

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

ABSTRACT:

Met deze berekening wordt aangetoond dat de spanningen, berekend met PLE, niet voldoen aan hetgeen gesteld is in NEN 3650 paragraaf 10.7.3.

Eerst wordt met de vloeï-ellips bepaald of er plastische vervorming optreedt en of alle doorlopen primaire belastingen binnen de vloeïkromme liggen. Indien dit het geval is, wordt er een schuifspanningsanalyse voor wisselend vloeïen toegepast.

Bij de schuifspanningsanalyse wordt er van uitgegaan dat de richting van de hoofdspinningen kan veranderen. We volgen de methode zoals omschreven in ASME Section VIII div.2 par. 5-110.3b.

Het betreft een fictieve berekening. De toelaatbare spanningen zijn zodanig aangepast dat er een goed-niet goed situatie is ontstaan.

De berekening heeft een informatief karakter en kan voor geen enkel ander doel gebruikt worden.

De berekening is uitgevoerd met een niet geverifieerd programma.



REFERENCES:

- NEN 3650 par 10.7.3
- ASME Section III div.1 table NB3685.1-2
- ASME Section VIII div.2 5-110.3b
- Stoomwezen D1200
- CEN TC 54/WG/C/N329 sixth draft may 1995 page 14

- 1 = Leiding koud
- 2 = Leiding warm voorgespannen (fictief)
- 3 = Leiding koud Druk + Zetting
- 4 = Leiding met Temperatuur, Druk + Zetting
- 5 = Leiding koud + Zetting

0	PVo	Di 17-Mrt-1998	First Issue				
REV	BY	DATE	DESCRIPTION	CHECKED	PROJECT APPROVAL	THIRD PARTY APPROVAL	
STATUS CODE			DOCUMENT NUMBER	REVISION	STATUS		
A	Preliminary for information only		FOR INFO ONLY	0	A		
B	For review						
C	Authorized for construction						

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Date: Di 17-Mrt-1998

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Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

OVERZICHT VAN UITGEVOERDE BEREKENINGEN VAN ELEMENT 212 :



1: Zeroload

Rekgrens : 320.00

2: Voorspanning

Rekgrens : 235.00

3: Druk + Zetting

Rekgrens : 350.00

4: Temperatuur, Druk + Zetting

Rekgrens : 235.00

5: Zetting

Rekgrens : 350.00

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Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650 WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

T620-33 S 03/05 PLE-micro-CAD 25264956: VSP 96nov20 oc:14



TEBOLIN B.V. Pijpleidingen & Infrastructuur Datum: Sept 1996
 Project: Stoomw. berek. aansl. Boring Binkhorstln, Den Haag
 Adres: ENECO Energiebedrijf VOORSPANRUN Ordernr: 18952-02

ELEM 212 LOADCASE Zeroload CS-LINE 236 REDISTRIBUTED

TSTRESS	ANGLE	SKIT	SKOT	SFIT	SFOT	TZUT	TXMT	SEIT	SEOT
RESULT	DEG	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2
CLOSED	value	value	value	value	value	value	value	value	value

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1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	37.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	67.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	82.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	97.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	112.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	127.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	142.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	157.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	172.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	187.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	195.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	202.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	210.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	217.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	232.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	240.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	247.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	262.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	270.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	277.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39	285.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	292.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	300.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	307.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	315.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	322.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46	337.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47	345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	352.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

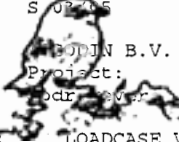
Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

T620-33 S 09205 PLE-micro-CAD 25264956: VSP 96nov20 oc:14



BOUW B.V. Pijpleidingen & Infrastructuur Datum: Sept 1996
 Project: Stoomw. berek. aansl. Boring Binkhorstln, Den Haag
 opdrachtgever: ENECO Energiebedrijf VOORSpanRUN Ordernr: 18952-02

ELEM 212 LOADCASE VOORSpan CS-LINE 236 REDISTRIBUTED

TSTRESS	ANGLE	SKIT	SKOT	SFIT	SFOT	TZUT	TXMT	SEIT	SEOT
RESULT	DEG	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2
CLOSED	value	value	value	value	value	value	value	value	value

1	0.0	-.16645E2	.16647E2	-.56938E2	.52934E2	.7408E-4	.25314E0	.50707E2	.46882E2
2	7.5	-.15544E2	.15546E2	-.53250E2	.49356E2	.1422E-3	.63909E0	.47429E2	.43708E2
3	15.0	-.13527E2	.13530E2	-.46483E2	.42814E2	.2089E-3	.99342E0	.41412E2	.37905E2
4	22.5	-.10702E2	.10707E2	-.37004E2	.33655E2	.2733E-3	.12920E1	.32982E2	.29781E2
5	30.0	-.72333E1	.72407E1	-.25360E2	.22409E2	.3340E-3	.15142E1	.22628E2	.19807E2
6	37.5	-.33287E1	.33382E1	-.12252E2	.97511E1	.3901E-3	.16443E1	.10973E2	.85835E1
7	45.0	.77199E0	-.76053E0	.15160E1	-.35419E1	.4407E-3	.16727E1	.13129E1	.32295E1
8	52.5	.48132E1	-.48005E1	.15086E2	-.16643E2	.4849E-3	.15964E1	.13347E2	.14837E2
9	60.0	.85408E1	-.85280E1	.27605E2	-.28728E2	.5219E-3	.14193E1	.24479E2	.25554E2
10	67.5	.11719E2	-.11707E2	.38281E2	-.39032E2	.5510E-3	.11522E1	.33973E2	.34693E2
11	75.0	.14145E2	-.14136E2	.46434E2	-.46902E2	.5719E-3	.81163E0	.41224E2	.41673E2
12	82.5	.15665E2	-.15659E2	.51545E2	-.51835E2	.5841E-3	.41924E0	.45769E2	.46047E2
13	90.0	.16181E2	-.16180E2	.53286E2	-.53515E2	.5874E-3	.2901E-4	.47318E2	.47537E2
14	97.5	.15661E2	-.15663E2	.51546E2	-.51835E2	.5817E-3	-.41919E0	.45771E2	.46047E2
15	105.0	.14138E2	-.14144E2	.46435E2	-.46903E2	.5672E-3	-.81159E0	.41227E2	.41672E2
16	112.5	.11709E2	-.11717E2	.38282E2	-.39033E2	.5442E-3	-.11522E1	.33976E2	.34692E2
17	120.0	.85302E1	-.85392E1	.27606E2	-.28728E2	.5129E-3	-.14193E1	.24482E2	.25552E2
18	127.5	.48028E1	-.48114E1	.15087E2	-.16643E2	.4740E-3	-.15964E1	.13350E2	.14835E2
19	135.0	.76283E0	-.76997E0	.15167E1	-.35420E1	.4281E-3	-.16727E1	.13135E1	.32267E1
20	142.5	-.33360E1	.33309E1	-.12252E2	.97514E1	.3759E-3	-.16444E1	.10971E2	.85851E1
21	150.0	-.72386E1	.72358E1	-.25360E2	.22410E2	.3185E-3	-.15142E1	.22627E2	.19809E2
22	157.5	-.10705E2	.10705E2	-.37005E2	.33656E2	.2567E-3	-.12920E1	.32982E2	.29783E2
23	165.0	-.13529E2	.13529E2	-.46485E2	.42816E2	.1916E-3	-.99346E0	.41412E2	.37907E2
24	172.5	-.15544E2	.15546E2	-.53251E2	.49358E2	.1244E-3	-.63911E0	.47430E2	.43710E2
25	180.0	-.16645E2	.16647E2	-.56939E2	.52936E2	.5616E-4	-.25313E0	.50709E2	.46884E2
26	187.5	-.16783E2	.16784E2	-.57410E2	.53373E2	-.1193E-4	.14182E0	.51128E2	.47271E2
27	195.0	-.15947E2	.15947E2	-.54648E2	.50612E2	-.7870E-4	.53865E0	.48675E2	.44819E2
28	202.5	-.14137E2	.14136E2	-.48651E2	.44657E2	-.1430E-3	.93337E0	.43347E2	.39533E2
29	210.0	-.11364E2	.11360E2	-.39452E2	.35545E2	-.2038E-3	.13216E1	.35175E2	.31444E2
30	217.5	-.76490E1	.76437E1	-.27119E2	.23351E2	-.2599E-3	.16983E1	.24218E2	.20621E2
31	225.0	-.30271E1	.30199E1	-.11762E2	.81954E1	-.3105E-3	.20581E1	.10578E2	.71788E1
32	232.5	.24360E1	-.24444E1	.64520E1	-.96549E1	-.3547E-3	.23602E1	.56432E1	.86943E1
33	240.0	.82761E1	-.82847E1	.25935E2	-.28721E2	-.3916E-3	.23070E1	.22945E2	.25605E2
34	247.5	.13486E2	-.13493E2	.43519E2	-.45519E2	-.4208E-3	.18978E1	.38586E2	.40495E2
35	255.0	.17498E2	-.17503E2	.57028E2	-.58487E2	-.4416E-3	.13450E1	.50602E2	.51994E2
36	262.5	.20026E2	-.20027E2	.65538E2	-.66652E2	-.4538E-3	.69704E0	.58170E2	.59234E2
37	270.0	.20890E2	-.20888E2	.68442E2	-.69438E2	-.4571E-3	-.6936E-4	.60753E2	.61705E2
38	277.5	.20030E2	-.20023E2	.65536E2	-.66651E2	-.4515E-3	-.69717E0	.58168E2	.59234E2
39	285.0	.17505E2	-.17495E2	.57026E2	-.58485E2	-.4370E-3	-.13450E1	.50598E2	.51994E2
40	292.5	.13495E2	-.13482E2	.43516E2	-.45517E2	-.4139E-3	-.18979E1	.38582E2	.40495E2
41	300.0	.82862E1	-.82730E1	.25932E2	-.28719E2	-.3827E-3	-.23070E1	.22940E2	.25605E2
42	307.5	.24459E1	-.24330E1	.64492E1	-.96527E1	-.3437E-3	-.23602E1	.56392E1	.86954E1
43	315.0	-.30184E1	.30297E1	-.11764E2	.81970E1	-.2978E-3	-.20581E1	.10583E2	.71788E1
44	322.5	-.76420E1	.76513E1	-.27121E2	.23352E2	-.2457E-3	-.16982E1	.24221E2	.20620E2
45	330.0	-.11359E2	.11366E2	-.39452E2	.35545E2	-.1882E-3	-.13215E1	.35176E2	.31443E2
46	337.5	-.14134E2	.14139E2	-.48651E2	.44657E2	-.1265E-3	-.93328E0	.43348E2	.39531E2
47	345.0	-.15945E2	.15948E2	-.54647E2	.50611E2	-.6139E-4	-.53858E0	.48674E2	.44818E2
48	352.5	-.16782E2	.16784E2	-.57408E2	.53371E2	.5839E-5	-.14178E0	.51127E2	.47269E2

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Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650 WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

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Project: STOOMWEZEN ROTTERDAM CBA

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T620-33 S 03/05 PLE-micro-CAD 25264956: PZ 96nov20 oc:16

TEBODIN B.V. Pijpleidingen & Infrastructuur Datum: Sept 1996
 Project: Stoomw. berek. aansl. Boring Binkhorstln, Den Haag
 Ordergever: ENECO Energiebedrijf DRUK & ZETT Ordernr: 18952-02

ELEM 212 LOADCASE DRUK+ZET CS-LINE 2 REDISTRIBUTEDPHASE 2

TSTRESS	ANGLE	SKIT	SXOT	SFIT	SFOT	TZUT	TXMT	SEIT	SEOT
RESULT	DEG	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2
CLOSED	value	value	value	value	value	value	value	value	value
1	0.0	-.27742E1	.24277E2	-.18705E2	.70574E2	.3636E-2	.24171E0	.17483E2	.62102E2
2	7.5	-.18727E1	.23119E2	-.15286E2	.67195E2	-.1325E-1	.59266E0	.14441E2	.59129E2
3	15.0	-.40661E0	.20886E2	-.91704E1	.61103E2	-.2975E-1	.90187E0	.89742E1	.53792E2
4	22.5	.15160E1	.17749E2	-.82181E0	.52752E2	-.4557E-1	.11378E1	.20557E1	.46492E2
5	30.0	.37561E1	.13973E2	.90873E1	.42808E2	-.6044E-1	.12798E1	.79098E1	.37810E2
6	37.5	.61803E1	.99019E1	.19768E2	.32051E2	-.7411E-1	.13209E1	.17516E2	.28424E2
7	45.0	.86896E1	.59172E1	.30420E2	.21270E2	-.8634E-1	.12670E1	.27140E2	.19016E2
8	52.5	.11228E2	.23978E1	.40321E2	.11178E2	-.9692E-1	.11341E1	.36044E2	.10194E2
9	60.0	.13770E2	-.33428E0	.48890E2	.23431E1	-.10568E0	.94371E0	.43666E2	.25335E1
10	67.5	.16285E2	-.20605E1	.55715E2	-.48322E1	-.11247E0	.71753E0	.49619E2	.42044E1
11	75.0	.18710E2	-.26958E1	.60542E2	-.10103E2	-.11716E0	.47365E0	.53691E2	.90632E1
12	82.5	.20916E2	-.22923E1	.63247E2	-.13348E2	-.11967E0	.22425E0	.55811E2	.12364E2
13	90.0	.22715E2	-.10155E1	.63790E2	-.14528E2	-.11998E0	-.2429E-1	.56001E2	.14049E2
14	97.5	.23880E2	.90227E0	.62184E2	-.13650E2	-.11806E0	-.26917E0	.54334E2	.14124E2
15	105.0	.24197E2	.32168E1	.58485E2	-.10756E2	-.11395E0	-.50771E0	.50901E2	.12676E2
16	112.5	.23515E2	.57199E1	.52797E2	-.59318E1	-.10772E0	-.73401E0	.45815E2	.10093E2
17	120.0	.21793E2	.82676E1	.45306E2	.66628E0	-.9949E-1	-.93858E0	.39246E2	.79572E1
18	127.5	.19114E2	.10792E2	.36275E2	.88119E1	-.8938E-1	-.11126E1	.31431E2	.99523E1
19	135.0	.15676E2	.13280E2	.26074E2	.18164E2	-.7757E-1	-.12349E1	.22735E2	.16281E2
20	142.5	.11789E2	.15713E2	.15245E2	.28197E2	-.6427E-1	-.12831E1	.13845E2	.24473E2
21	150.0	.78177E1	.18049E2	.44817E1	.38250E2	-.4970E-1	-.12414E1	.67951E1	.32143E2
22	157.5	.41330E1	.20201E2	-.54482E1	.47582E2	-.3412E-1	-.11036E1	.83238E1	.41363E2
23	165.0	-.10666E1	.22047E2	-.13785E2	.55457E2	-.1778E-1	-.87607E0	.14348E2	.48362E2
24	172.5	-.11222E1	.23458E2	-.19879E2	.61244E2	-.9638E-3	-.57801E0	.19342E2	.53521E2
25	180.0	-.22671E1	.23432E2	-.23278E2	.64508E2	.1603E-1	-.23957E0	.22231E2	.56425E2
26	187.5	-.23024E1	.24624E2	-.23819E2	.65047E2	.3292E-1	.10641E0	.22755E2	.56884E2
27	195.0	-.12410E1	.24329E2	-.21537E2	.62854E2	.4942E-1	.44262E0	.20944E2	.54894E2
28	202.5	.85321E0	.23450E2	-.16536E2	.58041E2	.6524E-1	.75927E0	.16979E2	.50573E2
29	210.0	.38688E1	.21970E2	-.89720E1	.50767E2	.8011E-1	.10537E1	.11410E2	.44098E2
30	217.5	.76570E1	.19829E2	.10112E1	.41182E2	.9378E-1	.13313E1	.72066E1	.35674E2
31	225.0	.12050E2	.16911E2	.13336E2	.29379E2	.10601E0	.16038E1	.12743E2	.25540E2
32	232.5	.16873E2	.13069E2	.28006E2	.15449E2	.11659E0	.18509E1	.24424E2	.14408E2
33	240.0	.21614E2	.85185E1	.43769E2	.54918E0	.12535E0	.17961E1	.37907E2	.82605E1
34	247.5	.25310E2	.40333E1	.57921E2	-.12299E2	.13214E0	.14499E1	.50295E2	.14737E2
35	255.0	.27525E2	.2947E-1	.68741E2	-.22002E2	.13683E0	.10163E1	.59925E2	.22018E2
36	262.5	.28173E2	-.32289E1	.75673E2	-.27964E2	.13934E0	.53078E0	.66244E2	.26499E2
37	270.0	.27330E2	-.54612E1	.78358E2	-.29865E2	.13965E0	.1883E-1	.68887E2	.27544E2
38	277.5	.25185E2	-.63996E1	.76658E2	-.27583E2	.13773E0	-.49608E0	.67676E2	.25007E2
39	285.0	.21993E2	-.58384E1	.70652E2	-.21200E2	.13362E0	-.99046E0	.62623E2	.18969E2
40	292.5	.18020E2	-.36871E1	.60642E2	-.11000E2	.12739E0	-.14388E1	.53939E2	.96996E1
41	300.0	.13522E2	-.1489E-1	.47129E2	.24532E1	.11915E0	-.18034E1	.42033E2	.24694E1
42	307.5	.89180E1	.47437E1	.31824E2	.18047E2	.10905E0	-.18716E1	.28434E2	.16206E2
43	315.0	.49986E1	.96133E1	.17470E2	.32701E2	.9724E-1	-.16326E1	.15585E2	.29110E2
44	322.5	.19926E1	.14073E2	.53525E1	.45221E2	.8394E-1	-.13642E1	.46878E1	.40083E2
45	330.0	-.23670E0	.17938E2	-.45100E1	.55471E2	.6937E-1	-.10867E1	.43980E1	.49029E2
46	337.5	-.17955E1	.21029E2	-.12013E2	.63317E2	.5378E-1	-.78803E0	.11224E2	.55855E2
47	345.0	-.27344E1	.23189E2	-.16988E2	.68567E2	.3744E-1	-.46349E0	.15799E2	.60408E2
48	352.5	-.30626E1	.24295E2	-.19258E2	.71031E2	.2063E-1	-.11659E0	.17924E2	.62529E2

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SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

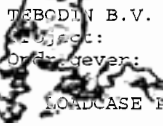
Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

T620-33 S 03/05 PLE-micro-CAD 25264956: PZT 96nov20 oc:16



TEBODIN B.V. Pijpleidingen & Infrastructuur Datum: Sept 1996
 Project: Stoomw. berek. aansl. Boring Binkhorstln, Den Haag
 Opdr.gever: ENECO Energiebedrijf DRUK&ZET&TEMP Ordernr: 18952-02

ELEM 122 LOADCASE F&ZET&T CS-LINE 2 REDISTRIBUTEDPHASE 3

TSTRESS	ANGLE	SKIT	SKOT	SFIT	SFOT	TZUT	TXMT	SEIT	SEOT
RESULT	DEG	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2
CLOSED	value	value	value	value	value	value	value	value	value
1	0.0	.54668E2	-.93847E2	.27216E3	-.21799E3	-.1202E-1	.24028E0	.24936E3	.18939E3
2	7.5	.48755E2	-.10183E3	.27556E3	-.22141E3	-.18386E0	.55777E0	.25471E3	.19195E3
3	15.0	.29577E2	-.12315E3	.27904E3	-.22501E3	-.35086E0	.13946E0	.26549E3	.19516E3
4	22.5	-.34600E1	-.15389E3	.27513E3	-.22134E3	-.51018E0	-.15047E1	.27688E3	.19650E3
5	30.0	-.49905E2	-.18775E3	.25419E3	-.20075E3	-.65910E0	-.44544E1	.28247E3	.19458E3
6	37.5	-.10685E3	-.21667E3	.20770E3	-.15474E3	-.79505E0	-.83233E1	.27704E3	.19330E3
7	45.0	-.16813E3	-.23196E3	.13151E3	-.79152E2	-.91572E0	-.12336E2	.26014E3	.20423E3
8	52.5	-.22456E3	-.22592E3	.28072E2	.23563E2	-.10190E1	-.15517E2	.23983E3	.23858E3
9	60.0	-.26556E3	-.19380E3	-.93022E2	.14381E3	-.11032E1	-.16948E2	.23340E3	.29345E3
10	67.5	-.28156E3	-.13534E3	-.21638E3	.26620E3	-.11669E1	-.16014E2	.25530E3	.35385E3
11	75.0	-.26664E3	-.55669E2	-.32376E3	.37251E3	-.12089E1	-.12586E2	.29933E3	.40324E3
12	82.5	-.22036E3	.35245E2	-.39800E3	.44557E3	-.12285E1	-.70794E1	.34535E3	.42904E3
13	90.0	-.14831E3	.12432E3	-.42673E3	.47304E3	-.12255E1	-.37122E0	.37525E3	.42476E3
14	97.5	-.61077E2	.19810E3	-.40519E3	.45019E3	-.11997E1	.63932E1	.37838E3	.39081E3
15	105.0	.28200E2	.24577E3	-.33720E3	.38086E3	-.11518E1	.12068E2	.35216E3	.33445E3
16	112.5	.10674E3	.26148E3	-.23417E3	.27652E3	-.10825E1	.15774E2	.30204E3	.26932E3
17	120.0	.16484E3	.24545E3	-.11243E3	.15361E3	-.99299E0	.17054E2	.24156E3	.21481E3
18	127.5	.19741E3	.20363E3	.98288E1	.30507E2	-.88480E0	.15882E2	.19269E3	.19028E3
19	135.0	.20446E3	.14603E3	.11633E3	-.76521E2	-.75980E0	.12864E2	.17763E3	.19584E3
20	142.5	.19056E3	.83276E2	.19672E3	-.15737E3	-.62011E0	.89428E1	.19372E3	.21167E3
21	150.0	.16322E3	.24781E2	.24795E3	.20894E3	-.46813E0	.50860E1	.21829E3	.22373E3
22	157.5	.13091E3	-.23095E2	.27350E3	-.23476E3	-.30646E0	.20696E1	.23693E3	.22411E3
23	165.0	.10149E3	-.57279E2	.28128E3	-.24272E3	-.13787E0	.28829E0	.24672E3	.21975E3
24	172.5	.81093E2	-.77181E2	.28039E3	-.24197E3	.3477E-1	-.32212E0	.24992E3	.21408E3
25	180.0	.73523E2	-.83294E2	.27795E3	-.23959E3	.20849E0	-.22966E0	.24945E3	.21068E3
26	187.5	.80069E2	-.75947E2	.27660E3	-.23830E3	.38032E0	-.13359E0	.24652E3	.21085E3
27	195.0	.99474E2	-.54849E2	.27377E3	-.23555E3	.54733E0	-.71658E0	.24003E3	.21348E3
28	202.5	.12801E3	-.19605E2	.26266E3	-.22451E3	.70665E0	-.24235E1	.22750E3	.21538E3
29	210.0	.15967E3	.29037E2	.23462E3	-.19651E3	.85556E0	-.52978E1	.20756E3	.21252E3
30	217.5	.18677E3	.87804E2	.18239E3	-.14423E3	.99151E0	-.89293E1	.18463E3	.20293E3
31	225.0	.20103E3	.15010E3	.10322E3	-.64878E2	.11122E1	-.12534E2	.17413E3	.19100E3
32	232.5	.19517E3	.20636E3	.91025E0	.37861E2	.12155E1	-.15178E2	.19472E3	.19029E3
33	240.0	.16441E3	.24599E3	-.11484E3	.15443E3	.12997E1	-.16217E2	.24311E3	.21536E3
34	247.5	.10805E3	.25991E3	-.23000E3	.27117E3	.13634E1	-.15056E2	.29905E3	.26573E3
35	255.0	.30880E2	.24248E3	-.32781E3	.37054E3	.14054E1	-.11535E2	.34430E3	.32596E3
36	262.5	-.57494E2	.19365E3	-.39232E3	.43655E3	.14250E1	-.60889E1	.36698E3	.37887E3
37	270.0	-.14435E3	.11940E3	-.41243E3	.45803E3	.14219E1	.41847E0	.36250E3	.41154E3
38	277.5	-.21657E3	.30591E2	-.38445E3	.43125E3	.13962E1	.68606E1	.33384E3	.41681E3
39	285.0	-.26359E3	-.59334E2	-.31315E3	.36096E3	.13483E1	.12114E2	.29155E3	.39400E3
40	292.5	-.27978E3	-.13739E3	-.21066E3	.25930E3	.12790E1	.15322E2	.25243E3	.34891E3
41	300.0	-.26550E3	-.19374E3	-.93828E2	.14303E3	.11895E1	.16100E2	.23321E3	.29276E3
42	307.5	-.22638E3	-.22367E3	.20558E2	.29514E2	.10813E1	.14773E2	.23733E3	.23980E3
43	315.0	-.17124E3	-.22820E3	.11944E3	-.68538E2	.95626E0	.11948E2	.25307E3	.20281E3
44	322.5	-.11047E3	-.21232E3	.19396E3	-.14220E3	.81657E0	.82503E1	.26693E3	.18738E3
45	330.0	-.53398E2	-.18355E3	.24105E3	-.18850E3	.66459E0	.46189E1	.27171E3	.18608E3
46	337.5	-.63894E1	-.15038E3	.26420E3	-.21100E3	.50293E0	.18326E1	.26746E3	.18816E3
47	345.0	.27500E2	-.12066E3	.27135E3	-.21764E3	.33433E0	.28604E0	.25870E3	.18886E3
48	352.5	.47688E2	-.10055E3	.27163E3	-.21760E3	.16170E0	-.8732E-1	.25121E3	.18863E3

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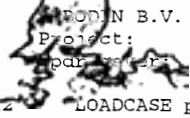
Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

T620-33 S 12205 PLE-micro-CAD 25264956: GPGT 96nov20 oc:16



ROODIN B.V. Pijpleidingen & Infrastructuur Datum: Sept 1996
 Project: Stoomw. berek. aansl. Boring Binkhorstln, Den Haag
 opdr. nr.: ENECO Energiebedrijf -DRUK -TEMP Ordernr: 18952-02

ELEM 212 LOADCASE p-t- CS-LINE 2 REDISTRIBUTEDPHASE 4

TSTRESS	ANGLE	SXIT	SXOT	SFIT	SPOT	TZUT	TXMT	SEIT	SEOT
RESULT	DEG	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2	N/mm**2
CLOSED	value	value	value	value	value	value	value	value	value
1	0.0	.64768E1	.10447E2	-.10173E2	.29284E1	-.1852E-1	.24978E0	.14537E2	.93336E1
2	7.5	.70012E1	.99128E1	-.84051E1	.12042E1	.59232E0	.18179E0	.13400E2	.94249E1
3	15.0	.72983E1	.94796E1	-.71747E1	.2412E-1	.11952E1	.11773E0	.12704E2	.96912E1
4	22.5	.73906E1	.91303E1	-.64167E1	-.67534E0	.17798E1	.6488E-1	.12358E2	.99743E1
5	30.0	.73259E1	.88382E1	-.60024E1	-.10115E1	.23361E1	.2987E-1	.12249E2	.10220E2
6	37.5	.71772E1	.85718E1	-.57523E1	-.11496E1	.28546E1	.1815E-1	.12261E2	.10445E2
7	45.0	.70389E1	.82998E1	-.54509E1	-.12897E1	.33264E1	.3320E-1	.12281E2	.10698E2
8	52.5	.70173E1	.79939E1	-.48892E1	-.16660E1	.37434E1	.7592E-1	.12227E2	.11047E2
9	60.0	.72445E1	.76011E1	-.36468E1	-.24699E1	.40986E1	.18075E0	.11941E2	.11535E2
10	67.5	.79532E1	.69490E1	-.10428E1	-.43569E1	.43858E1	.35607E0	.11417E2	.12460E2
11	75.0	.91457E1	.60598E1	-.27896E1	-.73951E1	.46001E1	.45935E0	.11375E2	.14132E2
12	82.5	.10580E2	.51527E1	-.70377E1	-.10873E2	.47379E1	.46702E0	.12424E2	.16375E2
13	90.0	.12002E2	.44114E1	-.10955E2	-.14097E2	.47968E1	.39502E0	.14199E2	.18692E2
14	97.5	.13187E2	.39597E1	-.13954E2	-.16501E2	.47757E1	.26188E0	.15907E2	.20536E2
15	105.0	.13954E2	.38671E1	-.15611E2	-.17679E2	.46751E1	.8775E-1	.16916E2	.21481E2
16	112.5	.14179E2	.141590E1	-.15680E2	-.17390E2	.44967E1	-.10630E0	.16889E2	.21277E2
17	120.0	.13812E2	.48255E1	-.14094E2	-.15566E2	.42435E1	-.29911E0	.15772E2	.19868E2
18	127.5	.12876E2	.58285E1	-.10958E2	-.12302E2	.39199E1	-.47058E0	.13816E2	.17410E2
19	135.0	.11462E2	.71047E1	-.65352E1	-.78455E1	.35313E1	-.60299E0	.11687E2	.14324E2
20	142.5	.97148E1	.85681E1	-.12185E1	-.25660E1	.30845E1	-.68263E0	.10610E2	.11425E2
21	150.0	.78126E1	.10113E2	-.45118E1	.30798E1	.25871E1	-.70129E0	.11693E2	.10034E2
22	157.5	.59431E1	.11620E2	-.10138E2	.85989E1	.20476E1	-.65743E0	.14523E2	.11029E2
23	165.0	.42811E1	.12971E2	-.15162E2	.13516E2	.14752E1	-.55667E0	.17879E2	.13496E2
24	172.5	.29701E1	.14058E2	-.19165E2	.17427E2	.87972E0	-.41140E0	.20866E2	.16083E2
25	180.0	.21089E1	.14805E2	-.21850E2	.20053E2	.27135E0	-.23946E0	.22982E2	.18018E2
26	187.5	.17448E1	.15179E2	-.23101E2	.21237E2	-.33949E0	-.5850E-1	.24028E2	.18958E2
27	195.0	.18965E1	.15163E2	-.22881E2	.20903E2	-.94236E0	.12896E0	.23942E2	.18777E2
28	202.5	.25796E1	.14737E2	-.21128E2	.18996E2	-.15269E1	.32423E0	.22683E2	.17467E2
29	210.0	.38069E1	.13867E2	-.17760E2	.15440E2	-.20832E1	.52979E0	.20262E2	.15152E2
30	217.5	.55889E1	.12500E2	-.12671E2	.10137E2	-.26017E1	.74955E0	.16820E2	.12353E2
31	225.0	.79362E1	.10563E2	-.57139E1	.29546E1	-.30735E1	.98867E0	.13012E2	.10837E2
32	232.5	.10847E2	.79795E1	.32850E1	-.61784E1	-.34906E1	.12183E1	.11374E2	.13700E2
33	240.0	.13955E2	.50370E1	.13199E2	-.16234E2	-.38457E1	.11579E1	.15137E2	.20373E2
34	247.5	.16395E2	.25405E1	.21430E2	-.24294E2	-.41330E1	.81546E0	.20687E2	.26639E2
35	255.0	.17769E2	.86288E0	.26415E2	-.29382E2	-.43473E1	.40474E0	.24511E2	.30759E2
36	262.5	.17986E2	.11890E0	.27843E2	-.31126E2	-.44851E1	-.2483E-1	.25657E2	.32138E2
37	270.0	.17084E2	.33983E0	.25721E2	-.29542E2	-.45439E1	-.43063E0	.23999E2	.30738E2
38	277.5	.15223E2	.14672E1	.20414E2	-.24986E2	-.45229E1	-.77034E0	.19977E2	.26916E2
39	285.0	.12672E2	.33449E1	.12639E2	-.18144E2	-.44223E1	-.10043E1	.14793E2	.21442E2
40	292.5	.97840E1	.57154E1	.34371E1	-.99904E1	-.42439E1	-.10977E1	.11311E2	.15608E2
41	300.0	.69544E1	.82453E1	-.59700E1	-.17095E1	-.39907E1	-.10498E1	.13164E2	.11523E2
42	307.5	.45555E1	.10577E2	-.13989E2	.58851E1	-.36670E1	-.81365E0	.17903E2	.11163E2
43	315.0	.31212E1	.12150E2	-.18993E2	.10804E2	-.32785E1	-.39360E0	.21495E2	.12858E2
44	322.5	.27267E1	.12828E2	-.20713E2	.12625E2	-.28317E1	-.5128E-1	.22738E2	.13640E2
45	330.0	.30742E1	.12838E2	-.20063E2	.12161E2	-.23343E1	.17725E0	.22136E2	.13150E2
46	337.5	.38579E1	.12416E2	-.17965E2	.10280E2	-.17947E1	.30080E0	.20411E2	.11911E2
47	345.0	.48112E1	.11775E2	-.15232E2	.77501E1	-.12224E1	.33713E0	.18246E2	.10580E2
48	352.5	.57283E1	.11082E2	-.12497E2	.51704E1	-.62688E0	.31059E0	.16179E2	.96653E1

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Date: Di 17-Mrt-1998

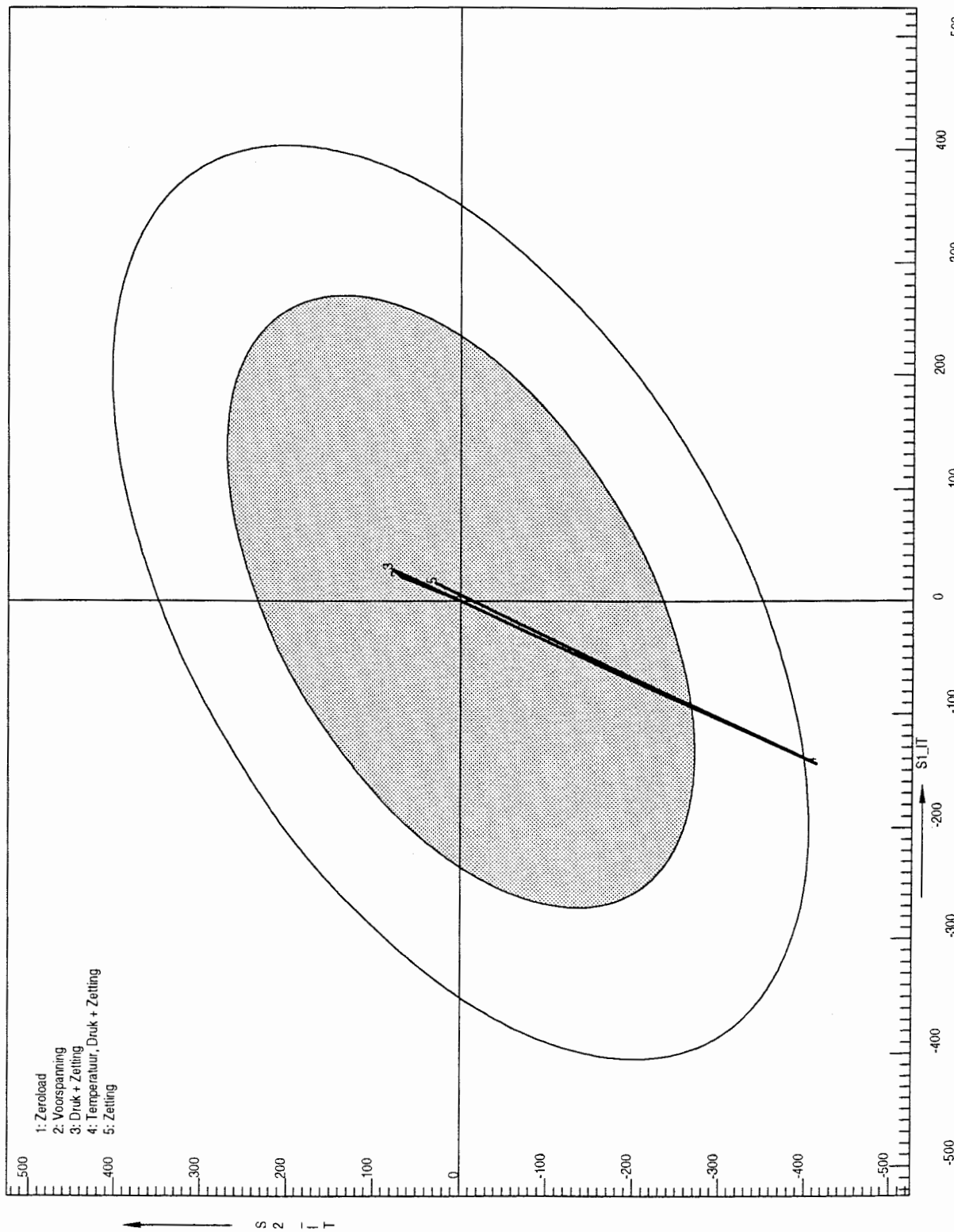
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Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

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Element: 212 VLOEI-ELLIPS Hoek: 270.0



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SCHUIFSPANNINGSANALYSE NEN3650 WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

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Project: STOOMWEZEN ROTTERDAM CBA

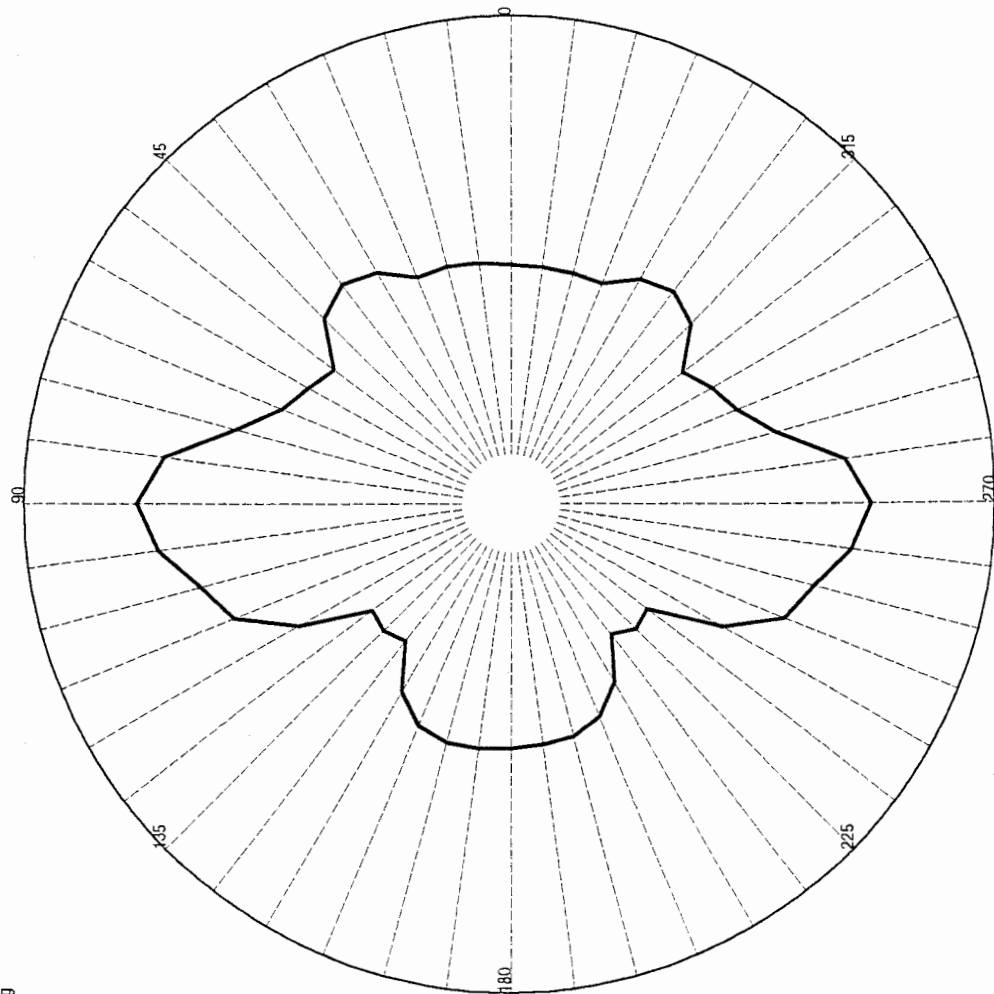
Jobnr: 20204-00

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TRESCA analyse : RATIO_IT

Element : 212 LOADCASE: Zeroload

Reference Case at Maximum :
Temperatuur, Druk + Zetting
Max: 0.769 bij 90.0 gr.
Min: 0.337 bij 217.5 gr.
Allowable range:
555.000 N/mm²



Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

Calculation according ASME VIII div. 2 appendix 5 par. 5-110.3b at the location with the combination giving the highest ratio:

Loadcase = Zeroload

Refcase = Temperatuur, Druk + Zetting

SX
Loadcase = 0.0000

Sx = SX
Refcase Sx = -148.3100

SF
Loadcase = 0.0000

Sf = SF
Refcase Sf = -426.7300

TZ
Loadcase = 0.00000

Tz = TZ
Refcase Tz = -1.22550

$$S_{1 \text{ or } 2} = \frac{(SX - Sx) + (SF - Sf)}{2} + \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{2 \text{ or } 1} = \frac{(SX - Sx) + (SF - Sf)}{2} - \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

S₁ = 148.3046

S₂ = 426.7354

S₃ = 0

S_{1,2} = S₁ - S₂

S_{2,3} = S₂ - S₃

S_{3,1} = S₃ - S₁

S_{1,2} = -278.4308

S_{2,3} = 426.7354

S_{3,1} = -148.3046

Traject is the maximum absolute magnitude of:

$$|S_{1,2}|, |S_{2,3}| \text{ \& } |S_{3,1}|$$

Traject = 426.7354

Allowable = Re_{Loadcase} + Re_{Refcase}

Allowable = 555.000

Ratio = $\frac{\text{Traject}}{\text{Allowable}}$

Ratio = 0.769

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

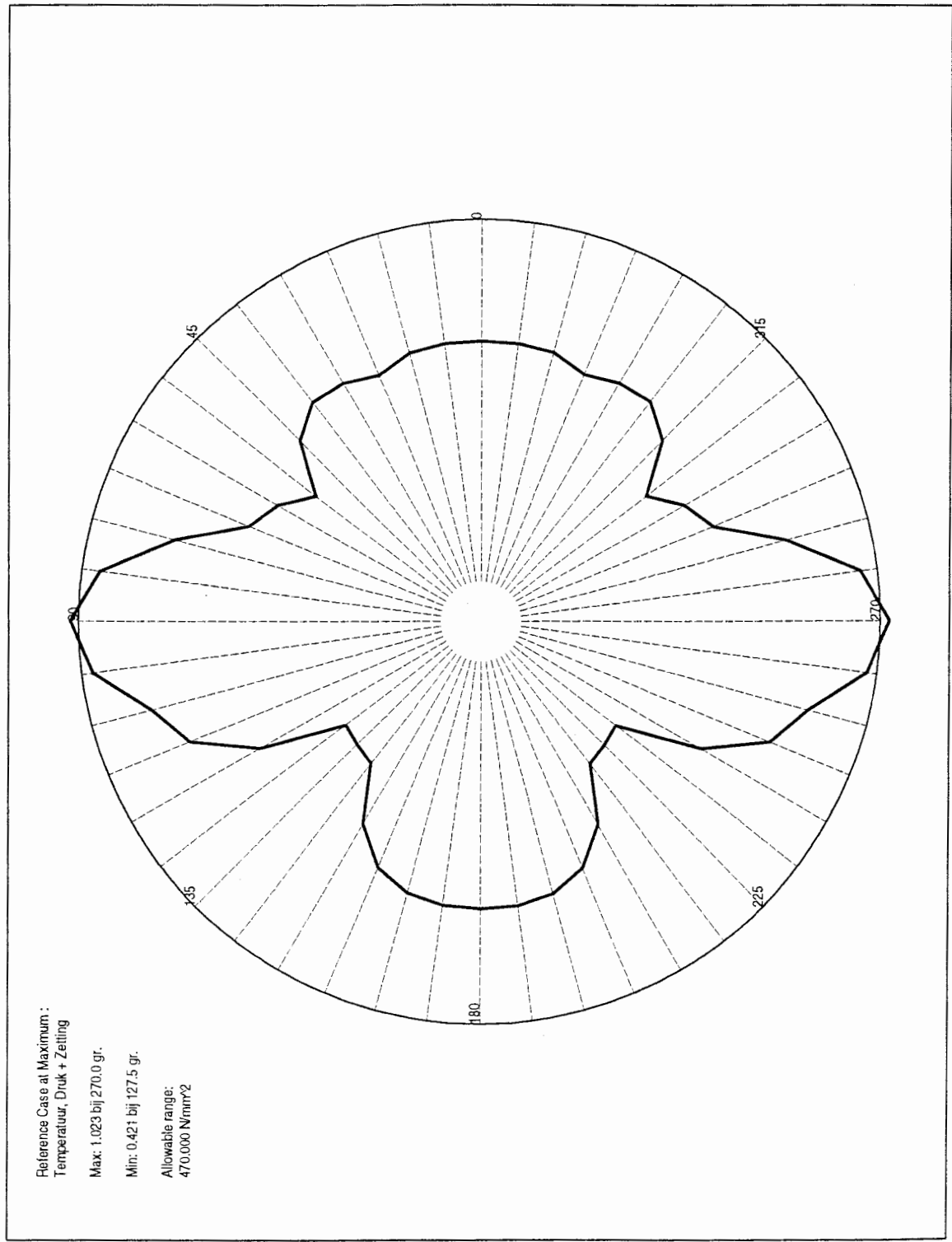
Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

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TRESCA analyse : RATIO_IT

Element : 212 LOADCASE: Voorspanning



Reference Case at Maximum :
Temperatuur, Druk + Zetting
Max: 1.023 bij 270.0 gr.
Min: 0.421 bij 127.5 gr.
Allowable range:
470.000 N/mm²

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Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650 WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

Calculation according ASME VIII div. 2 appendix 5 par. 5-110.3b at the location with the combination giving the highest ratio:

Loadcase = Voorspanning

Refcase = Temperatuur, Druk + Zetting

SX
Loadcase = 20.8900

Sx = SX
Refcase Sx = -144.3500

SF
Loadcase = 68.4420

Sf = SF
Refcase Sf = -412.4300

TZ
Loadcase = -0.00046

Tz = TZ
Refcase Tz = 1.42190

$$S_{1 \text{ or } 2} = \frac{(SX - Sx) + (SF - Sf)}{2} + \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{2 \text{ or } 1} = \frac{(SX - Sx) + (SF - Sf)}{2} - \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

S₁ = 165.2336

S₂ = 480.8784

S₃ = 0

S_{1,2} = S₁ - S₂

S_{2,3} = S₂ - S₃

S_{3,1} = S₃ - S₁

S_{1,2} = -315.6448

S_{2,3} = 480.8784

S_{3,1} = -165.2336

Traject is the maximum absolute magnitude of:

$$\left| S_{1,2} \right| , \left| S_{2,3} \right| \text{ \& } \left| S_{3,1} \right|$$

Traject = 480.8784

Allowable = Re_{Loadcase} + Re_{Refcase}

Allowable = 470.000

Ratio = $\frac{\text{Traject}}{\text{Allowable}}$

Ratio = 1.023

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

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TRESCA analyse : RATIO_IT

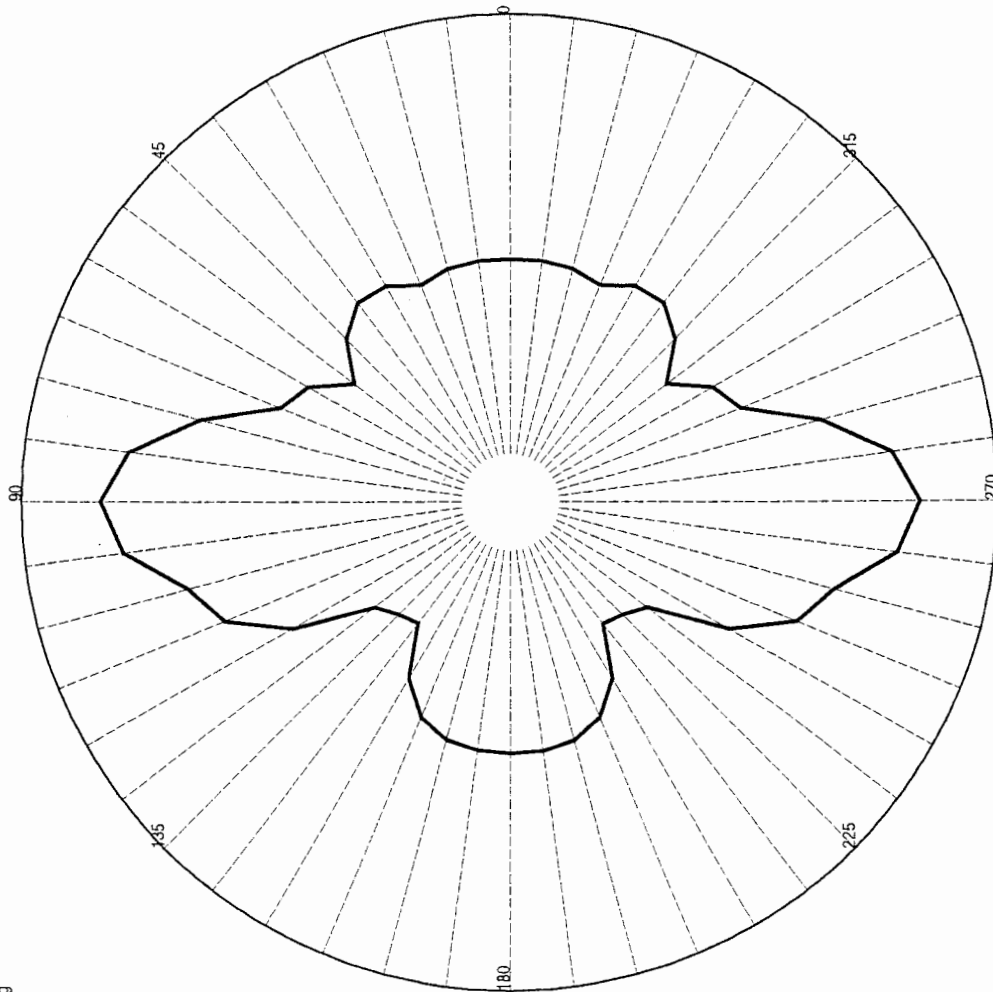
Element : 212 LOADCASE: Druk + Zetting

Reference Case at Maximum :
Temperatuur, Druk + Zetting

Max: 0.839 bij 90.0 gr.

Min: 0.310 bij 142.5 gr.

Allowable range:
585.000 N/mm²



Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

Calculation according ASME VIII div. 2 appendix 5 par. 5-110.3b at the location with the combination giving the highest ratio:

Loadcase = Druk + Zetting

Refcase = Temperatuur, Druk + Zetting

SX_{Loadcase} = 22.7150

Sx = SX_{Refcase} Sx = -148.3100

SF_{Loadcase} = 63.7900

Sf = SF_{Refcase} Sf = -426.7300

TZ_{Loadcase} = -0.11998

Tz = TZ_{Refcase} Tz = -1.22550

$$S_{1 \text{ or } 2} = \frac{(SX - Sx) + (SF - Sf)}{2} + \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{2 \text{ or } 1} = \frac{(SX - Sx) + (SF - Sf)}{2} - \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

S₁ = 171.0212

S₂ = 490.5238

S₃ = 0

S_{1_2} = S₁ - S₂

S_{2_3} = S₂ - S₃

S_{3_1} = S₃ - S₁

S_{1_2} = -319.5027

S_{2_3} = 490.5238

S_{3_1} = -171.0212

Traject is the maximum absolute magnitude of:

$$|S_{1_2}|, |S_{2_3}| \text{ \& } |S_{3_1}|$$

Traject = 490.5238

Allowable = Re_{Loadcase} + Re_{Refcase}

Allowable = 585.000

Ratio = $\frac{\text{Traject}}{\text{Allowable}}$

Ratio = 0.839

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

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TRESCA analyse : RATIO_IT

LOADCASE: Temperatuur, Druk + Zetting

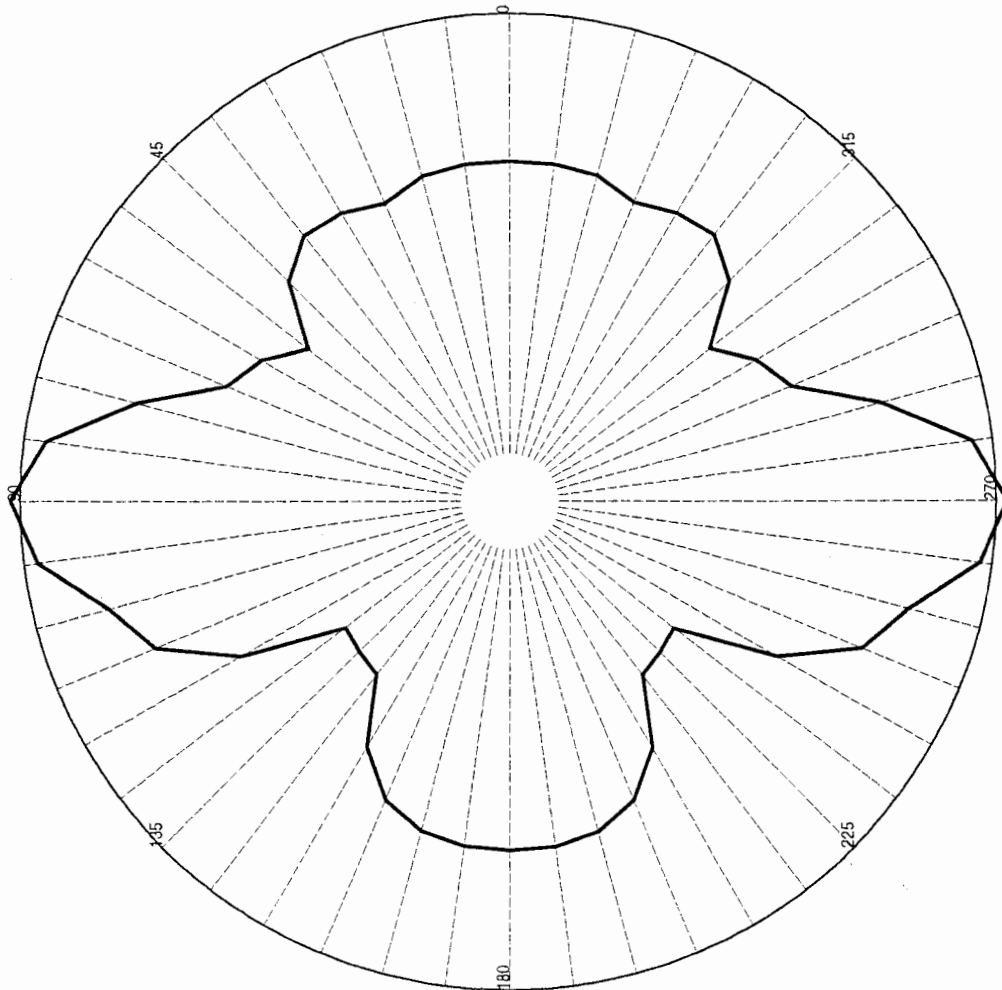
Element : 212

Reference Case at Maximum :
Vousspaming

Max: 1.023 bij 270.0 gr.

Min: 0.421 bij 127.5 gr.

Allowable range:
470.000 N/mm²



Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

Calculation according ASME VIII div. 2 appendix 5 par. 5-110.3b at the location with the combination giving the highest ratio:

Loadcase = Temperatuur, Druk + Zetting

Refcase = Voorspanning

$$SX_{\text{Loadcase}} = -144.3500$$

$$Sx = SX_{\text{Refcase}} = 20.8900$$

$$SF_{\text{Loadcase}} = -412.4300$$

$$Sf = SF_{\text{Refcase}} = 68.4420$$

$$TZ_{\text{Loadcase}} = 1.42190$$

$$Tz = TZ_{\text{Refcase}} = -0.00046$$

$$S_{1 \text{ or } 2} = \frac{(SX - Sx) + (SF - Sf)}{2} + \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{2 \text{ or } 1} = \frac{(SX - Sx) + (SF - Sf)}{2} - \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{1,1} = -165.2336$$

$$S_{2,2} = -480.8784$$

$$S_{3,3} = 0$$

$$S_{1,2} = S_{1,1} - S_{2,2}$$

$$S_{2,3} = S_{2,2} - S_{3,3}$$

$$S_{3,1} = S_{3,3} - S_{1,1}$$

$$S_{1,2} = 315.6448$$

$$S_{2,3} = -480.8784$$

$$S_{3,1} = 165.2336$$

Traject is the maximum absolute magnitude of:

$$|S_{1,2}|, |S_{2,3}| \text{ \& } |S_{3,1}|$$

$$\text{Traject} = 480.8784$$

$$\text{Allowable} = Re_{\text{Loadcase}} + Re_{\text{Refcase}}$$

$$\text{Allowable} = 470.000$$

$$\text{Ratio} = \frac{\text{Traject}}{\text{Allowable}}$$

$$\text{Ratio} = 1.023$$

Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650 WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

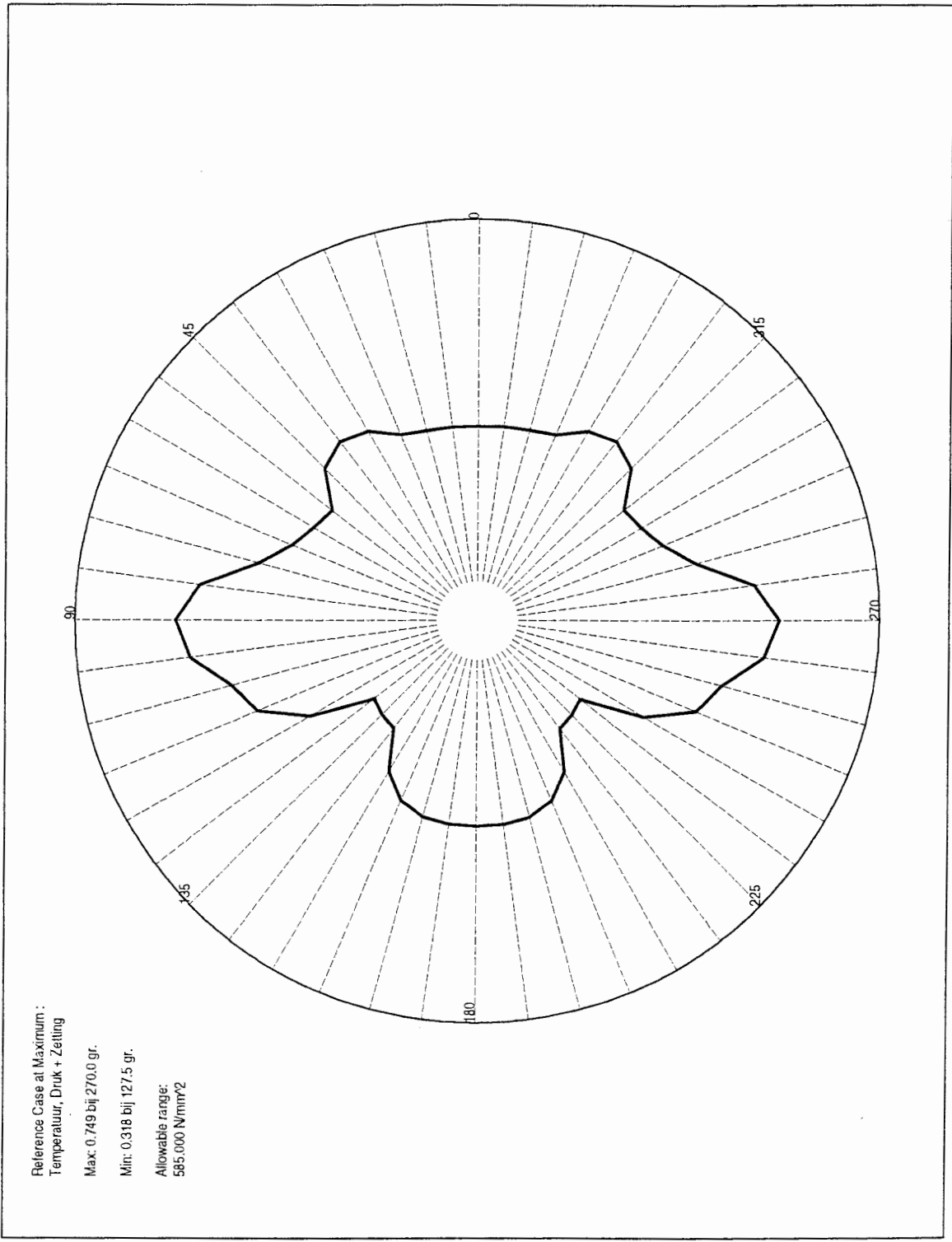
Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

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TRESCA analyse : RATIO_IT

Element : 212 LOADCASE: Zetting



Centrale Beoordelingsafdeling

SCHUIFSPANNINGSANALYSE NEN3650

WERKWIJZE CONFORM ASME

Date: Di 17-Mrt-1998

Time: 12:04:28

Project: STOOMWEZEN ROTTERDAM CBA

Jobnr: 20204-00

Calculation according ASME VIII div. 2 appendix 5 par. 5-110.3b at the location with the combination giving the highest ratio:

Loadcase = Zetting

Refcase = Temperatuur, Druk + Zetting

SX
Loadcase = 17.0840

Sx = SX_{Refcase} Sx = -144.3500

SF
Loadcase = 25.7210

Sf = SF_{Refcase} Sf = -412.4300

TZ
Loadcase = -4.54390

Tz = TZ_{Refcase} Tz = 1.42190

$$S_{1 \text{ or } 2} = \frac{(SX - Sx) + (SF - Sf)}{2} + \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

$$S_{2 \text{ or } 1} = \frac{(SX - Sx) + (SF - Sf)}{2} - \sqrt{\left[\frac{(SX - Sx) - (SF - Sf)}{2} \right]^2 + (TZ - Tz)^2}$$

S₋₁ = 161.3054

S₂ = 438.2796

S₃ = 0

S_{1,2} = S₁ - S₂

S_{2,3} = S₂ - S₃

S_{3,1} = S₃ - S₁

S_{1,2} = -276.9741

S_{2,3} = 438.2796

S_{3,1} = -161.3054

Traject is the maximum absolute magnitude of:

$$|S_{1,2}|, |S_{2,3}| \quad \& \quad |S_{3,1}|$$

Traject = 438.2796

Allowable = Re_{Loadcase} + Re_{Refcase}

Allowable = 585.000

Ratio = $\frac{\text{Traject}}{\text{Allowable}}$

Ratio = 0.749