OECD APPROVAL # 1511/1 AND 2
(Restricted code)
Date of approval: 16 March 1994

NEBRASKA TRACTOR TESTING LABORATORY
DEPARTMENT OF AGRICULTURAL ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA - EAST CAMPUS
LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD RESTRICTED CODE (CODE II)

FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

JOHN DEERE 8970 POWRSYNC (4WD)
JOHN DEERE 8970 SYNCRO (4WD)



MANUFACTURED BY: John Deere Waterloo Works
P.O.Box 270
Waterloo, Iowa 50704-0270
NEBRASKA TEST NO. 1673
Test dates: October - December , 1993

This test report provides the results of the tests conducted in accordance with the OECD Standard Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final - Annex II, Restricted Code.

This report has been approved by the OECD Coordinating Centre in Paris (CEMAGREF) on 16 March 1994

John Deere 8970 PowrSync (4WD) - Articulated OECD # 1511/1
John Deere 8970 Syncro (4WD) - Articulated OECD # 1511/2

The transmissions of the 8970 PowrSync and 8970 Syncro are mechanically similar and thus tests were not repeated. The test results are valid for both models.

No reproduction of this report or any part of it can be made without prior approval by the Tractor Testing Laboratory - University of Nebraska, Lincoln.

Associate Director

Dr. Louis I. Leviticus

Senior Test Engineer

David L. Morgan

Test Engineer

Brent T. Sampson

Chairman, Tractor Test Board

Dr. Robert D. Grisso

Members, Tractor Test Board

Dr. Michael F. Kocher

Dr. Kenneth von Bargen

Date: APR 05 1994

LINCOLN, NEBRASKA 68583-0832, USA

Table of Contents.

	Page
1. SPECIFICATIONS	1
2. TEST CONDITIONS	10
3. COMPULSORY TESTS	
Main Power Take-Off Performance	12
Hydraulic Pump Performance	13
Drawbar Performance at Rated Engine Speed	14
4. GRAPHS	15
5. OPTIONAL TESTS	
Drawbar performance at 1900 rpm	17
Measurement of external noise level	18

SPECIFICATIONS OF TRACTOR.

Manufacturers name/address	John Deere Tractor Works P.O. Box 270 Waterloo, Iowa, USA
Location of tractor assembly	Same
Submitted for test by	The manufacturer
Selected for test by	The manufacturer in agreement with the test station.
Place of running in	John Deere Product Eng. Ctr Waterloo, Iowa, USA
Duration of running in	135 hours
Location of Test	Tractor Testing Laboratory Lincoln, Nebraska,USA.

TRACTOR SPECIFICATIONS.

Make	John Deere
Model	8970 PowerSync
Type	Articulated frame, four-wheel drive
Number of driving wheels	8
Serial Number	*RW8970H001193*
1st Serial number	*RW8970H001001*

ENGINE.

Make	Cummins
Model	NTA-855-A400E
Type	Diesel; 4-stroke; turbocharged aftercooled, direct injection,
Serial Number	*30339839*

Cylinders

Number/Disposition	6, in-line, vertical
Bore/stroke	139.7 mm x 152.4 mm
Capacity	14011 ml
Compression Ratio	14.0 : 1
Arrangement of valves	Overhead
Cylinder liners	Wet; replaceable

Super charging

Make/Model/Type	Holset/HT3B/Exhaust driven
Pressure	145 - 179 kPa at rated speed and load

Fuel System	
Feed system	Engine driven transfer pump
Make/Type/Model of filters	Fleetguard/FS1212/synthetic and microglass reinforced cellulose
Fuel tank capacity	835 l
Fuel Cooler	None
Make/Model/Type Injection Pump	Cummins/PTG-AFC/Unit injector (with Century Advantage)
Pump Serial number	9304012038
Production setting of pump Flow Rate (Rated Eng.Spd & Full Load)	66.5 +/- 1.9 kg/h
Make/Model/Type Injectors	Cummins/PTG-RFD/Top Stop Unit
Injection pressure	75 MPa
Timing	12.0 degrees BTDC
Governor	
Make/Model/Type	Cummins Century/Electronic control
Governed engine speed range	From 800 to 2260 rev/min
Rated engine speed	2100 rev/min
High-idle speed range	2260 +/- 50 rpm
Air Cleaner.	
Pre-cleaner	
Make/Model/type	Donaldson/R116627/Strato-tube precleaner with aspirator
Air intake location	Top of air stack, right front corner of cab
Main Cleaner	
Make/Model/Type	Donaldson/AR95758/pleated paper
Location	Below pre-cleaner, right front
Secondary cleaner	Donaldson/RE95759/pleated paper
Maintenance indicator	Dash mounted warning light and audio signal
Lubrication system.	
Type of feed pump	Full pressure; positive displacement
Type of filters	Full flow, with bypass
Number	One spin-on.
Oil cooler	Heat exchanger with engine coolant

Cooling system.	
Type of coolant	Liquid
Type of pump	Centrifugal, belt driven
Fan specification	Belt driven; Suction type; variable speed
Number of fan blades	8
Fan diameter	813 mm
Coolant system capacity	68 l
Type of temperature control	One thermostat and variable speed fan
System pressure	103 kPa
Starting system.	
Make/Model/Type of starter	Delco-Remy/RE41754/solenoid engaged
Power Rating	6.9 kW
Cold starting aid	Ether spray in intake manifold
Safety device	Electrical lockout on gearshift
Electrical system.	
Voltage & grounding.	12 Volt DC; negative ground
Generator	
Make/Model/Type	Nippondenso/RE51921/Belt driven
Power rating	120 Amp at rated engine speed
Batteries	
Number & connection	Three ; 12 Volt batteries in parallel.
Rating	925 cold cranking amps/battery 175 Ah/battery at 20 h. rating
Exhaust system.	
Muffler Make/Model/Type	Nelson/RE52169/Expansion chamber
Location	Vertical, right front corner of cab
Exhaust stack location	Vertical; right front corner of cab

TRANSMISSION.

Clutch. (travel)

Make/Model/Type	John Deere/Multiple plate/oil cooled
Number of plates	7
Plate diameter	279 mm
Method of operation	Hydraulic; pedal actuated

Gear Box.

Make/Model/Type	John Deere/PowrSync
Arrangement	Countershaft and Planetary design consisting of one 3-speed gearbox with 4 synchronized ranges and one two-speed planetary gearset with multiple wet disc and brake.
Number of gears (8970 PowrSync)	24 forward and 6 reverse operated by 2 levers
Available options (8970 Syncro)	12 forward, 3 reverse (same arrangement without the two-speed planetary gearset)
Oil cooler	Heat exchanger with air

Rear axle and final drives.

Make/Model/Type	John Deere/Crown wheel and pinion, differential and inboard planetary reduction
Differential Lock (optional)	None

Front Axle and final drives.

Make/Model/Type	John Deere/1150/Crown wheel and pinion, differential and inboard planetary reduction
Differential lock (optional)	None

Gear ratios and travel speeds - PowrSync transmission.

(Tire dynamic radius of 905 mm ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2100 rev/min [km/h]
Forward		
A1	213.20	3.36
A2	177.66	4.03
A3	165.48	4.33
A4	138.07	5.19
A5	120.97	5.92
A6	100.86	7.10
B1	100.00	7.16
C1	90.71	7.90
B2	83.40	8.59
B3	77.69	9.22
C2	75.65	9.47
C3	70.47	10.17
B4	64.79	11.06
C4	58.77	12.19
B5	56.76	12.62
C5	51.48	13.92
B6	47.34	15.13
C6	42.94	16.69
D1	42.56	16.83
D2	35.50	20.18
D3	33.06	21.67
D4	27.57	25.99
D5	24.16	29.66
D6	20.15	35.56
Reverse		
A1	177.66	4.03
A2	148.20	4.83
B1	83.40	8.59
C1	75.65	9.47
B2	69.56	10.30
C2	63.08	11.36

Number of front wheel revolutions
for one rear wheel revolution: 1

Gear ratios and travel speeds - Syncro transmission.

(Tire dynamic radius of 905 mm ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2100 rev/min [km/h]
Forward		
A1	213.20	3.36
A2	165.48	4.33
A3	120.97	5.92
B1	100.00	7.16
C1	90.71	7.90
B2	77.69	9.22
C2	70.47	10.17
B3	56.76	12.62
C3	51.48	13.92
D1	42.56	16.83
D2	33.06	21.67
D3	24.16	29.66
Reverse		
A1	177.66	4.03
B1	83.40	8.59
C1	75.65	9.47

Number of front wheel revolutions
for one rear wheel revolution: 1

DRIVETRAIN OVERLOAD PROTECTION

After 30 seconds of continuous operation at high loads with wheel speeds below 7.2 km/hour, maximum engine power will be limited to 298 kW by means of an electronic governor signal. This feature cannot be controlled by the operator.

In order to enable uniform tests to be conducted, a special switch was installed for the test. This switch enabled operation without the automatic switching back and forth on the power curve, which would otherwise have occurred.

In order to provide a baseline for the track performance, a PTO run was also made at the 298 kW level. Note that this choice is not available to the user, but was only used to facilitate the test.

POWER - TAKE - OFF (Option)

Main Power-Take-Off.	
Type	Independent
Method of engagement	Electro-hydraulically actuated multi-plate wet clutch operated by hand control lever
Number of shafts	One
Method of changing speeds	None
PTO Proportional to engine speed	
Standard PTO-1000 rev/min.	
Location	Rear of tractor;center plane
Diameter of shaft	44.5 mm
Number of splines	20; conforms to ISO 500/1979.
Height above ground	799 mm
Distance from median plane of tractor	0 mm
Distance behind rear axle	760 mm
PTO Speed at rated engine spd	1108 rev/min
Engine speed at Std. PTO spd	1895 rev/min
Engine speed/PTO speed ratio	1.895:1
Power restriction	None
Direction of rotation when viewed from shaft end	Clockwise.

POWER LIFT. — **NOT AVAILABLE ON THIS MODEL**

HYDRAULIC SYSTEM.

Hydraulic system make	John Deere
Pump relief valve pressure setting	172 - 178 bar
Opening pressure of system safety valve	197 - 218 bar
Pump type	Radial piston, variable delivery and flow, constant pressure
Power transmission to pump	Direct drive in transmission
Type/Number of filters	Spin-on canister/one
Location of oil reservoir	Integral with right side fuel tank
Number/Type/Location of tapping points	3 pairs/ISO standard/rear of tractor; 4th and 5th coupler optional
Maximum oil volume available for external cylinders	19 liters regular; 32 liters with additional 13 liters allowable overfill

SWINGING DRAWBAR.

Type	Oscillating
Height above groundt to top	
- maximum	489 mm
- minimum	464 mm
Adjustments	Invert drawbar; removable clevis
Distance of hitch point from rear wheel axis-horizontal	1118 or 1268 mm
Distance of hitch point from PTO shaft end: Vertical	300 mm
Horizontal	358 or 508 mm
Lateral adjustment-Right side	200 mm
Left side	200 mm
Distance of pivot point from rear wheel axis-horizontal	435 or 585 mm
Diameter of drawbar pin hole	52.5 mm
Maximum vertical static permissible load	20 kN - both positions

STEERING.

Make/Model/Type	John Deere/Hydrostatic
Method of operation	Steering wheel
Pump(s)	Same as main hydraulic pump
Ram(s)	Two external; double acting; with feedback
Working pressure	175 +/- 3 bar

BRAKE SYSTEM.

Service brake.	
Make/Model/Type	John Deere/oil immersed disc
Method of operation	Hydraulic actuated by main system; operated by one pedal
Parking brake.	
Type	Transmission lock.
Method of operation	Gear selector lever
Trailer Brake	None

WHEELS.

Number.	
Front	Four; Driving and steering
Rear	Four; Driving and steering
Wheel base	3400 mm

Track width adjustment

	Minimum [mm]	Maximum [mm]	Adjustment method
Inner wheels	1738	2181	Rack axle, reversing wheels and offset rims
Outer wheels	3212	3655	Same as inner wheels

PROTECTIVE STRUCTURE.

Make/Model/Type	John Deere/SG-041/Sound-Gard body
Manufacturer's name/address	John Deere Tractor Works Waterloo, Iowa, USA
Protective device	Cab; tiltable with tool
OECD approval number	
8970 PowrSync	CSS 0141/11
8970 Syncro	CSS 0141/10

DRIVER'S SEAT.

Make/Model/Type	Sears/FS92-01/Air suspension; Personal posture cushioning
Type of suspension	Air
Type of damping	Air
Range of adjustment	
Longitudinal	150 mm
Vertical	64 mm
Rotation	20 degrees left and right

LIGHTING.

	Height above ground of center [mm]	Size [mm]	Distance from outside edge to median plane of tractor. [mm]
Head lights	2040	100 diam.	483
Rear lights	1996	100 diam.	845
Reflectors			
front	3536	50 x 197	533
rear	3536	50 x 197	554

TEST CONDITIONS.

Overall dimenensions

Length	6807 mm
Width	
minimum	3752 mm
maximum	4190 mm
Height - Top protective structure	3505 mm
- Top of exhaust	4125 mm
Ground clearance	378 mm
Clearance-limiting part	Drawbar rear support

Tractor Mass (with cab,full fuel tank).

		without driver [kg]	with driver [kg]
Unballasted	Front	9243	9280
	Rear	6022	6060
	Total	15265	15340

Tire Specifications.

	Front Wheels	Rear Wheels
Make	Goodyear	Goodyear
Dimensions	20.8R42	20.8R42
Number/Ply rating	2 star	2 star
Type	Radial	Radial
Max.load (tire mfg)	3651 kg/tire	3651 kg/tire
Inflation pressure(tire mfr)-max	165 kPa	165 kPa
- as tested	90 kPa	90 kPa
Dynamic Radius Index	905 mm	905 mm
Chosen track width-inner	2137 mm	2137 mm
-outer	3639 mm	3639 mm

Oils and Lubrication.

Capacity and change interval:

	Capacity liter	Oil change hours	Filter change hours
Engine (w/o filter)	34.0	250	250
Transmission	37.8	1500	1500
Hydraulic system combined with Rear axle, Front axle and Steering system	144.0	1500	1500

Oil and Lubricant specifications:

	Recommended	Used during test
Engine oil		
Type	John Deere, Torq-Gard Supreme Plus 50; SAE 15W-40	same
Viscosity	12.8 cSt at 100°C	
Classification	API CE or CD; CCMD specification D5 or D4	
Transmission		
Type	John Deere Hy-Gard; J20C SAE 10W-30	same
Viscosity	58 cSt at 40°C	
Classification	NA	
Hydraulic fluid	Same as transmission	same
Steering system	Same as transmission	same
Grease	John Deere MOLY HIGH TEMPERATURE EP GREASE	same
Number of lube points	22	

Fuel

Type/grade	Premier; Grade 2-D, in conformity with the national standard
Density (Pto test)	0.838 kg/l at 15° C
(Drawbar test)	same as Pto test.
Cetane number	53.9
Viscosity	2.31 cSt at 37.8° C

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF

Date: 23-Nov-93 Location: UNL Tractor Test Lab, Lincoln, NE, U.S.A.

Type of dynamometer: Eddy current, Eaton Fuel density: 6.994 lb/gal

Power kW *hp*	Eng rev/min	PTO rev/min	l/h *gal/h*	kg/h *lb/h*	kg/kW-h *lb/hp-h*	kW-h /l *hp-h /gal*
1.1 Maximum Power – 2 hours						
293.35	1900	1003	81.52	68.32	0.233	3.60
393.39			*21.53*	*150.62*	*0.383*	*18.27*
1.2 Power at Rated Engine Speed – 1 hour						
264.31	2100	1109	78.46	65.76	0.249	3.37
354.45			*20.73*	*144.97*	*0.409*	*17.10*
1.3 Power at Standard Power Take-Off Speed – 1 hour						
293.35	1900	1003	81.52	68.32	0.233	3.60
393.39			*21.53*	*150.62*	*0.383*	*18.27*
1.4 Part Loads						
1.4.1 Torque at maximum power at rated engine speed						
264.31	2100	1109	78.46	65.76	0.249	3.37
354.45			*20.73*	*144.97*	*0.409*	*17.10*
1.4.2 85% of torque obtained in 1.4.1						
227.87	2130	1124	68.85	57.70	0.253	3.31
305.58			*18.19*	*127.20*	*0.416*	*16.80*
1.4.3 75% of torque defined in 1.4.2						
172.93	2157	1138	56.67	47.49	0.275	3.05
231.90			*14.97*	*104.70*	*0.451*	*15.49*
1.4.4 50% of torque defined in 1.4.2						
117.68	2189	1155	42.54	35.65	0.303	2.77
157.81			*11.24*	*78.60*	*0.498*	*14.04*
1.4.5 25% of torque defined in 1.4.2						
59.41	2233	1179	29.55	24.77	0.417	2.01
79.67			*7.81*	*54.60*	*0.685*	*10.21*
1.4.6 unloaded						
1.27	2253	1189	17.05	14.29	11.285	0.07
1.70			*4.50*	*31.50*	*18.552*	*0.38*
1.5 Part Loads at Standard Power Take-off Speed						
1.5.1 Torque at maximum power						
293.35	1900	1003	81.52	68.32	0.233	3.60
393.39			*21.53*	*150.62*	*0.383*	*18.27*
1.5.2 85% of torque obtained in 1.5.1						
254.17	1935	1022	71.44	59.87	0.236	3.56
340.85			*18.87*	*132.00*	*0.387*	*18.06*
1.5.3 75% of torque defined in 1.5.2						
192.72	1955	1032	57.15	47.90	0.249	3.37
258.44			*15.10*	*105.60*	*0.409*	*17.12*
1.5.4 50% of torque defined in 1.5.2						
130.44	1989	1050	42.54	35.65	0.273	3.07
174.93			*11.24*	*78.60*	*0.449*	*15.57*
1.5.5 25% of torque defined in 1.5.2						
66.63	2032	1073	28.58	23.95	0.359	2.33
89.36			*7.55*	*52.80*	*0.591*	*11.84*
1.5.6 unloaded						
0.96	2054	1084	14.13	11.84	12.305	0.07
1.29			*3.73*	*26.10*	*20.230*	*0.35*

No load maximum engine speed:	2253 rev/min	
Equivalent torque at rated speed:	1202 N-m	*886 lb-ft*
Equivalent torque at maximum power:	1475 N-m	*1088 lb-ft*
(engine speed:	1900 rev/min)	
Maximum equivalent crankshaft torque:	1766 N-m	*1302 lb-ft*
(engine speed:	1400 rev/min)	
Mean Dry bulb:	25 deg C	*77 deg F*
Wet bulb:	18 deg C	*64 deg F*
Relative humidity:	50 %	
Pressure:	98.07 kPa	*28.96 in Hg*
Maximum Coolant:	91 deg C	*195 deg F*
Engine oil:	103 deg C	*218 deg F*
Fuel:	62 deg C	*143 deg F*
Air intake:	46 deg C	*114 deg F*
Transmission/hydraulic oil:	67 deg C	*152 deg F*
Intake manifold pressure at rated speed:	141 kPa	*20.5 psig*
Intake manifold pressure at maximum power:	152 kPa	*22.0 psig*

Hydraulic Power Test

Date of test: 29 OCT 1993
Location of test–City–State: Tractor Test Lab, Lincoln, NE, USA
Tapping point used for test: Remote hydraulic outlets

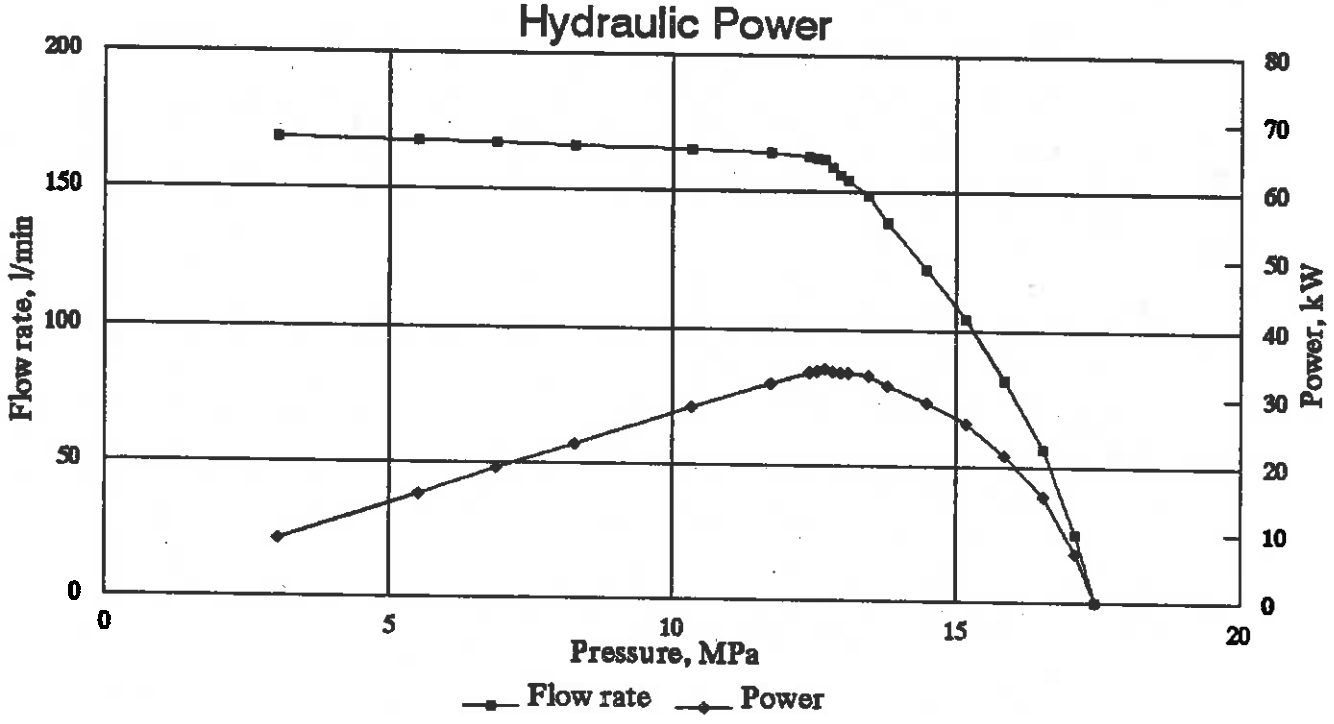
I. Sustained pressure with pump stalled:
17.44 MPa
2530 psi

II. Pump delivery rate at minimum pressure and rated engine speed:
168.5 l/min
44.5 gpm

III. Flow rate, pressure, power:

90% of relief valve setting:					
82.1	l/min	15.86	MPa	21.71	kW
21.7	*gpm*	*2300*	*psi*	*29.12*	*hp*
Maximum hydraulic power:					
162.0	l/min	12.69	MPa	34.26	kW
42.8	*gpm*	*1840*	*psi*	*45.95*	*hp*

IV. Hydraulic fluid temperature at flow meter:
66 C
150 F



OECD Drawbar Data (SI)

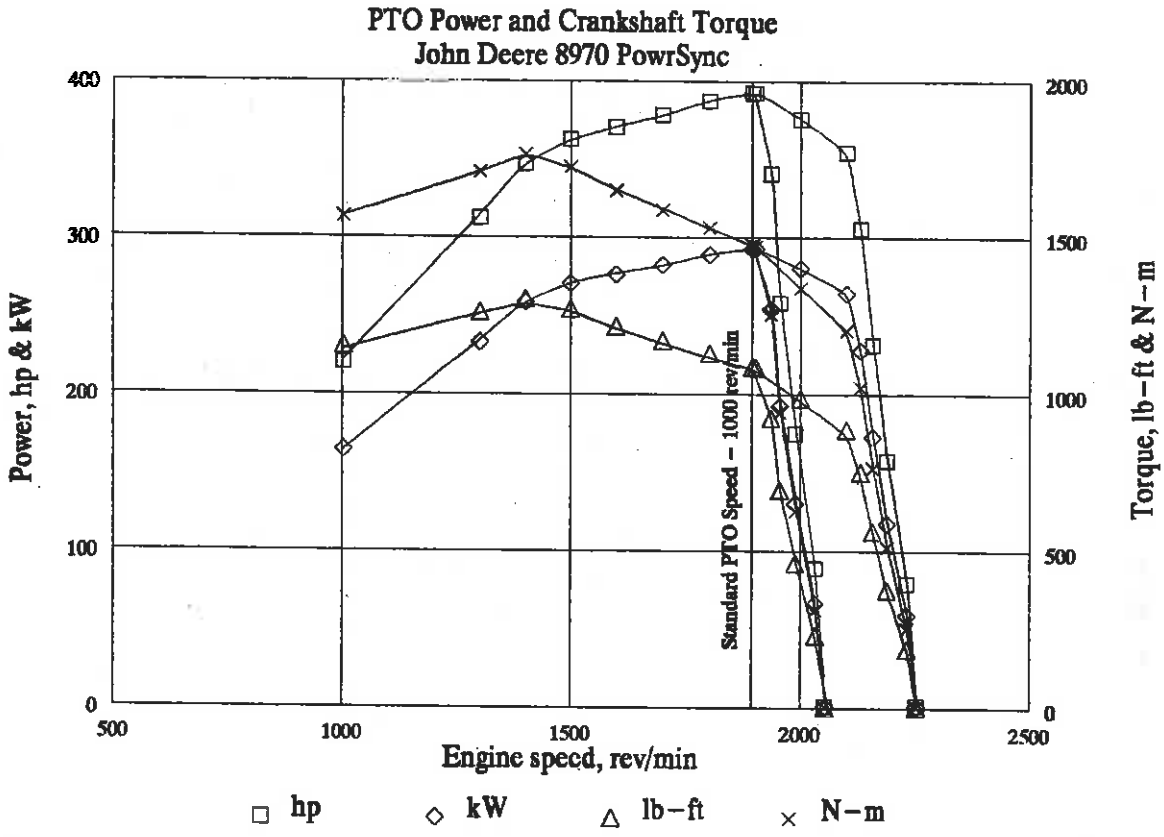
Date of tests:	22,30-NOV-93	Fuel density:	0.838 kg/l
Type of track:	Concrete	Test number:	1673

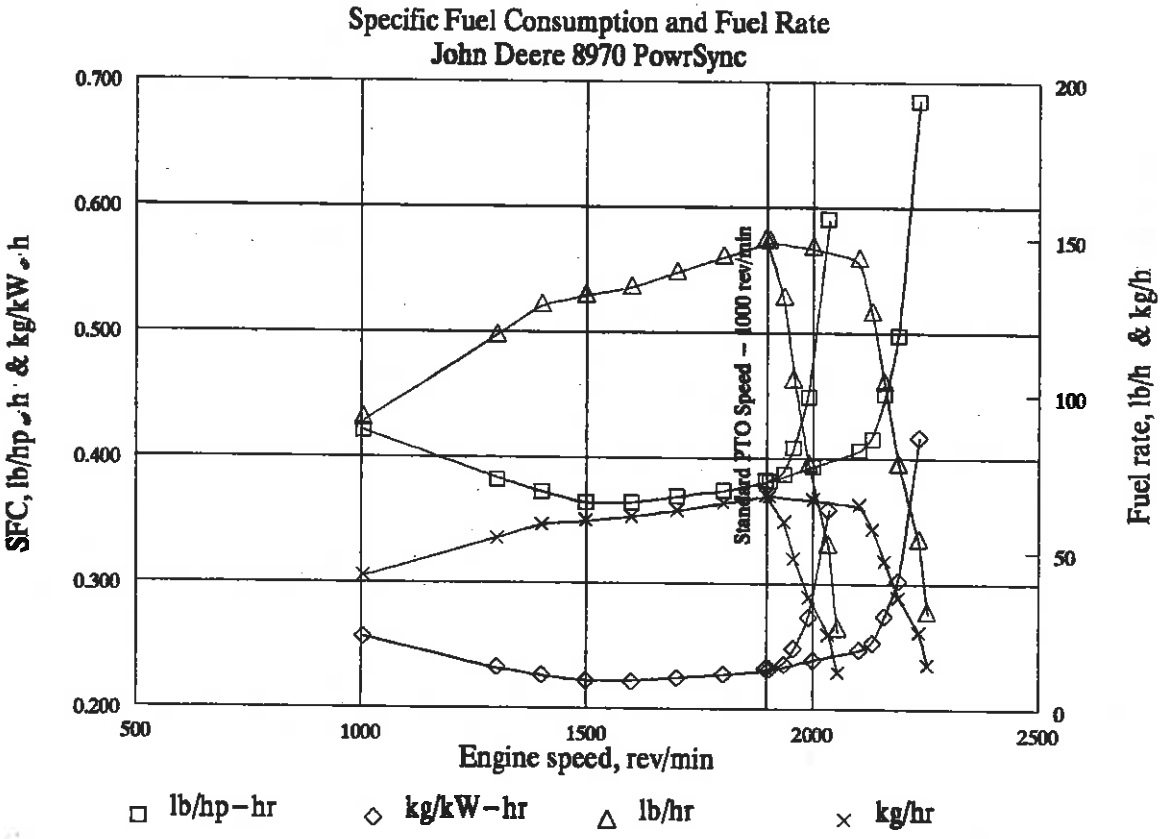
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg C					Rel humidity	Pressure
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet		kPa
I. Maximum Power (unballasted, 4wd at 2100 rev/min					Tire pressure:		90 kPa, rear		90 kPa, front		Drawbar height:		533 mm	
A4 *	208.82	152.58	4.93	2146	9.08%	0.300	2.79	55	83	87	6	3	60%	98.27
A5	225.54	142.21	5.71	2101	5.66%	0.283	2.96	56	83	90	8	4	51%	98.27
A6	229.52	118.28	6.99	2099	3.67%	0.280	2.99	56	83	91	8	4	51%	98.27
B1	232.84	118.91	7.05	2100	3.67%	0.278	3.02	56	83	NA	8	4	51%	98.27
C1	232.53	107.28	7.80	2099	3.31%	0.276	3.04	57	83	90	8	4	51%	97.80
B2	229.62	97.04	8.52	2100	2.96%	0.277	3.02	57	83	91	8	4	51%	97.80
B3	233.83	91.85	9.16	2100	3.05%	0.274	3.06	58	83	93	8	4	51%	97.80
C2	231.35	88.48	9.41	2100	2.69%	0.275	3.05	58	82	94	8	4	51%	97.80
C3	234.09	83.17	10.13	2101	2.60%	0.272	3.08	57	83	89	10	6	55%	97.80
B4	231.65	75.57	11.03	2099	2.33%	0.276	3.04	58	81	94	10	6	55%	97.80
C4	231.25	68.26	12.20	2099	2.05%	0.275	3.04	59	81	94	10	6	55%	97.80
B5	232.23	66.13	12.64	2100	1.96%	0.277	3.02	58	83	93	12	7	48%	97.43
C5	232.74	60.06	13.95	2099	1.87%	0.277	3.03	59	82	96	12	7	48%	97.43
* Pull limited to avoid excessive tractor bounce.														
II. Part loads (unballasted, 4wd)														
II.1 in selected gear at maximum power														
C3	234.09	83.17	10.13	2101	2.60%	0.272	3.08	57	83	89	10	6	55%	97.80
II.1.1 75% of pull at maximum power at rated speed														
C3	181.04	62.42	10.44	2151	1.96%	0.290	2.89	56	NA	88	13	7	41%	97.26
II.1.2 50% of pull at maximum power at rated speed														
C3	123.42	41.64	10.67	2187	1.22%	0.332	2.52	56	NA	88	13	7	41%	97.26
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
C5	180.71	62.43	10.42	1569	1.87%	0.254	3.30	58	NA	89	13	7	41%	97.26
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
C5	123.39	41.73	10.64	1594	1.50%	0.276	3.04	56	NA	84	13	7	41%	97.26
II.2 in selected gear nearest to 7.5 km/h														
C1	232.53	107.28	7.80	2099	3.31%	0.276	3.04	57	83	90	8	4	51%	97.80
II.2.1 75% of pull at maximum power at rated speed														
C1	180.34	80.46	8.07	2151	2.51%	0.296	2.83	57	NA	90	13	7	41%	97.26
II.2.2 50% of pull at maximum power at rated speed														
C1	123.23	53.65	8.27	2189	1.87%	0.329	2.55	56	82	88	11	6	46%	97.32
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
B4	180.50	80.31	8.09	1541	2.60%	0.255	3.28	57	NA	87	11	6	46%	97.26
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
B4	123.05	53.72	8.25	1559	1.59%	0.270	3.10	56	NA	83	11	6	46%	97.32

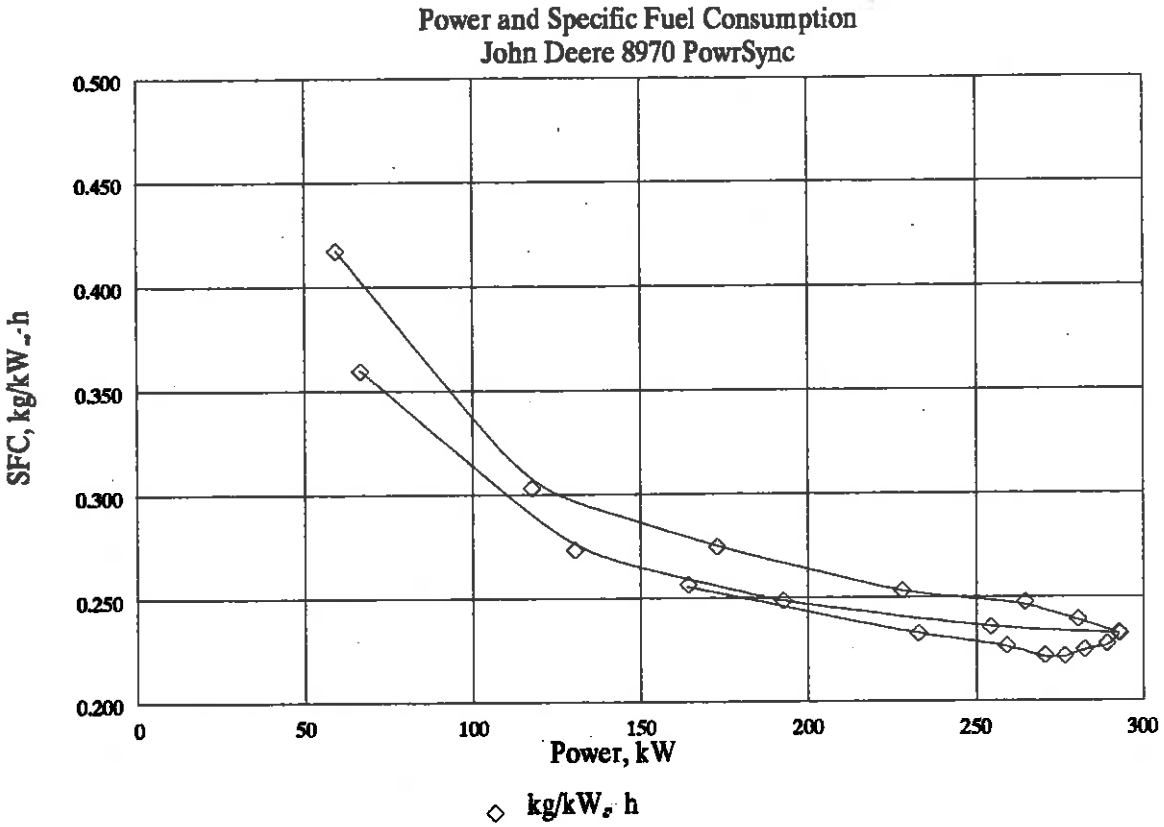
OECD Drawbar Data (US)

Date of tests:	22,30-NOV-93	Fuel density:	6.994 lb/gal
Type of track:	Concrete	Test number:	1673

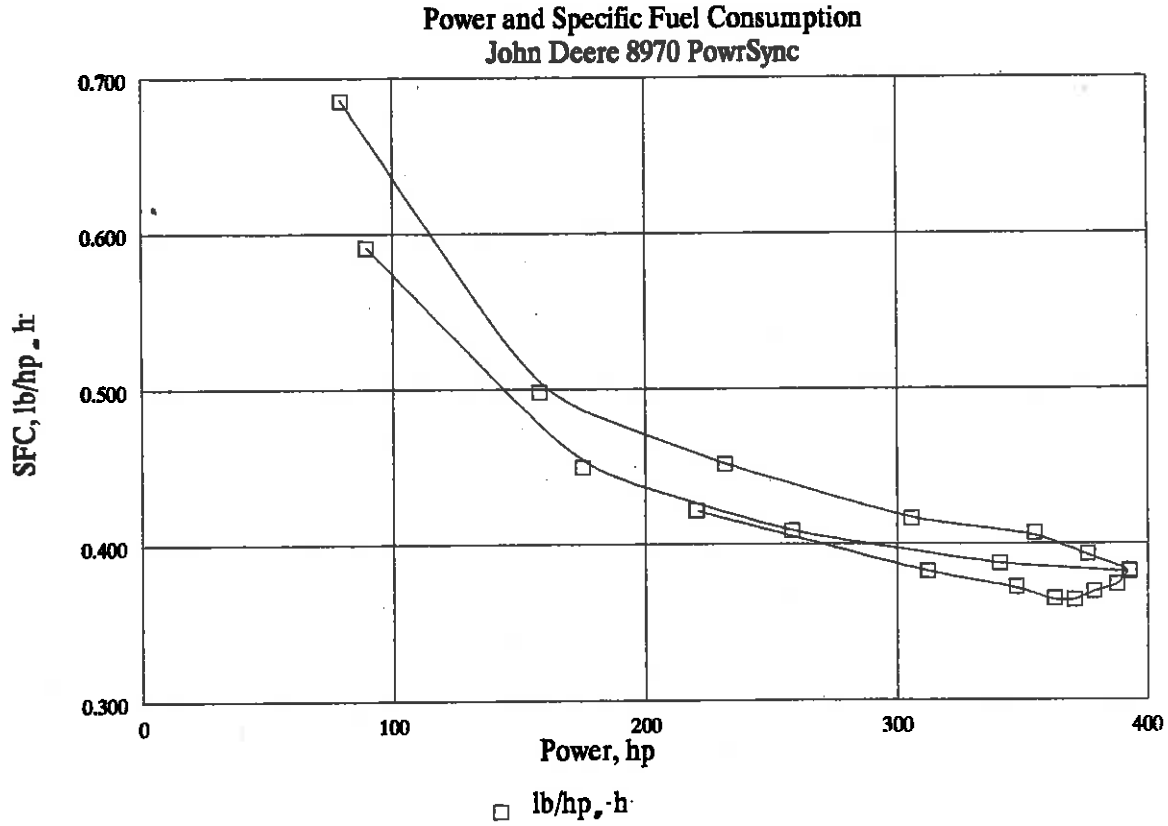
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg F					Rel humidity	Pressure
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		in Hg
I. Maximum Power (unballasted, 4wd at 2100 rev/min					Tire pressure:		13 psig, rear		13 psig, front		Drawbar height:		21.0 in	
A4 *	280.03	34302	3.06	2146	9.08%	0.494	14.17	132	182	189	42	38	60%	29.02
A5	302.46	31971	3.55	2101	5.66%	0.466	15.02	133	182	195	46	40	51%	29.02
A6	307.79	26591	4.34	2099	3.67%	0.460	15.20	133	182	196	46	40	51%	29.02
B1	312.24	26732	4.38	2100	3.67%	0.456	15.33	133	182	NA	46	40	51%	29.02
C1	311.83	24118	4.85	2099	3.31%	0.453	15.43	134	181	195	46	39	51%	28.88
B2	307.93	21815	5.29	2100	2.96%	0.456	15.35	134	181	197	46	39	51%	28.88
B3	313.57	20650	5.69	2100	3.05%	0.450	15.55	136	182	200	46	39	51%	28.88
C2	310.24	19891	5.85	2100	2.69%	0.452	15.48	136	180	202	46	39	51%	28.88
C3	313.92	18697	6.30	2101	2.60%	0.447	15.65	134	181	193	50	42	55%	28.88
B4	310.64	16990	6.86	2099	2.33%	0.453	15.43	137	178	202	50	42	55%	28.88
C4	310.11	15346	7.58	2099	2.05%	0.453	15.44	138	178	202	50	42	55%	28.88
B5	311.42	14867	7.86	2100	1.96%	0.455	15.36	136	181	199	53	44	48%	28.77
C5	312.11	13501	8.67	2099	1.87%	0.455	15.38	139	180	204	53	44	48%	28.77
* Pull limited to avoid excessive tractor bounce.														
II. Part loads (unballasted, 4wd)														
II.1 in selected gear at maximum power														
C3	313.92	18697	6.30	2101	2.60%	0.447	15.65	134	181	193	50	42	55%	28.88
II.1.1 75% of pull at maximum power at rated speed														
C3	242.78	14032	6.49	2151	1.96%	0.477	14.66	133	NA	191	56	45	41%	28.72
II.1.2 50% of pull at maximum power at rated speed														
C3	165.51	9361	6.63	2187	1.22%	0.546	12.82	134	NA	191	56	45	41%	28.72
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
C5	242.34	14034	6.48	1569	1.87%	0.418	16.75	136	NA	192	56	45	41%	28.72
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
C5	165.46	9382	6.61	1594	1.50%	0.454	15.41	133	NA	183	56	45	41%	28.72
II.2 in selected gear nearest to 4.6 mph														
C1	311.83	24118	4.85	2099	3.31%	0.453	15.43	134	181	195	46	39	51%	28.88
II.2.1 75% of pull at maximum power at rated speed														
C1	241.84	18089	5.01	2151	2.51%	0.486	14.39	134	NA	194	56	45	41%	28.72
II.2.2 50% of pull at maximum power at rated speed														
C1	165.25	12061	5.14	2189	1.87%	0.540	12.95	133	179	190	52	43	46%	28.74
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
B4	242.05	18056	5.03	1541	2.60%	0.420	16.65	134	NA	189	52	43	46%	28.72
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
B4	165.01	12078	5.12	1559	1.59%	0.444	15.74	132	NA	182	52	43	46%	28.74


PTO Power and Crankshaft Torque
John Deere 8970 PowrSync
Power, hp & kW
Torque, lb–ft & N–m
Engine speed, rev/min
Standard PTO Speed – 1000 rev/min
400
300
200
100
0
2000
1500
1000
500
0
500
1000
1500
2000
2500
□ hp
◇ kW
△ lb–ft
× N–m


Specific Fuel Consumption and Fuel Rate
John Deere 8970 PowrSync
SFC, lb/hp•h & kg/kW•h
Fuel rate, lb/h & kg/h
Engine speed, rev/min
Standard PTO Speed – 1000 rev/min
0.700
0.600
0.500
0.400
0.300
0.200
200
150
100
50
0
500
1000
1500
2000
2500
□ lb/hp–hr
◇ kg/kW–hr
△ lb/hr
× kg/hr



Test 1673 rerun



OPTIONAL TESTS - Drawbar Performance at 1900 Engine RPM

OECD Drawbar Data (SI)

Date of tests:	22,30-NOV-93		Fuel density:	0.838 kg/l										
Type of track:	Concrete		Test number:	1673										
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SPE	Temperature, deg C					Rel humidity	Pressure
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet		kPa
I. Maximum Power (unballasted, 4wd at 1900 rev/min)					Tire pressure:		90 kPa, rear		90 kPa, front		Drawbar height:		533 mm	
A3 *	175.29	151.21	4.17	2175	8.77%	0.315	2.66	56	83	90	6	3	60%	98.27
A4 *	207.95	152.24	4.92	2145	9.32%	0.305	2.75	57	83	91	6	3	60%	98.27
A5	222.75	145.45	5.51	2050	6.75%	0.287	2.92	57	83	93	8	4	51%	98.27
A6	226.55	129.85	6.28	1903	4.46%	0.270	3.10	58	84	93	8	4	51%	98.27
B1	228.34	129.97	6.32	1901	4.54%	0.268	3.13	57	83	NA	8	4	51%	98.27
C1	254.09	131.47	6.96	1896	4.54%	0.263	3.19	58	82	94	8	4	51%	97.80
B2	253.42	119.48	7.64	1900	3.93%	0.265	3.17	58	NA	94	8	4	51%	97.80
B3	257.06	112.74	8.21	1898	3.67%	0.259	3.23	59	83	94	8	4	51%	97.80
C2	253.80	108.11	8.45	1900	3.49%	0.263	3.19	59	82	94	8	4	51%	97.80
C3	259.59	102.84	9.09	1899	3.31%	0.258	3.24	61	NA	99	13	7	41%	97.43
B4	256.08	92.87	9.93	1899	2.87%	0.259	3.24	59	82	95	10	6	55%	97.80
C4	256.35	84.20	10.96	1897	2.69%	0.261	3.21	60	82	95	10	6	55%	97.80
B5	259.20	81.89	11.39	1902	2.51%	0.260	3.22	60	82	95	12	7	48%	97.43
C5	258.12	74.30	12.51	1890	2.14%	0.259	3.24	60	82	95	12	7	48%	97.43
B6	255.67	67.23	13.69	1898	2.14%	0.261	3.22	60	84	95	12	7	48%	97.43

* Pull limited to avoid excessive tractor bounce.

OECD Drawbar Data (US)

Date of tests:	22,30-NOV-93		Fuel density:	6.994 lb/gal										
Type of track:	Concrete		Test number:	1673										
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SPE	Temperature, deg F					Rel humidity	Pressure
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		in Hg
I. Maximum Power (unballasted, 4wd at 1900 rev/min)					Tire pressure:		13 psig, rear		13 psig, front		Drawbar height:		21.0 in	
A3 *	235.07	33993	2.59	2175	8.77%	0.518	13.51	133	182	194	42	38	60%	29.02
A4 *	278.87	34226	3.06	2145	9.32%	0.501	13.96	134	182	196	42	38	60%	29.02
A5	298.71	32698	3.43	2050	6.75%	0.471	14.85	135	182	199	46	40	51%	29.02
A6	303.81	29192	3.90	1903	4.46%	0.444	15.74	136	183	199	46	40	51%	29.02
B1	306.21	29219	3.93	1901	4.54%	0.440	15.88	135	182	NA	46	40	51%	29.02
C1	340.74	29556	4.32	1896	4.54%	0.432	16.19	137	179	201	46	39	51%	28.88
B2	339.84	26861	4.74	1900	3.93%	0.435	16.08	137	NA	201	46	39	51%	28.88
B3	344.73	25345	5.10	1898	3.67%	0.427	16.40	138	182	201	46	39	51%	28.88
C2	340.35	24303	5.25	1900	3.49%	0.432	16.20	138	180	202	46	39	51%	28.88
C3	348.12	23120	5.65	1899	3.31%	0.425	16.46	141	NA	210	56	45	41%	28.77
B4	343.42	20878	6.17	1899	2.87%	0.426	16.43	139	180	203	50	42	55%	28.88
C4	343.77	18928	6.81	1897	2.69%	0.429	16.31	140	179	203	50	42	55%	28.88
B5	347.59	18411	7.08	1902	2.51%	0.428	16.34	141	180	203	53	44	48%	28.77
C5	346.14	16703	7.77	1890	2.14%	0.426	16.43	140	180	204	53	44	48%	28.77
B6	342.86	15114	8.51	1898	2.14%	0.428	16.33	140	184	203	53	44	48%	28.77

* Pull limited to avoid excessive tractor bounce.

MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of Test	27 October 1993
Sound level meter Make/Model/Type	Bruel and Kjaer 2203
Type of Track	Concrete Oval
Gear Number	24th (D-6)
Travel speed before acceleration	28.6 km/h
Sound level	84.5 dB(A)

Repairs: None
Remarks: None