





Temperature Gauges



Bimetal Dial Thermometer



Indicating Temperature Switch



Liquid Filled Dial Thermometer



In-House Test Facilities



Gas Filled Dial Thermometer

| °F | ° C | °F | °C |
|------|-----|------|-----|
| -328 | 8 | 46.4 | 220 |
| -292 | 9 | 48.2 | 230 |
| -256 | 10 | 50 | |
| -220 | 20 | 68 | |
| -184 | 30 | 86 | 30 |
| -166 | 40 | 104 | |

Temperature Conversion Chart

Thermowells

| Thermowells |
|--|
| Bar Stock Threaded Thermowell15 |
| Bar Stock Weld In Thermowell16 |
| Bar Stock Flanged Thermowell 17 |
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| In-House Test Facilities |
| |

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EMPERATURE GAUGES

Bimetal Dial Thermometer



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The Bimetal thermometer employs a bimetal strip in the form of helix (it works on the principle of thermal expansion - two metals having different coefficient of expansions are joined to form a bimetal. The resultant expansion of bimetal is proportional to temperature). Bimetal dial thermometers are simple in construction, yet rugged. They are used for measurement of temperature in most of the industrial applications. They are offered in the range of (-) 50°C to 600°C. With rigid stem having bottom or back entry. It can also be offered in every angle rotatable construction.

Features

- Rugged construction
- Bottom/Back entry, every angle construction
- Fast response
- Protection class IP-67
- Accuracy ± 1% FSD
- High repeatability, low hysteresis
- Hermetically sealed case

Specifications

| Ref. Standard | ASME B 40.200. EN 13190 |
|---------------|--|
| Dial | 100 mm or 150 mm in aluminium white background, |
| | black markings |
| Case | SS304 with bayonet bezel / SS316 optional |
| Protection | Weatherproof to IP - 67 (IS/IEC : 60947 / IEC : 60529) |
| Window | Shatterproof glass |
| Pointer | Aluminium, black, micrometer adjustable |
| Stem | SS304 or SS316 in 6 mm, 8 mm, 10 mm, 12 mm dia and |
| | length from 100 mm to 1000 mm as standard |
| Connection | 1/2" NPT (M) as standard in SS304 or SS316 |
| | adjustable three piece compression fitting |
| Range | (-) 50°C to 600°C with a minimum span of 60°C |
| Accuracy | ± 1% FSD |
| Over range | 125% FSD (upto max temp range of 500°C) |
| Reset | Micrometer Pointer (standard) |
| | External (optional) |
| Optional | 1) Silicon Oil Filled Case (Suitable upto 339°C Max) |
| - | 2) Contacts: Single SPST, normally open to close on rise / |
| | fall in temperature (specify action required) adjustable |
| | over the entire range, rating 30 VA @ 230 V AC (100 |
| | mm dial, back entry only) |
| Note | 1) For minimum insertion length essential for proper |
| | sensing, contact our design department. |
| | 2) Three point adjunction cortificate accompanies each |

 2) Three point calibration certificate accompanies each thermometer.



Ordering Information





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20 3/4"

25 1" PF PF

GS Gas NS NPS

Liquid Filled Dial Thermometer



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Liquid filled system based on liquid (other than mercury) expansion principle is used for measuring temperature ranging from (-) 30° C to 250° C.

It has faster response and the same is available in rigid stem as well as capillary type for remote sensing. Every angle type can be offered in all SS construction. Generally used where mercury type thermometer is not used in industries such as Food, Pharmaceutical, etc. The main advantage is its minimum immersion length required for sensing (as low as 30mm suffices for proper sensing thereby making it ideal for installing in lower line sizes)

Features

- Rugged construction
- Rigid stem or capillary type
- Suitable for pharmaceutical, food, biotechnology industry.
- Protection class IP-67
- Accuracy ± 1% FSD
- Minimum immersion length (as low as 30 mm suitable for lower line sizes possible)
- Case compensated system



Specifications

| Ref. Standard | ASME B 40 200 EN 13190 |
|---------------|--|
| System | Liquid filled case compensated in accordance with SAMA CLLB |
| Dial | 100 mm or 150 mm in aluminium white background |
| Diai | black markings |
| Casa | CC204 / CC216 with hovenet here! |
| Case | |
| Protection | Weather proof to IP - 67 (IS/IEC : 60947 / IEC : 60529) |
| Window | Shatterproof glass |
| Pointer | Aluminium, black, micrometer adjustable |
| Stem | S304 or SS316 in 6 mm, 8 mm, 10 mm, 12 mm dia as standard |
| | (immersion length as small as 30 mm possible). |
| Capillary | SS Covered / SS Covered + PVC / SS Covered + SS armoured / |
| | SS Covered + SS Armoured + PVC (up to 5 Mtr.). |
| Connection | 1/2" NPT (M) as standard in SS304 or SS316 three piece adjustable |
| | compression fitting. |
| Range | (-) 30°C to 250°C with a minimum span of 50°C |
| Accuracy | ± 1% FSD |
| Over range | 125% FSD |
| Reset | Micrometer Pointer |
| Optional | Silicone Oil Filled Case |
| Note | 1) For minimum insertion length essential for proper sensing, |
| | contact our design department. |
| | 2) Three point calibration certificate accompanies each thermometer. |

Ordering Information

LDT-R - Rigid Stem





Ν Not Applicable for LDT-R type.

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Gas Filled Dial Thermometer



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150

00

200

60

40

20

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Gas filled Temperature Gauge overcomes most of the limitations of other members of family. It is offered in a very wide temperature range i.e. (-)200 to 800°C. Practically any stem length can be offered and capillary length as long as 25 mtr, without any loss of accuracy. Inert, non hazardous, non toxic nature of the filled system makes it virtually ideal choice of cross section of industries.

Features

- Use of inert gas N2
- Suitable for sanitary application
- All SS construction
- Rigid stem or capillary type
- Fast response
- Non-polluting, environment friendly
- Non-hazardous for the service
- High reliability
- IP-67 protection
- Accuracy ± 1% FSD

Specifications

| | | 100 | GAS |
|---------------|---|-----------|-------------------|
| Ref. Standard | ASME B 40.200, EN 13190 | - | ASME B40.200 |
| System | Gas (N2) filled, case compensated in accordance with SAMA CI. III B | Ξ | GRADE- A |
| Dial | 100 mm / 150 mm in aluminium, white background, black marking | -50 | 600 |
| Case | SS304 / SS316 with bayonet bezel | = | 0 |
| Protection | Weatherproof to IP-67 (IS/IEC : 60947 / IEC : 60529) | | C |
| Window | Shatterproof glass | | 0 0 |
| Pointer | Aluminium, black with micrometer adjustment | Technical | Gener |
| Stem | SS316 in 6 mm, 8 mm, 10 mm, 12 mm dia as standard | In Coll | Iboration with Ga |
| Capillary | SS Covered / SS Covered + PVC / SS Covered + SS armoured / | | |
| | SS Covered + SS Armoured + PVC (up to 25 Mtr.). | | |
| Connection | 1/2"NPT (M) adjustable three piece compression fitting in SS304 or SS316 | | Π |
| Range | (-) 200°C to 800°C with minimum span of 80°C | | |
| Accuracy | ± 1% FSD | | |
| Overrange | 125% FSD | | |
| Reset | Micrometer Pointer | | |
| Optional | Silicon Oil Filled Case | | |
| Note | 1) For minimum insertion length essential for proper sensing, | | |
| | contact our design department. | | |
| | Three point calibration certificate accompanies each thermometer. | | |
| | For operating temp>600°C; stem of SS310 / Inconel 600 shall be recommended | | |

recommended.

Ordering Information

GDT-R - Rigid Stem

GDT-C - Capillary Type



N Not Applicable for GDT-R type.

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Indicating Temperature Switch



Indicating temperature switch combines indication with switching (in order to make or break the associated electrical circuit). Can be offered with contact assembly as well as microswitch (as a combination of switch and movement)

150

Features

- Combination of indication and switch
- Fast response
- Choice of contact assembly or microswitch
- Switching accuracy ± 2% FSD
- High repeatability and low hysteresis
- Flameproof version available
- Case compensated system

Specifications

| System Dial Case Protection | Gas (N2) filled case compensated in accordance with SAMA Cl. IIIB 100 mm / 150 mm in aluminium, white background, black marking SS304 / SS316 with bayonet bezel (Flameproof case in Al only) Weatherproof to IP-67 (IS/IEC : 60947 / IEC : 60529) Flameproof to IIA IIB (Equivalent to NEC Cl. I Div 2 Gr. C&D) Flameproof to IIC (Equivalent to NEC Cl. Div 1 Gr. A&B) |
|--------------------------------------|---|
| Stem | SS304 or SS316, 6 mm, 8 mm, 10 mm, 12 mm dia as standard |
| Connection | 1/2" NPT (M) adjustable three piece compression fitting as standard |
| Capillary | SS Covered / SS Covered + PVC / SS Covered + SS armoured / |
| | SS Covered + SS Armoured + PVC (up to 25 Mtr.). |
| Range | (-) 200 to 800°C (minimum span 80°C) |
| Accuracy | \pm 1% FSD for indication, \pm 2% FSD for switching |
| Over range | 125% FSD |
| Contacts | 1) SPST, single, normally open, closes on rise in temperature or vice versa, rated 30 VA @ 230V AC |
| | 2) SPST, two contacts, independently adjustable, one normally open other normally closed or both normally open or both normally closed, rated 30 VA @ 230 V AC |
| | 3) 1SPDT, single microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC) |
| | 4) 2SPDT, double microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC) |
| Accessory | Relay for the contact assembly to suit 5 amp @ 230 V AC, separately mounted. |
| Note | Flameproof version is offered with SPDT Microswitch in Die Cast Aluminium housing only. |
| | 2) Surface mounted flameproof housing is available with capillary. |
| | For minimum insertion length essential for proper |
| | sensing, contact our design department. |
| | 4) Three point calibration certificate accompanies each thermometer. |
| | For operating temp>600°C; stem of SS310 / Inconel 600 shall be recommended. |
| Advantages of Mi | croswitch Type Models: Microswitch is rated 5 amp @ 230 V AC (3A @ 28 VDC). No |

Advantages of Microswitch Type Models: Microswitch is rated 5 amp @ 230 V AC (3A @ 28 VDC). No relay is required. Microswitch is imported from reputed international supplier as combination of movement and switch. Microswitch assembly gives better switching accuracy. Compact design.

Under Technical Collaboration with M/s. Gauges Bourdon, U.K.

Ordering Information

GDT-SW-R - Rigid Stem GDT-SW-C - Capillary Type



** Ranges mentioned are in °C. Equivalent unit in °F can be provided on request.

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In-House Test Facilities



In-House testing facilities for Temperature Gauges

For the manufacturing & testing of Temperature Gauges, we strictly follow EN : 13190-2001 and ASME B40.200. Following tests are carried out to ensure the quality of Temperature Gauges. We have facilities to carry out following tests in-house at our manufacturing plant.

- 1. Accuracy test
- 2. Over range test
- 3. Hysteresis test
- 4. Response time test
- 5. Repeatability test
- 6. Vibration test (rattling test)
- 7. Load test
- 8. Mounting position test
- 9. Ambient temperature compensation test (Case compensation test)
- 10. Capillary compensation test
- 11. Thermal stability test

- 12. Hermetical sealing test (for Bimetal Temperature Gauges)
- 13. End nipple test (for Bimetal Temperature Gauges
- 14. Hose down test (water spray test)
- 15. Switching accuracy test (for contact assembly & microswitch type models)
- 16. High voltage test (for contact assembly & microswitch type models)
- 17. Insulation test
- 18. Contact resistance test
- 19. Altitude test
- 20. Cyclic test



Temperature Conversion Chart



| ° C | ° F | ° C | ° F | ° C | °F | ° C | ° F | °C | ° F |
|------|------|------------|-------|-----|-----|-----|------------|-----|------------|
| -200 | -328 | 8 | 46.4 | 220 | 428 | 460 | 860 | 700 | 1292 |
| -180 | -292 | 9 | 48.2 | 230 | 446 | 470 | 878 | 710 | 1310 |
| -160 | -256 | 10 | 50 | 240 | 464 | 480 | 896 | 720 | 1328 |
| -140 | -220 | 20 | 68 | 250 | 482 | 490 | 914 | 730 | 1346 |
| -120 | -184 | 30 | 86 | 260 | 500 | 500 | 932 | 740 | 1364 |
| -110 | -166 | 40 | 104 | 270 | 518 | 510 | 950 | 750 | 1382 |
| -100 | -148 | 50 | 122 | 280 | 536 | 520 | 968 | 760 | 1400 |
| -90 | -130 | 50 | 140 | 290 | 554 | 530 | 986 | 770 | 1418 |
| -80 | -112 | 70 | 158 | 300 | 572 | 540 | 1004 | 780 | 1436 |
| -70 | -94 | 80 | 176 | 310 | 590 | 550 | 1022 | 790 | 1454 |
| -60 | -76 | 90 | 194 | 320 | 608 | 560 | 1040 | 800 | 1472 |
| -50 | -58 | 100 | 212 | 330 | 626 | 570 | 1058 | | |
| -40 | -40 | 110 | 230 | 340 | 644 | 580 | 1076 | | |
| -30 | -22 | 120 | 248 | 350 | 662 | 590 | 1094 | | |
| -20 | -4 | 130 | 266 | 360 | 680 | 600 | 1112 | | |
| -10 | 14 | 140 | 284 | 370 | 698 | 610 | 1130 | | |
| 0 | 32 | 150 | 302 | 380 | 716 | 620 | 1148 | | |
| 1 | 33.8 | 160 | 320 | 390 | 734 | 630 | 1166 | | |
| 2 | 35.6 | 170 | 338 | 400 | 752 | 640 | 1184 | | |
| 3 | 37.4 | 180 | 356 | 410 | 770 | 650 | 1202 | | |
| 4 | 39.2 | 190 | 374 | 420 | 788 | 660 | 1220 | | |
| 5 | 41 | 200 | 392 | 430 | 806 | 670 | 1238 | | |
| 6 | 42.8 | 210 | 410 | 440 | 824 | 680 | 1256 | | |
| 7 | 44.6 | 212 | 413.6 | 450 | 842 | 690 | 1274 | | |

For the conversion of temperature values other than listed above, use the formula: ${}^{\circ}F=({}^{\circ}Cx9/5)+32$ Further for conversion of ${}^{\circ}C$ into Kelvin(K), following formula can be used: K= ${}^{\circ}C+273.15$



THERMOWELLS

1.18

COPSSIESO -

Thermowells



Thermowells are provided to protect the basic sensor from mechanical damage and corrosion. An extremely sturdy design may increase the life of the sensor but may lead to a poor response. Similarly, a delicate design will have poor life but will improve the response time. Therefore, a proper balance needs to be struck.

For given process parameters, *General* can arrive at an optimum Thermowell design considering aspects such as temperature, pressure, fluid velocity and corrosion. Such designs will conform to ASTM PTC 19.3.

The Thermowell material can be brass, SS304, SS316, SS316L, SS310, Inconel[®] 600, Incoloy[®] 800, Monel[®], Hastelloy[®] depending upon the process parameters and type of fluid. For proper selection of Thermowell material, expert advice is available from our design department.





Thermowells



Various Types of Thermowells

Type Tests:

NACE Compliance

Radiography

Physical Testing

Ultrasonic

- Bar Stock Threaded (BT) (Process threads NPT, BSP or Metric)
- Bar Stock Flanged (BF) (Flanges as per ANSI, BS, IS or DIN)
- □ Bar Stock Weld In (BW)
- Fabricated Threaded (FT)
- □ Fabricated Flanged (FF)
- Fabricated Weld In (FW)
- □ Van Stone Type (TW-V)
- □ Sleeved (Lined) (BF-S)

Routine Tests:

- Chemical Analysis
- Dimensional
- Hydro Test
- Dye Penetration
- Bore Concentricity
- Physical
- Microstructure
- Post Weld H/T (if specified)

Barstock Thermowell is normally offered up to an insertion length of 600mm. Fabricated Thermowells are recommended above 600mm. If required, insertion length can be determined by performing wake frequency calculations, in accordance with PTC 19.3. Based on the Wake frequency calculation, if required a velocity Collar can be provided on the Thermowell to reduce the unsupported length of Thermowell. Further, in order to avoid the mismatching between Collar OD and Nozzle ID at Site during installation, suitable matching Nozzle with Flange also can be supplied along with Thermowell.

Welding (TIG welding process) of the Thermowell is performed by professional and approved welders following practice laid down in the ASME code and weld joints can be tested up to 600 kg/ cm².

Bore concentricity within 10% of wall thickness can be checked by radiography or ultrasonic method. Special material tests such as ultrasonic test for flaw detection are also available. For steam/ feed water service, an IBR certificate in form IIIC can be issued.



Bar Stock Threaded Thermowell



Ordering Information



X X - Any other

*Exotic material if required as forged, please mention F in the bracket after mentioning the code e.g. M (F) or SH (F) etc.

Typical Model No.: TW-BT-S6-28-15 NT F-20 NT M-7-21-16-200-50-4-0

| т | W-BT | S 6 | 28 | 15 NT | F 20 | NT M | 7 | | 21 | | 16 | 2 | 200 | 50 | | 4 | (|) |
|---------|-------------|------------|-------------|--------------|-----------|------------|--------|--------------|-------|--------------|-----|---------------|-------------|-------|------------|--------|-------------|-----------|
| Constru | uction Type | Dia of | f Bar-stock | (mm) (D) | Process (| Connection | | Cold end Dia | meter | (mm) (D2) | I | Insertion Ler | ngth (mm) (| U) | Tip Thickn | iess (| (mm) (t) | |
| | Wel | I Material | | Instrument C | onnection | Bore | e ID (| (mm) (d) | | Hot end Dian | mme | eter (D1) | Extension I | _engt | h (mm) (T) | | Special rec | luirement |

Bar Stock Weld In Thermowell





*Exotic material if required as forged, please mention F in the bracket after mentioning the code e.g. M (F) or SH (F) etc.

Typical Model No.: TW-BW-S4-30-15 NT F-20-7-22-18-100-50-4-I

| т | N-BW | S4 | | 30 | 1 | 15 NT F | 2 | 0 | 7 | | 22 | | 18 | 1 | 00 | 50 | | 4 | | I | |
|---------|-------------|-------|------------|--------|---------|---------|--------------|-------------|--------|------------|-------|-------------|-------|-------------|----------|----------|---------|--------|----------|---------|-------|
| Constru | iction Type | | Dia of Bar | -stock | (mm) (D |)) | Weld in diam | neter in mr | n Co | ld end Dia | amete | er (mm) (D2 |) In | sertion Len | igth (mm | ר) (U) | Tip Thi | ckness | (mm) (t) | | |
| | We | ll Ma | terial | | Instrum | ent Con | inection | Bore | ID (mr | m) (d) | | Hot end Di | iamet | ter (D1) | Exten | sion Len | gth (mn | n) (T) | Special | require | ement |

Bar Stock Flanged Thermowell





| | Well Material | Instrument Connection | Flange Material | Cold end Diameter (mm) (D2) | Insertion Length (mm) |
|--|---------------|-----------------------|-----------------|-----------------------------|-----------------------|
|--|---------------|-----------------------|-----------------|-----------------------------|-----------------------|

U)

Fabricated Weld In Thermowell



Ordering Information Instrument Connection D U Т **TYPE : TW-FW** WELL MATERIAL* 1825- Incoloy[®] 825 16-Inconel[®] 600 S4-SS304 **SPECIAL REQUIREMENT** S6-SS316 I8-Incoloy[®] 800 **D-Dye Penetration Test** S3-SS310 S2-SS321 N-NACE SH-SS446 K-Kanthal 4L-SS304L B-Tail portion in bar stock** HC-Hastelloy® C-276 6L-SS316L XX-Any other C-CS to A105 HB-Hastelloy[®] B S1-SS410 M-Monel[®] 400 **O-No Special Requirement** T-Titanium S7-SS317 (t) Tip thickness in mm 7L-SS317L N-Nickel 200 (T) Extension length in mm Pipe size & schedule 1/2" Sch 40 - 15A (U) Insertion length in mm 1/2" Sch 80 - 15B 1/2" Sch 160 - 15C Weld in diameter in mm ³/₄" Sch 40 - 20A ³/₄" Sch 80 - 20B 10x7 - 10x7 - 14x9 14x9 XX - Any other **INSTRUMENT CONNECTION** Size Туре Male / Female 6-1/4" NT - NPT M - Male F - Female BP - BSP 10-3/8" 15-1/2" BT - BSPT 20-3/4" PF - PF 25-1" GS - Gas NS - NPS **Metric Threads** 18 M - M 18 x 1.5 20 M - M 20 x 1.5 24 M - M 24 x 1.5 X X - Any other Note: ** Tail portion of 100 mm / 150 mm in bar stock to be mentioned as 100 B & 150 B respectively.

Typical Model No.: TW-FW-S3-15A-10 NT F-28-1500-50-4-0

| TW-F | W | S 3 | 15A | 10 NT F | 2 | 3 1 | 500 | 50 | 4 | | 0 | |
|-------------|---------|------------|---------------|-------------|-------------|--------------|----------|--------------|------------|------------|-------------|---|
| Constructio | on Type | Pip | e size & sche | dule | Weld in dia | (mm) (D) | Extens | ion Length (| mm) (T) | Specia | requirement | t |
| | Well | Material | Ins | trument Con | inection | Insertion Le | ngth (mn | ו) (U) Ti | p Thicknes | s (mm) (t) | | |

Fabricated Threaded Thermowell



Ordering Information



Fabricated Flanged Thermowell



Ordering Information



Note: 1) ***For flange material refer the same code as that of well material. If the flange is with

'HUB' specify the same in the bracket e.g. 20 BRF (HUB).

2) ** Tail portion of 100 mm / 150 mm in bar stock to be mentioned as 100 B & 150 B respectively.

Typical Model No.: TW-FF-S6-15A-15 NT F-40 ARF-S6-1500-70-4-N

| TW- | FF | S6 | 15/ | A | 15 NT F | 40 ARF | Se | i | 1500 | 7 | 0 | 4 | | N |
|------------|----------|----------|----------|----------|-------------|------------|----------|-----------|--------|-------------|-----------|---------|-----------|------------|
| Constructi | ion Type | Pip | e size & | schedule | e Proc | ess Connec | tion | Insertion | Length | (mm) (U) | Tip Thic | kness (| (mm) (t) | |
| Well Ma | | Material | I | Instrum | ent Connect | ion | Flange N | laterial | Ext | tension Ler | igth (mm) | (T) | Special r | equirement |

Special Thermowells

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Van Stone Type Thermowell

Instrument Connection

For high pressure applications and where welding is to be avoided, Van Stone design thermowells are used. These are machined from a single barstock, sandwiched between the nozzle flange and cover (companion) flange. The OD of the machined portion corresponding the raised face portion of the flange. Wake frequency calculations (in accordance with PTC 19.3) are performed where ever data is made available and are essential in order to suggest appropriate dimensions of thermowell.



How to Order

| | UIUCI | | | TYPE : TW-V | DI |
|--|---|--|-----------------------|--|---|
| | | | | | |
| WE S4-SS304 S6-SS316 S3-SS310 SH-SS446 4L-SS304L 6L-SS316L C-CS to A10 S1-SS410 S7-SS317 7L-SS317L (D) Dia 0 to be sa INSTF Size | LL MAT 1825 - 1 16-Incc 18-Incc S2-SS K-Kant HC-Ha M-Mor T-Titar N-Nick f barsto ndwitch RUMENT Tyne | ERIAL ncoloy® 825 nel® 600 loy® 800 321 hal stelloy® C-2 stelloy® B nel® 400 ium el 200 ck portion ed in mm CONNECT Male / | 76 TION | | SPECIAL REQUIREMENT U-Ultrasonic Test X1-X Ray for Bore Concentricity I- IBR W-PWHT H-H2 Service N-NACE C1-Companion flange in CS to A105 C2-Companion flange in same material as that of thermowell flange F-Studs / Nuts & Gasket Z1-Nozzle / Stub in CS to A106 or A105 Z2-Nozzle / Stub in Same material as that of flange VC-Velocity Collar XX-Any other O-No Special Requirement |
| 6-1/4" 10- 3/8" | NT - NP BP - BS | T M - Ma P F - Fem | e ale | | (t) Tip thickness in mm |
| 15-1/2" 20-3/4" 25_1" | BT - BSI PF - PF | PT | | | (T) Extension length in mm |
| 20-1 | NS - NP | S | | | (U) Insertion length in mm |
| Metric 18 M - M 1 | 8 x 1.5 | | | | (D1) HOT END DIAMETER IN mm |
| 20 M - M 2 24 M - M 2 | 20 x 1.5 24 x 1.5 | | | | (D2) COLD END DIAMETER IN mm |
| X X - ANY C | otner | | | | (d) BORE in mm |
| Back-up f | lange si Rating | ze, rating (| & facing | | ***Back-up Flange Material |
| ½" 15 ¾" 20 1" 25 1½" 40 | 150# 300# 600# 900# | A RF B FF C RTJ D LT | RF FF RTJ LT | Note: 1) ***For flange material refe flange is with 'HUB' specify the sam | r the same code as that of well material. If the e in the bracket e.g. 20 BRF (HUB). |

Typical Model No.: TW-V-S6-72-15 NT F-40 A RF-S6-7-30-16-250-75-6-0

LG

E F

LG

1500#

2500

| | TW-V | S 6 | | 72 | 15 N | IT F | 40 A RF | S 6 | | 7 | 30 | 1 | 16 | 2 | 50 | 75 | | 6 | | 0 | |
|-------|-------------|------------|-------------|-----------|--------|------------|----------------------|------------|--------|-----------|-------|-----------|-------|------------|------------|------|-----------|------|---------|--------|-------|
| Const | ruction Typ | be C |)ia of Bar- | stock (mn | n) (D) | Back-up F | Flange, Size & Ratin | g | Bore | ID (mm) | d) | Hot end | Diam | eter (D1) | Extension | Leng | th (mm) (| T) 8 | Special | requir | ement |
| | We | II Ma | terial | Instru | ument | Connection | Back-up Flange | Mate | rial C | old end D | amete | er (mm) (| D2) I | nsertion L | ength (mm) | (U) | Tip Thick | ness | (mm) | (t) | |

2" 3"

50

80

Special Thermowells



Sleeved (Lined) Thermowell

One of the most economical solutions to protect the thermowells from chemically agressive fluids is to provide a bar-stock flanged thermowell made out of conventional stainless steel (SS316) with loose lining in the form of a sleeve on the entire wetted portion. This will provide strength from stainless steel & corrosion resistance from the lining.





| indi indi annon | | | | Longar (mm) (1) |
|------------------|--------------------|----------------------|-------------------------|---------------------------|
| Sleeven Material | Process Connection | Basic Well OD mm (D) | Insertion Length (mm) (| U) No Special requirement |

Stub dia (mm)

Material Selection Guide



| APPLICATION | | MATERIAL | | | | |
|----------------|--|---|--|--|--|--|
| IRON AND STEEL | Blast furnaces Stove dome Hot blast main | Silicon Carbide Inconel [®] 600 | | | | |
| | Flues and Stack Waste heat Boiler | Inconel [®] 600, SS 446 Inconel [®] 600, SS 446 | | | | |
| CEMENT | Exit Flue Gas Kilns, Heating Zone | Inconel [®] 600, SS 446 Inconel [®] 600 | | | | |
| CERAMIC | Kilns Dryers | Ceramic and silicon carbide Silicon carbide | | | | |
| POWER | Coal-air mixtures Flue Gas Preheater Boiler Tube | Solid sintered tungsten carbide SS 446 SS 446 SS 304, SS 316, SS 310 | | | | |
| INCINERATOR | Up to 1050°C Over 1050°C | Inconel [®] 600, SS 446 Ceramic 610/710 (Primary), Silicon Carbide (Secondary) | | | | |
| CHEMICAL | Acetic Acid 10 to $50\% 20^{\circ}$ C $50\% 100^{\circ}$ C $99\% 21$ to 100° C Alcohol, Ethyl, Methyl 20 to 100° C Ammonia All concentrations 20° C Ammonium Chloride All Concentration 100° C Brine Bromine Butyl Acetate Calcium Hydroxide Upto $50\% 100^{\circ}$ C Chlorine Gas Moist - 7 to 100° C Chromic Acid 10 to $50\% 100^{\circ}$ C Ethyl Acetate Ethyl Chloride 20° C Ethyl Sulphate 20° C Ferric Chloride $5\% 20^{\circ}$ C to boiling Formaldehyde Formic Acid $5\% 20$ to 66° C Hydrochloric Acid Upto $5\% 20^{\circ}$ C Upto $25\% 100^{\circ}$ C Hydrogen peroxide Hydrogen Sulphide wet and dry Phosphoric Acid Upto $10\% 20^{\circ}$ C $10\% 100^{\circ}$ C Sodium Hydroxide Sulphuric Acid Upto $90\% 20^{\circ}$ C | SS 304, Hastelloy [®] C, Monel [®] 400 SS 316, Hastelloy [®] C, Monel [®] 400 Hastelloy [®] C, Monel [®] SS 304 SS 304 SS 304, SS 316 SS 316, Monel [®] Monel [®] 400 Tantalum, Monel [®] 400 Monel [®] 400 SS 304 SS 304, Hastelloy [®] C Hastelloy [®] C, Tantalum SS 316, Hastelloy [®] C (all concentrations) SS 304, Nonel [®] 400 SS 304, low carbon steel Monel [®] 400 Tantalum, Hastelloy [®] C SS 304, SS 316 SS 316 Hastelloy [®] C, Monel [®] SS 304, SS 316 SS 316 SS 316 SS 316 SS 316 SS 316 Hastelloy [®] C Hastelloy [®] C Hastelloy [®] C Hastelloy [®] C Hastelloy [®] C Hastelloy [®] B Hastelloy [®] B Nickel 200 Hastelloy [®] B | | | | |

In-House Test Facilities



In-House Testing facilities for Thermowells

- 1. Dimensional : As per approved drawing & data sheet
- 2. Hydro Test
 For barstock threaded 100 Kg/cm² (internal as standard) and more as per customer requirement
 External if applicable
 - : Flanged Thermowells Internal / external 1.5 times the operating pressure
 - : Internal 100 kg/cm² for ratings below 600# & 200 kg/cm² above 600# rating
 - : External In accordance with flange rating
- Bore Concentricity : By using "D" meter (Ultrasonic thickness tester) Wall thickness measurement Sample 5% at two different points & each at 180° angle to each other
 Badiography test by external lab (X-Bay) for immersion
 - : Radiography test by external lab (X-Ray) for immersion length portion (optional)
- 4. Dye Penetration Test : For weld joints of thermowell / protecting tube
- 5. Threading Check : Process thread & instrument thread Check by thread gauge
- 6. PMI Test

Optional Tests

- 1. Hardness Test
- 2. PWHT Post weld heat treatment
- 3. Intra Granular Corrosion Test
- 4. Corrosion test as per A293 Method C
- 5. Ferrite No. Test

- 6. Impact test
- 7. Radiography for bore concentricity and weld joint as applicable
- 8. Physical, Chemical & Micro Analysis as applicable
- 9. PMI test (Positive Material Identification)
- 10. IBR Test



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Zenith Quality Assessors Pvt. Ltd. Management System Certificate

Certificate No. QMS/91/R/1413-1

This is to certify that

GAUGES BOURDON (INDIA) PVT. LTD. (Manufacturing Unit of General Instruments Consortium)

at

Unit-1 : Plot No.4, 5, 6, Jawahar Co-op. Industrial Estate, Kamothe, Panvel - 410 209, Navi Mumbai, Maharashtra, India.

has been found to conform to Management System Standard :

ISO 9001:2008

This certificate is valid for the following products / service ranges :

Manufacture and Supply of Pressure Gauges, Diaphragm Seals, Differential Pressure Gauges, Capsule Gauges, Absolute Pressure Gauges, Manifold Valves, Snubbers, Gauge Savers, Other Accessories, Level Instruments, Level Gauges, Level Switches, Sight Flow Indicators, HART Level Transmitter, FIELDBUS Level Transmitter, Dial Thermometers (Bimetallic, Liquid Filled and Gas Filled Type), Temperature Switches, Thermowells and Accessories.

Initial Certification : 29th August, 2011 Valid until

28th August, 2014 Modified on : 6th January, 2012, 15th May, 2012, 29th May, 2012 (Replaces the withdrawn Certificate No.QMS/91/R/1413/b issued on 15th May, 2012)



Management Representative Zenith Quality Assessors Pvt. Ltd.

Further clarification regarding the scope of this certificate and the applicability of ISO 9001:2008 requirements may be obtained by consulting the organization. Lack of fulfillment of conditions as set out in the Certification Agreement may render this certificate invalid.

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State-of-the-art Manufacturing Plant (Unit I)

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MFG. PLANT:

Gauges Bourdon (India) Pvt. Ltd.

(Under technical collaboration with M/s. Gauges Bourdon, U.K.)

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