CH25AW

Documentation Summary

For pressure tanks

1 FAT, Factory Acceptence Test.

1.1 FAT, Factory Acceptence Test plan

1.2 FAT, Factory Acceptence Test sheet

1.3 Materials overview – incl. certificates

1.4 Surface test

1.5 Construction and placement test

1.6 Passivation test

1.7 Triclorid test

1.8 Cleaning test

1.9 Drainable test

1.10 Hydrostatic test - NDT examinations

1.11 Leak test - NDT examinations

1.12 X-rays – NDT examinations

2 EC Declarition of conformity

2.1 Declaration of conformity - Manufactor

2.2 Declaration of conformity – Design examination, Modul B

2.3 Declaration of conformity – Pressure equipment, Modul F

3 Operation manual

3.1 Operation manual (DK – version) ikke not included.

4 Drawings & calculation

4.1 Design drawings

4.2 Calculation

5 Welding Procedures & Certificates

5.1 Welders log

5.2 Welders certificate overview – incl certificate

5.3 WPS

Maskinfabrikken KOFA aps Færøvej 6 4681 Herfølge – DK
Email:Kofa@kofa.dk

Maskinfabrikken Kofa aps

Tanktestplan

Valid for:	600l Pressure tank, Tag nr: CH25AW	**Substitut:**	None
Customer:	Novo Nordisk A/S, Site Chartres, France	**Works from:**	2005.01.05
Case no.:	195-04		
Subject:	600l Novomix tank	**Version no.:**	001

Enclosure:

FAT test:	Document no: Tanktest.001
Welding certifikat overvieiw:	Document no: Weldingcertifikat.001
Welding log overview:	Document no: Weldinglog.001
Material certifikat overview:	Document no: Matr.certifikat.001
Drainable test:	Document no: Drainable.001
Surface test:	Document no: Surface.001
Construction test:	Document no: Construction.001
Cleaning test:	Document no: Cleaning.001
Leak test:	Document no: Leak.001
Passivation test:	Document no: Passivation.001
Triclorid test:	Document no: Triclorid.001
Deviation raport:	Document no: Deviation.001

	Init.	Date	Signature:
KOFA - Responsible		14-2-05	
Done by:			

	Init.	Date	Signature:
NN - Chartres			

Table of contents

1 Purpose

The purpose of this document is to secure a correct end control of the tank. Components mounted on the tank is controlled according to the specifications.

2 Summary

The tank will be end controlled after this form, before shipment.

3 Validity area

This document is valid for tank with concerned drawing no, and Tag no. (please see tests)

4 Responsible

It is the QA manager of Maskinfabrikken Kofa aps who is in charge of all documents and forms is being used as described

5 Documents / Forms

FAT test:	Document no: Tanktest.001
Welding certifikat overview:	Document no: Weldingcertifikat.001
Welding log overview:	Document no: Weldinglog.001
Material certifikat overview:	Document no: Matr.certifikat.001
Drainable test:	Document no: Drainable.001
Surface test:	Document no: Surface.001
Construction test:	Document no: Construction.001
Cleaning test:	Document no: Cleaning.001
Leak test:	Document no: Leak.001
Passivation test:	Document no: Passivation.001
Triclorid test:	Document no: Triclorid.001
Deviation raport:	Document no: Deviation.001

6 Connection to other procedures – and instructions

Drawings, partlists and fabric de approvement.

7 Method

7.01 Authority approvement

Check weather an approvement from the autorised organ / production control according to announcement no. 743. is available.

7.02 Check weather the tank is done according to drawings

According to the drawing, each position no. on the tank is checked.

7.03 Check weather surface test is done

Check weather there is a surface test available in this case.

7.04 Check weather drainable test is done.

Check weather there is a drainable test available in this case.

7.05 Check weather a leak test is done.

Check weather there is a leak test available in this case.

7.06 Check weather a passivation test is done.

Check weather there is a passivation test available in this case.

7.07 Check weather a triclorid test is done.
Check weather there is a triclorid test available in this case.

7.08 Check of mainmeasures and tolerances.
Mainmeasures and tolerances is checked by measuring the tank and compares the values with the construction drawings.

7.09 Check of gaskets and gaskets surfaces.
Do a visuel check of all gaskets and gaskets surfaces for damages.

7.10 Check of mark plate.
The mark plate i checked by comparing the plate with the construction drawings.

7.11 Check of lifting gear
The lifting gear is checked by comparing with the construction drawings

7.12 Check of all bolts, nuts, and threads.
Check of all bolts, nuts, and threads

7.13 Check weather pressure test is done
Check weather there is a pressure test, and approwing available according to announcement no. 743. in this case.

7.14 Check weather cleaning for the tank is done
Check weather there is cleaning test available in this case.

7.15 Check of shipment
Visuel control of wrapping, saddles.

8 Used help aid

Calibrered masure equipmelt:	Surface tester.
Not calibrered masure equipment:	Tape measure, angle
Drawings, partlists, control forms	

9 Documentation

All overall acceptcriteria must be met, and a documentation of who and which date this person has done the FAT test must be available in this case.

10 Deviation

Any deviation or additions is to be registered in the enclosed deviation document with is numbered in succession. The number is taken form the overview and placed after the FAT testform. The deviation number plus which area the deviation is verified is to be registered on the overview.

For further action with a deviation, please contact NN - person

11 Comments:

Maskinfabrikken Kofa aps

FAT TEST
(Factory Acceptence Test)

Customer:	*Novo Nordisk A/S, Site Chartres, France*		
Case no:	*195-04*	**Drwg. no.:** *570-00278-A-002*	
		Tank. no.: *3012*	**Tag number:** *CH25AW*
Subject:	*600l Novomix tank*		

Controlpoints:

Appellation:	**Acceptcriteria observance:**	
7.01 Check weather a approvement from the autorised organ / production control according to announcement no. 743. is available.	YES ☒	NO ☐
7.02 Check weather the tank is done according to drawings	YES ☒	NO ☐
7.03 Check weather surface test is done.	YES ☑	NO ☐
7.04 Check weather drainable test is done.	YES ☒	NO ☐
7.05 Check weather leak test is done.	YES ☒	NO ☐
7.06 Check weather passivation test is done.	YES ☒	NO ☐
7.07 Check weather triclorid test is done.	YES ☒	NO ☐
7.08 Check of mainmeasures and tolerances.	YES ☒	NO ☐
7.09 Check of gaskets and gaskets surfaces.	YES ☒	NO ☐
7.10 Check of mark plate.	YES ☒	NO ☐
7.11 Check of lifting gear	YES ☒	NO ☐
7.12 Check of all bolts, nuts, and threads.	YES ☒	NO ☐
7.13 Check weather pressure test is done	YES ☒	NO ☐
7.14 Check weather cleaning for the tank is done	YES ☒	NO ☐
7.15 Check of shipment	YES ☒	NO ☐

Accept criteria observance: YES ☒ NO ☐ **Date:** 14-2-05 **Sign:** _____

If no please view deviation raport.:

Approved by NN: YES ☒ NO ☐ **Date:** 2005.02.15 **Sign:** _____

If no please view deviation raport.:

Comments:

Maskinfabrikken Kofa aps

Version no.: 01
Date.: 2005.01.05

Materiel Certificate overview
Document no.: Matr.Certificate.001
Tankproject no: 195-04

Material Certificate overview

Customer.: *Novo Nordisk A/S, Site Chartres - France* **TAG no.:** CH25 AW **Fabrication no:** 3012
Order no.: 195-04 **Fabrication year:** *2004*

Pos. no.:	Charge no.:	Materiel supplyer	Approved by.: Date and signification:	Approval organ: Date and signification:
01	E346107	UGINE		
02	E41013	UGINE		
03	E426071	UGINE		FORCE-Dantest CERT Poul T. Kristensen FORCE INSTITUTTERNE
05	454191	SANDVIK		
08	501452	SANDVIK	KOFA aps Specialist i rustfrit stål og alu Faksevej 6 - 4581 Rørvig Tlf. 56 27 51 11 Telefax 56 27 57 83	
09	0483245	SATINOX		
10	246056	UGINE		
15	E41710	UGINE		
*27+ 28	423049	UGINE		
24	237264	ACCIAIERIE		
04	48807	P.H. SCANDING		

* 27+28 TOOLED IN ONE PIECE
06 16633 BGH
07 436482 NOVASEPTIC

28/06/2005

56 27 51 11
KOFA MASINFABRIK ApS
Færøvej 6,
4681 Herfølge

BESCHEINIGUNG ÜBER KALTGEFORMTE BÖDEN **Werks Nr.**
CERTIFICATE FOR COLD FORMED ENDS **Works No. 1374**

Besteller	**Bestellung Nr.**
Customer KOFA MASKINFABRIK ApS	**Order No. 08413 /19504**
Unser bestellung Nr. **Rechnung nr.**	**Abnahmeprüfzeugnis**
Our order No. 240734 **Invoice no. 37089**	**Inspection/test certificate : 2.1 – EN 10204**
Prüfungsgrundlag AD-Merkblatt HP8/1, HP7/3, TRB 200	**Lieferung vom**
Inspection based on AD- Merkblatt HP8/1, HP7/3, TRB 200	**Date of delivery 20. oktober 2004**

Pos Item	Stück Quantity	Art Type	Abmessung Dimensions	Werkstoff Material	Schmelze-/Probe Nr. Haet/sample No.
1	2	Kløpperbund	ø 900 x 6 mm	1.4404	E 346107
2	2	Klopperbund	ø 903 x 5 mm	1.4404	E 410113

Wir bestätigen, dass die gelieferten Böden nach dem DIN 28011 norm , fabrikert wurden
We confirm that the dished heads supplied, were fabricatet acc. to DIN 28011.

Datum/Date 12. juli 2005

Verwendet wurden: Bleche gemäß beiliegender Bescheinigung/von ihnen angelieferte
The used plates as per attached certificate/materiale supplied by the customer

Nach DIN 50049 bzw. EN 10204
To DIN 50049 or EN 10204

Die verwendeten Bleche wurden nicht umgestemplet
The used plates were not restamped

Beschtigung und Ausmessung ohne Beanstandung
Visual and dimensional check satisfactory

Es wird bestätigt, daß die lieferung auftragsgemäß ist.
We hereby certify, that the delivery complies with the terms of the order contract.

Søborg the. 12. juli 2005

Chr. Ib Andersen

Ordrenr.: 491072 Arbj.seddel: 688514 Kundenr.: 11460 Deres ref.: 16904

UGINE & ALZ
ARCELOR GROUP

UGINE & ALZ Belgium NV
Maatschappelijke zetel
Gent : Zone 6A, Swinnenwijerweg 5, B 3600 Gent
Tel. (... 30 21 11 - Telefax (089) 30 23 80
Telex 39058 aldozg b
H.R. Tongeren nr 41.051 - B.T.W. nr BE 401.277.914

U&A. SURVEYOR'S MARK · CACHET DE L'EXPERT · STEMPEL DES WERKSSACHVERSTÄNDIGEN

Der TÜV Rheinland hat mit Schreiben vom 21. März 1972 auf die Gegenzeichnung verzichtet

Certificate of test - Mill certificate
Certificat de Réception C.C.P.U.
Abnahmeprüfzeugnis B
nach EN 10204/3.1.B

No 2004.0029307
Nr 1/1

Approved as supplier according to AD2000-WO - TRD 100 statement W E 603 certified acc. PED (97/23/EC) by TÜV , NB 0035

PROD.PROCES: Electric Arc Furnace - VOD/AOD - Continuous Casting.
PROC. FABRIC.: Four à Arc - VOD/AOD - Coulée Continue
FERTIGUNGSABL.: Elektro-Lichtbogen Ofen - VOD/AOD - Strangguss.

your order n° - votre n° de cde - Bestell.Nr	our order n° - notre n° de cde - Werksnr
344.439 - 04AU1500/	3UA393500/19 08256/365/19

STAINLESS STEEL, SHEETS, COLD ROLLED, FINISH 2 B

heat n°-n° coulée Schmelze Nr: E 346107
coil n°-n° bobine Band Nr: 34610735

Specifications - Spécifications - Verschriften	Type - Nuance - Quality	Finish	Corrosion test - Corr. inter - Interkrist.Korr.
DIN 17441-02/97	WNR 1.4404	IIIC	DIN EN ISO 3651-2 :OK
ASTM A240/A240M-03C	TYPE 316L - S 31603	2B	ASTM A262 E - 02A :OK
EN 10088-2:1995	WNR 1.4404	2B	EURONORM 114 :OK
EN 10028-7/2000	WNR 1.4404	2B	EN ISO 3651/2 :OK

dimensions - Abmessungen
mm 6.00 1250.00 2500.0
Inches

Material (Code Designation) Matière Werkstoff (Nombre) X2 CRNIMO 17-12-2

Quenching Hypertrempe Abschreckung DIN 17441 1050°c forced air air poussé bewegter Luft

Particular requirem. - Prescr. particul. - Sondervorschriften :
TRR 100 -- AD 2000 W2/01-2000 -- AD 2000 W10/05-2000
AC TO BS EN 10259

CHEMICAL ANALYSIS · COMPOSITION CHIMIQUE · CHEMISCHE ZUSAMMENSETZUNG

ELEMENTS	LADLE ACIERIE SCHMELZE	PRODUCT PRODUIT STUCKANAL.
C	0.024	0.025
Mn	1.29	1.27
P	0.031	0.031
S	0.007	0.007
Si	0.36	0.34
Cr	16.90	16.90
Ni	10.08	10.08
Mo	2.05	2.06
Cu		
Ti		
Co		
N	0.030	0.030
α- ferrite		
δ- ferrite		

MECHANICAL PROPERTIES - PROPRIETES MEC. - MECH. WERTE

TENSILE TEST ESSAI DE TRACTION ZUG VERSUCH	ROOM TEMP. - TEMP. AMB. - RAUMTEMP.. REQ.-EXIGÉ ANFORDERUNG.	OBTAINED - OBTENU - ERGEBNISSE TEST N° - N° TEST - PROBE	TEMP. °C REQ.-EXIGÉ ANFORDER.	OBTAIN.-OBTENU ERGEBNISSE
EN 10002	N/MM2 min. max.	34610735 A (T) E	min.	
Section-Q.Schnitt mm²		12.49X 5.88		
yield limite él. Str.grenze 0.2%	240	318 316		
1.0%	270	350 346		
tensile strength rupture Zugfestigkeit	530 680	607 604		
elong. % A5 allong. Br.Dehn. A50	40	50 50 49 49		
E 0.2 /R max %		52 52		
hardness dureté Härte H V	1	170.8 165.1		

0001034543

grain size astm grain astm Korngrösse

bend pliage Biegeversuch 180° OK

impact strength test essai de résilience Kerbschlagbiegeversuch °C

TESTS TO VERIFY BATCH AND QUALITY HAVE BEEN CARRIED OUT
TESTS DE VERIFICATION DE LA CONFORMITE DE LA NUANCE FOURNIE
VERWECHSLUNGSPRÜFUNG WURDE DURCHGEFÜHRT OK

VISUAL INSPECTION AND DIMENSIONAL CHECK
EXAMEN VISUEL ET DIMENSIONEL DE SURFACE
BESICHTIGUNGEN UND ABMESSUNGEN GOOD WORKMANSHIP, PERMISSIBLE VARIATIONS IN DIMENSIONS OK

QUANTITY / WEIGHT MEMO / QUANTITÉ MÉMO POIDS LIVRÉ / ÜBERSICHT GELIEFERTEN GEWICHTE (KG)

PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.	PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.
40051395	9	1334			
TOTAL/GESAMT:	QTY. QTÉ. ANZ. 9	NET WEIGHT POIDS NET NETTO GEW. 1334 KG			

The delivery is in accordance with the order.
La fourniture est conforme aux exigences de la commande.
Die Lieferung entspricht den Bestellbedingungen.

DAMSTAHL A/S
DANMARKSVEJ 28
8660 SKANDERBORG
DENMARK

UGINE & ALZ Belgium NV
THE SURVEYOR - L'EXPERT - DER WERKSSACHVERSTÄNDIGE

Gent the le den 04.03.2004 (01)

PACKING LIST 408621 - DK - 0404776

Top 6mm .I VANTRAPPEN

Ordrenr.: 491072 Arbj.seddel: 688514 Kundenr.: 11460 Deres ref.: 16904

UGINE & ALZ
ARCELOR GROUP

UGINE & ALZ Belgium NV
Maatschappelijke zetel
Gent - : Zone 6A, Swinaenwijerweg 5, B 3600 Gent
Tel. (... 30 21 11 - Telefax (089) 30 23 80
Telex 39058 eldorg b
H.R. Tongeren nr 41.051 - B.T.W. nr BE 401.277.914

U&A SURVEYOR'S MARK
CACHET DE L'EXPERT
STEMPEL DES WERKSSACHVERSTÄNDIGEN

Der TÜV Rheinland hat mit Schreiben vom 21. März 1972 auf die Gegenzeichnung verzichtet

Certificate of test – Mill certificate
Certificat de Réception C.C.P.U.
Abnahmeprüfzeugnis B
nach EN 10204/3.1.B

No 2004.0049141
Nr 1/1

Approved as supplier according to AD2000-WO - TRD 100 statement W E 803 certified acc. PED (97/23/EC) by TÜV , NB 0035

PROD.PROCES: Electric Arc Furnace - VOD/AOD - Continuous Casting
PROC. FABRIC.: Four à Arc - VOD/AOD - Coulée Continue
FERTIGUNGSABL.: Elektro-Lichtbogen Ofen - VOD/AOD - Strangguss

your order n° - votre n° de cde - Bestell.Nr	our order n° - notre n° de cde - Werksnr
345.249 - 04AU250	4UA397336/11 08256/388/11

STAINLESS STEEL, SHEETS, COLD ROLLED, FINISH 2B

heat n°-n° coulée Schmelze Nr: E 410113
coil n°-n° bobine Band Nr: 41011356

Specifications - Spécifications - Vorschriften	Type - Nuance - Quality	Finish	Corrosion test - Corr. inter - Int.krist.Korr.
DIN 17441-02/97	WNR 1.4404	IIIC	DIN EN ISO 3651-2 :OK
ASTM A240/A240M-04A	TYPE 316L - S 31603	2B	ASTM A262 E - 02A :OK
EN 10088-2:1995	WNR 1.4404	2B	EURONORM 114 :OK
EN 10028-7/2000	WNR 1.4404	2B	EN ISO 3651/2 :OK

Dimensions - Abmessungen
mm 5.00 1250.00 2500.0
Inches

Material (Code Designation) Matière Werkstoff (Normbez.): X2 CRNIMO 17-12-2

Quenching Hypertrempe Abschreckung: DIN 17441, 1050°c, forced air / air poussé / bewegter Luft

Particular requirem. - Prescr. particul. - Sondervorschriften :
TRB 100 -- AD 2000 W2/01-2000 -- AD 2000 W10/05-2000
AC TO BS EN 10259

CHEMICAL ANALYSIS
COMPOSITION CHIMIQUE
CHEMISCHE ZUSAMMENSETZUNG

ELEMENTS	LADLE ACIERIE SCHMELZE	PRODUCT PRODUIT STUCKANAL.
C	0.020	0.020
Mn	1.12	1.12
P	0.033	0.033
S	0.002	0.002
Si	0.42	0.40
Cr	16.88	16.90
Ni	10.13	10.13
Mo	2.05	2.06
Cu		
Ti		
Co		
N	0.039	0.039
Nb		
α- ferrite		
δ- ferrite		

MECHANICAL PROPERTIES - PROPRIETES MEC. - MECH. WERTE

TENSILE TEST ESSAI DE TRACTION ZUG VERSUCH	ROOM TEMP. - TEMP. AMB. - RAUMTEMP. REQ.-EXIGÉ ANFORDERUNG		OBTAINED - OBTENU - ERGEBNISSE TEST N° - N° TEST - PROBE 41011356		TEMP. °C REQ.-EXIGÉ ANFORDER.	OBTAIN.-OBTENU ERGEBNISSE
EN 10002	N/MM2 min.	max.	A (T)	E	min.	
Section-Q.Schnitt mm²			12.56X	5.01		
yield 0.2% limite él. Str.grenze 1.0%	240		324	323		
	270		357	354		
tensile strength rupture Zugfestigkeit	530	680	601	597		
elong. % A5 allong. Br.Dehn. A50	40		50	50		
			50	50		
E 0.2 /R max %			53	54		
hardness dureté Härte HV	1		170.4	164.8		

grain size astm / grain astm / Korngröße:
bend / pliage / Biegeversuch: 180° OK
impact strength test / essai de résilience / Kerbschlagbiegeversuch: °C

TESTS TO VERIFY BATCH AND QUALITY HAVE BEEN CARRIED OUT
TESTS DE VERIFICATION DE LA CONFORMITE DE LA NUANCE FOURNIE
VERWECHSLUNGSPRÜFUNG WURDE DURCHGEFÜHRT: OK

VISUAL INSPECTION AND DIMENSIONAL CHECK
EXAMEN VISUEL ET DIMENSIONEL DE SURFACE
BESICHTIGUNGEN UND ABMESSUNGEN: GOOD WORKMANSHIP, PERMISSIBLE VARIATIONS IN DIMENSIONS OK

QUANTITY / WEIGHT MEMO / QUANTITÉ MÉMO POIDS LIVRÉ / ÜBERSICHT GELIEFERTER GEWICHTE (KG)

PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.	PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.
40322324	11	1350			
40322358	11	1350			
40322366	11	1356			
40322374	11	1352			
40322382	11	1352			
40322390	11	1352			
40322407	11	1354			
40322415	11	1352			
TOTAL/GESAMT:	QTY. QTÉ. ANZ. 88		NET WEIGHT POIDS NET NETTO GEW.		10818 KG

PACKING LIST 414288 - DK - 0408080

The delivery is in accordance with the order.
La fourniture est conforme aux exigences de la commande.
Die Lieferung entspricht den Bestellbedingungen.

DAMSTAHL A/S
DANMARKSVEJ 28
8660 SKANDERBORG
DENMARK

0001036702

UGINE & ALZ Belgium NV
THE SURVEYOR - L'EXPERT - DER WERKSSACHVERSTÄNDIGE

Gent the / le / den 19.04.2004

(02)

Bund 5mm J.VANTRAPPEN

Ordrenr.: 515781 Arbejdsedel: 607420 Kundenr.: 11460 Deres ref.: Tlf. Ove

UGINE & ALZ
ARCELOR GROUP

UGINE & ALZ Belgium NV
Maatschappelijke zetel
Gent: : Zone BA, Swinnenwijerweg 5, B 3600 Gent
Tel. (0...) 30 21 11 - Telefax (089) 30 23 80
Telex 39058 sidezg b
H.R. Tongeren nr 41.051 - B.T.W. nr BE 401.277.914

U&A SURVEYOR'S MARK
CACHET DE L'EXPERT
STEMPEL DES WERKSSACHVERSTÄNDIGEN

Der TÜV Rheinland hat mit Schreiben vom 21. März 1972 auf die Gegenzeichnung verzichtet

Certificate of test – Mill certificate
Certificat de Réception C.C.P.U.
Abnahmeprüfzeugnis B

No 2004.0131051
Nr 1/1

nach EN 10204/3.1.B

Approved as supplier according to AD2000-WO - TRD 100 statement W E 503 certified acc. PED (97/23/EC) by TÜV, NB 0035

PROC.PROCES: Electric Arc Furnace - VOD/AOD - Continuous Castir
PROC. FABRIC.: Four à Arc - VOD/AOD - Coulée Continue
FERTIGUNGSABL.: Elektro-Lichtbogen Ofen - VOD/AOD - Stranggus

your order n° - votre n° de cde - Bestell.Nr	our order n° - notre n° de cde - Werksnr
04AU3500/006 350.204	4UA428136/11 08256/425/11

STAINLESS STEEL, SHEETS, COLD ROLLED, FINISH 2 B

heat n°-n° coulée Schmelze Nr: E 426071
coil n°-n° bobine Band Nr: 42607146

Specifications - Spécifications - Vorschriften	Type - Nuance - Quality	Finish	Corrosion test - Corr. inter - Int.krist.Korr.
DIN 17441-02/97	WNR 1.4404	IIIC	DIN EN ISO 3651-2 :OK
ASTM A240/A240M-04AE1	TYPE 316L - S 31603	2B	ASTM A262 E - 02A.E1:OK
EN 10088-2:1995	WNR 1.4404	2B	EURONORM 114 :OK
EN 10028-7/2000	WNR 1.4404	2B	EN ISO 3651/2 :OK

dimensions - Abmessungen
mm 5.00 1000.00 2000.0
Inches

Material (Code Designation) Matière Werkstoff (Normbez.): X2 CRNIMO 17-12-2

Quenching Hypertrempe Abschreckung: DIN 17441 1050°c forced air air poussé bewegter Luft

Particular requirem. - Prescr. particul. - Sondervorschriften :
TRR 100 -- AD 2000 W2/01-2000 -- AD 2000 W10/05-2000
AC TO BS EN 10259

CHEMICAL ANALYSIS - COMPOSITION CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

ELEMENTS	LADLE ACIERIE SCHMELZE	PRODUCT PRODUIT STUCKANAL.
C	0.019	0.020
Mn	1.14	1.12
P	0.030	0.029
S	0.005	0.005
Si	0.40	0.40
Cr	16.80	16.85
Ni	10.01	10.03
Mo	2.05	2.05
Cu		
Ti	0.003	0.006
Co		
N	0.041	0.041
Al		
α - ferrite		-
δ - ferrite		

MECHANICAL PROPERTIES - PROPRIETES MEC. - MECH. WERTE

TENSILE TEST ESSAI DE TRACTION ZUG VERSUCH	ROOM TEMP. - TEMP. AMB. - RAUMTEMP. REQ.-EXIGÉ ANFORDERUNG		OBTAINED - OBTENU - ERGEBNISSE TEST N° - N° TEST - PROBE 42607146		TEMP. °C REQ.-EXIGÉ ANFORDER.	OBTAIN.-OBTENU ERGEBNISSE
EN 10002	N/MM2 min.	max.	A (T)	E	min.	
Section-Q.Schnitt mm²			12.45X	4.91		
yield 0.2% limite él. Str.grenze 1.0%	240 270		319 349	318 344		
tensile strength rupture Zugfestigkeit	530	680	600	595		
elong. % A5 elong. Br.Dehn. A50	40		51 51	50 50		
E 0.2 /R max %			53	53		
hardness dureté Härte H V	1		170.8	165.1		

0001044581

grain size astm grain astm Korngrösse

band pliage Biegeversuch 180° OK

Impact strength test essai de résilience Kerbschlagbiegeversuch °C

TESTS TO VERIFY BATCH AND QUALITY HAVE BEEN CARRIED OUT
TESTS DE VERIFICATION DE LA CONFORMITE DE LA NUANCE FOURNIE
VERWECHSLUNGSPRÜFUNG WURDE DURCHGEFÜHRT: OK

VISUAL INSPECTION AND DIMENSIONAL CHECK
EXAMEN VISUEL ET DIMENSIONEL DE SURFACE
BESICHTIGUNGEN UND ABMESSUNGEN: GOOD WORKMANSHIP, PERMISSIBLE VARIATIONS IN DIMENSIONS OK

QUANTITY / WEIGHT MEMO / QUANTITÉ MÉMO POIDS LIVRÉ / ÜBERSICHT GELIEFERTER GEWICHTE (KG)

PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.	PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.
40686754	10	792			
TOTAL/GESAMT:	QTY. QTÉ. ANZ. 10	NET WEIGHT POIDS NET NETTO GEW. 792 KG			

The delivery is in accordance with the order.
La fourniture est conforme aux exigences de la commande.
Die Lieferung entspricht den Bestellbedingungen.

DAMSTAHL A/S
DANMARKSVEJ 28
8660 SKANDERBORG
DENMARK

UGINE & ALZ Belgium NV
THE SURVEYOR - L'EXPERT - DER WERKSSACHVERSTÄNDIGE

Gent the le den 19.10.2004

03

PACKING LIST 437187 - DK - 0421146

I VANTRAPPEN

Svøb 5mm

Arbejdstilsynet

Landskronagade 33
2100 København Ø

Telefon 3915 2000
www.arbejdstilsynet.dk

Høyers Maskinfabrik
Albuen 32
6000 Kolding

Deres ref. Knud Erik Brixen
Vores sag 2001-0096303
Vores ref. Stig K. Petersen
Direkte fax. +45 3927 1488

21. december 2001

Komponent som indgår i et trykbærende udstyr

Betegnelse: Skueglas ø65, ø125 og ø150

Tegninger nr.: 33612A og 33613B (mærket "kolster engineering a/s")

Med henvisning til Deres breve af 15. og 29. november 2001 meddeles, at Arbejdstilsynet som bemyndiget organ nr. 0030 på basis af reglerne i bekendtgørelse nr. 743 af 23. september 1999 om indretning af trykbærende udstyr og efter modul G i EF-direktiv nr. 97/23/EF har gennemgået konstruktionen af ovennævnte komponent med hensyn til materialevalg og dimensioner og fundet komponenten passende til beregningstrykkene 10 (ø65 og ø125) eller 16 (ø150) bar overtryk og højeste brugstemperatur 150°C eller 300°C som anført på tegning nr. 33613B.

Komponenten kan anvendes i trykbærende udstyr i alle kategorier efter overensstemmelsesprocedurer, hvor Arbejdstilsynet indgår som bemyndiget organ og hvor TRB/AD-Merkblätter eller Tryckkärlsnormer 1987 anvendes som konstruktions-/fremstillingsnorm.

Der er med dette brev ikke taget stilling til komponentens indbygning i trykbærende udstyr. Den konkrete anvendelse af komponenten vil blive vurderet i forbindelse med indbygningen.

Procedure for overensstemmelsesvurdering af det trykbærende udstyr som komponenten indgår i skal fastsættes efter retningslinierne i artikel 9 og 10 i EF-direktiv nr. 97/23/EF.

./. Vedlagt returneres 4 stk. (2 sæt) stemplede konstruktionsplaner.

./. Endvidere vedlægges et oplysningsskema om kontrol under fremstillingen og dokumentation.

Venlig hilsen

05

Poul Holmegaard

Stig K. Petersen

Poul Holmegaard *Stig K. Petersen*

Oplysningsskema:

Arbejdstilsynet

Dato 21. december 2001
Vores sag 2001-0096303

Kontrol under fremstillingen

Komponenten skal under fremstillingen kontrolleres af Arbejdstilsynets lokale tilsynskreds.

De nedenfor anførte punkter vil som minimum blive kontrolleret i henhold til dette brev.

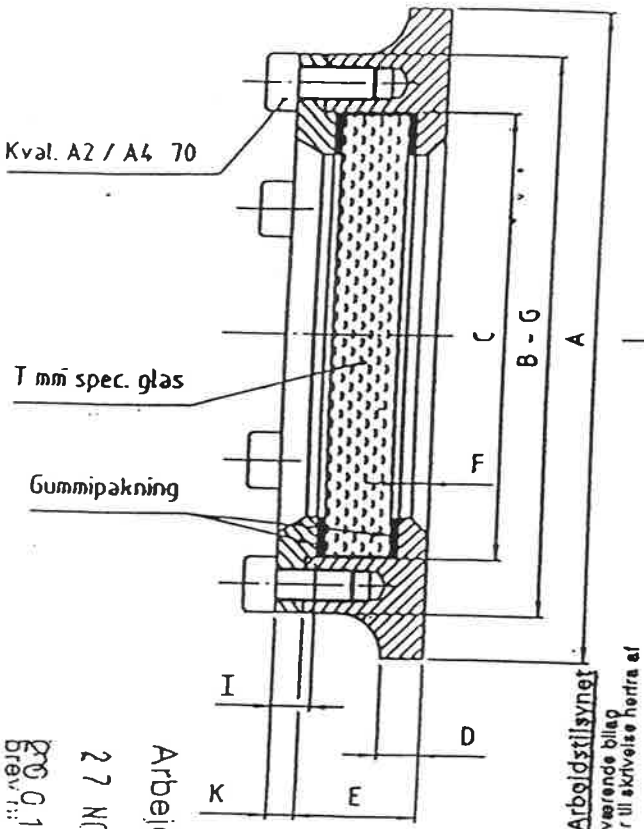
- Kontrol af værkstedets kvalifikationer (AD-M HP 0)
- Kontrol af at anvendt kontrol- og måleudstyr har gyldig kalibrering
- Kontrol af anvendte materialer og materialecertifikater
  Materialefabrikantens kvalitetsstyringssystem skal være certificeret i overensstemmelse med punkt 4.3 i direktivets bilag 1.
  - materialecertifikater
  - materialeidentifikation
  - eventuel overførelse af identifikationsmærker
- Formnings procedurer
- Visuel undersøgelse af form, rundhed, opretning m.m.
- Kontrol af dimensioner
- Indvendig og udvendig besigtigelse
- Slutinspektion og mærkning
  - Slutinspektion
  - istempling af chargenummer og Arbejdstilsynets bomærke (♔) i fast- og løsflange.
  - Kontrol af dokumentation som skal følge komponenten
  - Attest for fremstillingskontrollen stemples og underskrives

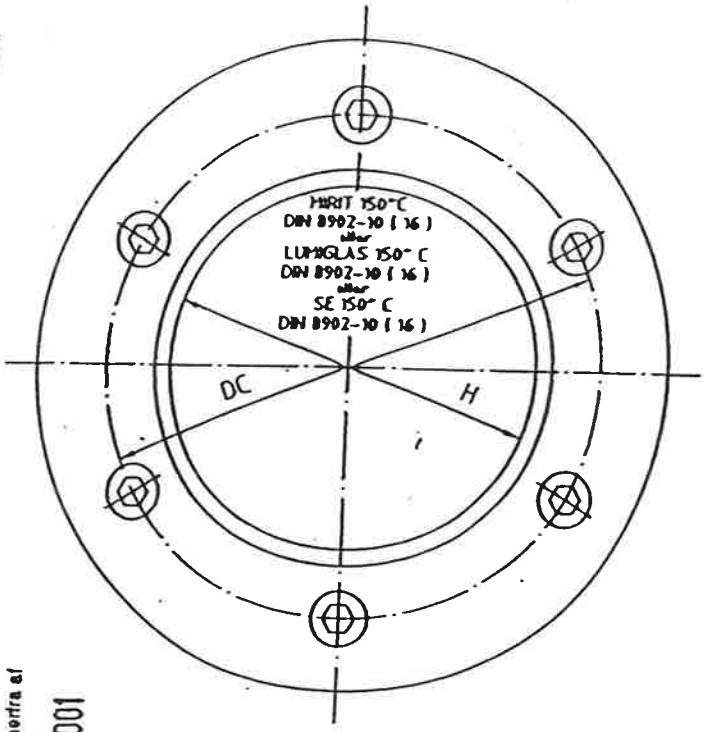
Dokumentation

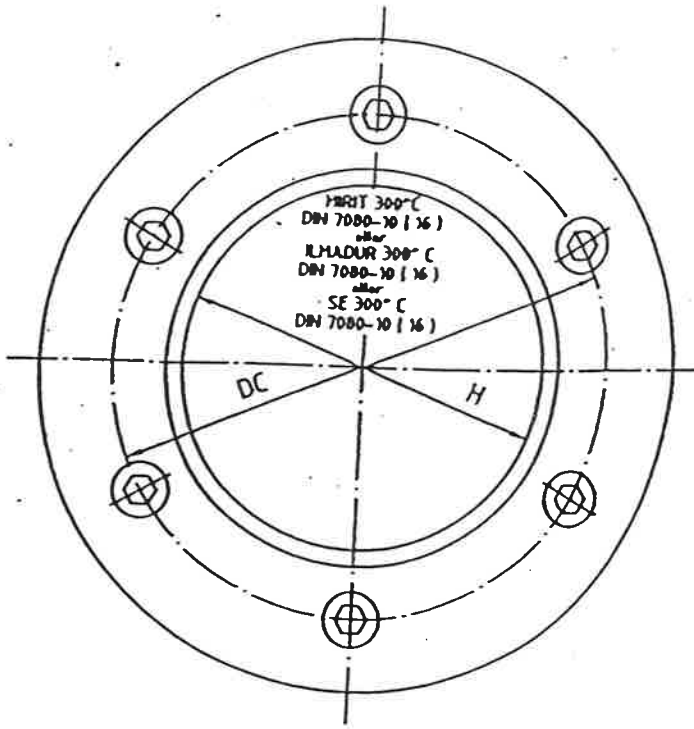
Komponenten skal ledsages af følgende dokumentation i et eksemplar som skal foreligge i forbindelse med indbygningen:

- Fremstillingsblanket, konstruktionsplaner, kopi af dette brev og materialecertifikater.

Init: SKP







Arbejdstilsynet
Nærværende bilag
hører til skrivelse herfra af
21 DEC. 2001

Arbejdstilsynet
27 NOV 2001
Brevnr. / Journal nr.

Materiale over Ø160 ultralydsprøves

Se tilhørende DIMENSION / DATATABEL tegning nr 33613A

Pos.	Benævnelse	Materiale	Anm.
Rettelse			
A	01.11.15		

kolster engineering a/s
Bogbakkevej 19 - Kragelund - DK-8723 Løsning
TLF. 76 75 89 50

HØYERS MASKINFABRIK
SKUFFGLAS
TEF 150° C og 300° C

Målforhold	Konstr.		
	Tegn.	01.01.26	KEB
		ACADIK	
	Sag nr.	99641	

Erstatning for:
33612A
Erstattet af:

DIMENSION / DATATABEL FOR SKUEGLAS iflg. tegning nr. 33612A

SKUEGLAS 150° C	KARM						SPÆNDERING				BOLT		GLAS	PAKNING
LYSNING	A	B	C	D	E	F	G	H	I	K	DC	stk. DIM.	T	
ø 65 mm	116	100	80	7.5	22	5.2	100	65	7	5	90	6 M6 x 16	12 mm – DIN 8902-10	2 mm
ø 125 mm	198	180	150	7.5	30	6.2	180	125	8	6	165	8 M8 x 16	19 mm – DIN 8902-10	FJ 5054 EPDM
ø 150 mm	230	210	175	12	38	8.2	210	150	12	10	192	10 M10 x 25	25 mm – DIN 8902-16	70 Shore A

SKUEGLAS 300° C	KARM						SPÆNDERING				BOLT		GLAS	
LYSNING	A	B	C	D	E	F	G	H	I	K	DC	stk. DIM.	T	
ø 65 mm	116	100	80	7.5	22	5.2	100	65	7	5	90	6 M6 x 16	12 mm – DIN 7080-10	2 mm
ø 125 mm	198	180	150	7.5	30	6.2	180	125	10	8	165	8 M8 x 16	19 mm – DIN 7080-10	FJ 6103 VITON
ø 150 mm	230	210	175	12	38	8.2	210	150	14	12	192	10 M10 x 25	25 mm – DIN 7080-16	75 Shore A

Materiale:				
Rustfri stangstål 3.1 B certifikat EN 10204	W 1.4401 – SS14-2347-27 W 1.4404 – SS14-2348-27 W 1.4435 – SS14-2353-27 W 1.4436 – SS14-2343-27 W 1.4571 – SS14-2350-27 DS/EN 10028-7 DIN 17.440	W 1.4301 – SS14-2333-27 W 1.4306 – SS14-2352-27 W 1.4404 – SS14-2348-27 DS/EN 10028-7 DIN 17.440	Rustfri A2 / A4 Kval. 70	

Arbejdstilsynet
Nærværende bilag hører til skrivelse hertil af
21 DEC. 2001

Arbejdstilsynet
3 NOV. 2001

j.nr. 2001-0096303
brev af 2

Pos.	Benævnelse	Materiale	Anm.
Rettelse			
A 01.11.15	kolster engineering a/s Bogtrykkervej 19 – Kringsbord – DK-8721 Løsning TLF. 75 89 58	Målforhold	Konstr.
B 01.11.29			Tegn. 01.01.24 KEB
			ACAD14
			Sag nr. 99441
	HØYERS MASKINFABRIK DIMENSION / DATATABEL FOR SKUEGLAS 150° C og 300° C	Erstatning for:	
		33613B	
		Erstattet af:	

irlbacher
BLICKPUNKT GLAS

Am Steinbühl 4
92539 Schönsee
Tel. 09674 / 9202-0
Fax. 09674 / 9202-30
e-mail: info@irlbacher.com

Werkszeugnis
gem. EN 10 204 – 3.1B
Prüfung nach DIN 8902

Bestellung Nr. 10123 vom: 23.02.2004

Artikel: Schauglasplatte Maße: 149 +0,5/-0 x 12 +/-0,3 mm 141 Stück

149 +0,5/-0 x 19 +/-1 mm 195 Stück

Auftragsbestätigung-Nr.: 291554

Wertstoff

Natron-Kalk-Glas, thermisch vorgespannt

Es wird bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht und die Kontrollen entsprechend DIN 8902 durchgeführt wurden.

ξ	**Vorspannung quantitativ; Berstdruckversuch**	i. O.	**siehe Anlage Nr. 0231H-04**
ξ	**100 % spannungsoptische Prüfung**	i. O.	
ξ	**100 % ige Sichtprüfung auf Werkstofffehler**	i. O.	
ξ	**Prüfung auf Abschreckfestigkeit**	i. O.	

Schönsee, den 12.05.2004

.....
Günther Irlbacher, Technischer Leiter

Prüfbescheinigung Nr. / No. 0231H-04
Inspection certificate

Besteller: Irlbacher Blickpunkt Glas GmbH
Purchaser: Am Steinbühl 4
D-92539 Schönsee

Bestell-Nr.: 12826
Order-no.:
Unsere Auftragsnummer:
Our job no:
Bestelldatum: 29. Apr. 04
Order date:
Produktbezeichnung: Presshartglas
Name of product:
Kunden Art.-Nr.:
Your article no.:
Werkstoff: Floatglas
Material: thermisch vorgespannt
Lieferbedingungen: DIN 8902 Abschnitt 7.2
Terms of delivery:

Wasserdruckprüfung
Hydraulic pressure test

Prüf-Nr.	Anzahl Qty.	Abmessung Dimensions [mm]	Art.-Nr. Part-no.	Berstdruck (bar) burst pressure (bar)	Bemerkungen
4078	1	149+0,5/-0 x 124+/-0,3	1354552	35	keine
4079	1	149+0,5/-0 x 194+/-1	1354562	100	keine

Es wird bestätigt, daß die IST-Werte der Prüfstücke innerhalb der SOLL-Werte der bei Bestellannahme in Spezifikationen vereinbarten Bedingungen liegen.
We hereby certify that the actual values of the tested pieces are within the required values defined in the specification, agreed upon acceptance of the order.

Datum: 11.5.2004
Date:

Der Werkssachverständige / Works inspector
Dipl.-Ing. Karl Schuller

SANDVIK

CERTIFICATE

No. A/02-962819 Rev 00
Date 2002-04-17 Page 1/2

INSPECTION CERTIFICATE acc to
EN 10 204 3.1.B

Høyers Maskinfabrik I/S
Albuen 32
6000 Kolding

INSPECTION STAMP
SVQ

Customer References		Sandvik References		
	Customer order 2002-04-09	Order No. 636578	Subs No. 36679	ABSS Dispatch note 05118/53
100-00991 HØYER MF		ABSS No. 284-61051	C.Code 97	

Material description
HOT WORKED STAINLESS BAR STEEL
FORGED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Steel making process
Electric furnace

Steel/material Designations
Sandvik
SANMAC 316/SANMAC 316L
W.nr
1.4435

Technical requirements
TRB 100, AD-W2, DIN 17440-96

EXTENT OF DELIVERY

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SANMAC-4435-204 FL-1-2500-	454191	02271	1	651.0
			Total	1	651.0

TEST RESULTS
Chemical composition (weight%)

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
454191	0.021	0.42	1.56	0.029	0.019	17.37	12.63	2.56

Heat	N
454191	0.061

Tensile test at room temperature

Lot	Test No	Yield strength N/mm2 Rp0.2	Yield strength N/mm2 Rp1.0	Tensile strength N/mm2 Rm	Elongation % A
02271	05124	254	311	550	49

Hardness test

Lot	Hardness HB	HB
02271	154.0	153.0

Quality assurance :- Ulf Svensson/QA-manager Long Products
MTC Service / Certificates

R + KRONE

Impact test, J

Lot	Test No	Single values			Average
02271	05124	138	220	203	187

Following controls/tests have been satisfactorily performed:
- Intergranular corrosion test acc to EN ISO 3651-2 Method A
- Material Identification
- Ultrasonic testing
- Visual inspection and dimensional control.

Heat Treatment:
Solution annealed and quenched.

Marking:
SANDVIK, W.NR, HEAT, LOT, INSPECTION STAMP.

Approved acc. AD-Merkblatt W0/TRD 100 by TUEV Nord e.V.
Certified acc. Pressure Equipment Directive (97/23/EC) by
TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9002.

The certificate is produced with EDP and valid without signature

SANDVIK

CERTIFICATE

No. A/02-962819 Rev 00
Date 2002-04-17 Page 1/2

INSPECTION CERTIFICATE acc to
EN 10 204 3.1.B

Høyers Maskinfabrik I/S
Albuen 32
6000 Kolding

INSPECTION STAMP
SVQ

Customer References

Customer order 2002-04-09

100-00991 HØYER MF

Sandvik References

Order No.	Subs No.	ABSS Dispatch note
636578	36679	05118/53

ABSS No.	C.Code
284-61051	97

Material description
HOT WORKED STAINLESS BAR STEEL
FORGED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Steel making process
Electric furnace

Steel/material Designations
Sandvik
SANMAC 316/SANMAC 316L
W.nr
1.4435

Technical requirements
TRB 100, AD-W2, DIN 17440-96

EXTENT OF DELIVERY

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SANMAC-4435-204 FL-1-2500-	454191	02271	1	651.0
			Total	1	651.0

TEST RESULTS
Chemical composition (weight%)

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
454191	0.021	0.42	1.56	0.029	0.019	17.37	12.63	2.56
	N							
454191	0.061							

Tensile test at room temperature

		Yield strength		Tensile strength	Elongation
		N/mm2	N/mm2	N/mm2	%
Lot	Test No	Rp0.2	Rp1.0	Rm	A
02271	05124	254	311	550	49

Hardness test

	Hardness	
Lot	HB	HB
02271	154.0	153.0

Quality assurance :- Ulf Svensson/QA-manager Long Products
MTC Service / Certificates

R + KRANG

Impact test, J

Lot	Test No	Single values			Average
02271	05124	138	220	203	187

Following controls/tests have been satisfactorily performed:
- Intergranular corrosion test acc to EN ISO 3651-2 Method A
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- Visual inspection and dimensional control.

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SANDVIK, W.NR, HEAT, LOT, INSPECTION STAMP.

Approved acc. AD-Merkblatt W0/TRD 100 by TUEV Nord e.V.
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TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9002.

The certificate is produced with EDP and valid without signature

Høyers Maskinfabrik
Albuen 32
DK-6000 Kolding

Tlf.: +45 7552-9699
Fax:+45 7552-9499
E-mail:

Omstemplingsrapport

Dato: 04-05-2004	Ordre nr.:	Rapport nr.: 0011
Kunde: HØYERS MASKINFABRIK	Kunde ordre nr.:	

Materialecertifikat (standart/benævnelse): EN 10 204 3.1.B.

Plader: ☐ Rør: ☐ Stænger: ☒ Profiler: ☐ Andet: ☐

Antal: 41 STK. Dimension: Ø 204

Materiale (standart/kvalitet): W. 1.4435

Original mærkning: 454191

Mærkningsform (original mærkning):
Hårdt stempel: ☒ Maling: ☐ Mærkeseddel: ☐ Andet: ☐

Antal omstemplinger: 41 STK.

Ny mærkningsform (HM-mærkning):
Hårdt stempel: ☒ Maling: ☐ Mærkeseddel: ☐ Andet: ☐

Overført mærkning:
454191 HM

Evt. skitse af opmærkning:

Omstempling har fundet sted i henhold til procedure for stempeloverførsel.

Dato: 04-05-2004 Inspektør: Flemming Høyer

Høyers Maskinfabrik
Albuen 32 - DK-6000 Kolding
Tlf. 75 52 96 99
Fax 75 52 94 99

SANDVIK

PRUEFZEUGNIS Nr. A/01-850292 Rev 00

Datum 2001-06-21 Seite 1/

STAPPERT SPEZIAL-STAHL
HANDEL GMBH
WILLSTAETTERSTR. 15
40549 DUESSELDORF

ABNAHMEPRUEFZEUGNIS gemaess
EN 10 204 3.1.B

300988

INSPEKTIONSSTEMPEL
SVQ

Kunden Referenz

V 24828 S/SV-J5I

Kunden auftrag 2001-03-02

340-00991 STAPPERT SPEZ

Sandvik Referenz

Best. Nr. Subs Nr. 11204 ABSS Packzettel 20311/53

ABSS Nr. 284-35599 A.code 03

Materialbeschreibung

WARMBEARBEITETER NICHTROSTENDER
STABSTAHL
GESCHMIEDET
GEGLUEHT & GERICHTET
GESCHAELT UND POLIERT

Erschmelzungsart
Elektroofen

Werkstoffbezeichnung

Sandvik
SANMAC 304/SANMAC 304L
AISI
304/304L W.nr 1.4301
EN no
1.4301/1.4307

Pruefgrundlagen/Anforderungen

TRB 100, AD-W2/W10, DIN 17440-96
EN 10088-3:-1995
ASTM A-479-00
ASME SA-479-ED-98 AD-99

LIEFERUMFANG

Pos	Produktbezeichnung	Schmelze	Los	Stueck	Kg
05	MBR-SANMAC-4301-180 BW-4000-6500-	453395	32431	5	5710.0
			Total	5	5710.0

PRUEFERGEBNISSE

Chemische Zusammensetzung (Gewichts%)

Schmelze	C	Si	Mn	P	S	Cr	Ni	Co
453395	0.013	0.22	1.76	0.029	0.024	18.45	8.27	0.080

	N
453395	0.076

Zugversuch bei Raumtemperatur

Los	Streckgrenze N/mm2 Rp0.2	Streckgrenze N/mm2 Rp1.0	Zugfestigkeit N/mm2 Rm	Bruchdehnung % A
32431	242	290	542	58

Haertepruefung

Los	Haerte	
32431	149.0	154.0

Qualitaetssicherung - Ulf Svensson/QA-manager Long Products
MTC Service / Certificates

Kerbschlagbiegeversuch, J, -20 graden C

Los	Einzelwerte Joule			Mittelwert Joule
32431	214	164	138	172

Folg. Kontrollen/Pruefungen wurden ohne Beanstandung durchgefuehrt:
- Interkristalline Korrosionspruefung gemaess DIN 50914
- Verwechslungskontrolle
- Ultraschallpruefung
- Visuelle Besichtigung und Masskontrolle.

Waermebehandlung:
Loesungsgegluecht und abgeschreckt.

Kennzeichnung der stabh:.
SANDVIK, W.NR, SCHMELZE, LOS, INSPEKTIONSSTEMPEL.

Ueberprueft als Hersteller nach AD-WO/TRD 100 durch den TUEV Nord e.V mit Verzicht auf Gegenzeichnung und Zustimmung zur Ausstellung unterschriftsloser Abnahmepruefzeugnisse nach EN 10204-3.1B.
Az: 0121WL14900

Die gelieferten Produkte erfuellen die in der Bestellung gestellten Anforderungen.

Unsere Produkte sind entsprechend einem Qualitaetssystem hergestellt, dass nach ISO 9001 zugelassen und registriert ist.

Dieses Zeugnis ist mit EDV erstellt und ohne Unterschrift gueltig

Høyers Maskinfabrik
Albuen 32
DK-6000 Kolding

Tlf.: +45 7552-9699
Fax:+45 7552-9499
E-mail:

Omstemplingsrapport

Dato: 11-06-2004	Ordre nr.:	Rapport nr.: 0014
Kunde: HØYERS MASKINFABRIK	Kunde ordre nr.:	

Materialecertifikat (standart/benævnelse): EN 10 204 3.1.B

Plader: ☐ Rør: ☐ Stænger: ☒ Profiler: ☐ Andet: ☐

Antal: 75 STK. Dimension: Ø 180

Materiale (standart/kvalitet): W. 1. 4301

Original mærkning: 453395 SANDVIK

Mærkningsform (original mærkning):
Hårdt stempel: ☐ Maling: ☐ Mærkeseddel: ☒ Andet: ☐

Antal omstemplinger: 75 STK.

Ny mærkningsform (HM-mærkning):
Hårdt stempel: ☒ Maling: ☐ Mærkeseddel: ☐ Andet: ☐

Overført mærkning:

453395 HM

Evt. skitse af opmærkning:

Omstempling har fundet sted i henhold til procedure for stempeloverførsel.

Dato: 11-06-2004 Inspektør: Flemming Høyer

Høyers Maskinfabrik
Albuen 32 - DK-6000 Kolding
Tlf. 75 52 96 99
Fax 75 52 94 99

VI SER EN LØSNING

A/S MIRIT-GLAS
Kantatevej 29
DK-2730 Herlev
Tlf.: +45 4494 4449
Fax +45 4494 0844
e-mail: post@mirit.dk
www.mirit.dk

Industriparken 12
DK-6500 Vojens
Tlf.: +45 7454 2555
Fax +45 7454 1455

Høyers Maskinfabrik
Albuen 32
6000 Kolding

Vojens 22.Sept. 2004

Trykprøveattest

I henhold til Din. 7080

Glaskvalitet	:	Borosilikat glas, termisk hærdet
Dimension	:	149 mm Ø x 19 mm
Antal	:	25 stk.
Max. Arbejdstryk Kp/cm2 (bar)	:	10

Attesteres hermed leveret på Mirit ordre nr. 29946

Ved anvendelse af trykbelastede skueglas hænger driftssikkerheden afgørende sammen med udførslen af flanche og montagebetingelser.

En garanti for holdbarheden kan derfor ikke gives.

Med venlig hilsen
A/S Mirit-Glas
Lis Winum

Betech Seals

CERTIFICATE OF CONFORMANCE/INSPECTION

Customer:	Høyers MF
Customer order no:	Tlf. Høyer
Drawing no:	Ø 150 x 125 x 2,0 mm
Part no:	1004589 300 stk.

It is hereby certified that above mentioned parts supplied for the above mentioned order number has been inspected before shipment and was found in accordance with the relevant drawings and specifications as well in conformity with the stipulations of the above mentioned customer order.

FJ-5405 Silicone 60 sh.A 2,0 mm. FDA and CFR § 177.2600 specifications.

Signature:

Frank Dølby

Date: 14.09.04

Betech Seals A/S – Vesterlundvej 4 – DK-2730 Herlev – Telefon +45 4485 8100 – Fax +45 4492 7800
Betech Seals A/S – Industrivej 29 – DK-6740 Bramming – Telefon +45 7656 2600 – Fax +45 7510 1558
CVR-nr.: DK-10611342 – Bank: Nordea 2228 0197 112255

invensys APV

Overensstemmelseserklæring for Ventiler og Ventilmanifolds

APV Rosista GmbH, Zechenstr. 49, 59425 Unna-Königsborn
erklærer som producent med eneansvar, at

dobbeltsædeventiler i serie D2, SD4, SDM4, DA3, DE3, DEU3, DET3, DKR2, DKRT2, DKRH2
i de nominelle diamtre DN 25 - 150, 1" – 4" og 1 Sh5 - 6 Sh5

butterfly ventiler i serie SV1 og SVS 1 F
i de nominelle diametre DN 25 - 100, DN 125 - 250 og 1" – 4"

kuglehaner i serien KH, KHV
i de nominelle diametre DN 15 - 100

enkeltsæde-, membran- og fjederaktiverede ventiler i serie S2, SW4, SWmini4, SWT4, M3, MF3, M4, MP4, CPV, RG4, RGE4, PR2, PR3, PR4, SI2, UF3, VRA,VRAH
i de nominelle diametre DN 10 - 150, 1/2" – 4" og 1 Sh5 - 6 Sh5

og de herfor installerede ventilmanifolds

opfylder kravene i Direktiverne 89/392/EEC (seneste ændring 93/44/EEC) og GSG - 9.GSGV.

For officiel inspektion præsenterer APV Rosista GmbH teknisk dokumentation i henhold til appendix V i Maskindirektivet. Denne dokumentation består af dokumenter omhandlende udvikling og konstruktion, beskrivelse af trufne foranstaltninger til imødekommelse af konformitet og overensstemmelse med de gundlæggende krav til sikkerhed og helbred, inkl. en analyse af de resterende risici samt en betjeningsmanual med sikkerhedsinstruktioner.

Der garanteres for ventilernes og ventilmanifoldenes overensstemmelse.

59425 Unna-Königsborn, 18.08.2004,
APV Rosista GmbH

i.V. Raumbach

Udviklingschef

SANDVIK

INTYG

2004-01-26

Nr. A/04-296055 Rev 00
Datum 2004-01-23 Sida 1/2

INSPEKTIONSINTYG enligt
EN 10 204 3.1.B

Jitmech AB
Box 503
915 23 ROBERTSFORS

2004-01-26

Kundreferenser		Sandvik Referenser		
63023	kundorder 2004-01-20	Order Nr. 108140	Subs Nr. 45773	ABSMT Packnota 20453/53
003-00991 JITMECH		ABSMT Nr. 284-10199	Int.Kod 87	

Materialbeskrivning
VARMBEARBETAT ROSTFRI STÅNG
VALSAT
GLÖDGAD & RIKTAD
SVARVAD OCH POLERAD

Smältmetod
Elektrisk ugn

Stål/materialbeteckningar
Sandvik
SANMAC 316/SANMAC 316L

AISI	UNS
316/316L	S31600/S31603
W.nr	EN no
1.4401/1.4404	1.4401/1.4404

Tekniska fordringar/krav
EN 10088-3:-1995
NACE MR 01-75-2003
ASTM A-276-02A, A-479-02, ASME SA-479-ED-01 SEC II PART A

LEVERANSOMFATTNING

Pos	Produktbeteckning	Charge	AO	Antal	Kg
01	MBR-SANMAC-316L-80	501452	77845	1	255.0
			Summa	1	255.0

PROVNINGSRESULTAT
Kemisk sammansättning (vikts%)

Charge	C	Si	Mn	P	S	Cr	Ni	Mo
501452	0.014	0.26	1.69	0.030	0.026	16.76	10.26	2.07
	V	N						
501452	0.046	0.039						

Dragprovning vid rumstemperatur

	Sträckgräns N/mm2	N/mm2	Brottgräns N/mm2	Förlängning %	%	Kontraktion %
Ao	Rp0.2	Rp1.0	Rm	A	2"	Z
77845	314	375	593	44	44	71

Hårdhetsprovning

	Min	Max
Ao	HB	HB
77845	153.0	154.0

08

Kvalitetssäkring - Ulf Svensson/QA-manager Primary Products
MTC Service / Certificates

2004-01-26

Kornstorlek
Ao
77845 9.0

Följande kontroller/provningar har utförts med tillfredställande res:
- Interkristallin korrosionsprovning enligt ASTM A-262 PR.E
- Sammanblandningskontroll.
- Visuell inspektion och dimensionskontroll.

Värmebehandling:
Upplösningsbehandlat och släckt.

aterial free from mercury contamination.

ingen svetsning eller svetsreparation utförd.

Härmed intygas att innehållet i detta intyg är korrekt och att alla
rovningsresultat och operationer är i enlighet med
aterialspecifikationen.

Detta material uppfyller helt kraven med avseende på kemisk analys och mekaniska egenskaper enligt ASTM A-182 och ASME SA-182 Grade F316L

Materialet är tillverkat enligt ett kvalitetssystem, godkänt och certifierat mot ISO 9001.

Intyget är ADB-framställt och giltigt utan underskrift

Ordrenr.: 515781 Arbj.seddel: 607420 Kundenr.: 11460 Deree ref.: Tlf. Ove

SATINOX TUBI INOX SPA
VIA INDUSTRIA 16
20010 VIGANO DI GAGGIANO MI
Azienda Certificata ISO9001: 2000
Processo di saldatura omologato AQUAP
Omologazione PED 97/23/EC All.1,Par.4.3
Azienda approvata AD2000 W0-TRD100

ORDINE N. 345511JM del 19.01.04
Order N. dtd
Bestellung N. vom

FATTURA N. 10376 del 10.03.04
Invoice N. dtd
Rechn. N. vom

CERTIFICATO DI COLLAUDO N. 200400075
Inspection certificate
Abnahmepruefzeugnis
EN 10204 /3.1.B

Vigano di Gaggiano 10.03.04

2260.04

DAMSTAHL A/S (DK)

DANMARKSVEJ 28
08660 DK-SKANDERBORG DANIMARCA

TUBI ELETTROUNITI/Welded Tubes/Geschweisste Rohre
FATTORE DI SALDATURA/Welding Factor/Schweissfaktor :V=1
QUALITA' /Steelgrade/Werkstoff: TYPE 316L W 1.4404 X2 CRNIMO 17 12 2
REQUISITI/Requir./Anforder.:Rif. DIN 17457 PK1 ISO EN 1127 D4/T3
ESECUZIONE RICOTTO
STX AISI316L WST. 1.4404 D12X1,0 K3 W PK1 DIN 17457 COL. 0483245 MV

Dimens/Abmess.	Kg.	Mtr.	Pezzi/Pieces/Stueckzahl	N. e data bolla
12X1,0DR mm	1.503	5.472,00	912 x 6,000 Mt	28.718 10.03.04

COMPOSIZIONE CHIMICA Heat Analisys/Schmelzenanalyse		CARATTERISTICHE MECCANICHE Mech.Properties/Mech.werte	Richieste Required Anforder.	Ottenute Obtained Ergebnis
C	0,023	SNERVAMENTO 0,2% N/mm2	> 240	262
Mn	0,830	SNERVAMENTO 1% N/mm2	> 270	291
P	0,027	Yield Strength Streckgrenze		
S	0,001	ROTTURA N/mm2	> 530	586
Si	0,340	Tens.Strength Zugfestigkeit		
Cr	16,680	ALLUNGAMENTO A% L=50mm	> 40	51
Ni	11,220	Elongation Dehnung		
Mo	2,100	DUREZZA HRB	< 95	82
Cu		Hardness / Haerte		
Ti				
Co				

PROVA DI PIEGATURA / Bending / Biegen : OK
PROVA DI ALLARGAMENTO / Flaring / Aufweit : OK
PROVA DI SCHIACCIAMENTO / Flattening / Ringfalt : OK
TRATTAMENTO TERMICO/Heat Treatment/Waermebehand : 1050 C
CORRENTI PARASSITE / Eddy Current / Wirbelstrom SEP 1914/1925 : OK
ESAME DIMENSIONALE VISIVO/Visual and Dimens.Contr/Besich. und Ausmessung : OK
ANTIMISCUGLIO / Verwechslungs / Anti mixing : OK

COLATA/ Heat/ Schmelze 0483245
Bobina/Coil Nr 489023

PROVA / Test / Probe Nr 0403897
Specification ASTM A240 EN10028/7 DIN 17441 COLD ROLL.

Corrosion test
ASTM A 262 PRACTICE :OK
DIN 50914 (ISO 3651-2) :OK

SATINOX TUBI INOX SPA

C.Q. MARCO VENDRAMEL

Conferma n. 75613 / 001 del 19.01.04

09

Mod.: 20-04-08 rev.:1 data:08.10.02 redatto da:DG approvato da:DG

SOS 12X1

Ordrenr.: 271369 Arbj.seddel: 634224 Kundenr.: 11460 Deres ref.: 7603

UGINE-SAVOIE IMPHY
Groupe Arcelor

FRANCE

5 Usine Productrice / Hersteller / Manufacturer
UGINE
F 73403 UGINE CEDEX
Tél : 04.79.89.30.30
Fax : 04.79.89.30.51

4 N. Nr No 08488

11 N. de commande usine-Werksbestellnummer-Works order number
FUGE TEC2 01/01 6ZV11000 M

3
CERTIFICAT DE RECEPTION 3.1.B
ABNAHMEPRUEFZEUGNIS 3.1.B
INSPECTION CERTIFICATE 3.1.B

EN 10204.3/1.B

Produit / Erzeugnisform / Product: 4404 IMA HOT ROLLED BAR ROUND SOLUTION ANNEALED — 6

Client et/ou destinataire - Besteller und/oder Empfaenger - Purchaser and/or Consignee: DAMSTAHL A.S — 9

N. de commande client - Kundenbestellnummer - Purchaser order number: 327.606 — 10

Nuance et spécifications techniques - Stahlsorte und Pruefbedingungen - Quality and Specifications: UGIMA 4404 / DIN 17440 VON 09/96 — AD-2000 W2 WNR 1.4404 — 12

Etat de livraison - Lieferzustand - As delivered (1): SOFTENED COND. AC.TO EN10088-3 — 13

Traitement de Référence - Probestreifenbehandlung - Treatment of test samples (1) — 14

Identification du produit Erzeugnis Benennung-Product identification N. de cde usine Werksbestellnummer Works order number 15	N. de poste Post Nr Item No 17	N. de Coulée Schmelz Nr Heat No 18	Nombre Stueckzahl Pieces Nbr 19	Profil Profile Shape 20	Dimension Ausmessung Dimension 21	Longueur Laenge Length 22	Masse Gewicht Weight
6ZV11	000	246056	23	ROUND	35,000		986 KG

N. de Prélèvement Probenummer Test N. 39 B	Demandé/Vorschrift Required	Sens Richtung Direction (3) 24	Température d'essai Pruefstemperatur Test Temperature 25	Traction - Zugversuch - Tensile test: Limite d'Elasticité Streckgrenze Yield Strength 0,2 % 28 A	1 % 28 B	Résistance à la traction Zugfestigkeit Tensile strength 27	Allongement Bruchdehnung Elongation (L0 = 5d0) 28	Striction Einschnürung Red of Area 29	Dureté Haerte Hardness (4) 30	Résilience - Kerbschlagzaehigkeit - Notch Toughness: Type Form Type 31	Sens Richtung Direction (3) 32	Température d'essai Pruefstemperatur Test Temperature 33	Valeurs individuelles Einzelwerte Individual Values 35	Moyenne Mittelwerte Average 36	Dureté Haerte Hardness (5) 37
		L	RT	MPA	MPA	MPA	%			ISOV	L	°C	J		HB
	Min			190	225	490	40					20	85,0		
0130	Max					690									
	(4)														
	(5)			296	342	581	56								172
				292	338	576	56								

MIN = 160
MIT = 220
MAX = 280

N. de Prélèvement Probenummer Test N. 39 A	Demandé Vorschrift Required 40	Analyse/Produit-Stueck-analyse-Check Analysis 41	C 42	SI 43	MN 44	NI 45	CR 46	MO 47	N 48	CU 49	AL 50
	Min					10,00	16,50	2,00			
	Max		0,030	1,00	2,00	13,00	18,50	2,50	0,110		
N. de Coulée Schmelz Nr Heat N. 246056			0,015	0,51	1,30	11,06	16,58	2,03	0,024	0,49	0,002

Mode d'élaboration Erschmelzungsart Melting process 38	Demandé Vorschrift Required 51	52	53	54	55
Electrique Elektrisch Electric	Min	S	P		
	Max	0,030	0,045		
		0,024	0,030		

EN 4404 ,10272/4404
ADWO+TRD100:ZUSTIMMUNGSSCHREIBEN DES TUEV SUEDWEST LIEGT VOR.
AUF GEGENZEICHNUNG WIRD VERZICHTET
INTERKRISTALLINE KORROSION BESTAENDIG NACH DIN 50914 § 9.1/IDENTIT. GEPRUEFT
INNERE FEHLERFREIHEIT DURCH PROZESS-KONTROLLE GARANTIERT
ADWO + TRD100 : APPROVAL BY TUEV SUEDWEST
INTERCRYSTAL. CORROSION RESISTANT ACC. TO EURONORM 114 / ANTIMIXING TESTED

10 Clamp 33,6

0001014051 — 56

(3) L = Long / Laenge - Long / T = Travers / Quer-Transverse

(1) TE = Trempé à l'eau - Wasserhaerten - Waterquench / TH = Trempé à l'huile - Oilharten - Oil Quench / A = Hypertrempé - Loesungsgegluecht - Solution annealed / R = Revenu - Anlassen - Tempered / RT = Recuit - Gegluecht - Annealed / TRM = Recuit mixi - Weichgegluecht - Mixi annealed — 7

Ugine, le 28-11-02
L'Agent Réceptionnaire de l'usine / Der Werksachverstaendige / The Work inspector
C. Bioteau — 63

(4) A l'état de référence / Zum Bezug Zustand / At reference condition 60 A

(5) A l'état de livraison / In Lieferzustand / In state of delivery 60 B

Controles de marquage, d'aspect et de dimensions: satisfaisants / Bezeichnung, Besichtigung und Ausmessung : ohne Beanstandung / Marking, inspection and measurement : without objection — 62

Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten Erzeugnisse den Bestellungsvorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions — 66

Schl Ø 33,7

UGINE & ALZ
ARCELOR GROUP

UGINE & ALZ Belgium NV
Maatschappelijke zetel
Gent-Zuid : Zone 8A, Swinnenwijerweg 5, B 9800 Gent
Tel. (089) 30 21 11 - Telefax (089) 30 23 80
Telex 36058 aldozg b
H.R. Tongeren nr 41.051 - B.T.W. nr BE 401.277.914

Certificate of test – Mill certificate
Certificat de Réception C.C.P.U.
Abnahmeprüfzeugnis B
nach EN 10204/3.1.B

No 2004.0094068
Nr 1/1

Approved as supplier according to AD2000-WO - TRD 100 statement W E 003 certified acc. PED (97/23/EC) by TÜV, NB 0035

PROD.PROCES: Electric Arc Furnace - VOD/ADD - Continuous Casting.
PROC. FABRIC.: Four à Arc - VOD/ADD - Coulée Continue
FERTIGUNGSABL.: Elektro-Lichtbogen Ofen - VOD/ADD - Strangguss.

U & A. SURVEYOR'S MARK
CACHET DE L'EXPERT
STEMPEL DES WERKSSACHVERSTÄNDIGEN

Der TÜV Rheinland hat mit Schreiben vom 21. März 1972 auf die Gegenzeichnung verzichtet

your order n° - votre n° de cde - Bestell.Nr	our order n° - notre n° de cde - Werksnr
350.395 - 04AU350	4UA429353/10 08256/429/10

STAINLESS STEEL, SHEETS, COLD ROLLED, FINISH 2 B

heat n°-n° coulée Schmelze Nr: E 417110
coil n°-n° bobine Band Nr: 41711039

Specifications - Spécifications - Vorschriften	Type - Nuance - Quality	Finish	Corrosion test - Corr. inter - Interkrist.Korr.
DIN 17441-02/97	WNR 1.4404	IIIC	DIN EN ISO 3651-2 :OK
EN 10028-7/2000	WNR 1.4404	2B	EN ISO 3651/2 :OK
ASTM A240/A240M-04AE1	TYPE 316L - S 31603	2B	ASTM A262 E - 02A :OK
EN 10088-2:1995	WNR 1.4404	2B	EURONORM 114 :OK

dimensions - Abmessungen
mm 3.00 1000.00 2000.0
inches

Material (Code Designation) Matière Werkstoff (Nummer.): X2 CRNIMO 17-12-2

Quenching Hypertrempe Abschreckung: DIN 17441, 1050°c, forced air / air poussé / bewegter Luft

Particular requirem. - Prescr. particul. - Sonstervorschriften :
TRB 100 -- AD 2000 W2/01-2000 -- AD 2000 W10/05-2000
ACC. TO BS EN 10259

CHEMICAL ANALYSIS
COMPOSITION CHIMIQUE
CHEMISCHE ZUSAMMENSETZUNG

ELEMENTS	LADLE ACIERIE SCHMELZE	PRODUCT PRODUIT STUCKANAL.
C	0.020	0.019
Mn	1.16	1.16
P	0.030	0.030
S	0.003	0.003
Si	0.45	0.46
Cr	16.85	16.87
Ni	10.10	10.13
Mo	2.06	2.07
Cu		
Ti		
Co		
N	0.035	0.035
Al		
α- ferrite		
δ- ferrite		

MECHANICAL PROPERTIES - PROPRIETES MEC. - MECH. WERTE

TENSILE TEST ESSAI DE TRACTION ZUG VERSUCH EN 10002	ROOM TEMP. - TEMP. AMB. - RAUMTEMP. REQ.-EXIGÉ ANFORDERUNG N/MM2 min.	max.	OBTAINED - OBTENU - ERGEBNISSE TEST N° - N° TEST - PROBE 41711039 A (T) E		TEMP. °C REQ.-EXIGÉ ANFORDER. min.	OBTAIN.-OBTENU ERGEBNISSE
Section-Q.Schnitt mm²			12.44X 2.95			
yield 0.2% limite él. 1.0% Str.grenze	240		295	293		
	270		325	320		
tensile strength rupture Zugfestigkeit	530	680	598	593		
elong. % A5 allong. Br.Dehn. A50	40		52	52		
			51	51		
E 0.2 /R max %			49	49		
hardness dureté Härte H V	1		171.6	165.9		

grain size astm / grain astm / Korngrösse:

bend / pliage / Biegeversuch: 180° OK

Impact strength test / essai de résilience / Kerbschlagbiegeversuch:

TESTS TO VERIFY BATCH AND QUALITY HAVE BEEN CARRIED OUT / TESTS DE VERIFICATION DE LA CONFORMITE DE LA NUANCE FOURNIE / VERWECHSLUNGSPRÜFUNG WURDE DURCHGEFÜHRT: OK

VISUAL INSPECTION AND DIMENSIONAL CHECK / EXAMEN VISUEL ET DIMENSIONEL DE SURFACE / BESICHTIGUNGEN UND ABMESSUNGEN: GOOD WORKMANSHIP, PERMISSIBLE VARIATIONS IN DIMENSIONS OK

QUANTITY / WEIGHT MEMO / QUANTITÉ MÉMO POIDS LIVRÉ / ÜBERSICHT GELIEFERTER GEWICHTE (KG)

PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.	PACKAGE Nr N° DE CAISSE PAKET NR	QTY. QTÉ. ANZ.	NET WEIGHT POIDS NET NETTO GEW.
40460447	29	1358			
40460455	29	1366			
40460463	29	1362			
40460489	29	1360			
40460497	29	1362			
TOTAL/GESAMT:	QTY. QTÉ. ANZ. 145		NET WEIGHT POIDS NET NETTO GEW.		6808 KG

The delivery is in accordance with the order.
La fourniture est conforme aux exigences de la commande.
Die Lieferung entspricht den Bestellbedingungen.

DAMSTAHL A/S
DANMARKSVEJ 28
8660 SKANDERBORG
DENMARK

0001041510

PACKING LIST 427523 - DK - 0415840

EQC538 11/02/2004

UGINE & ALZ Belgium NV
THE SURVEYOR - L'EXPERT - DER WERKSSACHVERSTÄNDIGE

Gent the le den 02.08.2004

J. VANTRAPPEN

15

3mm Baffel p.2

Ordrenr.: 516864 Arbejdsseddel: 648504 Kundenr.: 11460 Deres ref.: Tlf. + 18004

UGITECH
Groupe Arcelor

FRANCE

Certificate number 01/01 4PK91000 I

CERTIFICAT DE RECEPTION 3.1.B
ABNAHMEPRUEFZEUGNIS 3.1.B
INSPECTION CERTIFICATE 3.1.B

EN 10204.3/1.B

5 Usine Productrice / Hersteller / Manufacturer
UGINE
F 73403 UGINE CEDEX
Tél : 04.79.89.30.30
Fax : 04.79.89.30.51

Produit / Erzeugnisform / Product: IMA4404 HOT ROLLED BAR ROUND SOLUTION ANNEALED K13 — 6

Client et/ou destinataire - Besteller und/oder Empfaenger - Purchaser and/or Consignee 9: DAMSTAHL A.S

N. de commande client - Kundebestellnummer - Purchaser order number 10: 349.988

Nuance et spécifications techniques - Stahlsorte und Pruefbedingungen - Quality and Specifications 12:
UGIMA 4404 AD 2000 W2 1.4404
EN 10272/2000 PED 97/23

Etat de livraison - Lieferzustand - As delivered (1) 13: SOFTENED COND. AC.TO EN10088-3

Traitement de Référence - Probestreifenbehandlung - Treatment of test samples (1) 14:

Identification du produit / Erzeugnis Benennung-Product identification N. de cde usine / Werksbestellnummer / Works order number 15	N. de poste / Post Nr / Item No 17	N. de Coulée / Schmelz Nr / Heat No 16	Nombre / Stueckzahl / Pieces Nbr 18	Profil / Profile / Shape 19	Dimension / Ausmessung / Dimension 20	Longueur / Laenge / Length 21	Masse / Gewicht / Weight 22
4PK91 000		423049	21	ROUND	65,000		2998 KG

N. de Prélèvement / Probenummer / Test N. 39 B	Demande-Vorschrift-Required	Sens / Richtung / Direction (3) 24	Température d'essai / Pruefemperatur / Test Temperature 25	Traction - Zugversuch - Tensile test: Limite d'Elasticité / Streckgrenze / Yield Strength 0,2 % 26 A	1 % 26 B	Résistance à la traction / Zugfestigkeit / Tensile strength 27	Allongement / Bruchdehnung / Elongation (L0 = 5d0) 28	Striction / Einschnürung / Red of Area 29	Dureté / Haerte / Hardness (4) 30	Type / Form / Type 31	Sens / Richtung / Direction (3) 32	Température d'essai / Pruefemperatur / Test Temperature 33	Résilience - Kerbschlagzaehigkeit - Notch Toughness: Valeurs individuelles / Einzelwerte / Individual Values 35	Moyenne / Mittelwerte / Average 36	Dureté / Haerte / Hardness (5) 37
		L	RT	MPA	MPA	MPA	%	%		ISOV	L	C	J		HB
	Min			200		500	40					20		100,0	
0140	Max					700									
	(4)														
	(5)			294	330	538	60	76					226-235-240		158
				298	338	552	60	75					245-234-235		

N. de Prélèvement / Probenummer / Test N. 39 A	Demande / Vorschrift / Required	Analyse/Produit-Check Analysis	C 42	SI 43	MN 44	NI 45	CR 46	MO 47	N 48	CU 49	AL 50
	Min					10,00	16,50	2,00			
	Max		0,030	1,00	2,00	13,00	18,50	2,50	0,110		
N. de Coulée / Schmelz Nr / Heat N.			0,020	0,52	1,27	11,04	16,73	2,02	0,025	0,48	0,002
423049											

Mode d'élaboration / Erschmelzungsart / Melting process	Demande / Vorschrift / Required	S 51	P 52	53	54	55				
Electrique / Elektrisch / Electric	Min									
	Max	0,030	0,045							
		0,024	0,031							

EN 4404 .10272/4404.NACEMR0175.316L/316
HRC:<22
ADWO+TRD100:ZUSTIMMUNGSSCHREIBEN DES TUEV SUEDWEST LIEGT VOR.
AUF GEGENZEICHNUNG WIRD VERZICHTET
INTERKRISTALLINE KORROSION BESTAENDIG NACH DIN 50914 § 9.1/IDENTIT. GEPRUEFT
INNERE FEHLERFREIHEIT DURCH PROZESS-KONTROLLE GARANTIERT
ADWO + TRD100 : APPROVAL BY TUEV SUEDWEST
INTERCRYSTAL. CORROSION RESISTANT ACC. TO EURONORM 114 / ANTIMIXING TESTED

27 28

0001040127

64 x 51 x 2 CLAMPS

56

(3) L = Long / Laengs - Long / T = Travers / Quer-Transverse — 58

(1) TE = Trempé à l'eau - Wasserhaerten - Waterquench; TH = Trempé à l'huile - Olharten - Oil Quench; A = Hypertrempé - Losungsgegluecht - Solution annealed; R = Revenu - Anlassen - Tempered; RT = Recuit - Gegluecht - Annealed; TRM = Recuit maxi - Weichgegluecht - Maxi annealed — 7

Ugine, le 24-06-04
L'Agent Réceptionnaire de l'usine / Der Werkssachverstaendige / The Work Inspector
C. Bioteau 63

(5) A l'état de référence / Zum Bezug Zustand / At reference condition 60 A

(5) A l'état de livraison / In Lieferzustand / In state of delivery 60 B

Contrôles de marquage, d'aspect et de dimensions: satisfaisants / Bezeichnung, Besichtigung und Ausmessung : ohne Beanstandung / Marking, inspection and measurement : without objection 62

Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande / Wir bestatigen hiermit dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions 66

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.

Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

EN 10204 , 3.1.B

Cliente / Besteller/Purchaser/Client
INOX STAAL HANDELSSELSKAB A/S
BOELETVEJ 7 - P.O.BOX 70
-8680 - RY (DENMARK) - DK

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Item/Usine productrice

Oggetto Prove: - Annealed Peeled
Prüfgegenstand/Item Inspected/Finissage

Avviso di Spedizione: D-VI04010053
Lieferanzeige/Packing list/B.L.

Ordine nr: 113.402
Bestell/Your order/Commande

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d'élaboration

Certificato nr: MEST094938/2004/
Prüfung/Test/Essai

Conferma ordine nr: EI04001200
Werks/Our Order/Ref nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'essayeur

MR

Specifiche:
Anforderungen / Requirements / Exigences
EN 10088-3 95 1.4404 A 0 EN 10272 2000 1.4404 A 0 0

Qualità: 1.4404 MAXIVAL
Werkstoff/Quality/Nuance

Marca: MVAPML
Markenbezeichnung/Brand/Nuance

Punzonatura: 1.4404
Kennzeichnung/Marking/Marquage

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - mm Abmessungen Dimension Dimension	Tolleranza Toleranz. Allowance Tolerance	Lunghezza -mm Länge Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - KG Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0030	Round	85,000	K12-MIN	4900 / 4900	237264	4	889,0	328602270

Sono state soddisfatte tutte le condizioni richieste
Die gestellten Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel à été trouvé conforme aux exigences

Controllo antimescolanza: OK
Verwechslungsprüfung: spektralanalytisch durchgeführt
Antimixing testing performed: OK
Contrôle antimélange fait: r.s.a.

Controllo visivo e dimensionale: soddisfa le esigenze:
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks satisfactory
Contrôle visuel et dimensions: satisfaisant

TEST	Provetta/Probestück Specimen/Eprouvette Larg./Diam. Breite Width/ Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Position Location Emplacement 1)	Snervamento Grenze Yield Stress Limite élastique Rp 0,2% N/mm2	Snervamento Grenze Yield Stress Limite élastique Rp 1% N/mm2	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement A5 %		Strizione Einschnürung Reduction of area Striction Z %		Resilienza Kerbschlagarbeit Impact Value Resilience KV J °C			Durezza Härte Hardness Dureté HB		
Valori richiesti 1 Anforderungen/Required values Valeurs demandées		min max		200	235	500 700	40	-	-	-	100			- 215		
A	10	20	L	300	331	614	57		69		238	237	234	180		

1)L=longitudinale/längs, Q=trasversale/quer, T=Tangenziale/tangential

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata: Sonmelze/Heat/ Coulée	- min 0,030 max	- 1,00	- 2,00	16,50 18,50	2,00 2,50	10,00 13,00	- 0,045	- 0,030	- 0,110						
	C %	Si %	Mn %	Cr %	Mo %	Ni %	P %	S %	N %						
237264	0,015	0,69	1,52	16,72	2,04	10,00	0,027	0,029	0,069						

I.Korrosion nach EN ISO 3651-2A Sensibilisierung : T1 : OK
Corrosion test per EN ISO 3651-2A sensitized T1 : OK

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1,a.,4.3 by TUEV and LLOYD'S

24

Vicenza,07/04/04
Mod./VCQ006

Il collaudatore di stabilimento / der Werkssachverständige / Works inspector / L'agent d'usine
M.Rizzotto

3012

ZIMMERLIN GMBH
EDELSTAHLTECHNIK
Frohmattenstr. 19, 79268 Bötzingen

Werkstoffnachweisliste

für Druckbehälter-Teil - Druckdomdeckel

DRUCKDOMDECKEL NW 450

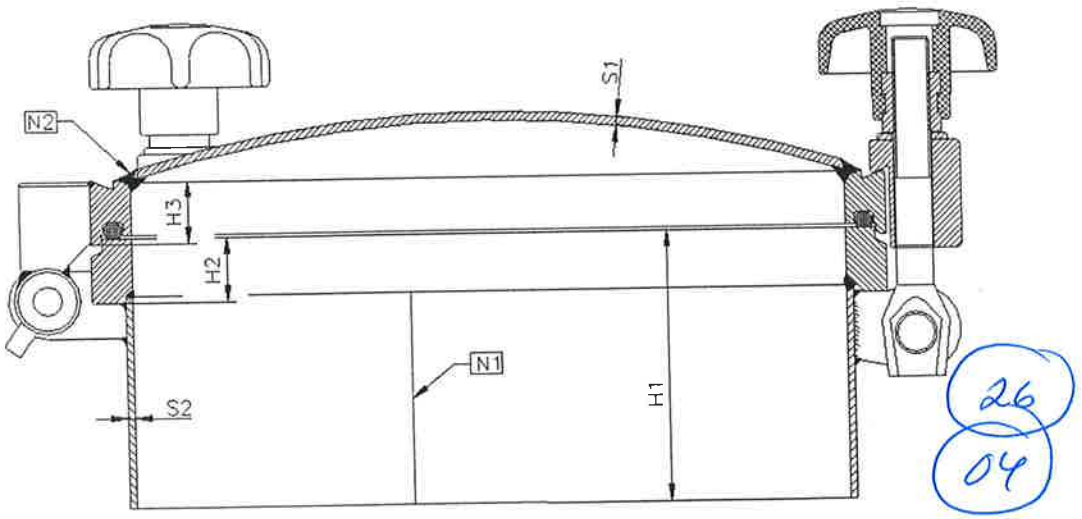
Fert.Kontr.Nr. D1104 48807
Zeichnungsnummer 200 000 00

Best.Nr. 136432

PS (Druck) +3/-1 bar
TS (Temperatur) +150 °C
Werkstoff 1.4404
Anzahl Schrauben (x) 6 Stück

P.	Teilebenennung	Werkst.Nr.	Abmessung	Hersteller	Kenn.	Schmelze	APZ
1	Deckelflansch	1.4404 316 L	40x20 mm	Einsal	225	428052	3.1 B AD W 2
2	gewölbte Scheibe	1.4404 316 L	5 mm	Outokumpu		41587	3.1 B AD W 2
3	Kragenflansch	1.4404 316 L	30x20 mm	Einsal	225	428052	3.1 B AD W 2
4	Kragenblech	1.4404 316 L	5 mm	Avesta	CCK	20334	3.1 B AD W 2
5	Klappschrauben M16 A4-70	1.4401 316	M16x135	Tigges		167842	3.1 B AD W2
6	Bolzen für Pos.5	1.4301 304 L	16 mm	Cogne		472344	3.1 B AD W 2
7	Griffmutter	1.4301 304	25 mm	Krupp		167870	3.1 B AD w 2
8	Laschen für Pos.5	1.4301 304	6 mm	Einsal	DBG	833095	3.1 B AD W 2
9	Spannbuchse	1.4301 304 L	40 mm	Olarra		816546	3.1B AD W 2
10	TC-Stutzen (Beistellung)	1.4404 316 L	NW 150	Schoeller-		32550	3.1 B

S1 : 5 mm S2 : 5 mm H1 : 150 mm H2 : 27 mm H3 : 37 mm



26
04

schematische Darstellung

Werkstoff-Bestätigung für Kleinteile
Es wird hiermit bestätigt, daß für Kleinteile, die nicht im obenstehenden Verzeichnis angeführt sind die in der Zeichnung bzw. Stückliste angegebenen Werkstoffe verwendet wurden.
Werkstoffnachweise liegen bei uns vor.

TÜV Industrie Service GmbH Benannte 0036 Stelle TÜV SÜD Gruppe

Die nach AD-Merkblatt HP 5/2 erforderlichen Arbeitsprüfungen wurden durchgeführt.
Die nach AD-Merkblatt HP 5/3 erforderlichen zerstörungsfreien Prüfungen wurden durchgeführt.

Bötzingen, den 02.12.2004

Sachbearbeiter

i.A.

Werksachverständiger

Zimmerlin GmbH
Edelstahl-Technik
Daniel Thoma
Dipl. Ing. (FH) SEL

Prüf-Nummer: D1104 48807

Prüflabor der TÜV Industrie Service GmbH TÜV SÜD Gruppe
Benannte Stelle Nummer 0036 für Druckgeräte

Prüfbericht über eine Teilbauprüfung nach Anhang I Nr. 3.2 der EG-Richtlinie 97 / 23

Auftraggeber:	**zimmerlin GmbH** **EDELSTAHL-TECHNIK** **Frohmattenstr. 19** **D-79268 Bötzingen**	Auftragsnummer: Prüf-Nummer:	--- **D1104 48807**
Objektart:	---	Fertigungsstätte:	**Bötzingen**
Zertifikat-Nr.:	---	Ausgestellt am:	**2004-12-02**

Prüfgrundlage: Richtlinie 97 / 23 / EWG für Druckgeräte, Modul / Artikel: G
Angewandte technische Regel: **AD-2000 Merkblätter in der zur Zeit gültigen Fassung**

Kennzeichnung des Bauteils:
Kennzeichnung **auf Tellerboden/Flansch**

- Angabe zur Identifikation des Herstellers: **HZ**
- Herstellungsjahr: **2004**
- Fabrikationsnummer: **D1104 48807**
- Verwendungszweck: **Verschluss NW 450**

Weitere Identifikationsdaten:

Raumbezeichnung:	1	2	3
Max./min. zulässiger Druck PS (bar):	**+3/-1**	**+**	
Max./min. zulässige Temperatur TS (°C):	**+150**	**+**	

Entwurfsprüfung am: **15.05.2001**
durch: TÜV Süddeutschland Bau und Betrieb GmbH, D-68167 Mannheim Modul: G
Zeichnungs- Nummer: **200 000 00**
Die Dokumente liegen vor und sind weiterhin gültig.

Teilbauprüfung nach Anhang I Nr. 3.2.1 der Druckgeräterichtlinie am: **2004-12-02** durch das Prüflabor der TÜV Industrie Service GmbH TÜV SÜD Gruppe, Mooswaldallee 1, D-79108 Freiburg

Durchgeführte Messungen und Untersuchungen sowie daraus abgeleitete Ergebnisse:

- Aus den Kalibrierbescheinigungen geht hervor, daß die bei den Prüfungen verwendeten Messmittel kalibriert sind.
- Die Werkstoffzeugnisse der drucktragenden Hauptbauteile haben vorgelegen und entsprechen den Anforderungen.
- Die Nachweise über die erforderlichen Qualifikationen des eingesetzten Fügepersonals und ZfP-Personals liegen vor und sind weiterhin gültig.
- Die Nachweise über die erforderliche Qualifikation der Arbeitsverfahren liegen vor und sind weiterhin gültig.
- Besichtigung und Maßkontrolle wurde stichprobenweise durchgeführt als: Besichtigung der Hauptnähte (Längs- und Rundnähte) und Maßkontrolle durch Hersteller. Die Prüfungen wurden ohne Beanstandungen durchgeführt.
- Eingeführte Verfahren zur Sicherstellung der Rückverfolgbarkeit werden im Zuge von Prüfungen laufend überprüft. Es ergaben sich keine Beanstandungen.

: 1 Auftrag : 02.04.44486 Teilebennenung : Deckelflansch

5530 SC
10104

WALZWERKE EINSAL GMBH

USt-IdNr. DE 123 841 325
Walzwerke Einsal GmbH · Postfach 20 · 58766 Nachrodt (Westf.)

Zimmerlin GmbH
Edelstahl-Technik
Frohmattenstr. 19

D 79268 Bötzingen

Besteller Customer / Acheteur

Abnahmeprüfzeugnis 3.1.B nach DIN EN 10204

Seite: 1

Nr. (No.) (No.)	24103 0050	vom (of) (du)	11.10.2004
Bestell-Nr. Your Order-No. No. de Commande	04.04.07303		
Herstellerzeichen Symbol of Manufacturers Sigle de L'usine	EW	Zeichen des Werkssachverständigen Inspectors Stamp Poincon de l'expert	WEE

Auftrags-Nr. our works No. No. Ref	Pos. Item	Abmessung mm Size Dimension	Brutto - Gewicht - Netto weigt poids kg/lbs	kg/lbs	Anzahl Quantity Nombre
125739 0020		Flach 40 x 20 mm 14404 (225)	2037	2037	2

Werkstoff-Nr. Material-No. No. de matière	Werkstoff-Normbezeichnung Standard Grade of Material Norme de matière
1.4404	X 2 CR NI MO 17-12-2

Chemische Zusammensetzung % Chargen-Nr.: 428052 E

C	0,0290	SI	0,5400	MN	1,3100	P	0,0280	S	0,0260	CR	16,8700
										NI	11,0700
V		W		MO	2,0100	TI	0,0020	PB		CO	0,1520
										N	0,0270
AL		CU	0,5100	NB	0,0100						

Mechanische Werte:

Probe Nr.:	838 /	839 /	840 /	841 /	/
Streckgrenze Rp0,2 N/mm2 / psi	286	294	282	299	41470
1% Dehngrenze Rp1,0 N/mm2 / psi	328	336	324	340	
Zugfestigkeit Rm N/mm2 / psi	587	590	584	594	85115
Dehnung A5% / A50%	57,4 /	57,1 /	57,6 /	57,2 /	64,0 /
Einschnürung Z	/	/	/	/	62,0 /

Kerbschlagarbeit [J]

ISO-V	Längs	-60°C
154	160	161
155	162	156
154	152	160
152	155	148

Härte

168 HB

Wärmebehandlung

Von 1050 Grad C abgeschreckt

Verwechselungsprüfung:
Ohne Beanstandung

Maßkontrolle:
Ohne Beanstandung
Besichtigung:
Ohne Beanstandung

Oberflächenbeschaffenheit
nach DIN 17440 Tabelle 8 /c2

Nach DIN EN ISO 3651-2 ist der Werkstoff interkristallin beständig
according DIN EN ISO 3651-2 material is resistent against intercryst. corrosion
selon DIN EN ISO 3651-2 le matériau est résistant à la corrosion intercristalline

X im Lieferzustand in the delivered cond. en état livraison

○ im sensibilisierten Zustand in the sensitized condition en état sensibilisé

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht.
The delivery corresponds to the requirements mentioned.
La livraison correspond aux exigences mentionnées.
Das Zeugnis wurde maschinell erstellt und ist gemäß

Anlagen

Walzwerke Einsal GmbH
Qualitätsstelle
Feldmann

'''ALZWERKE
EINSAL GMBH

USTIdNr.: DE 123 841 325
Walzwerke Einsal GmbH · Postfach 20 · 58766 Nachrodt (Westf.)

Zimmerlin GmbH
Edelstahl-Technik
Frohmattenstr. 19

D 79268 Bötzingen

Besteller Customer / Acheteur

Abnahmeprüfzeugnis 3.1.B nach DIN EN 10204

Nr. (No.) (No.) 24103 0050 vom (of) (du) 11.10.2004

Bestell-Nr. Your Order-No. No. de Commande 04.04.07303

Herstellerzeichen Symbol of Manufacturers Sigle de L'usine: E W

Zeichen des Werkssachverständigen Inspectors Stamp Poincon de l'expert: WEE

Auftrags-Nr. our works No. No.-Ref.	Pos. Item	Abmessung mm Size Dimension	Brutto - Gewicht - Netto weigt poids kg/lbs	kg/lbs	Anzahl Quantity Nombre
125739 0020		Flach 40 x 20 mm 14404	2037	2037	2

Werkstoff-Nr. Material-No. No. de matière	Werkstoff-Normbezeichnung Standard Grade of Material Norme de matière
1.4404	X 2 CR NI MO 17-12-2

14404 X 2 CR NI MO 17-12-2
Stabstahl warmgewalzt
DIN 1017
abgeschreckt
gebeizt
gerichtet
Unterlängen ab 1 m <10%
Stempelung: WNR/EW/CHNR/WEE
mit rostfreiem Verpackungsband
Zeugnis DIN EN 10204/3.1.B EN 10272 AD2000W2

6.000-6.250
WAZ:ASME_SA_479/316L
sowie_nach_AD-W10.TRB100_und
Kerbschlagprobe_bei_-60_Grad

Nach DIN EN ISO 3651-2 ist der Werkstoff interkristallin beständig
according DIN EN ISO 3651-2 material is resistent against intercryst. corrosion
selon DIN EN ISO 3651-2 le matériau est résistant à la corrosion intercristalline

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht.
The delivery corresponds to the requirements mentioned.
La livraison correspond aux exigences mentionnées.
Das Zeugnis wurde maschinell erstellt und ist gemäß

○ im Lieferzustand in the delivered cond. en état livraison
○ im sensibilisierten Zustand in the sensitized condition en état sensibilisé

Anlagen

Walzwerke Einsal GmbH
Qualitätsstelle

WALZWERKE
EINSAL GMBH

USt-IdNr.: DE 123 841 325
Walzwerke Einsal GmbH · Postfach 20 · 58766 Nachrodt (Westf.)

5529

10/04

Abnahmeprüfzeugnis 3.1.B nach DIN EN 10204

Seite: 1

Zimmerlin GmbH
Edelstahl-Technik
Frohmattenstr. 19

D 79268 Bötzingen

Nr. (No.) (No.)	24103 0040	vom (of) (du)	11.10.2004
Bestell-Nr. Your Order-No. No. de Commande	04.04.07303		
Herstellerzeichen Symbol of Manufacturers Sigle de L'usine	E W	Zeichen des Werkssachverständigen Inspectors Stamp Poincon de l'expert	WEE

Besteller · Customer / Acheteur

Auftrags-Nr. our works No No.-Ref.	Pos. Item	Abmessung mm Size Dimension	Brutto - Gewicht - Netto weigt poids kg/lbs	kg/lbs	Anzahl Quantity Nombre
125739 0010		Flach 30 x 20 mm 14404	2095	2095	2

225

Werkstoff-Nr. Material-No. No. de matière: 1.4404

Werkstoff-Normbezeichnung Standard Grade of Material Norme de matière: X 2 CR NI MO 17-12-2

Chemische Zusammensetzung % Chargen-Nr.: 428052 E

C	0,0290	SI	0,5400	MN	1,3100	P	0,0280	S	0,0260	CR	16,8700
NI	11,0700	V		W		MO	2,0100	TI	0,0020	PB	
CO	0,1520	N	0,0270	AL		CU	0,5100	NB	0,0100		

Mechanische Werte:

	Probe Nr.: 834	835	836	837	
Streckgrenze Rp0,2 N/mm2 / psi	286	294	296	293	42630
1% Dehngrenze Rp1,0 N/mm2 / psi	327	336	339	333	
Zugfestigkeit Rm N/mm2 / psi	587	591	594	590	85695
Dehnung A5% / A50%	57,6 /	57,4 /	57,6 /	57,2 /	68,0 /
Einschnürung Z	/	/	/	/	67,0 /

Kerbschlagarbeit [J] Härte

ISO-V	Längs	-60°C	
154	156	160	167 HB
166	167	160	
164	161	164	
167	165	162	

Wärmebehandlung

Von 1050 Grad C abgeschreckt

Verwechselungsprüfung:
Ohne Beanstandung

Maßkontrolle:
Ohne Beanstandung
Besichtigung:
Ohne Beanstandung

Oberflächenbeschaffenheit
nach DIN 17440 Tabelle 8 /c2

Nach DIN EN ISO 3651-2 ist der Werkstoff interkristallin beständig
according DIN EN ISO 3651-2 material is resistent against intercryst. corrosion
selon DIN EN ISO 3651-2 le materiau est résistant à la corrosion intercristalline

X im Lieferzustand in the deliverad cond. en état livraison

○ im sensibilisierten Zustand in the sensitized condition en état sensibilisé

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht.
The delivery corresponds to the requirements mentioned.
La livraison correspond aux exigences mentionnées.

Walzwerke Einsal GmbH
Qualitätsstelle
Feldmann

. : 1 Auftrag : 02.04.44486 Teilebennenung : Kragenflansch

WALZWERKE EINSAL GMBH

UST-IdNr.: DE 123 841 325

Walzwerke Einsal GmbH · Postfach 20 · 58766 Nachrodt (Westf.)

Zimmerlin GmbH
Edelstahl-Technik
Frohmattenstr. 19

D 79268 Bötzingen

Abnahmeprüfzeugnis 3.1.B nach DIN EN 10204

Nr. (No.) (No.) 24103 0040 vom (of) (du) 11.10.2004

Bestell-Nr. Your Order-No. No. de Commande 04.04.07303

Herstellerzeichen Symbol of Manufacturers Sigle de L'usine: E W

Zeichen des Werkssachverständigen Inspectors Stamp Poincon de l'expert: WEE

Besteller / Customer / Acheteur

Auftrags-Nr. our works No. No.-Ref.	Pos. Item	Abmessung mm Size Dimension	Brutto - Gewicht - Netto weigt poids kg/lbs	kg/lbs	Anzahl Quantity Nombre
125739 0010		Flach 30 x 20 mm 14404	2095	2095	2

Werkstoff-Nr. Material-No. No. de matière 1.4404

Werkstoff-Normbezeichnung Standard Grade of Material Norme de matière: X 2 CR NI MO 17-12-2

14404 X 2 CR NI MO 17-12-2
Stabstahl warmgewalzt
DIN 1017
abgeschreckt
gebeizt
gerichtet
Unterlängen ab 1 m <10%
Stempelung: WNR/EW/CHNR/WEE
mit rostfreiem Verpackungsband
Zeugnis DIN EN 10204/3.1.B EN 10272 AD2000W2

6.000-6.250
WAZ:ASME_SA_479/316L
sowie_nach_AD-W10.TRB100_und
Kerbschlagprobe_bei_-60_Grad

Nach DIN EN ISO 3651-2 ist der Werkstoff interkristallin beständig
according DIN EN ISO 3651-2 material is resistent against intercryst. corrosion
selon DIN EN ISO 3651-2 le materiau est resistant a la corrosion intercristalline

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht.
The delivery corresponds to the requirements mentioned.
La livraison correspond aux exigences mentionnées.

○ im Lieferzustand in the delivered cond. en état livraison
○ im sensibilisierten Zustand in the sensitized condition en état sensibilisé

Walzwerke Einsal GmbH
Qualitätsstelle

Anlagen

1 Auftrag : 02.04.44486 Teilebennenung : Kragenblech

4126 03103 SC

AvestaPolarit STAINLESS

Certificate No. / Zeugnis Nr. / N° du certificat: 699114/001 — Page / Seite / Page: 1(01)

ABNAHMEPRUEFZEUGNIS 3.1.B
DIN EN 10204 3.1B + AD-2000 W2

Date / Datum / Date: 27.08.02

Delivery address, Empfänger, Lieu de livraison:

BESTELLER

Requirements, Anforderungen, Exigences:
AD 2000-MERKBL. W2 DIN 17441 02.97
ASTM A240-02 ASME 2001 II A SA-240
NFA 36209 MAI -90
AD 2000-MERKBLATT W 10

Our Order No. / Unser Auftrag Nr. / Notre commande n°: 19696

Your order, Ihre Bestellung:

020601

Product, Erzeugnisform, Produit: BLECHE AUS BAND , NICHTROSTEND

Mark of Manufacturer, Zeichen des Lieferwerkes, Signe de producteur:

Process, Erschmelzungsart, Mode de fusion: AOD

Inspector's stamp, Zeichen d. Sachverst., Poinçon de l'expert:

Grade, Werkstoff, Nuance: 1.4404 TYPE 316L Z3CND17-11-02

Tolerances, Toleranzen, Tolérances: DIN EN 10259: 1997

Marking, Kennzeichnung, Marquage: 1.4404 2B

Marks, Verbandzeichen, Marques: 102752 12.03.388

Line, Reihe, Ligne	Item, Position, Poste	Charge-/test No., Schmelze-/Probe Nr., Coulée n°	Size, Abmessungen, Dimensions	Quantity, Stückzahl, Nombre	Weight, Gewicht, Poids	Finish, Ausführung, Fini
1	7	17025 4	4,0 X 1500 X 3000 MM	28	3974 KG	2B

BBi

Charge no., Schmelze Nr., Coulée n° — Chemical composition, Chemische Zusammensetzung, Composition mecanique

Charge no.	C %	Si %	Mn %	P %	S %	Cr %	Ni %	MO %	N %			
17025	0,017	0,51	1,69	0,028	0,001	16,8	10,3	2,11	0,022			

Mechanical properties, Mechanische Eigenschaften, Caracteristiques mecaniques

Line, Reihe, Ligne	Location, Ort, Lieu	Rp0.2 N/mm²	Rp1.0 N/mm²	Rm N/mm²	A5 %	A50 %	%	Hardness, Härte, Dureté HB30
1	E	297	328	575	54	51		164
	A	294	325	564	56	53		163

ÜBERPRÜFT NACH AD 2000-W0/TRD100 DURCH TÜV NORD E.V. MIT VERZICHT AUF GEGENZEICHNUNG ZERTIFIZIERT NACH DRUCKGERÄTERICHTLINIE 97/23/EG DURCH DIE TÜV CERT-ZERTIFIZIERUNGSSTELLE FÜR DRUCKGERÄTE DER TÜV NORD GRUPPE; BENANNTE STELLE, KENN-NR. 0045

Identity test, Verwechslungsprüfung, Controle d'identification: O.B.
Size, Abmessungen, Dimensions: O.B.
Surface, Oberfläche, Surface
Test of intergran. corros., Prüfung auf interkrist. Korros., Test de corros. intercrist.: EN ISO 3651-2 (DIN 50914) GENUEGEND

A = Beginning / Anfang / Début
E = End / Ende / Fin

We certify that the above mentioned products comply with the terms of the order contract.
Wir bestätigen, dass die Lieferung den Vereinbarungen der Bestellannahme entspricht.
Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande.

This test certificate is made by controlled ADP-system and is valid without signature.
Dieses Zeugnis wurde von einem überprüften Datenverarbeitungssystem erstellt und ist ohne Unterschrift gültig.
Ce certificat a été établi par un système informatique contrôlé et est valide sans signature.

AvestaPolarit Stainless Oy

Authorized Inspector, Werksachverständiger, Inspecteur autorisé: JORMA RUKAJÄRVI

FIN-95400 Tornio, Finland
Tel. +358 16 4621, Fax +358 16 452350.
www.avestapolarit.com
Domicile: Tornio, Finland. Business Identity Code 0823315-9

1 Auftrag : 02.04.44486 Teilebennenung : gewölbte Scheibe

5537 10/04 Sc

OUTOKUMPU

Certificate No. / Zeugnis Nr. / N° du certificat: 972977/001
Page / Seite / Page: 1(01)
Date / Datum / Date: 12.07.04

ABNAHMEPRUEFZEUGNIS 3.1.B
DIN EN 10204 3.1B (AD 2000-W2)

Delivery address, Empfänger, Lieu de livraison
OUTOKUMPU PSC GERMANY GMBH

HANS-BOECKLER-STR. 36
DE-47877 WILLICH
BR DEUTSCHLAND

BESTELLER
OUTOKUMPU PSC GERMANY GMBH

HANS-BOECKLER-STR. 36
DE-47877 WILLICH
BR DEUTSCHLAND

Requirements, Anforderungen, Exigences
AD 2000-MERKBL. W2 DIN 17441 02.97
ASTM A240-04A
ASME 2001 PART A SEC. II SA-240 A02
AD 2000-MERKBL. W2 EN 10028-7
AD 2000-MERKBLATT W 10

Our Order No. / Unser Auftrag Nr. / Notre commande n°: 52537
Your order, Ihr:

079093

Product, Erzeugnisform, Produit: BAND , NICHTROSTEND

Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur: OUTOKUMPU

Process / Erschmelzungsart / Mode de fusion: AOD

Inspector's stamp / Zeichen d. Sachverst. / Poinçon de l'expert

Grade, Werkstoff, Nuance: 1.4404 TYPE 316L 1.4404

Tolerances Toleranzen, Tolérances: EN 10259

Marking, Kennzeichnung, Marquage: 1.4404 2B

Marks, Versandzeichen, Marques: 108672 CC

Line / Reihe / Ligne	Item / Position / Poste	Charge-test No. / Schmelze-Probe Nr. / Coulée n°	Size, Abmessungen, Dimensions	Quantity / Stückzahl / Nombre	Weight, Gewicht, Poids	Finish / Ausführung / Fini
1	1	41587 1	5,0 X 1500 MM		8770 KG	2B

Charge no. / Schmelze Nr. / Coulée n° — Chemical composition, Chemische Zusammensetzung, Composition mecanigues

	C %	Si %	Mn %	P %	S %	Cr %	Ni %	MO %	N %
41587	0,018	0,37	1,29	0,033	0,001	16,8	10,2	2,04	0,025

Mechanical properties, Mechanische Eigenschaften, Caracteristiques mecaniques

Line / Reihe / Ligne	Location / Ort / Lieu	Rp0.2 N/mm²	Rp1.0 N/mm²	Rm N/mm²	A5 %	A50 %	%	Hardness Härte,Dureté HB30
1	E	313	350	587	54	52		184
	A	310	349	587	54	52		184

ÜBERPRÜFT NACH AD 2000-W0/TRD100 DURCH TÜV NORD E.V. MIT VERZICHT AUF GEGENZEICHNUNG ZERTIFIZIERT NACH DRUCKGERÄTERICHTLINIE 97/23/EG DURCH DIE TÜV CERT-ZERTIFIZIERUNGSSTELLE FÜR DRUCKGERÄTE DER TÜV NORD GRUPPE; BENANNTE STELLE, KENN-NR. 0045

Identity test, Verwechslungsprüfung, Controle d'identification: O.B.
Sizes, Abmessungen, Dimensions: O.B.
Surface, Oberfläche, Surface: O.B.
Test of intergran. corros, Prüfung auf interkrist. Korros, Test de corros. intercrist.: DIN EN ISO 3651-2 : GENUEGEND

A = Beginning / Anfang / Début
E = End / Ende / Fin

NFA 36209 MAI -90/Z7CND17-11-02
WARMEBEHANDLUNG: 1070 C

We certify that the above mentioned products comply with the terms of the order contract.
Wir bestätigen, dass die Lieferung den Vereinbarungen der Bestellannahme entspricht.
Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande.

This test certificate is made by controlled ADP-system and is valid without signature.
Dieses Zeugnis wurde von einem überprüften Datenverarbeitungssystem erstellt und ist ohne Unterschrift gültig.
Ce certificat a été établi par un système informatique controlé et est valide sans signature.

Outokumpu Stainless Oy

Authorized inspector / Werksachverständiger / Inspecteur autorisé: TUOMAS KAUPPI

FIN-95400 Tornio, Finland
Tel. +358 16 4521, Fax +358 16 452350.

1449

SCHOELLER BLECKMANN EDELSTAHLROHR
SEAMLESS-STAINLESS
NAHTLOS ZUM ERFOLG

Zertifizierter Hersteller nach DGR 97/23/EG
Certified Manufacturer to PED 97/23/EC
von / by LRQA GmbH
Kennummer / Identification No.: 0525

Certificate No.: 692147

ABNAHMEPRÜFZEUGNIS B - INSPECTION CERTIFICATE B
CERTIFICAT DE RECEPTION PAR L'USINE 3.1.B C.C.P.U.
nach/according to OENORM/DIN EN 10 204-3.1.B

Schoeller-Bleckmann
Edelstahlrohr AG
Rohrstrasse 1
A-2630 Ternitz, Austria
Tel: +43 02630/316 469
Fax: +43 02630/316 683

417769

Zert./cert: C100114
Seite/Page: 1 /3
Datum/Date: 040318
e-mail: helga.harather@sber.co.at

Besteller/Purchaser/Commettant

Bestell-Nr./Purchaser's Order No/No. de commande: V. 42478 R/SB-D4 I

Auftrags-Nr./Works Order No/No. de commande d'usine: 0427323/ 1

Lieferschein/Delivery note/Avis d'expedition: 0427323/ 1 Date: 04-03-03

Erzeugnis/Product/Produit
HOHLSTAHL - HOLLOW BAR, SBS MARKE / GRADE A200S2,
1.4401-IM/1.4404-IM, TP316/TP316L,
AUSF. C2 = WARMGEFORMT, WÄRMEBEHANDELT, GEBEIZT,
FINISH C2 = HOT FINISHED,HEAT-TREATED,PICKLED,
LIEFERUNG NACH / TECHN. COND. ACC. SBER HOHLSTAHLPROGRAMM,
DIN 17458/07.85 PKL.1,
MECHANISCHE ANFORDERUNG IN ANL.ASTM A312/A312M-01A,
CORROSION TESTED TO DIN 50914/DIN EN ISO 3651-2 PRACT.A,
TOLERANZEN NACH / TOLERANCES ACC. SBER HOHLSTAHLPROGRAMM,
EINGEENGTE LÄNGE / RANDOM LENGTH 3000/ 7000 MM
GERADE ENDEN / PLAIN ENDS,

Lieferung/Deliv./Entrega:

Pos	Abmessung Dimensions Dimensione	Menge Quantity Poids	Gewicht Netweight Poids net	Stk Pcs Pcs	Schmelze Heat Coulee	Prüf-Nr Test-No No.Epr.
20	190,0 / 160,0 MM	780,00 KG	780,00 KG	2	032550	148297

Ergebnis der Prüfungen/Test Result/Resultat des essais:
Die gestellten Anforderungen sind erfüllt.
The material has been furnished in accordance to the requirements.
Le material a été trouvé conforme aux exigences.

Zeichen des Lieferwerks: SBS
Mark of Manufacturer:
Marques de l'usine:

Zeichen des Prüfers:
Symbol of inspector
Symbole de l'inspecteur:

SCHOELLER-BLECKMANN
EDELSTAHLROHR AG
FR. H. HARATHER
(DER WERKSSACHVERSTÄNDIGE)
(WORKS INSPECTOR/L'EXPERT DE USINE)

SCHOELLER BLECKMANN EDELSTAHLROHR
SEAMLESS-STAINLESS NAHTLOS ZUM ERFOLG

Certified Manufacturer acc. PED 97/23/EC
Certified Manufacturer to PED 97/23/EC
von / by LRQA GmbH
Kennnummer / Identification No.: 0525

ABNAHMEPRÜFZEUGNIS B - INSPECTION CERTIFICATE B
CERTIFICAT DE RECEPTION PAR L'USINE 3.1.B C.C.P.U.
nach/according to OENORM/DIN EN 10 204-3.1.B

Schoeller-Bleckmann
Edelstahlrohr AG
Rohrstrasse 1
A-2630 Ternitz, Austria
Tel: +43 02630/316 469
Fax: +43 02630/316 683

Zert./Cert: C100114
Seite/Page: 2 /3
Datum/Date: 040318
e-mail: helga.harather@sber.co.at

Chemische Zusammensetzung/Chemical Composition/Composition chimique (%)
Schmelze
Heat
coulee

C	SI	MN	P	S	CR	MO	NI	CO
032550 0,014	0,410	1,540	0,025	0,023	16,950	2,180	11,150	0,050

Mechanische Eigenschaften/Mechanical Properties/Charact. mecaniques

Prüf-Nr Test-No No.Epr.	Proben-Nr. Sample-no. sample-no.		TEMP °C	RP0.2 MPA	RP1.0 MPA	RM MPA	A5 %	AZ" %
		min		205	240	515	40	35
		max				690		
148297	1		20	288	348	585	53	57

Ergebnisse weiterer Prüfungen/Further test results/Résultat d'autre essais
RINGZUGVERSUCH: IN ORDNUNG
RING TENSILE TEST: SATISFACTORY
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND
DIN 50914/DIN EN ISO 3651-2 VERF.A: IN ORDNUNG
INTERGRANULAR CORROSION TEST ACCORDING TO
DIN 50914/DIN EN ISO 3651-2 PRACT.A: SATISFACTORY
WECHSLUNGSPRUEFUNG AN JEDEM ROHR
MIT "RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE
BY "X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
LÖSUNGSGEGLÜHT BEI / SOLUTION ANNEALED AT / HYPERTREMPE
1060°C (1940°F), 10 MINUTES, WASSER/WQ

WASSERDRUCKVERSUCH MIT 80 BAR: IN ORDNUNG
HYDROSTATIC TEST AT 80 BAR: SATISFACTORY
ESSAI HYDRAULIQUE 80 BAR: SATISFAISANT

BESICHTIGUNG UND NACHMESSUNG: IN ORDNUNG
INSPECTION AND CHECKING OF DIMENSIONS: SATISFACTORY

Ergebnis der Prüfungen/Test Result/Resultat des essais:
Die gestellten Anforderungen sind erfüllt.
The material has been furnished in accordance to the requirements.
Le material a été trouvé conforme aux exigences.

Zeichen des Lieferwerks: SBS
Brand of Manufacturer:
Marques de l'usine:

Zeichen des Prüfers:
Symbol of inspector
Symbole de l'inspecteur:

SCHOELLER-BLECKMANN EDELSTAHLROHR AG
FR. H. HARATHER
(DER WERKSSACHVERSTÄNDIGE)
(WORKS INSPECTOR/L'EXPERT DE USINE)

SCHOELLER
BLECKMANN
EDELSTAHLROHR
SEAMLESS·STAINLESS
NAHTLOS ZUM ERFOLG

Zertifizierter Hersteller nach DGR 97/23/EG
Certified Manufacturer to PED 97/23/EC
von / by LRQA GmbH
Kennnummer / Identification No.: 0525

Certificate No.: 831147

ABNAHMEPRÜFZEUGNIS B - INSPECTION CERTIFICATE B
CERTIFICAT DE RECEPTION PAR L'USINE 3.1.B C.C.P.U.
nach/according to ÖENORM/DIN EN 10 204-3.1.B

Schoeller-Bleckmann
Edelstahlrohr AG
Rohrstrasse 1
A-2630 Ternitz, Austria
Tel: +43 02630/316 469
Fax: +43 02630/316 683

Zert./cert: C100114

Seite/Page: 3 /3

Datum/Date: 040318

e-mail: helga.harather@sber.co.at

INSPECTION ET CONTROL DES DIMENSIONS: SATISFAISANT

KENNZEICHNUNG/MARKING/MARQUAGE: WERKSTOFF/MATERIAL/MATERIAUX
-ABMESSUNG/DIMENSION-SCHMELZE/HEAT NO./COULEE-PL NR./LOT NO.
SMLS/S-C2-PKL.1

ERSCHMELZUNGSART/STEELMAKING PROC./PROC.D'ACIERIATION:EF+AOD

Ergebnis der Prüfungen/Test Result/Resultat des essais:
Die gestellten Anforderungen sind erfüllt.
The material has been furnished in accordance to the requirements.
Le material a été trouvé conforme aux exigences.

Zeichen des Lieferwerks:
Brand of Manufacturer:
Marques de l'usine: SBS

Zeichen des Prüfers:
Symbol of Inspector
Symbole de l'inspecteur:

SCHOELLER-BLECKMANN
EDELSTAHLROHR AG

FR. H. HARATHER
(DER WERKSSACHVERSTÄNDIGE)
(WORKS INSPECTOR/L'EXPERT DE USINE)

NovAseptic

QC/RC No: N/A

06

Quality Control Release Certificate

This document certifies that the hereunder specified NovAseptic product has passed the QC Test Procedure by fulfilling the requirements set down in Approval document MB-003.

NA-Connect®		
Part No	NAC-538/25	
Marking on welding flange	Production ID	AA-26971
	Material code	316L 1.4435
	Heat No	16633
Marking on locking rings	Production ID	AA-27152
	Material code	316L 1.4404
	Heat No	490770

Nödinge

.....

NovAseptic AB Quality Assurance Department

BL-193-2

06

NovAseptic AB (publ)
Rödjans väg 7
SE-449 34 Nödinge, Sweden

Tel: +46 (0)303 - 975 20
Fax: +46 (0)303 - 960 79

info@novaseptic.se
www.novaseptic.com

Vat.no SE556460083001

Zeugnis-Nr. 178100
Certificate no.
No. de certificat

Bescheinigung über Werkstoffprüfung nach EN 10204 3.1.B
Certificate of material tests according to EN 10204
Certificat des essais des matériaux selon EN 10204

Die Lieferung entspricht den vereinbarten Lieferbedingungen.
The above mentioned material have been delivered in accordance with the terms of the order.
La livraison correspond aux conditions de livraison convenues.

BGH Edelstahl Freital GmbH, Postfach 10 15 66, D-01691 Freital

BGH Edelstahlwerke GmbH

Am Stahlwerk 1
01705 Freital
Deutschland

BGH
EDELSTAHL FREITAL

Kundon-Bestell-Nr. 07590700400
Customer order no.
Cde. no. du client

BGH-Auftrags-Nr. 075907-004
BGH works no.
BGH référence

Zeichen des Lieferwerkes
Trade mark
Signe du fournisseur

Stempel des Werkssachverständigen
Inspector's stamp
Poinçon de l'inspecteur

BGH Q404

Erzeugnisform Product	Stab, rund, geschält Round bars,peeled
Werkstoff / Quality	1.4435 X 2 CrNiMo 18 14 3
Anforderungen Requirements	DIN EN 10088-3 8/95 Z3 CND 18-14-03 ,NF A 35- 574 05/90 316 S 13 ,BS 970-Part 1 1996 1.4435 X2CrNiMo18-14-3 ,DIN EN 10272 01/01 Type 316 L ,ASTM A 276 - 2002a Type 316 L ,ASTM A 182 - 2002 1.4435 X2CrNiMo18-14-3 ,AD2000 W 2 01/03 316L ,ASTMA479/A479M 2003 + SA479/SA479M 1.4435 X2CrNiMo18-14-3 ,BN 2 Ausg. 06/97 BS EN 10088-3, NF EN 10088-3 - 1.4435 X2 CrNiMo 18-14-3

Besichtigung und Maßnachprüfung Inspection and dimensional control Inspection et contrôle de dimension	Erschmelzung/Nachbehandlung Meltingprocess/secondary refining Mode d'élaboration/traitement ultérieur	Verwechslungsprüfung (spectroanalytisch) Identification test (spectral-analysis) examination d' identification(analyse spectrale)
ohne Beanstandung without objection	E - VOD	ohne Beanstandung without objection

Pos. Item	Anzahl Quantity	Abmessung Dimension	Gewicht kg Weight kg	Schmelz-Nr. Heat-No.
4	15	85,0 RD	3584	16633

Schmelze Heat %	C	Si	Mn	P	S	Cr	Mo	Ni	Ti	N2
16633	0,018	0,30	1,86	0,026	0,010	17,25	2,56	12,75	0,004	0,0570

Wärmebehandlungszustand: abgeschreckt 1040°C/120'/Wasser/water
Condition of heat treat: quenched

Probe-Nr. Test.-No.	Lage	Temp. °C	Rp0,2 N/mm²	Rp1,0 N/mm²	Rm N/mm²	A5 %	Z %	Kerbschlagarbeit Impact value J		Probenform Shape of test piece Charpy-V	°C	Härte HB Hardness
275LD1	L	+20	314	372	593	46	68	260	267	271	+20	161
275LD2	L	+20	310	367	590	46	67	257	268	263	+20	160

Ferritgehalt/ferrite=0,1%
Korngröße/grain size ASTM E 112=6/7

IK-Beständigkeit/ intercrystalline corrosion
DIN EN ISO 3651-2/ASTM A 262 Pract.E,wird gewährleistet /is warrented

Anlagen Encl. Annexe	Freital,don Place and date Lieu et date	Der Werkssachverständige Works-inspector L'expert de l'usine
US-certificate / Protokoll	20.01.2004	OESER

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig.
This certificate was generated by data system it must not be signed for validity as well.
Ce certificat a été établi sur système informatique et est valable sans signature aussi.

EDELSTAHL WITTEN-KREFELD GMBH

Auestraße 4
D-58452 Witten
Telefon: (02302)29-0
Telefax: (02302)29-40 00
Postanschrift: D-58449 Witten

Datum/Date: 04.04.04

Zertifiziert nach:	ISO 9001 VDA 6, Teil 1	Werkstofflieferant gemäß Druckgeräte-richtinie 97 / 23 EG
	AD2000 W 0 TRD 100	

Abnahmeprüfzeugnis nach DIN EN 10204 3.1B

Inspection Certificate acc.to/Certificat de réception selon

Zeugnis-Nr./Certificate No./No.de Certificat: 750466/7254719/bit

Edelstahl Witten - Krefeld GmbH, D-58449 Witten
ThyssenKrupp Materials (SE)
Sverige AB
POSTFACH 47057
SE-40257 Göteborg

Herstellerzeichen/Supplier's Mark/Marque d'usine	wk
Prüfstempel/Inspector's stamp/Poincon de l'expert	QA

Warenempfänger
ThyssenKrupp Materials (SE)
Sverige AB
Dagjämningsgatan 2
SE-40254 Göteborg

Ihre Auftr.-Nr. vom Your order No. date /No.de votre commande du	0003207600 000010 / 01.04.04
Unsere Auftr.-Nr. Our order No./No.de notre Commande	220890 / 1
Unsere Material-Nr. Our material No./No.de notre matériel	2181798
Unsere Abteilung/Our department/Notre département	Bamt
Telefon/Telephone/Téléphone	02302/29-4215

Produkt/Product/Produit

STAEBE AUS NICHTROSTENDEM STAHL
REMANIT 4401/4404 SUP.IM, TYPE 316/316L
GEWALZT, ABGESCHRECKT,
GERICHTET, GESCHAELT
1.4401/1.4404
EN 10272, AD2000-W2/W10, EN 10088-3,
ASTM A 182/276/479, ASME SA 182/479,
NACE MR 0175,
IN ANLEHNUNG AN EN 10222-5, DIN 17440/96

Fertigungsauftr.-Nr./Production lot-No./Lot de fabrication No.	:
Lieferschein-Nr./Delivery note/No. de l'avis de livraison	:
Schmelzen-Nr./Heat No./No.de coulée	: 490770
Stückzahl/Piece No./Nombre des pièces	: 12
Gewicht/Weight/Masse	: 3150 [kg]
Zeichnungs-Nr./Drawing No./No.du dessin	:
Format/Shape/Profil	: rund / round / rond
Durchm./Breite/Diameter/width/Diamètre/largeur	: 85 [mm] +0.540/-0.000 [mm]
Dicke/Thickness/Epaisseur	:
Länge/Length/Longueur	: 5000 - 6000 [mm]

Stückzahl und Gewicht siehe Rechnung. / Quantity and weight see delivery bill/invoice.
Nombre des pièces et masse voir facture.

Lieferzustand / Condition as supplied/Etat de livraison: 1050 °C Luft (beschleunigt)

Die Prüfergebnisse zu Ihrer Lieferung finden Sie auf der Rückseite bzw. den nächsten Seiten
As for test results of your delivery see overleaf. / Vouz trouverez les resultats d'essais de votre livraison aux pages suivantes.

EDELSTAHL WITTEN-KREFELD GMBH
Abnahmetechnik/Inspection department/Département de Réception

Krause
Der Werkssachverständige
Works' inspector/L'Agent Réceptionnaire de l'usine

EDELSTAHL WITTEN-KREFELD GMBH

Auestraße 4
D-58452 Witten
Telefon: (02302)29-0
Telefax: (02302)29-40 00
Postanschrift: D-58449 Witten

Datum/Date: 04.04.04

Zeugnis-Nr. Certificate No./No.de Certificat	Unsere Auftr.-Nr. Our order No./No.de notre Commande	Ihre Auftr.-Nr. vom Your order No. date /No.de votre commande du	Fertigungsauftr.-Nr. Production lot-No./Lot de fabrication No.
750466/7254719/bit	220890 / 1	0003207600 000010	

Schmelzen-Nr. Heat No./No.de coulée	Erschmelzungsart Steelmaking process/Procédé d'élaboration	Sekundärmetallurgie Secondary metallurgy/Metallurgie secondaire
490770	E	VOD

Chemische Zusammensetzung/ Chemical Composition/ Composition chimique

	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	Co	Al	N	
Ist/Actual/Actuel	0.012	0.35	1.69	0.029	0.028	17.15	2.08	10.11	0.24	0.04	0.088	0.004	0.036	[%]
	B	Ti	Nb	Ca										
Ist/Actual/Actuel	0.0047	< 0.003	< 0.005	< 0.0005										[%]

Härte/ Hardness/ Dureté

Lieferzustand/Condition as supplied/Etat de livraison

Proben-Nr./Specimen-No./No.d'eprouvette	93169	
Ist/Actual/Actuel	172	[HB]

HRC MAX 22

Zugversuch/ Tensile test/ Essai de traction

Lieferzustand/Condition as supplied/Etat de livraison

Probenabm./Specimen dimension/Dimension d'éprouvette	Probenrichtung/Specimen direction/Sens de Prélèvement	Prüftemp./Test temperature/Température d'essai
Zugprobe; 12,5 mm rd	längs/longitudinal/longueur	23 [°C]

Proben-Nr./Specimen-No./No.d'eprouvette	Rpo.2 [MPa (N/mm²)]	Rp1.o [MPa (N/mm²)]	Rm [MPa (N/mm²)]	A5 [%]	A2'' [%]	Z [%]
93171	298	344	593	52.9	54.6	74
93170	301	341	589	52.6	54.4	75

Schlagbiegeversuch/ Impact test/ Essai de résilience

Lieferzustand/Condition as supplied/Etat de livraison

Probenform/Type of specimen/Type d'éprouvette	Probenrichtung/Specimen direction/Sens de Prélèvement	Prüftemp./Test temperature/Température d'essai
[CHARPY V]	längs/longitudinal/longueur	23 [°C]

Proben-Nr./Specimen-No./No.d'eprouvette	1.Prfl./Spec./Eprouvette	2.Prfl./Spec./Eprouvette	3.Prfl./Spec./Eprouvette
93171	253 [J]	260 [J]	260 [J]
93170	265 [J]	261 [J]	275 [J]

Korngröße/ Grain size/ Grosseur de grain

Lieferzustand/Condition as supplied/Etat de livraison

Richtreihe gemäß/Chart acc.to/Série type selon	Größe/Size/Grosseur
ASTM E 112	2 und feiner/and smaller/et plus fin

Interkristalline Korrosion/ Intergranular corrosion/ Corrosion intercristalline

ASTM A 262 PRACTICE E / DIN 50914 / EURONORM 114 ISO 3651-2

US-Prüfung/ Ultrasonic testing/ Contrôle par ultrasons

Die Lieferung wurde US-geprüft nach: SEP 1921 3 E/e

ENTSPRICHT AUCH/ ALSO CORRESPONDING TO/CORRESPOND AUSSI A/CORRESPONDE TAMBIEN EN 10228-3 TYP 1A KL.4, ASTM A 388

Die Lieferung wurde auf Identität geprüft (Spectro.)
Rißkontrolle wurde durchgeführt.
Die Lieferung wurde besichtigt und auf Maß kontrolliert

Das Qualitaetsmanagement-System wurde durch RWTUEV, Prüfbericht Nr. 20 40 37 75
Gemäss der Richtlinie 97/23/EG (Druckgeräterichtlinie) überprüft.
Hiermit wird bescheinigt, dass die Lieferung in Werkstoff, Abmessung und
Lieferzustand dem Geltungsbereich der Zulassung entspricht.

It is hereby certified that the quality management system has been reviewed by
the rwtuev , test report no. 20 40 37 75 according to the regulation 97/23/EC

EDELSTAHL WITTEN-KREFELD GMBH

Auestraße 4
D-58452 Witten
Telefon: (02302)29-0
Telefax: (02302)29-40 00
Postanschrift: D-58449 Witten

Datum/Date: 04.04.04

Zeugnis-Nr. Certificate No./No.de Certificat	Unsere Auftr.-Nr. Our order No./No.de notre Commande	Ihre Auftr.-Nr. vom Your order No. date /No.de votre commande du	Fertigungsauftr.-Nr. Production lot-No./Lot de fabrication No.
750466/7254719/bit	220890 / 1	0003207600 000010	

(guidelines for pressure instruments). It is certified, that the delivery complies with the scope of admission as fas as material, size and as-supplied conditon is concerned.

Le système d'assurance de qualité est verifié par la société "RWTUEV" (Rapport No. 20 40 37 75) selon recommandation 97/23/EG (Directive pour Appareils soumis a Pression).
Cette vérification confirme, que la livraison corresplond au domaine d'emploi d'agrément concernant le matériel, les dimensions et l'état de livraison.

El Sistema de Calidad fue examinado por el RWTUEV - certificado de comprobación no. 20 40 37 75 - en conformidad con la directiva 97/23/EG (para equipos de presión).
Con la presente certificamos que la entrega respecto a calidad, dimensión y estado de suministro corresponde al campo de aplicación de la admisión.

Erläuterung/ Explanations/ Explications

¤Erschmelzungsart/Steelmaking process/Procédé d'élaboration:
E = Elektrostahl / Electric-arc-furnace steel / Acier électrique
¤Sekundärmetallurgie/Secondary metallurgy/Metallurgie secondaire:
VOD = Vakuum-Sauerstoff-Entkohlungs-Verfahren / Vacuum-Oxygen-Decarburization / Vacuum-Oxygène-Décarburation

Die Lieferung wurde aus einem bevorrateten, geprüften Abnahmelos entnommen.
Material against this delivery has been taken from a stored and tested inspection lot.
La livraison a été pris d'un lot de réception stocké et éprouvé.

Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellungsannahme enspricht.
We hereby certify that the material described above has been tested and complies with the terms of the order.
Nous certifions que la livraison été vérifiée et est conforme aux stipulations de l'acception de la commande.

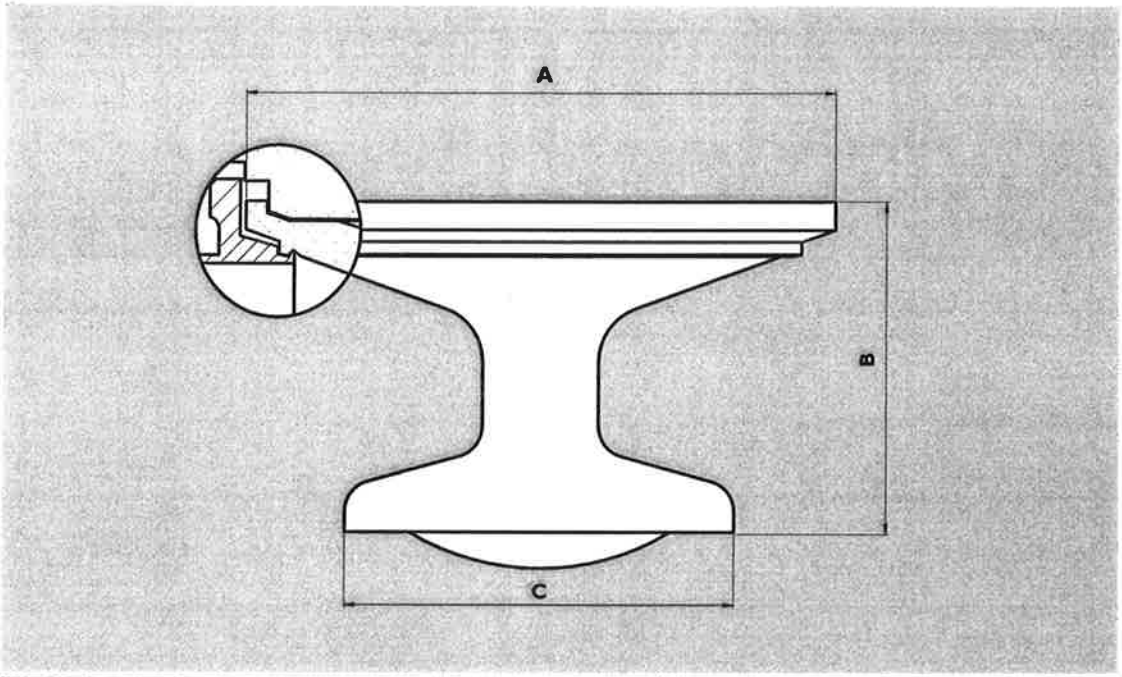
NovAseptic

Product Specification Sheet

The NA-Valve is specifically designed for aseptic applications and complies with the most stringent clean ability and sterilize ability requirements. The focus on aseptic design is a significant feature for all our valves. The NA-Valve is designed for minimum dead-leg, complete drain ability and high chemical resistance.

Part No: **NA##/22**

Description: **Diaphragm, EPDM**



General measures (mm)				Compatible Valve house	
NA##	A [inch]	B [inch]	C [inch]	NA##	NU###
NA12	34.0 [1.339]	16.0 [0.630]	18.0 [0.709]	NA12	NU050
NA18	46.5 [1.831]	23.0 [0.906]	25.0 [0.984]	NA18	NU075
NA25	62.0 [2.441]	30.0 [1.181]	34.0 [1.339]	NA25	NU100
NA38	75.0 [2.953]	41.0 [1.614]	48.0 [1.890]	NA38	NU150
NA51	97.0 [3.819]	53.0 [2.087]	64.0 [2.520]	NA51	NU200

NovAseptic AB
Rödjans väg 7
449 34 Nödinge, Sweden

Ph: +46 303 975 20
Fax: +46 303 960 79

info@novaseptic.se
www.novaseptic.com

Brief product information, NA##/22

Approx. net weight

Diaphragm	NA12	NA18	NA25	NA38	NA51
Weight (kg)	0.01	0.02	0.05	0.10	0.16

Design temperature

Diaphragm	Short term use	
	Steam	Dry Heat
Max	+140°C [+284 °F]	+140 °C [+284 °F]
Min	-30 °C [-22 °F]	-30 °C [-22 °F]

Material:

Diaphragms in EPDM, Ethylene-propylene rubber compound, for NovAseptic design valves. The diaphragm is manufatured from 100% EPDM.

All diaphragms are manufactured in accordance with FDA regulaions §177.2600 and supplied with statement. Chemically, for your specific needs, see appropriate guide lines and actual media characteristics.

Surface Roughness:

Hydrophobic smooth surface

Design Pressure:

-1 to 6 bar(g) [-14.5psi to 101.5psi]

Note!

The applied valve body and actuator may have different design temperature and/or pressure. The weakest part in the assembled product sets the final, permitted design temperature and pressure limits.

Marking:

Each Diaphragm is marked for full LOT traceability according to NovAseptic QA routines.

Packing:

The diaphragm is packed in a closed box to reduce exposure.

Quality Control:

The Quality Assurance Department guarantees the control and traceability at all stages of the manufacturing.

Options and Non-Standard Product

For non-standard Diaphragm options, please contact NovAseptic for further information.

NovAseptic AB
Rödjans väg 7
449 34 Nödinge, Sweden

Ph: +46 303 975 20
Fax: +46 303 960 79

info@novaseptic.se
www.novaseptic.com

NovAseptic

3012

GM20/33

Quality Control Release Certificate

This document certifies that the hereunder specified NovAseptic product has passed the QC Test Procedure (QC/TP) and has been qualified for a Certificate of Conformance (QC/CC) in accordance with the document number stated below.

NA-Mixer® Tank Plate

ID-No 5849

Heat No	456482
Material designation	316L/1.4435

Mixer size	GMP 2000
Ordering No	GM20/33
QC/CC document No	QC/CC-12/b

Nödinge 2004-10-11

.....

NovAseptic AB Quality Assurance Department
lhn

07

NovAseptic AB (publ)
Rödjans väg 7
SE-449 34 Nödinge, Sweden

Tel: +46 (0)303 - 975 20
Fax: +46 (0)303 - 960 79

info@novaseptic.se
www.novaseptic.com

Vat.no SE556460083001

SANDVIK

CERTIFICATE

No. A/03-181446 Rev 00
Date 2003-03-05 Page 1/2

INSPECTION CERTIFICATE acc to
EN 10 204 3.1.B

Specialstål AB
Box 82
343 21 ÄLMHULT

Customer References

25472

Customer order 2003-02-25

001-12418 SPECIALSTÅ

Sandvik References

Order No.	Subs No.	ABSMT Dispatch note
100445	39522	33874/53

ABSMT No. 284-79859
C.Code 91

Material description

HOT WORKED STAINLESS BAR STEEL
FORGED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Steel making process

Electric furnace

Steel/material Designations

Sandvik: SANMAC 4435
AISI: 316/316L
UNS: S31600/S31603

Technical requirements

ASME SA-479-ED-01 Sec II Part A

EXTENT OF DELIVERY

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SANMAC4435-163	456482	67011	1	1051.0
			Total	1	1051.0

TEST RESULTS

Chemical composition (weight%)

Heat	C	Si	Mn	P	S	Cr	Ni	Mo	N
456482	0.015	0.42	1.55	0.028	0.019	17.34	12.60	2.52	0.064

Tensile test at room temperature

Lot	Yield strength N/mm2 Rp0.2	Yield strength N/mm2 Rp1.0	Tensile strength N/mm2 Rm	Elongation % 2"	Red.of Area % Z
67011	252	298	540	58	65

Hardness test

Lot	Min HB	Max HB
67011	148.0	148.0

Quality assurance - Ulf Svensson/QA-manager Primary Products
MTC Service / Certificates

SANDVIK

CERTIFICATE

No. A/03-181447 Rev 00
Date 2003-03-05 Page 2/2

Impact test, J

Lot	Test No	Single values			Average
67011	01620	165	189	213	189

Following controls/tests have been satisfactorily performed:
- Intergranular corrosion test acc to EN ISO 3651-2 Method A
- Material Identification
- Ultrasonic testing
- Visual inspection and dimensional control.

Heat Treatment:
Solution annealed and quenched.

Marking:
SANDVIK, W.NR, HEAT, LOT, INSPECTION STAMP.

Approved acc. AD-Merkblatt W0/TRD 100 by TUEV Nord e.V.
Certified acc. Pressure Equipment Directive (97/23/EC) by TUEV CERT-Certification body for pressure equipment of the TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9002.

The certificate is produced with EDP and valid without signature

Maskinfabrikken Kofa aps

Version no.: 01
Date.: 2005.01.05

Materiel Certificate overview
Document no.: Matr.Certificate.001
Tankproject no: 195-04

Material Certificate overview pipe

Customer.: *Novo Nordisk A/S, Site Chartres - France* **TAG no.:** CH25AW **Fabrication no:** 3012
Order no.: 195-04 570-00278-□-002 **Fabrication year:** *2004*

Pos. no.:	Charge no.:	Materiel supplyer	Approved by.: Date and signification:	Approval organ: Date and signification:
01	413344	INOX	KOFA aps Speciale: rustfrit stål og alu Færevej 6 - 4681 Herfølge Tlf. 56 27 51 11 Telefax 56 27 57 83	KOFA aps Speciale: rustfrit stål og alu Færevej 6 - 4681 Herfølge Tlf. 56 27 51 11 Telefax 56 27 57 83
02	423049	UGINE		
03	E31075	ZWAHLEN		

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.

Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

EN 10204 , 3.1.B

Cliente / Besteller/Purchaser/Client
INOX STAAL HANDELSSELSKAB A/S
BOELETVEJ 7 - P.O.BOX 70
-8680 - RY (DENMARK) - DK

Produttore: STABILIMENTO DI BOLZANO
Hersteller/Item/Usine productrice

Avviso di Spedizione: D-BZ04000706
Lieferanzeige/Packing list/B.L.

Ordine nr: 011.401/A
Bestell/Your order/Commande

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d'elaboration

Certificato nr: MEST077684/2004/
Prüfung/Test/Essai

Conferma ordine nr: EI04000256
Werks/Our Order/Ref nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

SC

Oggetto Prove: Annealed Peeled
Prüfgegenstand/Item inspected/Fini essage

Specifiche:
Anforderungen / Requirements / Exigences
EN 10088-3 95 1.4404 A 0

EN 10272 2000 1.4404 A 0

0

Qualità: 1.4404 MAXIVAL
Werkstoff/Quality/Nuance

Marca: MVAPML
Markenbezeichnung/Brand/Nuance

Punzonatura: 1.4404
Kennzeichnung/Marking/Marquage

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - mm Abmessungen Dimension Dimension	Tolleranza Toleranz Allowance Tolerance	Lunghezza -mm Länge Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - KG Gewicht Weight Poids	Lotto nr. Losnr Lot nr. Lot nr.
0060	Round	50,000	K12-MIN	5000 / 5500	413344		1979,0	306900490

Sono state soddisfatte tutte le condizioni richieste
Die gestellten Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel à été trouvé conforme aux exigences

Controllo antimescolanza: OK
Verwechslungsprüfung: spektralanalytisch durchgeführt
Analmixing testing performed: OK
Contrôle antimélange fait r.a.s.

Controllo visivo e dimensionale: soddisfa le esigenze:
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional check: satisfactory
Contrôle visuel et dimension: satisfaisant

TEST	Provetta/Probestück Spessore/Stärke/Epaisseur Lung. diam. Spess. Breite Diam. Dicke Width Diam. Thickness Lung. diam. epais mm		°C	Posiz. Saggio Probenlage Location Lage prélèvement	Snervamento Grenze Yield Stress Limite élastique Rp 0,2% N/mm2	Snervamento Grenze Yield Stress Limite élastique Rp 1% N/mm2	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement A5 %		Strizione Einschnürung Reduction of area Striction Z %		Resilienza Kerbschlagzähigkeit Impact Value Resilience KV J °C				Durezza Härte Hardness Dureté HB	
Valori richiesti 1 Anforderungen/Required values Valeurs demandées			min		200	235	500	40	-	-	-	100				-	
			max				700									215	
A	10.00	20	L		320	369	623	44		72		212	210	215	182		

1)L=longitudinale/länga, Q=trasversale/quer, T=Tangenziale/tangential

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata: Schmelze/Heat/ Coulee	- min 0,030 max	- 1,00	- 2,00	16,50 18,50	2,00 2,50	10,00 13,00	- 0,045	- 0,030	- 0,110	-	-	-	-	-	-
	C %	Si %	Mn %	Cr %	Mo %	Ni %	P %	S %	N %						
413344	0,016	0,62	1,48	16,90	2,00	10,28	0,025	0,023	0,069						

Corrosion test per EN ISO 3651-2A sensitized T1 : OK

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1, s.,4.3 by TUEV and LLOYD'S

01 Diptope

Bolzano,02/02/04
Mod.:BBL008

Il collaudatore di stabilimento / der Werkssachverständige / Works inspector / L'agent d'usine
R.Cristel

Ordrenr.: 516864 Arbejdseddel: 648504 Kundenr.: 11460 Deres ref.: Tlf. + 18004

UGITECH
Groupe Arcelor

FRANCE

Date 01/01 Document number 4PK91000 I

CERTIFICAT DE RECEPTION 3.1.B
ABNAHMEPRUEFZEUGNIS 3.1.B
INSPECTION CERTIFICATE 3.1.B

EN 10204.3/1.B

5 Usine Productrice / Hersteller / Manufacturer:
UGINE
F 73403 UGINE CEDEX
Tél : 04.79.89.30.30
Fax : 04.79.89.30.51

Produit / Erzeugnisform / Product: IMA4404 HOT ROLLED BAR ROUND SOLUTION ANNEALED K13 — 6

Client et/ou destinataire - Besteller und/oder Empfänger - Purchaser and/or Consignee: DAMSTAHL A.S — 9

N. de commande client - Kundenbestellnummer - Purchaser order number: 349.988 — 10

Nuance et spécifications techniques - Stahlsorte und Pruefbedingungen - Quality and Specifications: UGIMA 4404 AD 2000 W2 1.4404
EN 10272/2000 PED 97/23 — 12

Etat de livraison - Lieferzustand - As delivered (1): SOFTENED COND. AC.TO EN10088-3 — 13

Traitement de Référence - Probestreifenbehandlung - Treatment of test samples (1): — 14

Identification du produit Erzeugnis Benennung-Product identification N. de cde usine Werksbestellnummer Works order number 15	N. de poste Post Nr Item No 17	N. de Coulée Schmelz Nr Heat No 18	Nombre Stueckzahl Pieces Nbr 18	Profil Profile Shape 19	Dimension Ausmessung Dimension 20	Longueur Laenge Length 21	Masse Gewicht Weight 22
4PK91	000	423049	21	ROUND	65,000		2998 KG

N. de prélèvement Probenummer Test N. 39 B	Demandé Vorschrift Required	Sens Richtung Direction 24	Température d'essai Pruefemperatur Test Temperature 25	Traction - Zugversuch - Tensile test: Limite d'Elasticité Streckgrenze Yield Strength 0,2 % 28 A	Limite d'Elasticité Streckgrenze Yield Strength 1 % 28 B	Résistance à la traction Zugfestigkeit Tensile strength 27	Allongement Bruchdehnung Elongation (Lo=5do) 28	Striction Einschnürung Red of Area 29	Dureté Haerte Hardness (4) 30	Type Form Type 31	Sens Richtung Direction (3) 32	Température d'essai Pruefemperatur Test Temperature 33	Résilience - Kerbschlagzaehigkeit - Notch Toughness: Valeurs individuelles Einzelwerte Individual Values 35	Moyenne Mittelwerte Average 36	Dureté Haerte Hardness (5) 37
	Min	L	RT	MPA 200	MPA	MPA 500	% 40	%		ISOV	L	C 20	J 100,0		HB
	Max					700									
0140	(4)														
	(5)			294	330	538	60	76					226-235-240		158
				298	338	552	60	75					245-234-235		

N. de Prélèvement Probenummer Test N. 39 A	Demandé Vorschrift Required	Analyse Produit Stück Analyse Check Analysis	42 C	43 SI	44 MN	45 NI	46 CR	47 MO	48 N	49 CU	50 AL
	Min					10,00	16,50	2,00			
	Max		0,030	1,00	2,00	13,00	18,50	2,50	0,110		
N. de Coulée Schmelz Nr Heat N. 423049			0,020	0,52	1,27	11,04	16,73	2,02	0,025	0,48	0,002

Mode d'élaboration Erschmelzungsart Melting process	Demandé Vorschrift Required	51	52 P	53	54	55					
Electrique Elektrisch Electric	Min	S									
	Max	0,030	0,045								
		0,024	0,031								

EN 4404 .10272/4404.NACEMR0175.316L/316
HRC:<22
ADWO+TRD100:ZUSTIMMUNGSSCHREIBEN DES TUEV SUEDWEST LIEGT VOR.
AUF GEGENZEICHNUNG WIRD VERZICHTET
INTERKRISTALLINE KORROSION BESTAENDIG NACH DIN 50914 § 9.1/IDENTIT. GEPRUEFT
INNERE FEHLERFREIHEIT DURCH PROZESS-KONTROLLE GARANTIERT
ADWO + TRD100 : APPROVAL BY TUEV SUEDWEST
INTERCRYSTAL. CORROSION RESISTANT ACC. TO EURONORM 114 / ANTIMIXING TESTED

0001040127

02 diplubc

56

(3) L = Long Laengs - Long T = Travers Quer-Transverse — 58

(1) TE = Trempé à l'eau - Wasserhaerten - Waterquench; TH = Trempé à l'huile - Olharten - Oil Quench; A = Hypertrempé - Losungsgegluecht - Solution annealed; R = Revenu - Anlassen - Tempered; RT = Recuit - Gegluecht - Annealed; TRM = Recuit maxi - Weichgegluecht - Maxi annealed — 7

(4) A l'état de référence / Im Lieferzustand / At reference condition — 60 A

(5) A l'état de livraison / In Lieferzustand / In state of delivery — 60 B

Contrôles de marquage, d'aspect et de dimensions: satisfaisants
Bezeichnung, Besichtigung und Ausmessung : ohne Beanstandung
Marking, inspection and measurement : without objection — 62

Nous certifions que les produits énumérés ci-dessous sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obengenannten Erzeugnisse den Bestellungsvorschriften entsprechen
We certify hereby that the above mentioned products are consistent with the order prescriptions — 66

Usine, le 24-06-04
L'Agent Réceptionnaire de l'usine
Der Werksachverstaendige
The Work Inspector
C. Bioteau — 63

Alt. Flansche

ZWAHLEN & MAYR S.A.
ZM TUBES
Z.I. 2, CH-1860 AIGLE
Tel. ++41-(0)24-468 46 46
Fax ++41-(0)24-468 46 01

* DER TÜV SÜDWEST HAT DIE SCHWEIZEN VOM 3 NOVEMBER 1992 AUF DIE GEGENZEICHNUNG VERZICHTET

INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS

EN 10204 /3.1 B

N° 031146

SHEET / PAGE / SEITE 1 OF / DE / VON 1

Certified ISO 9001
LRQA n° 9143175
Quality System

CONFIRMATION N°: / AUFTRAGS N° 47172 B

CUSTOMER: / CLIENT / KUND NEUMO

CUSTOMER ORDER N° COMMANDE CLIENT / KUNDENBESTELLUN	SPECIFICATIONS: ANFORDERUNGEN	HEAT N. COULEE N. SCHMELZE N.	QUANTITY QUANTITE STÜCKE	DIMENSIONS mm ABMESSUNGEN	LENGTH LONGUEUR LÄNGE mm	STEEL GRADE NUANCE D'ACIER MARKENBEZEICHNUN
RA 030240WE-Lager						
PRODUCT PRODUIT / PRÜFGEGENSTAND: REDRAWN TUBES - TUBES ETIRES - NACHGEZOGENE ROHRE	DIN17457 PK2- AD-W2 /AD2000/ ASTM-A 269/270/BN2	E31075	465 m	21.30 x 1.60	6000	1.4435

HEAT ANALYSIS ANALYSE DE COULEE / SCHMELZANALYSE

HEAT N. COULEE N SCHMELZE N.	% C	% Si	% Mn	% P	% S	% Cr	% Ni	% Mo	% N	% Ti	% Cu	% Fe	% Al	% Co	% B	% Zr	%	%
E31075	0.024	0.42	1.81	0.005	0.002	17.13	12.76	2.801		0.001								

PRODUCT ANALYSIS ANALYSE PRODUIT / STÜCKANALYSE

HEAT N. COULEE N SCHMELZE N.	% C	% Si	% Mn	% P	% S	% Cr	% Ni	% Mo	% N	% Ti	% Cu	% Fe	% Al	% Co	% B	% Zr	%	%
PIECE	0.020	0.42	1.72	0.017	0.001	17.2	12.7	2.74	0.045	0.004								

(10 BAR = 1MPa)

FLATTENING APLATISSEMENT RINGFALTVERSUCH	HYDROSTATIC TEST ESSAI HYDRAULIQ BAR WASSERDRUCKVERSUCH	FLARING EVASEMENT AUFWEITUNG
NE	NE	S
FLANGING COLLET BÖRDELVERSUCH	**REVERSE FLATTENING RETOURNEMENT INVERSE WURZELSEITIGER RINGFA**	**GRAIN SIZE ASTM GROSSEUR DE GRAIN KORNGRÖSSE**
NE	NE	S 6-8
EDDY-CURRENT	**DIMENSIONAL CONTROL CONTROLE DIMENSIONNE MASSKONTROLLE**	**VISUAL CONTROL CONTROLE VISUEL BESICHTIGUNGSKONTR**
S 100%	S	S

S = Satisfactory - Satisfaisant - Zufriedenstellend
NE = Not executed - Pas effectué - Nicht durchgeführt

HEAT TRAITMENT : TREATEMENT THERMIQUE WÄRMEBEHANDLUNG
ANNEALED AT : HYPERTREMPE A LÖSUNGSGEGLÜHT BEI 1050 °
AND RAPIDLY COOLING ET REFROIDI RAPIDEMENT UND ABGESCHRECKT

I.D.Nr. 313

03

100 % OF THE MATERIAL HAVE BEEN PASSED WITH SATISFACTORY RESULT THE : DU MATERIEL SATISFAIT AU(X) CONTROLE(S) DES MATERIALS HAT DIE PRÜFUNG BESTANDEN

Eddy Current

TEST ACCORDING TO : SUIVANT ENTSPRECHEND SEP 1614/1925

Dipdub

MARKING : MARQUAGE KENNZEICHNUNG 21.3x1.6-1.4435/W-DIN11866/17457-PK2-K3G-Schmelze E31075-ZM

REMARKS : REMARQUE ANMERKUNG
Ferrite test < 0.50% : S
Corrosion test DIN 50914 : S
Welding factor V=1

TEST RESULTS RESULTATS DES ESSAIS / ERGEBNIS DER PRÜFUNGEN (1 N/mm2 = 1M Pa)

SAMPLE ECHANTILLO PROBE	Ø OU. EXT AUSS.	Ø INT. INN	WALL THIC. EPAISSEU WANDSTÄR	LENGTH LONGUEUR LÄNGE	ROUGHNESS RUGOSITE RAUHIGKEIT	ROUGHNESS RUGOSITE RAUHIGKEIT	ROUGHNESS RUGOSITE RAUHIGKEIT	TENSILE TRACTION / ZUGVERSUCH p 0,2 /mm2	Rp 1% /mm2	Rm /mm2	A % Lo=5,6 √ So	HARDNESS DURETE HÄRTE	
TOLERANCES TOLERANZEN	21.30 -0.10/+0.05	16.00	1.60 ±0.15	6000 -50/+100	int.Ra <0.80 µ	ext.Ra <0.80 µ	µ					HV3	
1	21.306	18.33	1.498	3030	0.32	0.32		275	300	597	58.3	168	
2	21.304	18.33	1.487		0.37	0.31		276	300	596	58.8		
3	21.306	18.334	1.486	6030	0.21	0.31		263	291	590	61.3		
4	21.303	18.332	1.485		0.4	0.52		264	287	594	58.3		
5	21.308	18.334	1.487	6030	0.34	0.22		272	299	59.6	60.1	175	

Aigle, le : 29-sept-03

Emis et vérifié par :

SERVICE QUALITE
DE MARCHI

KLITSØ processtechnic a-s

Engholm Parkvej 4, 3450 Allerød
Telefon 70 15 05 25 - Telefax 70 15 05 75

NEUMO

Dokumentation for ruhedsmåling.

Kunde: Maskinfabriken Kofa A/S

Ordre nr: 16904

KLITSØ ordre nr: KO 0459200

Bemærkninger:

NEUMO Vare nr: PTR015ISO S RØR

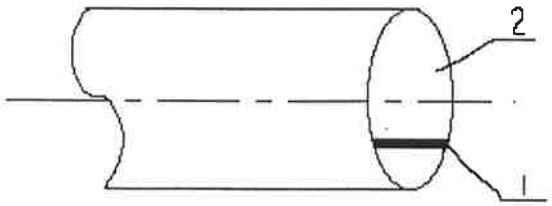
Materiale: 1.4435

Chargenr. E 31075

Nominel overfladeruhed: Ra ≈0,8 / 0,8 µm

Identifikationsnr. 313

Overfladeruhed målt:



1. Svejsning: Ra ≈0,375 µm

2. Rørside : Ra ≈0,239 µm

ID. Nr.
313

Perthometer M1
Object 1.
Name
#
Lt 5.600 mm
Lc 0.800 mm
Ra 0.375 µm
Rz 2.51 µm

Perthometer M1
Object 2
Name
#
Lt 5.600 mm
Lc 0.800 mm
Ra 0.239 µm
Rz 1.66 µm

Udfyldt af: Niels Dahm

Dato: 17/9-04

Instruktion ved forsendelse:

Kopi af denne dokumentation og 3.1B materiale-certifikat vedlægges rør.

** P L U K L I S T E **

N76492 - 01 Side: 1

AvestaPolarit STAINLESS

03-04-23 / 8.44.33

Ordrenummer..: N76492
Kunde KOFHER : KOFA APS
Lev.adresse..: KOFA APS
FÆRØVEJ 6
4681 HERFØLGE

Lager.....: CO
Lagertype.: CO
Ordredato.: 030423
Deres ref.:
FINN/LAGER
Bilnummer.: 56275783
Turnummer.: N
Sælgerkode: THOERI

Lev.beting...: CI CIP (INCOTERMS 2000)
Transportmåde: BI BIL
Betalingsbet.: LØBENDE MÅNED + 50 DAGE
Intern Medd..:

Varenr.	Produkt Beskrivelse		Lokation	Antal Enhed	Lev.	Rækkenr
91000307	TIG-TRÅD SYREFAST 316L-Si/SKR-Si	1,20 X1000 MM 5	A1 02	10,0 KG	10	2
Individnr..: M74366-104		Chargenr.: 5666		Lev.dato: 030423		
91000308	TIG-TRÅD SYREFAST 316L-Si/SKR-Si	1,60 X1000 MM 5	B1 01	20,0 KG	20	3
Individnr..: M74366-105		Chargenr.: 5549		Lev.dato: 030423		
91000320	TIG-TRÅD DUPLEX 2205	1,60 X1000 MM 5	D4 04	5,0 KG	5	1
Individnr..: M69689-104		Chargenr.: 5319		Lev.dato: 030423		

Vægt..: 35,000 Ekspederet af :....

Volume: Tilbagemeldt:..... Tilbagem. dato:.....

CERTIFIKAT

_____ Stang _____ Fittings _____ Rør 1-20 Svejs

Forsendelse: Emb:_____kr. Trans:_____kr. Modt:_____

Avesta Polarit A/S
Telefon: 70 10 26 10
Telefax: 76 32 16 05

Hovedkontor
Postboks 310
Kokbjerg 31
6000 Kolding

Afdeling Sjælland:
Herskætten 5
2630 Tåstrup
Telefax: 43 55 34 55

Betaling til:
Handelsbanken
0893-1000455
SE nr: DK74101828

GRAYEL & FILS
Mécanique de Précision
Appareils de Laboratoire

S21_715X

SARL au Capital de 61 000 €

23 Rue Guilloux 69230 ST GENIS LAVAL
Téléphone 04.78.56.43.01 • Télécopie 04.78.56.72.95
RC LYON 71 B 597
N° SIRET 971 505 979 00015
N° Intracommunautaire FR 77971505979

COMMANDE N° 11759 / B20700/05
AFFAIRE N° 0538001

PROCES-VERBAL ET RESULTATS D'ESSAIS

SOUPAPE DE SURETE REFERENCE S21 CL51 CL25 - Inox 316L - Piston PTFE – Joint Silicone FDA --
RACCORDEMENTS : ENTREE CLAMP 51 SMS ET SORTIE CLAMP 25 SMS
TYPE : S21 - ORIFICE : ∅ 21 MM - A = 346.36 MM2

DATE DE L'ESSAI : 27/05/05 N° DE L'ESSAI : 715 X
NUMERO D'IDENTIFICATION : 715 X

BANC D'ESSAI DE SOUPAPE, AIR COMPRIME ET EAU

RELEVE DES PRESSIONS (NF E 29-410 et 411)

PRESSION DE DEBUT D'OUVERTURE	PDO :	3	BAR RELATIF
PRESSION D'OUVERTURE TOTALE	PO :	3,3	BAR RELATIF
PRESSION DE REFERMETURE	:	2,5	BAR RELATIF
PRESSION DE REGLAGE	PR :	3	BAR RELATIF

TEMPERATURE D'ESSAI : 18 ° C NOM du CONTROLEUR : M. CHAINTRON

ANOMALIES CONSTATEES A L'EXPERTISE PAR DEMONTAGE : Néant.

TRAVAUX EFFECTUES EN REVISION :
REMPLACEMENT DES JOINTS :
REMPLACEMENT DU RESSORT :
REMPLACEMENT OU POSE D'ORGANES MECANIQUES :

OBSERVATIONS PENDANT L'ESSAI DE FONCTIONNEMENT (VIBRATIONS, BATTEMENTS, OU AUTRES) : Néant.

RAPPEL : P ABSOLUE = RELATIVE + ATMOSPHERIQUE
P ATMOSPHERIQUE = 1 BAR

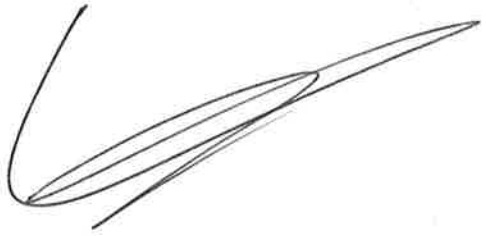
Attention : La pression de réglage n'inclut aucune contre pression initiale (NFE 29-410)

FICHE SIGNALETIQUE NFE 29 - 410.

COEFFICIENT DE DEBIT : 0.5
POSITION DE REGLAGE DES CARACTERISTIQUES DE FONCTIONNEMENT : VERTICALE.

NOTA : Selon les normes et principes en vigueur, le plombage de la soupape par nos soins atteste que la soupape est une soupape de sûreté.

RELEVE ETABLI SOUS LE CONTROLE DE : M. CHIGUER.
POUR LE COMPTE DE LA SOCIETE : BIONAZ.
Le vendredi 27 mai 2005



GRAYEL & FILS SARL au Capital de 61 000 €
Mécanique de Précision - Appareils de Laboratoire
RC LYON 71 B 597, N° SIRET 971 505 979 00023, N° Intra-communautaire FR 779 715 059 79
23 Rue Guilloux - BP. 74, 69564 ST GENIS LAVAL Cedex
Téléphone 04.78.56.43.01 - Télécopie 04.78.56.72.95

DIRECTIVE 97/23/CE - DECLARATION DE CONFORMITE - CE. - N° 0538001

(application de la Directive 97/23-CE du 29 mai 1997 relative aux équipements sous pression)

Constructeur : GRAYEL & Fils
Lieu de fabrication : 23 rue Guilloux, 69564 Saint GENIS LAVAL

Année de fabrication : 2005
N° de fabrication : 714X à 723X
Dossier de fabrication : 05380
Plan d'exécution N° : 01142000.02
Destinataire : BIONAZ

1) Description de l'équipement :

1- Genre	Organe de sécurité
2- Type	Soupape de sûreté type S21 CL51 CL25
3- Position d'utilisation	Verticale
4- Type de fluides susceptibles d'être contenus	Liquide, gaz, et vapeur
5- Pression de calcul	10 bars
6- Pression de réglage	3 bars
7- Température minimale Admissible	0°C
8- Température maximale Admissible	220°C (≤ suivant matière de joints utilisés)
9- Température de calcul	220°C

2) Catégorie de risque : Catégorie IV - Produits dangereux du groupe I

3) Procédure d'évaluation : Procédure suivant module B + F

4) Organisme notifié : n° 0060 - APAVE GROUPE - 177 route de Sain BEL - 69811 TASSIN

5) N° certificat CE de type, N° attestation de conformité aux essais réalisés et PV rapport final, voir en annexe.

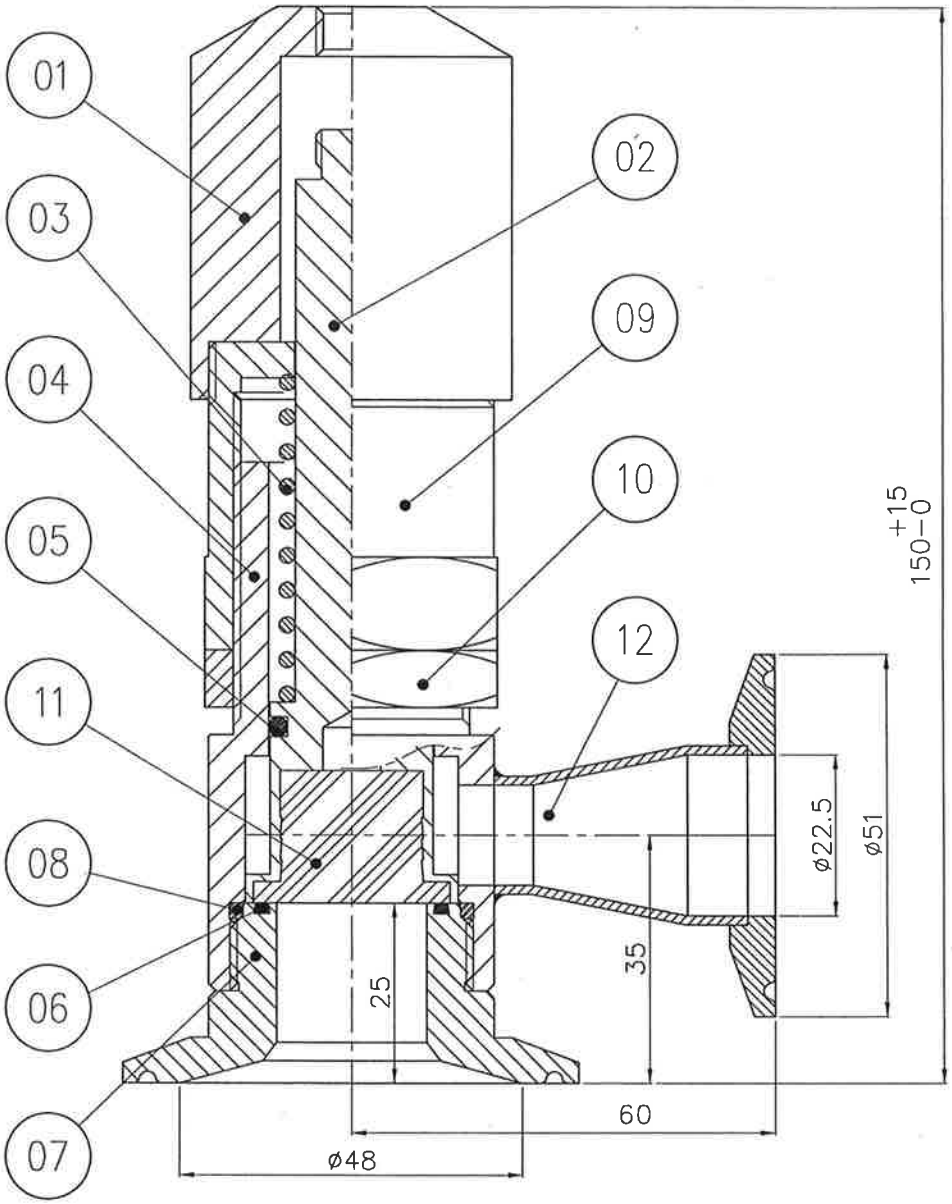
Nous soussignés, GRAYEL & Fils Constructeurs, certifions que les équipements ci-dessus désignés ont été exécutés conformément aux exigences essentielles des Directives 97/23/CE du 29 mai 1997 (J.O. L181 du 9 juillet 1997), ainsi qu'aux indications du présent état et des documents et plans qui lui sont annexés.

Fait à ST GENIS LAVAL, le 27/05/05.

Le Constructeur
Patrice GRAYEL

P.O. L. CHIGUER

01142000.02.DWG



Selon norme NF E 29-005

Pressions De Tarage: de 0.2b à 10b
Températures: TMS=150°C, TR=20°C.

* : Silicone, Viton, EPDM, ...

REP.	DESIGNATION	Matière	Nbre	REP.	DESIGNATION	Matière	Nbre
06	JOINT TORIQUE (23x2)	*	1	12	SORTIE CLAMP 25 SMS	1.4404	1
05	JOINT TORIQUE R13 (16.9x2.7)	*	1	11	PASTILLE	P.T.F.E	1
04	CORPS	1.4404	1	10	CONTRE ECROU	1.4305	1
03	RESSORT	1.4310	1	09	ECROU DE REGLAGE	1.4305	1
02	PISTON	1.4404	1	08	JOINT TORIQUE (29.6x2.4)	*	1
01	CHAPEAU	1.4404	1	07	EMBASE CLAMP 51 SMS	1.4404	1

Rév	Date	Déssiné par	Vérifié par	Modifications
02	03/04/03	LC		ALLONGEMENT EMBASE

SOUPAPE DE SURETE
S21 CL51 CL25

	Echelle : 1/1	Tolérances Générales JS13 Entraxes : ±0,2	N° Affaire :
GRAYEL & FILS BP 74 69564 St GENIS LAVAL TEL. 04.78.56.72.96 FAX. 04.78.56.72.95		N° Client :	N° Plan : 01142000.02

escudier sas

- Joints Toriques
- Bagues d'Etanchéité
- Roulements
- Circlips
- Goupilles
- Loctite
- Graisse et
- Lubrifiants spéciaux.
- Metafram

le 31/01/2005

Fournisseur: **ESCUDIER** *Supplier* **ZAC de l'Arsenal** **6, rue Marius Martin** **BP217** **69632 VENISSIEUX** **FRANCE**	N° de la déclaration: *Statement number* **25200929 / 10** Nombre de Feuilles: *Number of sheet(s)* 1
Client: **GRAYEL** *Customer* **23 RUE GUILLOUX** **BP 74** **69230 SAINT GENIS LAVAL** **FRANCE**	**DECLARATION DE CONFORMITE** *CONFORMITY STATEMENT* **(NFL 00-015C)**
Référence du client *Contract Number* **MR§CDE 001706**	N° Bordereau Livraison: *Number Deliverie note* **25200929** Date Bordereau Livraison: *Date of issue* **31-01-2005**

Dénomination / *Designation*	**23X2 SILICONE FDA**
Référence ou type /*Reference or type*	**23X2 Q FDA**
N° de série ou de Lot *Serial or batch number*	**711403 /**
Quantité /*Quantity*	**100**
Observations / *Others*	

Nous déclarons que la fourniture citée est conforme aux exigences du contrat et que, après vérifications et essais, elle répond en tout point, aux exigences spécifiées, aux normes et réglements applicables, sauf exceptions, réserves ou dérogations énumérées dans la présente déclaration de conformité.

We declare that the mentioned suply is in conformity with the requirement of the contract and, that after the controls and test, it is in accordance at all levels with the specified requirement, the applicable specifications and rules, unless exceptions, reservations of dispensations to the rules as listed on the current conformity statement

Responsable Qualité Fournisseur *Supplier Quality Control Manager*

Nom et Fonction *Name and Position:* **E. LOISY**

Signature /*Signature*

Date /*Date* **31-01-2005**

Réservé à l'organisme de surveillance / *Reserved to inspection Authority*

Nom et Fonction / *Name and position*

Signature / *Signature*

Date /*Date:*

ISOFLON
PRODUITS P.T.F.E.

SEMI-PRODUITS PTFE sur STOCK
PIECES FINIES TOUS PLASTIQUES TECHNIQUES
TISSUS DE VERRE IMPREGNES PTFE ou SILICONE
REVETEMENTS PTFE - FEP - PFA

LLOYD'S REGISTER QUALITY ASSURANCE ISO 9002

GRAYEL ET FILS
BP 74
23 RUE GUILLOUX
69230 ST GENIS LAVAL

Diémoz le 16/12/2004

CERTIFICAT DE MATIERE ET DE COMPATIBILITE ALIMENTAIRE

Les poudres que nous utilisons pour la transformation du PTFE proviennent des plus importants producteurs mondiaux et peuvent être utilisées en contact avec les aliments, en accord avec les réglementations :

EEC : 82/711/EEC - 85/572/EEC - 90/128/EEC - 92/39/EEC
93/9/EEC - 95/3/EC

USA : Code of Federal regulation (FDA) 21 CFR Ch.1.1-31-1995
sections 175.105 - 175.300 - 176.170 - 176.180 -
177.1520 - 177.1550 - 177.2600 - 178.3570.

ISOFLON S.A

Service Qualité

ISOFLON S.A.
Produits P.T.F.E.
Z.A. B.P. 3
38790 DIEMOZ
✆ 04 78 96 22 37 - Fax 04 78 96 26 37
R.C. Vienne B 307 179 093 RM 38/2

COGNE ACCIAI SPECIALI S.p.a.
11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 80.000.000 EUR INT. VERS.
VAT: IT00571320076
P.I. 00571320076 C.F. 02187360967
REG. IMP. AO003 - 7234 REA 50474

33827/1 920794

(A02) CERTIFICAT DE RECEPTION B (DIN S0049/EN 10204 - 3.1.B)

(A03) NUMERO DE DOCUMENT 2004025514

le 05/08/2004

06) ACHETEUR : COGNE FRANCE S.A.

07) N. DE LA COMMANDE DU CLIENT .: CDA28074 ROE080305

01) USINE PRODUCTRICE .: COGNE ACCIAI SPECIALI - AOSTA, VIA PARAVERA 16

05) AUTEUR DU DOCUMENT : SERVICE QUALITE

08) NUMERO DE LA COMMANDE DE L''USINE 25034575 /10 (A04) SIGLE DU PRODUCTEUR .: COGNE

063479

ECIFICATION :

01) PRODUIT : CAS-E

04) ETAT DE LIVRAISON : 15254 SRE RECTIFIE RONDS ISOH9 Piston 3217

11) DIMENSIONS DU PRODUIT (MM): RS HYPERTREMPE 30,000

02) NUANCE DE L'ACIER : WN.1.4401/4404-F316/F316L (B12) LONGUEUR DU PRODUIT (MM): 03000 /03100

08) NUMERO DE LA COULEE : 472296 NUANCE INTERNE : F316L 1.4404 IMCO 316/316L

06) MARQUAGE DU PRODUIT : (B07) NUMERO DE LOT : 707890

SIGLA SOST. N. COLATA : 789

ABORATION AU FOUR ELECTRIQUE + AOD + COULEE CONTINUE

S PRODUITS SONT CONFORMES A LA SPECIFICATION EN 10088/3 (95)
.1.4404-WN.1.4401

S PRODUITS SONT CONFORMES A LA SPECIFICATION DIN 17440/96, W.1.4404

ALYSE CONFORME A LA SIS 2347

ALYSE CONFORME A LA SIS 2348

S PRODUITS SONT CONFORMES A LA SPEC. NF A35-574/90, NUANCE Z7 CND 17-11-02

S PRODUITS SONT CONFORMES A LA SPECIFICATION NFA 35 574, NUANCE Z3 CND 18-12-02

193/SA193M-01, SA479/SA479M-01.

71) COMPOSITION CHIMIQUE - DE COULEE SELON ASTME1019-E1086-E415

MENT 020000136273

ENU

	C	Si	Mn	P	S	N	Cr	Mo	Ni	Cu	Co
MENT	0,016	0,490	1,800	0,028	0,028	0,072	16,500	2,000	10,000	0,420	0,100
ENU											

AI DE DURETE AU ETAT DE FOURNITURE

CIFICATION 790000038751

ENU EN 10003

188,0 ESSAI DE DURETE HB

AI DE RESILIENCE AU ETAT DE FOURNITURE

CIFICATION 790000038751

0) EPROUVETTE EN 10045

3) TEMPERATURE D''ESSAI °C KV

TE DE MESURE 20,0000

ENU J

264,00 268,00 272,00

(C02) ORIENTATION DE L'EPROUVETTE: L

COGNE ACCIAI SPECIALI S.p.A.
11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 80.000.000 EUR INT. VERS.
VAT: IT00571320076
P.I. 00571320076 C.F. 02187360967
REG. IMP. AO003 - 7234 REA 50474

(A02) CERTIFICAT DE RECEPTION B (DIN 50049/EN 10204 - 3.1.B)

(A03) NUMERO DE DOCUMENT 2004025514

SAI DE TRACTION AU ETAT DE FOURNITURE
f.
ECIFICATION 790000038751
EN 10002

(C02) ORIENTATION DE L'EPROUVETTE: L

063479

ITE DE MESURE	RM	RP02	A	Z	RP1
TENU	NMM	NMM	%	%	NMM
	635,00	279,00	5.0 D 50,20	75,00	325,00

S PRODUITS SONT CONFORMES A LA DIRECTIVE 97/23/CE PED
S PRODUITS SONT CONFORMES AUX NORMES EN10272/00
NTROLE' ANTIMELANGE AU 100%.
NTROLE VISUEL DES SURFACES ET DIMENSIONS : CONFORME.
UNE REPARATION DE SOUDURE EXECUTEE
EMPTE DE CONTAMINATION DE MERCURE
SAI DE CORROSION:
EL. ASTM A262/02a PRACT. E / EN ISO 3651-1 (00)): CONFORME
S PRODUITS SONT CONFORMES A LA SPECIFICATION ASTM A320/A320M-03 01A B8 CL.1
S PRODUITS SONT CONFORMES AUX STIPULATIONS DE LA COMMANDE.
ACCORD. AVEC LA NORME EN 10278/99
TERIEL PRODUIT DANS UN SYSTEME D'ASSURANCE QUALITE EN ACCORD
EC UNI EN ISO 9001:2000 ET QS-9000 ED.3 MAR.98 (POUR CETTE DERNIERE
JLEMENT POUR LES BARRES EN ACIER LAMINE'-ECROUTE'- RECTIFIE' ET
JDRES METALLIQUES ATOMISEES), CERTIFIE PAR IGQ.

1) DATE 17.06.2004

SIGNATURE AUTORISEE PAR ...

le 10/06/04 Embase CL51/SM5T

UGITECH
Groupe Arcelor

FRANCE

UGINE

Usine Productrice / Hersteller / Manufacturer

4 N.NrNo 86433

11 N.de commande usine-Werksbestellnummer-Works order number: FUGE TESF 1/1 1RA11A00 U

3 CERTIFICAT DE RECEPTION 3.1.B
INSPECTION CERTIFICATE B
ABNAHMEPRUEFZEUGNIS B

EN 10204 / 3.1.B

Produit / Erzeugnisform / Product: BARRE RONDE 4404 UGIMA LAMINEE DECALAMINEE (6)

Client et/ou destinataire - Besteller und/oder Empfaenger - Purchaser and/or Consignee (9)

N. de commande client - Kundebestellnummer - Purchase order number: 402137598 (10)

Nuance et spécifications techniques - Stalsorte und Pruefbedingungen - Quality and Specifications (12)

UGIMA 4404 | 4404I | EN 10272 | 1.4404/4401
EUROSTORE REV.9 DU 05/97

Etat de livraison - Lieferzustand - As delivered (1): ADOUCI CONFORME A EN 10272 (13)

Traitement de Référence - Probestreifenbehandlung - Treatment of test samples (1) (14)

Identification du produit / Erzeugnis Benennung-Product identification N. de cde usine / Werksbestellnummer / Works order number (15)	N. de poste / Post Nr / Item No (17)	N. de Coulée / Schmelz Nr / Heat No (16)	Nombre / Stueckzahl / Pieces Nbr (18)	Profil / Profile / Shape (19)	Dimension / Ausmessung / Dimension (20)	Longueur / Laenge / Length (21)	Masse / Gewicht / Weight (22)
1RA11 A00		350049	28	ROND	65,000		4018 KG

N. de Prélèvement / Probenummer / Test N. 39B	Demandé-Vorschrift-Required	Sens / Richtung / Direction (3)	Température d'essai / Pruefemperatur / Test temperature	Traction - Zugversuch - Tensile test: Limite d'Elasticité / Streckgrenze / Yield Strength 0,2% 26A	1% 26B	Résistance la traction / Zugfestigkeit / Tensile strength 27	Allongement / Bruchdehnung / Elongation (Lo=5do) 28	Striction / Einschnuerung / Red. of Area 29	Dureté / Haerte / Hardness (4) 30	Résilience - Kerbschlagzaehigkeit - Notch Toughness: Type / Form / Type 31	Sens / Richtung / Direction (3) 32	Température d'essai / Pruefemperatur / Test temperature 33	Valeurs individuelles / Einzelwerte / Individual Values 35	Moyenne / Mittelwerte / Average 36	Dureté / Haerte / Hardness (5) 37
	24	L	25 °C	MPA	MPA	MPA	%	%							HB
	Min		20	205	235	515	40	50							
	Max					700									215
	(4)														
				358	398	576	58	77							169
	(5)			339	379	575	60	79							169

39A N. de Prélèvement / Probenummer / Test N.	Demandé / Vorschrift / Required 40	Analyse/Produit-Stueck / analyse-Check Analysis 41	C 42	SI 43	MN 44	NI 45	CR 46	MO 47	N 48	S 49	P 50
	Min					10,00	16,50	2,00		0,015	
	Max		0,030	1,00	2,00	12,00	17,50	2,50	0,100	0,030	0,045
N. de Coulée / Schmelz Nr / Heat N. 3			0,026	0,49	1,31	11,06	16,71	2,04	0,026	0,023	0,027
350049											

38 Mode d'élaboration / Erschmelzungsart / Melting process	Demandé / Vorschrift / Required 51	52	53	54	55
Electrique / Elektrisch / Electric	Min				
	Max				

A316L/316 ,NACEMR0175
ISO-V >= 160 J - HRC <= 22
ASTM A182-02 A276-02A A479-02 GRADES 316L/316
NF EN 10088-3 DIN EN 10088-3 BS EN 10088-3 X2CRNIMO17-12-2/X5CRNIMO17-12-2
RESISTANT CORROSION INTERGRAN. SELON EURONORM 114 / VERIFIE ANTIMELANGE
INTERCRYSTAL. CORROSION RESISTANT ACC. TO EURONORM 114 / ANTIMIXING TESTED
INTERKRISTAL. KORROSION BESTAENDIG NACH EURONORM 114 / IDENTITAET GEPRUEFT
RESISTENTE ALLA CORROSIONE INTERCRISTALLINA SECONDO EURONORM 114
RESISTENTE A LA CORR. INTERCR. SEGUN EN114 / CONTROL CONTRA MEZCLA EFECTUADO

(3) L = Long / Laengs - Long; T = Travers / Quer-Transverse (58)

(1) TE = Trempé à l'eau - Wasserhaerten - Waterquench; TH = Trempé à l'huile - Olharten - Oil Quench; A = Hypetremp - Losungsgegluecht - Solution annealed; R = Revenu - Anlassen - Tempered; RT = Recuit - Geglueht - Annealed; TRM = Recuit maxi - Weichgegluecht - Maxi annealed (7)

Ugine, le 18-02-04
L'Agent Réceptionnaire de l'usine / Der Werksachverstaendige / The Work Inspector

(4) A l'état de référence / Zum Bezug Zustand / At reference condition (60A)

(5) A l'état de livraison / In Lieferzustand / In state of deliver (60B)

Controles de marquage, d'aspect et de dimensions : satisfaisants
Bezeichnung, Besichtigung und Ausmessung : ohne Beanstandung
Marking, inspection and measurement : without objection (62)

Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande
Wir bestatigen hiermit dass die obengennanten Erzeugnisse den Bestellungvorschriften entsprechen
We cetrtify hereby that the above mentioned products are constitent with the order prescriptions (66)

(63)

Maskinfabrikken Kofa aps

Surface test

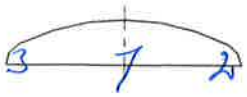
Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

Three Surface tests will be done on following parts of the tank (Top, Bottom, Cylinder, Manhole, Bottomvalve, TC-connection). Each measure shall be inside the specified values according to the construction drawings. In case it is not possible to measure the part a statement from the supplyer will be attached if possible.

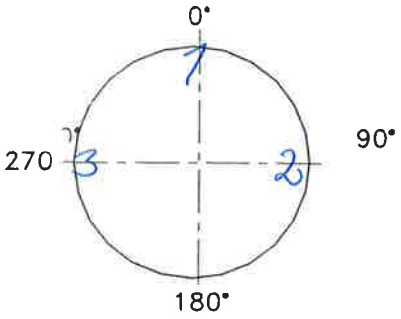
Calibration certificate for surfacetester shall be attached to this document.

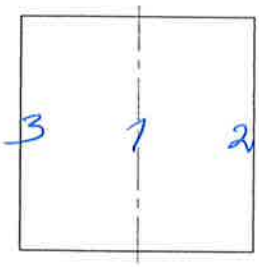
	No.:	µm	No.:	µm	No.:	µm	Acceptcriteria observance	
Klöppertop inside.:	1	0,2	2	0,2	3	0,1	YES ☒	No ☐
Cylinder inside.:	1	0,2	2	0,1	3	0,2	YES ☒	No ☐
Klöpperbottom inside.:	1	0,2	2	0,2	3	0,2	YES ☒	No ☐
Klöppertop out.:	1	0,2					YES ☒	No ☐
Cylinder out.:	1	0,5					YES ☒	No ☐
Klöpperbottom out.:	1	0,3					YES ☒	No ☐
Dip tube In.:			See suppliers certificate				YES ☐	No ☐
Dip tube out.:	1	0,2					YES ☒	No ☐
Bottom valve in.:	1	0,2					YES ☒	No ☐
Bottom valve out.:	1	0,3					YES ☒	No ☐
Manhole in.:	1	0,2					YES ☒	No ☐
Manhole out.:	1	0,5					YES ☒	No ☐
TC – connection in.:	1	0,2					YES ☒	No ☐
TC – connection out.:	1	0,4					YES ☒	No ☐
Accept criteria observance:		YES ☒		NO ☐	**Date:** 24-1-05		**Sign:**	
Approved by NN:		YES ☒		NO ☐	**Date:** 2005.02.15		**Sign:**	
If no please view deviation raport.:								

A marking with position no. and value for each measure made will be notice in the form (only for main parts as Top, Bottom, Cylinder).

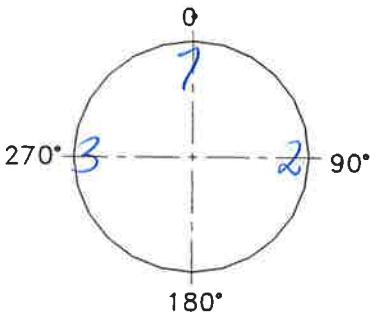


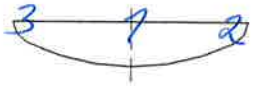
Klöppertop

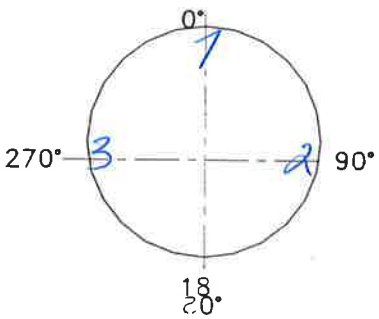




Klöpperbottom







Cylinder

Maskinfabrikken Kofa aps

Construction and placement

Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

Demand: (C) 5.2.2.3. Lifting construction of the tank	Construction of the tank must be comply with present weight profiles and lifting trolleys in existing building NNPSA1.	Done: Yes ☒ No ☐ Date/Sign 2005.02.14/Lajj
Demand: (C) 5.2.2.7. Welding plate / bottom valve	Agiator flange (welding plate) shall be mounted in the tank bottom to facilitate mounting of agiator in relation to Steridose bottom valve.	Done: Yes ☒ No ☐ Date/Sign 2005.02.14/Lajj
Demand: (C) 5.2.3.8. Sample valve	Sample valve shall be mounted as far down on the tank as possible for sampling of small intermediate solutions. Sampling valva shall be a NovAseptic type. Sampling valve shall be protected against bumps/collision by a metal frame.	Done: Yes ☒ No ☐ Date/Sign 2005.02.14/Lajj
Demand: (C) 5.2.4.2. Prepared for CIP	The tank is prepared for CIP by inlet in the tank top.	Done: Yes ☒ No ☐ Date/Sign 2005.02.14/Lajj
Demand: (C) 5.2.5.2. Leg design	Design and dimensions of legs shall be as exsisting filling tank and compatible with existing trolleys in NNPSA1.	Done: Yes ☒ No ☐ Date/Sign 2005.02.14/Lajj

Accept criteria observance: Yes ☒ No ☐ **Date:** 14-2-05 **Sign:** _____

If no please view deviation raport:

Approved by NN: Yes ☒ No ☐ **Date:** 2005.02.14 **Sign:** Lajj

If no please view deviation raport:

Comments:

Maskinfabrikken Kofa aps

Version.: 01
Date.: 2005.01.05

Passivation test
Document no.: Passivation.001
Tank for project: 195-04

Passivation

Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

Passivation:

Procedure:	please se attachment 01.

Passivation done: Yes ☒ No ☐ **Date:** 14-2-05 **Sign:**

If no please view deviation raport:

Approved by NN: Yes ☒ No ☐ **Date:** 2005.02.15 **Sign:**

If no please view deviation raport:

Comments:

–

Attachment for Fat-CH25AW

Logbog for affedtning/passivering med salpetersyre

Anlæg nr. CH25AW .

Skyl Rørsystemet fyldes med demineraliseret vand, der cirkuleres i 10 min. Vandet dumpes. Skylletid _____ min.

Affedtning NaOH - opløsningen cirkuleres rundt i rørsystemet i 30 min. Koncentrationen kontrolleres ved titrering. Starttid _____ Sluttid _____ (20-70°C) Temp: _____ (≥1.2%) Konc: _____

Skyl Demineraliseret vand cirkuleres rundt i rørsystemet i 30 min. Vandet dumpes. Skylletid: _____ min.

Passivering: Salpetersyre opløsningen cirkulerer rundt i rørsystemet i 60 min. Koncentrationen kontrolleres ved titrering. Starttid 13:30 Sluttid 14:30 (20-40°C) Temp: 34° (18-22%) Konc: 23%

Skyl Rørsystemet gennemskylles med vand af passende kvalitet indtil skyllevandets pH-værdi er 5-9. Starttid 14:30 Sluttid 14:45 (5-9) pH: 6,5

Passivering/Acceptkriterier: Samtlige specificerede tider og koncentrationer er overholdt. NaOH konc ≥ 1,2%, Saltpetersyre 18-22 %, pH-værdi 5-9, tider overholdt.

Acceptkriterier overholdt: JA: X **NEJ:** _____ **Hvis nej se afvigelsesrapport**

Arbejde udført af serviceteknikker(e): Kim Tribler

Udfyldt af: Kim Tribler **Dato:** 2005.02.03

Maskinfabrikken Kofa aps

Triclorid

Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

To be sure that all wax from grinding and polising is removed before entering the production Site a treatment with triclorid is done.

Passivation:						
Procedure:	please see Attachment 02					
Passivation done:	Yes ☒	No ☐	**Date:** —	**Sign:** —		
If no please view deviation raport:						
Approved by NN:	Yes ☒	No ☐	**Date:** 2005.02.15	**Sign:** Lgj		
If no please view deviation raport:						
Comments: —						

LOGKORT FOR UDSYRING
LOG CHART FOR CHEMICAL CLEANING

Side: ____

Kunde / Costumer	Novo
Arbejdssted / Work location	
System / System	Rensning af tank CH25-AW 7302
Sektion / Sektion	

Proces *Process*	Dato *Date*	Tid *Time*	Temp. *Temp.* °C	Flow m/s	pH	Syre *Acid* %	Jern *Iron* mg/l	Ledn. *Conduc.* µS/cm	Inhib.		Bemærkninger *Remarks*	Sign.
	4-02-05	07 00									Tiltekning	
		07 45									opvarmning og cirkulation	
		08 15	65°								af Halbasol (Petroleum)	
		09 00									aftapning af Halbasol	
		09 10									Skylning med 80° demivand	
		09 30	80°			1 %					Cirkulation af 1% Nach (Lud) ved	80°
		10 40									Skylning med 80° demivand	
		11 00	80°			1 %					Cirkulation med H_3PO_4 (Fosforsyre)	80°
		12 05									Skylning med 80° demivand	
		12 15	80°			1 %					Cirkulation 1% citronsyre	80°
		13 15									Skylning med 80° demivand	
		13 30	35°			23%					Passivering med 23% saltpetersyre	35°
		14 30									Skylning med 80° demivand	
											Renset af Kim Tribler	

Godkendt af: _____

Dato: 4/10-57

Maskinfabrikken Kofa aps

Cleaning

Customer:	*Novo Nordisk A/S, Site Chartres, France*		
Case no:	*195-04*	**Drwg. no.:** *570-00278-A-002*	
		Tank. no.: *3012*	**Tag number:** *CH25AW*
Subject:	*600l Novomix tank*		

Cleaning:

Demand: (C) 5.3.8.1. Cleaning	Cleaned with alcohol inside and outside. User will supply alcohol to vendor	Done: Yes ☒ No ☐ Date/Sign: 2005.02.14/LaJJ
Demand: (C) 5.3.8.2. Cleaning	Washed/high-pressure cleaned inside and outside to prevent undesired impurities to enter the department. Cleaning shall ensure that the tank can be cleaned with the department cleaning equipment.	Done: Yes ☒ No ☐ Date/Sign: 2005.02.14/LaJJ

Cleaning done: Yes ☒ No ☐ **Date:** 14-2-05 **Sign:** _____

If no please view deviation raport:

Approved of NN: Yes ☒ No ☐ **Date:** 2005.02.14 **Sign:** LaJJ

If no please view deviation raport:

Comments:

-

Maskinfabrikken Kofa aps

Version.: 01
Date.: 2005.01.05

Drainable test
Document no.: Drainable.001
Tank for project: 195-04

Drainable

Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

Drainable.

Procedure:	Fill the tank with water and then empty it. Now do a visuel inspection for not drainable spots, primarily around the bottomvalve.

Drainable done: Yes ☒ No ☐ **Date:** 14-2-05 **Sign:** _____

If no please view deviation raport

Approved by NN: Yes ☒ No ☐ **Date:** 2005.02.15 **Sign:** _____

If no please view deviation raport

Comments:

–

Checkliste ved trykprøvning

FORCE INSTITUTTET

Fabrikant: Navn

KOFA aps
Speciale: rustfrit stål og alu
Færøvej 6 - 4681 Herfølge
Tlf. 56 27 51 11
Telefax 56 27 57 83

Adresse

Identifikations nr. 3012 År 2005

			Godkendt / bemærkning Dato/Init.
	80.970-4/1583		
Konstruktionsgrundlag	Norm: F		FORCE-Dantest CERT Poul T. Kristensen
	Kontrol af design godkendelse		
Udstyr	Trykmåler nr. F52480		
Trykprøvning	Prøvnings temp. 20	°C	
	Prøvningstryk 48	bar	
	Holdetid 20	min.	
Besigtigelse	Utætheder IAB		
	Blivende deformationer IAB		

Bemærkninger

TEG. NR. 570-00278-A-002

FORCE-Dantest CERT
Poul T. Kristensen
Inspektør · dato/underskrift

Eksaminator · dato/underskrift

655 1 0

Maskinfabrikken Kofa aps

Version.: 01
Date.: 2005.01.05

Leak test
Document no.:Leak.001
Tank for project: 195-04

Leak

Customer:	*Novo Nordisk A/S, Site Chartres, France*				
Case no:	*195-04*	**Drwg. no.:**	*570-00278-A-002*		
		Tank. no.:	*3012*	**Tag number:**	*CH25AW*
Subject:	*600l Novomix tank*				

Leak:

Procedure:	1. After cleaning the tank, apply Rocol penetrationfluid at ca. 20°. Active time 20 min. 2. Remove all surplus penetrationfluid. 3. Now apply Rocol developerfluid. Active time 15 min. 4. Inspection for indications. 5. After done inspection clean with water

Penetration done: Yes ☒ No ☐ **Date:** 14-7-05 **Sign:**

If no please view deviation raport

Approved by NN: Yes ☒ No ☐ **Date:** 2005.02.15 **Sign:**

If no please view deviation raport

Comments:

–

DANAK **Reg. nr. 30**

FORCE-Dantest CERT

Prøvningsrapport
Ikke-destruktiv prøvning

Sag/Rapport nr.	Periode	Dato
i41 231438 / 01	20.12.2004.	04.01.2005

Emne
600 liter trykbeholder nr.: 3012
Tegning nr.: 570-00278-A-002.

Vedr. oversigt over prøvningsmetoder og –resultater, se bilag 1

Rekvirent/Kunde
Maskinfabrikken KOFA ApS

Rekv./Ordre nr.
195 / 04

Entreprenør
Maskinfabrikken KOFA ApS

Bygherre
Novo Nordisk A/S

Rådgivende
Novo Nordisk Engineering A/S

Kontrolsted
FORCE Technology, Brøndby

Division/Afdeling
Inspektion og Prøvning , Brøndby

Kundekategori
-

Nøgleord

FORCE F 101
Jørgen Werngreen
Jørgen Werngreen den 04.01.2005.
Sagsbehandler - *Dato/underskrift*

Norman Thomsen
EN 473 Level 3
4-1-05
Prøvningssagkyndig - *Dato/underskrift*

Denne rapport består af nærværende side 1 af 1 samt Bilag 1-2 med underbilag ialt 6 sider.

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Fax. +46 21 18 02 02
e-mail info@forcetechnology.se
www.forcetechnology.se

Ikke-destruktiv prøvning
Oversigt

FORCE TECHNOLOGY

Division for Inspektion og Prøvning

Bilag nr.	FORCE id./Sag nr.	Side / af
1	i41 231438 / 01	1 / 1

Emne

Tank nr.: 3012.

De anførte detaljer er prøvet efter følgende specifikationer og med følgende resultater:

Prøvemetode 1:	Prøvemetode 2:	Prøvemetode 3:	Prøvemetode 4:	Prøvemetode 5:
RT				

Bilag nr.	Me-tode	Identifikation af detalje	Prøvn. omfang %	Metodespecifikation / Acceptstandard	Klasse / Klasse	Krav opfyldt (Ja/Nej)	Antal blade el. rapporter
2	1	2 lang-og 2 rundsømme Krvds	10 100	EN1435	B	Ja	4
				EN12517 EN13445-5. Tab. 6.6.4-1	2		

Prøvningsteknikeren, det anvendte udstyrs identifikation, udstyrets indstillingsdata samt andre relevante oplysninger fremgår for de enkelte metoder af vedlagte markrapporter. Ved metode RT er bagsiden af blanket nr. 100/122 kopieret sidst i bilaget.

Øvrige bemærkninger

Til denne rapport hører følgende dokumentation:

Bilag 1.: Denne oversigt.
Bilag 2.: Radiografi markrapport R1.
Film.: 4 stk. mrk. 231438 / 3012 / film nr.: 1-4.

Markrapport

Radiografi svejsesømme

Division for Inspektion og Prøvning

DANAK Reg. nr.	Bilag nr.	FORCE id. / FORCE sag nr.	Rapport id	Rapport nr.	Side af
30	2	I41_231438	GNP1RT454	84	1 / 1

Rekvisition nr.	Prøvningsperiode / Dato	Tekniker (Init.)	Certifikat nr.	Assistent (Init.)	Certifikat nr.
195/04	20-12-2004	GNP	124-N2-R	FTO	0275-N2-R

Rekvirent	Bygherre
Maskinfabrikken Kofa ApS	Novo Nordisk A/S
Entreprenør	**Prøvningssted**
maskinfabrikken Kofa ApS	FORCE BRØNDBY

Emne (Mrk., dim., antal)
1 STK 600L Beholder Nr 3012

Tegning nr. / Revision / Skitse / Andet	Prøvningsomfang	Materialebetegnelse	Emne modtaget dato
~~3013~~ 570-00278-4-002	+ 100 af kryds 10% AF LANG OG RUNDSØMM	Rustfrit stål	

Prøvningsspecifikation (standard)	Kvalitetskrav (standard, niveau)
EN 1435, klasse B	EN 12517, acceptniveau 2EN13445-5 TAB.6.6.4-3

Supplerende oplysninger (Uden ansvar, se fodnote)

Svejsemetode	Varmebehandlet	Tidspunkt for prøvning
141 TIG		Timer efter sv.

Prøvetekniske oplysninger

Filmtype	Filmklasse 1)	Foliemateriale	For/bagfolie
AGFA D4	C3	Pb	0,027 / 0,027 mm
Fremkaldelse	**Betragterlampe reg. nr.**	**Max. sværtning**	**Densitometer reg nr.**
Automatisk	VGI-1 -	3,6	PDE 1

Optageteknik A-E	Eksp./søm	Eksp./søm	Eksp./søm	Exp.	kVP	SFD cm	mA/Ci	Min.
[X] A ☘ II	[ ] B ☢	[ ] C ☘	[ ] D ☘ ○	[X] E ☘ ○	1	190 /	110 /	4 /	1.20

Udstyr reg. nr.	Kildetype	Brændplet / Kilde dim.	Forfiltertype / -tykkelse		
XRM-1	Smart	1,6 x 1.6	-	-	mm
Udstyr reg. nr.	Kildetype	Brændplet / Kilde dim.	Forfiltertype / -tykkelse		
-	-	- x -	-	-	mm

Type / Placering af IQI		Filmsværtning (interval)
13 FE EN	Filmside	2,5-3,5

Film														
[✓] Film nr. [ ] Søm nr.	Filmplacering	Svejser mrk.	Opt./ eksp. data	Gennemstr. t + vulster Rør ø mm	MST 2)	Dominerende svejsefejl 3)	IIW kar. 4)	Kval. krav Op-fyldt	Kval. krav Ikke opfyldt	Svejsefejl / debris placering	Debris 5)	Extra for	Rep på film nr. 6)
1	LS1/RS1. 2,70-0,00-0,30	?	C-1	10/0 -	15			[✓]	[ ]		[ ]		
2	RS1/LS2. 0,00-0,17	?	A-1	10/0 -	15			[✓]	[ ]		[ ]		
3	LS2/RS2. 0,601,06	?	C-1	10/0 -	15			[✓]	[ ]		[ ]		
4	RS2/LS1. 0,68-0,85	?	A-1	10/0 -	15			[✓]	[ ]		[ ]		

Opmærkning	Kontrol af	Bilag vedlagt	Tekniker (Dato / Underskrift)
		3	20-12-2004 Gunner Nygaard Petersen
Emne stemplet	[ ] Kopi afleveret til	Att. af Rekvirent / Bygherre / Myndighed / Niveau 3	

Supplerende oplysninger : Oplysningerne i de grå felter er til information og angives kun i den udstrækning, de er tilgængelige og relevante. Deres angivelse på nærværende markrapport kan ikke betragtes som en verifikation af deres rigtighed

1)-6): Se forklaring på medfølgende side / bagside

ist CERT

2004

ohansen

Note: Ascending pipe, look at drawing no. 570-00278-D

Tank nr.: 3012
i41 231438 / 01
Rap nr.: R1
Bilag nr.: 1

Rev.:	Rev. date:	Design init.:	Revisions:
002	2004-03-24	CIS	Pos. no. 11 and 12 change to the same position as pos. no. 27 and 28. Change to pos. no. 10. Pos. no. 11, 12 and drawing no. 570-00278-E are cancelled.
001	2004-03-12	CIS	First edition.

ITEM	NAME	PCS.	DRWG. NO.	MATERIAL	DIMENSION/TYPE
29	Rating plate	1	–	SS	Refering to the supplyer
28	Clamp branches	3	–	EN 1.4404	Nom size 51 DIN 2852
27	Pipe branches	3	–	EN 1.4404	Pipe ø51 x 1,2 mm.
26	Clamp branches	1	–	EN 1.4404	Nom. size ø168,3 DIN 2852
25	Brackets/steps	3	–	EN 1.4301	Flat rolled steel 10 x 80 mm.
24	Flange. NovAseptic	1	–	EN 1.4404	NAC-S38/H25
23	Bracket	1	–	EN 1.4301	Round bar steel ø10 mm.
22	Base plate	4	–	EN 1.4301	Flat rolled steel 10 x ø100 mm.
21	Rectang. reinforcem. plate	4	–	EN 1.4301	Plate 4 x 116 mm.
20	Circular reinforcement plate	4	–	EN 1.4301	Plate 4 x ø100 mm.
19	Vertical brace	4	–	EN 1.4301	Flat rolled steel 10 x 80 mm.
18	Distance pieces for rails	4	–	EN 1.4301	Flat rolled steel 10 x 80 mm.
17	Rails	2	–	EN 1.4301	Flat rolled steel 10 x 80 mm.
16	Legs + reinforcement	–	–	EN 1.4301	Pipe ø76 x 2,0 mm.
15	Baffle plate + eye bar	1	570-00278-C	EN 1.4404	–
14	Bracket	1	–	EN 1.4301	Pipe ø20 x 2,0 Length 200 mm
13	Reinforcement plat	2	–	EN 1.4301	Flat rolled steel 30 x 10 mm.
12					
11					
10	Clamp branches	1	–	EN 1.4404	Welding clamp DN 10. DIN
09	Outlet pipe	1	–	EN 1.4404	Pipe ø12 x 1,0 mm.
08	Bottom valve. Steridose	1	–	EN 1.4435	Novo Nordisk supply
07	Magnetic stirrer. NovAseptic	1	–	EN 1.4435	Novo Nordisk supply
06	Sample valve. NovAseptic	1	–	EN 1.4404	NA-Sample type NAV-4-2/D
05	Sight glass. HØYER	1	–	EN 1.4404	Clearance ø125 150°C
04	Tank cap. Zimmerlin GMBH	1	–	EN 1.4404	6 pcs.Y-handle +3/-1 bar 220°C
03	Shell	–	–	EN 1.4404	Plate 5 mm.
02	Head/Bottom	1	570-00278-B	EN 1.4404	Outward ø910 Width=5 mm.
01	Head/Top	1	–	EN 1.4404	Outward ø912 Width=6 mm.

Drawing checked: 2004-03-25 AR. Drawing approved: 2004.03.25 Document classification: III

novo nordisk

Novo Nordisk A/S
Novo Allé
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Novo Nordisk Pharmaceutique S.A. - Chartres, France

Creation date:	2004-02-23
Revision date:	2004-03-25
Draughtsman:	CIS
Designer:	CIS
Scale:	1:5
Page no.:	

Vessel
600 litre pressure vessel
Assembly drawing

570-00278-A-002

C B

Tank nr.: 3012
i41 231438 / 01
Rap nr.: R1
Bilag nr.: 2

Fabrikant: Manufacturer:	Maskinfabrikken Kofa ApS Færøvej 6. 4681 Herfølge. DENMARK			
Fremstillingsår: Year of manufacturer:	2004			
Løbenummer: Serial Number:	–			
Tilladt minimal–/maksimaltryk Minimum/maximum allowable pressure	PS	Tank –1/3	Kappe	Baro
Prøvningstryk Test pressure	PT	4,8		Baro
Tilladt minimal–/maksimaltemperatur Minimum/maximum allowable temperature	TS	0/+144		°C
Volumen Volume	V	730		L
Fluida gruppe Fluids group	2			
Taramasse Tara mass	250			kg
CE 0200				

Permissible number of pressure variations (0–3 bar): 22.000

Field of purpose:	Pressure tank Category III according to the Danish Working Environment Service regulation no. 743 from 23 sep. 1999.
Conformity module:	B1 + F
Construction standard/ Fabrication standard:	EN 13445: 2002
Authority body:	Force–Dantest Cert. CE0200
Materials:	See item list, materials will be delivered with certificate 3.1.B according to EN 10204. Plate materials according to EN 10028–7 or DIN 17440/17441. Pipe materials will be delivered according to DIN 17457/17458.
Limits without specifications:	Welded components DS/EN 13920 serial C. Chip removing components DS/EN 22768–1 class C. Design engineering of end plates is based on a max. 10% reduction of the material thickness.
Welding procedure:	Welding methods arc welding DS/EN 288–2 WPS and approved WPAR according to EN 288–3 WPS and WPAR PED.
Welding filler:	According to WPAR EN 288–3.
Welding quality/level:	According to DS/EN 729–2. Level B according to DS/EN 25817.
Welder:	Certified according to DS/EN 287–1
Corrosion addendum:	0 mm.
Surface treatment:	External: Grinded to Ra < 0,7 µm. Leg, stay and bearer will be glass–blown. Internal: Grinded to Ra < 0,3 µm. with following polishing.
Placement of welding seam:	Seams will be placed free of cut outs, wrapped long seams based on min. 100 mm. according to the seam end plates.
Welding factor:	0,85
NDT:	10% X–rays of round– and long seams, 100% in junctions. 10% liquid penetrant examination of connection pieces according to DS/EN 571–1, acceptable level according to DS/EN 1289, 100% liquid penetrant examination of all round– and long seams.
Fillet welds:	a–measurement 0,7 x min thickness of plate without specifications.
End plates:	Materials with a deformation limit $A_5 >= 40\%$

10 9 8 7 6

Skitseblad/Beholdere

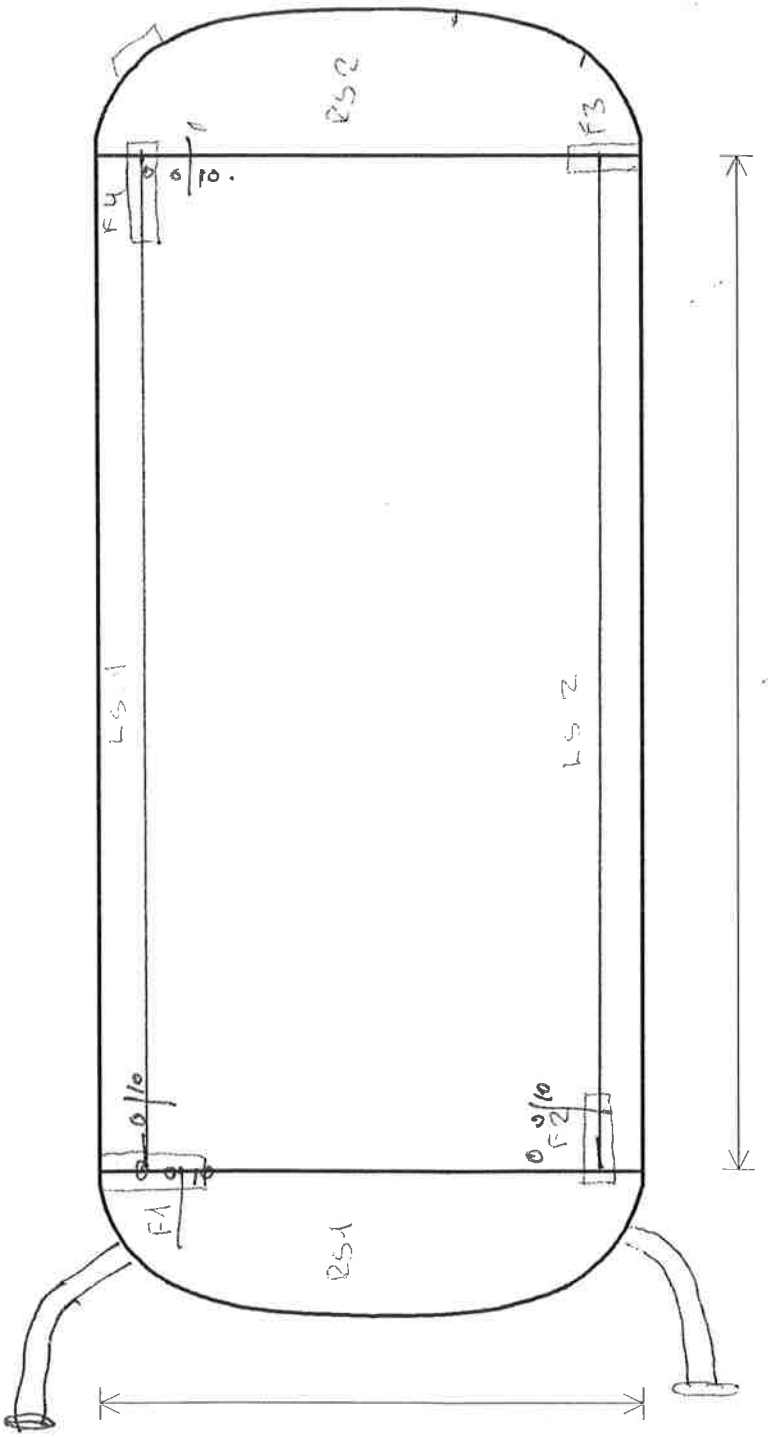
Division for Inspektion og Prøvning

FORCE INSTITUTTET

DANAK Reg. nr.	FORCE id./FORCE Sag nr.		Bilag nr.		Side af
30	141-231438/01		3		1/1
Rekvisition nr.	**Kontrolperiode/Dato**	**Tekniker (Init.)**	**Certifikat nr.**	**Assistent (Init.)**	**Certifikat nr.**
145/04	2004 12.20	GNP	0124-102-7	FTO	0275-102-7

Beholder nr. / mærke

3012.



Kontrolmetode / omfang

EC Declaration of conformity

Manufacturer: Maskinfabrikken Kofa ApS
Færøvej 6
4681 Herfølge

Hereby ensures and declares that.

Pressure Vessel.

Description:	600 litre Pressure vessel
Serial no.:	3012
Year of manufacture:	2004
Drawing no.:	570-00278-A-002
Fluida group:	2
Conformity assessment procedure followed:	B1 + F
Volume:	730 l
Design pressure:	-1 +3 BarG
Design temperature:	0/144°C
Code:	EN13445
Other Community Directives applied:	N/A
Approval no.:	DK-0200-4.1316.1/04
Notified body/identification no.:	FORCE-Dantest CERT /0200

Is manufactured in accordance with the DIRECTIVE 97/23/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment and the other Community Directives stated above.

Name, title and signature of the signatory authorized to sign the legally binding declaration for the manufacturer:

14-2-05	Smedemester	
Date	Title	Name

FORCE-Dantest CERT

Certificate of EC design-examination, Module B1, for pressure equipment

Number: DK - 0200 - 4.1315.1 / 04

Issued by FORCE-Dantest CERT, Denmark
EEC-notified body number 0200

In accordance with the Danish Ministry of Labour Regulation No. 743 of September 23rd 1999, which in Denmark implements The parliament and The Councils directive No. 97/23/ EEC Pressure Equipment Directive, Certificate of EC design-examination Module B1, is issued to:

The Manufacturer

Maskinfabrikken KOFA aps

Færøvej 6

4681 Herfølge

for pressure equipment		600 litre pressure vessel
Type		Vessel
Main drawing marked Novo Nordisk Pharmaceutique S.A. – Chartres, France		570-00278-A-002 Tank
Design pressure	bar	-1 / 3
Design temperature	min./max. °C	0 / 144

Tests have been carried out as noted in the annex to this certificate of EC design-examination.

The results of the tests are in accordance with the relevant requirements in the Danish Ministry of Labour Regulation No. 743 of September 23rd 1999.

Date of issue of Danish original: 2005-02-14

Danish original signed by Villy Andreasen
Certification manager

Lars Tofte Johansen
Examiner

Date of issue of translation: 2005-02-14 Signature

p. Villy Andreasen
Certification manager
FORCE-Dantest CERT
Park Allé 345
DK-2605 Brøndby

This document is a non approved translation of the original certification of conformity issued

194-1-1-da-da

FORCE-Dantest CERT

Annex to Certificate of EC Design-examination, Module B1, for pressure equipment

Number: DK - 0200 – 4.1315.1 / 04

for pressure equipment	600 litre pressure vessel
Type	Vessel
Main drawing marked Novo Nordisk Pharmaceutique S.A. – Chartres, France	570-00278-A-002

The certificate of EC design-examination is issued on the basis of the following tests:

The manufacture has in the construction applied:

	Yes	No	If yes write the name:
Harmonised standard	X		EN 13445
Alternative standard		X	
Other directives		X	

Examine the technical documentation with respect to design and the manufacturing procedures as stated in the drawings:
570-00278-A-002
570-00278-B-001
570-00278-C-001
570-00278-D-001

FORCE Dantest CERT
07 APR. 2004
Lars Tofte Johansen
4-1315/04

stamped with FORCE-Dantest CERT 's stamp

Approval/check of the procedures for welding in accordance with 97/23/EC section 3.1.2 of annex I
Examination of marking and labelling.

The certificate is issued on the condition that the welders are approved in accordance with 97/23/EC section 3.1.2 of annex I, and that the personal for non destructive examinations are approved in accordance with 97/23/EC section 3.1.3 of annex I

Date of issue of Danish original: 2005-02-14

Danish original signed by	Villy Andreasen Certification manager	Lars Tofte Johansen Examiner

Date of issue of translation: 2005-02-14 Signature:

Certification manager
FORCE-Dantest CERT
Park Allé 345
DK-2605 Brøndby

This document is a non approved translation of the original certification of conformity issued

FORCE-Dantest CERT

Certificate of conformity, Module F, for pressure equipment

Number: DK - 0200 - 4.1583.1 / 04

Issued by FORCE-Dantest CERT, Denmark
EEC-notified body number 0200

In accordance with the Danish Ministry of Labour Regulation No. 743 of September 23rd 1999, which in Denmark implements The parliament and The Councils directive No. 97/23/ EEC Pressure Equipment Directive, Certificate of conformity Module F (EC product verification) is issued to:

The Manufacturer

Maskinfabrikken KOFA ApS

Færøvej 6

4681 Herfølge

for pressure equipment	2 p., Vessel 600 litre
Serial number	3012 and 3013
The year of manufacture	2005
Main drawing marked Novo Nordisk Pharmaceutique S.A. – Chartres, France	570-00278-A-002

EC Type Examination / EC Design Examination no. DK – 0200 – 4.1315 / 04 issued by the notified body:

Name	FORCE-Dantest CERT
Address	Park Alle 345, 2605 Brøndby
Identifications no.	0200

		Tank
Design pressure	bar	-1 / 3
Design temperature	min./max. °C	0 / 144

Tests have been carried out as noted in the annex to this certificate of conformity.
The results of the tests are in accordance with the relevant requirements in the Danish Ministry of Labour Regulation No. 743.

Date of issue of Danish original: 2005-01-21

Danish original signed by

Villy Andreasen
Certification manager
FORCE-Dantest CERT
Park Allé 345
DK-2605 Brøndby

Lars Tofte Johansen
Examiner

Date of issue of translation: 2005-01-21

Signature

Villy Andreasen
Certification manager

This document is a non approved translation of the original certification of conformity issued

194-1-1-da-da

FORCE-Dantest CERT

Annex to
Certificate of conformity, Module F, for pressure equipment

Number: DK - 0200 - 4.1583.1 / 04

for pressure equipment	2 p., Vessel 600 litre
Serie number	3012 and 3013
The year of manufacture	2005
Main drawing marked Novo Nordisk Pharmaceutique S.A. – Chartres, France	570-00278-A-002

The certificate of conformity is issued on the basis of the following tests:

The manufacture has in the construction applied:

	Yes	No	If yes write the name:
Harmonised standard	X		EN 13445
Alternative standard		X	
Other directives		X	

EC Type Examination / EC Design Examination no. DK – 0200 – 4.1315 / 04
issued by the notified body:

Name	FORCE-Dantest CERT
Address	Park Alle 345, 2605 Brøndby
Identifications no.	0200

Approval/check of the procedures for welding in accordance with 97/23/EC section 3.1.2 annex I

Approval/check of the welders in accordance with 97/23/EC section 3.1.2 of annex I

Approval/verification of the qualifications of the personal for non destructive examinations in accordance with 97/23/EC section 3.1.3 of annex I

The final inspection as referred to in 97/23/EF section 3.2.1 of annex I

Performed proof test at 4,8 bar gauge in accordance with 97/23/EC section 3.2.2 of annex I

Examination of marking and labelling in accordance with 97/23/EF section 3.3 of annex I

Date of issue of Danish original: 2005-01-21

Danish original signed by Villy Andreasen
Certification manager

Lars Tofte Johansen
Examiner

Date of issue of translation: 2005-01-21

Signature:

p. Villy Andreasen
Certification manager

This document is a non approved translation of the original certification of conformity issued

194-1-1-da-da

Guide d'utilisation des cuves de pression

CH 25AW et CH 25AX

Author		
Init: OP	Date: 2004-11-12	Signature:

1. Generalités

- Les cuves sont livrées avec un certificat CE selon Arbejdstilsynets bekendtgørelse nr. 743 du 23. september 1999 effectuant directive UE n° 97/23/EF, 1997, L 181, p. 1.
- Les cuves sont livrées comme des équipements à pression sans des mesures de sécurité.
- Les cuves doivent être sécurisées avec une soupape de sécurité/ avec une pression tarée ne pas dépassant la pression maximale indiquée sur la plaque de la cuve. Il faut vérifier que la capacité des mesures de sécurité est suffisante.
- Les cuves ne doivent pas être remplies ou mises en service avant qu'elles soient sécurisées contre une pression supérieure à la pression maximale et une température supérieure à la température maximale.

2. Installation

- Pendant le transport les réservoirs devraient être manipulés avec une méthode appropriée pour exemple chariot élévateur, transpalette et/ou grue adaptée aux conditions.
- En installant les cuves il faut vérifier que le sol sera nivelé et plat et a une force suffisante pour le poids maximal de la cuve.

3. Mettre en service

- Avant de mettre les cuves en service, les soupapes de sécurité doivent être contrôlées au niveau des points suivants :
  - Action libre de toutes les pièces de la soupape.
  - Pression tarée conforme
  - Etanchéité intérieure et extérieure.
  - Autres paramètres indiqués dans la documentation fournisseur.
- Le type et l'état des joints doivent être vérifiés.
- Les cuves ne doivent pas être mises en servive avant qu'elles soient testées à pression et les fuites éventuelles sont identifiées.
- Avant de mettre les cuves en service elles doivent être approuvées par le « Arbejdstilsynet » ou autre service gouvernemental.
- Le cahier « Kontrolbog for trykbeholder » doit être rempli correcte et approuvé avant le mis en œuvre des cuves.

4. Domaine d'application

- Les cuves ne peuvent qu'être utilisées pour le groupe de liquide à quel elles sont approuvées.
- Les joints et boulons doivent être intacts et du vrai type.
- En cours utilisation, les cuves peuvent être chaudes et le contact avec celle-ci est donc déconseillé.
- Le trou d'homme ne peut d'être ouvert quand lorsque la cuve est sans pression et toutes les vannes d'entrée sont fermées.

5. Maintenance/Vérification par l'utilisateur

- Les autorités nationales donnent les exigences de mettre les cuves en service.
- Aux indications de corrosion des parties les cuves doivent être mises hors service et éventuellement dépannée.
- C'est la responsabilité de l'utilisateur de respecter les services intermittents décrits par les autorités locales.
- Après modification, rétablissement ou relocation les exigences d'installation et mettre en service des autorités nationales doivent être suivies.
- Les joints du trou d'homme etc. doivent être remplacés chaque 6 mois ou à l'indication de défaut.

EN13445 - 7.4.2 CYLINDRICAL SHELL

S1.1 Svøb 25 Mar. 2004 14:52

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

GENERAL DESIGN DATA

PRESSURE LOADING: Design Component for Internal and External Pressure
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm, Pext= .1MPa
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 1000.00 mm

SHELL DATA

CYLINDER FABRICATION: Plate Material
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
DIAMETER INPUT: Base Design on Shell Outside Diameter
EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 f=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93
OUTSIDE DIAMETER OF SHELL.....:De 910.00 mm
LENGTH OF CYLINDRICAL PART OF SHELL.....:Lcyl 931.00 mm
SAFETY FACTOR (1.0 carbon and 1.25 austenitic steels):s 1.25
UNSUPPORTED LENGTH OF SHELL (Fig. 8.5-2).....:L 1088.00 mm
AS BUILT WALL THICKNESS (uncorroded).....:en 5.00 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.3000 mm

DATA FOR STIFFENER RINGS

SHELL STIFFENER RINGS: Shell without stiffening rings

CALCULATION DATA

7.4.2 - CYLINDRICAL SHELLS UNDER INTERNAL PRESSURE

Required Minimum Shell Thickness Excl.Allow. emin :
emin = De * P / (2 * f * z + P) (7.4-2)
=910*.3098/(2*137.47*.85+.3098)= 1.20 mm

Required Minimum Shell Thickness Incl.Allow. :
emina = emin + c + th =1.2+0+.3= 1.50 mm

Analysis Thickness
ea = en - c - th =5-0-.3= 4.70 mm

»7.4.1 Cond.of Applicabilty emin/De=0.0013 <= 0.16« » OK«

»Internal Pressure emina=1.5 <= en=5[mm] « » (U= 30%) OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :

Inside Diameter of Shell
Di = De - 2 * ea =910-2*4.7= 900.60 mm
Mean Diameter of Shell
Dm = (De + Di) / 2 =(910+900.6)/2= 905.30 mm
MAWP HOT & CORR. (Corroded condition at design temp.)
MAWPHC = 2 * f * z * ea / Dm =2*137.47*.85*4.7/905.3= 1.21 MPa

MAWP NEW & COLD (Uncorroded condition at ambient temp.)
MAWPNC = 2 * f20 * z * (ea + c) / Dm
=2*180*.85*(4.7+0)/905.3= 1.59 MPa

Company Address
Client :NN Chartres Vessel Tag No.:XXX
Visual Vessel Design by OhmTech Ver:9.0-04 Operator :SqLr Rev.:A

EN13445 - 7.4.2 CYLINDRICAL SHELL

S1.1 Svøb 25 Mar. 2004 14:52

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Ptmax = 2 * ftest * z * (ea + c) / Dm
=2*265*.85*(4.7+0)/905.3= 2.34 MPa

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=2.34[MPa] « » (U= 20.9%) OK«

8.5 - CYLINDRICAL SHELL UNDER EXTERNAL PRESSURE

8.5.1.1 Circularity Limits

»The requirements of 8.5.2 and 8.5.3 apply to cylinders that are circular to wi_
thin 0.5% on radius (i.e. 0.005R) measured from the true centre. The tolerance s_
hall appear on the vessel drawing.

8.4.3 Nominal Elastic Limit Sige:

Sige = Rpt / (1.3 * s) (8.4.3-1) =183.16/(1.3*1.25)= 112.71 N/mm2

Preliminary Calculations

R = Dm / 2 =905.3/2= 452.65 mm
Z = PI * R / L (8.5.2-7) =3.14*452.65/1088= 1.31
Delta = 1.28 / Sqr(R * ea) (8.5.3-20) =1.28/Sqr(452.65*4.7)=0.0278
gamma = 0 for No Stiffeners

DETERMINATION OF eps FROM FIGURE 8.5-3 :

eps is a minimum when n=5
eps (from fig. 8.5-3) =0.000427

MEMBRANE YIELD py

py = Sige * ea / (R * (1 - gamma * G)) (8.5.3-15)
=112.71*4.7/(452.65*(1-0*0))= 1.17 MPa

ELASTIC INSTABILITY pe

pm = E * ea * eps / R (8.5.2-5)
=1.8945E05*4.7*4.2715E-04/452.65= 0.8402 MPa

MAX. ALLOWABLE EXTERNAL PRESSURE Pmax

Value pr/py From Figure 8.5-5 Curve 1
Valuel = == 0.3618
pr = Valuel * py =0.3618*1.17= 0.4235 MPa
Max. Allowable External Pressure
Pmax = pr / S (8.5.2-8) =0.4235/1.5= 0.2823 MPa

»External Pressure Pmax=0.2823 >= Pext=.1[MPa] « » (U= 35.4%) OK«

CALCULATION SUMMARY

EN13445 - 7.4.2 CYLINDRICAL SHELL

S1.1 Svøb 25 Mar. 2004 14:52

7.4.2 - CYLINDRICAL SHELLS UNDER INTERNAL PRESSURE

Required Minimum Shell Thickness Excl.Allow. emin :
emin = De * P / (2 * f * z + P) (7.4-2)
=910*.3098/(2*137.47*.85+.3098)= 1.20 mm

Required Minimum Shell Thickness Incl.Allow. :
emina = emin + c + th =1.2+0+.3= 1.50 mm

»Internal Pressure emina=1.5 <= en=5[mm] « » (U= 30%) OK«

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Ptmax = 2 * ftest * z * (ea + c) / Dm
=2*265*.85*(4.7+0)/905.3= 2.34 MPa

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=2.34[MPa] « » (U= 20.9%) OK«

8.5 - CYLINDRICAL SHELL UNDER EXTERNAL PRESSURE

Max. Allowable External Pressure
Pmax = pr / S (8.5.2-8) =0.4235/1.5= 0.2823 MPa

»External Pressure Pmax=0.2823 >= Pext=.1[MPa] « » (U= 35.4%) OK«

Volume:0.59 m3 Weight:105 kg (SG= 7.93)

EN13445 - 7.5 DOMED ENDS

E1.1 Kugleskal mandehul 25 Mar. 2004 14:53

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

Attachment: Other/DisConnected
Origo x-value referenced to the base coordinate system:x 0.00 mm
Origo y-value referenced to the base coordinate system:y 0.00 mm
Origo z-value referenced to the base coordinate system:z 0.00 mm
Angle between axis of symmetry and z-axis of the BCS:Teta 0.00 Degr.
Angle of rotation of z-axis projected in the x-y plane:Phi 0.00 Degr.

GENERAL DESIGN DATA

PRESSURE LOADING: Design Component for Internal and External Pressure
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm, Pext= .1MPa
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 1000.00 mm

DIMENSIONS OF END

Design Diameter: Base Design on Outside Diameter
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
OUTSIDE DIAMETER OF CYLINDRICAL FLANGE OF END.....:De 900.00 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.4000 mm
AS BUILT THICKNESS OF HEAD/END (uncorroded).....:en 4.00 mm

MATERIAL DATA FOR END

EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 f=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93
SAFETY FACTOR (1.0 carbon and 1.25 austenitic steels):s 1.25

CALCULATION DATA

7.4 - SPHERICAL ENDS UNDER INTERNAL PRESSURE

Required Minimum End Thickness Excl.Allow. emin :
emin = De * P / (4 * f * z + P) (7.4-5)
=900*.3098/(4*137.47*0+.3098)= 0.5961 mm

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =0.5961= 0.5961 mm

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =0.5961+0+.4= 1.00 mm

»Internal Pressure emina=1 <= en=4[mm] « » (U= 25%) OK«

Analysis Thickness
ea = en - c - th =4-0-.4= 3.60 mm
Inside Diameter of Shell
Di = De - 2 * (en - c) =900-2*(4-0)= 892.00 mm
Mean Diameter of Shell
Dm = (De + Di) / 2 =(900+892)/2= 896.00 mm

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*180*.85*3.6/896= 2.46 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*137.47*.85*3.6/896= 1.88 MPa

EN13445 - 7.5 DOMED ENDS

E1.1 Kugleskal mandehul 25 Mar. 2004 14:53

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*265*.85*3.6/896= 3.62 MPa

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=3.62[MPa] « » (U= 13.5%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

8.4.3 Nominal Elastic Limit Sige:
Sige = Rpt / (1.3 * s) (8.4.3-1) =183.16/(1.3*1.25)= 112.71 N/mm2
Mean Radius R:
Rmean = (De - ea) / 2 =(900-3.6)/2= 448.20 mm
MEMBRANE YIELD py
py = 2 * Sige * ea / Rmean (8.7.1-1) =2*112.71*3.6/448.2= 1.81 MPa

ELASTIC INSTABILITY pm
pm = 1.21 * E * ea ^ 2 / Rmean ^ 2 (8.7.1-2)
=1.21*1.8945E05*3.6^2/448.2^2= 14.79 MPa

Value pr/py From Figure 8.5-5 Curve 2
Value1 = == 0.5700

MAX. ALLOWABLE EXTERNAL PRESSURE Pmax

pr = Value1 * py =0.57*1.81= 1.03 MPa
Pmax = pr / S =1.03/1.5= 0.6881 MPa

»External Pressure Pmax=0.6881 >= Pext=.1[MPa] « » (U= 14.5%) OK«

8.7.2 - Permissible Shape Deviations

»The method of 8.7.1 applies to dished ends that are spherical to within 1% on _ radius and in which the radius of curvature based on an arc length of 2.4*Sqr(ea_ *Rmax) does not exceed the nominal value by more than 30%.

CALCULATION SUMMARY

7.4 - SPHERICAL ENDS UNDER INTERNAL PRESSURE

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =0.5961= 0.5961 mm

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =0.5961+0+.4= 1.00 mm

»Internal Pressure emina=1 <= en=4[mm] « » (U= 25%) OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*265*.85*3.6/896= 2.46 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*265*.85*3.6/896= 1.88 MPa

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Pmax = 4 * f * z * ea / Dm (7.4-6) =4*265*.85*3.6/896= 3.62 MPa

EN13445 - 7.5 DOMED ENDS

E1.1 Kugleskal mandehul 25 Mar. 2004 14:53

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=3.62[MPa] « » (U= 13.5%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

»External Pressure Pmax=0.6881 >= Pext=.1[MPa] « » (U= 14.5%) OK«

Volume:0.19 m3 Weight:40 kg (SG= 7.93)

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

Attachment: S1.1 Cylindrical Shell Svøb
Location: Along z-axis z1= 931

GENERAL DESIGN DATA

PRESSURE LOADING: Design Component for Internal and External Pressure
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm, Pext= .1MPa
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 69.00 mm

DIMENSIONS OF END

Type of Torispherical End: Dished End KLOPPERFORM EN 28011-28012
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
OUTSIDE DIAMETER OF CYLINDRICAL FLANGE OF END.....:De 910.00 mm
LENGTH OF CYLINDRICAL FLANGE OF END.....:Lcyl 21.00 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.6000 mm
AS BUILT THICKNESS OF HEAD/END (uncorroded).....:en 6.00 mm

MATERIAL DATA FOR END

EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 f=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93
SAFETY FACTOR (1.0 carbon and 1.25 austenitic steels):s 1.25
Material & Delivery Form: Cold Spun Seamless Austenitic Stainless Steel

NOZZLES IN KNUCKLE REGION TO SECTION 7.7

Nozzles In Knuckle Region: YES
INSIDE DIAMETER OF NOZZLE (corroded).....:dib 450.00 mm

CALCULATION DATA

7.7 Nozzles Which Encroach Into the Knuckle Region

V = LOG(1000 * P / f) (7.7.3) =LOG(1000*.3007/137.47)= 0.3399
A = MAX(0.5,0.264+0.938*V-0.592*V^2+0.14*V^3) (7.7.4)
=MAX(0.5,0.264+0.938*0.3399-0.592*0.3399^2+0.14*0.3399^3)=0.5199
B = MIN(4.2 , 4.9 - 2.165 * V + 0.151 * V ^ 2) (7.7.5)
=MIN(4.2,4.9-2.165*0.3399+0.151*0.3399^2)= 4.18
BetaK = MAX(A + B * dib / De, 1 + 0.3 * B * dib / De) (7.7.6)
=MAX(0.5199+4.18*450/910,1+0.3*4.18*450/910)= 2.59

7.5.3 - TORISPHERICAL ENDS UNDER INTERNAL PRESSURE

7.5.3.2 Required Minimum End Thickness

Required Thickness of End to Limit Membrane Stress in Central Part
es = P * R / (2 * f * z - 0.5 * P) (7.5-1)
=.3007*898/(2*137.47*.85-0.5*.3007)= 1.16 mm

fb = Rpt / (1.5 * 1.3) * 1.6 (7.5-5) =183.16/(1.5*1.3)*1.6= 150.29 N/mm2
Required Thickness of Knuckle to Avoid Plastic Buckling
eb = (0.75*R+0.2*Di)*((P/(111*fb)*(Di/r)^0.825)^(0.667) (7.5-3)
=(0.75*898+0.2*898)*((.3007/(111*150.29)*(898/89.8)^0.825)^(0.667)= 2.07 mm

7.5.3.5 Formulas for Calculation of Factor Beta
Y = MIN(emin / R, 0.04) (7.5-9) =MIN(4.57/898,0.04)= 0.0051
Z = LOG(1 / Y) (7.5-10) =LOG(1/0.0051)= 2.29
X = r / Di (7.5-11) =89.8/898= 0.1000
N = 1.006 - 1 / (6.2 + (90 * Y) ^ 4) (7.5-12)
=1.006-1/(6.2+(90*0.0051)^4)= 0.8458
Beta01 = N*(-0.1833*Z^3+1.0383*Z^2-1.2943*Z+0.837) (7.5-15)
=0.8458*(-0.1833*2.29^3+1.0383*2.29^2-1.2943*2.29+0.837)=0.9464
Beta02 = MAX(0.5, 0.95 * (0.56 - 1.94 * Y - 82.5 * Y ^ 2)) (7.5-17)
=MAX(0.5,0.95*(0.56-1.94*0.0051-82.5*0.0051^2))= 0.5206
beta = 10 * ((0.2 - X) * Beta01 + (X - 0.1) * Beta02) (7.5-16)
=10*((0.2-.1)*0.9464+(.1-0.1)*0.5206)= 0.9464
Required Thickness of Knuckle to Avoid Axisymmetric Yielding
ey = beta * BetaK * P * (0.75 * R + 0.2 * Di) / f (7.5-2)
=0.9464*2.59*.3007*(0.75*898+0.2*898)/137.47= 4.57 mm

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =4.57= 4.57 mm

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =4.57+0+.6= 5.17 mm

»Internal Pressure emina=5.17 <= en=6[mm] « » (U= 86.1%) OK«

Analysis Thickness
ea = en - c - th =6-0-.6= 5.40 mm
Inside Diameter of Shell
Di = De - 2 * (en - c) =910-2*(6-0)= 898.00 mm
Mean Diameter of Shell
Dm = (De + Di) / 2 =(910+898)/2= 904.00 mm

7.5.3.4 - Required Minimum Thickness of Straight Cylindrical Flange

Llim = 0.2 * SQR(Di * emin) =0.2*SQR(898*4.57)= 12.81 mm
Since Lcyl > Llim, Required Thickness of Straight Cylindrical Flange to 7.4.2
Minimum Thickness of Straight Flange Excl. Allow.
ecyl = P * Di / (2 * f * z - P) (7.4-1)
=.3007*898/(2*137.47*.85-.3007)= 1.16 mm

EN13445 - 7.5 DOMED ENDS

E3.1 Klöppertop 25 Mar. 2004 14:58 ConnID:S1.1

7.7.2 Conditions of Applicability - Nozzles in Knuckle Region

» - The nozzle centre-line shall lie between normal to the wall of the end and _
parallell to the vessel centre-line.
» - The location of the nozzle shall be such that it does not cross the tangent_
line between knuckle and cylinder.
» - Nozzles parallell to the vessel centre line and with outside diameter in li_
ne with the outside diameter of the vessel are included in these requirements.
» - Welded on compensation is not permitted.
» - When the distance between the edge of the nozzle where it meets the knuckl
e and the knuckle/cylinder tan line is less than 2.5*SQR(e*r)== 50.6 mm the validit
»Geometry Check dib=0.4945 / De <= 0.6[mm] (7.7-1)« » OK«

»Geometry Check dib=6.98 / SQR(e*De) <= 6.7[mm] (7.7-2)« » NOT OK«

7.5.3.1 Conditions of Applicability - Torispherical Ends

»Geometry Check r=89.8 <= 0.2 * Di=179.6[mm] « » OK«
»Geometry Check r=89.8 >= 0.06 * Di=53.88[mm] « » OK«
»Geometry Check r=89.8 >= 2*e=9.14[mm] « » OK«
»Geometry Check e=4.57 <= 0.08*De=72.8[mm] « » OK«
»Geometry Check ea=5.4 >= 0.001*De=.91[mm] « » OK«
»Geometry Check R=898 <= De=910[mm] « » OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*180*.85*5.4/(898+0.5*5.4)= 1.83 MPa
Py = f * ea / (beta * BetaK1 * (0.75 * R + 0.2 * Di)) (7.5-7)
=180*5.4/(0.9112*2.59*(0.75*898+0.2*898))= 0.4832 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*221.54*(5.4/(0.75*898+0.2*898))^1.5*(89.8/898)^0.825= 1.85 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =0.4832= 0.4832 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*137.47*.85*5.4/(898+0.5*5.4)= 1.40 MPa
Py = f * ea / (beta * BetaK1 * (0.75 * R + 0.2 * Di)) (7.5-7)
=137.47*5.4/(0.9112*2.59*(0.75*898+0.2*898))= 0.3691 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*150.29*(5.4/(0.75*898+0.2*898))^1.5*(89.8/898)^0.825= 1.26 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =0.3691= 0.3691 MPa

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*265*.85*5.4/(898+0.5*5.4)= 2.70 MPa
Py = f * ea / (beta * BetaK1 * (0.75 * R + 0.2 * Di)) (7.5-7)
=265*5.4/(0.9112*2.59*(0.75*898+0.2*898))= 0.7114 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*316.48*(5.4/(0.75*898+0.2*898))^1.5*(89.8/898)^0.825= 2.65 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =0.7114= 0.7114 MPa

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

EN13445 - 7.5 DOMED ENDS

E3.1 Klöppertop 25 Mar. 2004 14:58 ConnID:S1.1

»Test Pressure Ptmin=0.491 <= Ptmax=0.7114[MPa] « » (U= 69%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

8.4.3 Nominal Elastic Limit Sige:
Sige = Rpt / (1.3 * s) (8.4.3-1) =183.16/(1.3*1.25)= 112.71 N/mm2
Mean Radius R:
Rmean = R + ea / 2 =898+5.4/2= 900.70 mm
MEMBRANE YIELD py
py = 2 * Sige * ea / Rmean (8.7.1-1) =2*112.71*5.4/900.7= 1.35 MPa

ELASTIC INSTABILITY pm
pm = 1.21 * E * ea ^ 2 / Rmean ^ 2 (8.7.1-2)
=1.21*1.8945E05*5.4^2/900.7^2= 8.24 MPa

Value pr/py From Figure 8.5-5 Curve 2
Valuel = == 0.5678

MAX. ALLOWABLE EXTERNAL PRESSURE Pmax

pr = Valuel * py =0.5678*1.35= 0.7674 MPa
Pmax = pr / S =0.7674/1.5= 0.5116 MPa

»External Pressure Pmax=0.5116 >= Pext=.1[MPa] « » (U= 19.5%) OK«

8.7.2 - Permissible Shape Deviations

»The method of 8.7.1 applies to dished ends that are spherical to within 1% on _
radius and in which the radius of curvature based on an arc length of 2.4*Sqr(ea_
*Rmax) does not exceed the nominal value by more than 30%.

CALCULATION SUMMARY

7.5.3 - TORISPHERICAL ENDS UNDER INTERNAL PRESSURE

7.5.3.2 Required Minimum End Thickness

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =4.57= 4.57 mm

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =4.57+0+.6= 5.17 mm

»Internal Pressure emina=5.17 <= en=6[mm] « » (U= 86.1%) OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Pmax (is the least of Ps, Py and Pb) = Pmax =0.7114= 0.4832 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Pmax (is the least of Ps, Py and Pb) = Pmax =0.7114= 0.3691 MPa

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Pmax (is the least of Ps, Py and Pb) = Pmax =0.7114= 0.7114 MPa

EN13445 - 7.5 DOMED ENDS

E3.1 Klöppertop 25 Mar. 2004 14:58 ConnID:S1.1

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=0.7114[MPa] « » (U= 69%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

»External Pressure Pmax=0.5116 >= Pext=.1[MPa] « » (U= 19.5%) OK«

ERROR:Geometry Check ; dib / SQR(e*De) <= 6.7 Outside Valid Range

Volume:0.08 m3 Weight:41.3 kg (SG= 7.93)

EN13445 - 7.5 DOMED ENDS

E3.2 Klöpperbund 25 Mar. 2004 15:01 ConnID:S1.1

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

Attachment: S1.1 Cylindrical Shell Svøb
Location: Along z-axis zo= 0

GENERAL DESIGN DATA

PRESSURE LOADING: Design Component for Internal and External Pressure
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm, Pext= .1MPa
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 1000.00 mm

DIMENSIONS OF END

Type of Torispherical End: Dished End KLOPPERFORM EN 28011-28012
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
OUTSIDE DIAMETER OF CYLINDRICAL FLANGE OF END.....:De 910.00 mm
LENGTH OF CYLINDRICAL FLANGE OF END.....:Lcyl 17.50 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.5000 mm
AS BUILT THICKNESS OF HEAD/END (uncorroded).....:en 5.00 mm

MATERIAL DATA FOR END

EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 f=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93
SAFETY FACTOR (1.0 carbon and 1.25 austenitic steels):s 1.25
Material & Delivery Form: Cold Spun Seamless Austenitic Stainless Steel

NOZZLES IN KNUCKLE REGION TO SECTION 7.7

Nozzles In Knuckle Region: NO

CALCULATION DATA

7.5.3 - TORISPHERICAL ENDS UNDER INTERNAL PRESSURE

7.5.3.2 Required Minimum End Thickness

Required Thickness of End to Limit Membrane Stress in Central Part
es = P * R / (2 * f * z - 0.5 * P) (7.5-1)
=.3098*900/(2*137.47*.85-0.5*.3098)= 1.19 mm

fb = Rpt / (1.5 * 1.3) * 1.6 (7.5-5) =183.16/(1.5*1.3)*1.6= 150.29 N/mm2
Required Thickness of Knuckle to Avoid Plastic Buckling
eb = (0.75*R+0.2*Di)*((P/(111*fb)*(Di/r)^0.825)^(0.667) (7.5-3)
=(0.75*900+0.2*900)*((.3098/(111*150.29)*(900/90)^0.825)^(0.667)= 2.12 mm

7.5.3.5 Formulas for Calculation of Factor Beta
Y = MIN(emin / R, 0.04) (7.5-9) =MIN(2.09/900,0.04)= 0.0023
Z = LOG(1 / Y) (7.5-10) =LOG(1/0.0023)= 2.63
X = r / Di (7.5-11) =90/900= 0.1000
N = 1.006 - 1 / (6.2 + (90 * Y) ^ 4) (7.5-12)
=1.006-1/(6.2+(90*0.0023)^4)= 0.8448
Beta01 = N*(-0.1833*Z^3+1.0383*Z^2-1.2943*Z+0.837) (7.5-15)
=0.8448*(-0.1833*2.63^3+1.0383*2.63^2-1.2943*2.63+0.837)= 1.08
beta = Beta01 (7.5-15) =1.08= 1.08
Required Thickness of Knuckle to Avoid Axisymmetric Yielding
ey = beta * P * (0.75 * R + 0.2 * Di) / f (7.5-2)
=1.08*.3098*(0.75*900+0.2*900)/137.47= 2.09 mm

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =2.12= 2.12 mm

EN13445 - 7.5 DOMED ENDS

E3.2 Klöpperbund 25 Mar. 2004 15:01 ConnID:S1.1

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =2.12+0+.5= 2.62 mm

»Internal Pressure emina=2.62 <= en=5[mm] « » (U= 52.4%) OK«

Analysis Thickness
ea = en - c - th =5-0-.5= 4.50 mm
Inside Diameter of Shell
Di = De - 2 * (en - c) =910-2*(5-0)= 900.00 mm
Mean Diameter of Shell
Dm = (De + Di) / 2 =(910+900)/2= 905.00 mm

7.5.3.4 - Required Minimum Thickness of Straight Cylindrical Flange

Llim = 0.2 * SQR(Di * emin) =0.2*SQR(900*2.12)= 8.74 mm
Since Lcyl > Llim, Required Thickness of Straight Cylindrical Flange to 7.4.2
Minimum Thickness of Straight Cylindrical Flange Excl. Allow.
ecyl = P * Di / (2 * f * z - P) (7.4-1)
=.3098*900/(2*137.47*.85-.3098)= 1.19 mm

7.5.3.1 Conditions of Applicability - Torispherical Ends

»Geometry Check r=90 <= 0.2 * Di=180[mm] « » OK«
»Geometry Check r=90 >= 0.06 * Di=54[mm] « » OK«
»Geometry Check r=90 >= 2*e=4.24[mm] « » OK«
»Geometry Check e=2.12 <= 0.08*De=72.8[mm] « » OK«
»Geometry Check ea=4.5 >= 0.001*De=.91[mm] « » OK«
»Geometry Check R=900 <= De=910[mm] « » OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*180*.85*4.5/(900+0.5*4.5)= 1.53 MPa
Py = f * ea / (beta * (0.75 * R + 0.2 * Di)) (7.5-7)
=180*4.5/(0.9499*(0.75*900+0.2*900))= 0.9974 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*221.54*(4.5/(0.75*900+0.2*900))^1.5*(90/900)^0.825= 1.40 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =0.9974= 0.9974 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*137.47*.85*4.5/(900+0.5*4.5)= 1.17 MPa
Py = f * ea / (beta * (0.75 * R + 0.2 * Di)) (7.5-7)
=137.47*4.5/(0.9499*(0.75*900+0.2*900))= 0.7617 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*150.29*(4.5/(0.75*900+0.2*900))^1.5*(90/900)^0.825=0.9530 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =0.7617= 0.7617 MPa

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Ps = 2 * f * z * ea / (R + 0.5 * ea) (7.5-6)
=2*265*.85*4.5/(900+0.5*4.5)= 2.25 MPa
Py = f * ea / (beta * (0.75 * R + 0.2 * Di)) (7.5-7)
=265*4.5/(0.9499*(0.75*900+0.2*900))= 1.47 MPa
PB = 111*fb*(ea/(0.75*R+0.2*Di))^1.5*(r/Di)^0.825 (7.5-8)
=111*316.48*(4.5/(0.75*900+0.2*900))^1.5*(90/900)^0.825= 2.01 MPa
Pmax (is the least of Ps, Py and Pb) = Pmax =1.47= 1.47 MPa

EN13445 - 7.5 DOMED ENDS

E3.2 Klöpperbund 25 Mar. 2004 15:01 ConnID:S1.1

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=1.47[MPa] « » (U= 33.4%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

8.4.3 Nominal Elastic Limit Sige:
Sige = Rpt / (1.3 * s) (8.4.3-1) =183.16/(1.3*1.25)= 112.71 N/mm2
Mean Radius R:
Rmean = R + ea / 2 =900+4.5/2= 902.25 mm
MEMBRANE YIELD py
py = 2 * Sige * ea / Rmean (8.7.1-1) =2*112.71*4.5/902.25= 1.12 MPa

ELASTIC INSTABILITY pm
pm = 1.21 * E * ea ^ 2 / Rmean ^ 2 (8.7.1-2)
=1.21*1.8945E05*4.5^2/902.25^2= 5.70 MPa

Value pr/py From Figure 8.5-5 Curve 2
Valuel = == 0.5494

MAX. ALLOWABLE EXTERNAL PRESSURE Pmax

pr = Valuel * py =0.5494*1.12= 0.6177 MPa
Pmax = pr / S =0.6177/1.5= 0.4118 MPa

»External Pressure Pmax=0.4118 >= Pext=.1[MPa] « » (U= 24.2%) OK«

8.7.2 - Permissible Shape Deviations

»The method of 8.7.1 applies to dished ends that are spherical to within 1% on _ radius and in which the radius of curvature based on an arc length of 2.4*Sqr(ea_ *Rmax) does not exceed the nominal value by more than 30%.

CALCULATION SUMMARY

7.5.3 - TORISPHERICAL ENDS UNDER INTERNAL PRESSURE

7.5.3.2 Required Minimum End Thickness

Required Minimum End Thickness Excl.Allow. emin :
emin = emin =2.12= 2.12 mm

Required Minimum End Thickness Incl.Allow. :
emina = emin + c + th =2.12+0+.5= 2.62 mm

»Internal Pressure emina=2.62 <= en=5[mm] « » (U= 52.4%) OK«

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :NEW & COLD

Pmax (is the least of Ps, Py and Pb) = Pmax =1.47= 0.9974 MPa

MAXIMUM ALLOWABLE WORKING PRESSURE MAWP :HOT & CORR

Pmax (is the least of Ps, Py and Pb) = Pmax =1.47= 0.7617 MPa

EN13445 - 7.5 DOMED ENDS

E3.2 Klöpperbund 25 Mar. 2004 15:01 ConnID:S1.1

MAX TEST PRESSURE (Uncorroded cond.at ambient temp.)

Pmax (is the least of Ps, Py and Pb) = Pmax =1.47= 1.47 MPa

EN13445-5;10.2.3.3 REQUIRED MIN.HYDROSTATIC TEST PRESSURE:Ptmin

NEW AT AMBIENT TEMP. FOR TEST GROUPS 1, 2 and 3
Ptmin = MAX(1.43 * Pd , 1.25 * Pd * f20 / f)
=MAX(1.43*.3,1.25*.3*180/137.47)= 0.4910 MPa

»Test Pressure Ptmin=0.491 <= Ptmax=1.47[MPa] « » (U= 33.4%) OK«

8.7 - SPHERICAL SHELL UNDER EXTERNAL PRESSURE

»External Pressure Pmax=0.4118 >= Pext=.1[MPa] « » (U= 24.2%) OK«

Volume:0.08 m3 Weight:34.1 kg (SG= 7.93)

EN13445 - 9.5 ISOLATED OPENINGS IN SHELLS

N.1 Mandehul 25 Mar. 2004 15:01 ConnID:E3.1

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

Attachment: E3.1 Torispherical End Klöppertop S1.1
Orientation & Location of Nozzle: Center in End

GENERAL DESIGN DATA

Type of Opening: Nozzle Without Standard ANSI or DIN Flange Attachment
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 0.00 mm

SHELL DATA (E3.1)

Shell Type: Torispherical End
OUTSIDE DIAMETER OF SHELL.....:De 910.00 mm
AS BUILT WALL THICKNESS (uncorroded).....:en 6.00 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.6000 mm
INSIDE SPHERICAL RADIUS (corroded).....:R 898.00 mm
EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 fs=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93

NOZZLE MATERIAL DATA

Delivery Form: Plate Body
EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 fb=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93

NOZZLE DIMENSIONAL DATA

Attachment: Set In Flush Nozzle
Nozzle Diameter: Base Design on Nozzle OD
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
Shape of Nozzle/Opening: Circular
OUTSIDE NOZZLE DIAMETER.....:deb 458.00 mm
AS BUILT NOZZLE THICKNESS (uncorroded).....:enb 4.00 mm
Size of Flange and Nozzle:
Comment (Optional): Mandehul
NEGATIVE DEVIATION.....: 10.00 %
NOZZLE STANDOUT MEASURED FROM VESSEL OD.....:ho 135.00 mm

NOZZLE LOCATION/ARRANGEMENT

Nozzle Weld Intersect: Nozzle Does NOT Intersect with a Welded Shell Seam
ANGLE BETWN.BRANCH AXIS AND A LINE NORMAL TO MAIN BODY:Phi 0.00 Degr.

WELDING DATA

Nozzle to Shell Welding Area: Exclude Area of Nozzle to Shell Weld

DATA FOR REINFORCEMENT PAD

Type of Pad: Nozzle WithOut Pad

LIMITS OF REINFORCEMENT

Reduction of Limits of Reinforcement: No Reduction Required

EN13445 - 9.5 ISOLATED OPENINGS IN SHELLS

N.1 Mandehul 25 Mar. 2004 15:01 ConnID:E3.1

CALCULATION DATA

PRELIMINARY CALCULATIONS

```
Shell Analysis Thickness eas
eas = en - c - th =6-0-.6=                                   5.40 mm
Nozzle Analysis Thickness eab
eab = enb - c - NegDev =4-0-.4=                              3.60 mm
Reduction of Nozzle Material Strength Due To Nozzle Longitudinal Weld
fb = fb * z =137.47*.85=                                   116.85 N/mm2
ris = R (9.5-4) =898=                                      898.00 mm
dib = deb - 2 * eab =458-2*3.6=                            450.80 mm
Min.Nozzle Thk.Based on Internal Pressure ebp
ebp = P * deb / (2 * fb + P) =.3*458/(2*137.47+.3)=        0.5000 mm
Allowable Stresses
fob = Min( fs, fb) (9.5-8) =Min(137.47,116.85)=            116.85 N/mm2
```

GEOMETRIC LIMITATIONS

```
»Check Max.Diameter of Nozzle dib/De=0.4954 <=  .6[mm] «   »   OK«
```

»Min.Nozzle Thk. ebp=.5 <= eab=3.6[mm] « » (U= 13.8%) OK«

```
»Location in End to Fig.9.5-4 L=226 >= De/10=91[mm] «      »   OK«
```

Calculation of Stress Loaded Areas Effective as Reinforcement

9.5.3 Area of Shell Afs

```
Limit of Reinforcement Along Shell
Iso = Sqr(( 2 * ris + eas) * eas)                                (9.5-2)
  =Sqr((2*898+5.4)*5.4)=                                    98.63 mm
Set In Nozzle
Afs = eas * Is (9.5-20) =5.4*98.63=                        532.59 mm2
                                                           ----------
```

9.5.7 Area of Nozzle Afb

```
Limit of Reinforcement Along Nozzle
Ibo = MIN( Sqr(( deb - eb) * eb), ho)                            (9.5-39)
  =MIN(Sqr((458-3.6)*3.6,)135)=                             40.45 mm
Set In Nozzle
Afb = eb * (Ibo + Ibi + eas) (9.5-41) =3.6*(40.45+0+5.4)=  165.04 mm2
                                                           ----------
```

Calculation of Pressure Loaded Areas

```
9.5.7 In the Nozzle Apb
Apb = 0.5 * dib * (Ibo + eas) (9.5-45) =0.5*450.8*(40.45+5.4)= 10333.58 mm2
                                                           ----------
Spherical Shell/End on any Section Aps
Aps = 0.5 * ris ^ 2 * (Iso + a) / (0.5 * eas + ris)              (9.5-25)
  =0.5*898^2*(98.63+229.68)/(0.5*5.4+898)=                1,4697E05 mm2
                                                           ----------
```

9.5.2 Reinforcement Rules

Pressure Area Required pA(req.)

```
pAReq = P * (Aps + Apb + 0.5 * Apphi)                            (9.5-7)
  =.3*(1.4697E05+10333.58+0.5*0)=                           47.19 kN
                                                           ==========
```


Company Address
Client :NN Chartres Vessel Tag No.:XXX
Visual Vessel Design by OhmTech Ver:9.0-01 Operator :SqLr Rev.:A

EN13445 - 9.5 ISOLATED OPENINGS IN SHELLS
N.1 Mandehul 25 Mar. 2004 15:01 ConnID:E3.1

Pressure Area Available pA(aval.)

```
pAAval = (Afs+Afw)*(fs-0.5*P)+Afp*(fop-0.5*P)+Afb*(fob-0.5*P)     (9.5-7)
  =(532.59+0)*(137.47-0.5*.3)+0*(0-0.5*.3)+165.04*(116.85-0.5*.3)=  92.40 kN
                                                           ==========
```

»Nozzle Reinforcement pAAval=92.4 >= pAReq=47.19[kN] « » (U= 51%) OK«

Maximum Allowable Pressure Pmax

```
Pmax =(Afs+Afw)*fs+Afb*fob/((Aps+Apb+0.5*Apphi)+0.5*(Afs+Afw+Afb+Afp)) (10)
  =+0)*137.47+165.04*116.85/((1.4697E05+10333.58+0.5*0)+0.5*(532.59+0+165.04+
0))=                                                       =0.5867 MPa
                                                           ==========
```

Max.Allowable Test Pressure Ptmax

```
Ptmax =  **                                                 1.17 MPa
                                                           ----------
```

CALCULATION SUMMARY

```
Limit of Reinforcement Along Shell
Iso = Sqr(( 2 * ris + eas) * eas)                                (9.5-2)
  =Sqr((2*898+5.4)*5.4)=                                    98.63 mm
Limit of Reinforcement Along Nozzle
Ibo = MIN( Sqr(( deb - eb) * eb), ho)                            (9.5-39)
  =MIN(Sqr((458-3.6)*3.6,)135)=                             40.45 mm
```

Pressure Area Required pA(req.)

```
pAReq = P * (Aps + Apb + 0.5 * Apphi)                            (9.5-7)
  =.3*(1.4697E05+10333.58+0.5*0)=                           47.19 kN
                                                           ==========
```

Pressure Area Available pA(aval.)

```
pAAval = (Afs+Afw)*(fs-0.5*P)+Afp*(fop-0.5*P)+Afb*(fob-0.5*P)     (9.5-7)
  =(532.59+0)*(137.47-0.5*.3)+0*(0-0.5*.3)+165.04*(116.85-0.5*.3)=  92.40 kN
                                                           ==========
```

»Nozzle Reinforcement pAAval=92.4 >= pAReq=47.19[kN] « » (U= 51%) OK«

Maximum Allowable Pressure Pmax

```
Pmax =(Afs+Afw)*fs+Afb*fob/((Aps+Apb+0.5*Apphi)+0.5*(Afs+Afw+Afb+Afp)) (10)
  =+0)*137.47+165.04*116.85/((1.4697E05+10333.58+0.5*0)+0.5*(532.59+0+165.04+
0))=                                                       =0.5867 MPa
                                                           ==========
```

Volume:0.02 m3 Weight:7.7 kg (SG= 7.93)

INPUT DATA

COMPONENT ATTACHMENT/LOCATION

Attachment: E1.1 Hemispherical End Kugleskal mandehul
Orientation & Location of Nozzle: Center in End

GENERAL DESIGN DATA

Type of Opening: Nozzle Without Standard ANSI or DIN Flange Attachment
PROCESS CARD: General Design Data: Temp= 144°C, P= .3MPa, c= 0mm
SPECIFIC DENSITY OF OPERATING LIQUID.....:SG 1.00
LIQUID HEAD.....:LH 552.00 mm

SHELL DATA (E1.1)

Shell Type: Spherical Shell and Hemispherical End
OUTSIDE DIAMETER OF SHELL.....:De 900.00 mm
AS BUILT WALL THICKNESS (uncorroded).....:en 4.00 mm
NEGATIVE TOLERANCE/THINNING ALLOWANCE.....:th 0.4000 mm
EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 fs=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93

NOZZLE MATERIAL DATA

Delivery Form: Plate Body
EN 10028-7:2000, 1.4404 X2CrNiMo17-12-2 plate and strip THK<=6mm 144'C
Rm=530 Rp=270 Rpt=183.16 fb=137.47 f20=180 ftest=265 E=189448(N/mm2) ro=7.93

NOZZLE DIMENSIONAL DATA

Attachment: Set In Flush Nozzle
Nozzle Diameter: Base Design on Nozzle OD
WELD JOINT COEFFICIENT: Testing Group 3 (z=0.85)
Shape of Nozzle/Opening: Circular
OUTSIDE NOZZLE DIAMETER.....:deb 170.00 mm
AS BUILT NOZZLE THICKNESS (uncorroded).....:enb 3.50 mm
Size of Flange and Nozzle:
Comment (Optional):
NEGATIVE DEVIATION.....: 10.00 %
NOZZLE STANDOUT MEASURED FROM VESSEL OD.....:ho 28.00 mm

NOZZLE LOCATION/ARRANGEMENT

Nozzle Weld Intersect: Nozzle Does NOT Intersect with a Welded Shell Seam
ANGLE BETWN.BRANCH AXIS AND A LINE NORMAL TO MAIN BODY:Phi 0.00 Degr.

WELDING DATA

Nozzle to Shell Welding Area: Exclude Area of Nozzle to Shell Weld

DATA FOR REINFORCEMENT PAD

Type of Pad: Nozzle WithOut Pad

LIMITS OF REINFORCEMENT

Reduction of Limits of Reinforcement: No Reduction Required

Company Address
Client :NN Chartres Vessel Tag No.:XXX
Visual Vessel Design by OhmTech Ver:9.0-01 Operator :SqLr Rev.:A
EN13445 - 9.5 ISOLATED OPENINGS IN SHELLS
N.3 Studs i mandehul 25 Mar. 2004 15:02 ConnID:E1.1

CALCULATION DATA

PRELIMINARY CALCULATIONS

Shell Analysis Thickness eas
eas = en - c - th =4-0-.4= 3.60 mm
Nozzle Analysis Thickness eab
eab = enb - c - NegDev =3.5-0-.35= 3.15 mm
Reduction of Nozzle Material Strength Due To Nozzle Longitudinal Weld
fb = fb * z =137.47*.85= 116.85 N/mm2
Inside Radius of Curvature
ris = De / 2 - eas (9.5-3) =900/2-3.6= 446.40 mm
dib = deb - 2 * eab =170-2*3.15= 163.70 mm
Min.Nozzle Thk.Based on Internal Pressure ebp
ebp = P * deb / (2 * fb + P)
=.3054*170/(2*137.47+.3054)= 0.1900 mm
Allowable Stresses
fob = Min(fs, fb) (9.5-8) =Min(137.47,116.85)= 116.85 N/mm2

GEOMETRIC LIMITATIONS

»Check Max.Diameter of Nozzle dib/De=0.1819 <= .6[mm] « » OK«
»Min.Nozzle Thk. ebp=.19 <= eab=3.15[mm] « » (U= 6%) OK«

Calculation of Stress Loaded Areas Effective as Reinforcement

9.5.3 Area of Shell Afs

Limit of Reinforcement Along Shell
Iso = Sqr((2 * ris + eas) * eas) (9.5-2)
=Sqr((2*446.4+3.6)*3.6)= 56.81 mm
Set In Nozzle
Afs = eas * Is (9.5-20) =3.6*56.81= 204.51 mm2

9.5.7 Area of Nozzle Afb

Limit of Reinforcement Along Nozzle
Ibo = MIN(Sqr((deb - eb) * eb), ho) (9.5-39)
=MIN(Sqr((170-3.15)*3.15,)28)= 22.93 mm
Set In Nozzle
Afb = eb * (Ibo + Ibi + eas) (9.5-41) =3.15*(22.93+0+3.6)= 83.56 mm2

Calculation of Pressure Loaded Areas

9.5.7 In the Nozzle Apb
Apb = 0.5 * dib * (Ibo + eas) (9.5-45) =0.5*163.7*(22.93+3.6)= 2171.11 mm2

Spherical Shell/End on any Section Aps
Aps = 0.5 * ris ^ 2 * (Iso + a) / (0.5 * eas + ris) (9.5-25)
=0.5*446.4^2*(56.81+83.91)/(0.5*3.6+446.4)= 31282.88 mm2

9.5.2 Reinforcement Rules

Pressure Area Required pA(req.)

pAReq = P * (Aps + Apb + 0.5 * Apphi) (9.5-7)
=.3054*(31282.88+2171.11+0.5*0)= 10.22 kN

EN13445 - 9.5 ISOLATED OPENINGS IN SHELLS

N.3 Studs i mandehul 25 Mar. 2004 15:02 ConnID:E1.1

Pressure Area Available pA(aval.)

```
pAAval = (Afs+Afw)*(fs-0.5*P)+Afp*(fop-0.5*P)+Afb*(fob-0.5*P)      (9.5-7)
  =(204.51+0)*(137.47-0.5*.3054)+0*(0-0.5*.3054)+83.56*(116.85-0.5*.3054)
                                                  =    37.83 kN
                                                  ==============
```

»Nozzle Reinforcement pAAval=37.83 >= pAReq=10.22[kN] « » (U= 27%) OK«

Maximum Allowable Pressure Pmax

```
Pmax =(Afs+Afw)*fs+Afb*fob/((Aps+Apb+0.5*Apphi)+0.5*(Afs+Afw+Afb+Afp)) (10)
  =+0)*137.47+83.56*116.85/((31282.88+2171.11+0.5*0)+0.5*(204.51+0+83.56+0))
                                                  =     1.13 MPa
                                                  ==============
```

Max.Allowable Test Pressure Ptmax

```
Ptmax =  **                                            2.27 MPa
                                                  --------------
```

CALCULATION SUMMARY

```
Limit of Reinforcement Along Shell
Iso = Sqr(( 2 * ris + eas) * eas)                          (9.5-2)
  =Sqr((2*446.4+3.6)*3.6)=                               56.81 mm
Limit of Reinforcement Along Nozzle
Ibo = MIN( Sqr(( deb - eb) * eb), ho)                      (9.5-39)
  =MIN(Sqr((170-3.15)*3.15,)28)=                         22.93 mm
```

Pressure Area Required pA(req.)

```
pAReq = P * (Aps + Apb + 0.5 * Apphi)                      (9.5-7)
  =.3054*(31282.88+2171.11+0.5*0)=                       10.22 kN
                                                  ==============
```

Pressure Area Available pA(aval.)

```
pAAval = (Afs+Afw)*(fs-0.5*P)+Afp*(fop-0.5*P)+Afb*(fob-0.5*P)      (9.5-7)
  =(204.51+0)*(137.47-0.5*.3054)+0*(0-0.5*.3054)+83.56*(116.85-0.5*.3054)
                                                  =    37.83 kN
                                                  ==============
```

»Nozzle Reinforcement pAAval=37.83 >= pAReq=10.22[kN] « » (U= 27%) OK«

Maximum Allowable Pressure Pmax

```
Pmax =(Afs+Afw)*fs+Afb*fob/((Aps+Apb+0.5*Apphi)+0.5*(Afs+Afw+Afb+Afp)) (10)
  =+0)*137.47+83.56*116.85/((31282.88+2171.11+0.5*0)+0.5*(204.51+0+83.56+0))
                                                  =     1.13 MPa
                                                  ==============
```

Volume:0 m3 Weight:0.6 kg (SG= 7.93)

EN13445 - 17 - SIMPLIFIED ASSESSMENT OF FATIGUE LIFE

FA.1 Udmattelse 25 Mar. 2004 15:03

INPUT DATA

GENERAL DESIGN DATA

Type of Loading: Constant Amplitude Loading

LOADING DATA

```
PRESSURE RANGE (ALGEBRAIC DIFF.MAX./MIN. PRESSURE)..:dP      0.3000 MPa
REQUIRED NUMBER OF APPLIED STRESS CYCLES.............:Nreq    22000.00
MINIMUM OPERATING TEMPERATURE DURING A CYCLE.........:tmin        0.00 'C
MAXIMUM OPERATING TEMPERATURE DURING A CYCLE.........:tmax      144.00 'C
```

COMPONENTS DATA

COMPONENTS

--ID--	-en(mm)-	--z--	-f(N/mm2)-	--Mat.Type--	-Pmax(MPa)-	--TG--	--Kt-	-Welded-
S1.1	5.0	0.85	137.47	Stainless S.	1.21	3	NA	YES
E3.1	5.4	0.85	137.47	Stainless S.	0.37	3	NA	YES
E3.2	4.5	0.85	137.47	Stainless S.	0.76	3	NA	YES
N.1	3.6	1	137.47	Stainless S.	0.59	3	NA	YES
E1.1	3.6	0.85	137.47	Stainless S.	1.88	3	NA	YES
N.3	3.2	1	137.47	Stainless S.	1.13	3	NA	YES

--ID--	----------etta(Table 17.1)----------
S1.1	0.85 (S1.1 without shape imperfection)
E3.1	2.50 (DE1 Knuckle Region)
E3.2	2.50 (DE1 Knuckle Region)
N.1	3.00 (OS2.1 Without reinf.plate with full pen.welds)
E1.1	0.85 (S5.1 without shape imperfection)
N.3	3.00 (OS2.1 Without reinf.plate with full pen.welds)

--ID--	----------Class(Table 17.4)----------
S1.1	63 (1.2 to 1.4 Welded from both sides)
E3.1	63 (1.2 to 1.3 Welded from both sides)
E3.2	63 (1.2 to 1.3 Welded from both sides)
N.1	63 (3a As welded)
E1.1	63 (1.2 to 1.3 Welded from both sides)
N.3	63 (3a As welded)

EN13445 - 17 - SIMPLIFIED ASSESSMENT OF FATIGUE LIFE

FA.1 Udmattelse 25 Mar. 2004 15:03

CALCULATION DATA

17.6 Determination of Allowable Number of Pressure Cycles

LOADCASE No: 1 - Constant Amplitude Loading

tmin(minimum oper.temperature during this cycle) = == 0.00 'C
tmin(maximum oper.temperature during this cycle) = == 144.00 'C
dP(Pressure Range)= == 0.3000 MPa
Nreq(Required number of cycles)= == 22000.00

Component S1.1 Pressure Range dP = .3 MPa

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

Fatigue Curve Constant C1 = 5,00E+11
Fatigue Curve Constant C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)= 46.40
Cut-off Limit DeltaSCut (N/mm2)= 25.50

17.6.1 Pseudo-Elastic Stress Range

DeltaS = dP / Pmax * etta * f (17.6-1) =.3/1.21*.85*137.47= 28.97 N/mm2

17.6.2.1 Thickness Correction Factor Ce

Ce = 1.0 =1.0= 1.00

17.6.2.2 Temperature Correction Factor Ct

tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0= 108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108= 0.9966

17.6.3 Fictitious Stress Range DeltaSS

DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =28.97/(1*.99656)= 29.07 N/mm2

17.6.6 Allowable Number of Cycles Ni

Ni = C2 / DeltaSS ^ 3 (17.6-19) =1.08E15/29.07^5= 5,2015E07 Cycles

»S1.1 - 52014833 Cycles Ni=5.2015E07 > Nreq=22000« » (U= 0%) OK«

Component E3.1 Pressure Range dP = .3 MPa

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

Fatigue Curve Constant C1 = 5,00E+11
Fatigue Curve Constant C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)= 46.40
Cut-off Limit DeltaSCut (N/mm2)= 25.50

17.6.1 Pseudo-Elastic Stress Range

DeltaS = dP / Pmax * etta * f (17.6-1) =.3/.37*2.5*137.47= 278.66 N/mm2

17.6.2.1 Thickness Correction Factor Ce

Ce = 1.0 =1.0= 1.00

17.6.2.2 Temperature Correction Factor Ct

tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0= 108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108= 0.9966

17.6.3 Fictitious Stress Range DeltaSS

DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =278.66/(1*.99656)= 279.62 N/mm2

EN13445 - 17 - SIMPLIFIED ASSESSMENT OF FATIGUE LIFE

FA.1 Udmattelse 25 Mar. 2004 15:03

17.6.6 Allowable Number of Cycles Ni

Ni = C1 / DeltaSS ^ 3 (17.6-17) =5.0E11/279.62^3= 22870.00 Cycles

»E3.1 - 22870 Cycles Ni=22870 > Nreq=22000« » (U= 96.1%) OK«

Component E3.2 Pressure Range dP = .3 MPa

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

Fatigue Curve Constant C1 = 5,00E+11
Fatigue Curve Constant C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)= 46.40
Cut-off Limit DeltaSCut (N/mm2)= 25.50

17.6.1 Pseudo-Elastic Stress Range

DeltaS = dP / Pmax * etta * f (17.6-1) =.3/.76*2.5*137.47= 135.66 N/mm2

17.6.2.1 Thickness Correction Factor Ce

Ce = 1.0 =1.0= 1.00

17.6.2.2 Temperature Correction Factor Ct

tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0= 108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108= 0.9966

17.6.3 Fictitious Stress Range DeltaSS

DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =135.66/(1*.99656)= 136.13 N/mm2

17.6.6 Allowable Number of Cycles Ni

Ni = C1 / DeltaSS ^ 3 (17.6-17) =5.0E11/136.13^3= 1,982E05 Cycles

»E3.2 - 198204 Cycles Ni=198204 > Nreq=22000« » (U= 11%) OK«

Component N.1 Pressure Range dP = .3 MPa

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

Fatigue Curve Constant C1 = 5,00E+11
Fatigue Curve Constant C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)= 46.40
Cut-off Limit DeltaSCut (N/mm2)= 25.50

17.6.1 Pseudo-Elastic Stress Range

DeltaS = dP / Pmax * etta * f (17.6-1) =.3/.59*3*137.47= 209.70 N/mm2

17.6.2.1 Thickness Correction Factor Ce

Ce = 1.0 =1.0= 1.00

17.6.2.2 Temperature Correction Factor Ct

tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0= 108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108= 0.9966

17.6.3 Fictitious Stress Range DeltaSS

DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =209.7/(1*.99656)= 210.42 N/mm2

17.6.6 Allowable Number of Cycles Ni

Ni = C1 / DeltaSS ^ 3 (17.6-17) =5.0E11/210.42^3= 53664.00 Cycles

»N.1 - 53664 Cycles Ni=53664 > Nreq=22000« » (U= 40.9%) OK«

Component E1.1 Pressure Range dP = .3 MPa

EN13445 - 17 - SIMPLIFIED ASSESSMENT OF FATIGUE LIFE

FA.1 Udmattelse 25 Mar. 2004 15:03

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

```
Fatigue Curve Constant       C1 = 5,00E+11
Fatigue Curve Constant       C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)=    46.40
Cut-off Limit DeltaSCut (N/mm2)=    25.50
```

17.6.1 Pseudo-Elastic Stress Range

```
DeltaS = dP / Pmax * etta * f (17.6-1) =.3/1.88*.85*137.47=    18.65 N/mm2
```

17.6.2.1 Thickness Correction Factor Ce

```
Ce = 1.0 =1.0=                                                  1.00
```

17.6.2.2 Temperature Correction Factor Ct

```
tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0=          108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108=           0.9966
```

17.6.3 Fictitious Stress Range DeltaSS

```
DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =18.65/(1*.99656)=      18.71 N/mm2
```

17.6.6 Allowable Number of Cycles Ni

17.6.6.3 The Fatigue Action of the Cycles Shall be Ignored

»E1.1 - 1E+15 Cycles Ni=1E+15 > Nreq=22000« » (U= 0%) OK«

Component N.3 Pressure Range dP = .3 MPa

Table 17-2 Parameters of the Design Curve for Welded Joints for Class= 63

```
Fatigue Curve Constant       C1 = 5,00E+11
Fatigue Curve Constant       C2 = 1,08E+15
Endurance Limit DeltaSD (N/mm2)=    46.40
Cut-off Limit DeltaSCut (N/mm2)=    25.50
```

17.6.1 Pseudo-Elastic Stress Range

```
DeltaS = dP / Pmax * etta * f (17.6-1) =.3/1.13*3*137.47=    109.49 N/mm2
```

17.6.2.1 Thickness Correction Factor Ce

```
Ce = 1.0 =1.0=                                                  1.00
```

17.6.2.2 Temperature Correction Factor Ct

```
tstar = 0.75 * tmax + 0.25 * tmin =0.75*144+0.25*0=          108.00 'C
Ct = 1.043 - 0.00043 * tstar =1.043-0.00043*108=           0.9966
```

17.6.3 Fictitious Stress Range DeltaSS

```
DeltaSS = DeltaS / (Ce * Ct) (17.6-9) =109.49/(1*.99656)=     109.87 N/mm2
```

17.6.6 Allowable Number of Cycles Ni

```
Ni = C1 / DeltaSS ^ 3 (17.6-17) =5.0E11/109.87^3=          3,7702E05 Cycles
```

»N.3 - 377019 Cycles Ni=377019 > Nreq=22000« » (U= 5.8%) OK«

CALCULATION SUMMARY

17.6 Determination of Allowable Number of Pressure Cycles

LOADCASE No: 1 - Constant Amplitude Loading

»S1.1 - 52014833 Cycles Ni=5.2015E07 > Nreq=22000« » (U= 0%) OK«
»E3.1 - 22870 Cycles Ni=22870 > Nreq=22000« » (U= 96.1%) OK«
»E3.2 - 198204 Cycles Ni=198204 > Nreq=22000« » (U= 11%) OK«
»N.1 - 53664 Cycles Ni=53664 > Nreq=22000« » (U= 40.9%) OK«

Company Address
Client :NN Chartres Vessel Tag No.:XXX
Visual Vessel Design by OhmTech Ver:9.0-01T Operator :SqLr Rev.:A

EN13445 - 17 - SIMPLIFIED ASSESSMENT OF FATIGUE LIFE
FA.1 Udmattelse 25 Mar. 2004 15:03

»E1.1 - 1E+15 Cycles Ni=1E+15 > Nreq=22000« » (U= 0%) OK«
»N.3 - 377019 Cycles Ni=377019 > Nreq=22000« » (U= 5.8%) OK«

<END>

Maskinfabrikken Kofa aps

Version no.: 01
Date.: 2005.01.05

Welders log
Document no.: Welders log.001
Tankproject no: 195-04

Welders Log

Customer.: *Novo Nordisk A/S, Site Chartres - France*
TAG no.: CH25AW
Fabrication no: 3012
Order no.: 195-04
Fabrication year: *2004*

Pos. no.:	Pos. no.:	Part/tube adjacent to without pos no.: Plate, tube dimension or charge nro:	Charge no. For fill material	Welders no.:	Welder	
					Init.:	Date.:
03	03		5549	05	AN	16-11
01	28		5549	05	AN	3-12
01	28		5549	05	AN	3-12
01	28		5549	05	AN	3-12
01	05		5549	05	AN	3-12
02	07		5549	05	AN	6-12
02	08		5549	05	AN	6-12
08	09			05	AN	6-12
09	10			05	AN	6-12
01	03		5549	05	AN	8-12
02	03		5549	05	AN	13-12
03	24		5549	05	AN	10-1
01	04		5549	05	AN	13-12

Maskinfabrikken Kofa aps

Version no.: 01
Date.: 2005.01.05

Welders log
Document no.: Welders log.001
Tankproject no: 195-04

Welders Log PIPE

Customer.: *Novo Nordisk A/S, Site Chartres - France* **TAG no.:** CH25AW **Fabrication no:** 3012
Order no.: 195-04 **Fabrication year:** *2004*

Pos. no.:	Pos. no.:	Part/tube adjacent to without pos no.: Plate, tube dimension or charge nro:	Charge no. For fill material	Welders no.:	Welder	
					Init.:	Date.:
01	03		5549	05	AN	15-12
02	03		5549	05	AN	15-12

Maskinfabrikken Kofa aps

Version no.: 01
Date.: 2005.01.05

Welders Certificate overview
Document no.: Weld.Certificate.001
Tankproject no: 195-04

Welder Certificate overview

Customer.: *Novo Nordisk A/S, Site Chartres - France* **TAG no.:** CH25AW **Fabrication no:** 3012
Order no.: 195-04 **Fabrication year:** *2004*

Name:	Welder no.:	Welders test dimension:	Certificate Type:	Dimension Area:	Approved period:	Approved: Yes / No
ALLAN NIELSEN	05	1 - 12,0	JNB 141 022	1-2 / 12 - 24	05.02.06	YES ☒ NO ☐
ALLAN NIELSEN	05	1,2 - 51.0	JNB 141 023	1,2 -2,4 / 26 -102	05.02.06	YES ☒ NO ☐
ALLAN NIELSEN	05	7.11 - 168,3	KOFA CERT-002	3 -14 / 84 - 99	13.03.2005	YES ☒ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐
						YES ☐ NO ☐

Accept criteria observance: YES ☒ NO ☐ **Date:** 14-2-05 **Sign:**
If no please view deviation raport:

DANAK
Reg. nr. 3001

FORCE-Dantest CERT
Svejsecertifikat - EN 287
Welder Approval Test certificate - EN 287

FORCE TECHNOLOGY

Betegnelse / *Designation*: **EN 287-1 141 T BW W11 nm t1 D12 H-L045 ss nb**

05

Firma / *Manufacturer*: Maskinfabrikken Kofa ApS

Svejsers navn / *Welder's name*: **Allan Nielsen**

Fødselsdato / *Date of birth*: 27-02-76

Svejser ID.: / *Welder Ident*: AN

Fødested / *Place af Birth*:

Prøvning afsluttet den / *Date of completed test*: 05-02-04

Eksaminator / *Examiner*: Egon Hansen

	Aktuelle data / *Actual data*	Godkendelsesområde / *Range of approval*
Svejsemetode / *Welding process*	141	141
Plade eller rør / *Plate or pipe*	T	T, P
Sømtype / *Joint type*	BW	BW, FW
Grundmateriale / *Parent material*	W11 -	W11, W11/01-04
Tilsatsmateriale - type / *Filler metal - type*	nm	nm
Godstykkelse (mm) / *Tickness of test piece (mm)*	1	1-2
Udv. rørdiameter (mm) / *Outside pipe diameter (mm)*	12,0	12-24
Svejsestilling / *Welding position*	H-L045	PA,PB,PC,PD,PE,PF,H-L045
Opfugning/backing / *Gourging/backing*	ss/nb	ss/nb, ss/mb, bs/gg, bs/ng
Bemærkninger / *Remarks*		
Yderligere oplysninger fremgår af vedlagte bilag / *Additional information available on enclosures*	Nej / *No.*	

Certifikat nr / *Certificate No.*: BRB1457

Force sag id. / *FORCE Order ID.*: 211380

Identifikation af emne / *Welder Ident*: 211380 2A

Foto (hvis ønsket) / *Photo (if required)*

Svejseprocedurespecifikation / *Welding Procedure Specification*: JNB 141 022

Jobkendskab / *Job knowledge*: Ikke prøvet / *Not tested*

Gyldig til (dato): / *Validity of approval until (date)*: **05-02-06**

Certifikatet er kun gyldig, når det er underskrevet iflg. EN287 afsnit 10.1
Certificate is only valid, if signed acc.to EN287 subsection 10.1

Prøvningsmetode / *Type of test*	Rapport/ *Report* Bestået/ikke prøvet / *Accepted/Not tested*
Visuel kontrol / *Visual examination*	**Bestået/Accepted**
Radiografisk pr. / *Radiographic test*	**Bestået/Accepted**
Ultralydprøvning / *Ultrasonic test*	**Ikke prøvet/Not tested**
Magnetprøvning / *Magnetic test*	**Ikke prøvet/Not tested**
Penetrantpr. / *Dye penetrant test*	**Ikke prøvet/Not tested**
Makrounders. / *Macro examination*	**Ikke prøvet/Not tested**
Brudprøver / *Fracture test*	**Ikke prøvet/Not tested**
Bøjeprøver / *Bend test*	**Ikke prøvet/Not tested**
Andre prøver* / *Add. tests**	
Markrapport nr.: / *Field report No.:*	211380 2A

Acceptstandard / *Accept standard*: EN 25817

Acceptkrit. / *Accept crit.*: EN 287 afsnit 8

Forlængelse hver 6. måned efter afsluttet prøvning iflg. 10.1
Prolongation every 6 month after date of completed test acc. to 10.1

Dato / *Date*	Stilling eller titel / *Position or title*	Underskrift / *Signature*
5/8 -2004		

Certifikat udstedt i.h.t 10.2, forlængelse for yderligere 2 år / *Certificate issued acc to 10.2, prolongation for the following 2 years* ☐ Ja / *Yes*

Oprindeligt cert. nr./*Original cert. No.*

Cert. organ/*Certifying Body*

FORCE-Dantest CERT

Certificeringsansvarlig (dato) / *Certification manager (date)*

11 FEB. 2004

Ulf Larsen 09-02-04

Ulf Larsen

Se evt. bilag for supplerende oplysninger / *See separate sheet, if required*

310-1-1-da-en (akkrediteret)

604. 01.2002

DANAK
Reg. nr. 3001

FORCE-Dantest CERT
Svejsecertifikat - EN 287
Welder Approval Test certificate - EN 287

FORCE TECHNOLOGY

Betegnelse / *Designation*: **EN 287-1 141 T BW W11 nm t1,2 D51 H-L045 ss nb**

Firma / *Manufacturer*: Maskinfabrikken Kofa ApS

Svejsers navn / *Welder's name*: **Allan Nielsen**

Fødselsdato / *Date of birth*: 27-02-76

Svejser ID. / *Welder Ident*: AN

Fødested / *Place af Birth*:

Prøvning afsluttet den / *Date of completed test*: 05-02-04

Eksaminator / *Examiner*: Egon Hansen

	Aktuelle data *Actual data*	Godkendelsesområde *Range of approval*	Certifikat nr *Certificate No.*: BRB1458 Force sag id. *FORCE Order ID.*: 211380
Svejsemetode *Welding process*	141	141	Identifikation af emne *Welder Ident:* 211380 2B
Plade eller rør *Plate or pipe*	T	T, P	
Sømtype *Joint type*	BW	BW, FW	Foto (hvis ønsket) *Photo (if required)*
Grundmateriale *Parent material*	W11 -	W11, W11/01-04	
Tilsatsmateriale - type *Filler metal - type*	nm	nm	
Godstykkelse (mm) *Tickness of test piece (mm)*	1,2	1,2-2,4	
Udv. rørdiameter (mm) *Outside pipe diameter (mm)*	51,0	26-102	
Svejsestilling *Welding position*	H-L045	PA,PB,PC,PD,PE,PF,H-L045	Svejseprocedurespecifikation *Welding Procedure Specification*: JNB 141 023
Opfugning/backing *Gourging/backing*	ss/nb	ss/nb, ss/mb, bs/gg, bs/ng	
Bemærkninger *Remarks*			Jobkendskab *Job knowledge*: Ikke prøvet / Not tested
Yderligere oplysninger fremgår af vedlagte bilag *Additional information available on enclosures*	Nej / No.		

Gyldig til (dato) / *Validity of approval until (date)*: **05-02-06**

Certifikatet er kun gyldig, når det er underskrevet iflg. EN287 afsnit 10.1
Certificate is only valid, if signed acc.to EN287 subsection 10.1

Prøvningsmetode *Type of test*	Rapport/ *Report* Bestået/ikke prøvet *Accepted/Not tested*	Acceptstandard *Accept standard*: EN 25817 — Acceptkrit. *Accept crit.*: EN 287 afsnit 8 Forlængelse hver 6. måned efter afsluttet prøvning iflg. 10.1 *Prolongation every 6 month after date of completed test acc. to 10.1*		
		Dato *Date*	Stilling eller titel *Position or title*	Underskrift *Signature*
Visuel kontrol *Visual examination*	**Bestået/Accepted**			
Radiografisk pr. *Radiographic test*	**Bestået/Accepted**	5/8-04		
Ultralydprøvning *Ultrasonic test*	**Ikke prøvet/Not tested**			
Magnetprøvning *Magnetic test*	**Ikke prøvet/Not tested**			
Penetrantpr. *Dye penetrant test*	**Ikke prøvet/Not tested**			
Makrounders. *Macro examination*	**Ikke prøvet/Not tested**	Certifikat udstedt i.h.t 10.2, forlængelse for yderligere 2 år / *Certificate issued acc to 10.2, prolongation for the following 2 years* ☐ Ja / *Yes*		
Brudprøver *Fracture test*	**Ikke prøvet/Not tested**	Oprindeligt cert. nr./*Original cert. No.*	Cert. organ/*Certifying Body*	
Bøjeprøver *Bend test*	**Ikke prøvet/Not tested**	Certificeringsansvarlig (dato) / *Certification manager (date)*: FORCE-Dantest CERT 11 FEB. 2004		
Andre prøver* *Add. tests**				
Markrapport nr.: *Field report No.:*	211380 2B	Ulf Larsen 09-02-04 Ulf Larsen		

Se evt. bilag for supplerende oplysninger
See separate sheet, if required

310-1-1-da-en (akkrediteret)

604. 01.2002

DANAK
Reg. nr. 3001

FORCE-Dantest CERT
Svejsercertifikat - EN 287
Welder Approval Test Certificate- EN 287

FORCE TECHNOLOGY

Betegnelse
Designation
EN 287-1 141 T BW W11 wm t7,11 D168.3 H-L045 ss nb

Firma – navn og adresse
Manufacturer - name and address
Maskinfabrikken Kofa Færøvej 6 4681 Herfølge

Prøvning afsluttet den
Date of completed test
13-03-2003

Svejsers navn:
Welder's name:
Allan Nielsen

Eksaminator
Examiner
Kurt Johan Berg
F82i

Fødselsdato:
Date of birth:
27-02-1976

Svejser nr.:
Welder Ident.:
05

	Aktuelle data *Actual data*	Gyldighedsområde *Range of approval*	Journal nr.: 194707/3B *Reference No.:*
Svejsemetode *Welding process*	**141** ***TIG***	141	Identifikation af emne *Identification of test piece* **194707/3B** **F82i**
Plade eller rør *Plate or pipe*	**T** ***Pipe***	P or T *Plate or pipe*	
Sømtype *Joint type*	**BW** ***Butt weld***	FW or BW *Fillet weld or butt weld*	
Grundmateriale *Parent material*	**W11, TP 304L**	W11 to W11 W11 to W01 or W02 or W03 or W04	Foto (hvis ønsket) *Photo (if required)*
Tilsatsmateriale/type *Filler metal type* Klassifikation *Classification*	**Avesta 316-Si/SKR-Si** **EN 12072 W 19.12.3L**		
Beskyttelsesgas *Shielding gas*	**Ar** **I.1**	All inert gasses	
Andet *Other*	**Baggas: Formier** ***Back shield. gas: Formier***	Med eller uden baggas *With or without back shielding gas*	Svejseprocedurespecifikation *Welding Procedure Specification* **KOFA CERT-002**
Godstykkelse (mm) *Thickness of test piece (mm)*	**7,11**	3 – 14	
Udv. rørdiameter (mm) *Outside pipe diameter (mm)*	**168,3**	84 - ∞	
Svejsestilling *Welding position*	**H-L045**	PA, PB, PC, PD, PE, PF, H-L045 All, except downwards	Jobkendskab *Job knowledge* **Ikke prøvet** ***Not tested***
Opfugning/Backing *Gouging/Backing*	**ss nb**	ss, bs, nb, mb, ng, gg	

Yderligere oplysninger i bilag
Additional information: enclosure
Nej
No

Prøvningsmetode *Type of test*	Acceptstandard *Accept. standard*	Acceptkrit. *Acc. level*	Bestået/Ikke prøvet *Accepted/Not tested*
Visuel kontrol *Visual examination*	**DS/EN 25817**	**B (C)**	**Bestået** ***Accepted***
Radiografisk prøvn. *Radiographic test*	**DS/EN 12517**	**1**	**Bestået** ***Accepted***
Ultralydprøvning *Ultrasonic test*			**Ikke prøvet** ***Not tested***
Magnetprøvning *Magnetic testing*			**Ikke prøvet** ***Not tested***
Penetrantprøvning *Dye penetrant test*			**Ikke prøvet** ***Not tested***
Makroundersøgelse *Macro examination*			**Ikke prøvet** ***Not tested***
Brudprøver *Fracture test*			**Ikke prøvet** ***Not tested***
Bøjeprøver *Bend tests*			**Ikke prøvet** ***Not tested***

Certifikat udstedt i h.t. 10.2, forlængelse for yderligere 2 år — **Nej** / ***No***
Certificate issued acc. to 10.2, prolongation for the following 2 years

Gyldig til (dato): **13-03-2005**
Validity of approval until (date):

Forlængelse hver 6. måned efter afsluttet prøvning iflg. 10.1
Prolongation every 6 month after date of completed test acc. to 10.1

Dato *Date*	Stilling eller titel *Position or title*	Underskrift *Signature*
13/9-03	Smedemester	
13/9-04	— " —	
13/9-04	— " —	

Bemærkninger: *Kun ved anvendelse af rustfrit tilsatsmateriale
*Remarks: *Only with use of stainless steel welding consumable*

NOTIFIED BODY 0200

Markrapport nr.: *Field report No.:*	**194707/3B**
Andre prøver* *Add. tests**	

Brøndby, den 27-03-2003

FORCE TECHNOLOGY F 128 I

Niels Ovesen
Certificeringsansvarlig (udstedelsesdato)
Certification manager (date of issue)

PED-Approved
TPED-Approved

Welder / Operator
2003-03-27
date/sign.

* *Se evt. bilag for supplerende oplysninger*
See separate sheet, if required

Maskinfabrikken KOFA A/S
Færøvej 6
4681 Herfølge

Svejse-procedure-specifikation (WPS)

Udført i henhold til EN 288, sektion: 3

Supplerende specifikation:

Udført af: Erik Mørk Madsen

WPS nr: KOFA-001-1
Side 1 af 2
Dato: 21-12-00

Kunde/projekt

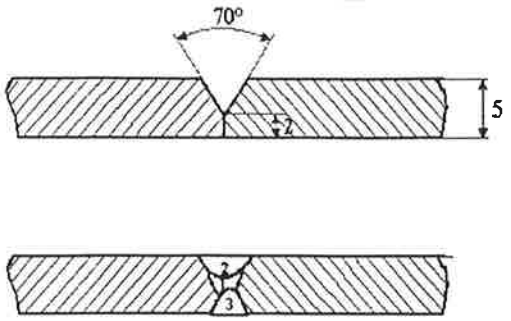
Projekt:

WPAR: KOFA-001

Grundmateriale:			EN 288 gruppe:		Tykkelse, mm:			Rør-diameter, mm:
A: EN 10028-7	W.nr. 1.4401	X5CrNiMo17-12-2	9	Plade	5.0	til	8.0	til
Til B: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	5.0	til	8.0	til
					3,0	-	14,0	

Forvarme (min. temp. af grundmateriale), °C: 15

Maks. mellemstrengstemp., °C: 150



Stilling side 1: PA

side 2:

Svejsested: Værksted

Bagskinne:

Opspænding: Clamp, hæftning i fugen

Fugeelektrode:
Elektrode diam., mm:
Opfugning, mm²:
orvarme ved opfugn., °C:
Lufttryk, bar:
Slibning ved opfugn.:

Hæftning:
Forvarme ved hæftn.,°C: 15
Hæftelængde, mm: 20
Antal strenge i hæftn.: 1
Hæftn./meter: 4
Hæfte-stilling: PA

Bem.
Hæftning og svejsning i.h.t.
EN 1011 del 1 og 2
Wolframelektrode 2,4 mm WL10
i.h.t. EN 26484

Tørring mv. af tilsatsmaterialer:
Opbevares tørt og fedtfri
Opbevares i.h.t. leverandøranvisning

Pulverklassifikation

Fugeforberedelse:
Mekanisk / termisk
Afrensning:
Rene og tørre fuger
Slibning / børstning

Streng	Side	Proces	Tråd/elektrode	Dimension, mm Diam.	Længde	Klassifikation	Gas/pulver	H2
1	1	141	Sandvik 19.12.3LSi	1.60		EN 12072 19 12 3L	Argon EN 439 I.1	D
2-N	1	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D
1	2	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D

Streng	Side	Polaritet	Strøm	Trådhast. m/min	Udstik mm	Spænding	Hast., m/min / Strækkelængde, mm	Energi kJ/mm	Pendling:	Gasflow, l/min	Bem. nr.
1	1	DC-	36-39	0.4-0.4		12.4-13.7	0.08-0.09	0.2-0.2			
2-N	1	DC+	66-73				85-95	0.7-0.8			
1	2	DC+	66-73				85-95	0.7-0.8			

8-10 FORCE Denmark
PED-Approved WPS
based on WPAR No. KOFA-001
with t: 7,1 mm
Imp. temp.: X °C

Product	Approved
UFPV	X
Shell Boiler	
Canal	
Pipes	X

2001-10-22
date/sign.

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)**	WPS nr: KOFA-001-1 Side 2 af 2 Dato: 21-12-00
	Udført af: Erik Mørk Madsen	

Baggas: Formier N2/H2 90/10 Strøm (l/min): 15 Gasdyse-diameter, mm: 11

Ekstra tråde / pulvere:
Trådplacering:

Pendling:

Varmebehandling:

Temperatur:		° C, + -	° C	Opvarmningshast.:	°C/time
Holdetid:	til	Timer		Kølehastighed:	°C/time

Bemærkninger og andre oplysninger:

Svejsning af streng nr. 1 kan udføres som pulserende svejsning med følgende data.
Pulsstrøm 60 Amp. Grundstrøm 15 Amp.
Pulstid 0,3 sek. Grundstrømstid 0,3 sek.

Der er følgende begrænsninger for verifikation af denne svejseprocedure ved svejsning af X6CrNiMoTi 17-12-2 W.nr. 4571 eller laver legerede stål i samme materialegruppe

Følgende stål kan blandt andet anvendes:

EN 10028-7 X2CrNiMo 17-11-2 W.nr. 1.4404

Overflade af overvulst og rodvulst slibes plan med pladekanterne til Ra 0,65 µm, efterfulgt af en bejsning.

Vi bekræfter, at denne procedure-specifikation er egnet for vores produktionsforhold.

Dato:

Underskrift

Værksted

Vi bekræfter/attesterer, at denne svejse-procedure er verificeret i henhold til det anførte grundlag.

Dato: 21/12. 01

FORCE Institutet
Underskrift
F 106 I Erik Mørk Madsen
Værksted

Dato:

Underskrift

Attesterende Instans

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)** Udført i henhold til EN 288, sektion: 3 Supplerende specifikation: Udført af: Erik Mørk Madsen	WPS nr: KOFA-001-2 Side 1 af 2 Dato: 21-12-00
Kunde/projekt	Projekt:	WPAR: KOFA-001

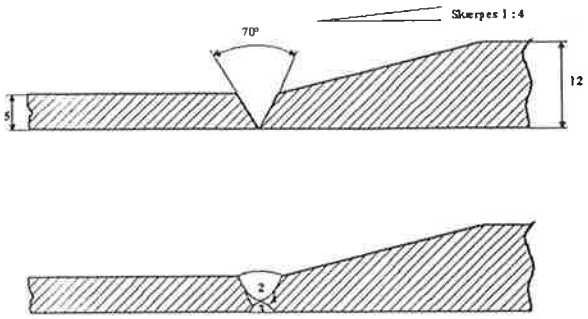
Grundmateriale:			EN 288 gruppe:		Tykkelse, mm:			Rør-diameter, mm:
A: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	5.0	til	8.0	til
Til B: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	8.0	til	12.0	til
					3.0	–	14	

Forvarme (min. temp. af grundmateriale), °C: 15

Maks. mellemstrengstemp., °C: 150

Stilling side 1: PA

side 2:



Svejsested: Værksted

Bagskinne:

Opspænding: Hæftning i fugen

Fugeelektrode:

Elektrode diam., mm:

Opfugning, mm²:

orvarme ved opfugn., °C:

Lufttryk, bar:

Slibning ved opfugn.:

Hæftning:

Forvarme ved hæftn.,°C: 15

Hæftelængde, mm: 20

Antal strenge i hæftn.: 1

Hæftn./meter: 4

Hæfte-stilling: PA

Bem.
Hæftning og svejsning i.h.t.
EN 1011 del 1 og 2
Wolframelektrode 2,4 mm WL10
i.h.t. EN 26484

Tørring mv. af tilsatsmaterialer:
Opbevares tørt og fedtfri
Opbevares i.h.t. leverandøranvisning

Pulverklassifikation

Fugeforberedelse:
Mekanisk / termisk
Afrensning:
Rene og tørre fuger
Slibning / børstning

Streng	Side	Proces	Tråd/elektrode	Dimension, mm Diam.	Længde	Klassifikation	Gas/pulver	H2
1	1	141	Sandvik 19.12.3LSi	1.60		EN 12072 19 12 3L	Argon EN 439 I.1	D
2-N	1	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D
1	2	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D

Streng	Side	Polaritet	Strøm	Trådhast. m/min	Udstik mm	Spænding	Hast., m/min / Strækkelængde, mm	Energi kJ/mm	Pendling:	Gasflow, l/min	Bem. Nr.
1	1	DC-	36-39	0.4-0.4		12.4-13.7	0.08-0.09	0.2-0.2			8-10
2-N	1	DC+	66-73				85-95	0.7-0.8			
1	2	DC+	66-73				85-95	0.7-0.8			

FORCE Technology

PED-Approved WPS
based on WPAR No. KOFA-001
with t: 3-14 mm
Imp. temp.: ∠ °C

Product	Approved
UFPV	X
Shell Boiler	
Canal	
Pipes	X

2001-12-12

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)**	WPS nr: KOFA-001-2 Side 2 af 2 Dato: 21-12-00
	Udført af: Erik Mørk Madsen	

Baggas: Formier N2/H2 90/10 Strøm (l/min): 15 Gasdyse-diameter, mm: 11

Ekstra tråde / pulvere:

Trådplacering:

Pendling:

Varmebehandling:

Temperatur: ° C, + - ° C Opvarmningshast.: °C/time

Holdetid: til Timer Kølehastighed: °C/time

Bemærkninger og andre oplysninger:

Svejsning af streng nr. 1 kan udføres som pulserende svejsning med følgende data.
Pulsstrøm 60 Amp. Grundstrøm 15 Amp.
Pulstid 0,3 sek. Grundstrømstid 0,3 sek.

Der er følgende begrænsninger for verifikation af denne svejseprocedure ved svejsning af X6CrNiMoTi 17-12-2 W.nr. 4571 eller laver legerede stål i samme materialegruppe

Følgende stål kan blandt andet anvendes:

EN 10028-7 X2CrNiMo 17-11-2 W.nr. 1.4404

Overflade af overvulst og rodvulst slibes plan med pladekanterne til Ra 0,65 µm, efterfulgt af en bejsning.

Vi bekræfter, at denne procedure-specifikation er egnet for vores produktionsforhold.

Dato:

Underskrift

Værksted

Vi bekræfter/attesterer, at denne svejse-procedure er verificeret i henhold til det anførte grundlag.

Dato: 21/12/00

FORCE Institutet
F 106 I
Underskrift Erik Mørk Madsen
Værksted

Dato:

Underskrift

Attesterende instans

Maskinfabrikken KOFA A/S
Færøvej 6
4681 Herfølge

Svejse-procedure-specifikation (WPS)

Udført i henhold til EN 288, sektion: 3

Supplerende specifikation:

Udført af: Erik Mørk Madsen

WPS nr: KOFA-001-3
Side 1 af 2
Dato: 22-12-00

Kunde/projekt | Projekt: | WPAR: KOFA-001

Grundmateriale:			EN 288 gruppe:		Tykkelse, mm:			Rør-diameter, mm:
A: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	8.0	til	12.0	til
Til B: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	8.0	til	12.0	til

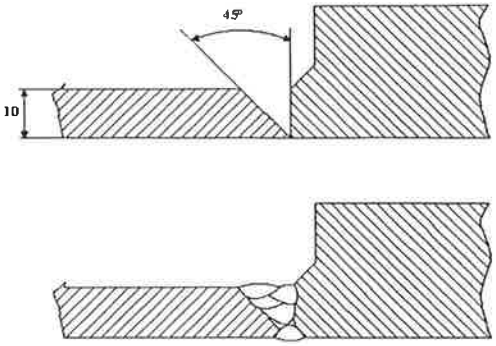
3.6 - 14

Forvarme (min. temp. af grundmateriale), °C: 15

Maks. mellemstrengstemp., °C: 150

Stilling side 1: PA

side 2: PA



Svejsested: Værksted

Bagskinne:

Opspænding: Hæftning i fugen

Fugeelektrode:
Elektrode diam., mm:
Opfugning, mm²:
orvarme ved opfugn., °C:
Lufttryk, bar:
Slibning ved opfugn.:

Hæftning:
Forvarme ved hæftn.,°C: 15
Hæftelængde, mm: 50
Antal strenge i hæftn.: 1
Hæftn./meter: 4
Hæfte-stilling: PA

Bem.
Hæftning og svejsning i.h.t.
EN 1011 del 1 og 2
Wolframelektrode 2,4 mm WL10
i.h.t. EN 26484

Tørring mv. af tilsatsmaterialer:
Opbevares tørt og fedtfri
Opbevares i.h.t. leverandøranvisning

Pulverklassifikation

Fugeforberedelse:
Mekanisk / Termisk
Afrensning:
Rene og tørre fuger
Slibning / børstning

Streng	Side	Proces	Tråd/elektrode	Dimension, mm Diam.	Længde	Klassifikation	Gas/pulver	H2
1	1	141	Sandvik 19.12.3LSi	1.60		EN 12072 19 12 3L	Argon EN 439 I.1	D
2-N	1	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D
1-N	2	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D

Streng	Side	Polaritet	Strøm	Trådhast. m/min	Udstik mm	Spænding	Hast., m/min / Strækkelængde, mm	Energi kJ/mm	Pendling:	Gasflow, l/min: Bem.
1	1	DC-	36-39	0.4-0.4		12.4-13.7	0.08-0.09	0.2-0.2		
2-N	1	DC+	66-73				85-95	0.7-0.8		
1-N	2	DC+	66-73				85-95	0.7-0.8		

Nr. 8-10 FORCE Denmark

PED-Approved WPS
based on WPAR No. KOFA-001
with t: 7.1 mm
Imp. temp.: 1 °C

Product	Approved
UFPV	X
Shell Boiler	
Canal	
Pipes	X

2001-10-22
Date/sign.

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)**	WPS nr: KOFA-001-3 Side 2 af 2 Dato: 22-12-00
	Udført af: Erik Mørk Madsen	

Baggas: Formier N2/H2 90/10 Strøm (l/min): 15 Gasdyse-diameter, mm: 11

Ekstra tråde / pulvere:
Trådplacering:

Pendling:

Varmebehandling:

Temperatur:		° C, + -	° C	Opvarmningshast.:	°C/time
Holdetid:	til	Timer		Kølehastighed:	°C/time

Bemærkninger og andre oplysninger:

Svejsning af streng nr. 1 kan udføres som pulserende svejsning med følgende data.
Pulsstrøm 70 Amp. Grundstrøm 18 Amp.
Pulstid 0,3 sek. Grundstrømstid 0,3 sek.

Der er følgende begrænsninger for verifikation af denne svejseprocedure ved svejsning af X6CrNiMoTi 17-12-2 W.nr. 4571 eller laver legerede stål i samme materialegruppe

Følgende stål kan blandt andet anvendes:

EN 10028-7 X2CrNiMo 17-11-2 W.nr. 1.4404

Overflade af overvulst og rodvulst slibes plan med pladekanterne til Ra 0,65 µm, efterfulgt af en bejsning.

Vi bekræfter, at denne procedure-specifikation er egnet for vores produktionsforhold.

Dato:

Underskrift

Værksted

Vi bekræfter/attesterer, at denne svejse-procedure er verificeret i henhold til det anførte grundlag.

Dato: 22/12.00

FORCE Instituttet
Underskrift
F 106 I Erik Mørk Madsen
Værksted

Dato:

Underskrift

Attesterende instans

Maskinfabrikken KOFA A/S
Færøvej 6
4681 Herfølge

Svejse-procedure-specifikation (WPS)

Udført i henhold til EN 288, sektion: 3

Supplerende specifikation:

Udført af: Erik Mørk Madsen

WPS nr: KOFA-001-7
Side 1 af 2
Dato: 20-09-01

Kunde/projekt

Projekt:

WPAR: KOFA-001

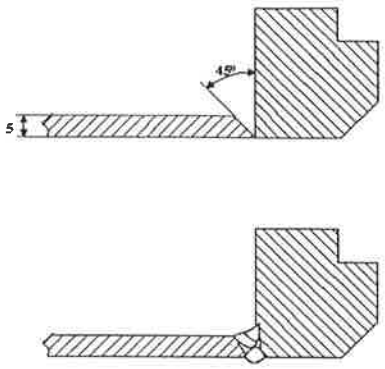
Grundmateriale:			EN 288 gruppe:		Tykkelse, mm:	Rør-diameter, mm:
A: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	5.0 til	til
Til B: EN 10028-7	W.nr. 1.4401	X5CrNiMo17-12-2	9	Forgrening	20.0 til 3.0 - 14 -	til

Forvarme (min. temp. af grundmateriale), °C: 15

Maks. mellemstrengstemp., °C: 150

Stilling side 1: PA

side 2: PA



Svejsested: Værksted

Bagskinne:

Opspænding: Hæftning i fugen

Fugeelektrode:
Elektrode diam., mm:
Opfugning, mm²:
orvarme ved opfugn., °C:
Lufttryk, bar:
Slibning ved opfugn.:

Hæftning:
Forvarme ved hæftn.,°C: 15
Hæftelængde, mm: 20
Antal strenge i hæftn.: 1
Hæftn./meter: 4
Hæfte-stilling: PA

Tørring mv. af tilsatsmaterialer:
Opbevares tørt og fedtfri
Opbevares i.h.t. leverandøranvisning

Pulverklassifikation

Fugeforberedelse:
Mekanisk / Termisk
Afrensning:
Rene og tørre fuger
Slibning / børstning

Bem.
Hæftning og svejsning i.h.t.
EN 1011 del 1 og 2
Wolframelektrode 2,4 mm WL10
i.h.t. EN 26484

Streng	Side	Proces	Tråd/elektrode	Dimension, mm Diam.	Længde	Klassifikation	Gas/pulver	H2
1	1	141	Sandvik 19.12.3LSi	1.60		EN 12072 19 12 3L	Argon EN 439 I.1	D
2-N	1	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D
1-N	2	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D

Streng	Side	Polaritet	Strøm	Trådhast. m/min	Udstik mm	Spænding	Hast., m/min / Strækkelængde, mm	Energi kJ/mm	Pendling:	Gasflow, l/min	Bem. Nr.
1	1	DC-	36-39	0.4-0.4		12.4-13.7	0.08-0.09	0.2-0.2			
2-N	1	DC+	66-73				85-95	0.7-0.8			
1-N	2	DC+	66-73				85-95	0.7-0.8			

8-10 FORCE Control

PED-Approved WPS
based on WPAR No. KOFA-001
with t: 3-1 mm
Imp. temp.: 1 °C

Product	Approved
UFPV	X
Shell Boiler	
Canal	
Pipes	X

2001-10-22

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)**	WPS nr: KOFA-001-7 Side 2 af 2 Dato: 20-09-01
	Udført af: Erik Mørk Madsen	

Baggas: Formier N2/H2 90/10 Strøm (l/min): 15 Gasdyse-diameter, mm: 11

Ekstra tråde / pulvere:
Trådplacering:

Pendling:

Varmebehandling:

Temperatur: ° C, + - ° C Opvarmningshast.: °C/time
Holdetid: til Timer Kølehastighed: °C/time

Bemærkninger og andre oplysninger:

Svejsning af streng nr. 1 kan udføres som pulserende svejsning med føl gende data.
Pulsstrøm 70 Amp. Grundstrøm 18 Amp.
Pulstid 0,3 sek. Grundstrømstid 0,3 sek.

Der er følgende begrænsninger for verifikation af denne svejseprocedure ved svejsning af X6CrNiMoTi 17-12-2 W.nr. 4571 eller laver legerede stål i samme materialegruppe

Følgende stål kan blandt andet anvendes:

EN 10028-7 X2CrNiMo 17-13-2
EN 10028-7 X6CrNiMo 17-12-2

Efter svejsning af side 1 opslibes rodsiden til rent metal, inden svejsning af side 2 påbegyndes.

Overfladen af side 1 slibes til Ra 0,65mym

Overfladen af side 2 slibes plan med pladekanterne til Ra 0,65 mym

Vi bekræfter, at denne procedure-specifikation er egnet for vores produktionsforhold.

Dato:

Underskrift

Værksted

Vi bekræfter/attesterer, at denne svejse-procedure er verificeret i henhold til det anførte grundlag.

Dato: 20/09-01

FORCE Institutet
Underskrift
F 106 I Erik Mørk Madsen
Værksted

Dato:

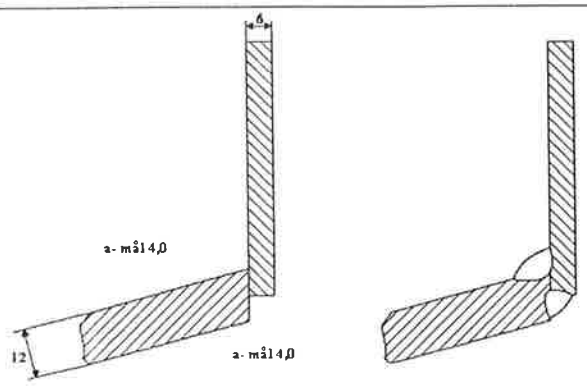
Underskrift

Attesterende instans

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)** Udført i henhold til EN 288, sektion: 3 Supplerende specifikation:	WPS nr: KOFA-001-012 Side 1 af 2 Dato: 3-11-00
	Udført af: Erik Mørk Madsen	
Kunde/projekt	Projekt:	WPAR: KOFA-001

Grundmateriale:			EN 288 gruppe:		Tykkelse, mm:	Rør-diameter, mm:
A: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	6.0 til	til
Til B: EN 10028-7	W.nr. 1.4404	X2CrNiMo17-12-2	9	Plade	12.0 til 3,0 - 14	til

Forvarme (min. temp. af grundmateriale), °C: 15	Maks. mellemstrengstemp., °C: 150



Stilling side 1: PB
side 2: PB

Svejsested: Værksted
Bagskinne:
Opspænding: Hæftning i fugen

Fugeelektrode:
Elektrode diam., mm:
Opfugning, mm²:
orvarme ved opfugn., °C:
Lufttryk, bar:
Slibning ved opfugn.:

Hæftning:
Forvarme ved hæftn.,°C: 15
Hæftelængde, mm: 50
Antal strenge i hæftn.: 1
Hæftn./meter: 4
Hæfte-stilling: PB

Bem.
Hæftning og svejsning i.h.t.
EN 1011 del 1 og 2

i.h.t. EN 26484

Tørring mv. af tilsatsmaterialer:
Opbevares tørt og fedtfri
Opbevares i.h.t. leverandøranvisning

Pulverklassifikation

Fugeforberedelse:
Mekanisk / Termisk
Afrensning:
Rene og tørre fuger
Slibning / børstning

Streng	Side	Proces	Tråd/elektrode	Dimension, mm Diam.	Længde	Klassifikation	Gas/pulver	H2
1-3	1	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D
1-3	2	111	Sandvik 19.12.3 LR	2.50	300	EN 1600 E 19.12.3 L R		D

Streng	Side	Polaritet	Strøm	Trådhast. m/min	Udstik mm	Spænding	Hast., m/min / Strækkelængde, mm	Energi kJ/mm	Pendling:	Gasflow, l/min	Bem. Nr.
1-3	1	DC+	66-73				66-73	0.9-1.0			
1-3	2	DC+	66-73				66-73	0.9-1.0			

FORCE-Denco

PED-Approved WPS based on WPAR No. KOFA-001
with t: 7,1 mm
Imp. temp.: — °C

Product	Approved
UFPV	X
Shell Boiler	
Canal	
Pipes	X

2001-10-22

Maskinfabrikken KOFA A/S Færøvej 6 4681 Herfølge	**Svejse-procedure-specifikation (WPS)**	WPS nr: KOFA-001-012 Side 2 af 2 Dato: 3-11-00
	Udført af: Erik Mørk Madsen	

Baggas: Formier N2/H2 90/10 Strøm (l/min): 15 Gasdyse-diameter, mm:

Ekstra tråde / pulvere:
Trådplacering:

Pendling:

Varmebehandling:
Temperatur: ° C, + - ° C Opvarmningshast.: °C/time
Holdetid: til Timer Kølehastighed: °C/time

Bemærkninger og andre oplysninger:

Der er følgende begrænsninger for verifikation af
denne svejseprocedure ved svejsning af X6CrNiMoTi 17-12-2 W.nr. 4571
eller laver legerede stål i samme materialegruppe

Følgende stål kan blandt andet anvendes:

EN 10028-7 X2CrNiMo 17-11-2 W.nr. 1.4404

Overflade af overvulst og rodvulst slibes plan med pladekanterne til
Ra 0,65 µm, efterfulgt af en bejsning.

Vi bekræfter, at denne procedure-specifikation
er egnet for vores produktionsforhold.

Dato:

Underskrift

Værksted

Vi bekræfter/attesterer, at denne svejse-procedure
er verificeret i henhold til det anførte grundlag.

Dato: 3/11-00

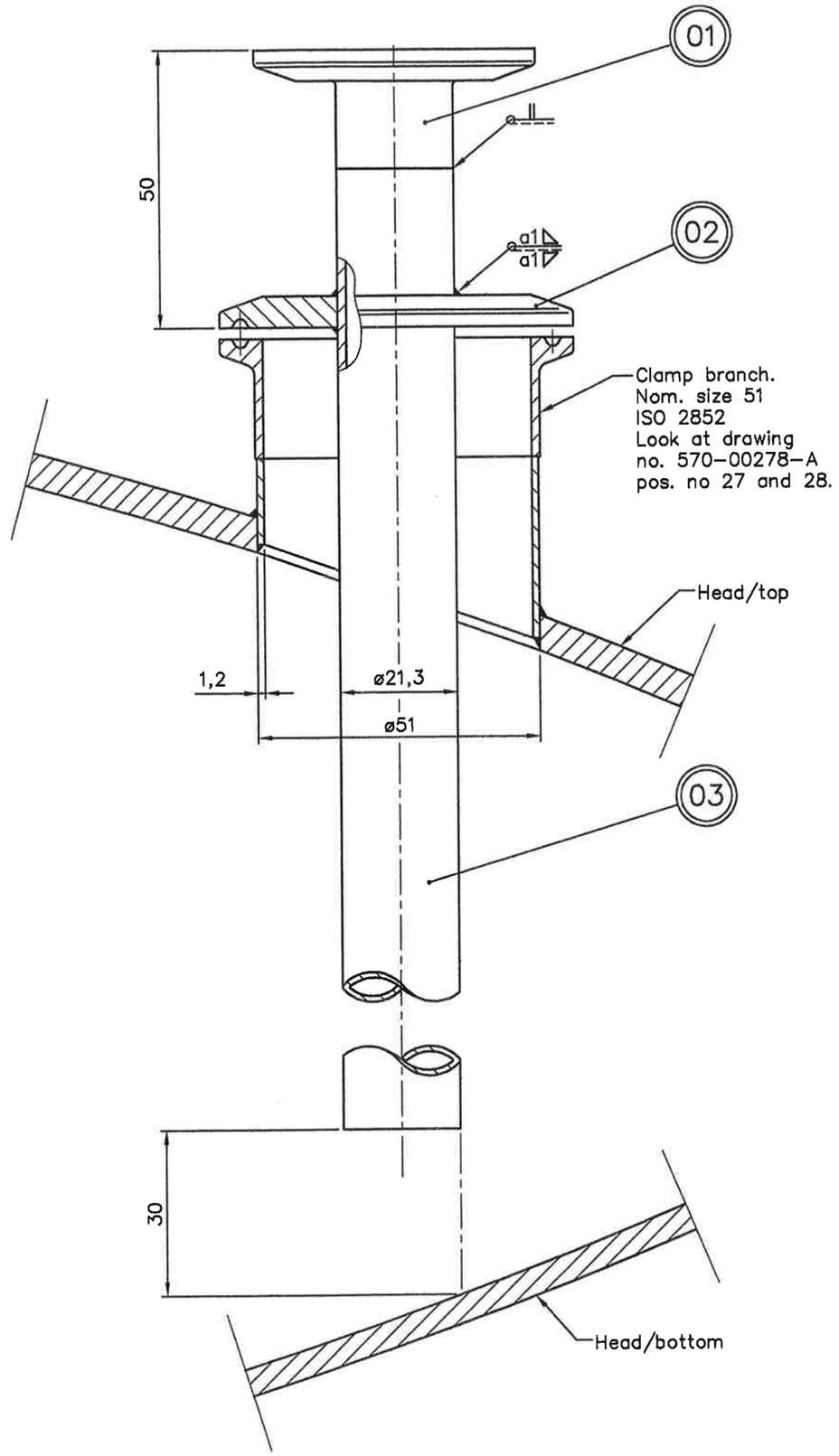
Underskrift

Værksted

Dato:

Underskrift

Attesterende instans



Assembly drawing, look at drawing no. 570-00278-A

ITEM	NAME	PCS.	DRWG. NO.	MATERIAL	DIMENSION/TYPE
03	Ascending pipe	1	–	EN 1.4404	Pipe ø21,3x1,6 Adjust length
02	Blind clamp branch	1	–	EN 1.4404	Nom. size 51 ISO 2852
01	Clamp branch	1	–	EN 1.4404	ø21,3x1,6 ISO 2852

Rev.:	Rev. date:	Design init.:	Revisions:
002	2004-03-25	CIS	Nom. size on pos. no. 02 change from 38 to 51 mm.
001	2004-03-12	CIS	First edition.

Drawing checked: 2004-03-25 AbG. Drawing approved: 2004.03.25 Document classification: III

novo nordisk

Novo Nordisk A/S
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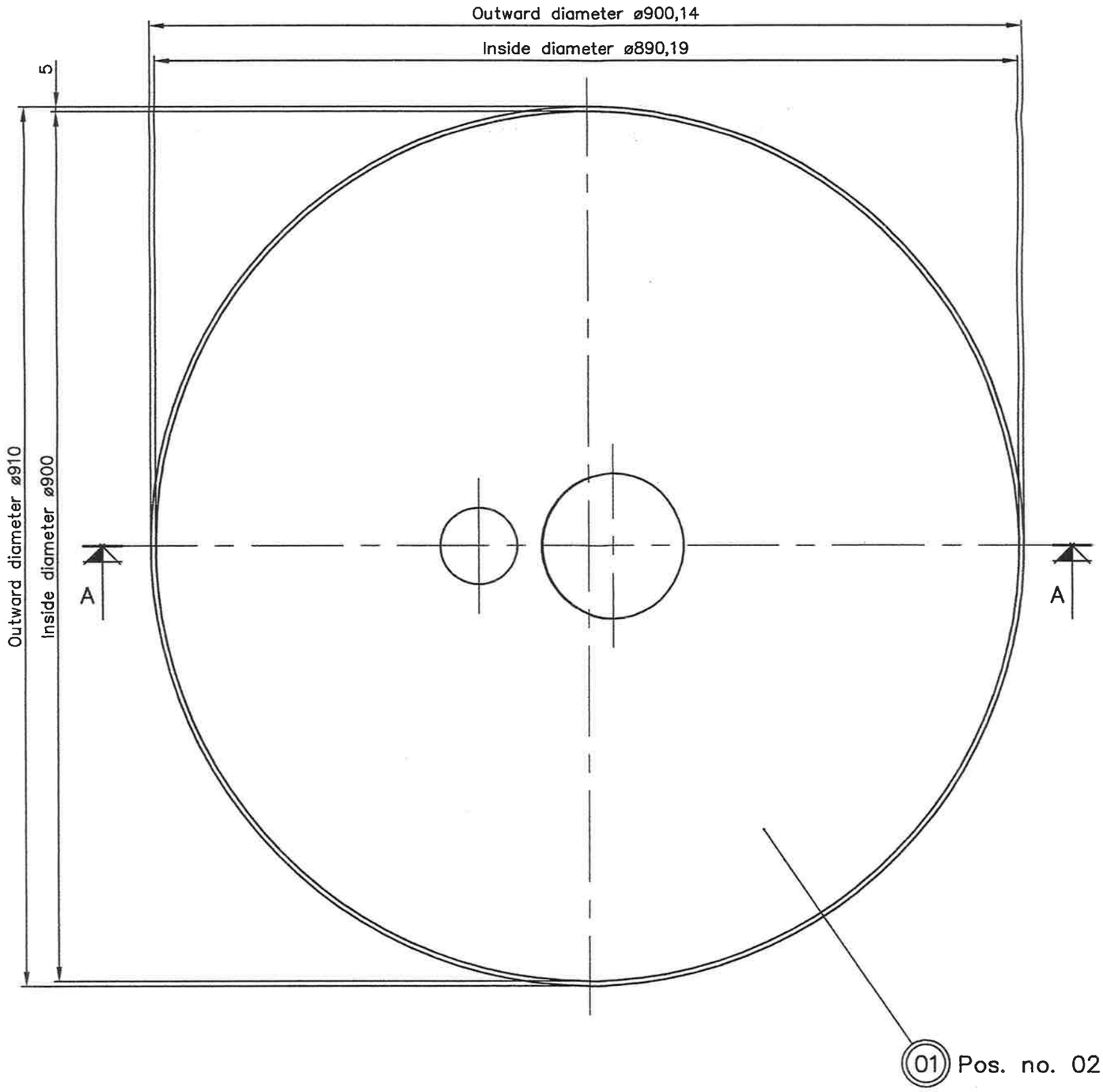
Novo Nordisk Pharmaceutique S.A. - Chartres, France

Creation date:	2004-02-23
Revision date:	2004-03-25
Draughtsman:	CIS
Designer:	CIS
Scale:	1:1
Page no.:	

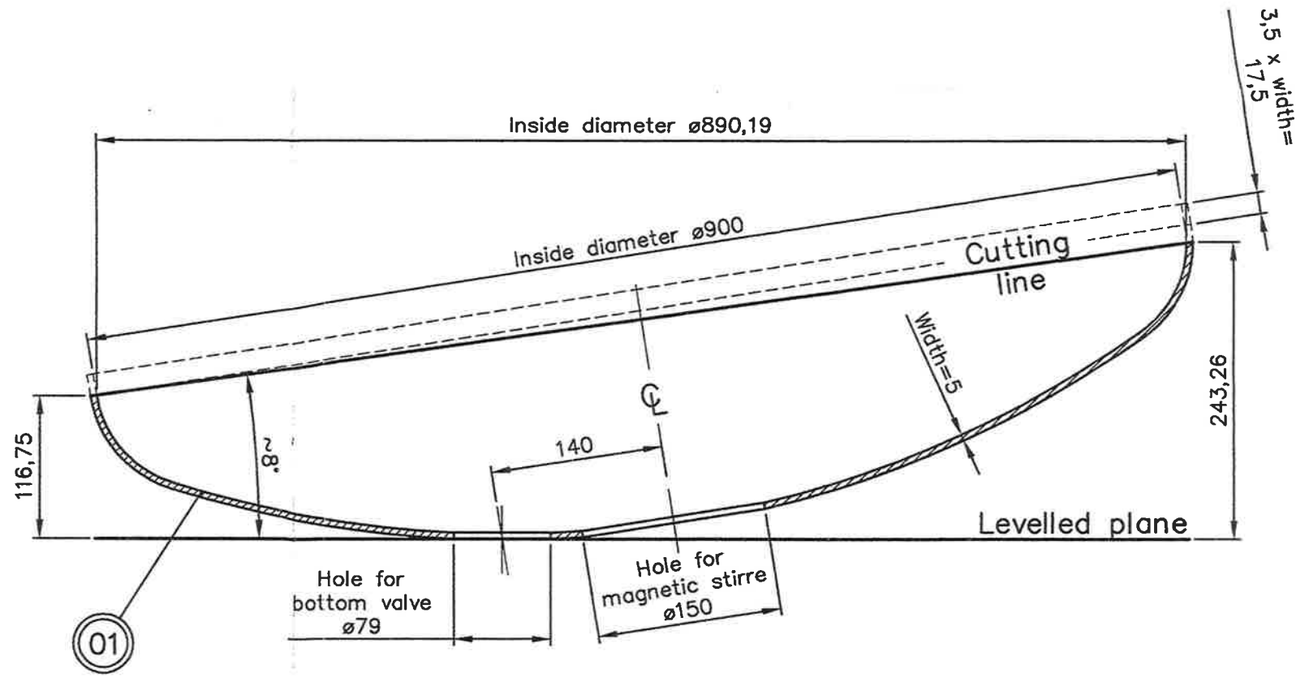
Vessel
600 litre pressure vessel
Detail about ascending pipe

570-00278-D-002



Assembly drawing, look at drawing no. 570–00278–A

001	2004–03–12	CIS	First e
Rev.:	Rev. date:	Design init.:	Revisio



Section A–A

rawing no. 570–00278–A

ITEM	NAME	PCS.	DRWG. NO.	MATERIAL	DIMENSION/TYPE
01	Head/bottom	1	–	EN 1.4404	Outward ø910 Width=5 mm.

Drawing checked: 2004-03-25 AG. Drawing approved: 2004.03.25 Document classification: III

novo nordisk

Novo Nordisk A/S
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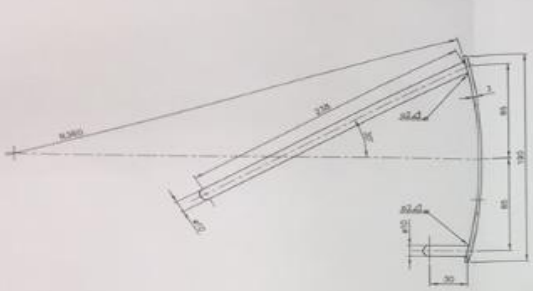
Novo Nordisk Pharmaceutique S.A. - Chartres, France

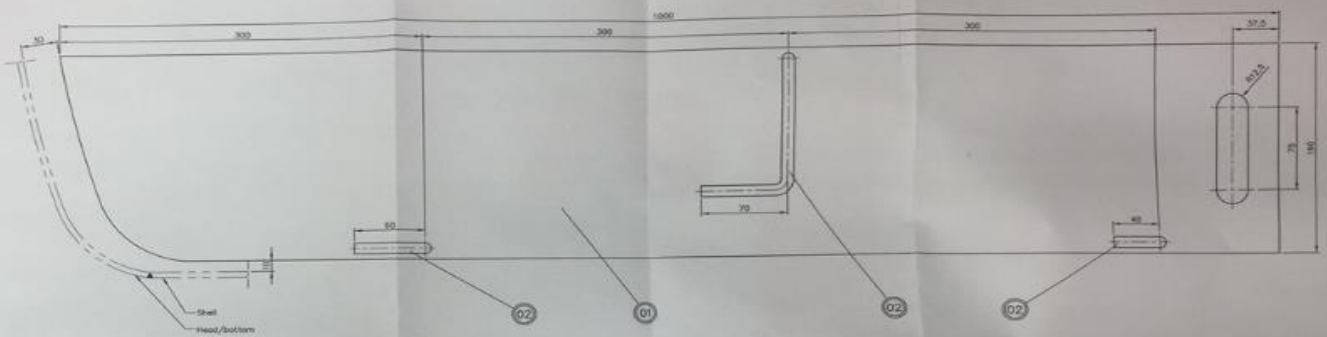
Creation date:	2004-02-23
Revision date:	2004-03-12
Draughtsman:	CIS
Designer:	CIS
Scale:	1:5
Page no.:	

Vessel
600 litre pressure vessel
Detail about angular head/bottom

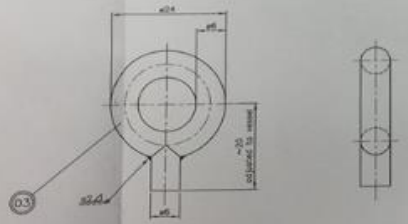
570-00278-B-001

on.





Bottom of the baffle plate must at 180° be adjusted to the crumb formation of the head/bottom. 10 mm. along the shell, and 30 mm. along the head/bottom.



Eye bar
Pos. no. 03
Measurement 2:1

Assembly drawing, look at drawing no. 570-00278-A

Surface: Grinded to Ra < 0,3 µm. with following polishing.

ITEM	NAME	POS.	DRWG. NO.	MATERIAL	DIMENSION/TYPE
03	Eye bar	3	-	EN 1.4404	Round bar steel ø8 mm.
02	Hooke	3	-	EN 1.4404	Round bar steel ø10 mm.
01	Baffle	1	-	EN 1.4404	Plate 3 mm.

Drawing checked: 2004-03-21 AB. Drawing approved: 2004-03-25 [illegible]. Document classification: III

Rev.	Rev. date	Design ref.	Revisions
001	2004-03-12	OS	First edition

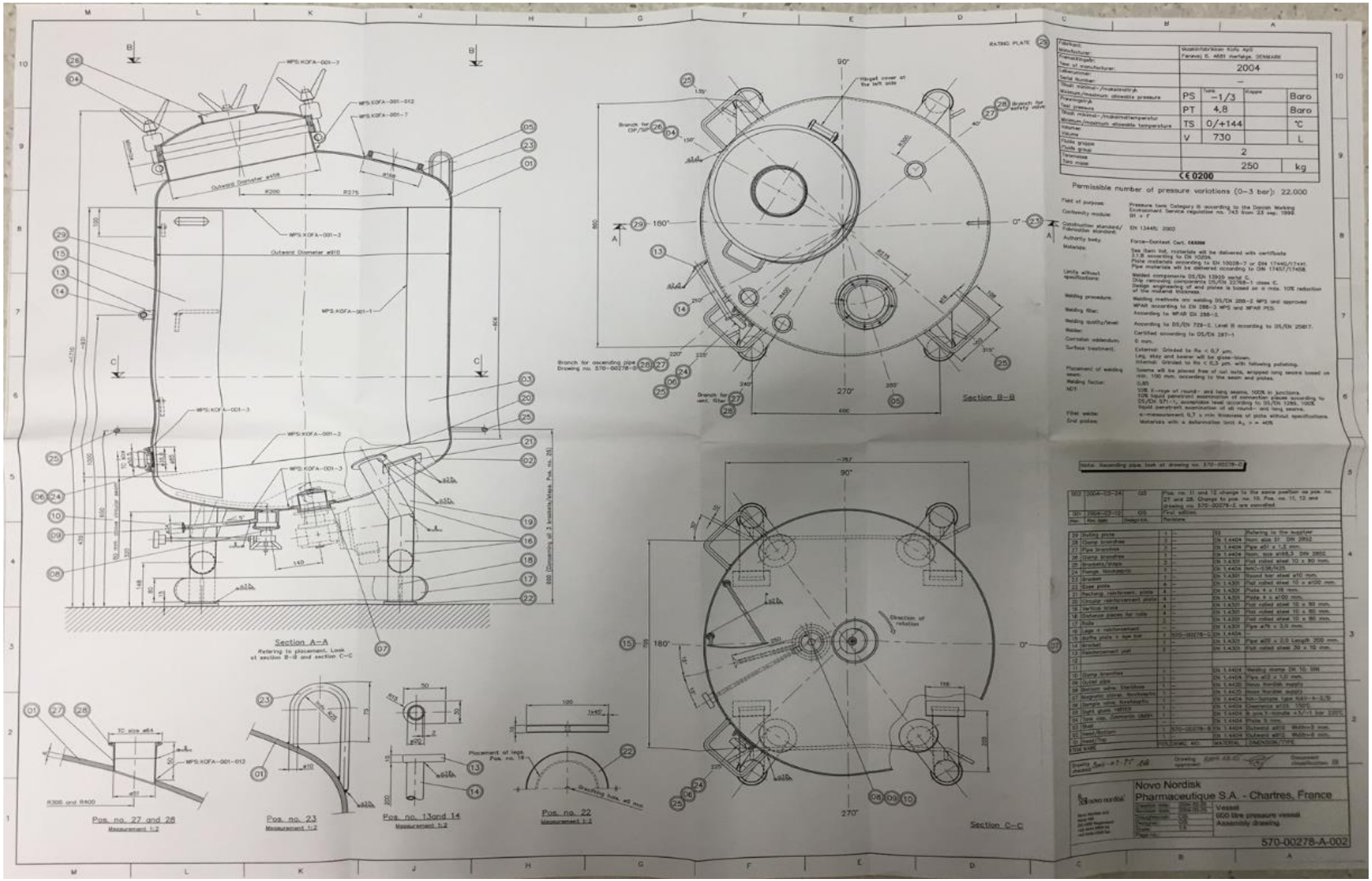
novo nordisk

Novo Nordisk
Pharmaceutique S.A. - Chartres, France

Creation date:	2004-03-10
Revision date:	2004-03-12
Draughtsman:	OS
Designer:	OS
Scale:	1:3
Page no.:	

Vessel
600 litre pressure vessel
Detail about baffle

570-00278-C-001


Section A–A
Referring to placement. Look at section B–B and section C–C
Section B–B
Section C–C
Pos. no. 27 and 28
Pos. no. 23
Pos. no. 13 and 14
Pos. no. 22
RATING PLATE
Permissible number of pressure variations (0–3 bar): 22.000
Novo Nordisk Pharmaceutique S.A. - Chartres, France
Vessel
600 litre pressure vessel
Assembly drawing
570-00278-A-002