Explosion proof enclosures

TNBCD …

The TNBCD range of Ex d enclosures are rugged and designed for harsh environment like:

- Oil and gas industry
- Chemical industry
- Pharmaceutical
- Industry
- Agribusiness

They are designed for use in potentially explosive atmospheres and certified according to the requirements of the ATEX Directive and IECEx.

Marking

Without Intrinsic safety	With Intrinsic safety
Ex db IIB T6 to T4 Gb	**Ex db [ia Ga] [ib Gb] [op is Ga] IIB T6 to T4 Gb**
Ex tb IIIB T85°C - T135°C Db IP66/67/68 – 0,4 bar 2 hours	**Ex tb [ia Da] [ib Db] [op is Ga] IIIB T85°C – T135°C Db IP66/67/68 – 0,4 bar**

The enclosures listed in this manual are certified:

II 2 G or II 2 (1) G / II 2 D or II 2 (1) D

The certificate numbers are :

TÜV 12 ATEX 101309 X
Iceux TUN 12.0014X

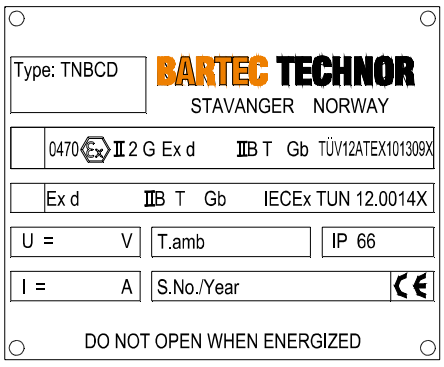
They are made in accordance with the following standards:

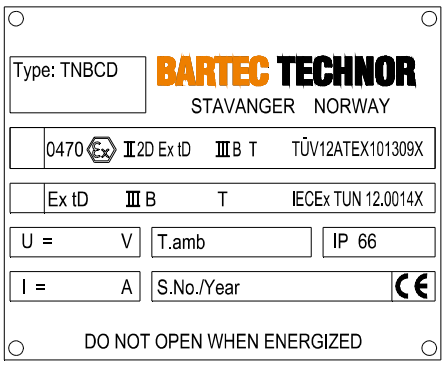
Zones due to gases, vapors and fumes

EN 60079-0 : 2018	IEC 60079-0 : 2017
EN 60079-1 : 2014/AC :2018-09	IEC 60079-1 : 2014

Zones for dusts

EN 60079-31 : 2014	IEC 60079-31: 2013





Description

Our TNBCD range of explosion proof enclosures is available in many sizes. They are made of welded or casted and machined acid resistant stainless steel 316L. Each enclosure is expected to receive electrical components inside, making service and maintenance easy. They can also be customized to meet each individual specific need. If necessary, multiple enclosures can be assembled on a frame with or without combined Ex e junction boxes.

The enclosures can be delivered fully equipped according to customer's requirements or empty with component certificate (U-certificate) to be used as basis for further certification of an Equipment or Protective System.

Equipment to be installed inside the enclosures in accordance with Technical Note 53-BCD-5 "Specification for the completion of TNBCD enclosures":

- Instruments of measure of electrical parameters
- Electronic thermoregulations units
- Radio communication and telephony units, max 3,5 W 80 µS, 250 µJ
- Laser or optical fibre units in accordance with Technical Note 53-BCD-5, section 6
- PLC and Multiplexer
- Devices for the control and the weight measure: pressure, damp; level; temperature
- Automatic and /or earth leakage circuit breakers
- Switches; on load switches; rotary switches
- Fuses
- Contactors; remote control switches
- Relays
- Electrical and electronic regulation and starting devices
- Time relays
- Photocells
- Capacitors
- Transformers
- Anti-condensate heating
- Various electronic boards

Optional solutions for the enclosures:

- internal hinges
- glass window in lid, walls and / or bottom of enclosure
- threaded holes in lid, walls and / or bottom side of enclosure
- maximum number of entries are 18, maximum thread size is M120, description given on drawing BCD-40-3. The table for cable entries in the section below also describes what is allowed

Type Code:

TNBCD XX YY ZZ

XX: Dimension of box, width in cm, 19 to 57

YY: Dimension of box, height in cm, 19 to 57

ZZ: Dimension of box, depth in cm, max 38

Enclosure type/Maximum window diameter:

- 2625xx 65/100 mm
- 3233xx 65/100 mm
- 4535xx 65/100/154 mm
- 5738xx 65/100/154 mm

Material: CD = Stainless Steel AISI 316L

Meaning of symbols

⚠ This symbol means a hazard and precaution to be taken

Safety instructions

⚠ The device must be installed, used and maintained in accordance with the following standards:

- IEC/EN 60079-1 (Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d")
- IEC/EN 60079-14 (Explosive atmospheres - Part 14: Electrical installations design, selection and erection)
- IEC/EN 60079-17 (Explosive atmospheres - Part 17: Electrical installations inspection and maintenance)
- IEC/EN 60079-31 (Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t")
- Decrees, orders, laws, directives, circulars, applications, standards, state of art and other documentation relating to its installation site

⚠ **It is forbidden to change anything (components, installation, wiring ...) without the prior written consent of Bartec Technor.**

⚠ **We cannot accept any responsibility for failure to observe these regulations:**

- Make sure of the compatibility between the information on the nameplate, the explosive atmosphere present, the area of use and ambient temperatures on surfaces
- Any damage on the device can cause the explosion-proof protection to become ineffective
- The installation of the enclosure must be done in the state of the art in the technical domains and only by qualified, competent and empowered personnel
- A defective or abnormal use as well as the noncompliance with the instructions of the present document exclude any clause of guarantee and do not engage our responsibility
- The use of the device in case of excessive deposits of dusts superior at 50mm according to EN / IEC 60079-31 is not authorized
- Liability for manufacturer traceability is ensured only at the first known delivery destination (serial number specified on the certification label)
- It is also required to observe the regulations of the country of use
- The doors of the TNBCD enclosures are relatively heavy, to avoid sagging of the doors, potentially making the door not align with the flange of the enclosure, the doors shall be closed and secured during any moving and shifting of the enclosures. It is

also strongly advisable to close and secure the doors when the daily working shift is over

- The flame paths of the doors and of the flanges of the enclosures must be well protected whilst work is performed and ongoing inside the enclosures

Transport, storage

- Check it the product has been damaged during transport. If any damage is observed, do the statutory reserves to the carrier
- Do not put damaged products into service

Packaging	Location storage	Duration storage
Open	In a covered location, clean (without contact with external substances) and closed with temperature a constant humidity (-40°C < T < +70°C). Shielded from important temperature variations	2 years and more with regular inspection (cleanliness and mechanical damage)

Putting into service

- Verify that the information on the label of the product is in accordance with the permissible conditions for the Ex area of the site of use (Group II: Surface Industries - Category 2: high level of protection for ATEX G = for Gas / D = for Dust, IECEx EPL - G = for Gas / D = for Dusts - IPxx: IP rating (waterproofness for solids and liquids)
- Check if there is a specific position of mounting
- Do not open the lid before the enclosure is securely fastened. Also check if the enclosure has been equipped with hinges
- The wiring of the cable conductors must be made with a particular care
- The conductor insulation must reach the terminal. The conductive soul must not be damaged
- Not to exceed the authorized maximal temperature appropriate cables must be selected and take particular care installing them
- Follow the instructions contained in the specifications
- Installation of intrinsic safety elements :
    - The installation of the intrinsic safety circuits (IS) inside the enclosure is subordinated to the respect of the requirements of their documents of certification, their certificates and with that after:
        - IS Circuits are cabled with connection wires of which the thickness of insulator is ≥ 0,5 mm and the section ≥0,5 mm ²
        - The connection wires support a dielectric test of 500 V effective
        - The air gap between the active parts under voltage of the connection elements of the intrinsic safety circuit compared to connection elements of an non intrinsic safety circuit is higher or equal to 50 millimeters
        - The air gap and creepage distances in the air between the active parts under voltage of the intrinsic safety circuit compared to an intrinsic safety circuit close are higher or equal to 6 millimeters
        - The air gap and creepage distances in the air between the active parts under voltage of the intrinsic safety circuit compared to the metal parts which can be with the ground are higher or equal to 3 millimeters
        - The active parts of the intrinsic safety circuits support a dielectric test of rigidity under an effective alternating voltage of 500 Volts compared to the metal mass

- The active parts of an intrinsic safety circuit support a dielectric test of rigidity under an effective alternating voltage of 500 Volts compared to an intrinsic safety circuit close
- Circuits NIS are cabled with conductive wires whose insulation is such as they can support a dielectric test of 2 U + 1000 V effective, U being the sum of the tensions of the IS and NIS circuits, with a minimum of 1500 V

⚠ Before starting

- Make sure the unit has been correctly settled and not damaged
- Make sure the wiring and the tightening of the terminal screws have been performed properly (see descriptive tightening torque)
- The device may include any foreign body and no part is damaged
- The cable gland must be tightened (see description of the gland torque)

⚠ Maintenance

The maintenance and repairs work on devices must be made only by authorized and trained persons for that purpose.

⚠ Before any work the devices must be switched off. In addition:

- Prevent and avoid any formation of layers of dusts: make a periodic cleaning with a wet cloth
- Do not take apart the command and control units (push buttons, pilot light, etc.)

⚠ It is advisable that the following checks must be made at least once a year:

- The external equipment and surfaces must not be damaged
- The cable entries and blanking plugs must be securely fastened
- Check tightness of the connections, rewiring if necessary
- Prior to closing, check the cleanliness of the flame path (machined part of the cover in contact the machined part of the box). Grease these 2 parts with a grease resistant to oxidation (acid free white vaseline)
- Screw the cover on the box using the original stainless steel bolts DIN 933 M12x25 A4-80. Ensure that the bolts are clean and are greased (grease like Gleitmo 165). Ensure that all the bolts are screwed. Torque the bolts to 65 Nm, max 75 Nm. After torqueing the bolts, check with a shim of 15/100 mm all around the flame path that the shim cannot penetrate the enclosure. Its non-penetration on full perimeter is the insurance of the conformity of the product with the standards

Technical features

Measurement table for Ex d IIB Explosion proof enclosures

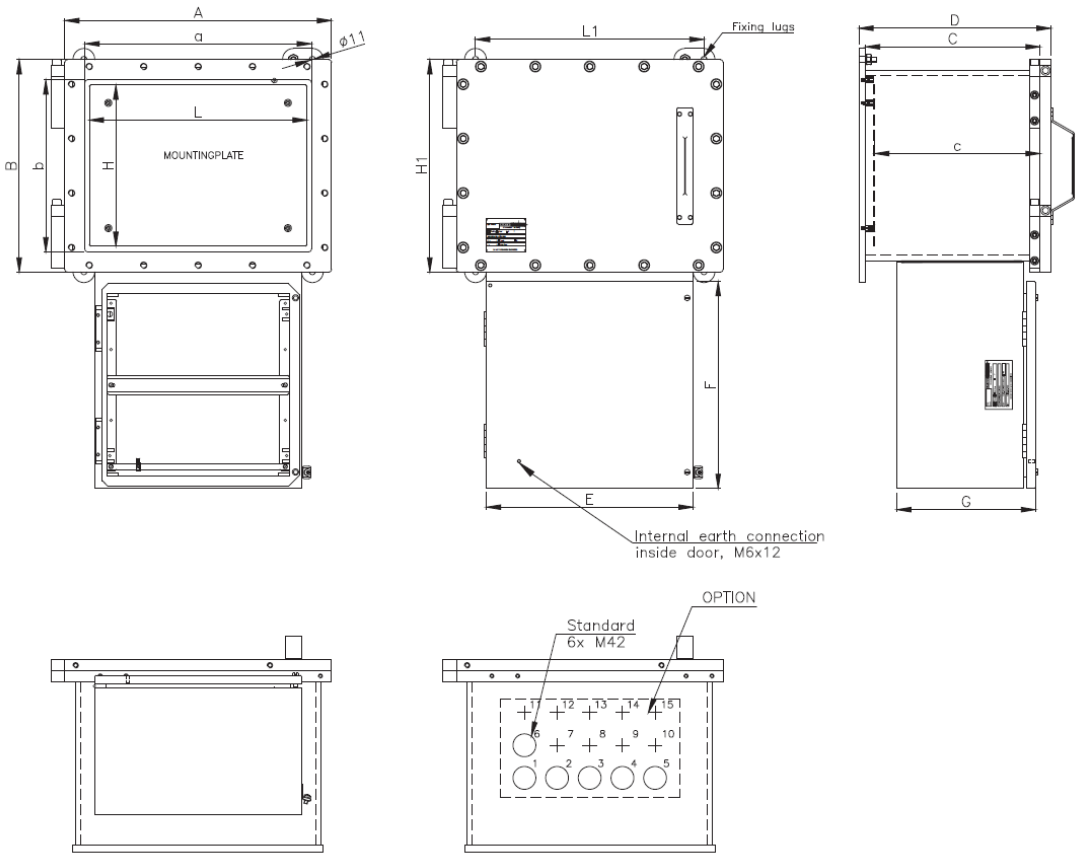
External dimensions						Internal dimensions				Fixing dimensions		Mounting plate	
TNBCD	Wide A	Height B	Depth C	Total Depth D	Window	Wide a	Height b	Depth c	Kg	L1	H1	L	H
262531	300	290	280	315	65/100	226	216	265	16	230	290	210	196
323321	360	370	180	215	65/100	286	296	165	37	360	300	266	280
453535	490	390	320	355	65/100/154	416	316	305	60	420	390	400	296
573835	615	420	320	355	65/100/154	541	346	305	125	545	420	525	326

Measures in mm. Other sizes upon request.

Measurement table for Ex e connection boxes

TNCC			
	E	F	G
202025	200	200	255
252015	250	200	155
383825	380	380	255
453825	450	380	255

Measures in mm.



⚠ Number of cable entries:

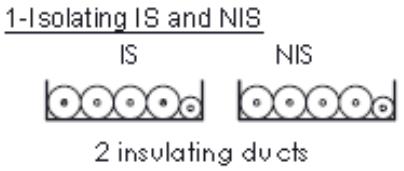
- Any type of cable or conduit entry certified Ex d can be used and installed according to EN / IEC 60079-14
- Different types of threads can be used but minimum five threads by bolt must always been engaged

Enclosure type	Max thread area (removed surface)	Metric threaded holes	
TNBCD26XX31	83,0 cm^2	Dimension	Area
TNBCD25XX31	83,0 cm^2	M20	3,1 cm^2
TNBCD32XX21	124,5 cm^2	M25	4,9 cm^2
TNBCD33XX21	124,5 cm^2	M32	8,0 cm^2
TNBCD45XX35	207,0 cm^2	M45	13,8 cm^2
TNBCD35XX35	207,0 cm^2	M50	19,6 cm^2
TNBCD57XX35	249,0 cm^2	M63	31,1 cm^2
TNBCD45XX35	249,0 cm^2	M75	44,1 cm^2

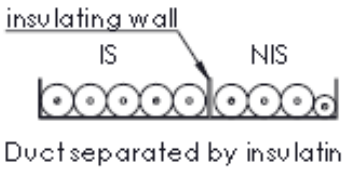
When only one side is drilled, the threaded area can be increased by up to 30%

⚠ Special Conditions for safe use (X):

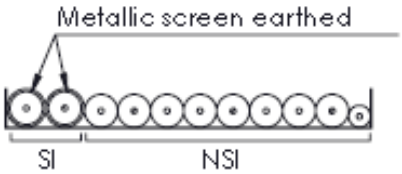
- When the enclosure is equipped with intrinsic safety elements, a temperature probe must be fitted inside and be connected to a system that can switch off the supply when the inner temperature raises above the maximum ambient temperature indicated in the certificates of the IS equipment.
- The products that can be connected to the IS equipment installed inside the enclosure must be of a certified type and association must be compatible in regards of intrinsic safety.



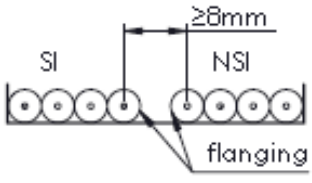
2 insulating ducts



Duct separated by insulating wall

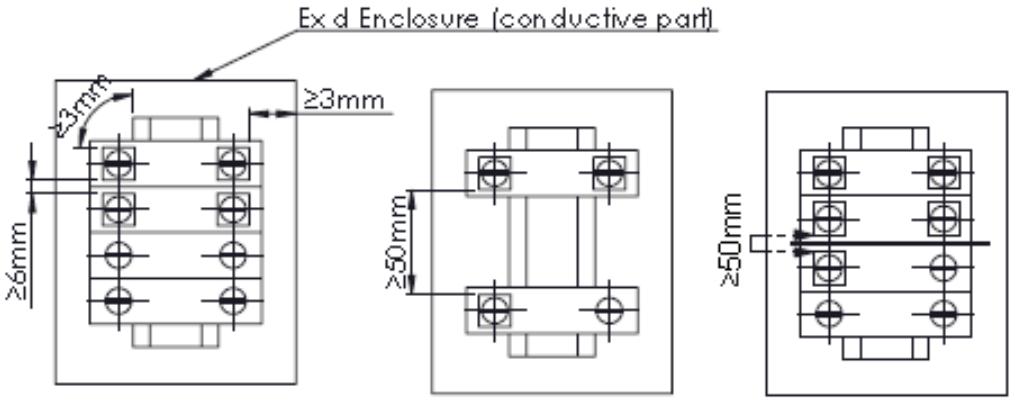


1 Duct



Duct with cable flanging IS and NIS

2- Clearances and creepage distances between IS and NIS materials



1. It´s only allowed for the manufacturer to make the finished mounting of the enclosures in accordance with Technical Note 53-BCD-5 “Specification for the completion of TNBCD enclosures”
2. Spacing between internal mounted components must be in accordance with Installation drawing BCD-122-5
3. The requirements in clause D.4 of EN 60079-1 shall be observed
4. Ultrasonic sources may not be mounted into the enclosure
5. Primary or secondary batteries may not be installed
6. [Ex i] certified components can only be installed if two thermostats are mounted in series for disconnecting the [Ex i] component if the temperature inside the flameproof enclosure exceeds the highest Tamb for the [Ex i] component. Alternatively a full-scale test for determination of the surface temperature must be performed
7. When viewing windows are mounted the temperature of the cementing resp. window shall not exceed:
   Enclosure with window type 195 and cementing DP190, according to drawing CDX-75-5:
   - -50°C to 90°C
   - Enclosure with window according to drawing BCD-55-4: -20°C to 70°C
   - For other windows the temperature on the cementing/window shall not exceed -20°C to 90°C
8. Certification with Tamb -50°C is limited to enclosure TNBCD 573835 with lid of stainless steel and with window type 195 according to drawing CDX-75-4
9. IP67 and IP68 - 0.4 bar 2 h only for TNBCD, without lamp globe, push buttons and window according to drawing BCD47-02-4
10. The maximum number of entries are 18, maximum thread size is M120, description given on drawing BCD-40-3. The table for cable entries in the section above also shows what is allowed
11. IECEx Certified and tested components that are built into the enclosure’s walls need to fulfil the requirements of types of explosion protection used as well as the IP level shown on the type label
12. Bartec Technor’s Type TNCN/TNCC Ex e junction box may be used for indirect cable entry
13. Rotating machines, or other devices which create turbulence, shall not be incorporated
14. Oil-filled circuit-breakers and contactors shall not be used
15. The Maximum dissipated power in the TNBCD enclosures have to follow values in the manufacturer’s power dissipation tables

16. Calculations of inner and surface temperatures must be performed by program: TempCalc-sm Rev. 1
17. The Manufacturer has to ensure all maximum temperatures of equipment used inside or in the enclosure walls are lower that it's maximal Tamb
18. Repairs on flame-proof joints can only be done by Bartec Technor
19. Routine tests:
    - Due to a welded construction routine test has to be done with minimum of 12 bar on each type/variant. Minimum 14.9 bar on each -50°C product
20. No high-pressure water to be applied in the connection between lid and enclosure

⚠The content of the TNBCD enclosures may be placed in any arrangement provided that an area of at least:

- - 20 % of each cross-sectional area remains free for gas group IIB

⚠**Dismantling, taking out of service :**

When removing the enclosure and taking it out of service, the same precautions apply as those observed when mounting the enclosure.

The enclosure with its content must be handled according to the WEEE (Waste Electrical and Electronic Equipment) Directive, 2012/19/EU.