COMITATO PER L'OMOLOGAZIONE
DELLE MACCHINE AGRICOLE

No. 682/O.E.C.D.

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

GOLDONI 1040



Manufactured by: GOLDONI S.p.A.
Migliarina di Carpi—MODENA (ITALY)

Date of tests: May 1979—July 1980

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: 5th September 1980

Serial No.: 682

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

GOLDONI 1040 TRACTOR

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Tractor manufacturer:	GOLDONI S.p.A. Migliarina di Carpi (Modena)
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with the agreement of Istituto of Meccanica agraria - University of Bologna
Place of running-in:	GOLDONI S.p.A. workshop, Migliarina di Carpi
Duration of running-in:	80 hrs for engine, 60 hrs for the tractor

SPECIFICATION OF TRACTOR

Tractor

Make:	GOLDONI S.p.A.
Model:	1040
Type:	Wheeled tractor, unit construction, four wheels drive
Serial No:	174966

Engine

Make:	SLANZI S.p.A. - Reggio Emilia
Model:	DVA 1750
Type:	Four-stroke direct injection Diesel
Serial No:	216946
Cylinders:	3, vertical, dry, in line; bore 92 mm, stroke 88 mm, total capacity 1755 cm^3; compression ratio 17.3
Valves:	Overhead
Fuel system:	Forced with diaphragm pump BCD type E 122; FIAAM FNA 168/00 replaceable paper cartridge-type filter; BOSCH, type PFR 3 K 70 A 350/2 injection pump, manufacturer's production setting for injection pump 35-40 mm^3 for stroke at at 3000 rev/min of engine; CIPA CKBEL 75JB 2071 injection nozzles, injection pressure 197 $\pm$ 10 bar; advanced admission: 26° (fly wheel measured); capacity of fuel tank 16 l
Governor:	SLANZI mechanical type with centrifugal weights governed range of engine speeds 1000-3250 rev/min; rated engine speed 3000 rev/min
Air cleaner:	FBN, type 402023 oil filter with cyclone pre-cleaner; oil capacity 0.6 l; flow 3000 l/min

Lubrication system:	SLANZI forced feed from gear-type pump; sieve filter in suction and paper cartridge replaceable filter FIAAM FOL 652-00 at delivery; oil capacity 8.2 l; recommended oil: ESSO TRACTOR LUBE 80 W 90 or another, conforming MIL L 2104 Supp. 1; recommended oil change period 100 hrs; recommended filter change period 100 hrs
Cooling system:	Air forced with 8 blades flywheel axial impeller; flywheel diameter 208 mm; transmission ratio crankshaft-flywheel 1:2.03; flow 1580 m^3/h at 3000 rev/min of engine
Starting system:	Solenoid engaged type BOSCH JF(R), 12 V, 1.47 kW motor; low temperature starting aid: manual operated fuel supplementary ratio device on injection pump, optional: heating plug
Muffler system:	SLANZI DGM-SA 935 motor right side located, lateral discarge
Electrical equipment:	12 V; DUCATI alternator, 0.22 kW; one battery, capacity 92 Ah at 20 hours rating
Transmission	
Clutch:	PITTERI AND VIOLINI F 215; single dry plate type, plate diameter 215 mm; driving both gear box and p.t.o.; pedal operated
Gear box:	Own make, mechanical; sliding gear countershaft change gear with 3 gear and one group gear with 2 forward and 1 reverse gear. Total: 6 forward and 3 reverse speed selected by means of 2 hand levers
Front and rear axles and final transmission:	Own model 1000; differential bevel gear (ratio 1:4.778) and bull gear final drives (ratio 1:3.143). Hand operated differential lock, manual disengaging for front axle, automatic for rear axle. The front and rear axles are constantly mechanically connected
Oil capacities:	Gear box and transmission 8.9 l
Oil change period:	1000 working hrs
Recommended oil qualities:	ESSO GEAR OIL GX80W90 or another conforming MIL L 2104 Supp. 1

Total ratios and speed

Gear	No of engine revolution for one revolution of driving wheels	Theoretical travelling speed for 3000 rev/min rated speed of engine	
		m/s	km/h
1st lower	347.073	0.36	1.28
2nd lower	166.178	0.74	2.68
3rd lower	110.450	1.12	4.03
1st high	64.573	1.92	6.90
2nd high	30.920	4.00	14.41
3rd high	20.543	6.03	21.69
1st reverse	264.449	0.47	1.68
2nd reverse	126.623	0.98	3.52
3rd reverse	84.155	1.47	5.29

Calculated with the tyre rolling circumference of 2474 mm in accordance to tyre manufacturer's specification

Power take-off (Non indipendents)

Main p.t.o.: Located ad the rear median plane of tractor
height above ground 454 mm;
dimensions 34.8x27.9x8.6mm(1.3/8", ISO R 500), 6 splines;
hand lever engaged.

Speeds proportional at engine speed:
two, 577 or 879 rev/min at 3000 rev/min rated engine speed;
2807 or 1843 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 0.16 m;
15.1 p.t.o. rev/min for one revolution of driving wheels.
Direction of rotation, clockwise in forward speeds, anti-clockwise in reverse speed

Accessory p.t.o.: Located under the main p.t.o., central position;
height above ground 374 mm;
dimensions 30x26x6 mm, 6 splines;
hand lever engaged.

Speeds proportional at engine speed:
two, 577 or 879 rev/min at 3000 rev/min rated engine speed;
2807 or 1843 rev/min of engine at p.t.o. 540 rev/min
Direction of rotation, anticlockwise viewed from tractor rear.

Speeds proportionat to travelling speed:
one, one p.t.o. revolution for 0.16 m;
15.1 p.t.o. rev/min for one revolution of driving wheels.
Direction of rotation, anticlockwise in forward speeds, clockwise in reverse speed.

Power lift: Make ERPOZ type 40G;
integral hydraulic system;
draught control hydraulic lift;
one single acting cylindres, 85 mm bore, 119.5 mm stroke;
SALAMI 2PA 5.5/S BF2 VS120 hydraulic gear pump directly driven by engine;
maximum pressure 120 bar;
oil capacity 4.5 l ESSO NUTO H 68
(2 oil tapping for two remote ram optional, non fitted on tractor tested: max amount of oil which may be taken off without damage for the system, 1 l)

Three point linkage: In special non unificated construction (cat 1N - proposal ISO, tab 730 II);
balls of link acc. to ISO I cat.
Lift rods lenght adjustable: 420 or 450 mm;
lift height above ground from 40 to 610 mm

Holed drawbar: Fitted on clevis of lower links;
lenght between the ball joints 735 mm;
thickness of holed bar 25 mm, width 65 mm;
7 holes, diameter 20 mm
Height above ground level adjustable from 40 to 610 mm
Distance of centre hole:
to rear axle centre 660 mm;
to end of main p.t.o. - shaft 500 mm

Hitch: Own make;
height above ground 210 or 290 mm;
adjustable by shifting hitch;
diamster of clevis hole 28 mm;
distance to rear axle centre 395 mm;
distance referred to the main p.t.o. - shaft:
horizontal 50 mm, vertical 2 position, 165 or 245 mm (under)

Steering: Make ORSTA type PG 63; hydrostatic type;
oil supply from hydraulic system of power lift;
handwheel operated steering valve acting one double-acting cylinder on front wheels

Brakes: Own make.
Travelling brakes: hydraulic operated internal shoe type brake acting on 4 brakes drums in the front and rear wheels; pedal operated.
Parking brake: with indipendent mechanic system acting the same brake drums in the rear wheels;
operated by hand lever with ratchet

Drive wheels: 2 at front and 2 at rear: 7.50 R 18, 4 p.r. radial pneumatic; 2 at front are steering
max. permissible masse on each tyre 510 kg at 1.3 bar internal air pressure;
track width 990 or 1100 mm; changeable by turning wheels;
wheelbase 1155 mm

Masses: With full fuel tank, oil; ballast no fitted

No driver			With driver		
on front wheels (kg)	on rear wheels (kg)	total (kg)	on front wheels (kg)	on rear wheels (kg)	total (kg)
770	455	1225	785	515	1300

Seat: Own make;
rigid with rubber cushion;
range of adjustement 20 mm, fore and aft in median plane of tractor;no vertical adjustement

Number of grease points: (whole tractor) 5

Overall dimensions: Lenght 2.68 m (with three points linkage 2.95 m)
Width 1.18 or 1.29 m
Height 1.17 m (to top of steering wheel)
Maximum ground clearance 0.155 m (to hitch in lower position)

Lighting: In accordance with italian standard

	Height above ground of centre cm	Diameter cm	Distance of centre from outside edge of tractor cm
Headlights	71	13.5	46 (1)
Side lights	81	6.0 x 7.0	15 (1)
Rear lights	86	6 x 7	20 (1)
Reflectors	80.5	5.5 x 5	14.5 (1)

(1) With track width of 0.99 m

Fuel and lubricants used in test

Fuel:	Agricultural Diesel oil; density 15°C: 0.825 kg/l cetane number: 69
Engine oil:	ESSO TRACTOR LUBE 80 W 90 viscosity index: 124
Transmission oil:	ESSO GEAR OIL CX 80 W 90 viscosity index: 99
Hydraulic fluid:	ESSO NUTO H 68 viscosity index: 103

COMPULSORY TEST

1) MAIN POWER TAKE-OFF PERFORMANCE

Date and location of test: 21th July 1980 - Experimental Centre of Cadriano - University of Bologna

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

Power	Speed		Fuel consuption		Specific energy
	engine	p.t.o.	hourly	specific	
kW	rev/min	rev/min	l/h	kg/kWh	kWh/l
AT MAXIMUM POWER 2-HOURS TEST					
26.74	3000	577	9.60	0.296	2.79
AT THE SPEED RECOMMENDED BY THE MANUFACTURER FOR DRAWBAR WORK					
26.74	3000	577	9.60	0.296	2.79
PART LOADS AT MAXIMUM POWER					
I) 85% of the torque at maximum power					
23.16	3060	589	7.95	0.283	2.91
II) Unloaded					
—	3140	604	2.85	—	—
III) 50% of the load defined in (I)					
11.71	3090	594	5.10	0.359	2.30
IV) Maximum power					
26.74	3000	577	9.60	0.296	2.79
V) 25% of the load defined in (I)					
5.90	3115	599	4.00	0.559	1.48
VI) 75% of the load defined in (I)					
17.45	3075	591	6.40	0.303	2.73

Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption hourly l/h	Fuel consumption specific kg/kWh	Specific energy kWh/l
PART LOAD AT STANDARD SPEED OF p.t.o.					
I) 85% of the torque at maximum power					
22.13	2840	546	7.37	0.275	3.00
II) Unloaded					
—	2870	552	2.35	—	—
III) 50% of the load defined in (I)					
11.10	2850	548	4.50	0.334	2.47
IV) Maximum power					
25.72	2807	540	9.10	0.292	2.83
V) 25% of the load defined in (I)					
5.56	2855	549	3.20	0.475	1.74
VI) 75% of the load defined in (I)					
16.62	2845	547	5.90	0.293	2.82

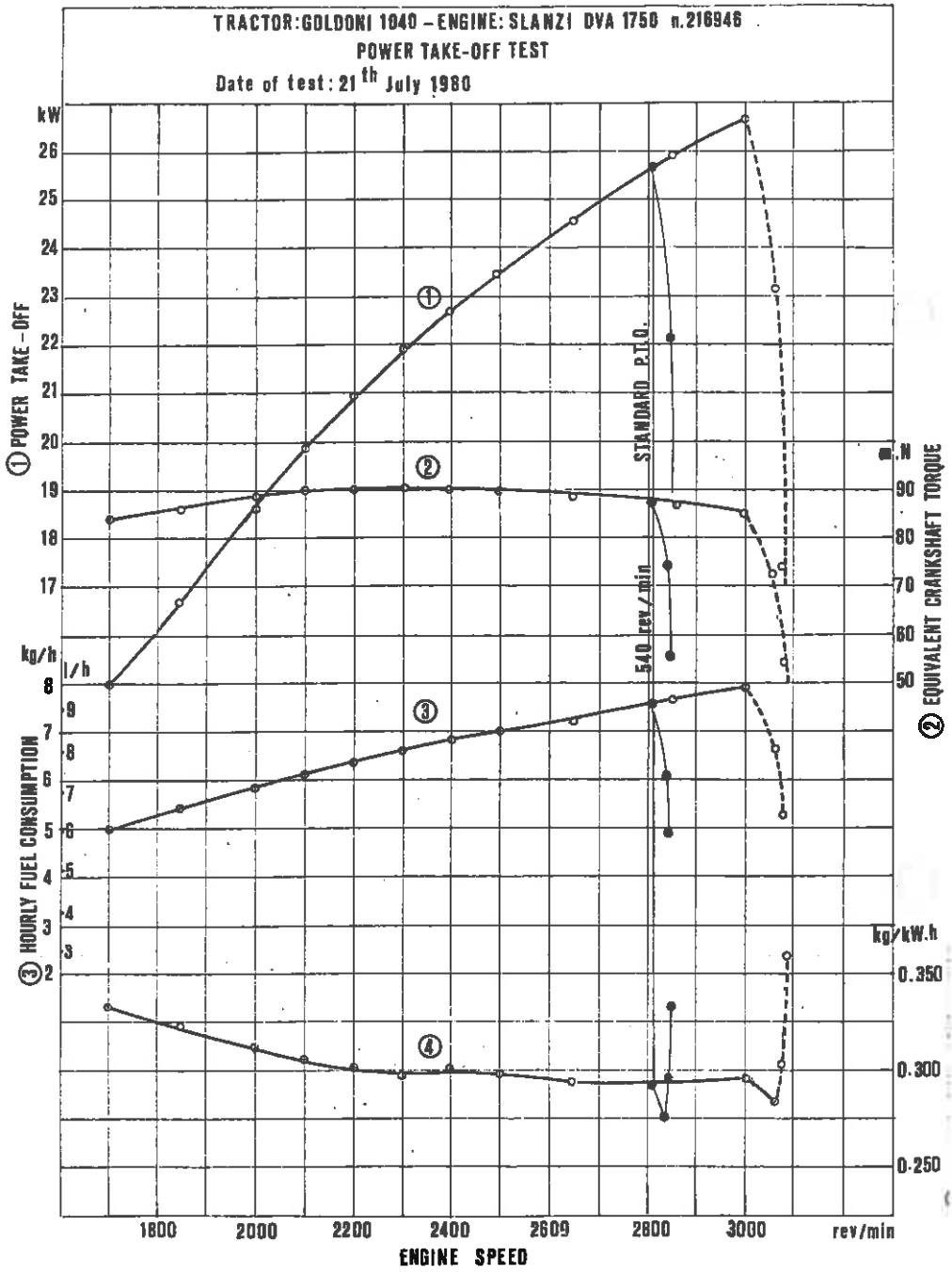
SPECIFIC STANDARD FUEL CONSUMPTION: 0.283 - 0.359 - 0.275 - 0.334 kg/kWh

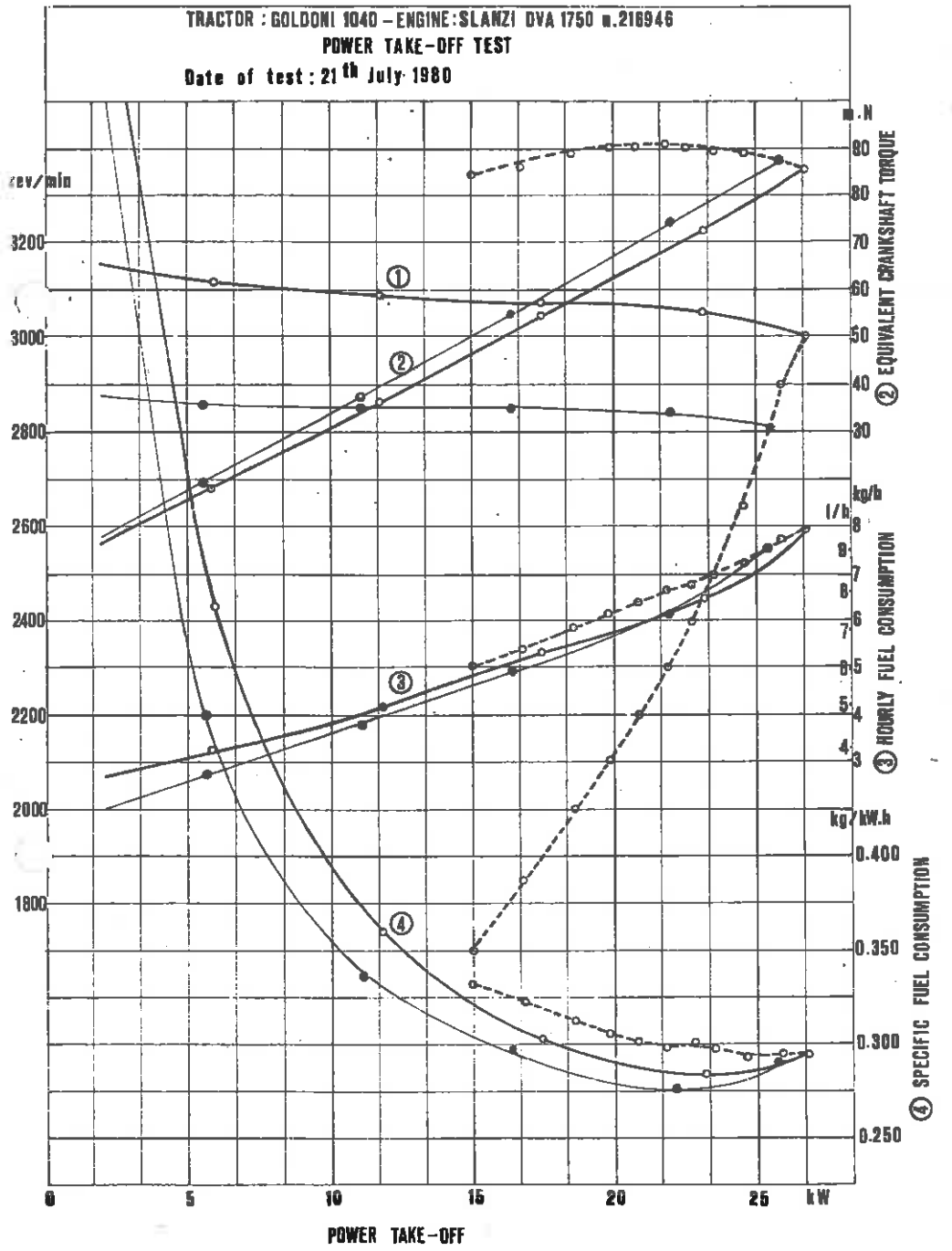
No load maximum engine speed: 3140 rev/min

Equivalent crankshaft torque at maximum power: 85.1 mN

Maximum equivalent crankshaft torque: 91.1 mN at 2300 rev/min of the engine

Mean atmospheric conditions:	temperature	24	°C
	pressure	101.900	Pascal
	relative umidity	45	%
Maximum temperature:	coolant	102	°C
	engine oil	90	°C
	fuel	35	°C


TRACTOR: GOLDONI 1040 – ENGINE: SLANZI DVA 1750 n.216946
POWER TAKE-OFF TEST
Date of test: 21th July 1980
kW
① POWER TAKE-OFF
STANDARD P.T.O.
540 rev/min
m.N
② EQUIVALENT CRANKSHAFT TORQUE
kg/h
l/h
③ HOURLY FUEL CONSUMPTION
kg/kW.h
0.350
0.300
0.250
1800
2000
2200
2400
2600
2800
3000
rev/min
ENGINE SPEED


TRACTOR : GOLDONI 1040 – ENGINE: SLANZI DVA 1750 n.216946
POWER TAKE-OFF TEST
Date of test : 21th July 1980
rev/min
3200
3000
2800
2600
2400
2200
2000
1800
m.N
80
70
60
50
40
30
② EQUIVALENT CRANKSHAFT TORQUE
kg/h
l/h
8
7
6
5
4
3
③ HOURLY FUEL CONSUMPTION
kg/kW.h
0.400
0.350
0.300
0.250
④ SPECIFIC FUEL CONSUMPTION
①
②
③
④
0
5
10
15
20
25
kW
POWER TAKE-OFF

2) DRAWBAR PERFORMANCE

Date of test: 25th - 26th July 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						
1st l	1.17	3.6	11180	3160	14.9	1.13
2nd l	2.39	7.3	11040	3150	15.0	1.84
3rd l	3.61	11.2	11180	3130	14.8	2.25
1st h	6.03	18.7	11180	3070	15.0	2.58
2nd h	13.75	24.3	6350	3010	5.0	2.71
3rd h	21.40	22.6	3800	3000	2.0	2.58
ii) Five hour test at 75% of pull at maximum power (in the 1st h gear)						
1st h	6.78	15.8	8380	3150	6.3	2.62
iii) Five hour test at pull corresponding to 15% wheelslip in test i)						
1st h	6.38	19.8	11180	3070	9.5	2.69

Test iii) was carried out with additional ballast of 150 kg

Oil consumption during ten hours duration of test ii) and iii): 25 g/h

Tyres inflation pressure: 1.3 bar at front and rear

Height of drawbar above ground: 290 mm

Drawbar fuel consumption kg/kWh	Temperatures °C			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature °C	Relative umidity %	Pressure Pa
0.733	28	74	68	27	48	102000
0.449	28	74	70	27	48	102000
0.366	30	78	76	27	50	102000
0.320	30	81	80	28	52	102000
0.304	30	92	82	28	48	102000
0.320	32	92	80	28	47	102000
0.315	30	88	80	28	55	102600
0.306	31	90	84	30	60	102600

3) TURNING SPACE AND TURNING CIRCLE

Details of wheels equipment: Front and rear 7.50 R-18, 4 p.r. pneumatic; track width, 990 mm

	Without brakes *	
	right hand	left hand
Radius of turning space, m	4.20	4.10
Radius of turning circle, m	4.10	4.00

* No "With brakes" test has been carried out since tractor is not previded with steering brakes.

4) LOCATION OF CENTRE OF GRAVITY

- Height above ground	530 mm
- Distance forward from the vertical plane containing the axis of the rear wheels	700 mm
- Distance of the median plane of the tractor to the right hand side	0 mm

5) BRAKING PERFORMANCE

Date of tests: 21th May 1979
Type of track: Concrete
Type of decelerometer: Moto Meter, at maximum, recorder
Mass of tractor: 1300 kg, with driver

A) Foot brake

Cold brakes

Travelling speed	22.7	km/h
Deceleration	9.4	m/s^2
Stopping distance	2.8	m
Force on pedal	600	N
Force on pedal for maximum deceleration of 2.5 m/s^2	80	N

Brake fade characteristics (hot tests)

Deceleration	hot/cold	96 %
Stopping distance	cold/hot	89 %
Force on pedal	hot/cold	95 %

B) Park brake

Tractor facing up slope:
Pull on hand brake 60 N, tractor does not roll

Tractor facing down slope:
Pull on hand brake 60 N, tractor does not roll

6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test:	25th July 1979
Type of track:	Concrete
Type of sound level meter:	Brüel and Kjaer, type 2209

Results of test

Gear	3rd	h
Maximum travelling speed:	22.9	km/h
Travelling speed before acceleration:	17.2	km/h
Sound level:	92.0	dB(A)

7) NOISE AT THE DRIVER'S EAR LEVEL

Date of test:	25th July 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
1st h*	11.180	6.90	6.06	102.8	169.1

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

8) POWER LIFT PERFORMANCE

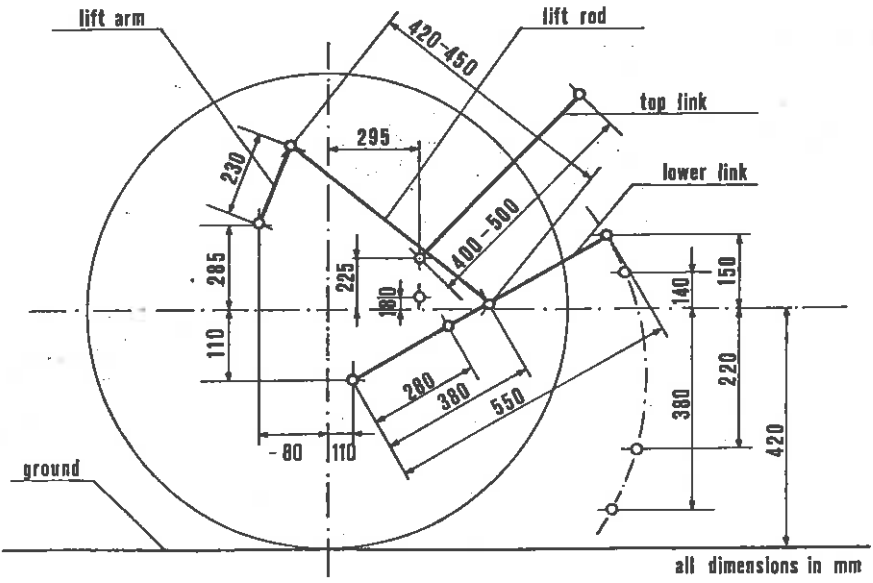
Date and location of test:	22nd July 1980 - Experimental Centre of Cadriano
Hydraulic fluid:	Esso Nuto H 68 - Viscosity index: 103
Type of linkage lok for transport:	Hydraulic
Opening pressure of the cylinder over pressure relief valve:	110 bar

Hydraulic pump

i)	Opening pressure of relief valve:	110	bar
	sustained pressure by open relief valve:	107	bar
ii)	Pump delivery rate ad minimum pressure and maximum engine speed:	12.6	l/min
iii)	Pump delivery rate:	10.8	l/min
	Delivery pressure:	80	bar
	Hydraulic power:	1.44	kW

Power lift

Dimensions of implement linkage for the table on the page 19



Linkage geometry (*)

		Maximum mechanical advantage	Minimum mechanical advantage
Projected lenght in side view			
lower links,	mm	550	550
lift arms,	mm	230	230
lift rods,	mm	420	450
top link, (*)	mm	400–500	400–500
Distance of lift rod connection point from pivot point of lower link	mm	380	280
The following dimensions are given relative to the rear wheel centre line, situated 420 mm above the ground level			
Lower link pivot point	mm	110 behind, 110 below	110 behind, 110 below
Top link pivot point (*)	mm	295 behind 180–225 above	295 behind 180–225 above
Lift arm pivot point	mm	80 behind, 285 above	80 behind, 285 above
Maximum and minimum height of lower link hitch points	mm	150 above, 220 below	140 above, 380 below
Height of lower link hitch points when locked in transport position	mm	150 above	150 above

(*) The standard test frame cannot be fitted because of the special construction of the implement linkage (Cat 1N - Prop. ISO tab. 730/II)

Lifting forces

Lifting heights in relation to a horizontal line through the lower link pivoting point, cm		- 27	- 25	- 20	- 15	- 11	- 10	- 5	0	+ 5	+ 10	+ 15	+ 20	+ 25	+ 26
Lifting force at the hitch points N	max. mech. advantage	—	—	—	—	15180	15100	15100	14800	14800	14780	14980	14980	15050	15050
Values for the pressure at maximum hydraulic horsepower (80 bar), calculated from measurement made at maximum pressure (107 bar)	min. mech. advantage	9680	9720	9750	10150	—	10280	10560	10900	11120	11120	11080	11080	10960	—
	Maximum force exerted throught whole range 9680 N Force ad wich front of tractor is calculated to lift with maximum allowable front ballast 15860 N														

The standard test frame cannot be fitted because of the special construction of the implement linkage (Cat. 1N - Prop. ISO Tab. 730/II)

Bologna, July 1980

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Prof.Ing. E. Manfredi