

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

January 1997

Test 1740: John Deere 7410 Syncroplus Diesel 12-Speed

Tractor Museum

University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Applied Mechanics Commons](#)

Museum, Tractor, "Test 1740: John Deere 7410 Syncroplus Diesel 12-Speed" (1997). *Nebraska Tractor Tests*. 2048.

<https://digitalcommons.unl.edu/tractormuseumlit/2048>

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.

NEBRASKA OECD TRACTOR TEST 1740—SUMMARY 240

JOHN DEERE 7410 SYNCROPLUS DIESEL

12 SPEED

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

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—1003 rpm)					
106.39 (79.33)	2100	6.23 (23.59)	0.413 (0.251)	17.07 (3.36)	
Maximum Power (2 hours)					
109.49 (81.64)	1750	6.00 (22.70)	0.386 (0.235)	18.26 (3.60)	

VARYING POWER AND FUEL CONSUMPTION

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Conditions
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)
Maximum Power—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)
75% of Pull at Maximum Power—6th (C1) Gear									
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)
50% of Pull at Maximum Power—6th (C1) Gear									
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)
75% of Pull at Reduced Engine Speed—8th (C2) Gear									
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)
50% of Pull at Reduced Engine Speed—8th (C2) Gear									
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)

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		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kWh)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
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		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kWh)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
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/kWh)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B3) Gear									
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)
75% of Pull at Maximum Power—7th (B3) Gear									
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)
50% of Pull at Maximum Power—7th (B3) Gear									
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)
75% of Pull at Reduced Engine Speed—9th (C3) Gear									
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)
50% of Pull at Reduced Engine Speed—9th (C3) Gear									
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)
MAXIMUM POWER IN SELECTED GEARS									
4th (B1) Gear									
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)
5th (B2) Gear									
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)
6th (C1) Gear									
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)
7th (B3) Gear									
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)
8th (C2) Gear									
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)
9th (C3) Gear									
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)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Disengaged dB(A)	Engaged dB(A)
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)

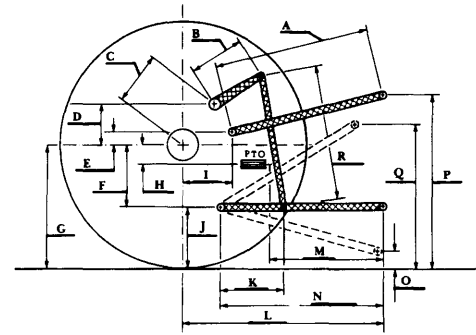
THREE POINT HITCH PERFORMANCE (OECD Static Test)

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

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
Darrell Nelson, Dean and Director