AFRC Institute of ENGINEERING RESEARCH

OECD Approval No. 1074
Restricted Code

Test in accordance with the OECD restricted standard code for the official testing of agricultural tractors

Case International 885 Four-Wheel Drive Tractor



Manufacturered by	J.I. Case Europe Limited, Wheatley Hall Road, Doncaster, South Yorkshire. DN2 4PG.
Test No.	R87/70564/OECD
Report No.	708
Date	March 1987

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

AFRC Institute of Engineering Research
Wrest Park Silsoe Bedford MK45 4HS

BSRAE Copyright

TABLE OF CONTENTS

	Page No.
I SPECIFICATION OF TRACTOR	1
Conditions during test	13
Fuels and lubricants used in tests	14
II TEST RESULTS	
A COMPULSORY TESTS	15
1. Main power take-off performance	15
2. Power lift and hydraulic pump performance	19
3. Maximum drawbar power, transmission and fuel consumption characteristic test (Unballasted tractor)	21
B. OPTIONAL TESTS	
1. Turning space and turning circle	22
2. Measurement of external noise level	22
REPAIRS AND ADJUSTMENTS DURING TESTS	23
REMARKS	23

Tractor manufacturer's name and address:	J.I. Case Europe Limited, Wheatley Hall Road, Doncaster, South Yorkshire, DN2 4PG
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running in:	J.I. Case Europe Limited, Doncaster
Duration of running in:	110 hours

I. SPECIFICATION OF TRACTOR

TRACTOR

Make:	Case International
Trade name:	Case International
Model:	885
Type:	Four wheel drive unit construction
Serial No:	B650025B18001
1st Serial No:	B650025B18001

ENGINE

Make:	J.I. Case Company, Neuss, Germany
Model:	D268
Type	4-stroke, naturally aspirated direct injection diesel
Serial No:	268 DT 2D 060093
Cylinders	
Number/disposition:	4, vertical, in-line
Bore/stroke:	100.0 mm x 139.7 mm
Capacity:	4389 cm^3
Compression ratio:	15.1
Arrangement of valves:	Overhead
Cylinder liners:	Replaceable, wet liners
Fuel System	
Fuel feed system:	Feed pump incorporated in injection pump
Make, type and model	Bosch double fuel filter with replaceable elements and water traps
Capacity of fuel tank:	77 l
Make, type and model of injection pump:	Bosch CR distributor type

Serial No:	VA4/11H 1200CR93/3
Manufacturer's production setting of injection pump:	16.99 l/h to 17.85 l/h at 2400 rev/min engine speed on full load and 38°C fuel temperature, using fuel of 0.825 specific gravity at 15°C
Injection pump timing:	Delivery starts 16° before T.D.C.
Make, type and model of injectors:	Bosch multihole DLL A 150 S 690
Injection pressure:	22.5 MPa
Governor	
Make:	Bosch
Type:	Hydraulic incorporated in injection pump
Governed range of engine speed:	650 to 2660 rev/min
Rated engine speed:	2400 rev/min
Air cleaner	
Pre-cleaner	
Make and type:	Coopers centrifugal
Location:	In cleaner body
Main	
Make:	Coopers
Type:	Dry paper element
Model:	Cyclomatic
Maintenance indicator:	Warning light on instrument panel
Location:	Under bonnet forward of engine
Lubrication system	
Type of feed pump:	Forced feed from gear pump
Total oil capacity including filter:	9.5 l
Oil change period:	200 hours
Type of filter:	Mann spin-on full flow with replaceable cartridge and metal strainer in sump
Filter change period:	200 hours
Recommended oil:	See "Fuels and lubricants used in tests"

Cooling system	
Type of coolant:	Water
Specification of pump	
Type:	Impeller
Description of fan:	Belt driven
Number of fan blades:	5
Fan diameter:	457 mm
Coolant capacity:	13.7 l
Type of temperature control:	Thermostat
System pressure:	70 kPa
Starting system	
Safety device:	Operable only when clutch pedal is fully depressed
Make:	Bosch
Model:	JF
Type:	Electrical, positive engagement solenoid operated
Model and starter motor power rating:	550, 12V, 2.7 kW
Cold starting aid:	C.A.V. Thermostart flame type
Electrical system	
Voltage:	12
Generator:	Alternator
Make:	Lucas
Model:	A127
Type:	Belt driven
Power:	45A at 6000 rev/min
Batteries	1, Chloride type 644, lead-acid
Rating:	90 Ah at 20-hour rating
Exhaust system	
Make:	Burgess
Type:	Reflex
Model:	IH 82713C1
Location:	Vertical above bonnet on right-hand side
Height of outlet above ground:	2410 mm

TRANSMISSION

Clutch	
Make:	Rockford
Type:	Dry, for transmission only
Number of plates:	1
Diameter of plate:	300 mm
Method of operation:	Mechanically by pedal
Gear box	
Make:	Own make
Type:	Mechanical synchromesh
Arrangement:	4 speeds in high and low forward and reverse ranges
Number of speeds:	8 forward and 4 reverse
Available options:	Change of gear ratios and addition of power shift/torque amplifier
Rear axle and final drives	
Make:	Own make
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:	Z.F.
Model:	APL 330
Type:	Crown wheel and pinion, self-locking differential and epicyclic reduction gear final drives
Driven from:	Main transmission
Transmission oils	
Gear box, transmission and final drives:	
Capacity:	34 l
Change period:	800 hours
Filter change period:	200 hours
Power lift:	Integral with transmission
Front axle	
Differential:	4.5 l
Final drives:	0.75 l each
Change period:	800 hours
Type of oil filter:	None
Recommended oil:	See "Fuels and lubricants used in tests"

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	L	241.91	2.77
2	L	186.50	3.59
3	L	114.79	5.83
4	L	84.91	7.89
1	H	72.73	9.21
2	H	56.07	11.94
3	H	34.51	19.40
4	H	25.53	26.23
Reverse			
1	R	161.28	4.15
2	R	124.34	5.38
3	R	76.53	8.75
4	R	56.61	11.83

L = Low range H = High range

Rear tyre size: 13.6-38

Tyre radius index: 740 mm

POWER TAKE-OFF

Main power take-off

Type:	Independent of main clutch
Method of engagement:	Lever and hydraulically operated multi-plate wet clutch
Number of shafts:	2
Method of changing power take-off speeds:	Manually, by selecting appropriate shaft

Power take-off proportional to engine speed

Tyre sizes, front, rear:	12.4-24, 13.6-38

(i) 540 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 to ISO standard 500
Height above ground:	728 mm
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	390 mm
Pto speed at rated engine speed:	605 rev/min
Engine speed at standard power take-off speed:	2140 rev/min
Engine to pto ratio:	3.964:1
Power restriction:	I.S.O. recommendation, 48 kW
Direction of rotation (viewed facing driving end):	Clockwise

(ii) 1000 rev/min

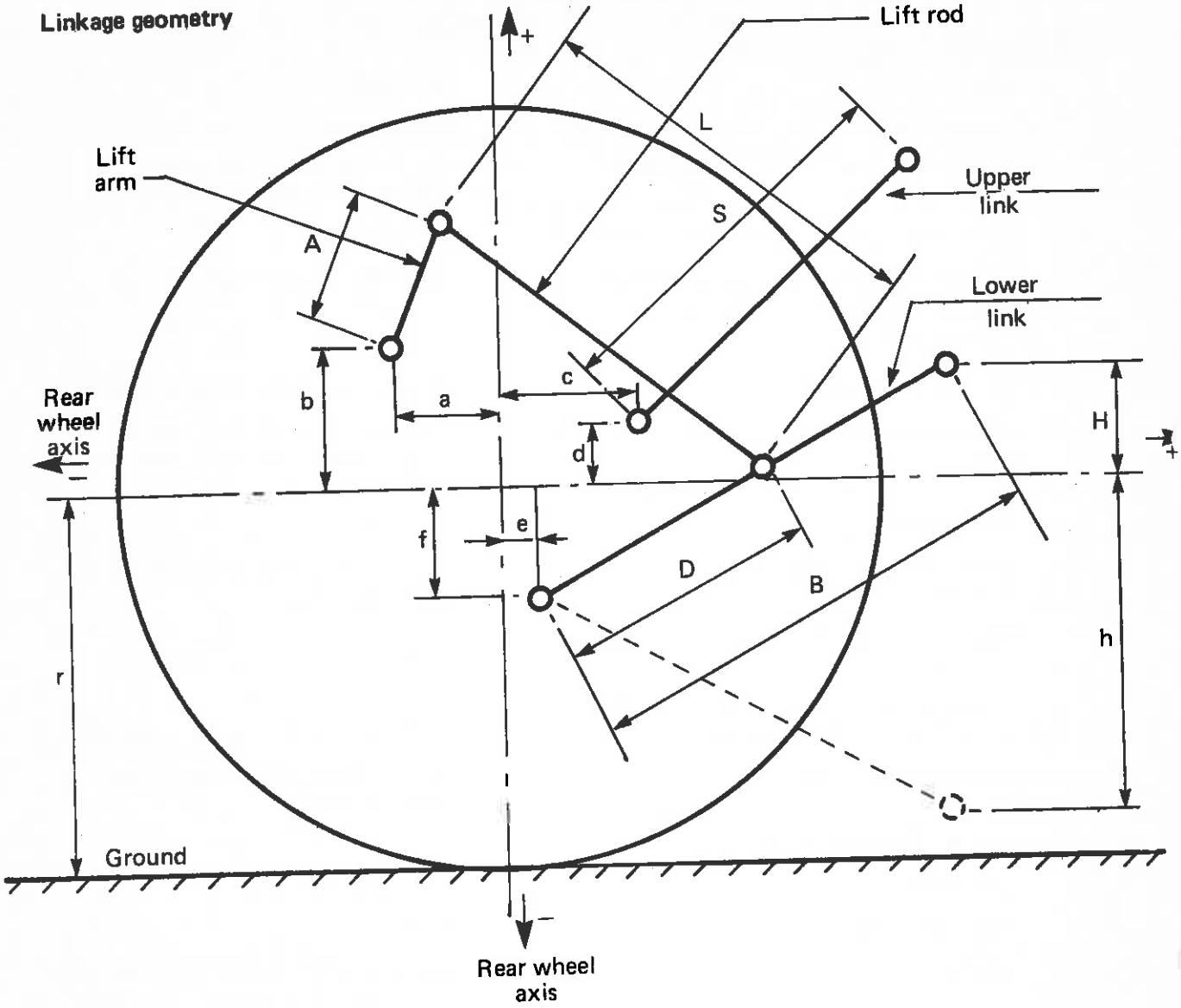
Location:	At rear of tractor
Diameter of power take-off shaft end:	34.9 mm
Number of splines:	21 to I.S.O. 500
Height above ground:	605 mm
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	390 mm
Pto speed at rated engine speed:	1096 rev/min
Engine speed at standard power take-off speed:	2190 rev/min
Engine to pto ratio:	2.190:1
Power restriction	ISO recommendation, 92 kW
Direction of rotation (viewed facing driving end):	Clockwise

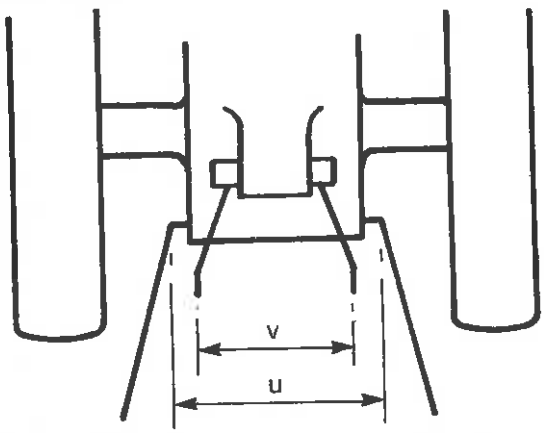
POWER LIFT

Make:	Own make
Type:	Hydraulic
Type and number of cylinders:	One internal, and 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
Oil capacity:	34 l
Site of oil reservoir:	Intergral with transmission housing
Type and number of tapping points:	2 on double acting auxiliary control valve
Maximum volume of oil available to external cylinders:	13.6 l, 40.9 l with overfill
Recommended oil	See "Fuels and lubricants used in test"

THREE-POINT LINKAGE

Category:	2 to ISO 730/1
Category adapter:	None
Controls	Draught and position control, floating position, top link sensing


Linkage geometry
+
Lift rod
L
Lift arm
A
S
Upper link
Lower link
c
b
a
d
H
+
Rear wheel axis
−
f
e
D
B
h
r
Ground
−
Rear wheel axis


v
u

Linkage dimensions for the lifting test

Rear tyres: (size 13.6-38) loaded radius:		(r)	740 mm
Front tyres:(size 12.4-24) loaded radius:		(r')	540 mm
Length of lift arms:		(A)	298 mm
Length of lower links:		(B)	814 mm
Distance of lift arm pivot point from rear wheel centre line:	horizontally:	(a)	66 mm
	vertically:	(b)	288 mm
Horizontal distance between the two lower link points:		(u)	518 mm
Horizontal distance between the two lift arm end points:		(v)	445 mm
Length of upper link:		(S)	715 mm
Distance of upper link pivot point from rear wheel centre line	horizontally:	(c)	279 mm
	vertically:	(d)	226 mm
Distance of lower link pivot point from rear wheel centre	horizontally:	(e)	171 mm
	vertically:	(f)	171 mm
Distance of lower link points to lift rod pivot points on lower link:		(D)	571 mm
Length of lift rods:		(L)	714 mm
Height of lower hitch points relative to the rear wheel centre line, situated 740 mm above the ground level			
- in low position:		(h)	527 mm
- in high position:		(H)	151 mm
Height of lower hitch points when locked in transport position:			Any height within lift range

SWINGING DRAWBAR

Tyre sizes	Front:	12.4-24 (Radius index 540 mm)
	Rear:	13.6-38 (Radius index 740 mm)
Height above ground, maximum:		442 mm
minimum:		330 mm
Type of adjustment:		Inverting drawbar
Distance of hitch point from rear axle centre:		750 mm to rear
Distance of hitch point from		
vertically 540 rev/min shaft:		286 and 398 mm
1000 rev/min shaft:		163 and 275 mm
horizontally:		360 mm to rear
Lateral adjustment:		292 mm
Distance of pivot point from rear axles horizontally:		290 mm to rear
Diameter drawbar pin hole:		26 mm

TRAILER HITCH

Type	Rear automatic pick-up hook
Height above ground	390 mm
Distance of hitch point from rear axle centre:	485 mm to rear
Distance of hitch point from power take-off shaft end:	
vertically 540 rev/min shaft:	338 mm
1000 rev/min shaft:	215 mm
horizontally:	95 mm to rear
Maximum vertical permissible load:	22.3 kN
Diameter of pin hole:	35 mm

STEERING

Method of operation:	Hydrostatic, steering wheel coupled to motor unit, power to unit from main hydraulic pump through priority valve/flow divider.
Pump:	Plessey, live
Motor:	Danfoss OSPC 100 OR
Ram:	Z.F. double-acting balanced
Working pressure:	14.5 MPa
Oil capacity:	34 l from transmission
Recommended oil:	See "Fuels and lubricants used in test"

BRAKES	
Service brake	
Make:	Own make
Type:	Oil immersed single disc, 1 per side
Method of operation:	Hydraulically actuated, independent or combined pedal operated
Parking brake	
Type:	Band brake operating on crown wheel
Method of operation:	Hand- lever with ratchet, mechanical linkage
Trailer braking take-off	None fitted
STEERING WHEELS	
Number:	2
Location:	At front
Tyres:	Kleber
Size:	12.4-24
Ply rating:	6
Type of casing:	Radial
Maximum permissible load on each tyre:	1200 kg
Corresponding inflation pressure:	170 kPa
Track widths:	1365 mm by 100 mm steps to 1825 mm
Method of adjustment:	Reversing wheels and offset lug rims
DRIVING WHEELS	
Number:	4
Location:	At front and rear of tractor
Rear tyres:	Goodyear Super Traction
Size:	13.6-38
Ply rating:	6
Type of casing:	Radial
Maximum permissible load on each tyre:	1660 kg
Corresponding inflation pressure:	160 kPa
Track widths:	1430 mm by 100 mm steps to 1930 mm
Method of adjustment:	Reversing wheels and offset lug rims
WHEELBASE	2235 mm

PROTECTIVE STRUCTURE SPECIFICATIONS

OECD approval number:	CSD 074/8-a(C)
Trade name:	Case International Type L Low Profile
Manufacturer's name and address:	J.I. Case Europe Ltd, Wheatley Hall Road, Doncaster DN2 4PG

Description

The cab has a steel framed protective structure attached to the tractor through four anti-vibration mounts, the unit does not tilt. Mounting steps and a door are fitted at each side. The structure has a steel roof, safety glass windows and noise reduction cladding.

DRIVER'S SEAT

Make:	Bostrom TS-3
Type of suspension:	Adjustable torsion bar
Type of damping:	Hydraulic
Range of adjustment, longitudinal:	150 mm
vertical:	70 mm

LIGHTING

Tyre sizes: front 12.4-24, rear 13.6-38

Unrestricted beam angle of head light in plan view 115°

	Height above ground of centre, mm	Size, mm	Distance from outside edge of tractor to centre, at 1430 mm track width, mm
Headlight	1335	160 x 100	750
Sidelight	1675	92 x 70	235
Rear light	1498	65 x 70	290
Reflector	1498	55 x 70	225

CONDITIONS DURING TEST

Overall dimensions

(front: 12.4-24 rear: 13.6-38 tyres fitted)

Length, m	Width, min. m	Width, max. m	Height at top of, exhaust silencer, m	Height at top of, protective structure, m
3.18	1.76	2.26	2.41	2.40

Ground clearance

Clearance: 345 mm limited by drawbar bracket catch

Track setting

Front: 1365 mm
Rear: 1430 mm

Tractor mass

(without driver but with tanks full - with cab)

Front, kg	Rear, kg	Total, kg
1255	1979	3234

Fuel and lubricants used in tests

Fuel

Type:	Diesel oil to Class D British Standard 2869:1970, specific gravity at 15°C : 0.8653, Cetane No. 47

Oils	Recommended	Used during test
Engine		
Type:	S.A.E. 20/50	As recommended
Viscosity:	89 cSt at 50°C	
Classification:	MIL-L-2104D	
Transmission, final drives, hydraulics and steering		
Type:	International Hy-Tran	As recommended
Viscosity:	27.2 cSt at 50°C	
Classification:	Not applicable	
Front differential and final drives		
Type:	S.A.E. 90EP	As recommended
Viscosity:	115 cSt at 50°C	
Classification:	MIL-L-2105B	
Recommended grease:	Lithium based to N.L.G.I. No.2	
Number of lubrication points:	10	

II TEST RESULTS

A COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date of tests: 9th September 1986

Type of dynamometer: Water brake, Heenan & Froude

Power, kW	Speed, rev/min		Fuel consumption, Hourly,		Specific,	Specific energy,
	Engine	P.t.o.	l/h	kg/h	kg/kWh	kWh/l
MAXIMUM POWER - 2 HOUR TEST						
54.4	2400	1096	16.78	14.51	0.267	3.25
POWER AT RATED ENGINE SPEED						
54.4	2400	1096	16.78	14.51	0.267	3.25
POWER AT STANDARD POWER TAKE-OFF SPEED						
52.1	2190	1000	15.51	13.42	0.258	3.35
PART LOADS						
(i) The torque corresponding to maximum power at rated engine speed						
54.4	2400	1096	16.78	14.51	0.267	3.25
(ii) 85% of the torque obtained in (i)						
47.3	2460	1123	14.66	12.69	0.268	3.23
(iii) 75% of the torque defined in (ii)						
35.8	2492	1138	12.00	10.38	0.290	2.98
(iv) 50% of the torque defined in (ii)						
24.1	2520	1151	9.59	8.30	0.344	2.52
(v) 25% of the torque defined in (ii)						
12.1	2544	1162	7.61	6.59	0.544	1.59
(vi) Unloaded						
0	2549	1164	5.17	4.47	-	-

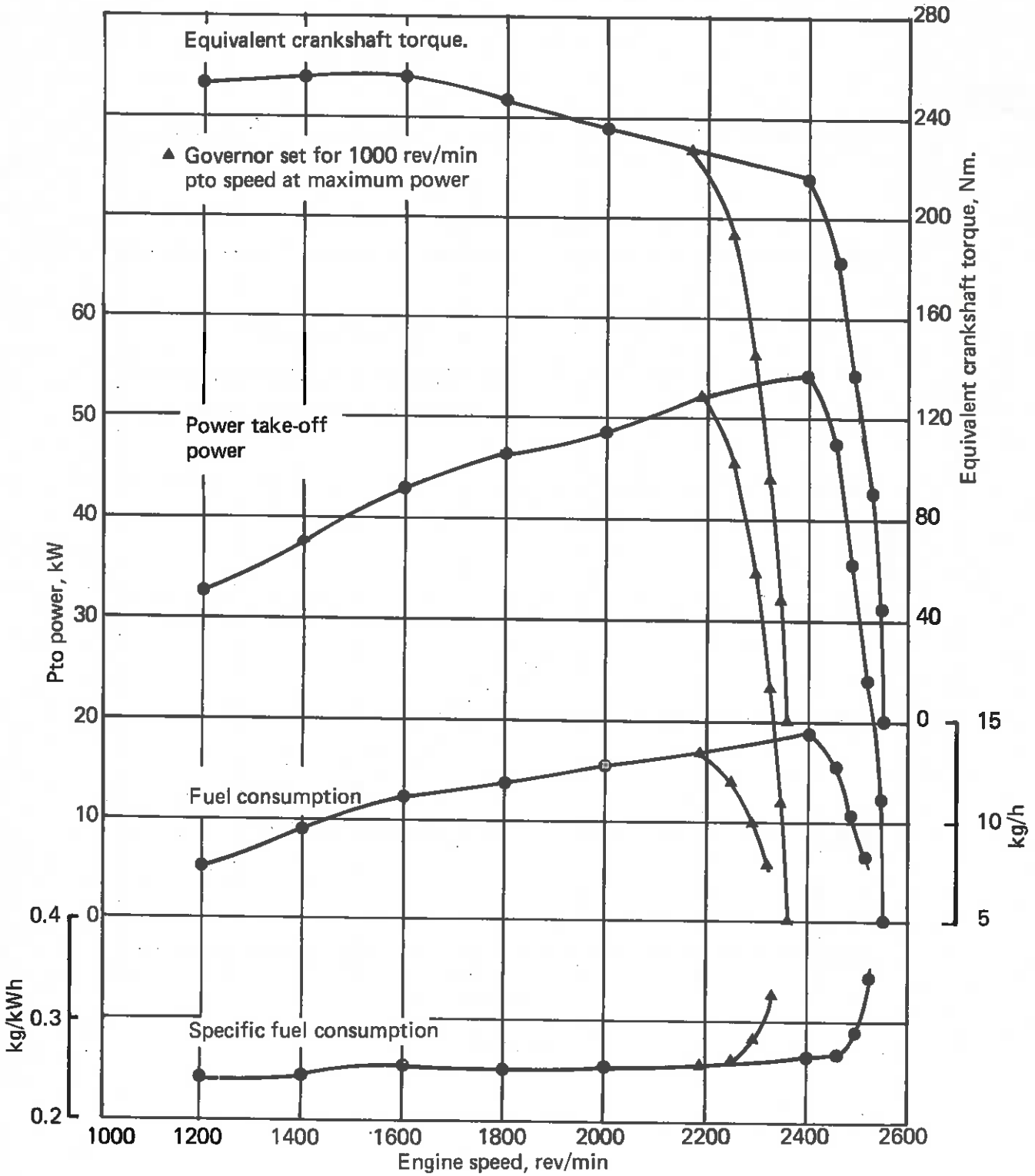
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (1000 rev/min).

Power, kW	Speed, rev/min		Fuel consumption, Hourly,		Specific,	Specific energy,
	Engine	P.t.o.	l/h	kg/h	kg/kWh	kWh/l
(i) The torque corresponding to maximum power at standard p.t.o. speed						
52.1	2190	1000	15.51	13.42	0.258	3.35
(ii) 85% of the torque obtained at maximum power						
45.8	2256	1030	13.87	12.00	0.262	3.30
(iii) 75% of the torque defined in (ii)						
34.8	2298	1049	11.28	9.76	0.281	3.08
(iv) 50% of the torque defined in (ii)						
23.4	2325	1062	8.86	7.67	0.328	2.64
(v) 25% of the torque defined in (ii)						
11.8	2348	1072	6.45	5.58	0.473	1.83
(vi) Unloaded						
0	2361	1078	4.61	3.99	-	-

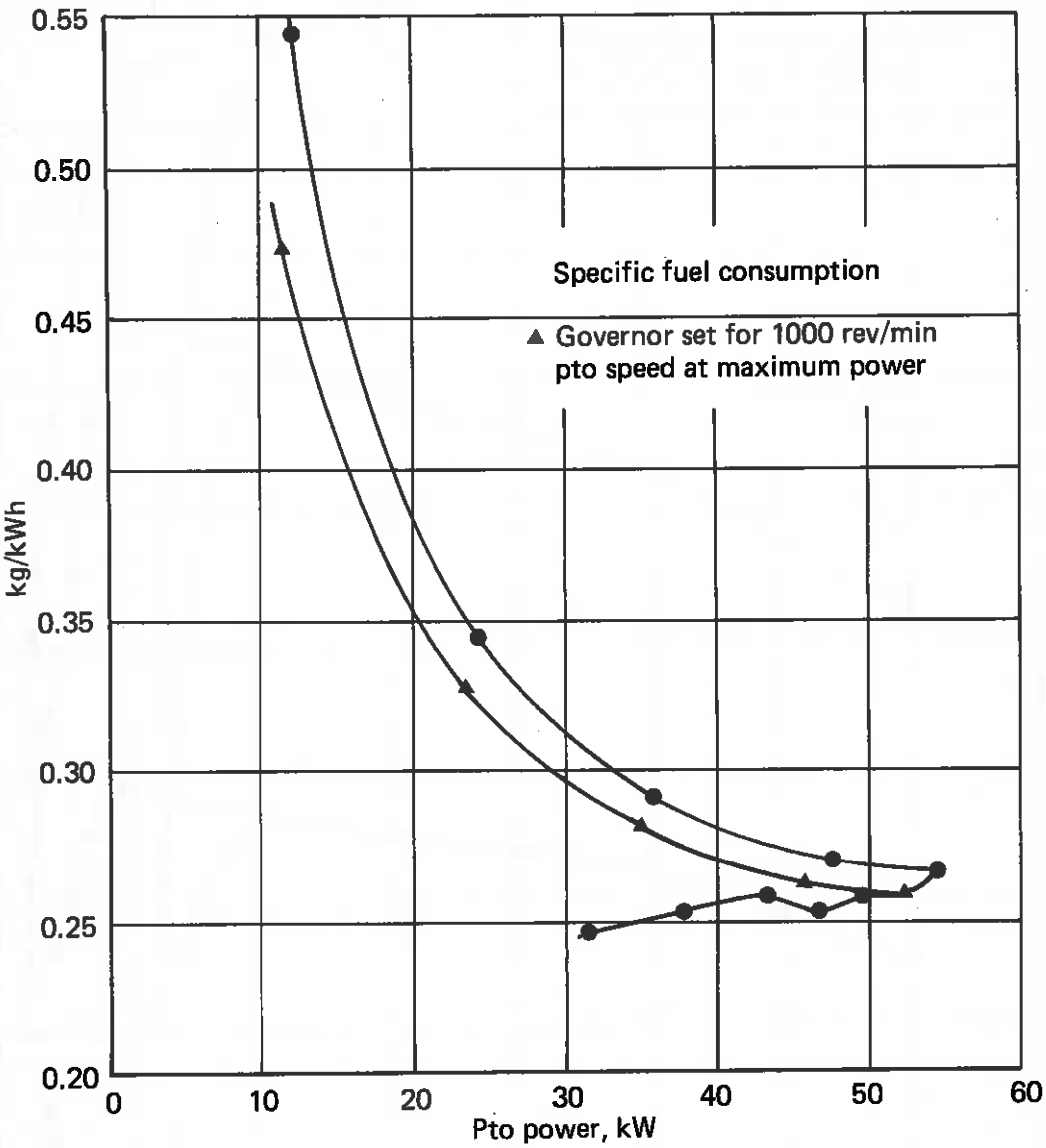
Standard specific fuel consumption, kg/kWh

a) 0.268
b) 0.344
c) 0.262
d) 0.328

No load, maximum engine speed		2549 rev/min
Equivalent crankshaft torque at maximum power		216.0 Nm
Maximum equivalent crankshaft torque		257.0 Nm 1545 rev/min engine speed
Mean atmospheric conditions	temperature	26°C
	pressure	1016 m bar
	relative humidity	30%
Maximum temperature	coolant	83°C
	engine oil	90°C
	fuel	43°C
	air intake	31°C



Power take-off test



Power take-off test

2. LIFTING FORCE AND HYDRAULIC POWER

Date of tests: 7th and 9th October 1986

Hydraulic fluid

Make and type: International Hy-Tran
Viscosity: 27.2 cSt at 50°C

Type of hydraulic system: Closed centre, oil supplied by fixed displacement pump.

Hydraulic fluid temperature at beginning of test: 65°C

Power lift test

	Height of lower hitch point above ground in down position, mm	Vertical movement, mm	Maximum force exerted through full range, kN	Corresponding pressure of hydraulic fluid, MPa	Moment about rear axle, kNm	Maximum tilt angle of mast over range of lift, degrees
At the hitch point	213	678	17.0	16.0	16.7	-
On the frame	213	846	16.3	16.0	26.0	13

Main linkage dimensions - see drawings and table on pages 8 and 9

Lifting heights relative to the horizontal plane including the lower link pivot points

mm	-389	-356	200	100	0	100	200	292	371

Lifting forces at hitch points
(corresponding pressure 16.0 MPa)

kN	-	17.0	20.9	21.9	23.0	23.4	23.1	22.1	-

Lifting forces at test frame
(corresponding pressure 16.0 MPa)

kN	16.3	16.5	18.1	18.8	19.2	18.8	18.0	17.3	16.3

Hydraulic power test

Sustained pressure with relief valve open	18.0 MPa
Pump delivery rate at minimum pressure	53.3 l/min

Flow rate corresponding to a hydraulic pressure equivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power

Flow rate	46.0 l/min
Pressure	16.2 MPa
Power	12.4 kW

Flow rate and hydraulic pressure corresponding to maximum hydraulic power

Flow rate	46.9 l/min
Pressure	16.0 MPa
Power	12.5 kW

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid, if different from $65^{\circ} \pm 5^{\circ}C$	Not applicable
Opening pressure of the unloading valve	Not applicable
Closing pressure of the unloading valve	Not applicable

3. MAXIMUM DRAWBAR POWER, TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS

Date of tests: 14th October 1986
Type of track: Concrete
Height of drawbar above ground: 310 mm
Tyre size and pressure:
Front: 12.4-24 110 kPa
Rear: 13.6-38 90 kPa

Gear	Speed, km/h	Power, kW	Drawbar pull, kN	Engine speed, rev/min	Wheel-slip, %	Specific fuel consumption, kg/kWh	kWh/l	Temperature, °C: Fuel	Coolant	Engine oil	Atmospheric conditions: Temperature, °C	Relative humidity, %	Pressure, m bar
(1) MAXIMUM DRAWBAR POWER IN GEARS													
L1	2.53	21.1	30.0	2519	12.5	0.421	2.05	45	79	74	12	80	1011
L2	3.24	27.0	30.0	2494	12.5	0.380	2.28	46	80	79	13	78	1009
L3	5.16	43.0	30.0	2400	12.5	0.347	2.49	47	83	78	12	81	1009
L4	7.37	46.0	22.5	2400	5.3	0.318	2.72	48	84	77	14	78	1009
H1	8.71	46.5	19.2	2400	4.0	0.317	2.73	48	83	78	15	77	1009
H2	11.47	46.0	14.4	2400	2.5	0.320	2.70	50	84	79	16	73	1008
(2a) TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS													
(i) SELECTED GEAR (Speed closest to 7.5 km/h)													
L4	7.37	46.0	22.5	2400	5.3	0.318	2.72	48	84	77	14	78	1009
(ii) 75% OF PULL AT MAXIMUM POWER													
L4	7.65	35.7	16.8	2446	3.1	0.331	2.61	49	82	80	14	74	1010
(iii) 50% OF PULL AT MAXIMUM POWER													
L4	7.88	24.5	11.2	2479	1.8	0.379	2.28	49	80	80	14	77	1009
HIGHEST GEAR SAME PULL AS IN (ii) REDUCED ENGINE SPEED													
H1	7.56	35.5	16.9	2062	3.1	0.306	2.82	50	83	77	15	72	1008
HIGHEST GEAR SAME PULL AS IN (iii) REDUCED ENGINE SPEED													
H1	7.82	24.5	11.3	2102	1.9	0.340	2.54	50	80	77	15	72	1008
(2b) TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS													
(i) SELECTED GEAR (Maximum power)													
H1	8.71	46.5	19.2	2400	4.0	0.317	2.73	48	83	78	15	77	1009
(ii) 75% OF PULL AT MAXIMUM POWER													
H1	9.01	36.1	14.4	2446	2.5	0.330	2.62	49	82	80	16	74	1008
(iii) 50% OF PULL AT MAXIMUM POWER													
H1	9.24	24.5	9.6	2479	1.5	0.381	2.27	49	81	80	16	73	1008
HIGHEST GEAR SAME PULL AS IN (ii) REDUCED ENGINE SPEED													
H2	9.02	36.1	14.4	1886	2.5	0.302	2.87	50	82	77	16	72	1008
HIGHEST GEAR SAME PULL AS IN (iii) REDUCED ENGINE SPEED													
H2	9.33	24.9	9.6	1926	1.5	0.331	2.61	49	81	76	15	74	1007

B. OPTIONAL TESTS

1. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: front tyres 12.4-24
rear tyres 13.6-38

Track of wheels: front 1365 mm
rear 1430 mm

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m	3.93	4.01	4.68	4.72
Radius of turning circle, m	3.75	3.83	4.51	4.55

2. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 24th October 1986

Type of sound level meter: Bruel and Kjaer 2209

Type of track: Concrete

Results of tests

Gear: H4

Travelling speed before acceleration: 19.7 km/h

Sound level: 90 dBA

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

Test carried out at AFRC Engineering by: P.C. Seward, F. Thistlethwaite.

Officer in charge: P.C. Seward

Signed: D.W. Smith Head of Testing Group

R.M. Stayner for the Director

Date: 23rd April 1987.