COMITATO PER L'OMOLOGAZIONE
DELLE MACCHINE AGRICOLE

No. 683/O.E.C.D.

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D.
TEST CODE FOR AGRICULTURAL TRACTORS

FIAT 300/6



Manufactured by: ZELEZARNA STORE
Store Pri Celju (JUGOSLAVE)

Date of tests: December 1979



CENTRO DI OMOLOGAZIONE DELL'ISTITUTO DI MECCANICA AGRARIA
UNIVERSITA' DEGLI STUDI DI BOLOGNA – ITALIA

This bulletin is based on engineering tests in accordance with the O.E.C.D. STANDARD CODE for the Official Testing of Agricultural Tractors. It does not contain an evaluation of the performance of the tractor on practical work.

This report has been approved by the O.E.C.D. Coordinating Center (C.N.E.E.M.A., France) as being in accordance with the O.E.C.D. STANDARD CODE.

Date of Approval: 17th July 1980

Serial No.: 683

In this report all performance characteristics are given according to the International System of Units and to the Technical System.

Equivalences

Forces:	1 N	= 0.102 kp	or	1 kp	= 9.81 N
Powers:	1 kW	= 1.36 h.p.	or	1 h.p.	= 0.736 kW
Pressures:	1 bar	= 1.02 kp/cm^2	or	1 kp/cm^2	= 0.981 bar
Angular velocity:	1 rad/s	= 9.554 rev/min	or	1 rev/min	= 0.1047 rad/s

FIAT 300/6 TRACTOR

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Tractor manufacturer:	ZELEZARNA STORE - STORE PRI CELJU (Jugoslave)
Submitted for test by:	FIAT TRATTORI - MODENA (Italy)
Selected by:	Manufacturer with the agreement of Istituto of Meccanica agraria - University of Bologna (Italy)
Place of running-in:	FIAT TRATTORI workshop - Modena (Italy)
Duration of running-in:	50 hrs for engine, 30 hrs for the tractor

SPECIFICATION OF TRACTOR

Tractor

Make:	FIAT
Model:	300/6
Type:	Wheeled tractor, unit construction, rear wheels driven
Serial No:	10007

Engine

Make:	FIAT/UTB
Model:	8025.01
Type:	Four-stroke direct injection Diesel
Serial No:	000002
Cylinders:	2, verticals, wets, in line; bore 95 mm, stroke 110 mm, total capacity 1560 cm^3; compression ratio 17
Valves:	Overhead
Fuel system:	Forced with plunger pump CAV BPA 3821 S 010; CAV replaceable paper cartridge-type filter; recommended filter change period 400 hrs; CAV type DPA 3822 F 010 injection pump, manufacturer's production setting for injection pump 41-43 mm^3 for stroke at 1125 rev/min of engine; FIAT type EPP Z 10 FI multihole injection nozzles, injection pressure 225 $\pm$ 5 bar; advanced admission: 16° (fly wheel measured); capacity of fuel tank 26 l
Governor:	CAV mechanical type with centrifugal weights governed range of engine speeds 650 + 2580 rev/min; rated engine speed 2400 rev/min

Air cleaner:	FIAT oil filter with cyclone pre-cleaner; oil capacity 0.2 l; flow 1670 l/min
Lubrication system:	FIAT forced feed from gear pump: sieve filter in suction and paper cartridge replaceable filter SAVARA at delivery; oil capacity 4.0 l; recommended oil and filter change period 400 hrs; recommended oil: according to MIL-L 2104 B - SAE 20W/40
Cooling system:	Water cooling with centrifugal pump and thermostat; pressurized system adjusted to 0.5 bar; water capacity 7 l; fan: with 4 blades, 290 mm of diameter
Starting system:	Electric, MARELLI M 125-3112-S solenoid engaged type, 12 V, 3.0 kW motor; low temperature starting aid: with heating plug CAV type 357/10
Exhaust silencer:	FIAT DGM-SA 695 motor right side located, upward discarge (in the tests) or posterior
Electrical equipement:	12 V, ELECTROPRECIZIE type EP 1130-36 A alternator, 0.43 kW; one battery, capacity 77 Ah at 20 hours rating

Transmission

Clutch:	Own make, single dry plate type, plate diameter 216 mm; driving both gear box and p.t.o.; pedal operated
Gear box:	Own make, constant mesh gear; speed change gear with 3 speeds forward and 1 reverse gear reducer group with 2 gear ratio. Totally 6 forward and 2 reverse speeds selected by means of one hand lever
Rear axle and final transmission:	Own make; bevel gear differential (ratio 1:4.444) and bull gears final drives (ratio 1:5.917). Pedal operated differential lock, automatic desengaging
Oil capacities:	Gear box 6.1 l; rear transmission 3.2 l
Oil change period:	400 working hrs
Recommended oil qualities:	According to MIL-L 2105 B - Viscosity SAE 20W/40

Total ratios and speeds

Gear	No of engine revolutions for one revolution of driving wheels	Theoretical travelling speed for 2400 rev/min rated speeds of engine	
		m/s	km/h
1st lower	171.996	0.75	2.71
2nd lower	99.605	1.30	4.68
3rd lower	62.898	2.06	7.41
1st high	48.646	2.66	9.58
2nd high	28.162	4.60	16.55
3rd high	17.775	7.28	26.22
1st reverse	26.292	0.93	3.34
2nd reverse	39.443	3.28	11.81

Calculated with the tyre rolling circumference of 3236 mm in accordance to tyre manufacturer's specification

Power take-off (Non indipendent)

Main p.t.o.: Located at the rear, median plane of the tractor;
height above ground 685 mm;
dimensions 34.8x27.9x8.6 mm (1.3/8", ISO R 500), 6 splines;
hand lever engaged. Distance to rear axle 325 mm.

Speeds proportional at engine speed:
612 rev/min at 2400 rev/min rated engine speed;
2118 rev/min of engine at p.t.o. 540 rev/min
Direction of rotation, clockwise viewed from tractor rear.

Speeds proportional to travelling speed:
one, one p.t.o. revolution for 0.29 m;
11 p.t.o. rev/min for one revolution of driving wheels.
Direction of rotation, clockwise viewed from tractor rear in forward speed, anticlockwise in reverse speed

Power lift: FIAT, with load and depth controls;
hydraulic power line in disintegrated construction;
two double acting cylinders, 35 mm bore, 145 stroke;
PLESSEY A 10 X hydraulic pump directly driven by engine;
depth and load controls with spring clip on top link pivot point; no filter;
maximum pressure 150 bar;
oil capacity 2.3 l;
recommended oil change period: 400 hrs;
recommended oil: FIAT AMBRA, viscosity SAE 20W/40

Three point linkage: Own make, according to ISO I cat.
Lift rods lenght adjustable: 465 or 500 mm;
lift height above ground adjustable from 304 to 794 mm

Trailer hitch: Own make;
Height above ground 405, 460, 515 mm;
adjustable by shifting hitch;
diameter of clevis hole 30 mm;
distance to rear axle centre 390 mm;
distance referred to the main p.t.o. - shaft:
horizontal 60 mm, vertical 3 positions, 280, 225 or 170 mm (un

Swinging drawbar: Own make;
height above ground 385 mm;
diameter of clevis hole 30 mm;
distance to rear axle centre 560 mm;
distance from the pivot to rear axle centre 0 mm;
distance refferred to te main p.t.o. - shaft:
horizontal 230 mm, vertical 300 mm (under);
lateral swingable max 315 mm to heither side

Steering: Own make;
mechanical type cam and roller steering operated by hand wheel

Brakes: Service brake: mechanically strap type acting with pedals on rear wheels.
Parking brake: mechanically, operated by hand lever with ratchet, acting the same service brake.
Steering brake: divided pedal of service brake; for normal use locked together.

Wheels

Steering: 2 in front 5.00-15, 4 p.r. diagonal pneumatic;
max. permissible masse on each tyre 365 kg at 2.8 bar internal air pressure;
track widht adjustable from 955 to 1590 mm with 7 positions (955-1055-1155-1255-1355-1455-1590 mm); changeable by telescopic axle

Driving: 2 at rear 11.2/10-24, 4 p.r. diagonal pneumatic;
max. permissible masse on each tyre 845 kg at 1.3 bar internal air pressure;
track widht adjustable from 955 to 1690 mm with 8 positions (955-1055-1155-1255-1355-1455-1555-1690 mm); changeable by reversing wheels centres and offset lugs on rims;
wheelbase 1700 mm

Masses: With full fuel tank, oil

Masses kg	No driver			With driver		
	on front wheels	on rear wheels	total	on front wheels	on rear wheels	total
Without additional weight	435	600	1035	450	660	1110
With maximum additional weight	535	740	1275	550	800	1350

Ballast: four, 25 kg each, two for drive wheels (50 kg for wheel)
four, 35 kg each, two for rear wheels (70 kg for wheel)

Seat: Own make;
spring-mounted with cushion;
range of adjustement 70 mm, fore and aft in median plane of tractor: no vertical adjustement

Number of grease points: (whole tractor) 6

Overall dimensions: Lenght 2.77 m (with three points linkage 2.95 m)
width 1.38 + 1.98 m
height 1.58 m (to top of steering wheel)
1.84 m (to top of vertical exhaust silencer)
maximum ground clearance 0.330 m (below trailer hitch, height above ground 405 mm)
maximum ground clearance 0.425 m (below lower links of three point linkage)

Lighting: In accordance with italian standard

	Height above ground of centre cm	Diameter cm	Distance of centre from outside edge of tractor cm
Headlights	99.0	13.0	27.5 (1)
Side lights	99.0	13.0	27.5 (1)
Rear lights	102.5	6.5 x 5.0	29.5 (1)
Reflectors	92.0	5.5	25.0 (1)

(1) With track width of 1.380 m

FUEL AND LUBRICANTS USED IN TEST

Fuel:	Agricultural Diesel oil; density 15°C: 0.825 kg/l cetane number: 69
Engine oil:	FIAT AMBRA viscosity SAE 20W/40
Transmission oil:	FIAT AMBRA viscosity SAE 20W/40
Hydraulic fluid:	FIAT AMBRA viscosity SAE 20W/40

COMPULSORY TEST

1) MAIN POWER TAKE-OFF PERFORMANCE

Date and location of test: 3rd May 1979 - Experimental Centre of Cadriano - University of Bologna

Type of dynamometer: Electrical, type I.M.A. Bo 65

Power	Speed		Fuel consumption		Specific
	engine	p.t.o.	hourly	specific	energy
kW	rev/min	rev/min	l/h	kg/kWh	kWh/l
AT MAXIMUM POVER 2-HOURS TEST					
18.67	2397	611	6.02	0.266	3.10
AT THE SPEED RECOMMENDED BY THE MANUFACTURER FOR DRAWBAR WORK					
18.67	2397	611	6.02	0.266	3.10
PART LOADS AT MAXIMUM POWER					
I) 85% of the torque at maximum power					
16.59	2507	639	5.45	0.271	3.04
II) Unloaded					
--	2581	658	2.27	--	--
III) 50% of the load defined in (I)					
8.38	2542	648	3.64	0.358	2.30
IV) Maximum power					
18.67	2397	611	6.02	0.266	3.10
V) 25% of the load defined in (I)					
4.23	2566	654	2.64	0.514	1.60
VI) 75% of the load defined in (I)					
12.46	2519	642	4.45	0.295	2.80

Power	Speed		Fuel consumption		Specific
	engine	p.t.o.	hourly	specific	energy
kW	rev/min	rev/min	l/h	kg/kWh	kWh/l
PART LOAD AT STANDARD SPEED OF p.t.o.					
I) 85% of the torque at maximum power					
15.57	2158	550	4.91	0.260	3.17
II) Unloaded					
—	2236	570	1.64	—	—
III) 50% of the load defined in (I)					
7.83	2165	552	3.09	0.326	2.53
IV) Maximum power					
18.02	2122	541	5.64	0.258	3.20
V) 25% of the load defined in (I)					
3.96	2201	561	2.18	0.475	1.82
VI) 75% of the load defined in (I)					
11.46	2146	547	3.82	0.275	3.00

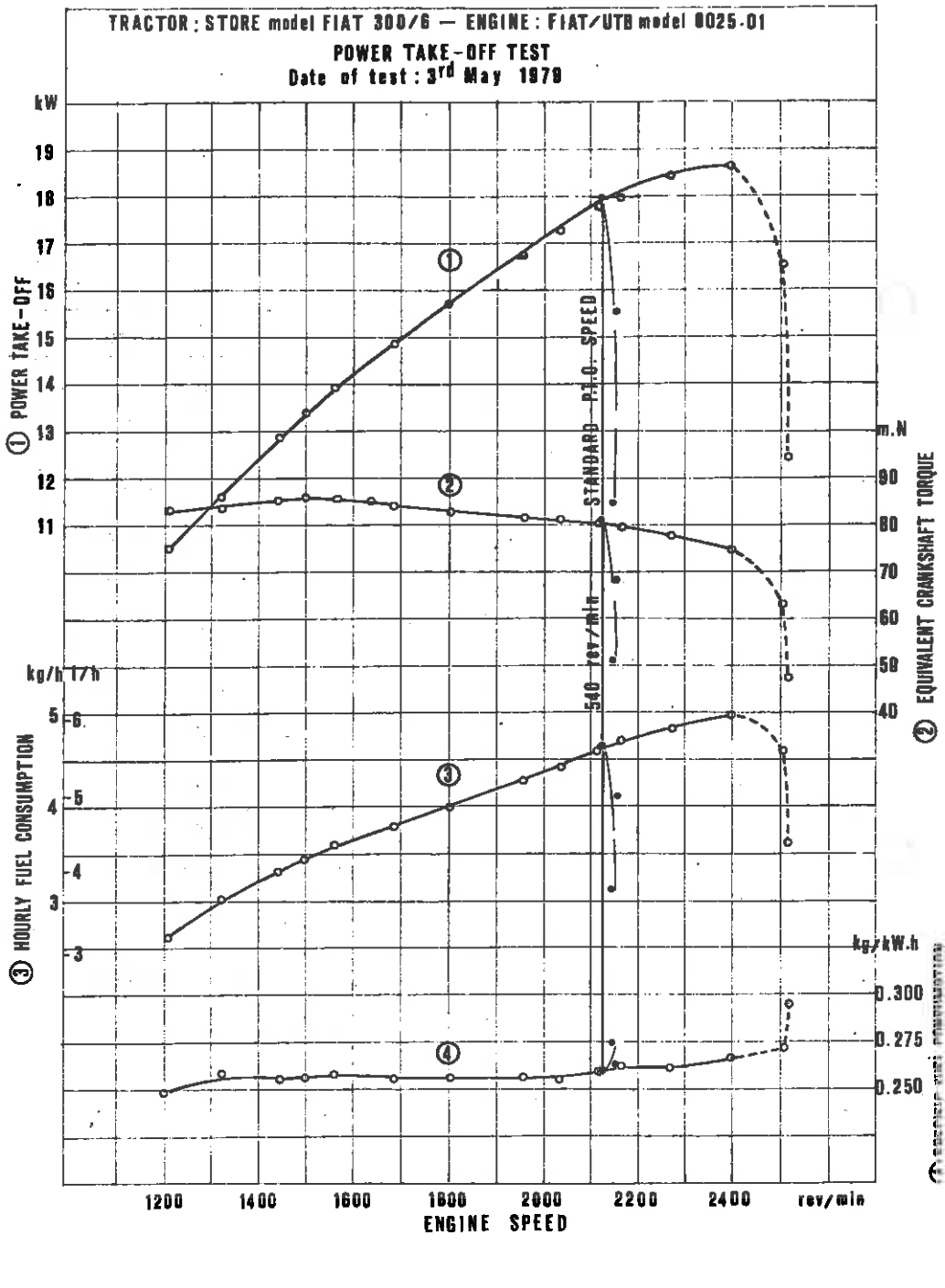
SPECIFIC STANDARD FUEL CONSUMPTION: 0.271 - 0.358 - 0.260 - 0.326 kg/kWh

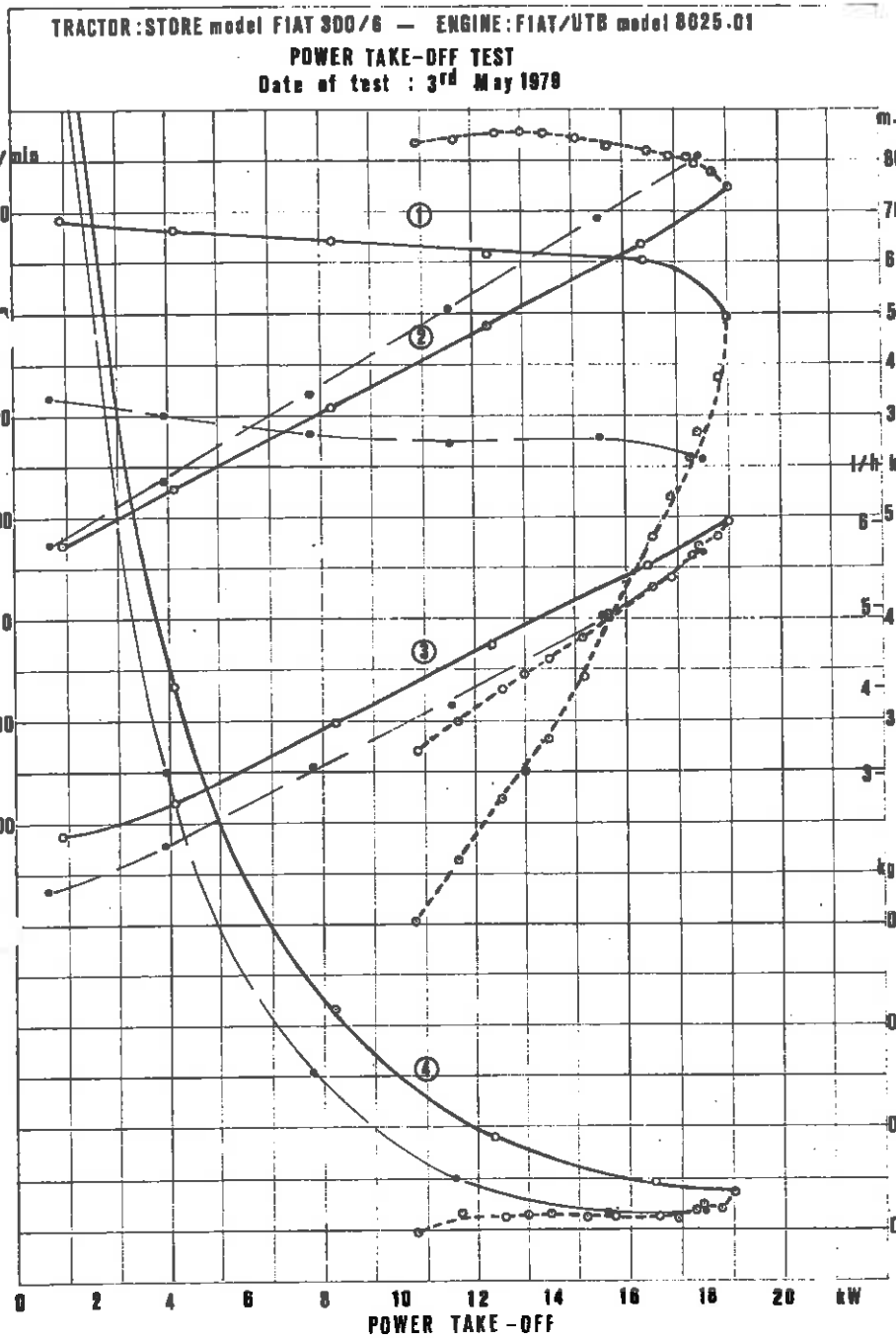
No load maximum engine speed: 2581 rev/min

Equivalent crankshaft torque at maximum power: 74.4 mN

Maximum equivalent crankshaft torque: 85.2 mN at 1500 rev/min of the engine

Mean atmospheric conditions:	temperature	22	°C
	pressure	101.100	Pascal
	relative umidity	50	%
Maximum temperature:	coolant	80	°C
	engine oil	108	°C
	fuel	28	°C


TRACTOR : STORE model FIAT 300/6 — ENGINE : FIAT/UTB model 8025-01
POWER TAKE-OFF TEST
Date of test : 3rd May 1979
kW
19
18
17
16
15
14
13
12
11
① POWER TAKE-OFF
m.N
90
80
70
60
50
40
② EQUIVALENT CRANKSHAFT TORQUE
STANDARD P.T.O. SPEED
540 rev/min
kg/h 1/h
6
5
4
3
③ HOURLY FUEL CONSUMPTION
kg/kW.h
0.300
0.275
0.250
1200
1400
1600
1800
2000
2200
2400
rev/min
ENGINE SPEED


TRACTOR : STORE model FIAT 300/6 — ENGINE : FIAT/UTB model 8025.01
POWER TAKE-OFF TEST
Date of test : 3rd May 1978
rev/min
2600
2400
2200
2000
1800
1600
1400
m.N
80
70
60
50
40
30
l/h kg/h
6 5
5 4
4 3
3
kg/kW.h
0.400
0.350
0.300
0.250
① EQUIVALENT CRANKSHAFT TORQUE
② HOURLY FUEL CONSUMPTION
③ SPECIFIC FUEL CONSUMPTION
0 2 4 6 8 10 12 14 16 18 20 kW
POWER TAKE-OFF

2) DRAWBAR PERFORMANCE

Date of test: 11th - 27th June 1979

Type of track: concrete

Gear	Speed km/h	Power kW	Drawbar pull N	Engine speed rev/min	Slip of wheels %	Drawbar fuel consumption kWh/l
i) Maximum power (with ballast)						
1st l	2.45	6.74	9900	2525	15.0	2.01
2nd l	4.21	11.58	9900	2530	15.0	2.50
3rd l	6.90	15.60	8140	2420	7.8	2.76
1st h	9.10	17.62	6970	2410	5.5	2.92
2nd h	16.08	15.99	3580	2400	3.0	2.75
3rd h	25.84	12.70	1770	2400	1.5	2.19
ii) Five hour test at 75% of pull at maximum power (in the 3rd l gear)						
3rd l	7.40	12.54	6100	2517	4.8	2.67

Tyres inflation pressure: steering wheels 2.8 bar
driving wheels 1.2 bar

Height of drawbar above ground: 460 mm

Drawbar fuel consumption kg/kWh	Temperatures °C			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature °C	Relative umidity %	Pressure bar
0.410	25	82	92	28	58	1.016
0.330	25	84	94	28	56	1.016
0.299	26	84	98	28	60	1.016
0.289	26	82	98	29	56	1.016
0.300	26	80	95	29	56	1.016
0.376	26	80	93	30	54	1.016
0.309	27	84	98	30	60	1.018

Gear	Speed km/h	Power kW	Drawbar pull N	Engine speed rev/min	Slip of wheels %	Drawbar fuel consumption kWh/l
iii) Five hour test at pull corresponding to 15% wheelslip in test i)						
2nd l	4.50	12.38	9900	2530	8.5	2.69
v) Maximum power (without ballast)						
1st l	2.39	5.86	8830	2480	14.8	2.00
2nd l	4.10	9.94	8730	2465	14.8	2.66
3rd l	6.50	14.26	7900	2410	12.4	2.88
1st h	8.93	16.81	6780	2400	6.6	2.95
2nd h	15.90	15.15	3430	2410	4.0	2.80
3rd h	25.70	12.64	1770	2400	1.7	2.32

Oil consumption during ten hours duration of test ii) and iii): 11.0 g/h

Drawbar fuel consumption kg/kWh	Temperatures °C			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature °C	Relative %	Pressure bar
0.307	28	82	97	29	60	1.018
0.413	27	83	96	25	62	1.010
0.310	27	83	96	25	65	1.010
0.287	28	84	98	25	63	1.010
0.280	28	85	100	26	64	1.010
0.295	28	84	98	26	65	1.010
0.355	29	84	98	26	65	1.010

Test iii) was carried out with 100 kg over ballast

3) TURNING SPACE AND TURNING CIRCLE

Details of wheels equipment: front 5.00-15, 4 p.r. diagonal pneumatic;
rear 11.2/10-24, 4 p.r. diagonal pneumatic;
no ballast;
track width, front and rear axles, 955 mm

	Without brakes		With brakes	
	right hand	left hand	right hand	left hand
Radius of turning space, m	3.25	3.15	2.45	2.35
Radius of turning circle, m	3.10	3.00	2.30	2.20

4) LOCATION OF CENTRE OF GRAVITY

- Height above ground	806 mm
- Distance forward from the vertical plane containing the axis of the rear wheels	715 mm
- Distance of the median plane of the tractor to the right hand side	0 mm

5) BRAKING PERFORMANCE

Date of test: 3rd October 1979

Type of track: Concrete

Type of decelerometer: Moto Meter, at maximum, recorder

Masse of ballasted tractor: 1350 kg, with driver

A) Foot brake

Cold brakes

		With ballast	Without ballast
Travelling speed	km/h	25.0	25.0
Deceleration	m/s^2	4.0	3.9
Stopping distance	m	7.9	7.2
Force on pedal	N	630	600
Force on pedal for maximum deceleration of 2.5 m/s^2	N	220	250

Brake fade characteristics (hot tests)

			With ballast	Without ballast
Deceleration	hot/cold	%	100	98
Stopping distance	cold/hot	%	98	95
Force on pedal	hot/cold	%	102	98

B) Park brake

Tractor facing up slope (16%):
Pull on hand brake 250 N, tractor does not roll

Tractor facing down slope (16%):
Pull on hand brake 250 N, tractor does not roll

6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test: 26th June 1979
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer, type 2209

Results of test

Gear:	3rd	h
Maximum travelling speed:	27.2	km/h
Travelling speed before acceleration:	20.4	km/h
Sound level:	84.5	dB(A)

7) NOISE AT THE DRIVER'S EAR LEVEL

Date of test: 26th June 1979
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer, type 2209
Type of frequency analyser: Brüel and Kjaer, type 1613

No cab or safety frame fitted on tractor

Results of test

Gear	Drawbar pull at which the tractor develops the maximum sound level N	Travelling speed km/h		Sound level	
		nominal	effective	dB(A)	Sones
3rd 1*	7900	7.41	6.50	96.3	106.0

* The 3rd 1 gear corresponds to the travelling speed nearest to 7.25 km/h

8) POWER LIFT PERFORMANCE

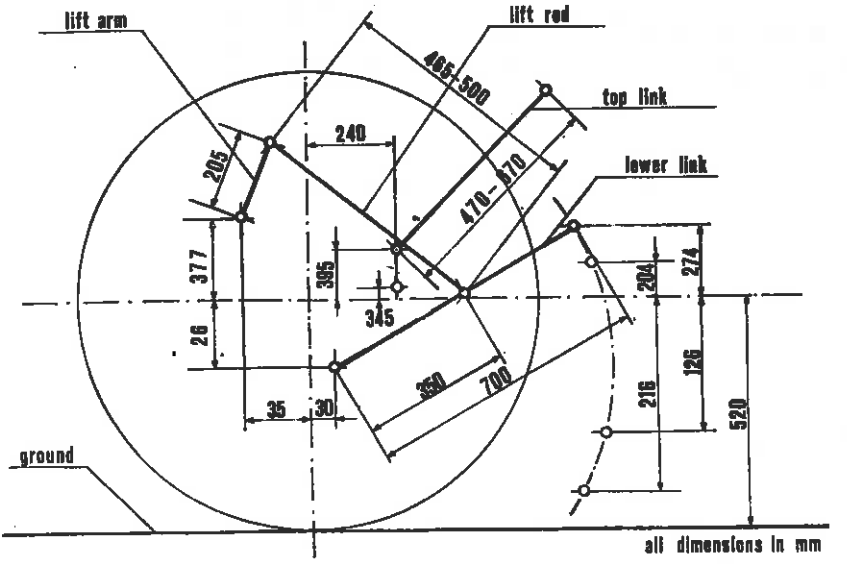
Date and location of test:	4th December 1979 - Experimental Centre of Cadriano
Hydraulic fluid:	FIAT AMBRA 20W/40
Type of linkage lok for transport:	Hydraulic
Opening pressure of the cylinder over pressure relief valve:	147 bar

Hydraulic pump

i) Opening pressure of relief valve:	147	bar
Sustained pressure by open relief valve:	150	bar
ii) Pump delivery rate at minimum pressure and maximum engine speed:	9.4	l/min
iii) Pump delivery rate:	8.0	l/min
Delivery pressure:	135	bar
Hydraulic power:	1.80	kW

Power lift

Dimension of implement linkage for the table on pag. 24



Lifting forces

Lifting height in relation to a horizontal line through the lower link pivoting point, cm			- 20	- 19	- 15	- 10
Lifting force (N) at the pressure at maximum hydraulic horsepower (135 bar) calculated from measurement made at maximum pressure (150 bar)	At the hitch point	max. mech. advantage	—	—	—	8490
		min. mech. advantage	—	8160	8050	7760
	At the standard point	max. mech. advantage	7410	—	7070	6750
		min. mech. advantage	—	—	6570	6370

- 5	0	+ 5	+ 10	+ 15	+ 20	+ 23	+ 25	+ 26	+ 30	+ 35	+ 37
8270	8050	7938	7710	7680	7500	—	7280	—	7060	—	—
7680	7500	7390	7280	7060	6950	6840	—	—	—	—	—

Maximum force exerted throughout whole range 6840 N

6390	6110	5730	5445	5180	4850	—	4460	4410	—	—	—
6140	5780	5520	5230	4990	4760	—	4430	—	4190	3970	3750

Maximum force exerted throughout whole range 4460 N
Force at wich front of tractor is calculated to lift with maximum allowable front ballast 6845 N

Linkage geometry

		Maximum mechanical advantage *	Minimum mechanica advantage
Projected length in side view			
lower links,	mm	700	700
lift arms,	mm	205	205
lift rods,	mm	465	500
top link,	mm	470-670	470-670
Distance of lift rod connection point from pivot point of lower link,	mm	350	350
The following dimensions are given relative to the rear wheel centre line, situated 520 mm above the ground level			
Lower link pivot points	mm	30 behind, 26 below	30 behind, 26 below
Top link pivot point	mm	240 behind, 345-395 above	240 behind, 345-395 above
Lift arm pivot points	mm	35 forward, 377 above	35 forward, 377 above
Maximum and minimum height of lower link hitch points	mm	274 above, 126 below	204 above, 216 below
Height of lower link hitch points when locked in transport position	mm	400 above, —	— —

Bologna, December 1979

TEST ENGINEER

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