Geschäftsbereich
Montage

BABCOCK

DEUTSCHE BABCOCK
WERKE
AKTIENGESELLSCHAFT

NTSB D09

Dokumentation

Kennwort SS Norway

Kom.-Nr. 94-8351-998

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1 of 69

E-0014

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

LIST OF CONTENTS

Code

Kom.-Nr. 94 - 8351 - 998

SS Norway

Component

Boiler 21, 22 and 23

	Page
☒ Welder's list	1
☒ Welding code	2
☒ Repair produce plan	3
☒ Testreport temperature recorder	4-5
☒ Boiler 21:	6-23
☐ Upper drum, lower drum, lateral drum:	
☐ space for sketch, surface crack test, preheating	
☒ Boiler 22:	24-41
☐ Upper drum, Lower drum, Lateral drum:	
☐ space for sketch, surface crack test, preheating	
☒ Boiler 23:	42-63
☐ Upper drum, Lower drum, lateral drum:	
☐ space for sketch, surface crack test, preheating	
☐	
☐	
☐	
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☐	
☐	

Druck	Ausgabe		Date	Signature	Date	Signature
		Erection division	12.2.91			

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

WELDER'S LIST

Code

Job No. 94-8351-998

S'S Norway

Serial No.	Welder check No.	Name	Examination	Valid till
1	4	Kreuzenbeck, Rolf	E-R III g	
2	34	Sprengart, Heinz	E-B III g	

Date Signature Date Signature

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

WELDING CODE

Code: SS Norway

Job No. 94-8351-998

Component: Upper, lower and lateral drum, boiler 21, 22, 23

	part 1	part 2
Dimensions:	Wall thickness 24 - 56 mm	
Material:	NF A36-205 A52 ≙ 19 Mn 5	

	root bead	between-bead
Welding process:	SMAW	
Welding filler metal:	SH Schweiß 3MK ≈ E 70 18-A1	

Form of weld: see sketch

Preheating: temperature 120-150 °C

Process:
- ☐ gas annealing
- ☒ resistive annealing
- ☐ induction annealing

Ground-out weld areas

Heat treatment after welding

Heating up period: ____ h
Holding time: ____ h
Anneal. temper.: ____ °C
Recooling time: ____ h

process:
- ☐ gas annealing
- ☐ resistive annealing
- ☐ induction annealing

Test:
- ☐ ultrasonic
- ☐ radiographic
- ☒ magnetic particle
- ☐ dye penetration
- ☐ hardness

Peculiarities: Quenched and tempered pieces are to be produced which are to be ground subsequently.

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

REPAIR PRODUCE PLAN

Page 3

Code

55 Norway

Job No. 94-8351-998

Component

Upper, lower and lateral drum, Boiler 21, 22, 23

Reproduction, even in an abridged form, only permitted with the approval of DBW AG

Inspection of the deficient area
- ☐ ultrasonic
- ☒ magnetic particle
- ☐ radiographic
- ☒ dye penetrant

Removal of the deficient area
- ☒ grinding
- ☐ milling
- ☐ drilling

Inspection for crack absence before welding
- ☒ magnetic particle
- ☐ dye penetrant

Preheating of deficient area
- ☒ welding procedure sheet

Execution of weld
- ☒ welding procedure sheet

Machining of weld
- ☒ grinding, etc.

Heat treatment
- ☐ annealing plan

Test
- ☐ ultransonic
- ☒ magnetic particle
- ☐ hardness
- ☐ radiographic
- ☐ dye penetrant

Pressure test
- ☐ flue gas
- ☐ hydrostatic

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Date	Signature	Date	Signature

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

PRÜFPROTOKOLL
Test Report

TEMPERATURSCHREIBER
Temperature Recorder

Kennwort Code Word: SS-Norway - Bremerhaven

Kom.-Nr. Job No.: 94 - 8351 - 999

Bauteil Component: 12 KW Nr. 12

Geräte-Nr. Equipment: 30700497

Hersteller Manufacturer: Hartmann + Braun

Meßbereich Measuring range: 20 - 1200 °C

Güteklasse Quality Class: 1

Prüfgerät Nr. Test Unit No.: 584

Hersteller Manufacturer: Thermoprozess

Meßgröße Measured quantity °C	Anzeigewerte Reading values °C	Anzeigefehler Indication error K
20°	–	–
100°	100	–
200°	200	–
300°	300	–
400°	400	–
500°	500	–
600°	600	–
700°	703	3
800°	800	–
900°	900	–
1000°	998	2

☒ Die festgestellten Abweichungen liegen im Toleranzenbereich des Prüflings.
The found deviations are within the tolerance range of the test object.

☐ Die festgestellten Abweichungen liegen **nicht** im Toleranzenbereich des Prüflings.
Justierung erforderlich durch Fachbetrieb.
The found deviations are not within the tolerance range of the test object.
Adjustment by specialist company necessary.

Bemerkungen: Notes:

Datum | Unterschrift | Datum | Unterschrift H. KOCONKA

DEUTSCHE BABCOCK WERKE

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

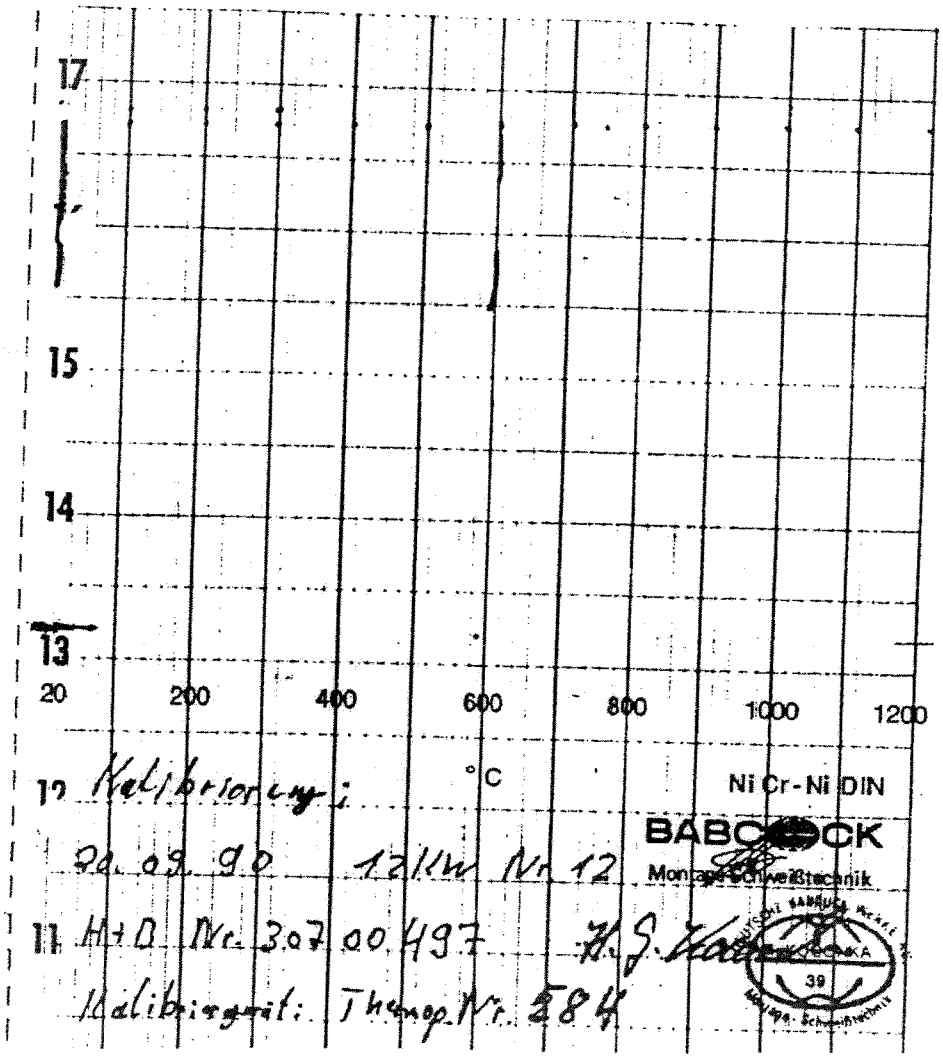
M 20

Pr.-Nr. 7a | Seite 5

Kennwort: SS Norway

Kom. Nr. 94-83541-998

Kalibrierung 12 KW Anlage



Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
		20-09-96			

Vordr. 7a

DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 6

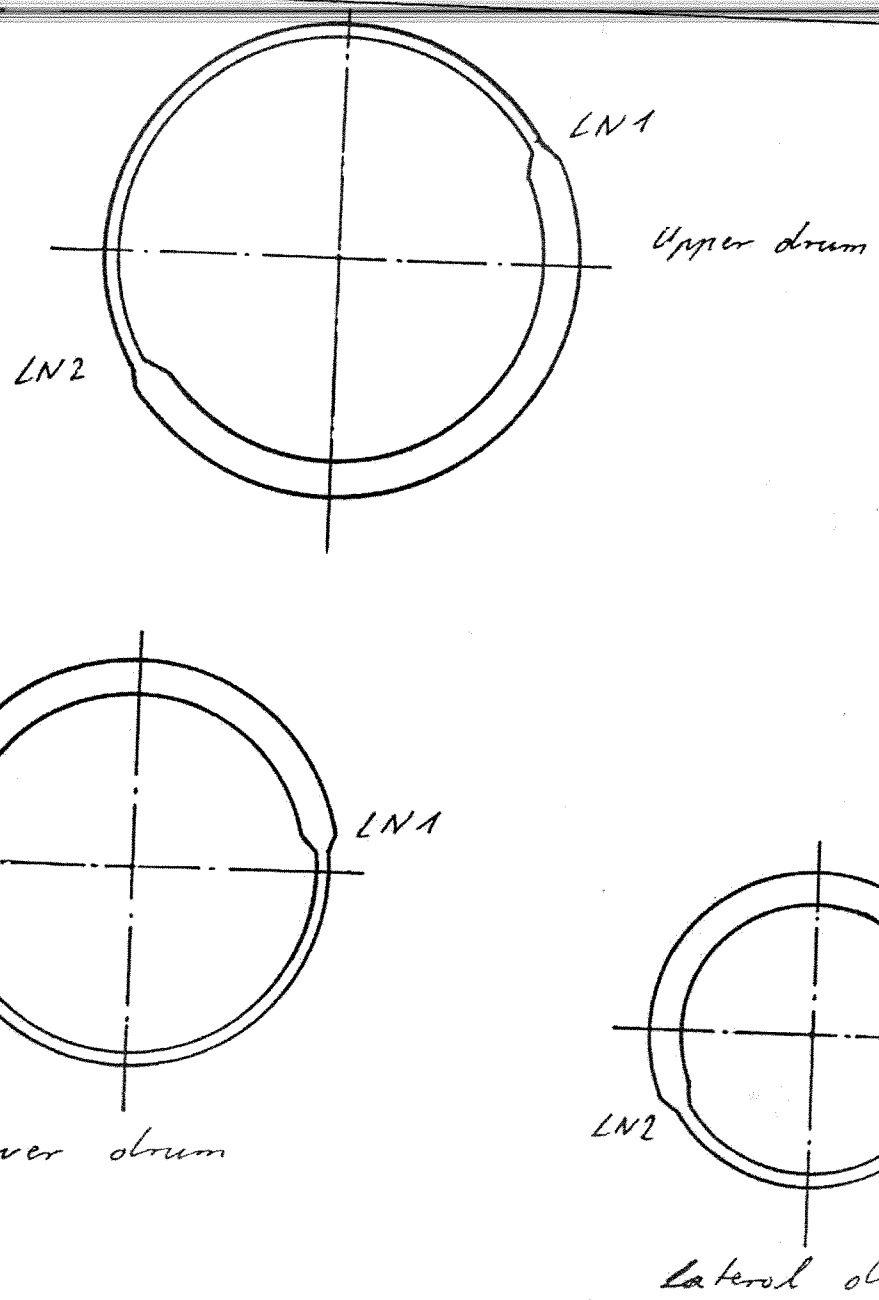
Code

Job No. 94-8351-998

SS Norway

Component

Boiler 21



Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	14.1.71	L. Backes		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

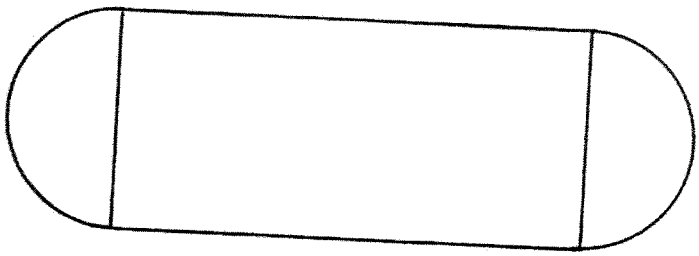
Job No. 94-8351-998

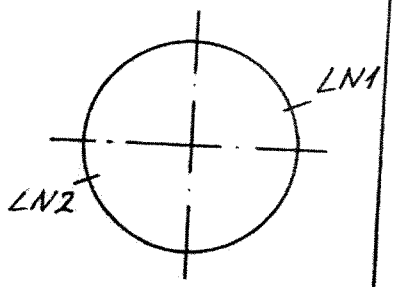
SS Norway

Component

Boiler 21 Upper drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
	> 54,1	> 54,9

Longitudinal welds 1 and 2 exhibit coarse corrosion pits, but no indications subject to registration.

Erection division	Date	Signature	Date	Signature
	14.1.91			

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

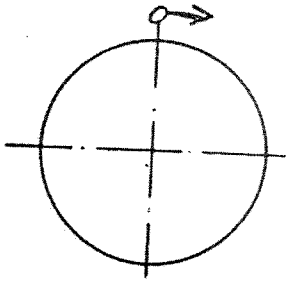
Job No. 94-8351-998

SS Norway

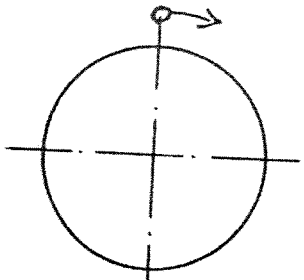
Component

Boiler 21 Upper drum

Inspection result before repair



RN1



RN2

Distance from →	Wall thickness [mm]	
	RN 1	RN 2
3 o'clock	> 53,7	56,5
4 o'clock		57,4

RN 1 : no crack indications

RN 2 : 2 indications in the 3 o'clock sector about 15 mm long on the left and right of the weld metal in HAZ; several smaller indications 5-6 mm in length in the weld metal in the half-past-three sector

Erection division	Date	Signature	Date	Signature
	14.1.91			

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Vordruck Ausgabe

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

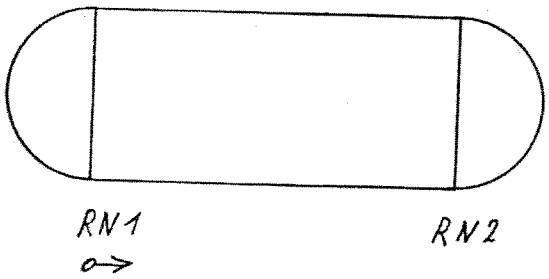
SS Norway

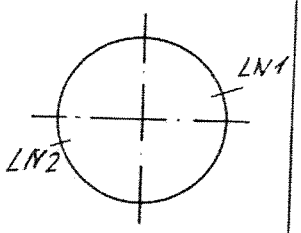
Job No. 94-8351-998

Component

Boiler 21 Upper drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
	> 54,1	> 54,9

No rework was performed.

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		14.1.91	J. Lachau		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

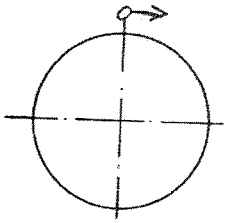
SPACE FOR SKETCH

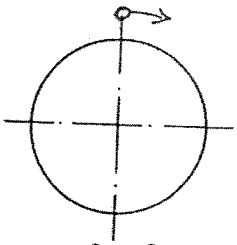
Code: SS Norway

Job No. 94-8351-998

Component: Boiler 21 Upper drum

Inspection result after repair





Distance from →	Wall thickness [mm] RN1	RN2
	> 53,7	
3 o'clock		55,0

RN1 + RN2 : No crack indications.

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		14. 1. 91	P. Zacher		

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 11
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
AK-Nr. / Plant identification No.:

Gegenstand / Subject: Upper drum Obertrommel Boiler Kessel 21
System: / System:

Bauteil / Component:
Abmessung / Dimension:
Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWH 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP 205
Magnetisierungsart / Kind of magnetization: JEW
naß / ~~trocken~~ / wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP 204
fluoreszierend / fluorescent: ~~ja~~ / yes / nein / no
Tangentialfeldstärke / Tangential field intensity: 4,0 KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN 1	1	100	1	Lfd 1614 x 104/56	~ 19 Mn 5		X	
RN 2	"	"	"	"	"		X	
LN 1	"	"	"	"	"		X	
LN 2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung Test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: i.V. Schiller
Prüfaufsicht / Test Supervision: ZF 47

91-2972 5.87

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Doc 9, p. 13 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

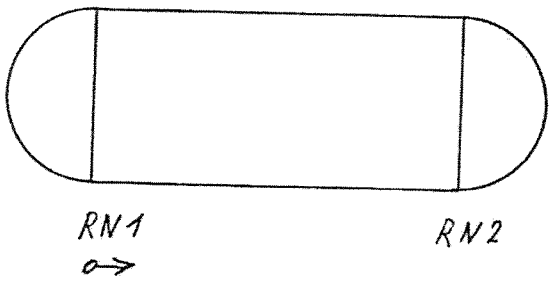
Job No. 94-8351-998

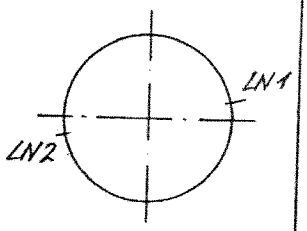
SS Norway

Component

Boiler 21 Lower drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
0	38,6	34,0
2000	37,5	36,2
4000	36,0	38,7

LN1 + LN2 : Severe corrosion pitting in the entire weld area.

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	14.1.91	J. Zschau		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

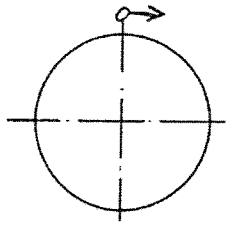
Job No. 94-8351-998

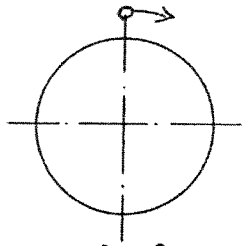
SS Norway

Component

Boiler 21 Lower drum

Inspection result before repair





Distance from →	Wall thickness [mm]	
	RN 1	RN 2
1 o'clock	35,2	35,7

RN 1: 1 o'clock 30 mm crack

2 o'clock – half past two
3 o'clock – 9 o'clock
11 o'clock – half past eleven
} severe corrosion pitting with crack-like connections

RN 2: 1 o'clock 25 mm crack

half past two – half past eight
11 o'clock – 12 o'clock
} severe corrosion pitting with crack-like connections

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	J. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

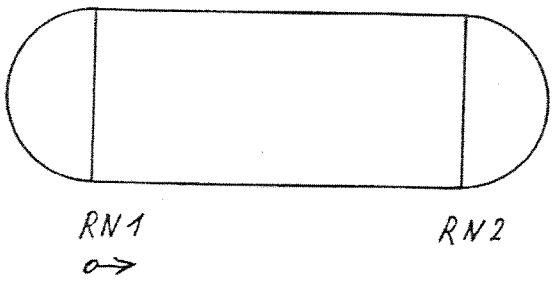
Job No. 94-8351-998

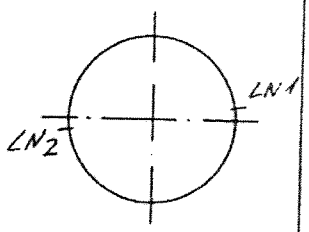
SS Norway

Component

Boiler 21 Lower Drum

Inspection result after repair





Distance from → [mm]	Wall thickness [mm] LN 1	LN 2
	> 35,3	> 33,8

LN1 + LN2 : No crack indications.

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	J. Zocher		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 15

Code

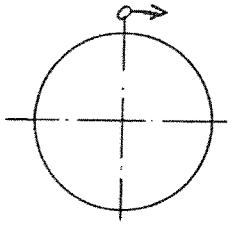
Job No. 94-8351-998

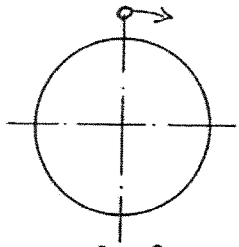
SS Norway

Component

Boiler 21 Lower drum

Inspection result after repair





Distance from →	Wall thickness [mm] RN1	RN2
nine o'clock	33,8	
seven o'clock	33,2	> 31,8
nine o'clock	33,5	

RN1 + RN2 : No crack indications

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	G. Bohm		

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 16
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
AK-Nr. / Plant identification No.:

Gegenstand / Subject: Lower drum Boiler Untertrommel Kessel 21
System: / System:

Bauteil / Component: Abmessung / Dimension:
Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: JB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWM 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP205
Magnetisierungsart / Kind of magnetization: JEW
naß / ~~trocken~~ wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP204
fluoreszierend / fluorescent: ~~ja / yes~~ / nein / no
Tangentialfeldstärke / Tangential field intensity: ..... KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	erfüllt / satisfactory: keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Lip 1030 x 79/36	~ 19Mn4		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung Test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Schiller
Prüfaufsicht / Test Supervision: ZF 47

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BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 17

Code

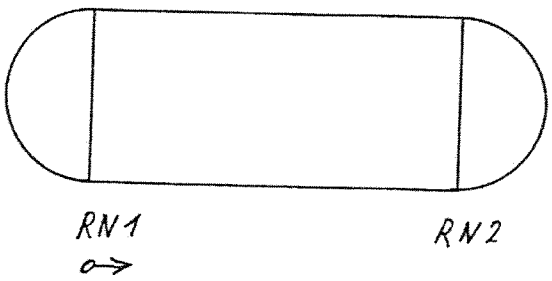
Job No. 94-8351-998

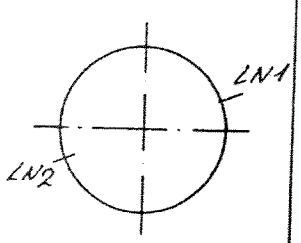
SS Norway

Component

Boiler 21 lateral drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
0	23,1	24,6
2000	23,0	25,8
4000	25,5	24,5

LN1 : 0 – 1400 Coarse corrosion pits with crack connections
2000 – 3000 7 cracks, 15 - 20 mm long
3000 – 4000 4 cracks, 20 - 25 mm long
4100 – 4350 severely pitted crack indications

LN2 : 0 – 2000 continuously small crack indications
2000 – 3000 6 cracks, 15 - 20 mm long
3000 – 4000 2 cracks, 10 mm long

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	J. Lockau		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

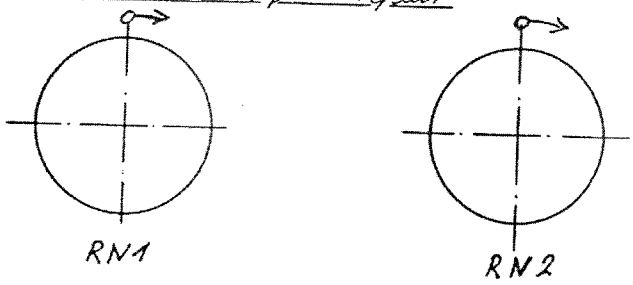
Job No. 94-8351-998

SS Norway

Component

Boiler 21 Lateral drum

Inspection result before repair



Distance from →	Wall thickness [mm]	
	RN 1	RN 2
0 o'clock	25,1	24,2
half past one	24,6	25,3
3 o'clock	23,7	27,5
half past four	23,6	28,9
6 o'clock	22,9	23,0
half past seven	24,0	22,3
9 o'clock	24,5	24,0
half past ten	24,2	25,2

RN1 : 3 o'clock crack 20 mm long; severe corrosion pitting in the entire weld area.

RN2 : 3 o'clock – 9 o'clock 6 cracks, 10-20 mm long; severe corrosion pitting in the entire weld area.

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	15.1.91	J. Zuchau		

Exhibit P. 30 OF 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiagramm

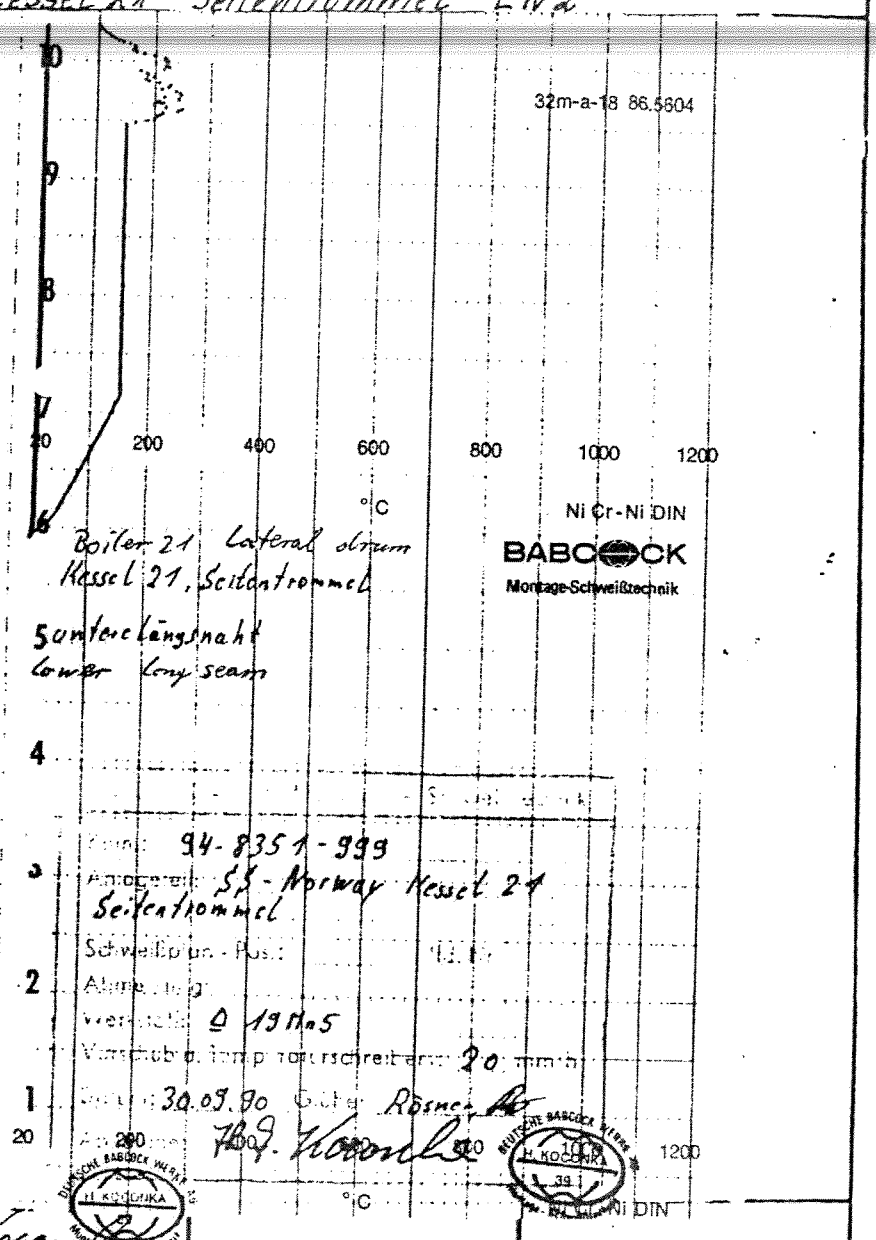
M 20

Pr.-Nr. 7 8 | Seite 19

Kennwort: SS Norway | Kom Nr: 94-8351-998

Boiler 21 Lateral olrum LN2

Kessel 21 Seitentrommel LN2



Vordr. 7a

H.J. Koch

Datum | Unterschrift | Datum | Unterschrift | Datum | Unterschrift

p. 21 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

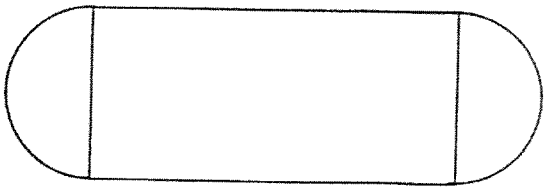
Job No. 94-8351-998

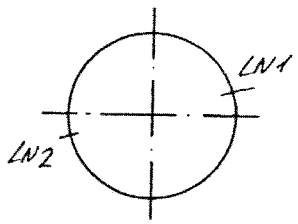
SS Norway

Component

Boiler 21, Lateral drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
1200	21,7	
2000	22,4	
3000	21,7	
3500	22,2	
4000	22,6	
4500	24,7	

LN1: No crack indications

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	15.1.91	L. Bohaus		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

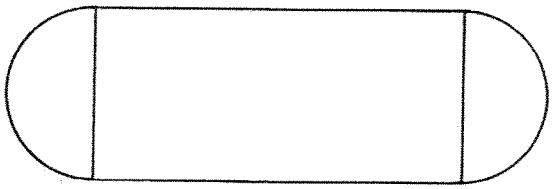
Job No. 94-8351-998

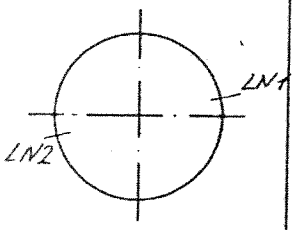
SS Norway

Component

Boiler 21, Lateral drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
300		26,2
450		27,2
1000		22,7
1500		21,3
2000		22,7
3500		22,7
4000		22,5
4500		24,1

In the area of 300 - 450mm the drum was weld-faced.

LN2 : No crack indications.

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	J. Eckau		

doc. p. 23 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

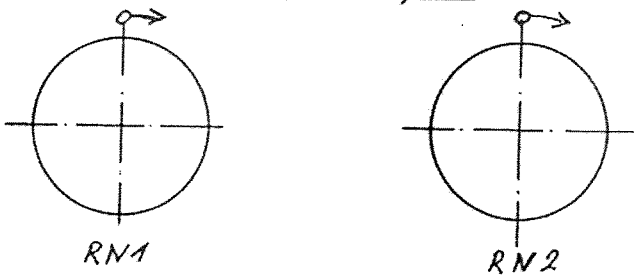
Job No. 94-8351-998

SS Norway

Component

Boiler 21, Lateral drum

Inspection result after repair



Distance from →	Wall thickness [mm] RN1	RN2
3 o'clock 6 o'clock 9 o'clock 12 o'clock	≥ 21,8	≥ 21,3

RN1 + RN2 : No crack indications

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		15.1.91	J. Eckert		

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Doc 2 p. 24 of 69

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 23
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
AK-Nr. / Plant identification No.:

Gegenstand / Subject: Seitentrommel Lateral drum — Kessel 21 Boiler 21
System: / System:

Bauteil / Component:
Abmessung / Dimension:
Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWM 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP 205
Magnetisierungsart / Kind of magnetization: J.E.W.
naß / ~~trocken~~ — ~~wet~~ / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP 204
fluoreszierend / fluorescent: ~~ja~~ / yes — nein / ~~no~~
Tangentialfeldstärke / Tangential field intensity: 4.0 KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory — anzeigenfrei / no indication	erfüllt / satisfactory — keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Liø 694 x 59/24	~ 19 Mo 4		x	
RN2	"	"	"	"	"		x	
LN1	"	"	"	"	"		x	
LN2	"	"	"	"	"		x	
				Test after repair				

Bemerkungen / Remarks: Endprüfung n. d. Schweißen

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Hohendorf
Prüfaufsicht / Test Supervision: ZF

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p. 25 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

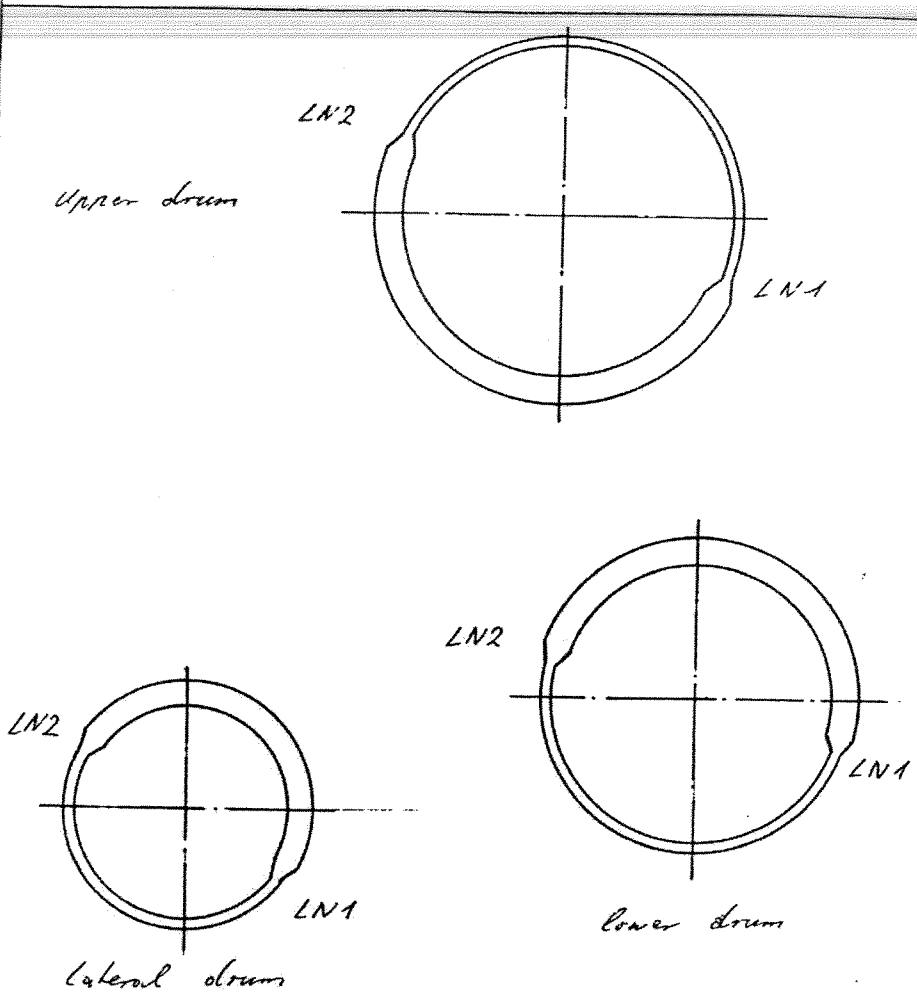
Code

Job No. 94-8351-998

SS Norway

Component

Boiler 22



Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		18.1.91	J. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

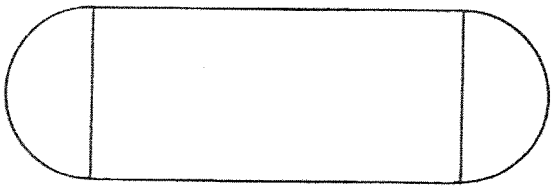
Job No. 94-8351-998

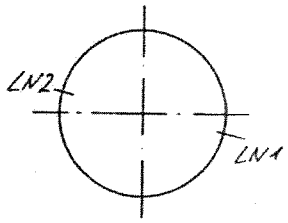
SS Norway

Component

Boiler 22, Upper drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
0	54,2	55,2
Center	55,4	
End	55,2	54,7

LN 1 : Severe corrosion pitting with crack connection

LN 2 : Severe corrosion pitting without crack connection

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		18.1.91	L. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

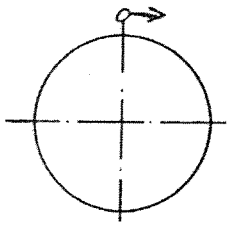
Job No. 94-8351-998

SS Norway

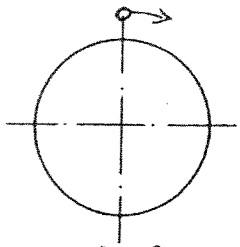
Component

Boiler 22, Upper drum

Inspection result before repair



RN1



RN2

Distance from →	Wall thickness [mm]	
	RN 1	RN 2
0 o'clock	55,1	55,3
3 o'clock	57,1	54,9
6 o'clock	60,2	57,8
9 o'clock	60,3	55,3

RN1: 2 o'clock crack 10 mm long

RN2: 3 o'clock – 9 o'clock severe corrosion pitting with crack connections

11 o'clock – half past eleven small crack indications

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	15.1.91	J. Eckes		

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Exh 50 p. 28 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

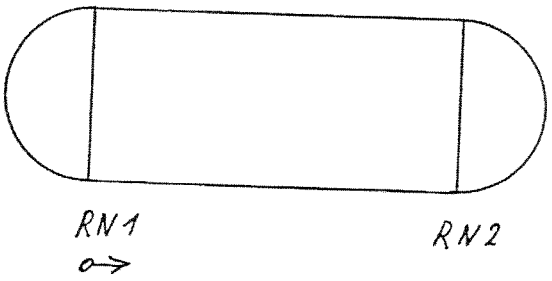
SPACE FOR SKETCH

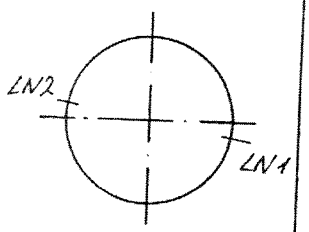
Code: SS Norway

Job No.: 94-8351-998

Component: Boiler 22, Upper drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
0	52,3	55,2
2500	50,9	
4800	53,4	54,7

LN1 : No crack indications
LN2 : No crack indications

Vordruck Ausgabe	Erection division	Date 18.1.91 Signature L. Zocher	Date Signature

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

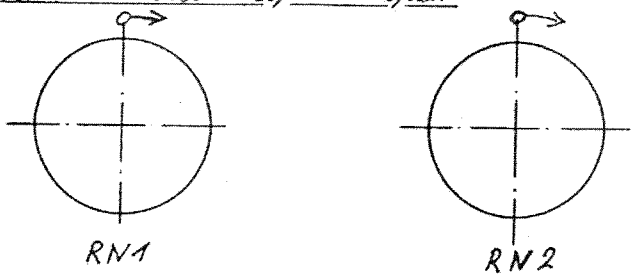
Job No. 94-8351-998

SS Norway

Component

Boiler 22, Upper drum

Inspection result after repair



Distance from →	Wall thickness [mm]	
	RN 1	RN 2
0 o'clock	54,7	54,6
3 o'clock	56,3	54,5
6 o'clock	59,4	55,3
9 o'clock	59,4	54,9

RN 1 : No crack indications
RN 2 : No crack indications

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		17.1.91	J. Eckau		

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 29
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
AK-Nr.: / Plant identification No.:
Kom. / Job.: 94-8351-98 Blatt / Sheet: Pos. / Item:
System: / System:
Gegenstand / Subject: Obertrommel Oberer 22 Kessel 22
Fabr.-Nr.: / Fabrication No.:
Bauteil / Component:
Abmessung / Dimension:
KE-Nr.:
Zeichn.-Nr. / Drawg.-No.: s. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
Bgr.: TE: / Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen / ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWH 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP205
Magnetisierungsart / Kind of magnetization: JEW
naß / ~~trocken~~ / wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP204
fluoreszierend / fluorescent: ~~ja~~ / yes / nein / no
Tangentialfeldstärke / Tangential field intensity: 4.0 KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	erfüllt / satisfactory: keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Lfd 1614 x 106/56	~ 19Mn5		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung Test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Schiller
Prüfaufsicht / Test Supervision: ZF

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BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

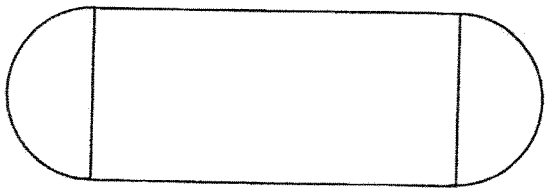
Job No. 94-8351-998

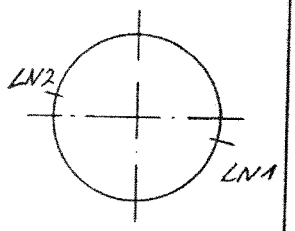
SS Norway

Component

Boiler 22, lower drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
0	34,6	35,5
1500	33,6	34,3
3000	34,5	34,5
4500	34,7	34,9

LN 1: 0 - 500 small crack indications
2500 interrupted crack indications about 150 mm long, followed by 2 cracks about 15 to 20 mm long

LN 2: 0 - 1500 small crack indications

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	27.1.91	J. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

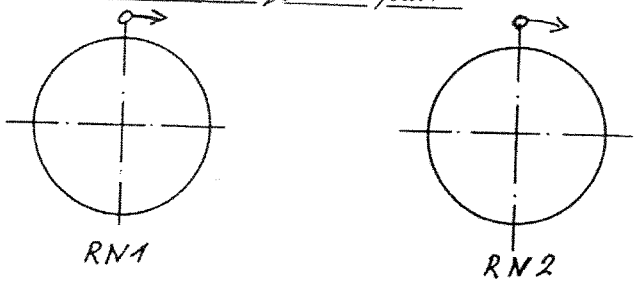
SPACE FOR SKETCH

Code: SS Norway

Job No. 94-8351-998

Component: Boiler 22, Lower drum

Inspection result before repair



Distance from ⊙→	Wall thickness [mm]	
	RN 1	RN 2
0 o'clock	36,1	38,0
3 o'clock	34,0	36,0
6 o'clock	36,7	34,0
9 o'clock	35,6	35,5

RN 1: 0 o'clock – 3 o'clock, 5 o'clock – 7 o'clock, 8 o'clock – 0 o'clock } severe corrosion pitting with crack-like connections.

RN 2: severe corrosion pitting with crack-like connections

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		21.1.91	J. Eschen		

Exhibit P-33 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

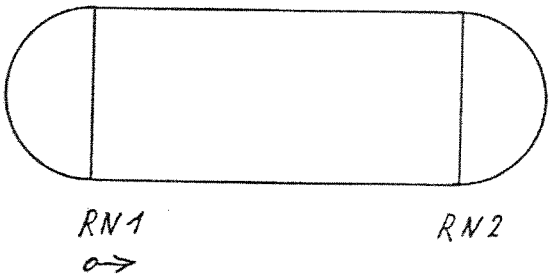
Job No. 94-8351-998

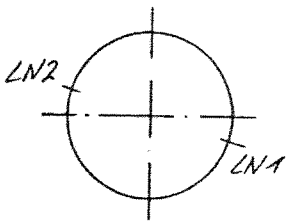
SS Norway

Component

Boiler 22, Lower drum

Inspection result after repair





Distance from [mm]	Wall thickness [mm] LN 1	LN 2
500		> 32,8
900		> 34,6
1800	> 32,6	
2500	> 33,0	

LN 1 : No crack indications

LN 2 : No crack indication

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		23.1.91	J. Eschen		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

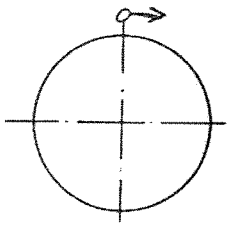
Job No. 94-8351-998

SS Norway

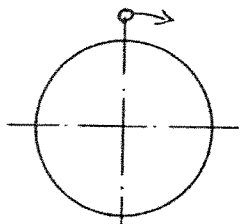
Component

Boiler 22, Lower drum

Inspection result after repair



RN1



RN2

Distance from →	Wall thickness [mm] RN1	RN2
3 o'clock	> 31,5	
6 o'clock	> 33,4	
8 o'clock	> 32,8	
6 o'clock		> 32,8
9 o'clock		> 34,8

RN1: No crack indications

RN2: No crack indications

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		23.1.91	J. Eichen		

p. 350 of 69

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 34
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
AK-Nr. / Plant identification No.:

Gegenstand / Subject: Lower drum Untertrommel Boiler 22 Kessel 22
System / System:

Bauteil / Component: Abmessung / Dimension:
Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht
Schweißverfahren / Welding process: E STAHL
KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWM 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP205
Magnetisierungsart / Kind of magnetization: JEW
naß / ~~trocken~~ wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP 204
fluoreszierend / fluorescent: ~~ja / yes~~ / nein / no
Tangentialfeldstärke / Tangential field intensity: ..... KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang / Testvolume %	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	erfüllt / satisfactory: keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Lip 1030 x 79/36	~ 19Mn4		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung Test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Schiller
Prüfaufsicht / Test Supervision: ZF

91-2972 5.87

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p. 36 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

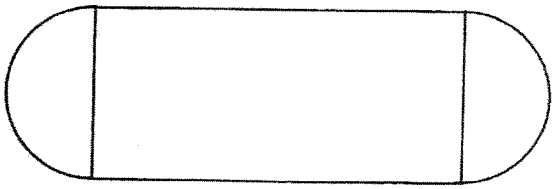
Job No. 94-8351-998

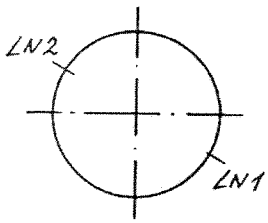
SS Norway

Component

Boiler 22, lateral drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
	20,3 – 22,8	21,2 - 22,8

LN1 + LN2 : Continuously crack-like indications

Ausgabe / Vordruck	Erection division	Date	Signature	Date	Signature
		22.1.91			

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

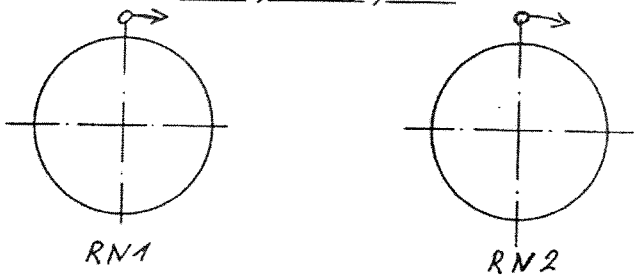
Job No. 94-8351-998

SS Norway

Component

Boiler 22, Lateral drum

Inspection result before repair



Distance from →	Wall thickness [mm] RN 1	RN 2
	> 22,8	21,4 - 23,8

RN1: 4 o'clock – 8 o'clock Pits with indications

RN2: 4 o'clock – 7 o'clock Crack-like indications

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	23.1.91	L. Zachau		

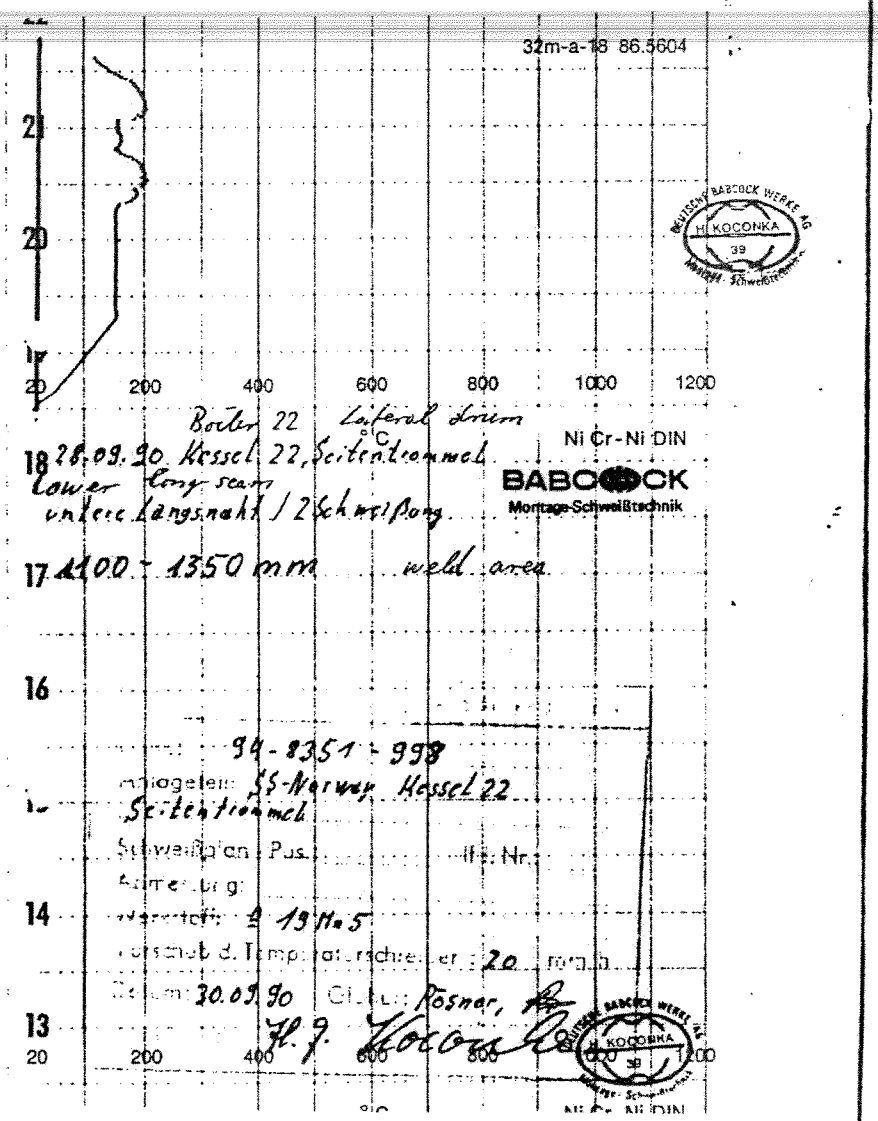
BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiogramm

M 20
Pr.-Nr. 7a
Seite 37

Kennwort: SS Norway
Kom. Nr. 94-8351-998

Boiler 22 Lateral drum
Kessel 22 Seitentrommel LN1



Vordr. 7a

Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
H. Koconka					

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Doc 9, p.39 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating

Glühdiagramm

M 20

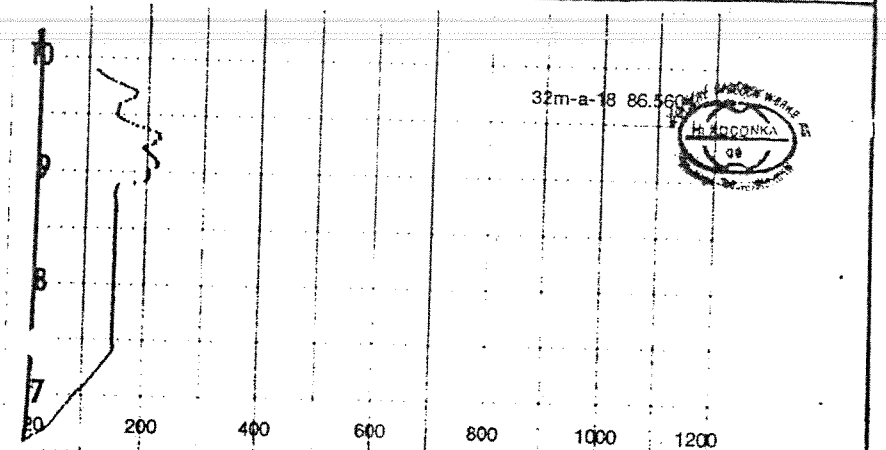
Pr.-Nr. 7a | Seite 38

Kennwort: SS Norway

Kom. Nr. 94-8351-998

Boiler 22 Lateral drum

Kessel 22 Seitentrommel LN 1



6 Boiler 22, Lateral drum Ni Cr-Ni DIN

22.09.90 Kessel 22, Seitentrommel BABCOCK Montage-Schweißtechnik

5 untere Längsnaht / 1 Schweißung 3100 - 3500 mm
lower long seam weld area 3100 - 3500 mm

4

Kom. 94-8351-998

3 Anl. SS-Norway Kessel 22 Seitentrommel

Schw.-Plan-Pos. H.E.Nr.

Ausführung

2 Werkstoff 19 Mn 5

Vorwärm-, Temperaturhaltetemperatur 20 mm/h

1 30.05.90 Rösner

H. Koconka

20 200 400 600 800 1000 1200

Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
30.05.90	H. Koconka				

Vordr. 7a

Nachdruck auch auszugsweise, ist nur mit Genehmigung der "Deutsche Babcock Werke AG", 42 Oberhausen, gestattet

Doc 30, page 70 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

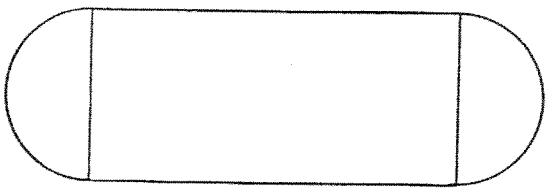
Job No. 94-8351-998

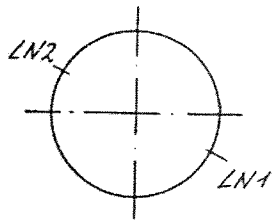
SS Norway

Component

Boiler 22, Lateral drum

Inspection result after repair





Distance from ⟶ [mm]	Wall thickness [mm] LN 1	LN 2
1000	21,5	
1150	24,1	
1380	21,1	
		> 20,7
3000	20,8	
3250	26,8	
3500	20,8	

LN1: Areas of 1100 to 1350 and 3100 to 3500 were welded. No crack indications.

LN2: No crack indications.

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		23.1.91	P. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 40

Code

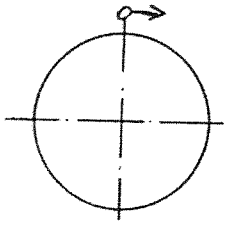
Job No. 94-8351-998

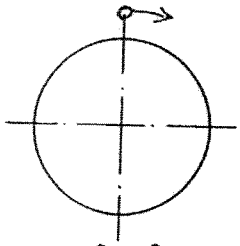
SS Norway

Component

Boiler 22, Lateral drum

Inspection result after repair





Distance from →	Wall thickness [mm]	
	RN1	RN2
6 o'clock	> 21,5	> 20,5

RN1 : No crack indications

RN2 : No crack indications

Vordruck / Ausgabe		Date	Signature	Date	Signature
	Erection division	27.1.91	J. Zacher		

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: — 41 —
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: S.S Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:

AK-Nr. / Plant identification No.:

Gegenstand / Subject: Seitentrommel / Lateral drum — Boiler 22 / Kessel 22

System / System:

Bauteil / Component:

Abmessung / Dimension:

Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht

Schweißverfahren / Welding process: E / SMAW

KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen / ground

Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗

Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130

Testkörper / Testbody: Berthold

Prüfgerät / Test equipment: Tiede TWM 42 V

Stromstärke / Current intensity:

Prüfmittel / Medium for testing: Peters MP 205

Magnetisierungsart / Kind of magnetization: JEW

naß / ~~trocken~~ / wet / ~~dry~~

Kontrastmittel / Medium of contrast: Peters MP 204

fluoreszierend / fluorescent: ~~ja~~ / yes / nein / no

Tangentialfeldstärke / Tangential field intensity: 40 KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	erfüllt / satisfactory: keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Lip 694 x 50/24	~ 19Mn4		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	
				Test after repair				

Bemerkungen / Remarks: Endprüfung n. d. Schweißen

Ort / Place: Bremerhaven den / dated: 30.09.90 Sachverständiger / Expert:

Prüfer / Operator: Schiller Prüfaufsicht / Test Supervision: ZP 47

91-2972 5.87

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p. 43 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

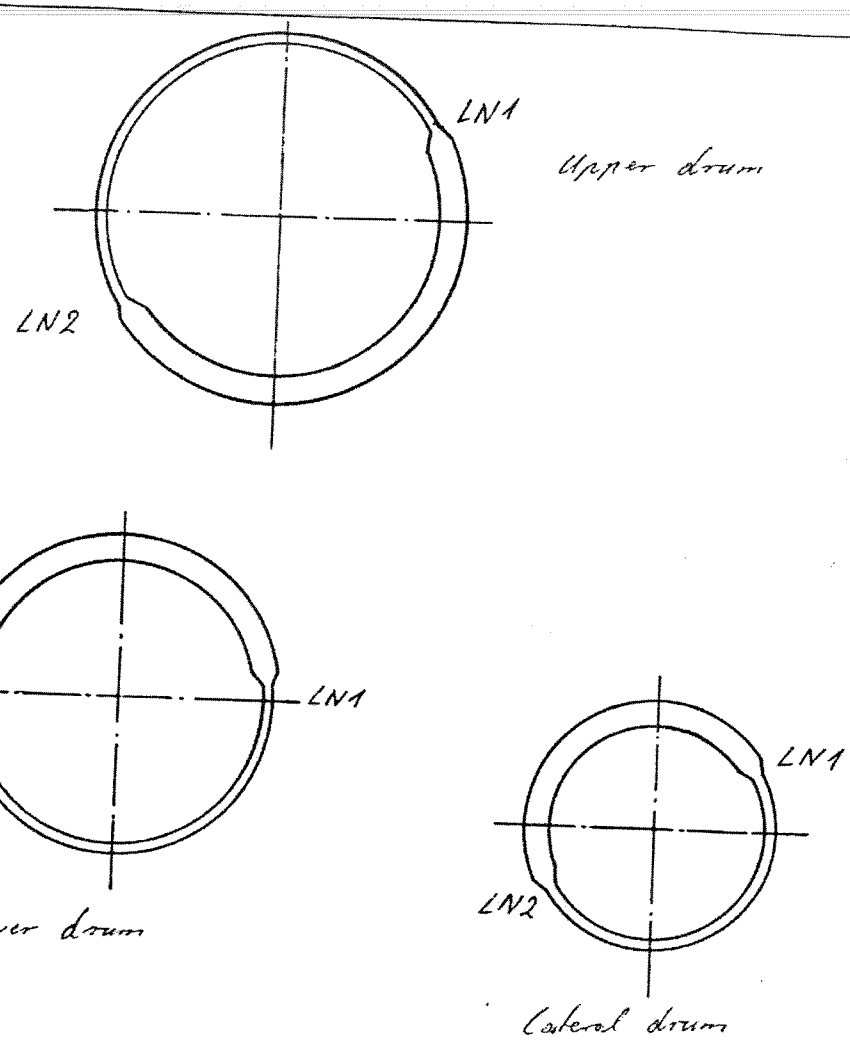
Code

Job No. 94-8351-998

SS Norway

Component

Boiler 23



Ausgabe / Vordruck	Erection division	Date	Signature	Date	Signature
		24.1.91	J. Bocken		

p. 44 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

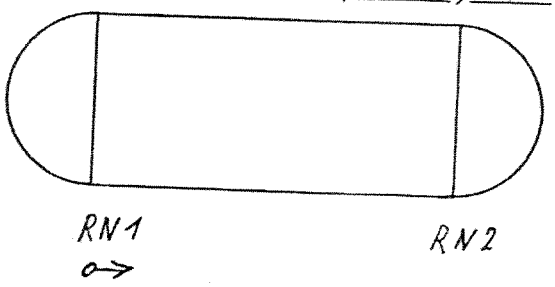
Job No. 94-8351-998

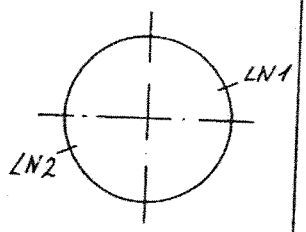
SS Norway

Component

Boiler 23, Upper drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
500	57,0	56,8
2 500	53,6	56,7
4500	54,8	56,6

Severe corrosion in the entire drum area.
LN 1: Appreciable indications in the area of 2600 to 2900 mm
LN 2: Indication in the root over the full length.

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		24.1.91	J. Eschen		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

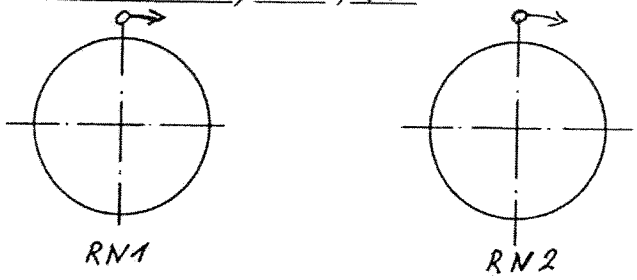
Job No. 94-8351-998

SS Norway

Component

Boiler 23, Upper drum

Inspection result before repair



Distance from →	Wall thickness [mm] RN1	RN2
0 o'clock	55,5	56,4
3 o'clock	55,6	55,6
6 o'clock	55,6	54,6
9 o'clock	55,5	53,2

RN1 : Severe corrosion pitting in the ground area crack-like indications in the area of 4-8 o'clock

RN2 : Severe corrosion pitting in the ground area crack-like indications in the area of 4-8 o'clock

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	14.1.91	J. Bohus		

Doc 2 p. 46 of 68

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 45

Code

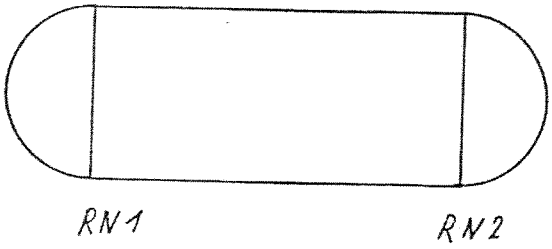
Job No. 94-8351-998

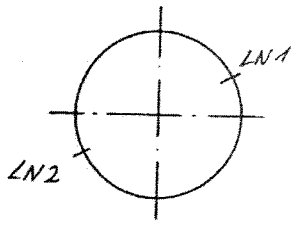
SS Norway

Component

Boiler 23. Upper drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
	> 52,8	> 49,9

LN1 : No crack indications

LN2 : No crack indications

Vordruck Ausgabe	Erection division	Date	Signature	Date	Signature
		14.1.91	J. Eckert		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

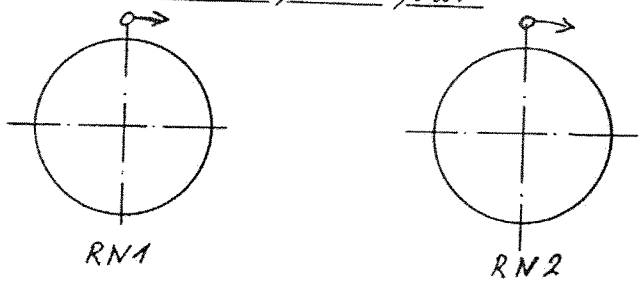
Job No. 94-8351-998

SS Norway

Component

Boiler 23, Upper drum

Inspection result after repair



Distance from →	Wall thickness [mm] RN 1	RN 2
0 o'clock	54,9	56,0
3 o'clock	52,5	53,6
6 o'clock	55,2	52,3
9 o'clock	54,5	52,7

RN 1: No crack indications

RN 2: No crack indications

Vordruck Ausgabe		Date	Signature	Date	Signature
	Erection division	24.1.91	J. Eichen		

p. 48 of 69

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 47
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
AK-Nr. / Plant identification No.:
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
System / System:
Gegenstand / Subject: Upper drum Obertrommel Boiler 23 Kessel 23
Fabr.-Nr. / Fabrication No.:
Bauteil / Component: Abmessung / Dimension:
KE-Nr.:
Zeichn.-Nr. / Drawg.-No.: s. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
Bgr.: TE: Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HPS/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWM 42 V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP205
Magnetisierungsart / Kind of magnetization: JEW
naß / ~~trocken~~ wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP204
fluoreszierend / fluorescent: ~~ja~~ / nein ~~yes~~ / no
Tangentialfeldstärke / Tangential field intensity: 4.0 KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation erfüllt / satisfactory: anzeigenfrei / no indication	keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Lfd 1614 x 104/56	~ 19Mn5		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Schiller
Prüfaufsicht / Test Supervision: Sl. ZF

91-2972 5.87

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p. 49 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

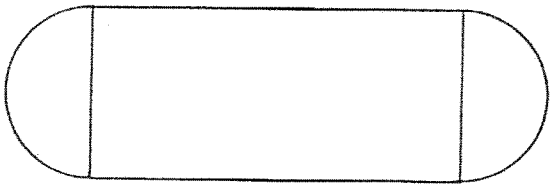
Job No. 94-8351-998

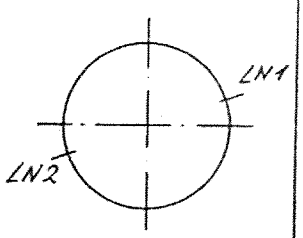
SS Norway

Component

Boiler 23, Lower drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
0 o'clock	35,4	35,2
2500 o'clock	36,5	36,5
4800 o'clock	35,1	34,5

LN1: 0 – 2250 mm — 4 crack areas 30 to 50 mm long
2250 – 4090 mm — Continuously small crack-like indications.
4090 – RN 2 — 1 point with crack-like indication

LN2: 17 areas with crack-like indications, distributed over the full length. The areas are 20 – 100 mm long.

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		24.1.91	L. Zachau		

p 50 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

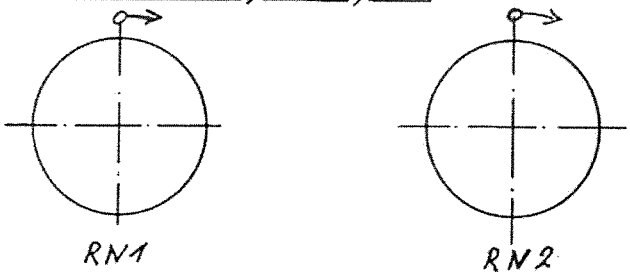
Job No. 94-8351-998

SS Norway

Component

Boiler 23, lower drum

Inspection result before repair



Distance from →	Wall thickness [mm] RN 1	RN 2
0 o'clock	37,2	38,9
3 o'clock	36,4	37,1
6 o'clock	38,0	34,5
9 o'clock	38,0	35,4

RN 1: 11 o'clock, 7 to 9 o'clock } pits with indications

RN 2: 6 to 7 o'clock, 11 to 5 o'clock } pits with indications

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		24.1.91	F. Schulz		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Page 50

Code

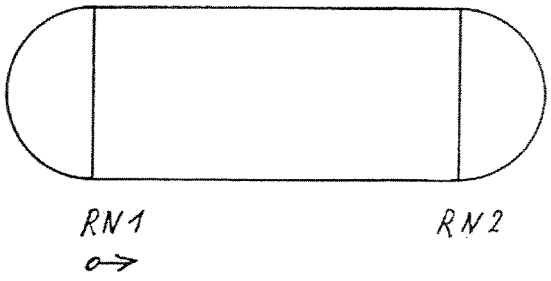
Job No. 94-8351-998

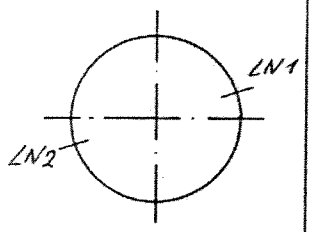
SS Norway

Component

Boiler 23, Lower drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN 1	LN 2
2500	> 34,1	
3500		> 32,0

LN 1: No crack indications

LN 2: No crack indications

Vordruck Ausgabe		Date	Signature	Date	Signature
	Erection division	24.1.91	J. Bohn		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

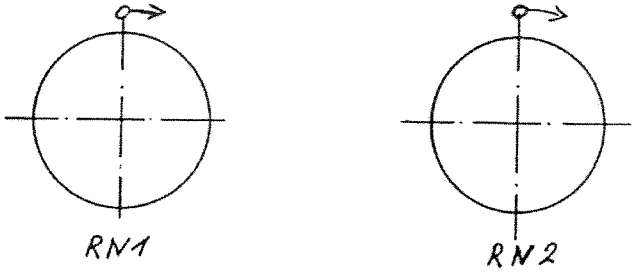
Job No. 94-8351-998

SS Norway

Component

Boiler 23, Lower drum

Inspection result after repair



Distance from →	Wall thickness [mm] RN1	RN2
4 o'clock		> 32,0
7 o'clock	> 31,7	> 31,8

RN1 : No crack indications

RN2 : No crack indications

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		14.1.91	J. Eckes		

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 52
Blatt: 1 von / Sheet: 1 of

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:
AK-Nr. / Plant identification No.:

Gegenstand / Subject: Lower drum Untertrommel Boiler 23 Kessel 23
System: / System:

Bauteil / Component:
Abmessung / Dimension:
Fabr.-Nr. / Fabrication No.:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht
Schweißverfahren / Welding process: E SMAW
KE-Nr.: Bgr.: TE: Ass: Term unit:

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen ground
Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗
Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130
Testkörper / Testbody: Berthold
Prüfgerät / Test equipment: Tiede TWM 42V
Stromstärke / Current intensity:
Prüfmittel / Medium for testing: Peters MP205
Magnetisierungsart / Kind of magnetization: JEW
naß / trocken — wet / ~~dry~~
Kontrastmittel / Medium of contrast: Peters MP 204
fluoreszierend / fluorescent: ~~ja / yes~~ / nein / ~~no~~
Tangentialfeldstärke / Tangential field intensity: ..... KA/m

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	keine unzul. Anzeigen / no indic. to be recorded	nicht erfüllt / not satisfactory
RN1	1	100	1	Li ϕ1030 x 79/36	~ 19Mn4		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"		X	

Bemerkungen / Remarks: Endprüfung test after repair

Ort / Place: Bremerhaven
den / dated: 30.09.90
Sachverständiger / Expert:

Prüfer / Operator: Schiller
Prüfaufsicht / Test Supervision: ZF

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P. 54 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

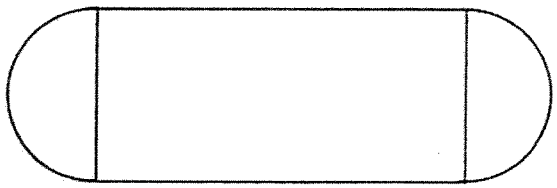
Job No. 94-8351-998

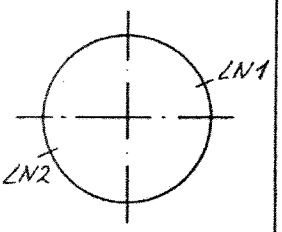
SS Norway

Component

Boiler 23, Lateral drum

Inspection result before repair





Distance from o→ [mm]	Wall thickness ⊗ [mm] LN 1	LN 2
1500	21,6	21,8
1800	21,4	–
2000	17,5	19,6
2500	18,2	20,6
3000	19,5	18,3
3500	19,3	19,4
4000	19,9	23,5
4500	22,1	–

LN1: 1000 – 3000 mm crack-like indications

LN2: 4 to 5 crack-like indications 8 to 10 mm long distributed over the full length.

⊗ After grinding out the crack indications.

Vordruck / Ausgabe		Date	Signature	Date	Signature
	Erection division	24.1.91	L. Bohn		

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p. 55 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

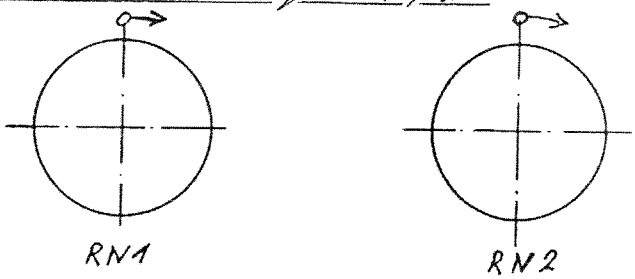
Job No. 94-8351-998

SS Norway

Component

Boiler 23, Lateral drum

Inspection result before repair



Distance from →	Wall thickness [mm] RN 1	RN 2
0 o'clock	30,0	24,2
3 o'clock	28,5	25,5
6 o'clock	28,4	24,7
9 o'clock	28,6	24,8

RN 1 + RN 2 : No crack-like indications

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	25.1.91	J. Cochen		

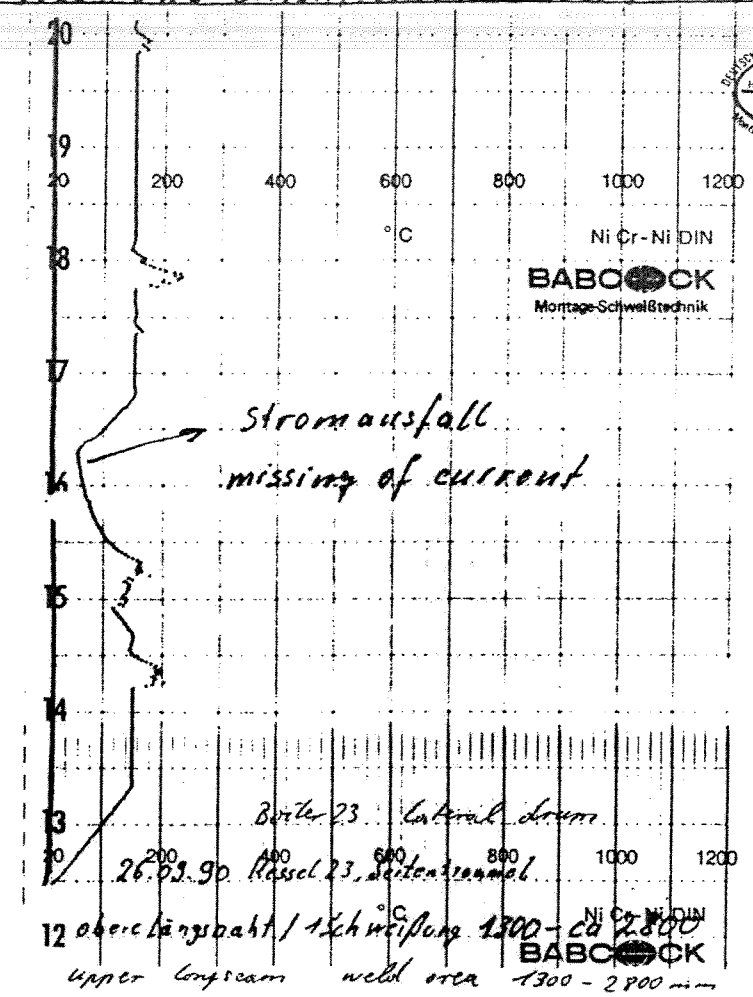
BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiagramm

M 20
Pr.-Br. 7 a
Seite 55

Kennwort – SS Norway
Kom. Nr 94-8351-998

Boiler 23 Lateral drum
Kessel 23 Seitentrommel LN1



H. KOCONKA 39 Montage-Schweißtechnik

Nachdruck auch auszugsweise, ist nur mit Genehmigung der "Deutsche Babcock Werke AG", 42 Oberhausen, gestattet

Vordr. 7a

Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
H.J. Koconka	H. KOCONKA 39 Montage-Schweißtechnik				

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p. 57 of 69

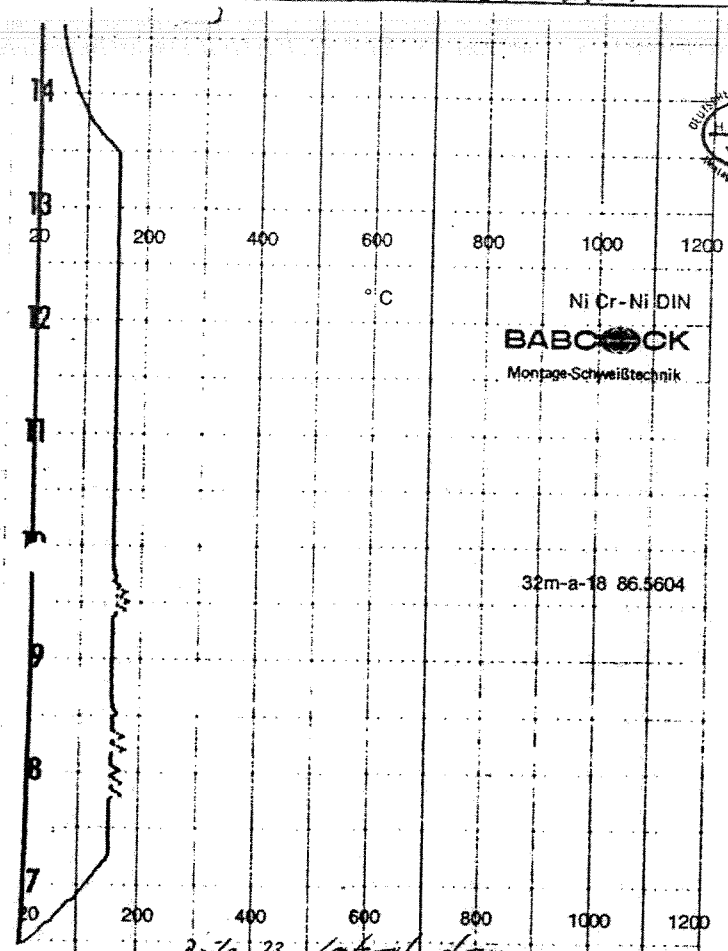
BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiogramm

M 20
Pr.-Nr. 7a
Seite 56

Kennwort: SS Norway
Kom. Nr: 94-8351-998

Boiler 23 Lateral drum
Kessel 23 Seitentrommel LN1



Boiler 23 Lateral drum
27.09.90 Kessel 23, Seitentrommel
obere Längsnaht / 2 Schweißpos. 2800 – 4400
upper long seam / weld area 2800 – 4400 mm

Vordr. 7a

Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
27.9.90	H. Koconka				

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p. 58 of 69

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

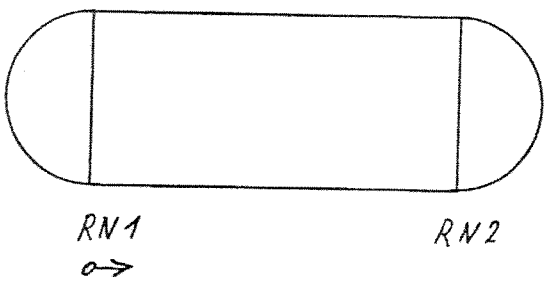
Job No. 94-8351-998

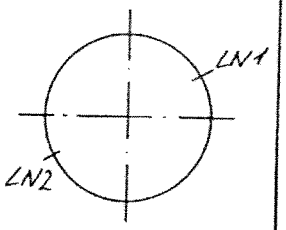
SS Norway

Component

Boiler 23, lateral drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
1300	22,8	
2000	22,7	
3000	23,7	
4000	24,0	

LN1: The area of 1300 to 4400 mm was rewelded and subsequently ground. Transitions of the weld beads are still visible

Surface crack test: No defects detected.

Vordruck / Ausgabe	Erection division	Date	Signature	Date	Signature
		27.1.71	G. Eschen		

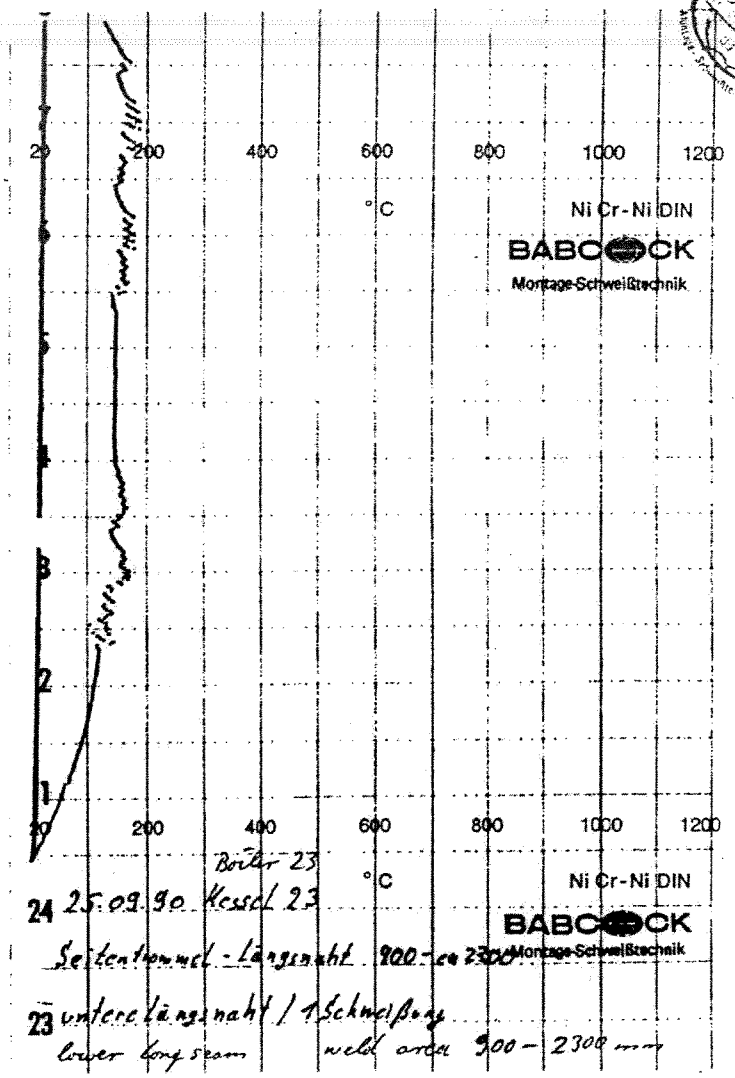
BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiagramm

M 20
Pr.-Nr. 7 a
Seite 58

Kennwort: SS Norway
Kom. Nr: 94-8351-998

Boiler 23 Lateral drum
Kessel 23 Seitentrommel LN2



Datum | Unterschrift | Datum | Unterschrift

Vordr. 7a

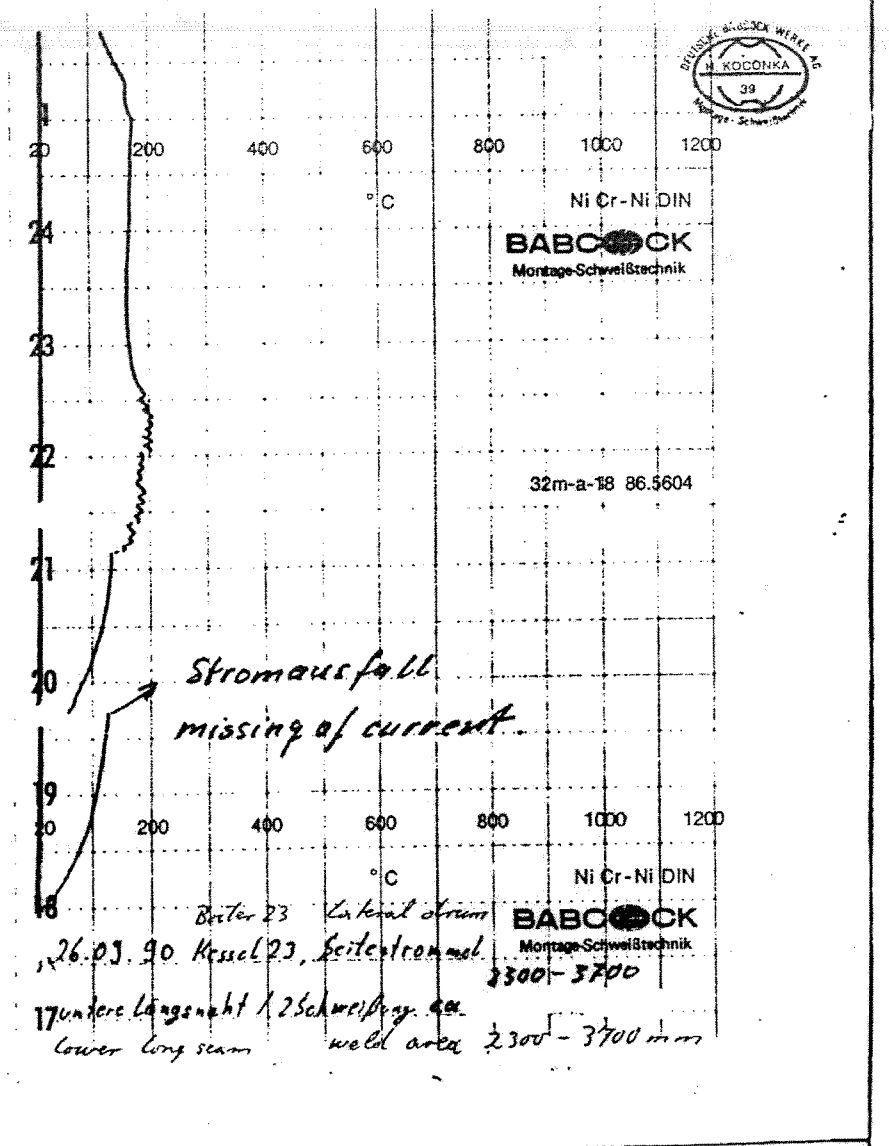
BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

Preheating
Glühdiagramm

M 20
Pr.-Br. 7a
Seite 59

Kennwort – SS Norway
Kom. Nr 94-8354-998

Boiler 23 Lateral drum
Kessel 23 Seitentrommel LN2



Vordr. 7a

Datum	Unterschrift	Datum	Unterschrift	Datum	Unterschrift
H.J. Kocanda	KOCONKA 39				

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

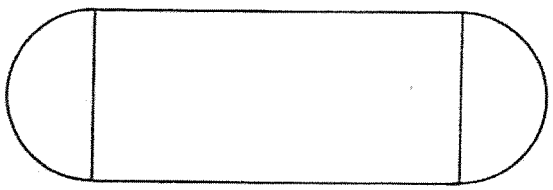
Job No. 94-8351-998

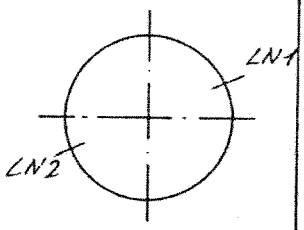
SS Norway

Component

Boiler 23, Lateral drum

Inspection result after repair





Distance from o→ [mm]	Wall thickness [mm] LN1	LN2
900		23,6
1500		22,4
2000		23,0
2700		21,4
3000		21,2
3700		21,6

LN2: The area of 900 to 3700 mm was rewelded and subsequently ground. Transitions of the weld beads are still visible.

Surface crack test: No defects detected.

Vordruck Ausgabe

Erection division	Date	Signature	Date	Signature
	25.1.91	G. Bachus		

BABCOCK
DEUTSCHE BABCOCK WERKE AKTIENGESELLSCHAFT

SPACE FOR SKETCH

Code

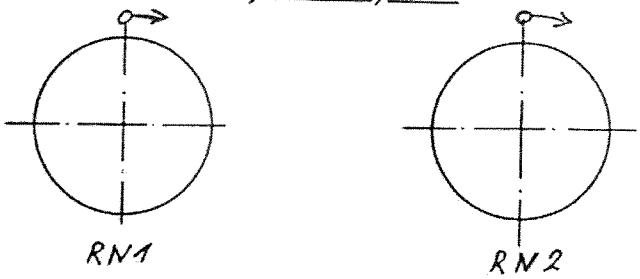
Job No. 94-8351-998

SS Norway

Component

Boiler 23, Lateral drum

Inspection result after repair



Distance from →	Wall thickness [mm] RN1	RN2
6 o'clock	> 28,0	> 23,9

RN1 + RN2 : No crack-like indications

Vordruck Ausgabe	Erection division	Date 25.1.91	Signature G. Bolen	Date	Signature

BABCOCK

HÄRTEPRÜFUNG
HARDNESS TEST

Beach.-Nr.: / Certif.-No.: / Blatt von / Sheet of: 62

Kennwort / Code word: S.S Norway

AK-Nr. / Plant identification No.:

Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:

System / System:

Gegenstand / Subject: Lateral drum Seitentrommel Boiler Kessel 23

Fabr.-Nr. / Fabrication No.:

Bauteil / Component: LN2

KE-Nr.:

Bgr.: TE: Azs.: Term. unit:

Zeichng.-Nr. / Drawg.-No.: s. Kesselübersicht

Wärmebehandlung / Heat treatment: ja / yes ○ nein / no (X)

Prüfflächenzustand/Nahtoberfläche / Surface Condition of test area/Surface of seam: geschliffen / ground

Schweißverfahren / Scope of Test: E-Hand

Prüfung nach / Test according to: Din 50150

Prüfumfang / Test volume: Stichprobe

Prüfgerät / Test app.: Equotip

Prüflast / Test load:

Bemerkungen / Notes:

Pos. Item	Naht-Nr. Weld-No.	Abmessung Dimension	Werkstoff Material	Bemerkungen Notes
	LN2	Lip 694x 50/24	≈ 19 Mn 4	

Prüfergebnis in HV / Examination result in HV

Pos. Item	Grundwerkstoff Base metal	Übergangszone Transition zone	Schweißnaht Weld seam	Pos. Item	Übergangszone Transition zone	Grundwerkstoff Base metal
LN2	~ 175 HB	/ / /	~ 183 HB		/ / /	/ 170 HB

Ort / Place: Bremerhaven den / dated 30.09.90 Sachverständiger / Expert:

Prüfer / Operator: Schiller Prüfaufsicht / Test Supervisor: (TE)

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p. 64 of 69

BABCOCK

OBERFLÄCHENRISSPRÜFUNG
SURFACE CRACK TEST

Besch.-Nr.: / Certif.-No.: 63
Blatt: 1 von / Sheet: 1 of

AK-Nr.: / Plant identification No.:

System: / System:

Fabr.-Nr.: / Fabrication No.:

KE-Nr.:
Bgr.: TE:
Ass: Term unit:

Kennwort / Code word: SS Norway
Kom. / Job.: 94-8351-998 Blatt / Sheet: Pos. / Item:

Gegenstand / Subject: Seitentrommel Kessel 23 Boiler
Lateral drum

Bauteil / Component:

Abmessung / Dimension:

Zeichn.-Nr. / Drawg.-No.: S. Kesselübersicht

Schweißverfahren / Welding process: E SMAW

Prüfflächenzustand / Nahtoberfläche / Surface condition of test area / Surface of seam: geschliffen / ground

Prüfung nach / Test according to: HP 5/3

Wärmebehandlung / Heat treatment: vor / before ○ nach / after ○ keine / no ⊗

Beurteilung durch / Evaluation by: DB

Prüfung an / Test on: Grundwerkstoff / Base material ○ Schweißkante / Weld edge ○ Schweißnaht / Weld seam ⊗

MAGNETPULVERPRÜFUNG nach / MAGNETIC particel test acc. to: Din 54130

Testkörper / Testbody: Berthold

Stromstärke / Current intensity:

Prüfgerät / Test equipment: Tiede TWM 42 V

Magnetisierungsart / Kind of magnetization: JEW

Prüfmittel / Medium for testing: Peters MP 205

Kontrastmittel / Medium of contrast: Peters MP 204

naß / ~~trocken~~ / wet / ~~dry~~

Tangentialfeldstärke / Tangential field intensity: 4.0 KA/m

fluoreszierend: ~~ja~~ / nein / fluorescent: ~~yes~~ / no

Pos. / Item or Naht-Nr. / Weld-No.	Gesamtstückzahl / Total Quantity	Prüfumfang % / Testvolume	geprüfte Stückzahl / tested quantity	Abmessung / Dimension [mm]	Werkstoff / Material	Beurteilung / evaluation: erfüllt / satisfactory: anzeigenfrei / no indication	Beurteilung / evaluation: erfüllt / satisfactory: keine unzul. Anzeigen / no indic. to be recorded	Beurteilung / evaluation: nicht erfüllt / not satisfactory
RN1	1	100	1	Lip 694 x 59/24	~ 19 Mn 4		X	
RN2	"	"	"	"	"		X	
LN1	"	"	"	"	"		X	
LN2	"	"	"	"	"			
				Test after repair				

Bemerkungen / Remarks: Endprüfung n. d. Schweißen

Ort / Place: Bremerhaven den / dated: 30.09.90

Sachverständiger / Expert:

Prüfer / Operator: Schiller

Prüfaufsicht / Test Supervision: ZF

91-2972 5.87

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p. 65 of 69