BDT20 – Safety process pressure gauge 100 & 160mm

Product description

Badotherm pressure gauge model BDT20 is the solid front, safety pattern gauge according the highest class of the EN 837-1 / 9.7.2 and ANSI B 40.1. The BDT20 stainless steel safety gauge has a solid front baffle wall and a full blow-out back. This pressure gauge is typically used for applications in the chemical, petro-chemical, and oil & gas industry or anywhere where safety comes first. These gauges are designed to withstand the severest of operating conditions created by the ambient environment and the process medium

Design standard

EN837-1. For the overpressure protected gauge (code _OPP) the gauge is following the safety pattern of version according the EN 837-1

Dial sizes, ranges & accuracy

Possibilities in ranges and accuracies are led by the dial size. The reduced volume execution specially designed for the use on diaphragm seals (code_R). Accuracy class is based on dry gauges. Liquid filling can affect the accuracy. The overpressure protected version (option code _OPP) has an accuracy according below table up to the measuring range (measuring range ends at the triangle on the scale)

Dial size	Ranges	Accuracy
100mm (100R)	0…1 to 0…1000	1.6% (option 1.0%)
100mm	0…1 to 0...1600 bar	1.0% (option 0.6 %)
160mm		
160mm (160R)		1.0%

Mounting variation

Not all gauges are suitable for some mounting variations. For the BDT20 series the mounting variations are below.

- **type A** (10) bottom connection, direct mounting
- **type C** (11) bottom connection, surface mounting (back)
- **type D** (30) lower back connection, direct mounting
- **type E** (32) lower back connection, panel mounting (front)

More specifically per dial size:

Dial size	A	C	D	E
100mm (100R)	•	•		
100mm	•	•	•	•
160mm	•	•		
160mm (160R)	•	•		



Process connection

Dial size	Standard thread	optionally	SW size
100mm (100R)	G ½ A or ½" NPT	1/4" , 3/8"	17mm
100mm			
160mm (160R)			
160mm			

Other thread standards such as ISO 7-1 R (BSPT), or DIN 13-1 (M20x1.5) can be selected as well.

-> See datasheet "thread information" for specific thread details

Materials of construction

	BDT20	BDT20…M
Case	AISI 304 (optionally AISI 316)	
Bezel		
Connection[1]	AISI 316	Alloy 400
Sensing element[1]	TP316	Alloy 400
Movement	Stainless steel	
Pointer	Aluminium	
Dial		
Window gasket	NBR	
Blow out	AISI 304 with NBR compensation	
Fill plug	NBR (HNBR for filled gauges)	
Mounting flanges	AISI 304	
Window	Laminated safety glass	

*1 wetted materials

Pressure limitations

The gauge are built to withstand harsh environments however the EN 837 limits the use of a pressure gauge according below table. Over pressure ranges for BDT20-P are seen in overpressure table.

Dial size	Steady	Fluctuating	Short time
100mm (100R)	0.75 x FSV	0.67 x FSV	FSV
100mm	FSV	0.9 x FSV	1.3 x FSV
160mm (160R)			
160mm			

FSV: full scale value

"P" version overpressure protection table

Range up to 225° scale (bar)	overload 225° up to 315° (bar)
-1…0	3
0…1	2.5
0…1.6	6
0…2.5	10
0….4	16
0….6	25
0…10	40
0…16	60
0…25	80
0…40	100

Over pressure for a short period of time

Temperature limitations

The gauges can withstand ambient and process temperature up to a certain limit. The limitations on temperature are:

	Ambient	Medium
Dry case	-40°C …+60°C	-40°C…+200°C
Filled case	-20°C …+60°C	-20°C…+90°C

The variation of indication caused by the effect of temperature shall not exceed: ± *0.4% / 10K FSV*

Window

Standard BDT20 gauges have a laminated safety glass window.

Pointer

Standard pointer is an adjustable slotted black painted aluminum pointer. The micro adjustable pointer can be selected as an option

Dial facing

The dial plate is made from aluminum and coated with UV resistant white coating. The black dial markings, scale, numbering, and interval is according the EN 837. Options like colored dial, customer logo, or colored segments are possible as well. Scale interval and numbering is following the EN837.

Limit stop

100mm and 160mm gauges are equipped with an internal limit stop on the movement to prevent, in case of overpressure, the pointer reentering the scale (graduations) thus preventing the operator reading a low pressure when in fact the pressure is dangerously high. This internal limit stop normally engages at approx. 130% of full scale value. The gauges have a free zero except for 100R gauges which are equipped with a pointer stop on the dial.

Degree of protection

The BDT20 has a standard degree of protection of IP65. The values are determined according the IEC/EN 60529. Class IP66 and IP67 are available as option.

Add-on contacts

The BDT20 is a safety pressure gauge and does not allow the use of an add-on contact due to the Makrolon material that is splintering.

Case filling

The gauges can be filled with different kind of fill fluids. The fill fluids available are:

- BPF01 - Glycerine 86%
- BPF02 - Silicon
- BPF03 - Silicon for contacts
- BPF04 - Mineral oil (Foaming service)
- BPF05 - Halocarbon (inert fluid for oxygen service)
- BPF06 - Glycerine 99.5%

Restrictor Screw

All gauges can be executed with a restrictor of 0.8 or 0.3 orifice in AISI316(L). For the Alloy 400 internal the orifice is 0.8mm.

Special service

The gauges can be supplied cleaned for oxygen use. This means the gauge is assembled and tested in a special area free of oil. The gauges are individually packed in a plastic bag with marking. The symbol used is:



Certification & Declaration

Calibration

Gauges are full range calibrated as a factory standard. Optionally you can select a 5 points calibration certificate, and a 10 points calibration certificate for the 0.6% and 0.5% gauges.

Pressure Equipment Directive - 2014_68_EU

PED approval is given according article 3.3 and is valid for ranges >200 bar. All gauges will be marked accordingly. A declaration of conformity can be supplied.

ATEX 114 - 2014/68/EU

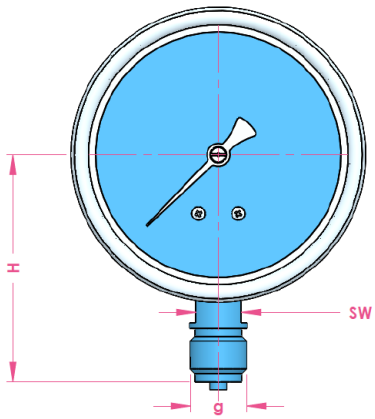
ATEX restrictions are explained in the IOM and in the ATEX background datasheet.

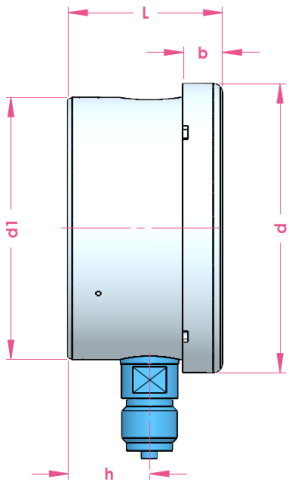
EN 10204 material certificate

A material 3.1 certificate on the wetted parts can be supplied.

Dimensions table

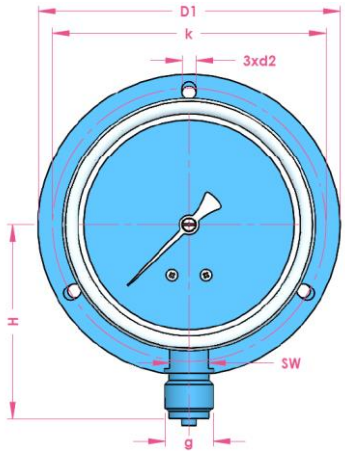
Type A (10)

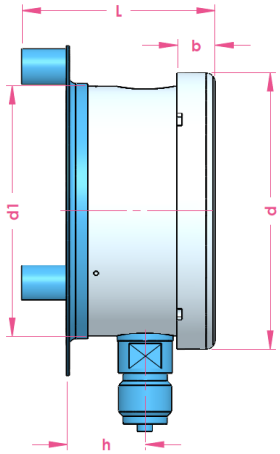




Dial size	d	d1	b	L	h	g	SW	H	weight
100/100R	110.0	100.0	15.0	63.0	31.5	G 1/2	17	85.0	0.5 kg
160/160R	160.0	150.0	16.0	63.0	30.0			116.0	0.8 kg

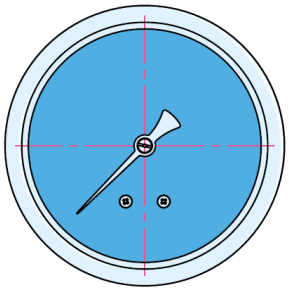
Type C (11)

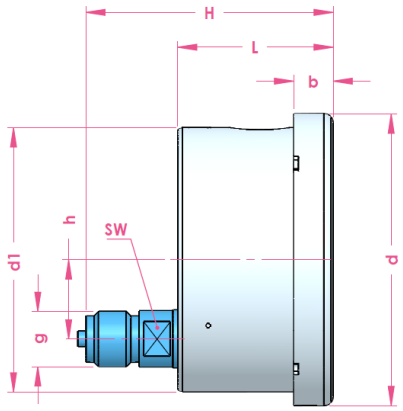




\size	d	d1	b	L	h	K	D1	d2	g	SW	H	weight
100/100R	110.0	100.0	15.0	78.0	31.5	117.6	132.0	6.0	G 1/2	17	85.0	0.5 kg
150/150R	160.0	150.0	16.0	78.0	30.0	168.0	190.0				116.0	0.8 kg
160/160R						178.0						

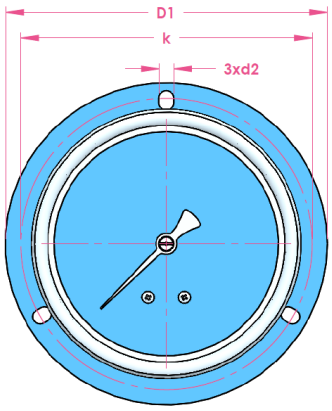
Type D (30)

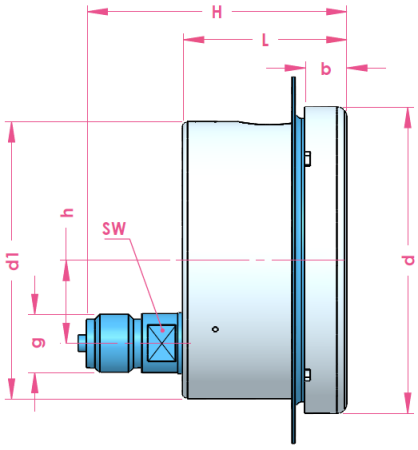




Size	d	d1	b	L	h	g	SW	H	weight
100	110.0	100.0	15.0	63.0	30.0	G 1/2	17	96.5	0.5 kg

Type E (32)





Size	d	d1	b	b2	L	h	K	D1	d2	g	SW	H	weight
100	110.0	100.0	15.0	41.0	63.0	30.0	117.6	132.0	6.0	G 1/2	17	92.0	0.5 kg

Product code 100, 150, 160mm

Code												
Example code:	**BDT20**	160	A	G12M	S363	S304	A	0	L	B50	10
TYPE												
100 mm◄	100											
100 mm reduced volume for diaphragm seal	100R											
160 mm◄	160											
160 mm reduced volume for diaphragm seal	160R											
MOUNTING												
Bottom connection - direct mounting (10) ◄	A											
Bottom connection - surface mounting (11)	C											
Lower back connection. - direct mounting (30)	D											
Lower back connection.- panel mount (32)	E											
CONNECTION												
G 3/8" A	G38M											
G1/2◄	G12M											
1/2" NPT	N12M											
R 1/2	R12M											
M20 x 1.5	M20M											
TUBE & SOCKET MATERIAL												
AISI 316L◄	S363											
Alloy 400	A400											
CASE/BEZEL MATERIAL												
AISI 304◄	S304											
AISI 316	S300											
POINTER												
Adjustable slotted pointer◄	A											
Micro adjustable pointer	M											
LIQUID FILLING												
Dry◄	0											
BPF 01 - Glycerine filled 1,23 (86%)	1											
BPF 06 - Glycerine filled 1,26 (99,5%)	6											
BPF 02 - Silicone filled	2											
BPF 03 – Silicone Contact use	3											
BPF 04 – Mineral oil (Foaming service)	4											
BPF 05 – Halocarbon (Oxygen service)	5											
WINDOW												
Laminated glass (S1) ◄	L											
RANGE												
See page table 1 and table 2	….											
ACCURACY												
0.5 (ANSI B40.1 2A)	5											
0,6	6											
1.0◄	10											
1,6 (100 R only)	16											

◄: is the sign for the standard pressure gauge
-0.5/0.6% not available for 100R
-"R" version reduced volume not possible in combination with option "_OPP" over pressure protected.
- _OPP over pressure protected option only possible in combination with mounting A or C

Tabel 1: Pressure Range code

bar		psi		MPa		kPa		kgf/cm2	
Code	Range	Code	Range	Code	Range	Code	Range	Code	Range
C36	-1…0,6	C37	30Hg/15psi	N50◂	0…1,6	D36	-100…60	E36	-1…0,6
C38	-1…1,5	C39	30Hg/30psi	N54◂	0…2,5	D38	-100…150	E38	-1…1,5
C40	-1…3	C41	30Hg/60psi	N57◂	0…4	D40	-100…300	E40	-1…3
C42	-1…5	C44	30Hg/100psi	N58	0…6	D42	-100…500	E42	-1…5
C45	-1…9	C46	30Hg/150psi	N60	0…10	D45	-100…900	E45	-1…9
C50	-1…15	C50	30Hg/220psi	N62	0…16	D50	-100…1500	E50	-1…15
C54	-1…24	C53	30Hg/300psi	N65	0…25	D54	-100…2400	E54	-1…24
B01◂	-1…0	P32◂	0…10	N69	0…40	L01◂	-100…0	K01◂	-1…0
B04	-0,6…0	P35◂	0…15	N71	0…60	L04	-60…0	K04	-0,6…0
B31◂	0…0,6	P37◂	0…30	N73	0…100	L31◂	0…60	K31◂	0…0,6
B35	0…1	P40◂	0…60	N76	0…160	L35◂	0…100	K35◂	0…1
B36◂	0…1,6	P43◂	0…100			L36◂	0…160	K36◂	0…1,6
B38◂	0…2,5	P46◂	0…160			L38◂	0…250	K38◂	0…2,5
B40◂	0…4	P48	0…200			L40◂	0…400	K40◂	0…4
B42◂	0…6	P51◂	0…300			L42◂	0…600	K42◂	0…6
B45◂	0…10	P55	0…400			L45◂	0…1000	K45◂	0…10
B50◂	0…16	P56	0…500					K50◂	0…16
B54◂	0…25	P57◂	0…600					K54◂	0…25
B57◂	0…40	P58	0…800					K57◂	0…40
B58	0…60	P59	0…1000					K58	0…60
B60	0…100	P60	0…1500					K60	0…100
B62	0…160	P61	0…2000					K62	0…160
B65	0…250	P64	0…3000					K65	0…250
B69	0…400	P66	0…4000					K69	0…400
B71	0…600	P68	0…5000					K71	0…600
B73	0…1000	P69	0…6000					K73	0…1000
B76	0…1600	P72	0…10000					K76	0…1600
		P73	0…15000						
		P75	0…20000						

◂ Ranges suitable for overpressure protected version

Table 2: Secondary scale

Dual scale option	code
PSI red	#PR
PSI black	#PB
PSI blue	#PBL
bar red	#BR
bar black	#BB
bar blue	#BBL

Add the code behind the pressure code
(eg B45#PR for 0…10 bar//psi with red scale)

Table 3: General option code

Option (start options with X_)	code
IP 66 class	_IP66
IP 67 Class	_IP67
Restrictor screw 0.8mm	_RS8
Restrictor screw 0.3mm	_RS3
Calibrated at 0°	C0
Calibrated at 180°	_C180
Cleaned for Oxygen use	_CFO
NACE ISO 15156 (MR 01 75) (alloy 400)	_N75
ATEX II2GDc-IM2c	_ATEX
3.1 material certificate	_IC31
Calibration certificate 5 points	_CC5
Calibration certificate 10 points	_CC10
Overrange protected version “P”	_OPP

_OPP only in combination with mounting A or C

Supplier:

NATIONWIDE OIL & GAS

46, Jalan SS 22/21, Damansara Jaya,
47400 Petaling Jaya,
Selangor Darul Ehsan, Malaysia.

Email: nog@nog.com.my
Webste: www.nog.com

Change log

Date	Change
30-3-2020	BDT20-P over pressure safe option added to the datasheet

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