

Division Tracteurs et Travail du Sol

TEST REPORT N° 8009
DATE OF PUBLICATION 26th september 1990
OECD TEST OF AN AGRICULTURAL TRACTOR (RESTRICTED CODE)
50.12

Reference texts : O.E.C.D code II

OECD Approval
N° 1284 Restricted Code
Date 17th september 1990

Tested equipment

Nature : TRACTOR
Make : MASSEY FERGUSON
Model : B 115
Trade name : 3115
Number of driving wheels : 2
Type : standard

Submitted for tests by

Name : MASSEY FERGUSON S.A.
Address : avenue Blaise Pascal
 BP 307
 60026 BEAUVAIS CEDEX

Phone : 44.89.33.33

Telex : 140396 F

This test report may only be duplicated as a whole

1. GENERALITIES

Tractor manufacturer's name and address : MASSEY FERGUSON S.A, BP 307 avenue Blaise Pascal 60026 BEAUVAIS

Submitted for tests by : MASSEY FERGUSON S.A.

Selected for tests by the manufacturer with the agreement of CEMAGREF

Date of arrival of the equipment in CEMAGREF : 13th march 1990

Place of running in : BEAUVAIS

Duration of running in : 20 h

2. SPECIFICATIONS

2.1 Tested tractor

Make : MASSEY FERGUSON
Model : B 115
Trade name : 3115
Number of driving wheels : 2
Type : standard
Serial number : P 193 019
1st serial number : P 193 019

2.2 Engine

2.2.1 Identification

Make : PERKINS
Model : 1006-6-LR
Type : 4 strokes, direct injection diesel
Serial number : YA 31232 U 501959P

2.2.2 Cylinders

Number : 6
Disposition : vertical, in line
Bore/stroke : 100/127 mm
Capacity : 5985 cm³
Compression ratio : 16,5/1
Arrangement of valves : overhead
Cylinders liners : dry

2.2.3 Supercharging

none

2.2.4 Fuel system

Fuel feed system : diaphragm fuel feed pump
Make, type and model of fuel filter : CAV 2 FAS 58488130, dual element with water trap
Capacity of fuel tank : 190 l
Make, type and model of injection pump : CAV, DPA 939, rotative
Serial number : 06709 EFG
Manufacturer's setting of injection pump : 60 ± 2 mm³/stroke (at rated engine speed and full load)
Injection pump timing : 22° before T.D.C.
Make, type and model of injectors : CAV, LRB, 670 1418
Injection pressure : 220 bars

2.2.5 Governor

Make : CAV
Type : mechanical, incorporated into fuel injection pump
Model : DPA
Governed range of engine speed : 850 - 2310 rev/min

2.2.6 Rated engine speed : 2200 rev/min

2.2.7 Air cleaner

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

Main : . Make : DONALDSON
 . Type and model : dry, ELB 08 - 0024
 . Location : under bonnet

Maintenance indicator : lamp on desk board

2.2.8 Lubrication system

Type of feed pump : gear
Total oil capacity including filter : 19 l
Oil change period : 400 h
Type and number of filter : 1 cartridge
Filter change period : 400 h
Recommended oil : see "fuel and lubricants used in test"

2.2.9 Cooling system

Type of coolant : water or water anti-freeze mixture
Type of pump : centrifugal
Description of fan
 . Puller
 . Number of fan blades : 7
 . Fan diameter : 504 mm
Coolant capacity : 25 l
Type of temperature control : thermostatic
Surpressure system : 0,5 bar

2.2.10 Starting system

Safety device : electrical switch under clutch pedal
Make : LUCAS
Type and model : pre-engaged M 127
Power : 2,8 kW
Cold starting aid : safety switch on clutch pedal

2.2.11 Electrical system

Voltage : 12 V
Generator :
 . Make : MOTOROLA
 . Type and model : alternator, 70 AMS
 . Power : 840 W
Batteries
 . Number : 2
 . Rating : 80 Ah at 20 hours
 . Cold starting capacity : 420 A for 60 s at -18 °C

2.2.12 Exhaust system

Make : LUCHAIRE
Type : perforated
Model : 86
Location : under bonnet with vertical stack pipe
Height of outlet above ground : 2774 mm

2.3 Steering wheels

Number : 2

Location : front axle

Tyres :

- . Size : 11.0 - 16

- . Ply rating : 8

- . Type of casing : cross ply

- . Maximum permissible load on each tyre : 13,1 kN (with inflation pressure 276 kPa)

Track width : 1543 - 1622 - 1644 - 1724 - 1746 - 1826 - 1848 - 1927 - 1949 - 2028 - 2051 - 2130 - 2231 - 2254
2333 mm

Method of adjustment : telescopic

2.4 Driving wheels

Number : 2

Location : rear

Tyres :

- . Size : 18.4 - 38

- . Ply rating : 8

- . Type of casing : cross ply

- . Maximum permissible load on each tyre : 27 kN (with inflation pressure 138 kPa)

Track width : 1530 - 1650 - 1750 - 1850 - 1950 mm

Method of adjustment : lugs

2.5 Wheelbase : 2696 mm

2.6 Transmission

2.6.1 Clutch (travel)

Make : VALEO

Type : dry, single plate clutch, pulled type

Number of plates : 1

Diameter of plates : 330 mm

Method of operation (for travel) : foot pedal

2.6.2 Gear box

Make : MASSEY FERGUSON

Type and model : basic gearbox to be manual (8 x 2 speeds)

Arrangement : mechanically operated gear shift, speedshift as an option

4 gears, 2 ranges (2 forward and 2 rear) and speedshift

Number of speeds : 8 (8x2 with speedshift) - 16 forward and 16 rear on tested model

Available option : creeper

2.6.3 Rear axle and final drives

Make : MASSEY FERGUSON

Type and model : crown wheel and pinion and inboard epicyclic reduction

Differential lock :

- . Type and model : mechanical hydraulically actuated

- . Method of engagement : electrical switch

- . Method of disengagement : when brake pedal is depressed

2.6.4 Front axle

Make : MASSEY FERGUSON

Type and model : telescopic

2.6.5 Transmission oils

Capacity :

- . Gear box : }
- . Hydraulic system : } 64 l
- . Rear axle final drives : }
- . Front axle assembly : -
- . Front axle final drives : -

Change period : 1200 h

Filter change period : 600 h

Type of oil filter : removable cartridge in metallic filter elements

Recommended oils : see "fuel and lubricants used in tests"

2.6.6 Total ratios and travelling speeds

Group	Gear	Number of engine revolutions for one revolution of driving wheels	Nominal travelling speed ^(*) at rated engine speed of 2200 rev/min (km/h)
T	1	278,260	2,444
	2	184,214	3,692
	3	133,126	5,109
	4	91,951	7,396
T (rear)	1	279,897	2,430
	2	185,297	3,670
	3	133,909	5,079
	4	92,491	7,353
T + S	1	220,162	3,081
	2	145,752	4,666
	3	105,331	6,457
	4	72,752	9,348
T + S (rear)	1	221,457	3,071
	2	146,609	4,639
	3	105,950	6,419
	4	73,180	9,293
R	1	69,387	9,801
	2	45,936	14,805
	3	33,196	20,487
	4	22,929	29,661
R (rear)	1	69,795	9,744
	2	46,206	14,719
	3	33,392	20,367
	4	23,064	29,488
R + S	1	54,900	12,388
	2	36,345	18,712
	3	26,265	25,893
	4	/	/
R + S (rear)	1	55,223	12,315
	2	36,558	18,603
	3	26,420	25,742
	4	/	/

T : Turtle - R : Rabbit - S : Speedshift

(*) Calculated with a tyre dynamic index of 820 mm (ISO 4251/1 - 1984)

2.7 Main power take-off

2.7.1 General specifications

Independant

Hydraulic multiplate wet clutch

Engagement by lever with electrical switch located at the middle of the upper RH side console

Number of shafts : 1

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

2.7.2 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 R 500 - 1979)

Height above ground : 777 mm with tyres 18.4-38

Distance from the median plane of the tractor : 0 mm

Distance behind rear axle : 450 mm

Power take-off speed : 600 rev/min

for rated engine speed : 2200 rev/min

Engine speed : 1980 rev/min

for standard power take-off speed : 540 rev/min

Engine to power take-off ratio : 3,666

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 R 500 - 1979)

Height above ground : 777 mm with tyres 18.4-38

Distance from the median plane of the tractor : 0 mm

Distance behind rear axle : 450 mm

Power take-off speed : 1100 rev/min

for rated engine speed : 2200 rev/min

Engine speed : 2000 rev/min

for standard power take-off speed : 1000 rev/min

Engine to power take-off ratio : 2,00

Power restriction : none

Direction of rotation (viewed facing driving end) : clockwise

2.7.3 Power take-off proportional to ground speed :

Speed of shaft : both 540 and 1000 rev/min

Size of tyre : 18.4 - 38

Travelling distance for one revolution of power take-off shaft : 0,843 (540), 0,460 (1000)

Number of power take-off shaft revolutions for one revolution of rear wheels : 5,6 (540), 10,3 (1000)

Direction of rotation with forward gear engaged : clockwise

2.8 Power lift

Make : MASSEY FERGUSON
 Type : top link, electronic position, draft or mixed control
 Type hydraulic system : open centre system
 Type and number of cylinders : 2, single acting, diameter 73 mm
 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 : gears
 Transmission between pump and engine : mechanical
 Make and number of filters : 1 - PUROLATOR
 Time between oil changes : 1200 h
 Time between filter changes : 600 h
 Oil capacity : 64 l
 Site of oil tank : transmission housing
 Type and number of tapping points : 2 - on lift cover
 Maximum volume of oil available to external cylinders : 25 l
 Recommended oil : see "fuel and lubricants used in test"

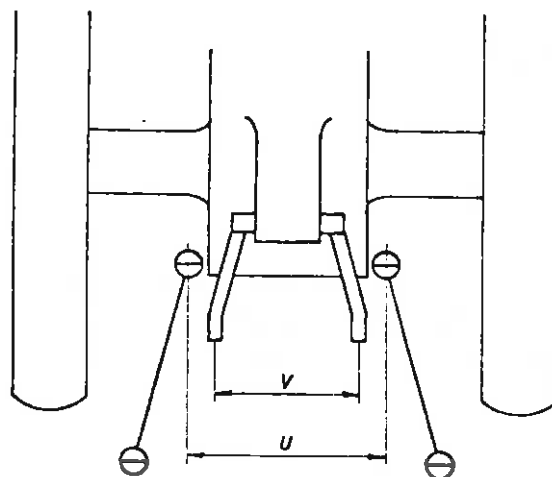
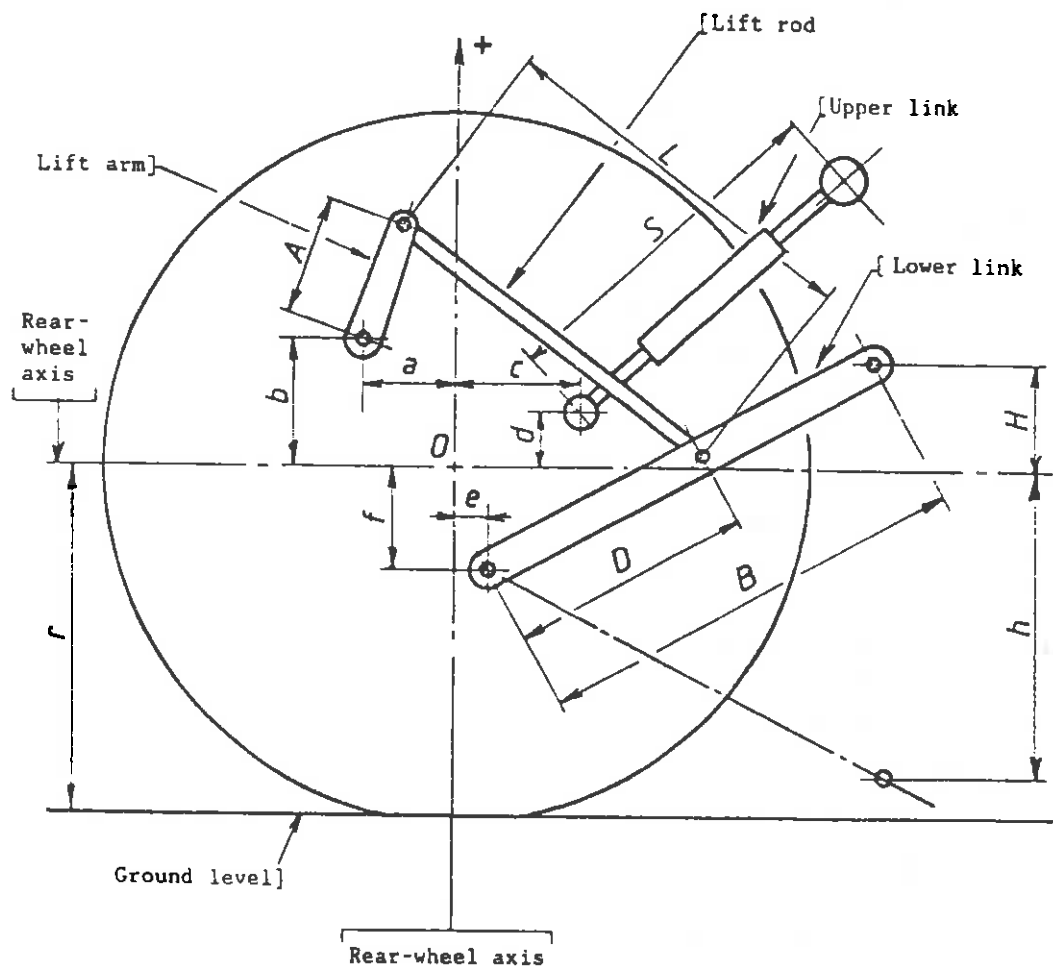
2.9 Three-point linkage

Category : II (in accordance with ISO 730/1 - 1977)
 Category adapter : none
 Controls : Position control by linear sensor measuring the rockshaft position
 Draft control by pin sensors at each lower link

Linkage dimensions (mm)			Settings used for test
Rear tyres : dynamic index radius	(r) *	820	
Front tyres : loaded radius	(r')	610	
Length of lift arms	(A)	295	
Length of lower links	(B)	940	
Distance of lift arm pivot point from rear wheels centre line	horizontally (a)	128	
	vertically (b)	330	
Horizontal distance between the two lower link points	(u)	610	
Horizontal distance between the two lift arm end points	(v)	604	
Length of upper link	(S)	from 660 to 807	720
Distance of upper link pivot point from rear wheels centre	horizontally (c)	382	
	vertically (d)	120 160 200	200
Distance of lower link pivot point from rear wheels centre	horizontally (e)	161	
	vertically (f)	280	
Distance of lower link points to lift rod pivot points on lower link	(D)	550 650	650
Length of lift rods	(L)	from 595 to 827	820
Height of lower hitch points relative to the rear wheels centre	(h)	from 174 to 800	615
	(H)	from -140 to 225	-17
Height of lower hitch points when locked in transport position		from 1150 to 1161	/

* Assuming (r) : tyre dynamic index radius of ISO 4251/1-1984

2.10 Linkage geometry



2.11 Swinging drawbar

Height above ground : . maximum : 542 mm
 . minimum : 542 mm
 Type of adjustment : none
 Distance of hitch point from rear axle centre, horizontally : 875 mm to rear
 Distance of hitch point from power take-off shaft end : . vertically : 234 mm
 . horizontally : 400 mm
 Maximum permissible load : . vertically : 20 kN
 . horizontally : 120 kN
 Lateral adjustment : 283 mm (left and right hand)
 Distance of pivot point from rear axle horizontally : 106 mm to rear
 Diameter drawbar pin hole : 30 mm

2.12 Trailer hitch

Height above ground : . maximum : 1000 mm
 . minimum : 615 mm
 Distance of hitch point from rear axle centre, horizontally : 560 mm
 Distance of hitch point from power take-off shaft end :
 . vertically : from 183 to 223 mm
 . horizontally : 144 mm
 Maximum vertical permissible load : 17 kN (static load)
 Diameter of pin hole : 33 mm

2.13 Linkage drawbar

Height above ground : . maximum : 1161 mm
 . minimum : 62 mm
 Horizontal distance to power take-off shaft end : 629 mm
 Number of holes : 9
 Distance between holes : 80 mm
 Hole diameter : 24 mm
 Thickness and width of drawbar : 30/80 mm

2.14 Front towing hitch

Vertical height at centre of clevis : 851 mm
 Width of clevis : 365 mm
 Diameter of pin hole : 32 mm

2.15 Steering

Method of operation : hydrostatic steering system, gearbox housing mounted on gear pump
 Make : DANFOSS steering unit
 Model : OSPC - ON
 Type : open center type with integral system relief valves, anti-shock end and anti-cavitation valves
 Working pressure : 15,7 to 16,2 MPa
 Oil capacity : 64 l
 Oil change period : 1200 h
 Filter change period : 600 h
 Recommended oil : see "fuels and lubricants used in test"

2.16 Brakes

2.16.1 Service brake

Make : MASSEY FERGUSON and GIRLING
 Model : oil-immersed, 652 cm² friction area on each brake
 Type : single disk brake, hydraulic actuated Girling hydraulic master cylinder
 MF hydraulic slave annular piston.
 Method of operation : independant or dependant operation of twin pedals (which can be latched)

2.16.2 Parking brake

Make and Type : SIRMAC - HUSCO
 Method of operation : hand lever - cable and rod

2.16.3 Trailer brake

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 sensitive valve

Method of operation : automatic, as the right hand side tractor brake pedal is depressed

Maximum braking pressure : 130-150 bars

Maximum flow : 15 l/min

2.17 Protective structure specifications

2.17.1 Specifications

Manufacturer's name : MASSEY FERGUSON S.A.

Trade name : 3000 - B

Type of structure : . cab

. tiltable : no

CEMAGREF test : 7689

OECD approval number : CSD 1043/8

Description : see test report

2.17.2 Driver's seat

Make : GRAMMER DS 85H/90 AR

Type of suspension : parallelogram

Type of damping : gas cylinder

Range of adjustment . longitudinal : 150 mm

. vertical : 60 mm

2.17.3 Miscellaneous

Passenger's seat : either factory fitted or as an accessory

Location : left of the operator

Number of places : 1

2.18 Lighting

Unrestricted beam angle of head light in plan view in accordance with French regulation

	Height above ground of centre (mm)	Size (mm)	Distance from outside edge of tractor to centre at 1950 mm track width (mm)
Headlights	1208	167 x 107	1057
Sidelights	1720	120 x 80	460
Rearlights	1734	300 x 62	444
Reflectors	769	98 x 62	723

3. CONDITIONS DURING TEST

3.1 Overall dimensions

LENGTH m	WIDTH		HEIGHT	
	min m	max m	exhaust silencer m	at top of protective structure
4,323	1,899	2,399	2,774	2,774

3.2 Ground clearance : 457 mm limited by drawbar bracket

3.3 Track setting : front : 1543 mm
rear : 1530 mm

3.4 Tractor mass (kg)

(with tanks full and with cab)

	Front	Rear	Total
Without driver	1480	3050	4530
With driver	1505	3100	4605

3.5 Fuel

- . Type : Diesel Oil (in accordance to AFNOR standard NFM 15-008)
- . Gravity at 15°C : 0,853

3.6 Recommended and used during test lubricants

Engine oil :

- . Make : BP
- . Type : SUPER TOU - MIL L 2104-C
- . Viscosity : 10 W 30

Transmission oils } Make : BP
Hydraulic fluid } Type : Agrotrans
Steering oil } Classification : GL4
Final drives } Viscosity : 80 W 90

Grease : BP AGRICHARGE

Number of lubrication points : 15

4. COMPULSORY TESTS RESULTS

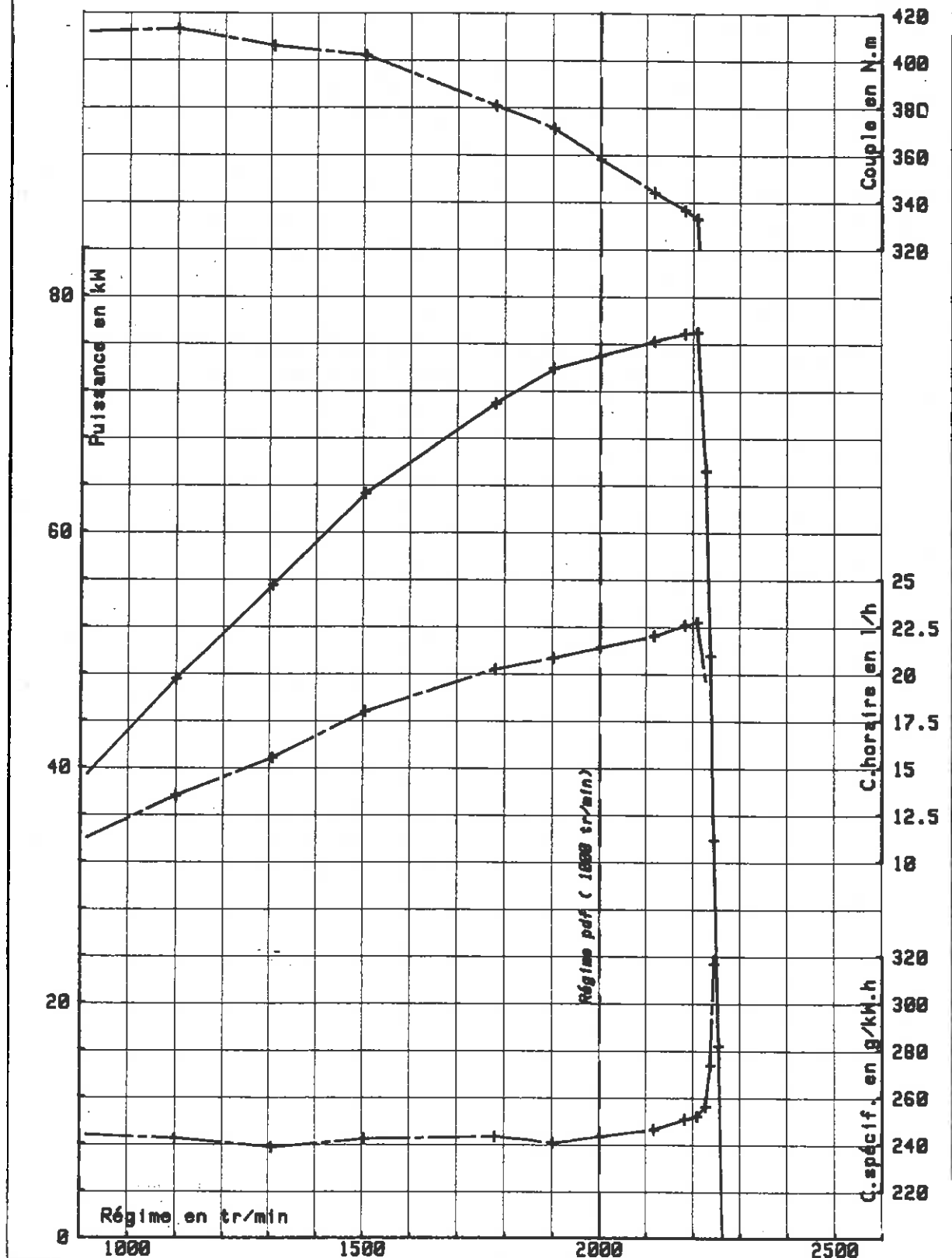
4.1 Main power take-off performance

Location and date of tests : ANTONY, 15th april 1990
Type of dynamometer : SCHENCK W780

Power	Speed		Fuel consumption		Specific energy
	engine	power take-off	hourly	specific	
kW	rev/min		l/h	g/kWh	kWh/l
MAXIMUM POWER - TWO HOURS TEST					
76,9	2208	1104	22,72	252	3,39
MAXIMUM POWER AT RATED ENGINE SPEED					
76,9	2208	1104	22,72	252	3,39
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					
65,2	2226	1113	19,57	256	3,33
(2) 75% of the torque defined in (1)					
49,5	2236	1118	15,88	274	3,12
(3) 50% of the torque defined in (1)					
33,8	2244	1122	12,56	317	2,69
(4) 25% of the torque defined in (1)					
16,3	2254	1127	8,99	470	1,82
(5) Unloaded					
-	2262	1131	6,09	-	-
MAXIMUM POWER AT STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)					
74,9	2000	1000	21,38	243	3,51
PART LOADS (governor control being set for maximum power at standard power take-off speed)					
(6) Torque corresponding to 85% of the torque at maximum power at standard power take-off speed					
63,4	2008	1004	17,97	242	3,53
(7) 75% of the torque defined in (6)					
48,5	2020	1010	14,54	256	3,34
(8) 50% of the torque defined in (6)					
31,8	2034	1017	10,92	293	2,91
(9) 25% of the torque defined in (6)					
16,2	2048	1024	7,88	415	2,05
(10) Unloaded					
-	2060	1030	5,00	-	-

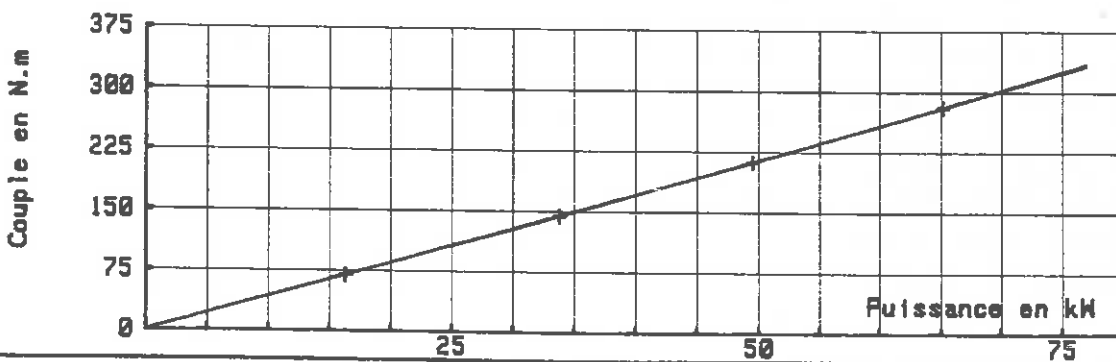
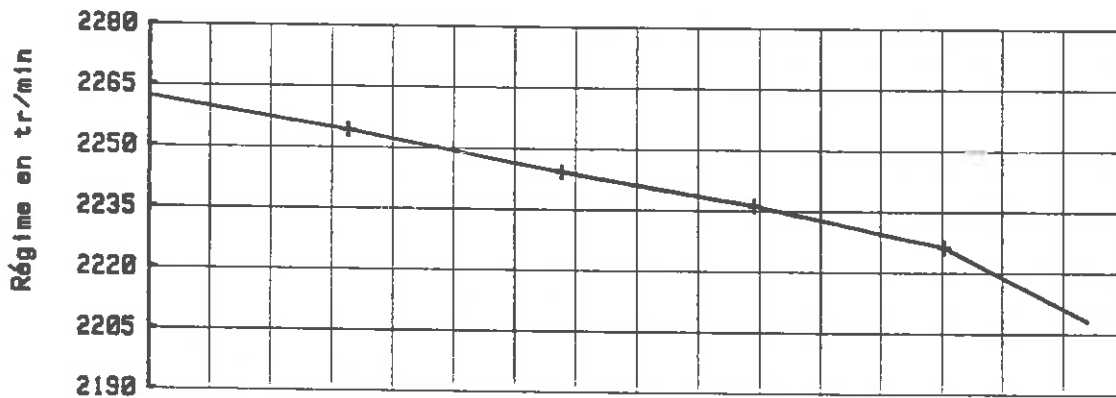
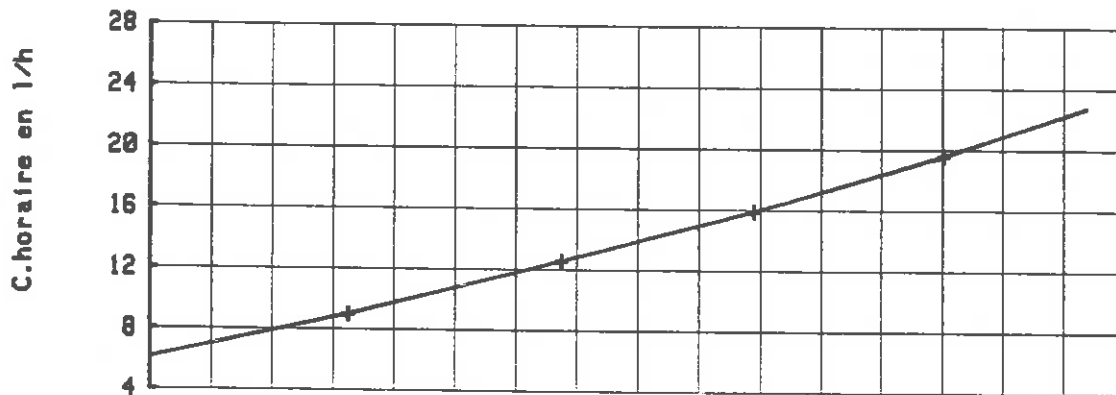
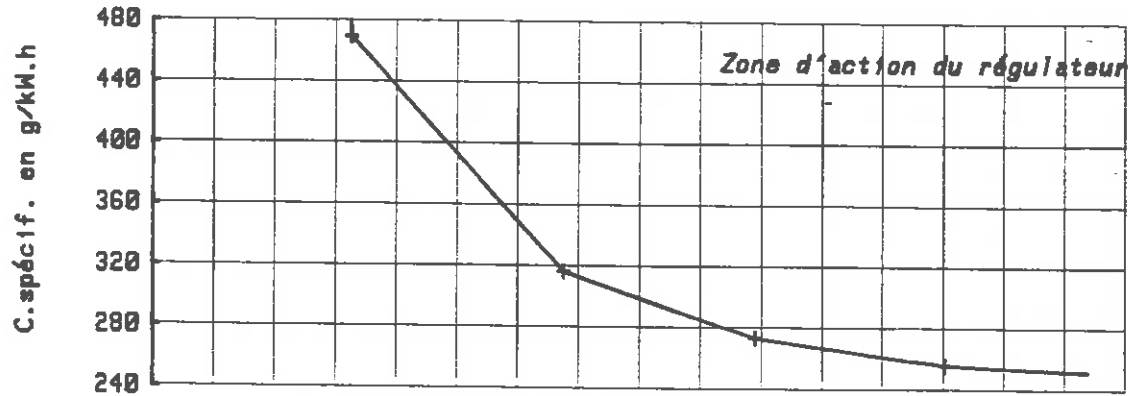
Essai au banc à la prise de force principale
Tracteur MASSEY FERGUSON 3115 (2 WD)

Essai 8009
du 15.05.90



Essai au banc à la prise de force principale
Tracteur MASSEY FERGUSON 3115 (2 WD)

Essai 8009
du 15.05.90



4.1 Main power take-off performance (continued)

Other results

No load, maximum engine speed : 2262 rev/min

Equivalent crankshaft torque at maximum power at rated engine speed : 332,8 N.m

Maximum equivalent crankshaft torque : 413,0 N.m at 1098 rev/min

Mean atmospheric conditions

Temperature : 22 °C

Pressure : 1015 mbar

Relative humidity : 58 %

Maximum temperatures

Coolant : 94 °C

Engine oil : 108 °C

Fuel : 34 °C

Air intake : 22 °C

Fuel consumption at varying load

Charge	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)	19,57	12,56	17,97	10,92
Standard specific consumption (g/kWh)	256	317	242	293

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

(2) 50% of the torque defined in (1)

4.2 Lifting force and hydraulic power

Date : 5th june 1990

4.2.1 Power lift test

Hydraulic fluid : see "fuel and lubricants used in tests"

	at the hitch point	on the frame
Height of lower hitch point above ground in low position mm	205	223
Vertical movement mm	575	580
Maximum force exerted through full range kN	49,5	43,9
Corresponding pressure of hydraulic fluid bar	173	173
Moment about rear axle kN.m	54,5	75,1
Maximum tilt angle of mast over range of lift degree	/	2°

4.2.1 Power lift test (continued)

Lifting height (1)	mm	-335	-317	-200	-100	0	+100	+200	+240	+263
Lifting force (2)	at the hitch point kN	52,9	53,1	54,4	55,1	55,4	55,1	54,0	49,5	-
	at the frame kN	-	56,8	54,9	52,6	51,3	48,6	45,9	45,0	43,9

(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.

4.2.2 Hydraulic power test

Tapping point used for test : auxiliary service connection

Sustained pressure with relief valve open : 192 bars

Pump delivery rate at minimum pressure : 50,0 l/min

		corresponding to maximum hydraulic power	corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting
Pressure	bars	179	173
Flow rate	l/min	46,9	48,0
Power	kW	14,0	13,8

4.3 Drawbar performance (unballasted tractor)

Date and location of test : 6th June 1990, Antony

Type of track : Tarmacadam

Height of drawbar above ground : 0,78 m

Tyres

Front

Rear

. Size : 11.00 - 16
. Inflation pressure (bar) : 2,5

18.4 - 38
1,1

Atmospheric conditions :

. Temperature : 20°C
. Pressure : 1011 mbar
. Relative humidity : 50 %

Gear ratio	Travelling speed km/h	Drawbar pull kN	Power kW	Engine speed rev/min	Wheelslip %	Specific consumption g/kWh	Specific energy kW/l	Temperatures		
								(1) °C	(2) °C	(3) °C
MAXIMUM POWER IN TESTED GEAR										
1 T	2,12	40,0	23,6	2244	15	457	1,86	24	81	83
1 T + S	2,68	40,3	30,0	2237	15	403	2,12	26	81	90
2 T	3,23	39,8	35,7	2232	14	380	2,24	27	81	92
2 T + S	4,10	39,5	45,0	2224	14	356	2,40	27	81	93
3 T	4,52	38,9	48,8	2220	13	345	2,47	27	81	94
3 T + S	5,96	36,3	60,1	2210	8	327	2,60	28	82	94
4 T	6,91	31,9	61,3	2196	7	320	2,65	29	82	94
4 T + S	9,00	24,5	61,2	2197	4	321	2,65	27	84	95
1 R	9,38	23,4	61,1	2195	4	322	2,63	28	82	94
1 R + S	11,85	18,4	61,1	2167	2	319	2,66	27	83	93
2 R	14,39	15,0	59,9	2166	2	327	2,59	29	83	94
2 R + S	18,35	11,1	56,6	2166	1	373	2,27	30	82	95
TRANSMISSION AND FUEL CONSUMPTION CHARACTERISTICS										
(i) Maximum drawbar power in tested gear and nearest to 7,5 km/h										
4 T	6,91	31,9	61,3	2196	7	320	2,65	29	82	94
(ii) 75% of pull at maximum power										
4 T	7,22	24,0	48,1	2222	4	325	2,61	28	83	93
(iii) 50% of pull at maximum power										
4 T	7,37	16,6	33,9	2232	2	373	2,27	30	80	92
(iv) Higher gear same pull as in (i) reduced engine speed										
4 T + S	7,25	23,9	48,2	1766	4	302	2,81	29	82	93
(v) Higher gear as in (ii) reduced engine speed										
4 T + S	7,38	16,4	33,7	1767	2	324	2,61	29	81	90
(vi) Higher gear same pull as in (i) reduced engine speed										
1 R	OUT OF MEASURE									
(vii) Higher gear same pull as in (i) reduced engine speed										
1 R	7,36	16,1	32,8	1683	2	330	2,57	29	80	90

(1) Fuel temperature - (2) Coolant temperature - (3) Engine oil temperature

5. OPTIONAL TESTS RESULTS

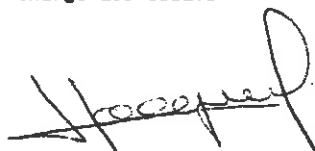
5.1 Measurement of external noise level

Date of test : 6th june 1990
Type of sound level meter : BRUEL & KJAER 2209
Type of track : Tarmacadam
Gear : 4 R
Travelling speed before acceleration : 22,4 km/h
Sound level : 87 dB(A)

6. REPAIRS AND ADJUSTMENTS DURING TESTS

none

Le Technicien
chargé des essais



M. HOCQUEL

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