MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACION
SECRETARIA GENERAL DE PRODUCCIONES
Y MERCADOS AGRARIOS
DIRECCION GENERAL DE PRODUCCIONES Y
MERCADOS AGRICOLAS

Test Report N°: 1519 RESTRICTED CODE
OECD Ref.: II-T 568/94-R8
Date of aproval: 1st July 1994

TEST IN ACCORDANCE WITH THE O.E.C.D. RESTRICTED STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS



Agricultural Tractor
KUBOTA M1-100 DT E (4 WD)
Four-Wheel Drive

Manufactured by:

EBRO KUBOTA, S.A.
Carretera del Aeroclub, S/N
28044 Madrid, Spain

ESTACION DE MECANICA AGRICOLA (E.M.A.)
Carretera de Toledo, km 6,800
28916 Leganés, Madrid

ESTACION DE MECANICA AGRICOLA MADRID	TRACTOR: KUBOTA M1-100 DT E (4WD) O.E.C.D. CODE II	O.E.C.D. Test N°: 1519 Restricted Code

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N.I.P.O.: 251-95-005-4

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1. GENERALITIES

Tractor manufacturer

Name:	EBRO KUBOTA S.A.
Adress:	Ctra. del Aeroclub S/N. 28044 Madrid.
Location of tractor assembly:	Cuatro Vientos factory.
Submitted for test by:	The manufacturer.
Selected for test by:	The manufacturer with the agreement of E.M.A.
Place of running in:	Cuatro Vientos.
Duration of running in:	50 h
Location of test:	ESTACION DE MECANICA AGRICOLA MADRID (SPAIN)

2. SPECIFICATION OF TRACTOR

2.1. Tested tractor

- Make:	KUBOTA.
- Model:	M1-100 DT E.
- Type:	Agricultural tractor.
- Number of driving wheels:	Four.
- Serial number:	M195DTS700267
- First serial number:	M195DTS700001

2.2. Engine

2.2.1. Identification

- Make:	KUBOTA.
- Model:	V4702 TAH
- Type:	4-cycle diesel engine with direct injection, water cooled. Supercharged.
- Serial number:	V4702-95846

2.2.2. Cylinders

- Number/Disposition:	4, Vertical, in line.
- Bore/Stroke:	109 mm/125 mm
- Capacity:	4665 cm^3
- Compression ratio:	17.5:1
- Arrangement of valves:	Overhead.
- Cylinder liners:	Replaceable, dry.

2.2.3. Supercharging

- Make:	TURBOCHARGER.
- Model:	TD05H-12G
- Type:	Radial flow.
- Supercharging pressure:	56.5 kPa.

2.2.4. Fuel system

- Fuel feed system:	Forced type (diaphragm pump).
- Make, model and type of fuel filter:	TSUCHIYA MGF Co. Ltd., 1663143011, Replaceable paper element.
- Capacity of fuel tank:	150 dm^3
- Make, model and type of injection pump:	MIKUNI PRECISION Co.Ltd., DPK J3942 F980N Distribuitor type. Serial number 0822MK
- Manufacturer's production setting of injection pump:	Flow rate: 76 $\pm$ 3 mm^3/stroke at rated speed and full load corresponding to 21.9 $\pm$ 0.9 dm^3/h. Timing: 12° before TDC.
- Make model and type of injectors:	CAV, BDLL 140S6655, hole type.
- Injection pressure:	22.5 MPa

2.2.5. Governor

- Make:	MIKUNI PRECISION Co.Ltd.
- Model:	Incorporated in injection pump.
- Type:	Centrifugal variable speed.
- Governor range of engine speed:	From 600 to 2590 rev/min

2.2.6. Rated engine speed: 2400 rev/min

2.2.7. Air Cleaner

- Precleaner:	Optional, not fitted in tested tractor.
* Make:	TSUCHIYA
* Type:	Cyclone type.
* Model:	TSUCHIYA 98317-011
* Location of air intake:	In front of engine, under the bonnet.

- Main filter
  - * Make: MANN FILTER
  - * Type: Dry paper double element.
  - * Model: 445 230 92 344
  - * Location: In front of the radiator, under the bonnet.
  - * Manteinance indicator: Electrical vacuum sensor.

2.2.8. Lubrication system

Type of feed pump:	Forced feed from gear pump.
Total oil capacity including oil filter:	16.3 dm^3
Oil change period:	200 h
Type of filter:	Full flow, replaceable paper element.
Filter change period:	400 h
Oil specifications:	See page 18

2.2.9. Cooling system

Type of coolant:	Solution of permanent antifreeze and water.
Specification of pump:	
- Type:	Centrifugal.
- Model:	15481-73030
Specification of fan:	Axial fan driven by engine shaft.
Number of fan blades:	Seven.
Fan diameter:	460 mm
Coolant capacity:	14.5 dm^3
Type of temperature control:	Wax type termostat.
System pressure:	88.3 kPa (0.9 kg/cm^2)

2.2.10 Starting system

- Make:	BOSCH.
- Model:	0001862317
- Type:	Solenoid engaged type.
- Starter motor power rating:	2.5 kW
- Cold starting aid:	Four electrical glow plugs.
- Safety device:	Starting only with main clutch pedal operated and P.T.O. clutch disengaged.

2.2.11. Electrical system

- Voltage:	12 V
- Generator	
Make:	NIPPON DENSO.
Model:	100211-7260
Type:	Three phase generator.
Power:	0.72 kW
- Battery:	One.
Rating:	110 A·h at 20 hours.

2.2.12. Exhaust system

- Make:	Own make.
- Model:	16544-12111
- Type:	Multiple chamber absorption-expansion.
- Location:	Vertical on the left side of bonnet .
- Height of outlet above ground:	2485 mm

2.3. Transmision

2.3.1. Clutch (Travel alone)

- Make:	VALEO.
- Model:	687171C6/H6
- Type:	Dry single.
- Number of plates:	One.
- Plates diameter:	350 mm
- Method of operation:	Mechanical operated by foot pedal.

2.3.2. Gear box

- Make:	Own make.
- Type:	Mechanical.
- Arrangement:	As on tested tractor.

* Synchromesh six speed gears with main lever and constant mesh two speed (L/H) gears with auxiliary lever.
* Sinchromesh type forward/reverse shuttle with shuttle lever.
* Dual speed changer: gear reduction with multiple clutches, electrical-hydraulically activated by a lever. Speed reduction 25 %

- Number of gears:	Total 24 forward & 24 reverse speeds.

- Avaliable options:

  * Synchromesh six speeds gears with main lever and constant mesh two speed (L/H) gears with auxiliary lever. Synchromesh type forward/reverse shuttle with shuttle lever (Tot. 12F/12R)
  * Aditional one constant mesh creeper gear to above versions.

  Total 36 forward and 36 reverse speeds, and 18 forward and 18 reverse speeds, respectively.

2.3.3. Rear axle and final drives

- Make: Own make.
- Type: Bevel gear type differential and planetary gear type final. drives
- Differential lock:
  - * Type: Mechanical, dog clutch.
  - * Method of engagement: Operated by foot pedal.
  - * Method of disengagement: Self disengaging.

2.3.4. Front axle and final drives

- Make: Own make.
- Type: Bevel gear type differential and planetary gear type final. drives.
- Differential lock:
  - * Type: Mechanical, dog clutch.
  - * Method of engagement: Operated by foot pedal.
  - * Method of disengagement: Self disengaging.

2.3.5. Total ratios and travelling speeds

Gear Box 24 Forward + 24 Rear Dual Speed (as on tested tractor)

GEAR	RANGE Dual Speed	NUMBER OF ENGINE REV. FOR ONE REV. OF THE DRIVING WHEELS		NOMINAL TRAVELLING SPEED (*) AT RATED ENGINE SPEED OF 2400 rev/min (km/h)	
		forward	reverse	forward	reverse
1	L1 LO	628.45	619.45	1.18	1.20
2	L2 LO	477.61	470.78	1.55	1.58
3	L3 LO	337.02	332.23	2.20	2.23
4	L4 LO	283.48	279.41	2.61	2.65
5	L5 LO	215.43	212.34	3.44	3.49
6	L6 LO	152.03	149.86	4.88	4.95
7	H1 LO	122.74	120.85	6.04	6.13
8	H2 LO	93.21	91.86	7.96	8.07
9	H3 LO	65.74	64.83	11.27	11.44
10	H4 LO	55.31	54.52	13.40	13.60
11	H5 LO	42.03	41.44	17.64	17.89
12	H6 LO	29.65	29.24	25.00	25.35
13	L1 HI	469.75	463.00	1.58	1.60
14	L2 HI	357.00	351.90	2.08	2.11
15	L3 HI	251.91	248.32	2.94	2.99
16	L4 HI	211.89	208.85	3.50	3.55
17	L5 HI	161.03	158.73	4.61	4.67
18	L6 HI	113.63	112.01	6.53	6.62
19	H1 HI	91.66	90.34	8.09	8.21
20	H2 HI	69.66	68.66	10.65	10.80
21	H3 HI	49.15	48.45	15.09	15.31
22	H4 HI	41.34	40.75	17.94	18.20
23	H5 HI	31.42	30.97	23.61	23.95
24	H6 HI	22.17	21.85	33.46	33.94

(*) Calculated with a tyre dinamic index of 820 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.41623

Total ratios and travelling speeds (Cont.)

Gear Box 36 Forward + 36 Rear Dual Speed and creep

GEAR	RANGE		NUMBER OF ENGINE REV. FOR ONE REV. OF THE DRIVING WHEELS		NOMINAL TRAVELLING SPEED (*) AT RATED ENGINE SPEED OF 2400 rev/min (km/h)	
	Dual Speed	Creep	forward	reverse	forward	reverse
1	L1 LO	ON	3506.64	3456.14	0.21	0.22
2	L2 LO	ON	2664.76	2626.64	0.28	0.33
3	L3 LO	ON	1880.33	1853.57	0.40	0.40
4	L4 LO	ON	1581.65	1558.95	0.47	0.48
5	L5 LO	ON	1202.02	1184.78	0.62	0.63
6	L6 LO	ON	848.18	836.08	0.87	0.89
7	L1 LO		628.45	619.45	1.18	1.20
8	L2 LO		477.61	470.78	1.55	1.58
9	L3 LO		337.02	332.23	2.20	2.23
10	L4 LO		283.48	279.41	2.61	2.65
11	L5 LO		215.43	212.34	3.44	3.49
12	L6 LO		152.03	149.86	4.88	4.95
13	H1 LO		122.74	120.85	6.04	6.13
14	H2 LO		93.21	91.86	7.96	8.07
15	H3 LO		65.74	64.83	11.27	11.44
16	H4 LO		55.31	54.52	13.40	13.60
17	H5 LO		42.03	41.44	17.64	17.89
18	H6 LO		29.65	29.24	25.00	25.35
19	L1 HI	ON	2620.96	2583.46	0.28	0.29
20	L2 HI	ON	1991.90	1963.40	0.37	0.44
21	L3 HI	ON	1405.55	1385.53	0.53	0.54
22	L4 HI	ON	1182.28	1165.30	0.63	0.64
23	L5 HI	ON	898.51	885.62	0.83	0.84
24	L6 HI	ON	634.03	624.95	1.17	1.19
25	L1 HI		469.75	463.00	1.58	1.60
26	L2 HI		357.00	351.90	2.08	2.11
27	L3 HI		251.91	248.32	2.94	2.99
28	L4 HI		211.89	208.85	3.50	3.55
29	L5 HI		161.03	158.73	4.61	4.67
30	L6 HI		113.63	112.01	6.53	6.62
31	H1 HI		91.66	90.34	8.09	8.21
32	H2 HI		69.66	68.66	10.65	10.80
33	H3 HI		49.15	48.45	15.09	15.31
34	H4 HI		41.34	40.75	17.94	18.20
35	H5 HI		31.42	30.97	23.61	23.95
36	H6 HI		22.17	21.85	33.46	33.94

Total ratios and travelling speeds (Cont.)

Gear Box 18 Forward + 18 Rear with creep

GEAR	RANGE		NUMBER OF ENGINE REV. FOR ONE REV. OF THE DRIVING WHEELS		NOMINAL TRAVELLING SPEED (*) AT RATED ENGINE SPEED OF 2400 rev/min (km/h)	
	Creep		forward	reverse	forward	reverse
1	L1	ON	2620.96	2583.46	0.28	0.29
2	L2	ON	1991.90	1963.40	0.37	0.44
3	L3	ON	1405.55	1385.53	0.53	0.54
4	L4	ON	1182.28	1165.30	0.63	0.64
5	L5	ON	898.51	885.62	0.83	0.84
6	L6	ON	634.03	624.96	1.17	1.19
7	L1		469.75	463.00	1.58	1.60
8	L2		357.00	351.90	2.08	2.11
9	L3		251.91	248.32	2.94	2.99
10	L4		211.89	208.85	3.50	3.55
11	L5		161.03	158.73	4.61	4.67
12	L6		113.63	112.01	6.53	6.62
13	H1		91.66	90.34	8.09	8.21
14	H2		69.66	68.61	10.65	10.80
15	H3		49.15	48.45	15.09	15.31
16	H4		41.34	40.75	17.94	18.20
17	H5		31.42	30.97	23.61	23.95
18	H6		22.17	21.85	33.46	33.94

(*) Calculated with a tyre dinamic index of 820 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.41623

Gear Box 12 Forward + 12 Rear

GEAR	RANGE	NUMBER OF ENGINE REV. FOR ONE REV. OF THE DRIVING WHEELS		NOMINAL TRAVELLING SPEED (*) AT RATED ENGINE SPEED OF 2400 rev/min (km/h)	
		forward	reverse	forward	reverse
1	L1	469.75	463.00	1.58	1.60
2	L2	357.00	351.90	2.08	2.11
3	L3	251.91	248.32	2.94	2.99
4	L4	211.89	208.85	3.50	3.55
5	L5	161.03	158.73	4.61	4.67
6	L6	113.63	112.01	6.53	6.62
7	H1	91.66	90.34	8.09	8.21
8	H2	69.66	68.66	10.65	10.80
9	H3	49.15	48.45	15.09	15.31
10	H4	41.34	40.75	17.94	18.20
11	H5	31.42	30.97	23.61	23.95
12	H6	22.17	21.85	33.46	33.94

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.41623

2.4. Power take-off

2.4.1. Main Power take-off

- Type: Independent.
- Method of engagement: Engaged or disengaged by hand lever. Driven by wet multi-plate clutch.
- Number of shafts: One (Two replaceable shaft ends).
- Method of changing power take-off shaft ends and speeds: Through screws, to mount one PTO shaft end at six or twenty one splines. Speed selection by external hand lever.

2.4.2. Power take-off proportional to engine speed

Power take-off 540 rev/min

- Location:	At rear of tractor.
- Diameter of power take-off shaft end:	35 mm
- Number of splines:	Six, in conformity with ISO 500/1979.
- Height above ground:	830 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear wheel axle:	445 mm
- PTO speed at rated engine speed:	637 rev/min
- Engine speed at standard PTO speed:	2035 rev/min
- Ratio of rotation speeds (engine speed/PTO speed):	3.7692
- Direction of rotation (viewed facing driving end):	Clockwise.

Power take-off 1000 rev/min

- Location:	At rear of tractor.
- Diameter of power take-off shaft end:	35 mm
- Number of splines:	Six, in conformity with ISO 500/1979.
- Height above ground:	830 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear wheel axle:	445 mm
- PTO speed at rated engine speed:	1005 rev/min
- Engine speed at standard PTO speed:	2389 rev/min
- Ratio of rotation speeds (engine speed/PTO speed):	2.389
- Direction of rotation (viewed facing driving end):	Clockwise.

2.4.3. Power take-off proportional to ground speed:

- Indicate 540 or 1000 rev/min:	540	1000
- Travelling distance for one revolution of power take-off shaft:	0.76 m	0.49 m
- Number of power take-off revolutions for one revolution of rear driving wheels:	6.36	10.03
- Direction of rotation with forward gear engaged (viewed facing driving end):	Clockwise	

2.5. **Power Lift**

- Make:	Own make.
- Type:	Hydraulic three point hitch (position draft and mix controls).
- Type of hydraulic system:	Open center system.
- Type and number of cylinders:	One, single acting and two additional external cylinders single acting.
- Type of linkage lock for transport:	Hydraulically by throttle valve.
- Lift pump type:	Gear pump.
- Relief valve pressure setting for lifting:	From 19.12 to 19.6 MPa
- Opening pressure of cylinder safety valve:	From 23.0 to 24.5 MPa
- Another pump for auxiliary service:	Gear pump, it is possible to use together with the pump lift. In this case, twice flow rate is capable to obtain.
- Relief valve pressure setting for auxiliary service:	From 17.2 to 17.8 MPa
- Transmission between pump and engine:	Drive shaft.
- Type and number of filters:	Paper cartridge type, two.
- Site of oil reservoir:	In rear transmission case.
- Type, number and location of tapping points	Hydraulic female coupler, two sets, at rear of tractor.
- Maximum volume of oil avaliable to external cylinders:	Hydraulic oil should be added for external circuit.

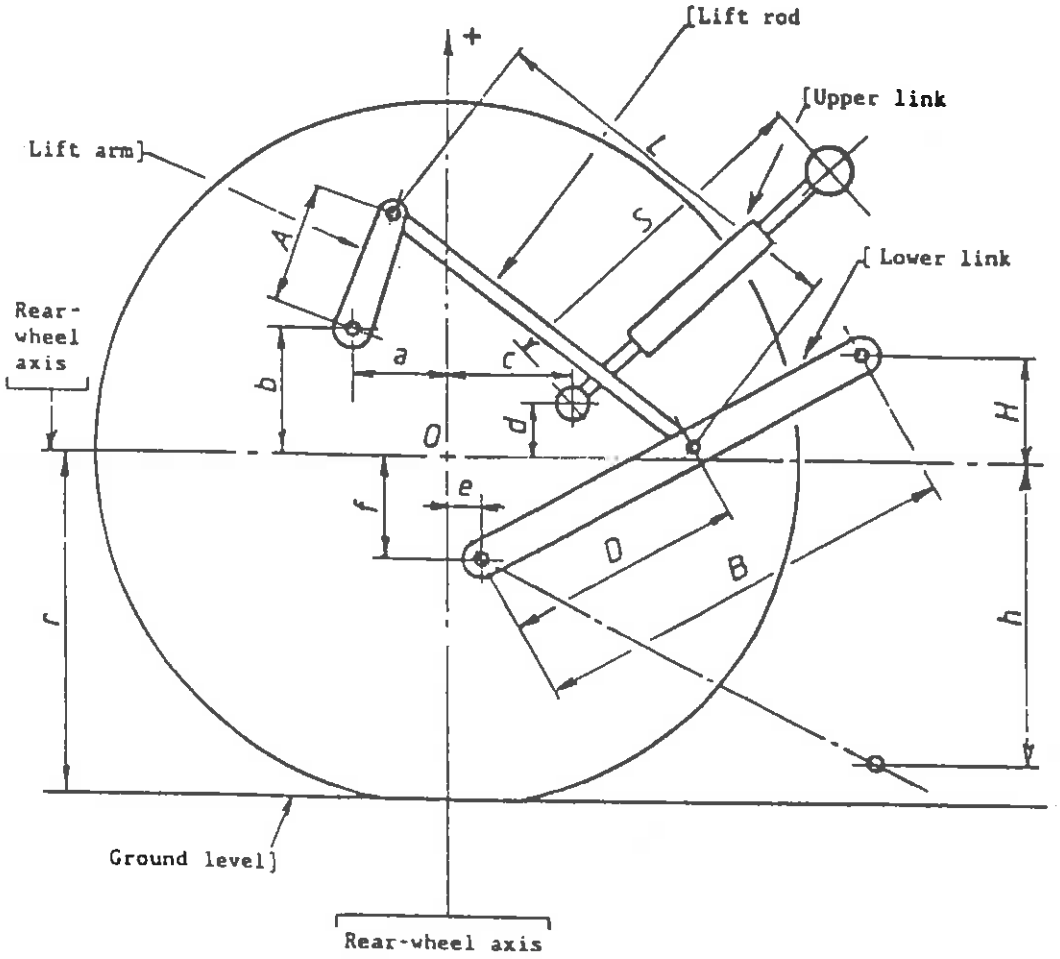
2.6. **Three-point linkage**

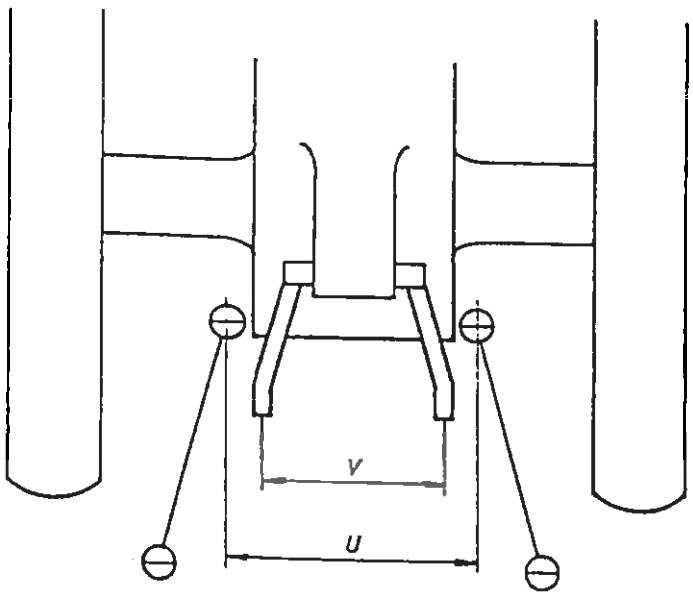
- Category: II, in conformity to ISO 730/I.
- Category adapter: None.

Linkage dimensions (mm)			Settings used for test (mm)
Length of lift arms	(A)	250	250
Lenght of lower links	(B)	900	900
Distance of lift arm pivot point from rear wheel axis			
Horizontally	(a)	70	70
Vertically	(b)	303	303
Horizontal distance between the two lower link points	(u)	512	512
Horizontal distance between the two lift arms end points	(v)	535	535
Length of upper link	(S)	From 665 to 930	670
Distance of upper link pivot point from rear wheel axis			
Horizontally	(c)	273 or 290	273
Vertically	(d)	286 or 221	286
Distance of lower link pivot point from rear wheel axis			
Horizontally	(e)	115	115
Vertically	(f)	176	176
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	401, 450 or 499	499
Length of lift rods	(L)	From 545 to 685	680
Height of lower hitch points relative to the rear wheel axis			
In low position	(h)	From 200 to 891	612
In high position	(H)	From 20 to 320	68
Height above ground of lower hitch points when locked transport position (*)		From 695 to 1005	

(*) Asuming the dynamic radius index= 820 mm (ISO 4251/1-1984)

2.7. **Linkage geometry**





2.8. Swinging drawbar (Not fitted)

- Type:	Bar type.
- Height above ground (tyre 18.4 R 38)	
* Maximum:	624 mm at center of hitch.
* Minimum:	517 mm at center of hitch.
- Type of adjustment:	Changing by turning the bar.
- Distance of hitch point from rear wheel axis, horizontally:	1005 mm
- Distance of hitch point from power take-off shaft end:	
* Horizontally:	560 mm
* Vertically:	175 mm and 282 mm
- Lateral adjustment (center of clevis)	
* Right hand:	184 mm
* Left hand:	184 mm
- Distance of pivot point from rear wheel axis, horizontally:	215 mm
- Diameter drawbar pin hole:	28 mm
- Maximum vertical permissible load:	14.7 kN

2.9. Trailer hitch

- Type:	Clevis type.
- Hole diameter:	30 mm
- Height above ground:	From 530 to 830 mm
- Distance of hitch point from rear wheel axis, horizontally:	570 mm
- Distance of hitch point from power take-off shaft end	
* Horizontally:	125 mm
* Vertically:	From 0 to 300 mm
- Maximum vertical permissible load:	14.7 kN

2.10. Holed drawbar: Not fitted.

2.11. Steering

- Make:	SUMITOMO EATON HYDRAULICS, Co. or DANFOSS, alternatives.
- Model:	WDE 120 Y 14KB4B or OSPC 125 OR/OLSA 40, respectively.

- Type: Hydrostatic.
- Method of operation: Hydraulic steering system.
  - * Pump: Gear type.
  - * Ram Balanced type cylinder.
- Working pressure: From 11.8 to 12.5 MPa
- Bi-Speed turn feature: Whenever a tight turn is required, the front wheels automatically start turning at a rate nearly twice as fast as the rear wheels (optional).

2.12. Brakes

2.12.1. Service brake

- Make: Own make.
- Type: Hydraulic transmission, with master cylinder, acting on oil - immersed disk type. Three disks on each rear half shaft.
- Method of operation: Independent or combined foot pedal.
- Trailer braking take-off: Not fitted (Optional).

2.12.2. Parking brake

- Type: Mechanical, acting oil-inmersed cam-disk on intermediate shaft of gear box.
- Method of operation: Pulling handle with ratchet.

2.13. Wheels

2.13.1. Number

- Front: Two, steering and driving.
- Rear: Two, driving.

2.13.2. Wheelbase: 2440 mm

2.13.3. Track width adjustment

	Minimum (mm)	Maximum (mm)	Adjustment method
Front	1610	1820	Changing by turning wheels and offset of rims
Rear	1580	1990	Changing by turning wheels and offset of rims

2.14. Protective structure

- Manufacturer's name: EBRO KUBOTA, S.A.
- Make: EBRO KUBOTA.
- Model: EK - 64.
- Type: Cab.
- Protective device: Safety cab, not tiltable.
- O.E.C.D. aproval number: CSS 0264/1.

2.15. Driver's seat

- Make: ISRINGHAUSEN.
- Model: 6000/515
- Type of suspension: Mechanical, adjustable to driver's weight.
- Type of damping: Hydraulic damping.
- Range of adjustment
  - * Longitudinal: 180 mm
  - * Vertical: 65 mm

2.16. Lighting

	Height above ground of center (mm)	Size (mm)	Distance from outside edge of tractor to median plane (mm)
Headlights	1160	167 x 106	854
Front lights	1765	82 x 55	320
Rear ligths	1710	50 x 105	267
Reflectors	1710	50 x 105	267
Stop	1710	102 x 105	343
Direction indicator			
Front	1820	82 x 55	320
Rear	1710	88 x 105	198

Track width: 1580 mm

3. TEST CONDITIONS

3.1. Overall dimensions

	LENGTH (mm)	WIDTH (mm)		HEIGHT (mm)	
		min	max	at top of protective structure (mm)	exhaust silencer (mm)
Unballasted	4012	2110	2460	2740	2465

3.2. Ground clearance: 542 mm

Clearance - limiting part: Drawbar frame.

3.3. Tractor mass (with cab)

	BALLASTED		UNBALLASTED	
	Without driver (kg)	With driver (kg)	Without driver (kg)	With driver (kg)
Front	2165	2175	1490	1500
Rear	3405	3470	2310	2375
Total	5570	5645	3800	3875

3.4. Ballast

- Front: * 1 bracket: 50 kg
  * 8 weights. Total: 200 kg
  * Water in tyres: 350 kg

- Rear: * 3 weights per wheel total: 420 kg
  * Water in tyres: 750 kg

3.5. Tyres and track width specifications

	FRONT	REAR
Tyres:		
Dimension	14.9 R 24	18.4 R 38
Ply rating	126 A8	141 A8
Type	Radial	Radial
Maximum load (kN)	16.68	29.43
Inflation pressure (kPa)	160	160
Dynamic radius index (mm)	590	820
Chosen track width (mm)	1610	1580

3.6. Oils and lubrication

3.6.1. Capacity and change interval

	Capacity (dm^3)	Oil change (h)	Filter change (h)
Engine	16.3	200	400
Gear box including rear axle final drive (front and rear) hydraulic system and power steering	50	600	200
Front axle	21.0	600	———
Service brake	0.3	600	———

3.6.2. Specifications

	Recommended	Used during test
Engine oil:		
Viscosity	Below 0° C SAE 10W or /10W/30 Over 0° C SAE 20W/40	SAE 20W/40
Classification	API CC/CD/CE	API CE/SG
Transmission oil hydraulic fluid and Steering oil		
Viscosity	EKUBOIL UDT CS3	As recommended
Classification	SAE 10W/30	

3.6.3. Grease

- Number of lubrication points: Eleven.

3.6.4. Fuel

- Type: Diesel fuel cetane number 49 (ASTM D 613).
- Density at 20° C: 0.84 g/cm^3

4. COMPULSORY TESTS RESULTS

4.1. Main power take-off test

Date and location of test: E.M.A., 21st december 1993
Type of dynamometer: SCHENCK, W-400.

Power (kW)	Speed (rev/min)		Fuel consumption			Specific energy (kWh/l)
	Engine	P.T.O.	Hourly kg/h	Hourly l/h	Specific (g/kWh)	
1. Maximum power 1.1. At two - hour test						
70.0	2485	1040	18.76	22.32	268	3.14
1.2. Power at rated engine speed						
69.6	2400	1005	18.09	21.54	260	3.23
1.3. Standard power take-off speed (1000 rev/min)						
69.4	2389	1000	18.09	21.54	261	3.22
1.4. Part loads (governor control being set for maximum power at rated engine speed) 1.4.1. The torque corresponding to maximum power at rated engine speed						
69.6	2400	1005	18.09	21.54	260	3.23
1.4.2. 85 % of torque obtained in 1.4.1.						
61.7	2506	1049	16.98	20.22	275	3.05
1.4.3. 75 % of torque defined in 1.4.2.						
46.7	2528	1058	14.23	16.94	305	2.76
1.4.4. 50 % of torque defined in 1.4.2.						
31.3	2544	1065	11.54	13.74	369	2.28
1.4.5. 25 % of torque defined in 1.4.2.						
15.8	2559	1071	9.02	10.74	571	1.47
1.4.6. Unloaded						
0	2587	1083	7.11	8.47	———	———

Power (kW)	Speed (rev/min)		Fuel consumption			Specific energy (kW·h/l)
	Engine	P.T.O.	Hourly kg/h	Hourly l/h	Specific (g/kW·h)	
1.5. Part loads (governor control being set for maximum power at standard P.T.O. speed 1.5.1. The torque corresponding to maximum power						
69.4	2389	1000	18.09	21.54	261	3.22
1.5.2. 85 % of torque obtained in 1.5.1						
59.5	2410	1009	16.07	19.13	270	3.11
1.5.3. 75 % of torque defined in 1.5.2						
45.1	2432	1018	13.43	15.99	298	2.82
1.5.4 50 % of torque defined in 1.5.2.						
30.3	2454	1027	10.88	12.95	359	2.34
1.5.5. 25 % of torque defined in 1.5.2.						
15.2	2468	1033	8.35	9.94	549	1.53
1.5.6. Unloaded						
0	2494	1044	6.21	7.39	———	———

4.1. Main power take-off test (continued)

Other results:

No load maximum engine speed: 2587 rev/min
Torque (equivalent crankshaft) at maximum power: 269.2 N·m
Torque (equivalent crankshaft) at rated engine speed: 276.7 N·m
Maximum torque (equivalent crankshaft): 343.2 N·m at 1500 rev/min

Mean atmospheric conditions:

Temperature:	14.0 °C
Pressure:	95.6 kPa
Relative humidity:	62.0 %

Maximum temperatures:

Coolant:	87.0 °C
Engine oil:	112.0 °C
Fuel:	26.0 °C
Engine air intake:	22.0 °C

Standard fuel consumption at varying load:

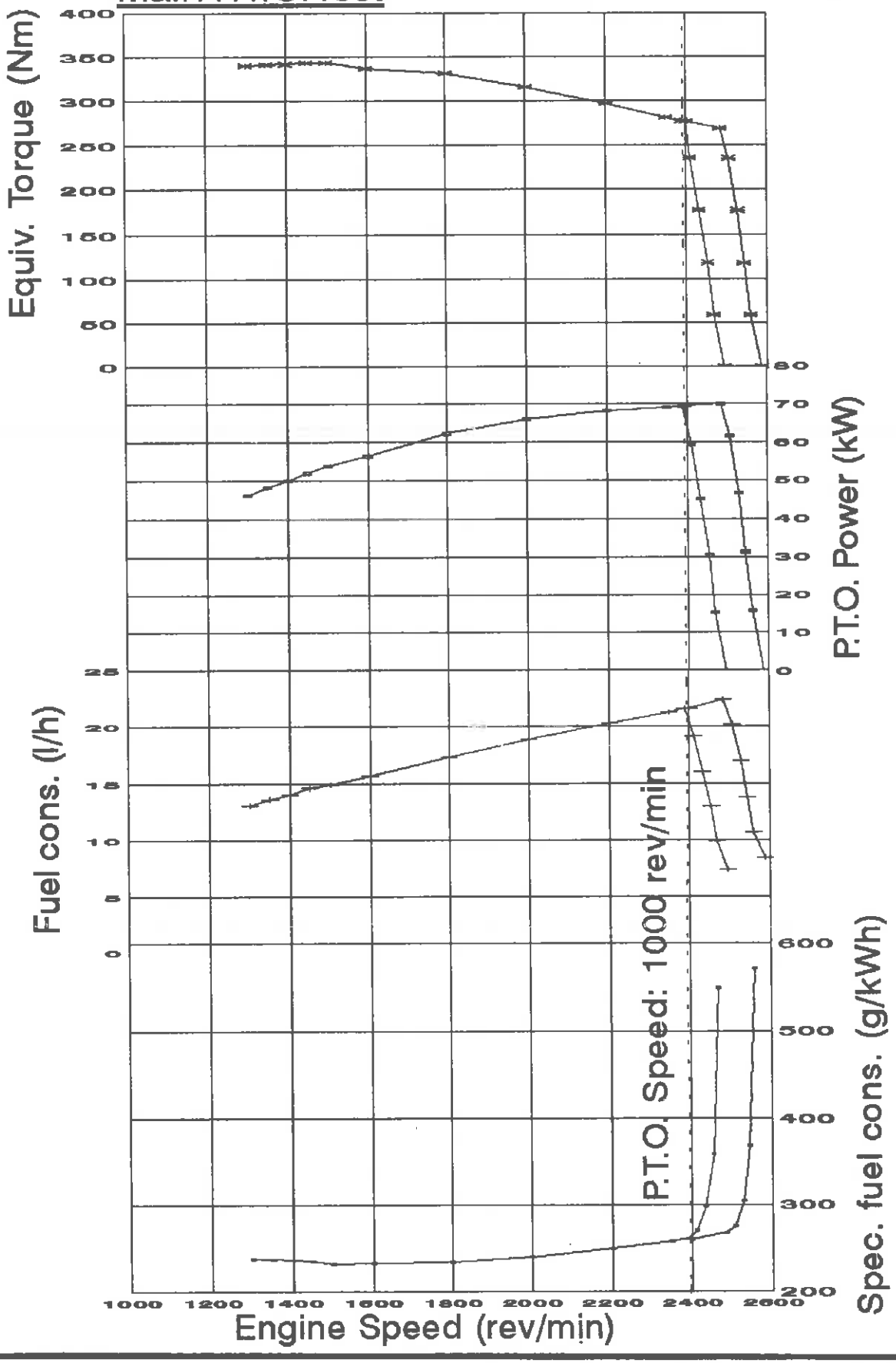
Load	Governor control being set for maximum power at rated engine speed		Governor control being set for maximum power at standard P.T.O speed	
	85 % (1)	50 % of 85 % (2)	85 % (1)	50 % of 85 % (2)
Hourly fuel consumption (l/h)	20.22	13.74	19.13	12.95
Standard specific fuel consumption (g/kW·h)	275	369	270	359

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

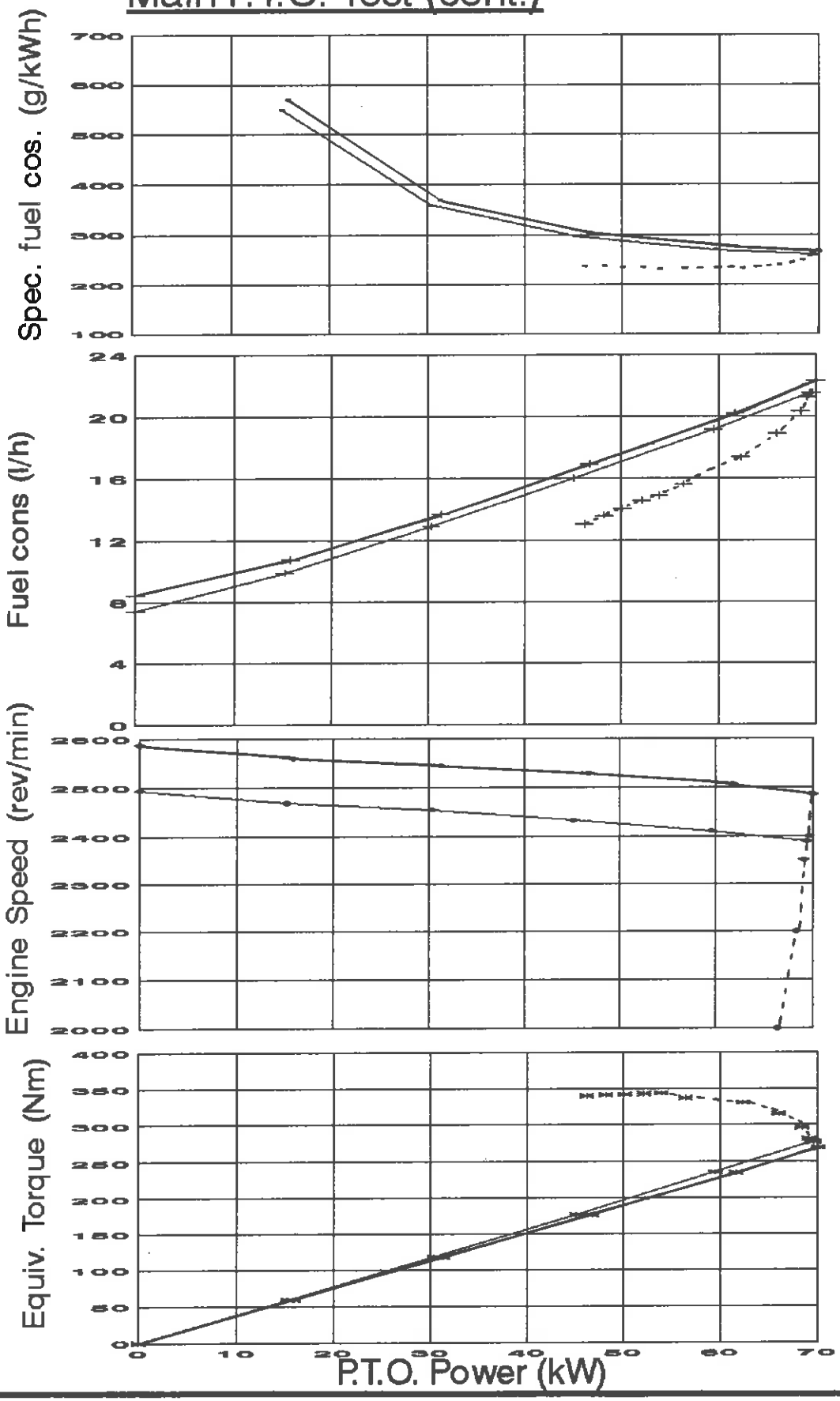
(2) 50 % of the torque defined in (1).

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Main P.T.O. Test



Main P.T.O. Test (cont.)



4.2. Hydraulic power and lifting force

Date: 2nd December 1993

4.2.1. Hydraulic power test

Tapping point used for test: Auxiliary services
Sustained pressure with relief valve opened: 17.8 MPa (177.6 bar)
Pump delivery rate at minimum pressure: 59.5 l/min

	Flow rate (l/min)	Pressure (bar)	Power (kW)
Flow rate corresponding to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting and corresponding power	29.5	159.8	7.9
Flow rate and pressure corresponding to maximum hydraulic power	53.4	140.4	12.5

4.2.2. Power lift test

Relief valve pressure setting for lifting: 19.6 MPa (196.0 bar)

Mesurement results		at the hitch point	at the frame
Height of lower hitch points above ground in down position	(mm)	200	198
Vertical movement (exerting lifting force)	(mm)	600	642
Maximum corrected force exerted trough full range	(kN)	34.1	29.5
Corresponding hydraulic pressure	(bar)	176.6	176.6
Moment about rear-wheel axis	(kN·m)	34.7	48.0
Maximum tilt angle of mast from vertical	(degree)	——	2.1°

4.2.2. Power lift test (continued)

Lifting height (1)	mm	-445	-400	-300	-200	-100	0	100	155
Lifting force (2) at the hitch points	kN	36.1	37.1	37.4	37.3	36.9	36.0	35.0	34.1

Lifting height (1)	mm	-447	-400	-300	-200	-100	0	100	195
Lifting force (2) at the frame	kN	36.9	36.7	36.4	35.9	34.9	33.4	31.7	29.5

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

(2) The values of measured forces are corrected to correspond to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting.

4.3. Drawbar power and fuel consumption (unballasted tractor)

Date of test: 27-28th january 1994
Type of track: Concret

	Tyres inflation pressure	
Height of drawbar	Front	Rear
510 mm	60 kPa	60 kPa

Mean atmospheric conditions:

- Temperature: 6.7 °C
- Pressure: 94.7 kPa
- Relative humidity: 31.5 %

Gear ratio	Speed (km/h)	Drawbar pull (kN)	Power (kW)	Engine speed (rev/min)	Wheel slip (%)	Specific consumption (g/kWh)	Specific energy (kWh/l)	Temperatures (°C)		
								Fuel	Coolant	Oil
Maximum power in tested gears										
L4LO	2.39	36.7	24.4	2565	14.5	513	1.64	19	87	108
L3HI	2.67	36.8	27.3	2562	15.0	511	1.64	23	88	110
L5LO	3.05	36.7	31.1	2531	15.0	467	1.80	23	88	111
L4HI	3.09	37.4	32.1	2498	14.0	468	1.79	27	87	110
L5HI	4.15	36.9	42.5	2514	14.0	417	2.02	16	89	110
L6LO	4.29	37.2	44.3	2500	15.0	404	2.08	30	86	112
H1LO	5.36	35.0	52.1	2392	11.0	358	2.35	22	87	112
L6HI	6.01	31.9	53.3	2415	8.5	348	2.41	25	86	110
H2LO	7.37	27.2	55.7	2415	8.0	336	2.50	19	87	110
H1HI	7.46	27.1	56.2	2405	8.0	337	2.50	20	87	111
H2HI	9.92	20.3	55.9	2417	7.5	338	2.49	22	85	111
H3LO	10.59	18.9	55.6	2422	7.0	337	2.49	23	86	106
H4LO	12.69	15.7	55.3	2415	6.0	338	2.48	24	86	109
H3HI	14.27	14.0	55.5	2414	6.0	339	2.48	26	88	111

Gear ratio	Speed (km/h)	Drawbar pull (kN)	Power (kW)	Engine speed (rev/min)	Wheel slip (%)	Specific consumption (g/kWh)	Specific energy (kWh/l)	Temperatures (°C)		
								Fuel	Coolant	Oil
Fuel consumption (i) In selected gear at maximum power at rated speed										
H1HI	7.46	27.1	56.2	2405	8	336	2.50	20	87	111
(ii) 75 % of pull at maximum power										
H1HI	8.00	20.3	45.1	2551	7	395	2.13	15	85	109
(iii) 50 % of pull at maximum power										
H1HI	8.18	13.5	30.7	2579	6	470	1.79	17	86	108
(iv) Next higher gear at reduced engine speed, same pull and travelling speed as in (ii)										
H2HI	8.07	20.3	45.5	1934	6	320	2.63	24	86	103
(v) Next higher gear at reduced engine speed, same pull and travelling speed as in (iii)										
H2HI	8.23	13.3	30.4	1951	5	384	2.19	32	90	109
(vi) Selected gear nearest to 7.5 km/h (*)										

(*) This gear is the same than the one selected at maximum power at rated speed. So the test result is identical.

- The height of the test track over the sea level (550 m) makes impossible to work with an atmospheric pressure higher than 996 mbar (99.6 kPa).

4.4. Repairs and remarks: **None**

The Engineer in charge of the test

Luís Marquez

The Engineer responsable of the test

Gonzalo Rubio de Hornedo

The Director of Testing Station

José Luís Ponce de León

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