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CODE 2
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NEBRASKA TRACTOR TEST LABORATORY
DEPARTMENT OF BIOLOGICAL SYSTEMS ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA - EAST CAMPUS
LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE 2 FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS



CATERPILLAR CHALLENGER 95E
Rubber Track Laying - 30 km/h Version

MANUFACTURED BY:	**Caterpillar Agricultural Products, Inc.** **12101 Barber Greene Road** **De Kalb, IL 60115 USA**
NEBRASKA TEST NO.	**1751**
TEST DATES:	**May 19 - June 2, 1998**

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, Code 2.

This report has been approved by the OECD Coordinating Centre in Paris on 9 October 1998 for the Caterpillar Challenger 95E, Rubber Tracked - 30 km/h version, 10-speed with OECD Number 2/1788.

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

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LINCOLN, NEBRASKA 68583-0832, USA

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- Tractor Manufacturer's Name and Address:	Caterpillar Agricultural Products Inc. 12101 Barber Greene Rd. De Kalb, IL 60115 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:	Caterpillar Proving Grounds Peoria, Illinois USA
- Duration of running-in:	134 hr
- Location of test:	Nebraska Tractor Test Laboratory University of Nebraska Lincoln, Nebraska 68583-0832 USA

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

- Make/Model/Type:	Caterpillar Challenger 95E Unit construction, Rubber Track Laying - 30 km/h
- Number of driving wheels:	Two rubber tracks
- Serial No:	6KS205
- 1st Serial No:	This model is the first of the 6KS series.

1.2 Engine

- Make/Model/Type:	Caterpillar 3196 Diesel, direct injection, turbocharged and air to air aftercooled
- Serial No:	6AR00796

1.2.1 *Cylinders*

- Number/disposition:	6, in-line, vertical
- Bore/stroke:	130 mm x 150 mm
- Capacity:	11946 cm^3
- Compression ratio:	16.0 to 1
- Arrangement of valves:	Overhead
- Cylinder liners (wet or dry):	Wet, replaceable

1.2.2 *Supercharging*

- Make/Model/Type:	Garret/1355394/radial flow/exhaust gas driven
- Pressure:	Low Power 128.6 kPa +/- 19.3 kPa Mid Power 143.0 kPa +/- 21.4 kPa High Power 168.3 kPa +/- 25.2 kPa

1.2.3 *Fuel system*

- Fuel feed system:	Engine driven transfer pump
- Make/Model/Type of fuel filter(s):	Caterpillar/133-5673-primary filter - paper element 1R0762-secondary filter - paper element
- Capacity of fuel tank:	1060 l
- Make/Model/Type of injection pump:	Caterpillar electronically controlled unit injector system
- Serial No:	None - pump is integral part of engine

- Manufacturer's production setting of injection pump

- Flow rate (rated engine speed):	
Gears 1 & 2, and PTO	50.6 +/- 2.53 kg/h
Gears 3	55.5 +/- 2.76 kg/h
Gears 4-10	61.0 +/- 3.05 kg/h
- Fuel density	0.846 g/cm^3
- Timing:	Variable, electronically controlled
- Make/Model/Type of injectors:	Caterpillar part # 116-5426
- Injection pressure:	
Gears 1 & 2, and PTO	131 MPa
Gears 3	140 MPa
Gears 4-10	152 MPa

1.2.4 *Governor*

- Make/Model/Type:	Caterpillar/ADEM II Engine Management
- Governed range of engine:	880 to 2300 rev/min
- Rated engine speed:	2100 rev/min

1.2.5 *Air cleaner*

- Pre-cleaner	
. Make/Model/Type:	Donaldson/Cat #1488281/Dust ejector
. Location of air intake:	Above right front fender
- Main cleaner	
. Make/Model/Type:	Donaldson/Cat # 6I2505 and 6H2506/ Dry paper dual element
. Location of air intake:	Above right front fender
- Maintenance indicator:	Restriction gauge air intake near air cleaner

1.2.6 *Lubrication system*

- Type of feed pump:	Gear pump
- Type of filer(s):	Spin-on, Caterpillar 1R0716
- Number of filters:	One

1.2.7 *Cooling system*

- Type of coolant:	Liquid
- Type of pump:	Centrifugal, gear driven
- Specification of fan or blower	
. Number of fan blades:	8
. Fan diameter:	914 mm
- Coolant capacity:	76 l
- Type of temperature control:	Thermostat
- Superpressure system:	48 kPa

1.2.8 *Starting system*

- Make/Model/Type:	Delco/42MT/solenoid-engaged
- Starter motor power rating:	5.6 kW
- Cold starting aid:	Ether spray in intake manifold
- Safety device:	Transmission neutral switch

1.2.9 *Electrical system*

- Voltage:	12 V
- Generator	
. Make/Model/type:	Delco Remy/Cat # 1259597
. Power:	145 amps at 2,100 engine revs/min
- Battery of accumulators	
. Number:	2
. Rating	950 Cold Cranking Amps

1.2.10 *Exhaust system*

- Make/Model/Type:	Donaldson/305 mm diameter (Cat # 1365108)
- Location:	Muffler and exhaust pipe vertical on right front fender

1.3 Transmission

1.3.1 *Clutch (travel and power take-off/travel alone)*

- Make/Model/Type:	Caterpillar, wet disc, integral with transmission, oil cooled
- Number of plates:	6
- Diameter of plates:	215 mm
- Method of operation:	Hydraulic, pedal actuated

1.3.2 *Gear box*

- Make/Model/Type:	Caterpillar, direct drive, full powershift transmission
- Description:	Four rotating countershaft clutches and the four stationary planetary clutches

1.3.2 *Gear box*

- Make/Model/Type: Caterpillar, direct drive, full powershift transmission
- Description: Four rotating countershaft clutches and the four stationary planetary clutches

	Forward	Reverse
Number of gears	10	2
Number of ranges/groups	All gears accessible with use of single hand lever.	All gears accessible with use of single hand lever.
Total of arrangements	1	1

- Available options: None

1.3.3 *Rear axle and final drives*

- Make/Model/Type: Caterpillar/outboard single reduction pinion and bull gear
- Differential lock
  - . Type: Not applicable
  - . Method of engagement:
  - . Method of disengagement:

1.3.4 *Front axle and final drives* Not applicable

1.3.5 *Total ratios and traveling speeds*

Gear No.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal traveling speed (*) at rated engine speed of 2100 min^{-1} (rev/min) km/h
1		93.66	4.5
2		65.34	6.4
3		53.05	7.9
4		46.39	9.0
5		40.45	10.4
6		37.01	11.3
7		32.37	13.0
8		28.22	14.9
9		20.81	20.2
10		14.52	28.9
1R		128.23	3.3
2R		55.37	7.6
(*) Calculated with a rear track dynamic radius of 526 mm.			

1.4 Power take-off

1.4.1 *Main power take-off*

- Type:	Independent
- Method of engagement:	Multiple wet clutch hydraulically actuated by lever, independent of main drive clutch
- Number of shafts:	1
- Method of changing power take-off shaft ends and speeds:	None

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 1000 min^{-1} (rev/min)

- Location:	Rear of tractor; center plane
- Diameter of power take-off shaft end:	45 mm
- Number of splines:	20, conforms to ISO 500:1991
- Height above ground:	746 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear-wheel axis:	382 mm
- PTO speed at rated engine speed:	1024 rev/min
- Engine speed at standard power take-off speed:	2050 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed):	2.05 to 1
- Power restriction:	Dependent on gear selection
- Maximum torque transmissible:	1898 Nm
- Direction of rotation (viewed from behind tractor):	Clockwise

1.4.2 Optional power take-off

N/A

1.5 Hydraulic power lift

- Make/Model/Type:	Caterpillar
- Type of hydraulic system:	Closed center; load sensing
- Type and number of cylinders (single or double-acting):	N/A
- Type of linkage lock for transport:	N/A
- Compensator Pressure Setting:	19.981 +/- 0.35 MPa margin pressure = 2.8 +/- 0.10 MPa
- Opening pressure of cylinder line relief valve (if fitted):	N/A
- Lift pump type:	Vickers/PVH63/Axial piston, pressure and flow compensated
- Transmission between pump and engine:	Gear drive from transmission
- Type and number of filters:	1 spin-on cartridge and screen in return line
- Site of oil reservoir:	Behind cab, left side
- Type, number and location of tapping points:	ISO-5675 standard couplings, 4 pairs located at rear of tractor
- Maximum volume of oil available to external cylinders:	40 l

1.6 Three point linkage

Not available on this model.

1.7 Swinging drawbar

- Type:	Oscillating
- Height above ground	
. Maximum:	440 mm
. Minimum:	
- Type of adjustment:	None
- Distance of hitch point from rear-wheel axis, horizontally:	882 mm
- Distance of hitch point from power take-off shaft end	
. Vertically:	306.5 mm
. Horizontally:	500 mm
- Lateral adjustment (centre of clevis)	
. Right hand	431 mm
. Left hand	431 mm
- Distance of pivot point from rear-wheel axis, horizontally:	730.5 mm
- Diameter of drawbar pin hole:	50 mm
- Maximum vertical permissible load:	22.2 kN

1.8 Trailer hitch

Not Available

1.9 Holed drawbar

Not available

1.10 Steering

- Make/Model/Type:	Caterpillar/Differential Steer
- Method of operation	
. Pump(s):	Sauer-Sundstrand piston pump and Rexroth motor, pilot activated valves, controlled by steering wheel
. Ram(s):	N/A
- Working pressure:	41.5 MPa

1.11 Brakes

1.11.1 *Service brake*

- Make/Model/Type: Caterpillar, multiple wet disc, oil cooled, hydraulically boosted, located in steering differential
- Method of operation: Manual pedal operated
- Trailer braking take-off : None

1.11.2 *Parking brake*

- Type: Caliper, dry disc
- Method of operation: Manual/mechanical, lever operated

1.12 Wheels

- Number N/A
  . Front:
  . Rear:
- Wheelbase: N/A
- Track width adjustment:

	Minimum	Maximum	Adjustment
	mm	mm	method
Rear	2286	2286	None

1.13 Protective structure

- Make/Model/Type: Caterpillar/136-5500/Cab
- Manufacturer's name and address: Caterpillar Inc.
  100 N.E. Adams
  Peoria, IL 61629 USA
- Protective device
  . Cab/frame/ rollguard/ other: Cab
  . Tiltable/not tiltable: Not tiltable
- OECD approval
  . Approval number: None. Certified to ISO 3449: 1992; ISO 3471: 1986
  . Date of approval:
  . Nos. of minor modification certificates, if any:

1.14 Seat

1.14.1 *Driver's seat*

- Make/Model/Type:	Sears/(Cat # 136-5411)/low profile
- Seat and steering wheel reversible:	No
- Type of suspension:	Air suspension
- Type of damping:	Air spring and adjustable oil shocks - 3 positions
- Range of adjustment	
. Longitudinally:	177.8 mm
. Vertically:	76 mm (in addition to 80 mm suspension)
- Safety Belt:	Yes

1.14.2 *Optional driver's seat(s)* — Not available

1.14.3 *Passenger seat*

- Location:	To the left of driver's seat
- Capacity (number):	1

1.15 Lighting

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1842	102 x 305	318
Rear Work Lights	3385	114 x 114	381, 597, 845
Front Work Lights	1457	114 x 114	1041, 1314
Rear Reflectors	1784	184 x 38	965
Rear Lights	1784	184 x 38	965
Stop Lights	1715	44 x 89	927

2. TEST CONDITIONS

2.1 Overall dimensions

	Length	Width		Height at top of	
		minimum	maximum	protective structure	exhaust pipe
	mm	mm	mm	mm	mm
Unballasted	6005	3048	3048	3400	3668
Ballasted	6473	3048	3048	3400	3668

2.2 Ground clearance (unballasted tractor): 378.3 mm

- Clearance-limiting part: Drawbar anchor point

2.3 Tractor mass

Mass (with cab)

	Unballasted		Ballasted	
	Without driver (kg)	With driver (kg)	Without driver (kg)	With driver (kg)
Total	16277	16352	17962	18037

	Number of weights	Weight mass (kg)	Liquid (kg)
Front Bracket	1	70	0
Front Weights	20	45	0
Rear Weights	13	46	0
Test Equipment	1	117	0

2.4 Track specifications

Track materials	Rubber covered steel cables
Track width and base	762 mm, 2721mm
Dynamic radius (rolling radius)	525.8 mm
Track support system	Four bogie axles with pneumatic suspension
Treadbars: Total per track Number per meter Bar length at top Bar width at top Bar height	 72 8.2 360 mm 40 mm 63 mm
Track length	8529 mm
Track ground contact length	2721 mm

2.5 Tyres and track width specifications

	Front	Rear
Tyres:	N/A	N/A
- dimensions		
- ply rating		
- type		
- maximum load (tyre manufacturer's)		
- maximum load (tractor manufacturer's)		
- inflation pressure (tyre manufacturer's)		
- dynamic radius index		
Chosen track width		

2.6 Fuel

- Type: Grade 2-D, in conformity with national standard.

- Density at 15°C: 0.846 g/cm^3

2.7 Oils and lubricants

2.7.1 *Capacity and change interval*

	Capacity	Oil change	Filter change
	L	H	H
Engine	26	250	250
Gear box	57	1000	500
Front axle	N/A	N/A	N/A
Rear axle	N/A	N/A	N/A
Final drive (front)	N/A	N/A	N/A
Final drive (rear)	216	1000	None
Hydraulic system (*)	68	1000	500
Steering, common with final drive (rear)			

2.7.2 *Specifications (SAE, API, CCMC, ACEA, Mil.L, ISO)*

	Recommended	Used during test
Engine oil . Type: . Viscosity: . Classification:	Caterpillar fluids SAE 15W40 API-CF-4	Same
Transmission oils . Type: . Viscosity: . Classification:	Caterpillar fluids SAE 10W TO-4	Same
Hydraulic fluid . Type: . Viscosity: . Classification:	Caterpillar fluids SAE 10W HYDO	Same
Steering oil . Type: . Viscosity: . Classification:	Caterpillar fluids SAE 10W HYDO	Same

2.7.3 *Grease*

- Number of lubrication points: 3

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

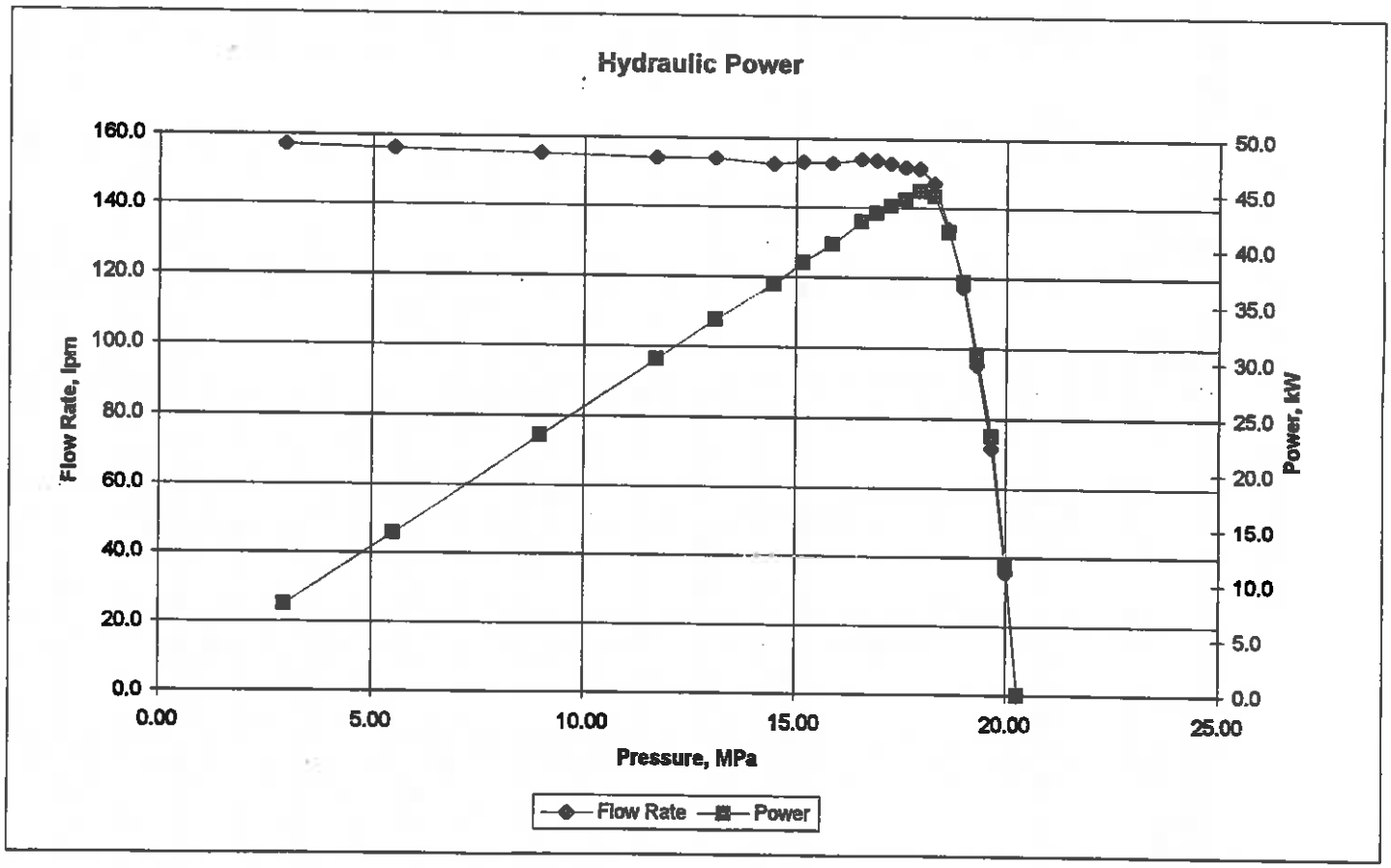
- Date and location of tests: 19-May-98 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

	Speed		Fuel consumption			Specific energy
Power	Engine	PTO	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
254.94	1800	877	53.78	63.54	211	4.01
3.1.2 POWER AT RATED ENGINE SPEED						
228.14	2101	1023	51.57	60.93	226	3.74
3.1.3 STANDARD POWER TAKE-OFF SPEED						
228.44	2053	1000	51.08	60.35	224	3.79
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maxiimum power at rated engine speed						
228.14	2101	1023	51.57	60.93	226	3.74
3.1.4.2 85% of torque obtained in 3.1.4.1						
199.21	2158	1051	47.22	55.79	237	3.57
3.1.4.3 75% of torque defined in 3.1.4.2						
154.58	2230	1086	39.73	46.95	257	3.29
3.1.4.4 50% of torque defined in 3.1.4.2						
106.32	2302	1121	32.11	37.95	302	2.80
3.1.4.5 25% of torque defined in 3.1.4.2						
52.52	2302	1121	22.86	27.01	435	1.94
1.4.6 unloaded						
0.84	2302	1121	14.29	16.88	17099	0.05
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED						
3.1.5.1 the torque corresponding to maximum power						
228.44	2053	1000	51.08	60.35	224	3.79
3.1.5.2 85% of torque obtained in 3.1.5.1						
201.06	2131	1038	47.22	55.79	235	3.60
3.1.5.3 75% of torque defined in 3.1.5.2						
153.06	2159	1051	39.19	46.31	256	3.31
3.1.5.4 50% of torque defined in 3.1.5.2						
103.81	2192	1067	30.48	36.02	294	2.88
3.1.5.5 25% of torque defined in 3.1.5.2						
52.50	2223	1082	21.91	25.89	417	2.03
3.1.5.6 unloaded						
0.78	2254	1097	13.61	16.08	17474	0.05

- No load maximum engine speed: 2302 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 1037 Nm
  - At 2-hour test 1352 Nm
- Maximum torque (equivalent crankshaft): 1483 Nm
  (engine speed: 1401 rev/min)

Mean atmospheric conditions:		
Dry bulb	25	°C
Pressure	97.7	kPa
Relative Humidity	67	%
Maximum temperatures:		
Coolant	88	°C
Engine oil	108	°C
Fuel	53	°C
Engine air intake	44	°C

Date of Test: 22-May-98			
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:			
20.27 MPa			
2940 psig			
II. Pump delivery rate at minimum pressure and rated engine speed:			
157.1 l/min			
41.5 gpm			
III. Flow rate, pressure, power:			
90% of relief valve setting			
147.3 l/min	18.27 MPa	44.8 kW	
38.9 gpm	*2650 psig*	60.1 *hp*	
Maximum hydraulic power:			
151.4 l/min	17.93 MPa	45.2 kW	
40.0 gpm	*2600 psig*	*60.7 hp*	
IV. Hydraulic fluid temperature at flow meter:			
'67.6 °C			
154 °F			
This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.			



3.3 DRAWBAR POWER TEST (Rubber Track Laying - Unballasted tractor, 1900 rev/min)

OECD Drawbar Data (SI)

Date of tests: 26-May-98 | Fuel density 0.846 kg/l
Type of track: Concrete | Test number 1751

Gear	Power kW	Pull kN	Speed km/h	Engine speed rev/min	Slip	SFC kg/kW.h	SFE kW.h/l	Temperature, °C Fuel	Coolant	Oil	Dry	Wet	Rel hum-idity	Baro. Pres kPa
I. Maximum Power (unballasted, trk at 1900 rev/min)						Tire pressure:	trk	kPa, rear	trk	kPa, front		Drawbar height:	470 mm	
1	168.86	156.20	3.89	2119	15%	0.297	2.85	51	87	109	18	17	95%	97.09
2	212.59	138.40	5.53	1912	6%	0.252	3.35	50	88	109	18	18	95%	97.12
3	243.79	127.39	6.89	1899	5%	0.244	3.46	51	88	110	20	18	86%	97.12
4	270.13	122.54	7.94	1900	4%	0.245	3.46	51	88	112	21	19	86%	97.16
5	272.46	106.29	9.23	1898	2%	0.243	3.48	52	88	113	20	18	86%	97.16
6	271.20	96.21	10.15	1902	2%	0.244	3.46	51	88	113	21	18	81%	97.16
7	271.25	83.95	11.63	1898	2%	0.243	3.48	51	88	113	21	19	86%	97.16
8	272.26	73.11	13.41	1902	1%	0.242	3.50	51	88	113	21	19	82%	97.16
II. Part loads (unballasted, track)														
II.1 in selected gear at maximum power at rated engine speed.														
5	244.39	85.60	10.28	2097	2%	0.252	3.36	51	88	112	20	18	86%	97.16
II.1.1 75% of pull at maximum power at rated engine speed														
5	190.65	64.06	10.71	2175	1%	0.267	3.17	49	87	110	21	18	82%	97.05
II.1.2 50% of pull at maximum power at rated engine speed														
5	131.57	42.72	11.09	2243	1%	0.306	2.77	50	87	109	21	18	77%	97.05
II.1.3 higher gear at reduced engine speed, same pull and travel speed as II.1.1														
6	190.44	64.19	10.68	1984	1%	0.255	3.32	50	87	110	21	18	77%	97.09
II.1.4 higher gear at reduced engine speed, same pull and travel speed as II.1.2														
6	131.41	42.85	11.04	2044	1%	0.295	2.87	50	87	108	21	18	77%	97.05
II.1.5 higher gear at reduced engine speed, same pull and travel speed as II.1.3														
7	190.57	64.26	10.68	1735	1%	0.243	3.48	50	88	109	21	18	77%	97.05
II.1.6 higher gear at reduced engine speed, same pull and travel speed as II.1.4														
7	131.60	42.59	11.12	1801	1%	0.272	3.12	49	87	108	21	18	77%	97.05
II.2 in selected gear nearest to 7.5 km/h at rated engine speed.														
3	223.10	103.01	7.80	2099	2%	0.253	3.34	51	87	110	19	18	90%	97.12
II.2.1 75% of pull at maximum power at rated engine speed														
3	175.37	77.40	8.16	2178	1%	0.267	3.17	49	87	109	22	19	82%	97.12
II.2.2 50% of pull at maximum power at rated engine speed														
3	121.54	51.58	8.48	2254	1%	0.311	2.73	51	87	109	21	19	82%	97.09
II.2.3 higher gear at reduced engine speed, same pull and travel speed as II.2.1														
4	175.59	77.16	8.19	1915	2%	0.250	3.39	50	87	109	22	19	78%	97.12
II.2.4 higher gear at reduced engine speed, same pull and travel speed as II.2.2														
4	121.43	51.67	8.46	1966	1%	0.283	2.99	49	87	107	21	18	82%	97.05
II.2.5 higher gear at reduced engine speed, same pull and travel speed as II.2.3														
5	175.33	77.44	8.15	1661	2%	0.240	3.53	49	87	109	21	19	82%	97.09
II.2.6 higher gear at reduced engine speed, same pull and travel speed as II.2.4														
5	121.52	51.59	8.48	1718	1%	0.268	3.16	49	87	107	21	18	82%	97.05

3.3.1 DRAWBAR POWER TEST (Rubber Track Laying - Unballasted tractor, 1900 rev/min)

OECD Drawbar Data (US)

Date of tests: 26-May-98				Fuel density	7.063 lb/gal									
Type of track: Concrete				Test number	1751									
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, °F					Rel hum-idity	Baro. Pres in Hg
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		
I. Maximum Power (unballasted, trk at 1900 rev/min)						Tire pressure:	trk	psig, rear	trk	psig, front		Drawbar height:	18.5 in	
1	226.44	35115	2.42	2119	15%	0.488	14.46	124	189	228	64	63	95%	28.67
2	285.09	31113	3.44	1912	6%	0.415	17.02	122	190	229	65	64	95%	28.68
3	326.93	28639	4.28	1899	5%	0.402	17.58	124	190	230	68	65	86%	28.68
4	362.25	27548	4.93	1900	4%	0.402	17.55	125	191	234	69	66	86%	28.69
5	365.38	23896	5.73	1898	2%	0.399	17.68	125	191	236	68	65	86%	28.69
6	363.68	21629	6.31	1902	2%	0.402	17.57	124	191	235	69	65	81%	28.69
7	363.75	18874	7.23	1898	2%	0.400	17.67	124	191	235	69	66	86%	28.69
8	365.10	16436	8.33	1902	1%	0.398	17.77	124	191	235	70	66	82%	28.69
II. Part loads (unballasted,track)														
II.1 in selected gear at maximum power at rated engine speed.														
5	327.74	19244	6.39	2097	2%	0.415	17.03	125	190	234	68	65	86%	28.69
II.1.1 75% of pull at maximum power at rated engine speed														
5	255.66	14401	6.66	2175	1%	0.439	16.10	121	189	231	69	65	82%	28.66
II.1.2 50% of pull at maximum power at rated engine speed														
5	176.44	9604	6.89	2243	1%	0.503	14.04	123	188	229	70	65	77%	28.66
II.1.3higher gear at reduced engine speed, same pull and travel speed as II.1.1														
6	255.38	14430	6.64	1984	1%	0.419	16.88	123	189	230	70	65	77%	28.67
II.1.4 higher gear at reduced engine speed, same pull and travel speed as II.1.2														
6	176.23	9634	6.86	2044	1%	0.485	14.56	122	188	226	70	65	77%	28.66
II.1.5 higher gear at reduced engine speed, same pull and travel speed as II.1.3														
7	255.56	14446	6.63	1735	1%	0.400	17.65	122	190	229	70	65	77%	28.66
II.1.6 higher gear at reduced engine speed, same pull and travel speed as II.1.4														
7	176.48	9576	6.91	1801	1%	0.447	15.81	121	189	226	70	65	77%	28.66
II.2 in selected gear nearest to 4.6 mph at rated engine speed.														
3	299.18	23159	4.84	2099	2%	0.416	16.96	124	189	231	66	64	90%	28.68
II.2.1 75% of pull at maximum power at rated engine speed														
3	235.17	17401	5.07	2178	1%	0.439	16.08	121	189	229	71	67	82%	28.68
II.2.2 50% of pull at maximum power at rated engine speed														
3	162.98	11597	5.27	2254	1%	0.511	13.83	123	188	228	70	66	82%	28.67
II.2.3 higher gear at reduced engine speed, same pull and travel speed as II.2.1														
4	235.47	17347	5.09	1915	2%	0.411	17.19	123	189	229	71	66	78%	28.68
II.2.4 higher gear at reduced engine speed, same pull and travel speed as II.2.2														
4	162.85	11616	5.26	1966	1%	0.465	15.18	120	188	225	69	65	82%	28.66
II.2.5 higher gear at reduced engine speed, same pull and travel speed as II.2.3														
5	235.12	17409	5.06	1661	2%	0.395	17.90	121	189	228	70	66	82%	28.67
II.2.6 higher gear at reduced engine speed, same pull and travel speed as II.2.4														
5	162.96	11598	5.27	1718	1%	0.440	16.04	120	189	225	69	65	82%	28.66

4.1 DRAWBAR POWER TEST (Rubber Track Laying - Unballasted tractor, 2100 rev/min)

OECD Drawbar Data (SI)

Date of tests: 26-May-98				Fuel density	0.846 kg/l									
Type of track: Concrete				Test number	1751									
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, C					Rel hum-idity	Baro. Pres kPa
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet		
I. Maximum Power (unballasted at 2100 rev/min)						Tire pressure:	trk	kPa, rear	trk	kPa, front	Drawbar height:		470 mm	
1	170.93	156.58	3.93	2118	14%	0.295	2.87	51	87	109	18	17	95%	97.09
2	197.25	112.83	6.29	2100	3%	0.262	3.23	49	87	110	18	18	95%	97.12
3	223.10	103.01	7.80	2099	2%	0.253	3.34	51	87	110	19	18	90%	97.12
4	245.22	98.90	8.93	2098	2%	0.251	3.37	52	88	112	20	18	86%	97.12
5	244.39	85.60	10.28	2097	2%	0.252	3.36	51	88	112	20	18	86%	97.16
6	242.30	77.50	11.26	2096	1%	0.254	3.33	50	88	112	20	18	86%	97.16
7	241.45	67.32	12.91	2099	1%	0.255	3.31	51	87	113	21	19	86%	97.16
8	238.41	57.86	14.83	2098	1%	0.256	3.30	52	87	113	22	19	82%	97.16

OECD Drawbar Data (US)

Date of tests: 26-May-98				Fuel density	7.063 lb/gal									
Type of track: Concrete				Test number	1751									
Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, F					Rel hum-idity	Baro. Pres in Hg
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		
I. Maximum Power (unballasted at 2100 rev/min)						Tire pressure:	trk	psig, rear	trk	psig, front	Drawbar height:		18.5 in	
1	229.22	35202	2.44	2118	14%	0.484	14.58	124	189	228	64	63	95%	28.67
2	264.52	25366	3.91	2100	3%	0.431	16.39	120	189	230	65	64	95%	28.68
3	299.18	23159	4.84	2099	2%	0.416	16.96	124	189	231	66	64	90%	28.68
4	328.84	22234	5.55	2098	2%	0.413	17.09	125	190	233	68	65	86%	28.68
5	327.74	19244	6.39	2097	2%	0.415	17.03	125	190	234	68	65	86%	28.69
6	324.93	17423	6.99	2096	1%	0.418	16.89	122	190	234	68	65	86%	28.69
7	323.79	15134	8.02	2099	1%	0.420	16.82	125	189	235	69	66	86%	28.69

4.2 DRAWBAR POWER TEST (Rubber Track Laying - Ballasted tractor, 1900 rev/min)

OECD Drawbar Data (SI)

Date of tests: 26-May-98 | Fuel density 0.846 kg/l
Type of track: Concrete | Test number 1751

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, °C					Rel hum-	Baro. Pres
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet	idity	kPa
I. Maximum Power (ballasted, trk at 1900 rev/min)						Tire pressure:	trk	kPa, rear	trk	kPa, front	Drawbar height:		470 mm	
1	185.10	174.85	3.81	2045	14%	0.280	3.03	50	87	109	14	13	89%	97.77
2	217.98	149.00	5.27	1801	5%	0.243	3.48	50	88	109	17	14	75%	97.80
3	247.87	127.47	7.00	1898	3%	0.240	3.53	51	88	111	18	15	76%	97.80
4	272.26	122.80	7.98	1899	4%	0.241	3.51	54	88	111	22	17	58%	97.77
5	275.93	106.88	9.29	1902	2%	0.240	3.53	52	88	113	22	18	69%	97.77
6	274.73	97.28	10.17	1899	2%	0.240	3.52	52	88	113	22	18	69%	97.77
7	274.83	84.72	11.68	1902	2%	0.240	3.53	53	88	112	22	18	66%	97.77
8	272.47	73.05	13.43	1902	1%	0.242	3.50	53	88	113	22	17	62%	97.77

OECD Drawbar Data (US)

Date of tests: 26-May-98 | Fuel density 7.063 lb/gal
Type of track: Concrete | Test number 1751

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, °F					Rel hum-	Baro. Pres
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet	idity	in Hg
I. Maximum Power (ballasted, trk at 1900 rev/min)						Tire pressure: trk		psig, rear	trk	psig, front	Drawbar height:		18.5 in	
1	248.22	39309	2.37	2045	14%	0.460	15.36	122	189	229	57	55	89%	28.87
2	292.32	33496	3.27	1801	5%	0.400	17.68	122	190	229	62	57	75%	28.88
3	332.40	28658	4.35	1898	3%	0.394	17.93	124	190	232	64	59	76%	28.88
4	365.11	27606	4.96	1899	4%	0.397	17.81	129	190	233	72	62	58%	28.87
5	370.03	24028	5.78	1902	2%	0.394	17.93	125	190	236	71	64	69%	28.87
6	368.42	21869	6.32	1899	2%	0.395	17.89	126	191	235	71	64	69%	28.87
7	368.56	19047	7.26	1902	2%	0.394	17.93	127	190	234	72	64	66%	28.87
8	365.38	16423	8.34	1902	1%	0.398	17.75	127	191	235	72	63	62%	28.87

4.3 DRAWBAR POWER TEST (Rubber Track Laying - Ballasted tractor,2100 rev/min)

OECD Drawbar Data (SI)

Date of tests: 26-May-98 — Fuel density 0.846 kg/l
Type of track: Concrete — Test number 1751

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, °C					Rel hum-	Baro. Pres
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet	idity	kPa
I. Maximum Power (ballasted, Crwl at 2100 rev/min)						Tire pressure:	trk	kPa, rear	trk	kPa, front		Drawbar height:	470 mm	
1	190.31	165.51	4.14	2100	9%	0.269	3.14	50	87	109	14	13	84%	97.77
2	201.06	114.01	6.35	2100	2%	0.257	3.30	50	87	109	16	13	79%	97.80
3	224.07	102.93	7.84	2099	2%	0.250	3.39	51	87	110	17	14	75%	97.77
4	244.99	98.34	8.97	2099	2%	0.250	3.39	51	87	112	21	17	69%	97.83
5	245.94	85.86	10.31	2098	2%	0.250	3.39	52	87	112	22	18	69%	97.77
6	243.32	77.57	11.29	2099	2%	0.252	3.36	52	88	112	22	18	69%	97.77
7	243.17	67.70	12.93	2099	1%	0.252	3.35	53	87	112	22	18	66%	97.77
8	241.00	58.45	14.84	2097	1%	0.255	3.31	52	87	112	22	17	62%	97.77

OECD Drawbar Data (US)

Date of tests: 26-May-98 — Fuel density 7.063 lb/gal
Type of track: Concrete — Test number 1751

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, °F					Rel hum-	Baro. Pres
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet	idity	in Hg
I. Maximum Power (ballasted, Crwl at 2100 rev/min)						Tire pressure:	TRK	psig, rear	TRK	psig, front		Drawbar height:	18.5 in	
1	255.21	37209	2.57	2100	9%	0.443	15.95	123	189	228	58	55	84%	28.87
2	269.62	25630	3.94	2100	2%	0.422	16.74	122	189	229	60	56	79%	28.88
3	300.49	23139	4.87	2099	2%	0.411	17.20	123	189	231	63	58	75%	28.87
4	328.54	22109	5.57	2099	2%	0.410	17.22	125	189	233	69	62	69%	28.89
5	329.81	19303	6.41	2098	2%	0.410	17.21	125	189	233	71	64	69%	28.87
6	326.30	17439	7.02	2099	2%	0.414	17.04	125	190	234	71	64	69%	28.87
7	326.10	15219	8.04	2099	1%	0.415	17.02	127	189	233	72	64	66%	28.87
8	323.19	13139	9.22	2097	1%	0.420	16.82	126	189	233	72	63	62%	28.87

Tabulated Drawbar Performance as per Code 2, Paragraph 3.3.3

	Unballasted
Maximum drawbar pull	156.20 kN
Slip	15 %
Corresponding to 7%	138.40 kN

	Ballasted
Maximum drawbar pull	174.85 kN
Slip	14 %
Corresponding to 7%	165.51 kN

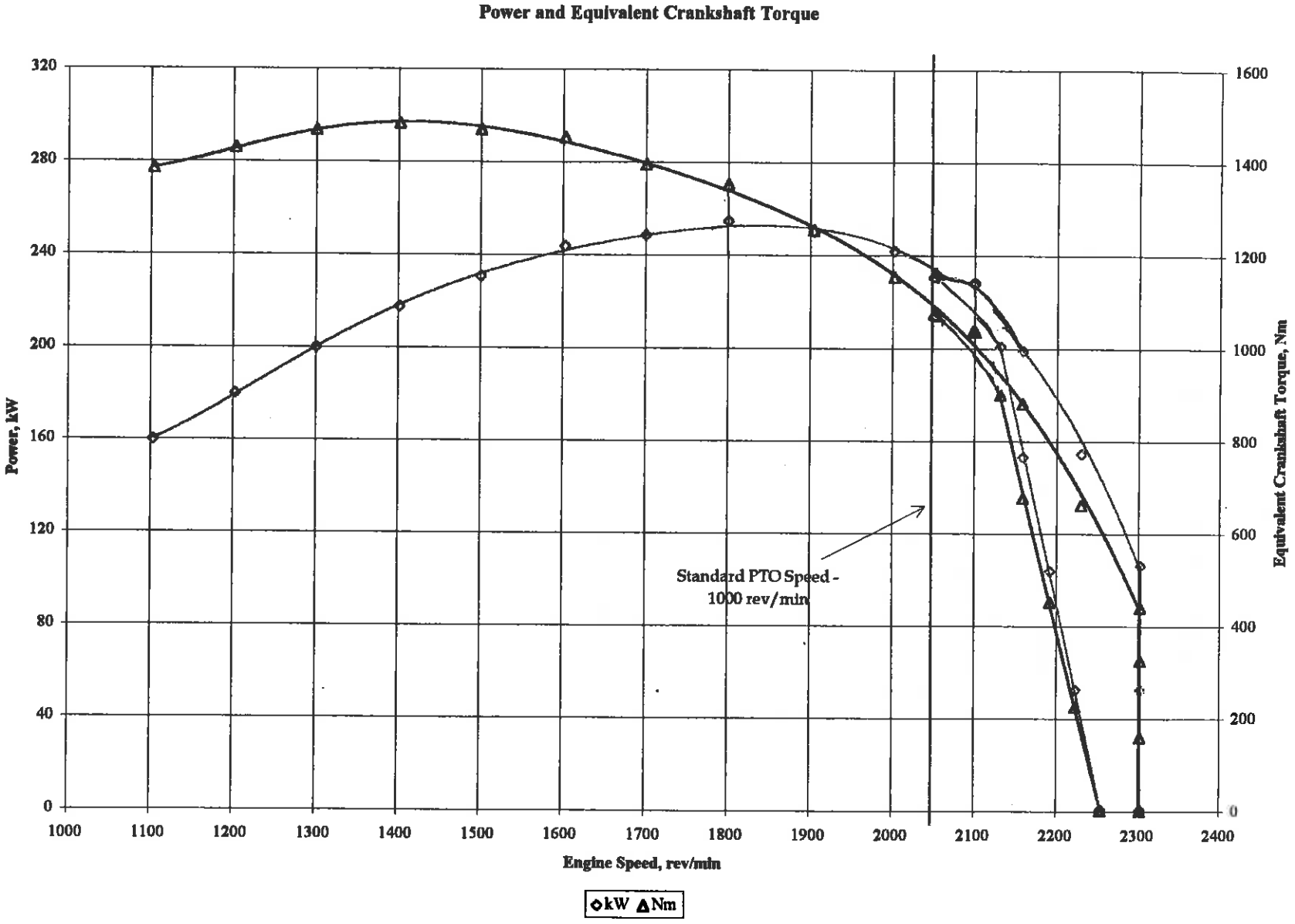
5. REPAIRS

None

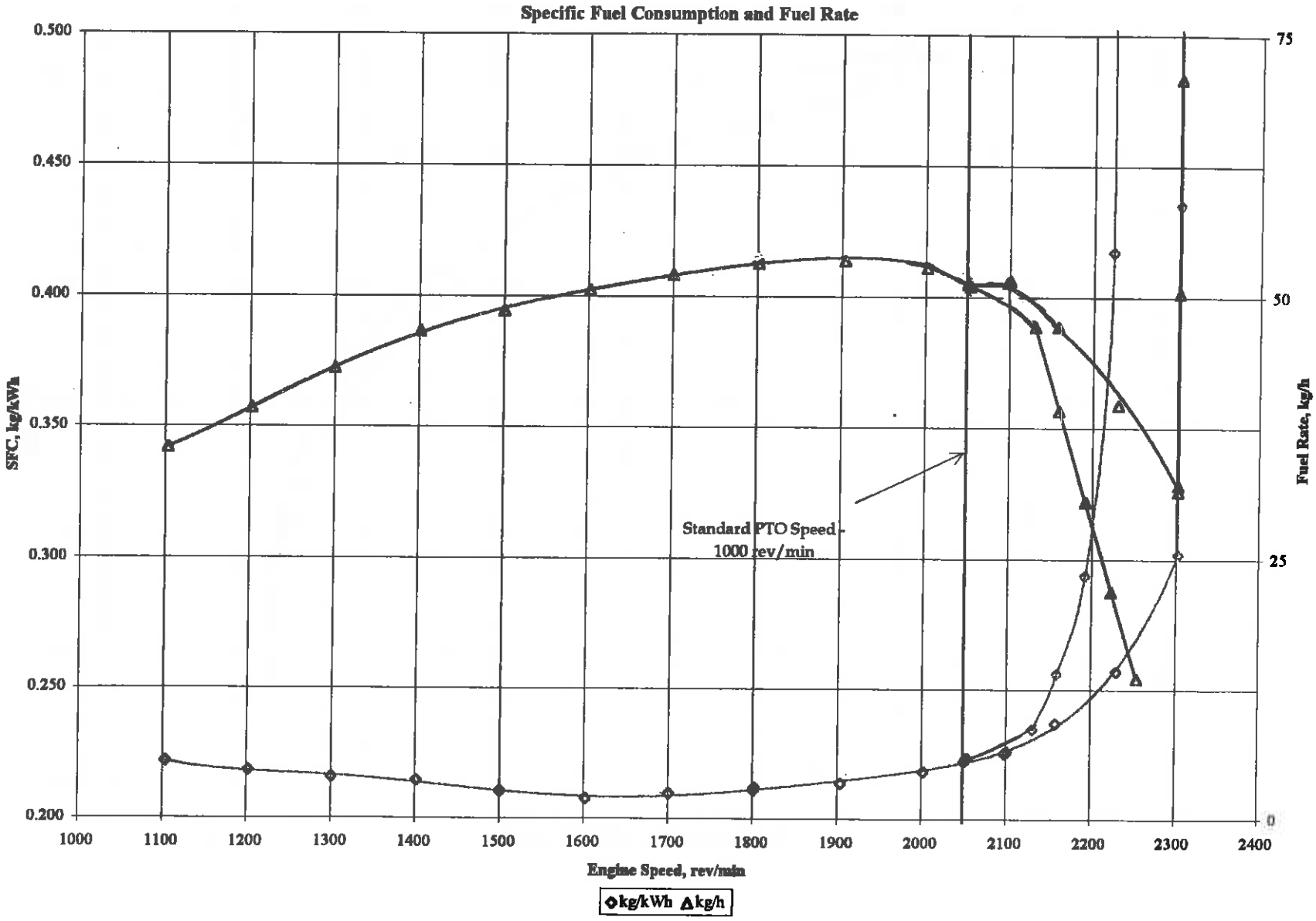
6. REMARKS

The performance values shown for the mid and high horsepower PTO results are not available to the user.

Caterpillar Challenger 95E Low Power

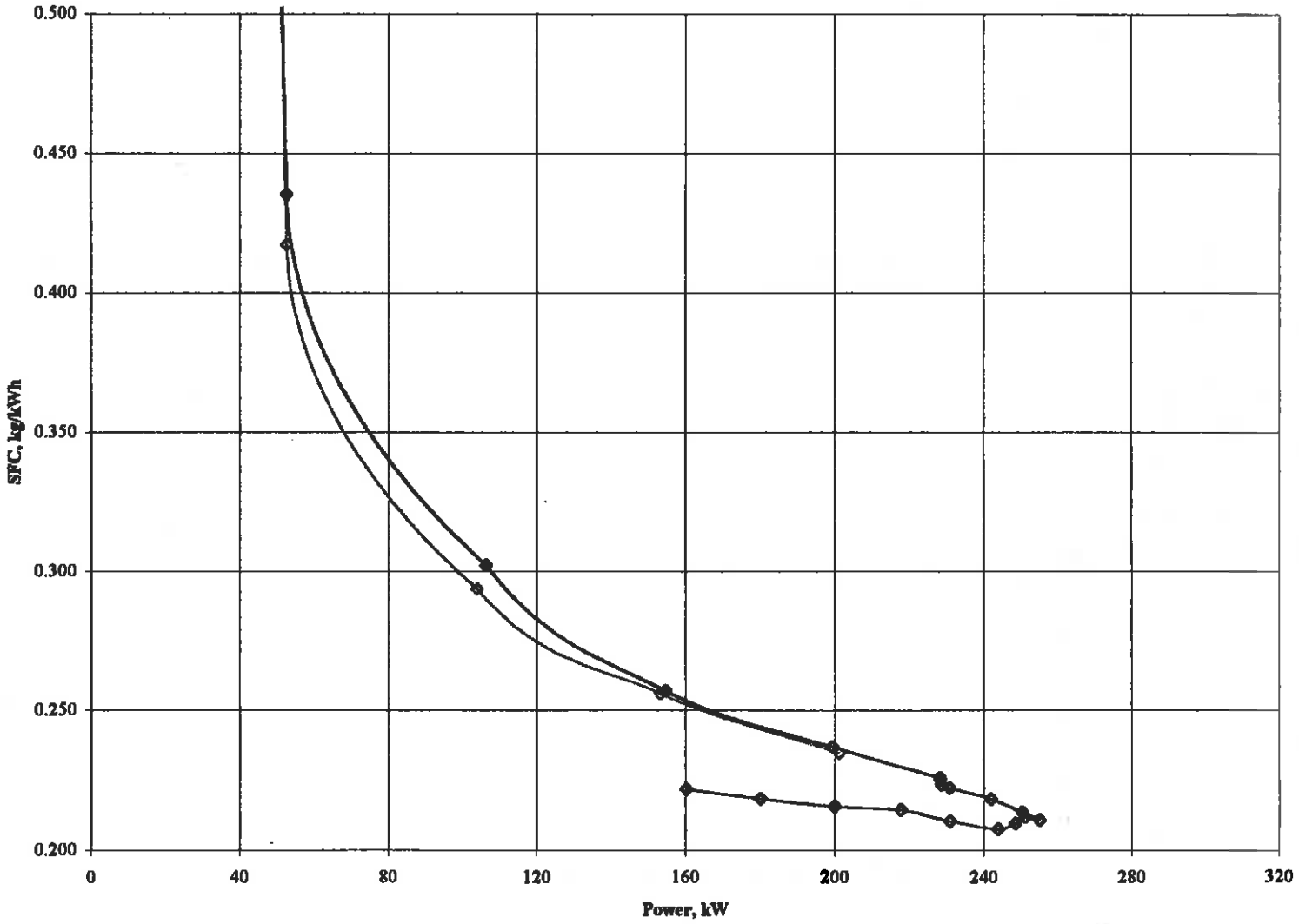


Caterpillar Challenger 95E Low Power



Caterpillar Challenger 95E Low Power

Power and Specific Fuel Consumption



6.1 MAIN POWER TAKE-OFF(Optional test - Medium power)

- Date and location of tests: 20-May-98 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench:

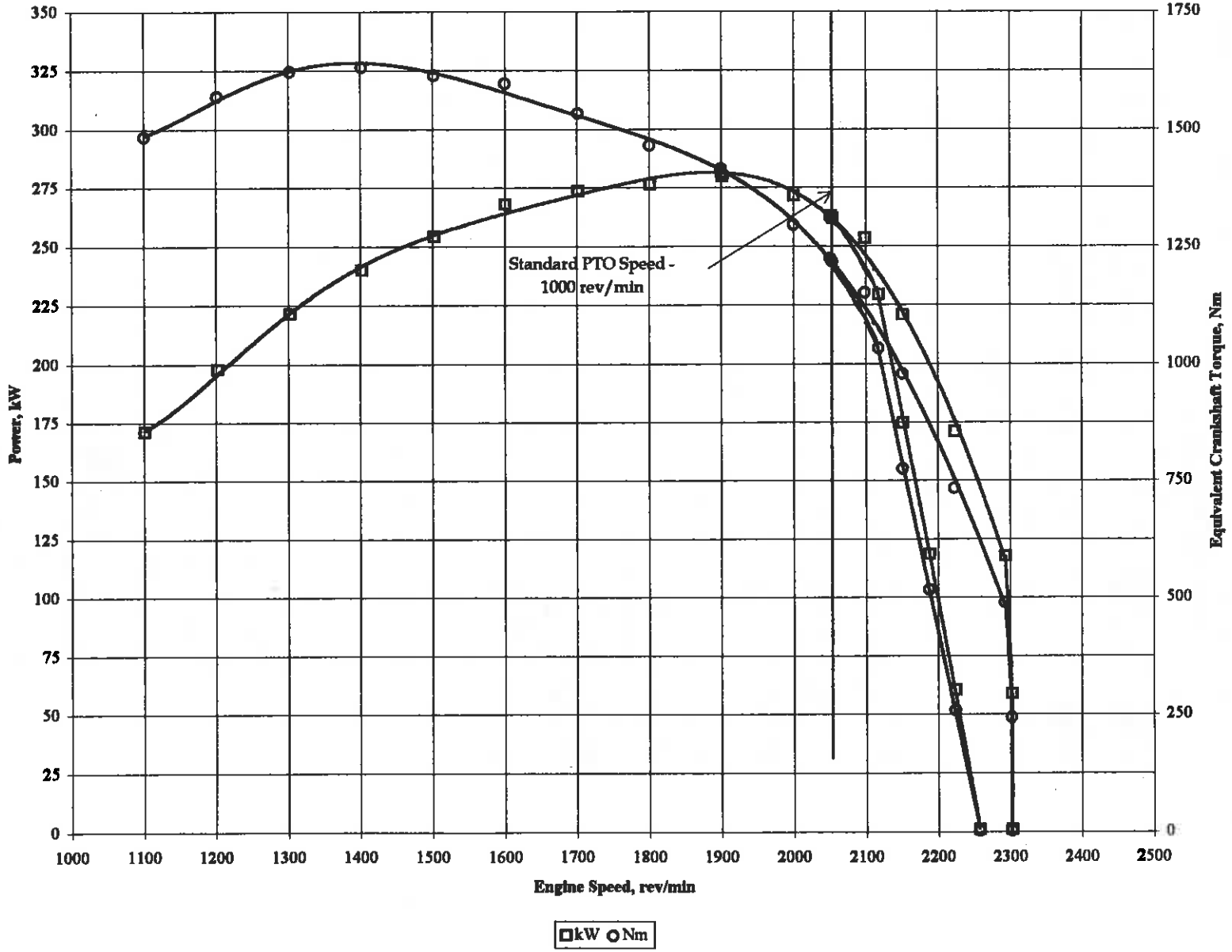
Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
281.61	1900	925	59.96	70.85	213	3.97
3.1.2 POWER AT RATED ENGINE SPEED						
253.12	2099	1022	56.11	66.30	222	3.82
3.1.3 STANDARD POWER TAKE-OFF SPEED						
261.70	2054	1000	57.16	67.54	218	3.87
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maxiimum power at rated engine speed						
253.12	2099	1022	56.11	66.30	222	3.82
3.1.4.2 85% of torque obtained in 3.1.4.1						
220.59	2151	1048	50.76	59.97	230	3.68
3.1.4.3 75% of torque defined in 3.1.4.2						
170.91	2223	1082	42.59	50.33	249	3.40
3.1.4.4 50% of torque defined in 3.1.4.2						
117.56	2293	1117	33.75	39.87	287	2.95
3.1.4.5 25% of torque defined in 3.1.4.2						
58.65	2302	1121	23.68	27.98	404	2.10
1.4.6 unloaded						
0.80	2302	1121	14.42	17.04	18125	0.05
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED						
3.1.5.1 the torque corresponding to maximum power						
261.70	2054	1000	57.16	67.54	218	3.87
3.1.5.2 85% of torque obtained in 3.1.5.1						
229.16	2118	1031	51.85	61.26	226	3.74
3.1.5.3 75% of torque defined in 3.1.5.2						
174.59	2151	1047	43.14	50.97	247	3.43
3.1.5.4 50% of torque defined in 3.1.5.2						
118.32	2188	1065	33.07	39.07	279	3.03
3.1.5.5 25% of torque defined in 3.1.5.2						
60.20	2224	1083	23.27	27.49	387	2.19
3.1.5.6 unloaded						
0.78	2257	1099	13.61	16.08	17442	0.05

- No load maximum engine speed: **2302** rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed **1152** Nm
  - At 2-hour test **1415** Nm
- Maximum torque (equivalent crankshaft): 1634 Nm
  (engine speed: 1402 rev/min)

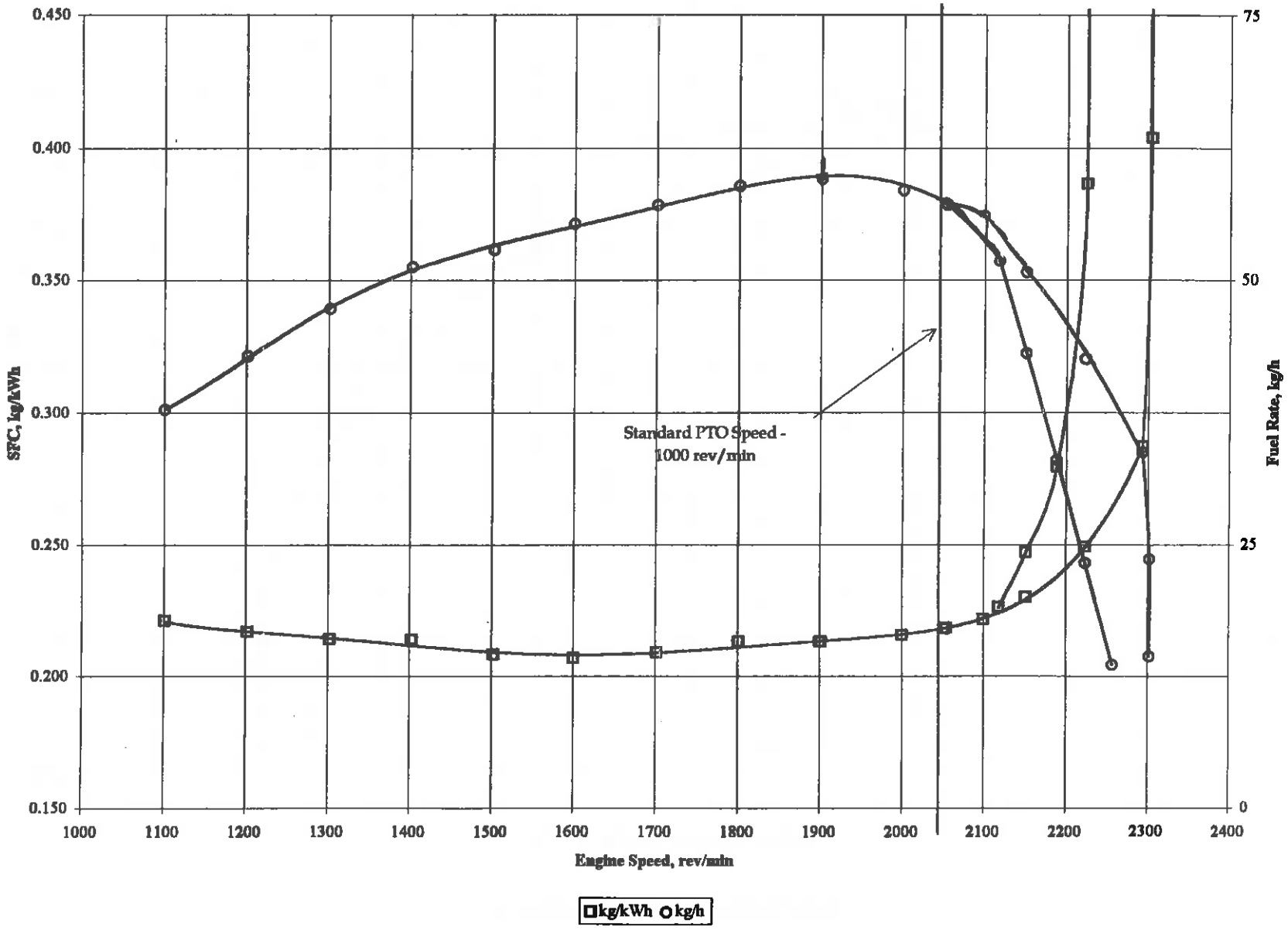
Mean atmospheric conditions:		
Dry bulb	24	°C
Pressure	97.9	kPa
Relative Humidity	74	%
Maximum temperatures:		
Coolant	88	°C
Engine oil	109	°C
Fuel	52	°C
Engine air intake	39	°C

Caterpillar Challenger 95E Medium Power

Power and Equivalent Crankshaft Torque

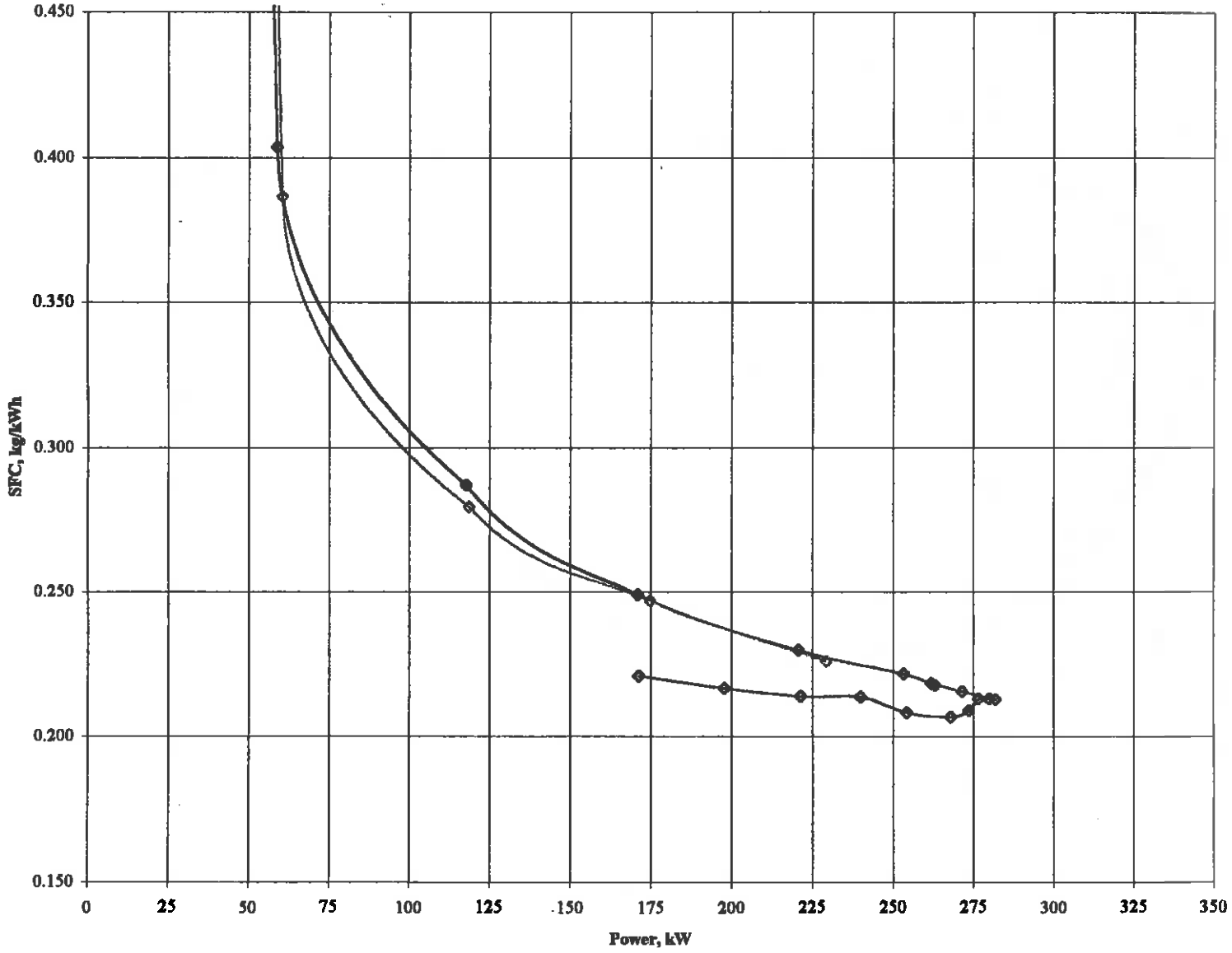


Specific Fuel Consumption and Fuel Rate



Caterpillar Challenger 95E Medium Power

Power and Specific Fuel Consumption



6.2 MAIN POWER TAKE-OFF(Optional Test - High Power)

- Date and location of tests: 21-May-98 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

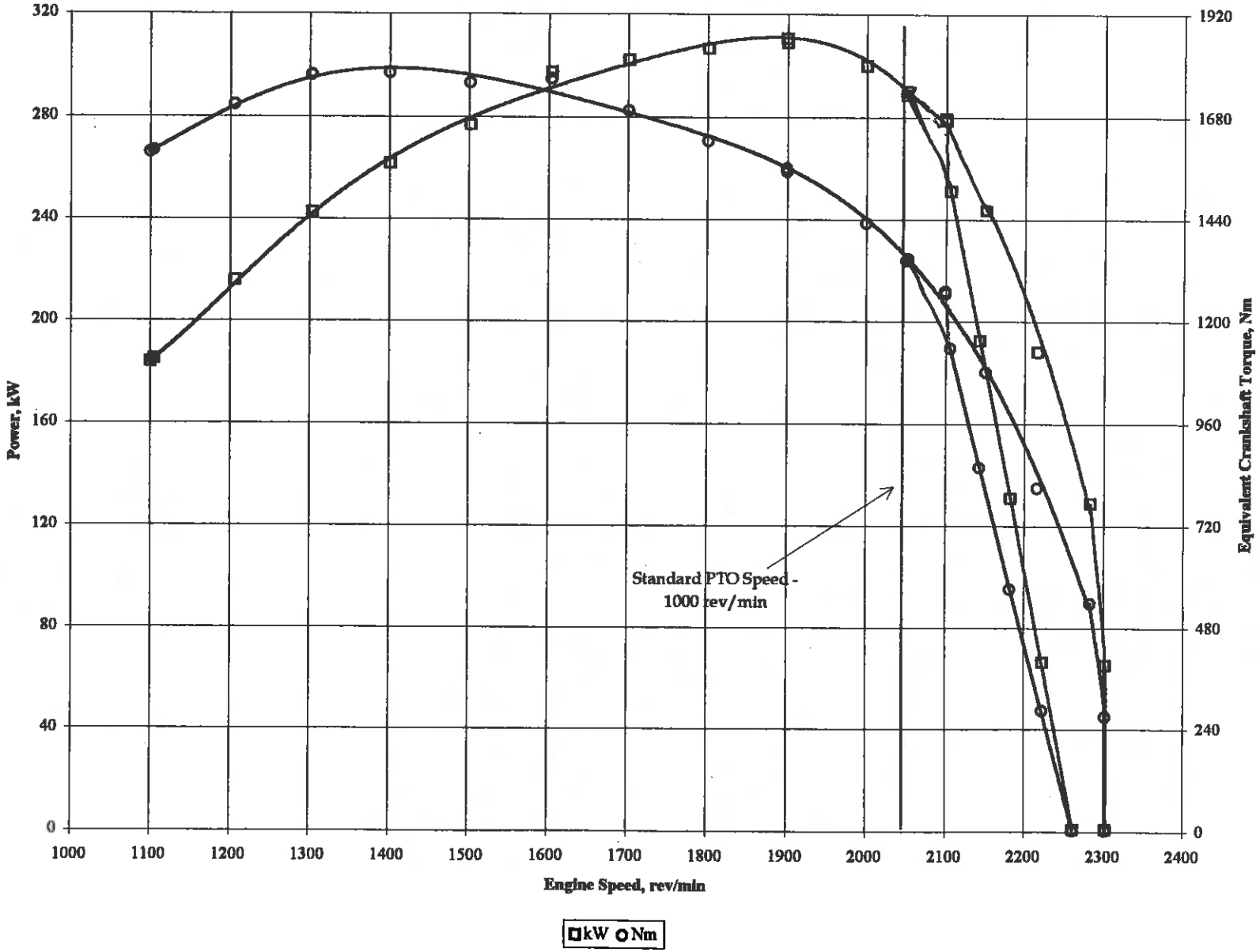
	Speed		Fuel consumption			Specific
Power	Engine	PTO	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
310.44	1899	924	66.51	78.58	214	3.95
3.1.2 POWER AT RATED ENGINE SPEED						
279.45	2100	1023	61.46	72.62	220	3.85
3.1.3 STANDARD POWER TAKE-OFF SPEED						
289.67	2053	1000	62.92	74.34	217	3.90
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maxiimum power at rated engine speed						
279.45	2100	1023	61.46	72.62	220	3.85
3.1.4.2 85% of torque obtained in 3.1.4.1						
243.54	2151	1048	54.57	64.47	224	3.78
3.1.4.3 75% of torque defined in 3.1.4.2						
188.05	2216	1079	45.31	53.54	241	3.51
3.1.4.4 50% of torque defined in 3.1.4.2						
128.67	2283	1112	35.65	42.13	277	3.05
3.1.4.5 25% of torque defined in 3.1.4.2						
65.10	2302	1121	24.90	29.42	383	2.21
1.4.6 unloaded						
0.80	2302	1121	14.15	16.72	17783	0.05
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED						
3.1.5.1 the torque corresponding to maximum power						
289.67	2053	1000	62.92	74.34	217	3.90
3.1.5.2 85% of torque obtained in 3.1.5.1						
250.92	2106	1026	55.66	65.76	222	3.82
3.1.5.3 75% of torque defined in 3.1.5.2						
192.47	2143	1044	45.72	54.02	238	3.56
3.1.5.4 50% of torque defined in 3.1.5.2						
130.80	2182	1062	35.24	41.64	269	3.14
3.1.5.5 25% of torque defined in 3.1.5.2						
66.37	2223	1082	24.22	28.62	365	2.32
3.1.5.6 unloaded						
0.78	2261	1101	13.61	16.08	17410	0.05

- No load maximum engine speed: 2302 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 1271 Nm
  - At 2-hour test 1561 Nm
- Maximum torque (equivalent crankshaft): 1783 Nm
  (engine speed: 1401 rev/min)

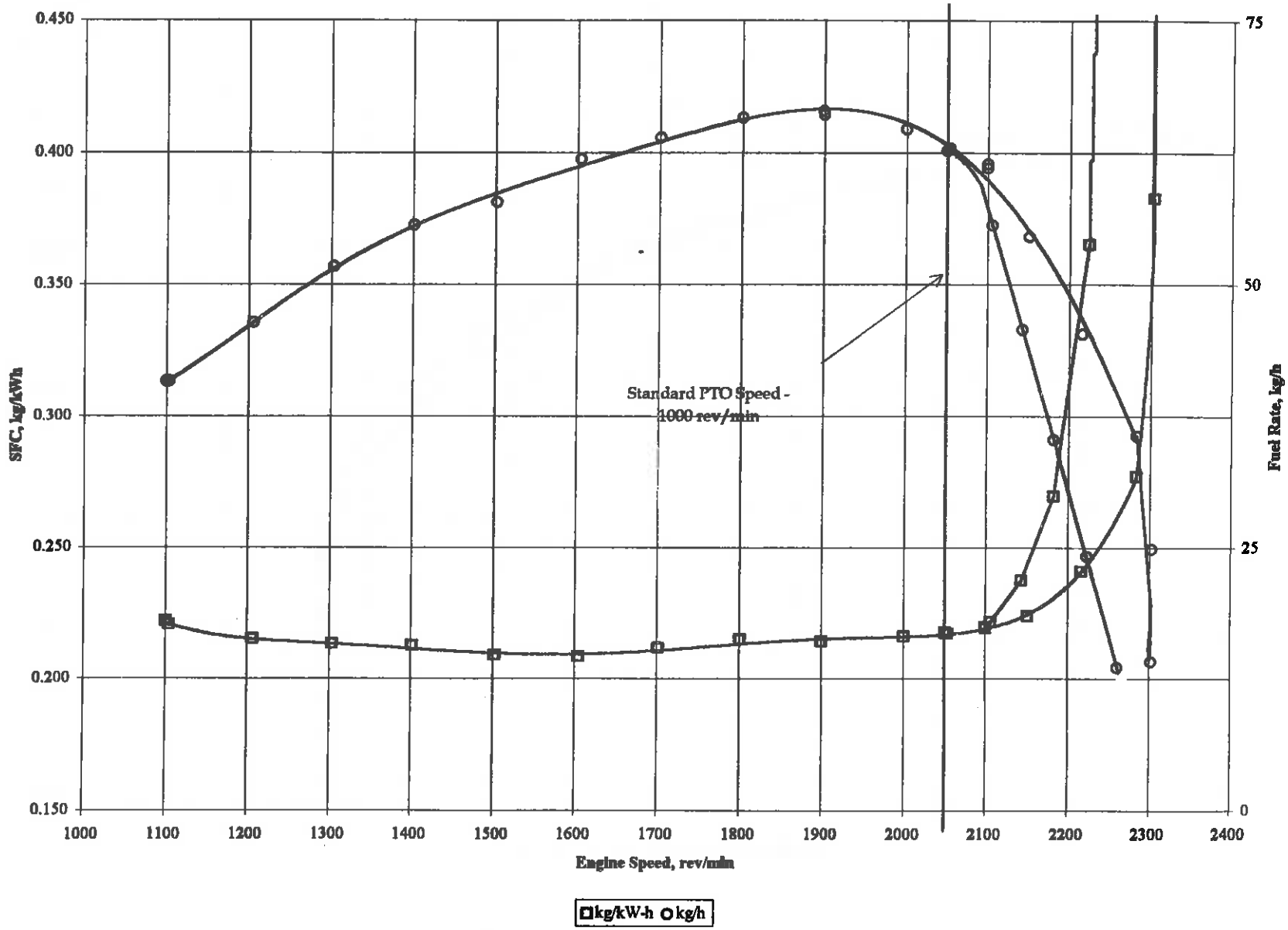
Mean atmospheric conditions:		
Dry bulb	24	°C
Pressure	97.8	kPa
Relative Humidity	82	%
Maximum temperatures:		
Coolant	88	°C
Engine oil	111	°C
Fuel	55	°C
Engine air intake	53	°C

Caterpillar Challenger 95E High Power

Power and Equivalent Crankshaft Torque

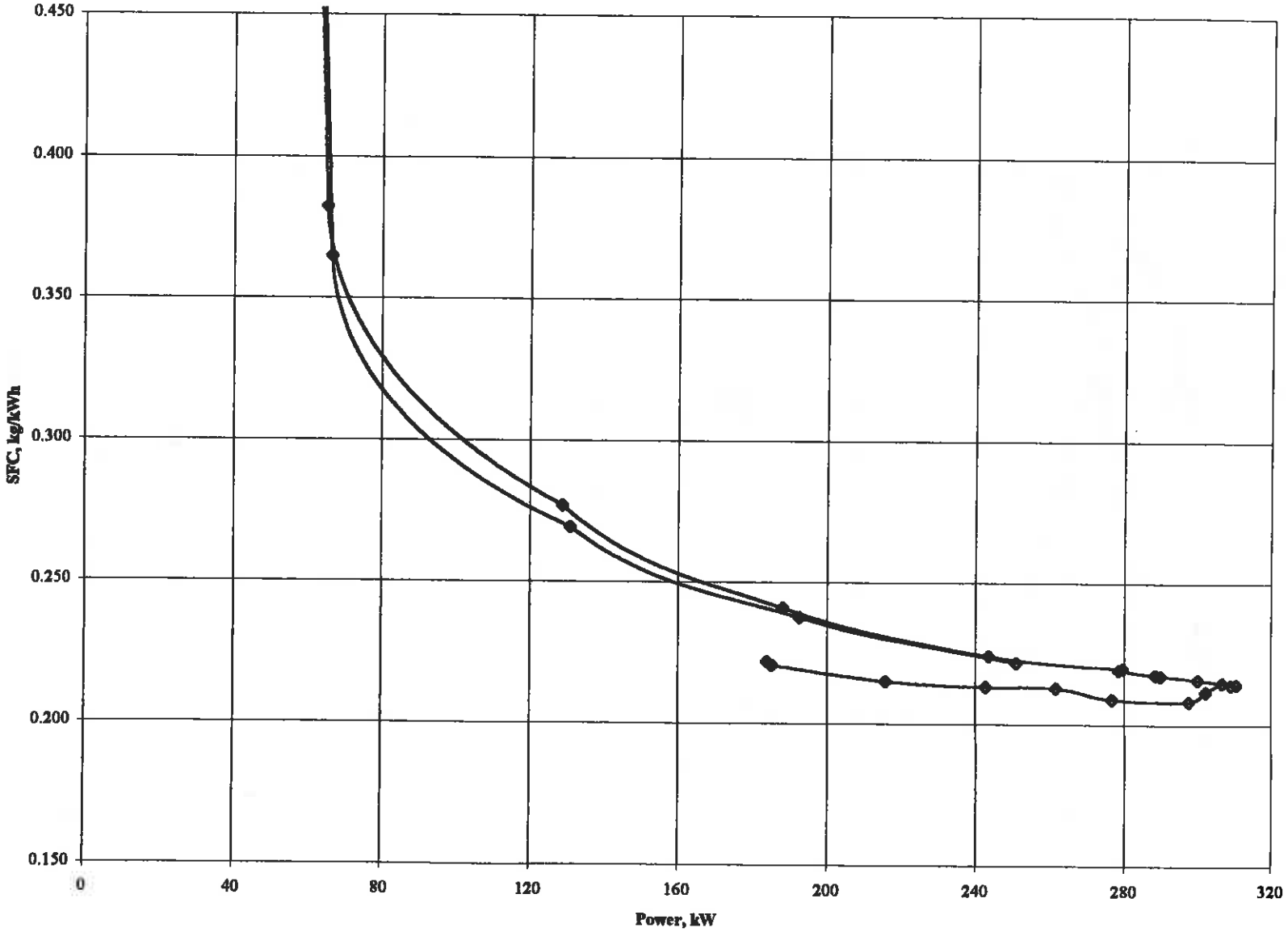


Specific Fuel Consumption and Fuel Rate



Caterpillar Challenger 95E High Power

Power and Specific Fuel Consumption



6.3 DRAWBAR POWER TEST (Rubber Track Laying - Ballasted Tractor)

OECD Drawbar Data (SI)

Date of tests: 29-May-98 | Fuel density: 0.846 kg/l
Type of track: Concrete | Test number 1751

Gear	Power kW	Pull kN	Speed km/h	Engine speed rev/min	Slip	SFC kg/kW.h	SFE kW.h/l	Temperature, °C Fuel	Coolant	Oil	Dry	Wet	Rel hum-idity	Baro. Pres kPa
2 Hours @ Max Power														
6	252.81	89.48	10.17	1900	2%	0.255	3.32	53	88	114	25	20	64%	97.83
I. Lug Run (100 RPM increments)						Tire pressure:	trk	kPa, rear	trk	kPa, front		Drawbar height:	470 mm	
6	240.43	76.70	11.29	2101	2%	0.256	3.31	54	87	112	26	21	61%	97.83
6	260.64	87.47	10.73	2001	2%	0.249	3.40	55	88	112	26	21	61%	97.83
6	270.10	95.74	10.16	1900	2%	0.245	3.45	55	88	112	26	21	61%	97.83
6	265.75	99.59	9.61	1803	2%	0.245	3.45	55	88	113	26	21	61%	97.83
6	261.76	104.24	9.04	1701	3%	0.242	3.50	55	88	113	26	21	61%	97.83
6	256.45	108.82	8.48	1601	3%	0.239	3.54	56	88	112	26	21	61%	97.83
6	241.86	109.28	7.97	1505	3%	0.236	3.58	55	88	112	26	21	61%	97.83
6	229.38	111.55	7.40	1400	3%	0.237	3.57	56	89	112	26	21	61%	97.83
6	210.96	110.35	6.88	1301	4%	0.242	3.50	55	89	111	26	21	61%	97.83
II. Part loads (ballasted,track)														
II.1 in selected gear at maximum power at rated engine speed.														
6	240.43	76.70	11.29	2101	2%	0.256	3.31	54	87	112	26	21	61%	97.83
II.1.1 75% of pull at maximum power at rated engine speed														
6	188.79	57.91	11.74	2176	2%	0.269	3.14	55	87	110	27	21	61%	97.90
II.1.2 50% of pull at maximum power at rated engine speed														
6	129.62	38.52	12.11	2240	1%	0.313	2.70	55	86	109	27	21	58%	97.90

OECD Drawbar Data (US)

Date of tests: 29-May-98 | Fuel density: 7.063 lb/gal
Type of track: Concrete | Test number 1751

Gear	Power hp	Pull lb	Speed mph	Engine speed rev/min	Slip	SFC lb/hp.h	SFE hp.h/gal	Temperature, °F Fuel	Coolant	Oil	Dry	Wet	Rel hum-idity	Baro. Pres in Hg
2 Hours @ Max Power														
6	339.02	20117	6.32	1900	2%	0.419	16.87	128	190	237	77	68	64%	28.89
I. Lug Run (100 RPM increments)						Tire pressure:	trk	psig, rear	trk	psig, front		Drawbar height:	18.5 in	
6	322.42	17242	7.01	2101	2%	0.420	16.80	130	189	233	79	69	61%	28.89
6	349.53	19663	6.67	2001	2%	0.409	17.28	131	190	234	79	69	61%	28.89
6	362.22	21524	6.31	1900	2%	0.403	17.53	131	190	234	79	69	61%	28.89
6	356.38	22388	5.97	1803	2%	0.403	17.51	132	191	235	79	69	61%	28.89
6	351.03	23433	5.62	1701	3%	0.397	17.79	132	191	235	79	69	61%	28.89
6	343.90	24463	5.27	1601	3%	0.393	17.96	133	191	234	79	69	61%	28.89
6	324.34	24568	4.95	1505	3%	0.388	18.18	132	190	234	79	69	61%	28.89
6	307.61	25077	4.60	1400	3%	0.390	18.11	132	192	233	79	69	61%	28.89
6	282.90	24808	4.28	1301	4%	0.397	17.77	131	192	232	79	69	61%	28.89
II. Part loads (ballasted,track)														
II.1 in selected gear at maximum power at rated engine speed.														
6	322.42	17242	7.01	2101	2%	0.420	16.80	130	189	233	79	69	61%	28.89
II.1.1 75% of pull at maximum power at rated engine speed														
6	253.17	13020	7.29	2176	2%	0.443	15.96	131	188	230	80	70	61%	28.91
II.1.2 50% of pull at maximum power at rated engine speed														
6	173.82	8639	7.53	2240	1%	0.514	13.73	131	187	229	81	70	58%	28.91