PAMI

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1646/2 (Restricted Code)
Date of Approval: February 21, 1997

REPORT OF TEST IN ACCORDANCE WITH OECD RESTRICTED CODE (CODE II)
FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS



NEW HOLLAND 8970 POWERSHIFT MFWD
NEW HOLLAND G240 POWERSHIFT MFWD
30 km/h Version (4WD)

lanufactured by: New Holland Canada Ltd.
Versatile Farm Equipment Operations
Box 7300; 1260 Clarence Ave.
Winnipeg, Manitoba; Canada; R3C 4E8

ate of Test: May/July 1996

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This report also pertains to the New Holland Tractor Model G240. For marketing purposes the New Holland 8970 can also be designated as the New Holland G240 in certain countries.

Manufacturer's Name and Address:	New Holland Canada, Ltd. Versatile Farm Equipment Operations Box 7300, 1260 Clarence Ave. Winnipeg, Manitoba; Canada R3C 4E8
Location of tractor assembly plant:	Winnipeg, MB; Canada
Submitted for test by:	Manufacturer
Selected for test by:	Manufacturer, with agreement of the test station
Place of running in:	New Holland North America Inc. Test center, New Holland, P A., and Versatile Farm Equipment test track Sanford, Manitoba.
Duration of running in:	270 hours
Location of test:	PTO and hydraulic power lift tests carried out at, Prairie Agricultural Machinery Institute (PAMI), Portage la Prairie, MB/Canada. Drawbar performance and noise tests carried out at the manufacturers premises Versatile farm Equipment test track Sanford, Manitoba and witnessed by D.J. May, P.Eng., Project Engineer and K.A. Carmichael, Technical Services Manager (PAMI-Portage la Prairie).

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

Make/Model/Type:	New Holland/8970/ Mechanical Front Wheel Drive, 30 km/h Version
Number of driving members:	2 or 4
Serial Nº:	D407840
1st Serial Nº:	Confidential

1.2 ENGINE

Make/Model/Type:	New Holland/675-TA-VB/Diesel, Turbocharged Air-to-air intercooled
Serial Nº:	VB586878

1.2.1 Cylinders

Number/disposition:	Six/in-line, vertical
Bore/Stroke:	111.8/127 mm (4.4/5.0 in)
Capacity:	7480 cm^3 (456 sq in)
Compression ratio:	17.5:1
Arrangement of valves:	Overhead
Cylinder liners:	None

1.2.2 Supercharging

Make/Model:	Garret/TO4E
Pressure:	135 kPa (40 in HG) max. at 2100 rev/min

1.2.3 Fuel System

Fuel feed system:	In line injection pump
Make/model/type of fuel filters:	Racor/87840136/Cartridge
Capacity of fuel tank:	416 Litres (110 US Gallons)
Fuel cooler:	None
Make/model/type of injection pump:	Bosch/87800845/ "p" 3000 In-line
Serial Nº:	56920 50071
Pump Manufacturer's production rack setting:	158 ± 4.7 mm^3/stroke at 1050 pump rev/min
Flow rate (rated engine speed and full load):	36.8 ± 1.0 kg/h (81.1 ± 2.2 lb/h)
Fuel density:	0.840 kg/l at 15°C
Timing:	16 deg BTDC static
Make/model/type of injectors:	Bosch/1876871/5 Hole Type Differential Needle
Injection pressure:	24.13 MPa (3500 psi)

1.2.4 Governor

Make/model/type:	Bosch/ "RSV"All Speed/Mechanical
Governed range of speed:	750 to 2305 rev/min
Rated engine speed:	2100 rev/min
High Idle speed range:	2280 ± 25 rev/min

1.2.5 Air cleaner

Pre-cleaner:	
Make/model/type:	Nelson/86011070/Aspirator
Location of air intake:	Through front grill
Main Cleaner:	
Make/model/type:	Nelson/9846495/Pleated paper
Maintenance indicator:	Light on cab instrument cluster
Location of air intake:	Through front grill
Secondary Element:	Nelson/9846495 Pleated paper

1.2.6 Lubrication system

Type of feed pump:	Gerotor, Full pressure, positive displacement
Type of filter:	Spin on/Paper Element
Number:	One
Oil cooler:	Oil to water, plate type, engine mounted, left side

1.2.7 Cooling system

Type of coolant:	50/50 water/glycol base anti-freeze
Type of pump:	Belt driven Centrifugal Vane Pump
Specification of fan:	Belt driven, Viscous fan speed control
Number of fan blades:	Eight
Fan diameter:	711 mm (28.0 in)
Coolant capacity:	26.5 liters (7 US Gallons)
Type of temperature control:	Thermostat
System pressure:	89.6 kPa (13 psi)

1.2.8 Starting system

Make/model/type:	Delco Remy/37MT/300
Starter motor power rating:	4.5 kW (6.0 hp)
Cold starting aid:	Engine coolant heater and Ether spray to intake mainfold
Safety device:	PTO off, Park brake on, Transmission in neutral

1.2. 9 Electrical system

Voltage:	12 Volt, negative ground
Alternator:	
Make/model/type:	Delco Remy/21 SI/belt driven
Power:	12 Volt, 130 amp
Battery (number of accumulators):	Two, (SAE Group 31) 950 cold cranking amps at -18°C (SAE J537 rating)
Rating:	122 Ah at 20 hour rating/battery

1.2.10 Exhaust system

Make/model/type:	Nelson/2483A/Aspirating
Location:	Under engine hood at cab end, mounted horizontally

1.3 TRANSMISSION TO WHEELS

1.3.1 Clutch (travel alone)

Make/Model/Type:	Funk/9300 series/Wet multi-plate clutch/Integral with transmission/oil cooled
Number of plates:	Fourteen
Diameter of plates:	150 mm (6.0 in)
Method of operation:	Electronic/Hydraulic/Pedal actuated

1.3.2 Gear box

Make/Model/Type:	Funk/9300 series/direct drive, full power shift, 9 rotating countershafts, oil cooled.
Arrangement:	Gear box with full power shift
Number of gears:	16 Forward, 9 Reverse operated by one lever
Available options:	Creeper Gear Box
Oil Cooler:	Heat exchanger with air

1.3.3 Rear axle and final drives

Make/Model/Type:	New Holland/crown wheel and pinion, differential and inboard reduction
Differential lock:	
Type:	Electro-hydraulic
Method of engagement:	Switch in cab
Method of disengagement:	Self disengaging with brake pedal operation or switch

3.4 Front axle and final drives:

Make/model/type:	Dana/70 AG/Crown wheel and pinion, differential and planetary reduction with Electro-Hydraulic engagement
Differential lock:	Not Available

1.3.6 Total Ratios and travelling speeds

Gear No.	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*) at rated engine speed of 2100 rev/min km/h
Forward		
1	251.40	2.85
2	212.72	3.37
3	181.78	3.94
4	158.69	4.51
5	134.29	5.34
6	114.75	6.24
7	97.48	7.35
8	83.39	8.59
9	70.56	10.15
10	60.30	11.88
11	52.64	13.61
12	44.54	16.09
13	38.06	18.82
14	32.33	22.16
15	27.36	26.19
16	23.38	30.64
Reverse		
3	186.22	3.85
4	157.57	4.55
5	134.65	5.32
6	117.55	6.10
7	99.46	7.20
8	85.00	8.43
9	72.21	9.92
10	61.10	11.73
11	52.21	13.72

* Tire dynamic radius of 905 mm (ISO 4251/1-1992)
Number of revolutions of front wheels for one revolution of rear wheels: 1.31

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

Type:	Independent/wet/multi-plate
Method of engagement:	Electro-hydraulic/Modulated engagement/controlled form console
Number of shafts:	One at rear of tractor in vertical median plane
Method of changing power take-off shaft ends and speeds:	None

1.4.1.1 Power take-off proportional to engine speed at 1000 rev/min

Location:	Rear of tractor in vertical median plane
Diameter of power take-off shaft end:	44.5 mm (1.75 in)
Number of splines:	20; conforms to ISO 500/1991
Height above ground:	843 mm (with 20.4 R 42 tires - 905 mm dynamic radius)
Distance from the median plane of the tractor:	On center line
Distance behind rear-wheel axis:	589.5 mm (23.2 in)
PTO speed at rated engine speed (2100 rev/min):	1103 rev/min
Engine speed at standard power take-off speed:	1903 rev/min
Ratio of rotation speeds (engine speed/PTO speed):	1.903
Direction of rotation (viewed from behind tractor):	Clockwise

1.4.1.2 Power take-off proportional to ground speed: None

1.4.2 Optional power take-off None

1.5 POWER LIFT

Make/Model/Type:	New Holland Cat 2, 3 and 3N with draft and position control with Cat III quick coupler
Type of hydraulic system:	Closed centre, load sensing
Number/Type/Size of cylinders (single- or double-acting):	Two/single acting/114 mm (4.5 in), length 200 mm (7.88 in)
Type of linkage lock for transport:	Electro-hydraulic
Relief valve pressure setting (tolerance):	19.0 ± 0.3 MPa (2750 ± 50 psi)
Opening pressure of cylinder safety valve (if fitted):	None
Lift pump type:	Variable displacement axial piston pump
Transmission between pump and engine:	Gear drive from engine output to hydraulic pump
Type and number of filters:	Synthetic media, screw on canister type, 2 filters
Site of oil reservoir:	Integral with transmission and rear axle
Type, number and location of tapping points:	Leverless, quick disconnect, four, located at rear of tractor
Maximum volume of oil available to external cylinders:	37.1 l (9.8 US Gallons)

1.6 THREE-POINT LINKAGE

Category: III, in conformity with category 3 of ISO 730/2-1982

Category adapter: Available as optional equipment

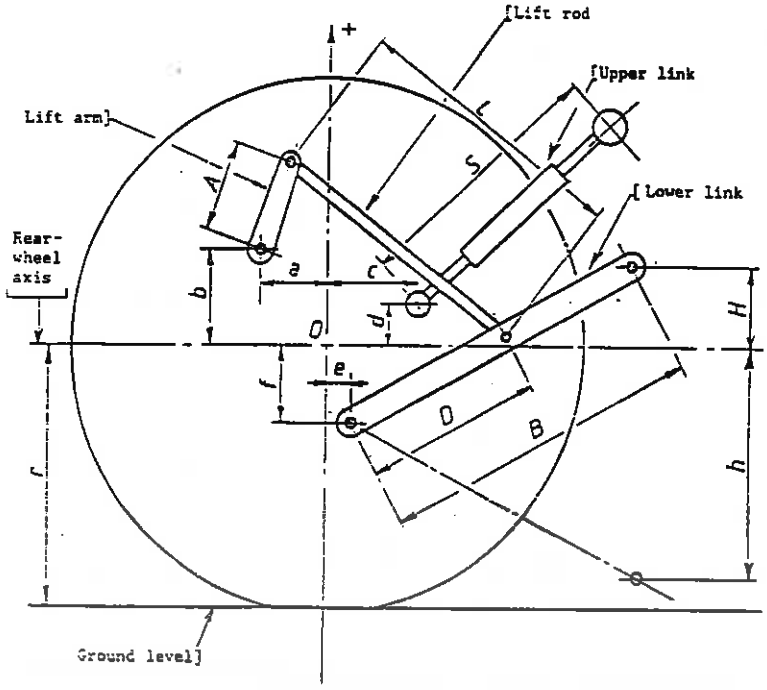


Figure 1.1 Lift test - Linkage geometry

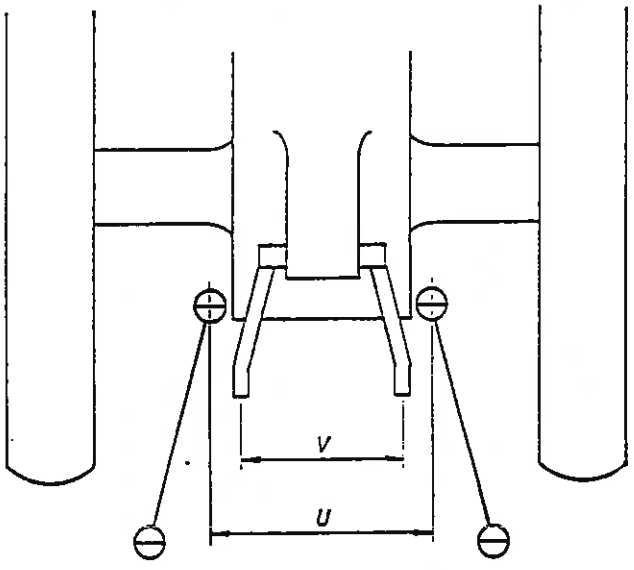


Figure 1.2 Lift Test - Linkage Geometry

Table 2.1 - Linkage geometry dimensions (when connected to standard frame)

		Dimension or range	Settings used in test			
		(mm)	Main test 3.2.2 (mm)	Small tires 4.2 (mm)	Large tires 4.3 (mm)	ASAE/SAE 4.4 & 4.5 (mm)
Rear tire - radius index	(r)	905	905	855	920	905
Front tire - radius index	(r')	695	695	695	695	695
Length of arms	(A)	380	380	380	380	380
Length of Lower links	(B)	915	915	915	915	915
Distance of lift arm pivot point from rear wheel axis:						
horizontally	(a)	-200	-200	-200	-200	-200
vertically	(b)	395	395	395	395	395
Horizontal distance between the 2 lower link points	(u)	540	540	540	540	540
Horizontal distance between the 2 lift arm end points	(v)	637	637	637	637	637
Length of upper link	(s)	608 to 815	758	755	758	690
Distance of upper link pivot point from rear wheel axis:						
horizontally	(c)	505	505	505	505	505
vertically	(d)	200	200	200	200	200
Distance of lower link pivot point from rear wheel axis:						
horizontally	(e)	325	325	325	325	325
vertically	(f)	315	315	315	315	315
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	465	465	465	465	465
Length of lift rods	(L)	759 to 890	867	835	875	880
Height of lower hitch points relative to the rear-wheel axis						
in low position	(h)	490 to 730	675	625	690	702
in high position	(H)	50 to 281	84	121	71	59
Height above ground of lower hitch points when locked in transport position (*)		Any height within lift range - Electro-hydraulic lock				

(*) Assuming r = tire dynamic radius index of 905 mm (ISO 4251/-1992)

1.7 SWINGING DRAWBAR

Type:	Sliding drawbar
Height above ground:	
Maximum:	545 mm (21.5 in)
Minimum:	448 mm (17.6 in)
Type of adjustment:	
Vertical:	Reverse bend
Horizontal:	Manual slide
Distance of hitch point from rear wheel axis, horizontally:	1102 mm (43.4 in)
Distance of hitch point from take-off shaft end:	
Vertical:	305 mm (12.0 in)
Horizontal:	508 mm (20.0 in)
Lateral adjustment (centre of clevis):	
Right-hand:	259 mm (10.2 in)
Left-hand:	259 mm (10.2 in)
Distance of pivot point from rear wheel axis, horizontally:	Forward 51 mm (2.0 in)
Diameter of drawbar pin hole:	41.0 mm (1.6 in)
Maximum vertical permissible load:	20.9 kN (4700 lbs)

1.8 TRAILER HITCH

None

1.9 HOLED DRAWBAR

Number of holes:	Three
Distance between holes:	102 mm (4.0 in)
Hole diameter:	41 mm (1.6 in)
Thickness/width of the drawbar:	45/76 mm (1.8/3.0 in)
Height above ground:	
Minimum:	448 mm (17.6 in)
Maximum:	545 mm (21.5 in)
Horizontal distance to power take-off shaft end (rear):	508 mm (20.0 in)

1.10 STEERING

Make/Model/Type:	New Holland/Hydrostatic/Power steering
Method of operation:	Steering wheel
Pump(s):	Pressure/Flow Control, Piston Pump, on demand
Ram(s):	Two dual, acting cylinders
Maximum working pressure:	17.24 MPa (2500 psi)

1.11 BRAKES

1.11.1 Service brake:

Make/Model/Type: New Holland/disk brakes (Multiple disk between differential and final drives)

Method of operation: Hydraulic Boosted, in cab pedals

Trailer Braking Take-off: Not available

1.11.2 Parking brake

Type: Rear axle - oil immersed 3 disc

Method of operation: Mechanical, in cab control

1.12 WHEELS

Number:

Front: Two

Rear: Two, Four optional (duals)

Wheelbase: 3115 mm (122.6 in)

Track width adjustment:

	Minimum	Maximum	Adjustment Method
Front	1524 mm (60 in)	2235 mm (88 in)	Reversing wheels and offset lug rims
Rear	1524 mm (60 in)	3150 mm (124 in)	Sliding tapered hubs and reversible rims

1.13 PROTECTIVE STRUCTURE

Make/Model/Type: New Holland/Genesis 2/Safety Cab

Manufacturer's name and address: Crenlo
Rochester, Minn; USA

Protective device: ROPS Cab, not tiltable

Tiltable/Not Tiltable: Not tiltable

OECD approval number: CSS - 0256/1-3

Date of approval: November 29/93

Modification Certificate if any: MC/96/7149/0296
(under authority of Silsoe Research Institute)

1.14 SEAT

1.14.1 Driver's Seat

Make/Model/Type:	Sears/Generation 2000/SA12055-000E/Low profile
Type of suspension:	Air spring with adjustable damper
Type of damping:	Hydraulic
Range of adjustment:	
Rotation:	30 deg (25 to right, 5 to left) 6 stops
Longitudinal:	178 mm (7.0 in)
Vertical:	76 mm (3.0 in)

1.14.2 Optional and Passenger Seats: Not available

1.15 LIGHTING

	Height of centre above ground mm	Size mm	Distance from out side edge to median plane of tractor mm
Headlights	1720 mm	250 x 100	360 mm
Sidelights	1025 mm	150 x 80	780 mm
Rear top	2905 mm	150 x 80	490 mm
Reflectors	1970 mm	75 x 190	965 mm
Rear fender	1925 mm	150 x 80	600 mm
Front cab	2905 mm	150 x 80	300 mm

2. TEST CONDITIONS

2.1 OVERALL DIMENSIONS (unballasted tractor)

	Length	Width		Height at top of:	
	(mm)	Minimum (mm)	Maximum (mm)	Protective Structure (mm)	Exhaust Silencer (mm)
Unballasted	5027	2186		3118	3197
Ballasted	5669		3700	3118	3197

2.2 Ground clearance (unballasted): 509 mm
Clearance limiting part: Drawbar Cage

2.3 TRACTOR MASS (with cab)

	Unballasted (kg)		Ballasted (kg)	
	Without Driver	With Driver	Without Driver	With Driver
Front	2953	2963	4273	4283
Rear	5874	5939	8171	8236
Total	8827	8902	12444	12519

2.3.1 BALLAST DETAILS

	Weights	
	Number	Total Mass (kg)
Front	10 weights (110 kg each) + brackets	1183
Rear Wheels	Duals with hubs	884
Rear Weights	40 weights (38 kg each)	1520
Additional test equipment		30

2.4 TRACK SPECIFICATIONS: Not Applicable

2.5 TIRE SPECIFICATIONS

	Front	Rear
Tires:		
-make	Armstrong	Armstrong
-dimensions	16.9 R 30	20.8 R 42
-ply rating	2 Star	2 Star
-maximum load (tire manufacturer)	22.5 kN	38.0 kN
-maximum load (tractor manufacturer)	22.5 kN	38.0 kN
-inflation pressure (tire manufacturer)	165 kPa	165 kPa
-dynamic radius index	695 mm	905 mm
-chosen track width, inner tires	1855 mm	1645 mm
outer tires		3160 mm

2.6 OILS AND LUBRICATION

2.6.1 Capacity and change interval

	Capacity	Oil Change	Filter Change
Engine	21 L (5.5 US Gallons)	Every 300 Hours	Same
Transmission Final drive (rear) Rear axle Hydraulic system Brakes Steering	117 L (30.9 US Gallons)	Every 900 Hours (or yearly)	
Front axle	12.3 L (3.25 US Gallons)	Every 1200 Hours	Same
Final drive (front)	3.2 L (0.85 US Gallons)	Every 1200 Hours	Same

Hydraulic system is common with transmission, final drive (rear), rear axle, brakes, and steering.

2.6.2 Specifications (SAE, API, Mil.L, ISO)

	Recommended	Used during the test
Engine oil . type: . viscosity: . classification:	NH 15W - 40 API CF - 4	Petro Canada 15 W 40 API CF - 4
Transmission oils . type: . viscosity: . classification:	NH @100 - min 9 c'stokes ESN - M2C134 -D	Esso Hydraul 56 ESN - M2C134 - D
Hydraulic fluid	Same as transmission	Same as transmission
Final drive oil (rear)	Same as transmission	Same as transmission
Steering oil	Same as transmission	Same as transmission
Brake Fluid	Same as transmission	Same as transmission
Front axle and hubs	Same as transmission	Same as transmission

2.6.3 Grease: Lithium Based EP-high temperature

Number of lubrication points: 29

2.7 FUEL

Type: No. 2, diesel in conformity with national standard

Density at 15°C (60°F):

PTO tests 0.8525 gm/cm^3 (7.115 lb/US Gallon)

Drawbar tests 0.8502 gm/cm^3 (7.095 lb/US Gallon)

3. COMPULSORY TEST RESULTS

3.1 MAIN POWER TAKE-OFF TEST

Date and location of tests: May 21, 1996
Prairie Agricultural Machinery Institute
Portage la Prairie, MB; CANADA

Dynamometer: AW Dynamometer Inc.
Water Brake Dynamometer

Power	Speed		Fuel Consumption			Specific Energy
	Engine	PTO	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER - TWO-HOUR TEST						
167.5	1824	958	37.4	44.03	223	3.80
3.1.2 POWER AT RATED ENGINE SPEED						
158.4	2100	1103	37.4	44.06	236	3.60
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)						
167.4	1902	999	37.8	44.55	226	3.76
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
158.4	2100	1103	37.4	44.06	236	3.60
3.1.4.2 85% of torque obtained in 3.1.4.1						
139.9	2183	1147	34.3	40.34	245	3.47
3.1.4.3 75% of torque defined in 3.1.4.2						
106.6	2217	1165	27.3	32.11	256	3.32
3.1.4.4 50% of torque defined in 3.1.4.2						
72.1	2249	1182	20.6	24.25	286	2.97
3.1.4.5 25% of torque defined in 3.1.4.2						
36.5	2278	1197	14.1	16.63	387	2.20
3.1.4.6 unloaded						
3.2	2300	1209	9.0	10.55	2839	0.30
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min) 3.1.5.1 the torque corresponding to maximum power						
167.4	1902	999	37.8	44.55	226	3.76
3.1.5.2 85% of torque obtained in 3.1.5.1						
157.8	2090	1098	36.6	43.11	232	3.66
3.1.5.3 75% of torque defined in 3.1.5.2						
122.2	2157	1134	29.5	34.72	241	3.52
3.1.5.4 50% of torque defined in 3.1.5.2						
82.6	2187	1149	21.9	25.77	265	3.20
3.1.5.5 25% of torque defined in 3.1.5.2						
41.9	2219	1166	14.5	17.01	345	2.46
3.1.5.6 unloaded						
3.3	2248	1181	8.7	10.22	2651	0.32

No load maximum engine speed:	2300	rev/min
Torque (equivalent crankshaft) at maximum power:	876.8	N-m
- at rated engine speed	720.3	N-m
- at standard power take-off speed	848.2	N-m

Maximum torque (equivalent crankshaft): 1062.5 N-m at 1330 rev/min engine speed

Mean atmospheric conditions:

- temperature: 20°C
- pressure: 97.54 kPa
- relative humidity: 78%

Maximum temperatures:

- coolant: 92°C
- engine oil: 119°C
- fuel: 64°C
- engine air intake: 26°C

3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: May 27, 1996
Prairie Agricultural Machinery Institute
Portage la Prairie, Manitoba; Canada

3.2.1 Hydraulic Power Tests

Sustained pressure with relief valve open: 19.2 MPa
Pump delivery rate at minimum pressure: 126.8 L/min

	Flow Rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	94.3	17.3	27.2
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	116.9	16.2	31.6

Tapping point used for test: Dual remote hydraulic outlets
Temperature of hydraulic fluid: 65 ± 5°C
Opening and closing pressure of the unloading valve: Not applicable since this hydraulic system does not use an accumulator.

3.2.2 Power Lift Test

Linkage settings for test - See Table 2.1 and Figures 2.1 and 2.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	230 mm	178 mm
Vertical movement without load	759 mm	929 mm
Vertical movement with load	678 mm	829 mm
Maximum corrected force exerted through full range	78.3 kN	65.9 kN
Corresponding pressure of hydraulic fluid	17.3MPa	17.3MPa
Moment about rear-wheel axis	97.1 kNm	121.9 kNm
Maximum tilt angle of mast from vertical		10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points													
mm	-412	-400	-360	-300	-200	-100	0	+100	+200	+300	+318	+400	+417
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting of the hydraulic lift system													
at the hitch points in kN	–	–	78.3	80.0	83.7	86.8	90.0	92.7	93.0	89.2	86.8	–	–
Corresponding pressure:						17.3 MPa							
at the frame in kN	65.9	66.0	–	68.4	70.5	72.2	73.4	73.8	73.4	71.9	–	68.1	67.1
Corresponding pressure:						17.3 MPa							

3.3 DRAWBAR PERFORMANCE

Date of Tests: June 17, 1996
Location of tests: Versatile Farm Equipment Operations Test Track
Sanford, MB CANADA

Drawbar Height: 495 mm
Tire Pressure: Front: 83 kPa
Rear: 138 kPa

Gear and Range	Power	Drawbar Pull	Ground Speed	Engine Speed	Slip of Tires	Specific Fuel Consumption	Specific Energy	Temperatures			Atmospheric Conditions		
								Fuel	Coolant	Engine Oil	Temperature	Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
F1	59.6	80.71	2.66	2253	15.0	371	2.29	58	84	106	25	55	98.19
F2	72.3	83.47	3.12	2239	15.0	351	2.42	58	84	107	25	55	98.19
F3	81.2	80.48	3.63	2226	15.1	345	2.46	59	84	108	25	55	98.19
F4	87.5	76.23	4.13	2214	15.0	335	2.54	62	85	110	27	42	98.75
F5	102.0	75.90	4.84	2195	15.0	325	2.62	61	86	110	27	42	98.75
F6	122.3	77.36	5.69	2136	12.3	305	2.78	62	87	113	27	42	98.75
F7	133.4	76.13	6.31	1991	11.3	290	2.93	62	88	114	27	42	98.75
F8	143.4	70.80	7.29	1829	5.6	272	3.12	56	87	113	24	57	98.89
F9	150.7	62.57	8.67	1826	3.9	257	3.30	58	87	113	24	59	98.22
F10	149.7	52.88	10.19	1824	3.3	262	3.25	56	87	113	24	57	98.89
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	142.9	50.98	10.09	2101	2.8	265	3.20	58	85	113	24	59	98.22
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	113.6	38.27	10.69	2205	1.9	278	3.06	59	85	112	24	59	98.22
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	77.4	25.47	10.94	2240	1.1	317	2.68	59	84	110	24	59	98.22
3.3.2.1.3 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.1.1													
F10	113.4	38.25	10.67	1882	1.8	268	3.18	58	85	111	24	59	98.22
3.3.2.1.4 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.1.2													
F10	78.2	25.63	10.98	1921	1.0	292	2.91	58	84	109	24	59	98.22
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	136.2	57.63	8.51	2099	3.9	282	3.02	58	87	113	24	57	98.89
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	108.1	43.14	9.02	2211	3.4	279	3.05	60	86	111	27	41	98.82
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	74.2	28.84	9.26	2245	2.4	309	2.75	61	84	111	27	41	98.82
3.3.2.2.3 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.2.1													
F9	108.3	43.19	9.03	1873	2.4	259	3.28	58	87	111	27	41	98.82
3.3.2.2.4 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.2.2													
F9	73.9	28.90	9.20	1888	1.3	274	3.10	57	84	107	27	41	98.82

4.0 OPTIONAL TESTS

4.1 BALLASTED DRAWBAR PERFORMANCE

Date of tests: July 2, 1996
Location of tests: Versatile Farm Equipment Operation Test Track
Sanford, MB; CANADA

Drawbar Height: 500 mm
Tire Pressure: Front: 144 kPa
Rear: 69 kPa

Gear and Range	Power	Drawbar Pull	Ground Speed	Engine Speed	Slip of Tires	Specific Fuel Consumption	Specific Energy	Temperatures			Atmospheric Conditions		
								Fuel	Coolant	Engine Oil	Temperature	Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
F1	87.6	121.22	2.60	2220	14.9	328	2.59	61	83	108	24	48	98.85
F2	102.9	121.89	3.04	2201	15.1	317	2.68	60	85	108	24	48	98.85
F3	120.3	124.07	3.49	2159	15.1	310	2.74	60	84	109	24	48	98.85
F4	128.4	124.60	3.71	2001	15.0	299	2.84	60	86	110	22	60	98.85
F5	145.5	119.87	4.37	1826	7.2	268	3.17	60	84	111	22	60	98.85
F6	143.4	98.71	5.23	1823	4.8	270	3.14	61	88	115	27	35	98.84
F7	146.0	83.83	6.27	1826	3.3	264	3.22	62	89	116	27	35	98.84
F8	148.6	71.69	7.46	1825	2.5	259	3.29	61	87	114	26	42	98.83
F9	149.5	61.37	8.77	1824	2.0	257	3.30	61	88	116	26	42	98.83
F10	146.5	51.11	10.32	1825	1.5	263	3.23	60	88	115	26	42	98.83
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	141.3	50.1	10.15	2101	1.6	268	3.17	61	88	112	26	42	98.83
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	108.1	36.29	10.72	2205	1.0	288	2.95	62	85	110	27	35	98.84
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	73.6	24.19	10.96	2242	0.4	324	2.62	62	85	112	27	35	98.84
3.3.2.1.3 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.1.1													
F10	107.9	36.30	10.70	1879	0.8	272	3.13	61	87	113	27	34	98.84
3.3.2.1.4 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.1.2													
F10	73.53	24.22	10.93	1912	0.4	297	2.86	61	85	112	27	34	98.84
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	136.1	56.57	8.66	2101	1.8	275	3.09	62	88	116	27	35	98.84
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	106.9	42.42	9.07	2209	2.2	288	2.95	62	87	114	27	34	98.83
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	72.7	28.25	9.27	2245	1.6	317	2.68	61	86	114	27	34	98.83
3.3.2.2.3 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.2.1													
F9	106.7	42.40	9.06	1869	1.3	265	3.21	62	88	115	27	34	98.83
3.3.2.2.4 next higher gear at reduced engine speed; same pull and traveling speed as in 3.3.2.2.2													
F9	72.1	28.26	9.19	1884	0.7	282	3.01	61	85	114	27	34	98.83

4.2 POWER LIFT TEST (with 20.8 R38 tires - Dynamic Radius Index 855 mm)

Linkage settings for test - Stt Table 2.1 and Figures 2.1 and 2.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	230 mm	185 mm
Vertical movement without load	746 mm	930 mm
Vertical movement with load	665 mm	821 mm
Maximum corrected force exerted through full range	77.5 kN	65.3 kN
Corresponding pressure of hydraulic fluid	17.3 MPa	17.3 MPa
Moment about rear-wheel axis	96.1 kNm	120.8 kNm
Maximum tilt angle of mast from vertical		13 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-355	-310	-300	-200	-100	0	+100	+200	+300	+355	+400	+466
Corrected lifting forces												
at the hitch points in kN	–	77.5	78.0	81.9	86.0	89.2	91.5	92.8	93.2	93.0	–	–
Corresponding pressure:	17.3 MPa											
at the frame in kN	65.6	–	67.0	70.0	72.0	73.0	73.0	72.0	70.0	–	67.0	65.3
Corresponding pressure:	17.3 MPa											

4.3 POWER LIFT TEST (with 710/70 R38 tires - Dynamic Radius Index 920 mm)

Linkage settings for test - See Table 2.1 and 2.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	230 mm	169 mm
Vertical movement without load	761 mm	933 mm
Vertical movement with load	678 mm	816 mm
Maximum corrected force exerted through full range	75.8 kN	66.8 kN
Corresponding pressure of hydraulic fluid	17.3 MPa	17.3 MPa
Moment about rear-wheel axis	94.0 kNm	123.6 kNm
Maximum tilt angle of mast from vertical		10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-436	-400	-375	-300	-200	-100	0	+100	+200	+300	+303	+380
Corrected lifting forces												
at the hitch points in kN	–	–	75.8	78.4	82.6	86.4	89.5	91.9	93.0	92.8	92.8	–
Corresponding pressure:	17.3 MPa											
at the frame in kN	66.8	67.4	–	69.8	71.9	73.4	74.9	74.3	73.2	71.0	–	67.6
Corresponding pressure:	17.3 MPa											

4.4 POWER LIFT TEST (ASAE S349.2 with standard cylinders and 20.8 R42 tires-Nebraska Test)

Linkage settings for test - See Table 2.1 and Figures 2.1 and 2.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	203 mm	209 mm
Vertical movement without load	761 mm	810 mm
Vertical movement with load	687 mm	730 mm
Maximum corrected force exerted through full range	81.3 kN	81.7 kN
Corresponding pressure of hydraulic fluid	18.6 MPa	18.6 MPa
Moment about rear-wheel axis	100.8 kNm	151.2 kNm
Maximum tilt angle of mast from vertical		5 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points										
mm	-387	-381	-300	-200	-100	0	+100	+200	+300	+349
Corrected lifting forces										
at the hitch points in kN	81.3	–	84.2	89.2	92.6	95.9	99.0	99.2	97.1	–
Corresponding pressure:	18.6 MPa									
at the frame in kN	–	85.1	85.5	87.2	88.5	88.9	88.4	86.4	83.6	81.7
Corresponding pressure:	18.6 MPa									

4.5 POWER LIFT TEST (SAE J283 Jun 93, with 20.8 R42 tires-Nebraska Test)

Linkage settings for test - See Table 2.1 and Figures 2.1 and 2.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	203 mm	209 mm
Vertical movement without load	761 mm	810 mm
Vertical movement with load	687 mm	730 mm
Maximum corrected force exerted through full range	75.5 kN	75.8 kN
Corresponding pressure of hydraulic fluid	17.3 MPa	17.3 MPa
Moment about rear-wheel axis	93.7 kNm	140.3 kNm
Maximum tilt angle of mast from vertical		5 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points										
mm	-387	-381	-300	-200	-100	0	+100	+200	+300	+349
Corrected lifting forces										
at the hitch points in kN	75.5	–	78.2	82.8	86.1	89.0	91.9	92.1	90.2	–
Corresponding pressure:	17.3 MPa									
at the frame in kN	–	79.0	79.3	81.0	82.1	82.5	82.0	80.3	77.7	75.8
Corresponding pressure:	17.3 MPa									

4.6 NOISE TESTS (Nebraska Test)

Date of tests:	June 17, 1996
Location of tests:	Versatile Farm Equipment Test Track Sanford, Manitoba; Canada
Sound level meter Make/Model/Type:	Bruel & Kjaer/Model T2236/Precision Integrating
Type of track:	Concrete
Noise at operator ear 75% pull at maximum power rated speed noise level:	76.0 dB(A)
Gear Number:	F10

5. REPAIRS

None

6. REMARKS

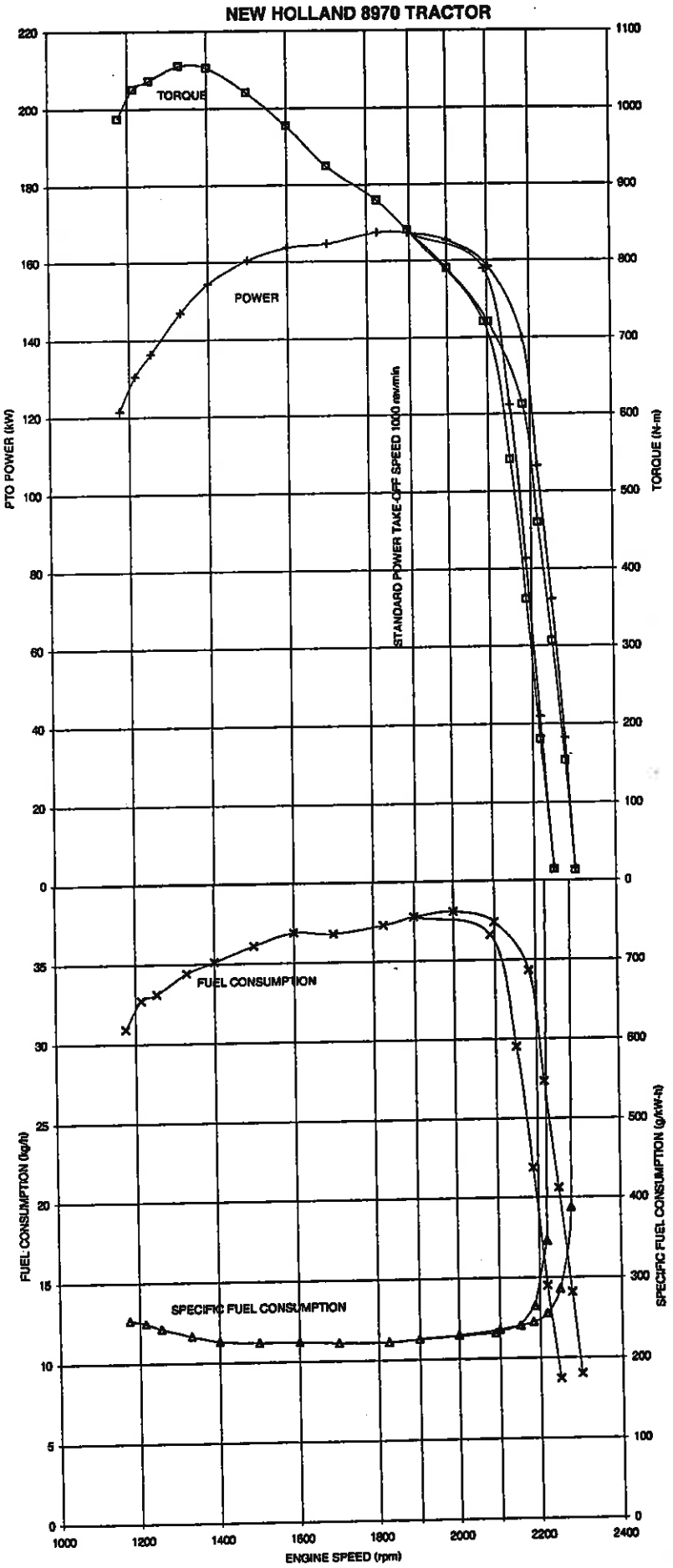
None

7. ANNEX (CURVES)

Tests carried out by: D.J. May, P.Eng., Project Engineer
K.A. Carmichael, Project Technologist

Signed: _____
Bruce Allen, P.Eng., MBA
Station Manager for the Director

Date: Jan 23, 1997


NEW HOLLAND 8970 TRACTOR
TORQUE
POWER
STANDARD POWER TAKE-OFF SPEED 1000 rev/min
FUEL CONSUMPTION
SPECIFIC FUEL CONSUMPTION
PTO POWER (kW)
TORQUE (N-m)
FUEL CONSUMPTION (kg/h)
SPECIFIC FUEL CONSUMPTION (g/kW-h)
ENGINE SPEED (rpm)
220
200
180
160
140
120
100
80
60
40
20
0
35
30
25
20
15
10
5
0
1100
1000
900
800
700
600
500
400
300
200
100
0
700
600
500
400
300
200
100
0
1000
1200
1400
1600
1800
2000
2200
2400

NEW HOLLAND 8970 TRACTOR

