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

Test Report N°: 1512 RESTRICTED CODE
OECD Ref: II-T 547/94-R7
Date of aproval: 16th March 1994

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



Agricultural Tractor
KUBOTA M1-85 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

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1. GENERALITIES

Tractor manufacturer

Name:	EBRO KUBOTA S.A.
Address:	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:	M1-85 DT E
- Type:	4 WD.
- Number of driving wheels:	Four.
- Serial number:	M185DTS700070
- First serial number:	M185DTS700001

2.2. Engine

2.2.1. Identification

- Make:	KUBOTA.
- Model:	V4702
- Type:	4-cycle diesel engine with direct injection, water cooled. Naturally aspirated.
- Serial number:	V4702-90769

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: None.

2.2.4. Fuel system

- Fuel feed system:	Forced type (diaphragm pump).
- Make, model and type of fuel filter:	TSUCHIYA MGF Co. Ltd., 16631-99540. Replaceable paper element.
- Capacity of fuel tank:	105 dm^3
- Make, model and type of injection pump:	MIKUNI PRECISION Co.Ltd., DPK J3943 F010N Distribuitor type. Serial number 0187FK
- Manufacturer's production setting of injection pump:	Flow rate: 68 $\pm$ 2 mm^3/stroke at rated speed and full load corresponding to 19,5 $\pm$ 0,6 dm^3/h. Timing: 12º before TDC.
- Make model and type of injectors:	CAV, BDLL 140S6655 CF, hole type.
- Injection pressure:	23.4 MPa

2.2.5. Governor

- Make:	LUCAS CAV.
- 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:	MANN FILTER
* Type:	Cyclone type.
* Model:	448 056 67 923
* Location of air intake:	In front of engine, under the bonnet.
- Main filter	
* Make:	MANN FILTER
* Type:	Dry paper, double element.
* Model:	445 165 92 103
* 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:	Six.
Fan diameter:	420 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:	00013-62317.
- Type:	Solenoid engaged type.
- Starter motor power rating:	2.7 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:	3E221-6523 EKSA.
- Type:	Multiple chamber absorption-expansion.
- Location:	Vertical on the left side of bonnet .
- Height of outlet above ground:	2565 mm

2.3. Transmision

2.3.1. Clutch (Travel alone)

- Make:	VALEO.
- Model:	687171AO-687163CO
- Type:	Dry single.
- Number of plates:	One.
- Plates diameter:	330 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-hidraulically 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 drive

- 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	594.485	585.963	1.21	1.23
2	L2 LO	451.791	445.335	1.59	1.62
3	L3 LO	318.803	314.275	2.26	2.29
4	L4 LO	268.158	264.303	2.68	2.73
5	L5 LO	203.789	200.863	3.53	3.58
6	L6 LO	143.806	141.765	5.00	5.08
7	H1 LO	116.106	114.318	6.20	6.30
8	H2 LO	88.171	86.894	8.16	8.28
9	H3 LO	62.186	61.327	11.57	11.74
10	H4 LO	52.319	51.574	13.75	13.96
11	H5 LO	39.755	39.197	18.10	18.36
12	H6 LO	28.051	27.656	25.66	26.02
13	L1 HI	444.353	438.005	1.62	1.64
14	L2 HI	337.709	332.884	2.13	2.16
15	L3 HI	238.302	234.898	3.01	3.07
16	L4 HI	200.435	197.572	3.59	3.64
17	L5 HI	152.331	150.155	4.72	4.79
18	L6 HI	107.491	105.956	6.69	6.79
19	H1 HI	86.703	85.464	8.30	8.41
20	H2 HI	65.894	64.953	10.91	11.08
21	H3 HI	46.498	45.834	15.47	15.69
22	H4 HI	39.109	38.551	18.39	18.66
23	H5 HI	29.723	29.298	24.20	24.55
24	H6 HI	20.974	20.674	34.30	34.80

(*) Calculated with a tyre dinamic index of 795 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.40134

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	3316.795	3269.303	0.22	0.22
2	L2 LO	ON	2520.709	2484.649	0.29	0.29
3	L3 LO	ON	1778.682	1753.381	0.40	0.40
4	L4 LO	ON	1496.152	1474.670	0.49	0.49
5	L5 LO	ON	1137.028	1120.735	0.63	0.64
6	L6 LO	ON	802.333	790.893	0.90	0.91
7	L1 LO		594.485	585.963	1.21	1.23
8	L2 LO		451.791	445.335	1.59	1.62
9	L3 LO		318.803	314.275	2.26	2.29
10	L4 LO		268.158	264.303	2.68	2.73
11	L5 LO		203.789	200.863	3.53	3.58
12	L6 LO		143.806	141.765	5.00	5.08
13	H1 LO		116.106	114.318	6.20	6.30
14	H2 LO		88.171	86.894	8.16	8.28
15	H3 LO		62.186	61.327	11.57	11.74
16	H4 LO		52.319	51.574	13.75	13.96
17	H5 LO		39.755	39.197	18.10	18.36
18	H6 LO		28.051	27.656	25.66	26.02
19	L1 HI	ON	2479.262	2443.843	0.29	0.30
20	L2 HI	ON	1884.243	1857.322	0.38	0.39
21	L3 HI	ON	1329.603	1310.610	0.54	0.55
22	L4 HI	ON	1118.326	1102.350	0.64	0.65
23	L5 HI	ON	849.929	837.788	0.85	0.86
24	L6 HI	ON	599.743	591.180	1.20	1.22
25	L1 HI		444.353	438.005	1.62	1.64
26	L2 HI		337.709	332.884	2.13	2.16
27	L3 HI		238.302	234.898	3.01	3.07
28	L4 HI		200.435	197.572	3.59	3.64
29	L5 HI		152.331	150.155	4.72	4.79
30	L6 HI		107.491	105.956	6.69	6.79
31	H1 HI		86.703	85.464	8.30	8.41
32	H2 HI		65.894	64.953	10.91	11.08
33	H3 HI		46.498	45.834	15.47	15.69
34	H4 HI		39.109	38.551	18.39	18.66
35	H5 HI		29.723	29.298	24.20	24.55
36	H6 HI		20.974	20.674	34.30	34.80

Total ratios and travelling speeds (Cont.)

Gear Box 18 Forward + 18 Rear with creep

GEAR	RANGE Creep	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 ON	2479.262	2443.843	0.29	0.30
2	L2 ON	1884.243	1857.322	0.38	0.39
3	L3 ON	1329.603	1310.610	0.54	0.55
4	L4 ON	1118.326	1102.350	0.64	0.65
5	L5 ON	849.929	837.788	0.85	0.86
6	L6 ON	599.743	591.180	1.20	1.22
7	L1	444.353	438.005	1.62	1.64
8	L2	337.709	332.884	2.13	2.16
9	L3	238.302	234.898	3.01	3.07
10	L4	200.435	197.572	3.59	3.64
11	L5	152.331	150.155	4.72	4.79
12	L6	107.491	105.956	6.69	6.79
13	H1	86.703	85.464	8.30	8.41
14	H2	65.894	64.953	10.91	11.08
15	H3	46.498	45.834	15.47	15.69
16	H4	39.109	38.551	18.39	18.66
17	H5	29.723	29.298	24.20	24.55
18	H6	20.974	20.674	34.30	34.80

(*) Calculated with a tyre dinamic index of 795 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.40134

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	444.353	438.005	1.62	1.64
2	L2	337.709	332.884	2.13	2.16
3	L3	238.302	234.890	3.01	3.07
4	L4	200.435	197.572	3.59	3.64
5	L5	152.331	150.155	4.72	4.79
6	L6	107.491	105.956	6.69	6.79
7	H1	86.703	85.464	8.30	8.41
8	H2	65.894	64.953	10.91	11.08
9	H3	46.498	45.834	15.47	15.69
10	H4	39.109	38.551	18.39	18.66
11	H5	29.723	29.298	24.20	24.55
12	H6	20.974	20.674	34.30	34.80

(*) Calculated with a tyre dynamic radius index of 795 mm (ISO 4251/1).
Number of revolutions of front wheels for one revolution of rear wheels: 1.40134

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:	765 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:	765 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 hidraulic system:	Open center system.
- Type and number of cylinders:	One, single acting and one additional external cylinder 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.

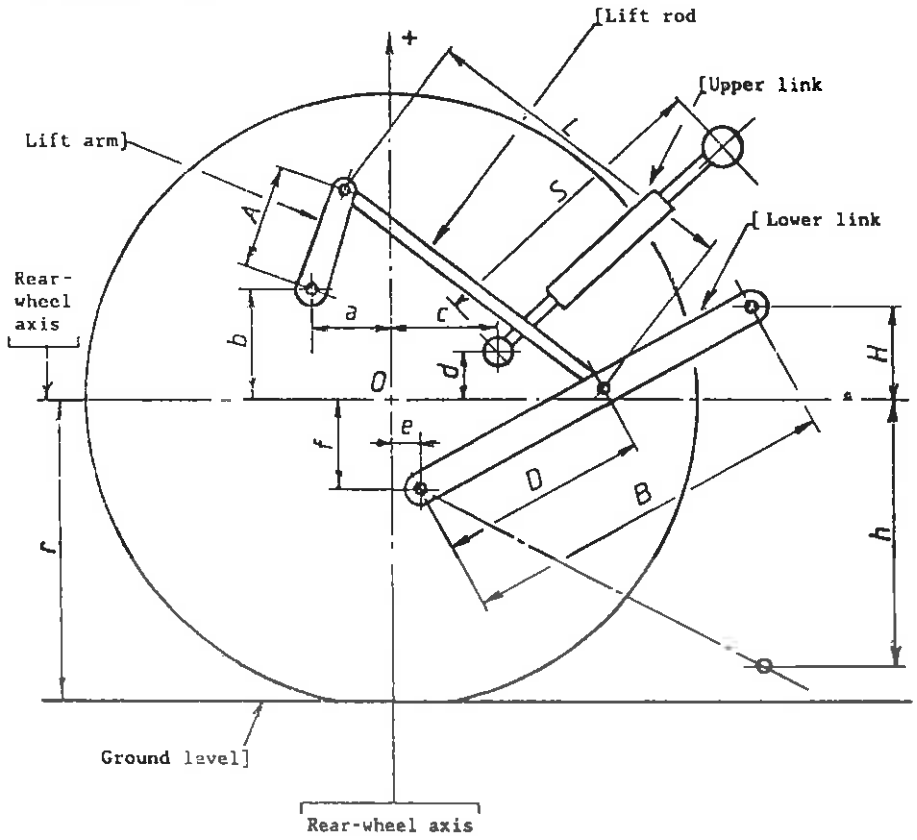
2.6. **Three-point linkage**

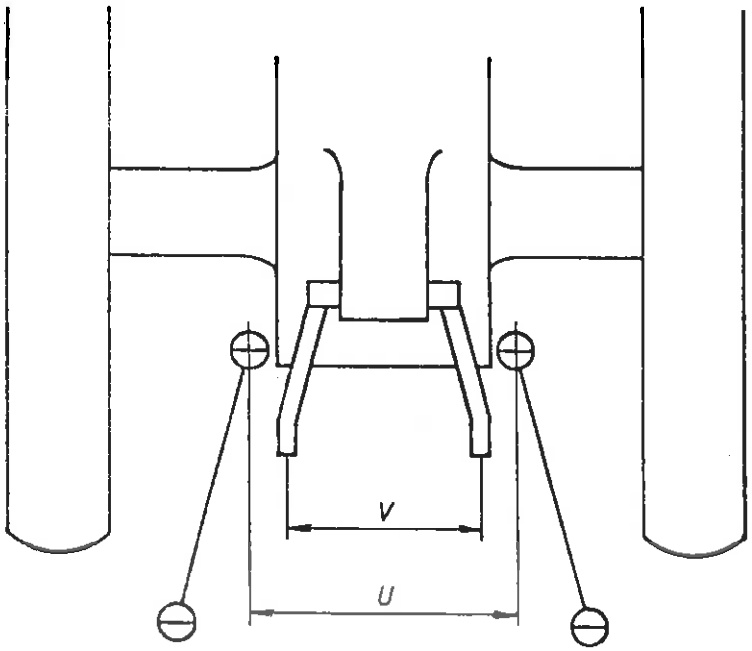
- Category: II, in conformity to ISO 730/I.
- Category adapter: None.

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	740
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 240 to 800	595
In high position	(H)	From -10 to 290	70
Height above ground of lower hitch points when locked transport position (*)		From 695 to 1005	

(*) Asuming the dynamic radius index = 795 mm (ISO 4251/1-1984)

2.7. **Linkage geometry**





2.8. Swinging drawbar (Not fitted)

- Type:	Bar type.
- Height above ground (tyre 16.9 R 38)	
* Maximum:	599 mm at center of hitch.
* Minimum:	492 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 430 to 730 mm
- Distance of hitch point from rear wheel axis, horizontally:	635 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

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: 2300 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	1980	Changing by turning wheels and offset of rims

2.14. Protective structure

- Manufacturer's name: EBRO KUBOTA, S.A.
- Make: EBRO KUBOTA.
- Model: EK - 57.
- Type: Cab.
- Protective device: Safety cab, not tiltable.
- O.E.C.D. aproval number: M1 85 DT E CSS 0267/1.

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	1150	167 x 106	854
Front lights	1753	82 x 55	320
Rear ligths	1660	50 x 105	267
Reflectors	1660	50 x 105	267
Stop	1660	102 x 105	343
Direction indicator			
Front	1808	82 x 55	320
Rear	1660	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	2010	2410	2705	2565

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	2050	2060	1450	1460
Rear	3150	3215	2230	2295
Total	5200	5275	3680	3755

3.4. Ballast

- Front: * 1 bracket: 50 kg
  * 8 weights. Total: 200 kg
  * Water in tyres: 230 kg

- Rear: * 3 weights per wheel total: 420 kg
  * Water in tyres: 620 kg

3.5. Tyres and track width specifications

	FRONT	REAR
Tyres:		
Dimension	14.9 R 24	16.9 R 38
Ply rating	126 A8	141 A8
Type	Radial	Radial
Maximum load (kN)	16.68	25.26
Inflation pressure (kPa)	160	160
Dynamic radius index (mm)	590	795
Chosen track width (mm)	1820	1823

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., 13th july 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						
60.0	2437	1020	17.14	20.40	286	2.94
1.2. Power at rated engine speed						
59.9	2400	1005	16.90	20.12	282	2.98
1.3. Standard power take-off speed (1000 rev/min)						
59.6	2389	1000	16.90	20.12	284	2.96
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						
59.9	2400	1005	16.90	20.12	282	2.98
1.4.2. 85 % of torque obtained in 1.4.1.						
52.6	2482	1039	15.00	17.85	285	2.96
1.4.3. 75 % of torque defined in 1.4.2.						
40.0	2516	1053	12.32	14.67	308	2.73
1.4.4. 50 % of torque defined in 1.4.2.						
26.9	2540	1063	10.06	11.98	374	2.25
1.4.5. 25 % of torque defined in 1.4.2.						
13.5	2561	1072	7.90	9.41	585	1.43
1.4.6. Unloaded						
0	2583	1081	5.64	6.72	———	———

Power (kW)	Speed (rev/min)		Fuel consumption			Specific energy (kWh/l)
	Engine	P.T.O.	Hourly kg/h	l/h	Specific (g/kWh)	
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						
59.6	2389	1000	16.90	20.12	284	2,96
1.5.2. 85 % of torque obtained in 1.5.1						
50.9	2401	1005	14.34	17.07	282	2.98
1.5.3. 75 % of torque defined in 1.5.2						
38.7	2434	1019	11.80	14.05	305	2.75
1.5.4 50 % of torque defined in 1.5.2.						
26.1	2458	1029	9.50	11.31	364	2.31
1.5.5. 25 % of torque defined in 1.5.2.						
13.2	2482	1039	7.31	8.71	554	1.52
1.5.6. Unloaded						
0	2501	1047	5.28	6.29	———	———

4.1. Main power take-off test (continued)

Other results:

No load maximum engine speed: 2583 rev/min
Torque (equivalent crankshaft) at maximum power: 235.2 N·m
Torque (equivalent crankshaft) at rated engine speed: 238.1 N·m
Maximum torque (equivalent crankshaft): 290.5 N·m at 1047 rev/min

Mean atmospheric conditions:

Temperature:	26.0 °C
Pressure:	95.9 kPa
Relative humidity:	32.0 %

Maximum temperatures:

Coolant:	94.0 °C
Engine oil:	119.0 °C
Fuel:	38.0 °C
Engine air intake:	28.0 °C

Standard fuel consumption at varying load:

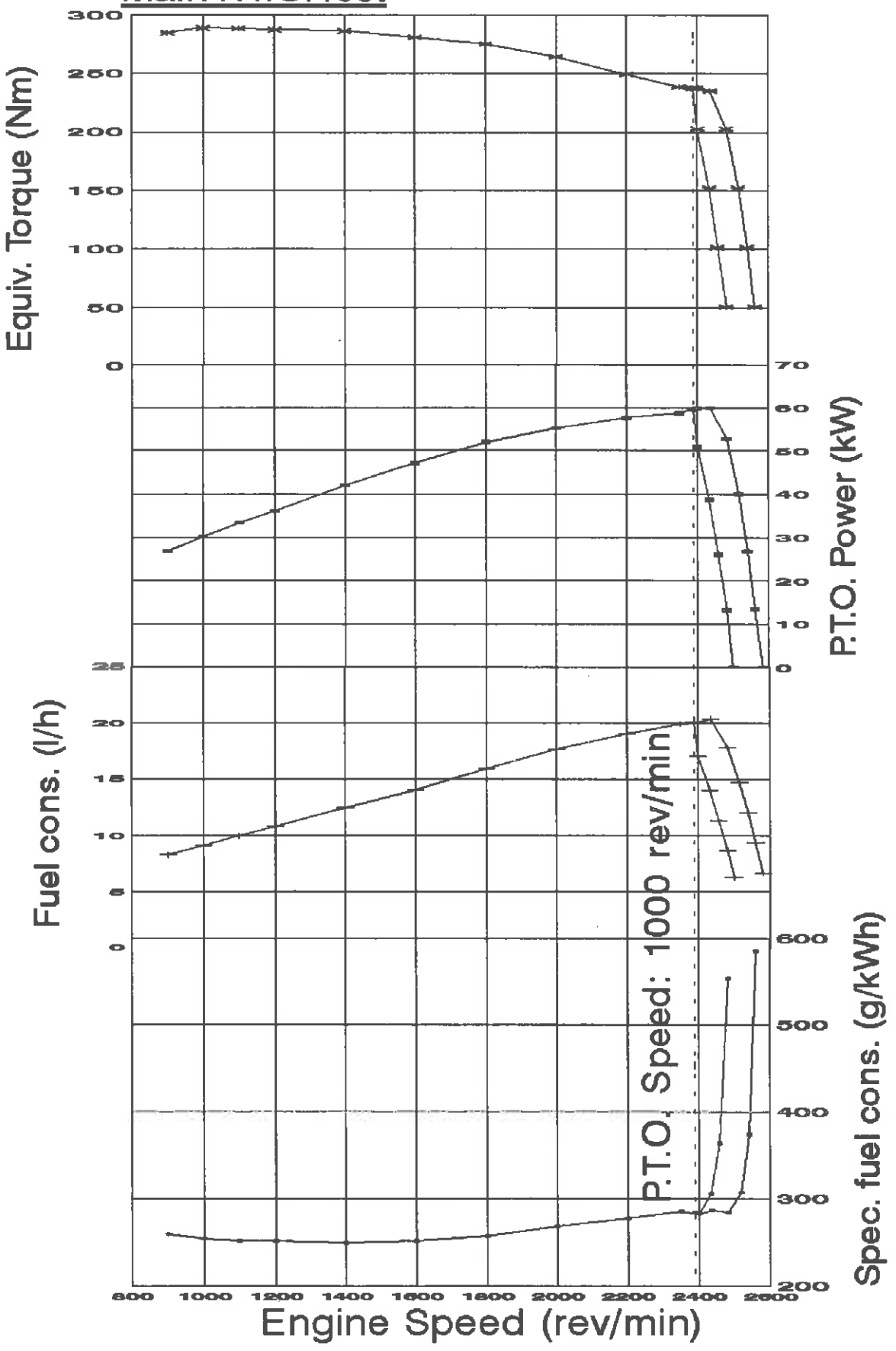
Load	Governor control being set for maximum power at rated engine speed		Governor control being set for maximum power at standard P.T.O speed	
	85 % (1)	50 % of 85 % (2)	85 % (1)	50 % of 85 % (2)
Hourly fuel consumption (l/h)	17.85	11.98	17.07	11.31
Standard specific fuel consumption (g/kW·h)	284	374	282	364

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

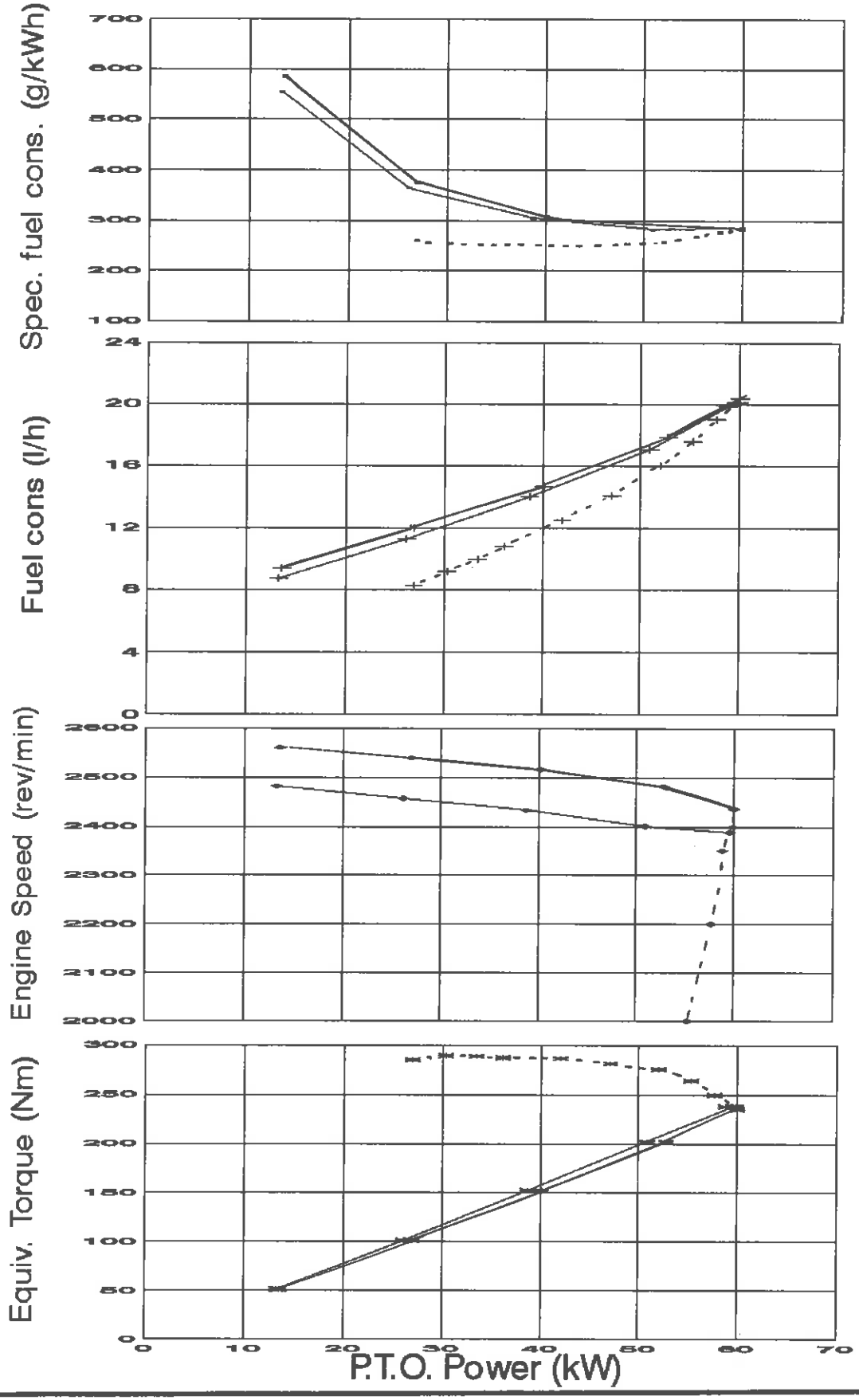
(2) 50 % of the torque defined in (1).

ESTACION DE MECANICA AGRICOLA MADRID	TRACTOR: KUBOTA M1-85 DT E (4WD) O.E.C.D. CODE II	O.E.C.D. Test N°: 1512 Restricted Code

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	637
Maximum corrected force exerted trough full range	(kN)	27.9	24.0
Corresponding hydraulic pressure	(bar)	176.4	176.4
Moment about rear-wheel axis	(kN·m)	28.3	39.0
Maximum tilt angle of mast from vertical	(degree)	——	2°

4.2.2. Power lift test (continued)

Lifting height (1)	mm	-419	-319	-300	-200	-100	0	100	181
Lifting force (2) at the hitch points	kN	28.3	29.0	29.1	29.5	29.6	29.3	28.0	27.9

Lifting height (1)	mm	-421	-321	-300	-200	-100	0	100	200	216
Lifting force (2) at the frame	kN	28.2	28.4	28.4	28.1	27.2	26.9	25.1	24.5	24.0

(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: 8-9th September 1993
Type of track: Concret

	Tyres inflation pressure	
Height of drawbar	Front	Rear
430 mm	98.0 kPa	78.4 kPa

Mean atmospheric conditions:

- Temperature: 20 °C
- Pressure: 94.1 kPa
- Relative humidity: 45.0 %

Gear ratio	Speed (km/h)	Drawbar pull (kN)	Power (kW)	Engine speed (rev/min)	Wheel slip (%)	Specific consumption (g/kW·h)	Specific energy (kW·h/l)	Temperatures (°C)		
								Fuel	Coolant	Oil
Maximum power in tested gears										
L4LO	2.41	36.4	24.4	2538	15	461.1	1.82	34	88	109
L3HI	2.71	35.9	27.0	2530	15	444.8	1.89	33	86	109
L5LO	3.15	36.5	31.9	2520	15	410.8	2.04	38	87	112
L4HI	3.18	36.8	32.5	2500	15	402.9	2.08	35	86	111
L5HI	4.15	35.2	40.6	2450	14	389.1	2.16	32	89	114
L6LO	4.38	35.6	43.3	2440	14	382.2	2.20	32	88	114
H1LO	5.75	28.8	46.0	2420	8	364.9	2.30	35	92	119
L6HI	6.30	26.7	46.7	2425	7	361.6	2.32	34	90	118
H2LO	7.68	22.6	48.2	2400	6	362.5	2.32	42	90	119
H1HI	7.79	22.0	47.6	2395	6	365.2	2.30	40	93	121
H2HI	10.42	16.1	46.6	2408	5	364.2	2.31	41	92	120
H3LO	10.97	15.4	46.9	2394	5	366.8	2.29	37	94	119
H4LO	13.42	12.4	46.2	2438	4	372.4	2.26	28	88	111
H3HI	15.11	10.4	43.7	2439	4	371.4	2.26	35	86	111

Gear ratio	Speed (km/h)	Drawbar pull (kN)	Power (kW)	Engine speed (rev/min)	Wheel slip (%)	Specific consumption (g/kW-h)	Specific energy (kW-h/l)	Temperatures (°C)		
								Fuel	Coolant	Oil
Fuel consumption (i) In selected gear at maximum power at rated speed										
H2LO	7.68	22.6	48.2	2400	6	362.5	2.32	42	90	119
(ii) 75 % of pull at maximum power										
H2LO	8.08	16.7	37.6	2500	5	368.9	2.28	37	88	111
(iii) 50 % of pull at maximum power										
H2LO	8.28	11.3	26.0	2534	4	438.5	1.92	33	89	110
(iv) Next higher gear at reduced engine speed, same pull and travelling speed as in (ii)										
H1HI	8.06	16.7	37.4	2451	5	361.7	2.32	41	88	114
(v) Next higher gear at reduced engine speed, same pull and travelling speed as in (iii)										
H1HI	8.26	11.0	25.2	2487	4	428.7	1.96	39	87	110
(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).

- The drawbar test has been done with D.T. off for gears higher than 7.5 km/h

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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