SILSOE RESEARCH INSTITUTE
Wrest Park, Silsoe,
Bedford MK45 4HS

Report No: OECD/7066/0195
OECD Approval No: 1573 Restricted Code
Approval Date: 2 October 1995

Test in accordance with the OECD Restricted Standard Code for the Official Testing of Agricultural Tractors

Case International 4240AXL Four-Wheel Tractor (68 kW engine)



Manufactured by: J I Case (Europe) Limited
Wheatley Hall Road
Doncaster
DN2 4PG

Submitted for test by: The manufacturer

Report No: 771

Date: July 1995

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Tractor manufacturer's name and address:	J I Case (Europe) Limited Wheatley Hall Road Doncaster DN2 4PG
Location of tractor assembly:	As above
Submitted for test by:	As above
Selected for test by:	As above with the agreement of the testing station
Place of running in:	Doncaster
Duration of running in:	20 hours
Location of test:	Silsoe Research Institute Wrest Park Silsoe England

I. SPECIFICATION OF TRACTOR

TRACTOR

Make:	Case International
Model:	4240AXL
Type:	Four wheel drive unit construction
Serial No:	JJE0900025 (Prototype)
1st Serial No:	JJE0914309

ENGINE

Make:	J I Case Company, Neuss, Germany
Model:	DT268/68
Type:	4-stroke, turbocharged direct injection diesel
Serial No:	268 TT 2D 900 000 (upswept exhaust)
Ist Serial No:	268 TT 2D 900 000 (upswept exhaust) 268 TT 2D 300 000 to 399 999 (downswept exhaust)

Cylinders

Number/disposition:	4, vertical, in-line
Bore/stroke:	100.0 mm x 139.7 mm
Capacity:	4389 cm^3
Compression ratio:	16 : 1
Arrangement of valves:	Overhead
Cylinder liners:	Replaceable, wet

Supercharging

Make:	Garrett
Model:	Case part 1 967 070 C1
Type:	Exhaust driven
Pressure:	0.72 bar

Fuel system

Fuel feed system:	Feed pump incorporated in injection pump
Make, type and model of fuel filter:	Bosch double fuel filter with replaceable elements and water traps
Capacity of fuel tank:	112 l
Make, type and model of injection pump:	Bosch CR distributor type - Case part 191 963 A1
Serial No:	548066
Manufacturer's production setting of injection pump:	
. Flow rate	76.0 +/- 2 mm^3 per stroke at 1200 rpm pump speed for fuel 0.835/0.845 sg at 15° C
. Timing	12° before T.D.C. for 1 mm plunger lift.
Make, type and model of injectors:	Bosch DLLA 150 S 815
Injection pressure:	24.0 (+1.0) MPa

Governor

Make:	Bosch
Model:	Incorporated in injection pump
Type:	Mechanical
Governed range of engine speed:	700 to 2648 rev/min
Rated engine speed (Cut off):	2400 (+/- 36) rev/min

Air cleaner

Pre-cleaner:	
. Make	Coopers
. Type	Centrifugal
. Model	In main cleaner body
. Location of air intake	
Main cleaner:	
. Make	Coopers
. Type	Dry paper element
. Model	Case part 1536486 C (with elements 3 125 342 R & 3 125 255 R)
Options	Case parts 3 125 189 R 3 125 248 R
. Location of air intake	Under bonnnet forward of engine
Maintenance indicator:	Warning light on instrument panel

Lubrication system

Type of feed pump:	Forced feed from gear pump
Type of filter:	Mann spin-on full flow with replaceable cartridge and metal strainer sump
Number:	1

Cooling system

Type of coolant:	Water and antifreeze solution
Type of pump:	Impeller
Specification of fan:	Belt driven puller
Number of fan blades:	7
Fan diameter:	452 mm
Coolant capacity:	13.7 l
Type of temperature control:	Thermostat
System pressure:	70 kPa

Starting system

Make:	Magneti Marelli
Model:	M127
Type:	Electrical, pre-engaged, solenoid operated
Starter motor power rating:	2.8 kW
Cold starting aid:	Thermostart
Safety device:	The clutch pedal must be fully depressed to actuate the safety start switch.

Electrical system

Voltage:	12
Generator:	
. Make	Magneti Marelli
. Model	A127
. Type	Belt driven
. Power	65A at 6,000 rev/min
Batteries:	
. Rating	1, Case (Chloride or Exide) 90 Ah at 20-hour rating

Exhaust system

Make:	Nelson-Burgess
Model:	Case part 138162 A
Type:	Straight through
Location:	Vertical above bonnet on right-hand side
Height of outlet above ground:	2798 mm

TRANSMISSION TO WHEELS

Clutch

Make:	Rockford
Model:	Case part 85026 C3
Type:	Dry, for transmission only
Number of plates:	1
Diameter of plates:	300 mm
Method of operation:	Hydraulically by foot pedal

Gear box

Make:	Case IH
Model:	Doncaster
Type:	Mechanical synchromesh
Number of gears:	16 forward + 8 reverse
Available options:	Change of gear ratios, 8 forward + 4 reverse, 8 forward + 8 reverse shuttle, (16 forward + 8 reverse) including creeper

Rear axle final drives

Make:	Case IH
Model:	Doncaster
Type:	Crown wheel and pinion, with differential and epicyclic reduction gear final drives

Differential lock:
. Type — Mechanical
. Method of engagement — Pedal operated
. Method of disengagement — Self-disengaging

Front axle and final drives

Make: Carraro

Model: 707 S4 164

Type: Crown wheel and pinion, and epicyclic reduction gear final drives

Differential lock:
. Type — Self-locking
. Method of engagement
. Method of disengagement

Total ratios and travelling speeds

Gear	Group No	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed:* 2400 rev/min km/h
Forward			
1	LP1	336.195	2.0
2	LD1	278.790	2.42
3	LP2	190.911	3.53
4	LD2	158.281	4.26
5	LP3	118.028	5.71
6	LD3	97.855	6.88
7	LP4	82.198	8.20
8	LD4	68.149	9.89
9	HP1	87.721	7.68
10	HD1	72.728	9.26
11	HP2	49.803	13.53
12	HD2	41.291	16.32
13	HP3	30.790	21.88
14	HD3	25.527	26.39
15	HP4	21.443	31.42
16	HD4	17.778	37.90
Reverse			
1	P1	280.220	2.40
2	D1	232.325	2.90
3	P2	159.093	4.23
4	D2	131.901	5.11
5	P3	98.356	6.85
6	D3	81.545	8.26
7	P4	68.493	9.84
8	D4	56.791	11.86

L = Low range H = High range P = Power-shift D = Direct-drive

(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251/1-1984)

Number of revolutions of front wheels for one revolution of rear wheels: 1.407

POWER TAKE-OFF

Main power take-off

Type:	Independent
Method of engagement:	By hand lever lever
Number of shafts:	1 (2 speed shiftable)
Method of changing power take-off speeds:	Manual, lever selection

Clutch

Make:	Case IH
Model:	Doncaster
Type: clutch	Hydraulically engaging wet multi-plate
Number of plates:	5
Diameter of plates:	125 mm

Power take-off proportional to engine speed

540 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 to ISO 500/1991
Height above ground:	610
Distance from the median plane of the tractor:	0
Distance behind rear wheel axis:	435 mm
Pto speed at rated engine speed:	606 rev/min
Engine speed at standard power take-off speed:	2183 rev/min
Ratio of rotation speeds:	4.04:1
Power restriction and maximum torque:	ISO recommendation, 48 kW
Direction of rotation (viewed from behind tractor):	Clockwise

1000 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 to ISO 500/1991
Height above ground:	610 mm
Distance from the median plane of the tractor:	0
Distance behind rear-wheel axis:	435 mm
PTO speed at rated engine speed:	1096 re/min
Engine speed at standard power take-off speed:	2190 rev/min
Ratio of rotation speeds:	2.19048:1
Direction of rotation (viewed from behind tractor):	Clockwise

POWER LIFT

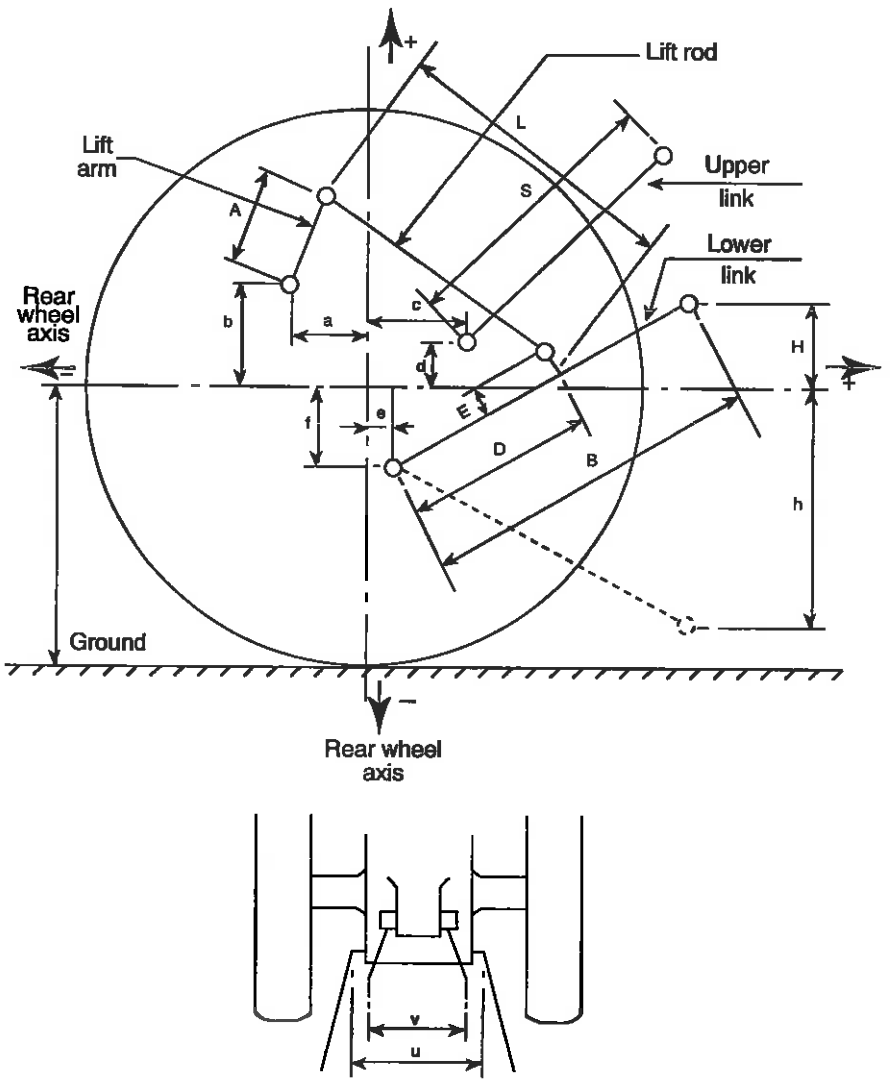
Make:	Case IH
Model:	Doncaster
Type:	Hydraulic, open centre system
Type and number of cylinders:	One internal single acting + one external single acting
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	17.2 MPa - 18.0 MPa
Opening pressure of cylinder safety valve:	18.6 MPa
Lift pump type:	Plessey, fixed delivery gear
Transmission between pump and engine:	Forward end of pto shaft, independent of main and pto clutches
Type and number of filters:	1 full flow filter to main pump and fine screen to transfer pump
Site of oil reservoir:	Integral with transmission housing
Type, number and location of tapping points:	None
Maximum volume of oil available to external cylinders:	13.6 l, 40.9 l with overfill

AUXILIARY HYDRAULIC SYSTEM

Make:	
Model:	Case IH
Type:	Doncaster
Relief valve pressure setting:	17.2 MPa - 18.0 MPa
Lift pump type:	Plessey, fixed delivery gear
Transmission between pump and engine:	Forward end of pto shaft, independent of main and pto clutches
Type and number of filters:	1 full flow filter to main pump and fine screen to transfer pump
Site of oil reservoir:	Integral with transmission housing
Type and number of tapping points:	3 on double acting auxiliary control valve
Maximum volume of oil available to external cylinders:	13.6 l, 40.9 l with overfill

THREE-POINT LINKAGE

Category:	2 to ISO 730-1:1990
Category adaptor:	None
Controls:	Draught and position control, floating position, top link sensing



LIFT TEST
Linkage geometry

Table 2.1

Dimensions of linkage when attached to the standard frame (ISO 730-1:1990 CAT 2)

			Dimensions and range	Setting used in test
Length of lift arms:		(A)	298 mm	298 mm
Length of lower links:		(B)	814 mm	814 mm
Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	66 mm 288 mm	66 mm 288 mm
Horizontal distance between the two lower link points:		(u)	460 mm	460 mm
Horizontal distance between the two lift arm end points:		(v)	525 mm	525 mm
Length of upper link:		(S)	584-774 mm	730 mm
Distance of upper link pivot point from rear wheel centre line:	horizontally: vertically:	(c) (d)	279 mm 186-226 mm	279 mm 226 mm
Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	165 mm 175 mm	165 mm 175 mm
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally: vertically:	(D) (E)	571 mm on central line	571 mm on central line
Length of lift rods:		(L)	680-735 mm	720 mm
Height of lower hitch points (*) relative to the rear wheel centre line, situated 745 mm above the ground level:				
- in low position		(h)	465-570 mm	546 mm
- in high position		(H)	95-175 mm	105 mm
Height of lower hitch points when locked in transport position (*):		Any height within lift range (Hydraulic Transport Lock)		

* Assuming r = tyre dynamic radius index of 745 mm ISO 4251/1-1992

SWINGING DRAWBAR

Type:		Clevis
Height above ground,	maximum:	489
	minimum:	379
Type of adjustment:		Inverting drawbar
Distance of hitch point from rear-wheel axis, horizontally:		720 mm, 770 mm
Distance of hitch point from power take-off shaft ends:		
. Vertically:		121 mm, 221 mm
. Horizontally:		320 mm, 370 mm
Lateral adjustment (centre of clevis):		
. Right-hand:		170 mm, 190 mm
. Left-hand:		170 mm, 190 mm
Distance of pivot point from rear axles horizontally:		50 mm forward
Vertical opening of clevis:		66 mm
Diameter of drawbar pin hole:		26 mm
Maximum vertical permissible load:		908 kg

TRAILER HITCH

Type:	None fitted

LINKAGE DRAWBAR

Type:	None fitted

FRONT TOWING HITCH

Type:	None fitted

STEERING

Make:	Case IH
Model:	Doncaster
Type:	Hydrostatic, steering wheel coupled to motor unit, power to unit from main hydraulic pump through priority valve/flow divider.
Method of operation:	
. Pump	Plessey, live
. Motor	Danfoss OSPC 100 OR
. Ram	Cararo double acting balanced
. Filter	As main hydraulics
Working pressure:	14.5 MPa

BRAKES

Service brake

Make:	Case IH
Model:	Doncaster
Type:	Oil immersed single disc, 1 per side
Method of operation:	Hydraulically actuated, independent or combined, pedal operated
Trailer braking take-off:	Optional

Parking brake

Type:	Mechan ical via linkage
Method of operation:	Hand lever with ratchet

WHEELS

Number:	4
. Front	2 steering and driving
. Rear	2 driving
Wheelbase:	2235 mm

Track width adjustment:

	Minimum, mm	Maximum, mm	Adjustment method
Front	1364	1824	By reversing wheels and offset lug rims
Rear	1425	1925	By reversing wheels and offset lug rims

PROTECTIVE STRUCTURE

Make:	Case IH
Model:	C85XL with revised mounts
Type:	Safety cab
Manufacturer's name and address:	Case IH, Croix, France
Protective device:	
. Rollguard	Safety cab
. Tiltable/Not tiltable	Non-tiltable
OECD approval number:	Case International 4240AXL (4WD) with seat Grammer DS85 H/90 AR, CSS 0195/86

DRIVER'S SEAT

Make/Model/Type:	Grammer DS 85 H / 90 AR
Type of suspension:	Spring
Type of damping:	Hydraulic
Range of adjustment:	
. Longitudinal	150 mm minimum
. Vertical	60 mm minimum

LIGHTING

Unrestricted beam angle of headlight in plan view: **110°**

	Height above ground to centre, mm	Size, mm	Distance from outside edge to median plane of tractor, mm
Headlights	1330	160 x 90	240
Sidelights	1470	90 x 40	730
Rear lights	1590	100 x 45	825
Axle reflectors	–	–	–
Cab reflectors	1505	90 x 47	820

II. TEST CONDITIONS

Overall dimensions

Length mm	Width		Height at top of	
	Minimum mm	Maximum mm	Protective structure mm	Exhaust pipe mm
3845 mm	1854	2354	2670	2798

Ground clearance (unballasted tractor) 315 mm

Clearance-limiting part: Drawbar clevis inverted

Tractor mass (with **safety cab**)

	Unballasted		Ballasted	
	Without driver kg	**With driver kg**	**Without driver kg**	**With driver kg**
Front	1366	1380	–	–
Rear	2114	2175	–	–
Total	3480	3555	–	–

Tyres and track width specification

	Front	Rear
Tyres . dimensions . ply rating . type	12.4 x 24 A8 Radial	16.9 x 34 A8 Radial
Maximum load (tyre manufacturer's), kg	1200	2015
Maximum load (tractor manufacturer's), kg	1200	2015
Inflation pressure (tyre manufacturer's), Bar	1.7	1.3
Dynamic radius index	540	745
Chosen track width (manufacturer's nominal)	1515	1530

Oils and lubrication

Capacity and change interval

	Capacity l	Oil change h	Filter change h
Engine	9.8	200	200
Front axle	5.0	800	None
Final drive (front)	0.6	800	None
Gearbox	36.5	800	200
Rear axle Hydraulic system) Final drives (rear)) Steering Brakes	Integral with gearbox		

Fuels and lubricants used in tests

Fuel

Type: Diesel oil with cetane index of 50.0 and kinematic viscosity of 3.246 cSt at 40°C within the specification limits of Class A12 British Standard 2869/1983.

Specific gravity: 0.8571 kg/l at 15°C

Oils	Recommended	Used during test
Engine oil		
Type:	SAE 15W/40	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Transmission oils		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Rear final drives		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Front differential and final drives		
Type:	SAE 85W-140EP	As recommended
Viscosity:	11.0 cSt at 100°C	
Classification:	MIL-L-2105-C	
Hydraulic brakes		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Hydraulic fluid		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Steering oil		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Recommended grease:	Consistency 2 lithium	As recommended
Number of lubrication points:	8	

III. TEST RESULTS

A. COMPULSORY TEST RESULTS

1. MAIN POWER TAKE-OFF (1000)

Date and location of tests: 5 May 1995
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
1.1 MAXIMUM POWER - TWO HOUR TEST						
65.0	2302	1051	18.10	21.12	278	3.08
1.2 POWER AT RATED ENGINE SPEED						
64.6	2398	1095	18.31	21.37	284	3.02
1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 10 rev/min)						
64.3	2189	1000	17.61	20.55	274	3.13
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
64.6	2398	1095	18.31	21.37	284	3.02
1.4.2 85% of the torque defined in 1.4.1						
55.3	2449	1118	16.64	19.42	301	2.85
1.4.3 75% of the torque defined in 1.4.2						
41.8	2470	1128	13.54	15.80	324	2.65
1.4.4 50% of the torque defined in 1.4.2						
28.1	2500	1142	10.89	12.71	387	2.21
1.4.5 25% of the torque defined in 1.4.2						
14.4	2540	1160	8.50	9.91	591	1.45
1.4.6 Unloaded						
0	2562	1170	5.75	6.71	--	--

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O.	Hourly kg/h	l/h	Specific g/kWh	
1.5	PART LOADS AT STANDARD POWER TAKE-OFF SPEEDS (1000 ± 10 rev/min)					
1.5.1	The torque corresponding to maximum power					
64.3	2189	1000	17.61	20.55	274	3.13
1.5.2	85% of the torque obtained in 1.5.1					
56.3	2257	1030	15.76	18.39	280	3.06
1.5.3	75% of the torque obtained in 1.5.2					
42.9	2292	1046	12.86	15.01	300	2.86
1.5.4	50% of the torque obtained in 1.5.2					
29.1	2329	1063	10.29	12.00	353	2.43
1.5.5	25% of the torque obtained in 1.5.2					
14.8	2378	1086	7.84	9.14	530	1.62
1.5.6	Unloaded					
0	2405	1098	5.16	6.02	--	--

No load, maximum engine speed: 2562 rev/min

Torque (equivalent crankshaft) at maximum power: 269.8 Nm

Torque (equivalent crankshaft) at rated power: 253.8 Nm

Maximum torque (equivalent crankshaft)
(engine speed 1600 rev/min): 315.9 Nm

Mean atmospheric conditions:

- Temperature 26°C
- Pressure 1019 m bar
- Relative humidity 22%

Maximum temperatures:

- Coolant 85°C
- Engine oil 114°C
- Fuel 59°C
- Engine air intake 26°C

2. HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 12 June 1995

2.1 Hydraulic power test

Sustained pressure with relief valve open: 17.2 MPa

Pump delivery rate at minimum pressure: 46.6 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	31.1	15.5	8.02
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	37.2	15.0	9.31

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid if different from 65 ± 5°C — °C

Opening pressure of the unloading valve: -- MPa

Closing pressure of the unloading valve: -- MPa

2.2 Power lift test - (To ISO 730-1:1990)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement	650 mm	824 mm
Maximum corrected force exerted through full range	19.1 kN	15.6 kN
Corresponding pressure of hydraulic fluid	15.5 Mpa	15.5 Mpa
Moment about rear-wheel axis	18.7 kNm	24.8 kNm
Maximum tilt angle of mast from vertical	–	12 degrees

- Linkage settings for test - see Table 2.1 and Figure 2.1

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-469	-371	-300	-200	-100	0	50	100	200	279	355
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	–	19.1	20.9	21.7	22.8	23.7	24.0	24.4	24.2	23.6	–
Corresponding pressure: 15.5 Mpa											
at the frame kN	15.6	16.6	17.0	17.5	17.9	17.9	18.0	18.0	17.3	16.6	15.8
Corresponding pressure: 15.5 MPa											

III. TEST RESULTS

A. COMPULSORY TEST RESULTS

1. MAIN POWER TAKE-OFF (1000)

Date and location of tests: 5 May 1995
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	l/h	Specific g/kWh	
1.1 MAXIMUM POWER - TWO HOUR TEST						
65.0	2302	1051	18.10	21.12	278	3.08
1.2 POWER AT RATED ENGINE SPEED						
64.6	2398	1095	18.31	21.37	284	3.02
1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 10 rev/min)						
64.3	2189	1000	17.61	20.55	274	3.13
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
64.6	2398	1095	18.31	21.37	284	3.02
1.4.2 85% of the torque defined in 1.4.1						
55.3	2449	1118	16.64	19.42	301	2.85
1.4.3 75% of the torque defined in 1.4.2						
41.8	2470	1128	13.54	15.80	324	2.65
1.4.4 50% of the torque defined in 1.4.2						
28.1	2500	1142	10.89	12.71	387	2.21
1.4.5 25% of the torque defined in 1.4.2						
14.4	2540	1160	8.50	9.91	591	1.45
1.4.6 Unloaded						
0	2562	1170	5.75	6.71	--	--

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O.	Hourly kg/h	l/h	Specific g/kWh	
1.5 1.5.1	PART LOADS AT STANDARD POWER TAKE-OFF SPEEDS (1000 ± 10 rev/min) The torque corresponding to maximum power					
64.3	2189	1000	17.61	20.55	274	3.13
1.5.2	85% of the torque obtained in 1.5.1					
56.3	2257	1030	15.76	18.39	280	3.06
1.5.3	75% of the torque obtained in 1.5.2					
42.9	2292	1046	12.86	15.01	300	2.86
1.5.4	50% of the torque obtained in 1.5.2					
29.1	2329	1063	10.29	12.00	353	2.43
1.5.5	25% of the torque obtained in 1.5.2					
14.8	2378	1086	7.84	9.14	530	1.62
1.5.6	Unloaded					
0	2405	1098	5.16	6.02	--	--

No load, maximum engine speed: 2562 rev/min

Torque (equivalent crankshaft) at maximum power: 269.8 Nm

Torque (equivalent crankshaft) at rated power: 253.8 Nm

Maximum torque (equivalent crankshaft) (engine speed 1600 rev/min): 315.9 Nm

Mean atmospheric conditions:

- Temperature 26°C
- Pressure 1019 m bar
- Relative humidity 22%

Maximum temperatures:

- Coolant 85°C
- Engine oil 114°C
- Fuel 59°C
- Engine air intake 26°C

2. HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 12 June 1995

2.1 Hydraulic power test

Sustained pressure with relief valve open: 17.2 MPa

Pump delivery rate at minimum pressure: 46.6 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	31.1	15.5	8.02
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	37.2	15.0	9.31

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid if different from 65 ± 5°C -- °C

Opening pressure of the unloading valve: -- MPa

Closing pressure of the unloading valve: -- MPa

2.2 Power lift test - (To ISO 730-1:1990)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement	650 mm	824 mm
Maximum corrected force exerted through full range	19.1 kN	15.6 kN
Corresponding pressure of hydraulic fluid	15.5 Mpa	15.5 Mpa
Moment about rear-wheel axis	18.7 kNm	24.8 kNm
Maximum tilt angle of mast from vertical	–	12 degrees

- Linkage settings for test - see Table 2.1 and Figure 2.1

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-469	-371	-300	-200	-100	0	50	100	200	279	355
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	–	19.1	20.9	21.7	22.8	23.7	24.0	24.4	24.2	23.6	–
Corresponding pressure: 15.5 Mpa											
at the frame kN	15.6	16.6	17.0	17.5	17.9	17.9	18.0	18.0	17.3	16.6	15.8
Corresponding pressure: 15.5 MPa											

3. DRAWBAR POWER AND FUEL CONSUMPTION TEST (UNBALLASTED TRACTOR, 4 WHEEL DRIVE)

Date and location of tests: 12 May 1995
Silsoe Research Institute
Wrest Park
Silsoe

Type of track: Concrete

Height of drawbar above ground	Tyre inflation pressure (kPa) Front	Rear
345 mm	62	62

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Spec fuel cons	Spec energy	Temperature Fuel	Coolant	Eng oil	Atmospheric conditions Temp	Rel Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kwh	kWh/l	Deg.C	Deg.C	Deg.C	Deg.C	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS													
LD2	35.2	33.7	3.75	2473	15.1	413	2.08	46	57	97	9	59	100.2
LP3	47.0	33.8	5.00	2449	14.8	368	2.21	44	68	101	9	56	100.2
LD3	54.4	33.5	5.84	2303	12.4	346	2.48	41	70	101	8	56	100.2
HP1	56.7	29.5	6.91	2301	7.2	326	2.63	42	72	104	8	64	100.2
LP4	55.7	26.8	7.47	2301	6.0	329	2.61	40	71	104	8	65	100.2
HD1	57.3	24.2	8.53	2306	5.0	323	2.65	41	69	103	8	63	100.2
LD4	56.2	22.1	9.13	2303	4.5	334	2.57	40	69	103	8	62	100.2
3.2 FUEL CONSUMPTION													
3.2.1 In selected gear, at maximum power at rated speed													
HD1	55.8	22.5	8.91	2400	4.7	333	2.58	43	69	105	7	65	100.2
3.2.1.1 75% of pull at maximum power at rated speed													
HD1	43.6	17.0	9.25	2466	3.7	348	2.46	43	68	105	7	67	100.2
3.2.1.2 50% of pull at maximum power at rated speed													
HD1	29.5	11.3	9.43	2488	2.7	446	1.92	44	67	104	7	66	100.2
3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.1													
LD4	43.6	17.0	9.26	2314	3.6	347	2.47	44	63	97	10	52	100.2
3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.2													
LD4	29.5	11.3	9.43	2334	2.7	388	2.21	44	61	96	10	54	100.2
3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed													
HP1	55.3	27.3	7.29	2401	5.9	339	2.53	42	72	105	9	59	100.2
3.2.2.1 75% of pull at maximum power at rated speed													
HP1	43.4	20.5	7.62	2466	4.3	369	2.32	41	69	105	9	57	100.2
3.2.2.2 50% of pull at maximum power at rated speed													
HP1	29.5	13.7	7.78	2488	3.1	436	1.96	44	63	101	8	57	100.2
3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.1													
LP4	43.2	20.4	7.60	2306	4.3	356	2.41	41	60	95	10	57	100.2
3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.2													
LP4	29.2	13.5	7.80	2336	3.1	413	2.07	42	60	95	9	55	100.2

ximum power limited by wheelslip

TEST RESULTS

B. SUPPLEMENTARY TEST RESULTS

1. MAIN POWER TAKE-OFF (540)

Date and location of tests: 5 May 1995
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
1.1 MAXIMUM POWER						
64.0	2300	569	17.98	20.97	281	3.05
1.2 POWER AT RATED ENGINE SPEED						
63.6	2401	594	18.32	21.38	288	2.98
1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
63.5	2183	540	17.46	20.37	275	3.12
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
63.6	2401	594	18.32	21.38	288	2.98
1.4.2 85% of the torque defined in 1.4.1						
55.2	2449	606	16.62	19.39	301	2.85
1.4.3 75% of the torque defined in 1.4.2						
41.8	2470	611	13.57	15.83	325	2.64
1.4.4 50% of the torque defined in 1.4.2						
28.2	2500	619	10.82	12.62	384	2.23
1.4.5 25% of the torque defined in 1.4.2						
14.3	2542	629	8.33	9.72	581	1.47
1.4.6 Unloaded						
0	2561	634	5.97	6.96	–	–

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEEDS (540 ± 10 rev/min)						
1.5.1 The torque corresponding to maximum power						
63.5	2183	540	17.46	20.37	275	3.12
1.5.2 85% of the torque obtained in 1.5.1						
55.7	2255	558	15.75	18.38	283	3.03
1.5.3 75% of the torque obtained in 1.5.2						
42.4	2291	567	12.85	14.99	303	2.83
1.5.4 50% of the torque obtained in 1.5.2						
28.8	2332	577	10.22	11.93	355	2.42
1.5.5 25% of the torque obtained in 1.5.2						
14.7	2376	588	7.69	8.97	525	1.63
1.5.6 Unloaded						
0	2401	594	5.29	6.17	--	--

No load, maximum engine speed: 2561 rev/min

Torque (equivalent crankshaft) at maximum power: 265.7 Nm

Torque (equivalent crankshaft) at rated power: 253.0 Nm

Maximum torque (equivalent crankshaft)
(engine speed 1600 rev/min): 310.3 Nm

Mean atmospheric conditions:

- Temperature 26°C
- Pressure 1018 m bar
- Relative humidity 19%

Maximum temperatures:

- Coolant 87°C
- Engine oil 113°C
- Fuel 60°C
- Engine air intake 28°C

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

Test carried out by: S J Devonshire

Signed: Officer in charge of tests

P C Seward

for the Director

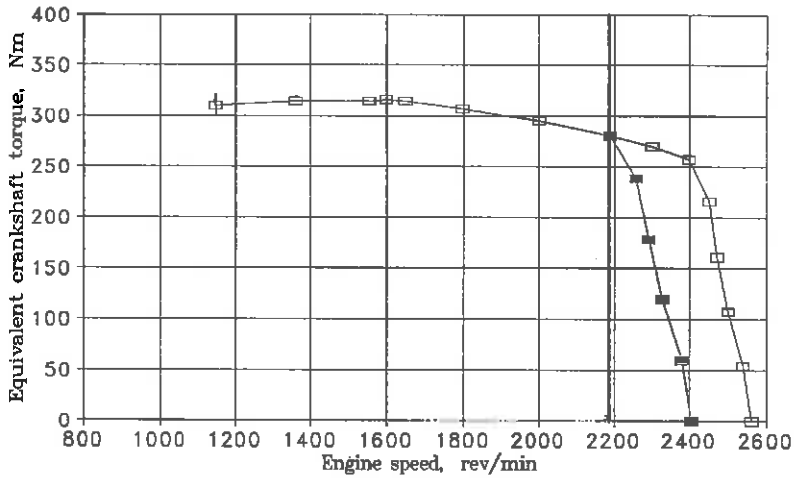
P C Seward
Head of Test Engineering Group

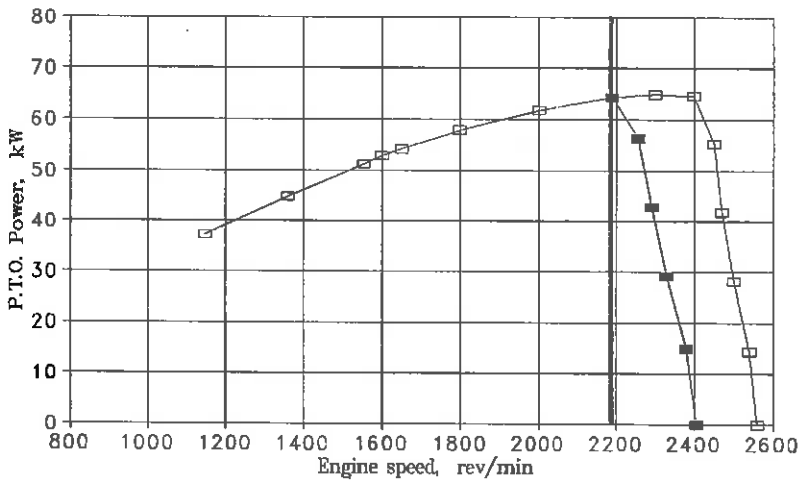
Date: 29/6/95

ANNEX 1 MAIN POWER TAKE-OFF CURVES

P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (1000 rev/min)

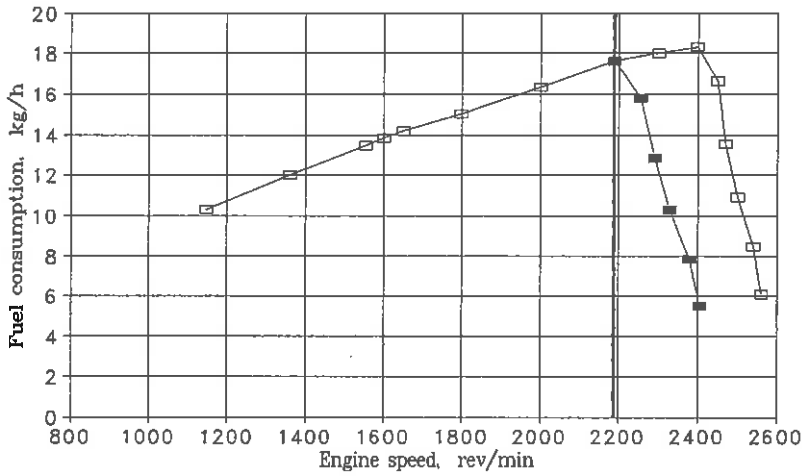
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

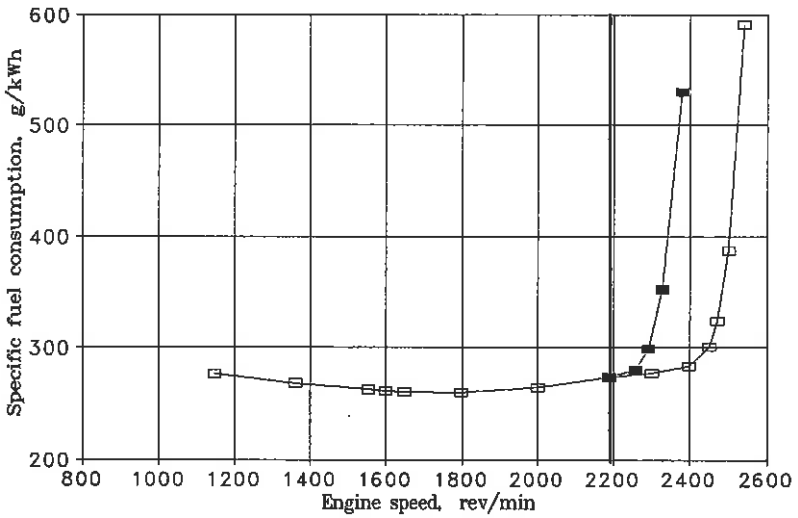




P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (1000 rev/min)

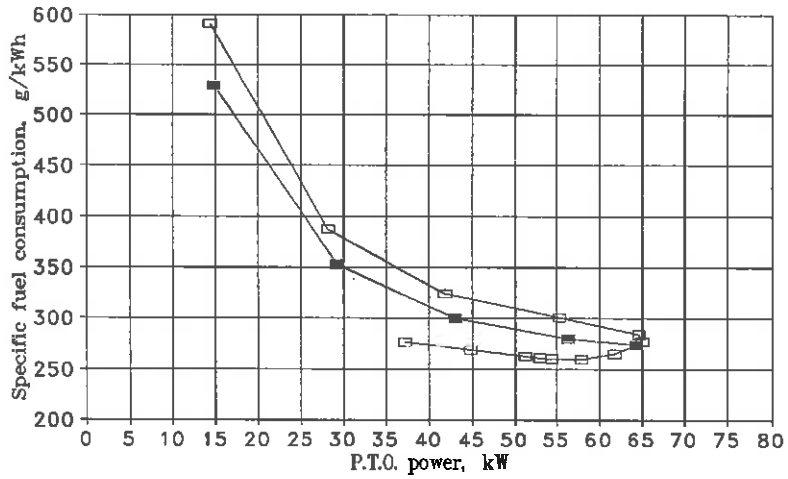
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■





P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (1000 rev/min)

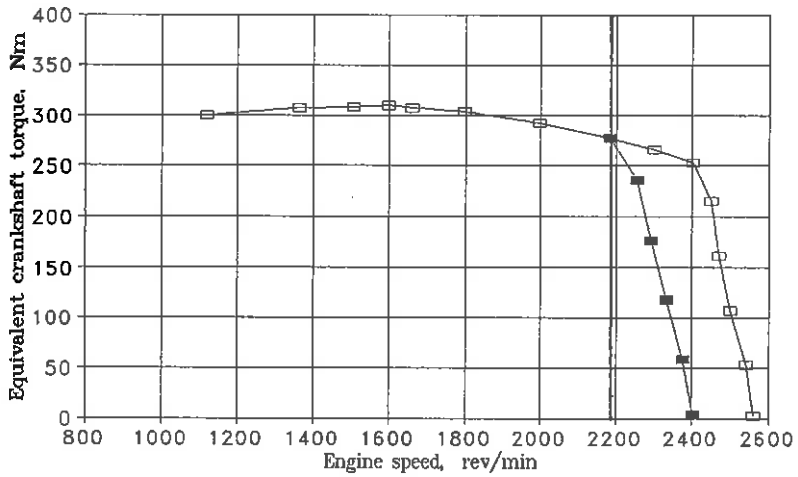
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

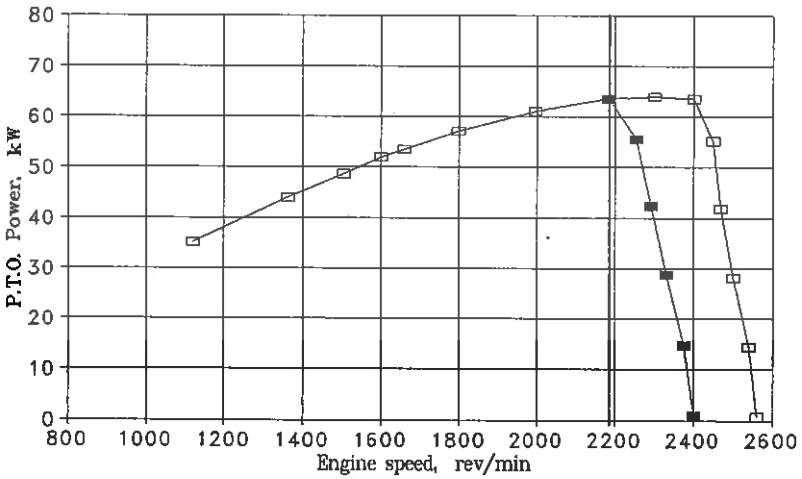


ANNEX 2 MAIN POWER TAKE-OFF CURVES

P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (540 rev/min)

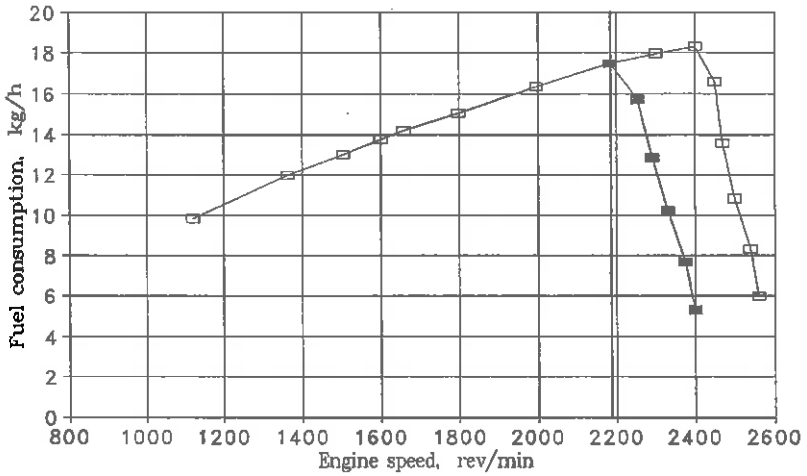
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

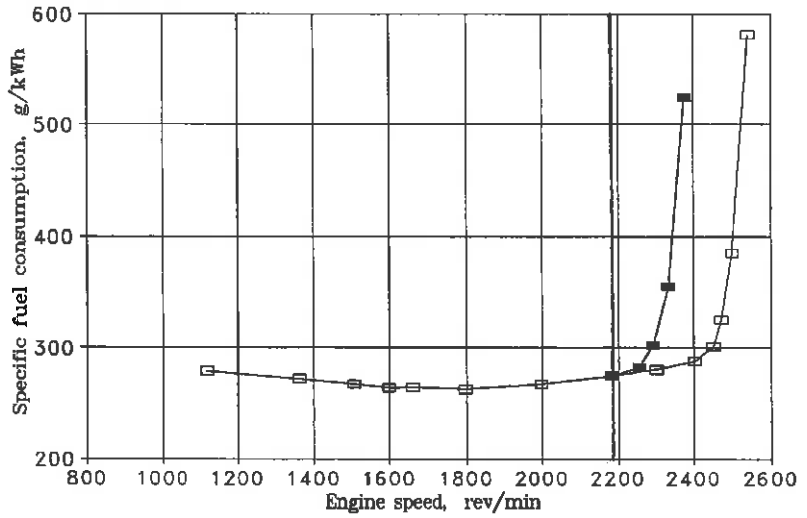




P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■





P.T.O. POWER TEST - CASE INTERNATIONAL 4240AXL FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

