PAMI

OECD NO. 1616 Restricted Code
Date of Approval: May 20, 1996

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



CATERPILLAR/CHALLENGER/C45
RUBBER TRACKED TRACTOR

Manufactured by: Caterpillar Inc.
100 N.E. Adams Street
Peoria, Illinois
61629 USA

Date of Test: October, 1995

PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

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Manufacturer's Name and Address:	Caterpillar Inc. 100 N.E. Adams Street Peoria, Illinois 61629 USA
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:	Caterpillar Proving Grounds Peoria, Illinois
Duration of running in:	102 h
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 manufacturer's premises VERSATILE FARM EQUIPMENT Test Track Sanford, Manitoba and witnessed by D.J. May, P.Eng., Project Engineer and K.A. Carmichael, Project Technologist, (PAMI - Portage la Prairie).

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

Caterpillar/Challenger/C45

Number of driving members:	2 tracks (rubber belts)
Serial Nº:	1DR00832
1st Serial Nº:	Confidential

1.2 ENGINE

Make/Model/Type:	Caterpillar/3116/DITATAC/Diesel direct injection turbo air to air after cooled
Serial Nº:	98Z12221

1.2.1 Cylinders

Number/disposition:	6/in-line, vertical
Bore/Stroke:	105 mm / 127 mm (4.13 in/5.00 in)
Capacity:	6598 cm^3 (401.9 in^3)

Compression ratio:	16.7:1
Arrangement of valves:	Two valve overhead
Cylinder liners:	Dry, (parent bore)

1.2.2 Supercharging

Make/Model:	Schwitzer/S2ES70UU1 76/27AL-DDM .70VTF/exhaust gas driven
Pressure:	162 to 219 kPa (23.5 to 31.8 psi) at rated engine speed and load

1.2.3 Fuel System

Fuel feed system:	Engine driven transfer pump/Piston type/Integral w/ 114-4523 governor Primary: Caterpillar/117-4089/150 micron sock type element Secondary: Caterpillar/1R0753/2 micron paper media spin-on
Capacity of fuel tank:	473 L (125 US gal)
Fuel Cooler:	Heat exchanger with air for pump inlet fuel Caterpillar/114-4523/transfer pump integral with governor
Serial Nº:	00238801 - D
Manufacturer's production rack setting:	8.73
Flow rate (rated engine speed and full load):	39.48 ± 1.97 kg/h (87.0 ± 4.34 lb/h)
Fuel Density:	0.839 g/cm^3 (7.002 lb/US gal)
Make/model/type of injectors:	Caterpillar/107-7735/Mechanical unit injectors
Injection pressure:	41 to 127 MPa (5950 to 18420 psi)
Timing:	10° BTDC

1.2.4 Governor

Make/model/type:	Caterpillar/114-4523/Hydro-mechanical
Governed range of speed:	from 900 to 2300 rev/min
Rated engine speed:	2100 rev/min
High idle speed range:	2300 ± 50 rpm

1.2.5 Air cleaner

Pre-cleaner:	Aspirator
Make/model/type	Donaldson/SRB120369/Venturi
Location of air intake:	In front of radiator under hood
Main Cleaner:	

Make/model/type:	Primary: Donaldson/6I2501/Radial seal paper element Secondary: Donaldson/6I2502/Radial seal paper element
Maintenance indicator:	Gauge on outlet of air cleaner, indicator light in cab

1.2.6 Lubrication system

Type of feed pump:	Engine Driven
Type of filter:	Caterpillar/1R0739/Paper element spin-on
Number:	One

1.2.7 Cooling system

Type of coolant:	Ethylene or Propylene Glycol 50/50 mixture
Type of pump:	Belt driven centrifugal pump
Specification of fan:	129-5450
Number of fan blades:	8
Fan diameter:	760 mm (30 in)
Coolant capacity:	32.6 L (8.6 US gal)
Type of temperature control:	Thermostat

1.2.8 Starting system

Make/model/type:	Delco/37 MT/Type 300 solenoid engagement
Starter motor power rating:	5.0 kW (6.7 hp)
Cold starting aid:	Air inlet heater, 12 V, 109-3000 Jacket water heater, 120 V, 124-0686
Safety device:	Timer

1.2. 9 Electrical system

Voltage:	12 volt, negative ground
Alternator:	
Make/model/type:	Delco Remy/2151/Type 200, 12 V, negative ground
Power:	115 amp at 2100 engine rpm
Battery (number of accumulators):	Two
Rating:	950 CCA/battery 100 ampere hours per battery at 20 hour rating

1.2.10 Exhaust system

Make/model/type:	Donaldson/129-4048/Expansion
Location:	Vertical on right

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:	14
Diameter of plates:	150 mm (5.9 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 countershaft controlled by a single lever, oil cooled
Arrangement:	Gear box with full power shift, one lever
Number of gears:	16 forward, 9 reverse
Available options:	Creeper gears optional
Oil cooler:	Heat exchanger with air

1.3.3 Rear axle and final drives

Make/Model/Type:	CAT/Inboard planetary with 3 planetary Caterpillar differential
Differential lock:	Not Applicable

1.3.4 Front axle and final drives: Not Applicable

1.3.5 Differential lock: Not Applicable

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	(mph)
Forward			
1	221	2.69	(1.67)
2	187.2	3.17	(1.97)
3	160	3.70	(2.30)
4	139.6	4.25	(2.64)
5	118.2	5.03	(3.13)
6	101.0	5.87	(3.65)
7	85.8	6.92	(4.30)
8	72.6	8.18	(5.08)
9	62.0	9.56	(5.94)
10	53.1	11.19	(6.95)
11	46.3	12.81	(7.96)
12	39.2	15.13	(9.40)
13	33.5	17.71	(11.00)
14	28.5	20.84	(12.95)
15	24.1	24.64	(15.31)
16	20.6	28.84	(17.92)
Reverse			
3	160	3.70	(2.30)
4	139.6	4.25	(2.64)
5	118.2	5.03	(3.13)
6	101.0	5.87	(3.65)
7	85.8	6.92	(4.30)
8	72.6	8.18	(5.08)
9	62.0	9.56	(5.94)
10	53.1	11.19	(6.95)
11	46.3	12.81	(7.96)

* Rolling radius is 749 mm (29.5 in) for travel speeds only

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

Type:	Independent
Method of engagement:	Wet clutch/electronic/hydraulic
Number of shafts:	One
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
Diameter of power take-off shaft end:	44.95 mm (1.77 in)
Number of splines in conformity with ISO 500/1991:	20 tooth
Height above ground:	750 mm (29.5 in) to CL of shaft
Distance from the median plane of the tractor:	Centre 0 mm (0 in)
Distance behind rear-wheel axis:	600 mm (23.6 in) to end of shaft
PTO speed at rated engine speed (2100 rev/min):	1105 rpm
Engine speed at standard power take-off speed:	1900 rpm
Ratio of rotation speeds (engine speed/PTO speed):	1.9:1
Direction of rotation (viewed from behind tractor:	Clockwise from rear

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:	CAT 2,3 and 3N with draft and position control with CAT III quick coupler
Type of hydraulic system:	Closed centre, pressure sensing, CCLS, load sensing
Number/Type/Size of cylinders:	Two/Single acting/102 mm (4 in), length 200 mm (7.88 in)
Type of linkage lock for transport:	Electro-hydraulic
Relief valve pressure setting (tolerance):	18.96 $\pm$ .34 MPa (2750 $\pm$ 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:	Paper filters, three
Site of oil reservoir:	Rear case
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 dm^3 (9.8 US gal)

1.6 Three-point linkage

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

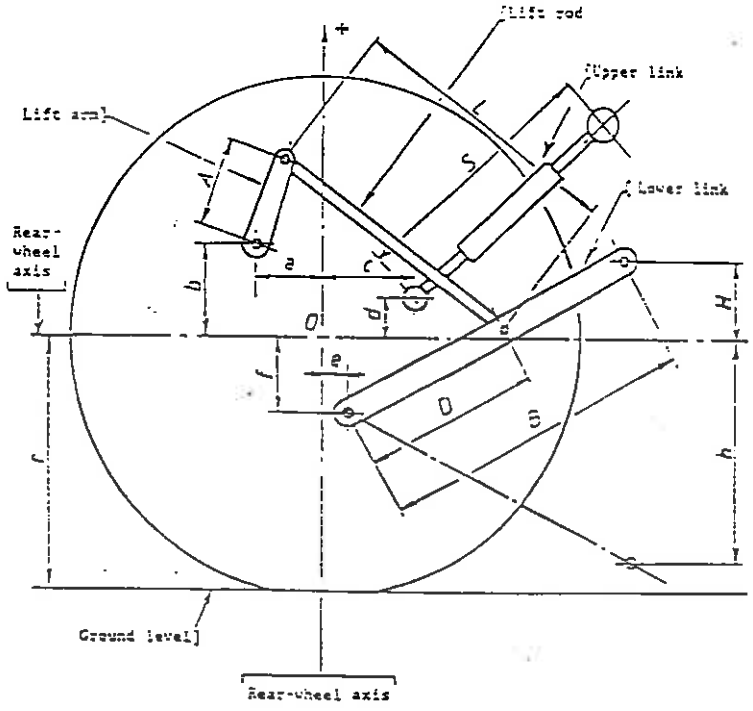


Figure 2.1 Lift test - Linkage geometry

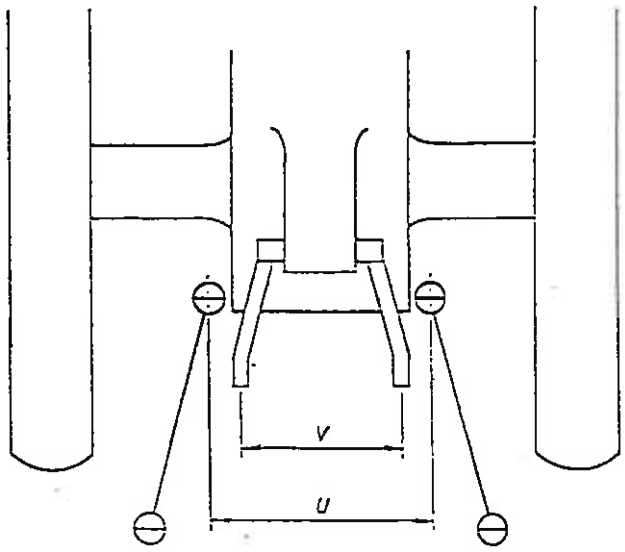


Figure 2.2 Lift test - Linkage geometry

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

		Dimension or Range mm (in)	Settings used in test mm (in)
Length of lift arms	(A)	380 (15.0)	Same
Length of Lower links	(B)	915 (36.0)	Same
Distance of lift arm pivot point from rear wheel axis: horizontally	(a)	-200 (-7.9)	Same
vertically	(b)	+395 (15.6)	Same
Horizontal distance between the 2 lower link points	(u)	538 (21.2)	Same
Horizontal distance between the 2 lift arm end points	(v)	637 (25.1)	Same
Length of upper link	(s)	605 to 815 (23.8 to 32.1)	766 (30.2)
Distance of upper link pivot point from rear wheel axis: horizontally	(c)	505 (19.9)	Same
vertically	(d)	200 (7.9)	Same
Distance of lower link pivot point from rear wheel axis: horizontally	(e)	325 (12.8)	Same
vertically	(f)	315 (12.4)	Same
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	473 (18.6)	Same
Length of lift rods	(L)	760 to 905 (29.9 to 35.6)	855 (33.7)
Height of lower hitch points relative to the rear-wheel axis: in low position	(h)	436 to 715 (17.2 to 28.1)	609 (24.0)
in high position	(H)	85 to 299 (3.3 to 11.8)	152 (6.0)
Height above ground of lower hitch points when locked in transport position (*)		885 to 1099 (34.8 to 43.3)	952 (37.5)

*r = 810 mm (31.9 in) Rear wheel centre line height

Rolling radius is not the same as centre line wheel height

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:	Reverse bend
Distance of hitch point from rear wheel axis, horizontally:	1102 mm (43.4 in)
Distance of hitch point from power take-off shaft end:	
Vertical:	305 mm (12.0 in)
Horizontal:	508 mm (20.0 in)
Lateral adjustment (centre of clevis):	
Right-hand:	220 mm (8.7 in)
Left-hand:	220 mm (8.7 in)
Distance of pivot point from rear wheel axis, horizontally:	Forward 51 mm (2.0 in)
Diameter of drawbar pin hole:	41 mm (1.6 in)
Maximum vertical permissible load:	20.9 kN (4700 lb)

1.8 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:	45/76.2 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)

1.9 STEERING

Make/Model/Type:	Caterpillar Differential Steering/Sundstrand Pump/Linde or Rexroth Motor/Steering Wheel Actuated
Method of operation:	Variable steering controlling speed difference between tracks
Pump(s):	Variable displacement pumps and fixed displacement motor
Ram(s):	None
Working pressure:	Up to 43.4 MPa (up to 6300 psi)

1.10 BRAKES

1.10.1 Service brake

Make/Model/Type:	CAT disk brakes/Multiple disk brakes between steering differential and final drives
Method of operation:	Pedal-hydraulic assist/Hydraulic boosted
Trailer Braking Take-off:	None

1.10.2 Parking brake

Type:	Disk brake on drive line
Method of operation:	Mechanical pull type

1.11 WHEELS

None

1.12 PROTECTIVE STRUCTURE

Make/Model/Type:	ROPS/FOPS
Manufacturer's name and address:	Crenlo Rochester, Minn.
Protective device:	
Cab/Frame/Rollguard/Other:	ROPS/FOPS
Tiltable/Not Tiltable:	Not tiltable
OECD approval number:	None (tested according to SAE J1040-Feb,'86; SAE J1040-April '88; ISO 3449; ISO 3471-1986

1.13 SEAT

1.13.1 Driver's Seat

Make/Model/Type:	Sears/SA13773.901/Low Profile
Type of suspension:	Air spring with adjustable damper
Type of damping:	Hydraulic
Range of adjustment:	
Rotation:	30° Degrees (25° to right, 5° to left) 6 stops
Longitudinal:	180 mm (7.1 in)
Vertical:	140 mm (5.5 in)
Optional and Passenger Seats:	None

1.14 LIGHTING

	Height of centre above ground mm (in)	Size mm (in)	Distance from out side edge to median plane of tractor mm (in)
Headlights	1575 (62.0)	250 x 100 (9.8 x 3.9)	373 (14.7)
Sidelights	1455 (57.3)	150 x 80 (5.9 x 3.1)	502 (19.8)
Rear top	2922 (115.0)	150 x 80 (5.9 x 3.1)	490 (19.3)
Reflectors	1880 (74.0)	55 x 70 (2.2 x 2.8)	910 (35.8)
Rear fender	1860 (73.2)	150 x 80 (5.9 x 3.1)	600 (23.6)
Front cab	2850 (112.2)	150 x 80 (5.9 x 3.1)	300 (11.8)

2. TEST CONDITIONS

2.1 OVERALL DIMENSIONS (unballasted tractor)

Length mm (in)	Minimum width mm (in)	Maximum width mm (in)	Height to top of protective structure mm (in)	Height to top of exhaust silencer mm (in)
5658 (222.8)	2324 (91.5)	3099 (122.0)	3500 (137.8)	3280 (129.1)

2.2 Ground Clearance

Unballasted: 370 mm (14.6 in)
Clearance limiting part: Drawbar cage

2.3 TRACTOR MASS (with cab)

	Unballasted		Ballasted*	
	Without Driver kg (lb)	With Driver kg (lb)	Without Driver kg (lb)	With Driver kg (lb)
Total	10,744 (23,690)	10,819 (23,855)	11,488 (25,330)	11,563 (25,496)

* All ballast in the form of cast iron weights added to frame.

BALLAST DETAILS

	Number of Weights	Total Mass kg (lb)
Front	12	600 (1323)
Roller frame	2	112 (247)
Additional test equipment	-	32 (71)

2.4 TRACK SPECIFICATIONS

Track materials	Rubber/with steel cables
Track width and base	635 mm (25 in), 2187 mm (86.1 in)
Dynamic radius (rolling radius)	750 mm (29.5)
Track support system	Roller frame with rollers
Treadbars	72 per track
Number per metre	8.97 per metre (8.20 per yard)
Treadbar width	584 mm (23 in)

2.5 TRACK WIDTH SPECIFICATIONS

	Minimum mm (in)	Maximum mm (in)	Adjustment method	Setting used in test mm (in)
Tracks	1524 (60)	2286 (90.0)	Spacers	2235 (88)

2.6 OILS AND LUBRICATION

2.6.1 Capacity and change interval

	Capacity dm^3	Oil Change h	Filter Change h
Engine	330	250	250
Gear box	*Common w/rear axle	-	-
Front axle	-	-	-
Rear axle	1506	1000	50 then 1000
Final drive (front)	-	-	-
Final drive (rear)	*Common w/rear axle	-	-
Hydraulic system	*Common w/rear axle	-	-
Other (steering)	*Common w/rear axle	-	-

* common with gear box or rear axle

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

	Recommended	Used during the test
Engine oil . type: . viscosity: . classification:	CATERPILLAR SAE 10W-30 CF-4 (APS)	Same
Transmission oils . type: . viscosity: . classification:	CATERPILLAR SAE 10W-30 CF-4 (MTO)	Same
Hydraulic fluid . type: . viscosity: . classification:	Common with transmission	Same
Steering oil . type: . viscosity: . classification:	Common with transmission	Same

2.6.3 Grease:

Number of lubrication points: 10 grease points all on 3 pt linkage

2.7 FUEL

Type: In conformity with national standard

Density at 15°C (60°F):

For PTO test: 0.848 g/cm^3 (7.076 lb/US gal)

For dawbar test: 0.844 g/cm^3 (7.044 lb/US gal)

3. COMPULSORY TEST RESULTS

3.1 Main power take-off test

Date and location of tests: October 17, 1995;
Prairie Agricultural Machinery Institute;
Portage la Prairie, Manitoba; Canada

Type of dynamometer: AW Dynamometer Inc., Water Brake Dynamometer, Model 375

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						
179.4	1773	933	41.2	48.6	230	3.69
3.1.2 POWER AT RATED ENGINE SPEED						
152.7	2100	1105	39.5	46.6	259	3.28
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)						
175.2	1900	1000	42.0	49.6	240	3.54
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
152.7	2100	1105	39.5	46.6	259	3.28
3.1.4.2 85% of torque obtained in 3.1.4.1						
135.8	2198	1157	38.5	45.4	284	2.99
3.1.4.3 75% of torque defined in 3.1.4.2						
103.7	2237	1178	31.2	36.9	301	2.82
3.1.4.4 50% of torque defined in 3.1.4.2						
70.1	2270	1195	24.8	29.3	354	2.40
3.1.4.5 25% of torque defined in 3.1.4.2						
35.6	2307	1214	19.1	22.5	537	1.58
3.1.4.6 unloaded						
1.8	2339	1231	13.4	15.8	7253	0.12
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min) 3.1.5.1 the torque corresponding to maximum power						
175.2	1900	1000	42.0	49.6	240	3.54
3.1.5.2 85% of torque obtained in 3.1.5.1						
160.4	2045	1077	40.6	47.9	253	3.35
3.1.5.3 75% of torque defined in 3.1.5.2						
124.3	2112	1112	33.5	39.5	270	3.15
3.1.5.4 50% of torque defined in 3.1.5.2						
84.7	2160	1137	25.6	30.2	303	2.80
3.1.5.5 25% of torque defined in 3.1.5.2						
43.2	2206	1161	19.3	22.8	447	1.90
3.1.5.6 unloaded						
3.3	2249	1183	12.8	15.1	3907	0.22

No load maximum engine speed: 2339 rev/min

Torque (equivalent crankshaft) at maximum power:

- at rated engine speed: 693.9 Nm (511.6 ft-lb)
- at standard power take-off speed: 870.7 Nm (642.1 ft-lb)
- at maximum power: 965.8 Nm (712.3 ft-lb)

Power	Speed		Fuel Consumption			Specific Energy
	Engine	PTO	Hourly		Specific	
hp	rev/min		lb/h	US gal/h	lb/hp-h	hp-h/US gal
3.1.1 MAXIMUM POWER - TWO-HOUR TEST						
240.4	1773	933	90.8	12.8	0.378	18.7
3.1.2 POWER AT RATED ENGINE SPEED						
204.6	2100	1105	87.1	12.3	0.425	16.6
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)						
234.9	1900	1000	92.6	13.1	0.394	17.9
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maximum power at rated engine speed						
204.6	2100	1105	87.1	12.3	0.425	16.6
3.1.4.2 85% of torque obtained in 3.1.4.1						
182.1	2198	1157	84.9	12.0	0.466	15.2
3.1.4.3 75% of torque defined in 3.1.4.2						
139.0	2237	1178	68.9	9.7	0.495	14.3
3.1.4.4 50% of torque defined in 3.1.4.2						
94.0	2270	1195	54.7	7.7	0.582	12.2
3.1.4.5 25% of torque defined in 3.1.4.2						
47.7	2307	1214	42.1	6.0	0.882	8.0
3.1.4.6 unloaded						
2.5	2339	1231	29.5	4.2	11.928	0.6
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
3.1.5.1 the torque corresponding to maximum power						
234.9	1900	1000	92.6	13.1	0.394	17.9
3.1.5.2 85% of torque obtained in 3.1.5.1						
215.1	2045	1077	89.5	12.7	0.416	17.0
3.1.5.3 75% of torque defined in 3.1.5.2						
166.6	2112	1112	73.8	10.4	0.443	16.0
3.1.5.4 50% of torque defined in 3.1.5.2						
113.5	2160	1137	56.5	8.0	0.498	14.2
3.1.5.5 25% of torque defined in 3.1.5.2						
57.9	2206	1161	42.6	6.0	0.736	9.6
3.1.5.6 unloaded						
4.4	2249	1183	28.2	4.0	6.426	1.1

Maximum torque (equivalent crankshaft): 1092.1 Nm (805.5 ft-lb) at 1302 rev/min

Mean atmospheric conditions:

Temperature: 25°C (77°F)

Pressure: 99.74 kPa (29.45 in-hg)

Relative humidity: 62%

Maximum temperatures:

Coolant: 88°C (190°F)

Engine Oil: 101°C (214°F)

Fuel: 36°C (97°F)

Engine air intake: 40°C (104°F)

3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: October 28 - November 9, 1995
Portage la Prairie, Manitoba; Canada

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.8 MPa (2727 psi)
Tapping point used for test: One remote hydraulic outlet
Pump delivery rate at minimum pressure (high idle): 98.4 l/min (26.1 gal/min)

	Flow Rate l/min (US gal/min)	Pressure MPa (psi)	Power kW (hp)
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	56.4 (14.9)	16.9 (2455)	15.6 (20.9)
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	82.1 (21.7)	14.0 (2029)	19.1 (25.7)

Tapping point used for second test: Two remote hydraulic outlets
Pumping delivery rate at minimum pressure (rated engine speed): 124.51 l/min (32.9 gal/min)

	Flow Rate l/min (US gal/min)	Pressure MPa (psi)	Power kW (hp)
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	57.2 (15.1)	16.9 (2455)	15.9 (21.3)
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	123.4 (32.6)	13.3 (1927)	27.3 (36.6)

Temperature of hydraulic fluid: 65 $\pm$ 5°C (148 $\pm$ 9°F)
Opening and closing of the unloading valve: Not applicable, since this hydraulic system does not use an accumulator

3.2.2 POWER LIFT TEST (Standard 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	202 mm (8.0 in)	195 mm (7.7 in)
Vertical movement: unloaded loaded	 756 mm (29.8 in) 688 mm (27.1 in)	 962 mm (37.9 in) 838 mm (33.0 in)
Maximum corrected force exerted through full range	57.1 kN (12840 lb)	50.3 kN (11300 lb)
Corresponding pressure of hydraulic fluid	16.9 MPa (2455 psi)	16.9 MPa (2455 psi)
Moment about rear-wheel axis	68.6 kNm (50500 ft-lb)	115.6 kNm (85320 ft-lb)
Maximum tilt angle of mast from vertical		12 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-300 (-11.8)	-293 (-11.5)	211 (-11.5)	-200 (-7.9)	-100 (-3.9)	0 (0)	+100 (3.9)	+200 (7.9)	+300 (11.8)	+395 (15.6)	+400 (15.7)	+404 (15.9)
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 (lb)	–	57.1 (12840)	–	60.9 (13700)	64.4 (14470)	67.2 (15110)	69.4 (15610)	71.0 (15970)	72.0 (10190)	72.4 (16270)	–	–
Corresponding pressure	16.9 MPa (2455 psi)											
at the frame in kN (lb)	50.9 (11440)	–	50.3 (11300)	52.4 (11780)	53.9 (12130)	55.2 (12420)	56.1 (12610)	56.3 (12650)	55.6 (12500)	–	53.8 (12100)	53.7 (12080)
Corresponding pressure:	16.9 MPa (2455 psi)											

3.2.3 Power lift test (optional lift cylinders/114 mm (4.5 in) diameter)

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	197 mm (7.8 in)	129 mm (5.1 in)
Vertical movement: unloaded loaded	 749 mm (29.5 in) 687 mm (27.0 in)	 937 mm (36.9 in) 864 mm (34.0 in)
Maximum corrected force exerted through full range	73.1 kN (16440 lb)	63.0 kN (14170 lb)
Corresponding pressure of hydraulic fluid	16.9 MPa (2455 psi)	16.9MPa (2455 psi)
Moment about rear-wheel axis	87.8 kN-m (64740 ft-lb)	113.8 kNm (83940 ft-lb)
Maximum tilt angle of mast from vertical		12.0 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-366 (-14.4)	-300 (-11.8)	-298 (-11.7)	-200 (-7.9)	-100 (-3.9)	0 (0)	+100 (3.9)	+200 (7.9)	+300 (11.8)	+396 (15.6)	+400 (15.7)	+498 (19.6)
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 (lb)			73.1 (16440)	74.9 (16840)	77.6 (17460)	80.4 (18070)	83.0 (18680)	85.8 (19290)	88.5 (19900)	91.1 (20480)		
Corresponding pressure:	16.9 MPa (2455 psi)											
at the frame in kN (lb)	63.0 (14170)	63.4 (14250)		65.9 (14830)	67.8 (15250)	69.0 (15570)	69.4 (15610)	69.2 (15550)	68.2 (15330)		66.5 (14950)	64.2 (14420)
Corresponding pressure:	16.9 MPa (2455 psi)											

3.3 DRAWBAR PERFORMANCE

Date of tests: October 24, 1995
Versatile Farm Equipment Operations Test Track
Sanford, Manitoba; Canada

Height of Drawbar Above Ground
unballasted 448 mm (17.6 in)
ballasted 450 mm (17.7 in)

Gear and Range	Power	Drawbar pull			Slip of wheels and/or tracks	Specific fuel consumption	Specific Energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine Oil	Temperature	Relative 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 (unballasted tractor)													
F1	79.55	118.25	2.42	2256	14.9	376	2.25	14	82	89	-5.0	97	101.45
F2	91.33	114.68	2.87	2237	15.0	364	2.32	18	83	89	-4.0	98	101.41
F3	105.37	114.22	3.32	2212	14.9	351	2.40	19	83	91	-1.0	99	101.38
F4	114.53	112.20	3.67	2145	15.0	330	2.56	20	83	92	-0.5	99	101.37
F5	125.61	111.25	4.06	1998	14.9	289	2.92	21	84	93	-0.5	99	101.33
F6	130.41	107.78	4.36	1772	12.1	264	3.20	21	86	94	1.0	99	101.33
F7	151.94	100.35	5.44	1774	6.6	275	3.07	20	85	93	4.0	88	101.27
F8	156.43	86.2	6.53	1771	4.9	262	3.22	20	85	93	4.0	88	101.27
F9	157.34	72.03	7.86	1775	2.6	261	3.23	19	85	92	4.0	88	101.27
F10	153.55	59.70	9.26	1773	1.8	268	3.15	19	84	93	4.0	88	101.27
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	133.41	51.02	9.41	2102	1.5	290	2.91	19	84	92	4.0	88	101.27
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	106.91	38.71	10.02	2226	1.0	324	2.61	19	82	91	4.0	88	101.27
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	72.37	25.48	10.22	2262	0.6	386	2.19	18	82	90	6.0	77	101.18
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
F10	105.63	38.19	9.96	1890	0.9	294	2.87	16	83	89	6.0	77	101.18
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
F10	72.53	25.54	10.23	1935	0.6	339	2.49	16	81	88	6.0	77	101.18
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	135.94	61.79	7.92	2099	2.7	286	2.95	18	83	88	6.0	77	101.18
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	109.06	46.39	8.46	2226	2.0	317	2.67	18	83	91	6.0	77	101.18
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	74.0	30.85	8.64	2263	1.6	374	2.26	18	82	90	6.0	77	101.18
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
F9	108.57	46.33	8.44	1878	1.2	280	3.01	17	82	89	6.0	77	101.18
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
F9	73.25	30.70	8.59	1904	0.8	324	2.60	17	81	87	6.0	77	101.18

Gear and Range	Power	Drawbar pull			Slip of tracks	Specific fuel consumption	Specific Energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine Oil	Temperature	Relative Humidity	Pressure
	hp	lb	mph	rev/min	%	lb/hp-h	hp-h/gal	°F	°F	°F	°F	%	in Hg
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
F1	106.63	26590	1.50	2256	14.9	0.618	11.40	57	180	192	23	97	30.0
F2	122.47	25780	1.79	2237	15.0	0.599	11.76	64	181	192	25	98	30.0
F3	141.25	25680	2.06	2212	14.9	0.577	12.20	66	181	196	30	99	30.0
F4	153.52	25230	2.28	2145	15.0	0.543	12.97	68	181	198	31	99	30.0
F5	168.38	25010	2.53	1998	14.9	0.475	14.82	70	183	199	31	99	30.0
F6	174.81	24230	2.71	1772	12.1	0.434	16.22	70	187	201	34	99	30.0
F7	203.68	22560	3.39	1774	6.6	0.453	15.55	68	185	199	39	88	30.0
F8	209.69	19380	4.06	1771	4.9	0.431	16.35	68	185	199	39	88	30.0
F9	210.91	16190	4.89	1775	2.6	0.430	16.39	65	185	198	39	88	30.0
F10	205.83	13420	5.75	1773	1.8	0.441	15.98	66	183	199	39	88	30.0
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	178.83	11470	5.85	2102	1.5	0.476	14.78	66	183	198	39	88	30.0
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	143.31	8640	6.23	2226	1.0	0.532	13.23	66	180	196	39	88	30.0
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	97.01	5730	6.35	2262	0.6	0.634	11.10	64	180	194	43	77	30.0
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
F10	141.60	8580	6.19	1890	0.9	0.483	14.57	61	181	192	43	77	30.0
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
F10	97.22	5740	6.36	1935	0.6	0.557	12.65	61	178	190	43	77	30.0
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	182.23	13890	4.92	2099	2.7	0.471	14.95	64	181	190	43	77	30.0
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	146.20	10430	5.26	2226	2.0	0.521	13.52	64	181	196	43	77	30.0
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	99.20	6940	5.37	2263	1.6	0.614	11.46	64	180	194	43	77	30.0
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
F9	145.43	10420	5.24	1878	1.2	0.460	15.30	63	180	192	43	77	30.0
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
F9	98.20	6900	5.34	1904	0.8	0.533	13.21	63	178	189	43	77	30.0

4. OPTIONAL TEST

4.1 BALLASTED DRAWBAR TEST

Date of Test: October 25, 1995
Location of Test: Versatile Farm Equipment Test Track
Sanford, Manitoba; Canada

Gear and range	Power	Drawbar pull	Speed	Engine Speed	Slip of wheels and/or tracks	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine Oil	Temperature	Relative Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.1.1 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
F1	83.09	125.19	2.39	2226	14.9	432	1.95	19	83	87	2	86	100.48
F2	98.55	126.02	2.82	2196	15.0	385	2.20	20	83	90	2	86	100.48
F3	110.85	121.70	3.28	2187	15.0	341	2.48	18	83	89	2	86	100.48
F4	122.80	124.95	3.54	2066	15.0	322	2.62	18	82	88	2	86	100.48
F5	132.88	122.17	3.92	1925	14.9	295	2.86	19	83	90	2	86	100.50
F6	145.57	116.48	4.50	1774	9.3	240	3.52	19	84	91	2	86	100.50
F7	147.08	94.68	5.59	1774	4.2	235	3.59	18	84	92	2	86	100.50
F8	157.82	85.87	6.62	1776	3.9	253	3.34	16	82	87	2	86	100.50
F9	158.14	72.09	7.90	1774	2.1	263	3.21	19	84	90	2	84	100.54
F10	153.74	59.55	9.29	1775	1.5	269	3.13	18	84	92	2	84	100.54
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	134.06	51.22	9.42	2098	1.3	294	2.88	19	83	92	2	84	100.54
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	106.68	38.25	10.04	2228	0.9	326	2.59	19	82	89	2	84	100.54
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	72.50	25.51	10.23	2261	0.5	384	2.20	19	82	90	2	84	100.54
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1.													
F10	107.51	38.52	10.05	1905	0.8	293	2.88	19	82	88	3	82	100.55
3.3.2.1.4 next higher gear at reduced engine speed, same pull and travelling speed as in 3.3.2.1.2.													
F10	72.87	25.63	10.24	1943	0.5	344	2.46	18	81	88	3	82	100.55
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	136.08	61.66	7.95	2099	2.4	292	2.89	19	83	91	2	84	100.54
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	108.97	46.33	8.47	2226	1.9	319	2.65	19	83	91	2	84	100.54
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	74.41	30.97	8.65	2264	1.5	374	2.26	20	82	90	2	84	100.54
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1.													
F9	109.11	46.27	8.49	1888	1.1	281	3.01	19	83	90	3	82	100.55
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2.													
F9	74.08	30.82	8.65	1915	0.7	323	2.62	19	81	88	3	82	100.55

Gear and range	Power	Drawbar pull	Speed	Engine Speed	Slip of wheels and/or tracks	Specific fuel consumption	Specific Energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine Oil	Temperature	Relative Humidity	Pressure
	hp	lb	mph	rev/min	%	lb/hph	hp-h/gal	°F	°F	°F	°F	%	in/Hg
3.1.1 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
F1	111.38	28150	1.48	2226	14.9	0.711	9.91	66	181	189	36	86	29.8
F2	132.11	28330	1.75	2196	15.0	0.633	11.16	68	181	194	36	86	29.8
F3	148.59	27360	2.04	2187	15.0	0.560	12.58	64	181	192	36	86	29.8
F4	164.60	28090	2.30	2066	15.0	0.529	13.32	64	180	190	36	86	29.8
F5	178.13	27470	2.43	1925	14.9	0.486	14.53	66	181	194	36	86	29.8
F6	195.14	26190	2.80	1774	9.3	0.395	17.84	66	183	196	36	86	29.8
F7	197.15	21290	3.47	1774	4.2	0.387	18.19	64	183	198	36	86	29.8
F8	211.56	19300	4.11	1776	3.9	0.416	16.94	61	180	189	36	86	29.8
F9	211.98	16210	4.91	1774	2.1	0.432	16.31	66	183	194	36	84	29.8
F10	206.09	13390	5.78	1775	1.5	0.443	15.90	64	183	198	36	84	29.8
3.3.2 FUEL CONSUMPTION													
3.3.2.1 in selected gear, at maximum power at rated speed													
F9	179.71	11510	5.86	2098	1.3	0.483	14.59	66	181	198	36	84	29.8
3.3.2.1.1 75% of pull at maximum power at rated speed													
F9	143.0	8600	6.24	2228	0.9	0.536	13.14	66	180	192	36	84	29.8
3.3.2.1.2 50% of pull at maximum power at rated speed													
F9	97.19	5740	6.36	2261	0.5	0.631	11.17	66	180	194	36	84	29.8
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	144.11	8660	6.24	1905	0.8	0.482	14.61	66	180	190	37	82	29.8
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	97.68	5760	6.36	1934	0.5	0.565	12.46	64	178	190	37	82	29.8
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed													
F8	182.41	13860	4.94	2099	2.4	0.480	14.67	66	181	196	36	84	29.8
3.3.2.2.1 75% of pull at maximum power at rated speed													
F8	146.07	10420	5.26	2226	1.9	0.524	13.44	66	181	196	36	84	29.8
3.3.2.2.2 50% of pull at maximum power at rated speed													
F8	99.75	6960	5.38	2264	1.5	0.614	11.46	68	180	194	36	84	29.8
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1.													
F9	146.26	10400	5.28	1888	1.1	0.462	15.26	66	181	194	37	82	29.8
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2.													
F9	99.30	6930	5.38	1915	0.7	0.531	13.28	66	178	190	37	82	29.8

4.2 POWER LIFT TEST (according to ASAE S349.2 July 1991 Static Test)

	on the frame
Height of lower hitch points above ground in down position	191 mm (7.5 in)
Vertical movement without load	1006 mm (39.6 in)
Vertical movement with load	916 mm (36.1 in)
Maximum corrected force exerted through full range	76.5 kN (17210 lb)
Corresponding pressure of hydraulic fluid	18.6 MPa (2700 psi)
Moment about rear-wheel axis	127.6 kNm (94180 ft-lb)
Maximum tilt angle of mast from vertical	10.5 degrees

The lower links were adjusted during the test to meet the specified power range.

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm (in)	-304 (12.0)	-300 (11.8)	-200 (7.9)	-100 (3.9)	0	+100 (3.9)	+200 (7.9)	+300 (11.8)	+400 (15.7)	+500 (19.7)	+600 (23.6)	+612 (24.1)
Lifting forces (the values of force measured shall be corrected to correspond to the minimum system (a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting of the hydraulic lift system)												
at the frame in kN	79.8 (17950)	79.9 (17970)	81.9 (18404)	83.2 (18710)	84.0 (18890)	84.3 (18950)	83.9 (18870)	83.0 (18670)	81.5 (18330)	79.5 (17870)	76.9 (17290)	76.5 (17210)
Corresponding pressure:				18.6 MPa (2700 psi)								

4.3 NOISE TESTS

Date of tests:	October 24, 1995
Location of tests:	Versatile Farm Equipment Test Track Sanford, Manitoba; Canada
Sound level meter Make/Model/Type:	Bruel & Kjaer/Model T2236/Precision Integrating Sound Level Meter
Type of track:	Concrete
External noise level gear number:	F16
Travelling speed before acceleration:	2164 km/h (13.4 mph)
Sound level:	89.0 dB(A)
Noise at operator ear 75% pull at maximum power rated speed noise level	75.0 dB(A)
Gear number:	F9

5. REPAIRS

None

6. REMARKS

None

7. ANNEX (CURVES)

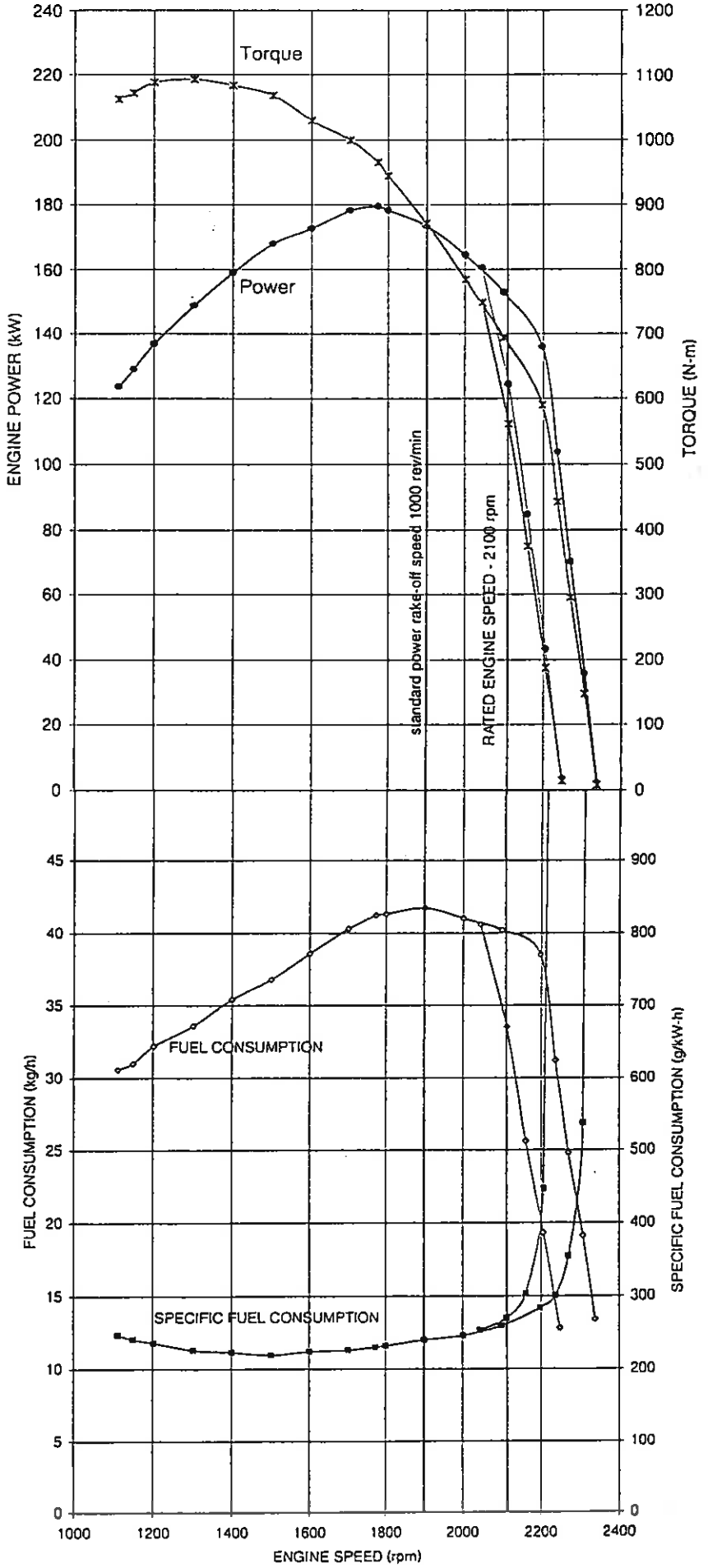
Tests carried out by: D.J. May, P.Eng., Project Engineer
K.A. Carmichael, Project Technologist

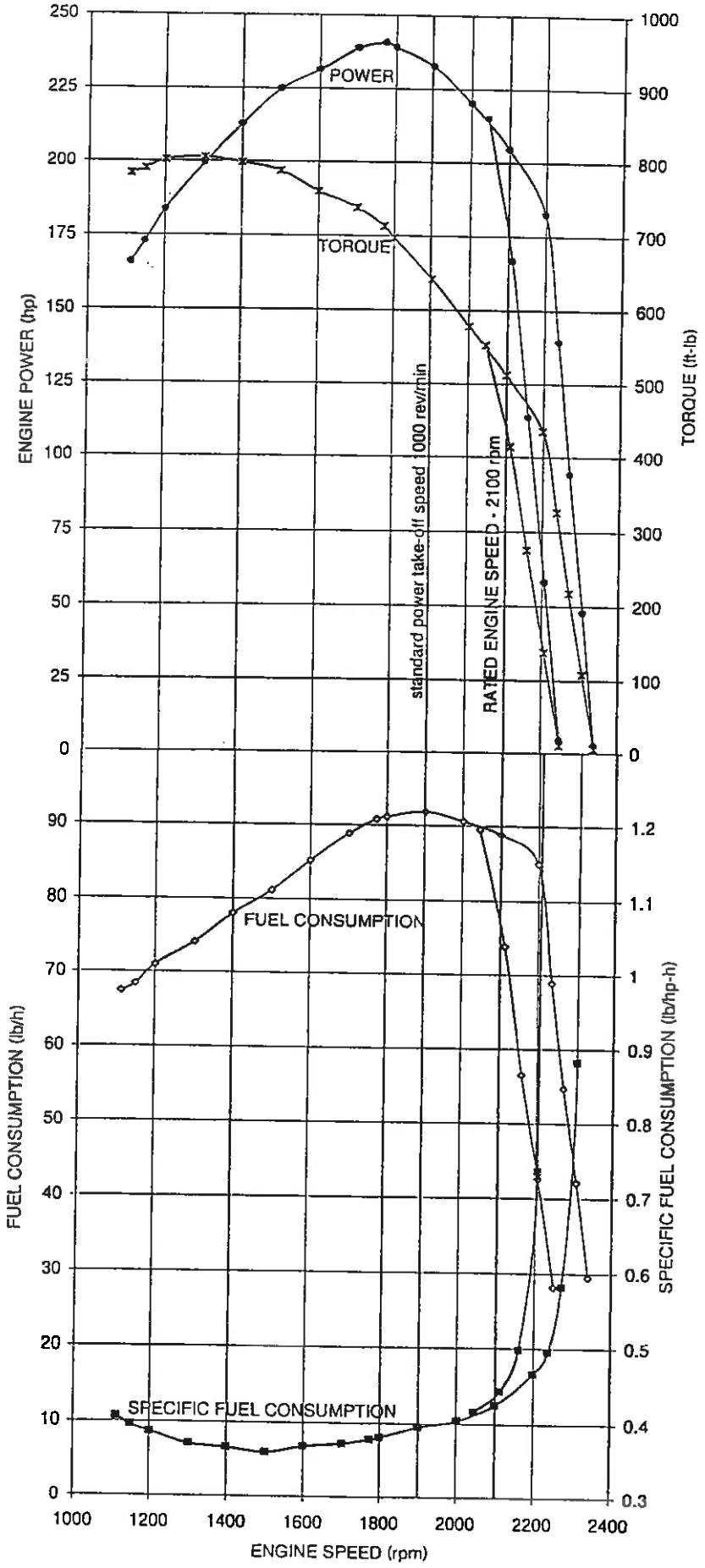
Signed:

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

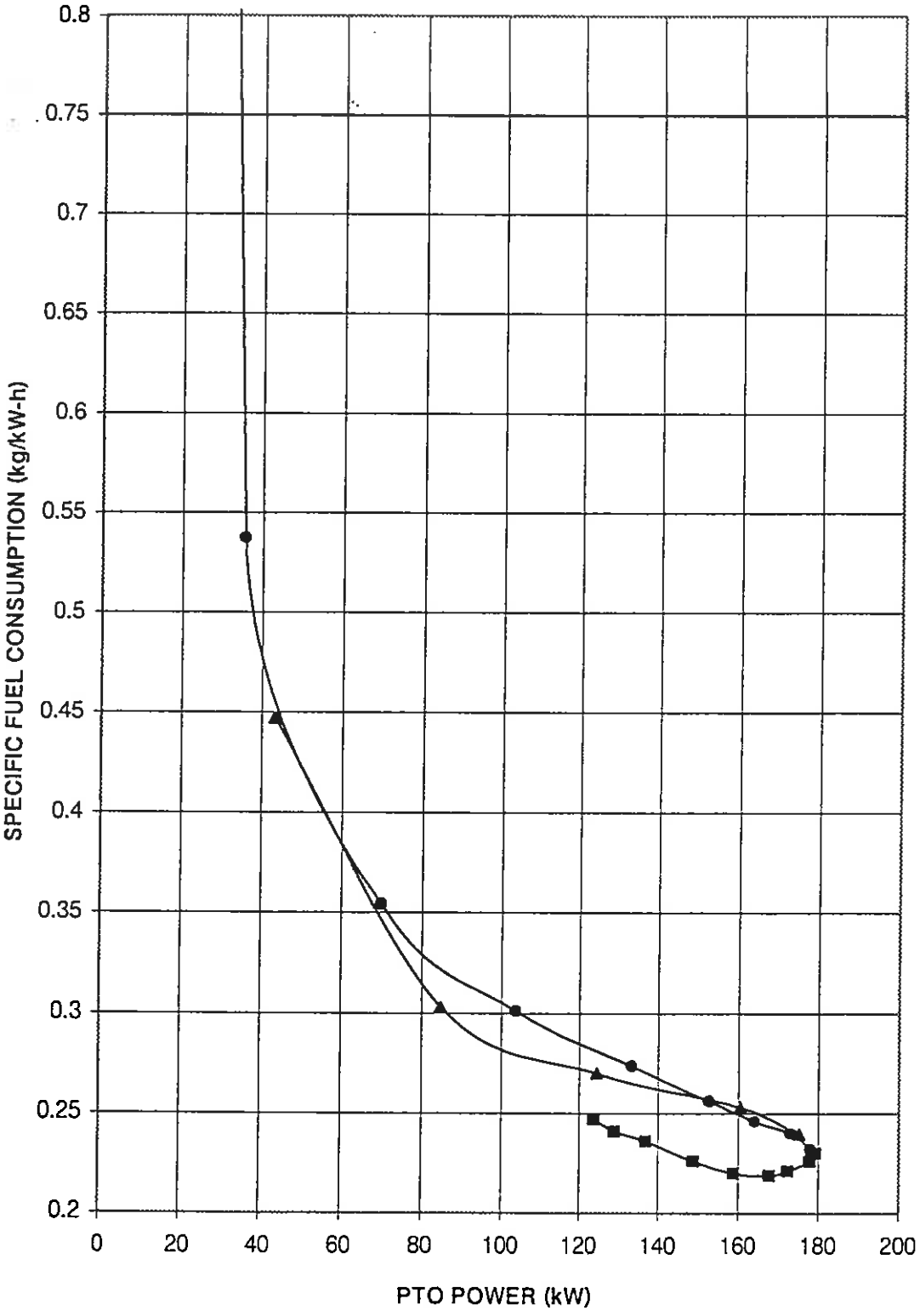
Date: July 10/96

CATERPILLAR 45 TRACTOR




POWER
TORQUE
standard power take-off speed 1000 rev/min
RATED ENGINE SPEED - 2100 rpm
FUEL CONSUMPTION
SPECIFIC FUEL CONSUMPTION
ENGINE POWER (hp)
TORQUE (ft-lb)
FUEL CONSUMPTION (lb/h)
SPECIFIC FUEL CONSUMPTION (lb/hp-h)
ENGINE SPEED (rpm)
250
225
200
175
150
125
100
75
50
25
0
1000
900
800
700
600
500
400
300
200
100
0
90
80
70
60
50
40
30
20
10
0
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
1000
1200
1400
1600
1800
2000
2200
2400

CATERPILLAR 45 TRACTOR



CATERPILLAR 45 TRACTOR

