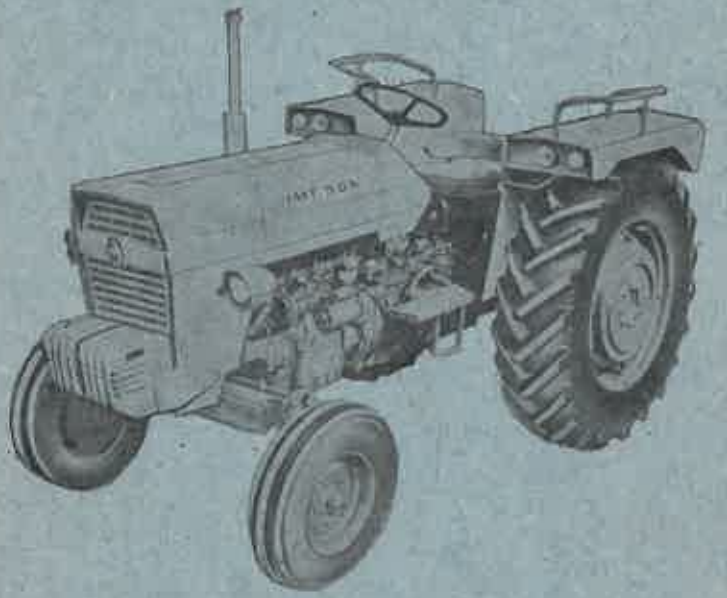
SOCIALISTIC REPUBLIC OF CROATIA
INSTITUTE FOR MECHANIZATION IN AGRICULTURE
AGRICULTURAL FACULTY OF THE ZAGREB UNIVERSITY

TEST BULLETIN: O. E. C. D. No. 380

Report on test in accordance with O. E. C. D. Test Code for Agricultural Tractors

Date of Approval: 17th August 1972



DIESEL TRACTOR
I M T - 585
equipped with 15 - 30 rear tyres

Manufactured by: IMT »Industrija mašina i traktora«, Beograd, JUGOSLAVIJA

Date of Tests: July 1971/June 1972.

Institut za mehanizaciju poljoprivrede
Ferenčića 104
ZAGREB — YUGOSLAVIA

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

Date of Approval: 17th August 1972 Serial No.: 380

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

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Tractor manufacturer:	IMT — Industrija mašina i traktora, Beograd
Submitted for test by:	The manufacturer
Selected by:	The manufacturer with the agreement of the testing station Zagreb
Place of running-in:	Zagreb
Duration of running-in:	50 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	IMT — Industrija mašina i traktora, Beograd
Model:	IMT — 585 with Perkins A 4. 248 diesel engine
Type:	Four wheel, rear wheel driven, unit construction
Serial No:	00017

Engine

Make:	P. Perkins Ltd., Peterborough, England
Model:	A 4. 248
Type:	Water cooled, 4-stroke, direct injection diesel
Serial No:	248 U 4048
Cylinders:	4 cylinders, vertical, in-line 101.0 mm bore × 127.0 mm stroke, capacity 4.067 cm^3, compression ratio 16 : 1, overhead in-line valves, replaceable cast-iron dry cyllinder liners
Fuel system:	Fuel: commercially available diesel oil; A. C. model V. P. mechanical type fuel feed pump with hand primer; two pressurized C. A. V. filters in series with water coalescent paper replaceable elements; primary filter with sediment bowl and drain tap, strainer in fuel tank, feeding pump and fuel injection pump, capacity of fuel tank 95.5 lit; C. A. V. type DPA 324 8850 injection pump, Serial No 1708 UM; manufacture's production setting 72 mm^3 per stroke, at 850 rev/min pump speed; C. A. V. injection nozzles, injector setting 170 kp/cm^2; injection timing 22^0 before TDC
Governor:	C A. V. mechanical incorporated in fuel injection pump, governed range of engine speed 500 to 2400 rev/min, rated engine speed 2250 rev/min
Air cleaner:	MBH dry paper filter, under hood forward of radiator, centrifugal pre-cleaner

Lubrication system: Forced feed from eccentric rotor type pump with metal strainer in sump; A. C. full flow replaceable element filter, total oil capacitiy 7.6 lit, recommended oil change period 250 h

Cooling system: Water cooled, pressurized at 0,4 kp/cm², impeller assisted with 440 mm dia, belt driven 6 blade fan; 75°C thermostat for temperature control, cooling water capacity 16.3 l

Starting system: Electrical, 12 V Lucas type M 50 G solenoid engaged starter motor, C. A. V. inlet manifold flame type cold starting aid

Electrical system: Voltage 12 V
Generator: Lucas 227800 2970
Battery: Tesla lead acid, capacity 135 Ah at 10 hour rating

Transmission

Clutch: Massey-Ferguson dual dry clutch, two plates, 245 mm dia for p. t. o. shaft drive, and 308 mm dia for gearbox drive; operated with one pedal

Gearbox: Own make, 6 forward and 2 reverse speeds; sliding gear 3 forward and 1 reverse speed gearbox and dual range epicyclic reduction gear at output end

Rear axle and final drive: Own make, crown wheel and pinion with bevel gear type differential and epicyclic reduction gear final drives, pedal operated differential lock

Oil capacities: Transmission 32 l, final drives 1.0 l each. Recommended oil change period 500 h

Gear ratios and speeds:

Gear	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for for 2250 rev/min rated speed of engine km/h
Forward		
1 st	181.4	3.35
2 nd	120.7	5.04
3 rd	78.6	7.74
4 th	60.5	10.05
5 th	40.3	15.1
6 th	26.2	23.2
Reverse		
1 st	167.4	3.63
2 nd	55.8	10.9

Power take-off

Manually engaged, proportional engine speed or proportional ground speed, 6 spline, 35 mm dia (acc. to JUS M.L1.601 and I.S.O. recommendation R. 500); at rear of tractor in median plane, height above ground 600 mm.
When proportional to engine speed: semi-indepedent p.t.o; direction of rotation clockwise viewed from tractor rear. When proportional to ground speed: direction of rotation clockwise viewed from tractor rear with a forward gear engaged. 3 final gears are available giving »Normal«, »Slow« or »Fast« p.t.o.

Normal: (As tested). Proportional engine speed: 721 rev/min at 2250 rev/min rated engine speed, 540 rev/min (standard p.t.o. speed) at 1685 rev/min engine speed; proportional ground speed: 1 revolution of p.t.o. for approximately 37.4 cm of travel; 12.1 revolution of p.t.o. for one revolution of driving wheel

Slow: (Available on request). Proportional engine speed: 560 rev/min at 2250 rev/min rated engine speed; 540 rev/min (standard p.t.o. speed) at 2170 rev/min engine speed;
Proportional ground speed: 1 revolution of p.t.o. for approximateiy 44.5 cm of travel; 10.0 revolutions of p.t.o. for one revolution of driving wheel

Fast: (Available on request). Proportional engine speed: 1060 rev/min at 2250 rev/min rated engine speed; 1000 rev/min (standard p.t.o. speed) at 2122 rev/min engine speed; 540 rev/min (standard p.t.o. speed) at 1150 rev/min engine speed; proportional ground speed: 1 revolution of p.t.o. for approximately 24 cm of travel; 18.6 revolutions of p.t.o. for one revolution of driving wheel

Power lift Own make, live hydraulic, 4 cylinder piston type pump with suction side control, oil from transmission supplied to singl-acting ram cyiinder and 3 external tappings

Controls: Two way draught control with top link sensing, controls for position and selective response on drop; external oil supply operated by tractor hydraulic controls or external spool valves
Category 2 three point linkage, vertical lift movement above ground: 330 mm to 890 mm

Auxiliary hydraulics: (Normal equipment), own make, live hydraulics for external hydraulic equipment controlled by external spool valve, comprising a gear type pump with pressure side control, oil from transmission; combining valve between gear pump and tractor main power lift pump; pump delivery rate 30 l/min at 2250 rev/min engine speed; opening pressure of the relief valve 140 kp/cm^2

Drawbars

Linkage drawbar: Drawbar fixed on lower links with central hole and 4 holes 54 mm apart either side of center line, vertical adjustment from 300 mm to 550 mm changed by adjustable stay links, distance from rear axle 795 mm as tested

Swinging drawbar: Lateral adjustment 40 mm, 80 mm and 120 mm apart either side of the centre line, vertical heights to centre of clevis 325 mm and 335 mm, drawbar hole to take 30 mm dia pin, distance behind rear axle 530 mm and 795 mm, position relative p. t. o. 240 mm and 505 mm to rear

Hitch

Rear: Automatic hitch (optional, not fitted), hook type, height above ground 335 mm

Steering Own make, worm and peg type with single drag link, power assisted

Brakes Own make, hydraulically operated double disc dry type on rear axle high speed shafts; independent or combined pedal operated; hand lever with rachet operating brakes for parking

Wheels

Steering wheels: Two at rear, power adjusted variable track type, cast - iron centres, permissible weight on each tyre 850 kg at 1.8 kp/cm², track width 1200 mm by 100 mm steps to 1700 mm changed by extending front axle

Driving wheels: Two at rear, power adjusted variable track type, cast - iron centres, »Cordiatic« 15—30 tyres, 8 ply rating on W 15 L rims, maximum permissible weight on each tyre 2000 kg at 1.0 kp/cm², track width 1500 mm to 2000 mm changed by power shifting

Wheelbase: 2205 mm

Weights

Tractor (without driver but with tanks full):

	Front kg	Rear kg	Total kg
Without ballast	920	1860	2780
With ballast	1200	2400	3600

Ballast:

	No of weights	Type	Total weights kg	Water kg
Rear	8	frame type	240	—
Front	—	. .	—	580

Seat Own make, upholstered cushion and back rest, adjustable for driver's weight; range of adjustment 75 mm fore and aft in median plane of tractor, angle adjustment

Cab (Optional, not fitted). Own make safety cab

Number of grease points

Whole tractor: 18

Overall dimensions

Overall lenght: With front weights and three — point linkage down 3800 mm

Overall width: 1975 mm at 1500 mm track (minimum)
2475 mm at 2000 mm track (maximum) s

Overall height: To top of steering wheel 1750 mm
To top of exhaust pipe 2500 mm

Minimum ground clearance: 355 mm

Lighting

	Height above ground of centre mm	Size mm	Distance from outside edge of tractor at 1600 mm wheel track, to centre mm
Headlights	1200	125 dia	578
Side lights	1582	85 dia	162
Rear lights	1622	62 × 62	342
Reflector	1812	135 dia	530

Unrestricted beam angle of headlight in plan view 32^0

FUELS AND LUBRICANTS USED IN TESTS

Laboratory tests and track tests

Fuel: Diesel oil, specific gravity 0.838 kp/dm³ at 15°C, Cetane No. 58 (commercially available quality acc. to JUS B. H2. 411)

Engine oil: INA SUPER HD - 30 (SAE) viskosity 8^0E at 50°C (acc. to JUS B. H3. 143)

Transmission oil: HENA Tractol 127 — viskozity 9^0E at 50°C

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORNANCE

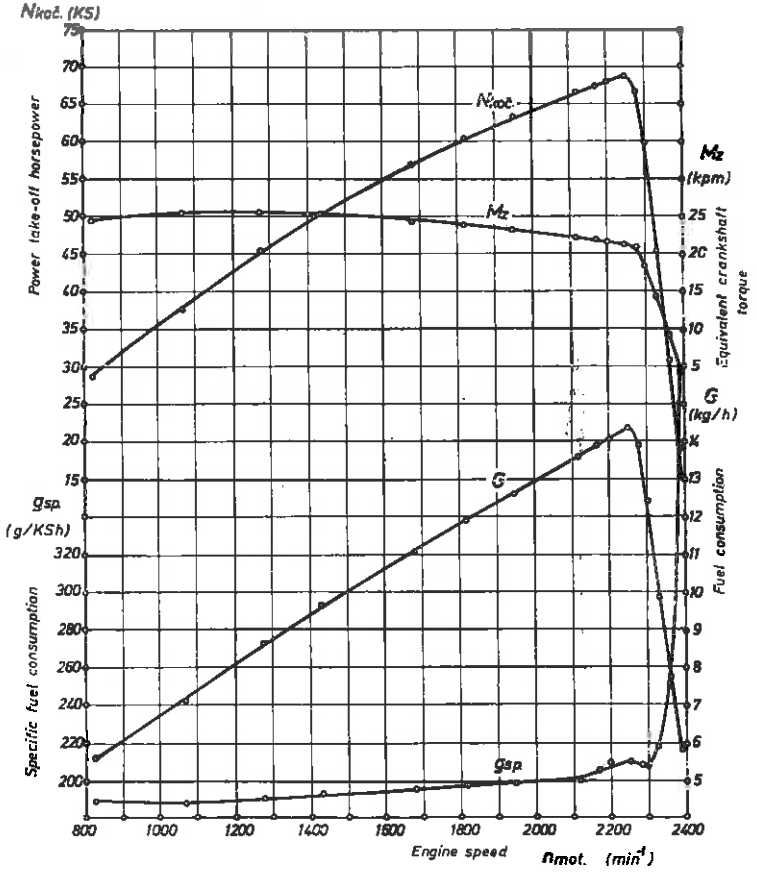
Date and location of tests: 9th November 1971, Zagreb
Type of dynamometer: Electrical swing frame, Siemens-Schuckert

Horsepower, metric hp	Speeds, Engine rev/min	Speeds, P. t. o. rev/min	Fuel consumption, Per hour, l/h	Fuel consumption, Specific, g/metric hp h	Fuel consumption, Hp hour/ unit of vol., metric hp h/l
Maximum power — 2 hour test					
68.5	2250	721	17.2	211	3.98
Standard p. t. o. speed (540 rev/min)					
56.8	1685	540	13.2	196	4.31
* Speed recommended by the manufacturer (for belt pulley and) for drawbar work					
68.8	2246	720	17.3	211	3.97
Fuel consumption at part loads					
(i) 85% of torque at maximum power					
60.0	2300	737	14.8	206	4.06
(ii) unloaded					
0	2420	775	5.62	—	—
(iii) 50% of the load defined in (i)					
30.8	2370	760	9.20	251	3.35
(iv) maximum power					
68.8	2246	720	17.3	211	3.97
(v) 25% of the load defined in (i)					
15.6	2395	768	7.05	377	2.22
(vi) 75% of the load defined in (i)					
45.5	2330	748	11.9	218	3.82

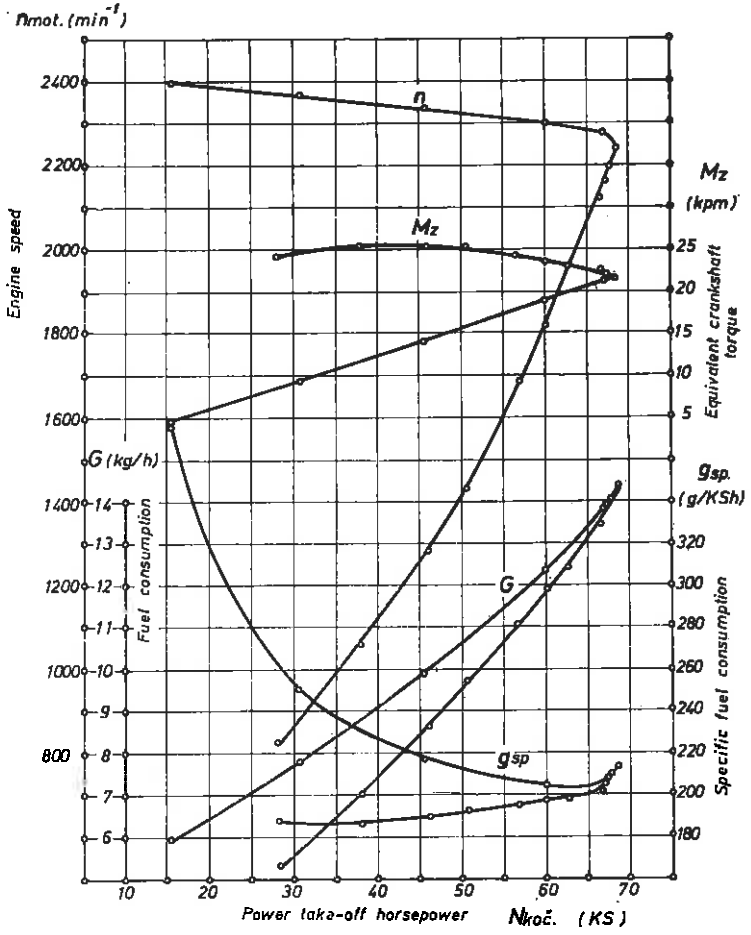
No load, maximum engine speed: 2420 rev/min
Equivalent crankshaft torque at maximum power: 21.9 kpm
Maximum equivalent crankshaft torque: 25.8 kpm at 1280 rev/min engine speed
Mean atmospheric conditions: temperature 23°C
pressure 747 mm Hg
relative humidity 65%
Maximum temperature: coolant 82°C
engine oil 115°C
fuel 20°C

* The manufacturer made no specif recommendation for speed for drawbar work and the results given are at the rated engine speed.

Tractor IMT - 585
Power take - off test



Tractor IMT - 585
Power take - off test



(2) Drawbar performance Type of track: Tarmacadam Height of drawbar above ground: 335 mm

Date of tests: October 1971.

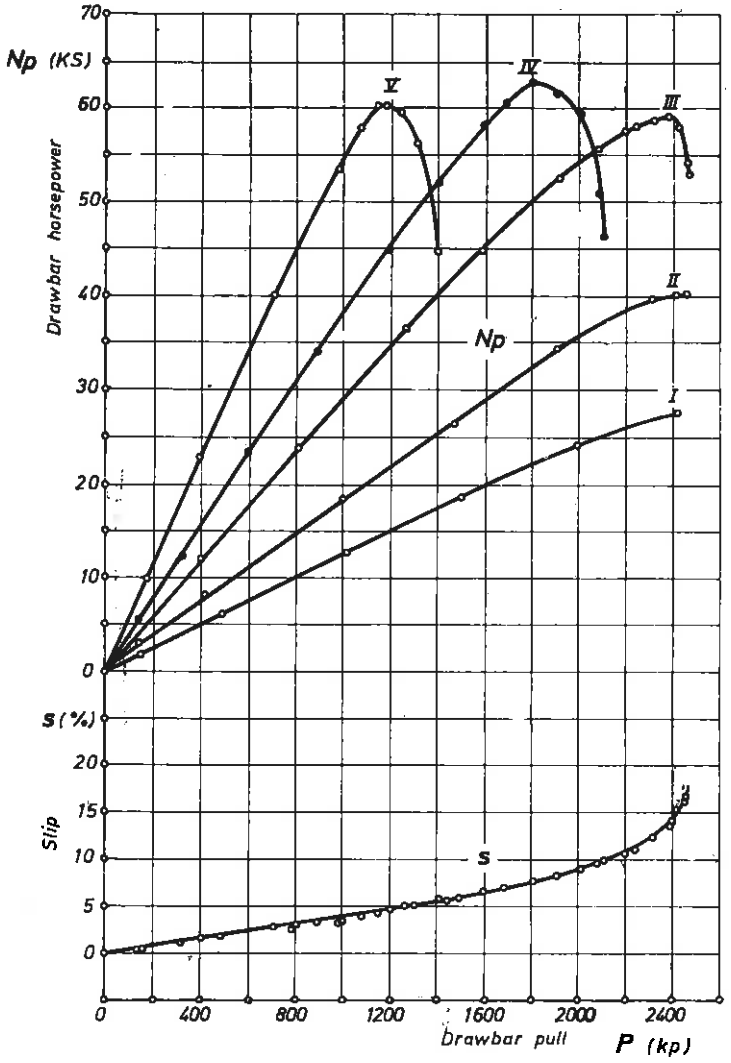
Gear	Horse-power, metric hp	Drawbar pull, kp	Speed km/h	Engine speed, rev/min	Wheel-slip, %	Specific work, drawbar hp h/lit	Specific fuel consumption, g/drawbar hp h	Temperature,			Atmospheric conditions,		
								Coolant °C	Fuel °C	Engine oil °C	Tempe-rature, °C	Relative humidity, %	Presurre, mm Hg
(i) Maximum power (ballasted)													
1	27.3	2415	3.1	2310	14.1	2.76	304	60	18	70	15	72	768
2	39.6	2415	4.4	2280	15.1	3.10	270	70	18	80	16	72	768
3	59.0	2390	6.6	2240	13.1	3.42	245	80	19	90	16	76	768
4	62.6	1810	9.4	2240	7.6	3.54	236	80	19	90	15	80	768
5	60.5	1150	14.2	2230	4.8	3.42	245	75	19	85	15	80	768
(ii) Five hour test at 75% of pull at maximum power													
3	46.3	1700	7.3	2270	8.0	3.44	244	70	11	97	10	70	768
(iii Five hour test at pull correspoding to 15% wheelslip in test (i)													
2*	41.3	2395	4.9	2290	—	—	—	75	12	95	13	65	767
(iv) Maximum power (unballasted)													
1	21.7	1908	3.1	2310	15.0	2.40	349	70	24	80	19	60	764
2	31.8	1860	4.7	2310	12.9	2.98	281	70	23	80	19	60	764
3	48.9	1920	6.9	2260	15.0	3.33	252	75	21	85	18	68	764
4	59.8	1170	9.5	2240	10.0	3.78	221	90	20	90	17	68	763
5	62.5	1190	14.2	2180	6.1	3.56	235	80	19	90	16	68	763
6	59.0	710	22.5	2200	3.6	3.38	248	70	18	80	15	72	763

Total oil consumption during ten hours of tests (ii) and (iii): 44 g/h

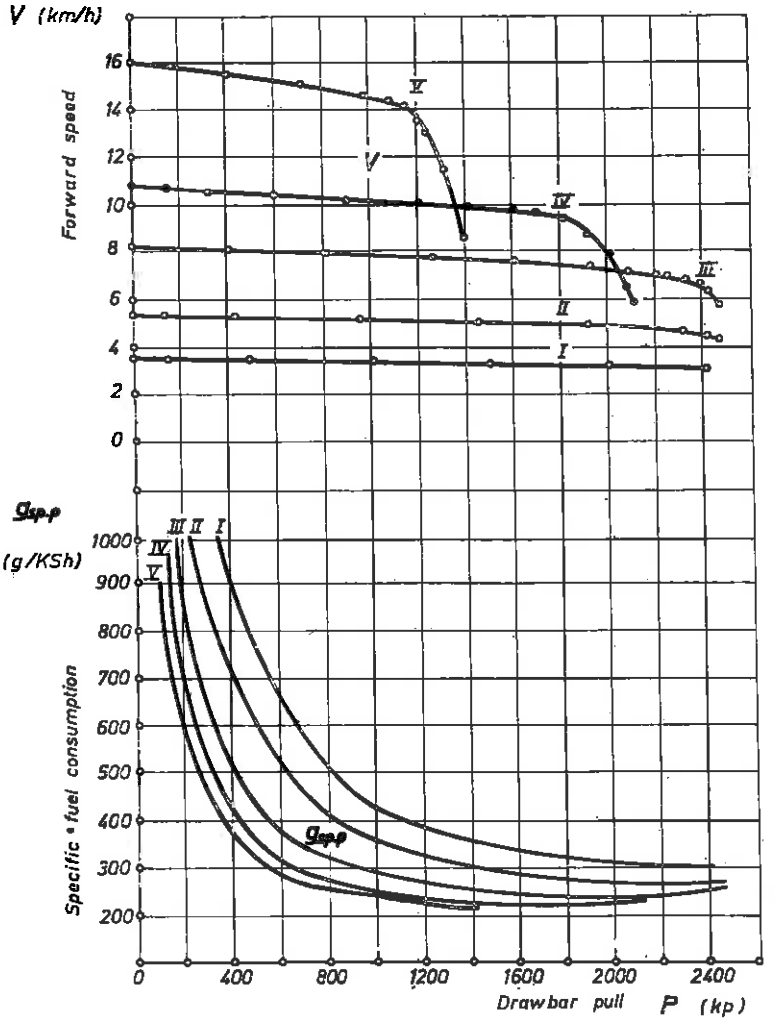
* Test (iii) was carried out with additional ballast and the results for power and fuel consumption have no practical significance

Tractor IMT - 585

Drawbar test on a tarmacadam track, with ballast

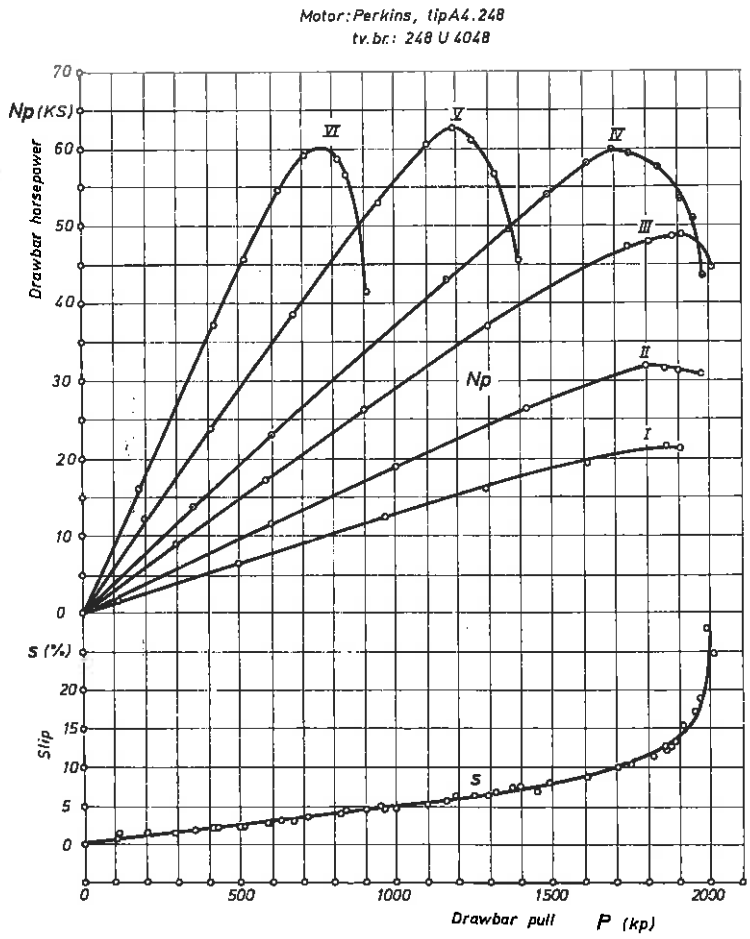


Tractor IMT - 585
Drawbar test on a tarmacadam track, with ballast



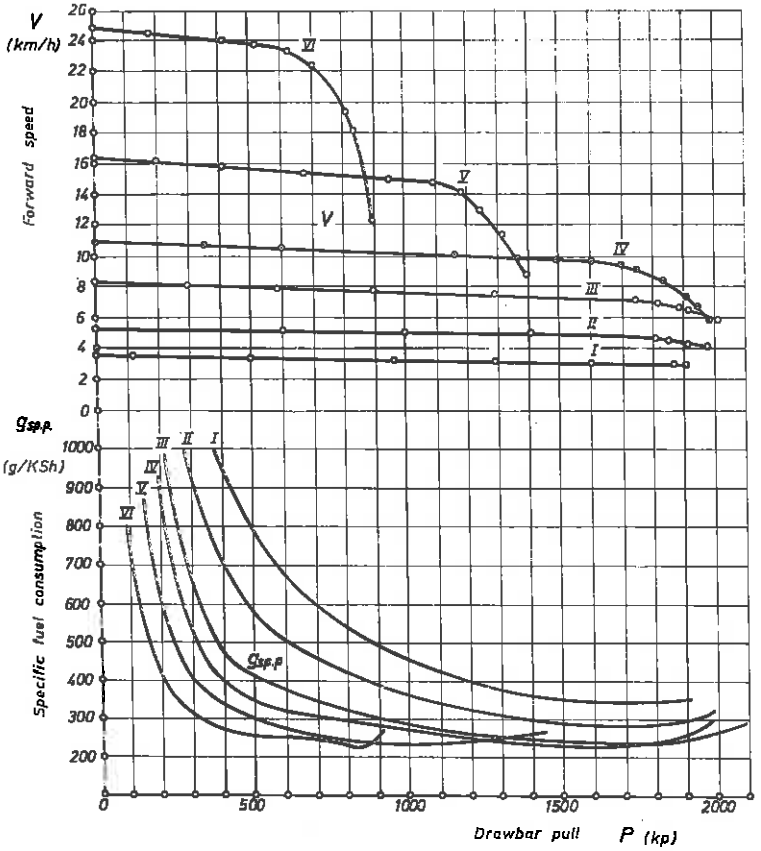
Tractor IMT - 585

Drawbar test on a tarmacadam track, without ballast



Tractor IMT - 585

Drawbar test on a tarmacadam track, without ballast



(3 and 4) **Turning space and turning circle**

Wheel equipment: front — 7.50-16 TR 6 ply, without ballast
rear — 15 - 30 TP 8 ply, without ballast

Track of wheels: front — 1400 mm
rear — 1600 mm

	Without brakes		With brakes	
	Right hand	Left hand	Right hand	Left hand
Radius of turning space	3.93 m	4.03 m	4.45 m	4.72 m
Radius of turning circle	3.88 m	3.98 m	4.40 m	4.67 m

(5) **Location of centre of gravity**

	mm
Height above ground	830
Distance forward from the vertical plane containing the axis of the rear wheels	710
Distance from the median plane to the right hand	11

(6) **Braking**

Date of tests: 8 October and 6 November 1971
Type of track: tarmacadam
Type of decelerometer: Nr. 04 Moto-Meter Recorder
Travelling speed of tractor: 25.0 km/h

Cold brakes

		Tractor without ballast	Tractor ballasted
Maximum deceleration,	m/s^2	4.6	3.6
Stopping distance,	m	6.8	6.9
Force on brake pedal,	kp	65	26
Force exerted on the brake pedal to achive a decelaration of 2.5 m/s^2	kp	23	19

Brake fade characteristics (hot tests, tractor without ballast)

Maximum deceleration:	hot/cold: 96%
Stopping distance:	cold/hot: 103%
Force on pedal:	cold/hot: 115%

Parking brake

Efficiency of handbrake:	facing up slope: good facing down slope: good
Pull on handbrake:	28 kp

(7) Measurement of ambient noise emitted by the tractor

Date of test:	28 June 1972
Type of sound level meter:	Brüel & Kjaer, Kopenhagen type 2203
Type of track:	Tarmacadam
Results of test:	gear: 6th travelling speed before accelaration: 15.4 km/h sund level: 88.5 dBA

(8) Noise measurements at the driver's ear level

Date of test:	28 June 1972
Type of sound level meter and octave filter:	Brüel & Kjaer, Kopenhagen, type 2203 with octave band noise analyzer type 1613
Type of track:	Tarmacadam
Type of frequency analyser:	Octave filter with eight bands width 60 to 8000 Hz

Results of test:

Gear	Travelling Speed *	Loudness
3rd	7.6 km/h	113 sones

* The gear tested corresponds to the travelling speed nearest to 7.25 km/h

(9) **Power lift and hydraulic pump performance**

Date and location of test: 1 October 1971, Zagreb

Hydraulic fluid: make and type: HENA TRAKTOL 127
viscosity: $9\,^{0}E/50^{0}C$
viscosity index: 100

Power lift

	Height above ground in down position mm	Total vertical movement mm	Maximum force exerted through full lift range kp	Pressure of hidraulic oil kp/cm^2	Lifting force at front axle load = 0 kp kp
At lower hitch points	330	410	1450	190	Greater than maximum lifting force
On the frame	480	340	1260	190	1000
Linkage arrangement has only one position possible of the tie rods on the lower links					

Type of linkage lock for transport: Implement position control lever
Opening pressure of the cylinder over pressure relief valve (manufacturer's figure):
Not applicable

Pump characteristics

(i) Opening pressure of relief valve: 175 kp/cm^2
Sustained pressure by the open relief valve: 190 kp/cm^2
Pump delivery rate at external tapping:
(ii) at minimum pressure: 12.4 l/min
(iii) at maximum hydraulic power: 12.0 l/min
delivery pressure: 160 kp/cm^2
power: 3.7 hp

Test Engineer: D. KRPAN
Officer in charge: V. OBELIĆ
Director: I. TODORIĆ
Date: 11 June 1972