

NEBRASKA OECD TRACTOR TEST 1778-SUMMARY 313

JOHN DEERE 8410T DIESEL

16 SPEED

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

Dates of Test: April 7-27, 2000

Manufacturer: John Deere Waterloo Works, P.O. Box 270, Waterloo Ia, USA

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8487 Fuel weight 7.067 lbs/gal (0.847 kg/l) Oil SAE 15W-40 API service classification CF-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Total time engine was operated: 32.5 hours

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger and air to air aftercooler Serial No. *RG6081H098907* Crankshaft lengthwise Rated engine speed 2200 Bore and stroke 4.56" x 5.06" (115.8 mm x 128.5 mm) Compression ratio 16.5 to 1 Displacement 496 cu in (8134 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 and water separator Fuel cooler radiator for pump return fuel Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 93.0 - 100.4 lb/h (42.2 - 45.6 kg/h) High idle: 2275 - 2325 rpm Turbo boost: nominal 20.9 - 25.2 psi (144 - 174 kPa) as measured 25.1 psi (173 kPa)

CHASSIS: Type tracklayer-rubber tracked Serial No. *RW8410T901086* Track width 88.0" (2235 mm) to 119.5 (3035 mm) Length of track on ground 89.0" (2261 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled power shift Nominal travel speeds mph (km/h) first 1.16 (1.87) second 1.49 (2.39) third 1.89 (3.04) fourth 2.41 (3.88) fifth 2.92 (4.70) sixth 3.30 (5.31) seventh 3.73 (6.01) eighth 4.21 (6.78) ninth 4.75 (7.65) tenth 5.36 (8.63) eleventh 6.07 (9.77) twelfth 6.85 (11.02) thirteenth 8.71 (14.02) fourteenth 11.13 (17.91) fifteenth 14.17 (22.80) sixteenth 18.10 (29.13) reverse 1.01 (1.63), 2.55 (4.10), 2.88 (4.63), 5.53 (8.90) @ 1600 engine rpm Clutch wet multiple disc hydraulically actuated by foot pedal Brakes wet multiple disc hydraulically actuated foot pedal Steering electro-hydraulic differential steering controlled by steering wheel Power take-off 1000 rpm at 179 engine rpm Unladen tractor mass 26380 lb (11965 kg)

POWER TAKE-OFF PERFORMANCE

| Power HP (kW) | Crank shaft speed rpm | Gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Mean Atmospheric Conditions |
|--|-----------------------|------------------|--------------------|--------------------|-----------------------------|
| MAXIMUM POWER AND FUEL CONSUMPTION | | | | | |
| Rated Engine Speed (PTO speed 1009 rpm) | | | | | |
| 236.75 (176.54) | 2200 | 13.66 (51.70) | 0.408 (0.248) | 17.33 (3.41) | |
| Maximum Power (2 hours) | | | | | |
| 270.62 (201.80) | 2000 | 14.60 (55.25) | 0.381 (0.232) | 18.54 (3.65) | |
| VARYING POWER AND FUEL CONSUMPTION | | | | | |
| 236.75 (176.54) | 2200 | 13.66 (51.70) | 0.408 (0.248) | 17.33 (3.41) | Air temperature |
| 206.22 (153.78) | 2254 | 12.40 (46.92) | 0.425 (0.258) | 16.64 (3.28) | 74°F (24°C) |
| 155.19 (115.73) | 2264 | 9.89 (37.44) | 0.450 (0.274) | 15.69 (3.09) | Relative humidity |
| 104.46 (77.89) | 2275 | 7.60 (28.76) | 0.514 (0.313) | 13.75 (2.71) | 43% |
| 51.93 (38.72) | 2285 | 5.14 (19.44) | 0.699 (0.425) | 10.11 (1.99) | Barometer |
| 2.50 (1.87) | 2293 | 3.06 (11.57) | 8.627 (5.248) | 0.82 (0.16) | 28.92" Hg (97.93 kPa) |
| Maximum Torque - 844 lb.-ft. (1144 Nm) at 1400 rpm | | | | | |
| Maximum Torque Rise - 49.3% | | | | | |
| Torque rise at 1798 engine rpm - 36% | | | | | |

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) | Hp.hr/gal (kW.h/l) | Temp. °F (°C) cooling med | Air dry bulb | Barom. inch Hg (kPa) |
|--|-----------------------|------------------|-----------------------|--------|-------------------------------------|--------------------|---------------------------|--------------|----------------------|
| Maximum Power 10th Gear | | | | | | | | | |
| 205.84 (153.50) | 14723 (65.49) | 5.24 (8.44) | 2201 | 2.05 | 0.471 (0.286) | 15.01 (2.96) | 198 (92) | 56 (13) | 29.22 (98.95) |
| 75% of Pull at Maximum Power 10th Gear | | | | | | | | | |
| 159.65 (119.05) | 11027 (49.05) | 5.43 (8.74) | 2260 | 1.27 | 0.505 (0.307) | 14.01 (2.76) | 195 (91) | 60 (16) | 29.16 (98.75) |
| 50% of Pull at Maximum Power 10th Gear | | | | | | | | | |
| 107.62 (80.25) | 7361 (32.74) | 5.48 (8.82) | 2271 | 0.72 | 0.581 (0.353) | 12.16 (2.40) | 187 (86) | 63 (17) | 29.12 (98.61) |
| 75% of Pull at Reduced Engine Speed 12th Gear | | | | | | | | | |
| 159.67 (119.07) | 11001 (48.93) | 5.44 (8.76) | 1774 | 1.12 | 0.446 (0.272) | 15.83 (3.12) | 191 (88) | 61 (16) | 29.15 (98.71) |
| 50% of Pull at Reduced Engine Speed 12th Gear | | | | | | | | | |
| 107.62 (80.25) | 7353 (32.71) | 5.49 (8.83) | 1780 | 0.72 | 0.498 (0.303) | 14.19 (2.79) | 187 (86) | 63 (17) | 29.12 (98.61) |

DRAWBAR PERFORMANCE(Unballasted)

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) | Consumption Hp.hr/gal (kW.h/l) | Temp. °F (°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|--------------------------------------|--------------------------------------|--------------------|-------------------------------|
| 3rd Gear | | | | | | | | | |
| 117.32 (87.48) | 27233 (121.14) | 1.62 (2.60) | 2200 | 14.29 | 0.586 (0.356) | 12.06 (2.38) | 181 (83) | 48 (9) | 28.95 (98.04) |
| 4th Gear | | | | | | | | | |
| 133.29 (99.39) | 23421 (104.18) | 2.13 (3.43) | 2135 | 8.64 | 0.528 (0.321) | 13.40 (2.64) | 183 (84) | 50 (10) | 29.30 (99.22) |
| 5th Gear | | | | | | | | | |
| 159.89 (119.23) | 23124 (102.86) | 2.59 (4.17) | 2126 | 8.04 | 0.500 (0.304) | 14.13 (2.78) | 185 (85) | 51 (11) | 29.29 (99.19) |
| 6th Gear | | | | | | | | | |
| 180.16 (134.34) | 22981 (102.22) | 2.94 (4.73) | 2126 | 7.56 | 0.487 (0.296) | 14.52 (2.86) | 190 (88) | 52 (11) | 29.28 (99.15) |
| 7th Gear | | | | | | | | | |
| 206.85 (154.25) | 23133 (102.90) | 3.35 (5.40) | 2147 | 7.84 | 0.483 (0.294) | 14.64 (2.88) | 195 (91) | 52 (11) | 29.27 (99.12) |
| 8th Gear | | | | | | | | | |
| 221.77 (165.38) | 23039 (102.48) | 3.61 (5.81) | 2046 | 7.77 | 0.467 (0.284) | 15.14 (2.98) | 201 (94) | 53 (12) | 29.26 (99.09) |
| 9th Gear | | | | | | | | | |
| 229.71 (171.29) | 21167 (94.15) | 4.07 (6.55) | 2001 | 5.61 | 0.452 (0.275) | 15.64 (3.08) | 207 (97) | 54 (12) | 29.25 (99.05) |
| 10th Gear | | | | | | | | | |
| 232.61 (173.45) | 18651 (82.96) | 4.68 (7.53) | 2000 | 3.71 | 0.445 (0.271) | 15.89 (3.13) | 201 (94) | 55 (13) | 29.23 (98.98) |
| 11th Gear | | | | | | | | | |
| 231.96 (172.98) | 16228 (72.19) | 5.36 (8.63) | 1999 | 2.51 | 0.445 (0.271) | 15.87 (3.13) | 204 (95) | 57 (14) | 29.21 (98.92) |
| 12th Gear | | | | | | | | | |
| 231.18 (172.39) | 14238 (63.33) | 6.09 (9.80) | 1999 | 1.90 | 0.446 (0.272) | 15.83 (3.12) | 199 (93) | 58 (14) | 29.19 (98.85) |
| 13th Gear | | | | | | | | | |
| 229.19 (170.91) | 10980 (48.84) | 7.83 (12.60) | 2004 | 1.20 | 0.447 (0.272) | 15.80 (3.11) | 207 (97) | 58 (14) | 29.18 (98.82) |

TRACTOR SOUND LEVEL WITH CAB

dB(A)

| | |
|---------------------------------------|------|
| At no load in 9th gear | 75.7 |
| Transport speed - no load - 16th gear | 79.1 |
| Bystander in 16th Gear | 89.7 |

TIRES, BALLAST AND WEIGHT

| | With Ballast | Without Ballast |
|-----------------------------|--------------------|--------------------|
| Track width | 30.0 in (760 mm) | 30.0 in (760 mm) |
| Ballast - Cast iron(front) | 2250 lb (1021 kg) | None |
| Height of Drawbar | 18.5 in (470 mm) | 18.5 in (470 mm) |
| Static Weight with operator | 28795 lb(13061 kg) | 26545 lb(12040 kg) |

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: The 8410T engine has an electronic control system which provides a vehicle protection system to avoid overloading the drive train. This system provides four different engine power levels. The engine produces up to 165 PTO hp when the transmission is in forward gears 1 through 4 and the PTO is not engaged. The engine produces up to 185 PTO hp when the transmission is in 5th forward gear and the PTO is not engaged. The engine produces up to 205 PTO hp when the transmission is in 6th forward gear and the PTO is not engaged. The engine produces up to 235 PTO Hp in all other applications.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 126°F(52°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1778**, Nebraska Summary 313, July 7, 2000.

Leonard L. Bashford
Director

G. J. Hoffman
M. F. Kocher
R. D. Grisso, Jr.
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE
(Ballasted at 2000 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) | Fuel Consumption Hp.hr/gal (kW.h/l) | Temp. °F(°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|---|-------------------------------------|--------------------|-------------------------------|
| 2nd Gear | | | | | | | | | |
| 105.93 (78.99) | 30541 (135.85) | 1.30 (2.09) | 2253 | 14.44 | 0.619 (0.376) | 11.43 (2.25) | 178 (81) | 45 (7) | 29.10 (98.54) |
| 3rd Gear | | | | | | | | | |
| 133.02 (99.19) | 30091 (133.85) | 1.66 (2.67) | 2149 | 10.25 | 0.530 (0.322) | 13.34 (2.63) | 181 (83) | 41 (5) | 29.06 (98.41) |
| 4th Gear | | | | | | | | | |
| 147.43 (109.94) | 27038 (120.27) | 2.04 (3.29) | 2002 | 6.89 | 0.483 (0.294) | 14.62 (2.88) | 183 (84) | 41 (5) | 29.06 (98.41) |
| 5th Gear | | | | | | | | | |
| 175.00 (130.50) | 26326 (117.10) | 2.49 (4.01) | 2000 | 6.19 | 0.457 (0.278) | 15.45 (3.04) | 185 (85) | 44 (7) | 29.05 (98.37) |
| 6th Gear | | | | | | | | | |
| 197.29 (147.12) | 26400 (117.43) | 2.80 (4.51) | 2001 | 6.47 | 0.453 (0.276) | 15.60 (3.07) | 187 (86) | 44 (7) | 29.05 (98.37) |
| 7th Gear | | | | | | | | | |
| 225.15 (167.90) | 26878 (119.56) | 3.14 (5.06) | 2000 | 7.44 | 0.457 (0.278) | 15.47 (3.05) | 199 (93) | 47 (8) | 29.04 (98.34) |
| 8th Gear | | | | | | | | | |
| 231.93 (172.95) | 23961 (106.58) | 3.63 (5.84) | 1998 | 5.12 | 0.442 (0.269) | 15.99 (3.15) | 203 (95) | 49 (9) | 29.03 (98.31) |
| 9th Gear | | | | | | | | | |
| 235.13 (175.34) | 21175 (94.19) | 4.16 (6.70) | 2000 | 3.57 | 0.435 (0.264) | 16.25 (3.20) | 206 (96) | 51 (11) | 29.02 (98.27) |
| 10th Gear | | | | | | | | | |
| 235.55 (175.65) | 18602 (82.75) | 4.75 (7.64) | 2002 | 2.59 | 0.435 (0.265) | 16.23 (3.20) | 197 (92) | 52 (11) | 29.01 (98.24) |
| 11th Gear | | | | | | | | | |
| 234.80 (175.09) | 16253 (72.30) | 5.42 (8.72) | 2003 | 1.98 | 0.437 (0.266) | 16.16 (3.18) | 209 (98) | 55 (13) | 28.97 (98.10) |
| 12th Gear | | | | | | | | | |
| 232.28 (173.21) | 14199 (63.16) | 6.13 (9.87) | 2002 | 1.44 | 0.439 (0.267) | 16.09 (3.17) | 199 (93) | 56 (13) | 28.96 (98.07) |
| 13th Gear | | | | | | | | | |
| 227.68 (169.78) | 10874 (48.37) | 7.85 (12.64) | 2002 | 1.04 | 0.450 (0.274) | 15.71 (3.10) | 209 (98) | 57 (14) | 28.94 (98.00) |

DRAWBAR PERFORMANCE
(Ballasted at 2200 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) | Temp. °F(°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|-------------------------------------|--------------------|-------------------------------|
| 2nd Gear | | | | | | | | | |
| 103.98 (77.54) | 30086 (133.83) | 1.30 (2.09) | 2253 | 14.73 | 0.623 (0.379) | 11.34 (2.23) | 179 (82) | 50 (10) | 29.10 (98.54) |
| 3rd Gear | | | | | | | | | |
| 128.82 (96.06) | 27359 (121.70) | 1.77 (2.84) | 2200 | 6.54 | 0.530 (0.322) | 13.34 (2.63) | 181 (83) | 41 (5) | 29.07 (98.44) |
| 4th Gear | | | | | | | | | |
| 132.05 (98.47) | 21208 (94.34) | 2.33 (3.76) | 2201 | 3.35 | 0.514 (0.313) | 13.74 (2.71) | 181 (83) | 42 (6) | 29.06 (98.40) |
| 5th Gear | | | | | | | | | |
| 158.53 (118.22) | 21016 (93.48) | 2.83 (4.55) | 2200 | 3.20 | 0.484 (0.295) | 14.59 (2.87) | 184 (84) | 44 (7) | 29.06 (98.40) |
| 6th Gear | | | | | | | | | |
| 178.69 (133.25) | 21009 (93.45) | 3.19 (5.13) | 2201 | 3.27 | 0.473 (0.288) | 14.94 (2.94) | 183 (84) | 45 (7) | 29.05 (98.37) |
| 7th Gear | | | | | | | | | |
| 206.78 (154.19) | 21529 (95.77) | 3.60 (5.80) | 2199 | 3.42 | 0.464 (0.282) | 15.25 (3.00) | 188 (87) | 46 (8) | 29.05 (98.37) |
| 8th Gear | | | | | | | | | |
| 207.28 (154.57) | 18961 (84.34) | 4.10 (6.60) | 2202 | 2.82 | 0.466 (0.283) | 15.17 (2.99) | 198 (92) | 51 (11) | 29.03 (98.31) |
| 9th Gear | | | | | | | | | |
| 206.61 (154.07) | 16644 (74.03) | 4.66 (7.49) | 2201 | 2.06 | 0.468 (0.284) | 15.12 (2.98) | 194 (90) | 51 (11) | 29.02 (98.27) |
| 10th Gear | | | | | | | | | |
| 205.79 (153.46) | 14621 (65.04) | 5.28 (8.49) | 2201 | 1.51 | 0.466 (0.283) | 15.17 (2.99) | 193 (89) | 53 (12) | 29.00 (98.21) |
| 11th Gear | | | | | | | | | |
| 202.13 (150.73) | 12640 (56.23) | 6.00 (9.65) | 2201 | 1.28 | 0.473 (0.288) | 14.94 (2.94) | 197 (91) | 54 (12) | 28.99 (98.17) |
| 12th Gear | | | | | | | | | |
| 200.37 (149.42) | 11069 (49.24) | 6.79 (10.93) | 2200 | 0.97 | 0.478 (0.291) | 14.80 (2.91) | 197 (91) | 56 (13) | 28.96 (98.07) |
| 13th Gear | | | | | | | | | |
| 194.16 (144.79) | 8418 (37.45) | 8.65 (13.92) | 2201 | 0.89 | 0.494 (0.300) | 14.31 (2.82) | 198 (92) | 57 (14) | 28.94 (98.00) |

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range: 15749 lbs (70.1 kN)

i) Opening pressure of relief valve: NA

| | | |
|---|---------------------------------|---|
| Sustained pressure at compensator cutoff: | 2900 psi (200 bar) | <u>High flow option</u> 2930 psi (202 bar) |
| | two outlet sets combined | |

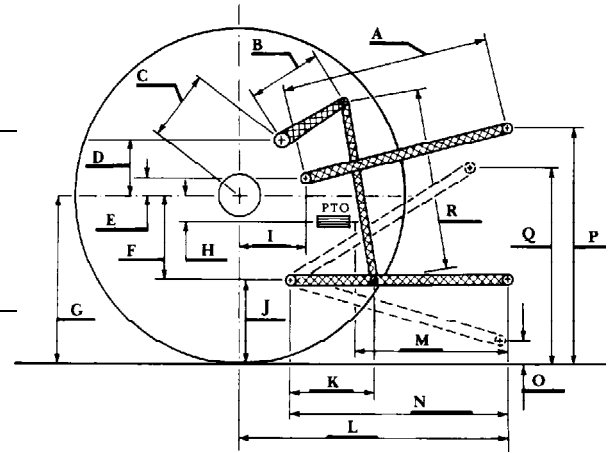
| | | |
|--|------------------------|------------------------|
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 34.7 GPM (131.4 l/min) | 43.3 GPM (163.9 l/min) |
|--|------------------------|------------------------|

| | | |
|---|------------------------|------------------------|
| iii) Pump delivery rate at maximum hydraulic power: | 32.8 GPM (124.2 l/min) | 41.0 GPM (155.2 l/min) |
| Delivery pressure: | 2540 psi (175 bar) | 2370 psi (163 bar) |
| Power: | 48.6 HP (36.2 kW) | 56.7 HP (42.3 kW) |

single outlet set

| | | |
|--|------------------------|------------------------|
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 31.4 GPM (118.9 l/min) | 32.2 GPM (121.9 l/min) |
|--|------------------------|------------------------|

| | | |
|---|------------------------|------------------------|
| iii) Pump delivery rate at maximum hydraulic power: | 29.9 GPM (124.2 l/min) | 27.7 GPM (104.9 l/min) |
| Delivery pressure: | 2200 psi (152 bar) | 2250 psi (155 bar) |
| Power: | 38.4 HP (28.6 kW) | 36.4 HP (27.1 kW) |



HITCH DIMENSIONS AS TESTED NO LOAD

THREE POINT HITCH PERFORMANCE

| | | | | | |
|---|----------------|------------|------------|------------|-------------|
| Observed Maximum Pressure psi. (bar): | 2890 (199) | | | | |
| Location: | lift cylinder | | | | |
| Hydraulic oil temperature: °F (°C): | 148 (64) | | | | |
| Location: | hydraulic sump | | | | |
| Category: | III | | | | |
| Quick attach: | yes | | | | |
| SAE Static Test System pressure 2575 psi (177 Bar) | | | | | |
| Hitch point distance to ground level in. (mm) | 8.0 (203) | 16.1 (408) | 24.1 (613) | 32.1 (814) | 40.0 (1016) |
| Lift force on frame lb | 15904 | 15964 | 16354 | 16348 | 15410 |
| " " " " " " (kN) | (70.7) | (71.0) | (72.8) | (72.7) | (68.6) |

| | | | | | |
|--|-----------|------------|------------|------------|-------------|
| ASAE Static Test System pressure 2850 psi (196 Bar) | | | | | |
| Hitch point distance to ground level in. (mm) | 8.0 (203) | 16.1 (408) | 24.1 (613) | 32.1 (814) | 40.0 (1016) |
| Lift force on frame lb | 17671 | 17634 | 18059 | 18053 | 16981 |
| " " " " " " (kN) | (78.6) | (78.4) | (80.3) | (80.3) | (52.7) |

| | inch | mm |
|-----|------|------|
| A | 28.9 | 733 |
| B | 19.5 | 495 |
| C | 22.9 | 582 |
| D | 22.2 | 565 |
| E | 10.2 | 260 |
| F | 11.0 | 280 |
| G | 33.6 | 853 |
| H | 3.2 | 81 |
| I | 15.6 | 395 |
| J | 22.6 | 573 |
| K | 28.3 | 718 |
| L | 48.5 | 1231 |
| *L' | 52.0 | 1320 |
| M | 25.5 | 647 |
| N | 41.6 | 1056 |
| O | 8.0 | 203 |
| P | 40.8 | 1037 |
| Q | 39.1 | 993 |
| R | 42.9 | 1089 |

*L' to Quick Attach ends



JOHN DEERE 8410T DIESEL

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