307/O.E.C.D.

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

EICHER KÖNIGSTIGER II - ALLRAD. TYPE: 3016 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: 17-2-1970 *Serial No.: 307*

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 wheel-slip/drawbar pull curves.

Drawbar test without ballast
curves of drawbar horse power and wheel-slip/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 dor test by: Manufacturer
Selected by: Manufacturer, in accordance with testing station
Place of running-in: by manufacturer
Duration of running-in: 16,5 h

SPECIFICATION OF TRACTOR

Tractor

make: Eicher
model: Königstiger II-Allrad
type: 3016 S
Serial No.: 116257

Motor

make: Eicher
model: four-stroke diesel
type: EDK 4-7
Serial No.: 108164

Cylinders

number: 4
disposition: in line
bore/stroke: 100/125 mm
capacity: 3927 cm^3
compression ratio: 20,4:1
arrangement of valves: overhead valves
cylinder liners: replaceable Alfin cylinders 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 14-22.30 A plunger in line pump
Serial no.: 2 R 01283
manufacturer's production setting: 27° (+ °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 4575 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: 10,0 l

changing period: 200 h

Cooling system

type: air cooled

details of pump and fan: 4 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: 0001 359 005

Battery

main: lead accumulator

make: Mittermaier

type: 12 ED 114

capacity: 114 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 212

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

lear 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 : 25,5 1 gear oil SAE 80

rear axle: per planetary gear

final drive(s): 2,5 1 gear oil SAE 80 per 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	269,91	1,77	1,82
2 L	158,85	3,04	3,09
3 L	111,92	4,31	4,37
4 L	68,86	7,00	7,28
1 H	74,98	6,43	6,52
2 H	44,10	10,94	11,13
3 H	31,08	15,52	15,74
4 H	19,12	25,23	26,22
reverse			
1	149,62	3,22	
2	88,04	5,48	
3	62,02	7,78	
4	38,16	12,64	

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 178 mm of p.t.o. (value given by manufacturer

no.of p.t.o. revolutions for I revolution of driving wheel: 22,58

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

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

Belt pulley (optional extra, values given by manufacturer

location: at rear of p.t.o.. Two types are possible:

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 at rated engine speed 2000 rev/min

engine speed 1544/1893 rev/min at standard linear speed 16,75 m/sec

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. 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. 900 mm, min. 80 mm

method of changing position: by power lift and adjustable stay links

Fixed drawbar: optional extra, on lower links

construction 1: 90x40x825 mm

construction 2: 90x40x1500 mm

holes construction 1: central hole and three holes apart either side of centre line at a distance 90/90/90 mm

holes construction 2: central hole and six holes apart either side of centre line at a distance 90/90/90/150/90/90 mm

distance from central hole behind rear wheel centre: 880 mm

distance from central hole behind p.t.o.: 620 mm

Swinging drawbar: optional extra

height above ground: 345 or 430 mm

distance from pivot behind rear wheel centre 615, 665 ot 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 900 140

method of operation: mechanical

Brakes

make: Knott

type: internal shoe brakes

method of operation: 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: none

iving 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 tyre: 1535 kg

at 1,3 atm. pressure

track width: 1360, 1500 mm

method of changing: reversible wheels

wheelbase: 2170 mm

Weights

Tractor (without driver but with tanks full)

	Front	Rear	Total
Without ballast	1032 kg	1506 kg	2538 kg
With ballast	1335 kg	2235 kg	3570 kg

Ballast	No. of weights	Total weight	Water
Front	4	242 kg	-- kg
Rear	1 inner and 4 outer weights per wheel	790 kg	-- kg
Additional	--	--	

Seat

make: Fritzmeier SF 4005

type of suspension: torsion spring

type of damping: hydraulic shockabsorber

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

Number of grease points (whole tractor): 26

Overall dimensions (mm)

	Length	Width	Height
With ballast	3970	2060	Steering wheel: 1500
Without ballast	3550	1730	passenger seat: 1700

special remarks: lengths are incl. three point linkage

Lighting

	height above ground of centre	diameter	distance from outside edge of tractor to centre
Head lights	1028 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 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°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 (h.p.)	Speed			Fuel consumption	
	Engine rev/min	p.t.o. rev/min	Total l/h	specific ghp/h	hp.h/l
Maximum power - 2 hours test					
50,6	2028	566	11,3	184,5	4,47
Standard p.t.o. speed (540/1000 rev/min)					
48,7	1953	545	11,1	188,1	4,4
The speed recommended by the manufacturer for drawbar work					
49,6	2000	558	11,4	187,4	4,4
Part loads					
43,5	2060	575	9,9	188,5	4,4
--	2143	598	3,6	--	--
22,5	2107	588	6,7	244,6	3,4
50,8	2028	566	11,2	182,6	4,5
11,2	2121	592	5,0	371,6	2,2
32,9	2082	581	8,1	203,4	4,0

No loads maximum engine speed: 2143 rev/min

Equivalent crankshaft torque at maxumum power: 17,84 kgm

Maximum equivalent crankshaft torque 19,4 kgm at 1372 rev/min of the engine

Mean atmospheric conditions: temperature 19 °C
pressure 760 (mm) Hg
relative humidity 69%

Maximum temperature : coolant -- °C
engine oil 83 °C
fuel 18 °C

(2) DRAWBAR PERFORMANCE

Date of tests: June-Sept. 1969

Type of track: concrete

Height of drawbar above ground: 640 mm

Gear number	Horse-power (h.p.)	Draw-bar pull (kg)	Engine speed rev/min	Slip of wheels %	Fuel consumption	
					Drawbar horse-power h.p.h./l	Specific (h.p.h.)
(i) MAXIMUM POWER (ballasted)						
1 L	17,0	2850	2058	14,3	--	--
2 L	30,3	3020	2073	15,8	3,1	263,4
3 L	38,5	2800	1946	12,7	3,4	243,2
4 L	42,1	1650	1993	5,0	3,9	235,7
1 H	43,1	1930	1980	6,37	3,7	225,3
FIVE HOUR TEST at 75% of pull at maximum power						
1 H	32,2	1350	2069	4,2	3,3	250
FIVE HOUR TEST at pull corresponding to 15% wheelslip in test (i)						
2 L	30,3	3020	2073	15,8	3,1	263,4
MAXIMUM POWER (unballasted)						
1 L	14,9	2500	2072	15,4	--	--
2 L	25,7	2590	2051	16,4	--	--
3 L	36,0	2500	2057	14,7	--	--
4 L	40,4	1520	2056	5,1	--	--
1 H	37,9	2020	1686	8,7	--	--
2 H	39,5	1050	1884	2,8	--	--
3 H	37,7	710	1843	1,9	--	--

Temperature (°C)				Atmospheric conditions	
Fuel	Coolant	Engine oil	Temperature (°C)	Relative humidity %	Pressure in mm Hg
(i) MAXIMUM POWER (ballasted)					
20	--	83	21,3	42	756
20	--	83	21,4	42	756
18	--	84	17,9	68	755
15	--	84	14,9	79	758
16	--	85	17,4	76	754
FIVE HOUR TEST at 75% pull at maximum power					
16	--	85	16,4	68	766
FIVE HOUR TEST at pull corresponding to 15% wheelslip in test (i)					
16	--	86	16,4	68	766
MAXIMUM POWER (unballasted)					
15	--	83	15,9	66,7	761
15	--	83	15,9	66,7	761
15,5	--	85	15,9	66,7	761
15,5	--	85	15,9	66,7	761
15,5	--	84	15,9	66,7	761
14,5	--	84	13,2	55,7	764
14	--	84	13,2	55,7	764

(3) TURNING SPACE AND TURNING CIRCLE

Detail of wheel equipment: front: 7.50-18; rear 14,9/13-28; both 6 PR unballasted

Track of wheels - front 1455 mm rear 1360 mm

Results	With brakes		Without brakes	
	right-hand	left-hand	right-hand	left-hand
Radius of turning space	3830 mm	3930 mm	4480 mm	4630 mm
Radius of turning circle	3700 mm	3800 mm	4350 mm	4500 mm

(4) LOCATION OF CENTRE GRAVITY

Height above ground 660 mm

Distance forward from the vertical plane containing the axis of the rear wheels 900 mm

Distance from the medium plane --

(5) BRAKING

date of test: Ocotber 1969

type of track: concrete

weight of ballasted tractor: 3570 kg

Cold brakes

	ballasted	without ballast
travelling speed of the tractor	25 km/h	25 km/h
(I) deceleration m/sec^2	2,4	4,2
(II) stopping distance m	9,7	5,3
(III) force exerted on the brake pedal	78 kg	76 kg

Brake fade characteristics (hot tests)

deceleration hot/deceleration cold.100 90%

stopping distance cold/stopping distance hot.100 90%

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

efficiency of handbrake parkinglatch: no rotation of the wheels

pull on handbrake (cold) 35 kg (hot) 35 kg

(6) MEASUREMENT OF AMBIENT NOISE EMITTED BY THE TRACTOR

Date of tests: October 1969

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

Type of track: Asphalt

Results of tests:

Gear: 4 H

Travelling speed: 19,0 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: October 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	7,64	95

(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: October 1969, Wageningen

Hydraulic fluid:

make and type: motor oil

Viscosity: SAE 20 HD

Viscosity index

	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 380 mm	520	1295	184
On the frame	645	610	
Linkage giving minimum mechanical advantage			
At lower hitch points (height above ground in down position 80 mm	680	1320	184
On the frame		985	

Type of linkage lock for transport: hydraulic
Opening pressure of the cylinder over pressure relief valve 184 atm

Pump characteristics:

i - opening pressure of the relief valve 184 atm
- sustained pressure by the open relief valve 184 atm

ii - pump delivery rate at minimum pressure and rated engine speed 20 1/min

iii - pump delivery rate 19 1/min
delivery pressure 150 atm
power (calculated) 6,33 pk

Part IV

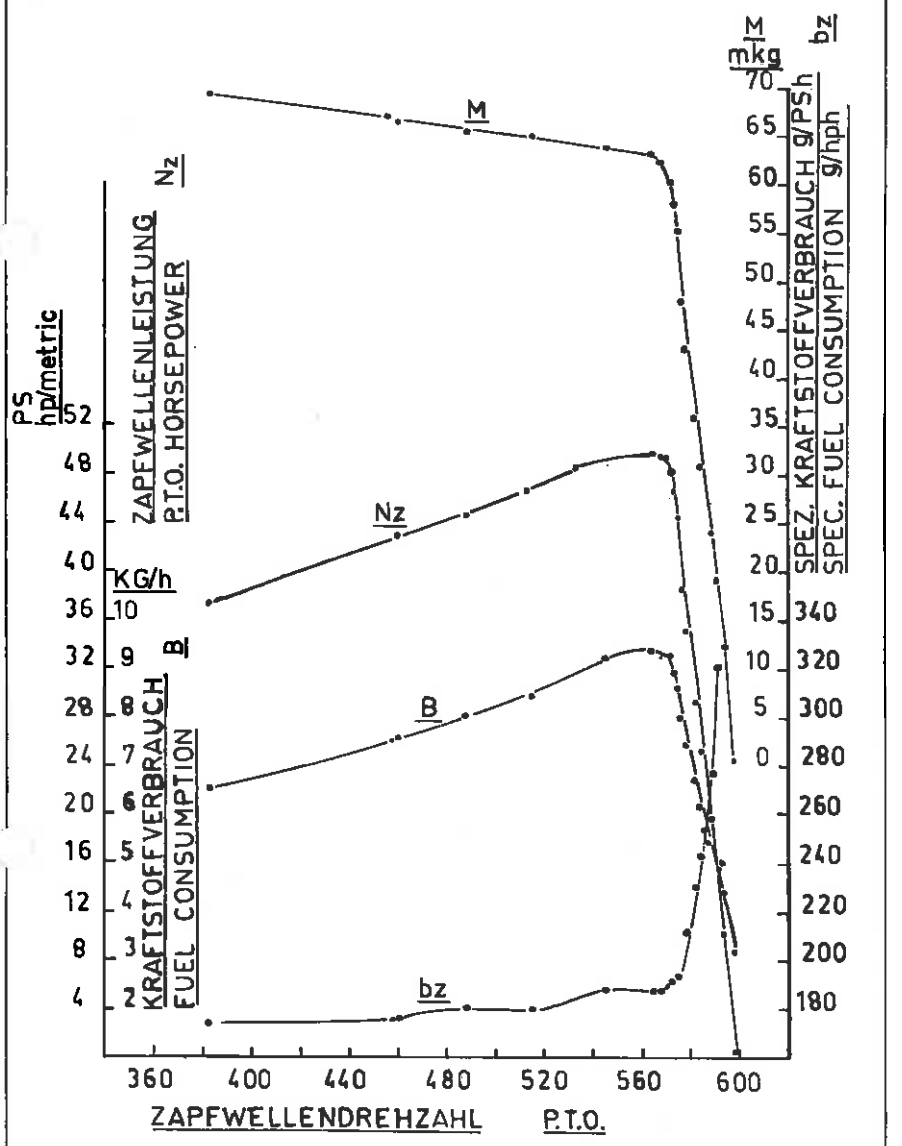
1 Repairs and adjustments during tests: none

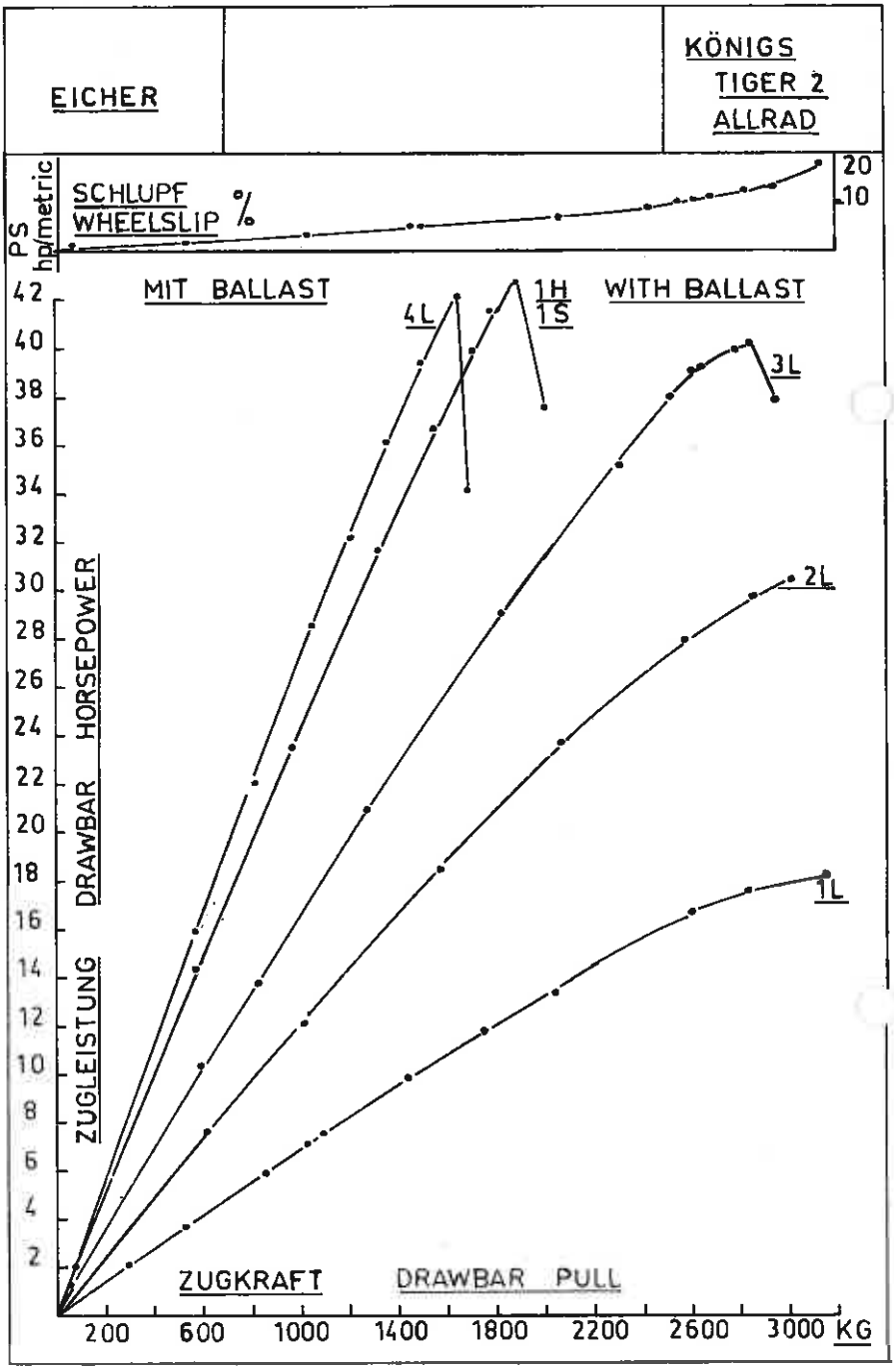
2 Remarks : none

Wageningen, 17th January 1970

Head of Department of Agricultural Engineering Agricultural University	Head of Testing Department Institute of Agricultural Engineering and Rationalization
Prof. Ir. G.J. Quast	Ir. A.R. Kraai

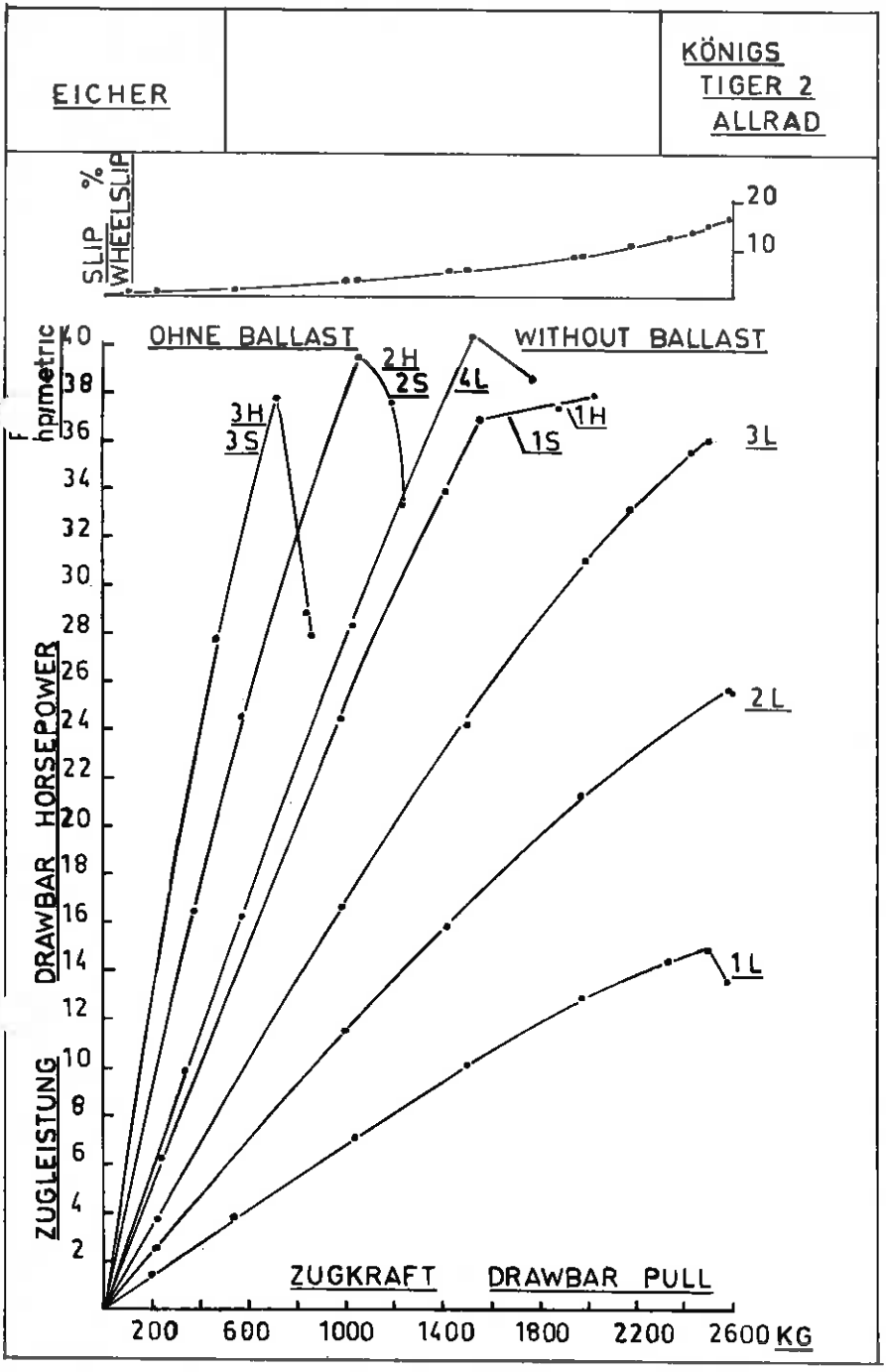
EICHER	ZAPFWELLENLEISTUNG P.T.O. TEST	KÖNIGS TIGER 2 ALLRAD




EICHER
KÖNIGS
TIGER 2
ALLRAD
PS
hp/metric
SCHLUPF
WHEELSLIP %
20
10
MIT BALLAST
WITH BALLAST
4L
1H
1S
3L
2L
1L
42
40
38
36
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32
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28
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12
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2
ZUGLEISTUNG
DRAWBAR HORSEPOWER
ZUGKRAFT
DRAWBAR PULL
200
600
1000
1400
1800
2200
2600
3000
KG

EICHER

KÖNIGS
TIGER 2
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