UNIVERSITÀ DEGLI STUDI DI MILANO
ISTITUTO DI INGEGNERIA AGRARIA

O.E.C.D. No. 719
Printed: 20th October 1982

Report on test in accordance with
O.E.C.D. STANDARD CODE for the
Official Testing of Agricultural Tractors



SAME AGRICULTURAL TRACTOR JAGUAR 95/VDT

Manufactured by: Same Trattori S.p.A. Treviglio (BG) Italy

Date of approval: 2th July 1981

ISTITUTO DI INGEGNERIA AGRARIA DELL'UNIVERSITÀ DI MILANO
Via Celoria, 2 - 20133 MILANO Italy

UNIVERSITÀ DEGLI STUDI DI MILANO
ISTITUTO DI INGEGNERIA AGRARIA

O.E.C.D. No. 719
Printed: 20th October 1982

Report on test in accordance with
O.E.C.D. STANDARD CODE for the
Official Testing of Agricultural Tractors



SAME AGRICULTURAL TRACTOR JAGUAR 95/VDT

Manufactured by: Same Trattori S.p.A. Treviglio (BG) Italy

Date of approval: 2th July 1981

ISTITUTO DI INGEGNERIA AGRARIA DELL'UNIVERSITÀ DI MILANO
Via Celoria, 2 - 20133 MILANO Italy

TABLE OF CONTENTS

	page
Specification of tractor	3 to 10
Fuel and lubrificants used in tests	10
Compulsory tests	
1) Power take-off performance	11 to 14
2) Drawbar performance	15
3) Turning space and turning circle	16
4) Location of centre of gravity	16
5) Braking performance	17
6) Ambient noise	18
7) Noise at the driver's ear level	18
8) Power lift and hydraulic pump performance	19 to 21

Date of tests June 1980 till September 1980

Tractor manufacturer:	Same Trattori S.p.A. - Treviglio (BG) Italy
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by I.I.A.
Place of running in:	Treviglio
Duration of running-in:	50 Hours

SPECIFICATION OF TRACTOR

Tractor

Make:	Same Trattori S.p.A.
Model:	Jaguar 95/VDT
Type:	wheel tractor, unit construction, all-wheel driven.
Serial No.:	1007

Engine

Make:	Same Trattori S.p.A.
Model:	1055 P
Type:	4-stroke Diesel-engine, direct injetion, air cooled
Serial No.:	3395
Cylinders:	5, vertical in line, bore 105 mm, stroke 120 mm., capacity 5193 cm^3; compression ratio 17:1, without liners.
Valves:	Overhead
Fuel system:	AC Corona fuel feed pump, two Bosch distributor injecting pumps PFR 3 K 80 A 392/2 (3 pumping elements) and PFR 2K 80A 337 (2 pumping elements), manufacturer's production setting 60 mm^3/stroke at rated engine speed, injection timing 24° before TDC, Bosch multihole injection nozzles DLLA 160 S 225 injection pressure 196 bar, FIAMM FNA 160/00 paper element filter with replaceable cartridge capacity of fuel tank 120 l.
Governor:	Own make centrifugal variable speed governor, governed range of engine speed: from 650 to 2370 rev/min, rated engine speed: 2200 rev/min.

Air cleaner:	Donaldson dry paper element filter, without precleaner
Exhaust silencer:	Own make 4 chambres reflection absorption type, 935 mm long, 194 mm width, on the right hand side of engine cowling, mouth showing upward.
Lubrification system:	Forced from gear pump, FIAMM FT-4813-IN oil filter in full flow with replaceable paper cartridge, change period 250 hours, recommended oil: Agip FI Diesel Gamma SAE 20 W/20 MIL-L-46152, oil capacity 13.3 l, change period 125 hours.
Cooling system:	Air cooling with axial blower, V-belt driven fan dia 277.8 mm, 3340 m^3/h delivery rated engine speed.
Starting system:	electrical, Bosch screw push starter motor JD 12 V, 3 KW
Eletrical system:	12 V, negative earth, Bosch 3-phase alternator KI, 14 V, 55 A 1 battery Marelli lead acid type 6 ATP 21, capacity 110 Ah at 20 hours rating.

Trasmission

Clutch:	Own make 320 mm dia, single plate dry clutch, pedale operated for travel drive only.
Gearbox:	Own make synchromesch speed change gear with 4 speeds foreward and 1 speed reverse group gear with 3 groups: slow, normal and fast, total 12 speeds forward and 3 speeds reverse.
Rear axle and final drive:	Bevel gear drive with crown wheel and pinion. Bevel gear differential with lock, pedal operated, self disengaging, epicyclic final.
Driven front axle:	Own make driven by shaft situated in tractor's median plane, engageable and disengageable by slading gear, not in motion hand lever operated bevel gear drive with crown wheel and pinion bevel gear type differential without lock, epicyclic final drive.

Oil capacity: Gearbox in common with rear axle final drive: 72.5 l
front axle differential: 12 l
front axle final drive: 5.4 l

Oil change period: Gearbox rear and front drive 3000 hours.

Reccommended oil: Gearbox rear and front drive: AGIP FI ROTRA MP/S SAE 80 W API CC GL-5

Total ratio and speed (Tyres 18.4-34)

Group	Gear	Number of engine revolutions for one revolution wheel	(*) Nominal travelling speed for rated of engine Km/h
Forwards speeds			
slow	1	385.802	1.65
	2	276.021	2.31
	3	213.694	2.99
	4	171.527	3.72
normal	1	135.552	4.56
	2	96.980	6.37
	3	75.082	8.23
	4	60.266	10.25
fast	1	47.626	12.97
	2	34.074	18.13
	3	26.380	23.42
	4	21.175	29.18
Reverse speeds			
slow	R	240.405	2.57
normal	R	84.467	7.31
fast	R	29.677	20.82

(*) Calculated with the index-radius 770 mm as per ETRTO NORM

Power take-off:

Indipendent p.t.o, at rear of tractor, in tractor's median plane engaged and disengaged through and lever hydraulically operated wet multidisc clutch 150 standard 500 - 1979, 800 mm above ground - 34.9 mm dia, 6 splines SAE 6 B standard, 1 p.t.o. shaft for 540 rev/min and 1000 rev/min p.t.o. speeds.
540 rev/min p.t.o.
607 rev/min at rated engine speed, standard p.t.o. speed at 1957 rev/min engine
1000 rev/min p.t.o.
1035 rev/min at rated engine speed, standard p.t.o. speed at 2125 rev/min engine. Direction of rotation clockwise viewed from driving end.

Power lift:

Own make, Hydraulic rotary piston pump driven from engine shaft, indipendent of clutch, metallic net oil filter delivery 35 l/min at rated engine speed, Same control valve for lifting, lowering, draft control, position control and floating position, maximum working pressure 186 bar, cylinder in power lift unit with 120 mm bore, 150 mm stroke, 1 relief valve on delivery circuit, opening pressure 176 bar
1 relief valve antishock in the cylinder's head, opening pressure 186 br
reccomended oil: AGIP F1 ROTRA MP/S
SAE 80 W API CC G1-5
Oil capacity: 20 l
Oil change period: 3000 hours

Additional oil tep:

1 ancillary double effect four-way distributor on the cover cap of power lift, 35 l/min delivery, amount of oil which can be taken out without provoking damage 8 ÷ 10 C.

Implement linkage:

Three point linkage category II, 2 holes in the lower links for fitting the lift rods:
hole 1 at 415 mm
hole 2 at 450 mm distance of pivot point of lower links.

Holed bar:	Optional, fitted on clevis of lower links, lenght between the joint balls 965 mm., width 80 mm, thickness 30 mm, 7 holes, hole centre line with lower links horizontal position: from rear axle: 1030 mm from p.t.o. shaft end: 530 mm behind 230 mm below
Trailer hitch:	Own make height above ground adjustable by shifting from 510 mm to 760 mm hitch hole 30 mm, distance of hitch hole centre to rear axle centre 670 mm., permissible vertical load 1500 Kg.
Swinging drawbar:	Height above ground 550 mm hitch hole dia 33 mm distance of hitch hole centre: from p.t.o. shaft end 250 mm below, 320 mm behind from rear axle 820 mm lateral adjustement 250 mm pivot point 40 mm foreward rear axle
Steering:	Danfoss hydrostatic steering model OSPB 100, own oil circuit Bosch hydraulic gear pump HY/ZFR 1/8 CL 101, delivery 17.6 l/min at rated engine speed, driven from engine shaft 1 ram acting directly on front axle, bore 48 mm, stroke 190 mm oil capacity 2 l specified oil AGIP F 1 ATF Dextron, oil change period 1000 hours.

Brakes

Parking brake:	Brand brake mechanical hand lever acting on front wheel drive propeller shaft.
Service brake:	Hydraulically acting oil single oil bath disc type brake, disc dia 302 mm, mounted on rear differential half shafts, pedal operated, indipendently or together.

Wheels

Steering wheels:	2 at front 16.9-24 radial tyre, 6 ply rating maximum permissible weight on each tyre 1725 Kg at 1.3 bar track width: 1700-1720-1820-1880-1980 mm changed by turning wheels.

Driving wheels:	At front and at rear, specification of driving front wheels (see at steering wheels) driving rear wheels: 2.18.4-34, radial tyre, 6 ply rating, maximum permisible weight on each tyre 2250 Kg at 1.1 bar, track width: 1630-1730-1830-1930-2030-2130 mm, changed by turning wheels. Rim size: W 14x34".
Wheelbase:	2530 mm
Cab:	Own Make, safety cab model C 20 OECD tested approval No. CSD 0138/4 - a (C) lower structure is made by welded square tubes 50x50x3 mm, stiffened with sheet steel 1.5 mm fastenend to the tractor frame trough four rubber shock absorbers constraint assured by two U bentplates, by two shaped flanges and by bolts upper structure mase by square tubes 50x50x3 mm stiffened at the corners with steel plates, welded to two steel plates fixed to the lower structure with bolts M 14x1.5 all windws tiltable, inside of cab covered with noise damping material, doors on both sides of the cab, each entry with two steps, lower step 530 mm upper step 760 mm above ground, heater and ventilator Borletti T 3.
Seat:	Grammer upholstered seat with back rest, adjustable spring with shock absorber height of unloaded seat above platform from 500 mm to 600 mm, fore-and-aft adjustable about 150 mm.
Number of grease points:	20
Track setting during tests:	front axle 1820 mm, rear axle 1830 mm.
Overall dimensions:	total lenghts 4210 mm with ballast 4210 mm without ballast total width 2530 mm max 2030 mm min total height 2800 mm to top of the cab. ground clearance 470 mm below swinging drawbar pivot.

Weights
tractor without driver but with full tanksand safety cab

without ballast:	**front 1410 Kg.** **rear 2380 Kg.** **total 3790 Kg.**
with ballast:	**front 1610 Kg.** **rear 2580 Kg.** **total 4190 Kg.**
ballast:	**front 4, total weight 200 Kg.** **rear 4, total weight 200 Kg.**

Lighting

Lighting system in accordance with CEE 78/933

	Height above ground of centre mm	Dimensions mm	Distance from outside edge of tractor to centre mm
Head lights	1110	115x115	1040
Side lights	1740	180x60	350
Red tail l.	1740	90x60	460
Reflectors	1370	Ø 55	540

Fuel and lubricants used in tests

laboratory and track tests

fuel: Diesel fuel specific gravity at 15° C 0,825 Kg/dm³ at p.t.o. test, 0,829 Kg/dm³ at drawbar test.
Cetane No. 48

engine oil: Agip F1 Diesel Gamma SAE 20 W/40 MIL-L-46152

Transmission and rear axle, front axle differential and power lift: Agip F1 Rotra MP/S SAE 80 W API CC GL-5

Steering: Agip ATF Dextron

COMPULSORY TESTS

1) POWER TAKE-OFF PERMORMANCE (1000 rev/min)

Date and locations of tests: 25th June 1980 - Treviglio
type of dynamometer: Borghi e Saveri magnetoelectric dynamometer

Power KW	Speed		Fuel consumption		Specific Energy KWh/l
	Engine rev/min	p.t.o. rev/min	hourly l/h	specific Kg/KWh	
MAXIMUM POWER - 2 hours test -					
67.32	2200	1035	19.371	238	3.47
THE SPEED RECOMMENDED BY THE MANUFACTURER FOR DRAWBAR WORK					
67.32	2200	1035	19.371	238	3.47
PART LOADS - MAXIMUM POWER					
(i) 85% of torque obtained at maximum power					
58.88	2264	1065	17.023	239	3.46
(ii) unloaded					
–	2372	1116	5.372	–	–
(iii) half the load defined in (i)					
30.16	2319	1091	8.868	294	2.82
(iv) a load corresponding to maximum power					
67.32	2200	1035	19.371	238	3.47
(v) one quarter of the load defined in (i)					
15.26	2347	1104	7.767	421	1.96
(vi) three quarters of the load defined in (i)					
44.83	2298	1081	13.848	256	3.24

Power KW	Speed		Fuel consumption		Specific Energy KWh/l
	Engine rev/min	p.t.o. rev/min	hourly l/h	specific Kg/KWh	
PART LOADS - STANDARD SPEED OF THE P.T.O.					
(i) 85% of torque obtained at maximum power					
58.03	2168	1020	13.856	239	3.47
(ii) unloaded					
–	2291	1078	4.896	–	–
(iii) half the load defined in (i)					
29.81	2228	1048	8.710	292	2.83
(iv) a load corresponding to maximum power					
66.93	2126	1000	19.060	236	3.51
(v) one quarter of the load defined in (i)					
15.12	2259	1063	7.536	413	2.01
(vi) three quarters of the load defined in (i)					
44.12	2198	1034	13.487	253	3.27

STANDARD SPECIFIC FUEL CONSUMPTION: 239-249-239-292 g/Kwh

No load maximum engine speed: 2372 rev/min

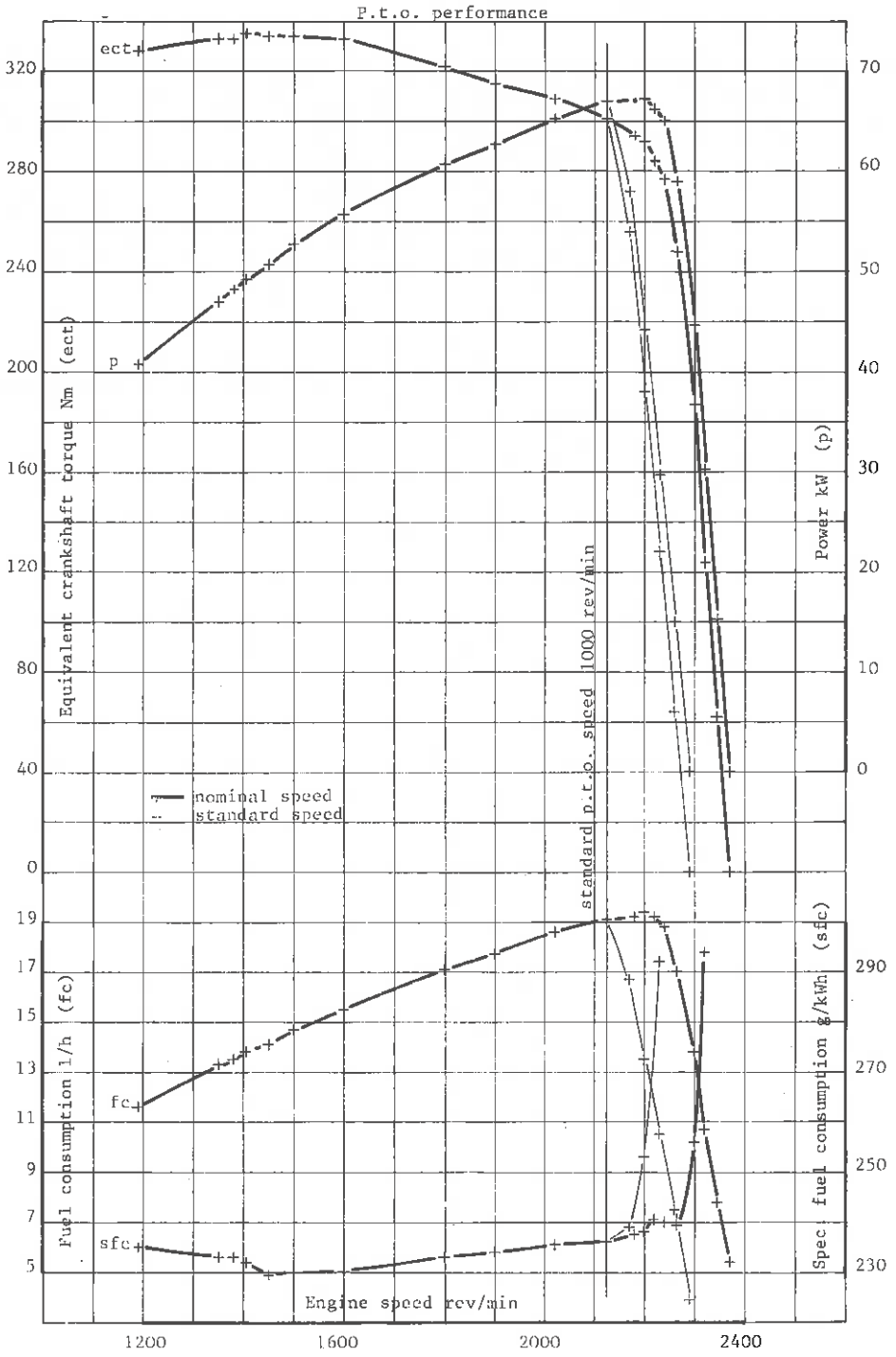
Torque (°) at maximum power: 292.24 Nm

Maximum torque (°): 334.73 Nm a 1403 rev/min of the engine

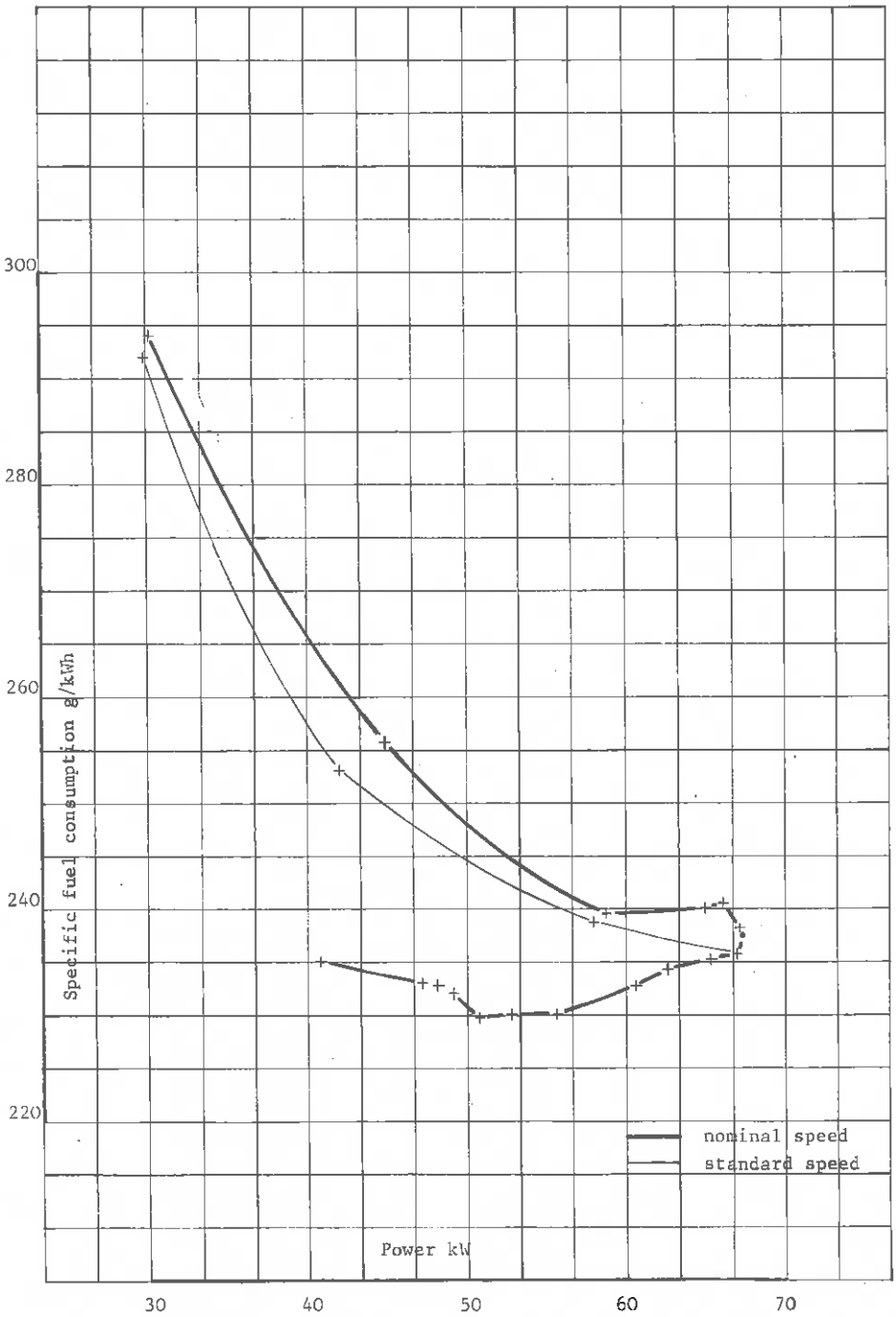
Mean atmospheric conditions: temperature:18° C
pressure: 997 mbar
relative humidity 65%

Maximum temperatures: coolant:
engine oil: 102° C
fuel: 20° C
engine air intake: 20° C

(°) the torque is the equivalent crankshat torque


P.t.o. performance
ect
p
nominal speed
standard speed
standard p.t.o. speed 1000 rev/min
Equivalent crankshaft torque Nm (ect)
Power kW (p)
Fuel consumption l/h (fc)
Spec. fuel consumption g/kWh (sfc)
fc
sfc
Engine speed rev/min
320
280
240
200
160
120
80
40
0
70
60
50
40
30
20
10
0
19
17
15
13
11
9
7
5
290
270
250
230
1200
1600
2000
2400

P.t.o. performance



(2) DRAWBAR PERFORMANCE

Date of tests: 30th June till 17th July 1980

type of track: concrete

Height of drawbar above ground: for both test series: 700 mm.

tyre inflation pressure for both test serie: front 1.3 bar.
rear 1.1 bar

Gear	Speed Km/h	Power KW	Drawbar pull daN	Engine speed rev/min	Slip of wheels %	Specific anel consump. g/KWh	Specific energy KWh/l	Temperatures			Atmospheric cond.		
								fuel °C	coolant °C	engine oil °C	Temperat. °C	relative humid %	pressure mbar
1st slow	1,50	16,02	3840	2342	15.0	518	1.60	24	–	80	22	68	1011
2nd slow	2,09	22,09	3800	2324	15.0	437	1.90	22	–	81	22	68	1011
3rd slow	2,62	27,98	3840	2307	15.0	396	2.10	25	–	82	23	69	1011
4th slow	3,20	33,65	3780	2269	15.0	375	2.21	25	–	82	23	69	1011
1st normal	4,00	41,19	3710	2279	15.0	334	2.49	24	–	82	22	68	1011
2nd normal	5,60	51,87	3330	2243	14.1	316	2.63	24	–	82	22	68	1011
3rd normal	7,68	54,81	2570	2232	8,6	295	2.82	25	–	82	22	68	1011
4th normal	9,81	55,58	2040	2225	5.5	288	2.89	25	–	82	23	69	1011
1st fast	12,65	56,86	1620	2224	4.5	281	2.96	25	–	82	22	68	1011
2nd fast	17,87	54,52	1100	2207	2.3	294	2.82	25	–	82	22	68	1011
(ii) FIVE HOUR TEST at 75% of pull at maximum power in 2nd normal gear													
2nd normal	6,10	42,37	2500	2270	7.6	318	2.61	27	–	89	24	77	1011
(iii) FIVE HOUR TEST at pull corresponding to 15% wheel slip in test (i)													
1st normal	4,15	44,31	3840	2270	–	–	–	26	–	90	23	72	1011
(iv) MAXIMUM POWER (without ballast)													
1st slow	1,50	14,10	3380	2346	15.0	542	1.53	25	–	83	24	77	1011
2nd slow	2,08	19,72	3410	2328	15.0	459	1.81	25	–	83	24	77	1011
3rd slow	2,65	25,41	3450	2313	15.0	404	2.06	26	–	83	25	77	1011
4th slow	3,31	31,74	3450	2301	15.0	368	2.26	26	–	83	26	71	1011
1st normal	4,03	37,43	3340	2281	15.0	358	2.32	27	–	83	25	77	1011
2nd normal	5,48	51,35	3370	2239	15.0	318	2.61	27	–	83	26	71	1011
3rd normal	7,60	55,94	2650	2228	8.6	278	2.99	27	–	83	25	77	1011
4th normal	9,96	58,33	2110	2211	5.6	276	2.94	27	–	83	26	71	1011
1st fast	12,58	58,94	1690	2205	3.4	273	3.04	27	–	83	26	71	1011
2nd fast	17,69	57,34	1170	2210	2.3	281	2.96	27	–	83	26	71	1011

Total oil consumption during ten hours duration of tests (ii) and (iii): 96 g/h

Test (iii) was carried out with additional ballast, the figures not quoted are therefore irrilevant

(3) TURNING PACE AND TURNING CIRCLE

Details of wheel equipment: front 16.9-24 6 ply rating
rear 18.4-34 6 ply rating

Track - front: 1820 mm

rear: 1830 mm front axle engaged

	With brakes		Without brakes	
	right-hand m	left-hand m	right-hand m	left-hand m
Radius of turning space	4.70	4.70	5.56	5.50
Radius of turning circle	4.50	4.46	5.53	5.30

(4) LOCATION OF CENTRE OF GRAVITY

	mm
Height above ground	1002
Distance forward from the vertical plane containing the axis of the rear wheels	956
Distance from the median plane	0

(5) BRAKING

Date of tests: 3 rd July 1980
Type of track: concrete
Type of decelerometer: Motometer
Mass of ballasted tractor: 4260 Kg.

Cold brakes:

	Ballasted	Without Ballast
Travelling speed of the tractor Km/h	25.0	25.0
(i) Deceleration m/s²	3.4	3.5
(ii) Stopping distance m	7.4	7.5
(iii) Force exerted on the brake pedal daN	59	54
(iv) Force exerdet on the brake pedal to achieve a deceleration of 2.5 m/s² daN	29	29

Brake Fade Characteristics (hot tests):

	Ballasted	Without Ballast
Deceleration, hot/deceleration, cold x 100	93	97
Stopping distance, cold/stopping distance, hot x 100	90	96
Force on pedal, cold/force on pedal, hot x 100	98	100

Parking brake:

Tractor facing up 16% slope: tractor does not roll
down 16% slope: tractor does not roll
Pull on handbrake: 29 daN

(6) MEASUREMENT OF AMBIENT NOISE:

Date of tests: 2nd July 1980
Type of sound level meter: Brüel & Kiær 2209-1613
Typer of track: concrete
Results of tests:

Gear: 4th fast
Travelling speed before acceleration: 21.88 Km/h
Sound level: 87 dB (A)

(7)(°) NOISE MEASUREMENT AT THE DRIVER'S EAR LEVEL

Date of tests: June 1979
Type of sound level meter and octave filter: Brüel & Kiær 2209-1613
Type of track: concrete
Type of frequency analyser: Brüel & Kjær 1613
Tractor fitted with Same C 20 safety cab.

Results of tests:

Gear	Travelling speed (x) Km/h	dB (A)
3th normal	7.7	86
4th fast	27.3	85.5

(°) Data taken from O.E.C.D. test report No. CSD 0138/4-a (C)
(x) the first gear tested corresponds to the nominal travelling speed nearest to 7.5 km/h.

(8) POWER LIFT AND HYDRAULIC PUMP PERFORMACE

Date and location of tests: 23rd september 1980 - Treviglio

Hydraulic fluid

Make and type:	AGIP F 1 ROTRA MP/S
Viscosity:	80
Viscosity index:	SAE

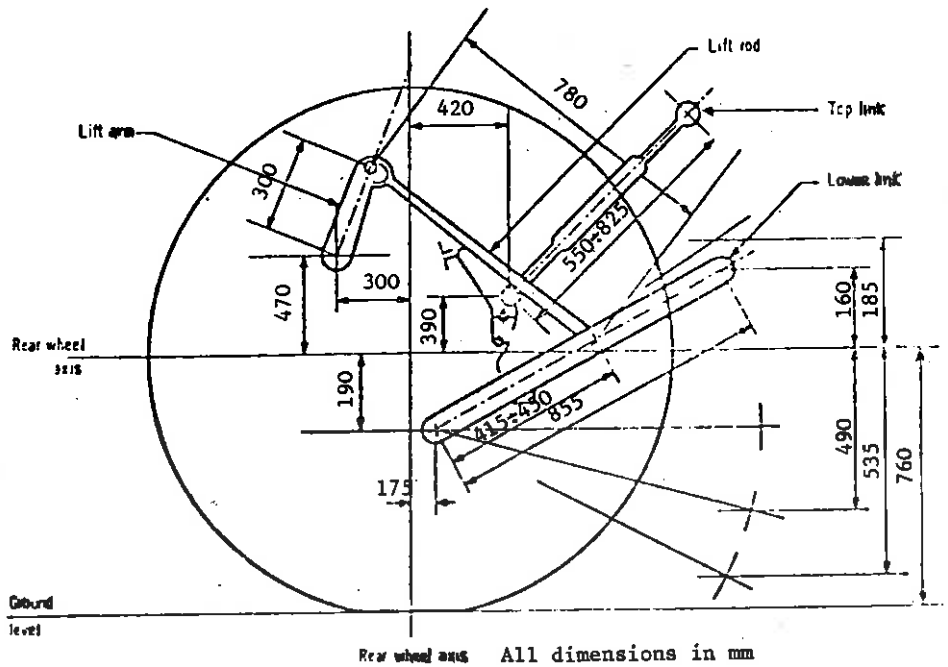
Cylinder over pressure relief valve, openingpressure: 186 bar

Pump characteristics:

(i) Opening pressure of the relief valve: 176 bar
sustained pressure by the open relief valve: 186 bar
(ii) Pump delivery rate at minimum pressure and rated engine speed: 38 l/min
(iii) pump delivery rate at maximum hydraulic power: 37.5 l/min
corresponding delivery pressure: 172 bar
power: 10.73 KW

Power lift

Dimension of linkage geometry for the table on pag. 21.



Linkage geometry when connected to the standard frame

		Maximum mechanical advantage		Minimum mechanical advantage	
Projected leghts in side view					
lower links	mm	855		855	
lift arms	mm	300		300	
lift rods	mm	780		780	
top link	mm	550÷825		550÷825	
Distance of lift rod connection point from pivot point of lower link	mm	450		415	
The following dimensions are given relative to the rear wheel centre line, situated 760 mm above the ground level:					
Lower link pivot point		175 mm behind,	190 mm below	175 mm behind,	190 mm below
Top link pivot point		420 mm behind,	390 mm above	400 mm behind,	390 mm above
Lift arm pivot point		300 mm forward,	470 mm above	300 mm forward,	470 mm above
Mawimum and minimum height of lower link hitch points		160 mm above	490 mm below	185 mm above	535 mm below
Height of lower link hitch points when locked in transport position		160 mm above,	—	185 mm above	—

Lifting heights in relation to a horizontal line throught the lower link pivoting point

		mm	-300	-250	-200	-170	-150	-100	-50	0	+50	+100	+150	+200	+250	+300	+320	+350
Lifting force with the pressure at maximum hydraulic power 172 bar calculated from measurement made at the max. presure 186 bar.	AT THE HITCH POINTS daN	Max. mech. advantage	3070	3270	3440	–	3730	3920	3970	4000	4140	4410	4510	4590	4600	4370	–	1570
		Min. mech. advantage	2920	3050	3210	–	3390	3480	3630	3790	3900	3980	4070	4120	4190	4220	–	1960
		Maximum force exerted throughout whole range 1570/1960 daN Force at wich front of tractor is calculated to lift with maximum allowable front ballast 3955 daN																
	ON THE FRAME daN	Max. mech. advantage	–	–	–	4530	4460	4290	4170	4080	4040	4020	3970	3920	3820	–	–	–
		Min. mech. advanage	–	–	–	4140	4120	4040	4020	4000	3940	3850	3780	3750	3130	2250	1470	–
		Maximum force exrted throughout whole range 3820/1470 daN Force at which front of tractor is calculated to lift with maximum allowable front ballast 2480 daN																

TEST OFFICIER

(Sergio Mancastroppa) (Luigi Viola) (Claudio Trolli)

HEAD OF I.I.A.
(Ettore Gasparetto)

OFFICIER IN CHARGE
(Pierluigi Febo)