Institut za mehanizaciju poljoprivrede – Zemun

O.E.C.D. Report No 1116
Printed: February 1988

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



Agricultural Tractor IMT–545 DE LUXE (2 WD)

Manufactured by: IMT – Industrija Mašina i Traktora
Novi Beograd – Yugoslavia

Date of test: May – June 1987

This Bulletin is based on engineering tests in accordance with the O.E.C.D. STANDARD—CODE for the Official Testing of Agricultural Tractors.

It does not contain an evaluation of the performance of the tractor on practical work.

This Report has been aporoved by the O.E.C.D. Co-ordinating Centre (CEMAGREF, France) as being in accordance with the O.E.C.D. STANDARD–CODE.

Date of Approval January 13th, 1988

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Printed in Yugoslavia

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Tractor manufacturer:	IMT - Industrija Mašina i Traktora Novi Beograd - Yugoslavia
Submited for test by:	The manufacturer
Selected by:	Representatives of IMP
Place of running-in:	Laboratory of IMP
Duration of running-in:	cca 65 hours

SPECIFICATION OF TRACTOR

TRACTOR

Make:	IMT
Model:	IMT - 545 DE LUXE (2 WD)
Type:	Standard-unit construction, four wheels, rear wheels driven
Serial N°:	501 000 277 (Start of series)

ENGINE

Make:	IMR - Industrija Motora Rakovica
Model:	DM 33
Type:	Four stroke, water cooled diesel, direct injection, naturally aspirated
Serial N°:	6604
Cylinders:	3, vertical, in-line, bore 91,4 mm, stroke 127 mm, displacement 2500 cm^3, compression ratio 16,5:1, overhead valves, replaceable dry cylinder liners
Fuel system:	IPM membrane type feed pump with hand primer and sediment bowl, two CAV-DONIT paper element fuel filters on the pressure side of feed pump, first filter with sediment bowl; fuel tank capacity 50 l; CAV-IPM distributor type DPA 3238F 230 injection pump, serial N° 12358 FCG, manufacturer's production setting 50-52 mm^3/stroke at rated engine speed and full load; injection timing 20° before T.D.C.; CAV-IPM injector nozzles of multi hole type (four holes), model EE, injection pressure setting 18,6 ± 5 MPa

Governor:	CAV-IPM, mechanical, all range, incorporated in fuel injection pump, governed range of engine speed 5oo to 24oo rev/min, rated engine speed 225o rev/min
Air cleaner:	DONALDSON-TPR dry paper element filter with maintenance indicator; horizontal, with air inlet bellow bonnet in front of the engine; signal light of maintenance indicator on the instrument panel
Lubrication system:	Forced feed from excentric rotor pump; oil filter with replaceable cartridge; recommended oil and filter change period 25o hours; recommended oil quality acc. MIL-L-21o4 A -2o°C to - 5°C SAE 1o - 5°C to +3o°C SAE 2o or SAE 15W4o over 3o°C SAE 4o or SAE 15w4o Oil capacity 5,5 l
Cooling system:	Water cooling with impeller pump, pressurized system set to 5o KPa overpressure; fan with 6 blades 4o6 mm dia; water capacity 13,5 l; temperature control by piston type thermostat;
Starting system:	Electrical, LUCAS-TVS solenoid-engaged starter motor 2SM 114 or ISKRA solenoid-engaged starter motor AZJo4o4 12V, 3kW Z1o; heating plug in intake manifold as aid for cold starting; hand lever of speed selector in neutral position as starting safety device
Electrical system:	12 Volt, negative earth; 3-phase alternator ISKRA AAG 13o2, 14V, 28A 1 lead acid battery, 97 Ah at 2o hours rating
Exhaust:	Vertical, on the left hand side of tractor's body; single chamber expansion type silencer with 85 mm dia and 5oo mm length; exhaust outlet 5o mm dia, with mouth showing upwards, 255o mm above ground

TRANSMISSION

Clutch: KRON - Novi Beograd;
dry dual friction disc type double acting clutch, tractor drive disc dia 300 mm, p.t.o. shaft drive disc dia 228,6 mm, mechanically pedal operated

Gearbox: Own make;
mechanical, 3 forward and 1 rewerse gear, all gears with sliding gears; low and high speed selector of epicyclic (planetary) type;
N° of speeds (totally):
6 forward
2 reverse

Rear axle: Own make;
bevel gear drive with crown wheel and pinion;
bevel gear type differential with lock pedal operated, self disengaging

Front axle: Own make;
steering axle of telescopic type, not driven;
track width adjustable in steps

Oil capacities: Gearbox (with hydraulic power lift) and rear axle 33,0 l

Recommended oil qualities: Hydraulic transmission oil Galax Traktol HT, INA TRANSHIDROL 85 or HENA Traktol M 80, or engine oil acc. to MIL-L-2104 C;
oil changing interval 800 h;
oil filter cleaning interval 800 h;

Power take-off

Main P.T.O. Semi-independent p.t.o.;
driven by the pedal operated second disc of the double acting clutch;
at rear of tractor, in the median plane, height above ground 463 mm (with 12,4-28 rear tyres and radius index 590 mm);
distance of the p.t.o. shaft end from the rear axle centre line:
- below 127 mm
- behind 261 mm

	dimensions 35 mm Ø, 6 splines, acc. to ISO 5oo type 1 and JUS M.L1-6o1;
Proportional to engine speed p.t.o.:	Standard p.t.o. speed 54o rev/min; direction of rotation clockwise, viewed from tractor rear; p.t.o. speeds may be set by aid of tractormeter

p.t.o. speed rev/min	engine speed rev/min	transmission ratio engine: p.t.o.
54o	1982	3,67 : 1
613	225o	

Power restriction and maximum torque:	Maximum engine power and torque equivalent to maximum engine torque
Ground speed p.t.o.:	Driven by rear axle drive, sense of rotation clockwise, at forward movement

p.t.o.	travel distance per p.t.o. revolution m	number of p.t.o. revolutions per rear wheel revolution
54o	o,51	7,31

Maximum torque: 95o Nm

Total ratios and speeds

Gear	Total ratio engine: driving wheel	Nominal travelling speed at rated engine speed km/h	at standard p.t.o. speed 54o rev/min km/h
Forward speeds			
1 low	2o9,67	2,39	2,11
2 low	139,78	3,58	3,15
3 low	76,24	6,56	5,78
1 high	52,42	9,55	8,41
2 high	34,94	14,32	12,62
3 high	19,o6	26,26	23,13
Reverse speeds			
low	153,95	3,25	2,86
high	38,49	13,oo	11,45

Calculated with the driving wheel radius index 59o mm

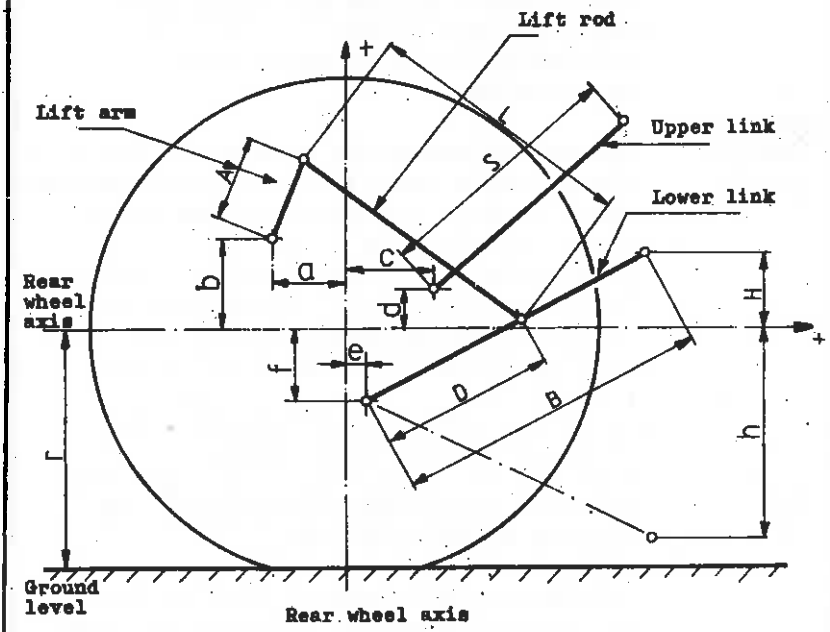
Belt pulley: Available optionally:
located at rear of tractor, connected to p.t.o. shaft;
width 165 mm, diameter 286,6 mm;
speeds at rated engine speed (2250 rev/min)
linear 1006 m/min
rotational 1118 rev/min
engine speed at standard belt pulley speed (945 m/min) 2113 rev/min;
direction of rotation clockwise viewed face of pulley

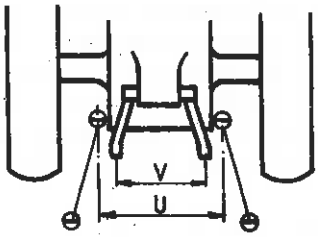
Power lift:

Hydraulic system: Four cylinder piston pump of boxer type with 26,4 cm^3/rev delivery, located in central housing, driven by p.t.o. shaft front end, with control valve at suction side;
control valve for lifting and sinking, draught control, position control, both stepless mixable;
opening pressure of relief valve 17,5 MPa
sustained pressure by the opened relief valve 18,0-18,5 MPa;
no cylinder safety valve exist; single acting ram with 83 mm bore, 121 mm stroke;
4 external oil tappings, single or double acting at rear of tractor available optionally (not fitted on the tested tractor);
hydraulic oil tank in common with gearbox, oil capacity 33 l, max 5 l may be taken off through oil tappings when tractor is mooving, 10 l when tractor is stationary;
strainer in hydraulic pump suction line, every 500 working hours maintained by washing;
optional (not fitted on the tested tractor) hydraulic system with own gear pump, pump delivery 33 l/min at 2250 rev/min engine speed; opening pressure of relief valve 16 MPa;

Implement linkage: See pages 6 and 7

Implement linkage: Three point linkage, joint balls category 1 acc. to ISO 730/I





Dimensions of implement linkage (projected lengths, in mm)
underlined dimensions are valid for power lift test, page 23

Rear tyres (size 12,4 - 28)	radius index	(r)	59o
Front tyres (size 6,oo - 16)	static radius	(r')	324
Length of lift arms		(A)	256
Length of lower links		(B)	864
Distance of lift arm pivot point from rear wheel centre line	horizontally	(a)	196
	vertically	(b)	241
Horizontal distance between the 2 lower link points		(u)	46o
Horizontal distance between the 2 lift arm end points		(v)	535
Length of upper link		(S)	575 to 77o, 69o
Distance of upper link pivot point from rear wheel centre line	horizontally	(c)	13o
	vertically	(d)	278
Distance of lower link pivot point from rear wheel centre line	horizontally	(e)	-45
	vertically	(f)	114
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	374
Length of lift rods		(L)	5oo

Height of lower link hitch points relative to rear axle centre line (situated 59o mm above ground) in mm

These data are velid for unloaded power lift

		lift rod length L
		5oo mm
Lowest position	(h)	37o mm
Highest position	(H)	3oo mm
Transport position	(H')	3oo mm

Pull attachment

Holed bar: Fitted on the clevis of lower links;
length between ball joints 66o mm;
thickness of the bar 3o mm, width 7o mm;
centre hole and 4 holes on either side in 48 mm steps;
all holes with 2o mm diameter;
height above ground adjustable by power lift within the range from 22o to 89o mm continuoslly;
mechanically lockable in all positions within the range from 28o to 61o mm above ground by means of two supporting bars with adjustable lengts;
distance of centre hole with lower links in horizontal position:

from rear axle:

horizontal	82o mm behind
vertical	114 mm below

from p.t.o. shaft end

horizontal	559 mm behind
vertical	13 mm above

Trailer hitch: Automatically acting by means of power lift;
height above ground 326 mm in working position;
distance of hitch centre

from rear axle:

horizontal	39o mm behind
vertical	264 mm below

from p.t.o. shaft end

horizontal	129 mm behind
vertical	137 mm below

diameter of the coupling pin 3o mm;
maximum admissible vertical load 15oo daN

Towing hitch: Fixted:
height above ground 665 mm;
distance of the hitch centre:
from the rear axle
horizontal 608 mm behind
vertical 75 mm above
from the p.t.o. shaft end
horizontal 347 mm behind
vertical 202 mm above
diameter of the coupling pin 30 mm

NOTE:

1° All pull attachment heights are given for the radius index of rear wheels 590 mm (12,4-28 tyres).

2° Holed bar, trailer hitch and towing hitch are available optionally.

Steering: PPT-ORSTA
hydrostatic steering model LAG B63,
with own oil circuit;
engine driven pump with constant delivery 12 l/min, maximum working pressure 10 MPa;
double acting ram with 40/22 mm bore and 170 mm stroke;
oil capacity 1,5 l;
recomended oil - GALAXMATIC DAC or DEXTRON B, ZF ATF, ALLISON C- 2 and C-3;
oil changing interval 400 h;
oil filter in reverse line with changing interval 800 h.

Brakes:

Service brake: Own make;
mechanically acting shoe type brake with 2 brake drums at the end of diferential half shafts;
operated with 2 pedals coupled by a latch;

Steering brake: Divided pedals of service brake, for normal use locked together;

Parking brake:	Hand lever with ratchet on the left hand side of driver's seat, mechanically actuating service brake
Trailer braking take-off:	Optional equipment, fitted on the tested tractor; make PPT; single line air brake, operated by pedal mounted valve; compresor with 75 mm bore, 28 mm stroke, driven by the engine at 234o rev/min by rated engine speed (225o rev/min); compressor delivery o,29 m^3/min (at atmospheric pressure) at rated engine speed; pressure control valve with filter and coupling for tyre pressurizing, operating within 4,8-5,3 bar; compressed air tank with 2o l capacity; standardized coupling head

Wheels

Steering wheels:	2 pneumatics in front 6,oo-16 AS-FRONT, 6 ply, diagonal type tyre casing; maximum permissible load per tyre 535 daN at 3,o bar inflation pressure and 3o km/h; track width adjustable from 126o to 2o6o mm in loo mm steps by extending axle; rims 4,5Ex16
Driving wheels:	2 pneumatics at rear 12,4-28, agricultural, 6 ply, diagonal type tyre casing; maximum permissible load per tyre 129o daN at 1,8 bar inflation pressure and 3o km/h; steel wheel discs, track width adjustable from 123o to 193o mm in cca loo mm steps by reversing discs and rims rims W11x28
Wheel base:	195o mm

Seat:	Own make; model 52o o4 5oo; upholstered seat with back rest; adjustable spring (6o to 12o kg) with shock absorber; for and aft adjustable about 125 mm
Cab:	Own make; Safety cab IMT 527 39 2oo with drivers platform IMT 527 39 35o (O.E.C.D. Approval number CSD o998/3-a(C)); joined to the tractor body in four points by means of elastic supports; interior padding of the cab is from sound deadening materials; windows with safety glasses, back window may be opened; heating and ventilating unit make TAP-Ptuj, with filter and air inlet in cab's roof front panel
Number of grease points:	with grease 7 with oil 6
OVERALL DIMENSIONS	
Total length:	358o mm with horizontal lower links and with front ballast (3365 mm without front ballast, but with ballast carrier)
Maximum width:	2245 mm with maximum rear track setting with and without rear ballast
Minimum width:	176o mm between the outside edges of cab's fenders
Total height:	247o mm to the top of the cab 255o mm to the top of the exhaust outlet
Ground clearance:	344 mm, in the middle of tractor
NOTE:	Total heights and ground clearance are given for the radius index of rear tyres 59o mm
Running-time meter	Mechanical with tachometer combined driven by the engine; reference engine speed for one really counted hour 15oo rev/min

Lighting equipment: Electrical, 12 Volt, negative earth

	Dimensions mm	Height above ground to centre mm	Distance from outside edge of tractor to centre mm 1)
Head lights: 2)	Ø 135	95o	73o
Side lights:			
front 3)	12o/35	138o	15o
rear 4)	6o/55	141o	12o
Position lights:			
front 3)	12o/35	1415	15o
rear 4)	12o/35	1365	15o
Stop lights: 4)	6o/35	141o	18o
Reflectors:			
rear 5)	Ø 135	1365	9o

1) distance from outside edge of cab's fender (rear wheel track setting 133o mm)

2) unrestricted beam angle of Head lights in plan view 32°

3) on common plate 12o/7o mm

4) on common plate 12o/9o mm

5) only one reflector on the rear edge of right hand fender

NOTE: All heights are given for the radius index of rear wheels 59o mm (12,4-28 tyres) and static radius of front wheels 324 mm (6.oo-16 tyres).

TEST CONDITIONS

Masses Ready for use as tested

		without driver kg	with driver kg
Without ballast:	front	920	935
	rear	1305	1365
	total	2225	2300
With ballast:	front	1145	1160
	rear	1700	1760
	total	2845	2920
Ballast:	front	6 weights 30 kg each	180 kg
	rear	4 weights 60 kg each	240 kg
		water in tyres	200 kg

Track setting:	front	1260 mm
	rear	1330 mm

FUELS AND LUBRICANTS USED IN TESTS

Fuel:	INA Diesel-fuel D_2 in all tests	
	Density at 15°C:	0,830 kg/l
	Cetane number:	min 50
	Viscosity at 50°C	2,5 cSt
Engine oil:	GALAX SUPER HD S3, SAE 30 (11 cSt at 98,9°C)	
Transmission and power lift oil:	GALAX TRAKTOL HT (8,7 cSt at 98,9°C)	
Steering oil:	GALAXMATIC DAC	

COMPULSORY TESTS

(1) MAIN POWER-TAKE-OFF PERFORMANCE

Date and location of test: 2oth May 1987
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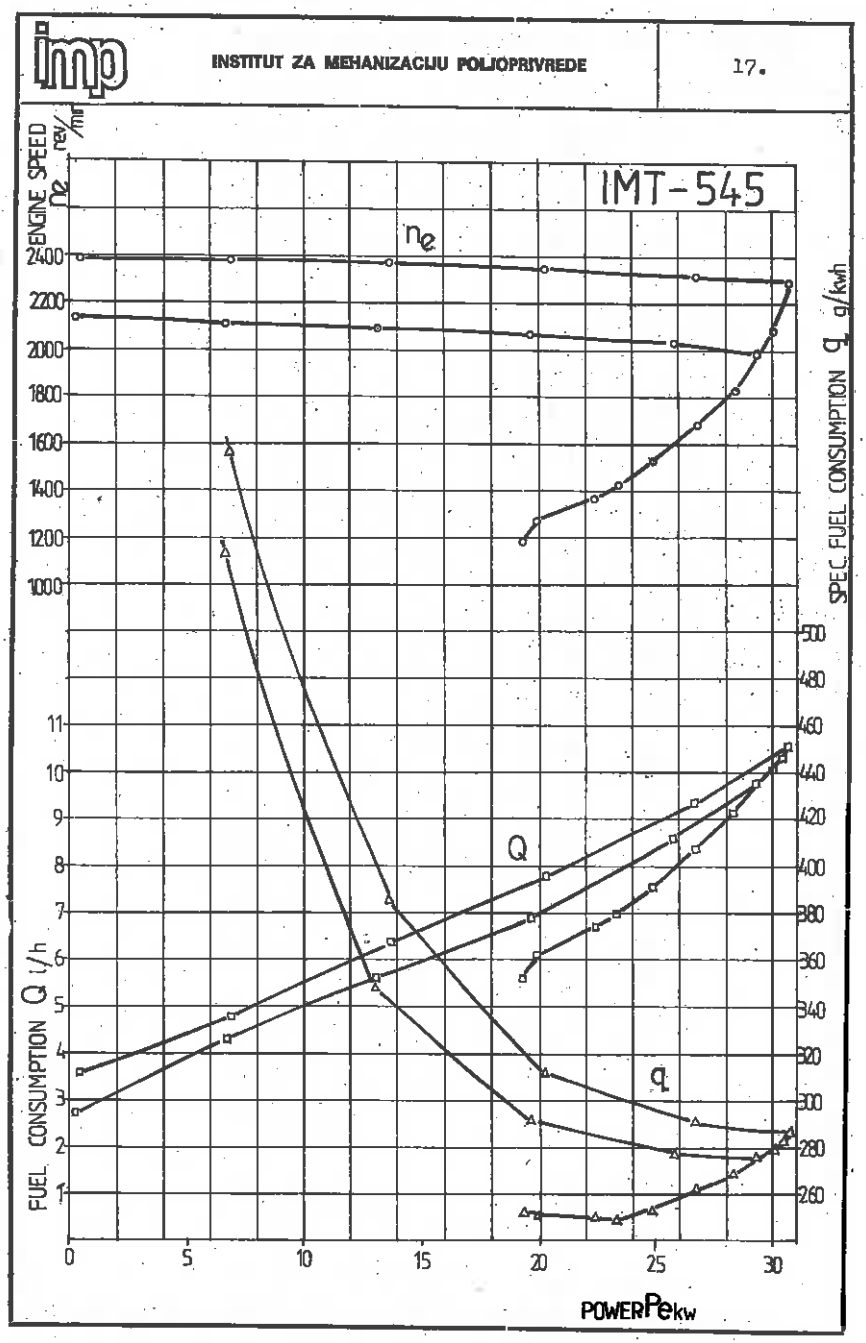
Type of dynamometer: Hydraulic brake SCHENCK U1-3o with auxilary band brake

Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption hourly l/h	Fuel consumption hourly kg/h	Fuel consumption specific kg/kWh	Specific energy kWh/l
	MAXIMUM POWER					
	At 2-hour test					
3o,6o	225o	613	1o,52	8,72	o,285	2,91
	At standard p.t.o. speed (54o rev/min)					
29,38	1982	54o	9,75	8,o8	o,275	3,o1
	At speed recommended by the manufacturer for drawbar work					
3o,6o	225o	613	1o,52	8,72	o,285	2,91
	PART LOADS					
	Governor hand lever in position giving maximum power					
(i) 85% of torque at maximum power						
26,75	2312	63o	9,36	7,76	o,29o	2,86
(ii) unloaded						
o,45	24oo	654	3,58	2,97	-	-
(iii) 5o% of the load defined in (i)						
13,71	2371	646	6,37	5,28	o,385	2,15
(iv) maximum power						
3o,6o	225o	613	1o,52	8,72	o,285	2,91
(v) 25% of the load defined in (i)						
6,88	2382	649	4,78	3,96	o,576	1,44
(vi) 75% of the load defined in (i)						
2o,34	2345	639	7,75	6,43	o,316	2,62

Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption hourly l/h	Fuel consumption hourly kg/h	Fuel consumption specific kg/kWh	Specific energy kWh/l
Governor setting giving standard p.t.o. speed at full load						
(i) 85% of the torque at full load						
25,69	2037	555	8,59	7,12	0,277	2,99
(ii) unloaded						
0,28	2128	580	2,71	2,25	-	-
(iii) 50% of the load defined in (i)						
13,21	2096	571	5,56	4,61	0,349	2,38
(iv) full load						
29,38	1982	540	9,75	8,08	0,275	3,01
(v) 25% of the load defined in (i)						
6,68	2114	576	4,31	3,57	0,534	1,55
(vi) 75% of the load defined in (i)						
19,55	2066	563	6,86	5,69	0,291	2,85

STANDARD SPECIFIC FUEL CONSUMPTION:	0,290; 0,385; 0,277; 0,349 g/kWh
No load, maximum engine speed:	2400 rev/min
Equivalent crank-shaft torque at maximum power:	130 Nm
Maximun equivalent crankshaft torque:	157 Nm at 1412 rev/min engine speed
Mean atmospheric conditions:	
temperature:	22°C
pressure:	999 mbar
humidity:	57%
Maximum temperatures	
coolant:	88°C
engine oil:	98°C
fuel:	24°C
air intake:	25°C

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16.
IMT -545
POWER Pe kw
EQUIV CRANKSHAFT TORQUE Me Nm
FUEL CONSUMPTION Q l/h
SPEC. FUEL CONSUMPTION q g/kwh
STANDARD P.T.O. SPEED 540 rev/min
ENGINE SPEED ne rev/min
P
M
Q
q
1000
1200
1400
1600
1800
2000
2200
2400


IMT-545
ENGINE SPEED ne rev/min
2400
2200
2000
1800
1600
1400
1200
1000
ne
FUEL CONSUMPTION Q l/h
11
10
9
8
7
6
5
4
3
2
1
Q
q
SPEC. FUEL CONSUMPTION q g/kwh
500
480
460
440
420
400
380
360
340
320
300
280
260
0
5
10
15
20
25
30
POWER Pe kw

(2) DRAWBAR PERFORMANCE

Date of test: 18th May and 9th June 1987

Type of track: Tarmacadam

Note: The drawbar test was started with new, run-in tyres

Gear	Driving speed	Power	Drawbar pull	Engine speed	Slip of wheels	Specific energy	Specific fuel consumpt.	Temperatures			Atmospheric conditions		
								Fuel	Co-olant	Engine oil	Tempe-rature	Relative humidity	Pres-sure
-	km/h	kW	daN	rev/min	%	kWh/l	kg/kWh	°C	°C	°C	°C	%	mbar
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	(i) MAXIMUM POWER (unballasted) height of drawbar above ground 740 mm										tyre inflation pressure front 1,7 bar; rear 1,2 bar		
1 L	2,14	11,29	1900	2370	15,0	1,76	0,471	21	80	80	23	53	1006
2 L	3,14	16,57	1900	2320	15,0	2,05	0,403	22	80	82	22	56	1006
3 L	5,96	25,00	1510	2250	9,1	2,37	0,348	23	83	82	22	56	1006
1 H	9,15	26,31	1035	2250	4,2	2,50	0,332	24	84	83	22	56	1006
2 H	14,00	26,06	670	2250	2,2	2,48	0,333	24	83	84	21	58	1006
3 H	26,00	24,56	340	2250	1,0	2,33	0,357	23	82	84	21	58	1006

Gear	Driving speed	Power	Drawbar pull	Engine speed	Slip of wheels	Specific energy	Specific fuel consumpt.	Temperatures Fuel	Co-olant	Engine oil	Atmospheric conditions Tempe-rature	Relative humidity	Pres-sure
-	km/h	kW	daN	rev/min	%	kWh/l	kg/kWh	°C	°C	°C	°C	%	mbar
1	2	3	4	5	6	7	8	9	1o	11	12	13	14
			(ii) MAXIMUM POWER (ballasted) height of drawbar above ground 72o mm								tyre inflation pressure front 3,o bar; rear 1,7 bar		
1 L	2,13	14,2o	24oo	2354	15,o	1,86	o,444	2o	81	82	22	64	lool
2 L	3,1o	2o,67	24oo	2296	15,o	2,11	o,392	22	81	84	22	64	lool
3 L	6,11	25,29	149o	225o	6,9	2,4o	o,346	23	83	84	23	59	lool
1 H	9,25	25,95	1o1o	225o	3,2	2,46	o,337	24	84	85	23	59	lool
2 H	14,1o	25,26	645	225o	1,6	2,39	o,346	24	84	85	23	59	lool
3 H	25,95	22,71	315	225o	1,1	2,15	o,385	24	83	84	23	59	lool
			(iii) FIVE-HOUR-TEST at 75% of drawbar pull at maximum power in 3th L gear										
3 L	6,53	2o,32	112o	232o	3,5	2,31	o,358	26	81	84	24	56	lool
			(iv) FIVE-HOUR-TEST at pull corresponding 15% wheel sleep in test (ii)										
2 L	-	-	24oo	225o	-	-	-	26	86	9o	25	56	lool

Total oil consumption during ten hours duration of tests (iii) and (iv) was 56 g/h

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

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(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment	front:	6,oo - 16 AS Front, 6 ply
	rear:	12,4 - 28 AS 6 ply
Track of wheels	front:	126o mm
	rear:	133o mm

	Without brakes		With brakes	
	left-hand	right-hand	left-hand	right-hand
	m	m	m	m
Radius of turning space	3,68	3,62	3,34	3,27
Radius of turning circle	3,57	3,5o	3,24	3,15

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground:	78o mm
Distance forward from rear axle centre:	793 mm
Distance from tractor's median plane:	2 mm to the left

(5) BRAKING PERFORMANCE

Date of test: 26th May and 2nd June 198

Type of track: Tarmacadam

Mass of tractor with driver (kg):

	front	rear	total
ballasted	116o	176o	292o
unballasted	935	1365	23oo

Type O (ordinary cold service braking device performance) test

Speed before application of brakes 27,5 km/h

Ballasted	Braking device control force	daN	28	32	36	45	55
	Mean deceleration	m/s^2	2,1o	2,8o	2,9o	3,2o	3,35
Unballasted	Braking device control force	daN	24	3o	36	45	5o
	Mean deceleration	m/s^2	2,1o	2,5o	2,9o	3,2o	3,3o

Type I (fade) test

Speed before application of brakes 27,5 km/h

Ballasted	Braking device control force	daN	28	32	36	45	55
	Mean deceleration	m/s^2	2,oo	2,4o	2,7o	3,1o	3,2o
Unballasted	Braking device control force	daN	24	3o	36	45	5o
	Mean deceleration	m/s^2	2,o5	2,5o	2,8o	3,15	3,2o

Maximum deviation of tractor from its original course less than o,3 m to the left

No abnormal vibrations occured

The brakes were heated by towing the tractor with the braking force about 1o% of the mass at the speed 22 km/h (8o% of the maximum speed)

Parking braking device test

		ballasted tractor on 18 per cent slope		unballasted tractor on 12 per cent slope with trailer of 2225 kg	
		Up	Down	Up	Down
Braking device control force,	daN	27	27	29	29

(6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test: 28th May 1987
Type of track: Tarmacadam
Type of sound level meter: BRUEL &.KJAER mod.2209

Results of test

Gear: 3rd high
Travelling speed before acceleration: 18,5 km/h
Sound level: 87,8 dB(A)

(7) NOISE AT DRIVER'S EAR LEVEL

Date of test: 28th May 1987
Type of track: Tarmacadam
Type of sound level meter: BRUEL &.KJAER mod.2209

Results of test

Tractor with cab and with vertical exhaust pipe

Gear	Drawbar pull at which the tractor develops the maximum sound level daN	Travelling speed nominal km/h	Travelling speed efective km/h	Sound level dB(A)
1 L	1900	2,39	2,2	82,7
2 L	1900	3,58	3,2	83,2
3 L+)	1500	6,56	5,8	83,9
3 L+)	light load	6,56	7,0	83,0
1 H	1000	9,55	9,2	83,5
2 H	650	14,32	14,0	83,0
3 H	light load	26,26	26,7	83,1

+) The 3rd low gear corresponds to the travelling speed nearest to 7,5 km/h

(8) POWER LIFT AND HYDRAULIC POWER TEST

Date and location of test: 5th June 1987, IPM - Zemun

Hydraulic fluid:

Make and type: Galax Traktol HT

Viscosity: 8,7 mm/s (cSt) at 98,9°C

Viscosity index: over 85

Hydraulic fluid temperature at the beginning of test: 63°C

Type of linkage lock for transport: hydraulic

Opening pressure of the cylinder overpressure safety valve (manufacturer's specification): No overpressure valve exist

Power lift:

Main linkage dimensions see on pages 6 and 7

	Height of lower hitch point above ground in down position mm	Vertical movement mm	Maximum force exerted through full range daN	Corresponding pressure of hydraulic fluid MPa	Moment around rear axle daNm	Max.tilt angle of mast over range of lift degr.
At hitch points	222	670	1310	15,8	-	-
On the frame	171	865	950	15,8	1358	- 2° 5' +10° 5'

Performance of power lift

Lifting heights in relation to a horizontal line through the lower link pivot points

mm	-307	-256	-200	-100	0	+100	+200	+300	+400	+414	+500	+558
At hitch points												
daN	-	1310	1350	1370	1410	1430	1450	1480	1500	1480	-	-
At test frame (610 mm behind lower link hitch points)												
daN	1180	-	1170	1150	1140	1120	1100	1070	1040	-	1000	950

1° The forces are measured at sustained pressure with the relief valve open (18,3 MPa) and calculated on the pressure 15,8 MPa which corresponds 90% of relief valve setting (17,5 MPa).

Hydraulic power test:

Sustained pressure with relief valve open:	18,1 MPa (181 bar)	
Opening pressure of relief valve:	17,5 MPa (175 bar)	
Pump delivery rate on minimum pressure:	15,8 l/min at 2250 rev/min	
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power:	Flow rate: Pressure: Power:	14,7 l/min 15,8 MPa (158 bar) 3,87 kW
Flow rate and hydraulic pressure corresponding to maximum hydraulic power:	Flow rate: Pressure: Power:	14,1 l/min 16,8 MPa (168 bar) 3,95 kW
Tapping point used for test:	At rear of tractor	
Temperature of hydraulic fluid:	63-68°C	

REMARKS and REPAIRS: No