SILSOE RESEARCH INSTITUTE
Wrest Park, Silsoe,
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Report No: R91/71309/OECD
OECD Approval No: 1344 Restricted Code
Approval Date: 20 December 1991

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

Ford New Holland 4830 (DR41) Four-Wheel Drive Tractor with 8-speed Synchromesh Transmission



Manufactured by: Ford New Holland Limited
Basildon
Essex
England

Submitted for test by: The manufacturer

Report No: 747

Date: June 1991

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Tractor manufacturer's name and address:	Ford New Holland Ltd Basildon, Essex, England
Location of tractor assembly:	Basildon, Essex, England
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer
Place of running in:	Basildon, Essex
Duration of running in:	121 hours
Location of test:	Silsoe Research Institute Wrest Park, Silsoe, England

I. SPECIFICATION OF TRACTOR

TRACTOR

Make:	Ford New Holland
Model:	4830 (DR41)
Type:	Four wheel drive
Serial No:	BC 71787
1st Serial No:	BC 54997

ENGINE

Make:	Ford New Holland
Model:	L256 CID NA
Type:	4 stroke direct injection diesel
Serial No:	L291307

Cylinders

Number/disposition:	4 vertical inline
Bore/stroke:	111.8 mm/106.7 mm
Capacity:	4190 cm^3
Compression ratio:	16.3:1
Arrangement of valves:	Overhead
Cylinder liners:	None monobloc construction

Supercharging

Make:	None

Fuel system

Fuel feed system:	Gravity
Make, type and model of fuel filter:	Plastic strainer in tank and CAV paper element filter with sediment bowl and water trap between tank and injection pump
Capacity of fuel tank:	96.1 l
Make, type and model of injection pump:	Lucas CAV DPS-DSA 929
Serial No:	08028 HHG
Manufacturer's production setting of injection pump:	
. Flow rate	48.5-51.5 mm^3 per stroke at 1000 rev/min pump speed and full load
. Timing	Delivery starts 10° before T.D.C.
Make, type and model of injectors:	CAV multihole JB 6801087 nozzle
Injection pressure:	233-243 Bar

Governor

Make:	CAV
Model:	None
Type:	Mechanical incorporated in fuel injection pump
Governed range of engine speed:	600 rev/min to 2400 rev/min
Rated engine speed:	2200 rev/min

Air cleaner

Pre-cleaner:	
. Make	Ford New Holland
. Type	Raincap
. Model	None
. Location of air intake	Above front bonnet
Main cleaner:	
. Make	Locker Air Maze
. Type	Dry paper element
. Model	3 stage
. Location of air intake	Under front bonnet, forward of radiator
Maintenance indicator:	Warning light on instrument panel

Lubrication system	
Type of feed pump:	Forced feed from eccentric rotor pump
Type of filter:	Metal mesh strainer in sump and full flow replaceable paper element
Number:	1
Cooling system	
Type of coolant:	Water and antifreeze 50% solution
Type of pump:	Centrifugal impeller
Specification of fan:	Belt driven puller
Number of fan blades:	6
Fan diameter:	406 mm
Coolant capacity:	13.5 l
Type of temperature control:	Thermostat
System pressure:	90 kPa
Starting system	
Make:	Lucas-MME
Model:	M127
Type:	Electrical, positive engagement, solenoid operated
Starter motor power rating:	2.8 kW
Cold starting aid:	CAV Thermostart
Safety device:	Only operable when gear levers in neutral
Electrical system	
Voltage:	12 V
Generator:	
. Make	Lucas-MME
. Model	A 127-70
. Type	Belt driven alternator
. Power	70 amps at 6000 rev/min
Batteries:	
. Rating	Lucas lead acid 107 Ah at 20 hours rating

Exhaust system

Make:	Nelson Burgess
Model:	None
Type:	Vertical silencer
Location:	Above left-hand front cover
Height of outlet above ground:	2650 mm

TRANSMISSION TO WHEELS

Clutch

Make:	AP
Model:	None
Type:	Single dry plate
Number of plates:	1
Diameter of plates:	330 mm
Method of operation:	Mechanical pedal operated

Gear box

Make:	Ford New Holland
Model:	8 x 8 Synchromesh
Type:	Mechanical manual synchromesh operation, 4-speed and 2 ranges selected with two side mounted levers. Third side mounted lever selects forward or reverse for each combination
Number of gears:	8 forward, 8 reverse
Available options:	16 x 8 Dual power

Rear axle final drives

Make:	Ford New Holland
Model:	None
Type:	Crown wheel and pinion with differential and epicyclic reduction gear final drive

Differential lock:	
. Type	Mechanical
. Method of engagement	Mechanical pedal operated self-disengaging

Front axle and final drives

Make:	Carraro
Model:	707/164
Type:	Crown wheel and pinion with differential and epicyclic reduction gear final drive
Differential lock:	
. Type	Limited slip
. Method of engagement	Automatic
. Method of disengagement	Automatic

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:* 2200 rev/min km/h
Forward			
1	L	238.82	2.48
2	L	161.17	3.68
3	L	105.79	5.61
4	L	72.04	8.23
1	H	67.72	8.76
2	H	45.70	12.98
3	H	30.00	19.77
4	H	20.43	29.03
Reverse			
1	L	240.05	2.47
2	L	162.00	3.66
3	L	106.34	5.58
4	L	72.41	8.19
1	H	68.07	8.71
2	H	45.94	12.91
3	H	30.15	19.67
4	H	20.53	28.89

L = Low range H = High range

(*) Calculated with a tyre dynamic radius index of 715 mm (ISO 4251/1-1984)

Number of revolutions of front wheels for one revolution of rear wheels: 1.3355

POWER TAKE-OFF

Main power take-off

Type:	Independent
Method of engagement:	Lever and hydraulically operated multi-plate clutch
Number of shafts:	1
Method of changing power take-off speeds:	None

Clutch

Make:	Ford New Holland
Model:	None
Type:	Multiplate, wet
Number of plates:	7
Diameter of plates:	133.4 mm

Power take-off proportional to engine speed

540 rev/min

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6
Height above ground:	596 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	415 mm
Pto speed at rated engine speed:	676 rev/min
Engine speed at standard power take-off speed:	1756 rev/min
Ratio of rotation speeds:	3.252:1
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

Optional two speed shiftable Power take-off

540 rev/min

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6
Height above ground:	596 mm
Distance from the median plane of the tractor:	Central
Distance behind rear-wheel axis:	415 mm
PTO speed at rated engine speed:	676 and 818 rev/min
Engine speed at standard power take-off speed:	1451 and 1756 rev/min
Ratio of rotation speeds:	
Direction of rotation (viewed from behind tractor):	Clockwise

Optional Power take-off proportional to ground speed

540 rev/min

Travelling distance for 1 rev of the power take-off shaft:	275 mm
Number of power take-off shaft revolutions for one revolution of (rear) driving wheel:	16.32
Direction of rotation (viewed from behind tractor):	Clockwise

POWER LIFT

Make:	Sauer Sundstrand
Model:	None
Type: system	Gear type, closed centre load sensing
Type and number of cylinders:	1 located inside of transmission housing plus the option of additional 2 externally mounted, single acting; 2 fitted for test
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	17.6 - 18.3 MPa
Opening pressure of cylinder safety valve:	19.7 MPa
Lift pump type:	
Transmission between pump and engine:	Gear driven from pto shaft, independent of main and pto clutches
Type and number of filters:	1, replaceable paper element filter canister
Site of oil reservoir:	Rear axle housing
Type, number and location of tapping points:	1, from top of accessory cover
Maximum volume of oil available to external cylinders:	14.5 l

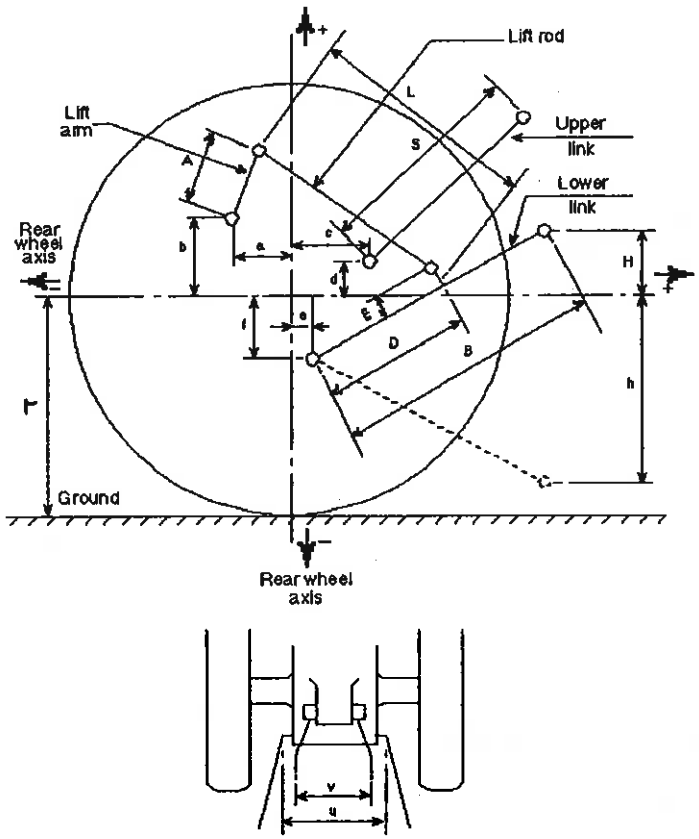
AUXILIARY HYDRAULIC SYSTEM

Make:	Sauer Sundstrand
Model:	None
Type:	Gear type
Relief valve pressure setting:	2650 psi
Lift pump type:	--
Transmission between pump and engine:	Direct drive from cam shaft
Type and number of filters:	1, replaceable paper element canister
Site of oil reservoir:	Rear Axle housing

Type and number of tapping points:	13
Maximum volume of oil available to external cylinders:	14.5 l

THREE-POINT LINKAGE

Category:	2 to ISO standard 730/1-1977
Category adaptor:	None
Controls:	Draught or position control with top link sensing



LIFT TEST
Linkage geometry

Table 2.1

Dimensions of linkage when attached to the standard frame (ISO 730/3-1982 CAT 2)

			Dimensions or range	Setting used in main test (supplementary tests)			
				MAIN	(B1)	(B2)	(B3)
Length of lift arms:		(A)	254	254			
Length of lower links:		(B)	864	864			
Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	203 257	203 257			
Horizontal distance between the two lower link points:		(u)	520	520			
Horizontal distance between the two lift arm end points:		(v)	546	546			
Length of upper link:		(S)	622 - 762	719	719	742	742
Distance of upper link pivot point from rear wheel centre line:	horizontally: vertically:	(c) (d)	222 or 262 191 or 153	222 191			
Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	68 203	68 203			
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally: vertically:	(D) (E)	480 on centre line	480 on centre line			
Length of lift rods:		(L)	720-774	770	743	770	743
Height of lower hitch points (*) relative to the rear wheel centre line, situated 715 mm above the ground level:							
- in low position		(h)	382 - 550	520	420	520	420
- in high position		(H)	176 - 270	142	202	142	202
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 715 mm ISO 4251/1-1984

SWINGING DRAWBAR	Drawbar as tested	Pick up hook
(Incorporated in automatic pick - up hitch with hook on opposite end selectable by reversing drawbar)		
Type:	Clevis	Hook
Height above ground, maximum:	476 mm	430 mm
minimum:	364 mm	--
Type of adjustment:	Inverting drawbar	None
Distance of hitch point from rear-wheel axis, horizontally:	637 mm - 807 mm	465 mm
Distance of hitch point form power take-off shaft ends:		
. Vertically:	120 mm - 232 mm	157 mm
. Horizontally:	222 mm - 392 mm	450 mm
Lateral adjustment (centre of clevis):		
. Right-hand:	51 mm - 280 mm	None
. Left-hand:	51 mm - 280 mm	None
Distance of pivot point from rear axles horizontally:	268 mm	--
Width of clevis:	64 mm	--
Diameter of drawbar pin hole:	27 mm	--
Maximum vertical permissible load:	1590 kg	1860 kg

TRAILER HITCH

Type: None fitted

LINKAGE DRAWBAR

Type: None fitted

FRONT TOWING HITCH

Type: None fitted

STEERING

Make:	Ford New Holland
Model:	None
Type:	Hydrostatic
Method of operation:	
. Pump	Sauer Sundstrand
. Motor	Danfoss OSPC-100-OR
. Ram	Double acting balance cylinder acting on both steering arms
. Filter	Replaceable paper element, integral with pump
Working pressure:	95 - 100 bar

BRAKES

Service brake

Make:	Girling
Model:	None
Type:	Oil-immersed multiplate discs
Method of operation:	Independent or combined pedal mechanical linkage
Trailer braking take-off:	None fitted

Parking brake

Type:	Mechanical linkage
Method of operation:	Hand lever with ratchet

WHEELS

Number:	4
. Front	2 steering and driving
. Rear	2 driving
Wheelbase:	2266 mm

Track width adjustment:

	Minimum, mm	Maximum, mm	Adjustment method
Front	1319	1926	Reversing wheels and offset lug rims
Rear	1420	2019	Reversing wheels and offset lug rims

PROTECTIVE STRUCTURE

Make:	Sekura
Model:	SEK 580 S90
Type:	Safety cab
Manufacturer's name and address:	Sekura Industries, Randers, Denmark
Protective device:	
. Rollguard	Safety cab
. Tiltable/Not tiltable	Non tiltable
OECD approval number:	CSS 0136/9

DRIVER'S SEAT

Make/Model/Type:	Bostrom, Field Master, Kab/XH2
Type of suspension:	Low frequency scissor, mechanical
Type of damping:	Double acting, hydraulic
Range of adjustment:	
. Longitudinal	75 mm
. Vertical	35 mm

LIGHTING

Unrestricted beam angle of headlight in plan view:	145°

	Height above ground of centre, mm	Size, mm	Distance from outside edge to median plane of tractor, mm
Headlight	976	127 dia	213
Sidelights	1465	70 x 70	737
Rear lights	1440	70 x 70	770
Axle reflectors	725	80 dia	513
Cab reflectors	1268	180 x 40	857

II. TEST CONDITIONS

Overall dimensions (overall width at 1620 measured front track)

Length mm	Width		Height at top of	
	Minimum mm	Maximum mm	Protective structure mm	Exhaust pipe mm
3818	1771	2457	2548	2650

Ground clearance (unballasted tractor) 305 mm

Clearance-limiting part: Drawbar clevis in lowest position

Tractor mass (with safety cab)

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	1279	1305	--	--
Rear	2089	2136	--	--
Total	3368	3441	--	--

Tyres and track width specification

	Front	Rear
Tyres . dimensions . ply rating . type	12.4 R 24 6 Radial	13.6 R36 6 Radial
Maximum load (tyre manufacturer's), kg	1200	1615
Maximum load (tractor manufacturer's), kg	1200	1615
Inflation pressure (tyre manufacturer's), Bar	1.7	1.6
Dynamic radius index	540	715
Chosen track width (manufacturer's nominal)	1620	1430

Oils and lubrication

Capacity and change interval

	Capacity l	Oil change h	Filter change h
Engine	8.5	300	300
Front axle	5.5	1200	None
Final drive (front)	1.8	1200	None
Gearbox	9.4	1200	1200
Rear axle	33.9	1200	300
Hydraulic system) Final drives (rear)) Brakes)	Integral with rear axle		
Steering	2.2	1200	1200

Fuels and lubricants used in tests

Fuel

Type: Diesel oil with cetane index of 54.5 and kinematic viscosity of 2.9 cSt at 40°C within the specification limits of Class A2 British Standard 2869/1983.

Specific gravity: 0.8380 kg/l at 15°C

Oils	Recommended	Used during test
Engine oil		
Type:	SAE 15W/40	As recommended
Viscosity:	11.5 cSt at 100°C	
Classification:	L-2104-C	
Transmission oils		
Type:	SAE 80W	As recommended
Viscosity:	9 cSt at 100°C	
Classification:	L-2105	
Rear final drives		
Type:	SAE 80W	As recommended
Viscosity:	9 cSt at 100°C	
Classification:	L-2105	
Front differential and final drives		
Type:	SAE 80W	As recommended
Viscosity:	9 cSt at 100°C	
Classification:	L-2105	
Hydraulic brakes		
Type:	None	As recommended
Viscosity:		
Classification:		
Hydraulic fluid		
Type:	SAE 80W	As recommended
Viscosity:	9 cSt at 100°C	
Classification:	L-2105	
Steering oil		
Type:	ATF 200	As recommended
Viscosity:	7.0 cSt at 100°C	
Classification:	A.T.F. 200	
Recommended grease:	Lithium based	As recommended
Number of lubrication points:	13	

III. TEST RESULTS

A. COMPULSORY TEST RESULTS

1. MAIN POWER TAKE-OFF

Date and location of tests: 23 April 1991
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Water brake, Heenan & Froude

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						
46.5	2200	676	12.26	14.63	264	3.17
1.2 POWER AT RATED ENGINE SPEED						
46.5	2200	676	12.26	14.63	264	3.17
1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
41.6	1756	540	10.54	12.58	253	3.31
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
46.5	2200	676	12.26	14.63	264	3.17
1.4.2 85% of the torque defined in 1.4.1						
40.7	2260	695	11.17	13.33	274	3.06
1.4.3 75% of the torque defined in 1.4.2						
30.8	2281	701	9.22	11.01	300	2.79
1.4.4 50% of the torque defined in 1.4.2						
20.7	2297	706	7.23	8.62	349	2.40
1.4.5 25% of the torque defined in 1.4.2						
10.5	2307	709	5.50	6.56	526	1.59
1.4.6 Unloaded						
0	2325	715	4.12	4.91	--	--

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	
1.5 1.5.1	PART LOADS AT STANDARD POWER TAKE-OFF SPEEDS (± 10 rev/min) The torque corresponding to maximum power					
41.6	1756	540	10.54	12.58	253	3.31
1.5.2	85% of the torque obtained in 1.5.1					
36.2	1810	557	9.25	11.04	256	3.27
1.5.3	75% of the torque obtained in 1.5.2					
27.8	1838	565	7.44	8.88	267	3.14
1.5.4	50% of the torque obtained in 1.5.2					
18.8	1864	573	5.76	6.88	306	2.74
1.5.5	25% of the torque obtained in 1.5.2					
9.4	1890	581	4019	4.99	445	1.88
1.5.6	Unloaded					
0	1935	595	2.94	3.51	--	--

No load, maximum engine speed: 2325 rev/min

Torque (equivalent crankshaft) at maximum power: 201.8 Nm

Maximum torque (equivalent crankshaft)
(engine speed 1200 rev/min): 249.7 Nm

Mean atmospheric conditions:

- Temperature 21°C
- Pressure 1022 m bar
- Relative humidity 30%

Maximum temperatures:

- Coolant 85°C
- Engine oil 101°C
- Fuel 56°C
- Engine air intake 29°C

2. HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 7 May 1991

2.1 Hydraulic power test

Sustained pressure with relief valve open: 17.7 MPa

Pump delivery rate at minimum pressure: 35.3 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	22.8	15.9	5.90
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	29.0	15.0	7.25

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

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement	672 mm	798 mm
Maximum corrected force exerted through full range	16.3 kN	14.8 kN
Corresponding pressure of hydraulic fluid	15.9 MPa	15.9 MPa
Moment about rear-wheel axis	15.2 kNm	22.8 kNm
Maximum tilt angle of mast from vertical	--	10 degrees

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

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	370	-317	-200	-100	0	50	125	200	300	345	428
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	--	16.3	19.0	20.1	22.0	22.6	23.1	23.6	24.3	24.1	--
Corresponding pressure: 15.9 MPa											
at the frame kN	14.8	15.6	17.3	18.0	18.6	18.6	18.7	18.6	18,2	18.6	17.4
Corresponding pressure: 15.9 MPa											

3. DRAWBAR POWER AND FUEL CONSUMPTION TEST (UNBALLASTED TRACTOR)

Date of tests: 4 June 1991
Type of track: Concrete

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
330 mm	83 kPa	83 kPa

Gear and Range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels or track	Spec fuel cons	Spec energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Eng oil	Temp	Rel humidity	Pres
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS													
*1L	20.1	32.8	2.20	2289	15.0	441	1.90	45.7	72.9	89.4	14.7	46.1	1008
*2L	29.2	32.6	3.23	2267	15.0	387	2.17	41.9	75.6	85.4	11.2	60.8	1009
3L	37.2	25.6	5.22	2200	7.1	338	2.48	39.6	77.8	92.6	12.1	55.1	1008
4L	36.1	16.4	7.90	2200	4.2	348	2.41	41.7	77.0	93.1	12.6	47.2	1008
1H	38.1	16.2	8.44	2200	4.3	329	2.55	47.9	78.1	94.5	12.7	53.5	1008
2H	37.6	10.7	12.62	2200	3.1	337	2.49	42.2	75.6	94.8	12.2	50.8	1008
3.2 FUEL CONSUMPTION 3.2.1 In selected gear, at maximum power at rated speed													
1H	38.1	16.2	8.44	2200	4.3	329	2.55	47.9	78.1	94.5	12.7	53.3	1008
3.2.1.1 75% of pull at maximum power at rated speed													
1H	29.9	12.3	8.77	2271	3.4	356	2.35	42.5	68.5	88.2	13.3	44.7	1008
3.2.1.2 50% of pull at maximum power at rated speed													
1H	20.3	8.2	8.94	2294	2.4	413	2.03	41.3	71.5	88.3	13.1	48.0	1008
3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.1													
2H	30.2	12.3	8.77	1537	3.4	304	2.76	47.0	76.3	88.5	14.2	46.3	1008
3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.2													
2H	20.2	8.2	8.94	1554	2.4	324	2.59	48.1	76.8	88.8	13.7	43.5	1008
3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed													
4L	36.1	16.4	7.90	2200	4.2	348	2.41	41.7	77.0	93.1	12.6	47.2	1008
3.2.2.1 75% of pull at maximum power at rated speed													
4L	27.8	12.3	8.25	2271	3.3	381	2.20	44.0	74.9	89.4	13.8	48.1	1008
3.2.2.2 50% of pull at maximum power at rated speed													
4L	19.0	8.1	8.41	2291	2.3	453	1.85	44.23	74.9	90.0	13.5	48.2	1008
3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.1													
1H	27.7	12.3	8.25	2125	3.3	346	2.42	48.5	74.0	88.1	14.3	45.7	1008
3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.2													
1H	18.9	8.1	8.41	2147	2.5	400	2.10	48.1	71.5	88.4	14.4	43.5	1008

* Maximum power limited by wheelslip

B. SUPPLEMENTARY POWER LIFT TESTS

1. Power lift test - To ISO 730/3-1982 but manufacturers lift rod setting

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	288 mm	288 mm
Vertical movement	630 mm	789 mm
Maximum corrected force exerted through full range	18.7 kN	16.0 kN
Corresponding pressure of hydraulic fluid	15.9 MPa	15.9 MPa
Moment about rear-wheel axis	17.4 kNm	24.7 kNm
Maximum tilt angle of mast from vertical	--	11 degrees

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

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	255	217	100	50	0	50	100	200	300	405	518
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	--	18.7	20.1	21.8	22.6	23.3	23.7	24.8	25.4	25.6	--
Corresponding pressure: 15.9 MPa											
at the frame kN	16.0	16.5	18.0	18.6	18.8	19.1	19.1	19.1	18.8	18.3	17.8
Corresponding pressure: 15.9 MPa											

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	672 mm	896 mm
Maximum corrected force exerted through full range	16.3 kN	13.1 kN
Corresponding pressure of hydraulic fluid	15.9 MPa	15.9 MPa
Moment about rear-wheel axis	15.2 kNm	20.2 kNm
Maximum tilt angle of mast from vertical	--	13 degrees

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

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	401	317	200	100	0	50	125	200	300	345	495
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	--	16.3	19.0	20.1	22.0	22.6	23.1	23.6	24.3	24.1	--
Corresponding pressure: 15.9 MPa											
at the frame kN	13.1	14.4	15.9	16.6	17.0	17.1	17.2	17.1	16.7	16.7	15.8
Corresponding pressure: 15.9 MPa											

3. Power lift test - To ISO 730-1:1990 but manufacturers lift rod setting

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	288 mm	288 mm
Vertical movement	630 mm	856 mm
Maximum corrected force exerted through full range	18.7 kN	14.5 kN
Corresponding pressure of hydraulic fluid	15.9 MPa	15.9 MPa
Moment about rear-wheel axis	17.4 kNm	22.4 kNm
Maximum tilt angle of mast from vertical	--	15 degrees

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

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	281	217	100	50	0	50	100	200	300	405	575
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	--	18.7	20.1	21.8	22.6	23.3	23.7	24.8	25.4	25.6	--
Corresponding pressure: 15.9 MPa											
at the frame kN	14.5	15.6	17.0	17.3	17.5	17.6	17.7	17.7	17.5	17.1	15.9
Corresponding pressure: 15.9 MPa											

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

Test carried out by: E Nigro, S Devonshire

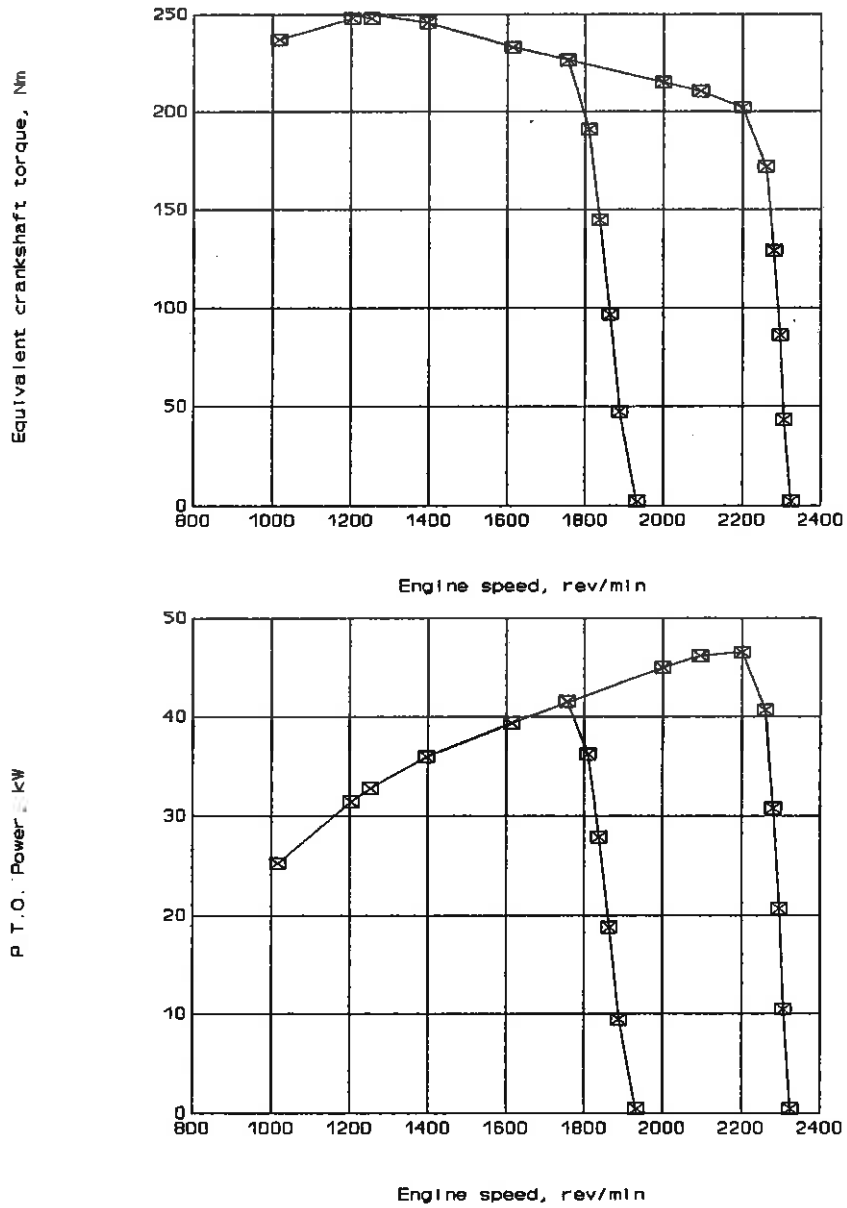
Officer in charge: P C Seward

Signed: H M R Proctor — Head of Test Engineering Group

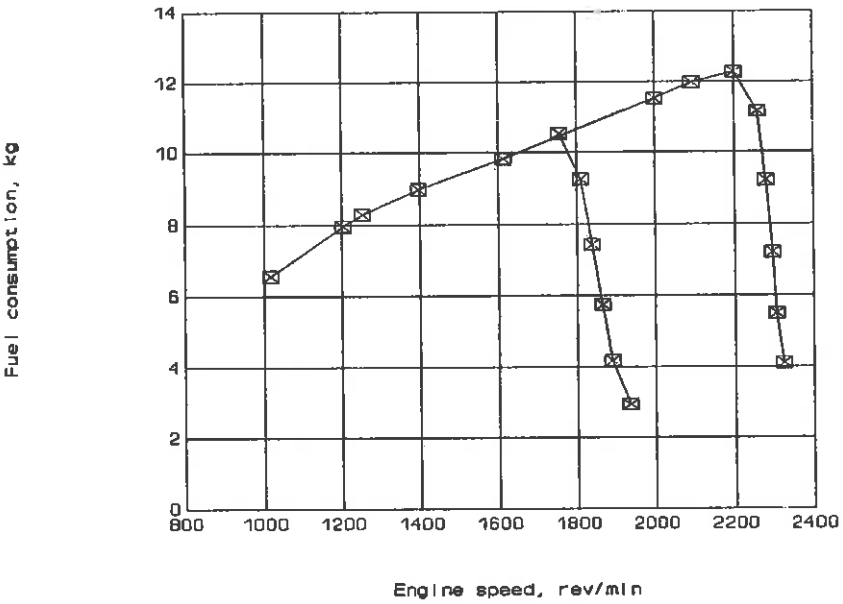
H M R Proctor — for the Director

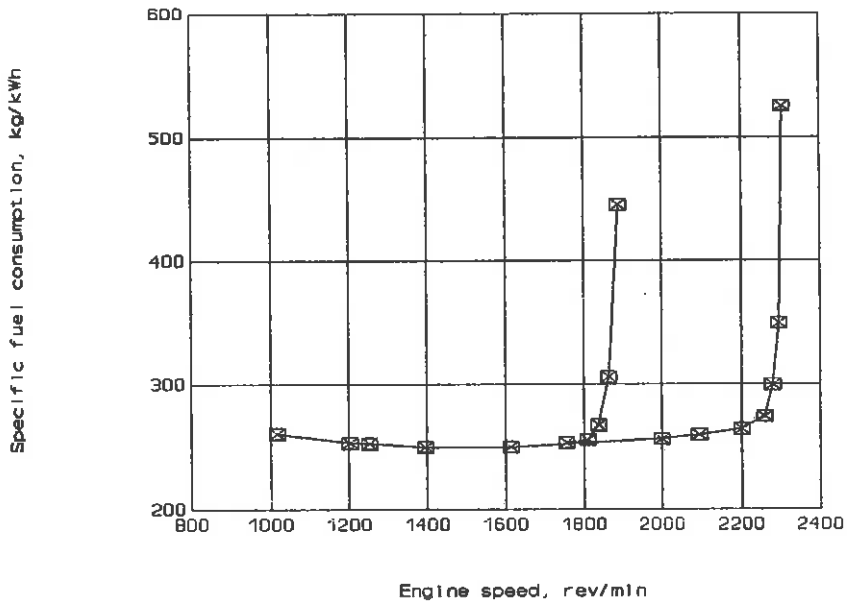
Date: 21/11/91

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