Consiglio Nazionale delle Ricerche

IMAMOTER

Istituto per le Macchine Agricole e Movimento Terra

Report No. 3081*2*CASE*MAXXUM120MC*1*2009

OECD Approval No. 2/2 482 on 17th June 2009

TEST IN ACCORDANCE WITH THE OECD STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL AND FORESTRY TRACTOR PERFORMANCE

Make:	**CASE IH**
Trade Name:	**MAXXUM 120 MULTICONTROLLER**
Type:	**4 WD, 40 km/h, 17+16 speeds, semi-powershift transmission**



Manufactured by:	CNH Europe Holding S.A.. 13, Rue Aldringen L-1118 Luxembourg
Date and location of the tests:	2008 TORINO (Italy)

Istituto per le Macchine Agricole e Movimento Terra
73, Strada delle Cacce
10135 Torino, Italia
Tel +39 011 39 77 1 Fax +39 011 34 89 218

tractorhomologation@imamoter.cnr.it
www.imamoter.cnr.it

)REWORD

his vehicle is equipped with an electronically-controlled **Engine Power Management** (EPM) system that onitors and boosts power output in certain circumstances as engine load increases.
his is achieved by electronically changing the characteristics of the engine power-speed curve.

ie **EPM** function (boosted power level) becomes active in these two following operation conditions:

in PTO operations when
- Engine speed is above 1300 rpm
- Tractor forward speed is above 0.5 kmh^{-1}
- PTO driveline torque is above 150 Nm

ith the tractor moving and the engine speed above 1300 rpm engaging the PTO will put the EPM into andby mode. As the torque and load on the PTO reaches or exceed the above levels, the EPM will be tive and a warning light will illuminate

in road transport application when
- 13th gear, or above, is selected
- Auto Transport Mode (function that permits automatic gear changing) is selected
- engine speed between is 1800 and 2200 rpm

PM does not allow operate boosted mode with tractor stationary.
or test purpose an over ride system has been provide by the manufacturer of the tractor to enable PTO eration mode whilst the tractor is stationary.
or this reason the results of the test in chapter *3.1.A Optional power take-off test (with power boost)* can be hieved ONLY when PTO operation conditions are satisfied.

NOTE

The information opposite each item has been validated by the testing station as follows

C data declared and checked by the testing station

D data declared by the manufacturer

C	Tractor manufacturer's name and address:	CNH Europe Holding S.A. 13, Rue Aldringen L-1118 Luxembourg
D	Location of tractor assembly:	Basildon – United Kingdom St. Valentin - Austria
D	Submitted for test by:	the Manufacturer
C	Selected for test by:	manufacturer with the agreement of IMAMOTER
D	Place of running-in:	Modena - Italy
D	Duration of running-in:	appr. 50 hours
C	Location of test:	IMAMOTER – Torino, Italy

1 SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1 Denomination

C	Make of the tractor:	CASE IH
C	Model (trade name):	MAXXUM 120 MULTICONTROLLER
C	Type:	4WD

1.1.2 Numbers

D	1st serial N° or prototype:	Z6BE01001
C	Serial N°:	Z6BE01003

1.1.3 Other specification (if applicable)

D	Model(s) for other countries:	MAXXUM 120 PRO
C	Transmission type or gears x ranges:	17+16 speeds, semi-powershift
C	Speed version:	40 km/h
D	- Manufacturer identification or technical type number :	BEHCFC

1.2 Engine

C	Make:	CNH
C	Model:	445TA/EGK
C	Type:	4 stroke supercharged, intercooler Diesel direct injection type
C	Serial N°:	333045

2.1 Cylinders

C	Number and disposition:	4, vertical, in line
D	Bore and stroke:	104x132 mm
D	Capacity:	4485 cm^3
D	Compression ratio:	16.5:1
D	Arrangement of valves:	overhead, 4 valves for cylinder
D	Cylinder liners (wet or dry):	none, monobloc construction

2.2 Supercharging

C	Make, model and type:	HOLSET, HX27W, exhaust driven
D	Pressure:	0.142 MPa

2.3 Fuel system

C	Fuel feed system:	gear pump
C	Make model and type of fuel filter(s):	plastic strainer in tank, 1 glass glow sediment and water separation pre-filter, and 2 disposable canister filters (FLEETGUARD, 2830359 and 4897897 drawings, spin on cartridge)
D	Capacity of fuel tank:	176 dm^3, placed under the tractor platform, on the left side
C	Make model and type of injection pump:	BOSCH, CR-CP3, radial plunger high pressure pump
C	Serial N°:	not available

Manufacturer's production setting of injection pump

C	Flow rate (rated engine speed and full load):	92.77 mm^3/stroke at rated speed and full load corresponding 24.49 dm^3/h without power boost 106.55 mm^3/stroke at rated speed and full load corresponding 28.13 dm^3/h with power boost
D	Timing:	electronically controlled
D	Make, model and type of injectors:	BOSCH, CRIN2 (DLLA137 PV3 198), high pressure electronically controlled.
D	Injection pressure:	160 MPa
C	Make, model and type of carburettor:	not applicable

2.4 Governor

C	Make model and type:	BOSCH , VE, mechanical type, incorporated in the fuel pump
C	Governed range of engine speed from-to:	900–2354/2348 rev/min (un-boosted/boosted)
C	Rated engine speed:	2200 rev/min

2.5 Air cleaner

Pre-cleaner

C	Make model and type:	none
C	Location of air intake:	none

	Main cleaner	
C	Make, model and type:	CNH, 3 stage dry paper element with 2 replaceable cartridge, inner (82028149 drawing) and outer (82028976 drawing)
C	Location of air intake:	on front of the radiator under the bonnet cowling inside the pre-cleaner, on front of the radiator under the bonnet cowling
C	Maintenance indicator:	warning lamp on the dashboard
1.2.6	Lubrication system	
D	Type of feed pump:	forced feed from concentric rotor pump
C	Type of filter(s):	mesh strainer in sump on suction line and full flow disposable canister on pressure line
C	Number of filters:	1
1.2.7	Cooling system	
C	Type of coolant:	50% water and 50% antifreeze
D	Type of pump:	centrifugal blade pump with visco-fan belt driven by engine shaft
	Specification of fan or blower	
C	Number of fan blades:	9
C	Fan diameter:	510 mm
D	Coolant capacity:	23 dm^3
C	Type of temperature control:	thermostat with full flow bypass
D	Over-pressure system:	100 kPa
1.2.8	Starting system	
C	Make model and type:	ISKRA, 11131464, positive engagement, solenoid operated
D	Starter motor power rating:	4.2 kW
C	Cold starting aid:	PHILIPS & TEMRO grid heater
C	Safety device:	starting inoperable unless shuttle lever in neutral, clutch pedal depressed and operator seat presence switch is activated
1.2.9	Electrical system	
C	Voltage:	12 V, negative earth
	Generator:	alternator
C	Make model and type:	ISKRA, AAK 5592, belt driven
D	Power:	1.6 kW
	Battery of accumulators	
C	Number:	1, lead acid type
D	Rating:	12 V, capacity 132 Ah, cranking 960 A
1.2.10	Exhaust system	
C	Make model and type:	COR.TUBI, 1.15.1 02AL model, vertical stack pipe with integrated silencer
C	Location:	on the right hand side of engine, with the

vertical exhaust pipe on right of the bonnet cowling

3 Transmission

3.1 Clutch (travel alone)

D	Make model and type:	CNH, own drawing model, wet multi-plate disc
D	Number of plates:	9
D	Diameter of plates:	160 mm
C	Method of operation:	electro hydraulic operated by pedal

3.2 Gear box

D	Make model and type:	CNH make, own drawing model, mechanical
	Description:	17+16 speeds, (40 km/h max speed at reduced engine speed in highest speed) mechanical transmission with semi powershift. 17 forward gears and 16 reverse gears in 2 ranges (Low and High) shiftable with 1 lever. 8 gears for range (+1 in forward High range) with switch for up/down power-shifting. Forward/reverse shuttle lever on steering column. Optional creeper switch acted, 33+32 speeds, not fitted on tested tractor.

		Forward	Reverse
C	Number of ranges	2	2
C	Number of gears	8 (+1 for High range)	8
C	Total of arrangements	17	16

D	Available options:	16+16 speeds (40 km/h) mechanical transmission with semi powershift. 16 forward and reverse speeds in 2 ranges (Low and High) shiftable with 1 lever. 8 gears for range with switch for up/down power-shifting. Forward/reverse shuttle lever on steering column. Optional creeper switch acted, 33+32 speeds. 17+16 speeds (50 km/h) mechanical transmission with semi powershift. 17 forward gears and 16 reverse gears in 2 ranges (Low and High) shiftable with 1 lever. 8 gears for range (+1 in forward High range) with switch for up/down power-shifting. Forward/reverse shuttle lever on steering column. Optional creeper switch acted, 33+32 speeds.

1.3.3 Rear axle and final drives

D	Make model and type:	CNH, own drawing, crown wheel and pinion with differential and inboard epicyclical reduction gear final drive
	Differential lock:	
D	Type:	multi-plate wet discs
C	Method of engagement:	electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto differential lock actuation
C	Method of disengagement:	via panel switch or in response to signal from brakes on application, or auto differential lock disengagement

1.3.4 Front axle and final drives

D	Make model and type:	CNH, own drawing oscillating axle with suspension, jointed cross shaft axle, crown wheel and pinion with differential and outboard epicyclical reduction gear final drive
	Drive engagement	
D	Type:	dog clutch
C	Method of operation:	electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto 4WD engagement
	Differential lock	
D	Type:	multi-plate wet discs
C	Method of engagement:	electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto differential lock actuation
C	Method of disengagement:	via panel switch or in response to signal from brakes on application, or auto differential lock disengagement

3.5 Total ratios and travelling speeds

	Speed No.[1]	Range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed[2] at rated engine speed of 2200 min^{-1} (rev/min) km/h
	Forward			
C	1A	Low	300.124	2.266
C	2A	Low	244.663	2.780
C	3A	Low	200.928	3.385
C	4A	Low	163.797	4.152
C	5B	Low	127.757	5.323
C	6B	Low	104.148	6.530
C	7B	Low	85.531	7.951
C	9C	High	76.750	8.861
C	8B	Low	69.725	9.754
C	10C	High	62.567	10.870
C	11C	High	51.383	13.236
C	12C	High	41.887	16.236
C	13D	High	32.671	20.816
C	14D	High	26.633	25.536
C	15D	High	21.872	31.094
C	16D	High	17.831	38.141
C	17D	High	14.842	38.137[3]
	Reverse			
C	1A	Low	303.673	2.240
C	2A	Low	247.556	2.747
C	3A	Low	203.304	3.345
C	4A	Low	165.734	4.104
C	5B	Low	129.267	5.261
C	6B	Low	105.379	6.454
C	7B	Low	86.542	7.859
C	9C	High	77.657	8.758
C	8B	Low	70.550	9.640
C	10C	High	63.307	10.743
C	11C	High	51.990	13.081
C	12C	High	42.383	16.046
C	13D	High	33.057	20.573
C	14D	High	26.948	25.237
C	15D	High	22.131	30.730
C	16D	High	18.041	37.697

[1] *As displayed on dashboard*

[2] *Calculated with a tyre dynamic radius index of 820 mm (ISO 4251-1:2005)*

[3] *At maximum engine speed of 1831 rpm*

C Number of revolution of front wheels for one revolution of rear-wheels: 1.353

1.4 Power take-off

1.4.1 Main power take-off

C Type:	fully independent
C Method of engagement:	engaged/disengaged by pulling/pushing a switch on the right-hand control panel, driven by electro-hydraulic operated multi-plate clutch
C Number of shafts:	1
C Method of changing power take-off shaft ends and speeds:	removing circlip, swapping shaft and replace circlip

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 540 min^{-1} rev/min

C Location:	at the rear of the tractor, in the median plane
C Diameter of power take-off shaft end:	35 mm
C Number of splines:	6, in conformity with ISO 500-1:2005, ISO 500-2:2004 and ISO 500-3:2004
C Height above ground:	795 mm
C Distance from the median plane of the tractor:	0 mm
C Distance behind rear-wheel axis:	555 mm
C PTO speed at rated engine speed:	603 rev/min
C Engine speed at standard power take-off speed:	1970 rev/min
C Ratio of rotation speeds (engine speed/p.t.o. speed):	3.648
D Power restriction:	none
D Maximum torque transmissible:	engine torque
C Direction of rotation (viewed from behind tractor):	clockwise

Power take-off at 1000 min^{-1} rev/min

C Location:	at the rear of the tractor, in the median plane
C Diameter of power take-off shaft end:	35 mm
C Number of splines:	21, in conformity with ISO 500-1:2005, ISO 500-2:2004 and ISO 500-3:2004
C Height above ground:	795 mm
C Distance from the median plane of the tractor:	0 mm
C Distance behind rear-wheel axis:	555 mm
C PTO speed at rated engine speed:	1038 rev/min
C Engine speed at standard power take-off speed:	2120 rev/min
C Ratio of rotation speeds (engine speed/p.t.o. speed):	2.119
D Power restriction:	none
D Maximum torque transmissible:	engine torque
C Direction of rotation (viewed from behind tractor):	clockwise

1.4.1.2 Power take-off proportional to ground speed

Optional, not fitted on tested tractor

4.2 Optional power take-off

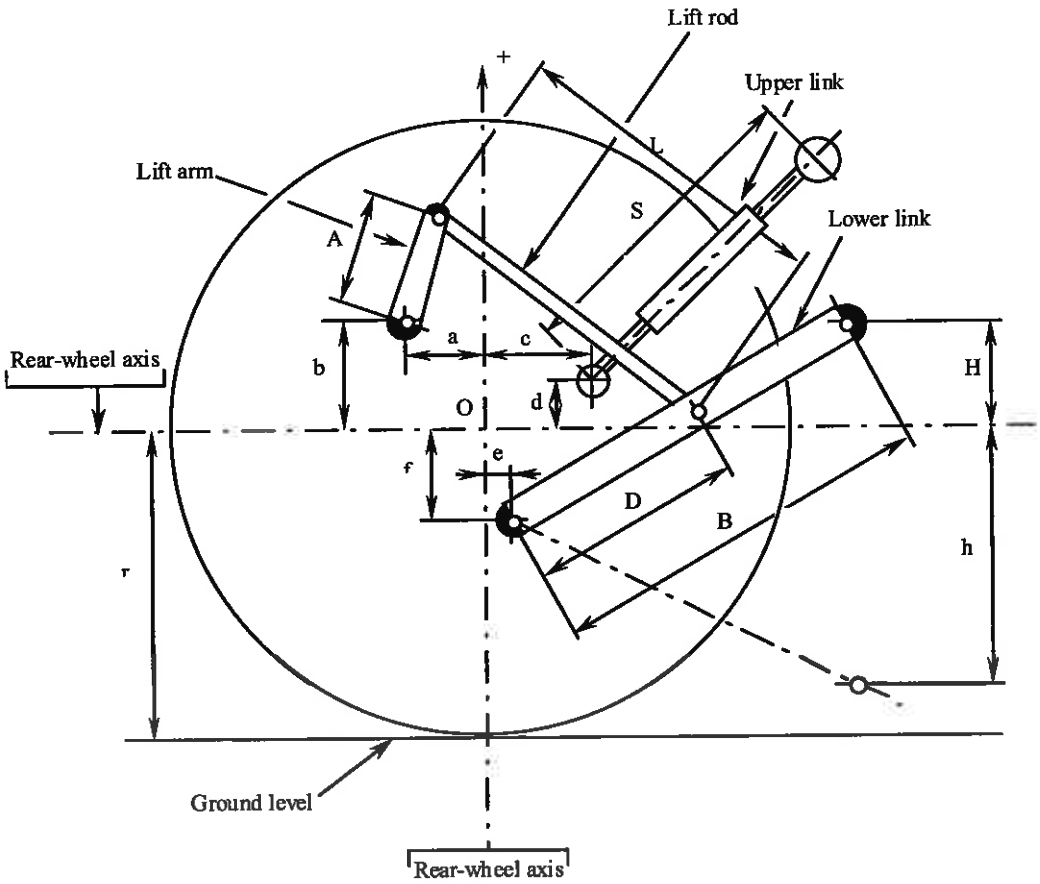
Optional, not fitted on tested tractor

5 **Hydraulic power lift**

C	Make, model and type:	CNH, own drawing, draft and position control and float function; electronically controlled
C	Type of hydraulic system:	closed centre system
C	Type and number of cylinders:	2 single acting Ø 90 mm external
C	Type of linkage lock for transport:	hydraulic
D	Relief valve pressure setting (tolerance):	21.0±1 MPa
D	Opening pressure of cylinder safety valve (if fitted):	22.0±0.5 MPa
D	Lift pump type:	load sensing variable displacement pump driven by the engine shaft
D	Transmission between pump and engine:	mechanical
C	Type and number of filters:	2, replaceable canister filters
C	Site of oil reservoir:	in common with transmission and rear axle
C	Type, number and location of tapping points:	3 control valves, double acting, 3 couple of couplers at rear of tractor
D	Maximum volume of oil available to external cylinders:	38 dm^3

6 **Three point linkage**

C	Category:	2nd, in conformity with categories 2 ISO 730-1:1994+Cor.1:1995
C	Category adapter:	3rd



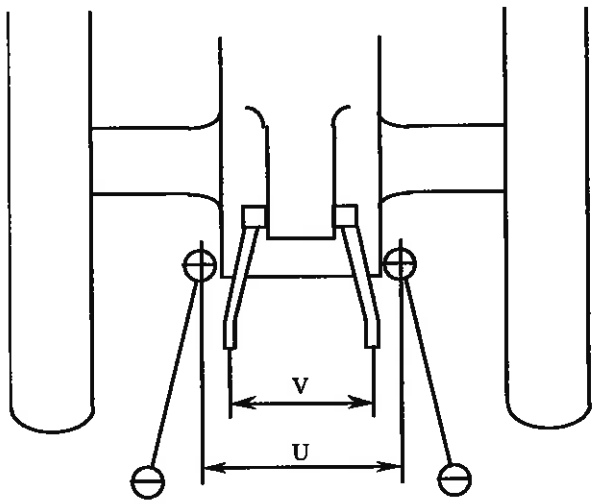


Figure 1. Lift test- Rear linkage geometry

Table 1.1. Dimension of rear linkage geometry when connected to the standard frame

		Dimension or range	Settings used in test		
			OECD[1]		SAE[2]
			Main	Additional	
		mm	mm	mm	
Length of lift arms:	(A)	310	310	310	310
Length of lower links:	(B)	1010	1010	1010	1010
Distance of lift arm pivot point from rear wheel axis:					
- horizontally (rearward)	(a)	138	138	138	138
- vertically	(b)	370	370	370	370
Horizontal distance between the 2 lower link points:	(u)	460	460	460	460
Horizontal distance between the 2 lift arm end points:	(v)	550	550	550	550
Length of upper link:	(S)	650→920	770	795	781
Distance of upper link pivot point from rear wheel axis:					
- horizontally (rearward)	(c)	395-430	430	395	395
- vertically	(d)	200-250	200	250	250
Distance of lower link pivot point from rear wheel axis:					
- horizontally	(e)	168	168	168	168
- vertically	(f)	235	235	235	235
Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	505-585-665	505	665	585
Length of lift rods:	(L)	691→867	817	867	862/755
Height of lower hitch points (corresponding to travel of the lift without power) relative to the rear wheel axis[3]:					
- in low position	(h)	-755→-199	-620	-539	-620/-407
- in high position	(H)	-37→299	97	50	49/204
Height above ground of lower hitch points when locked in transport position		Any height within lift range			

[1] *Main and additional settings are in accordance with OECD Code and manufacturer specifications*

[2] *SAE settings is in accordance with SAE Standard and manufacturer specifications*
SAE setting tests' results is not covered by OECD approval

[3] *Assuming r=820 mm tyre dynamic radius index of 600/65R38 (equivalent to 18.4R38) tyres on rear axle (ISO 4251-1:2005)*

1.7 Swinging drawbar

C	Type:	automatic pick-up drawbar with clevis
	Height above ground	
C	Maximum:	440 mm
C	Minimum:	340 mm
C	Type of adjustment:	overturning the drawbar to position the fork uppermost or underneath
C	Distance of hitch point from rear-wheel axis, horizontally:	962-1346 mm
	Distance of hitch point from power take-off shaft end:	
C	Vertically:	256-346 mm
C	Horizontally:	407-791 mm
	Lateral adjustment (centre of clevis):	
C	Right hand:	Not applicable
C	Left hand:	Not applicable
C	Distance of pivot point from rear-wheel axis, horizontally:	Not applicable
C	Diameter drawbar pinhole:	33 mm
D	Maximum vertical permissible load:	15.0 kN – 13.6 kN on uppermost position depending on longitudinal adjustment 15.0 kN – 13.6 kN on underneath position depending on longitudinal adjustment

1.8 Trailer hitch

Optional, not fitted

1.9 Holed drawbar

Optional, not fitted

1.10 Steering

D	Make model and type:	DANFOSS make, OSPC 160 OR model, hydrostatic type with independent circuit
	Method of operation	
D	Pump(s):	BOSCH, hydraulic gear pump
D	Ram(s):	2 steering cylinders, one for each steering stub, acting directly on front axle
D	Working pressure:	17.0±0.5 MPa

11 Brakes

11.1 Service brake

D	Make model and type:	CNH make, oil bath disc, total 2 discs, 1 per side at rear axle, independently acting on the rear axle, additionally automatic 4WD engagement.
C	Method of operation:	hydraulically actuated with 2 pedals
C	Trailer braking take-off (hydraulic or air brake):	hydraulic brake system and air brake system

11.2 Parking brake

C	Type:	4 oil immersed discs acting on bevel pinion shaft
C	Method of operation:	mechanical cable linked by means of hand lever

12 Wheels

Number

C	Front:	2, driving and steering
C	Rear:	2, driving
C	Wheelbase:	2421 mm

Track width adjustment:

		Minimum mm	Maximum mm	Adjustment method
D	Front	1325	2285	Changing the position of the rims with respect to the disc
D	Rear	1430	2130	Changing the position of the rims in respect to the disc

13 Protective structure

C	Make model and type:	CNH, SLTV 12, cab
C	Manufacture's name and address:	CNH Europe Holding S.A. 13, Rue Aldringen L-1118 Luxemburg

Protective device

C	Cab, frame, rollguard or other:	four posts
C	Tiltable or not tiltable:	not tiltable

OECD Approval

C	Approval number:	4/0 741/2
C	Date of approval:	16th January 2008
C	Nos. of minor modification certificates, if any:	4

1.14 Seat

1.14.1 Driver's seat

C	Make model and type:	GRAMMER, MSG 95G/741 (MSG 95A/741 previous denomination), air suspended type
C	Seat and steering wheel reversible:	No
C	Type of suspension:	parallelogram linkage
C	Type of damping:	hydraulic
	Range of adjustment:	
C	Longitudinally:	210 mm
C	Vertically:	60 mm
C	Safety belt:	yes
	Type:	pelvic

1.14.2 Optional driver's seat(s)

Make	Model	Type of suspension	Type of damping	Range of adjustment	
				Longitudinal	Vertical
				mm	mm
GRAMMER	MSG 85/731	Mechanical	Hydraulic	210	80
GRAMMER	MSG 44/520	Mechanical	Hydraulic	210	80
GRAMMER	MSG 93/731	Air	Hydraulic	210	60
GRAMMER	MSG 95GL/741[1]	Air	Hydraulic	210	80
[1] *Included in EC Type Approval and previously named MSG95A/741*					

1.14.3 Passenger seat

C	Location:	on the left side of the driver's seat
C	Capacity (number):	1

1.15 Lighting

		Height above ground of centre	Size (lxh)	Distance from outside edge of lights to median plane of tractor
		mm	mm	mm
C	Headlights	1355	175x110	195
C	Front direction light	1850	80x90	955
C	Front position light	1790	80x75	955
C	Front lower working light	1355	95x110	290
C	Front middle working light	2350	135x85	1025
C	Front higher working light	2780	150x75	610
C	Rear direction lights	1855	265x55	1115
C	Stop/rear position	1800	265x55	1115
C	Reflectors	800	105x45	645
C	Rear middle working light	2280	135x85	920
C	Rear higher working light	2760	135x85	510

TEST CONDITIONS

1 **Overall dimensions**

	Length	Width		Height at top of	
		minimum	maximum	protective structure	exhaust pipe
	mm	mm	mm	mm	mm
Unballasted	4291	2450	2810	2985	2940

2 **Ground clearance (unballasted tractor):** 300 mm

Clearance-limiting part: drawbar clevis in underneath position

3 **Tractor mass**

	Unballasted	
	without driver	with driver
	kg	kg
Front	2200	2210
Rear	3455	3520
Total	5655	5730

4 **Ballast**

Not applicable

5 **Track specifications**

Not applicable

6 **Tyres and track width specifications**

	Front	Rear
Tyres:		
- dimensions (equivalent)	480/65R28 (14.9R28)	600/65R38 (18.4R38)
- ply rate	none	none
- load index	136	153
- type	radial	radial
- maximum load (tyre manufacturer's)	15.7 kN	25.8 kN
- maximum load (tractor manufacturer's)	15.7 kN	25.8 kN
- inflation pressure (tyre manufacturer's)	80 kPa	80 kPa
- dynamic radius index*	640 mm	820 mm
Chosen track width:	1765 mm	1735 mm
** ISO 4251-1:2005*		

2.7 Fuel

Type: Diesel oil, in conformity with UNI EN 590 July 2004.

Density at 15 °C: 840 kg/m^3

2.8 Oils and lubricants

2.8.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm^3	h	h
Engine	10.0	600	600
Gear box, rear axle, final drive, hydraulic system and steering	62.0	1200 or annually	1200 or annually
Front axle	9.0	1200 or annually	None
Final drive (front)	1.5	1200 or annually	None
Brakes	0.5	Max. level	None

2.8.2 Specifications (SAE, API, CCMC, ACEA, Mil.L, ISO)

	Recommended	Used during test
Engine oil - Type: - Viscosity: - Classification:	15W-40 14.4 cSt at 100 °C (ASTM D 445) API CI-4/CH-4 ACEA E7/E5	As recommended
Transmission oils - Type: - Viscosity: - Classification	SAE 10W-30 10 cSt at 100 °C (ASTM D 445) API GL 4	As recommended
Hydraulic fluid - Type: - Viscosity: - Classification	SAE 10W-30 10 cSt at 100 °C (ASTM D 445) API GL 40	As recommended
Steering oil - Type: - Viscosity: - Classification:	SAE 10W-30 10 cSt at 100 °C (ASTM D 445) API GL 40	As recommended
Grease - Type: - Viscosity: - Classification:	Lithium based Not applicable NLGI 2	As recommended
Brake fluid - Type: - Viscosity: - Classification:	No equivalent 6.5 cSt at 100 °C (ASTM D 445) ISO 7308	As recommended

2.8.3 Grease

Number of lubrication points: 16

TEST RESULTS

1 **Main power take-off (without power boost)**

Date and location of tests: 4th December 2007, I.M.A.MO.TER, TORINO, ITALY
Type of dynamometer: parasitic currents, BORGHI&SAVERI FA300-30SP

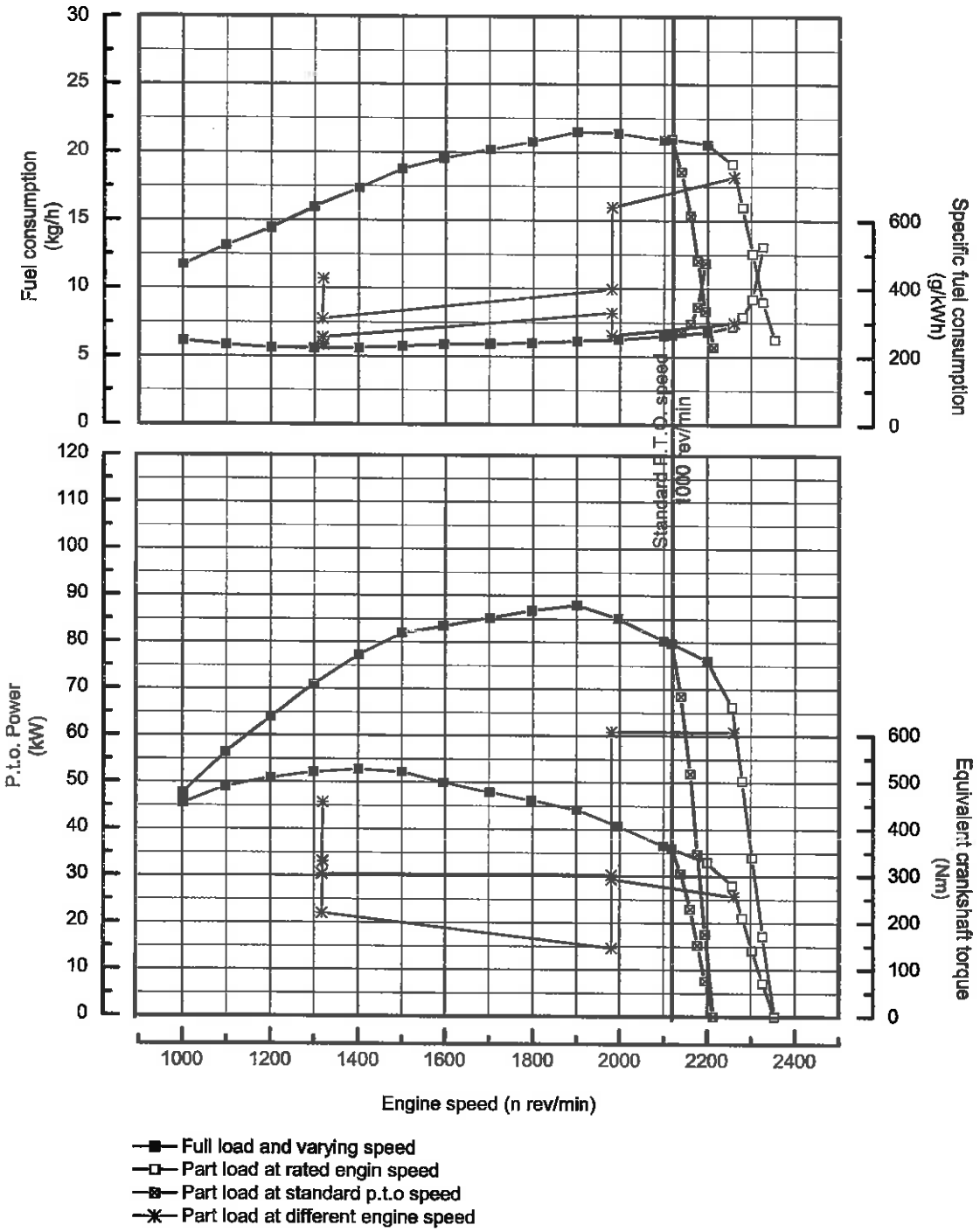
Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER-ONE-HOUR TEST							
87.9	1901	897	1740	21.51	25.61	245	3.43
3.1.2 POWER AT RATED ENGINE SPEED							
76.0	2200	1038	1800	20.57	24.49	271	3.10
3.1.3 POWER AT STANDARD PTO SPEED [1000 ± 25 min^{-1}]							
79.8	2119	1000	1740	20.99	24.99	263	3.19
3.1.4 PART LOADS							
3.1.4.1 The torque corresponding to maximum power at rated engine speed							
76.0	2200	1038	1800	20.57	24.49	271	3.10
3.1.4.2 85% of torque obtained in 3.1.4.1							
66.2	2257	1065	1860	19.15	22.80	289	2.91
3.1.4.3 75% of torque defined in 3.1.4.2							
50.3	2280	1076	1920	15.95	18.99	317	2.65
3.1.4.4 50% of torque defined in 3.1.4.2							
34.0	2303	1087	1920	12.56	14.95	369	2.28
3.1.4.5 25% of torque defined in 3.1.4.2							
17.2	2327	1098	1800	9.02	10.74	523	1.61
3.1.4.6 Unloaded							
-	2354	1111	1740	6.26	7.45	-	-
3.1.5 PART LOADS AT STANDARD PTO SPEED [1000 ± 25 min^{-1})]							
3.1.5.1 the torque corresponding to maximum power							
79.8	2119	1000	1740	20.99	24.99	263	3.19
3.1.5.2 85% of torque obtained in 3.1.5.1							
68.5	2140	1010	1920	18.55	22.08	271	3.10
3.1.5.3 75% of torque defined in 3.1.5.2							
51.9	2161	1020	1860	15.35	18.27	296	2.84
3.1.5.4 50% of torque defined in 3.1.5.2							
34.8	2178	1028	1860	12.02	14.31	346	2.43
3.1.5.5 25% of torque defined in 3.1.5.2							
17.6	2195	1036	1740	8.35	9.94	475	1.77
3.1.5.6 Unloaded							
-	2214	1045	1620	5.69	6.77	-	-

Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
3.1.6 PART LOADS AT DIFFERENT ENGINE SPEEDS							
3.1.6.1 Maximum power at rated engine speed							
76.0	2200	1038	1800	20.57	24.49	271	3.10
3.1.6.2 80% of power obtained in 3.1.6.1 at max speed setting							
60.8	2261	1067	1920	18.18	21.64	299	2.81
3.1.6.3 80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
60.8	1981	935	1800	15.95	18.99	262	3.20
3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
30.3	1981	935	1560	9.95	11.85	329	2.55
3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
45.7	1320	623	1260	10.68	12.71	234	3.59
3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
30.4	1318	622	1200	7.74	9.21	255	3.29

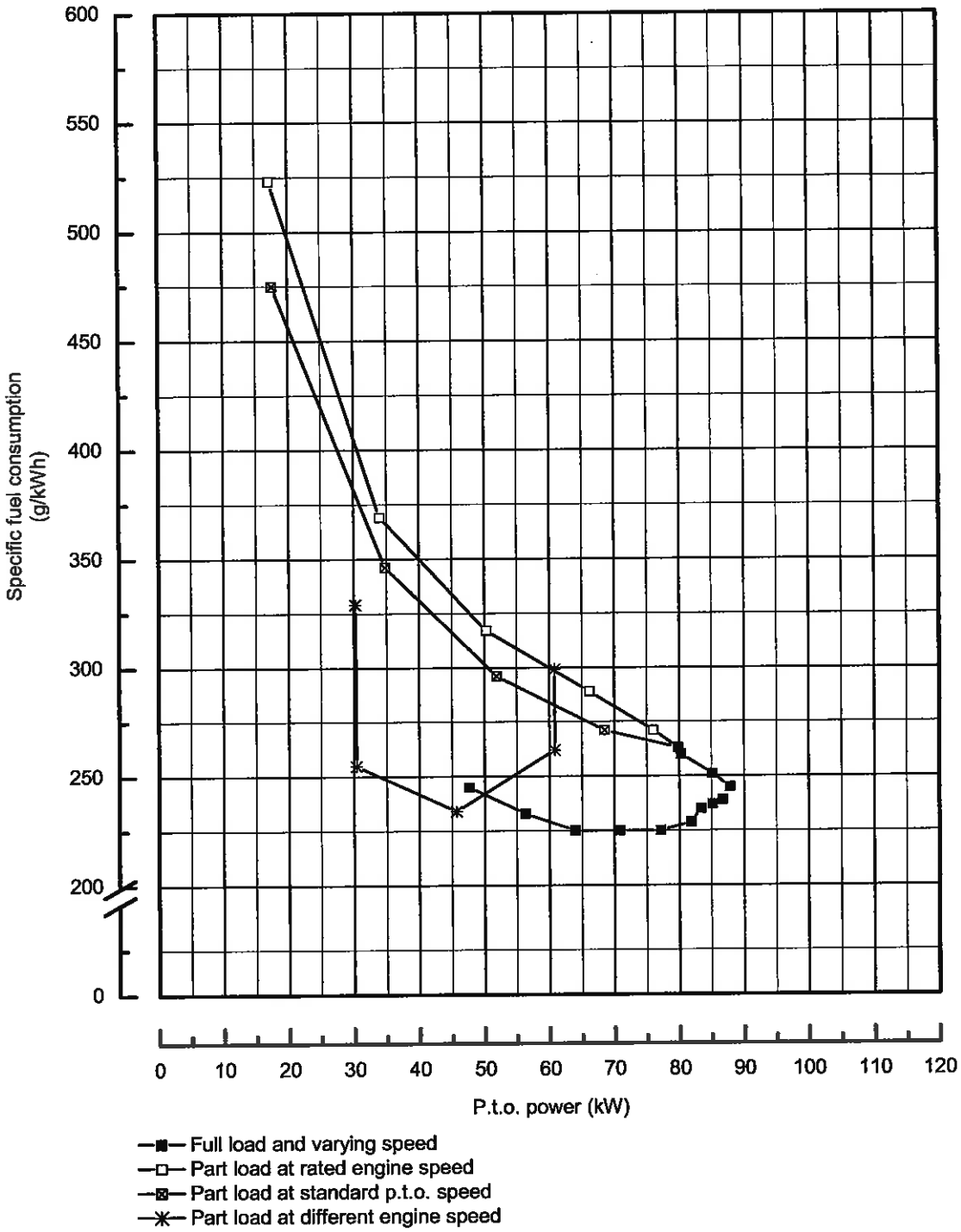
- No load maximum engine speed: 2354 min^{-1} (rev/min)
- Torque (equivalent crankshaft) at maximum power
  - At rated engine speed 329.9 Nm
  - At 1-hour test 441.7 Nm
- Maximum torque (equivalent crankshaft): 526.7 Nm at 1401 min^{-1} (rev/min)

Mean atmospheric conditions:	
Temperature	18.0 °C
Pressure	99.2 kPa
Relative humidity	41%
Maximum temperatures:	
Coolant	86.7 °C
Engine oil	110.0 °C
Fuel	46.3 °C
Engine air intake	27.3 °C

raph 1. Power take-off test (without power boost)



Graph 2. Power take-off test (without power boost)



1.A Optional power take-off test (with power boost)(see [1] next page)

Date and location of tests: 5th December 2008, I.M.A.MO.TER, TORINO, ITALY

Type of dynamometer: parasitic currents, BORGHI&SAVERI FA300-30SP

Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
1.1.A.	MAXIMUM POWER-ONE - HOUR TEST						
95.7	1901	897	1920	23.22	27.64	243	3.46
1.2.A	POWER AT RATED ENGINE SPEED						
90.9	2197	1037	1740	23.63	28.13	260	3.23
1.3.A	POWER AT STANDARD PTO SPEED [1000 ± 25 min^{-1}]						
91.9	2121	1001	1860	23.69	28.20	258	3.26
1.4.A	PART LOADS						
1.4.1.A	The torque corresponding to maximum power at rated engine speed						
90.9	2197	1037	1740	23.63	28.13	260	3.23
1.4.2.A	85% of torque obtained in 3.1.4.1						
78.6	2238	1056	1920	21.33	25.39	271	3.10
1.4.3.A	75% of torque defined in 3.1.4.2						
59.7	2267	1070	1860	17.80	21.19	298	2.82
1.4.4.A	50% of torque defined in 3.1.4.2						
40.5	2295	1083	1800	13.95	16.61	345	2.44
1.4.5.A	25% of torque defined in 3.1.4.2						
20.4	2322	1096	1740	9.68	11.52	474	1.77
1.4.6.A	Unloaded						
-	2348	1108	1680	6.29	7.49	-	-
1.5.A	PART LOADS AT STANDARD PTO SPEED [1000 ± 25 min^{-1})]						
1.5.1.A	the torque corresponding to maximum power						
91.9	2121	1001	1860	23.69	28.20	258	3.26
1.5.2.A	85% of torque obtained in 3.1.5.1						
78.8	2140	1010	1920	20.86	24.83	265	3.17
1.5.3.A	75% of torque defined in 3.1.5.2						
59.8	2166	1022	1920	17.08	20.33	285	2.94
1.5.4.A	50% of torque defined in 3.1.5.2						
40.3	2189	1033	1800	13.21	15.73	327	2.57
1.5.5.A	25% of torque defined in 3.1.5.2						
20.2	2208	1042	1740	8.82	10.50	437	1.92
1.5.6.A	Unloaded						
-	2229	1052	1740	5.43	6.46	-	-

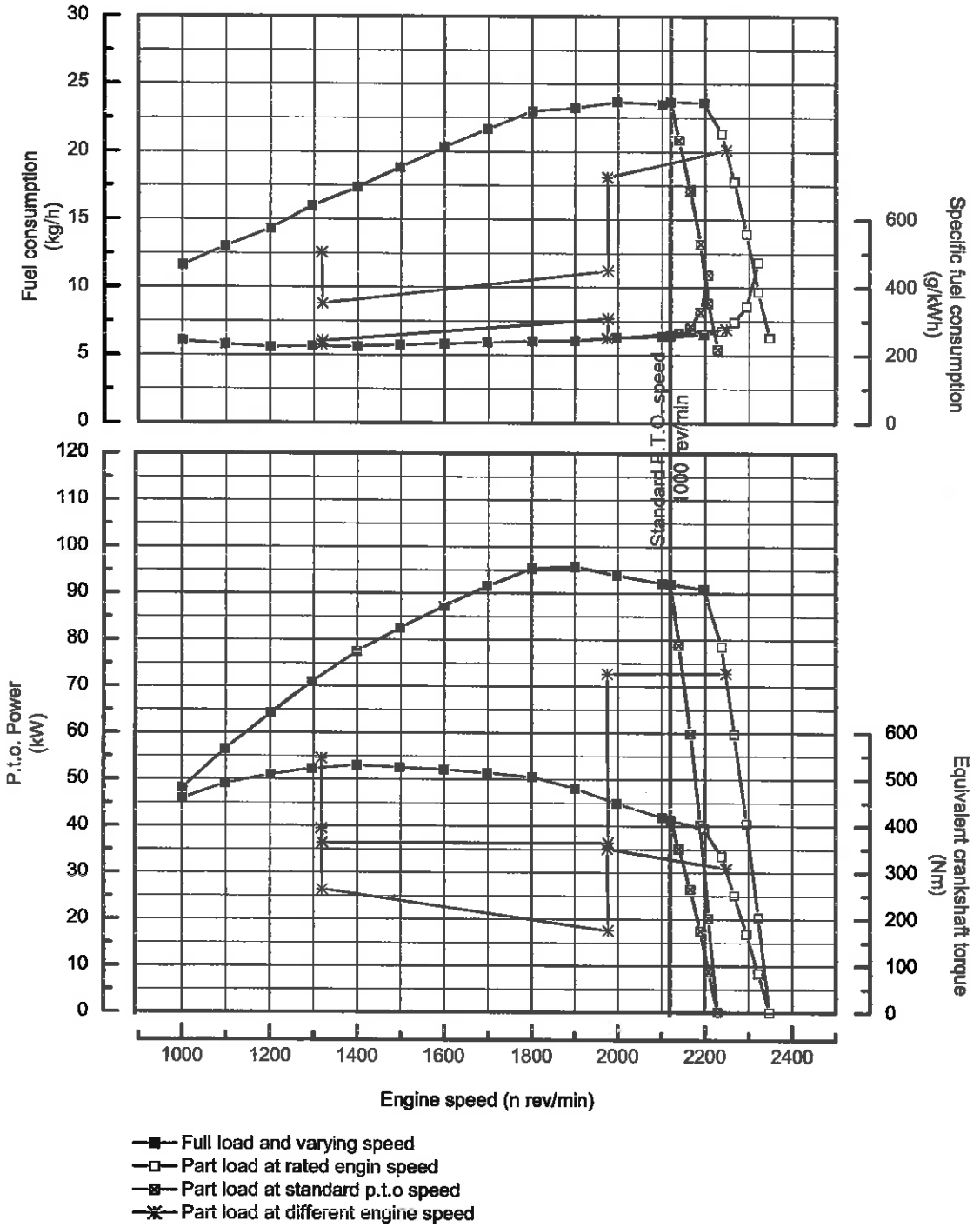
Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
3.1.6.A	PART LOADS AT DIFFERENT ENGINE SPEEDS						
3.1.6.1.A	Maximum power at rated engine speed						
90.9	2197	1037	1740	23.63	28.13	260	3.23
3.1.6.2.A	80% of power obtained in 3.1.6.1 at max speed setting						
72.8	2248	1061	1800	20.16	24.00	277	3.03
3.1.6.3.A	80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed						
72.7	1975	932	1860	18.09	21.54	249	3.38
3.1.6.4.A	40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed						
36.4	1977	933	1620	11.21	13.35	308	2.73
3.1.6.5.A	60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed						
54.5	1318	622	1440	12.55	14.94	230	3.65
3.1.5.6.A	40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed						
36.4	1320	623	1320	8.80	10.48	242	3.47

- No load maximum engine speed: 2348 min^{-1} (rev/min)
- Torque (equivalent crankshaft) at maximum power
  - At rated engine speed 395.0 Nm
  - At 1-hour test 480.9 Nm
- Maximum torque (equivalent crankshaft): 529.5 Nm
  (engine speed: 1399 min^{-1} (rev/min))

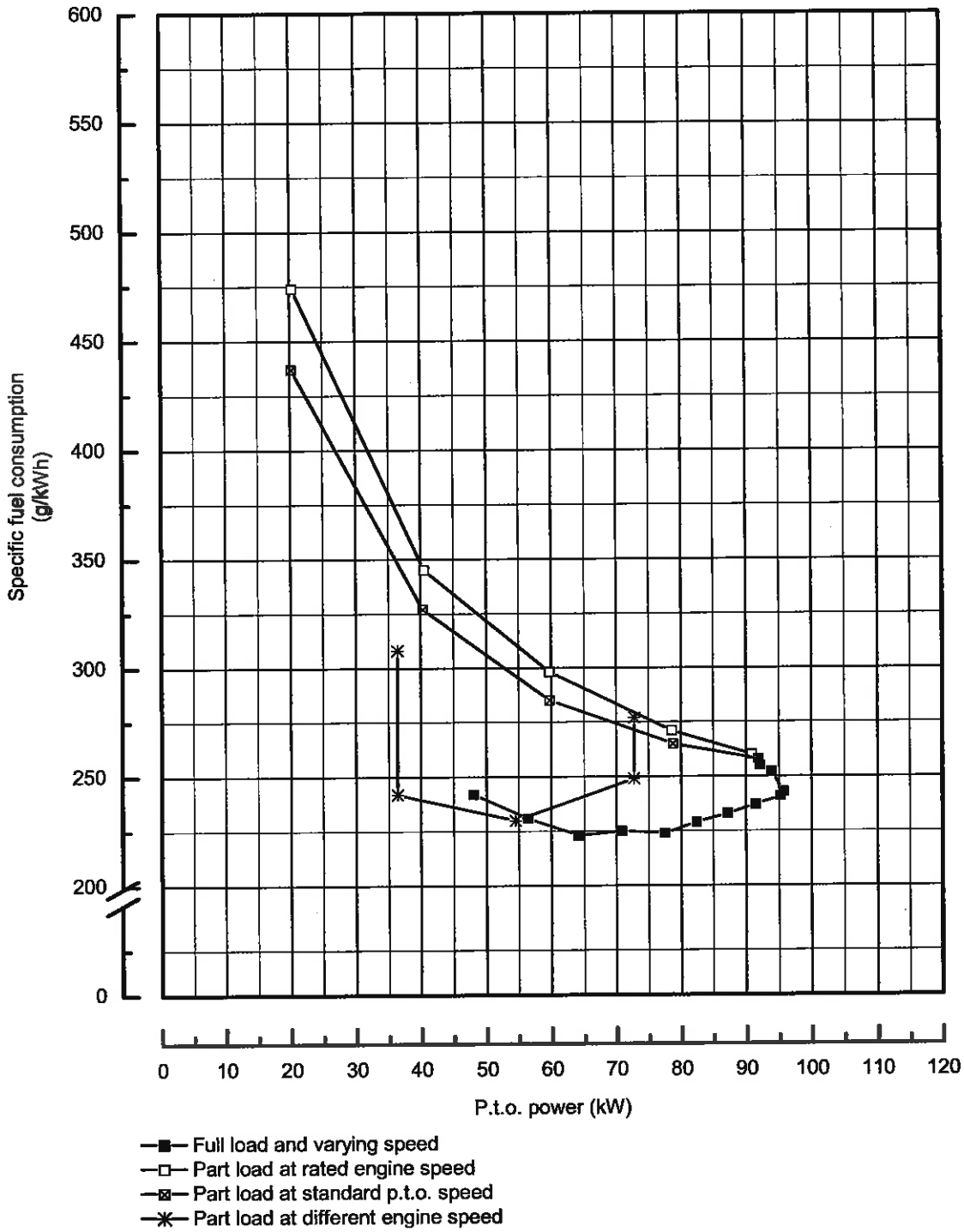
Mean atmospheric conditions:	
Temperature	18.0 °C
Pressure	99.4 kPa
Relative humidity	52%
Maximum temperatures:	
Coolant	86.1 °C
Engine oil	111.0 °C
Fuel	45.6°C
Engine air intake	26.4 °C

[1] In operation conditions of power take-off test the EPM system makes the engine operate in un-boosted mode.
For this test an over ride system has been provide by the manufacturer of the tractor to enable engine operate in boosted mode when tractor is stationary.
Results of this test can be achieved ONLY when EPM system makes the engine operate in PTO operation mode.
See Foreword on page 2 for more details on EPM operation modes.

raph 3. Power take-off test (with power boost)



Graph 4. Power take-off test (with power boost)



2 Hydraulic power and lifting force

Date of tests: 4th February and 13th May 2008

2.1 Hydraulic Power Test

2.1.1 Hydraulic fluid data

Hydraulic fluid data:

Viscosity index (ASTM D 2270): 147

Viscosity at 65°C (ASTM D 341): 25 mm^2/s

2.1.2 Compulsory reporting

	Pressure[1]	Reservoir oil Temperature °C (65°C target)		Engine speed	Flow rate	Power
	MPa	Min.	Max.	min^{-1}	l/min	kW
ated Engine Speed				2200		
.2.1.2.1 ump delivery rate at minimum ressure through one coupler		60	68	2350	97.4	
.2.1.2.1 B ump delivery rate at minimum ressure through three couplers		68	70	2350	107.9	
.2.1.2.2 laximum (sustained) pressure with elief valve open as measured at the oupler ump stalled: Yes	20.6	60	68	2340		
.2.1.2.3 A low rate corresponding to a ydraulic pressure equivalent to 0% of the actual relief valve ressure setting and corresponding ydraulic power measured at one oupler	18.5	60	68	2340	71.4	22.0
.2.1.2.3 B low rate corresponding to a ydraulic pressure equivalent to 0% of the actual relief valve ressure setting and corresponding ydraulic power measured at three ouplers	18.5	68	70	2340	78.9	24.3
.2.1.2.4 laximum available hydraulic power ith flow through a single coupler air, and corresponding flow and vailable coupler outlet pressure	17.0	60	68	2340	94.4	26.7
.2.1.2.5 laximum available hydraulic power ith coupler pairs operating imultaneously (flow through three ouplers), and corresponding flow nd available coupler outlet ressure	17.0	68	70	2340	100.2	28.4

Pressure as measured at the outlet coupler (pressure near coupler where oil is exiting from tractor)

3.2.1.3 Supplementary reporting:

	Pressure[2]	Reservoir oil Temperature °C		Engine speed	Flow rate	Power
	MPa	min.	max.	min^{-1}	l/min	kW
3.2.1.3.1 Pump delivery rate at minimum pressure from one couple pair		67	73	2200	97.4	
3.2.1.3.2 Maximum available flow and maximum useable (*continuous*) power from one coupler	15.0	67	73	2200	91.9	23.0
3.2.1.3.3 Maximum available flow and maximum useable (*continuous*) power from tree coupler pairs operating simultaneously	15.6	68	82	2200	91.0	23.7
3.2.1.3.4 Maximum differential pressure Category 1 Tractor						
3.2.1.3.5 Maximum differential pressure Category 2 or 3 Tractor	18.8	67	73	2200	50	
3.2.1.3.6 Peak Pressure						
3.2.1.3.7 Maximum sump return pressure with coupler	2.0	67	73	2200		
3.2.1.3.8 Maximum return pressure without coupler						

[2] *Differential pressure (pressure near coupler where oil is exiting from tractor – pressure near coupler where oil is re-entering the tractor)*

2.2 Compulsory Power lift test

Linkage settings for test - see Table 1.1 and Figure 1.1 and 1.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement - With lifting force - Without lifting force	 668 mm 717 mm	 800 mm 850 mm
Maximum corrected force exerted through full range	43.3 kN	34.1 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	51.1 kNm	60.9 kNm
Maximum tilt angle of mast from the vertical	none	10.4 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-456	-385	-285	-185	-85	0	100	200	283	300	344
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to a 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	-	48.8	49.9	51.7	52.2	52.8	53.8	54.7	43.3	-	-
Corresponding pressure: 18.5 MPa											
at the frame kN	41.4	41.9	41.8	41.5	41.3	40.7	40.3	38.9	-	37.6	34.1
Corresponding pressure: 18.5 MPa											

3.2.3 Optional Power lift test

Tests have been performed in accordance with setting requested by manufacturer.

Linkage settings for test - see *"Additional"* column in Table 1.1 and Figure 1.1 and 1.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	281 mm	281 mm
Vertical movement - With power travel of the lift - Without power travel of the lift	 567 mm 589 mm	 648 mm 688 mm
Maximum corrected force exerted through full range	43.7 kN	34.7 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	51.4 kNm	62.0 kNm
Maximum tilt angle of mast from the vertical	none	6.3 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-341	-304	-250	-150	-50	0	50	150	250	263	307
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to a 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	-	61.4	61.7	61.8	62.3	62.4	62.4	61.5	60.1	43.7	-
Corresponding pressure:18.5 MPa											
at the frame kN	54.0	54.3	54.1	53.7	52.6	52.3	51.2	49.9	46.8	-	34.7
Corresponding pressure: 18.5 MPa											

Compulsory drawbar power and fuel consumption test (unballasted tractor)

In operation conditions of drawbar power test EPM system makes the engine operate in unboosted mode.
See Foreword on page 2 for more details on EPM operation modes.

Date of tests: 18th and 19th June 2008
Type of track: asphalt

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
440 mm	80 kPa	80 kPa

Speed No.[1]	Power	Drawbar pull	Speed	Engine speed	Fan speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
									Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	min^{-1}	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS/SPEED SETTINGS														
1A	33.0	55.71	2.13	2298	2101	12.00	442	1.90	23	86	100	25	42	97.9
2A	40.8	55.27	2.66	2286	2070	9.64	394	2.13	26	86	100	26	48	97.9
3A	48.8	53.90	3.26	2271	2079	8.45	370	2.27	26	86	100	26	50	97.9
4A	58.7	53.79	3.93	2230	2115	8.20	351	2.39	27	86	100	25	50	97.9
5B	68.3	54.63	4.50	1992	1987	8.68	314	2.68	28	85	101	25	51	97.9
6B	73.9	49.01	5.43	1901	2015	5.51	291	2.88	25	85	102	25	49	97.9
7B	72.1	38.08	6.82	1900	1909	3.37	297	2.83	30	85	102	27	52	97.9
9C	74.2	34.85	7.67	1897	1990	2.81	288	2.91	32	85	102	25	53	97.9
8B	73.1	30.86	8.53	1911	2043	2.43	295	2.85	30	85	102	25	53	97.9
10C	74.1	27.78	9.60	1921	1928	2.09	290	2.90	31	85	103	25	56	97.9
11C	71.7	22.19	11.64	1898	2029	1.43	300	2.80	32	85	102	23	55	97.9
12C	70.5	17.59	14.42	1908	2056	0.93	304	2.76	33	86	102	24	56	97.9

[1] as displayed on dashboard

Speed No.[1]	Power	Drawbar pull	Speed	Engine speed	Fan speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
									Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	min^{-1}	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.2 FUEL CONSUMPTION														
3.3.2.1 In selected gear/speed setting nearest 7.5 km/h, at maximum power at rated engine speed														
7B	60.1	27.03	8.00	2205	2032	2.12	340	2.47	25	85	97	18	54	97.9
3.3.2.1.1 75% of pull corresponding to maximum power at rated engine speed														
7B	46.4	20.33	8.21	2262	2181	1.59	401	2.09	26	85	99	19	58	97.9
3.3.2.1.2 50% of pull corresponding to maximum power at rated engine speed														
7B	31.2	13.51	8.32	2296	2100	1.06	484	1.74	27	85	99	19	55	97.9
3.3.2.1.3 Highest gear/speed setting at reduced engine speed able to achieve both 3.3.2.1.1 and 3.3.2.1.2; same pull and travelling speed as in 3.3.2.1.1														
9C	46.5	20.39	8.21	2017	1853	1.67	341	2.46	28	84	99	21	51	97.9
3.3.2.1.4 Same gear/speed selection as 3.3.2.1.3 at reduced speed; same pull and travelling speed as in 3.3.2.1.2														
9C	30.7	13.29	8.32	2054	1875	0.98	428	1.96	28	84	99	22	51	97.9
3.3.2.2 In selected gear/speed setting nearest between 7 and 10 km/h at rated engine speed														
8B	60.4	22.39	9.71	2195	2095	1.83	341	2.46	29	86	99	25	35	97.9
3.3.2.2.1 75% of pull corresponding to maximum power at rated engine speed														
8B	46.9	16.66	10.14	2261	2062	1.20	408	2.06	30	86	100	25	34	97.9
3.3.2.2.2 50% of pull corresponding to maximum power at rated engine speed														
8B	32.2	11.31	10.25	2295	1572	0.73	479	1.75	32	86	95	23	39	97.9
3.3.2.2.3 Highest gear/speed setting at reduced engine speed able to achieve both 3.3.2.2.1 and 3.3.2.2.2; same pull and travelling speed as in 3.3.2.2.1														
10C	46.9	16.65	10.14	2028	1807	1.21	352	2.39	32	85	97	22	40	97.9
3.3.2.2.4 Same gear/speed setting as 3.3.2.2.3 at reduced speed; same pull and travelling speed as in 3.3.2.2.2														
10C	32.1	11.27	10.25	2045	1750	0.78	428	1.96	33	85	98	23	38	97.9

[1] *As displayed on dashboard*

4 REPAIRS

None

5 REMARKS

Tests results of this report have been obtained from tests carried out on a prototype identical to the tractor CASE IHMAXXUM 120 MULTICONTROLLER in all practical aspects relating to the tests.
It has been checked that the series production conforms to the tested tractor.

ANNEX

Other tests results not covered by OECD approval

1 Test in accordance with SAE J 283, Nov. 1999: Test procedure for measuring hydraulic lift capacity on agricultural tractors equipped with three-point hitch

1.1 Test conditions

Tests have been performed in accordance with Section 4 of SAE J283: Static lift force test. Setting of the three-point hitch is specified in *"SAE"* column the table 1.1 and more details on linkage geometry are in figure 1.1 and 1.2.

Lifting heights relative to the horizontal plane including the lower link pivot points												
Lift rods length 862 mm	-385	-285	-185	-	-85	0	85	185	261	-	-	-
Lift rods length 755 mm	-	-	-	-172	-85	0	85	185	-	285	385	435
Lifting forces corrected to correspond to a hydraulic pressure equivalent to a 90% of the minimum relief valve setting of the hydraulic lift system												
kN	61.2	59.9	58.4	-	56.7	55.6	54.4	52.6	35.7	-	-	-
kN	-	-	-	57.6	57.2	57.1	56.1	54.8	-	52.8	50.0	31.9
Corresponding pressure: 18.5 MPa												

is report has been approved by the O.E.C.D. Co-ordinating Centre (CEMAGREF, France) as being in cordance with the O.E.C.D. Standard Code for the official testing of agricultural and forestry tractor rformance.

The Head of the Section

E. CAVALLO

The Director

G.L. ZAROTTI

rino, 24th March 2009