

# NEBRASKA TRACTOR TEST 2191

## JOHN DEERE 5090R DIESEL

### 16 SPEED

Open center hydraulic system

#### POWER TAKE-OFF PERFORMANCE

| Power<br>HP<br>(kW)                           | Crank<br>shaft<br>speed<br>rpm | Diesel<br>Consumption<br>Gal/hr<br>(l/h) | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | D.E.F.<br>Consumption<br>Gal/hr<br>(l/h) | Mean Atmospheric<br>Conditions   |
|---|--------------------------------|--|-----------------------|-----------------------|--|--|
| <b>MAXIMUM POWER AND FUEL CONSUMPTION</b>     |                                |  |                       |                       |  |  |
| <b>Rated Engine Speed—(PTO speed—566 rpm)</b> |                                |  |                       |                       |  |  |
| 77.17<br>(57.55)                              | 2201                           | 4.84<br>(18.33)                          | 0.441<br>(0.268)      | 15.94<br>(3.14)       | 0.16<br>(0.59)                           | Fuel used during active exhaust<br>regeneration-0.58 gal (2.18 l)<br>(see note 1, p.2) |
| <b>Standard Power Take-off Speed(539rpm)</b>  |                                |  |                       |                       |  |  |
| 81.89<br>(61.07)                              | 2100                           | 4.88<br>(18.49)                          | 0.419<br>(0.255)      | 16.77<br>(3.30)       | 0.17<br>(0.65)                           |  |
| <b>Maximum Power (1 hour)</b>                 |                                |  |                       |                       |  |  |
| 89.61<br>(66.82)                              | 1902                           | 4.96<br>(18.78)                          | 0.389<br>(0.236)      | 18.06<br>(3.56)       | 0.22<br>(0.85)                           |  |

#### VARYING POWER AND FUEL CONSUMPTION

|                  |      |                 |                   |                 |                |                       |
|------------------|------|-----------------|-------------------|-----------------|----------------|-----------------------|
| 77.17<br>(57.55) | 2201 | 4.84<br>(18.33) | 0.441<br>(0.268)  | 15.94<br>(3.14) | 0.16<br>(0.59) | Air temperature       |
| 67.66<br>(50.45) | 2269 | 4.52<br>(17.12) | 0.469<br>(0.286)  | 14.96<br>(2.95) | 0.13<br>(0.50) | 76°F (25°C)           |
| 50.88<br>(37.94) | 2279 | 3.77<br>(14.26) | 0.520<br>(0.316)  | 13.50<br>(2.66) | 0.10<br>(0.36) | Relative humidity     |
| 34.11<br>(25.44) | 2293 | 3.13<br>(11.84) | 0.644<br>(0.392)  | 10.91<br>(2.15) | 0.05<br>(0.18) | 47%                   |
| 17.18<br>(12.81) | 2309 | 2.43<br>(9.21)  | 0.994<br>(0.605)  | 7.06<br>(1.39)  | 0.06<br>(0.24) | Barometer             |
| 1.08<br>(0.81)   | 2321 | 1.85<br>(6.99)  | 11.961<br>(7.276) | 0.59<br>(0.12)  | 0.04<br>(0.16) | 28.04" Hg (94.95 kPa) |

Maximum torque - 269 lb.-ft. (365 Nm) at 1552 rpm  
 Maximum torque rise - 46.1%  
 Torque rise at 1762 engine rpm - 40%  
 Power increase at 1902 engine rpm - 16.1%

#### TRACTOR SOUND LEVEL WITH CAB

|                             | Front Wheel Drive<br>Engaged<br>dB(A) | Disengaged<br>dB(A) |
|-----------------------------|---------------------------------------|---------------------|
| At no load in 7th (B3) gear | 73.6                                  | 73.4                |
| Transport in 16th (D4) gear |                                       | 76.3                |
| Bystander in 16th (D4) gear |                                       | 82.8                |

Horizontal distances of drawbar hitch point behind rear wheel axis - 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 16.9R30; \*\*, 12 (85)  
 Two 11.2R24; \*\*, 18 (125)  
 16.0 in (405 mm)  
 5900 lb (2676 kg)  
 3635 lb (1649 kg)  
 9535 lb (4325 kg)

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

**Dates of tests:** April 13 - 24, 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)** 0.8434 **Fuel weight** 7.023 lbs/gal (0.842 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** 9.5 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.** \*PE4045U057010\* **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:** 32.4 - 35.1 lb/h (14.7 - 15.9 kg/h) **High idle:** 2300 - 2350 rpm **Turbo boost:** nominal 16.0 - 18.9 psi (110 - 130 kPa) as measured 17.4 psi (120 kPa)

**CHASSIS: Type** front wheel assist **Serial No.** \*1LV5090RHHH400177\* **Tread width** rear 58.0" (1473 mm) to 71.6" (1819 mm) front 58.6" (1488 mm) to 81.5" (2070 mm) **Wheelbase** 88.6" (2250 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Nominal travel speeds mph (km/h)** first 1.29 (2.07) second 1.59 (2.56) third 1.97 (3.17) fourth 2.41 (3.88) fifth 2.98 (4.79) sixth 3.67 (5.91) seventh 4.55 (7.33) eighth 5.59 (8.99) ninth 5.76 (9.27) tenth 7.11 (11.45) eleventh 8.81 (14.18) twelfth 10.81 (17.40) thirteenth 12.89 (20.75) fourteenth 15.93 (25.63) fifteenth 19.73 (31.75) sixteenth 24.21 (38.96)

## HYDRAULIC PERFORMANCE

CATEGORY: II

Quick Attach: None

OECD Static test

|  |                                |                                 |
|--|--------------------------------|---------------------------------|
|  |                                | <u>lift cylinders</u>           |
| Maximum force exerted through whole range:                         | 7720 lbs (34.3 kN) (2 x 75 mm) |                                 |
|  | 8678 lbs (38.6 kN) (2 x 80 mm) |                                 |
|  | <u>single outlet set</u>       | <u>two outlet sets combined</u> |
| i) Sustained pressure of the open relief valve:                    | 2857 psi (197 bar)             | 2865 psi (198 bar)              |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 21.4 GPM (80.9 l/min)          | 21.3 GPM (80.6 l/min)           |
| iii) Pump delivery rate at maximum hydraulic power:                | 21.2 GPM (80.4 l/min)          | 21.2 GPM (80.3 l/min)           |
| Delivery pressure:   | 2464 psi (170 bar)             | 2618 psi (181 bar)              |
| Power:   | 30.5 HP (22.8 kW)              | 32.4 HP (24.2 kW)               |

reverse 1.37 (2.21), 1.70 (2.73), 2.10 (3.38), 2.58 (4.15), 3.18 (5.11), 3.92 (6.31), 4.86 (7.82), 5.96 (9.59), 6.15 (9.89), 7.59 (12.22), 9.40 (15.13), 11.54 (18.57), 13.76 (22.15), 17.00 (27.35), 21.05 (33.88), 25.84 (41.58) **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** 9360 lb (4246 kg)

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

**NOTE 1:** The manufacturer declares that the average time between active regenerations is 150 hours. A 2% power increase was observed during the active exhaust regeneration.

**NOTE 2:** The performance data on this report applies to tractors with an open center hydraulic system.

**REMARKS:** This tractor exceeded the 73 dB(A) sound power claim, with front drive engaged, by 14.8% (0.6 dB(A)) and with front drive disengaged by 9.6% (0.4 dB(A)). All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures.

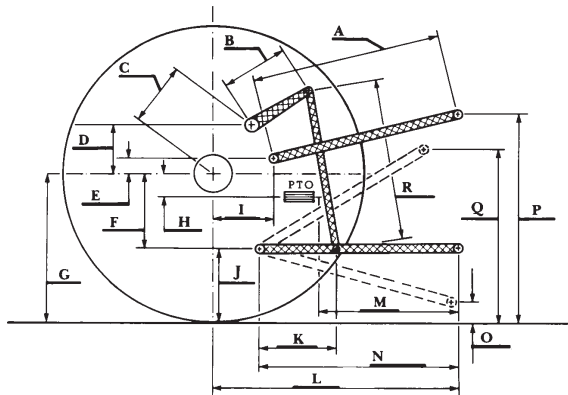
We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2191**, June 15, 2018.

Roger M. Hoy  
Director

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

### HITCH DIMENSIONS AS TESTED—NO LOAD

|   | inch | mm   |
|---|------|------|
| A | 26.4 | 670  |
| B | 14.1 | 358  |
| C | 17.7 | 449  |
| D | 15.0 | 380  |
| E | 14.4 | 365  |
| F | 8.8  | 223  |
| G | 31.3 | 795  |
| H | 0.2  | 4    |
| I | 14.4 | 365  |
| 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  |



### RECOMMENDED CITATION FORMAT:

NTTL.(2018). Nebraska tractor test 2191 for John Deere 5090R OC Diesel. Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>

## 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) |
| 81.86<br>(61.04)    | 1645                           | 4.37<br>(16.55)       | 0.375<br>(0.228)      | 18.73<br>(3.69)       | 0.19<br>(0.71)  |
| 61.44<br>(45.82)    | 1651                           | 3.38<br>(12.78)       | 0.386<br>(0.235)      | 18.20<br>(3.58)       | 0.14<br>(0.52)  |
| 41.04<br>(30.60)    | 1651                           | 2.50<br>(9.45)        | 0.427<br>(0.260)      | 16.44<br>(3.24)       | 0.09<br>(0.35)  |
| 20.46<br>(15.25)    | 1641                           | 1.74<br>(6.59)        | 0.598<br>(0.364)      | 11.74<br>(2.31)       | 0.03<br>(0.11)  |
| 0.95<br>(0.71)      | 1641                           | 1.09<br>(4.14)        | 8.096<br>(4.925)      | 0.87<br>(0.17)        | 0.04<br>(0.14)  |

### 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) |
| 81.86<br>(61.04)    | 2100                           | 4.86<br>(18.39)       | 0.417<br>(0.254)      | 16.85<br>(3.32)       | 0.18<br>(0.68)  |
| 61.42<br>(45.80)    | 2098                           | 3.95<br>(14.97)       | 0.452<br>(0.275)      | 15.53<br>(3.06)       | 0.13<br>(0.50)  |
| 40.97<br>(30.55)    | 2097                           | 3.10<br>(11.74)       | 0.532<br>(0.323)      | 13.21<br>(2.60)       | 0.06<br>(0.22)  |
| 20.48<br>(15.27)    | 2099                           | 2.21<br>(8.36)        | 0.757<br>(0.461)      | 9.27<br>(1.83)        | 0.03<br>(0.11)  |
| 0.93<br>(0.69)      | 2097                           | 1.60<br>(6.07)        | 12.133<br>(7.380)     | 0.58<br>(0.11)        | 0.01<br>(0.02)  |



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