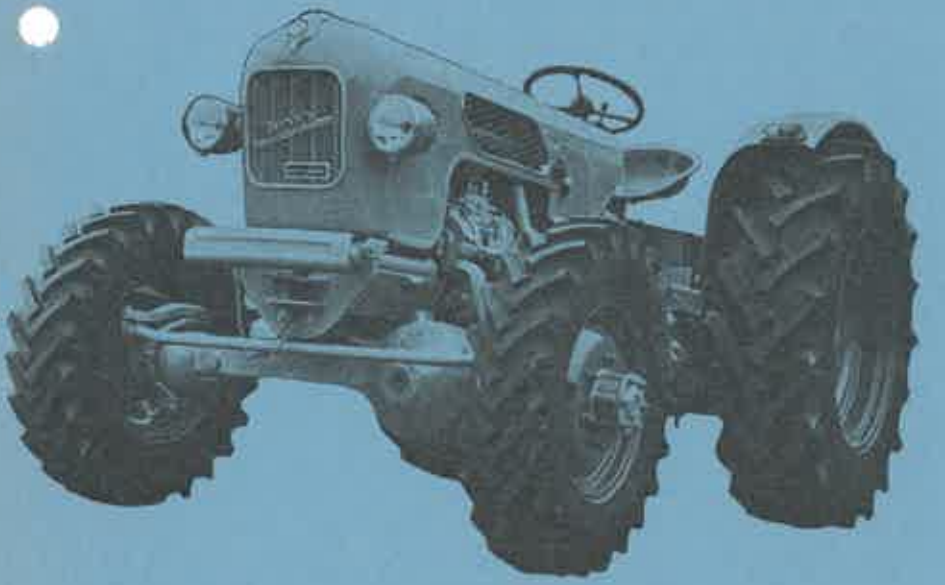
REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE FOR AGRICULTURAL TRACTORS

EICHER KÖNIGSTIGER A, TYPE EA 400

Manufactured by:

Gebr. Eicher Traktoren und Landmaschinenwerke, Forstern/Obb



Test No.: 104/O.E.C.D.

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: 30-12-1965 *Serial No.:* 104

INSTITUUT VOOR LANDBOUWTECHNIEK EN RATIONALISATIE

DR. S. L. MANSHOLTLAAN 12 - WAGENINGEN

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APPENDIX

Power take-off test

curves of power take-off horse power, torque and specific fuel consumption/engine speed

Drawbar test with ballast

curves of drawbar horse power and wheelslip/drawbar pull

curves of specific fuel consumption/drawbar pull

Drawbar test without ballast

curves of drawbar horse power and wheelslip/drawbar pull

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

PART I

SPECIFICATION OF TRACTOR

Tractor:

Make: Gebr. Eicher, Traktoren und Landmaschinenwerke, Forstern/Obb.
Type: EA 400, Königstiger A.
Number of the tested tractor: 00010

Motor:

Make: Gebr. Eicher, Traktoren und Landmaschinenwerke, Forstern/Obb.
Type: EDK 3.
Air cooled four stroke diesel engine with 3 cylinders.
Number of the tested motor: 83711
Rated output: 40 Hp. (D.I.N.)
Rated speed: 2000 r.p.m.
Cylinders: 3 in line, replaceable units, make Alfin, each cylinder equiped with a blower.
Bore/stroke: 100/125 mm
Compression ratio: 20,4 : 1
Place of the valves: hanging in the cylinderhead
Speed of the engine:

for P.T.O. work	2000 r.p.m.	max power
for standard P.T.O. work (540 r.p.m.)	1940 r.p.m	
for drawbar work	2000 r.p.m	
for pulley work	2000 r.p.m	

Fuel system:
Fuel: diesel oil
Fuel pump: Kugelfischer, PSAFE 12 VJP569F
Injector nozzles: Kugelfischer, DFO 40-A1
Filter: Dual filter with "Micronicein-Sätzen"
Capacity fuel tank: 50 l.

Regulator:
Make: Kugelfischer
System: centrifugal regulator
Governed range: 600 r.p.m. - 2200 r.p.m.

Airfilter:
Make: Mann u. Hummel, type 31040 75004 with centrifugal pre filter

Lubricating system:
System: forced feed
Recommended oil: Winter SAE 10 HD
Summer SAE 20 HD
Tropics SAE 30 HD
Filter: Mann, type 67504 92146, "Multi-Hochleistungs" filter
Recommended oul change: after 200 hours
Oil capacity: 10,5 l.
Cooling system: air cooling by 3 blowers belt driven

Clutch:

Make: Fichtel & Sachs AG
System: double clutch
type: DO 250/225 K

Transmission:

Make: Zahnradfabrik Friedrichshafen AG
Type: A 210/11
Number of the gears: 8 forward and 4 reverse
Oil capacity: 22,0 l.

Differential:
Make: Zahnradfabrik Friedrichshafen AG
System: Crown wheel and pinion
Differential lock: hand or foot operated

Gear	Reduction motor - driving wheel	Theoretical travelling speed for 2000 r.p.m. of the motor in km/h
	Low gearing	
1.	408,735 : 1	1,21
2.	239,103 : 1	2,06
3.	145,638 : 1	3,40
4.	89,838 : 1	5,52
	High gearing	
1.	113,543 : 1	4,36
2.	66,402 : 1	7,43
3.	40,455 : 1	12,20
4.	24,970 : 1	19,80
	Reverse	
1.	227,385 : 1	2,17
2.	132,704 : 1	3,72
3.	80,910 : 1	6,10
4.	49,841 : 1	9,90

Front shaft drive:

Make: Zahnradfabrik Friedrichshafen AG
System: Friction plate clutch hand operated, provided with a differential

Front shaft:

Make: Zahnradfabrik Friedrichshafen AG
System: Pendel shaft with hypoid drive
Type: 20 DMS / 20 FMXS
Reduction: 4,13 : 1
Oil capacity: 4 l. hypoid oil

Steering device:

Make: Zahnradfabrik Friedrichshafen AG
System: ZF Gemmer
mechanical or ZF hydrostatic drive

Brakes:

Hand- and footbrake.
Footbrake independent or combined operated.

Wheels:

Steering wheels:
Two at front
Tyres: 7,50 - 18 or 6,50 - 20 extra special
Track: 1430 mm

Driving wheels:
2 (+ 2 front)
Two at rear
Tyres: 11 - 32, 13 - 28, 13 - 30 or 9 - 36 AS
Track: 1370 mm
Wheelbase: 1970 mm

Belt pulley:

Location: Attachable to rear of tractor in two alternative positions, main p.t.o. driven.
Diameter x width: 220/150 mm
1545 r.p.m. at rated motor r.p.m. (2000)
Speed: 17,8 m/sec.
Direction of rotation: both

Power take-off:

Main: p.t.o. at rear of tractor, 6 spline - 1 3/8"
Hight above ground: 565 mm
Proportional r.p.m. to motor: 558 r.p.m./2000 r.p.m.
or: 1116 r.p.m./2000 r.p.m.
Speed reverseable by handle

Power lift:

Make: ZF-Bosch-Eicher
System: Hydraulical power lift with implement position control (Schwimmstellung) and draught control (automatically weight transfer).
Gear type pump independently driven from wheels.
Oil capacity: 7,0 l.
Working pressure: 150 kg/cm^2
Oil flow of the pump: 20 l./min.
Torque: 1090 kpm
Maximum load at end of linkage:
200 mm above ground: 1800 kg
Minimum load through complete range: 1200 kg

Drawbar:

Fixed drawbar on hydraulically controlled linkage.
Category 1 or 2
Max. height: 900 mm
Min. height: 100 mm
Distance from rear axle: 830 mm

Hitch:

Height above ground: 670 - 820 mm, adjustable by steps of 50 mm
Distance from rear axle: 470 mm

Electrical equipment:

Voltage: 12
Generator: Bosch 160 W
Battery: Bayern Dünnplatten-Batterie - 90 Ah
Starting device: Bosch 3 PS

Overall dimensions: (with 11-32)

Overall length: 3340 mm with three point linkage
Overall width: 1690 mm
Overall height: 1510 mm
Minimum ground clearance: 370 mm
Wheel position: 1970 mm

Weights:

With three point linkage, power lift, oil, no driver, without hydraulic dynamometer and steering device.

	Without additional weight kg	With max.additional weight kg
On front wheels	830	1128
On rear wheels	1380	2101
Total	2210	3229

Special remarks:

None

PART II

LABORATORY TESTS

1. Compulsory test: Power take-off test

Date and location: 1st June 1965.
State Agricultural University, Department of Agricultural Machinery and Farm Buildings, Dr. S.L. Mansholtlaan 12, Wageningen

Type of dynamometer: 2 HT. Water brake

Position of governor control: Fully open

Fuel: Shell - Diesel oil
density at 20°C: 0,820

Engine oil: Shell Rotella SAE 20 HD

Transmission oil: SAE 80

Horse Power	Engine R.P.M.	P.T.O. R.P.M.	Torque P.T.O. Kpm	Fuel consumption l/h	g/Psh	Psh/l	Temperature Fuel °C	Air °C	Atmos.pressure mm Hg
A. Maximum power (2 h. at the power take-off shaft)									
40,0	2050	570	50,3	9,37	192	4,27	20	20	760
B. Power at standard R.P.M. of the P.T.O.									
38,8	1950	540	51,7	8,86	187	4,38	20	20	760
C. Power at maximum torque (1 h.)									
31,8	1560	433	52,7	6,82	176	4,66	20	20	760
D. Power at standard R.P.M. of the engine									
39,8	2000	558	51,2	9,2	190	4,32	20	20	760
No load, maximum engine speed: 2200 rev/min									

PART III

DRAWBAR TEST ON CONCRETE TRACK

Date of tests: June 1965.

Position of governor control: Fully open

Type of tyre: Rear 14,9/13-30 AS
Front 7,50 - 18

Fuel: Shell diesel oil
density at 20°C 0,820 kg/l

Engine oil: Shell Rotella SAE 20

a) TEST WITH ADDITIONAL WEIGHT ')

Weight of the tractor with driver:

without ballast, front 812 kg, rear 1518 kg;
with ballast, front 1120 kg, rear 2226 kg;
total weight with ballast 3346 kg.

Weight of the ballast-weights:

front: weight 57 kg; 4 times
rear: water 402 kg;
weights 193 kg; 2 times

Tyre pressure:

front: 2,0 kp/cm^2
rear: 1,0 kp/cm^2

Height of the drawbar above ground: 350 mm

') Total weight of the steering device and the hydraulical dynamometer at the drawbar of the tractor: 45 kg.

1. Max. Powers and Pulls

Gear	horse power hp	pull kp	maximum powers: wheel slip %	maximum powers: engine speed R.P.M.	speed km/h	air temp. °C	atmos. pressure mm Hg	maximum pulls: pull kp	maximum pulls: reason for stall
Low gear (1)									
1.	-	-	-	-	-	-	-	-	-
2.	19,8	2970	20,0	2150	1,80	18	760	3110	wheelspin
3.	28,9	2880	12,7	2000	3,00	18	760	2790	eng.stall
4.	30,6	1600	6,2	1980	5,14	18	760	1710	eng.stall
High gear (2)									
1.	31,3	2050	8,6	2050	4,12	18	760	2190	eng.stall
2.	30,9	1150	4,7	2020	7,22	18	760	1370	eng.stall
3.	30,5	710	4,2	1970	11,60	16	760	750	eng.stall
4.	-	-	-	-	-	-	-	-	-

2. Fuel consumption

Gear	Optimum fuel consumption: Specific consumption g/hph	Specific consumption hph/l	corresponding pull kp	Range of pull over which specific fuel consumption does not exceed optimum consumption by more than 10 % kp
Low gear (1)				
1.	-	-	-	-
2.	333	2,46	2970	1800 - 3100
3.	265	3,10	2600	1600 - 2800
4.	248	3,30	1600	1200 - 1710
High gear (2)				
1.	243	3,37	2050	1300 - 2200
2.	244	3,36	1150	1200 - 1400
3.	240	3,41	700	600 - 750
4.	-	-	-	-

b) TEST WITHOUT BALLAST

Weight of tractor without driver:

front: 812 kg
rear: 1518 kg
total: 2330 kg

Total weight of the steering device and the hydraulical dynamometer at the drawbar of the tractor: 45 kg.

Tyre pressure:

front: 2,0 kp/cm^2
rear: 0,9 kp/cm^2

Height of drawbar above ground: 350 mm

1. Maximum powers and pulls

Gear	maximum powers: horse power hp	pull kp	wheel slip %	engine speed R.P.M.	speed km/h	air temp. °C	atmos. pressure mm Hg	maximum pulls: pull kp	reason for stall
Low gear (1)									
1.	-	-	-	-	-	-	-	-	-
2.	14,5	2120	16,0	2100	1,86	20	760	2200	wheelspin
3.	23,0	2020	12,4	2090	3,06	20	760	2150	wheelspin
4.	30,5	1720	10,5	1940	4,80	20	760	1790	eng.stall
High gear (2)									
1.	28,7	1920	11,5	2040	4,04	20	760	2000	wheelspin
2.	31,4	1190	6,3	2000	7,15	20	760	1350	eng.stall
3.	31,6	730	2,9	1980	11,70	20	760	800	eng.stall
4.	-	-	-	-	-	-	-	-	-

PART IV

1. Location of centre of gravity

Tractor ballasted	Test III.a) with ballast	Test III.b) without ballast
Distance from rear axis	658	685

2. Turning space and turning radius

Wheel equipment: As for drawbar test without ballast
Wheel track: Front 1440 mm
Rear 1370 mm

Radius	With brakes		Without brakes	
	Right-hand	Left-hand	Right-hand	Left-hand
Radius of turning space	4,2 m	4,13 m	4,35 m	4,38 m
Turning radius	4,0 m	3,93 m	4,15 m	4,18 m

PART V

1. Repairs and adjustments during tests: None

2. Remarks: None

Wageningen, 7th September, 1965.

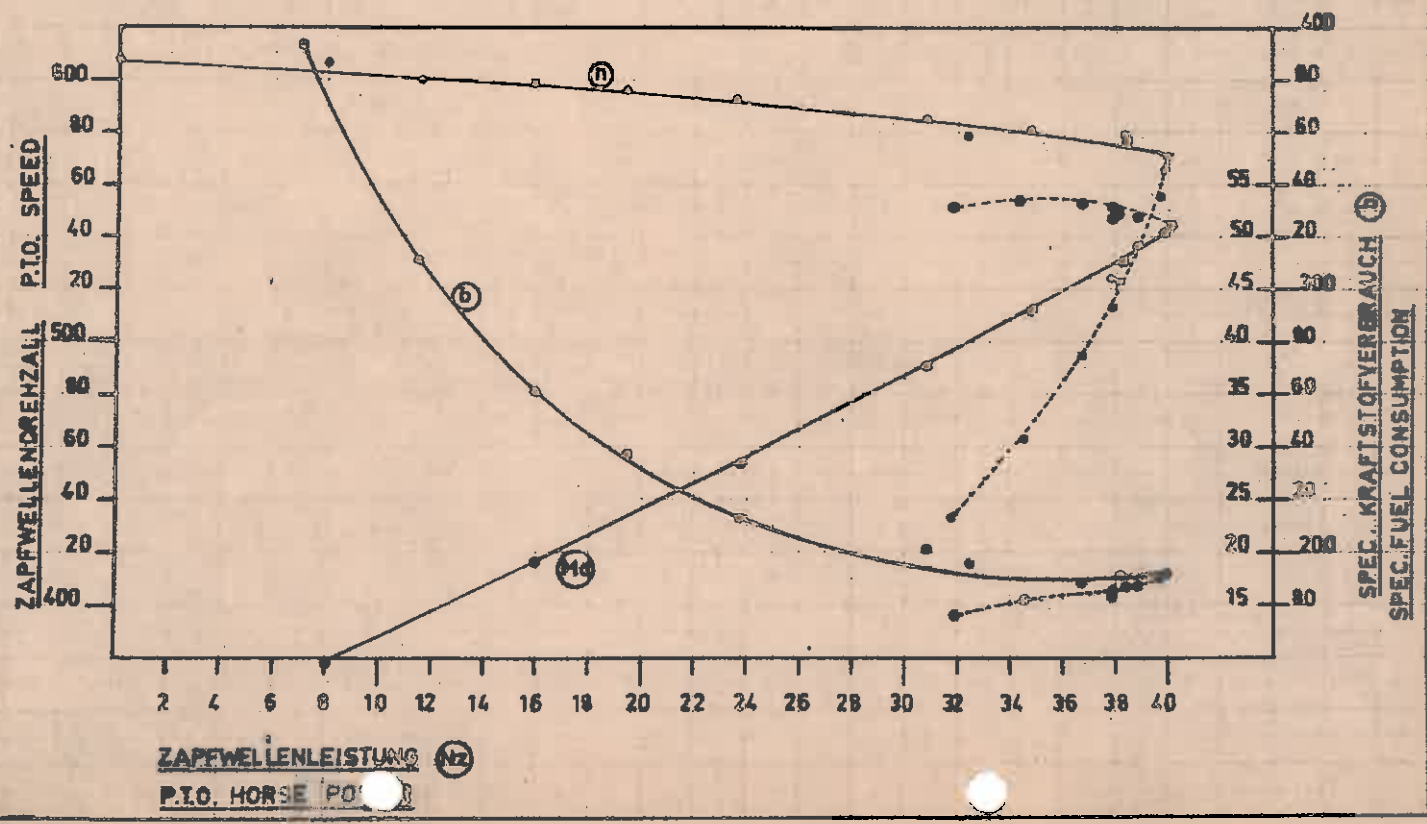
Test engineer

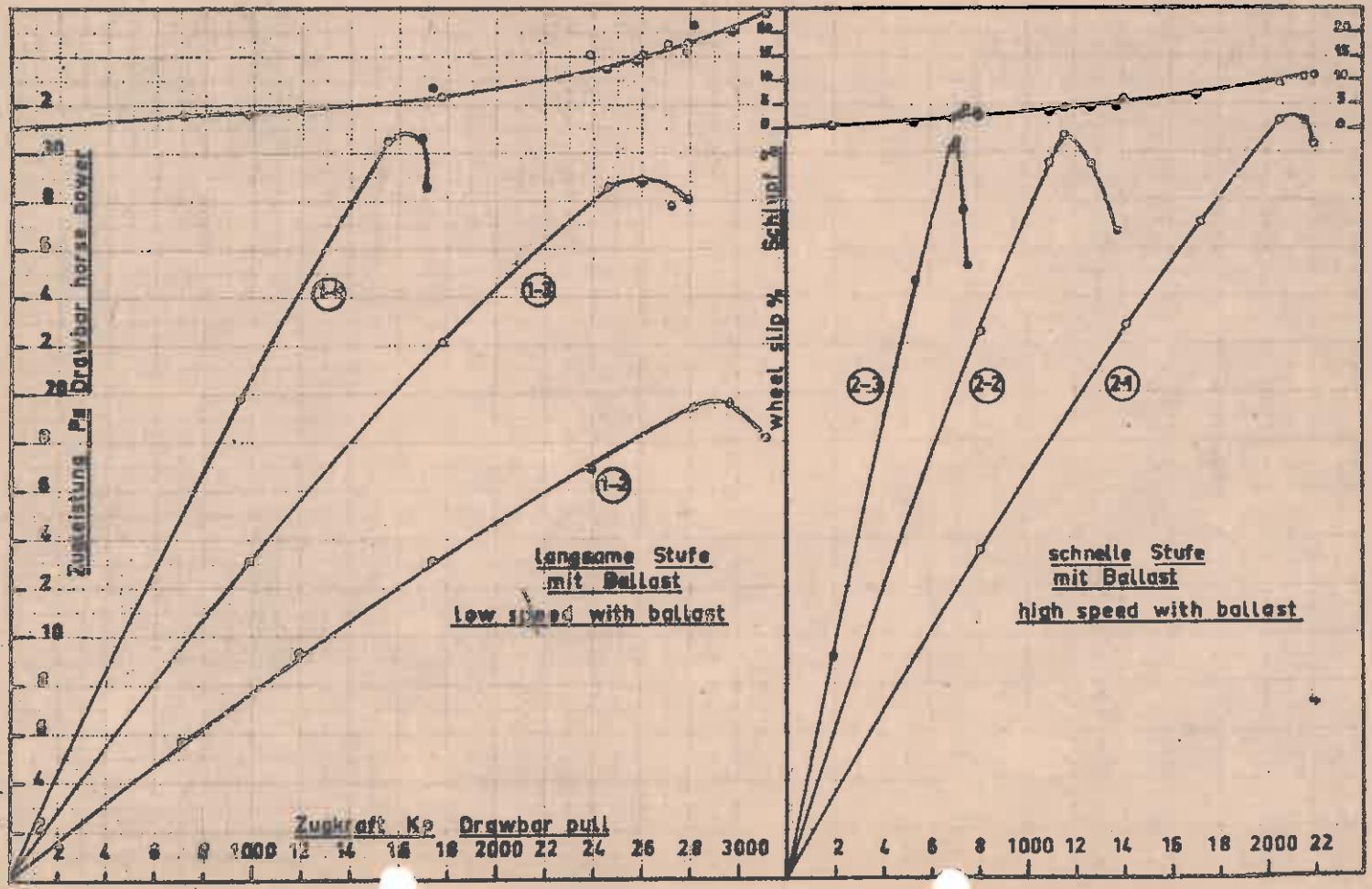
W.C. Bergman.

Head of Department of Agricultural Machinery and Farm Buildings

Prof. Ir. G.J. Quanjard

EICHER	LANDBOUWHOGESCHOOL	TYPE EA 600




Zugleistung Pz Drawbar horse power
wheel slip % Schlupf %
1-3
1-2
1-1
2-3
2-2
2-1
langsame Stufe
mit Ballast
low speed with ballast
schnelle Stufe
mit Ballast
high speed with ballast
Zugkraft Kp Drawbar pull
2 4 6 8 1000 12 14 16 18 2000 22 24 26 28 3000

EICHER

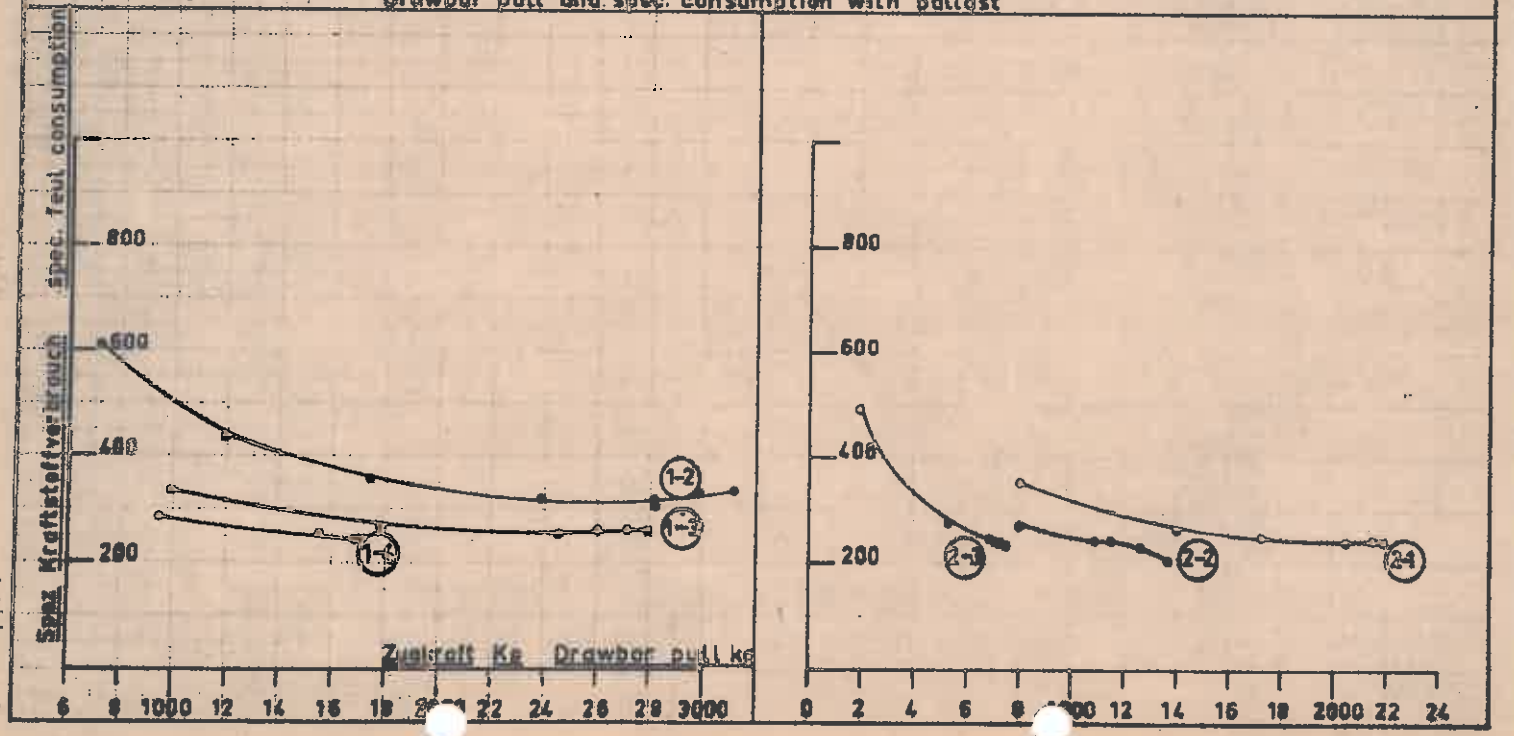
LANDBOUWHOGESCHOOL

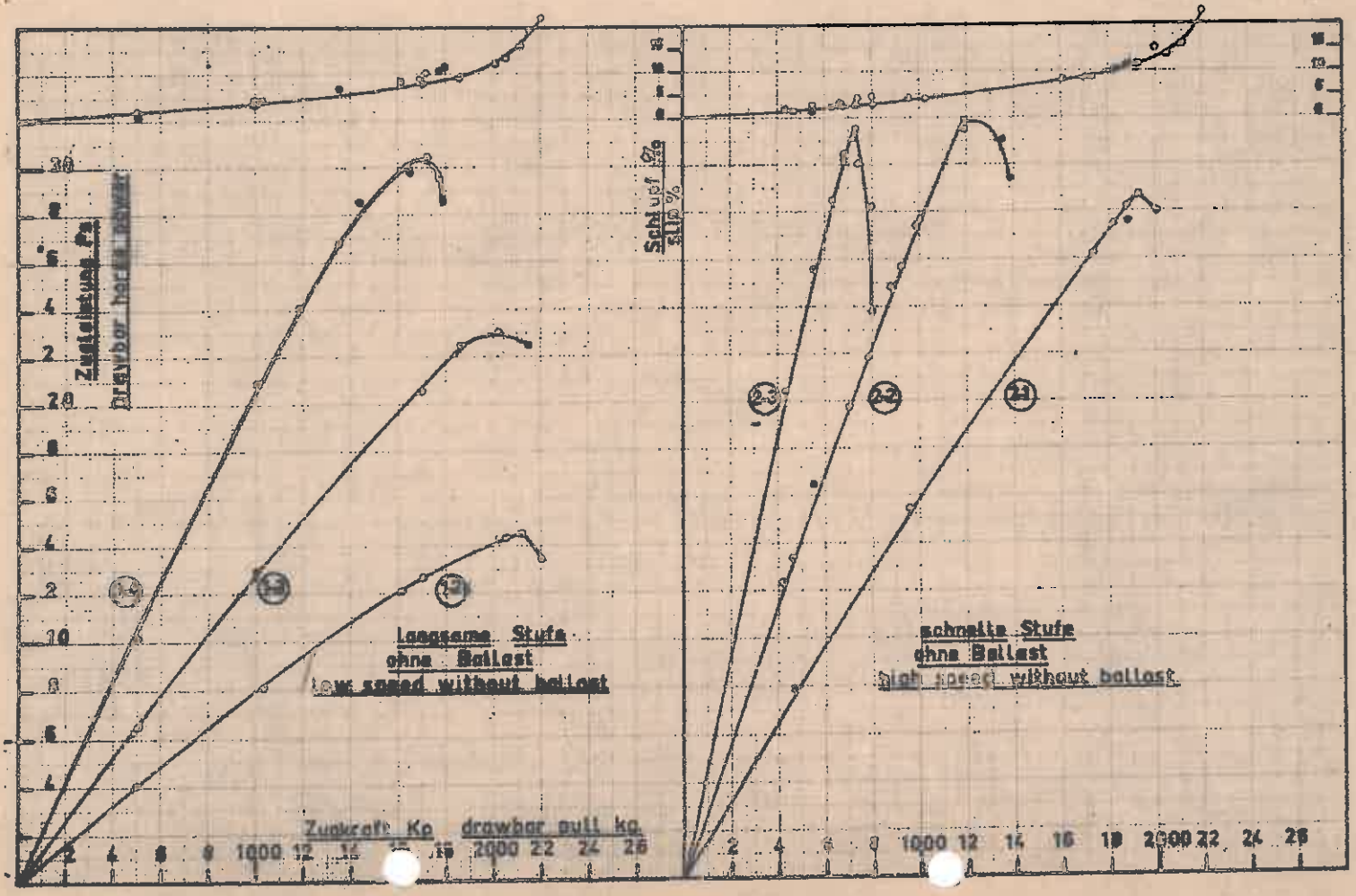
TYPE EA 400

Zugleistung und Spez. Kraftstofverbrauch

mit Ballast

Drawbar pull and spec. consumption with ballast




Zugkraft Fz
drawbar pull
Schlupf %
slip %
1-4
1-3
1-2
Langsame Stufe
ohne Ballast
low speed without ballast
2-3
2-2
2-1
schnelle Stufe
ohne Ballast
high speed without ballast
Zugkraft Kg drawbar pull kg
1000
2000