ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

O.E.C.D. no.1134

Test in accordance with O.E.C.D. Standard Code for the official testing of agricultural tractors



Report on test of: HURLIMANN 478 VDT "4WD"

Submitted for test by: S+L+H S.p.A
V.le Cassani, 15
24047 Treviglio (BG)

Date of O.E.C.D. approval: 26.02.1988

Period of test: Nov. - Dec. 1987

I.S.M.A. - TREVIGLI(
Via Milano, 43

Test no.040

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Test no.040

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All stated dimensions and tests referred to tyre size 14.9/24 (6 ply) at front and 16.9/34 (6 ply) at rear, as well as to track widths 1620 mm at front and 1600 mm at rear.

- Tractor manufacturer
  . Name : S + L + H S.p.A.
  . Address: V.le Cassani, 15 - 24047 TREVIGLIO (BG) - ITALY
- Location of tractor assembly: TREVIGLIO (BG) - ITALY;
- Submitted for test by: the manufacturer;
- Selected by: the manufacturer with the agreement of ISMA;
- Place of running in: TREVIGLIO (BG) - ITALY;
- Duration of running in: 50 hours.
- Location of test: I.S.M.A. - Via Milano, 43 - Treviglio (Bg) - ITALY

I - SPECIFICATION OF TRACTOR

TRACTOR

- Make: Hürliman;
- Model: 478 VDT;
- Type: wheeled tractor, unit constr.,all wheels drive tractor
- Number of driving wheels: 4;
- Serial number: 10093;
- First serial number: 10001.

ENGINE

- Make: S + L + H;
- Model: H1000.4 W1;
- Type : watercooled 4 stroke diesel engine direct injection;
- Serial number: 3294.

Cylinders

- Number/disposition: 4 vertical in line;
- Bore/stroke: 105*115.5 mm;
- Capacity: 4000 cm^3;
- Compression ratio: 17.1/1;
- Arrangement of valves: overhead;
- Cylinder liners: wet liners.

Supercharging: none.

Fuel system

- Fuel feed system: AC corone fuel feed pump;
- Make, model and type of fuel filter: FIAMM Fna 160;
- Capacity of fuel tank: 100 dm^3;
- Make, model and type of injection pump: BOSCH PFR 1K 90A 503, immersed pump, one per cylinder, without serial number, in line injection pump;
- Manufacturer's production setting of injection pump:
  . flow rate: 54 ± 2 mm^3/stroke at rated speed and full load corresponding to 16.48 dm^3/h;
  . timing: 18 ± 0.5° before TDC;
- Make, model and type of injectors: BOSCH DLLA 150 S 925 multihole injection nozzles;
- Injection pressure: 18 ± 1.5 MPa.

Governor

- Make: own make;
- Model: 089.1652.4;
- Type: mechanical variable speed;
- Governor range of engine speed: from 700 to 2709 rev/min;
- Rated engine speed: 2500 rev/min.

Air Cleaner

- Main filter
  . make: DONALDSON;
  . model: 08-11242;
  . type: dry paper element filter;
  . location: front of engine;
- Maintenance indicator: with the warning lamp on the dashboard.

Lubrication system

- Type of feed pump: forced feed from gear pump;
- Total oil capacity including filter: 9.2 dm^3;
- Oil change period: 150 hrs;
- Type of filter: FIAMM FT 4803 IN;
- Number: 1;
- Filter change period: 300 hrs;
- Oil specifications (see page 19).

Cooling system

- Type and detail: water cooling with impeller pump, overpressure valve set to 40 kPa;
- Specification of fan: propeller fan driven by engine shaft;
- Number of fan blades: 4;
- Fan diameter: 400 mm;
- Coolant capacity: 11 dm^3;
- Type of temperature control: thermostat.

Starting system

- Make: BOSCH;
- Model: JF 12 V;
- Type: electromagnetic engagement;
- Starter motor power rating: 3 kW;
- Safety device: preventing engine from starting in gear;
- Starting system for low temperatures: thermostarter (optional).

Electrical equipement

- Voltage: 12 V;
- Generator
  . make: BOSCH;
  . model: K1 14 V 55 A 20;
  . type: alternator;
  . power: 770 W;
- Battery: 1 lead acid;
  . capacity: 110 Ah at 20 hours.

Exhaust system

- Make: S+L+H;
- Model: 255.5630.2;
- Type: 4 chambers reflection absorption;
- Location: on the left hand side of engine cowling, vertical position;
- Height of outlet above ground: 2850 mm.

TRANSMISSION

Clutch: utilized only for travelling of tractor

- Make: own make;
- Model: 449.23;
- Type: single disk dry clutch;
- Number of plates: 1;
- Plates diameter: 280 mm;
- Control system: hydraulically operated by pedal self readjusting.

Gear box

- Make: own make;
- Model: 449.31;
- Type: mechanical syncromesh speed change gear;
- Arrangement: five speeds forward, with four ranges of speed and one reverse group;
- Number of speeds.: 20 forward and 20 reverse;
- Available options: 24 forward and 12 reverse or
  16 forward and 16 reverse or
  15 forward and 15 reverse.

Rear axle and final drives

- Make: own make;
- Model: 449.44;
- Type: bevel gear differential and epicyclic final drives.

Differential lock

- Make: own make;
- Model: 449.46;
- Type: mechanical;
- Control system: engaged or disengaged by pedal.

Front axle and final drives

- Make: own make;
- Model: 449.43;
- Type: original S+L+H system with central shaft, bevel gear drive, differential and epicyclic final drives;

Differential lock

- Make: own make;
- Model: 449.35;
- Type: mechanical;
- Control system: engaged or disengaged by pedal.

Transmission lubrication

- Gear box, rear axle, final drives, power lift and hydraulic system (in common)
  . total capacity including filter: 52 dm^3;
  . change period: 1200 hrs;
  . filter change period: 2400 hrs or when the filter clogging warning lamp is lighted;

- Front axle and final drives
  . total capacity: 9 dm^3;
  . change period: 1200 hrs;
- Recommended oil: see page 19.

Total ratios and speeds

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at a rated engine speed of 2500 rev/min (*) (km/h)
	FORWARD		
1	R	1749.45	0.40
2	R	1180.88	0.59
3	R	887.59	0.79
4	R	672.99	1.04
1	S	622.02	1.12
5	R	506.94	1.38
2	S	419.86	1.67
3	S	315.58	2.22
4	S	239.23	2.93
1	N	195.30	3.59
5	S	180.24	3.89
2	N	131.83	5.32
3	N	99.08	7.08
4	N	75.11	9.34
1	F	64.50	10.88
5	N	56.59	12.40
2	F	43.54	16.12
3	F	32.72	21.45
4	F	24.80	28.30
5	F	18.68	37.58

(*) Calculated with a tyre dynamic radius index of 745 mm.
(ISO 4251/1 - 1984).

Total ratios and speeds

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at a rated engine speed of 2500 rev/min (*) (km/h)
	REVERSE		
1	R	1679.84	0.41
2	R	1133.89	0.61
3	R	852.26	0.82
4	R	646.09	1.08
1	S	597.27	1.17
5	R	486.77	1.44
2	S	403.15	1.74
3	S	303.02	2.31
4	S	229.71	3.05
1	N	187.52	3.74
5	S	173.06	4.05
2	N	126.58	5.54
3	N	95.14	7.37
4	N	72.12	9.73
1	F	61.93	11.33
5	N	54.34	12.91
2	F	41.80	16.78
3	F	31.42	22.33
4	F	23.81	29.47
5	F	17.94	39.12

(*) Calculated with a tyre dynamic radius index of 745 mm. (ISO 4251/1 - 1984).
- Number of revolutions of front wheels for one revolution of rear wheels: 1.26.

POWER TAKE-OFF

Power take-off proportional to engine speed

- Type: independent, at rear of tractor, in tractor's median plane, engaged or disengaged by hand lever. Driven by multiplate wet clutch independent of travel clutch; ISO Standard 500-1979.
- Number of shafts: 1;
- Method of changing power take-off shaft ends and speeds: it is possible, through 6 screws, to mount one PTO shaft end at 6 or 21 splines. Speed selection by external hand lever;
- Location:at rear of tractor;
- Height above ground (with tyre size 16.9/34) : 760 mm;
- Distance from the median plane of the tractor: 0 mm;
- Distance behind rear axle .....: 380 mm;
- Direction of rotation (viewed facing driving end): clockwise.

1) **540 rev/min**

- Dimensions: ISO Standard 500-1979, type 1 (35 mm, 6 splines)
- PTO speed at rated engine speed .....: 614 rev/min;
- Engine speed at standard power take-off speed: 2198 rev/min;
- Ratio of rotation speeds (engine speed/p.t.o. speed): 4.071;
- Maximum power and torque transmissible: 95 kW and 1445 Nm.

2) 1000 rev/min

- Dimensions: ISO Standard 500-1979, type 2 (35 mm, 21 splines);
- PTO speed at rated engine speed .....: 1020 rev/min;
- Engine speed at standard power take-off speed: 2450 rev/min;
- Ratio of rotation speeds (engine speed/p.t.o. speed): 2.45;
- Maximum power and torque transmissible: 95 kW and 670 Nm.

Power take-off proportional to ground speed (optional)

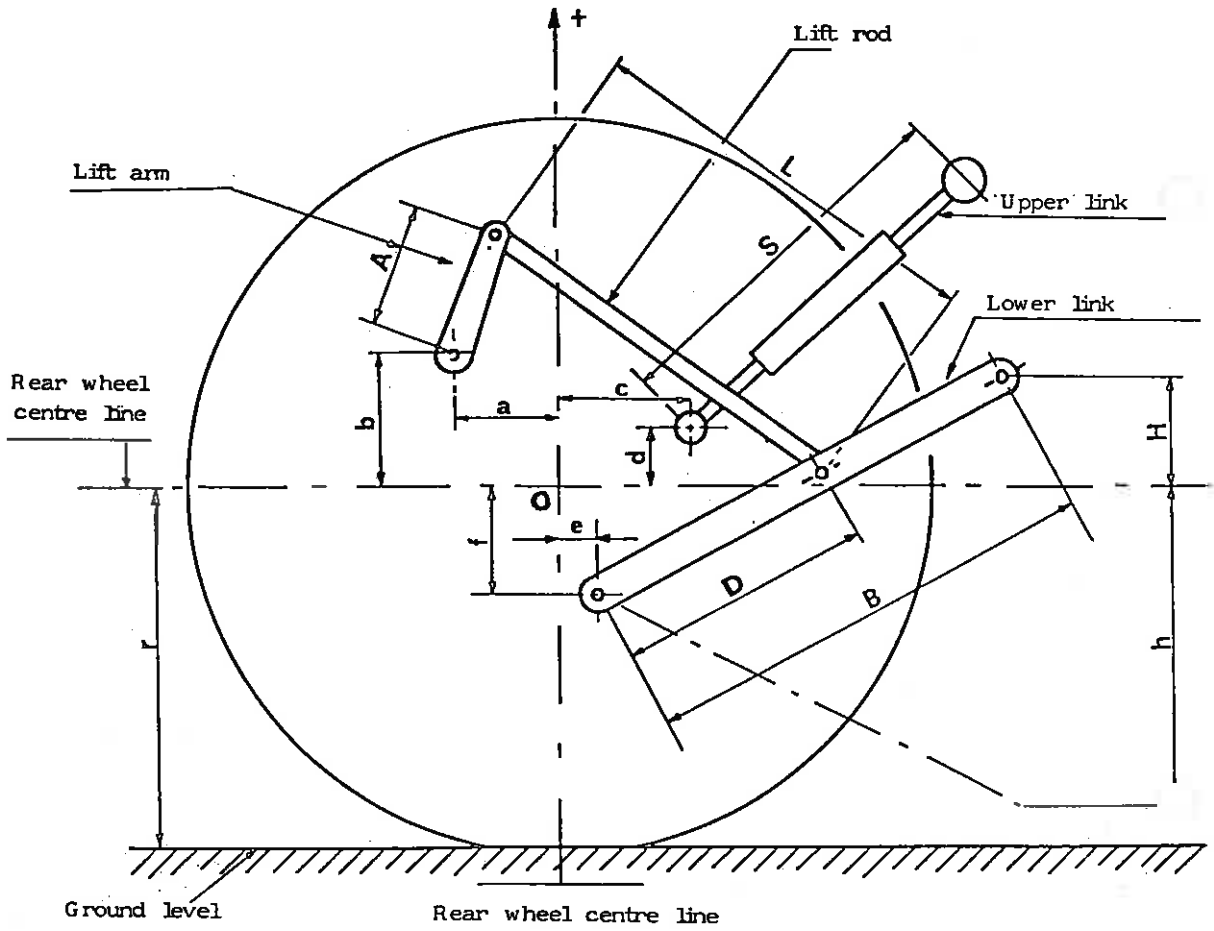
- Travelling distance for one revolution of power take-off shaft: 173 mm;
- Number of power take-off shaft revolutions for one revolution of rear driving wheels: 27;
- Direction of rotation with forward gear engaged (viewed facing driving end): clockwise.

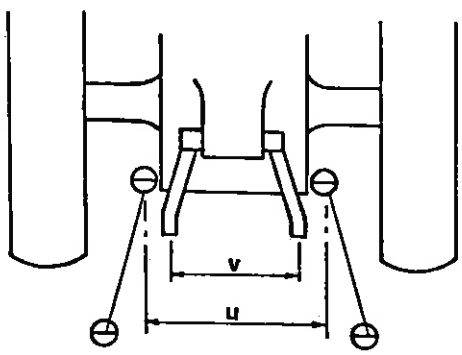
POWER LIFT

- Make: S+L+H;
- Model: 91310;
- Type: load sensing;
- Type of hydraulic system: open centre system;
- Type and number of cylinders: 2 external hydraulic jacks at single effect;
- Type of lock for transport: mechanical, with screwed tie rods that lock the lower links;
- Relief valve pressure setting: 19 - 0.5 MPa;
- Opening pressure of anti-shock valve: 21 MPa;
- Lift pump type: hydraulic rotary pump, driven by engine shaft;
- Transmission between pump and engine: mechanical;
- Type and number of filters: 1, replaceable paper cartridge;
- Changing: when the filter clogging warning lamp is lighted;
- Oil capacity: 52 dm^3 in common with gear box;
- Site of oil reservoir: gear box;
- Position, type and No.of additional oil plugs: 3 ways distributor at rear of tractor;
- Maximum volume of oil available to external cylinders: 15 dm^3;
- Recommended oil (see page 19).

Three-point linkage

- Category: 2 in conformity with ISO 730/1;
- Category adapter: none.


+
Lift rod
Lift arm
L
Upper link
S
A
Lower link
Rear wheel
centre line
a
c
b
d
H
O
e
f
D
B
h
r
Ground level
Rear wheel centre line


v
u

Dimensions of linkage geometry (when connected to the standard frame)

		Dimension or range (mm)	Settings used in test (mm)
Length of lifth arms	(A)	280	280
Length of lower links	(B)	860	860
Distance of lift arm :horizontally	(a)	95	95
pivot point from rear :vertically	(b)	400	400
wheel axis (behind)			
Horizontal distance between the 2 lower link points	(u)	510	510
Horizontal distance between the 2 lift arm end points	(v)	580	580
Length of upper link	(S)	from 500 to 770	655
Distance of upper link :horizontally	(c)	355	355
pivot point from rear :vertically	(d)	240-305-370	240
wheel axis			
Distance of lower link :horizontally	(e)	150	150
pivot point from rear :vertically	(f)	220	220
wheel axis			
Distance of lower link pivot point to lift rod pivot points on lower links	(D)	420-460	420
Length of lift rods	(L)	from 675 to 810	770
Height of lower hitch points relative to the rear wheel axis			
- in Low position	(h)	from 290 to 635	545
- in High position	(H)	from 95 to 310	170
Heigth above ground of lower hitch points when locked in transport position (*).		from 285 to 720	

(*) Assuming the dynamic radius index = 745 mm (ISO 4251/1-1984)

SWINGING DRAWBAR (optional)

- Type: S+L+H 97320;
- Height above ground (tyre size: 16.9/34): max 500 mm
  min 425 mm
- Type of adjustment: reversible;
- Distance of hitch point from rear wheel axis, horizontally: 815 mm;
- Distance of hitch point from power take-off shaft end
  . vertically ....: 283-358 mm below;
  . horizontally ..: 485 mm behind;
- Lateral adjustment (centre of clevis)
  . right hand: 270 mm;
  . left hand: 270 mm;
- Distance of pivot point from rear wheel axis, horizontally: 485 mm forward;
- Diameter of drawbar pin hole: 33 mm.
- Maximum vertical permissible load: 0 kN.

HOLED DRAWBAR

- Number of holes: 7;
- Distance between holes: 100 mm;
- Hole diameter: 28.5 mm;
- Thickness/width of the drawbar: 30/80 mm;
- Height above ground , minimum 270 mm;
  maximum 960 mm;
- Horizontal distance behind power take-off shaft end: 560 mm;
- Diameter of the pinhole: 28 mm.

TRAILER HITCH

- Type: S+L+H;
- Hole diameter: 28.5 mm;
- Height above ground: 500-630-760 mm;
- Distance of hitch point from rear wheel axis, horizontally: 530 mm;
- Distance of hitch point from power take-off shaft-end
  . vertically .: below 240-110 mm, above 20 mm;
  . horizontally: 150 mm;
- Maximum vertical permissible load: 14.7 kN.

STEERING

- Specifications: hydrostatic steering with BOSCH hydraulic gear pump HY/ZFS 11/11 L201, two rams at double effect acting directly on front axle.
- Make: DANFOSS;
- Model: ORBITROLL OSPC 80 OR;
- Type: hydrostatic;
- Working pressure: 12 MPa;
- Oil capacity: 52 dm^3 in common with gear box;
- Oil change period: 1200 hrs;
- Filter change period: 2400 hrs;
- Recommended oil (see page 19).

BRAKES

Service brake

- Make: S+L+H;
- Model: 450.54;
- Type: oil bath disc, total 4 discs, mounted 1 on each differential half shaft.
  front disc dia= 224 mm . rear disc dia= 290 mm
  FRENDO HDT 303 lining material;
- Method of operation: hydraulically acting with 2 pedals.
- Trailer braking take-off: none.

Parking brake

- Type: fully independent of service brake, 3 oil bath discs mounted on the pinion shaft in the gear box ISOBOND SINTERIX lining material;
- Method of operation: mechanically by hand lever.

Steering brake : divided pedal of service brake for normal use locked together.

STEERING WHEELS

- Number: 2;
- Location: at front;
- Tyres:
  - type: radial;
  - size: 14.9/24;
  - ply rating: 6;
  - maximum permissible load on each tyre: 1481 daN;
  - corresponding inflation pressure: 140 kPa;
- Track widths: 1620-1720-1820 mm;
- Regulation: changing the position of the rims in respect of the disc.

DRIVING WHEELS

- Number: 4;
- Location: 2 at front and 2 at rear;
- Rear tyres:
  . type: radial;
  . size: 16.9/34;
  . ply rating: 6;
  . maximum permissible load on each tyre: 1977 daN;
  . corresponding inflation pressure: 130 kPa;
- Track widths: 1500-1600-1700-1800-1900-2000-2100 mm;
- Regulation: changing the position of the rims in respect of the disc.

WHEELBASE: 2320 mm.

PROTECTIVE STRUCTURE

Specifications

- OECD approval number: CSD 0912/33;
- Make: SAME;
- Model: SAME C30;
- Type: cab;
- Manufacturer's name: SAME TRATTORI S.p.A;
  . address: V.le Cassani, 15 - Treviglio (Bg);
- Protective device: cab, not tiltable.

Materials used in the construction and dimensions

See OECD Test Report on Protective Stuctures.

DRIVER'S SEAT

- Make: BOSTROM;
- Model: U-SERIES XH;
- Type: upholstered seat with back rest;
- Type of suspension: adjustable spring;
- Type of damping: shock absorber;
- Range of adjustment, longitudinal 150 mm;
  vertical .... 60 mm.

PASSENGER'S SEAT

- Location: on the left side of the cab;
- Number of places: 1.

LIGHTING

Lighting system in accordance with E.E.C. 78/933

	Height above ground of centre with tyre(*) (mm)	Size (mm)	Distance from out side edge of trac tor to centre at 1600 mm track width (mm)
Headligths	1055.0	110*110	970
Front park.lights	1852.5	110*35	465
Front finger post	1887.5	110*35	465
Rear park.lights	1657.5	180*35	590
Rear finger post	1697.5	90*45	545
Stop	1697.5	90*45	635
Reflectors	1465.0	80 dia	595

(*) Tyre size: 14.9/24 front - 16.9/34 rear.

TEST CONDITIONS

Overall dimensions with tyres 14.9/24 front and 16.9/34 rear

	Length (mm)	Width (mm) min	Width (mm) max	Height (mm) at top of exaust sil.	Height (mm) at top of protec.struc.
Without ballast	4020	2020	2560	2850	2820

. Ground clearance (unballasted tractor): 470 mm;
. Clearance-limiting part: front axle.

Tractor mass (with tanks full, with cab, water in tyres none)

	Units	Front	Rear	Total
Without driver				
Without ballast	kg	1415	1980	3395
With ballast	kg	1635	2180	3815
With driver				
Without ballast	kg	1420	2050	3470
With ballast	kg	1640	2250	3890

Ballast

	no. of weights	total weight (kg)	water (kg)
front	5+1 *	220	-
rear	2+2	200	-
additional	-	-	-

*= front ballast mounting (20 kg)

Tyres and track width specifications		front	rear
- Tyres			
. dimensions		14.9/24	16.9/34
. ply rating		6	6
. type		radial	radial
. maximum load (tyre manufacturer's)	daN	1481	1977
. maximum load (tractor manufact.)	daN	932	1741
. inflation pressure (tyre manufact.)	kPa	140	130
. dynamic radius index	mm	590	745
- Chosen track width	mm	1620	1600

Oils, lubrication and fuel
Capacity and change interval

	capacity dm³	oil change h	filter change h
Engine	9.2	150	300
Gear box	52	1200	2400
Front axle and final drives	9	1200	--
Rear axle and final drives	in common with gear box		
Hydraulic system	"	"	"
Other (steering, etc.)	"	"	"

Fuel and lubricants reccomended and used in tests
All in accordance with API NORM.

Fuel
- Type: AGIP DIESEL, DIN 51601 (in accordance with the national standard);
- Specific gravity at 15 °C: 0.840 g/cm³.

Engine oil
- Type: AGIP DIESEL SIGMA S SAE 30;
- Viscosity: 12.5 cSt;
- Classification: API SE-CD.

Transmission oils
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt;
- Viscosity index: 95;
- Classification: API GL-3.

Hydraulic fluid
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt;
- Classification: API GL-3.

Steering oil
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt;
- Classification: API GL-3.

Grease
- Type: AGIP GREASE 30;
- Number of lubrication points: 11.

II - TEST RESULTS

A. COMPULSORY TESTS RESULTS

1) MAIN POWER TAKE-OFF PERFORMANCE

- Date and location of test: 12 november 1987 - I.S.M.A. TREVIGLIO (BG) ITALY
- Type of dynamometer: ZOELLNER 350 AC

Power	Speed		Fuel consumption			Specific
	Engine	P.T.O.	Hourly	Specific		Energy
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
MAXIMUM POWER - 2 HOUR TEST						
54.1	2510	1025	16.48	13.85	256	3.28
POWER AT RATED ENGINE SPEED						
54.1	2510	1025	16.48	13.85	256	3.28
STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)						
54.0	2439	996	16.38	13.76	255	3.30
PART LOADS						
i) The torque corresponding to maximum power at rated engine speed						
54.1	2510	1025	16.48	13.85	256	3.28
ii) 85% of torque obtained in i)						
48.0	2622	1070	14.92	12.54	261	3.22
iii) 75% of torque defined in ii)						
36.2	2648	1081	12.00	10.08	278	3.02
iv) 50% of torque defined in ii)						
24.3	2666	1088	9.36	7.86	323	2.60
v) 25% of torque defined in ii)						
12.2	2683	1095	6.95	5.84	479	1.75
vi) unloaded						
0	2709	1106	4.81	4.04	-	-

PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)

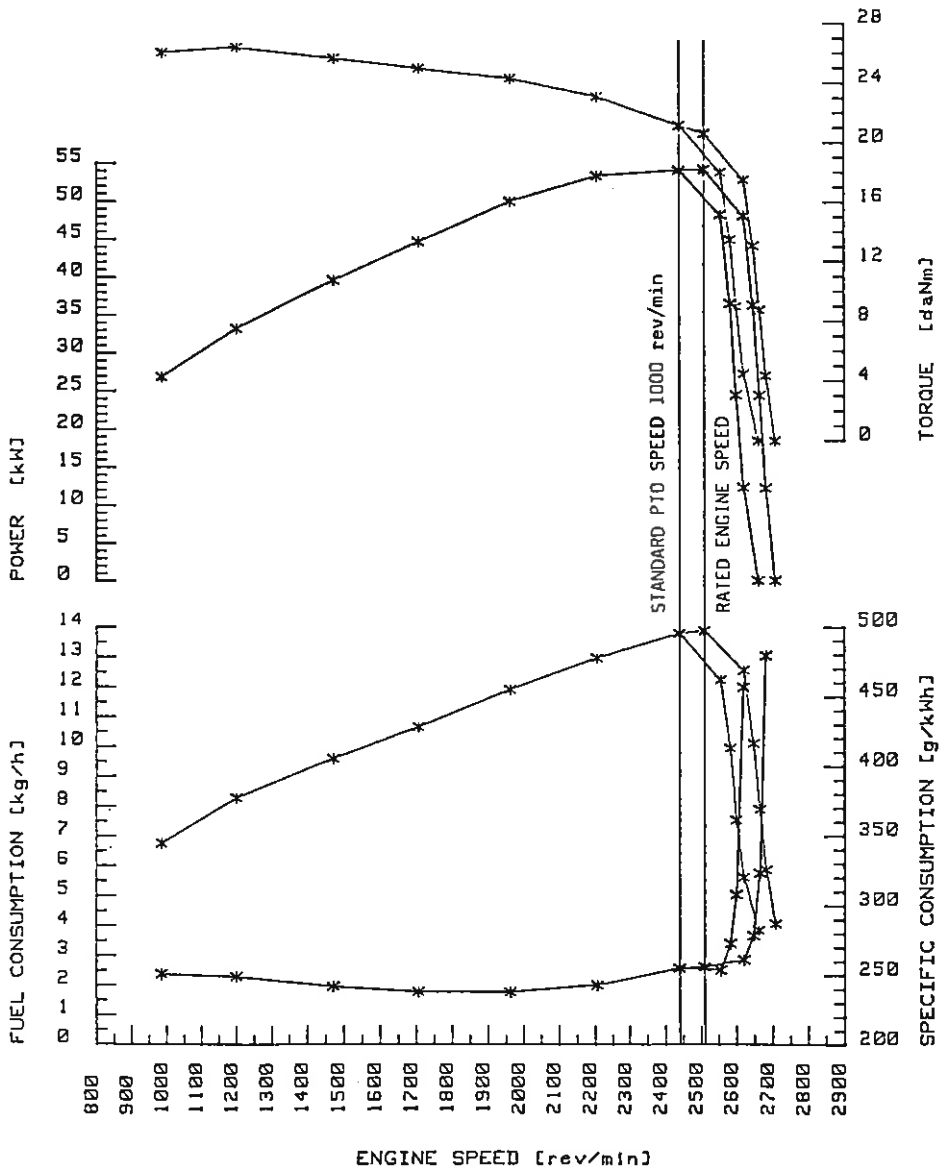
Power	Speed		Fuel consumption			Specific
	Engine	P.T.O.	Hourly		Specific	Energy
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
i) The torque corresponding to maximum power available						
54.0	2439	996	16.38	13.76	255	3.30
ii) 85% of torque obtained at maximum power						
48.2	2557	1044	14.54	12.22	254	3.31
iii) 75% of torque defined in ii)						
36.4	2584	1055	11.82	9.93	273	3.08
iv) 50% of torque defined in ii)						
24.4	2601	1062	8.93	7.50	308	2.73
v) 25% of torque defined in ii)						
12.2	2621	1070	6.66	5.59	457	1.84
vi) unloaded						
0	2662	1086	4.55	3.82	-	-

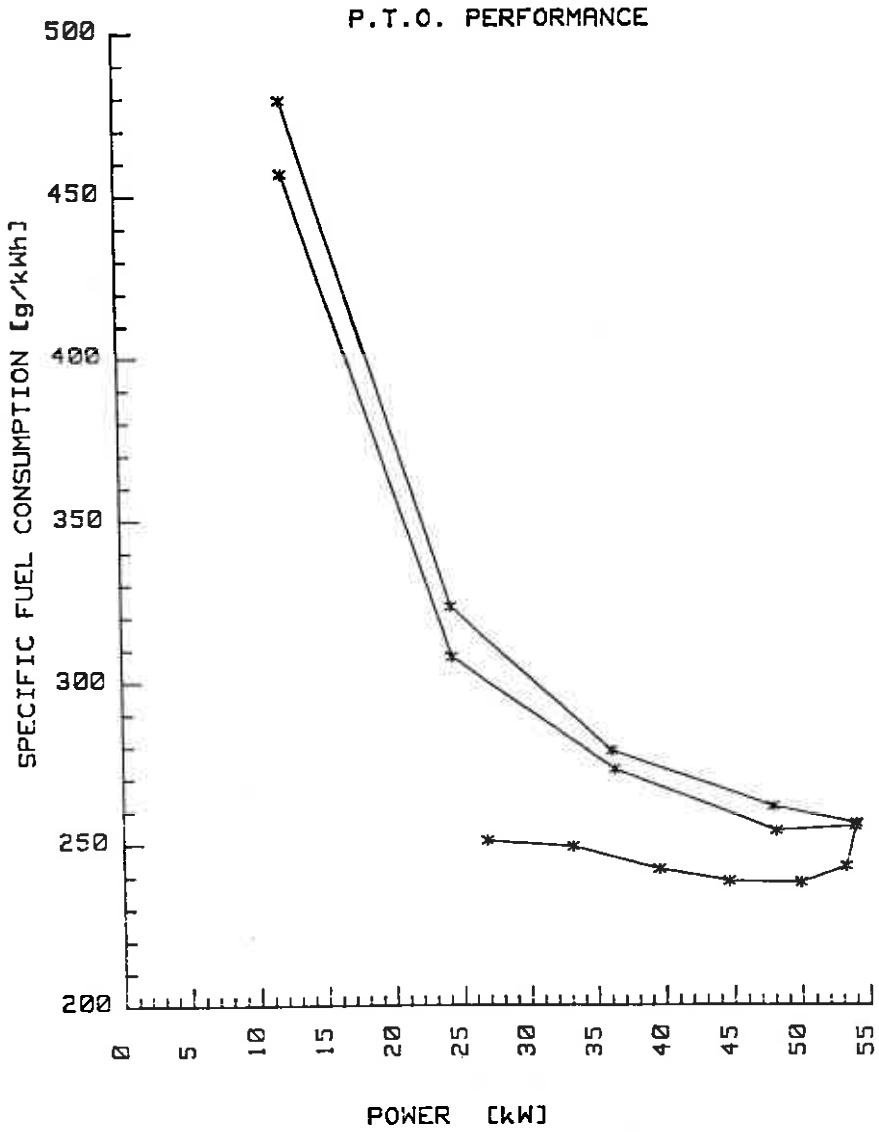
STANDARD SPECIFIC FUEL CONSUMPTION: 261/323/254/308 g/kWh

- No load maximum engine speed: 2709 rev/min
- Torque (1) at maximum power: 20.59 daNm
- Maximum torque (1) (engine speed: 1200 rev/min): 26.43 daNm
- Mean atmospheric conditions : Temperature .... 20°C
  Pressure ..... 99.5 kPa
  Relat.humidity . 81 %
- Maximum temperatures : Coolant ..... 92°C
  Engine oil ..... 104°C
  Fuel ..... 27°C
  Engine air intake ..... 23°C

(I) The torque is the equivalent crankshaft torque.

P.T.O PERFORMANCE




P.T.O. PERFORMANCE
SPECIFIC FUEL CONSUMPTION [g/kWh]
500
450
400
350
300
250
200
0
5
10
15
20
25
30
35
40
45
50
55
POWER [kW]

2) POWER LIFT AND HYDRAULIC POWER TEST

- Date and location of tests: 13.11.1987 - ISMA Treviglio (BG)

2.1) POWER LIFT

		at hitch point	on the frame
Height of lower hitch point above ground in down position	mm	200	200
Vertical movement	mm	715	800
Maximum corrected force exerted through full range	daN	2796	2747
Corresponding pressure of hydraulic fluid	MPa	17.8	17.8
Moment about rear axle	daNm	2824	4450
Maximum tilt angle of mast over range of lift	degrees	--	8

Lifting heights relative to the horizontal lower links

mm	-325	-300	-200	-100	0	100	200	300	390	400	475
Lifting forces at hitch points daN	2796	2845	3066	3291	3490	3679	3855	4002	3335	---	---
Lifting forces at test frame daN	2894	2943	3061	3188	3532	3551	3551	3551	----	3002	2747

2.2) HYDRAULIC POWER TEST

Sustained pressure with relief valve open: 18.50 MPa;
Pump delivery rate at min pressure: 41 l/min;

Hydraulic power	kW	flow rate l/min	pressure MPa	oil temp. °C
At 90% of the actual relief valve setting	9.97	37.5	16.6	60
Maximum	10.10	36.0	17.5	60

.opening pressure of the relief valve: 18 MPa

Tapping point used for test : at rear of tractor;
Hydraulic fluid: see page 19.

3) DRAWBAR PERFORMANCE

- Date of tests: 16 to 20 november 1987
- Type of track: concrete
- Type and size of tyres front: 14.9/24 - 6 ply
  rear : 16.9/34 - 6 ply

Height of drawbar above ground: 600 mm (unballasted) - 590 mm (ballasted)
Tyre inflation pressure : unballasted .front: 140 kPa .rear: 130 kPa
ballasted .front: 150 kPa .rear: 140 kPa

3.1) MAXIMUM POWER IN TESTED GEARS (unballasted tractor)

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener.cons.	fuel cool.	Temperatures eng.		Atm. cond. temp.	hum.	pres.
	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	kPa
1R	2.89	2739	0.38	2697	15	0.49	1730	31	73	95	0	95	100.1
2R	4.26	2738	0.56	2690	15	0.69	1216	30	73	96	0	95	100.1
3R	5.65	2748	0.74	2682	15	0.82	1028	32	75	96	1	94	100
4R	7.50	2756	0.98	2680	15	1.07	788	33	74	96	1	92	100
1S	8.12	2757	1.06	2677	15	1.14	739	32	74	95	1	92	100
5R	9.94	2753	1.30	2671	15	1.21	694	30	76	97	2	90	100
2S	11.88	2742	1.56	2666	15	1.26	665	33	77	97	2	90	100
3S	15.69	2729	2.07	2659	15	1.63	516	31	75	97	2	90	99.9
4S	20.59	2716	2.73	2655	15	1.94	432	31	77	99	3	87	100
4N	25.08	2704	3.34	2653	15	2.32	363	31	78	99	3	87	100
5S	27.15	2708	3.61	2650	15	2.40	350	31	78	98	4	87	100
2N	36.69	2696	4.90	2630	15	2.61	322	30	77	98	5	85	100
3N	44.30	2462	6.48	2502	11	2.69	313	32	76	99	5	85	100
4N	46.23	1862	8.94	2503	7	2.79	301	33	79	99	4	85	100
1F	46.64	1583	10.61	2500	5	2.82	298	34	79	99	4	87	100
5N	44.15	1301	12.22	2502	4	2.68	314	36	78	99	4	87	100

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener.cons.	fuel cons.	Temperatures cool.eng.temp.		hum.	Atm. cond. pres.
	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	%	kPa
3.2) MAXIMUM POWER IN TESTED GEARS (ballasted tractor)											
1R	3.34	3169	0.38	2691	15	0.54	1542	29	74	95	2	90	100
2R	4.93	3173	0.56	2684	15	0.76	1110	27	74	95	2	89	100
3R	6.52	3174	0.74	2680	15	0.92	910	31	76	97	3	87	100.1
4R	8.57	3181	0.97	2677	15	1.19	708	30	78	95	3	86	100.1
1S	9.24	3170	1.05	2675	15	1.25	672	32	76	96	3	84	100.2
5R	11.36	3171	1.29	2672	15	1.41	594	33	79	95	2	81	100.3
2S	13.63	3167	1.55	2666	15	1.45	578	34	79	98	3	77	100.2
3S	17.73	3100	2.06	2662	15	1.85	453	35	80	100	3	75	100.3
4S	22.85	3036	2.71	2659	15	2.35	357	35	80	97	4	72	100.3
1N	27.15	2954	3.31	2657	15	2.50	336	36	81	96	4	71	100.3
5S	28.99	2916	3.58	2651	15	2.55	329	37	83	96	5	69	100.3
2N	36.81	2733	4.85	2628	15	2.60	324	37	83	98	5	68	100.3
3N	45.72	2506	6.57	2502	9	2.76	304	37	85	99	5	67	100.3
4N	45.98	1844	8.98	2499	5.5	2.78	303	36	84	102	4	65	100.3
1F	46.68	1574	10.68	2499	3.5	2.82	298	36	84	99	6	64	100.3
5N	45.62	1341	12.25	2500	3	2.75	305	36	85	99	6	64	10[illegible] 3
3.3.1) FIVE HOUR TEST at 75% of pull at maximum power													
3N	37.75	1880	7.23	2623	4	2.70	312	21	83	103	5	95	101.2
3.3.2) FIVE HOUR TEST at pull corresponding to 15% wheelslip with additional ballast 320 kg.													
2N	39.92	2733	5.26	2630	(*)	(*)	(*)	25	85	103	5	94	99

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2: 53 g/h

(*) Having the test been carried out with additional ballast, these figures are irrelevant.

4) TURNING AREA AND TURNING CIRCLE

Wheel equipment front: 14.9/24 - 6 ply;
rear: 16.9/34 - 6 ply.

Track width front: 1620 mm;
rear: 1600 mm.

	With brakes on four wheels		Without brakes	
	rigth (m)	left (m)	right (m)	left (m)
radius of turning area	4.86	4.76	5.12	5.05
radius of turning circle	4.65	4.56	4.92	4.84

5) LOCATION OF CENTRE OF GRAVITY

Height above ground ..... 902 mm
Distance forward from rear wheel axis ..... 967 mm
Distance from tractor's median plane ..... 0 mm

6) BRAKING PERFORMANCE

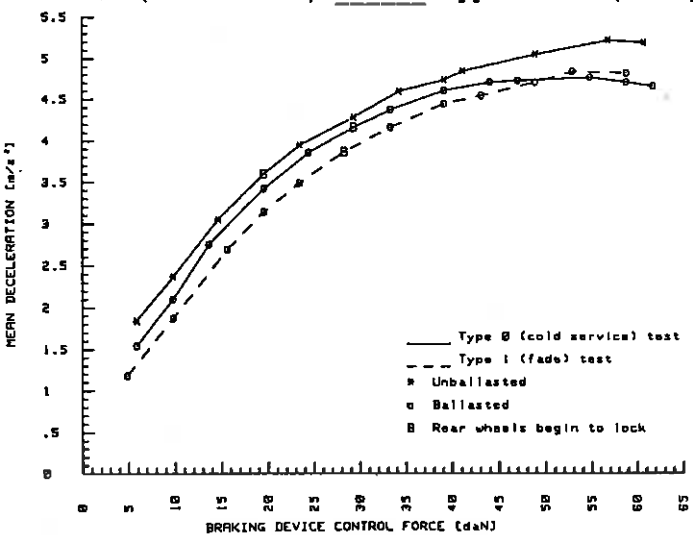
Date of test: 03 december 1987;
Type of track: asphalt;
Type of decelerometer: PEISELER.

Tractor masses during test (*)

	front axle (kg)	rear axle (kg)	total (kg)
without ballast	1420	2060	3480
with max ballast	1895	3550	5445

(*) Tractor carrying a driver and the decelerometer (85 kg)

6.1) SERVICE BRAKES (all wheels braked)
Type - 0 - test (cold brake) _____ Type - I - (fade) test ------



Speed before application of brakes (ballasted tractor): 40.8 km/h
The tractor brakes were heated by towing of the tractor for 1 km.
- Maximum deviation of tractor from its original course: no significant deviation.
- Abnormal vibration: none.

6.2) PARKING BRAKE

	ballasted tractor on 18% slope		unballasted tractor with trailer of 3000 kg on 12% slope	
	up	down	up	down
pull on handbrake daN	7	8	11	12

7) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test: 04 december 1987.
Type of sound level meter
. make: BRÜEL & KJAER;
. model: 2209;
. type: impulse precision sound level meter;
Type of track: concrete.

Result of test
No. gear used: 5F;
Travelling speed: 30.9 km/h;
Sound level: 84.5 dB(A).

REPAIRS AND REMARKS: none.

TEST CARRIED OUT BY
(P.A.Giovanni LAMORATTA)

THE DIRECTOR OF TESTING STATION
(Prof.Giuseppe COLZANI)

HEAD OF ISMA - ROMA
(Prof.Alfio CAMMILLI)

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