



Diesel Engine

Sheet 1

Test Certificate V-type Engines

Contract No.: 211 976/1

Engine Type: 12 M 453 AK

Engine Serial No.: 50 038

This certificate consists of 3 sheets:

Sheet 1: general particulars

Sheet 2: test bed results

Sheet 3: control and setting data

Testbed: 50/5

No. of Waterbrake: III K 005-016

atmospheric conditions during test run

barometric reading $b = 768$ mmHg
ambient temperature $t = 24-26$ °Crelative air humidity $\varphi = 90$ %
altitude above sea level 10 m

The following were used for running-in and test run:

type of fuel: Gasoil $\gamma = 0,827$

type of lub. oil: SAE 40

and supplier:

and supplier:

Engine Data:

4 stroke, solid injection, rotation anticlockwise / ~~clockwise~~

main bearing dia. mm 300 con rod bearing dia. mm 245

nominal output: 4000 ~~PS~~ nominal speed: 600 r.p.m.

max. speed, no-load n * r.p.m.

weight of engine:

kg; weight of flywheel: 1210 kg; lowest speed on load n r.p.m.

critical speed of engine from up to r.p.m.

In view of vibration damper wear there is to be no continuous running in this critical speed range.

crankshaft: test: yes / ~~no~~

manufacturer: Fried. Krupp-Hüttenwerke AG

Test -No.: NV 48026 ESN

Drawing -No.: 1.66.7-25.10.00-03 hardening: CK 45 S0

Fitted auxiliaries and elements:

dynamo No.: —

fresh water cooler: —

oil cooler: —

type: —

type: — cooling area: — m²type: — cooling area: — m²fuel filter: Boll & Kirch
107/40 MW 0,01charger type: VTR251-2N cyl. row A No.: HT320517 cyl. row B No.: HT320703
G8T19,7 IV CH
spec. 119 WP 21 n max. 2750 r.p.m. — t max. 670 °Cinjection pump: Bosch PF 1W 240 BS
plunger dia: 24 mm 1722
pitch: — mminjection nozzle: L'Orange VU0-U955f
injection pressure: 260 kp/cm^2 E
No. of perforations and dia: 6 x 0,55 110injection pump
locked at: A+B = 30 mm
rack of locking pump
locked at: mm

Conditions of Acceptance:

NV KEL 4.75 0078 NV
28.4.75

Remarks:

* Testbed run without original Gouverneur
there fore no revolutions adjusted.

Notes:

cyl. 1 = flywheel side of engine
row A = left } looking from
row B = right } drive endTest showed no reason for rejection.
Engine is ready for despatch.

MaK Maschinenbau GmbH Kiel

date:

Dalko/Milbrodt

Rauland/Kremin

28.4.75

FB4

In charge of test



Diesel Engine

Test Certificate
Test Bed Results

Sheet 2

Engine S/No.:

50 038

ITEM-NO.	CYL. ROW	running time	admission mm	Output			torque Md mkg	mean eff. pressure kg/cm ²	Lfr. meas. qty kg	fuel consumption			lub. oil		cooling water				
				r.p.m.	1) NPS kg	loading kg %				running time sec.	consumption g/bph kg/h	press. bar	temp. °C	h. std. 4,5 m press. bar	temp. °C				
1	A	1,5	30	600	4000	6667	100	4775	14,8	30	144,0	155,1	620,3	3,2	65	72	1,9	68	78
2	B		30											"	"	"	"	"	"
3	A	1,5	30	600	4000	6667	100	4775	14,8	30	144,2	154,8	619,4	3,2	65	72	1,9	68	78
4	B		30											"	"	"	"	"	"
5	A	1	31,5	619	4400	7108	110	5091	15,8	30	130,0	156,1	687,0	3,5	52	67	1,9	74	82
6	B		31,5											"	"	"	"	"	"
7	A	40'	24	600	3000	5000	75	3581	11,1	20	128,2	154,8	464,5	3,3	63	70	1,9	62	68
8	B		24											"	"	"	"	"	"
9	A	40'	18,5	600	2000	3333	50	2387	7,4	15	140,0	159,5	319,0	3,5	60	66	1,9	62	68
10	B		18,5											"	"	"	"	"	"
11	A	40'	13	600	1000	1667	25	1194	3,7	10	167,0	178,3	178,3	3,7	58	64	1,9	60	66
12	B		13											"	"	"	"	"	"
13	A	40'	26	545	3000	5505	75	3942	12,2	20	128,5	154,5	463,0	3,3	52	62	1,9	65	72
14	B		26											"	"	"	"	"	"
15	A	40'	20,5	476	2000	4202	50	3009	9,3	15	141,8	157,5	315,0	2,8	52	60	1,8	64	70
16	B		20,5											"	"	"	"	"	"
17	A	15,5	378	1000	2646	25	1895	5,9	10	172,5	172,6	173,0	173,0	2,4	48	56	1,8	65	69
18	B													15,5	"	"	"	"	"

ITEM-NO.	CYL ROW	charge air cooler				Exhaust temperatures °C										Turboscharger		
		water E °C	air A °C	water E °C	air A °C	1	2	3	4	5	6	7	8	9	after turbine	* before and behind cooler charging pressure bar	mmHg	speed r.p.m.
1	A	36	52	142	48	375	375	385	380	400	400	-	-	-	350	1,35	1045/1010	22500
2	B	"	"	144	48	390	400	400	390	385	400	375	-	-	345	1,35	1040/1010	22300
3	A	36	52	142	48	375	375	390	380	400	400	375	-	-	350	1,35	1045/1010	22500
4	B	"	"	149	48	395	400	400	390	385	400	375	-	-	345	1,35	1040/1010	22300
5	A	20	48	156	55	385	400	400	395	425	415	400	-	-	355	1,52	1200/1160	23700
6	B	"	"	160	55	405	430	420	410	405	425	400	-	-	355	1,65	1200/1160	23600
7	A	28	38	104	40	340	330	345	345	360	340	340	-	-	325	0,94	695/660	19500
8	B	"	"	106	40	350	360	360	350	345	360	340	-	-	320	0,88	690/660	19300
9	A	24	30	70	32	310	300	300	300	315	290	290	-	-	285	0,46	360/345	15000
10	B	"	"	72	32	295	320	320	305	305	300	300	-	-	280	0,46	355/345	15000
11	A	20	20	42	22	275	280	270	260	275	250	250	-	-	235	0,15	125/115	9700
12	B	"	"	44	22	295	270	270	250	245	250	250	-	-	225	0,15	120/115	9600
13	A	24	39	105	40	345	355	360	350	370	355	355	-	-	325	0,908	695/670	19400
14	B	"	"	108	40	350	370	365	355	350	360	360	-	-	325	0,89	690/670	19300
15	A	23	30	74	36	310	320	325	315	335	305	305	-	-	295	0,45	350/335	14800
16	B	"	"	75	36	320	320	325	315	305	300	300	-	-	295	0,45	350/335	14700
17	A	22	24	44	26	255	270	265	245	265	250	250	-	-	250	0,142	110/105	8800
18	B	"	"	45	26	260	250	250	230	225	225	225	-	-	240	0,14	110/105	8800

air consumption at starting & reversing	crank web deflection in 1/100 mm 3)										exhaust temperatures in front turbine °C				
air receiver capacity: — m ³	1. cold 2. warm										A B				
initial pressure: — atü	cylinder	1	2	3	4	5	6	7	8	9	1	2	1	2	load %
alternating starting & reversing: — x upto 7,5 atü	BDC	20	20	20	20	20	20	-	-	-	510	505	520	495	100
remaining press. in receiver: 7 atü	exhaust side B	20,5	19	19,5	19	20	20,5	21	-	-	510	505	520	495	100
tripping mechanism released at n — r.p.m.	TDC	20	19	19,5	19	20	20,5	21	-	-	515	520	540	520	110
1) output measured in h.p. on test bed	control side A	20,5	19	19,5	19	20	20,5	21	-	-	445	435	450	430	75
2) cylinder 1 = flywheel end of engine	compression pressure	A	75	75	74	72	74	72	-	-	385	370	390	370	50
3) measured on cold engine	pressure atü	B	73	72	74	75	74	73	-	-	310	285	300	270	25
	firing pressure ahead	A	107	106	106	106	105	105	-	-	460	445	460	440	75
	B	106	107	106	106	106	105	-	-	-	415	405	405	380	50
	firing pressure reverse	A	-	-	-	-	-	-	-	-	325	315	310	295	25
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Diesel Engine

Test Certificate
Control and setting data

Sheet 3

Engine S/No.:

50 038

Control Data	CYL.R.	cylinder								
		1	2	3	4	5	6	7	8	9
inlet opens (at deg) before T.D.C.	A	68	67	68	68	68	68	-	-	-
	B	68	69	68	69	69	68			
inlet closes (at deg) after B.D.C.	A	40	40	39	40	39	39			
	B	39	39	39	39	39	40			
exhaust opens (at deg) before B.D.C.	A	48	47	48	47	47	47			
	B	48	49	49	49	48	49			
exhaust closes (at deg) after T.D.C.	A	50	50	49	50	49	50			
	B	49	49	48	49	49	48			
admission (full load) at	A	30				regulator set to n = 600				r.p.m.
	B	30				nozzle injection pressure: 260				kg/cm ²

Setting (adjusting) Data	CYL.R.	cylinder								
		1	2	3	4	5	6	7	8	9
distance from top edge piston to top edge cyl. liner mm in TDC	A	7	7	7	7	7	7	-	-	-
	B	7	7	7	7	7	7			
fuel pumps, start of delivery before ignition dead centre with pressure valve (at deg) without pressure valve (at deg)	ahead	A	13,7	15,5	13,5	13,7	13,7	13,7		
	ahead	B	13,7	14,7	14,7	15,5	15,7	14,7		
	reverse	A								
	reverse	B								
covering of mark on guide and opening of pump body at delivery stroke (at deg. before TDC)	ahead	A	13,7	15,5	13,5	13,7	13,7	13,7		
	ahead	B	13,7	14,7	14,7	15,5	15,7	14,7		
	reverse	A								
	reverse	B								
Rack setting on Bosch pump when starting lever in stop position (mm)	A	2,5	2,5	2	1,5	2	1			
	B	2	2	2	2	2	2			
rack setting on Bosch pump in mm	at normal load	A	30,5	30,5	30	29,5	30	29	29,96	
	at normal load	B	30	30	30	30	30	30		
	at no-load	A	8,5	8,5	6	7,5	8	7	7,96	
	at no-load	B	8	8	8	8	8	8		

Remarks:

Firing order: A1 A5 A3 A6 A2 A4
B2 B4 B1 B5 B3 B6

Flywheel: $\phi = 1400$ mm $1^\circ = 11,5$ mm

groove fore T.D.C. marks: $11,5$ mm = 1°