

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

**Massey-Ferguson 390 Two-Wheel Drive Tractor with 12-speed
Multi-power Transmission**



Manufactured by	Massey-Ferguson Manufacturing Limited, Banner Lane, Coventry, Warwickshire CV4 9GF
Test No.	R87/70578/OECD
Report No.	718
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THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

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Tractor manufacturer's name and address: Massey-Ferguson Manufacturing Limited
Banner Lane, Coventry, Warwickshire
CV4 9GF

Submitted for test by: The manufacturer

Selected for test by: The manufacturer with the agreement
of the testing station

Place of running in: Coventry

Duration of running in: 60 hours

I. SPECIFICATION OF TRACTOR

TRACTOR

Make: Massey-Ferguson
Trade name: Massey-Ferguson
Model: M-F 390 with 12-speed multi-power
transmission
Type: Four wheel, rear wheel driven,
unit construction
Serial No: 5008U47002
1st Serial No: 5008U01001

ENGINE

Make: Perkins
Model: A4.248
Type: 4-stroke, direct injection,
naturally aspirated diesel
Serial No: LF 31141U131505N

Cylinders

Number/disposition: 4, vertical, in-line
Bore/stroke: 101.1 mm/127.0 mm
Capacity: 4078 cm³
Compression ratio: 16:1
Arrangement of valves: Overhead
Cylinder liners: Dry

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Fuel System

Fuel feed system:	AC Delco mechanical feed pump.
Make, type and model of fuel filter(s):	C.A.V. paper element filter with transparent sediment bowl
Capacity of fuel tank:	108 l
Make, type and model of injection pump:	C.A.V., distributor, DPA3241F570
Serial No:	13154 MDG
Manufacturer's production setting of injection pump:	14.9-15.7 l/h at 2000 rev/min engine speed at full load and 40°C pump inlet temperature
Injection pump timing:	Delivery starts 24° before T.D.C., static
Make, type and model of injectors:	C.A.V. 4-hole, BDLL 150S6600
Injection pressure:	17.1 MPa

Governor

Make:	C.A.V.
Type:	Mechanical incorporated in injection pump
Governed range of engine speed:	750 to 2420 rev/min
Rated engine speed:	2200 rev/min

Air cleaner**Pre-cleaner**

Make and type:	Nelson-Burgess, Visibowl, centrifugal
Location:	Above engine cover

Main

Make and type:	Donaldson, ELD08 2-stage dry paper element
Location	Under engine cover
Maintenance indicator:	Warning light on instrument panel

Lubrication system

Type of feed pump:	Forced feed from eccentric rotor pump
Total oil capacity including filter(s):	7.5 l
Oil change period:	250 hours
Type of filter:	Full flow replaceable element canister
Number:	1
Filter change period:	250 hours
Recommended oil:	See "Fuels and lubricants used in tests"

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Cooling system

Type of coolant:	Water or water and anti-freeze solution
Specification of pump	
Type:	Centrifugal
Description of fan:	Belt driven, puller
Number of fan blades:	4
Fan diameter:	457 mm
Coolant capacity:	15.1 l
Type of temperature control:	Thermostat
Superpressure system:	69 kPa

Starting system

Safety device:	Operable only when high/low gear and pto selectors are in neutral position
Starter motor	
Make:	Lucas
Type:	Electrical, pre-engaged, solenoid operated
Model and power rating:	M127, 12V, 2.8 kW
Cold starting aid:	Lucas C.A.V. Thermostart

Electrical system

Voltage:	12
Generator:	Alternator
Make:	Lucas
Model:	A127
Type:	Belt driven
Power:	0.54 kW
Batteries	2, M.F. Powerpart, lead-acid
Rating:	420 A CCA rating each or equivalent 75 Ah at 20-hour rating

Exhaust system

Make:	Nelson-Burgess
Type:	Spark arrester silencer
Model:	17AE10
Location:	Under engine cover with vertical stack pipe
Height of outlet above ground:	2386 mm

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TRANSMISSION**Clutch**

Make: Laycock
Type: Dry, for transmission only
Number of plates: 1
Diameter of plates: 305 mm
Method of operation: Mechanically by pedal

Gear box

Make: Massey-Ferguson
Type: Mechanical, manual operation
Arrangement: 3 forward and 1 reverse speeds with a manually operated high/low range epicyclic unit and an electro/hydraulically operated dual range constant mesh unit
Number of speeds: 12 forward, 4 reverse
Available options: 12 speed synchromesh

Rear axle and final drives

Make: Massey-Ferguson
Type: Crown wheel and pinion, with outboard epicyclic reduction gears

Differential lock

Type: Mechanical
Method of engagement: Pedal operated
Method of disengagement: Pedal operated

Transmission oils

Gear box, transmission,
final drives and power
lift housing:

Capacity 49.8 l
Change period: 1000 hours
Filter change period: 250 hours
Recommended oil: See "Fuels and lubricants used in tests"

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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	LM	294.83	1.96
1	L	232.81	2.48
2	LM	196.56	2.93
2	L	155.21	3.71
3	LM	107.21	5.38
3	L	84.66	6.81
1	HM	72.07	8.00
1	H	56.91	10.13
2	HM	48.05	12.00
2	H	37.94	15.19
3	HM	26.21	21.99
3	H	20.69	27.85
Reverse			
R	LM	196.56	2.93
R	L	155.21	3.71
R	HM	48.05	12.00
R	H	37.94	15.19

M = Multipower engaged L = Low range H = High range

Rear tyre size: 16.9-30

Tyre loaded radius 695 mm

FRONT AXLE

Make: Massey-Ferguson

Type: Non-driven, extendable

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POWER TAKE-OFFMain power take-off

Type:	Independent of main clutch
Method of engagement:	Lever and hydraulically operated multiplate clutch
Number of shafts:	1
Method of changing power take-off speeds	Manually, by exchanging shafts

Power take-off proportional to engine speed

Tyre sizes, Front, Rear:	7.50-16, 16.9-30
(i) <u>540 rev/min</u>	
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:	577 mm
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	296 mm
Pto speed at rated engine speed:	627 rev/min
Engine speed at standard power take-off speed:	1893 rev/min
Engine to pto ratio:	3.5064:1
Power restriction:	I.S.O. recommendation, 48 kW
Direction of rotation (viewed facing driving end):	Clockwise
(ii) <u>1000 rev/min</u> (not fitted for test)	
Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	21 to ISO standard 500
Height above ground:	577 mm
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	296 mm
Pto speed at rated engine speed:	1158 rev/min
Engine speed at standard power take-off speed:	1900 rev/min
Engine to pto ratio:	1.900:1
Direction of rotation (viewed facing driving end):	Clockwise

POWER LIFT

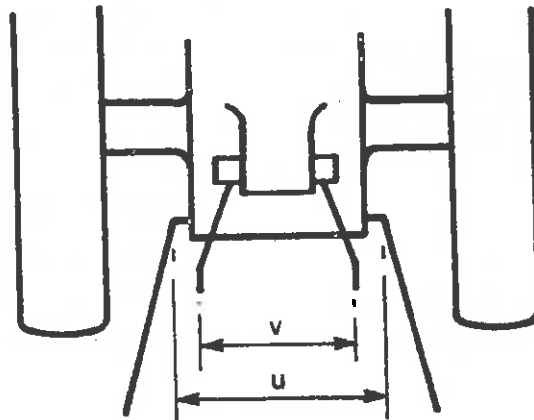
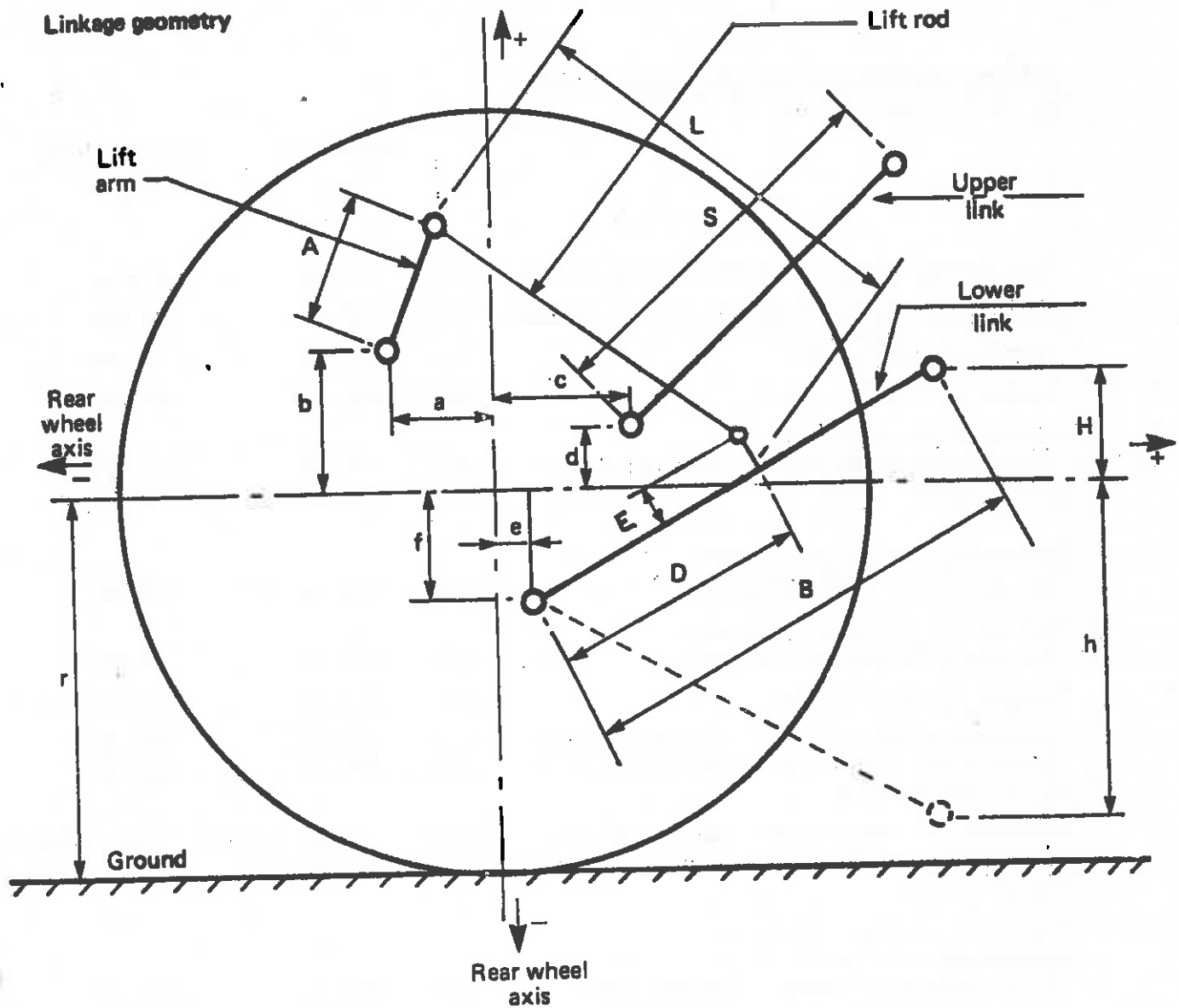
Make:	Massey-Ferguson
Type:	Hydraulic
Number and type of cylinders:	One, single acting,
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	20.5 - 24.0 MPa
Opening pressure of cylinder safety valve:	None fitted
Main lift pump type:	4-cylinder piston
Transmission between pump and engine:	Driven from pto shaft, independent of main clutch
Make and number of filters:	Own make metal mesh strainer
Time between oil changes:	1000 hours
Time between filter changes:	Clean mesh every 1000 hours
Oil capacity:	47.4 l
Site of oil reservoir:	Main transmission housing
Type and number of tapping points:	One on centre housing top cover.
Maximum volume of oil available to external cylinders:	18 l
Recommended oil	See "Fuels and lubricants used in tests"

AUXILIARY HYDRAULIC SYSTEM

Make:	Bosch
Relief valve pressure setting:	17.0 - 20.6 MPa
Pump type:	Gear
Transmission between pump and engine:	Driven in tandem with steering pump from engine timing gears
Make and number of filters:	Parker Hannifin replacement canister and mesh strainer
Time between oil changes:	1000 hours
Time between filter changes:	250 hours, clean strainer 1000 hours
Oil capacity:	47.4 l
Site of oil reservoir:	Main transmission housing
Type and number of tapping points:	2 quick release couplings via 2 spool valves with separate returns to ISO standard. A valve allows combination of main and auxiliary systems up to auxiliary system relief valve pressure
Maximum volume of oil available to external cylinders:	18 l
Recommended oil	See "Fuels and lubricants used in tests"

THREE POINT LINKAGE

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



Linkage dimensions for the lifting test

		Compulsory test	Supplementary test
Rear tyres: (size 16.9-30) radius index:	(r)	695 mm	695 mm
Front tyres: (size 7.50-16) loaded radius:	(r')	360 mm	360 mm
Length of lift arms:	(A)	267 mm	267 mm
Length of lower links:	(B)	965 mm	965 mm
Distance of lift arm pivot point from rear wheel centre line:	horizontally: (a) vertically: (b)	196 mm 233 mm	196 mm 233 mm
Horizontal distance between the two lower link points:	(u)	492 mm	492 mm
Horizontal distance between the two lift arm end points:	(v)	534 mm	534 mm
Length of upper link:	(S)	753 mm	753 mm
Distance of upper link pivot point from rear wheel centre line:	horizontally: (c) vertically: (d)	186 mm 205 mm	186 mm 205 mm
Distance of lower link pivot point from rear wheel centre:	horizontally: (e) vertically: (f)	32 mm forward 212 mm	32 mm forward 212 mm
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontal: (D) vertical: (E)	504 mm 21 mm	504 mm 21 mm
Length of lift rods:	(L)	677 mm	666 mm
Height of lower hitch points relative to the rear wheel centre line, situated 695 mm above the ground level			
- in low position:	(h)	495 mm	453 mm
- in high position:	(H)	178 mm	196 mm
Height of lower hitch points when locked in transport position:		Any height within lift range	

SWINGING DRAWBAR

Tyre sizes	Front:	7.50-16
	Rear:	16.9-30
Height above ground, maximum:		506 mm
	minimum:	352 mm
Type of adjustment:		Inverting drawbar and clevis
Distance of hitch point from rear axle centre:		602 mm and 652 mm
Distance of hitch point from power take-off shaft ends:		
vertically:		71 mm to 225 mm
horizontally:		356 mm and 406 mm
Lateral adjustment:		516 mm and 552 mm
Distance of pivot point from rear axles horizontally:		130 mm forward
Diameter of drawbar pin hole:		25.4 mm

FRONT TOWING HITCH

Vertical height to centre of clevis:	610 mm
Width of clevis:	65 mm
Diameter of pin hole:	33 mm

STEERING

Method of operation:	Hydrostatic system with hand operated steering motor powered from engine mounted gear pump operating a ram integral with track rod
Pump:	Bosch gear type, in tandem with auxiliary hydraulic system pump
Motor:	Danfoss OSPC-ON
Ram	Massey-Ferguson double acting, integral with track rod
Working pressure:	17 MPa
Oil capacity:	47.4 l
Oil change period:	1000 hours
Make and model of filter:	Parker Hannifin replaceable canister and metal strainer
Filter(s) change period:	250 hours
Recommended oil:	See "Fuels and lubricants used in tests"

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BRAKESService brake

Make:	Girling
Type:	Oil immersed multi-plate discs, 4 per side
Method of operation:	Independent or combined pedal, hydraulic actuation
Trailer braking take-off:	None fitted

Parking brake

Type:	Mechanical by cable connected to both service brakes
Method of operation:	Hand lever with ratchet

STEERING WHEELS

Number:	2
Location:	At front
Tyres:	Goodyear Super Rib Tractor
Size:	7.50-16
Ply rating:	6
Type of casing:	Cross-ply
Maximum permissible load on each tyre:	745 kg
Corresponding inflation pressure:	280 kPa
Track widths:	1247 mm by 102 mm steps to 1857 mm
Method of adjustment:	Extending axle

DRIVING WHEELS

Number:	2
Location:	At rear
Tyres:	Goodyear Dyna Torque
Size:	16.9-30
Ply rating:	6
Type of casing:	Crossply
Maximum permissible load on each tyre:	1900 kg
Corresponding inflation pressure:	130 kPa
Track widths:	1500 mm by 102 mm steps to 2112 mm
Method of adjustment:	Power assisted variable track

WHEELBASE

2136 mm

CSS 052/10

Trade name and model: Massey Ferguson 300H

Manufacturer: Massey-Ferguson Manufacturing Ltd

Description: A two-post folding ROPS of steel welded and bolted construction to the rear of the operator's seat, bolted to the rear axle casings.

Grammer DS44

Spring

Hydraulic

150 **2000**60 ~~1000~~

no

	Height above ground of centre, mm	Size, mm	Distance from out- side edge of tractor to centre, at 1500 mm track width, mm
Headlights,	1098	100 x 160	825
Front work lights	1590	70 x 130	256
Rear lights,	1545	73 x 50	438
Mudguard reflectors,	1545	46 x 46	381
Rear axle reflectors	658	80 dia	518

CONDITIONS DURING TESTOverall dimensions

(front: 7.50-16 rear: 16.9-30 tyres fitted)

Length, m	Width,		Height at top of, Protective structure, m	steering wheel, m
	min. m	max. m		
3.67	1.94	2.55	2.47	1.70

Ground clearance

Clearance: 295 mm limited by drawbar clevis in lowest position

Track setting

Front: 1350 mm
Rear: 1500 mm

Tractor mass

(without driver but with tanks full, ROPS fitted)

Front, kg	Rear, kg	Total, kg
1125	1869	2994

Fuel and lubricants used in testsFuel

Type: Diesel oil to Class D British Standard 2869:1970 specific gravity 0.8345 at 15°C, Cetane index 53.5

<u>Oils</u>	<u>Recommended</u>	<u>Used during test</u>
Engine		
Type:	SAE 15W/30	As recommended
Viscosity:	54cSt at 50°C	
Classification:	MIL-L-2104-C	
Transmission, final drives, steering and hydraulics		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-C	
Hydraulic brakes		
Type:	Mineral	As recommended
Viscosity:	7.2 cSt at 50°C	
Classification::	M-F CMS 1151A	
Recommended grease:	Consistency 2 lithium	As recommended
Number of lubrication points:		
	13	

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II. TEST RESULTSA. COMPULSORY TESTS1. MAIN POWER TAKE-OFF PERFORMANCE

Date of tests: 19th June 1987,

Type of dynamometer: Water brake, Heenan & Froude

Power, kW	Speed, rev/min		Fuel consumption,			Specific energy, kWh/1
	Engine	P.t.o.	Hourly, l/h	Specific, kg/h	kg/kWh	
MAXIMUM POWER - 2 HOUR TEST						
50.2	2200	627	16.55	13.81	0.275	3.03
POWER AT RATED ENGINE SPEED						
50.2	2200	627	16.55	13.81	0.275	3.03
POWER AT STANDARD POWER TAKE-OFF SPEED						
47.6	1893	540	14.73	12.29	0.258	3.23
PART LOADS						
(1) The torque corresponding to maximum power at rated engine speed						
50.2	2200	627	16.55	13.81	0.275	3.03
(2) 85% of the torque obtained in (1)						
43.5	2244	640	14.72	12.28	0.282	2.96
(3) 75% of the torque defined in (2)						
33.0	2274	649	12.08	10.08	0.305	2.73
(4) 50% of the torque defined in (2)						
22.2	2286	652	9.69	8.09	0.365	2.29
(5) 25% of the torque defined in (2)						
11.2	2310	659	7.37	6.15	0.549	1.52
(6) Unloaded						
0	2349	670	5.51	4.60	-	-

Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (540 rev/min).

Power, kW	Speed, rev/min		Fuel consumption,			Specific energy, kWh/l
	Engine	P.t.o.	Hourly, l/h	kg/h	Specific, kg/kWh	
(1) The torque corresponding to maximum power at standard pto speed						
47.6	1893	540	14.73	12.29	0.258	3.23
(2) 85% of the torque obtained at maximum power						
41.3	1932	551	12.59	10.51	0.254	3.28
(3) 75% of the torque defined in (2)						
31.6	1970	562	10.44	8.71	0.276	3.03
(4) 50% of the torque defined in (2)						
21.5	2003	571	8.26	6.89	0.320	2.60
(5) 25% of the torque defined in (2)						
10.9	2043	583	6.12	5.11	0.469	1.78
(6) Unloaded						
0	2086	595	4.24	3.54	-	-

Standard specific fuel consumption, kg/kWh

(a) 0.282	(c) 0.254
(b) 0.365	(d) 0.320

No load, maximum engine speed

2349 rev/min

Equivalent crankshaft torque at maximum power

217.8 Nm

Maximum equivalent crankshaft torque

258.0 Nm at

1360 rev/min engine speed

Mean atmospheric conditions temperature

21°C

pressure

996 m bar

relative humidity

74%

Maximum temperature

coolant

83°C

engine oil

114°C

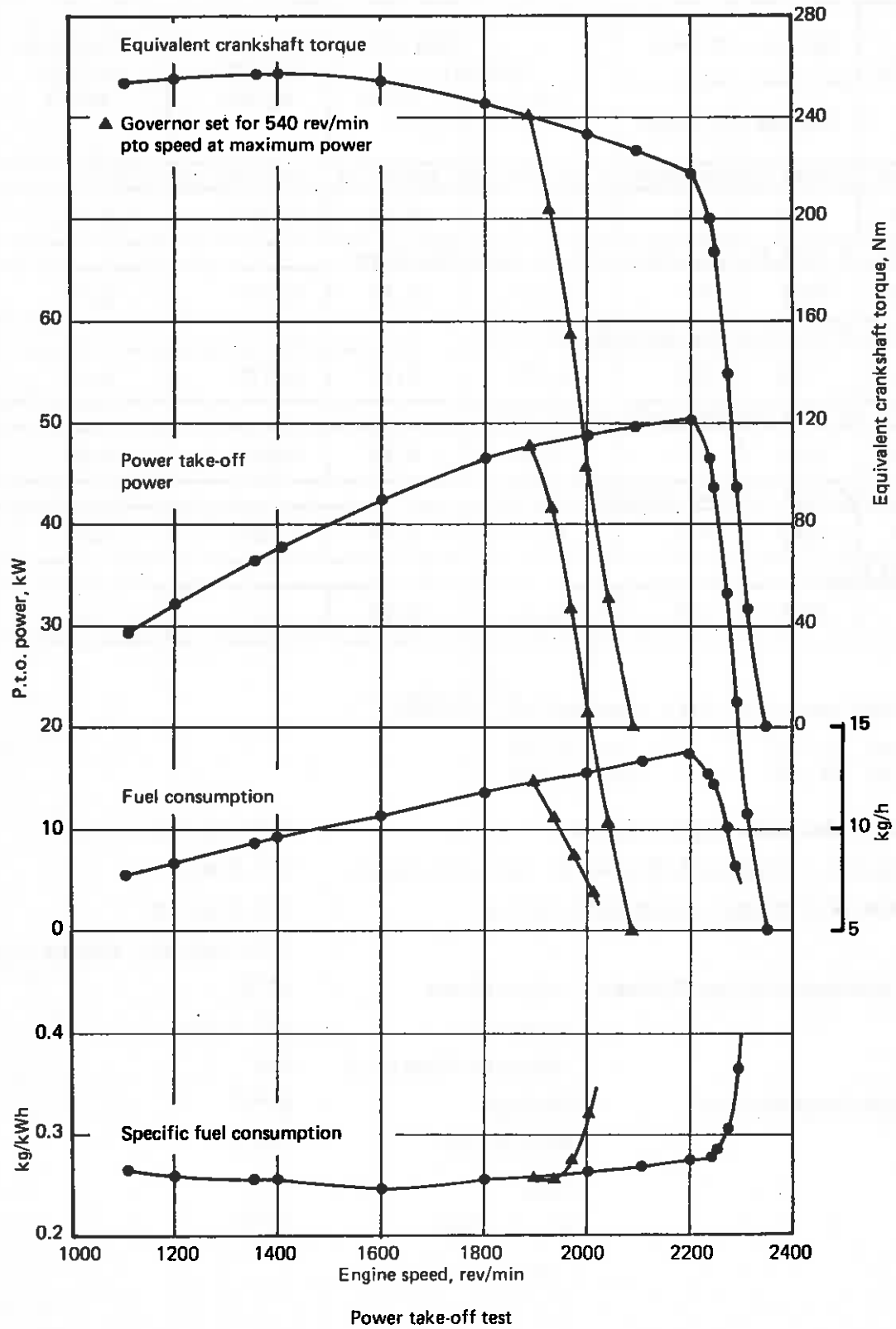
fuel

22°C

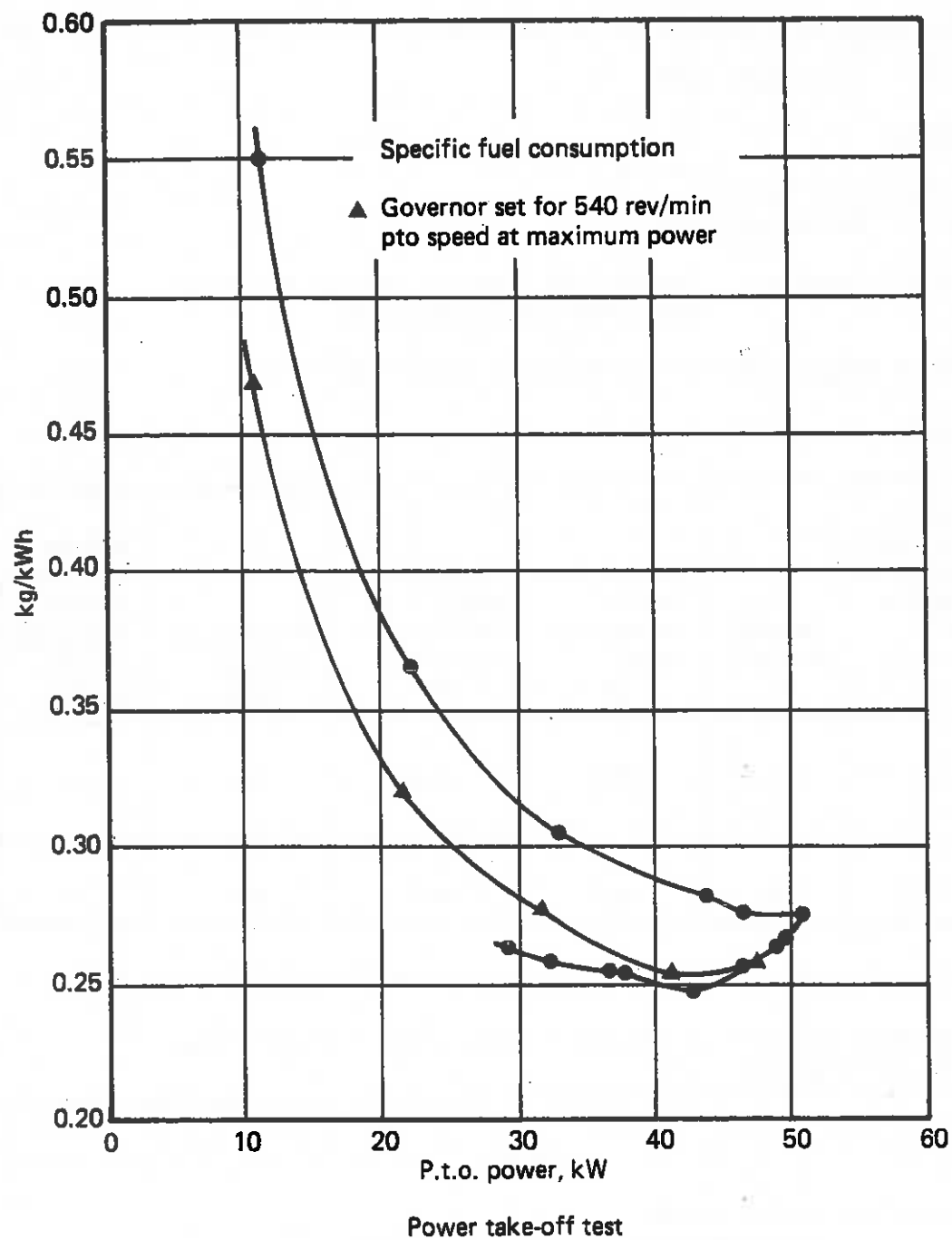
air intake

22°C

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2. LIFTING FORCE AND HYDRAULIC POWER (without auxiliary system in operation)

Date of tests: 22nd June 1987

Hydraulic fluid

Make and type: SAE 15W/30

Viscosity: 54 cSt at 50°C

Type of hydraulic system: Piston type pump delivering oil from
main transmission housing

Hydraulic fluid temperature at beginning of test: 60°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	200	673	20.7	20.5	19.3	-
On the frame	180	797	19.5	20.5	30.1	11

Main linkage dimensions - see drawings and table on pages 9 and 10

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

mm	-303	-283	-200	-100	0	100	250	335	445
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Lifting forces at hitch points
(corresponding pressure 20.5 MPa)

kN	-	20.7	21.5	22.9	23.9	24.6	25.5	26.4	-
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Lifting forces at test frame
(corresponding pressure 20.5 MPa)

kN	19.7	19.8	20.1	20.6	20.8	20.9	20.4	19.8	19.5
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Hydraulic power test

Sustained pressure with relief valve open 23.8 MPa

Pump delivery rate at minimum pressure 30.9 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 27.2 l/min

Pressure 21.4 MPa

Power 9.7 kW

Flow rate and hydraulic pressure corresponding to maximum hydraulic power

Flow rate 29.8 l/min

Pressure 20.5 MPa

Power 10.2 kW

Tapping point used for test: Auxiliary service connection fitted for test only

Temperature of hydraulic fluid, if different from $65^{\circ} \pm 5^{\circ}\text{C}$ 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: 29th September 1987

Type of track: Concrete

Height of drawbar above ground: 490 mm

Tyre size and pressure:
Front: 7.50-16 179 kPa
Rear: 16.9-30 83 kPa

Gear	Speed, km/h	Power, kW	Drawbar pull, kN	Engine speed, rev/min	Wheel- slip, %	Specific fuel consumption, kg/kWh	Fuel consumption, l/h	Temperature, °C		Atmospheric conditions			
								Fuel	Coolant	Engine oil	Temperature, °C	Relative humidity, %	Pressure, m bar
(1) MAXIMUM DRAWBAR POWER IN GEARS													
3M	4.63	28.7	22.3	2261	15.0	0.395	2.17	44	80	86	13	48	1027
3L	5.76	35.7	22.3	2224	15.0	0.364	2.29	45	81	91	13	51	1027
1H	6.97	39.5	20.4	2197	12.3	0.345	2.42	47	81	95	13	51	1027
1H	9.24	40.8	15.9	2198	8.0	0.335	2.49	45	81	95	14	48	1027
2H	11.13	41.4	13.4	2197	6.5	0.325	2.57	47	81	96	14	48	1027
2H	14.51	41.1	10.2	2200	5.0	0.327	2.55	47	81	96	13	49	1027
(2a) TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS													
(1) SELECTED GEAR (Speed closest to 7.5 km/h)													
1H	6.97	39.5	20.4	2197	12.3	0.345	2.42	47	81	95	13	51	1027
(11) 75% OF FULL AT MAXIMUM POWER													
1H	7.51	31.9	15.3	2257	7.7	0.353	2.36	47	81	95	13	48	1027
(111) 50% OF FULL AT MAXIMUM POWER													
1H	7.87	22.3	10.2	2284	5.0	0.406	2.06	47	81	95	14	48	1027
HIGHER GEAR SAME PULL AS IN (11) REDUCED ENGINE SPEED													
1H	7.51	31.9	15.3	1769	7.7	0.301	2.77	44	80	85	14	46	1026
HIGHER GEAR SAME PULL AS IN (111) REDUCED ENGINE SPEED													
1H	7.94	22.5	10.2	1804	5.0	0.328	2.54	44	80	86	14	45	1026
(2b) TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS													
(1) SELECTED GEAR (Maximum power)													
2H	11.13	41.4	13.4	2197	6.5	0.325	2.57	47	81	96	14	48	1027
(11) 75% OF FULL AT MAXIMUM POWER													
2H	11.65	32.7	10.1	2251	5.0	0.347	2.40	48	81	96	13	47	1027
(111) 50% OF FULL AT MAXIMUM POWER													
2H	12.14	22.6	6.7	2282	3.6	0.410	2.04	47	80	96	13	48	1027
HIGHER GEAR SAME PULL AS IN (11) REDUCED ENGINE SPEED													
2H	11.62	32.6	10.1	1772	5.0	0.296	2.82	43	80	83	14	45	1026
HIGHER GEAR SAME PULL AS IN (111) REDUCED ENGINE SPEED													
2H	12.04	22.4	6.7	1800	3.6	0.333	2.51	43	80	84	14	44	1026

*Maximum power limited by wheel slip

B. OPTIONAL TESTS**1. LOCATION OF CENTRE OF GRAVITY**

Height above ground, mm	779
Distance forward from the vertical plane containing the axis of the rear wheels, mm	796
Distance from the median plane of the tractor, mm	0

2. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 7th July 1987
 Type of sound level meter: Bruel and Kjaer 2209
 Type of track: Concrete
 Cab fitted: Roll bar

Results of tests:

Gear	Drawbar pull at which the tractor develops maximum sound level, kN	Measured travelling speed, km/h	Sound level, dBA
*1HM	18.0	7.1	95
*1HM	Light load	8.5	93
3LM	18.0	4.9	96
3L	12.0	7.6	96
2HM	13.7	10.5	96
3H	Light load	29.1	95

* The gear corresponds to the nominal travelling speed nearest to 7.5 km/h

3. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 7th July 1987
 Type of sound level meter: Bruel and Kjaer 2209
 Type of track: Concrete
 Results of tests
 Gear: 3H
 Travelling speed before acceleration: 21.8 km/h
 Sound level: 87 dBA

C. SUPPLEMENTARY TESTS**Lifting force** (Without auxiliary system in operation)

Linkage set in accordance with the manufacturers recommendations for general use.

Date of tests: 19th June 1987

Hydraulic fluid

Make and type: SAE 15w/30

Viscosity: 54 cSt at 50°C

Type of hydraulic system: Piston type pump delivering oil from main transmission housing

Hydraulic fluid temperature at beginning of test: 60°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	242	649	21.3	20.5	19.9	-
On the frame	223	777	19.4	20.5	29.9	12

Main linkage dimensions - see drawings and table on pages 9 and 10

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

mm	-260	-241	-150	-50	0	100	225	376	475
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Lifting forces at hitch points
(corresponding pressure 20.5 MPa)

kN	-	21.3	22.5	23.6	24.1	25.0	25.8	27.1	-
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Lifting forces at test frame
(corresponding pressure 20.5 MPa)

kN	20.2	20.2	20.6	20.9	21.0	21.0	20.4	19.8	19.4
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REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

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

Officer in charge: P.C. Seward

Signed:



Head of Testing Group



for the Director

Date: 7th September 1987.