305/O.E.C.D.

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE
FOR AGRICULTURAL TRACTORS

EICHER KÖNIGSTIGER I - ALLRAD, TYPE: 3010 S

Manufactured by:

Gebr. Eicher Traktoren- und Landmaschinenwerke. Forstern/Obb.



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

Date of Approval: 16-2-1970 *Serial No.: 305*

INSTITUUT VOOR LANDBOUWTECHNIEK EN RATIONALISATIE

DR. S. L. MANSHOLTLAAN 12 - WAGENINGEN

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APPENDIX

Power take off test
curves of power-off-horse power, torque, fuel consumption, specific fuel consumption/engine speed.

Drawbar test with ballast
curves of drawbar horse power and wheelslip/ drawbar pull curves.

Drawbar test without ballast
curves of drawbar horse power and wheelslip/ drawbar pull.

Spec. Fuel consumption and travelling speed

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE FOR AGRICULTURAL TRACTORS

PART I SPECIMEN TEST REPORT

Tractor manufacturer's name and address: Gebr. Eicher, Traktoren- und Landmaschinenwerke, 8011/Forstern.
Submitted for test by: Manufacturer
Selected by: Manufacturer, in accordance with testing station
Place of running-in: by manufacturer
Duration of running-in: 22 h

SPECIFICATION OF TRACTOR

Tractor

make: Eicher
model: Königstiger I-Allrad
type: 3010 S
Serial No.: 117609

Motor

make: Eicher
model: four-stroke diesel
type: EDK 3
Serial No.: 107422

Cylinders

number: 3
disposition: in line
bore/stroke: 100/125 mm
capacity: 2944 cm^3
compression ratio: 20,4:1
arrangement of valves: overhead valves
cylinder liners: replaceable Alfin cylinder with cooling ribs

Fuel and ignition system

type of fuel feed: commercial diesel fuel
make, type and model of fuel filters: Knecht/FB 716/1 MM with replaceable fine paper filter element
capacity of fuel tank: 50 l
make, type and model of injection pump: Kugelfischer PSAFE 13-22.18 A, plunger in line pump
Serial No.: 9 P 00252
manufacturer's production setting: 23° (+ 1°) before top dead centre
make, type and model of injectors: Kugelfischer DFO 40 A
manufacturer's production setting: 140 + 5 atm

Governor

make: Kugelfischer
type: centrifugal governor
range of speed: 600 - 2140 engine rev/min
rated speeds: 2000 rev/min

Air cleaner

main: oil bath filter
make: Mann und Hummel
type: 310 4075 094
oil capacity: 0,9 l

Pre-cleaner

main: centrifugal pre-cleaner
make: Mann und Hummel
type: 480 3667 160

Lubrication system

type: forced feed from gear pump
type and number of filters: replaceable full flow paper filter
oil capacity: 9,5 l
changing period: 200 h

Cooling system

type: air cooled
details of pump and fan: three separated blowers on one shaft, driven by V-belt
coolant capacity: --
means of temperature control: distance thermometer
pressure details: --

Electrical system

Voltage: 12 V
Generator: DC generator
make: Bosch
type: 0101 209 032
Battery

main: lead accumulator
make: Mittermaier
type: 12 D 90
capacity: 90 Ah

Starting system

main: electrical
make: Bosch
type: 0001 359 006
aids for cold starting: by means of a hand fuel pump

Transmission

clutch: dry clutch with two functions: 1. transmission 2. p.t.o.

make: Fichtel und Sachs

type and size: DUT 250/250 K

method of operation: by foot pedal

Gearbox

make: Zahnradfabrik Friedrichshafen

type: A 210/111

No. of speeds: 8 forward speeds and 4 reverse speeds

Rear axle and final drive

make: Zahnradfabrik Friedrichshafen

type: bevel gear and planetary drive

differential lock: Zahnradfabrik Friedrichshafen

type: sliding key

method of operating lock: by foot pedal

Oil capacity

gearbox + differential gear
rear axle per planetary gear } 25 l. gear oil SAE 80

final drive(s): 2,5 l gear oil SAE 80 p. planetary drive

change period: 1000 h or at least once a year

Gear no.	Number of engine revolutions for one revolution wheel or sprocket	Nominal travelling speed for rated speed of engine km/h	Nominal travelling speed for rated speed of engine. Results of test carried out by the testing station km/h
1 L	287,70	1,68	1,74
2 L	168,23	2,87	2,96
3 L	102,50	4,71	4,85
4 L	63,26	7,62	7,80
1 H	80,00	6,03	6,18
2 H	46,78	10,31	10,64
3 H	28,50	16,92	17,44
4 H	17,60	27,41	28,05
reverse			
1	160,01	3,01	
2	93,55	5,15	
3	57,00	8,46	
4	35,19	13,70	

Power take-off

location: at rear of tractor
dimensions: 29 x 34,9 x 8,7 mm or 1 3/8"
no. of splines: 6
standard B.S. 1495; ASAE 203.2; DIN 9611/Form A
height above ground: 543 mm

proportional engine speed: 558/1116 rev/min at 2000 rev/min engine speed

engine speed: 1935/1795 rev/min at standard p.t.o. speed 540/1000 rev/min

direction of rotation: clockwise viewed from the rear

Ground speed (optional extra, not fitted on tested tractor)

proportional ground speed: distance travelled for I revolution 229 mm of p.t.o. (value given by manufacturer)

no. of p.t.o. revolutions for I revolution of driving wheel: 17,54

direction of rotation: clockwise viewed from the rear with the tractor in forward gear

details of other power take-off, if any: none

Belt pulley (optional extra, not fitted on tested tractor)

location: at rear of p.t.o.

type: ZF/WTS 45 or WTS 35

dimensions: 220 mm , both

diameter and width of face: 150 mm, both

speed-linear: 21,7/17,7 m/sec and 1890/1545 rev/min engine speed 1544/1893 rev/min at standard linear speed 16,75 m/sec at rated engine speed 2000 rev/min

direction of rotation: clockwise or anti-clockwise, depending on way of fitting

Power lift

make: ZF-Bosch-Eicher

type: hydraulic

oil capacity: 7,5 l

category: cat. I (or II) implement linkage, acc.DIN 9674

description of controls: single lever control

Drawbars

Implement linkage: three point implement linkage, cat. I (or II), acc. DIN 9674
height above ground max. 950 mm min. 85 mm
method of changing period: power lift and adjustable stay links

Fixed drawbar: optional extra, fitted on lower links
construction 1: 90x30x680 mm
construction 2: 90x30x1320 mm
holes construction 1: central hole and three holes apart either side of centre line at a distance 90/90/90 mm
construction 2: central hole and six holes apart either side of the centre line at a distance 90/90/90/180/90/90 mm
distance from central hole behind rear wheel centre: 891 mm
distance from central hole behind p.t.o.: 631 mm

Swinging drawbar: optional extra
height above ground: 345 or 430 mm
distance from pivot behind rear wheel centre 615, 665 or 715 mm
distance from pivot behind p.t.o. 355, 405 or 455 mm
lateral adjustment: 290 mm to the left and to the right

Hitch

height above ground: 655, 705, 755 or 805 mm
distance from rear axle: 482 mm
position relative to p.t.o.: 224 mm

Steering

make: ZF-Gemmer

type: 7340 502 103

method of operation: mechanical

Brakes

make: Knott

type: internal shoe brakes

method of operating: by brake pedals. It is possible to couple the left and the right brake by turning the right brake pedal (180°)

type of parking brake: mechanical by lever

Wheeled tractors

Steering wheels: It is possible to couple these wheels with the driving wheels by lifting a hand lever. Than the tractor is four-wheel-driven

number: 2

arrangement: at front

type of tyre(s): pneumatic tyres acc. DIN 7793

make: Continental

size: 7.50-18

ply rating: 6

maximum permissible weight on each tyre: 1100 kg at 3,5 atm pressure

track widths: 1430 mm

method of changing: --

Driving wheels

number: 2 (or 4)

position: at rear (or at rear and at front)

type of tyre(s): pneumatic tyres acc. DIN 7807

make: Continental

size: 14.9/13-28

ply rating: 6

rim size: W 12x28

maximum permissible weight on each type : 1535 kg

at 1,3 atm.pressure

track width: 1360/1500 mm

method of changing: reversible wheels

wheelbase: 2010 mm

Weights

Tractor (without driver but with tanks full)

	Front	Rear	Total
Without ballast	1024 kg	1494 kg	2518 kg
With ballast	1363 kg	2200 kg	3563 kg

Ballast	No. of weights	Total weight	Water
Front	4	232 kg	-- kg
Rear	1 inner and 2 outer weights per wheel	510 kg	303 kg
Additional	--	--	

Seat

make: Fritzmeier SF 4005

type of suspension: torsion spring

type of damping: hydraulic shockabsorber

range of adjustments: at drivers weight, distance between steering wheel and seat and height of seat

Number of grease points (whole tractor): 26

Overall dimensions (mm)

	Lenght	Width	Height
With ballast	3800 mm	1725 mm	steering wheel:1500 mm passenger seat:1700 mm
Without ballast	3400 mm	1725 mm	with vertical exhaust pipe: 2120 mm

special remarks: A vertical exhaust pipe was fitted on the tested tractor. Lenghts are incl. three point linkage.

Lighting

	height above ground of centre	diameter	distance from outside edge of tractor to centre
Head lights	1020 mm	130 mm	530 mm
Side lights	1325 mm	85 x 55 mm	270 mm
Rear lights	1325 mm	85 x 55 mm	270 mm
Reflectors	1125 mm	124 x 36 mm	235 mm

Mirror and passenger seat: fitted on the left rear mudguard

Remarks: none

Part II FUELS AND LUBRICANTS USED IN TESTS

TRACK TESTS/LABORATORY TESTS

Fuel: Shell automotive gas oil

type: shell diesoline — Specific gravity at 15^{0}C: 0,8315
cetane number: 53
conforms to -- — Standard --

Engine-oil

type: motor oil HD — Viscosity: SAE 20

Transmission-oil

type: gear oil — Viscosity: SAE 80

Part III COMPULSORY TESTS

Date and location of tests: May 1969, Wageningen

Type of dynamometer: 2 RT water brake

Horsepower	Speed		Fuel consumption		
(h.p.)	Engine rev/min	p.t.o. rev/min	Total l/h	specific ghp/h	hp.h/l
Maximum power - 2 hours test					
41,5	1953	545	9,88	195,2	4,22
Standard p.t.o. speed (540/1000 rev/min)					
41,1	1931	539	8,0	194,6	4,23
The speed recommended by the manufacturer for drawbar work					
39,9	2004	559	9,7	198,3	4,1
Part loads					
36	1996	557	8,4	191,9	4,3
--	2103	587	2,67	--	--
18,4	2046	571	5,25	234,6	3,5
41,5	1953	545	9,88	195,2	4,22
9,4	2064	576	3,85	337,1	2,97
27,4	2021	564	6,62	199,1	5,02

No loads maximum engine speed: 2103 rev/min

Equivalent crankshaft torque at maximum power: 15,2 kgm

Maximum equivalent crankshaft torque 16,1kgm at 1150 rev/min of the engine

Mean atmospheric conditions: temperature 19 °C
pressure 747 (mm) Hg
relative humidity 73%

Maximum temperature : coolant --
engine oil 70 °C
fuel 18 °C

(2) DRAWBAR PERFORMANCE

Date of tests: May-Sept. 1969

Type of track: concrete

Height : drawbar above ground :450 mm

Gear number	Horse power (h.p.)	Drawbar pull (kg)	Engine speed rev/min	Slip of wheels %	Fuel consumption: Drawbar horsepower h.p.h./l	Fuel consumption: Specific (h.p.h.)
(i) MAXIMUM POWER (ballasted)						
1 L	15,7	2820	2053	15,4	2,65	308,8
2 L	26,8	2820	2031	14,5	3,11	264,4
3 L	33,4	2000	2010	7,6	3,23	255,7
4 L	32,1	1145	2005	3,4	3,2	257,5
1 H	33,6	1590	1952	5,1	3,33	248,3
FIVE HOUR TEST at 75% of pull at maximum power						
1 H	25,5	1100	2059,6	3,2	3,2	262
FIVE HOUR TEST at pull corresponding to 15% wheelslip in test (i)						
2 L	26,8	2820	2031	14,5	3,1	264,4
MAXIMUM POWER (unballasted)						
1 L	12,4	2150	2072	12,7	--	--
2 L	20,7	2160	2039	15,1	--	--
3 L	32,3	2020	1988	11,4	--	--
4 L	33,0	1190	1981	5,4	--	--
1 H	33,0	1570	1954	7,6	--	--

Temperature (°C)				Atmospheric conditions	
Fuel	Coolant	Engine oil	Temperature (°C)	Relative humidity %	Pressure in mm Hg
(i) MAXIMUM POWER (ballasted)					
21	--	69	21,2	63,8	764
15	--	71	15,0	56	760
11	--	70	10,2	76	769
11,5	--	71	12,2	67	770
1	--	71	10,2	76	769
FIVE HOUR TEST at 75% pull at maximum power					
14	--	75	15,2	55	766
FIVE HOUR TEST at pull corresponding to 15% wheelslip in test (i)					
14	--	79	15,5	53	766
MAXIMUM POWER (unballasted)					
21	--	74	21,5	66,7	759
21	--	74	21,5	66,7	759
21	--	74	21,5	66,7	759
21	--	74	21,5	66,7	759
21	--	74	21,5	66,7	759

(3) TURNING SPACE AND TURNING CIRCLE

Detail of wheel equipment: front: 7.50-18; rear 14.9/13 - 28 ; both 6 RP unballasted

Track of wheels - front 1430 mm rear 1360 mm

Results	With brakes		Without brakes	
	right-hand	left-hand	right-hand	left-hand
Radius of turning space	3630 mm	3730 mm	4230 mm	4380 mm
Radius of turning circle	3500 mm	3600 mm	4100 mm	4250 mm

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground 690 mm

Distance forward from the vertical plane containing the axis of the rear wheels 820 mm

Distance from the medium plane --

(5) BRAKING

Date of test: Sept. 1969

Type of track: concrete

Weight of ballasted tractor: 3563 kg

Cold brakes

	ballasted	without ballast
travelling speed of the tractor	20 km/h	20 km/h
(I) deceleration m/sec^2	3,4	5,2
(II) stopping distance m	6,8	4,6
(III) force exerted on the brake pedal	88 kg	72 kg

Brake fade characteristics (hot tests)

deceleration hot/deceleration cold.100 100%

stopping distance cold/stopping distance hot.100 91%

force on pedal, cold/force on pedal, hot.100 100%

efficiency of handbrake or parkinglatch: no rotation of the wheels

pull on handbrake (cold) 30 kg (hot) 30 kg

(6) MEASUREMENT OF AMBIENT NOISE EMITTED BY THE TRACTOR

Date of tests: 1-10-1969

Type of sound level meter: Rohde und Schwarz, type EZGA

Type of track: Asphalt

Results of tests:

Gear: 4 H

Travelling speed 20,56 km/h before acceleration

Sound level: left side 84 dBA, right side 85 dBA

(7) NOISE MEASUREMENT AT THE DRIVER'S EAR LEVEL

Date of tests: 1-10-1969

Type of sound level meter and octave filter: Rohde und Schwarz, type EZGA

Type of track: Asphalt

Type of frequency analyser: Rohde und Schwarz, type PBO

Results of tests:

Gear	Travelling speed (km/h)	Loudness sones
4 L	7,62	159

(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: October 1969, Wageningen

Hydraulic fluid:

make and type: motor oil HD

viscosity: SAE 20

	Vertical movement in (mm)	Maximum force exerted through full range (kg)	Pressure (kg/cm^2)
Linkage giving maximum mechanical advantage			
At lower hitch points (height above ground in down position 390 mm	560	1450	190
On the frame	695	925	190
Linkage giving minimum mechanical advantage			
At lower hitch points (height above ground in down position 85 mm	660	1640	190
On the frame		820	190

Type of linkage lock for transport: hydraulic

Opening pressure of the cylinder over pressure relief valve 190 atm

Pump characteristics:

i - opening pressure of the relief valve 190 atm
  - sustained pressure by the open relief valve 190 atm

ii - pump delivery rate at minimum pressure and rated engine speed 19,1 1/min

iii - pump delivery rate 18,75 1/min
  delivery pressure 150 atm
  power (calculated) 6,25 pk

Part IV

1 Repairs and adjustments during the tests: none

2 Remarks : none

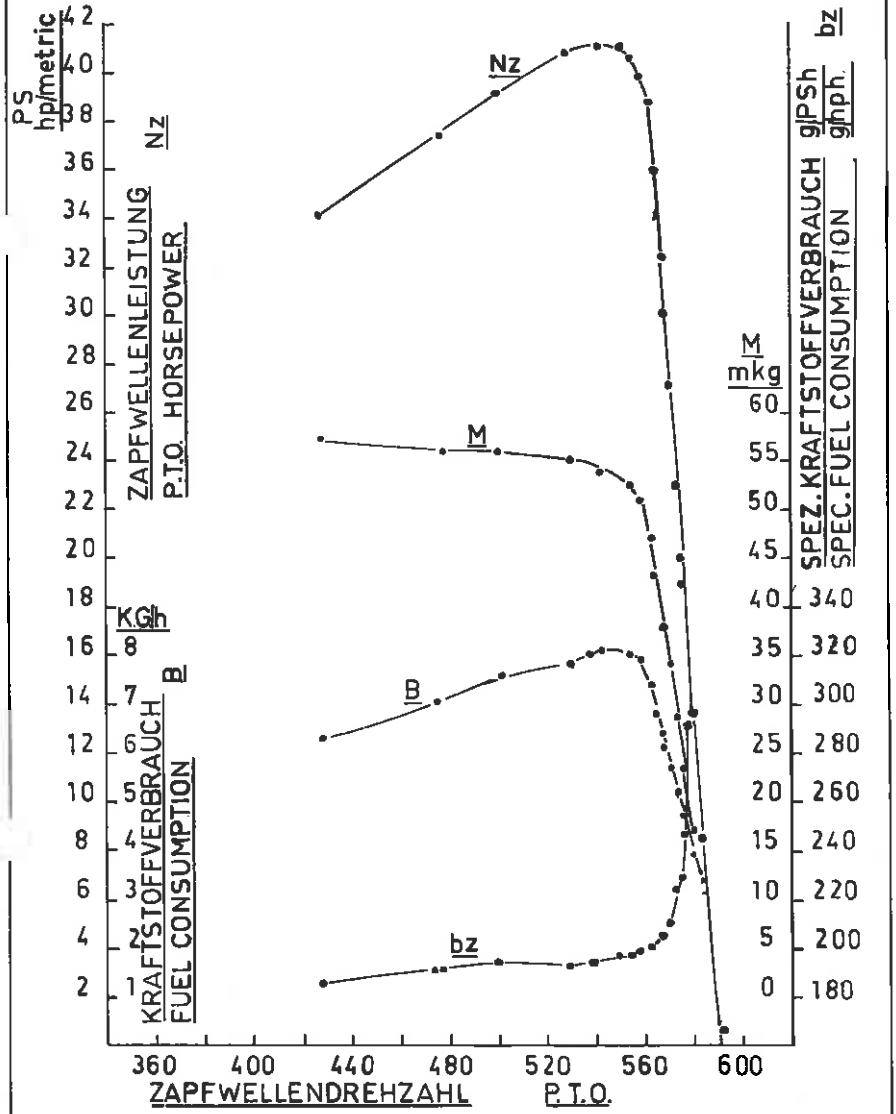
Wageningen, 17th January 1970

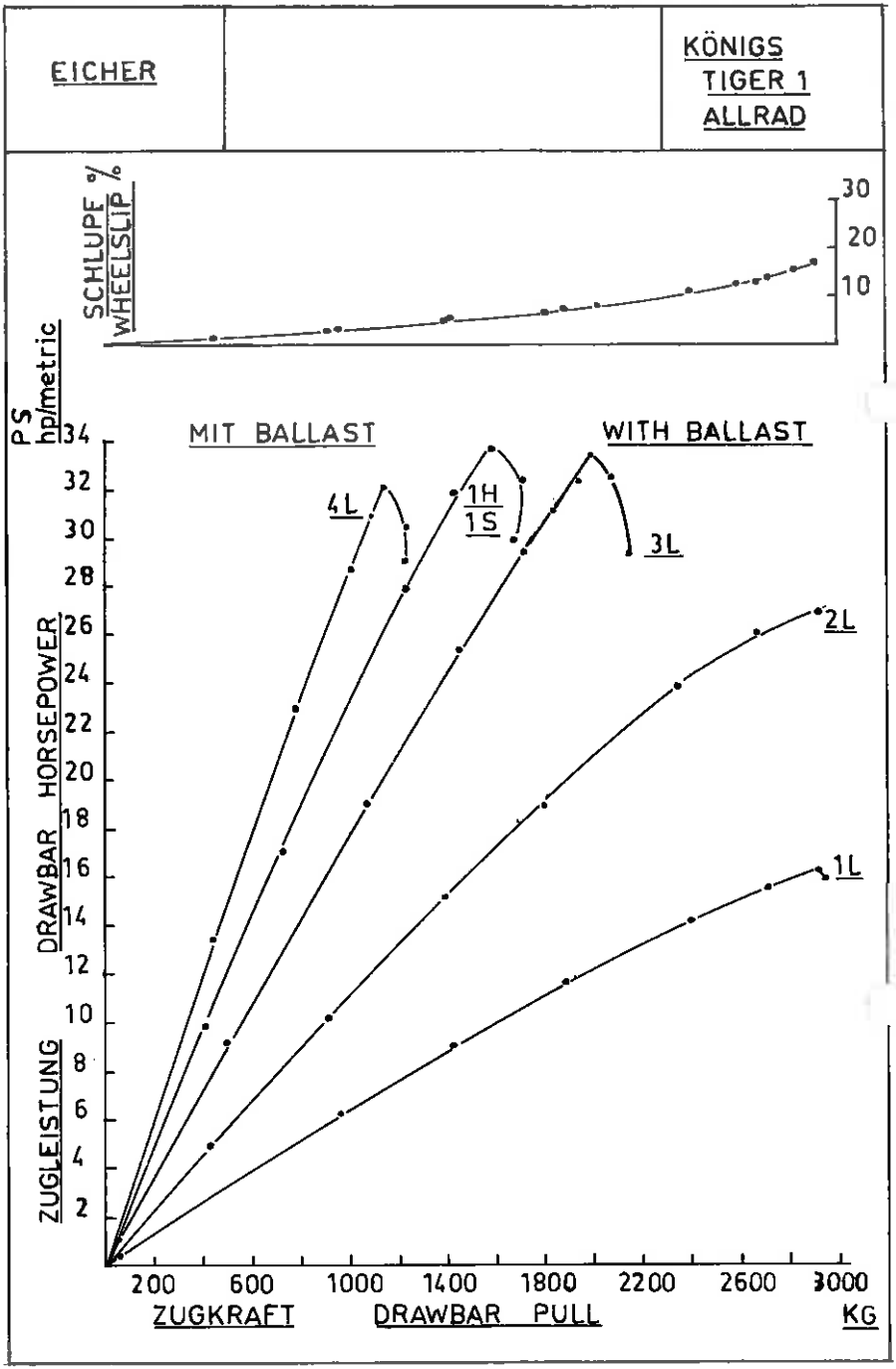
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P.T.O. TEST

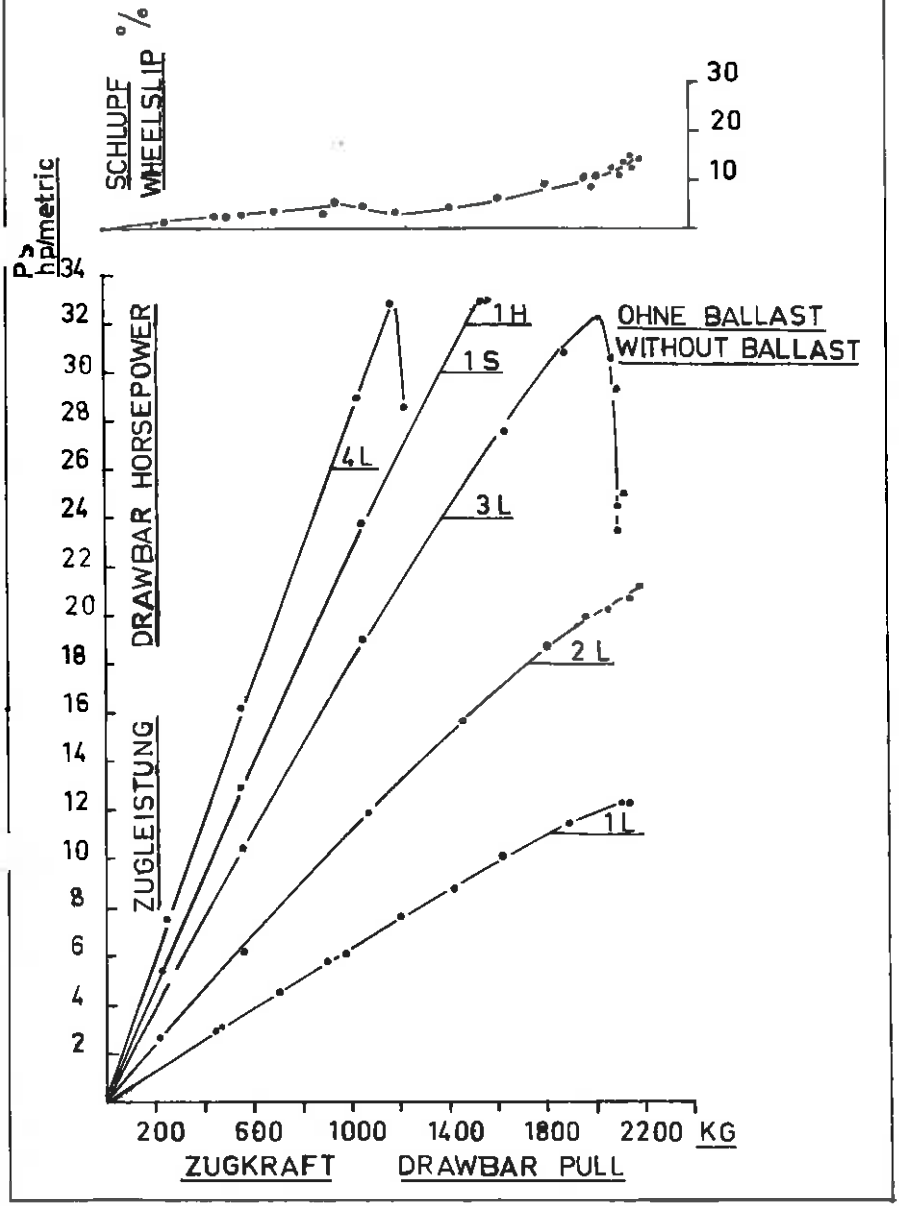
KÖNIGS
TIGER 1
ALLRAD




EICHER
KÖNIGS TIGER 1 ALLRAD
SCHLUPF % WHEELSLIP
30
20
10
PS hp/metric
MIT BALLAST
WITH BALLAST
4L
1H 1S
3L
2L
1L
DRAWBAR HORSEPOWER
ZUGLEISTUNG
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
200
600
1000
1400
1800
2200
2600
3000
ZUGKRAFT
DRAWBAR PULL
KG

EICHER

KÖNIGS TIGER 1 ALLRAD



EICHER

KÖNIGS TIGER 1 ALLRAD

