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2018

## Test 2204: John Deere 5090M

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 2204

## JOHN DEERE 5090M DIESEL

### 16 SPEED

#### POWER TAKE-OFF PERFORMANCE

| Power<br>HP<br>(kW)                           | Crank<br>shaft<br>speed<br>rpm | Diesel<br>Consumption |                       | D.E.F.<br>Consumption |                 | Mean Atmospheric<br>Conditions   |
|---|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------|--|
|   |                                | Gal/hr<br>(l/h)       | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Gal/hr<br>(l/h) |  |
| <b>MAXIMUM POWER AND FUEL CONSUMPTION</b>     |                                |                       |                       |                       |                 |  |
| <b>Rated Engine Speed—(PTO speed—566 rpm)</b> |                                |                       |                       |                       |                 |  |
| 75.61<br>(56.38)                              | 2201                           | 4.84<br>(18.32)       | 0.448<br>(0.272)      | 15.63<br>(3.08)       | 0.17<br>(0.63)  | Fuel used during active exhaust<br>regeneration-0.56 gal (2.11 l)<br>(see note 1, p.2) |
| <b>Standard Power Take-off Speed(540rpm)</b>  |                                |                       |                       |                       |                 |  |
| 77.84<br>(58.04)                              | 2100                           | 4.76<br>(18.03)       | 0.428<br>(0.261)      | 16.34<br>(3.22)       | 0.17<br>(0.63)  |  |
| <b>Maximum Power (1 hour)</b>                 |                                |                       |                       |                       |                 |  |
| 83.74<br>(62.45)                              | 1851                           | 4.65<br>(17.61)       | 0.389<br>(0.236)      | 18.00<br>(3.55)       | 0.21<br>(0.80)  |  |

#### VARYING POWER AND FUEL CONSUMPTION

|                  |      |                 |                   |                 |                |                       |
|------------------|------|-----------------|-------------------|-----------------|----------------|-----------------------|
| 75.61<br>(56.38) | 2201 | 4.84<br>(18.32) | 0.448<br>(0.272)  | 15.63<br>(3.08) | 0.17<br>(0.63) | Air temperature       |
| 65.55<br>(48.88) | 2244 | 4.47<br>(16.92) | 0.477<br>(0.290)  | 14.66<br>(2.89) | 0.13<br>(0.51) | 71°F (22°C)           |
| 49.83<br>(37.16) | 2270 | 3.88<br>(14.69) | 0.545<br>(0.331)  | 12.84<br>(2.53) | 0.09<br>(0.34) | Relative humidity     |
| 33.52<br>(24.99) | 2297 | 3.13<br>(11.86) | 0.654<br>(0.398)  | 10.70<br>(2.11) | 0.03<br>(0.12) | 54%                   |
| 16.76<br>(12.50) | 2300 | 2.52<br>(9.52)  | 1.050<br>(0.639)  | 6.66<br>(1.31)  | 0.03<br>(0.10) | Barometer             |
| 1.06<br>(0.79)   | 2300 | 1.88<br>(7.11)  | 12.367<br>(7.522) | 0.57<br>(0.11)  | 0.06<br>(0.24) | 28.75" Hg (97.37 kPa) |

Maximum torque - 251 lb.-ft. (340 Nm) at 1602 rpm  
 Maximum torque rise - 39.1%  
 Torque rise at 1761 engine rpm - 35%  
 Power increase at 1851 engine rpm - 10.8%

#### TRACTOR SOUND LEVEL WITH CAB

|                             | Front Wheel Drive |                     |
|-----------------------------|-------------------|---------------------|
|                             | Engaged<br>dB(A)  | Disengaged<br>dB(A) |
| At no load in 7th (B3) gear | 73.8              | 73.7                |
| Transport in 16th (D4) gear |                   | 76.8                |
| Bystander in 16th (D4) gear |                   | 80.6                |

Horizontal distances of drawbar hitch point behind rear wheel axis - 28.5" (725 mm), 32.5" (825 mm), 34.4" (875 mm)

#### 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

Two 16.9-30; 6; 12 (85)  
 Two 11.2-24; 6; 18 (125)  
 17.5 in (445 mm)  
 5650 lb (2563 kg)  
 3510 lb (1592 kg)  
 9160 lb (4155 kg)

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

**Dates of tests:** September 25 - 27, 2018

**Manufacturer:** John Deere Commercial Products Inc., 700 Horizon South Parkway, Grovetown Ga. USA 30813

**CONSUMABLE Fluids, OIL and TIME:** Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8404 **Fuel weight** 6.998 lbs/gal (0.839 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil** SAE 10W30 **API service classification** CJ-4 **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 10.0 hours

**ENGINE: Make** John Deere **Diesel Type** four cylinder vertical with turbocharger, air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** \*PE4045U064165\* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.19" x 5.00" (106.5 mm x 127.0 mm) **Compression ratio** 16.9 to 1 **Displacement** 276 cu in (4525 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** one paper element **Fuel cooler** radiator for return fuel **Exhaust** regenerative aftertreatment system consisting of DOC (diesel oxidation catalyst) and SCR (selective catalyst reduction) with an underhood muffler and vertical exhaust **Cooling medium temperature control** two thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS:** **Fuel rate:** 31.9 - 34.4 lb/h (14.4 - 15.6 kg/h) **High idle:** 2275 - 2325 rpm **Turbo boost:** nominal 16.0 - 18.9 psi (110 - 130 kPa) as measured 18.2 psi (125 kPa)

**CHASSIS: Type** front wheel assist **Serial No.** \*1LV5090MCJJ400430\* **Tread width** rear 59.4" (1508 mm) to 71.4" (1813 mm) front 52.8" (1342 mm) to 77.0" (1957 mm) **Wheelbase** 92.5" (2350 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Nominal travel speeds mph (km/h)** first 1.16 (1.87) second 1.48 (2.38) third 1.80 (2.89) fourth 2.14 (3.45) fifth 2.80 (4.50) sixth 3.57 (5.75) seventh 4.33 (6.97) eighth 5.18 (8.33) ninth 6.85 (11.03) tenth 8.76 (14.09) eleventh 10.59 (17.05) twelfth 10.61 (17.07) thirteenth 12.68 (20.41) fourteenth 13.53 (21.77) fifteenth 16.39 (26.38) sixteenth 19.60 (31.54)

## HYDRAULIC PERFORMANCE

CATEGORY: II

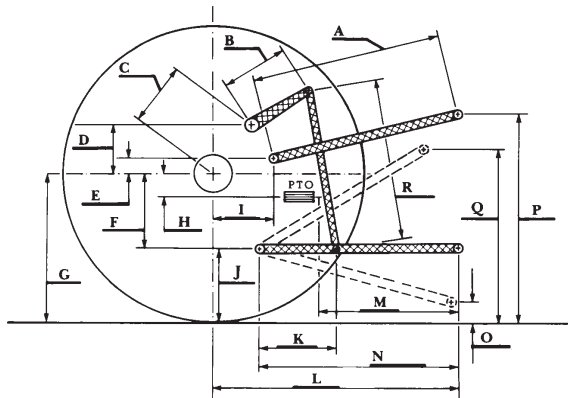
Quick Attach: None

OECD Static test

|  |  |                                 |
|--|--|---------------------------------|
| Maximum force exerted through whole range:                         | 5161 lbs (23.0 kN) (2 x 65 mm)               | <u>lift cylinders</u>           |
|  | 5958 lbs (26.5 kN) (1 x 65 mm and 1 x 75 mm) |                                 |
|  | <u>single outlet set</u>                     | <u>two outlet sets combined</u> |
| i) Sustained pressure of the open relief valve:                    | 2873 psi (198 bar)                           | 2890 psi (199 bar)              |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 19.4 GPM (73.4 l/min)                        | 19.6 GPM (74.0 l/min)           |
| iii) Pump delivery rate at maximum hydraulic power:                | 17.6 GPM (66.7 l/min)                        | 17.9 GPM (67.7 l/min)           |
| Delivery pressure:   | 2640 psi (182 bar)                           | 2714 psi (187 bar)              |
| Power:   | 27.1 HP (20.2 kW)                            | 28.3 HP (21.1 kW)               |

### HITCH DIMENSIONS AS TESTED—NO LOAD

|   | inch | mm   |
|---|------|------|
| A | 24.9 | 632  |
| B | 14.1 | 358  |
| C | 17.7 | 449  |
| D | 15.0 | 380  |
| E | 11.8 | 300  |
| F | 8.8  | 223  |
| G | 31.3 | 795  |
| H | 0.2  | 4    |
| I | 16.1 | 410  |
| J | 22.5 | 572  |
| K | 17.5 | 444  |
| L | 41.7 | 1060 |
| M | 23.0 | 585  |
| N | 33.1 | 840  |
| O | 9.1  | 230  |
| P | 46.5 | 1182 |
| Q | 38.4 | 975  |
| R | 32.3 | 820  |



reverse 1.28 (2.06), 1.63 (2.62), 1.98 (3.18), 2.36 (3.80), 3.08 (4.96), 3.93 (6.33), 4.77 (7.68), 5.70 (9.18), 7.56 (12.16), 9.64 (15.52), 11.68 (18.79), 11.69 (18.81), 13.98 (22.49), 14.91 (23.99), 18.07 (29.08), 21.60 (34.76) **Clutch** wet disc hydraulically actuated by foot pedal **Brakes** wet disc hydraulically actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2100 engine rpm, Economy PTO 540 rpm at 1645 engine rpm **Unladen tractor mass** 8985 lb (4075 kg)

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

**NOTE 1:** The manufacturer declares that the average time between active regenerations is 150 hours. A 1% power increase was observed during the active exhaust regeneration.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2204**, November 29, 2018.

Roger M. Hoy  
Director

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

## Shiftable PTO Performance

### Economy mode

540 PTO rpm @ 1645 engine rpm

| Power<br>HP<br>(kW) | Crank<br>shaft<br>speed<br>rpm | Diesel<br>Consumption |                       | D.E.F.<br>Consumption |                 |
|---------------------|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------|
|                     |                                | Gal/hr<br>(l/h)       | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Gal/hr<br>(l/h) |
| 77.65<br>(57.90)    | 1645                           | 4.20<br>(15.90)       | 0.379<br>(0.230)      | 18.49<br>(3.64)       | 0.20<br>(0.74)  |
| 58.21<br>(43.41)    | 1645                           | 3.32<br>(12.55)       | 0.399<br>(0.243)      | 17.55<br>(3.46)       | 0.13<br>(0.49)  |
| 38.82<br>(28.95)    | 1645                           | 2.45<br>(8.26)        | 0.441<br>(0.268)      | 15.87<br>(3.13)       | 0.09<br>(0.35)  |
| 19.36<br>(14.44)    | 1646                           | 1.76<br>(6.67)        | 0.637<br>(0.388)      | 10.98<br>(2.16)       | 0.01<br>(0.05)  |
| 0.91<br>(0.68)      | 1643                           | 1.12<br>(4.25)        | 8.667<br>(5.272)      | 0.81<br>(0.16)        | 0.02<br>(0.08)  |

### Normal mode

540 PTO rpm @ 2100 engine rpm

| Power<br>HP<br>(kW) | Crank<br>shaft<br>speed<br>rpm | Diesel<br>Consumption |                       | D.E.F.<br>Consumption |                 |
|---------------------|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------|
|                     |                                | Gal/hr<br>(l/h)       | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Gal/hr<br>(l/h) |
| 77.68<br>(57.93)    | 2102                           | 4.71<br>(17.83)       | 0.424<br>(0.258)      | 16.49<br>(3.25)       | 0.17<br>(0.65)  |
| 58.23<br>(43.42)    | 2104                           | 3.90<br>(14.78)       | 0.469<br>(0.285)      | 14.91<br>(2.94)       | 0.12<br>(0.47)  |
| 38.81<br>(28.94)    | 2099                           | 3.13<br>(11.85)       | 0.564<br>(0.343)      | 12.40<br>(2.44)       | 0.06<br>(0.22)  |
| 19.44<br>(14.50)    | 2100                           | 2.28<br>(8.64)        | 0.822<br>(0.500)      | 8.52<br>(1.68)        | 0.01<br>(0.03)  |
| 0.87<br>(0.65)      | 2099                           | 1.62<br>(6.12)        | 12.944<br>(7.874)     | 0.54<br>(0.11)        | 0.06<br>(0.21)  |

### RECOMMENDED CITATION FORMAT:

NTTL.(2018). Nebraska Tractor test 2204 for John Deere 5090M Diesel.

Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



**JOHN DEERE 5090M DIESEL**  
**Institute of Agriculture and Natural Resources**  
**University of Nebraska–Lincoln**