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January 1997

## Test 1740: John Deere 7410 Syncroplus Diesel 12-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 1740—SUMMARY 240

## JOHN DEERE 7410 SYNCROPLUS DIESEL

### 12 SPEED

#### 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1003 rpm)</b>					
106.39 (79.33)	2100	6.23 (23.59)	0.413 (0.251)	17.07 (3.36)	
<b>Maximum Power (2 hours)</b>					
109.49 (81.64)	1750	6.00 (22.70)	0.386 (0.235)	18.26 (3.60)	

#### VARYING POWER AND FUEL CONSUMPTION

106.39 (79.33)	2100	6.23 (23.59)	0.413 (0.251)	17.07 (3.36)	Air temperature
92.30 (68.83)	2146	5.71 (21.61)	0.436 (0.265)	16.17 (3.19)	77°F (25°C)
70.48 (52.56)	2180	4.77 (18.06)	0.477 (0.290)	14.77 (2.91)	Relative humidity
47.66 (35.54)	2205	3.88 (14.67)	0.573 (0.348)	12.30 (2.42)	70%
23.85 (17.78)	2231	2.85 (10.80)	0.843 (0.513)	8.36 (1.65)	Barometer
1.03 (0.77)	2257	1.96 (7.42)	13.447 (8.179)	0.52 (0.10)	29.06" Hg (98.41 kPa)

Maximum Torque 368 lb.-ft. (499 Nm) at 1400 rpm

Maximum Torque Rise 38.2%

Torque rise at 1699 engine rpm 26%

#### DRAWBAR PERFORMANCE (UNBALLASTED—FRONT DRIVE ENGAGED) 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) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—6th (C1) Gear</b>									
92.55 (69.01)	7192 (31.99)	4.83 (7.77)	2097	3.58	0.475 (0.289)	14.84 (2.92)	194 (90)	60 (16)	29.15 (98.71)
<b>75% of Pull at Maximum Power—6th (C1) Gear</b>									
72.15 (53.80)	5393 (23.99)	5.02 (8.07)	2167	2.92	0.511 (0.311)	13.78 (2.71)	189 (87)	49 (9)	29.24 (99.02)
<b>50% of Pull at Maximum Power—6th (C1) Gear</b>									
49.17 (36.67)	3593 (15.98)	5.13 (8.26)	2196	2.00	0.608 (0.370)	11.58 (2.28)	186 (85)	53 (12)	29.21 (98.92)
<b>75% of Pull at Reduced Engine Speed—8th (C2) Gear</b>									
72.34 (53.94)	5386 (23.96)	5.04 (8.11)	1554	2.84	0.442 (0.269)	15.95 (3.14)	194 (90)	51 (11)	29.24 (99.02)
<b>50% of Pull at Reduced Engine Speed—8th (C2) Gear</b>									
49.20 (36.69)	3607 (16.04)	5.12 (8.23)	1566	2.17	0.498 (0.303)	14.14 (2.79)	186 (85)	53 (12)	29.20 (98.88)

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

**Dates of Test:** October 9 - 22, 1997

**Manufacturer:** John Deere Tractor Works, P.O.  
Box 270, Waterloo, Iowa 50704

**FUEL OIL and TIME:** Fuel No. 2 Diesel Cetane  
No. 53.9 Specific gravity converted to 60°/60°  
F (15°/15°C) 0.8459 Fuel weight 7.043 lbs/gal  
(0.844 kg/l) Oil SAE 15W-40 API service  
classification CE/CG-4 To motor 4.899 gal  
(18.545 l) Drained from motor 4.832 gal  
(18.291 l) Transmission and hydraulic lubricant  
John Deere Hy-Gard fluid Front axle lubricant  
John Deere Hy-Gard fluid and API GL-5 Gear  
Lubricant Total time engine was operated 24.0  
hours.

**ENGINE:** Make John Deere Diesel Type six  
cylinder vertical with turbocharger Serial No.  
\*TO6068T720082\* Crankshaft lengthwise Rated  
engine speed 2100 Bore and stroke (as specified)  
4.19" × 5.00" (106.5 mm × 127.0 mm) Compression  
ratio 17.0 to 1 Displacement 414 cu in (6788 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  
prestrainer Fuel cooler radiator for return fuel  
Muffler underhood Exhaust vertical Cooling  
medium temperature control two thermostats  
and variable speed fan

**ENGINE OPERATING PARAMETERS:** Fuel  
rate: 43.7-45.4 lb/h (19.8-20.6 kg/h) High idle:  
2225-2325 rpm Turbo boost nominal 7.5-11.9 psi  
(52-82 kPa) as measured 9.3 psi (64 kPa)

**CHASSIS:** Type front wheel assist Serial No.  
\*RW7410S003246\* Tread width rear 60.0" (1525  
mm) to 100.3" (2548 mm) front 60.0" (1524 mm) to 88.0"  
(2235 mm) Wheel base 103.3" (2625 mm) Hydraulic  
control system direct engine drive Transmission  
selective gear fixed ratio Nominal travel speeds  
mph (km/h) first 1.43 (2.30) second 2.00 (3.22) third  
2.64 (4.25) fourth 3.03 (4.87) fifth 4.24 (6.82) sixth 4.82  
(7.75) seventh 5.59 (9.00) eighth 6.74 (10.85) ninth  
8.90 (14.33) tenth 9.99 (16.08) eleventh 13.98 (22.50)  
twelfth 18.46 (29.71) reverse 1.75 (2.81), 3.70 (5.96),  
5.89 (9.48), 12.21 (19.65) Clutch multiple wet disc  
hydraulically actuated by foot pedal Brakes wet  
multiple disc hydraulically actuated by two foot pedals  
which can be locked together Steering hydrostatic  
Power take-off 540 rpm at 2080 engine rpm and  
1000 rpm at 2093 engine rpm Unladen tractor  
mass 12740 lb (5778 kg)

**DRAWBAR PERFORMANCE  
(UNBALLASTED—FRONT DRIVE ENGAGED)  
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/kWh)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
84.37 (62.91)	13300 (59.16)	2.38 (3.83)	2128	14.36	0.508 (0.309)	13.87 (2.73)	189 (87)	47 (8)	29.24 (99.02)
4th (B1) Gear									
91.77 (68.44)	11884 (52.86)	2.90 (4.66)	2099	8.01	0.475 (0.289)	14.82 (2.92)	188 (86)	64 (18)	29.08 (98.48)
5th (B2) Gear									
93.60 (69.80)	8338 (37.09)	4.21 (6.77)	2098	4.30	0.465 (0.283)	15.16 (2.99)	194 (90)	62 (17)	29.14 (98.68)
6th (C1) Gear									
92.55 (69.01)	7192 (31.99)	4.83 (7.77)	2097	3.58	0.475 (0.289)	14.84 (2.92)	194 (90)	60 (16)	29.15 (98.71)
7th (B3) Gear									
92.91 (69.28)	6186 (27.51)	5.63 (9.06)	2099	3.00	0.471 (0.287)	14.95 (2.94)	196 (91)	62 (17)	29.14 (98.68)
8th (C2) Gear									
91.12 (67.95)	5006 (22.27)	6.83 (10.99)	2098	2.59	0.477 (0.290)	14.76 (2.91)	194 (90)	63 (17)	29.12 (98.61)
9th (C3) Gear									
89.50 (66.74)	3695 (16.44)	9.08 (14.62)	2100	1.92	0.494 (0.301)	14.26 (2.81)	190 (88)	63 (17)	29.09 (98.51)

**DRAWBAR PERFORMANCE  
(UNBALLASTED—FRONT DRIVE ENGAGED)  
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/kWh)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
84.61 (63.09)	13283 (59.08)	2.39 (3.84)	2128	14.04	0.506 (0.308)	13.91 (2.74)	188 (87)	47 (8)	29.24 (99.02)
4th (B1) Gear									
91.81 (68.46)	12105 (53.85)	2.84 (4.58)	2077	8.60	0.473 (0.288)	14.88 (2.93)	189 (87)	65 (18)	29.07 (98.44)
5th (B2) Gear									
96.48 (71.94)	10509 (46.75)	3.44 (5.54)	1749	6.04	0.438 (0.266)	16.08 (3.17)	195 (90)	63 (17)	29.14 (98.68)
6th (C1) Gear									
96.90 (72.26)	9117 (40.55)	3.99 (6.41)	1755	4.78	0.437 (0.266)	16.11 (3.17)	198 (92)	61 (16)	29.15 (98.71)
7th (B3) Gear									
98.14 (73.18)	7907 (35.17)	4.65 (7.49)	1752	4.14	0.431 (0.262)	16.32 (3.22)	196 (91)	62 (17)	29.14 (98.68)
8th (C2) Gear									
96.55 (72.00)	6404 (28.49)	5.65 (9.10)	1751	3.17	0.436 (0.265)	16.16 (3.18)	197 (91)	63 (17)	29.10 (98.54)
9th (C3) Gear									
95.76 (71.41)	4766 (21.20)	7.53 (12.13)	1752	2.42	0.440 (0.267)	16.02 (3.16)	197 (91)	63 (17)	29.08 (98.48)
10th (D1) Gear									
93.26 (69.54)	4134 (18.39)	8.46 (13.62)	1747	2.09	0.452 (0.275)	15.58 (3.07)	197 (92)	63 (17)	29.08 (98.48)

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

**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 return was maintained at 162° F (72°C). This tractor did not meet manufacturers claim of 72.0 dB(A) cab sound level. The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1740**, Summary 240, November 11, 1997.

LOUIS I. LEVITICUS  
Engineer-in-Charge

L.L. BASHFORD  
R.D. GRISSO  
M.F. KOCHER  
Board of Tractor Test Engineers

**DRAWBAR PERFORMANCE**  
**(UNBALLASTED—FRONT DRIVE DISENGAGED)**  
**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)
<b>Maximum Power—7th (B3) Gear</b>									
93.32 (69.59)	6322 (28.12)	5.54 (8.91)	2099	3.45	0.471 (0.286)	14.96 (2.95)	196 (91)	62 (17)	29.14 (98.68)
<b>75% of Pull at Maximum Power—7th (B3) Gear</b>									
72.67 (54.19)	4743 (21.10)	5.75 (9.25)	2162	2.72	0.509 (0.310)	13.84 (2.73)	188 (87)	51 (11)	29.23 (98.98)
<b>50% of Pull at Maximum Power—7th (B3) Gear</b>									
49.54 (36.94)	3162 (14.06)	5.88 (9.46)	2195	1.97	0.607 (0.370)	11.59 (2.28)	186 (86)	53 (12)	29.20 (98.88)
<b>75% of Pull at Reduced Engine Speed—9th (C3) Gear</b>									
72.53 (54.08)	4742 (21.09)	5.74 (9.23)	1357	2.63	0.430 (0.261)	16.39 (3.23)	198 (92)	52 (11)	29.22 (98.95)
<b>50% of Pull at Reduced Engine Speed—9th (C3) Gear</b>									
49.54 (36.95)	3185 (14.17)	5.83 (9.39)	1370	1.81	0.466 (0.283)	15.12 (2.98)	188 (86)	53 (12)	29.19 (98.85)
<b>MAXIMUM POWER IN SELECTED GEARS</b>									
<b>4th (B1) Gear</b>									
79.91 (59.59)	11131 (49.51)	2.69 (4.33)	2140	14.75	0.522 (0.318)	13.49 (2.66)	187 (86)	46 (8)	29.24 (99.02)
<b>5th (B2) Gear</b>									
92.68 (69.11)	8443 (37.56)	4.12 (6.62)	2097	5.11	0.470 (0.286)	14.97 (2.95)	193 (89)	62 (17)	29.14 (98.68)
<b>6th (C1) Gear</b>									
92.65 (69.09)	7337 (32.63)	4.74 (7.62)	2099	4.01	0.476 (0.289)	14.81 (2.92)	195 (91)	60 (16)	29.15 (98.71)
<b>7th (B3) Gear</b>									
93.32 (69.59)	6322 (28.12)	5.54 (8.91)	2099	3.45	0.471 (0.286)	14.96 (2.95)	196 (91)	62 (17)	29.14 (98.68)
<b>8th (C2) Gear</b>									
92.21 (68.76)	5163 (22.96)	6.70 (10.78)	2095	2.72	0.473 (0.288)	14.88 (2.93)	196 (91)	63 (17)	29.11 (98.58)
<b>9th (C3) Gear</b>									
91.62 (68.32)	3849 (17.12)	8.93 (14.37)	2099	1.93	0.477 (0.290)	14.77 (2.91)	195 (91)	63 (17)	29.09 (98.51)

<b>TRACTOR SOUND LEVEL WITH CAB</b>	<b>Front Wheel Drive</b>	
	<b>Disengaged dB(A)</b>	<b>Engaged dB(A)</b>
At 75% load in 7th (B3) Gear	73.8	73.8
Bystander in 12th (D3) Gear	81.4	—

**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 18.4R38: \*, 16 (110)

Two 14.9R28:\*\*\*, 16 (110)

21.5 in (545 mm)

8404 lb (3812 kg)

4500 lb (2041 kg)

12904 lb (5853 kg)

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: none

Maximum Force Exerted Through Whole Range: 6858 lbs (30.5 kN)  
7790 lbs (34.6 kN) with 80 mm lift cylinders

- i) Opening pressure of relief valve: NA
- Sustained pressure of the open relief valve: 2870 psi (198 bar)
- ii) Pump delivery rate at minimum pressure: 26.9 GPM (101.8 l/min)
- iii) Pump delivery rate at maximum hydraulic power: 25.0 GPM (94.6 l/min)
- Delivery pressure: 2580 psi (178 bar)
- Power: 37.6 HP (28.1 kW)

### THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar) 2950 (203)  
Location lift cylinders  
Hydraulic oil temperature °F (°C) 140 (60)  
Location hydraulic sump  
Category II  
Quick attach No

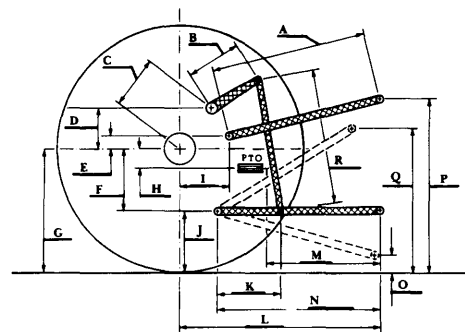
	system pressure—2650 psi (182 bar) lift cylinders—1 × 70 mm and 1 × 80 mm				
Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	10377	9369	8811	8217	7484
Lift force on frame (kN)	(46.2)	(41.7)	(39.2)	(36.6)	(33.3)

	lift cylinders—2 × 80 mm				
Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb.	11826	10773	10143	9405	8577
Lift force on frame (kN)	(52.6)	(47.9)	(45.1)	(41.8)	(38.2)

#### As per current SAE test procedures

	system pressure—2860 psi (197 bar) lift cylinders—1 × 70 mm and 1 × 80 mm				
Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	11178	10092	9491	8851	8061
Lift force on frame (kN)	(49.7)	(44.9)	(42.2)	(39.4)	(35.9)

	lift cylinders—2 × 80 mm				
Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb.	12739	11605	10926	10131	9239
Lift force on frame (kN)	(56.7)	(51.6)	(48.6)	(45.1)	(41.1)



#### HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	27.8	705
B	15.7	400
C	21.8	554
D	20.6	523
E	4.9	125
F	9.8	250
G	32.3	820
H	3.1	80
I	18.0	456
J	22.5	570
K	21.1	537
L	44.2	1122
M	19.8	502
N	37.9	962
O	8.0	203
P	46.5	1180
Q	35.9	911
R	35.0	889



**JOHN DEERE 7410 SYNCROPLUS DIESEL**

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Darrell Nelson, Dean and Director