Test n° 6178
Date : August 1987

OECD approval n° : 1092 Restricted Code
Date of approval : 21 september 1987

MINISTERE DE L'AGRICULTURE

CENTRE NATIONAL DU MACHINISME AGRICOLE, DU GENIE RURAL, DES EAUX ET DES FORETS
Groupement d'Antony, Division Tracteurs et Travail du sol

OECD TEST OF AN AGRICULTURAL TRACTOR (RESTRICTED CODE)

Report on test in accordance with the OECD standard code for the official testing of agricultural tractors C(84) 163 (Final) appendix IV



Tested tractor

Make : MASSEY FERGUSON
Model : B 510/4
Trade name : 3650
Number of driving wheels : 4
Type : Standard

Submitted by :

Name : MASSEY FERGUSON S.A.
Address : avenue Blaise Pascal
60026 BEAUVAIS (FRANCE)
Phone : 44.89.33.33 Telex : 140396 F

CEMAGREF Division TSAN
BP 121 - 92164 ANTONY CEDEX
Phone : (1) 40.96.61.21 Telex : 204565 F

PRINCIPALES UNITÉS DU SYSTEME INTERNATIONAL (SI) ET AUTRES UNITÉS UTILISÉES LORS DES ESSAIS (d'après la norme ISO 1000-1981 réimprimée le 30.6.1983)

Grandeurs	*Unités SI*		*Multiples Unités SI*	*Unité hors SI figurant dans la norme*
	Nom	*Symbole*		
Unités SI de base				
longueur	mètre	m	km, cm	
masse	kilogramme	kg	g, mg	tonne 1 t = 10^3 kg
temps	seconde	s	ms, µs	heure 1 h = 60 min
intensité de courant électrique	ampère	A	kA, mA	minute 1 min = 60 s
température thermodynamique	kelvin	K		
Unités SI dérivées				
angle plan	radian	rad		1° = (π / 180) rad
fréquence	hertz	Hz	MHz, kHz	
force	newton	N	kN, mN	
pression	pascal	Pa	kPa	1 bar = 10^5 Pa
contrainte		Pa ou N/m²	MPa ou N/mm²	
énergie travail	joule	J	kJ	1 kW.h = 3,6 10^6 J
quantité de chaleur	joule	J	kJ	
puissance	watt	W	kW	
charge électrique	coulomb	C	kC	1 A.h = 3,6 10^3 C
potentiel électrique	volt	V	kV, mV	
capacité électrique	farad	F	mF	
résistance électrique	ohm	Ω	kΩ, mΩ	
conductance électrique	siemens	S	kS, mS	
température Celsius	degré Celsius	°C		t (°C) = T (K) – 273,15
Autres unités SI figurant dans la norme				
aire, superficie		m^2	cm^2	hectare 1 ha = 10^4 m^2
volume		m^3	cm^3	litre 1 l = 10^{-3} m^3
vitesse angulaire		rad/s		
vitesse		m/s		1 km/h = (1/3,6) m/s
accélération (1)		m/s^2		
fréquence de rotation		s^{-1}		tours par minute (tr/min)
masse volumique		kg/m^3	g/cm^3	t/m^3, kg/l, g/l
quantité de mouvement		kg.m/s		
moment cinétique		$kg.m^2/s$		
moment d'inertie		$kg.m^2$		
moment d'une force		N.m		
viscosité (dynamique)		Pa.s	mPa.s	1 cP = 1 mPa.s
viscosité cinématique		m^2/s	mm^2/s	1 cSt = 1 mm^2/s
intensité acoustique		W/m^2		
niveau de pression acoustique				décibel dB
Unités hors SI ne figurant pas dans la norme				
débit volumique		m^3/s		l/s, l/h, m^3/h
débit massique		kg/s		t/h
consommation spécifique de carburant		kg/J		g/(kW.h)

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(1) La valeur adoptée en 1901 comme « accélération normale de la pesanteur » est de 9,80665 m/s^2 (accélération de la pesanteur à 45° de latitude au niveau de la mer). Dans les applications courantes on prend généralement g = 9,8 ou 10 m/s^2 suivant la précision recherchée.

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Test n° 6178
Date : August 1987

TESTED TRACTOR

Make : MASSEY FERGUSON
Model : B 510/4
Trade name : 3650
Number of driving wheels : 4
Type : Standard

SUBMITTED BY

Name : MASSEY FERGUSON S.A.
Address : Avenue Blaise Pascal
60026 BEAUVAIS (FRANCE)
Phone : 44.89.33.33 - Telex : 140396 F

SUMMARY

1. Specification of tested tractor
2. Compulsory tests results
   2.1. Main power take-off performance
   2.2. Lifting force and hydraulic power
   2.3. Drawbar performance (unballasted tractor)
3. Optional tests results
   3.1. Measurement of external noise level

Annex : Main power take-off performance curves

This test report includes 21 pages of text and 2 pages of annex

CEMAGREF Division TSAN
BP 121 - 92164 ANTONY CEDEX
Phone : (1) 40.96.61.21 Telex : 204565 F

- Tractor manufacturer's name and address : MASSEY FERGUSON S.A avenue Pascal Blaise Pascal 60026 BEAUVAIS (FRANCE)

- Submitted for test by : The manufacturer

- Selected for test by the manufacturer with the agreement of CEMAGREF

- Place of running in : BEAUVAIS

- Duration of running in : 20 hours

1. SPECIFICATION OF TRACTOR

TRACTOR

- Make : MASSEY FERGUSON
- Model : B 510/4
- Trade name : 3650
- Number of driving wheels : 4
- Type : Standard
- Serial number : U 204 201
- 1st serial number : U 191 212

ENGINE

- Make : PERKINS
- Model : AT6- 354 - CC
- Type : 4 strokes, direct injection diesel
- Serial number : U 758 572 N

Cylinders

- Number : 6
- Disposition : vertical in line
- Bore/stroke : 98,5/127 mm
- Capacity : 5806 cm³
- Compression ratio : 15,5/1
- Arrangement of valves : overhead in line
- Cylinders liners : dry

Supercharging

Make : GARETT - Air Research
Model : 465740 S
Type : turbo compressor
Supercharging pressure : 0,9 bar

Fuel system

- Fuel feed system : diaphragm fuel feed pump
- Make, type and model of fuel filter : CAV, DES 5863B040, twin parallel filter with water trap
- Capacity of fuel tank : 260 l
- Make, type and model of injection pump : CAV, 2643 D 187, rotative
- Serial number : 13839 GCG
- Manufacturer's production setting of injection pump : 72 mm³/stroke (rated engine speed & full load)
- Injection pump timing : 30 ± 2° before T.D.C.
- Make, type and model of fuel injectors : CAV, LRB 670 1402, 4 holes
- Injection pressure : 230 bars

Governor
- Make : CAV
- Type : Mechanical incorporated in fuel injection pump
- Governed range of engine speed : 900 - 2520 rev/min

Rated engine speed 2400 rev/min

Air cleaner

- Pre-cleaner
  . Make : DONALDSON
  . Type : cyclone
  . Model : incorporated into main
  . Location : under bonnet

- Main
  . Make : DONALDSON
  . Type : dry
  . Model : FLB 10-0070
  . Warning light on panel
  . Location : under bonnet - horizontal

Lubrification system

- Type of feed pump : gear
- Total oil capacity including filter : 17,5 l
- Oil change period : 250 h
- Type of filter : cartridge
- Number : 2
- Filter change period : 250 h
- Recommended oil : see "fuel and lubricants used in test"

Cooling system

- Type of coolant : water or water anti-freeze mixture
- Type of pump : centrifugal
- Description of fan
  . Type : puller
  . Number of fan blades : 6
  . Fan diameter : 508 mm
- Coolant capacity : 30 l
- Type of temperature control : thermostatic
- Surpressure system : 0,5 bar

Starting system

- Safety device : switch operated by main clutch pedal
- Make : LUCAS
- Type : pre-engaged
- Model and starter motor power rating : LUCAS M 127 - 2,8 kW
- Cold starting aid : CAV - Thermostart

Electrical system
- Voltage : 12 V - negative hearth
- Generator : alternator
  . Make : VALEO
  . Model : 55 AMS
  . Power : 660 W
- Batteries :
  . Make : CHLORYDE 372
  . Number : 2
  . Rating : 420 A for 60 s at -18°C

Exhaust system

- Make : NELSON
- Type : perforated
- Model : MF 100
- Location : Over bonnet
- Height of outlet above ground : 2905 mm

STEERING AND DRIVING WHEELS

- Number : 2
- Location : front axle
- Tyres : GOOD YEAR
  . Size : 14.9 - 28
  . Ply rating : 8
  . Type of casing : cross ply
  . Maximum permissible load on each tyre : 18,3 kN
- Track widths(mm) : 1686 - 1800 - 1854 - 1892 - 1968 - 2006 - 2060 - 2060 - 2171

- Method of adjustment : lugs

DRIVING WHEELS

- Number : 2
- Location : rear axle
- Tyres : GOOD YEAR
  . Size : 20.8 - 38
  . Ply rating : 8
  . Type of casing : cross ply
  . Maximum permissible load on each tyre : 30 kN (with inflation pressure : 138 kPa)
- Track widths (mm) : 1588 - 1680 - 1780 - 1880 - 1980 - 2080 - 2180
- Method of adjustment : lugs

WHEELBASE : 2763 mm

TRANSMISSION

Clutch

- Make : VALEO
- Type : dry, single plate clutch
- Number of plates : 1
- Diameter of plate : 352 mm
- Method of operation (for gearbox) : foot pedal

Gear box

- Make : MASSEY FERGUSON
- Type : basic gear box to be manual (4 x 2 speeds)
- Arrangement : mechanicaly operated gear shift - multipower as an option
- Number of speeds : 8 - (8 x 2 with multipower)
- Available option : creeper

Rear axle and final drive

- Make : own make
- Type : crown wheel and pinion and outboard epicyclic gear reduction
- Differential lock :
  - . Type : mechanical hydraulicaly actuated
  - . Method of engagement : electrical switch
  - . Method of disengagement : when brake pedal is depressed

Front axle

- Make : own make
- Type : crown wheel and pinion and outboard epicyclic gear reduction
- Driven from main shaft
- Differential lock : automatic

Transmission oils

- Capacity :
  - . Gear box and transmission housing)
  - . Steering) 88 l
  - . Power lift)

  - . Front axle assembly : 11 l

  - . Front axle final reduction : 3,3 l (each)

- Change period : 1200 h
- Type of oil filter : removable cartridge in metallic filter elements
- Recommended oil : see "fuel and lubricants used in test"

Gear	Group N°	Number of engine revolution for 1 revolution of driving wheels	Nominal travelling speed at rated engine speed (km/h)
1	T	352,873	2,192
2		224,426	3,447
3		164,420	4,705
4		118,370	6,535
AR 1		321,792	2,404
AR 2		204,659	3,780
AR 3		149,938	5,159
AR 4		107,944	7,167
1	T + MP	264,655	2,923
2		168,319	4,596
3		123,315	6,273
4		88,778	8,714
AR 1		241,696	3,201
AR 2		153,718	5,033
AR 3		112,618	6,869
AR 4		81,076	9,541
1	R	101;926	7,590
2		64,824	11,934
3		47,492	16,289
4		34,191	22,626
AR 1		92,948	8,323
AR 2		59,115	13,086
AR 3		43,309	17,862
AR 4		31,179	24,811
1	R + MP	76,444	10,120
2		48,618	15,911
3		35,619	21,718
4		25,643	30,167
AR 1		69,813	11,081
AR 2		44,401	17,423
AR 3		32,529	23,781
AR 4		23,419	33,033

T : Turtle - R : Rabbit - MP : MultiPower

(dynamic index radius : 855 mm)

POWER TAKE-OFF

Main power take-off

- Type : rear independant PTO (hydraulic mutiplate clutch)
- Method of engagement : electrical switch

- Method of changing power take-off speeds : speed and spline change accomplised by physically replacing the 540 rev/min shaft by the 1000 rev/min shaft and vice-versa

Power take-off proportional to engine speed

- 540 rev/min
  - . Location : at the rear of the tractor on vertical center plane
  - . Diameter of power take-off shaft : 34,9 mm
  - . Number of splines : 6 (in accordance with ISO R500)
  - . Height above ground : 779 mm with tyres 20.8-38
  - . Distance from the median plane of the tractor : 0
  - . Distance behind rear axle : 550 mm
  - . Power take-off speed at rated engine speed : 650 rev/min
  - . Engine speed at standard power take-off speed : 1992 rev/min
  - . Engine to power take-off ratio : 3,69
  - . Power restriction : none
  - . Direction of rotation (viewed facing driving end) : clockwise

- 1000 rev/min
  - . Location : at the rear of the tractor on vertical center plane
  - . Diameter of power take-off shaft : 34,9 mm
  - . Number of splines : 21 (in accordance with ISO R500)
  - . Height above ground : 779 mm with tyres 20.8-38
  - . Distance from the median plane of the tractor : 0
  - . Distance behind rear axle : 498 mm
  - . Power take-off speed at rated engine speed : 1148 rev/min
  - . Engine speed at standard power take-off speed : 2090 rev/min
  - . Engine to power take-off ratio : 2,09
  - . Power restriction : none
  - . Direction of rotation (viewed facing driving end) : clockwise

Power take-off proportional to ground speed : none

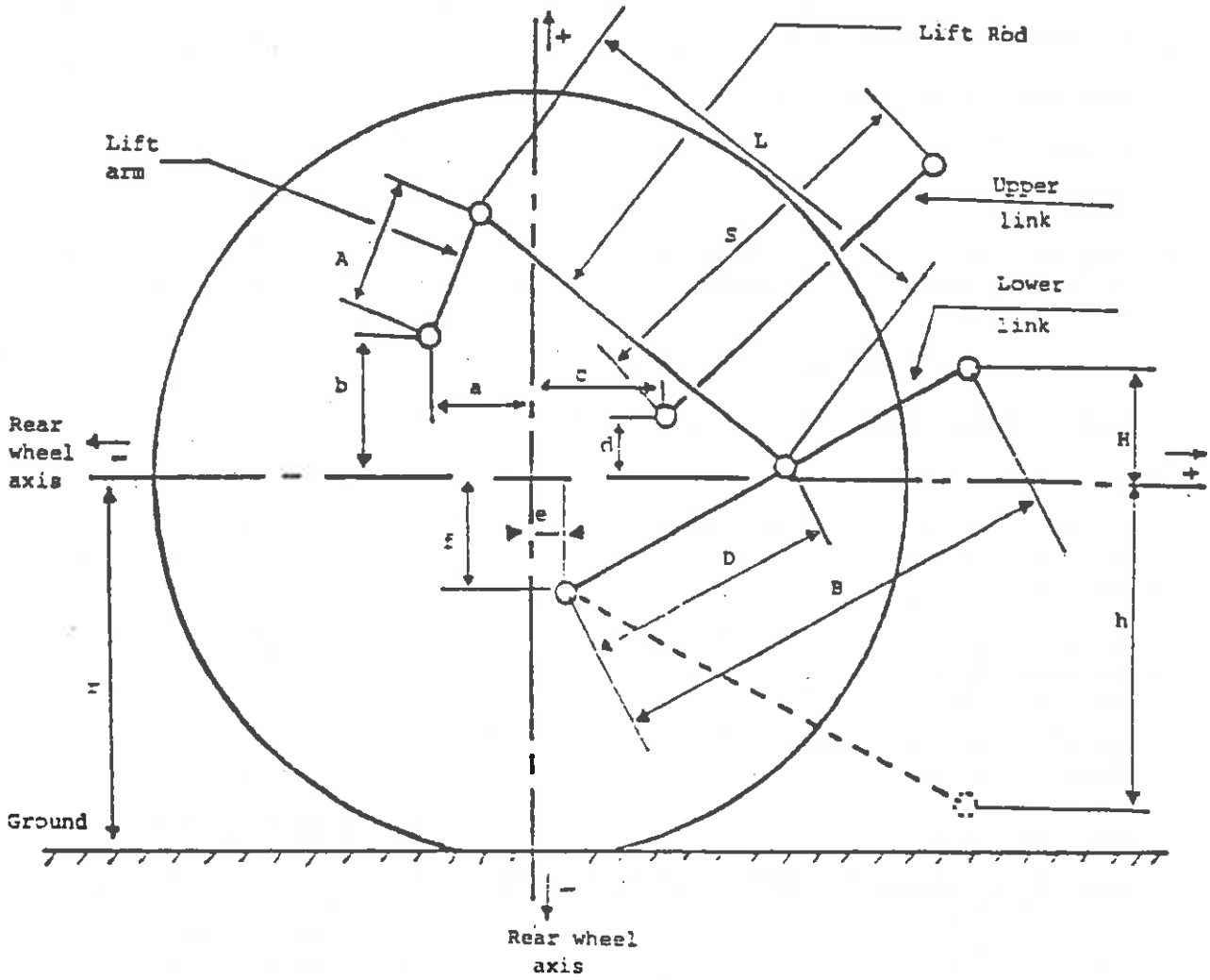
POWER LIFT

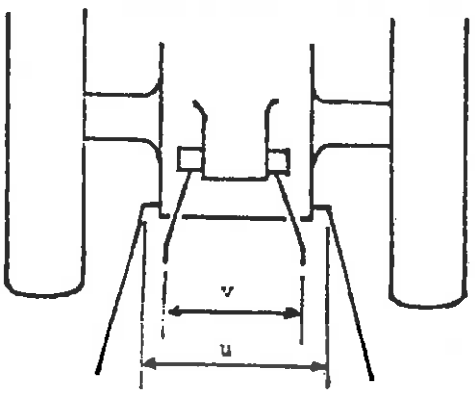
- Make : MASSEY FERGUSON
- Type : top link, electronic position, draft or mixed control
- Type and number of cylinders : 2 - single acting
- Type of linkage lock for transport : hydraulic lock
- Relief valve pressure setting : 188 bars
- Opening pressure of cylinder safety valve : 200 bars
- Lift pump type : gear (2 pumps)
- Transmission between pump and engine : mechanical
- Make and number of filters : PUROLATOR - 1
- Time between oil changes : 1200 h
- Time between filter changes : 600 h
- Oil capacity : 88 l
- Site of oil reservoir : transmission housing
- Type and number of tapping points : 2 - on lift cover
- Maximum volume of oil available to external cylinders : 34 l
- Recommended oil : see "fuel and lubricants used in test"

THREE - POINT LINKAGE

- Category : II-III (in accordance with ISO 730/I)
- Category adapter : yes
- Controls : position control by linear sensor measuring the rockshaft position
  draft control by pin sensors at each lower link

Linkage geometry





Linkage dimensions (mm)				Settings for the test
Rear tyres - dynamic index radius		(r)	855	
Front tyres - dynamic index radius		(r')	640	
Length of lift arms		(A)	362	
Length of lower links		(B)	975	
Distance of lift arm pivot point from rear wheel center line	horizontally	(a)	185,4	
	vertically	(b)	431,8	
Horizontal distance between the 2 lower link points		(u)	511	
Horizontal distance between the 2 lift arm end points		(v)	870	
Length of upper link		(S)	from 666 to 786	730
Distance of upper link pivot point from rear wheel center line	horizontally	(c)	428	
	vertically	(d)	179/237	179
Distance of lower link pivot point from rear wheel center line	horizontally	(e)	225	
	vertically	(f)	300	
Distance of lower link points to lift rod pivot points on lower link		(D)	514	
Length of lift rods		(L)	from 747 to 797	797
Height of lower hitch points relative to the rear wheel centre line situated 855 mm above the ground level				
- in low position		(h)	from 605 to 489	594
- in high position		(H)	from 196 to 75	76
Height of lower hitch points when locked in transport position			from 948 to1034	

SWINGING DRAWBAR

- Height above ground : maximum : 462 mm (with tyres 20.8-38)
  minimum : 462 mm
- Type of adjustment : none
- Distance of hitch point from rear axle centre : 898 mm
- Distance of hitch point from power take-off shaft end :
  . horizontally : 400 mm to rear (with 1000 rev/min), 355 mm to rear (with 540 rev/min)
  . vertically : 300 mm
- Lateral adjustment : 250 mm left hand
  250 mm right hand
- Distance of pivot point from rear axles horizontally : 228 mm to rear
- Diameter drawbar pin hole : 30 mm

LINKAGE DRAWBAR

- Height above ground : maximum :1051 mm (with tyres 20.8-38)
  minimum : 261 mm
- Horizontal distance to power take-off shaft end : 700 mm with 1000 rev/min, 650 mm with 540 rev/min
- Number of holes : 9
- Hole diameter : 24 mm
- Thickness and width of drawbar : 30/80 mm
- Distance beetween holes : 80 mm

TRAILER HITCH

- Height above ground : maximum :1000 mm (with tyres 20.8-38)
  minimum : 760 mm
- Distance of hitch point from rear axle centre : 749 mm to rear
- Distance of hitch point : vertically above maximum : 242 mm
  minimum : 1,8 mm
  horizontally : 251 mm
- Diameter hitch pin hole : 32 mm
- Maximum vertical permissible load : 20 kN

FRONT TOWING HITCH

- Vertical height at center of clevis : 848 mm
- Width of clevis : 340 mm
- Diameter of pin hole : 32 mm

STEERING

- Method of operation : hydrostatic steering system, gearbox housing mounted gear pump
- Make : DANFOSS steering unit
- Model : OSPC-ON
- Type : open center type with integral system relief valves, anti-schock and anti-cavitation valves
- Working pressure : 15,7 MPa - 16,2 MPa
- Oil capacity : 88 l
- Oil change period : 1200 h
- Filter change period : 600 h
- Recommended oil : see "fuel and lubricants used in test"

BRAKES

Service brake

- Make : MASSEY FERGUSON and GIRLING
- Type : oil immersed - 486,5cm² friction area on each brake - single disk brake - hydraulic actuated
  GIRLING hydraulic master cylinder - MASSEY FERGUSON hydraulic slave annular piston
- Method of operation : independant or dependant operation of twin pedals
  (which can be latched)

Parking brake

- Method of operation : hand lever - cable and rod

Trailer brakes

- Make : BOSCH
- Type : hydraulically actuated valve to regulate oil flow and pressure to the trailer brakes
  proportional and progressive trailer/tractor braking effort is achieved by linking their services
  together via a sensive line.
- Method of operation : automatic as the right hand tractor brake pedal is depressed
- Maximum braking pressure : 130-150 bars
- Maximum flow : 15 l/min

PROTECTIVE STRUCTURE SPECIFICATIONS

- Manufacturer's name and address : MASSEY FERGUSON S.A.
  avenue Blaise Pascal 60026 BEAUVAIS (FRANCE)
- Trade name : 3000 - C
- OECD approval number : CSD 1067/1
- Description : the cab is made up from 3 major sub-assemblies, the platform, side pillars and roof
  and the front pillars. These sub-assemblies are bolted together to form the complete
  cab structure.

DRIVER'S SEAT

- Make : GRAMMER
- Model : DS 85 H/90 AR
- Type of suspension : parallelogram
- Type of damping : gas cylinder
- Range of adjustment : longitudinal : 150 mm
  vertical : 60 mm

MISCELLANEOUS

- Passenger's seat : either factory fitted or as an accessory
  . Location : left of the operator
  . Number of places : 1

LIGHTING

Unrestricted beam angle of head light in plane view : in accordance with national regulation

	Height above ground of centre mm	Size mm	Distance from outside edge of tractor to centre at 2180 mm trackwidth
Headlights	1290	167 x 107	991
Sidelights	1775	120 x 80	410
Rear lights	1844	300 x 62	289
Reflectors	754	98 x 62	556,5

CONDITIONS DURING TEST

Overall dimensions (with tyres 20.8-38)

	Lenght mm	Width		Height at the top of	
		minimum mm	maximum mm	exhaust silencer mm	protective structure mm
Unballasted	4649	2088	2488	2905	2905

Ground clearance : 428 mm limited by drawbar bracket

Track setting . front : 1854 mm
. rear : 1588 mm

Tractor mass (kg)

	Front	Rear	Total
Unballasted	2175	3615	5790

Fuel used in test

- Type : Diesel oil
- Viscosity : (NFT 60.100) 4,84 cSt
- Gravity at 15°C : 0,836

Lubricants used in test

- Engine oil :
  . Type : BP TOU
  . Viscosity : 10 W 30
  . Classification : MIL-L-2104 C

- Transmission, hydraulic and steering oil :
  . Type : BP AGROTRANS
  . Viscosity : 9,3 cSt at 100°C
  60,6 cSt at 40°C
  . Classification : GL 4
- Recommended grease : BP AGRICHARGE

Number of lubrication points : 10

2. COMPULSORY TESTS RESULTS

2.1. MAIN POWER TAKE-OFF PERFORMANCE :

- Date and location of tests : 3rd August 1987 - CEMAGREF
- Type of dynamometer : SCHENCK W780

Power	Speed		Fuel consumption		Specific
	Engine	Power take-off	Hourly	Specific	Energy
kW	rev/min		l/h	g/kWh	kWh/l
MAXIMUM POWER - TWO HOUR TEST					
97,9	2401	1149	31,15	266	3,14
MAXIMUM POWER AT RATED ENGINE SPEED					
97,9	2401	1149	31,15	266	3,14
PART LOADS (governor control being set for maximum power at rated engine speed) (1) Torque corresponding to 85% of the torque at maximum power at rated engine speed					
84,6	2427	1161	28,04	277	3,02
(2) 75% of the torque defined in (1)					
64,4	2456	1175	23,00	299	2,80
(3) 50% of the torque defined in (1)					
43,2	2474	1184	18,02	349	2,40
(4) 25% of the torque defined in (1)					
21,1	2481	1187	12,94	514	1,63
(5) Unloaded					
-	2510	1201	8,24	-	-

2.1. MAIN POWER TAKE-OFF PERFORMANCE : (continued)

Power	Speed		Fuel consumption		Specific
	Engine	Power take-off	Hourly	Specific	Energy
kW	rev/min		l/h	g/kWh	kWh/l
MAXIMUM POWER AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)					
90,6	2092	1001	27,76	256	3,27
PART LOADS (governor control being set for maximum power at standard power take-off speed) (1) Torque corresponding to 85% of the torque at maximum power at standard power take-off speed					
78,7	2144	1026	24,71	262	3,19
(2) 75% of the torque defined in (1)					
60,0	2170	1038	20,00	279	3,00
(3) 50% of the torque defined in (1)					
40,0	2186	1046	15,23	319	2,62
(4) 25% of the torque defined in (1)					
20,3	2201	1053	10,79	445	1,88
(5) Unloaded					
-	2220	1062	6,31	-	-

Other results

- No load, maximum engine speed : 2510 rev/min
- Equivalent crankshaft torque at maximum power at rated engine speed : 389,5 N.m
- Maximum equivalent crankshaft torque : 449,2 N.m at 1470 rev/min engine speed

Mean atmospheric conditions

- Temperature : 23°C
- Pressure : 1013 mbar
- Relative humidity : 52%

Maximum temperature

- Coolant : 86°C
- Engine oil : 106°C
- Fuel : 23°C
- Air intake : 27°C

2.1. MAIN POWER TAKE-OFF PERFORMANCE : (continued)

Fuel consumption at varying load

	Governor control being set for maximum power at rated engine speed		Governor control being set for maximum power at standard pto speed	
	at 85% (1)	at 50% of 85% (2)	at 85% (1)	at 50% of 85% (2)
Hourly consumption (l/h)	28,04	18,02	24,71	15,23
Specific standard consumption (g/kWh)	277	349	262	319

(1) 85% of the torque corresponding to maximum power for the position of the governor hand lever
(2) 50% of the torque obtained in (1)

2.2 LIFTING FORCE AND HYDRAULIC POWER
- Date : 12th August 1987

2.2.1. Power lift test :

- Hydraulic fluid : see "Fuel and lubricants used in test"

		at the hitch point	on the frame
Height of lower hitch point above ground in down position	mm	261	291
Vertical movement	mm	670	690
Maximum force exerted through full range	kN	50,4	54,8
Corresponding pressure of hydraulic fluid	bar	159	159
Moment about rear rear axle	kN.m	60,5	99,2
Maximum tilt angle of mast over range of lift	degree	-	2°

2.2.1. Power lift test (continued)

Lifting height (1)	mm	- 294	- 264	- 200	- 100	0	+ 100	+ 200	+ 300	+ 376	+ 396
Lifting force (2)	at the hitch point kN	50,4	50,9	52,4	54,8	55,4	56,0	56,7	56,9	57,1	-
	at frame kN	55,0	55,9	56,7	57,6	57,1	56,9	56,7	56,6	55,2	54,8

(1) Lifting height relative to the horizontal plane including the lower link pivot points

(2) The values of force measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting or to maximum power delivered by the hydraulic system, whichever is lower.

2.2.2 Hydraulic power test :

- Tapping point used for test : auxiliary service connection (spool valve)
- Sustained pressure with relief valve open : 185 bars
- Pump delivery rate at minimum pressure : 58,3 l/min

		corresponding to maximum hydraulic power	corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting
Pressure	bars	159	167
Flow rate	l/min	51,3	43,3
Power	kW	13,68	12,18

2.3. DRAWBAR PERFORMANCE (UNBALLASTED TRACTOR)

- Date and location of test : 11th August 1987 - CEMAGREF

- Type of track : Tarmacadam

- Height of drawbar above ground : 0,53 m

- Tyres	Front	Rear
. Size :	14.9 - 28	20.8 - 38
. Inflation pressure (bars) :	1,6	1,3

- Atmospheric conditions :

. Temperature : 25°C
. Pressure : 1015 mbar
. Relative humidity : 49%

2.3. DRAWBAR PERFORMANCE : (continued)

Gear	Speed	Drawbar pull	Power	Engine speed	Wheelslip	Specific fuel consumption	Specific energy	Temperatures		
	km/h	kN	kW	rev/min	%	g/kWh	kWh/l	Fuel °C	Coolant °C	Engine oil °C
MAXIMUM DRAWBAR POWER IN TESTED GEAR										
2 T	3,05	47,3	40,0	2468	15	419	1,99	21	84	93
2 T + MP	4,09	47,5	54,0	2454	15	383	2,18	27	86	94
3 T	4,16	47,5	54,9	2454	15	376	2,23	28	86	93
3 T + MP	5,53	47,7	73,3	2442	15	353	2,37	26	86	99
4 T	5,71	47,4	75,2	2411	15	353	2,37	26	86	94
1 R	7,12	41,5	82,1	2403	9	321	2,61	26	84	101
4 T + MP	8,40	35,3	82,4	2382	7	319	2,62	27	84	103
1 R + MP	9,93	30,5	84,1	2384	5	312	2,68	26	86	103
2 R	11,80	26,2	85,9	2372	3	304	2,75	26	86	101
2 R + MP	15,76	19,0	83,2	2347	2	313	2,67	26	86	102
TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS (i) Maximum drawbar power in tested gear										
2 R	11,80	26,2	85,9	2372	3	304	2,75	26	86	101
(ii) 75 % of pull at maximum power										
2 R	12,35	19,9	68,3	2443	2	321	2,60	26	86	96
(iii) 50 % of pull at maximum power										
2 R	12,64	13,3	46,8	2466	1	374	2,23	26	84	94
(iv) Higher gear same pull as in (i) reduced engine speed										
2 R + MP	12,35	19,5	66,9	1831	1	296	2,83	26	84	98
(v) Higher gear as in (ii) reduced engine speed										
2 R + MP	12,65	13,3	46,7	1848	1	322	2,59	26	82	98

3. OPTIONAL TESTS RESULTS

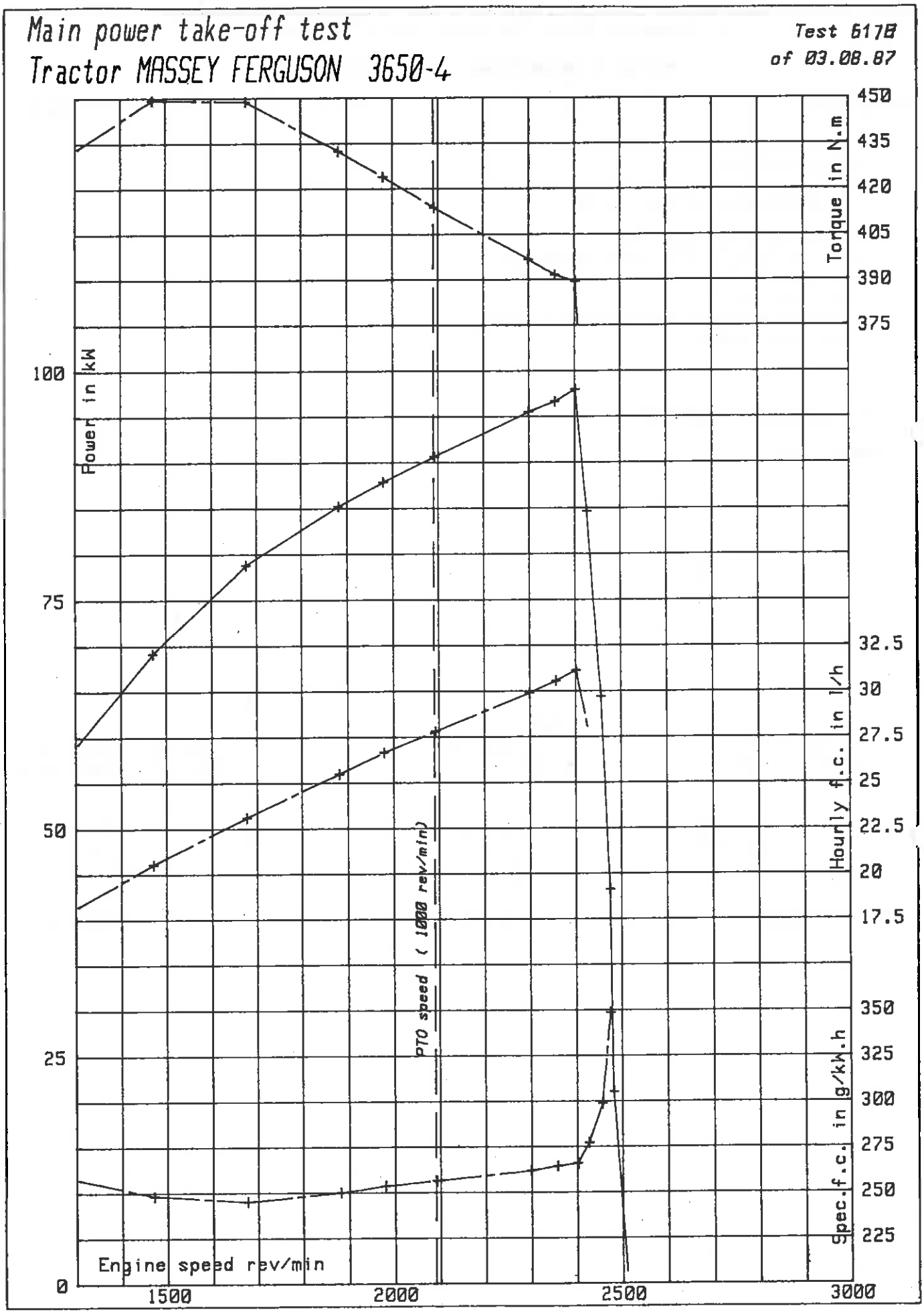
3.1. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test : 11th August 1987
Type of sound level meter : BRUEL & KJAER 2209
Type of track : TARMACADAM
Gear : 4 R + MP
Travelling speed before acceleration : 23,6 km/h
Sound level : 86 dB(A)

REPAIR AND ADJUSTMENTS DURING TESTS : none

REMARKS : none

Le Technicien Chargé de l'essai	L'Ingénieur Responsable de l'essai	Le Chef de la Division Tracteurs et Travail du Sol
M.HOCQUEL	E.HUGO	J.F.COUPILLON


Main power take-off test
Tractor MASSEY FERGUSON 3650-4
Test 6178
of 03.08.87
Power in kW
Torque in N.m
Hourly f.c. in l/h
Spec.f.c. in g/kW.h
PTO speed (1000 rev/min)
Engine speed rev/min
0
25
50
75
100
1500
2000
2500
3000
450
435
420
405
390
375
32.5
30
27.5
25
22.5
20
17.5
350
325
300
275
250
225

Main power take-off test

Tractor MASSEY FERGUSON 3650-4

Test 6178
of 03.08.87

