CEMAGREF

CENTRE NATIONAL
DU MACHINISME AGRICOLE
DU GÉNIE RURAL
DES EAUX ET DES FORÊTS

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ivision Tracteurs et Machines Agricoles

TEST REPORT N° 9035 **DATE : 1st september 1992**

OECD TEST OF AN AGRICULTURAL TRACTOR (RESTRICTED CODE) 50.3

eference text : O.E.C.D code II

OECD Approval

N° 1380 Restricted Code

Date 28th august 1992

ested equipment	
ature	: TRACTOR
ake	: MASSEY FERGUSON
odel	: B 515/2
rade name	: 3655-2 PS/4 (3660 for N.A.O)
umber of driving wheels	: 2
ype	: standard

Submitted for tests by

Name : MASSEY FERGUSON S.A.

Address : avenue Blaise Pascal
BP 307
60026 BEAUVAIS CEDEX

Phone : 44.89.33.33 FAX : 44.89.34.18

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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

Place of running in : BEAUVAIS

Duration of running in : 20 h

Date of arrival of the equipment in CEMAGREF : 23rd october 1991

SPECIFICATIONS

2.1 Tested tractor

Make : MASSEY FERGUSON
Model : B 515/2
Trade name : 3655-2 PS/4 (3660 for N.A.O)
Number of driving wheels : 2
Type : standard
Serial number : S 175 142
1st serial number : S 175 142

2.2 Engine

2.2.1 Identification

Make : PERKINS
Model : 1006-6 T4
Type : 4 strokes - Direct injection diesel turbocharged
Serial number : U 529 835 V

2.2.2 Cylinders

Number : 6
Disposition : vertical, in line
Bore/stroke : 100/127 mm
Capacity : 5985 cm^3
Compression ratio : 16/1
Arrangement of valves : overhead
Cylinders liners : dry

2.2.3 Supercharging

Make : AIRESEARCH (GARRET)
Model : turbo charger
Type : 452024
Supercharging pressure : 1,15 bar

2.2.4 Fuel system

Fuel feed system : piston fuel feed pump
Make, type and model of fuel filter : CAV 2 FAS 58488130, dual element with water trap
Capacity of fuel tank : 260 l (320 l with auxiliary fuel tank)
Make, type and model of injection pump : CAV, DPS 963, rotative
Serial number : 2643M022RK/3/2310
Manufacturer's setting of injection pump : 77 mm^3/stroke (at rated engine speed and full load)
Injection pump timing : 17° before TDC
Make, type and model of injectors : CAV, EGGI 680 1093
Injection pressure : 250 bars

2.2.5 Governor

Make : CAV
Type : DPA
Model : mechanical, incorporated into fuel injection pump
Governed range of engine speed : 1000 - 2310 rev/min

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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, FLB10-0070
. 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 : 2 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 on clutch pedal
Make : LUCAS
Type and model : pre-engaged M 127
Power : 2,8 kW
Cold starting aid : thermostart

2.2.11 Electrical system

Voltage : 12 V negative earth
Generator : alternator
. Make : VALEO
. Type and model : alternator 70 A
. Power : 980 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 : 110
Location : under bonnet with vertical stak pipe
Height of outlet above ground : 2905 mm

2.3 Transmission

2.3.1 Clutch (travel)

Mak : VALEO
Type : dry, single plate clutch, pushed type
Number of plates : 1
Diameter of plates : 350 mm
Method of operation (for travel) : foot pedal

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2.3 Transmission (continued)

2.3.2 Gear box

Make : MASSEY FERGUSON
Type and model : mechanically operated gear shift, speedshift
Arrangement : 4 gears with four positions speed shift,
2 ranges and one reverse groupe
Number of speeds : 32 forward gears and 32 reverse gears
Available option : none

2.3.3 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

2.3.4 Front axle and final drive

Make : MASSEY FERGUSON
Type and model : telescopically adjustable
Driven : not driven

2.3.6 Total ratios and travelling speeds

Range	Gear	Overall gear ratios	Rated forward speed km/h (*)
T forward	1 A	282,634	2,509
	1 B	241,482	2,937
	1 C	204,580	3,466
	1 D	174,787	4,057
	2 A	186,232	3,808
	2 B	159,116	4,457
	2 C	134,801	5,261
	2 D	115,170	6,157
	3 A	130,362	5,440
	3 B	111,381	6,367
	3 C	94,361	7,515
	3 D	80,619	8,796
	4 A	95,776	7,404
	4 B	81,831	8,666
	4 C	69,326	10,229
	4 D	59,230	11,972
T reverse	1 A	306,994	2,310
	1 B	262,299	2,703
	1 C	222,216	3,191
	1 D	189,855	3,735
	2 A	202,286	3,506
	2 B	172,833	4,103
	2 C	146,422	4,843
	2 D	125,098	5,669
	3 A	141,600	5,008
	3 B	120,983	5,861
	3 C	102,495	6,919
	3 D	87,569	8,098
	4 A	104,033	6,816
	4 B	88,885	7,978
	4 C	75,303	9,417
	4 D	64,336	11,022

T : Turtle, A B C D : quadrupler positions
(*) Calculated for the rated engine speed 2200 rpm and dynamic index ratio of 20.8 - 38 tyres : 855 mm (ISO 4251/1-1984)

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2.4 Main power take-off

2.4.1 General specifications

Type : rear independant power take-off (wet, hydraulic, multiplate clutch)

Engagement by lever with electrical switch located at the middle of the upper right hand 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

2.4.2 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 : 779 mm with types 20.8-38
Distance from the median plane of the tractor : 0 mm
Distance behind rear axle : 550 mm

Power take-off speed : 596 rev/min
for rated engine speed : 2200 rev/min

Engine speed : 1993 rev/min
for standard power take-off speed : 540 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 R 500-1979)
Height above ground : 779 mm with types 20.8-38
Distance from the median plane of the tractor : 0 mm
Distance behind rear axle : 498 mm

Power take-off speed : 1053 rev/min
for rated engine speed : 2200 rev/min

Engine speed : 2090 rev/min
for standard power take-off speed : 1000 rev/min

Engine to power take-off ratio : 2,09
Power restriction : none
Direction of rotation (viewed facing driving end) : clockwise

2.4.3 Power take-off proportional to ground speed :

None

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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 2180 mm track width (mm)
Headlights	1237	167 x 107	991
Sidelights	1775	120 x 80	410
Rearlights	1844	300 x 62	289
Reflectors	754	98 x 62	557

3. CONDITIONS DURING TEST

3.1 Overall dimensions

LENGTH m	WIDTH		HEIGHT	
	min m	max m	exhaust silencer m	at top of protective structure
4,649	2,088	2,488	2,905	2,905

3.2 Ground clearance : 428 mm limited by drawbar bracket

3.3 Tractor mass (kg)

(with or without driver but with tanks full and cab)

	Without driver kg	With driver kg
Front	1720	1725
Rear	3710	3765
Total	5430	5490

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4. COMPULSORY TESTS RESULTS

4.1 Main power take-off performance

Location and date of tests : ANTONY, 11th november 1991
Type of dynamometer : SCHENCK W 700

Power	Speed		Fuel consumption		Specific
	engine	power take-off	hourly	specific	energy
kW	rev/min		l/h	g/kWh	kWh/l
MAXIMUM POWER - TWO HOURS TEST					
106,1	2196	1050	30,99	249	3,42
MAXIMUM POWER AT RATED ENGINE SPEED					
106,9	2196	1050	30,99	249	3,42
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					
90,3	2230	1067	28,01	264	3,22
(2) 75% of the torque defined in (1)					
69,0	2240	1071	23,27	287	2,97
(3) 50% of the torque defined in (1)					
46,3	2253	1078	18,37	338	2,52
(4) 25% of the torque defined in (1)					
23,6	2264	1083	13,13	474	1,79
(5) Unloaded					
-	2279	1090	8,07	-	-
MAXIMUM POWER AT STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)					
104,6	2092	1001	29,82	242	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					
90,9	2136	1022	27,00	253	3,37
(7) 75% of the torque defined in (6)					
68,4	2150	1028	22,06	274	3,10
(8) 50% of the torque defined in (6)					
46,1	2166	1036	17,19	317	2,68
(9) 25% of the torque defined in (6)					
22,7	2181	1043	12,12	455	1,87
(10) Unloaded					
-	2197	1051	7,32	-	-

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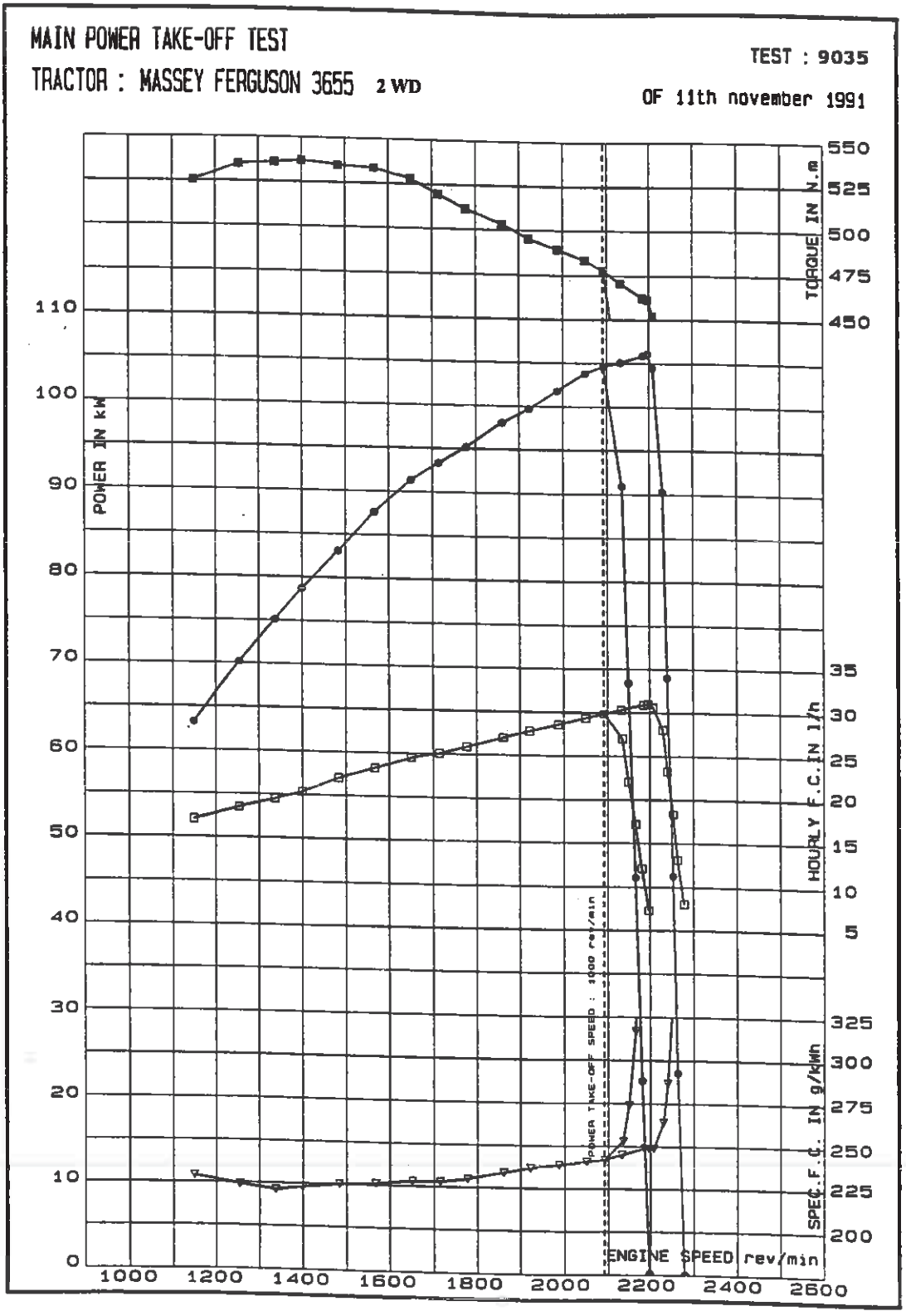
MAIN POWER TAKE-OFF TEST
TRACTOR : MASSEY FERGUSON 3655 2 WD
TEST : 9035
OF 11th november 1991
POWER IN kW
TORQUE IN N.m
HOURLY F.C. IN l/h
SPEC.F.C. IN g/kWh
ENGINE SPEED rev/min
POWER TAKE-OFF SPEED : 1000 rev/min
0
10
20
30
40
50
60
70
80
90
100
110
200
225
250
275
300
325
5
10
15
20
25
30
35
450
475
500
525
550
1000
1200
1400
1600
1800
2000
2200
2400
2600

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