3.47)	0.037 (0.022)	210 (99)	56 (13)	28.69 (97.16)
8th Gear										
590.32 (440.20)	33908 (150.83)	6.53 (10.51)	1900	2.2	0.399 (0.243)	17.57 (3.46)	0.037 (0.023)	214 (101)	56 (14)	28.68 (97.12)
9th Gear										
593.44 (442.53)	30924 (137.55)	7.20 (11.58)	1900	1.9	0.397 (0.242)	17.63 (3.47)	0.037 (0.022)	211 (99)	57 (14)	28.67 (97.09)
10th Gear										
591.59 (441.15)	28009 (124.59)	7.92 (12.75)	1899	1.7	0.400 (0.243)	17.54 (3.46)	0.037 (0.023)	213 (101)	58 (14)	28.69 (97.16)
11th Gear										
589.12 (439.31)	25395 (112.96)	8.70 (14.00)	1900	1.5	0.402 (0.244)	17.45 (3.44)	0.037 (0.023)	208 (98)	59 (15)	28.67 (97.09)

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Four 800/70R38;***;13(90)	Four 800/70R38;***;10(70)
<b>Ballast</b> - Cast iron - wheels (total)	1800 lb (816 kg)	None
- Cast Iron (total)	3785 lb (1718 kg)	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Four 800/70R38;***;17(115)	Four 800/70R38;***;12(85)
<b>Ballast</b> - Cast iron-Front end (total)	4570 lb (2073 kg)	None
- Cast Iron-wheels (total)	1800 lb (816 kg)	None
<b>Height of Drawbar</b>	22.0 in (560 mm)	22.0 in (560 mm)
<b>Static Weight with operator</b> - Rear	27125 lb(12304 kg)	23275 lb(10557 kg)
- Front	38875 lb(17633 kg)	30770 lb(13957 kg)
- Total	66000 lb(29937 kg)	54045 lb(24514 kg)

## HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range: 19620 lbs (87.3 kN)

### Three outlet sets combined

	Standard pump	High flow pump
i) Sustained pressure of the open relief valve:	2877 psi (198 bar)	3062 psi (211 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.8 GPM (165.8 l/min)	59.1 GPM (223.6 l/min)
iii) Pump delivery rate at maximum hydraulic power:	43.3 GPM (163.7 l/min)	56.7 GPM (214.6 l/min)
Delivery pressure:	2526 psi (174 bar)	2685 psi (185 bar)
Power:	63.7 HP (47.5 kW)	88.8 Hp (66.2 kW)

### Single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed:	42.8 GPM (162.2 l/min)	48.3 GPM (182.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	42.7 GPM (161.6 l/min)	46.5 GPM (175.9 l/min)
Delivery pressure:	2024 psi (139 bar)	2191 psi (151 bar)
Power:	50.4 HP (37.6 kW)	59.4 Hp (44.3 kW)

## MegaFlow system

### Two outlet sets combined

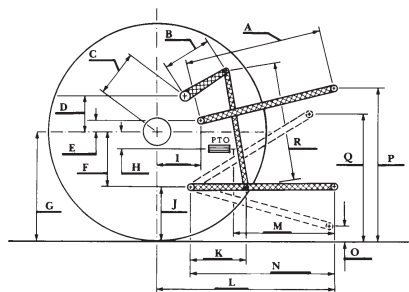
	Standard pump	MegaFlow pump
i) Sustained pressure at compensator cutoff:	2877 psi (198 bar)	2855 psi (197 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	43.8 GPM (165.8 l/min)	57.3 GPM (217.0 l/min)
Combined flow:	101.1 GPM (382.8 l/min)	
iii) Pump delivery rate at maximum hydraulic 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)

### Two outlet sets combined

	High flow pump	MegaFlow pump
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	32.6	827
B	29.9	760
C	23.2	590
D	22.0	558
E	13.5	342
F	13.4	340
G	38.2	970
H	6.4	162
I	22.8	578
J	24.8	630
K	29.0	736
L	56.3	1431
*L'	63.6	1615
M	34.3	871
N	46.5	1181
O	7.9	200
P	48.6	1234
Q	42.2	1072
R	39.8	1010



**NEW HOLLAND T9.700 Diesel**