

E I N G A B E N -- Programm ROHR2
Auftrag 9050300
ASU Kosice NO. 9
System: KO 07a

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CCC	*****	CCC
CCC	Spannungsanalyse	CCC
CCC	*****	CCC

Spannungsnachweise nach PRESSURE PIPING ASME B31.3 Stand 2002

Automatische Ermittlung der zul. Spannung nach folgenden Regeln:

Die zulaessigen Spannungen Sh und Sa werden entweder vom Programm in
Anlehnung an ASME B31.3 Art. 302.3
mit den Festigkeitswerten der Werkstoffdatei ermittelt oder direkt
der Werkstoffdatei entnommen, falls ein ASME/ASTM-Werkstoff vorliegt.
Die im ET-Satz (RR-Aufgabe) vorgegebenen zulaessigen Spannungen haben
jedoch Vorrang.

Sc = min (Rm\RT\min/3.0 , Rp0.2\RT\min/1.5)
Fuer ferritische Werkstoffe:
Sh = min (Sc , Rm\T\min/3.0 , Rp0.2\T\min/1.5 ,
Rm\100000\mitt/1.5 , 0.8*Rm\100000\min)
Fuer austenitische Werkstoffe:
Sh = min (Sc , Rp1.0\T\min/1.5 ,
Rm\100000\mitt/1.5 , 0.8*Rm\100000\min)
Sa = f * (1.25*Sc + 0.25*Sh)

Rm\RT\min	=Zugfestigkeit 20 Grad C Mindestw.	in N/mm ²
Rm\T\min	=Zugfestigkeit Berechn.-T. Mindestwert	in N/mm ²
Rp02\RT\min	=0.2% Streckgrenze 20 Grad C Mindestw.	in N/mm ²
Rp02\T\min	=0.2% Streckgrenze Berechn.-T. Mindestw.	in N/mm ²
Rp1.0\T\min	=1.0% Streckgrenze Berechn.-T. Mindestw.	in N/mm ²
Rm\100000\mitt	=Zeitstandsfestw. 100000h Mittelwert	in N/mm ²
Rm\100000\min	=Zeitstandsfestw. 100000h Mindestwert	in N/mm ²

Erlaeuterungen:

Bei austenit. Staehlen mit einem Verhaeltnis von Streckgrenze/Zugfestig-
keit bei 20 Grad C ≤ 0.5 wird mit Werten der 1% Streckgrenze gerechnet.
Dieser, in deutschen Regelwerken ueblicherweise verwendete Wert
zur Ermittlung der zul. Spannung fuer Austenite (/1.5), ersetzt den Wert
"90% der Steckgrenze bei Temperatur" aus ASME B31.3 (303.3.2 d(3))

Falls Rm\T\min nicht vorliegt, werden Naeherungsformeln eingesetzt.
Fuer ferritische Werkstoffe:
$$Rm\T\min = Rm\RT\min * (Rp02\RT\min + Rp02\T\min) / (2 * Rp02\RT\min) .$$

Der Faktor f (von Lastwechselzahl abhaengiger Spannungs-Reduktionsfaktor)
kann ueber den SPI-Datenatz eingegeben werden. (SPI F=f)

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ANSI B31.3		Werkstoff: X6CRNITI1810			
Materialkennwert	ZUGF	RP02	RM1H	EMOD	
		RP1P	RM2H	AFAT	
Quelle	DIN17458	DIN17458	DIN17458	SEW 310 I	
Ausgabe	07/1985	07/1985	07/1985	08/1997	
1.4541 nach DIN 17458 fuer warmgeformte / nahtlose Rohre					
1.4541 enthaelt d. Kennwerte fuer nahtlose warmgeformte Rohr und fuer weiterverarbeitete Bauteile nach DIN 17458, Fuer (K)altverformte / (G)eschweisste Rohre sind die in 1.4541KG enthaltenen erhoehten Werte nach DIN 17457 zulaessi Der Zeitstandswert fuer 100000h wurde extrapoliert.					
Auslegungstemp	GR C	-200.000			
Betriebstemp.	GR C	-200.000			
E-Mod kalt	kN/mm ²	197.00			
E-Mod warm	kN/mm ²	206.00			
Wanddicken	mm	0- 50			
in N/mm ²					
Rm\RT\min		460.00			
Rp0.2\RT\min		180.00			
Rp1.0\T\min		215.00			
Rm\100000\mitt		.-			
Rm\100000\min		.-			
Rm\RT\min/3.0		153.33			
Rp0.2\RT\min/1.5		120.00			
Sc		120.00			
Rp1.0\T\min /1.5		143.33			
Rm\100000\mitt/1.5		.-			
0.8*Rm\100000\min		.-			
Sh		120.00			
Sa		180.00			

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Den Spannungsnachweisen liegen folgende Lastfaelle zugrunde :

Lf-Datei	Lf-Feld	Lf-Bezeichnung	erstellt am:
Gewl.erg	G1	Gewicht	21.06.05 17:29:46
Templ.erg	T1	Betriebl	21.06.05 17:29:47
Windl.erg	W1	Windl-X	21.06.05 17:29:49
Windl.erg	W2	Windl-Y	21.06.05 17:29:49

Gedruckte Querschnittsdaten sind Nettowerte.

Es werden Toleranzeingaben beruecksichtigt fuer :
 Druck-Spannungsanteile S(P)
 Momenten-Spannungsanteile in SL, SOL

U E B E R L A G E R U N G S V O R S C H R I F T

Lf-Feld TMP1	Lastf. Betrie.-Gewich.1 = ARITHMET aus:		
	Lf-Feld T1	Lastf. Betriebl	* 1.00
	+ Lf-Feld G1	Lastf. Gewicht	* -1.00
Lf-Feld TRANGE	Lastf. Range	= RANGE aus:	
	Lf-Feld TMP1	Lastf. Betrie.-Gewich.1	* 1.00
Lf-Feld W-G_21	Lastf. Windl-X-Gew	= ARITHMET aus:	
	Lf-Feld W1	Lastf. Windl-X	* 1.00
	+ Lf-Feld G1	Lastf. Gewicht	* -1.00
Lf-Feld W-G_22	Lastf. Windl-Y-Gew	= ARITHMET aus:	
	Lf-Feld W2	Lastf. Windl-Y	* 1.00
	+ Lf-Feld G1	Lastf. Gewicht	* -1.00
Lf-Feld W_RMS2	Lastf. Windl-XY	= RMS aus:	
	Lf-Feld W-G_21	Lastf. Windl-X-Gew	* 1.00
	+ Lf-Feld W-G_22	Lastf. Windl-Y-Gew	* 1.00

Angeforderte GLEICHUNGEN:

ANSI B31.3 Nachweis 01 $SL = SLP + QXL / A + \sqrt{ii \cdot MiL^2 + io \cdot MoL^2} / Z$ < Sh
 P aus ET-Satz (Ausleg.Druck)
 Ma aus Lastfall Gewicht
 Sh aus MATDAT errechnet oder aus ET-Satz Faktor = 1.00

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ANSI B31.3 Nachweis 02 $SE = \sqrt{ii \cdot MiE^2 + io \cdot MoE^2 + MT^2} / Z < SA + f \cdot (Sh - SL)$
P aus ET-Satz (Ausleg.Druck)
Ma aus Lastfall Gewicht
Mc aus Lastfall Range
Sh aus MATDAT errechnet oder aus ET-Satz Faktor = 1.00
Sa aus MATDAT errechnet oder aus ET-Satz Faktor = 1.00
Ermuedungsfaktor $f = 1.00$
P, Ma fuer die Ermittlung von SL in Gleichung SE
 $Mc = Mc \cdot E\text{-MODkalt} / E\text{-MODwarm}$

ANSI B31.3 Nachweis 03 $SOL = SL + QXO / A + \sqrt{ii \cdot MiO^2 + io \cdot MoO^2} / Z < k \cdot Sh$
P aus ET-Satz (Ausleg.Druck)
Ma aus Lastfall Gewicht
Mb aus Lastfall Wind1-XY
Sh aus MATDAT errechnet oder aus ET-Satz Faktor = 1.33

Pkt 10 Strg 1 n Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf., Ubear.
ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL n	16.0	26.2	0.027	0.002	0.034 4.5	30.6	120.0	26
02	SE n	SL=	30.6	1.037	0.122	0.073 75.8	75.8	269.4	28
03	SOLn	SL=	30.6	0.457	0.042	0.211 29.1	59.7	159.6	37

Pkt 15 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf., Ubear.
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.027	0.002	0.019 2.5	28.7	120.0	24
01	SL n	16.0	26.2	0.027	0.002	0.019 2.5	28.7	120.0	24
02	SE v	SL=	28.7	1.037	0.207	0.026 76.6	76.6	271.3	28
02	SE n	SL=	28.7	1.037	0.207	0.026 76.6	76.6	271.3	28
03	SOLv	SL=	28.7	0.457	0.036	0.191 26.4	55.1	159.6	35
03	SOLn	SL=	28.7	0.457	0.036	0.191 26.4	55.1	159.6	35

Pkt 20 Strg 1 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
Strg 1 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.027	0.019	0.002 8.0	34.1	120.0	28
01	SL m	16.0	26.2	0.206	0.003	0.002 2.0	28.2	120.0	23
01	SL n	16.0	26.2	0.232	0.009	0.000 4.6	30.7	120.0	26
02	SE v	SL=	34.1	1.037	0.026	0.207 85.5	85.5	265.9	32
02	SE m	SL=	28.2	0.937	0.052	0.449 111.5	111.5	271.8	41
02	SE n	SL=	30.7	0.402	0.091	0.842 168.3	168.3	269.3	63
03	SOLv	SL=	34.1	0.457	0.191	0.036 82.2	116.3	159.6	73
03	SOLm	SL=	28.2	0.046	0.143	0.022 60.7	88.9	159.6	56
03	SOLn	SL=	30.7	0.385	0.095	0.011 41.0	71.7	159.6	45

Pkt 30 Strg 1 v Da= 88.9 mm s= 1.3 mm (TWA) T-Stck Weld., Aufsw
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 2.9 io= 2.9
Strg 4 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.165	0.000	0.004 2.1	28.2	120.0	24
01	SL n	16.0	26.2	0.163	0.000	0.004 2.1	28.2	120.0	24
01	SL n	16.0	13.0	0.000	0.000	0.000 1.0	14.0	120.0	12
02	SE v	SL=	28.2	0.402	0.524	0.109 115.0	115.0	271.8	42
02	SE n	SL=	28.2	0.402	0.524	0.109 115.0	115.0	271.8	42
02	SE n	SL=	14.0	0.000	0.000	0.000 0.0	0.0	286.0	0
03	SOLv	SL=	28.2	0.385	0.016	0.020 10.7	38.9	159.6	24
03	SOLn	SL=	28.2	0.385	0.016	0.020 10.7	38.9	159.6	24
03	SOLn	SL=	14.0	0.000	0.000	0.004 26.5	40.5	159.6	25

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Pkt 40 Strg 1 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 1 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN,kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.022	0.006	0.000 2.7	28.8	120.0	24
01	SL m	16.0	26.2	0.005	0.007	0.001 3.2	29.3	120.0	24
01	SL n	16.0	26.2	0.026	0.008	0.002 3.7	29.8	120.0	25
02	SE v	SL=	28.8	0.402	0.147	0.147 53.5	53.5	271.2	20
02	SE m	SL=	29.3	0.443	0.143	0.057 47.7	47.7	270.7	18
02	SE n	SL=	29.8	0.446	0.124	0.043 44.2	44.2	270.2	16
03	SOLv	SL=	28.8	0.385	0.084	0.037 38.8	67.6	159.6	42
03	SOLm	SL=	29.3	0.432	0.090	0.030 40.3	69.6	159.6	44
03	SOLn	SL=	29.8	0.410	0.087	0.019 38.3	68.2	159.6	43

Pkt 50 Strg 1 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 1 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN,kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.081	0.002	0.005 2.2	28.4	120.0	24
01	SL m	16.0	26.2	0.074	0.001	0.002 1.0	27.1	120.0	23
01	SL n	16.0	26.2	0.001	0.010	0.009 5.5	31.6	120.0	26
02	SE v	SL=	28.4	0.446	0.325	0.003 82.8	82.8	271.6	30
02	SE m	SL=	27.1	0.337	0.439	0.265 117.7	117.7	272.9	43
02	SE n	SL=	31.6	0.071	0.438	0.378 126.4	126.4	268.4	47
03	SOLv	SL=	28.4	0.410	0.023	0.051 21.3	49.7	159.6	31
03	SOLm	SL=	27.1	0.363	0.020	0.050 20.4	47.5	159.6	30
03	SOLn	SL=	31.6	0.179	0.024	0.020 12.7	44.3	159.6	28

Pkt 60 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN,kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.001	0.008	0.072 9.4	35.6	120.0	30
01	SL n	16.0	26.2	0.019	0.008	0.072 9.4	35.6	120.0	30
02	SE v	SL=	35.6	0.071	0.014	0.310 23.0	23.0	264.4	9
02	SE n	SL=	35.6	0.071	0.014	0.310 23.0	23.0	264.4	9
03	SOLv	SL=	35.6	0.179	0.047	0.123 17.6	53.2	159.6	33
03	SOLn	SL=	35.6	0.067	0.047	0.123 17.3	52.9	159.6	33

Pkt 65 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN,kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.019	0.002	0.160 20.8	47.0	120.0	39
01	SL n	16.0	26.2	0.045	0.002	0.160 20.9	47.0	120.0	39
02	SE v	SL=	47.0	0.071	0.115	0.417 31.7	31.7	253.0	13
02	SE n	SL=	47.0	0.071	0.115	0.417 31.7	31.7	253.0	13
03	SOLv	SL=	47.0	0.067	0.272	0.034 35.7	82.7	159.6	52
03	SOLn	SL=	47.0	0.178	0.272	0.034 36.0	83.1	159.6	52

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Pkt 70 Strg 1 v Da= 88.9 mm s= 1.3 mm (TFS) T-Stck FormStueck
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 2.5 io= 3.0
Strg 2 n Da= 88.9 mm s= 1.3 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.045	0.089	0.082 43.1	69.2	120.0	58
01	SL n	16.0	26.2	0.034	0.078	0.086 42.0	68.1	120.0	57
01	SL n	16.0	26.2	0.276	0.011	0.030 12.7	38.9	120.0	32
02	SE v	SL=	69.2	0.071	0.041	0.136 30.9	30.9	230.8	13
02	SE n	SL=	68.1	0.047	0.340	0.015 61.6	61.6	231.9	27
02	SE n	SL=	38.9	0.121	0.299	0.118 58.9	58.9	261.1	23
03	SOLv	SL=	69.2	0.178	0.057	0.026 21.5	90.8	159.6	57
03	SOLn	SL=	68.1	0.132	0.123	0.056 45.6	113.8	159.6	71
03	SOLn	SL=	38.9	0.049	0.081	0.076 39.0	77.9	159.6	49

Pkt 80 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.034	0.014	0.155 20.2	46.3	120.0	39
01	SL n	16.0	26.2	0.076	0.014	0.155 20.3	46.5	120.0	39
02	SE v	SL=	46.3	0.047	0.127	0.344 26.8	26.8	253.7	11
02	SE n	SL=	46.5	0.047	0.127	0.344 26.8	26.8	253.5	11
03	SOLv	SL=	46.3	0.132	0.187	0.081 26.8	73.1	159.6	46
03	SOLn	SL=	46.5	0.210	0.187	0.081 27.0	73.4	159.6	46

Pkt 90 Strg 1 v Da= 88.9 mm s= 1.3 mm (TFS) T-Stck FormStueck
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 2.5 io= 3.0
Strg 5 n Da= 88.9 mm s= 1.3 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.076	0.092	0.084 44.2	70.3	120.0	59
01	SL n	16.0	26.2	0.031	0.152	0.138 72.8	98.9	120.0	82
01	SL n	16.0	26.2	0.418	0.060	0.051 28.6	54.8	120.0	46
02	SE v	SL=	70.3	0.047	0.640	0.657 183.7	183.7	229.7	80
02	SE n	SL=	98.9	0.055	0.156	0.072 32.5	32.5	201.1	16
02	SE n	SL=	54.8	0.585	0.796	0.101 147.9	147.9	245.2	60
03	SOLv	SL=	70.3	0.210	0.033	0.053 23.7	94.0	159.6	59
03	SOLn	SL=	98.9	0.178	0.078	0.016 26.6	125.6	159.6	79
03	SOLn	SL=	54.8	0.286	0.065	0.071 34.9	89.6	159.6	56

Pkt 100 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.031	0.004	0.212 27.6	53.7	120.0	45
01	SL n	16.0	26.2	0.001	0.004	0.212 27.5	53.6	120.0	45
02	SE v	SL=	53.7	0.055	0.477	0.046 35.0	35.0	246.3	14
02	SE n	SL=	53.6	0.055	0.477	0.046 35.0	35.0	246.4	14
03	SOLv	SL=	53.7	0.178	0.010	0.026 4.1	57.8	159.6	36
03	SOLn	SL=	53.6	0.228	0.010	0.026 4.3	57.9	159.6	36

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Pkt 110 Strg 1 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 1 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.001	0.001	0.030 10.6	36.8	120.0	31
01	SL m	16.0	26.2	0.004	0.000	0.013 4.6	30.8	120.0	26
01	SL n	16.0	26.2	0.005	0.000	0.009 3.1	29.3	120.0	24
02	SE v	SL=	36.8	0.055	0.622	0.024 146.0	146.0	263.2	55
02	SE m	SL=	30.8	0.052	0.624	0.030 146.4	146.4	269.2	54
02	SE n	SL=	29.3	0.013	0.579	0.065 136.2	136.2	270.7	50
03	SOLv	SL=	36.8	0.228	0.107	0.010 45.4	82.2	159.6	52
03	SOLm	SL=	30.8	0.354	0.123	0.017 53.1	83.9	159.6	53
03	SOLn	SL=	29.3	0.305	0.119	0.018 51.1	80.4	159.6	50

Pkt 120 Strg 1 v Da= 88.9 mm s= 1.3 mm (TWA) T-Stck Weld.,Aufsw
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 2.9 io= 2.9
 Strg 9 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.002	0.037	0.000 13.7	39.9	120.0	33
01	SL n	16.0	26.2	0.002	0.037	0.000 13.7	39.9	120.0	33
01	SL n	16.0	13.0	0.002	0.000	0.000 0.0	13.1	120.0	11
02	SE v	SL=	39.9	0.013	0.078	0.484 102.1	102.1	260.1	39
02	SE n	SL=	39.9	0.013	0.078	0.484 102.1	102.1	260.1	39
02	SE n	SL=	13.1	0.000	0.000	0.000 0.0	0.0	286.9	0
03	SOLv	SL=	39.9	0.305	0.013	0.096 36.9	76.8	159.6	48
03	SOLn	SL=	39.9	0.305	0.013	0.096 36.9	76.8	159.6	48
03	SOLn	SL=	13.1	0.000	0.000	0.000 0.0	13.1	159.6	8

Pkt 130 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.001	0.000	0.056 7.3	33.4	120.0	28
01	SL n	16.0	26.2	0.026	0.000	0.056 7.4	33.5	120.0	28
02	SE v	SL=	33.4	0.009	0.398	0.090 29.6	29.6	266.6	11
02	SE n	SL=	33.5	0.009	0.398	0.090 29.6	29.6	266.5	11
03	SOLv	SL=	33.4	0.305	0.075	0.009 10.7	44.1	159.6	28
03	SOLn	SL=	33.5	0.312	0.075	0.009 10.7	44.2	159.6	28

Pkt 140 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 98.1 mm s= 5.9 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.023	0.000	0.125 16.2	42.4	120.0	35
01	SL n	16.0	5.5	0.021	0.000	0.125 3.4	8.8	120.0	7
02	SE v	SL=	42.4	0.009	0.262	0.059 19.5	19.5	257.6	8
02	SE n	SL=	8.8	0.009	0.262	0.059 6.1	6.1	291.2	2
03	SOLv	SL=	42.4	0.312	0.054	0.009 8.0	50.4	159.6	32
03	SOLn	SL=	8.8	0.312	0.054	0.009 1.7	10.5	159.6	7

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WWWWW Bei Pkt 150 D(VOR) UNGL. D(NACH) BEI KNICK

WWWWWWW

Pkt 150 Strg 1 v Da= 98.1 mm s= 5.9 mm (PWS) Rohr Weit.Segm-bog
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	5.5	0.009	0.000	0.074 2.0	7.5	120.0	6
01	SL n	16.0	26.2	0.005	0.000	0.074 9.6	35.7	120.0	30
02	SE v	SL=	7.5	0.009	0.086	0.019 2.0	2.0	292.5	1
02	SE n	SL=	35.7	0.007	0.086	0.019 6.4	6.4	264.3	2
03	SOLv	SL=	7.5	0.312	0.018	0.010 0.7	8.2	159.6	5
03	SOLn	SL=	35.7	0.313	0.018	0.010 3.6	39.3	159.6	25

Pkt 160 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.005	0.000	0.017 2.2	28.4	120.0	24
01	SL n	16.0	26.2	0.001	0.000	0.017 2.2	28.4	120.0	24
02	SE v	SL=	28.4	0.007	0.000	0.001 0.5	0.5	271.6	0
02	SE n	SL=	28.4	0.007	0.000	0.001 0.5	0.5	271.6	0
03	SOLv	SL=	28.4	0.313	0.009	0.010 2.6	30.9	159.6	19
03	SOLn	SL=	28.4	0.093	0.009	0.010 1.9	30.3	159.6	19

Pkt 170 Strg 1 v Da= 88.9 mm s= 1.3 mm (TWA) T-Stck Weld.,Aufsw
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 2.9 io= 2.9
 Strg 3 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.001	0.017	0.000 6.3	32.5	120.0	27
01	SL n	16.0	26.2	0.000	0.016	0.000 6.1	32.3	120.0	27
01	SL n	16.0	13.0	0.021	0.000	0.000 4.3	17.3	120.0	14
02	SE v	SL=	32.5	0.007	0.001	0.000 0.5	0.5	267.5	0
02	SE n	SL=	32.3	0.000	0.000	0.000 0.0	0.0	267.7	0
02	SE n	SL=	17.3	0.000	0.001	0.007 26.8	26.8	282.7	9
03	SOLv	SL=	32.5	0.093	0.010	0.008 5.0	37.5	159.6	23
03	SOLn	SL=	32.3	0.000	0.000	0.008 3.1	35.4	159.6	22
03	SOLn	SL=	17.3	0.039	0.010	0.009 87.8	105.2	159.6	66

Pkt 180 Strg 1 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 1 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.001	0.000	0.007 0.9	27.1	120.0	23
01	SL n	16.0	26.2	0.002	0.000	0.007 0.9	27.1	120.0	23
02	SE v	SL=	27.1	0.000	0.000	0.000 0.0	0.0	272.9	0
02	SE n	SL=	27.1	0.000	0.000	0.000 0.0	0.0	272.9	0
03	SOLv	SL=	27.1	0.000	0.003	0.000 0.4	27.4	159.6	17
03	SOLn	SL=	27.1	0.000	0.003	0.000 0.4	27.4	159.6	17

Pkt 185 Strg 1 v Da= 88.9 mm s= 1.3 mm (RKR) Reduz. Kl.Radien
 Strg 1 n Da= 76.1 mm s= 1.3 mm A= 13.0 Grd
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
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01	SL	v	16.0	26.2	0.001	0.000	0.004	0.5	26.7	120.0	22
01	SL	n	16.0	22.2	0.001	0.000	0.004	0.7	22.9	120.0	19

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Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
02	SE v	SL=	26.7	0.000	0.000	0.000 0.0	0.0	273.3	0
02	SE n	SL=	22.9	0.000	0.000	0.000 0.0	0.0	277.1	0
03	SOLv	SL=	26.7	0.000	0.001	0.000 0.2	26.8	159.6	17
03	SOLn	SL=	22.9	0.000	0.001	0.000 0.2	23.2	159.6	15

Pkt 190 Strg 1 v Da= 76.1 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	22.2	0.000	0.000	0.000 0.0	22.2	120.0	19
02	SE v	SL=	22.2	0.000	0.000	0.000 0.0	0.0	277.8	0
03	SOLv	SL=	22.2	0.000	0.000	0.000 0.0	22.2	159.6	14

Pkt 200 Strg 2 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 2 n Da= 98.1 mm s= 5.9 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.241	0.010	0.008 2.3	28.5	120.0	24
01	SL n	16.0	5.5	0.215	0.010	0.008 0.5	5.9	120.0	5
02	SE v	SL=	28.5	0.121	0.254	0.091 21.4	21.4	271.5	8
02	SE n	SL=	5.9	0.121	0.254	0.091 6.7	6.7	294.1	2
03	SOLv	SL=	28.5	0.049	0.063	0.054 10.8	39.3	159.6	25
03	SOLn	SL=	5.9	0.049	0.063	0.054 2.2	8.2	159.6	5

Pkt 210 Strg 2 v Da= 98.1 mm s= 5.9 mm (VUU) V-Naht Umf.,Ubear.
 Strg 2 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	5.5	0.011	0.007	0.039 1.1	6.5	120.0	5
01	SL n	16.0	26.2	0.015	0.007	0.039 5.1	31.3	120.0	26
02	SE v	SL=	6.5	0.121	0.181	0.048 5.1	5.1	293.5	2
02	SE n	SL=	31.3	0.121	0.181	0.048 16.1	16.1	268.7	6
03	SOLv	SL=	6.5	0.049	0.041	0.026 1.3	7.9	159.6	5
03	SOLn	SL=	31.3	0.049	0.041	0.026 6.4	37.7	159.6	24

Pkt 220 Strg 2 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 2 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 2 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.048	0.037	0.005 15.7	41.9	120.0	35
01	SL m	16.0	26.2	0.040	0.035	0.006 14.9	41.1	120.0	34
01	SL n	16.0	26.2	0.014	0.032	0.006 13.5	39.7	120.0	33
02	SE v	SL=	41.9	0.121	0.023	0.139 29.0	29.0	258.1	11
02	SE m	SL=	41.1	0.063	0.016	0.160 31.8	31.8	258.9	12
02	SE n	SL=	39.7	0.001	0.012	0.158 31.0	31.0	260.3	12
03	SOLv	SL=	41.9	0.049	0.015	0.031 12.7	54.6	159.6	34
03	SOLm	SL=	41.1	0.070	0.012	0.038 14.3	55.4	159.6	35
03	SOLn	SL=	39.7	0.079	0.011	0.039 14.6	54.3	159.6	34

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Pkt 230 Strg 2 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 2 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P	SLP	Qx,Mt	Mi	Mo S(Q,M)	S-ges	S-zul	Ausn
		(bar)	(N/mm2)	(kN, kNm)	(kNm)	(kNm) (N/mm2)	(N/mm2)	(N/mm2)	(%)
01	SL v	16.0	26.2	0.018	0.000	0.056 7.3	33.5	120.0	28
01	SL n	16.0	26.2	0.018	0.000	0.056 7.3	33.5	120.0	28
02	SE v	SL=	33.5	0.001	0.002	0.019 1.4	1.4	266.5	1
02	SE n	SL=	33.5	0.001	0.002	0.019 1.4	1.4	266.5	1
03	SOLv	SL=	33.5	0.079	0.030	0.008 4.2	37.7	159.6	24
03	SOLn	SL=	33.5	0.093	0.030	0.008 4.2	37.8	159.6	24

Pkt 240 Strg 2 v Da= 88.9 mm s= 1.3 mm (TWA) T-Stck Weld.,Aufsw
 Strg 2 n Da= 88.9 mm s= 1.3 mm ii= 2.9 io= 2.9
 Strg 7 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P	SLP	Qx,Mt	Mi	Mo S(Q,M)	S-ges	S-zul	Ausn
		(bar)	(N/mm2)	(kN, kNm)	(kNm)	(kNm) (N/mm2)	(N/mm2)	(N/mm2)	(%)
01	SL v	16.0	26.2	0.019	0.021	0.000 7.8	34.0	120.0	28
01	SL n	16.0	26.2	0.002	0.016	0.000 6.1	32.3	120.0	27
01	SL n	16.0	13.0	0.098	0.005	0.000 32.5	45.5	120.0	38
02	SE v	SL=	34.0	0.001	0.055	0.000 11.5	11.5	266.0	4
02	SE n	SL=	32.3	0.000	0.000	0.000 0.0	0.0	267.7	0
02	SE n	SL=	45.5	0.000	0.055	0.001 215.7	215.7	254.5	85
03	SOLv	SL=	34.0	0.093	0.009	0.000 3.8	37.8	159.6	24
03	SOLn	SL=	32.3	0.000	0.000	0.008 3.1	35.3	159.6	22
03	SOLn	SL=	45.5	0.011	0.009	0.012 98.8	144.3	159.6	90

Pkt 250 Strg 2 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 2 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P	SLP	Qx,Mt	Mi	Mo S(Q,M)	S-ges	S-zul	Ausn
		(bar)	(N/mm2)	(kN, kNm)	(kNm)	(kNm) (N/mm2)	(N/mm2)	(N/mm2)	(%)
01	SL v	16.0	26.2	0.001	0.000	0.007 0.9	27.1	120.0	23
01	SL n	16.0	26.2	0.001	0.000	0.007 0.9	27.1	120.0	23
02	SE v	SL=	27.1	0.000	0.000	0.000 0.0	0.0	272.9	0
02	SE n	SL=	27.1	0.000	0.000	0.000 0.0	0.0	272.9	0
03	SOLv	SL=	27.1	0.000	0.003	0.000 0.4	27.4	159.6	17
03	SOLn	SL=	27.1	0.000	0.003	0.000 0.4	27.4	159.6	17

Pkt 260 Strg 2 v Da= 88.9 mm s= 1.3 mm (RKR) Reduz. Kl.Radien
 Strg 2 n Da= 76.1 mm s= 1.3 mm A= 13.0 Grd
 ii= 1.0 io= 1.0

Na	Gl	P	SLP	Qx,Mt	Mi	Mo S(Q,M)	S-ges	S-zul	Ausn
		(bar)	(N/mm2)	(kN, kNm)	(kNm)	(kNm) (N/mm2)	(N/mm2)	(N/mm2)	(%)
01	SL v	16.0	26.2	0.001	0.000	0.004 0.5	26.7	120.0	22
01	SL n	16.0	22.2	0.001	0.000	0.004 0.7	22.9	120.0	19
02	SE v	SL=	26.7	0.000	0.000	0.000 0.0	0.0	273.3	0
02	SE n	SL=	22.9	0.000	0.000	0.000 0.0	0.0	277.1	0
03	SOLv	SL=	26.7	0.000	0.001	0.000 0.2	26.8	159.6	17
03	SOLn	SL=	22.9	0.000	0.001	0.000 0.2	23.2	159.6	15

Pkt 270 Strg 2 v Da= 76.1 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P	SLP	Qx,Mt	Mi	Mo S(Q,M)	S-ges	S-zul	Ausn
		(bar)	(N/mm2)	(kN, kNm)	(kNm)	(kNm) (N/mm2)	(N/mm2)	(N/mm2)	(%)
01	SL v	16.0	22.2	0.001	0.000	0.000 0.0	22.2	120.0	19

02 SE v SL= 22.2 0.000 0.000 0.000 0.0 0.0 277.8 0

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Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
03	SOLv	SL=	22.2	0.000	0.000	0.000 0.0	22.2	159.6	14

Pkt 500 Strg 3 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf.,Ubear.
 Strg 3 n Da= 21.3 mm s= 0.6 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.015	0.000	0.000 1.1	14.1	120.0	12
01	SL n	16.0	13.0	0.016	0.000	0.000 1.1	14.1	120.0	12
02	SE v	SL=	14.1	0.000	0.000	0.006 12.3	12.3	285.9	4
02	SE n	SL=	14.1	0.000	0.000	0.006 12.3	12.3	285.9	4
03	SOLv	SL=	14.1	0.039	0.002	0.001 11.2	25.2	159.6	16
03	SOLn	SL=	14.1	0.000	0.002	0.001 10.2	24.2	159.6	15

Pkt 510 Strg 3 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf.,Ubear.
 Strg 3 n Da= 27.7 mm s= 3.8 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.015	0.000	0.000 1.0	14.1	120.0	12
01	SL n	16.0	1.8	0.015	0.000	0.000 0.1	1.9	120.0	2
02	SE v	SL=	14.1	0.000	0.000	0.002 4.6	4.6	285.9	2
02	SE n	SL=	1.9	0.000	0.000	0.002 1.2	1.2	298.1	0
03	SOLv	SL=	14.1	0.000	0.000	0.000 2.3	16.4	159.6	10
03	SOLn	SL=	1.9	0.000	0.000	0.000 0.3	2.2	159.6	1

Pkt 530 Strg 3 v Da= 33.3 mm s= 3.8 mm (VUU) V-Naht Umf.,Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	2.4	0.000	0.000	0.000 0.0	2.4	120.0	2
02	SE v	SL=	2.4	0.000	0.000	0.000 0.0	0.0	297.6	0
03	SOLv	SL=	2.4	0.000	0.000	0.000 0.0	2.4	159.6	1

Pkt 550 Strg 4 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf.,Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.000	0.000	0.000 0.0	13.0	120.0	11
02	SE v	SL=	13.0	0.000	0.000	0.000 0.0	0.0	287.0	0
03	SOLv	SL=	13.0	0.000	0.000	0.000 0.0	13.0	159.6	8

Pkt 280 Strg 5 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 5 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 5 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.480	0.043	0.034 22.9	49.0	120.0	41
01	SL m	16.0	26.2	0.618	0.057	0.048 30.9	57.0	120.0	48
01	SL n	16.0	26.2	0.667	0.061	0.054 33.6	59.7	120.0	50
02	SE v	SL=	49.0	0.585	0.095	0.351 83.5	83.5	251.0	33
02	SE m	SL=	57.0	0.422	0.123	0.468 100.5	100.5	243.0	41
02	SE n	SL=	59.7	0.227	0.133	0.513 106.2	106.2	240.3	44

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Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
03	SOLv	SL=	49.0	0.286	0.097	0.058 46.2	95.2	159.6	60
03	SOLm	SL=	57.0	0.293	0.098	0.029 43.0	100.1	159.6	63
03	SOLn	SL=	59.7	0.252	0.093	0.011 39.9	99.6	159.6	62

Pkt 290 Strg 5 v Da= 88.9 mm s= 1.3 mm (TWA) T-Stck Weld.,Aufsw
 Strg 5 n Da= 88.9 mm s= 1.3 mm ii= 2.9 io= 2.9
 Strg 6 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.828	0.007	0.041 17.8	44.0	120.0	37
01	SL n	16.0	26.2	0.829	0.006	0.041 17.8	44.0	120.0	37
01	SL n	16.0	13.0	0.000	0.000	0.000 1.0	14.0	120.0	12
02	SE v	SL=	44.0	0.227	0.305	0.126 70.6	70.6	256.0	28
02	SE n	SL=	44.0	0.227	0.305	0.126 70.6	70.6	256.0	28
02	SE n	SL=	14.0	0.000	0.000	0.000 0.0	0.0	286.0	0
03	SOLv	SL=	44.0	0.252	0.017	0.011 8.0	52.0	159.6	33
03	SOLn	SL=	44.0	0.252	0.017	0.011 8.0	52.0	159.6	33
03	SOLn	SL=	14.0	0.000	0.000	0.004 26.5	40.5	159.6	25

Pkt 300 Strg 5 v Da= 88.9 mm s= 1.3 mm (BGL) Bogen GLatt
 Strg 5 m Da= 88.9 mm s= 1.3 mm R= 114.0 mm
 Strg 5 n Da= 88.9 mm s= 1.3 mm ii= 3.2 io= 2.7

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.896	0.033	0.013 17.1	43.3	120.0	36
01	SL m	16.0	26.2	0.626	0.001	0.006 3.7	29.9	120.0	25
01	SL n	16.0	26.2	0.044	0.079	0.006 33.2	59.4	120.0	50
02	SE v	SL=	43.3	0.227	0.123	0.647 130.6	130.6	256.7	51
02	SE m	SL=	29.9	0.679	0.083	0.445 101.7	101.7	270.1	38
02	SE n	SL=	59.4	0.856	0.011	0.017 62.1	62.1	240.6	26
03	SOLv	SL=	43.3	0.252	0.081	0.006 34.6	77.8	159.6	49
03	SOLm	SL=	29.9	0.118	0.123	0.056 55.3	85.2	159.6	53
03	SOLn	SL=	59.4	0.431	0.159	0.085 74.0	133.4	159.6	84

Pkt 320 Strg 5 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 Strg 5 n Da= 88.9 mm s= 1.3 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.044	0.006	0.079 10.4	36.5	120.0	30
01	SL n	16.0	26.2	0.044	0.006	0.079 10.4	36.5	120.0	30
02	SE v	SL=	36.5	0.856	0.017	0.011 62.0	62.0	263.5	24
02	SE n	SL=	36.5	0.856	0.017	0.011 62.0	62.0	263.5	24
03	SOLv	SL=	36.5	0.431	0.085	0.159 24.5	61.0	159.6	38
03	SOLn	SL=	36.5	0.431	0.085	0.159 24.5	61.0	159.6	38

Pkt 310 Strg 5 v Da= 88.9 mm s= 1.3 mm (VUU) V-Naht Umf.,Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx,Mt (kN, kNm)	Mi (kNm)	Mo S(Q,M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	26.2	0.044	0.000	0.127 16.6	42.8	120.0	36
02	SE v	SL=	42.8	0.856	0.074	0.069 62.4	62.4	257.2	24
03	SOLv	SL=	42.8	0.431	0.086	0.172 26.1	68.9	159.6	43

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Pkt 600 Strg 6 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf., Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.000	0.000	0.000 0.0	13.0	120.0	11
02	SE v	SL=	13.0	0.000	0.000	0.000 0.0	0.0	287.0	0
03	SOLv	SL=	13.0	0.000	0.000	0.000 0.0	13.0	159.6	8

Pkt 400 Strg 7 v Da= 21.3 mm s= 0.6 mm (TFS) T-Stck FormStueck
 Strg 7 n Da= 21.3 mm s= 0.6 mm ii= 1.3 io= 1.4
 Strg 8 n Da= 21.3 mm s= 0.6 mm

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.092	0.006	0.000 39.5	52.5	120.0	44
01	SL n	16.0	13.0	0.050	0.001	0.000 11.0	24.0	120.0	20
01	SL n	16.0	13.0	0.000	0.007	0.000 45.5	58.5	120.0	49
02	SE v	SL=	52.5	0.000	0.007	0.005 24.3	24.3	247.5	10
02	SE n	SL=	24.0	0.000	0.007	0.005 24.3	24.3	276.0	9
02	SE n	SL=	58.5	0.000	0.000	0.000 0.0	0.0	241.5	0
03	SOLv	SL=	52.5	0.013	0.002	0.006 47.4	99.9	159.6	63
03	SOLn	SL=	24.0	0.013	0.002	0.006 47.4	71.4	159.6	45
03	SOLn	SL=	58.5	0.000	0.000	0.009 62.4	120.9	159.6	76

Pkt 410 Strg 7 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf., Ubear.
 Strg 7 n Da= 21.3 mm s= 0.6 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.049	0.000	0.000 1.9	14.9	120.0	12
01	SL n	16.0	13.0	0.016	0.000	0.000 1.1	14.1	120.0	12
02	SE v	SL=	14.9	0.000	0.000	0.006 12.3	12.3	285.1	4
02	SE n	SL=	14.1	0.000	0.000	0.006 12.3	12.3	285.9	4
03	SOLv	SL=	14.9	0.013	0.002	0.001 10.5	25.4	159.6	16
03	SOLn	SL=	14.1	0.000	0.002	0.001 10.2	24.3	159.6	15

Pkt 420 Strg 7 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf., Ubear.
 Strg 7 n Da= 27.7 mm s= 3.8 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	13.0	0.015	0.000	0.000 1.0	14.1	120.0	12
01	SL n	16.0	1.8	0.015	0.000	0.000 0.1	1.9	120.0	2
02	SE v	SL=	14.1	0.000	0.000	0.002 4.6	4.6	285.9	2
02	SE n	SL=	1.9	0.000	0.000	0.002 1.2	1.2	298.1	0
03	SOLv	SL=	14.1	0.000	0.000	0.000 2.3	16.4	159.6	10
03	SOLn	SL=	1.9	0.000	0.000	0.000 0.3	2.2	159.6	1

Pkt 440 Strg 7 v Da= 33.3 mm s= 3.8 mm (VUU) V-Naht Umf., Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)
01	SL v	16.0	2.4	0.000	0.000	0.000 0.0	2.4	120.0	2
02	SE v	SL=	2.4	0.000	0.000	0.000 0.0	0.0	297.6	0
03	SOLv	SL=	2.4	0.000	0.000	0.000 0.0	2.4	159.6	1

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Pkt 450 Strg 8 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf., Ubear.
 Strg 8 n Da= 27.7 mm s= 3.8 mm ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)	
01	SL v	16.0	13.0	0.000	0.000	0.002	11.5	24.5	120.0	20
01	SL n	16.0	1.8	0.000	0.000	0.002	1.5	3.3	120.0	3
02	SE v	SL=	24.5	0.000	0.000	0.000	0.0	0.0	275.5	0
02	SE n	SL=	3.3	0.000	0.000	0.000	0.0	0.0	296.7	0
03	SOLv	SL=	24.5	0.000	0.003	0.000	12.9	37.4	159.6	23
03	SOLn	SL=	3.3	0.000	0.003	0.000	1.7	5.0	159.6	3

Pkt 460 Strg 8 v Da= 27.7 mm s= 3.8 mm (VUU) V-Naht Umf., Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)	
01	SL v	16.0	1.8	0.000	0.000	0.000	0.0	1.8	120.0	1
02	SE v	SL=	1.8	0.000	0.000	0.000	0.0	0.0	298.2	0
03	SOLv	SL=	1.8	0.000	0.000	0.000	0.0	1.8	159.6	1

Pkt 700 Strg 9 v Da= 21.3 mm s= 0.6 mm (VUU) V-Naht Umf., Ubear.
 ii= 1.0 io= 1.0

Na	Gl	P (bar)	SLP (N/mm2)	Qx, Mt (kN, kNm)	Mi (kNm)	Mo S(Q, M) (kNm) (N/mm2)	S-ges (N/mm2)	S-zul (N/mm2)	Ausn (%)	
01	SL v	16.0	13.0	0.000	0.000	0.000	0.0	13.0	120.0	11
02	SE v	SL=	13.0	0.000	0.000	0.000	0.0	0.0	287.0	0
03	SOLv	SL=	13.0	0.000	0.000	0.000	0.0	13.0	159.6	8

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EXTRAKT DER SPANNUNGSANALYSE NACH ASME B31.3:

Nachweis 01 Spannungen infolge staendiger Lasten (SL)

Bauteile mit maximaler Spannungsausnutzung

Pkt		ii	io	Errechn. Spannung (N/mm2)	Zulaess. Spannung (N/mm2)	Aus- nutzung (%)
90	(TFS)	2.50	3.00	98.9	120.0	82.5
70	(TFS)	2.50	3.00	69.2	120.0	57.7
280	(BGL)	3.24	2.70	59.7	120.0	49.8
300	(BGL)	3.24	2.70	59.4	120.0	49.5
400	(TFS)	1.32	1.42	58.5	120.0	48.8
100	(VUU)	1.00	1.00	53.7	120.0	44.8
65	(VUU)	1.00	1.00	47.0	120.0	39.2
80	(VUU)	1.00	1.00	46.5	120.0	38.7
240	(TWA)	2.87	2.87	45.5	120.0	37.9
290	(TWA)	2.87	2.87	44.0	120.0	36.6
310	(VUU)	1.00	1.00	42.8	120.0	35.7
140	(VUU)	1.00	1.00	42.4	120.0	35.3
220	(BGL)	3.24	2.70	41.9	120.0	34.9
120	(TWA)	2.87	2.87	39.9	120.0	33.2
110	(BGL)	3.24	2.70	36.8	120.0	30.7
320	(VUU)	1.00	1.00	36.5	120.0	30.4
150	(PWS)	1.00	1.00	35.7	120.0	29.8
60	(VUU)	1.00	1.00	35.6	120.0	29.7
20	(BGL)	3.24	2.70	34.1	120.0	28.4
130	(VUU)	1.00	1.00	33.5	120.0	27.9
230	(VUU)	1.00	1.00	33.5	120.0	27.9
170	(TWA)	2.87	2.87	32.5	120.0	27.1
50	(BGL)	3.24	2.70	31.6	120.0	26.3
210	(VUU)	1.00	1.00	31.3	120.0	26.1
10	(VUU)	1.00	1.00	30.6	120.0	25.5
40	(BGL)	3.24	2.70	29.8	120.0	24.8
15	(VUU)	1.00	1.00	28.7	120.0	23.9
200	(VUU)	1.00	1.00	28.5	120.0	23.7
160	(VUU)	1.00	1.00	28.4	120.0	23.7
30	(TWA)	2.87	2.87	28.2	120.0	23.5

0 Schnitte mit Spannungseueberschreitungen

(*)

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EXTRAKT DER SPANNUNGSANALYSE NACH ASME B31.3:

Nachweis 02 Spannungen infolge Staend. u. Temperaturlast

Bauteile mit maximaler Spannungsausnutzung

Pkt		ii	io	Errechn. Spannung (N/mm2)	Zulaess. Spannung (N/mm2)	Aus- nutzung (%)
240	(TWA)	2.87	2.87	215.7	254.5	84.8
90	(TFS)	2.50	3.00	183.7	229.7	80.0
20	(BGL)	3.24	2.70	168.3	269.3	62.5
110	(BGL)	3.24	2.70	146.0	263.2	55.5
300	(BGL)	3.24	2.70	130.6	256.7	50.8
50	(BGL)	3.24	2.70	126.4	268.4	47.1
280	(BGL)	3.24	2.70	106.2	240.3	44.2
30	(TWA)	2.87	2.87	115.0	271.8	42.3
120	(TWA)	2.87	2.87	102.1	260.1	39.3
15	(VUU)	1.00	1.00	76.6	271.3	28.2
10	(VUU)	1.00	1.00	75.8	269.4	28.1
290	(TWA)	2.87	2.87	70.6	256.0	27.6
70	(TFS)	2.50	3.00	61.6	231.9	26.6
310	(VUU)	1.00	1.00	62.4	257.2	24.3
320	(VUU)	1.00	1.00	62.0	263.5	23.5
40	(BGL)	3.24	2.70	53.5	271.2	19.7
100	(VUU)	1.00	1.00	35.0	246.3	14.2
65	(VUU)	1.00	1.00	31.7	253.0	12.5
220	(BGL)	3.24	2.70	31.8	258.9	12.3
130	(VUU)	1.00	1.00	29.6	266.5	11.1
80	(VUU)	1.00	1.00	26.8	253.5	10.6
400	(TFS)	1.32	1.42	24.3	247.5	9.8
170	(TWA)	2.87	2.87	26.8	282.7	9.5
60	(VUU)	1.00	1.00	23.0	264.4	8.7
200	(VUU)	1.00	1.00	21.4	271.5	7.9
140	(VUU)	1.00	1.00	19.5	257.6	7.6
210	(VUU)	1.00	1.00	16.1	268.7	6.0
410	(VUU)	1.00	1.00	12.3	285.1	4.3
500	(VUU)	1.00	1.00	12.3	285.9	4.3
150	(PWS)	1.00	1.00	6.4	264.3	2.4

0 Schnitte mit Spannungseuberschreitungen

(*)

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EXTRAKT DER SPANNUNGSANALYSE NACH ASME B31.3:

Nachweis 03 Spannungen infolge staend. + gelegentl. Lasten (SOL)

Bauteile mit maximaler Spannungsausnutzung

Pkt		ii	io	Errechn. Spannung (N/mm2)	Zulaess. Spannung (N/mm2)	Aus- nutzung (%)
240	(TWA)	2.87	2.87	144.3	159.6	90.4
300	(BGL)	3.24	2.70	133.4	159.6	83.6
90	(TFS)	2.50	3.00	125.6	159.6	78.7
400	(TFS)	1.32	1.42	120.9	159.6	75.8
20	(BGL)	3.24	2.70	116.3	159.6	72.8
70	(TFS)	2.50	3.00	113.8	159.6	71.3
170	(TWA)	2.87	2.87	105.2	159.6	65.9
280	(BGL)	3.24	2.70	100.1	159.6	62.7
110	(BGL)	3.24	2.70	83.9	159.6	52.6
65	(VUU)	1.00	1.00	83.1	159.6	52.0
120	(TWA)	2.87	2.87	76.8	159.6	48.1
80	(VUU)	1.00	1.00	73.4	159.6	46.0
40	(BGL)	3.24	2.70	69.6	159.6	43.6
310	(VUU)	1.00	1.00	68.9	159.6	43.2
320	(VUU)	1.00	1.00	61.0	159.6	38.2
10	(VUU)	1.00	1.00	59.7	159.6	37.4
100	(VUU)	1.00	1.00	57.9	159.6	36.3
220	(BGL)	3.24	2.70	55.4	159.6	34.7
15	(VUU)	1.00	1.00	55.1	159.6	34.5
60	(VUU)	1.00	1.00	53.2	159.6	33.3
290	(TWA)	2.87	2.87	52.0	159.6	32.6
140	(VUU)	1.00	1.00	50.4	159.6	31.6
50	(BGL)	3.24	2.70	49.7	159.6	31.1
130	(VUU)	1.00	1.00	44.2	159.6	27.7
30	(TWA)	2.87	2.87	40.5	159.6	25.4
200	(VUU)	1.00	1.00	39.3	159.6	24.6
150	(PWS)	1.00	1.00	39.3	159.6	24.6
230	(VUU)	1.00	1.00	37.8	159.6	23.7
210	(VUU)	1.00	1.00	37.7	159.6	23.6
450	(VUU)	1.00	1.00	37.4	159.6	23.5

0 Schnitte mit Spannungseuberschreitungen

(*)

1 Warnung(en)