

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

2011

## Nebraska Summary: S804 New Holland T7.220

Nebraska Tractor Test Laboratory

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](#)

---

Laboratory, Nebraska Tractor Test, "Nebraska Summary: S804 New Holland T7.220" (2011). *Nebraska Tractor Tests*. 3244.

<https://digitalcommons.unl.edu/tractormuseumlit/3244>

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.

# SUMMARY OF OECD TEST 2607-NEBRASKA SUMMARY 804

## NEW HOLLAND T7.220 DIESEL

### 19 SPEED

#### POWER TAKE-OFF PERFORMANCE

| Power<br>HP<br>(kW)                             | Crank<br>shaft<br>speed<br>rpm | Gal/ltr<br>(l/h) | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Mean Atmospheric<br>Conditions |
|---|--------------------------------|------------------|-----------------------|-----------------------|--------------------------------|
| <b>MAXIMUM POWER AND FUEL CONSUMPTION</b>       |                                |                  |                       |                       |                                |
| <b>Rated Engine Speed—(PTO speed—1162 rpm)</b>  |                                |                  |                       |                       |                                |
| 150.9<br>(112.5)                                | 2200                           | 8.46<br>(32.02)  | 0.391<br>(0.238)      | 17.82<br>(3.51)       |                                |
| <b>Standard Power Take-off Speed (1000 rpm)</b> |                                |                  |                       |                       |                                |
| 170.8<br>(127.4)                                | 1893                           | 8.95<br>(33.88)  | 0.365<br>(0.222)      | 19.09<br>(3.76)       |                                |
| <b>Maximum Power (1 hour)</b>                   |                                |                  |                       |                       |                                |
| 172.2<br>(128.4)                                | 1800                           | 8.82<br>(33.39)  | 0.357<br>(0.217)      | 19.53<br>(3.85)       |                                |

#### VARYING POWER AND FUEL CONSUMPTION

|                  |      |                 |                  |                 |                     |
|------------------|------|-----------------|------------------|-----------------|---------------------|
| 150.9<br>(112.5) | 2200 | 8.46<br>(32.02) | 0.391<br>(0.238) | 17.82<br>(3.51) | Air temperature     |
| 130.9<br>(97.6)  | 2244 | 7.68<br>(29.05) | 0.409<br>(0.249) | 17.05<br>(3.36) | 73°F (23°C)         |
| 98.9<br>(73.8)   | 2265 | 6.28<br>(23.76) | 0.442<br>(0.269) | 15.77<br>(3.11) | Relative humidity   |
| 66.5<br>(49.7)   | 2282 | 4.86<br>(18.41) | 0.509<br>(0.310) | 13.69<br>(2.70) | 46%                 |
| 33.5<br>(25.0)   | 2295 | 3.52<br>(13.34) | 0.733<br>(0.446) | 9.50<br>(1.87)  | Barometer           |
| --               | 2315 | 2.18<br>(8.26)  | --               | --              | 29.1" Hg (98.7 kPa) |

Maximum Torque - 567.4 lb.-ft. (769.3 Nm) at 1400 rpm

Maximum Torque rise - 57.5%

Torque rise at 1800 engine rpm - 38%

Power increase at 1800 engine rpm - 14.1%

#### DRAWBAR PERFORMANCE

(Unballasted - Front Drive Engaged)

#### FUEL CONSUMPTION CHARACTERISTICS

| Power<br>Hp<br>(kW)                                  | Drawbar<br>pull<br>lbs<br>(kN) | Speed<br>mph<br>(km/h) | Crank-<br>shaft<br>speed<br>rpm | Slip<br>% | Fuel Consumption<br>lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Temp. °F (°C)<br>cool-<br>ing<br>med | Air<br>dry<br>bulb | Barom.<br>inch<br>Hg<br>(kPa) |
|--|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|--------------------------------------|--------------------|-------------------------------|
| <b>Maximum Power—9th Gear</b>                        |                                |                        |                                 |           |   |                       |                                      |                    |                               |
| 132.8<br>(99.0)                                      | 10900<br>(48.48)               | 4.57<br>(7.35)         | 2100                            | 4.9       | 0.460<br>(0.280)                          | 15.13<br>(2.98)       | 178<br>(81)                          | 61<br>(16)         | 29.9<br>(101.1)               |
| <b>75% of Pull at Maximum Power—9th Gear</b>         |                                |                        |                                 |           |   |                       |                                      |                    |                               |
| 102.9<br>(76.7)                                      | 8140<br>(36.20)                | 4.74<br>(7.63)         | 2145                            | 3.8       | 0.488<br>(0.297)                          | 14.26<br>(2.81)       | 178<br>(81)                          | 59<br>(15)         | 29.9<br>(101.1)               |
| <b>50% of Pull at Maximum Power—9th Gear</b>         |                                |                        |                                 |           |   |                       |                                      |                    |                               |
| 70.3<br>(52.4)                                       | 5450<br>(24.24)                | 4.84<br>(7.78)         | 2160                            | 2.5       | 0.568<br>(0.346)                          | 12.26<br>(2.42)       | 178<br>(81)                          | 61<br>(16)         | 29.9<br>(101.1)               |
| <b>75% of Pull at Reduced Engine Speed—10th Gear</b> |                                |                        |                                 |           |   |                       |                                      |                    |                               |
| 103.8<br>(77.4)                                      | 8115<br>(36.10)                | 4.80<br>(7.72)         | 1830                            | 3.9       | 0.462<br>(0.281)                          | 15.13<br>(2.98)       | 174<br>(79)                          | 59<br>(15)         | 29.9<br>(101.1)               |
| <b>50% of Pull at Reduced Engine Speed—10th Gear</b> |                                |                        |                                 |           |   |                       |                                      |                    |                               |
| 71.6<br>(53.4)                                       | 5460<br>(24.29)                | 4.92<br>(7.92)         | 1840                            | 2.4       | 0.517<br>(0.315)                          | 13.45<br>(2.65)       | 174<br>(79)                          | 57<br>(14)         | 29.9<br>(101.1)               |

**Location of tests:** HBLFA Francisco Josephinum  
BLT Biomass-Logistics-Technology,  
Rottenhauser, Strasse, 1, AT, 3250, Wieselburg,  
Austria

**Dates of tests:** January to March, 2011.

**Manufacturer:** CNH UK Limited Basildon, Essex  
SS14 3AD United Kingdom

**FUEL and OIL:** Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.837  
**Fuel weight** 6.97 lbs/gal (0.835 kg/l) **Oil SAE**  
10W30 **API service classification** CG-4  
**Transmission and hydraulic lubricant** NH 410B  
**fluid Front axle lubricant** NH 410B fluid

**ENGINE:** Make F.P.T. Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment. **Serial No.** 721640 **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.094" x 5.197" (104.0 mm x 132.0 mm) **Compression ratio** 17.0 to 1 **Displacement** 410 cu in (6728 ml) **Starting system** 12 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, radiator for hydraulic and transmission oil **Fuel filter** two paper canisters **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat and variable speed fan

**CHASSIS:** **Type** front wheel assist **Serial No.** ZABZ07943T **Tread width** rear 60.2" (1530 mm) to 87.8" (2230 mm) front 61.4" (1560 mm) to 89.0" (2260 mm) **Wheelbase** 113.5" (2884 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 1.17 (1.89) second 1.40 (2.25) third 1.68 (2.71) fourth 2.01 (3.24) fifth 2.39 (3.85) sixth 2.86 (4.60) seventh 3.40 (5.47) eighth 4.06 (6.54) ninth 4.88 (7.86) tenth 5.83 (9.39) eleventh 6.95 (11.18) twelfth 8.30 (13.35) thirteenth 9.82 (15.80) fourteenth 11.74 (18.89) fifteenth 14.11 (22.70) sixteenth 16.86 (27.13) seventeenth 20.06 (32.29) eighteenth 25.10 (40.39) nineteenth 31.01 (49.90) reverse 2.59 (4.17), 3.10 (4.99), 3.73 (6.00), 4.45 (7.16), 5.30 (8.53), 6.33 (10.18) **Clutch** multiple wet disc electro-hydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1950 engine rpm or 1000 rpm at 1893 engine rpm **Unladen tractor mass** 18740 lb (8500 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted - Front Drive Engaged)**  
**MAXIMUM POWER IN SELECTED GEARS**

| Power<br>Hp<br>(kW) | Drawbar<br>pull<br>lbs<br>(kN) | Speed<br>mph<br>(km/h) | Crank-<br>shaft<br>speed<br>rpm | Slip<br>% | Fuel<br>lb/hp.hr<br>(kg/kW.h) | Consumption<br>Hp.hr/gal<br>(kW.h/l) | Temp. °F(°C)<br>cool-<br>ing<br>med | Air<br>dry<br>bulb | Barom.<br>inch<br>Hg<br>(kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|-------------------------------|--------------------------------------|-------------------------------------|--------------------|-------------------------------|
| 8th Gear            |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 134.0<br>(99.9)     | 17205<br>(76.53)               | 2.92<br>(4.70)         | 1800                            | 14.7      | 0.464<br>(0.282)              | 15.02<br>(2.96)                      | 178<br>(81)                         | 59<br>(15)         | 29.9<br>(101.1)               |
| 9th Gear            |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 144.6<br>(107.8)    | 14185<br>(63.11)               | 3.82<br>(6.15)         | 1800                            | 7.1       | 0.434<br>(0.264)              | 16.04<br>(3.16)                      | 172<br>(78)                         | 61<br>(16)         | 29.9<br>(101.1)               |
| 10th Gear           |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 145.2<br>(108.3)    | 11730<br>(52.17)               | 4.64<br>(7.48)         | 1800                            | 5.5       | 0.431<br>(0.262)              | 16.15<br>(3.18)                      | 172<br>(78)                         | 59<br>(15)         | 29.9<br>(101.1)               |
| 11th Gear           |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 147.0<br>(109.6)    | 9855<br>(43.83)                | 5.59<br>(9.00)         | 1800                            | 4.6       | 0.425<br>(0.259)              | 16.40<br>(3.23)                      | 171<br>(77)                         | 57<br>(14)         | 29.9<br>(101.1)               |
| 12th Gear           |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 143.6<br>(107.2)    | 7945<br>(35.35)                | 6.78<br>(10.91)        | 1800                            | 3.5       | 0.436<br>(0.265)              | 15.99<br>(3.15)                      | 171<br>(77)                         | 57<br>(14)         | 29.9<br>(101.1)               |
| 13th Gear           |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 147.6<br>(110.1)    | 6935<br>(30.85)                | 7.98<br>(12.85)        | 1800                            | 3.4       | 0.424<br>(0.258)              | 16.45<br>(3.24)                      | 171<br>(77)                         | 57<br>(14)         | 29.9<br>(101.1)               |
| 14th Gear           |                                |                        |                                 |           |                               |                                      |                                     |                    |                               |
| 145.9<br>(108.8)    | 5695<br>(25.33)                | 9.61<br>(15.46)        | 1800                            | 2.9       | 0.427<br>(0.260)              | 16.29<br>(3.21)                      | 171<br>(77)                         | 57<br>(14)         | 29.9<br>(101.1)               |

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

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD test procedures. This tractor did not meet the manufacturer's implement pump flow claim of 32 GPM (121 lpm). 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 summary of data from OECD Report No. **2607** Nebraska Summary 804, January 26, 2012.

Roger M. Hoy  
 Director

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

| TRACTOR SOUND LEVEL WITH CAB | Front Wheel Drive   |                  |
|------------------------------|---------------------|------------------|
|                              | Disengaged<br>dB(A) | Engaged<br>dB(A) |
| At no load in 9th gear       | 69.0                | 69.0             |
| Bystander                    | --                  | --               |

**TIRES, BALLAST 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**

Two 710/70R38; \*\*; 15(100)  
 Two 600/65R28; \*\*; 16(110)  
 18.1 in (460 mm)  
 10750 lb (4875 kg)  
 8155 lb (3700 kg)  
 18905 lb (8575 kg)

This vehicle is equipped with an electronically controlled engine Power management system that monitors and boosts engine power output in certain circumstances. This is achieved by electronically changing the characteristics of the engine power-speed curve. The engine Power management function ("boosted" power level) becomes active in the higher transmission gears (16th and above) and for road transport applications. The system is also activated when power transfer through the PTO and hydraulic pump exceeds a preset level (and forward speed exceeds 0.5 km/h), for mobile PTO driven implement applications. An override system is provided to enable PTO operations at the "boosted" power level while the vehicle is stationary for test purposes. The results of this PTO output test are presented below.

### POWER TAKE-OFF PERFORMANCE

| Power<br>HP<br>(kW)                               | Crank<br>shaft<br>speed<br>rpm | Gal/hr<br>(l/h)  | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Mean Atmospheric<br>Conditions |
|---|--------------------------------|------------------|-----------------------|-----------------------|--------------------------------|
| <b>MAXIMUM POWER AND FUEL CONSUMPTION</b>         |                                |                  |                       |                       |                                |
| <b>Rated Engine Speed—(PTO speed—1162 rpm)</b>    |                                |                  |                       |                       |                                |
| 180.1<br>(134.3)                                  | 2200                           | 9.95<br>(37.70)  | 0.385<br>(0.234)      | 18.08<br>(3.56)       |                                |
| <b>Standard Power Take-off Speed - (1000 rpm)</b> |                                |                  |                       |                       |                                |
| 198.5<br>(148.0)                                  | 1893                           | 10.14<br>(38.38) | 0.356<br>(0.217)      | 19.57<br>(3.86)       |                                |
| <b>Maximum Power (1 hour)</b>                     |                                |                  |                       |                       |                                |
| 198.7<br>(148.2)                                  | 1800                           | 10.13<br>(38.35) | 0.356<br>(0.216)      | 19.60<br>(3.86)       |                                |

### VARYING POWER AND FUEL CONSUMPTION

|                  |      |                 |                  |                 |                    |
|------------------|------|-----------------|------------------|-----------------|--------------------|
| 180.1<br>(134.3) | 2200 | 9.95<br>(37.70) | 0.385<br>(0.234) | 18.08<br>(3.56) | Air temperature    |
| 155.4<br>(115.9) | 2232 | 8.78<br>(33.25) | 0.393<br>(0.239) | 17.71<br>(3.49) | 68°F (20°C)        |
| 117.7<br>(87.8)  | 2254 | 7.09<br>(26.85) | 0.420<br>(0.255) | 16.60<br>(3.27) | Relative humidity  |
| 79.3<br>(59.1)   | 2274 | 5.46<br>(20.70) | 0.480<br>(0.292) | 14.52<br>(2.86) | 47%                |
| 40.0<br>(29.8)   | 2290 | 3.79<br>(14.34) | 0.661<br>(0.402) | 10.55<br>(2.08) | Barometer          |
| --               | 2315 | 2.20<br>(8.32)  | --               | --              | 29.1"Hg (98.7 kPa) |
| --               |      |                 | --               | --              |                    |

Maximum Torque 636.2 lb.-ft. (862.6 Nm) at 1500 rpm  
Maximum Torque Rise - 47.9%  
Torque rise at 1800 rpm - 34%  
Power increase at 1800 engine rpm - 10.3%

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: No

OECD Static test

Lift cylinders:

2 x 100 mm

Maximum force exerted through whole range:

12500 lbs (55.6 kN)

- i) Sustained pressure at compensator cutoff: 2975 psi (205 bar)  
**two outlet sets combined**
- ii) Pump delivery rate at minimum pressure: 29.6 GPM (112.0 l/min)
- iii) Pump delivery rate at maximum hydraulic power: 26.2 GPM (99.1 l/min)  
 Delivery pressure: 2685 psi (185 bar)  
 Power: 41.0 HP (30.6 kW)

- single outlet set**
- ii) Pump delivery rate at minimum pressure: 26.2 GPM (99.1 l/min)
- iii) Pump delivery rate at maximum hydraulic power: 24.3 GPM (91.8 l/min)  
 Delivery pressure: 2465 psi (170 bar)  
 Power: 34.9 HP (26.0 kW)

### HITCH DIMENSIONS AS TESTED—NO LOAD

|   | inch | mm   |
|---|------|------|
| A | 32.1 | 815  |
| B | 15.0 | 380  |
| C | 15.1 | 383  |
| D | 14.6 | 372  |
| E | 10.8 | 275  |
| F | 10.6 | 270  |
| G | 36.4 | 925  |
| H | 2.4  | 60   |
| I | 17.7 | 450  |
| J | 25.8 | 655  |
| K | 26.9 | 682  |
| L | 48.2 | 1224 |
| M | 23.1 | 587  |
| N | 38.3 | 974  |
| O | 9.0  | 230  |
| P | 52.8 | 1340 |
| Q | 37.2 | 945  |
| R | 40.2 | 1020 |

