

## IMMERSION

### Stainless Steel Immersion, Nickel RTD

The ACI Nickel Immersion Series features a 1/4" diameter stainless steel probe with two, 14 inch 22 AWG Etched Teflon colored lead wires to differentiate the many different sensor types. The sensors in this series are manufactured using ACI's proven double encapsulation process to eliminate the effects of moisture upon the sensors and to increase the thermal response times using our high quality, thermally conductive epoxy. The immersion sensors come standard with a welded thermowell "I" version but can also be ordered without the thermowell "INW" version. The "INW" Version includes a standard 1/2" NPS (National Pipe Straight) process thread to be used with an optional machined thermowell or in an existing thermowell application. This series can be ordered with optional NEMA rated weather proof enclosures and NIST Certificates as referenced on the back of the product data sheet. Please contact ACI for more information regarding this sensor or if you would like to discuss your application in further detail.

**Applications:** Chilled Water Systems, Hot Water Systems, Boilers, Pumps, Compressors, Chillers

**The ACI Nickel Immersion Series is covered by ACI's Five (5) Year Limited Warranty. The warranty can be found in the front of ACI's Sensors & Transmitters catalog, as well as on ACI's web site.**

**Disclaimer:** Specification of any thermowell and the materials of construction are the sole responsibility of the designer of the system that incorporates the thermowell. Sole responsibility for ensuring compatibility of the process fluid with the system rests with the end user.

## PRODUCT SPECIFICATIONS

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sensor Type   Sensor Curve:</b>                                            | Nickel RTD   PTC (Positive Temperature Coefficient)                                                                                                                                                                                                                                                                                                                                         |
| <b>Number Sensing Points:</b>                                                 | One                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Number Wires:</b>                                                          | Two (Non-Polarity Sensitive)                                                                                                                                                                                                                                                                                                                                                                |
| <b>Sensor Output @ 21.1°C (70°F)   Lead Wire Colors:</b>                      | 1000 Ohms nominal   (Red/Red)                                                                                                                                                                                                                                                                                                                                                               |
| <b>Sensor Accuracy:</b>                                                       | <b>-40°C (-40°F):</b> +/- 1.52°C (+/- 2.73°F)   <b>0°C (-40°F):</b> +/- 0.4°C (+/- 0.72°F)<br><b>21.1°C (70°F):</b> +/- 0.17°C (+/- 0.34°F)   <b>54.4°C (130°F):</b> +/- 0.56°C (+/- 1.00°F)<br><b>121°C (250°F):</b> +/- 1.25°C (+/- 2.25°F)                                                                                                                                               |
| <b>Din Standard   Temperature Coefficient (0-100°C):</b>                      | DIN 43760   6370 ppm / °C                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Sensor Stability:</b>                                                      | +/- 0.05% after 1000 Hours @ 150°C (302°F)                                                                                                                                                                                                                                                                                                                                                  |
| <b>Response Time (63% Step Change):</b>                                       | 8 Seconds nominal                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Self-Heating   Maximum Operating Current:</b>                              | 0.3°C/mW (Still Air)   5 mA                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Sensor Operating Temperature Range:</b>                                    | -40 to 121°C (-40 to 250°F)                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Enclosure Specifications (Temperature, Flammability, NEMA/IP Ratings):</b> | <b>"-GD" Enclosure:</b> Galvanized Steel, -40°C to 121°C (-40°F to 250°F), NEMA 1 (IP10)<br><b>"-PB" Enclosure:</b> ABS Plastic, -30°C to 90°C (-22°F to 194°F), UL94-HB, Plenum Rated<br><b>"-BB" Enclosure:</b> Aluminum, -40°C to 121°C (-40°F to 250°F), Plenum Rated, NEMA 3R<br><b>"-4X" Enclosure:</b> Polystyrene Plastic, -40°C to 70°C (-40°F to 158°F), UL94-V2, NEMA 4X (IP 66) |
| <b>Storage Temperature Range:</b>                                             | -40 to 85°C (-40 to 185°F)                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Operating Humidity Range:</b>                                              | 10 to 95% RH, non-condensing                                                                                                                                                                                                                                                                                                                                                                |
| <b>Probe Diameter   Thermowell Bore Diameter:</b>                             | 0.250" (6.35mm)   0.260"                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Probe Material   Thermowell Material:</b>                                  | 304 Stainless Steel   304 Series Stainless Steel                                                                                                                                                                                                                                                                                                                                            |
| <b>Thermowell Instrument   Process Thread Size:</b>                           | 1/2" NPS (National Pipe Straight) Female Thread   1/2" NPT (National Pipe Tapered) Male Thread                                                                                                                                                                                                                                                                                              |
| <b>Fitting Material   Flammability Rating:</b>                                | Polyamide 66 (High Performance Nylon 66)   UL94-HB                                                                                                                                                                                                                                                                                                                                          |
| <b>Fitting Thread Size:</b>                                                   | 1/2" NPS (National Pipe Straight) Male Thread                                                                                                                                                                                                                                                                                                                                               |
| <b>Foam Pad Material   Flammability Rating:</b>                               | Neoprene/EPDM/SBR Polymer   UL94-HBF; FMVSS-302; MIL-R-6130C                                                                                                                                                                                                                                                                                                                                |
| <b>Lead Length   Conductor Size:</b>                                          | 14" (35.6 cm)   22 AWG (0.65mm)                                                                                                                                                                                                                                                                                                                                                             |
| <b>Lead Wire Insulation   Wire Rating:</b>                                    | Etched Teflon (PTFE) Colored Leads   Mil Spec 16878/4 Type E                                                                                                                                                                                                                                                                                                                                |
| <b>Conductor Material:</b>                                                    | Silver Plated Copper                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Product Dimensions   Product Weight:</b>                                   | See table on back of Product Data sheet                                                                                                                                                                                                                                                                                                                                                     |
| <b>Agency Approvals:</b>                                                      | CE, RoHS2, WEEE                                                                                                                                                                                                                                                                                                                                                                             |



## MAXIMUM VELOCITY VS THERMOWELL INSERTION LENGHT MACHINED THERMOWELL

| Straight Shank Insertion Length "U" |                            |                         |                         |                         | Stepped Shank Insertion Length "U" |                         |                       |                       |                      |
|-------------------------------------|----------------------------|-------------------------|-------------------------|-------------------------|------------------------------------|-------------------------|-----------------------|-----------------------|----------------------|
| Material:                           | Media Type:                | 1.0"<br>(25.4 mm)       | 2.5"<br>(63.5 mm)       | 8.0"<br>(203.2 mm)      | 4.0"<br>(101.6 mm)                 | 6.0"<br>(152.4 mm)      | 12.0"<br>(304.8 mm)   | 18.0"<br>(457.2 mm)   | 24"<br>(609.6 mm)    |
| 304/316 SS                          | Air/Gas/Steam <sup>1</sup> | 349 ft/s<br>(106.3 m/s) | 349 ft/s<br>(106.3 m/s) | 71.9 ft/s<br>(21.9 m/s) | 109 ft/s<br>(33.2 m/s)             | 73.6 ft/s<br>(22.4 m/s) | 19.4 ft/s<br>(5.9m/s) | 8.8 ft/s<br>(2.7m/s)  | 5.2 ft/s<br>(1.6m/s) |
| 304/316 SS                          | Water                      | 360 ft/s<br>(109.7 m/s) | 360 ft/s<br>(109.7 m/s) | 71.9 ft/s<br>(21.9 m/s) | 82.2 ft/s<br>(25.1 m/s)            | 26.9 ft/s<br>(8.2 m/s)  | 11.3 ft/s<br>(3.4m/s) | 4.7 ft/s<br>(1.43m/s) | 2.5 ft/s<br>(0.8m/s) |

**Note 1:** Values are for Air/Gas/Steam and similar density media based upon Max pressure of 2900 PSI @ 1000°F (537.8°C) | **Note 2:** Values are for Water (No Glycol or other Chemicals factored in) @ 68 °F (20°C) and max pressure of 5700 PSI. (Calculated to ASME PTC 19.3 TW-2016 Code B31.1) | **Note 3:** 6-24" Machined Thermowells meet ASME PTC 19.3 TW-2016 Code B31.1.

## MAXIMUM PRESSURE VS TEMPERATURE RATINGS TWO-PART FABRICATED | WELDED THERMOWELL

| Material:  | 70°F (21.1°C)      | 200°F (93.3°C)     | 400°F (204.4°C)    | 600°F (315.6°C)    | 800°F (426.7°C)    | 1000°F<br>(537.8°C) | 1200°F<br>(648.9°C) |
|------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| 304/316 SS | 982 PSI (67.7 Bar) | 820 PSI (56.6 Bar) | 675 PSI (46.5 Bar) | 604 PSI (41.6 Bar) | 550 PSI (37.9 Bar) | 510 PSI (35.1 Bar)  | 290 PSI (20.0 Bar)  |

## MAXIMUM FLUID VELOCITY RATINGS TWO-PART FABRICATED | WELDED THERMOWELL

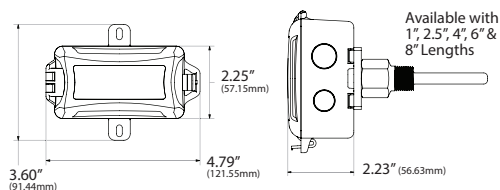
| Straight Shank Insertion Length "U" |                            |                     |                    |                    |
|-------------------------------------|----------------------------|---------------------|--------------------|--------------------|
| Material:                           | Media Type:                | 2.5" (63.5 mm)      | 4.0" (101.6 mm)    | 6.0" (152.4 mm)    |
| 304/316 SS                          | Air/Gas/Steam <sup>2</sup> | 169 ft/s (51.5 m/s) | 61 ft/s (18.6 m/s) | 20 ft/s (6.1 m/s)  |
| 304/316 SS                          | Water                      | 88 ft/s (26.8 m/s)  | 20 ft/s (6.1 m/s)  | 10 ft/s (3.05 m/s) |

**Note 2:** Values are for Air/Gas/Steam and similar density media



## DIMENSIONAL DRAWINGS. WEIGHTS

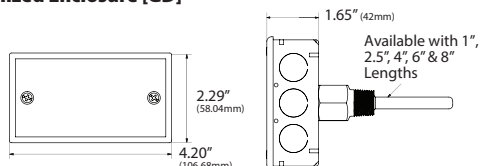
## Plastic Box Enclosure [PB]



## Plastic Box Enclosure [PB] Weights

| ACI Model #    | 1.0"                    | 2.5"                    | 4.0"                    | 6.0"                    | 8.0"                    |
|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| A/xx-INW-yy-PB | 0.20 lbs.<br>(0.091 kg) | 0.24 lbs.<br>(0.109 kg) | 0.28 lbs.<br>(0.127 kg) | 0.32 lbs.<br>(0.145 kg) | 0.36 lbs.<br>(0.163 kg) |
| A/xx-I-yy-PB   | N/A                     | 0.24 lbs.<br>(0.109 kg) | 0.60 lbs.<br>(0.272 kg) | 0.64 lbs.<br>(0.290 kg) | N/A                     |
| A/xx-IM-yy-PB  | 0.40 lbs.<br>(0.182 kg) | 0.58 lbs.<br>(0.263 kg) | 0.74 lbs.<br>(0.336 kg) | 0.92 lbs.<br>(0.417 kg) | 1.15 lbs.<br>(0.522 kg) |

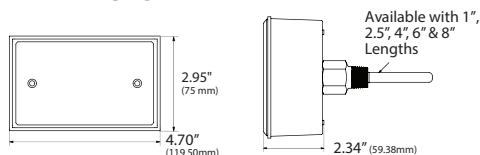
## Galvanized Enclosure [GD]



## Galvanized Enclosure [GD] Weights

| ACI Model #    | 1.0"                    | 2.5"                    | 4.0"                    | 6.0"                    | 8.0"                    |
|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| A/xx-INW-yy-GD | 0.62 lbs.<br>(0.281 kg) | 0.66 lbs.<br>(0.299 kg) | 0.70 lbs.<br>(0.318 kg) | 0.74 lbs.<br>(0.336 kg) | 0.78 lbs.<br>(0.354 kg) |
| A/xx-I-yy-GD   | N/A                     | 0.88 lbs.<br>(0.399 kg) | 1.00 lbs.<br>(0.454 kg) | 1.04 lbs.<br>(0.472 kg) | N/A                     |
| A/xx-IM-yy-GD  | 0.81 lbs.<br>(0.367 kg) | 1.00 lbs.<br>(0.454 kg) | 1.16 lbs.<br>(0.526 kg) | 1.32 lbs.<br>(0.599 kg) | 1.55 lbs.<br>(0.703 kg) |

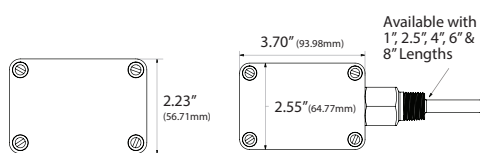
## Bell Box Enclosure [BB]



## Bell Box Enclosure [BB] Weights

| ACI Model #    | 1.0"                    | 2.5"                    | 4.0"                    | 6.0"                    | 8.0"                    |
|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| A/xx-INW-yy-BB | 0.64 lbs.<br>(0.290 kg) | 0.68 lbs.<br>(0.308 kg) | 0.70 lbs.<br>(0.318 kg) | 0.74 lbs.<br>(0.336 kg) | 0.80 lbs.<br>(0.363 kg) |
| A/xx-I-yy-BB   | N/A                     | 1.02 lbs.<br>(0.463 kg) | 1.00 lbs.<br>(0.454 kg) | 1.04 lbs.<br>(0.472 kg) | N/A                     |
| A/xx-IM-yy-BB  | 0.83 lbs.<br>(0.376 kg) | 1.02 lbs.<br>(0.463 kg) | 1.16 lbs.<br>(0.526 kg) | 1.32 lbs.<br>(0.599 kg) | 1.59 lbs.<br>(0.721 kg) |

## NEMA 4X Enclosure [4X]

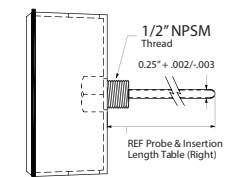


## NEMA 4X Enclosure [4X] Weights

| ACI Model #    | 1.0"                    | 2.5"                    | 4.0"                    | 6.0"                    | 8.0"                    |
|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| A/xx-INW-yy-4X | 0.28 lbs.<br>(0.127 kg) | 0.32 lbs.<br>(0.145 kg) | 0.36 lbs.<br>(0.163 kg) | 0.40 lbs.<br>(0.181 kg) | 0.44 lbs.<br>(0.200 kg) |
| A/xx-I-yy-4X   | N/A                     | 0.64 lbs.<br>(0.290 kg) | 0.68 lbs.<br>(0.308 kg) | 0.72 lbs.<br>(0.327 kg) | N/A                     |
| A/xx-IM-yy-4X  | 0.48 lbs.<br>(0.218 kg) | 0.66 lbs.<br>(0.299 kg) | 0.82 lbs.<br>(0.372 kg) | 1.00 lbs.<br>(0.454 kg) | 1.27 lbs.<br>(0.576 kg) |

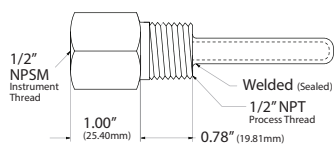
N/A = Not Available | xx = Sensor Type | yy = Insertion Length

## PROBE AND INSERTION LENGTH IMMERSION NO WELL



Pictured Above: immersion no well (INW) sensor in Bell Box Enclosure (BB).

Pictured Below: welded two piece thermowell to show connection and depth reference. Thermowell not included with immersion no well (INW).



## Probe &amp; Insertion Length

| Probe Length | Insertion Length | ACI Part #          | Thermowell Part # |
|--------------|------------------|---------------------|-------------------|
| 3"           | 2.81" +/- 0.13"  | A/xx-INW-1"-yy-yy   | A/M1"             |
| 4.5"         | 4.31" +/- 0.13"  | A/xx-INW-2.5"-yy-yy | A/2.5" or A/M2.5" |
| 6"           | 5.81" +/- 0.13"  | A/xx-INW-4"-yy-yy   | A/4" or A/M4"     |
| 8"           | 7.81" +/- 0.13"  | A/xx-INW-6"-yy-yy   | A/6" or A/M6"     |
| 10"          | 9.81" +/- 0.13"  | A/xx-INW-8"-yy-yy   | A/M8"             |
| 13"          | 12.75" +/- 0.13" | A/xx-INW-12"-yy-yy  | A/M12"            |
| 19"          | 18.75" +/- 0.13" | A/xx-INW-18"-yy-yy  | A/M18"            |
| 25"          | 24.75" +/- 0.13" | A/xx-INW-24"-yy-yy  | A/M24"            |



## CUSTOM ORDERING WELDED THERMOWELL

Model # Examples: A/ 1K-NI I 4" GD NIST  
A. B. C. D. E. F.

|                                        |                                                                |
|----------------------------------------|----------------------------------------------------------------|
| A. Sensor Series No Selection Required | A/                                                             |
| B. Model Series No Selection Required  | 1K-NI                                                          |
| C. Configuration Select One (1)        | I=Immersion with Welded Thermowell                             |
| D. Insertion Length Select One (1)     | 2.5" = 2.5" Insertion   4" = 4" Insertion   6" = 6" Insertion  |
| E. Enclosure Select One (1)            | GD=Galvanized   PB=Plastic   BB=Aluminum, NEMA 3R   4X=NEMA 4X |
| F. NIST Select One (1)                 | ---- = No NIST Certificate   NIST= NIST Certificate (3 Points) |

## MODEL #

|       |
|-------|
| A/    |
| 1K-NI |
|       |
|       |
|       |
|       |

## CUSTOM ORDERING MACHINED THERMOWELL

Model # Examples: A/ 1K-NI IM 4" GD NIST  
A. B. C. D. E. F.

|                                        |                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------|
| A. Sensor Series No Selection Required | A/                                                                                                    |
| B. Model Series No Selection Required  | 1K-NI                                                                                                 |
| C. Configuration Select One (1)        | IM=Immersion with Machined Thermowell                                                                 |
| D. Insertion Length Select One (1)     | 1" = 1" Insertion   2.5" = 2.5" Insertion   4" = 4" Insertion   6" = 6" Insertion   8" = 8" Insertion |
| E. Enclosure Select One (1)            | GD=Galvanized   PB=Plastic   BB=Aluminum, NEMA 3R   4X=NEMA 4X                                        |
| F. NIST Select One (1)                 | ---- = No NIST Certificate   NIST= NIST Certificate (3 Points)                                        |

## MODEL #

|       |
|-------|
| A/    |
| 1K-NI |
|       |
|       |
|       |
|       |

Note: Machined Thermowells with lengths of 12", 18" and 24" are available and must be ordered separately | See the Machined Thermowells Data Sheet (Accessories)

## CUSTOM ORDERING SENSOR ONLY NO THERMOWELL

Model # Examples: A/ 1K-NI INW 4" GD NIST  
A. B. C. D. E. F.

|                                        |                                                                                                                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Sensor Series No Selection Required | A/                                                                                                                                                                      |
| B. Model Series No Selection Required  | 1K-NI                                                                                                                                                                   |
| C. Configuration Select One (1)        | INW = Immersion without Thermowell                                                                                                                                      |
| D. Insertion Length Select One (1)     | 1" = 1" Insertion   2.5" = 2.5" Insertion   4" = 4" Insertion   6" = 6" Insertion   8" = 8" Insertion   12" = 12" Insertion   18" = 18" Insertion   24" = 24" Insertion |
| E. Enclosure Select One (1)            | GD=Galvanized   PB=Plastic   BB=Aluminum, NEMA 3R   4X=NEMA 4X                                                                                                          |
| F. NIST Select One (1)                 | ---- = No NIST Certificate   NIST= NIST Certificate (3 Points)                                                                                                          |

## MODEL #

|       |
|-------|
| A/    |
| 1K-NI |
|       |
|       |
|       |
|       |

## ACCESSORIES ORDERING

Model # Example: NSG HEAT TRANSFER PASTE 2 oz Or 102595

| Model #                        | Item # | Description                                                             |
|--------------------------------|--------|-------------------------------------------------------------------------|
| NSG Heat Transfer Paste 2 oz.  | 102595 | Thermal Grease, 2 oz. Tube, Silicone Free, -40 to 320°F (-40 to 160°C)  |
| NSG Heat Transfer Paste 16 oz. | 140574 | Thermal Grease, 16 oz. Jar, Silicon Free, -40 to 390°F (-40 to 198°C)   |
| A/2.5"                         | 128349 | 2.5" (63.5 mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell    |
| A/4"                           | 128350 | 4" (101.6 mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell     |
| A/6"                           | 128351 | 6" (152.4 mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell     |
| A/M1"                          | 128337 | 1" (25.4 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell    |
| A/M2.5"                        | 128338 | 2.5" (63.5 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell  |
| A/M4"                          | 128343 | 4" (101.6 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell   |
| A/M6"                          | 128344 | 6" (152.4 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell   |
| A/M8"                          | 138725 | 8" (203.2 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell   |
| A/M12"                         | 128339 | 12" (304.80 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell |
| A/M18"                         | 128341 | 18" (457.20 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell |
| A/M24"                         | 128342 | 24" (609.6 mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell  |
| A/M2.5" - 316SS                | 128352 | 2.5" (63.5 mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell  |
| A/M4" - 316SS                  | 128353 | 4" (101.6 mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell   |
| A/M6" - 316SS                  | 128354 | 6" (152.4 mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell   |