CONSIGLIO NAZIONALE DELLE RICERCHE
ISTITUTO PER LA MECCANIZZAZIONE AGRICOLA
Strada delle Cacce, 73 - 10135 TORINO (Italia)

Report No. 1900/T/1994

TEST IN ACCORDANCE WITH THE OECD FULL CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

TRACTOR: Make: S+L+H
Model: HURLIMANN 6115 VDT
Type: 4 WD



Manufactured by:	S+L+H S.p.A. - TREVIGLIO (Italy)
Date and location of the tests:	April-May 1991 - I.S.M.A. - Treviglio (BG) (Italy)
Date and location of the checks:	August-September 1994 - IMA - Torino (Italy)

This report has been approved by the O.E.C.D. Co-ordinating Center (CEMAGREF, France) as being in accordance with the O.E.C.D. Tractor Test Code.

Number and date of approval: 1321/2 - 11th October 1994

PRELIMINARY REMARK

The HÜRLIMANN 6115 VDT (4WD) and the LAMBORGHINI 115 VDT (4WD) (see tractor test OECD No. 1321 of 18/06/1991) tractors are technically identical in all main respects, except with regard to the following items:

- model designation
- colour
- side bonnets design
- starting system
- generator
- driver'seat
- height above ground of headlights.

Therefore, tests have not been repeated, and approval number is valid for the both tractor models.
All tests were carried out on the LAMBORGHINI 115 VDT (4WD).

This bulletin is based on engineering tests in accordance with O.E.C.D. Full Code (Code I).
It does not contain an evaluation of performance of the tractor on practical farm work.

The S+L+H HÜRLIMANN 6115 VDT tractor is manufactured in following variants:

1. with 24 forward and 24 reverse speeds (6x4 gear units plus inverter);

2. with 36 forward and 36 reverse speeds (12x3 gear units plus inverter);

3. with 48 forward and 48 reverse speeds (12x4 gear units plus inverter);

Checks have been carried out on tractor with the first variant.

In this report all performance characteristics are given corresponding to the International System of Units.

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Tractor manufacturer's name and address:	S+L+H S.p.A. Viale Cassani, 15 24047 TREVIGLIO (BG) - Italy
Submitted for checks by:	Manufacturer
Selected for checks by:	Manufacturer with the agreement of IMA
Place of running-in:	TORINO - Italy
Duration of running-in:	Engine and tractor appr. 50 hours
Location of checks :	IMA - Torino - Italy

I. SPECIFICATION OF TRACTOR

TRACTOR

Make:	S+L+H S.p.A.
Model:	HÜRLIMANN 6115 VDT
Type:	wheeled tractor, unit construction
Number of driving wheels:	4WD
Serial number:	H 6115 VT *1130*
First serial number:	1001

ENGINE

Make:	S+L+H S.p.A.
Model:	1000.6 W
Type:	4-stroke Diesel engine, direct injection, water cooled
Serial number:	001926

Cylinders

Number/disposition:	6, vertical, in-line
Bore/stroke:	105 x 115.5 mm
Capacity:	6000 cm^3
Compression ratio:	16 : 1
Arrangement of valves:	overhead
Cylinder liners:	wet liners

Supercharging

none

Fuel system

Fuel feed system:	AC CORONA type fuel feed pump
Make, model and type of fuel filter:	FIAMM FNA 255/00
Capacity of fuel tank:	210 dm^3

Make, model and type of injection pump:	BOSCH PFR 1K 90A 517, immersed pump, one for cylinder, without serial number, in line injection pump
Serial number:	none
Available options:	
Make, model and type of injection pump:	BOSCH PFR 1K 90A 503, immersed pump, one for cylinder, without serial number, in line injection pump
Serial number:	none
Manufacturer's production setting of injection pump:	
- flow rate:	51 ± 2 mm^3/stroke at rated speed and full load corresponding 23.13 dm^3/h
- timing:	16.0° ± 0.5° before TDC
Make, model and type of injectors:	BOSCH DLLA 150 S 925 multihole injection nozzles
Injection pressure:	18 ± 1 MPa

Governor

Make:	S+L+H
Model:	524.16
Type:	electronic
Governed range of engine speed:	from 650 to 2710 rev/min
Rated engine speed:	2500 rev/min

Air cleaner

Pre-cleaner:	none
Main cleaner:	
Make:	DONALDSON
Model:	FLG 8-0337
Type:	dry paper element filter with two replaceable cartridge elements; DONALDSON make, P11-9410 type for the internal one and P77-2550 type for the external one
Location of air intake:	left front side above the main cleaner under the bonnet
Maintenance indicator:	with the warning lamp on the dashboard

Lubrication system

Type of feed pump:	forced feed from gear pump
Type of filter:	FIAMM FT 48 03 IN
Number:	2

Cooling System

Type of coolant:	water
Type of pump:	impeller
Specification of fan:	propeller fan driven by engine shaft
Number of fan blades:	6
Fan diameter:	500 mm
Coolant capacity:	18 dm^3
Type of temperature control:	electrical control
Superpressure system:	0.6 bar

Starting system

Make:	ISKRA
Model:	AZ J3557 12 V
Type:	electromagnetic engagement

Available options:	
Make:	BOSCH
Model:	JF 12 V
Type:	electromagnetic engagement
Starter motor power rating:	3.0 kW
Cold starting aid:	none
Safety device:	preventing engine start in gear

Electrical system

Voltage:	12 V, negative earth
Generator:	
- Make:	ISKRA
- Model:	AAK3563 14V 65A
- Type:	Alternator
- Power:	780 W
Available options:	
- Make:	BOSCH
- Model:	K1 14V 65A
- Type:	Alternator
- Power:	780 W
Battery:	1 lead acid, FIAMM make, 2.9559.036.0 model
Rating:	155 Ah at 20 hours

Exhaust system

Make:	S+L+H
Model:	DGM SA 1687
Type:	one reflection absorption chamber
Location:	on the left side of engine cowling, vertical position

TRANSMISSION TO WHEELS

Clutch — utilized only for travelling

Make:	S+L+H
Model:	524.23
Type:	independent, single disk dry clutch
Number of plates:	1
Diameter of plates	330 mm
Method of operation:	hydraulically operated by pedal

Gearbox

Make:	S+L+H
Model:	524.22
Type:	mechanical syncromesh speed change gear
Arrangement:	six speeds forward, with four ranges and one reverse group;
Number of gears:	24 forward and 24 reverse
Available options:	
- Arrangement:	six speeds forward, with three ranges, one electro-hydraulic shifted reduction gear (hi/lo) and one reverse group
- Number of gears:	36 forward and 36 reverse
- Arrangement:	six speeds forward, with four ranges, one electro-hydraulic shifted reduction gear (hi/lo) and one reverse group
- Number of gears:	48 forward and 48 reverse

Rear axle and final drives

Make:	S+L+H
Model:	524.44
Type:	bevel gear differential and epyciclic final drive
Differential lock	
- Make:	S+L+H
- Model:	524.35
- Type:	electrohydraulic
- Method of engagement:	by push button
- Method of disengagement:	by push button
Available options:	
- Make:	S+L+H
- Model:	SBA original SAME system
- Type:	electrohydraulic
- Method of engagement:	by push button
- Method of disengagement:	by push button or automatically when steering angle exceeds 17 degrees, or when forward speed exceeds 15 km/h

Front axle and final drives

Make:	S+L+H
Model:	524.43
Type:	S+L+H system with central shaft, bevel gear drive, differential and epyciclic final drives
Differential lock	
- Make:	S+L+H
- Model:	524.46
- Type:	electrohydraulic
- Method of engagement:	by push button
- Method of disengagement:	by push button
Available options:	
- Make:	S+L+H
- Model:	SBA original SAME system
- Type:	electrohydraulic
- Method of engagement:	by push button
- Method of disengagement:	by push button or automatically when steering angle exceeds 17 degrees, or when forward speed exceeds 15 km/h

HÜRLIMANN 6115 VDT with 24 forward and 24 reverse speeds

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 kPa)

Gear no.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 rev/min km/h
		FORWARD	
1	R	3394.6	0.228
2	R	2632.6	0.294
3	R	2025.1	0.382
4	R	1579.6	0.489
5	R	1200.2	0.644
1	S	1131.5	0.683
6	R	935.2	0.826
2	S	877.5	0.881
3	S	675.0	1.145
4	S	526.5	1.468
5	S	400.1	1.932
1	N	326.9	2.364
6	S	311.7	2.479
2	N	253.5	3.049
3	N	195.0	3.963
4	N	152.1	5.081
5	N	115.6	6.687
6	N	90.1	8.581
1	F	71.2	10.861
2	F	55.2	14.004
3	F	42.5	18.205
4	F	33.1	23.340
5	F	25.2	30.718
6	F	19.6	39.421
		REVERSE	
1	R	3213.2	0.241
2	R	2491.9	0.310
3	R	1916.9	0.403
4	R	1495.1	0.517
5	R	1136.1	0.680
1	S	1071.1	0.722
6	R	885.2	0.873
2	S	830.6	0.930
3	S	639.0	1.210
4	S	498.4	1.551
5	S	378.7	2.041
1	N	309.4	2.498
6	S	295.1	2.619
2	N	240.0	3.221
3	N	184.6	4.187
4	N	144.0	5.368
5	N	109.4	7.064
6	N	85.2	9.066
1	F	67.4	11.474
2	F	52.2	14.795
3	F	40.2	19.233
4	F	31.3	24.658
5	F	23.8	32.452
6	F	18.6	41.647

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1 - 1988).

Number of revolutions of front wheels for one revolution of rear wheels: 1.2741

HÜRLIMANN 6115 VDT with 36 forward and 36 reverse speeds

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 kPa)

Gear no.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 rev/min km/h
		FORWARD	
1	S lo	1320.2	0.585
1	S hi	1131.5	0.683
2	S lo	1023.8	0.755
2	S hi	877.5	0.881
3	S lo	787.6	0.981
3	S hi	675.0	1.145
4	S lo	614.3	1.258
4	S hi	526.5	1.468
5	S lo	466.8	1.656
5	S hi	400.1	1.932
1	N lo	381.4	2.026
6	S lo	363.7	2.125
1	N hi	326.9	2.364
6	S hi	311.7	2.479
2	N lo	295.8	2.613
2	N hi	253.5	3.049
3	N lo	227.5	3.397
3	N hi	195.0	3.963
4	N lo	177.5	4.355
4	N hi	152.1	5.081
5	N lo	134.8	5.731
5	N hi	115.6	6.687
6	N lo	105.1	7.355
6	N hi	90.1	8.581
1	F lo	83.0	9.309
1	F hi	71.2	10.861
2	F lo	64.4	12.003
2	F hi	55.2	14.004
3	F lo	49.5	15.604
3	F hi	42.5	18.205
4	F lo	38.6	20.005
4	F hi	33.1	23.340
5	F lo	29.4	26.329
5	F hi	25.2	30.718
6	F lo	22.9	33.788
6	F hi	19.6	39.421

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1 - 1988).

Number of revolutions of front wheels for one revolution of rear wheels: 1.2741

Gear no.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 rev/min km/h
		REVERSE	
1	S lo	1249.6	0.618
1	S hi	1071.1	0.722
2	S lo	969.1	0.797
2	S hi	830.6	0.930
3	S lo	745.5	1.037
3	S hi	639.0	1.210
4	S lo	581.5	1.329
4	S hi	498.4	1.551
5	S lo	441.8	1.749
5	S hi	378.7	2.041
1	N lo	361.0	2.141
6	S lo	344.3	2.245
1	N hi	309.4	2.498
6	S hi	295.1	2.619
2	N lo	280.0	2.760
2	N hi	240.0	3.221
3	N lo	215.4	3.589
3	N hi	184.6	4.187
4	N lo	168.0	4.601
4	N hi	144.0	5.368
5	N lo	127.6	6.055
5	N hi	109.4	7.064
6	N lo	99.5	7.770
6	N hi	85.2	9.066
1	F lo	78.6	9.834
1	F hi	67.4	11.474
2	F lo	60.9	12.681
2	F hi	52.2	14.795
3	F lo	46.9	16.485
3	F hi	40.2	19.233
4	F lo	36.6	21.135
4	F hi	31.3	24.658
5	F lo	27.8	27.815
5	F hi	23.8	32.452
6	F lo	21.7	35.696
6	F hi	18.6	41.647

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1 - 1988).

Number of revolutions of front wheels for one revolution of rear wheels: 1.2741

HÜRLIMANN 6115 VDT with 48 forward and 48 reverse speeds

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 kPa)

Gear no.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 rev/min km/h
		FORWARD	
1	R lo	3960.5	0.195
1	R hi	3394.6	0.228
2	R lo	3071.4	0.252
2	R hi	2632.6	0.294
3	R lo	2362.7	0.327
3	R hi	2026.1	0.382
4	R lo	1842.9	0.419
4	R hi	1579.6	0.489
5	R lo	1400.3	0.552
1	S lo	1320.2	0.585
5	R hi	1200.2	0.644
1	S hi	1131.5	0.683
6	R lo	1091.1	0.708
2	S lo	1023.8	0.755
6	R hi	935.2	0.826
2	S hi	877.5	0.881
3	S lo	787.6	0.981
3	S hi	675.0	1.145
4	S lo	614.3	1.258
4	S hi	526.5	1.468
5	S lo	466.8	1.656
5	S hi	400.1	1.932
1	N lo	381.4	2.026
6	S lo	363.7	2.125
1	N hi	326.9	2.364
6	S hi	311.7	2.479
2	N lo	295.8	2.613
2	N hi	253.5	3.049
3	N lo	227.5	3.397
3	N hi	195.0	3.963
4	N lo	177.5	4.355
4	N hi	152.1	5.081
5	N lo	134.8	5.731
5	N hi	115.6	6.687
6	N lo	105.1	7.355
6	N hi	90.1	8.581
1	F lo	63.0	9.309
1	F hi	71.2	10.861
2	F lo	64.4	12.003
2	F hi	55.2	14.004
3	F lo	49.5	15.604
3	F hi	42.5	18.205
4	F lo	38.6	20.005
4	F hi	33.1	23.340
5	F lo	29.4	26.329
5	F hi	25.2	30.718
6	F lo	22.9	33.788
6	F hi	19.6	39.421

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1 - 1988).

Number of revolutions of front wheels for one revolution of rear wheels: 1.2741

Gear no.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 rev/min km/h
		REVERSE	
1	R lo	3748.8	0.206
1	R hi	3213.2	0.241
2	R lo	2907.3	0.266
2	R hi	2491.9	0.310
3	R lo	2236.4	0.346
3	R hi	1916.9	0.403
4	R lo	1744.4	0.443
4	R hi	1495.1	0.517
5	R lo	1325.4	0.583
1	S lo	1249.6	0.618
5	R hi	1136.1	0.680
1	S hi	1071.1	0.722
6	R lo	1032.8	0.748
2	S lo	969.1	0.797
6	R hi	885.2	0.873
2	S hi	830.6	0.930
3	S lo	745.5	1.037
3	S hi	639.0	1.210
4	S lo	581.5	1.329
4	S hi	498.4	1.551
5	S lo	441.8	1.749
5	S hi	378.7	2.041
1	N lo	361.0	2.141
6	S lo	344.3	2.245
1	N hi	309.4	2.498
6	S hi	295.1	2.619
2	N lo	280.0	2.760
2	N hi	240.0	3.221
3	N lo	215.4	3.589
3	N hi	184.6	4.187
4	N lo	168.0	4.601
4	N hi	144.0	5.365
5	N lo	127.6	6.055
5	N hi	109.4	7.064
6	N lo	99.5	7.770
6	N hi	85.2	9.066
1	F lo	78.6	9.834
1	F hi	67.4	11.474
2	F lo	60.9	12.681
2	F hi	52.2	14.795
3	F lo	46.9	16.485
3	F hi	40.2	19.233
4	F lo	36.6	21.135
4	F hi	31.3	24.658
5	F lo	27.8	27.815
5	F hi	23.8	32.452
6	F lo	21.7	35.696
6	F hi	18.6	41.647

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1 - 1988).

Number of revolutions of front wheels for one revolution of rear wheels: 1.2741

POWER TAKE OFF

Main power take-off

Type and method of engagement:	independent, engaged or disengaged by push button. 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 combined with a lever at the left hand side of the seat

Power take-off proportional to engine speed

540 rev/min

Location:	at rear of tractor, in tractor's median plane
Diameter of power take-off shaft end:	35 mm
Number of splines:	6, in conformity with ISO 500/1991 type 1
Height above ground:	830 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	475 mm
PTO speed at rated engine speed:	605 rev/min
Engine speed at standard power take-off speed:	2229 rev/min
Ratio of rotation speeds (engine speed/p.t.o. speed):	4.1278
Power restriction and maximum torque:	143 kW, 2525 Nm
Direction of rotation (viewed from behind tractor):	clockwise

1000 rev/min

Location:	at rear of tractor, in tractor's median plane
Diameter of power take-off shaft end:	35 mm
Number of splines:	21, in conformity with ISO 500/1991 type 2
Height above ground:	830 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	475 mm
PTO speed at rated engine speed:	1033 rev/min
Engine speed at standard power take-off speed:	2421 rev/min
Ratio of rotation speeds (engine speed/p.t.o. speed):	2.4211
Power restriction and maximum torque:	143 kW, 1363 Nm
Direction of rotation (viewed from behind tractor):	clockwise

775 rev/min

Location:	at rear of tractor, in tractor's median plane

Diameter of power take-off shaft end:	35 mm
Number of splines:	21
Height above ground:	830 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	475 mm
PTO speed at rated engine speed:	784 rev/min
Engine speed at standard power take-off speed:	2470 rev/min
Ratio of rotation speeds (engine speed/p.t.o. speed):	3.188
Power restriction and maximum torque:	143 kW, 1763 Nm
Direction of rotation (viewed from behind tractor):	clockwise

1300 rev/min

Location:	at rear of tractor, in tractor's median plane
Diameter of power take-off shaft end:	35 mm
Number of splines:	21
Height above ground:	830 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	475 mm
PTO speed at rated engine speed:	1337 rev/min
Engine speed at standard power take-off speed:	2431 rev/min
Ratio of rotation speeds (engine speed/p.t.o. speed):	1.869
Power restriction and maximum torque:	143 kW, 1050 Nm
Direction of rotation (viewed from behind tractor):	clockwise

Power take off proportional to ground speed
(separated syncromesh shaft, not adjustable to 540 - 775 - 1000 - 1300 rev/min)

Location and method of engagement:	at rear of tractor, in tractor's median plane, engaged or disengaged by hand level at the left hand side of the seat
Number of shafts:	1
Travelling distance for one revolution of power take-off shaft:	0.205 m
Number of power take-off shaft revolutions for one revolution of rear driving wheels:	25.08
Direction of rotation with forward gear engaged (viewed from behind tractor):	clockwise

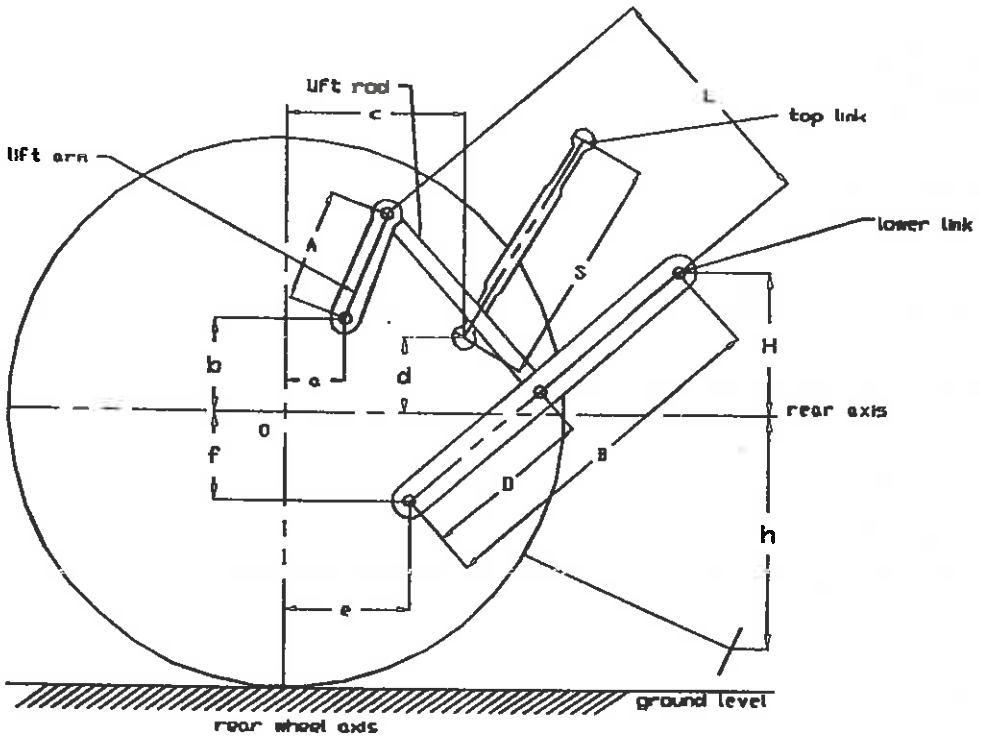
POWER LIFT

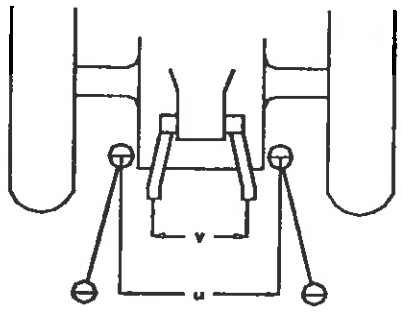
Make:	S+L+H
Model:	524.59 electronic control
Type:	load sensing
Type of hydraulic system:	open centre system
Type and number of cylinders:	1 internal single acting, and 2 external single acting

Type of linkage lock for transport:	mechanical, with screwed tie rods that lock the lower links
Relief valve pressure setting:	18 ± 0.5 MPa
Opening pressure of anti-shock valve:	21 MPa
Opening pressure of cylinder safety valve:	none
Lift pump type:	hydraulic rotary pump, driven by engine shaft, pump BOSCH make, HY/ZFS 11/22.5 R206V;
Transmission between pump and engine:	mechanical
Type and number of filters:	1, replaceable paper cartridge
Site of oil reservoir:	gear-box
Type, number and location of tapping points:	6 ways distributor at rear of tractor
Maximum volume of oil available to external cylinders:	15 dm^3

Three point linkage

Category:	2nd, implement attachment with three point linkage and lower links with quick connection, in conformity with I.S.O. STANDARD 730/I-1990
Category adapter:	3rd





POWER LIFT

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

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	280	280
Length of lower links	(B)	840	840
Distance of lift arm pivot point from rear wheel axis: - horizontally	(a)	135	135
- vertically	(b)	402	402
Horizontal distance between the 2 lower link points	(u)	550	550
Horizontal distance between the 2 lift arm end points	(v)	580	580
Length of upper link	(S)	from 500 to 770	741
Distance of upper link pivot point from rear wheel axis: - horizontally	(c)	335	335
- vertically	(d)	217-282-347	282
Distance of lower link pivot point from rear wheel axis: - horizontally	(e)	220	220
- vertically	(f)	230	230
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	430-470	430
Length of lift rods	(L)	from 730 to 870	820
Heigth of lower hitch points relative to the rear wheel axis: - in low position	(h)	from 416 to 735	620
- in high position	(H)	from 13 to 258	105
Height above ground of lower hitch points when locked in transport position (*)			925

(*) Assuming the dynamic radius index: 820 mm (ISO 4251/1-1988)

SWINGING DRAWBAR (optional not fitted on tested tractor)

Type:	97313
Height above ground (tyre size 18.4 R 38):	
- max:	530 mm
- min:	455 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:	290 - 365 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:	not specified

TRAILER HITCH

Type:	SAME DGM-GA 1189/C
Hole diameter:	28 mm
Height above ground:	
- min:	520 mm
- max:	770 mm
Distance of hitch point from rear wheel axis, horizontally:	560 mm
Distance of hitch point from power take-off shaft end:	
- vertically:	175 mm below, 20 mm above
- horizontally:	110 mm
Maximum vertical permissible load:	14.7 kN

HOLED DRAWBAR

Number of holes:	7
Distance between holes:	100 mm
Hole diameter:	28.5
Thickness/width of the drawbar:	30/80 mm
Height above ground with tyre 18.4R38:	
- minimum:	260 mm
- maximum:	1020 mm
Horizontal distance behind power take-off shaft end:	590 mm

STEERING

Make:	DANFOSS
Model:	ORBITROL OSPC 160 OR
Type:	hydrostatic
Method of operation:	
- pump:	hydrostatic steering with BOSCH hydraulic gear pump HY/ZFS 11/11 L201
- rams:	two double acting rams acting directly on front axle
Working pressure:	15 MPa

BRAKES

Service brake:

Make:	S+L+H
Model:	524.54

Type:	oil bath disc, total 6 discs, 4 at front (2 for wheel) and 2 at rear (1 for wheel), all mounted before the final drive. Front disc 224 mm dia, rear disc 280 mm dia, FRENDO HDT 303 lining material
Method of operation:	hydraulically actuated with 2 pedals
Trailer braking take-off:	none

Parking brake:

Type:	fully independent of service brake, 4 oil bath disc mounted on the pinion shaft in the gear box, ISOBOND SINTERIX lining material
Method of operation:	mechanical by hand lever

WHEELS

Steering wheels

Number:	2
Location:	at front

Driving wheels

Number:	4
Location:	2 at front and 2 at rear

Tyre matching			
At front		At rear	
14.9 R 30	129 A8	18.4 R 38	146 A8
16.9 R 24	134 A8	18.4 R 34	144 A8
420/70 R 24	130 A8	480/70 R 34	143 A8

Wheelbase: 2750 mm

Track width adjustment

	Minimum mm	Maximum mm	Adjustement method
Front	1800	2060	Changing the position of the rims with respect to the disc
Rear	1750	2250	Changing the position of the rims in respect to the disc

PROTECTIVE STRUCTURE

Make:	S+L+H
Model:	C 32
Type:	cab, not tiltable
Manufacture's name and address:	S+L+H S.p.A., Viale F. Cassani 15 24047 TREVIGLIO (BG) - Italy
OECD approval number:	CSD 1261/4

DRIVER'S SEAT

Make:	GRAMMER
Model:	LS 95H1/90 A
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
Available options:	
Make:	SABLE'
Model:	VF 100 ERG
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

	Height above ground of centre* mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1150	170 x 110	240
Sidelights	1845	110 x 35	860
Rearlights	1835	115 x 70	800
Reflectors	1785	110 X 35	800

(*) with tyres: 14.9 R 30 front - 18.4 R 38 rear

II. TEST CONDITIONS

Overall dimensions (with tyres 14.9 R 30 front and 18.4 R 38 rear)

	Length	Width		Height at top of	
		minimum	maximum	protective structure	exhaust silencer
	mm	mm	mm	mm	mm
Ballasted	4925	2250	2500	2840	2870
Unballasted	4560	2250	2500	2840	2870

Ground clearance (unballasted tractor): 490 mm

Clearance-limiting part: differential of the front axle

Tractor mass (with protective structure and full fuel tank):

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	2450	2465	2080	2095
Rear	3050	3110	2800	2860
Total	5500	5575	4880	4955

Ballast

	Weights		Water (kg)
	Number	Total mass (kg)	
Front wheels	-	-	-
Front weight	8	320	-
Rear wheels	6	300	-

Tyres and track width specifications

	Front	Rear
Tyres:		
- dimensions	14.9 R 30	18.4 R 38
- ply rating	129 A8	146 A8
- type	radial	radial
- maximum load (tyre manufacturer')	18.2 kN	29.4 kN
- maximum load (tractor manufacturer's)	13.7 kN	23.1 kN
- inflaction pressure (tyre manufacturer's)	160 kPa	160 kPa
- dynamic radius index	695 mm	820 mm
Chosen track width:	1800 mm	1840 mm

Oils and lubrication

Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine with filter	15.0	150	300
Gear box with power lifts, rear axle, final drive and hydraulic system	97.0	1200	2400 (*)
Front axle	13.0	1200	-
Front final drive	5.0	1200	-

(*) or when the warning lamp is lighted.

Specifications (SAE, API, MIL-L, ISO)

	Recommended	Used during test
Engine oil - Type: - Viscosity: - Classification:	AGIP DIESEL SIGMA S SAE 30 12.50 cSt API SE-CD	As recommended
Hydraulic fluid - Type: - Viscosity: - Classification	AGIP ROTRA THT 11.50 cSt API GL 4	As recommended
Front and rear axle, final drives and gear box - Type: - Viscosity: - Classification:	AGIP ROTRA THT 11.50 cSt API GL 4	As recommended
Steering oil - Type: - Viscosity: - Classification:	AGIP ROTRA THT 11.50 cSt API GL 4	As recommended

Grease: GREASE 30
- Number of lubrication points: 10

Fuel

Type: AGIP DIESEL, DIN 51601, in conformity with national standard.

Density at 15 °C: 0.838 g/cm^3

COMPULSORY TEST RESULTS

1. **MAIN POWER-TAKE-OFF**
   - Date and location of tests: 16th April 1991 - I.S.M.A. TREVIGLIO (BG)
   - Type of dynamometer: ZOELLNER 350 AC

Power	Speed		Fuel consumption			Specific energy
	Engine	P.t.o.	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
1.1 **MAXIMUM POWER** - TWO HOUR TEST						
79.3	2502	1033	19.39	23.13	244	3.43
1.2 POWER AT RATED ENGINE SPEED						
79.3	2502	1033	19.39	23.13	244	3.43
1.3 STANDARD POWER TAKE OFF SPEED (1000 ± 25 rev/min)						
79.4	2422	1001	19.25	22.97	242	3.46
1.4 **PART LOADS** 1.4.1 the torque corresponding to maximum power at rated engine speed						
79.3	2502	1033	19.39	23.13	244	3.43
1.4.2 85% of torque obtained in 1.4.1						
70.2	2587	1068	17.38	20.74	248	3.38
1.4.3 75% of torque defined in 1.4.2						
53.3	2627	1085	14.31	17.07	269	3.12
1.4.4 50% of torque defined in 1.4.2						
35.9	2658	1098	11.29	13.47	314	2.66
1.4.5 25% of torque defined in 1.4.2						
18.1	2683	1108	8.38	10.00	464	1.81
1.4.6 unloaded						
----	2710	1119	5.74	6.85	----	----
1.5 **PART LOADS AT STANDARD POWER TAKE OFF SPEED** (1000 ± 25 rev/min) 1.5.1 the torque corresponding to maximum power						
79.4	2422	1001	19.25	22.97	242	3.46
1.5.2 85% of torque obtained in 1.5.1						
70.2	2510	1037	17.16	20.47	244	3.43
1.5.3 75% of torque defined in 1.5.2						
53.6	2551	1053	13.86	16.54	259	3.24
1.5.4 50% of torque defined in 1.5.2						
36.1	2582	1066	11.10	13.24	308	2.72
1.5.5 25% of torque defined in 1.5.2						
18.2	2614	1080	8.05	9.61	441	1.90
1.5.6 unloaded						
----	2633	1088	5.40	6.44	----	----

STANDARD SPECIFIC FUEL CONSUMPTION: 248/314/244/308 g/kWh

- No load maximum engine speed: 2710 rev/min
- Torque (1) at maximum power at rated engine speed: 302.9 Nm
- Maximum torque (1) (engine speed: 1568 rev/min): 377.7 Nm
- Mean atmospheric conditions:
  - . Temperature: 21.0 °C
  - . Pressure: 99.5 kPa
  - . Relative humidity: 65%
- Maximum Temperatures:
  - . Coolant: 46°C
  - . Engine oil: 113°C
  - . Fuel: 27 °C
  - . Engine air intake: 26 °C

(1) The torque is the equivalent crankshaft torque

2. HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 22nd April 1991 - I.S.M.A. - TREVIGLIO (BG)

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 18.5 MPa
- Pump delivery rate at minimum pressure: 60.9 l/min

	Flow rate l/min	Power kW	Pressure MPa	Oil temp. °C
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	47.8	13.15	16	65
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	46.8	14.19	18	68

- Tapping point used for test: at rear of tractor

2.2 POWER LIFT TEST

	at the hitch point		on the frame	
Height of lower hitch points above ground in down position	200	mm	200	mm
Vertical movement	725	mm	714	mm
Maximum corrected force exerted through full range	41.20	kN	46.40	kN
Corresponding pressure of hydraulic fluid	18.5	MPa	18.5	MPa
Moment about rear-wheel axis	43.67	kNm	77.49	kNm
Maximum tilt angle of mast from the vertical	- degress		1 degress	

Lifting heights relative to the horizontal plane including the lower pivot points										
mm	- 390	- 300	- 200	-100	0	100	200	300	324	335
Lifting forces										
at the hitch points kN	41.20	42.18	45.91	48.46	50.91	52.83	55.03	58.47	-	59.25
Corresponding presure: 18.5 MPa										
at the frame kN	46.40	47.09	49.15	51.01	51.89	52.97	53.66	53.46	52.97	-
Corresponding pressure: 18.5 MPa										

3. DRAWBAR PERFORMANCE

Date of tests: 23th April - 13th May 1991 - I.S.M.A. TREVIGLIO (BG)
Type of track: concrete
Tyre size - front: 14.9 R 30 129 A8
- rear: 18.4 R 38 146 A8

	Height of hitch above ground	Tyre inflation pressure Front	Rear
Unballasted	570 mm	160 kPa	160 kPa
Ballasted	568 mm	160 kPa	160 kPa

Gear no. and group	Driving speed km/h	Power kW	Drawbar pull daN	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperature Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.1 - MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
1R	0.21	1.48	2530	2693	15	5068	0.165	30	77	96	12	70	98.5
2R	0.27	2.57	3432	2690	15	2996	0.280	30	76	96	12	70	98.5
3R	0.35	3.48	3579	2686	15	2356	0.356	29	76	97	12	72	98.6
4R	0.45	4.60	3677	2682	15	1891	0.443	30	77	97	12	71	98.4
5R	0.59	6.06	3697	2680	15	1444	0.580	33	78	97	13	72	98.7
1S	0.62	6.39	3712	2680	15	1377	0.609	33	80	99	12	71	98.7
6R	0.75	7.76	3727	2677	15	1160	0.723	33	81	99	13	70	98.4
2S	0.80	8.52	3835	2675	15	1086	0.772	34	81	98	13	68	98.3
3S	1.03	10.45	3652	2673	15	933	0.898	35	82	99	13	69	98.6
4S	1.32	13.50	3682	2669	15	741	1.131	35	82	100	13	65	98.9
5S	1.73	17.78	3700	2657	15	636	1.319	35	83	100	14	66	98.9
1N	2.12	21.52	3655	2648	15	572	1.466	34	81	99	14	66	98.8
6S	2.22	22.87	3710	2644	15	557	1.503	33	82	100	14	64	98.8
2N	2.71	27.49	3653	2636	15	495	1.694	34	82	101	14	64	98.5
3N	3.50	36.05	3709	2619	15	411	2.041	33	80	103	14	63	98.8
4N	4.44	45.51	3691	2587	15	379	2.211	33	79	102	14	61	99.0
5N	5.68	58.53	3711	2519	15	325	2.581	32	80	102	13	62	99.1
6N	7.95	61.03	2764	2514	7	317	2.643	33	81	101	14	60	99.2
1F	10.33	66.28	2310	2500	4	295	2.841	31	79	102	14	59	98.9
2F	13.50	64.60	1723	2507	3	301	2.783	33	80	102	14	60	98.9
3.2 - MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1R	0.21	1.49	2550	2693	15	5101	0.164	33	78	98	15	60	99.9
2R	0.27	2.00	2670	2691	15	3850	0.218	33	78	98	15	58	99.9
3R	0.35	3.61	3715	2686	15	2244	0.373	31	81	98	14	60	99.6
4R	0.44	5.06	4139	2679	15	1739	0.482	31	82	99	14	62	99.3
5R	0.58	6.85	4251	2676	15	1358	0.617	33	81	98	14	61	99.3
1S	0.62	7.09	4119	2680	15	1234	0.679	32	81	98	15	60	99.2
6R	0.74	8.51	4140	2674	15	1099	0.763	33	79	99	16	63	98.9
2S	0.79	9.06	4132	2676	15	1026	0.816	34	81	99	17	63	98.9
3S	1.03	11.83	4134	2671	15	826	1.015	32	83	100	16	62	98.9
4S	1.32	15.72	4288	2661	15	700	1.198	33	82	100	16	61	98.7
5S	1.72	19.67	4119	2651	15	610	1.374	35	79	101	15	62	98.7
1N	2.10	23.45	4021	2642	15	546	1.535	34	80	100	15	60	98.8
6S	2.20	26.18	4296	2634	15	519	1.613	32	81	103	14	60	98.7
2N	2.69	30.94	4141	2625	15	472	1.776	34	82	102	14	60	98.8
3N	3.48	38.02	3934	2612	15	410	2.042	31	82	102	13	62	98.9
4N	4.41	49.40	4033	2582	15	358	2.339	33	79	101	13	62	98.9
5N	5.96	60.56	3659	2508	10	318	2.636	32	79	102	13	64	98.7
6N	7.98	61.11	2758	2505	6	316	2.651	32	82	100	14	64	98.8
1F	10.20	65.83	2324	2504	5	295	2.841	33	81	100	14	64	98.9
2F	13.45	63.70	1705	2507	3	305	2.745	33	82	100	14	63	98.9
3.3.1 - FIVE HOUR TEST at 75% of pull at maximum power													
3N	6.42	48.87	2741	2587	6	357	2.347	33	83	103	15	60	99.8
3.3.2 - FIVE HOUR TEST at pull corresponding to 15% wheelslip - with 200 kg as additional ballast													
4N	4.73	51.91	3952	2594	-	-	-	31	85	104	15	63	99.7

Oil consumption during ten hours tests 3.3.1 and 3.3.2: 65 g/h

Tests 3.3.2 was carried out with additional ballast; so, the not quoted figures are irrelevant

4. TURNING AREA AND TURNIG CIRCLE

Wheel equipment front: 14.9 R 30 129 A8
rear: 18.4 R 38 146 A8
Track width front: 1800
rear: 1840

	With brakes		Without brakes	
	Right-hand m	Left-hand m	Right-hand m	Left-hand m
Radius of turning area	5.02	5.24	5.18	5.40
Radius of turning circle	4.90	5.11	5.05	5.25

5. LOCATION OF CENTRE OF GRAVITY

Height above ground	1026 mm
Distance forward from the vertical plane containing the axis of the rear wheels	1163 mm
Distance from the median plane of the tractor	0 mm

6. BRAKING

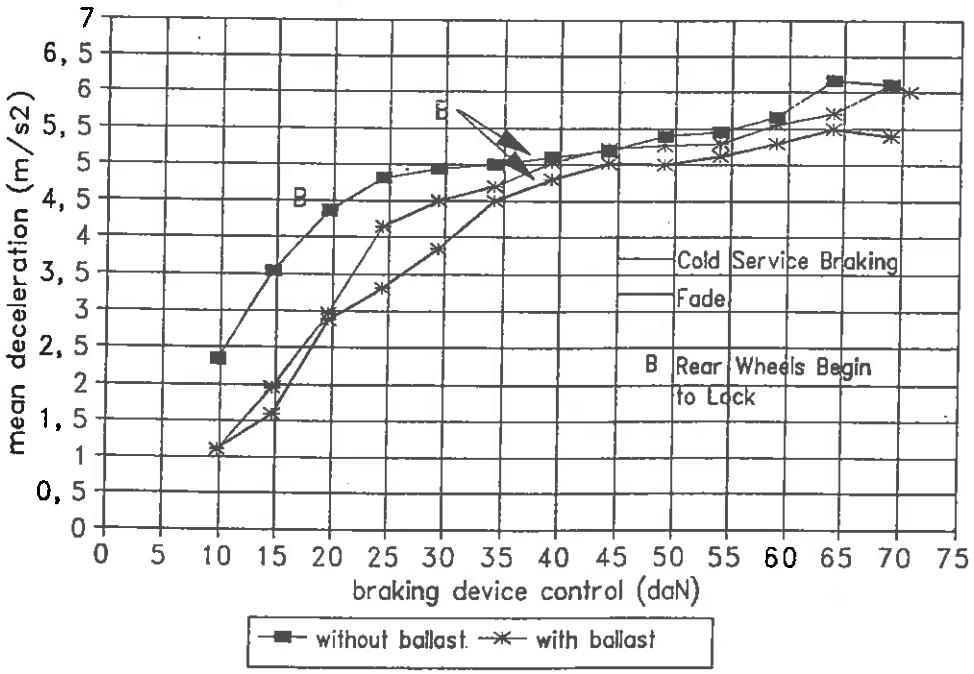
- Date of tests: 14th May 1991 - I.S.M.A. - TREVIGLIO (BG)
- Type of track: asphalt
- Type of decelerometer: PEISELER

- Tractor masses during test (*)

	front axle kg	rear axle kg	total kg
Ballasted	2715	4770	7485
Unballasted	2095	2870	4965

(*) tractor carring a driver and the decelerometer (85 kg)

6.1 Cold service braking device test - 6.2 Fade test



Cold service braking device test

	Ballasted tractor	Unballasted tractor
Speed before application of brakes (km/h)	42.1	42.1

Fade test

- Maximum deviation of the tractor from its original course: none
- Abnormal vibration: none
- Brake heating method: by means of towing the tractor for 1 km

6.3 **Parking braking device test**

	Uphill	Downhill
Braking device control force	12.75 daN	13.60 daN

7. **MEASUREMENT OF EXTERNAL NOISE LEVEL**

- Date of tests: 15th May 1991 - I.S.M.A. - TREVIGLIO (BG)
- Sound level meter:
  - . make: BRUEL & KJAER
  - . model: 2231
  - . type: impulse precision
- Type of track: concrete
- Gear number: 6 F
- Travelling speed before acceleration: 31.5 km/h
- Sound level: 85.4 dB(A)

8. **REPAIRS** = none

9. **REMARKS** = none

ADDITIONAL TEST

10. **MEASUREMENTS OF NOISE IN PROTECTIVE STRUCTURE**

Reference text: O.E.C.D. CODE V

Results of OECD test no. CSD 1261/8/NM 0404
(tractor fitted with 48 forward + 48 reverse speed gear box)

- Date of tests: 22nd June 1990 - I.S.M.A. - TREVIGLIO (BG)
- Location: ISMA-SOP - Via Milano, 43
  24047 Treviglio - (BG) Italy
- Sound level meter:
  - . make: BRUEL & KJAER
  - . model: 2231
  - . type: impulse precision
- Type of track: concrete

10.1 Table of noise levels at driver's ear at position

gear	travelling speed km/h	brake load daN	sound level dB(A)		driving axles
			a	b	
Unloaded test in the gear giving the speed nearest to 7.5 km/h					
6N lo	7.9	0	76.7	86.3	4
Unloaded test in the gear giving the maximum speed					
6F hi	42.2	0	77.0	85.6	4
Loaded test with nominal travelling speed nearest to 7.5 km/h					
6N lo	7.1	2760	77.0	86.8	4

a: all openings closed
b: all openings open

The Responsible of Homologation

R. MARENGO

The Director

S. POTECCHI

Torino, 1st September 1994

HURLIMANN 6115 VDT

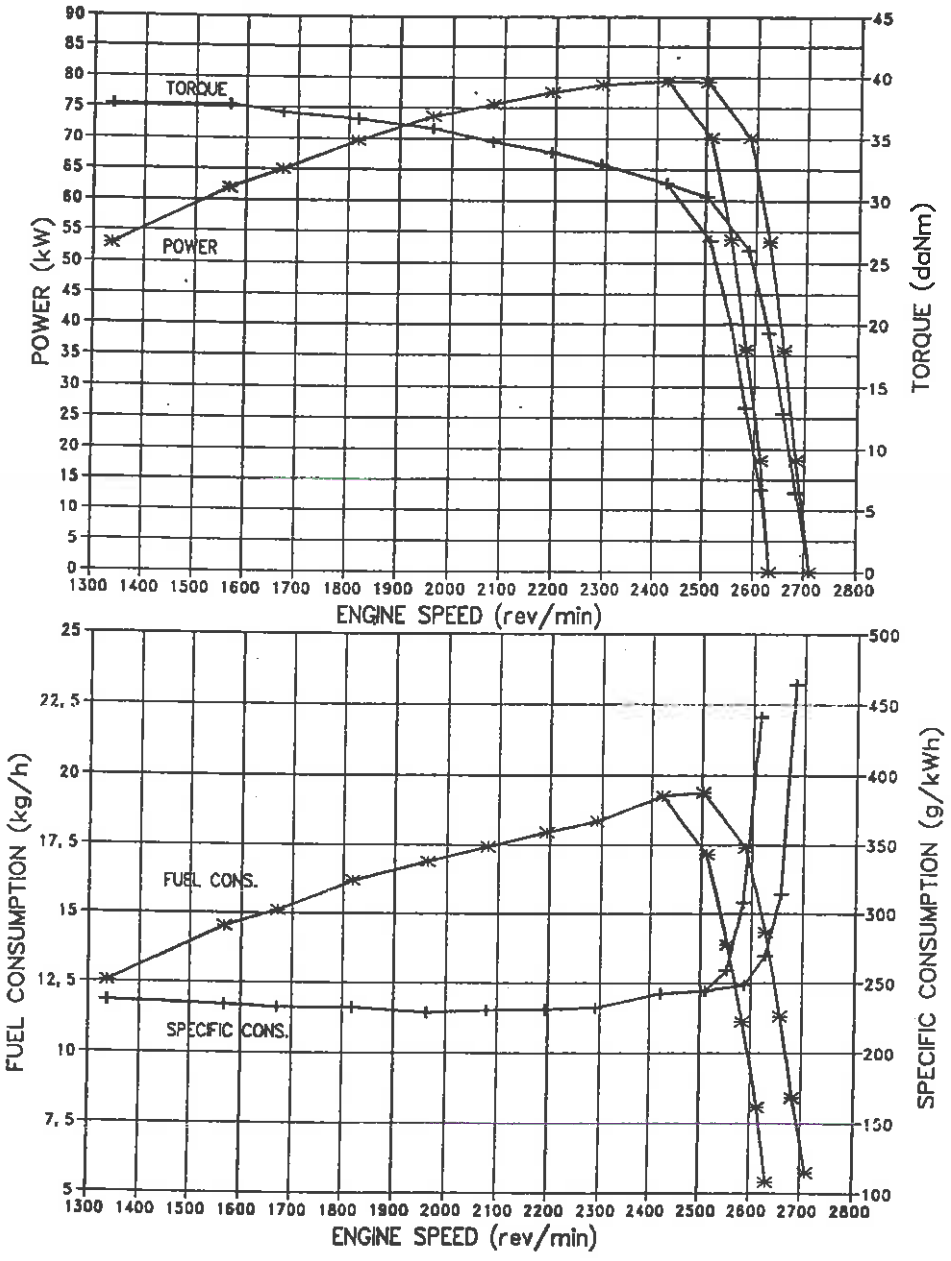


Fig. 1 - POWER TAKE-OFF TEST

HURLIMANN 6115 VDT

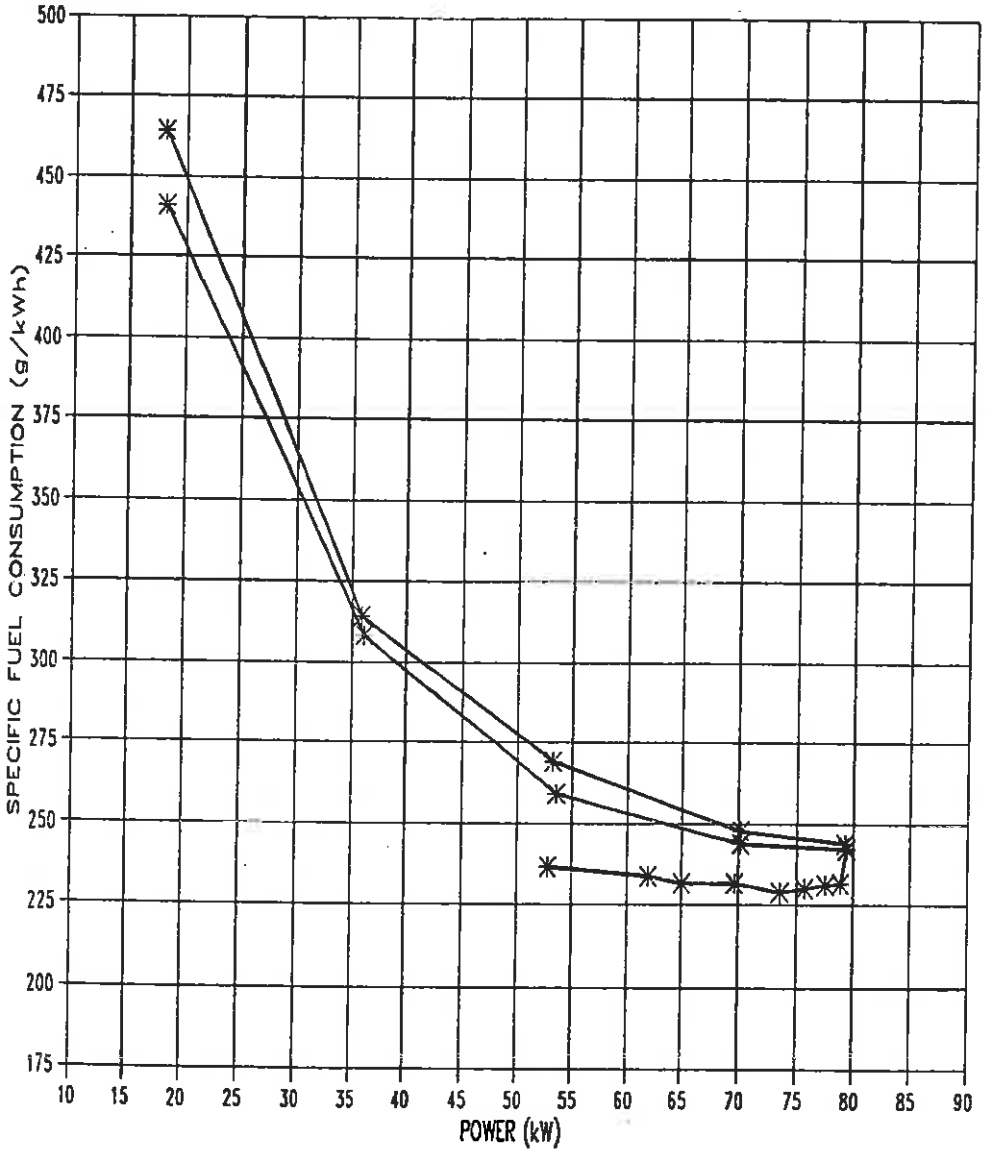


Fig. 2 - POWER TAKE-OFF TEST