O.E.C.D. Report No.: 841

BUNDESVERSUCHS - UND PRÜFUNGSANSTALT
für landwirtschaftliche Maschinen und Geräte,
Wieselburg

o. S. 25 u. S. 23

Dieseltractor URSUS Typ 1604

Date of approval: 1982 09 14

Date of tests: 1980 10 21

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

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Tractor manufacturer:	Zrzeszenie Przemyslu Ciagnikowego URSUS ul. Traktorzystow 10, 02-495 Warszawa, Poland
Submitted for test by:	Przedsiebiorstwo Handlu Zagranicznego AGROMET-MOTOIMPORT, ul. Przemyslowa 26, 00-950 Warszawa, Poland
Selected by:	Manufacturer by agreement with BVPA-Wieselburg
Place of running in:	Z.P.C. URSUS, Warszawa, Poland
Duration of running in:	50 hours

SPECIFICATION OF TRACTOR

Tractor:

Make:	Zrzeszenie Przemyslu Ciagnikowego URSUS
Model:	1604
Type:	Wheel tractor, four wheel driven, unit construction
Serial No.:	00015

Engine:

Make:	TS Martin
Model:	Z 8602
Type:	4 stroke diesel engine with direct injection, exhaust supercharged
Serial No.:	00060
Cylinders:	6, vertical in line Bore/stroke: 110/120 mm Capacity: 6842 cm^3 Compression ratio: 17 Wet liners
Valves:	Overhead valves
Fuel system:	Capacity of fuel tank appr. 195 l Fuel feed by piston pump CD1M-2237 Fuel filter: Make: Zaklady Sprzetu Motoryzacyjnego, Poland Type: two step filter, felt and paper element Model: FD 1 ORP 2.4 Injection pump: Make: MOTORPAL Type: in line fuel injection pump Model: PP6M85K1d Manufacturers production setting: 85^{+0}_{-3} mm^3/stroke at 2200 rev/min and full load

Fuel system: (cont.)	Injection timing: 24^{+2}_{-0} before TDC Injectors: Make: MOTORPAL Type: Injector with multi hole injector nozzle insert Model: Injector: VP81S453a - 2567 Insert: DOP150S428 - 4357 Injection pressure: $15,7^{\pm 0,8}$ MPa ($157^{\pm 3}$ bar)
Governor:	MOTORPAL speed governor RV1M-225/1100-2518 Mechanically acting, incorporated in injection pump Range of speed: 450 to 2450 rev/min engine speed Rated speed: 2200 rev/min
Turbocharger:	Make: Holset Type: Holset 3 LD-9/2,4, exhaust type turbocharger Pressure: up to 190 kPa (1,9 bar)
Air cleaner:	Two stage filter Main cleaner: Oil bath type with cyclonic pre-cleaner and dust container Oil quantity: appr. 2 l Oil changing interval: 100 hours
Exhaust silencer:	Own make Reflexion type, at left side of the engine, mouth upwards 2560 mm above ground, 380 mm left of median plane
Lubrication:	Forced lubrication with gear pump, strainer in sump, centrifugal oil filter RDP 3/A in full flow. Oil capacity: appr. 19 l Changing interval: 200 hours Cleaning interval of oil filter: 200 hours Recommended oil viscosity: Summer: SAE 20 W/40 CC, MIL-L-2104 B Winter: SAE 10 W/30 CC, MIL-L-2104 B
Cooling system:	Double circuit water cooling with centrifugal pump, pump and fan belt driven, 8 blade fan (dia: 460 mm) Tubular radiator Thermostat control and radiator shutter(driver operated by tow-line), cooling water thermometer Coolant capacity: appr. 23 l (25 l with cab heating) Overpressure: max. 52 kPa (0,52 bar) Joining for warm water heating
Starting system:	Electrically, solenoid engaged starter, model R 20 e, 24 V, 4,41 kW

Electrical system:	Voltage: 12 V, negative earth automatic change-over switch to 24 V for the starter motor Generator: ZELMOT, three phase type 14 V, 42 A, 588 W Batteries: 4; lead acid type, 2 + 2 in series connection, 6 V each, with totally 240 Ah at 20 hours rating Model: 3SE-120Z

Transmission:

Clutches:	Main clutch: ZBROJOVKA BRNO Single plate dry clutch, 380 mm dia, pedal operated P.t.o. clutch: Own make Wet multiplate clutch, 185 mm dia, hydraulically engaged, hand lever operated Front wheel drive clutch: Own make Wet multiplate clutch, 114 mm dia, hydraulically engaged, hand switch operated
Gearbox:	Own make, mechanically acting Torque amplifier group, 3 speed change gear, group-gear with 2 forward and 1 reverse group. Torque amplifier group, speed reduction 1,338, switched by hydraulically engaged brake band on a planetary gear. Totally: 12 forward and 6 reverse speeds
Rear axle and final drive:	Own make Central axle; pinion and bevel gear, lockable bevel gear differential, acting by planetary gears on rear wheels Differential lock: mechanically acting, hydraulically engaged, pedal operated, self disengaging
Front axle and final drive:	Own make Steering axle, unsymmetrically central axle without differential lock Front wheel driving clutch, universal joint, propeller shaft, pinion and bevel gear, bevel gear differential, double joints, planetary final gears in wheel hubs. Front wheel drive: hydraulically engaged, hand switch operated.
Switching aid circuit:	Own oil circuit with gear pump, directly driven by engine, oil supply from gearbox. Aid for p.t.o. clutch, torque amplifier group and front wheel drive clutch. Working pressure: 1,2 MPa (12 bar) Filter: working oil filtered by metal-net-felt of power lift circuit.

Oil capacity: Common oil case for gearbox, rear axle differential, hydraulic power lift and switching aid circuit: appr. 50 l
Planetary reduction of rear axle final drive: 2 x 6 l
Front drive axle differential: 3,5 l
Planetary reduction of front axle final drive: 2 x 1,25 l
Changing interval for all oils: 1600 hours or two years
Recommended oil: SAE 80 EP, MIL-L-2105, API GL-4

Total ratios and speeds:

Group	Gear No.	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for rated speed of engine km/h *)
without torque amplifier group	1 I H	214,42	2,98
	2 I H	131,57	4,85
	3 I H	78,46	8,14
	1 II H	68,42	9,33
	2 II H	41,98	15,20
	3 II H	25,03	25,50
with torque amplifier group	1 I M	286,89	2,23
	2 I M	176,04	3,63
	3 I M	104,97	6,08
	1 II M	91,55	6,97
	2 II M	56,17	11,36
	3 II M	33,50	19,06
without torque amplifier group reverse	1 H	182,47	3,50
	2 H	111,97	5,70
	3 H	66,77	9,56
with torque amplifier group reverse	1 M	244,15	2,62
	2 M	149,81	4,26
	3 M	89,33	7,15

*) Calculated with tyre index radius 770 mm

Power take off:

At rear of tractor, in median plane, 510 mm behind rear axle, 634 mm above ground (770 mm tyre index radius)
Dimensions:
1000 rev/min: ISO R 500 Type 3 (45 mm, 20 splines)

Optional:
1000 rev/min: ISO R 500 Type 2 (35 mm, 21 splines)

Proportional to engine speed (independent) p.t.o.:
Live p.t.o. driven by a mechanical control and a hydraulically engaged wet multiplate clutch, hand lever operated
Diameter of the wet multiplate clutch: 185 mm
Speed:
1000/1012 rev/min at 2174/2200 rev/min engine speed
Engine speed resp. p.t.o. speed indication by needle instrument
Direction of rotation: clockwise viewed from driving end

Proportional to ground speed (dependent) p.t.o.:
Switchable in all ratios and speeds by mechanical control and hydraulically engaged wet multiplate clutch.
Travelling distance for 1 revolution of p.t.o. shaft:
0,177 m (calculated with index radius 770 mm)
Number of p.t.o. shaft revolutions for 1 revolution of rear wheels: 27,38
Direction of rotation: clockwise in forward gears, anticlockwise in reverse gears (viewed from driving end)

Power lift:

ARCHIMEDES WROCLAW, open center type
Hydraulically acting, with single acting working cylinder (bore/stroke: 95/165 mm) and two additional working cylinders (bore/stroke: 50/305 mm)
Draft-control, position-control, pressure-control and floating position; lower link sensing
Standard linkage for categorie III; clearance zone and hydraulic linkage in accordance with ISO 730 1
Two lift rod/lower link coupling points, two stage oil pump system consisting of gear pump and piston pump, both pumps working in the same hydraulic circuit
Max. working pressure of gear pump:
$15,7^{+0,98}_{-0}$ MPa ($157^{+9,8}_{-0}$ bar)
Max. working pressure of piston pump:
$18,6^{+0,98}_{-0}$ MPa ($186^{+9,8}_{-0}$ bar)
Gear pump directly driven by engine, incorporated in clutch housing, switchable out of gear by a hand lever
Piston pump directly driven by engine
ARCHIMEDES WROCLAW control unit
Filter: One metal-net-filter in the suction pipe of the gear pump
Cleaning interval: 100 hours

Power lift:
(cont.)

Oil capacity: common oil case with gearbox: appr. 50 l
Recommended oil: SAE 80 EP, MIL-L-2105, API GL-4
Oil tappings: 2 with ARCHIMEDES WROCLAW control unit for two single acting cylinders or one double acting cylinder.

Optional (on tested tractor):
Up to 2 double acting oil circuits or 4 single acting tappings. Two tappings directly from hydraulic lift (connected with the hydraulic lift cylinder).
Max. oil requirement: 12 - 15 l

Holed drawbar:

Fitted in the clevis of the lower links of the three point linkage, category III, length 1069 mm

Dimensions of the holed drawbar		Category III
Number of holes		9
Hole diameter	mm	32
Distance between holes	mm	80 symmetrical with central hole
Thickness	mm	appr. 112
Width	mm	100

Height above ground *)

Lift rod/lower link coupling point giving	Min. lift rod length	Max. lift rod length
Max. mech. advantage	from 220 mm to 950 mm	from 10 mm to 755 mm
Min. mech. advantage	from 170 mm to 970 mm	from -35 mm to 760 mm

*) Calculated with index radius of rear wheels 770 mm

Method of changing: by power lift, lift rod and lower links
Distance of rear axle: 1080 mm (lower links horizontally)
Distance relative to p.t.o.: 570 mm behind

Pull attachement:

Trailer hitch:	Own make	
	Fork type, only for four wheel trailers without a vertical load on the pull attachement	
	Height above ground:	685/735/785/835 mm (tyre index radius 770 mm)
	Distance from rear axle:	810 mm
	Position relative to p.t.o.:	above 51 - 201 mm behind 300 mm
	Diameter of coupling pin:	30 mm
Swinging drawbar:	Height above ground:	462 mm (tyre index radius 770 mm)
	Distance from rear axle:	(2 positions) rearwards 1010/910 mm
	Lateral adjustment:	(5 positions) sym. 0/86/172 mm
	by changing the pivot point in the drawbar:	totally 10 positions
	Position relative to p.t.o.:	500/400 mm
	Diameter of coupling pin:	30 mm
	Distance of pivot point from rear axle:	305 mm
	Max. vertical load:	6900 N
Towing hitch:	Fork type	
	Height above ground:	910 mm
	Distance from front axle:	frontwards 655 mm
	Diameter of coupling pin:	30 mm
Single axle trailer hitch:	Diameter of hooks:	34 mm
	Position relative to rear axle:	behind 670 mm
	Height above ground:	415 mm
	Position relative to p.t.o.:	rearwards
	Max. vertical load:	20 600 N

Steering:

PILMET WROCLAW
Circular ball gear steering, hydraulic power assisted
Own oil circuit with paper filter in the oil case, gear pump (incorporated in clutch housing), directly driven by engine.
Changing interval of oil and filter: 800 hours
Capacity of oil case: appr. 10 l
Recommended oil: hydraulic oil, viscosity SAE 10 W Poland, PN-71/C-96057
or corresponding to VDMA 24318 type: HL 36 or HLP 36
Pump delivery rate: 20 l/min (at rated engine speed)
Working pressure: 7,85 MPa (78,5 bar)
Operated by steering wheel, acting on front wheels

Brakes:	Own make
Service brake:	Hydraulically activated dry disc brake with 4 friction-faces (dia 227 mm), acting on rear wheels, pedal operated
Parking brake:	Mechanically acting, same discs as service brake, operated by hand lever with ratchet
Steering assistance brake:	Operated by divided pedal of service brake
Trailer braking system:	Pressure air system, V-belt driven air compressor on left side of the engine, switchable out of gear by hand lever. Storage pressure: $0,58^{+0,02}_{-0}$ MPa ($5,8^{+0,2}_{-0}$ bar) Working pressure: $0,58^{+0,02}_{-0}$ MPa ($5,8^{+0,2}_{-0}$ bar) Storage capacity: 20 l Activated by service brake or parking brake
Wheels:	
Front wheels:	2 pneumatics, steering and driving function, radial carcass 14,9/13 - 24 (R), 6 PR; rim: W 12 x 24 Maximum permissible load on each tyre: 14 815 N at 1,4 bar inflation pressure 21 100 N at 1,7 bar inflation pressure for front-implement working, with speed limit of 8 km/h Track width: 1710 mm
Rear wheels:	2 pneumatics, driving function, radial carcass 18,4/15 - 34 (R), 8 PR; rim: W 15 L x 34 Maximum permissible load on each tyre: 25 165 N at 1,4 bar inflation pressure 21 760 N at 1,1 bar inflation pressure Track width: 1500 mm (1725 mm by reversing wheels)
Wheel base:	2695 mm

Lighting: Unrestricted beam angle of head light in plan view: 92 mrad (5, 27°)

	*) Height above ground of centre mm	Dimension mm	Distance from outside edge of tractor to centre mm
Head lights	1200	125 dia	895
Side lights	1790	60 × 60	275
Rear lights	1390	100 × 100	325
Reflectors	1040	dia 75	240
Back light right side	1540	dia 140	330
Brake lights	1390	100 × 100	425
Direction indicator in the front in the rear	 1790 1390	 60 × 75 90 × 95	 235 280

*) Measured with tyre index radius at rear 770 mm and 590 mm at front
Overall width of tractor 2160 mm (measured on front wheels).

Number of grease points: 29

Driver seat: Own make
Model 83.342.000
Seat pan guided backside with 2 rolls in a vertical column and mounted on a swinging bar on the bottom side forward.
Suspension with a helical compression spring in the column.
Drivers weight adjustable with a hand-wheel
Hydraulically damping
Horizontal adjustment range: 150 mm
Vertical adjustment range: 3 steps, total 60 mm

Safety cab: AGROMET, FMR-Kunow
Model 88.361.000
Rubber block mounted, with seat for driver and passenger, with roof, windscreen, front glasses, rubber floor, doors, side and rear glasses, air ventilation and warm water heating. Roof and rear glass can be turned up.
Strength tested according to OECD-Code (identical to Austrian national legislation)
OECD-Nr.: CSD 0534/1-a (c)

CONDITIONS DURING TEST

Tractormass:

Tractor without driver but with tanks full and safety cab

	Front	Rear	Total
Without ballast	1954 kg	2956 kg	4910 kg
With ballast	3280 kg	3941 kg	7221 kg

Ballastmass:

	Number and position of weights	Total mass (excluding water)	Water
Front	4 inside of the front-facing	107 kg	320 kg
	7 below the front-facing	159 kg	
	15 in front on an additional frame	545 kg	
Rear	2 x 8 full pieces in the wheel-hubs	540 kg	640 kg
Additional	-	-	-

Track setting and tyre equipment:

1710 mm at front
1500 mm at rear
Front wheels: 14,9/13 - 24, 6 PR (R)
Rear wheels: 18,4/15 - 34, 8 PR (R)

Overall dimensions:

	Length	Width*)	Height**)
	mm	mm	mm
With ballast	4950	2155	2550
Without ballast	4400	2155	2550

*) measured on the front axle (on the outside of the tyres)

Minimum ground clearance**):
440 mm under front axle
460 mm under the crankshaft case
390 mm under the hitch mounting plate
350 mm under the hitch hook

**) with index radius 770 mm at the rear and 590 mm at the front tyres.

Fuel and lubricants used in test:

Fuel:	ELAN Diesel fuel (according to DIN 51601 and ÖNORM C 1104) specific gravity at 15°C: 0,828 kg/l Viscosity at 20°C: 3 cSt (3 mm^2/s) Cetan no.: 48 (ÖNORM C 1104)
Engine oil:	Superol CC SAE 20 W/40 Viscosity at 100°C: 14,5 mm^2/s (14,5 cSt)
Transmission and hydraulic oil:	Hipol 6 SAE 80 EP Viscosity at 50°C: 48 mm^2/s (48 cSt)
Steering oil:	Hydraulic oil Viscosity SAE 10 W Poland, PN-71/C-96057 or corresponding to VDMA 24318 type HL 36 or HLP 36

COMPULSORY TESTS

1. Main power take-off performance

Date and location of tests: 1980 10 21
Type of dynamometer: SCHENK-eddy current brake - W 780

Main test on: P.t.o., ISO R 500 Type III - 1000 rev/min p.t.o.

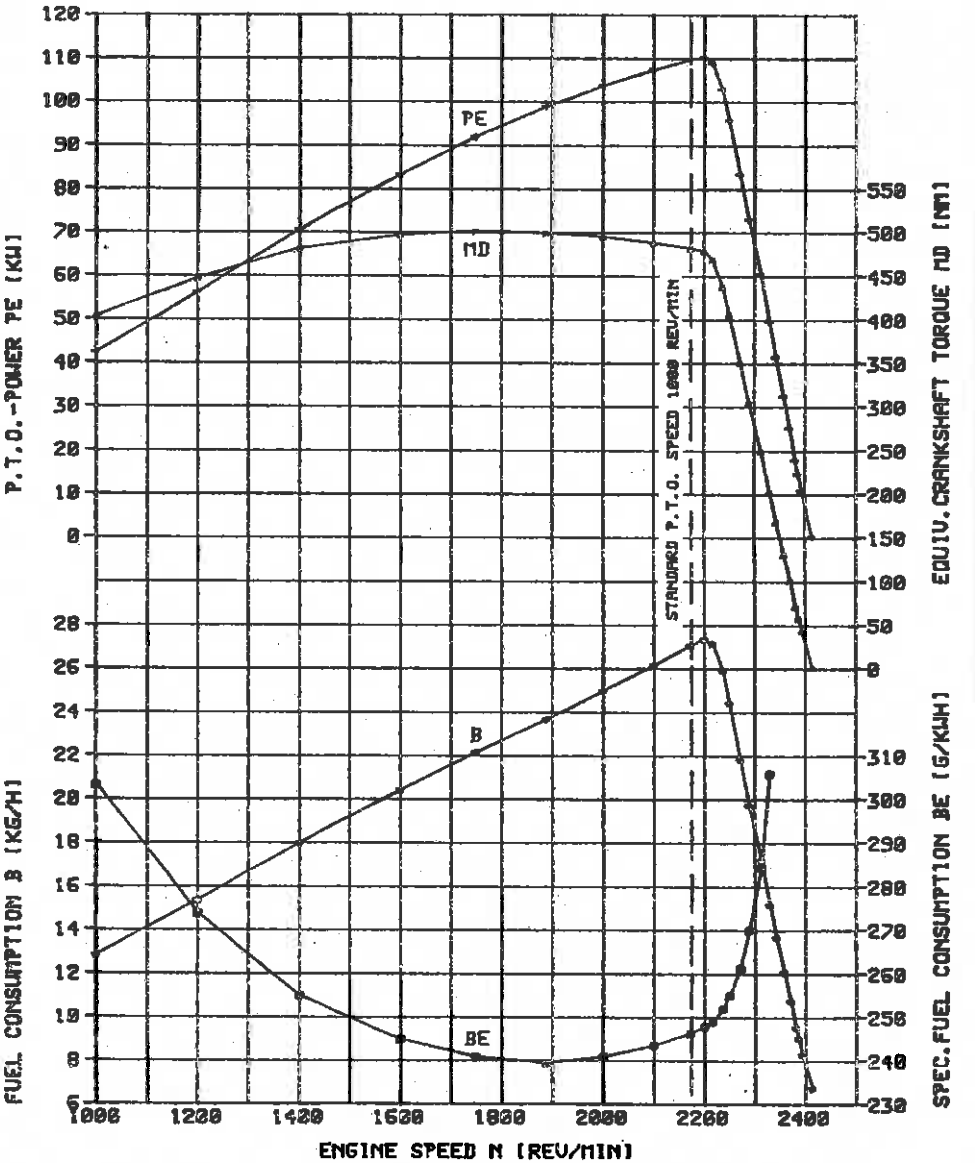
Power	Speed		Fuel consumption		
	engine	p.t.o.	total	specific	specific
kW	rev/min	rev/min	kg/h l/h	g/kWh	kWh/l
MAXIMUM POWER					
Maximum power - 2 hours test					
110,31	2200	1012	27,35 33,04	248	3,339
Standard p.t.o. speed					
109,80	2174	1000	27,06 32,69	246,5	3,359
The speed recommended by the manufacturer for drawbar work					
110,31	2200	1012	27,35 33,04	248	3,339
PART LOADS Governor hand lever in position giving maximum power					
(i) 85 % of torque at maximum power					
95,89	2250	1035	24,45 29,53	255	3,247
(ii) unloaded					
-	2415	1111	6,76 8,17	-	-
(iii) 50 % of the load defined in (i)					
49,63	2331	1072	15,19 18,34	306	2,706
(iv) maximum power					
110,31	2200	1012	27,35 33,04	248	3,339
(v) 25 % of the load defined in (i)					
25,29	2370	1090	10,78 13,01	426	1,944
(vi) 75 % of the load defined in (i)					
73,18	2289	1053	19,76 23,86	270	3,067

PART LOADS Governor hand lever in position giving standard p. t. o. speed at full load
Because the little difference (24 r. p. m.) between the engine speed at standard p. t. o. speed and the engine speed at maximum power there was not to find a certain governor characteristic at part load. The governor oscillates from part load to full load. The values of the table "PART LOADS - governor hand lever in position giving maximum power" are nearly identically.
STANDARD SPECIFIC FUEL CONSUMPTION: 255/306 g/kWh

No load maximum engine speed: 2415 rev/min
Equivalent crankshaft torque
at maximum power: 478,81 Nm
Maximum equivalent crankshaft torque: 502,08 Nm at 1750 rev/min

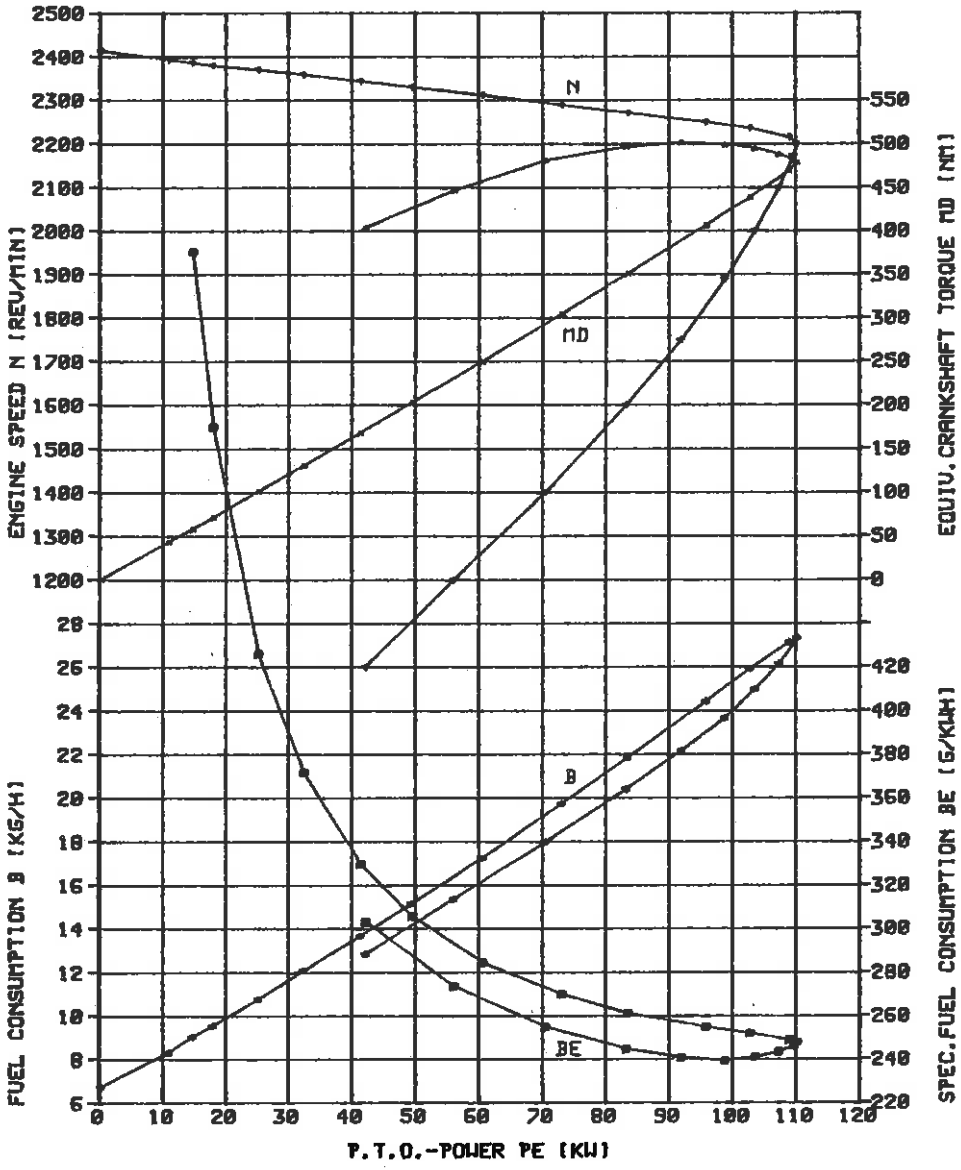
Mean atmospheric conditions:	temperature:	18°C
	pressure:	1000 mbar
	humidity:	59 %
Maximum temperatures:	coolant:	85°C
	engine oil:	117°C
	fuel:	67°C
	air intake:	20°C

BUNDESVERSUCHS-U. PRUEFUNGSANST. FUER LANDL. MASCHINEN U. GERATE WIESELBURG/ERLAUF, AUSTRIA PROT.NR.: 086/82	P.T.O.-TEST	URSUS TYP 1604 MOT.TYP Z 8602



ENGINE SER.NR.: 8602-00060	ATM.PRESSURE : 750 MMHG	FUEL TEMP.: 67 C	SIGNATURE
TRACTOR SER.NR.: 00013	AIR TEMPER. : 18 C	D.OF TESTS: 1980-10-21	
FUEL : 0.828/20 C	COOLANT TEMP.: 85 C	TEST NO. : 131/ZA 127	
ENGINE OIL : SUPEROL CC SAE 20	OIL TEMP. : 117 C	CURVES NO.: 1	REITHER

BUNDESVERSUCHS-U.PRUEFUNGSANST. FUER LANDW.MASCHINEN U.GERATE WIESELBURG/ERLAUF, AUSTRIA PROT.NR.:086/82	P.T.O.-TEST	URSUS TYP 1604 MOT.TYP Z 8602



ENGINE SER.NR.: 8602-00060	ATM.PRESSURE : 750 MMHG	FUEL TEMP.: 67 C	SIGNATURE
TRAKTOR SER.NR.: 00015	AIR TEMPER. : 19 C	D.OF TESTS: 1980-10-21	
FUEL : D.028/20 C	COOLANT TEMP.: 85 C	TEST NO. : 131/20 127	
ENGINE OIL : SUPEROL CC SAE 20	OIL TEMP. : 117 C	CURVES NO.: 2	REITHER

DVR.:0100046-DL303;MK0856;MK028-22

2. Drawbar performance

Date of tests: 1980 10 27, 1981 03 30
Type of track: Concrete
Height of drawbar above ground: 380 mm ballasted, 400 mm unballasted

Gear No.	Speed	Power	Drawbar pull	Engine speed	Slip of wheels	Fuel consumption		Temperatures			Atmosph. conditions		
						specific	specific	Fuel	Coo-lant	Engine Oil	Tempe-rature	rel.hu-midity	Pres-sure
	km/h	kW	N	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	mbar
(i) Maximum power (ballasted) tyre inflation pressure in the front 1,4 bar, in the rear 1,4 bar													
1 I M	1,997	38,50	69399	2332	15	-	-	59	85	105	23	59	988
1 I H	2,642	50,93	69406	2305	15	2,340	354	60	85	106	24	58	988
2 I M	3,184	61,39	69402	2281	15	2,451	338	61	85	107	24	58	988
2 I H	4,173	80,45	69394	2234	15	2,549	325	61	86	110	25	56	988
3 I M	5,334	91,88	62004	2200	12	2,780	298	61	86	112	25	57	988
1 II M	6,267	94,44	54251	2200	9,8	2,857	290	60	85	109	24	58	988
3 I H	7,448	96,51	46650	2200	8,1	2,923	283	60	85	110	24	57	988
1 II H	8,657	97,41	40506	2200	6,9	2,950	280,5	59	84	109	23	58	988
2 II M	10,691	97,26	32753	2200	5,6	2,946	281	59	83	107	22	59	988
2 II H	14,546	95,25	23573	2200	4	2,885	287	58	82	102	22	61	988

Gear No.	Speed	Power	Drawbar pull	Engine speed	Slip of wheels	Fuel consumption		Temperatures			Atmosph. conditions		
						specific	specific	Fuel	Coo-lant	Engine Oil	Tempe-rature	rel.hu-midity	Pres-sure
	km/h	kW	N	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	mbar
(ii) Five-hour-test at 75 % of pull at maximum power													
1 II H	9,069	76,55	30387	2271	5,2	2,834	292	66	81	109	21	55	994
(iii) Five-hour-test at pull corresponding to 15 % wheelslip in test (i)													
2 I H	4,146	79,90	69374	2230	15	2,516	329	71	88	116	24	58	975
(iv) Maximum power (unballasted) tyre inflation pressure in the front 0,9 bar, in the rear 1,1 bar													
3 I M	5,270	73,34	50104	2250	15	2,481	333,5	60	85	105	18	66	993
1 II M	5,979	83,21	50102	2227	15	2,584	320,5	60	84	105	18	65	993
3 I H	7,161	89,21	44848	2200	11,7	2,699	306,5	61	85	105	17	66	993
1 II H	8,407	93,18	39899	2200	9,6	2,822	293,5	60	85	104	17	67	993
2 II M	10,489	95,81	32885	2200	7,4	2,902	285,5	61	85	105	18	66	993
2 II H	14,398	96,51	24130	2200	5	2,923	283	61	86	106	20	64	993
3 II M	18,293	95,30	18755	2200	3,7	2,887	287	61	86	106	21	63	993
3 II H	24,782	92,10	13380	2200	2,5	2,790	297	60	85	107	21	64	993

Total oil consumption during 10 hours duration of tests (ii) and (iii): 138 g/h

3. Turning space and turning circle

Wheel equipment front: BARUM 14,9/13 - 24 (R), 6 PR, rim: W 12 x 24
rear: BARUM 18,4/15 - 34 (R), 8 PR, rim: W 15 L x 34

Track of wheels front: 1710 mm
rear: 1500 mm

Results *)	With brakes		Without brakes	
	right-hand	left-hand	right-hand	left-hand
	m	m	m	m
Radius of turning space	5,03/5,62	5,51/5,30	6,89/6,48	6,40/5,98
Radius of turning circle	4,73/5,32	5,21/5,00	6,59/6,18	6,10/5,68

*) Four-wheel drive switched: ON/FF

4. Location of centre of gravity

	mm
Height above ground	995
Distance forward from the vertical plane containing the axis of the rear wheels	1067
Distance from the median plane, left-side	1

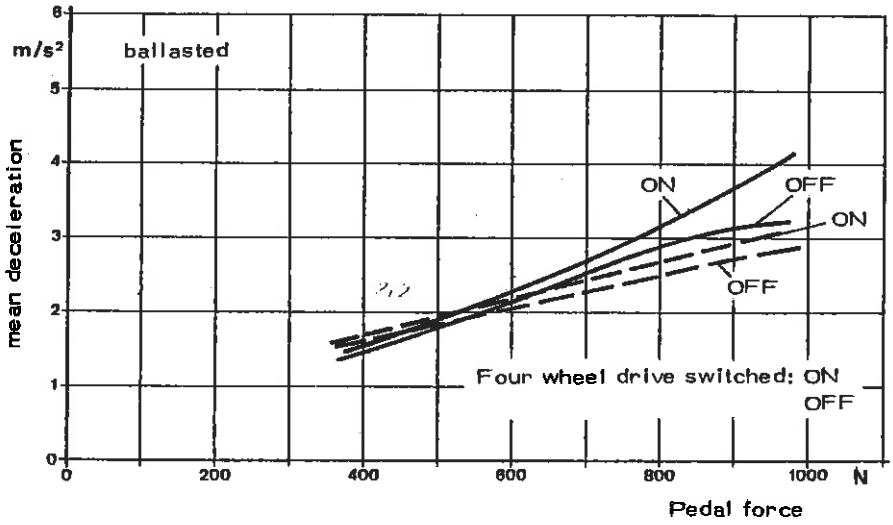
5. Braking

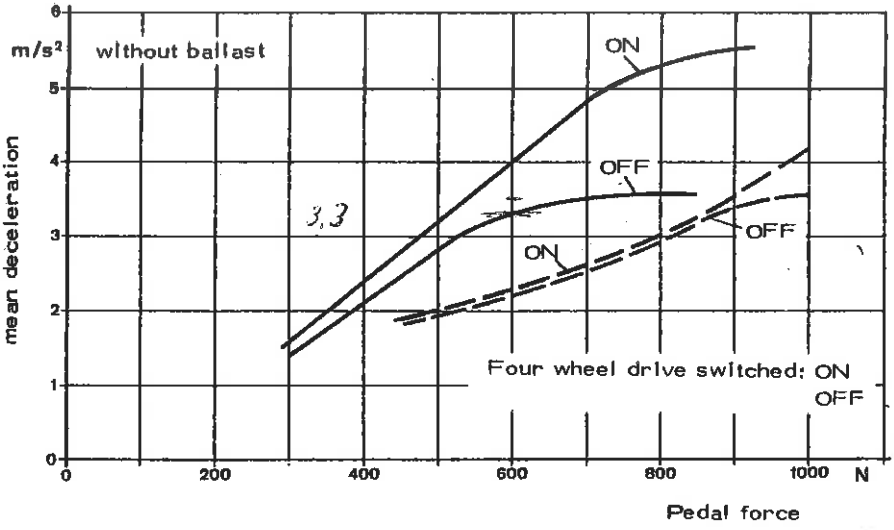
Date of tests: 17. 11. 1980
Type of track: Concrete
Type of decelerometer: Moto-Meter Nr. 03382 (Kombi-Schreiber)
Tractor masses during brake tests (with driver):

	Front kg	Rear kg	Total kg
Ballasted	3292	4004	7296
Unballasted	1966	3019	4985

Service brake

Four wheel drive switched on and off
Type-0-test (cold brakes)——, Type-I (fade) test — — —





Speed before application of brakes: 25 km/h
The tractor brakes were heated by towing of the tractor for 1 km

Parking braking device test

	Ballasted tractor on 18 % slope		Unballasted tractor on 12 % slope with trailer of 3000 kg	
	up	down	up	down
Braking device control force	245 N	170 N	355 N	295 N

6. Measurement of ambient noise level

Date of tests: 1980 11 17
Type of sound level meter: 2203 BRÜEL & KJAER
Type of track: Concrete

Results of tests:
Gear: Without torque amplifier group 3 II (high 3 II)
Travelling speed before acceleration: 19,4 km/h
Sound level: 89 dB(A)

7. Noise measurement at the driver's ear

Date of tests: 1980 11 17
Type of sound level meter: 2203 BRÜEL & KJAER
Type of track: Concrete
Cab fitted and completly closed

Results of tests:

Gear	Drawbar pull at which the tractor develops the max. sound level	Measured travelling speed	Sound level
	N	km/h	dB(A)
1 I L	28060	2,44	92
1 I S	27510	3,25	90
2 I L	37040	3,95	91,5
2 I S	46780	5,23	91,5
3 I L	21 8040	6,18	92
1 II L *)	light load	7,10	91,5
1 II L	36 3300	6,40	93,5
3 I S	32 4630	7,72	93
1 II S	25 2680	9,19	92
2 II L	27 9550	10,83	92,5
2 II S	16 7890	15,14	94
3 II L	12 3870	19,23	93
3 II S	9 1370	25,90	95
3 II S	light load	26,10	94,0

*) The 1 II L gear corresponds to the nominal travelling speed nearest to 7,5 km/h.

8. Power lift and hydraulic pump performance

Date and location of tests: 1981 08 05 and 1982 05 25, Wieselburg, Austria
Hydraulic fluid:
Make and type: Poland, HIPOL 6, SAE 80 EP
Viscosity at 50°C: 48 mm^2/s (48 cSt)
Type of linkage lock for transport: hydraulically, with system-selection lever on position control and lever for inner circuit in vertical position.

Hydraulic pump performance:

(i) Sustained pressure of the relief valve: 190 bar
Opening pressure of the relief valve: from 190 bar to 200 bar

(ii) Pump delivery rate at minimum pressure and rated engine speed:
gear pump: 35 l/min
piston pump: 4 l/min

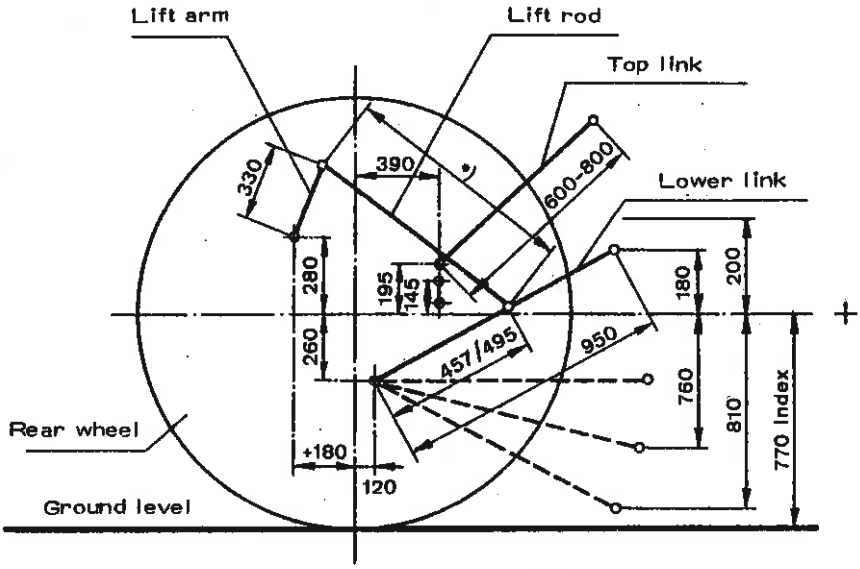
(iii) Gear pump
Pump delivery rate: 32 l/min
Delivery pressure: 157 bar

Piston pump
Pump delivery rate: 4 l/min
Delivery pressure: 190 bar

Calculated pressure for hydraulic power lift: 17,1 MPa (171 bar)
(90 % of sustained pressure)

Max. hydraulic power:
Pressure: 90 % of 157 bar = 141,3 bar
Power of gear pump: 7,54 kW
Power of piston pump: 0,94 kW
} 8,48 kW

Max. hydraulic power about a oil pressure of 141,3 bar
Piston pump:
Pump delivery rate: 4 l/min
Delivery pressure: 90 % of 190 bar = 171,1 bar
Hydraulic power: 1,11 kW



*) Length adjustable: left lift rod: from 550 to 700 mm with thread
right lift rod: from 550 to 650 mm with gear and thread

Adjustment during test: 585 mm

	**)Height of lower hitch point above ground in down position mm	Vertical movement mm	Max. force exerted through full range kN	Corresponding pressure of hydraulic fluid MPa	Moment about rear axle kNm	Max. tilt angle of mast over range of lift degrees
At hitch points	200/130	700/752	50,0/47,7	17,1 (171 bar)	53,5/51,0	-
On the frame	200/130	700/752	39,25/37	17,1 (171 bar)	66,0/62,0	13° (from -3° to +10°)

**) with lift rod length of 585 mm and max./min. mechanical advantage

Linkage geometry when connected to the standard frame (mast height 560 mm)

		Maximum mechanical advantage		Minimum mechanical advantage	
Projected length in side view					
Lower links	mm	950		950	
Lift arms	mm	330		330	
Lift rods	mm	585		585	600?
Top link	mm	705		705	
Distance of lift rod connection point from pivot point of lower link	mm	495		457	
The following dimensions are given relative to the rear wheel centre line, situated 770 mm above the ground level					
Lower link pivot point	mm	120 behind	260 below	120 behind	260 below
Top link pivot point	mm	390 behind	195 above	390 behind	195 above
Lift arm pivot point	mm	180 behind	280 above	180 behind	280 above
Maximum und minimum height of lower link hitch points	mm	130 above	570 below	112 above	640 below
Height of lower link hitch points locked in transport position	mm	from 130 above to 570 below		from 112 above to 640 below	

Performance of power lift

Lifting heights in relation to a horizontal line through the lower link pivoting point mm		-417	-380	-335	-200	-100	0	+100	+150	+200	+275	+350	+370	+425	+460
Lifting force at the hitch-points kN (Values for the pressure, calculated with 90 % of sustained oil pressure)	max. mech. advantage			54,55	53,45	52,65	52,20	51,50	51,20	51,00	50,50	50,15	50,00		
	min. mech. advantage	49,60	49,40	49,10	48,80	49,00	48,35	48,00	48,15	48,25	48,15	47,70			
	Maximum force exerted through whole range: 50,00/47,70 kN (5100/4860 kp)														
	Calculated oil pressure: 17,1 MPa (171 bar)														
Lifting force at the standard frame 560 mm mast height, 610 mm behind lower links hitch-point kN (Values for the pressure, calculated with 90 % of sustained oil pressure)	max. mech. advantage			50,60	48,45	47,25	45,25	44,15	43,30	42,60	41,40	39,80	39,60	39,25	
	min. mech. advantage		49,50	48,85	46,70	45,20	43,75	42,40	41,60	40,90	39,80	38,85	38,10	37,70	37,00
	Maximum force exerted through whole range: 39,25/37,00 kN (3850/3770 kp)														
	Calculated oil pressure: 17,1 MPa (171 bar)														