Remote Monitoring for Business

ALTA® Wireless Thermocouple Sensors

General Description

The ALTA® Wireless Thermocouple Sensor produces a temperature measurement using a K-Type (nickel-chromium / nickel-aluminum) thermocouple. This sensor is available in various commercial and industrial packages with three options: Fixed probe, Quick Connect with a probe, and Quick Connect only.

Key Features

- Measurement Range:
  - General K-Type thermocouples: –200°C to 1250°C (-328°F to 2282°F)
  - Fixed Probe: -100°C to 400°C (-148°F to 752°F)
  - Quick Connect Probe: -100°C to 260°C (-148°F to 500°F)
- Typically Accuracy: ± 2.2°C (± .2.8°F)
- Resolution: 0.1°C (0.18°F)
- Configurable thresholds for critical condition monitoring

Principles of Operation

The ALTA Wireless Thermocouple Sensor measures the ambient temperature based on a user-configurable time interval or Heartbeat. When performing a measurement, the sensor momentarily energizes a high-performance analog-to-digital converter (ADC) to measure the thermal voltage from the thermocouple and the cold-junction temperature voltage. These digitized voltages are then used to compute the temperature value of the K-Type thermocouple. On every Heartbeat, the sensor reports its current measurement to the gateway, making the data available in iMonnit or other approved data services.

Example Applications

- Ovens and Cooking Device Monitoring
- Furnace and HVAC Monitoring
- Exhaust Hood Monitoring
- Boiler Monitoring
- Turbine Exhaust Monitoring
- Chimney/Flue Temperature Monitoring
- Kiln Temperature Monitoring
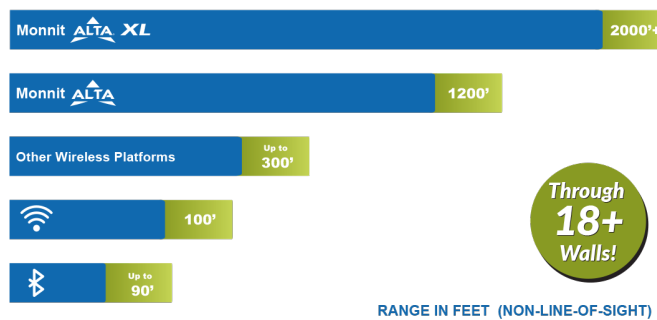- High-Temperature Food Monitoring
- Additional applications

Features of Monnit ALTA Sensors

- Wireless range of 2,000+ feet through 18+ walls[1]
- Frequency-Hopping Spread Spectrum (FHSS)
- Best-in-class interference immunity
- Best-in-class power management for longer battery life[2]
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + Advanced Encryption Standard (AES)-128 Cipher Block Chaining (CBC) for sensor data messages)
- Sensor logs 2000 to 4000 readings if the gateway connection is lost (non-volatile flash, persists through power cycling):
    - 10-minute Heartbeats = ~ 22 days
    - 2-hour Heartbeats = ~ 266 days
- Automatic over-the-air updates to sensor firmware (future-proof)
- Free iMonnit Basic Online Wireless Sensor Monitoring and Notification System to configure sensors, view data, and send alerts via SMS text, email, and voice call

1 Actual range may vary depending on the environment and gateway.

2 Battery life is determined by the sensor reporting frequency and other variables. Other power options are also available.

Wireless Range Comparison
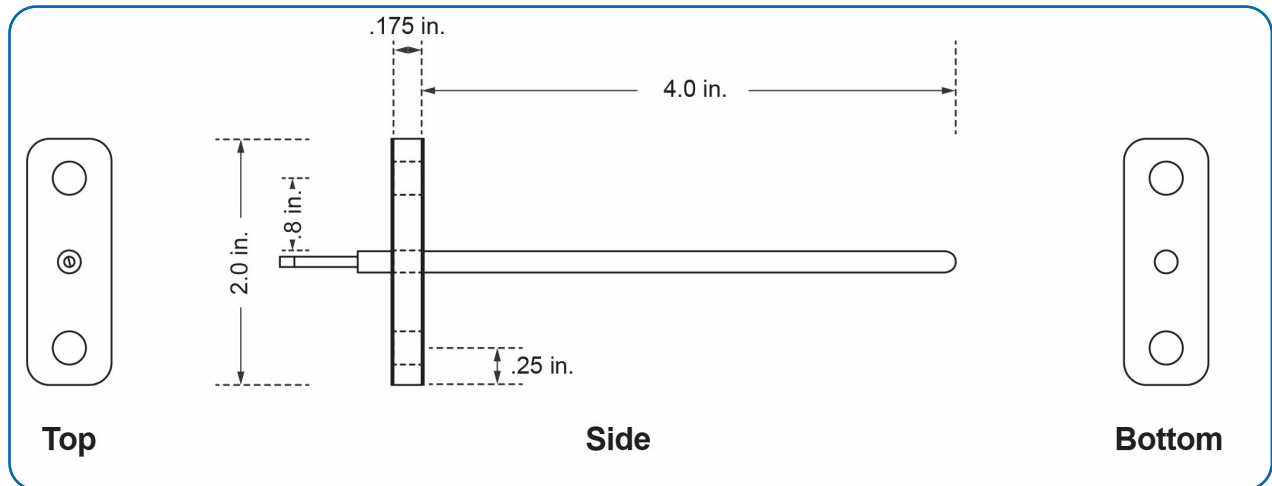

Monnit ALTA XL		2000'+
Monnit ALTA		1200'
Other Wireless Platforms	Up to 300'	
(wifi)	100'	
(bluetooth)	Up to 90'	

Through **18+** Walls!

RANGE IN FEET (NON-LINE-OF-SIGHT)

Technical Specification | ALTA® Wireless Thermocouple Sensors
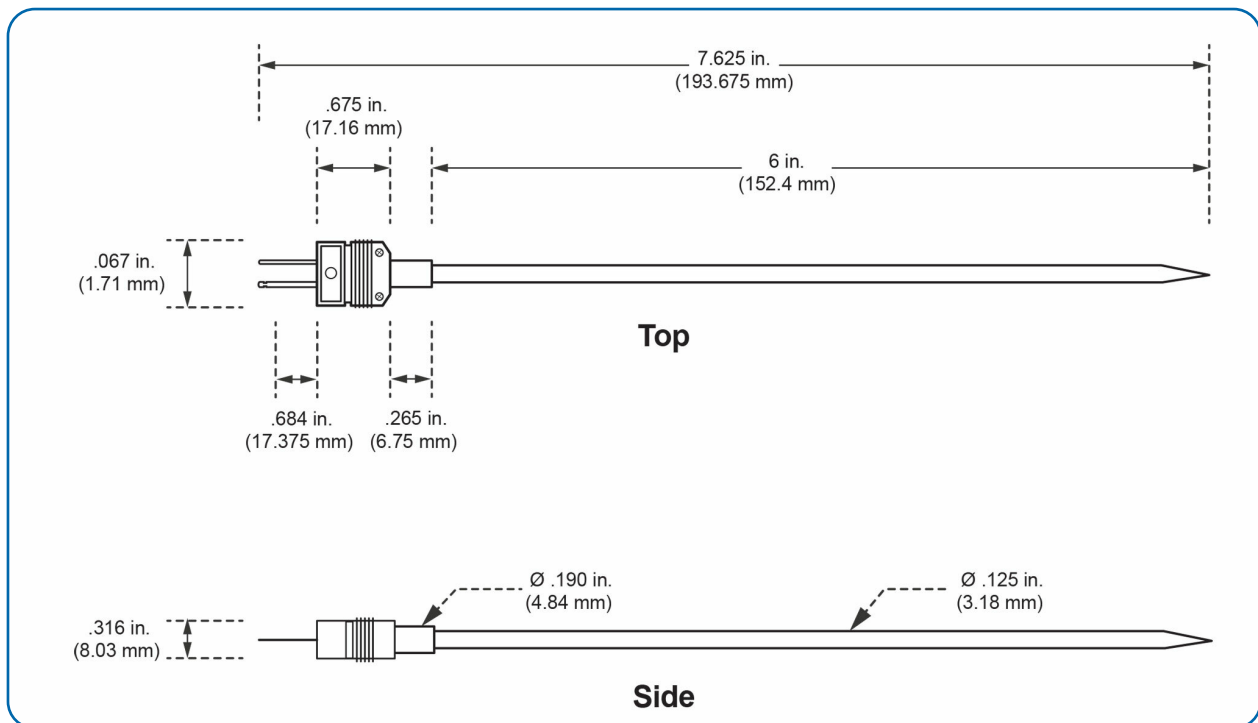
Temperature Measurement	Range - Full K-Type capability	-200°C to 1250°C (-328°F to 2282°F)
	Range - Fixed Probe	-100°C to 400°C (-148°F to 752°F)
	Range - Quick Connect Probe	-50°C to 260°C (-58°F to 500°F)
	Accuracy above 0°C (32°F)	± 2.2°C (±4°F) or 0.75% (whichever is greater)
	Accuracy below 0°C (32°F)	± 2.2°C (±4°F) or 2.0% (whichever is greater)
	Resolution	0.1°C (0.18°F)
	Response time	50 seconds (10-second time constant)[1]
Fixed Probe	Probe characteristics	Blunt 10 cm (4") bracketed stainless steel probe
	Cable dimensions	Length: 1.6 m (6'), Diameter: 2.7 mm (0.1")
	Cable material	Stainless steel braid over glass
Quick Connect Probe & Cable	Probe characteristics	Pointed 15 cm (6") quick connect stainless steel probe
	Probe connector	K-type mini (flat) male
	Cable dimensions	Waterproof high-temperature ABS with EMF shielding
	Cable material	Retractable yellow TPE jacket Maximum Operating Temperature: 104°C (220°F) 500% expansion or 1.5m (5') stretch
	Cable connector	K-Type mini (flat) female
ALTA Wireless	Data logging	Sensor logs 2000 to 4000 readings if gateway connection is lost (non-volatile flash, persists through power cycling): 10-minute Heartbeats = ~22 days - 2-hour Heartbeats = ~266 days
	Wireless protocol	ALTA Proprietary Frequency-Hopping Spread Spectrum (FHSS)
	Wireless transmission power (EIRP)	50 mW (900MHz), 25 mW (868 MHz), 10 mW (433 MHz)
	Wireless range	2,000+ ft. through 18+ walls with the ALTA XL® Gateway
	Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)
General	Battery voltage range	2.0 to 3.8 VDC
	Operating altitude (non-pressurized environments)	-15.2 to 1,982 m (-50 to 6,500 ft)[2]
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft)[2]
	Operating humidity	5 to 85% RH (non-condensing)
	Certifications	900 MHz sensors: **FCC ID: ZTL-G2SC1** and **IC: 9794A-G2SC1**. 868 and 433 MHz sensors tested and comply with: **EN 55032**: 2015/A11:2020; **EN 55035**:2017/A11:2020; **ETSI EN 300 220** V3.2.1 (2018-06); **ETSI EN 301 489-3** V2.2.0. (2021-11); and **ETSI EN 303 645**. All sensors tested and comply with: **EN 61010-1** and **EN 60950** and meet **RoHS 2015/863** and **REACH 224** (June 2022), according to **IEC 63000**:2016/AMD1:2022.

1. Response time defined as five time constants for 99.3% of actual temperature.
2. Operating and storage altitude without DC power supply is -30.48 to 9144 m (-100 to 30000 ft).
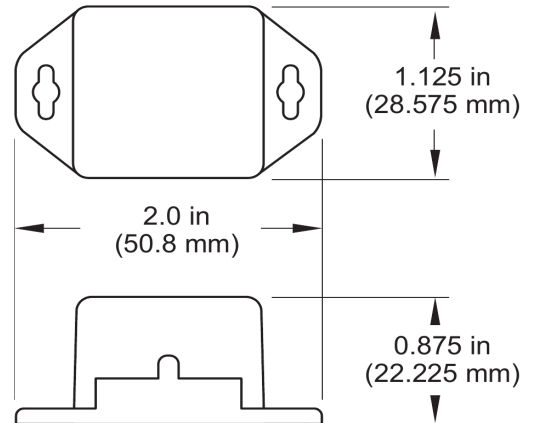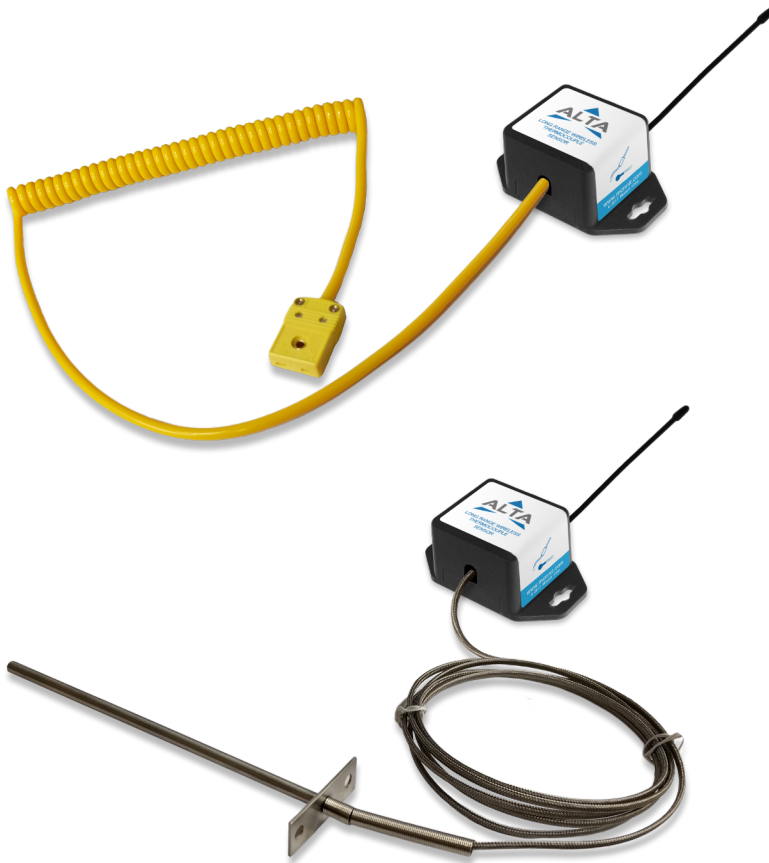
K-Type Fixed Probe Drawing

.175 in.

4.0 in.

2.0 in.

.8 in.

.25 in.

Top **Side** **Bottom**

K-Type Quick Connect Probe Drawings

7.625 in.
(193.675 mm)

.675 in.
(17.16 mm)

6 in.
(152.4 mm)

.067 in.
(1.71 mm)

Top

.684 in.
(17.375 mm)

.265 in.
(6.75 mm)

Ø .190 in.
(4.84 mm)

Ø .125 in.
(3.18 mm)

.316 in.
(8.03 mm)

Side

The sensor reports the temperature (in °C or °F) of the thermocouple.

1.125 in
(28.575 mm)

2.0 in
(50.8 mm)

0.875 in
(22.225 mm)

PinchPower™ Enclosures

Pinch
(press in on the sides)

Pull
(sensor away from base)

CR2032 BATTERY

Press
(sensor back into base)
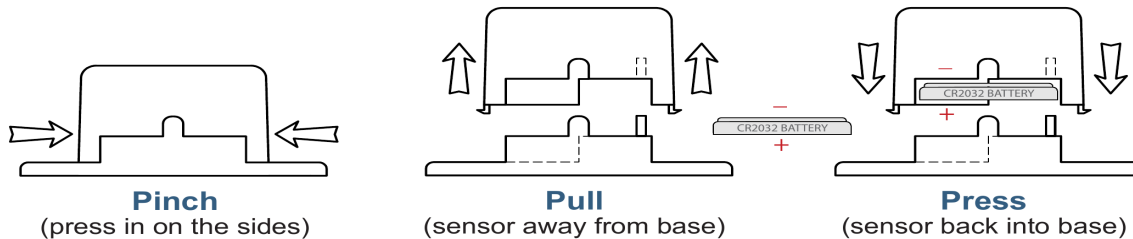
CR2032 BATTERY

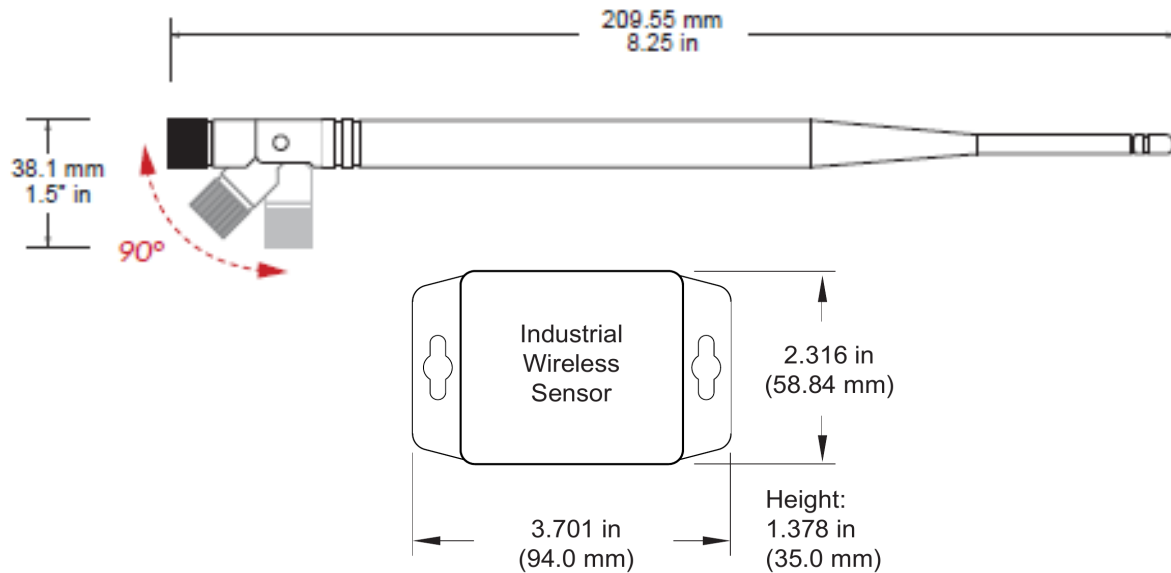| Technical Specifications | ALTA® Commercial	
Battery[1]	1x 3.0V CR2032 Button Cell, 100 mAh
Battery Life	2+ years expected
Operating temperature range (non-leaded measurement range)	10°C to 50°C (50°F to 122°F)
Wireless antenna type	1/4-wave, 20 gauge wire whip, 3.5" (900/868MHz), 7" (433MHz)
Weight	1.7 oz. (48 g) with either cable

1. Hardware cannot withstand negative voltage. Please take care when inserting and removing battery
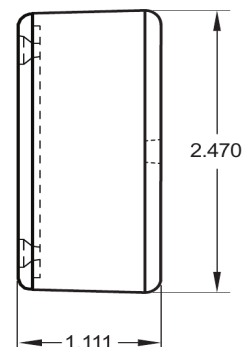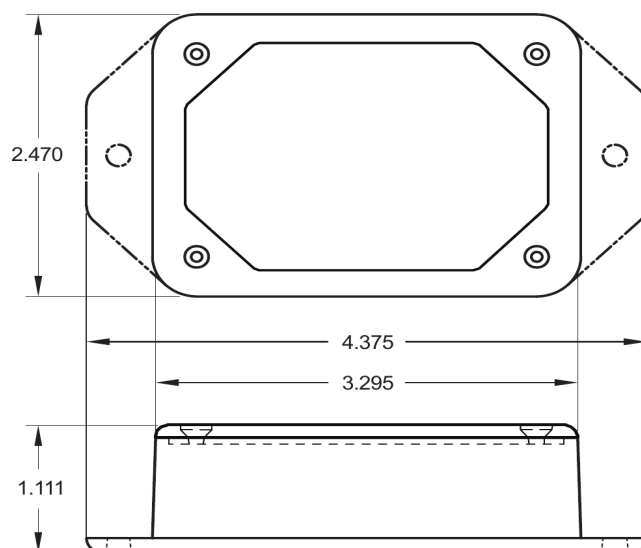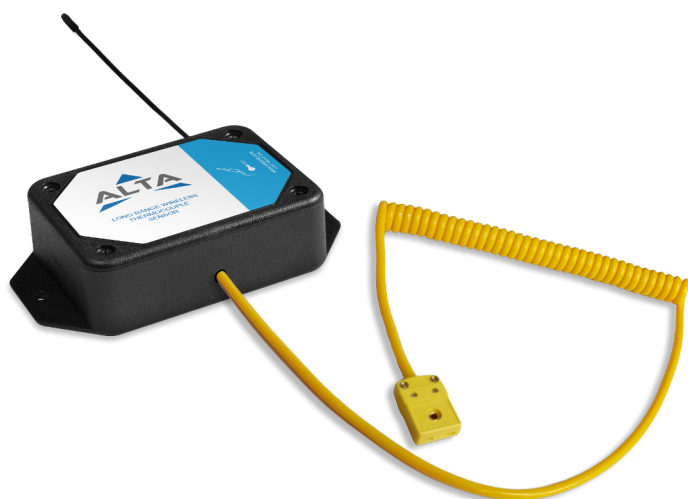
Technical Specifications | ALTA® Enterprise

Battery[1]	2x 1.5V AA Alkaline, 1800 mAh, (standard) 2x 1.5V AA Lithium, 3000 mAh, (optional)
Battery Life	10+ years expected
External line-power option[2]	Input voltage: 5.0-12.0 V Power jack: 2.1 x 5.5 mm barrel, center positive
Operating temperature range (non-leaded measurement range)[3]	-18°C to 55°C (0°F to 130°F) - AA Alkaline Batteries -25°C to 60°C (-13°F to 140°F) - AA Lithium L91 Batteries 0°C to 40°C (32°F to 104°F) - US 5V Power Supply 10°C to 40°C (50°F to 104°F) - International 5V Power Supply
Wireless antenna type	1/4-wave, 20 gauge wire whip, 3.5" (900/868MHz), 7" (433MHz)
Weight	4.7 oz. (133 g) with either cable

1. Hardware cannot withstand negative voltage. Please take care when inserting and removing batteries.
2. Batteries will provide backup power in the case the external power is removed.
3. Operating below 0°C (-32°F) degrees will reduce battery life.

Industrial
Wireless
Sensor

2.316 in
(58.84 mm)

3.701 in
(94.0 mm)

Height:
1.378 in
(35.0 mm)

209.55 mm
8.25 in

38.1 mm
1.5" in

90°

Technical Specifications | ALTA® Industrial

Battery	1x 3.6V AA Lithium Thionyl Chloride, 1500mAh, pre-installed
Battery Life	10+ years expected
Operating temperature range (non-leaded measurement range)[1]	-40°C to 85°C (-40°F to 185°F)
Wireless antenna type	1/2-wave waterproof dipole with RP-SMA connector and swivel neck; dBi of 3.0 (900/868MHz) or 2.5 (433 MHz); length of 8.27" (210mm) (900/868MHz) or 7.68" (195mm) (433 MHz); diameter at thickest point of 0.55" (14mm)
Weight	5.7 oz. (162 g) with either cable
Enclosure rating	IP-65 (dust-proof and waterproof but not submersible) NEMA 1, 2, 4, 4x, 12, and 13 rated, sealed, and weatherproof UL Listed to UL508-4x specifications (File E194432)

1. Operating below 0°C (-32°F) degrees will reduce battery life.

Commercial-Grade Sensors

Monnit commercial-grade sensors are designed for applications in ordinary environments (normal room temperature, humidity, and atmospheric pressure). Do not use these sensors under the following conditions as these factors can deteriorate the product characteristics and cause failures and burnout.

- Corrosive gas or deoxidizing gas: chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxide gas, etc.
- Volatile or flammable gas
- Dusty conditions
- Low-pressure or high-pressure environments
- Wet or excessively humid locations
- Places with salt water, oils, chemical liquids, or organic solvents
- Where there are excessively strong vibrations
- Other places where similar hazardous conditions exist

Use these products within the specified temperature range. Higher temperatures may cause deterioration of the characteristics or the material quality.

Industrial-Grade Sensors | Type 1, 2, 4, 4X, 12, and 13 NEMA-Rated Enclosure

Monnit's industrial sensors are enclosed in reliable, weatherproof NEMA-rated enclosures. Our NEMA-rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust and the damaging effects of water.

- Safe from falling dirt
- Protects against wind-blown dust
- Protects against rain, sleet, snow, splashing water, and hose-directed water
- Increased level of corrosion resistance
- Will remain undamaged by ice formation on the enclosure