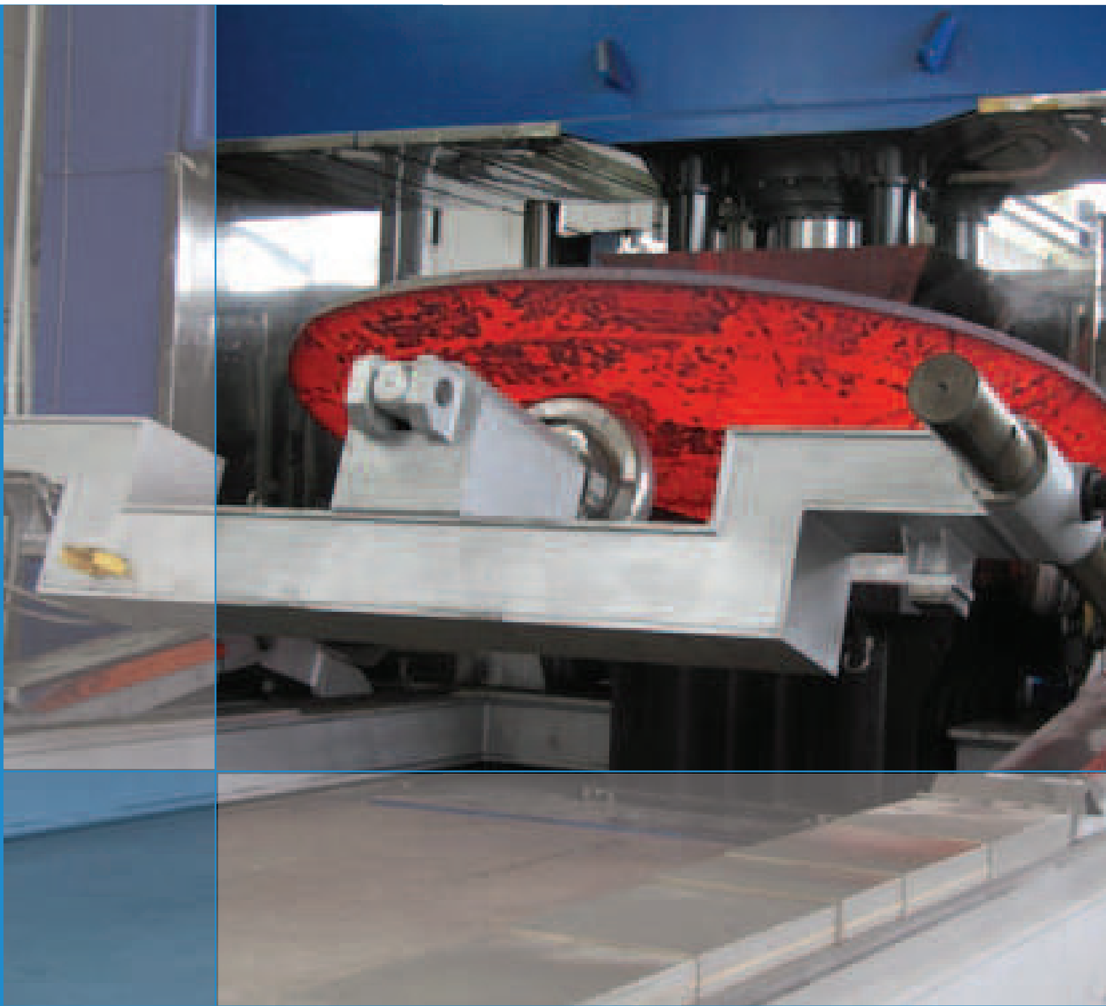
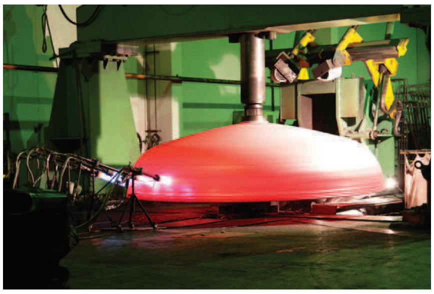


Heads catalogue

BOCAR GMBH

Design Code

AD-2000 regulatory guide
EN-13445 + PED 97/23/EC
PD 5500 , CODAP 2000 , SVTI , IBR
ASME VIII, Div. 1 and Div. 2 , U-Stamp, U2-Stamp Authorization



Examinations

Impact test at room temperature or lower acc DIN EN 10045-1
Tensile test - EN 10002-1, DIN EN ISO 6892-1 / ASTM A370
Hot tensile test till max. 900°C - DIN EN 10002-5
Hardness test acc. to Brinell - DIN EN ISO 6506-1
Intercrystalline corrosion - DIN EN ISO 2651-2 (A) /ASTM A262 Pract. E
Visual inspection - EN 970 / ISO 5817
X-ray inspection - EN 1435, ISO 5817 / ASME V Art.2, VIII Div.1 §UW 51
Ultrasonic inspection -EN 10160, EN 10307, EN 1714 / ASME SA-578, SA-435
Dye penetrant testing - EN 571, EN 1289 /ASME V Art.6, VIII Div.1 App.8
Magnetic particle test - EN 1290, EN 12891 / ASME V Art.7, VIII Div.1 App.6

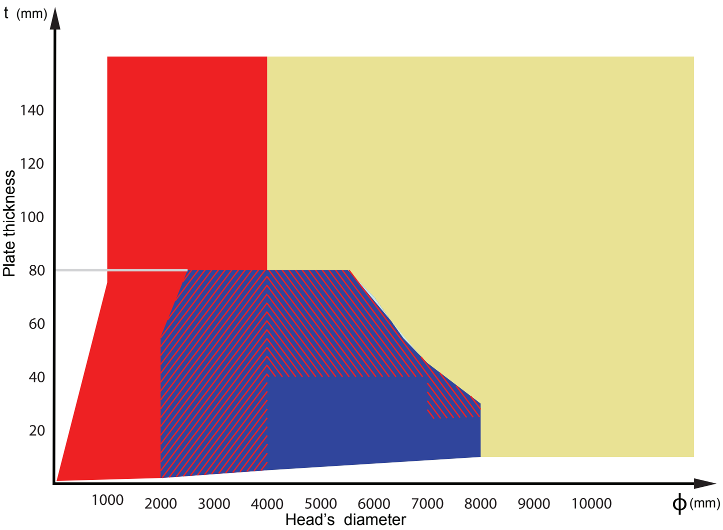
Certificates

Certificates acc. to EN 10204 - 3.1 and 3.2 from independen acceptance authorities
- Lloyd's Reg. of Shipping (LRS)
- TÜV , - DNV , - GL

Our **Heads** fulfil various requirements:

Range of Dimension

Range of diameter (Da): 21,3 – 13.500 mm, Wall thickness (s): 2 - 250 mm



- Cold-/hot pressing by means of deep drawing or hot dishing combined with hot spinning
- Heads made of crown and patels by means of combined cold and/ or combined cold/hot forming
- Combined cold/hot forming
- Cold-/hot pressing by means of deep drawing and/or cold- or combined cold/hot forming
- Cold forming

Notes:
- Max. diameter and plate thickness are depending on the form resistance strenght of the used material!
- Larger diameter and plate thickness on inquiry!
- All forming procedures can be combined with a following material grade specific heat treatment (max. temperature 1.200°C)!

Materials

	DIN- EN- standard	ASME / ASTM standard
Boiler vessel material	P 235 -GH P 265 -GH P 275 -NL1, -NL2 P 295 -GH	ASME SA 285 Gr.-C ASME SA 516 Gr.-60 ASME SA 516 Gr.-65 ASME SA 516 Gr.-65
CrMo (V) - steels	16Mo3 10CrMo9-10 13CrMo4-5 W 1.4903 / 15NiCuMoNb5	ASME SA 204 Gr.-B ASME SA 387 Gr.-22 ASME SA 387 Gr.-12 ASME SA 387 Gr.-91
Fine grained steel	P 355 -GH, -NH P 355 -NL1, -NL2	ASME SA 516 Gr.-70 ASME SA 516 Gr.-70 (485)
Stainless steel	W 1.4301 / 1.4307 W 1.4401 / 1.4404 W 1.4541 / 1.4878 W 1.4571 W 1.4539 W 1.4550 W 1.4828 W 1.4841	ASME SA 240 Gr.-304, -304L ASME SA 240 Gr.-316, -316L ASME SA 240 Gr.-321, -321H ASME SA 240 Gr.-316 Ti ASME SA 240 Gr.-904L AISI - Grade 347, -347H AISI - Grade 309 AISI - Grade 310
Duplex and Super Duplex	W 1.4462 W 1.4362 W 1.4410 W 1.4501	Duplex 2205 UNS 31803 Lean Duplex UNS 32304 Super Duplex UNS 32750 Super Duplex Cr25
Ni-Based material	W 2.4660 / 2.4605 W 2.4066 W 2.4858 W 2.4816 / 2.4851 / 2.4856 W 1.4876 / 2.4858 W 2.4360	Alloy 20, -59 Alloy 200 Alloy 825 INCONEL-600, -601, -625 Incoloy-800 , -825 MONEL 400

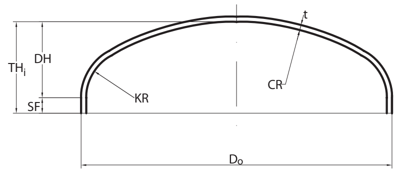
Non metal materials — Copper, Brass, Aluminium, Tandalum, Titanium, Zirconium

Composites / Plated materials — Basematerial + Platte acc. customer requirements/spec.

and many others...

Types of heads

Semi ellipsoidal head acc. DIN 28013

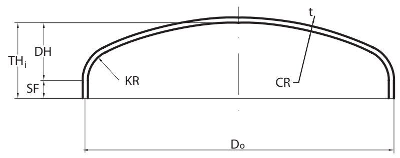


$CR = 0.8 \times D_o$ $SF \geq 3 \times t$

$KR = 0.154 \times D_o$ $DH = 0.255 \times D_o - 0.635 \times t$

$TH_i = SF + DH$

Torispherical head acc. DIN 28011

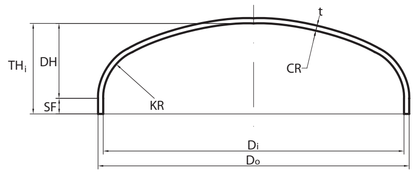


$CR = D_o$ $SF \geq 3{,}5 \times t$

$KR = 0.1 \times D_o$ $DH = 0.1935 \times D_o - 0.455 \times t$

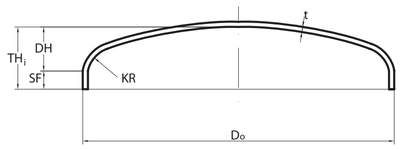
$TH_i = SF + DH$

Ellipsoidal head



Shape 2 :1	**Shape 1.9 :1**
$D_i = D_o - 2 \times t$	$D_i = D_o - 2 \times t$
$CR = 0.9 \times D_i$	$CR = D_i / 1.16$
$KR = 0.17 \times D_i$	$KR = D_i / 5.39$
SF = acc. spec.	SF = acc. NF E81-103
$DH = 0.25 \times D_i$	$DH = D_i / 3.8$
$TH = SF + DH$	$TH = SF + DH$

Standard-type / Flat dished head

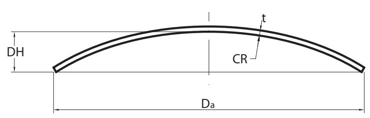


$CR = D_o$ (standard-type head) $SF \geq 3.5 \times t$

$CR = 1.3 \times D_o$ (flat dished head) DH = dished height

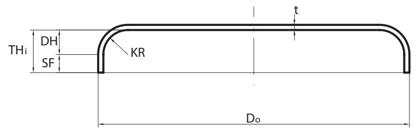
KR = depending on dim. (15 - 50mm) $TH_i = SF + DH$

Convex disc



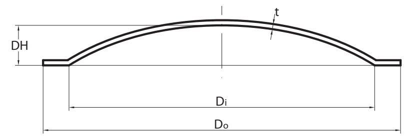
Shape CR = D_o	**Shape CR = 0.8 x D_o**	**Shape CR acc. spec.**
$DH = 0.134 \times D_o$	$DH = 0.176 \times D_o$	$DH = CR - \sqrt{CR^2 - (D_o / 2)^2}$

Flat head



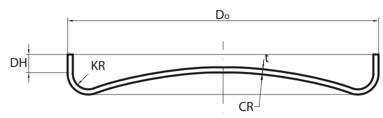
$SF = 3.5 \times t$ $DH = KR$ $TH_i = SF + DH$

Plate-type head



$CR = D_i$ $DH = 0.134 \times D_i$

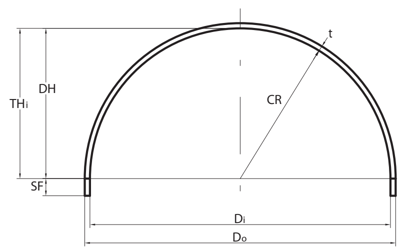
Diffuser head



$CR \geq 1.3 \times D_o$ $DH \geq 3.5 \times t$

KR = 15 - 50 mm depending on dimension

Hemispherical head

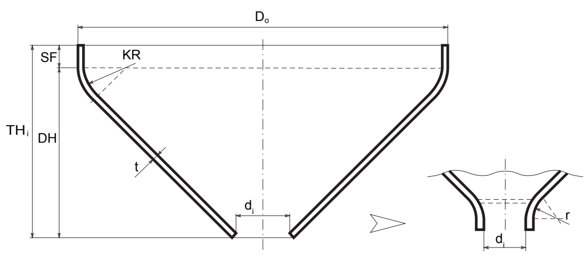


$D_i = D_o - 2 \times t$ SF = acc. to customers requirements

$CR = 0.5 \times D_i$ $DH = CR$

$TH_i = SF + DH$

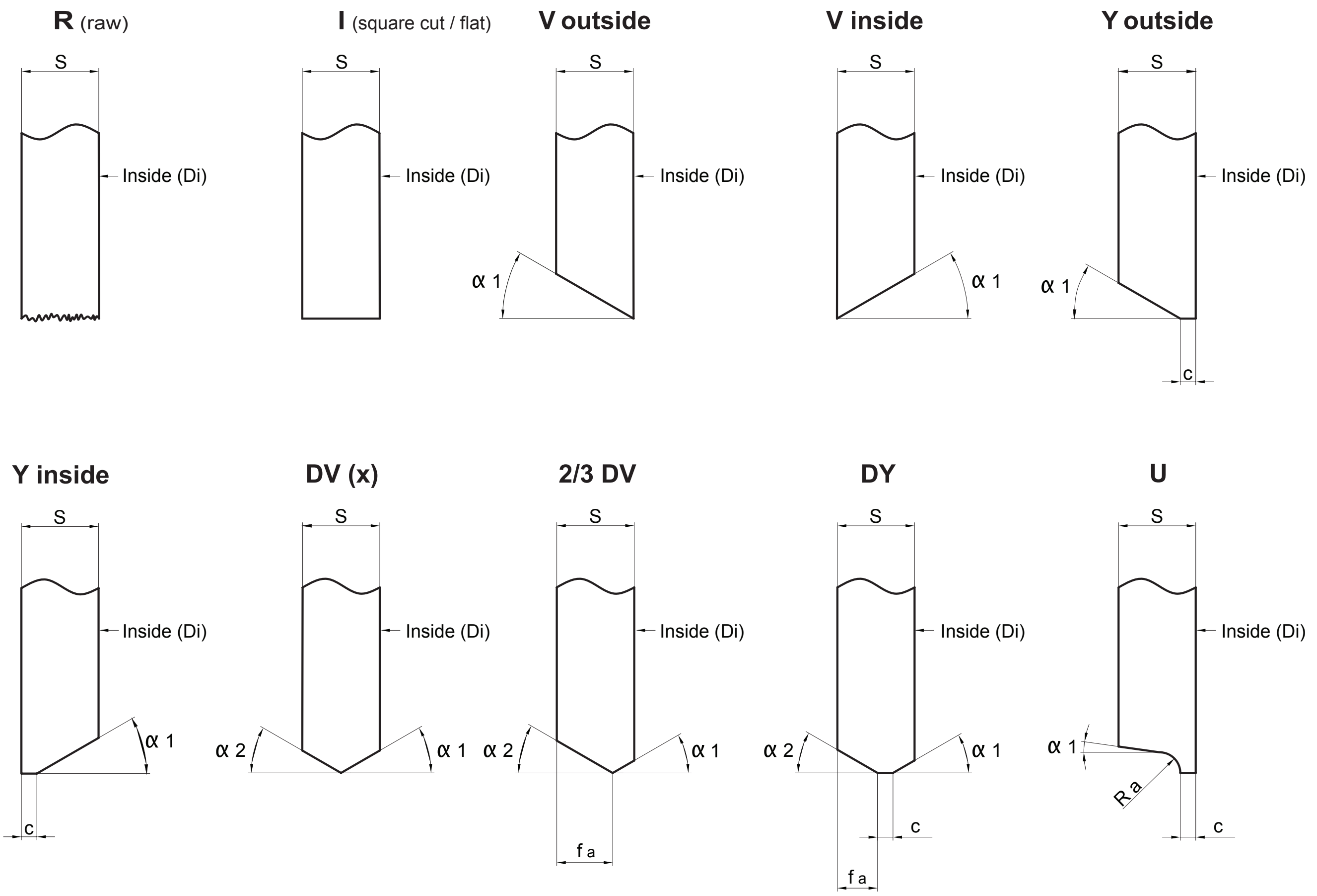
Cone

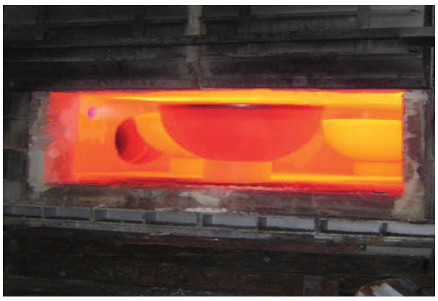


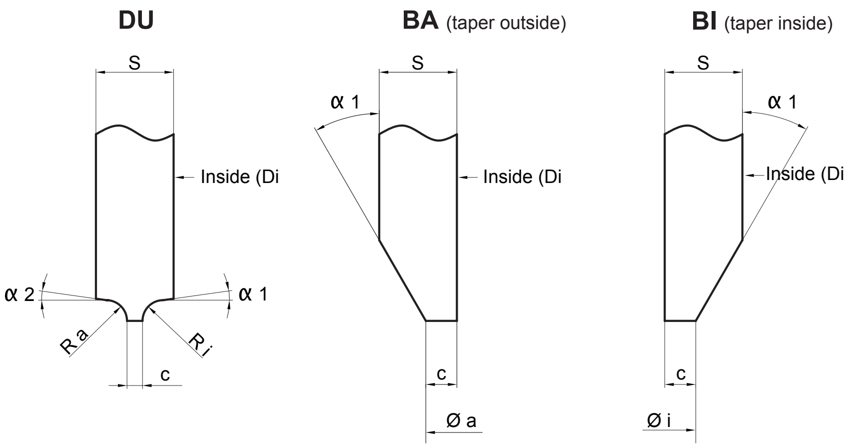
Neck at the narrow end is also possible

Legend:
t - wall thickness, D_o - outside diameter, D_i - inside diameter, SF - straight flange height, D_h - dished height, TH_i - total height inside, CR - crown radius, KR - knuckle radius

Edge preparation







Contact

Tel. +49 / 234 / 978887-0
Fax. +49 / 234 / 978887-29
E-mail: info@bocar.eu
Web: www.bocar.eu

BOCAR GmbH
Josef Baumann-Str. 21
D-44805 Bochum

tel: + 49 / 234 / 978887-0
fax: + 49 / 234 / 978887-29
E-mail: info@bocar.eu
www: www.bocar.eu