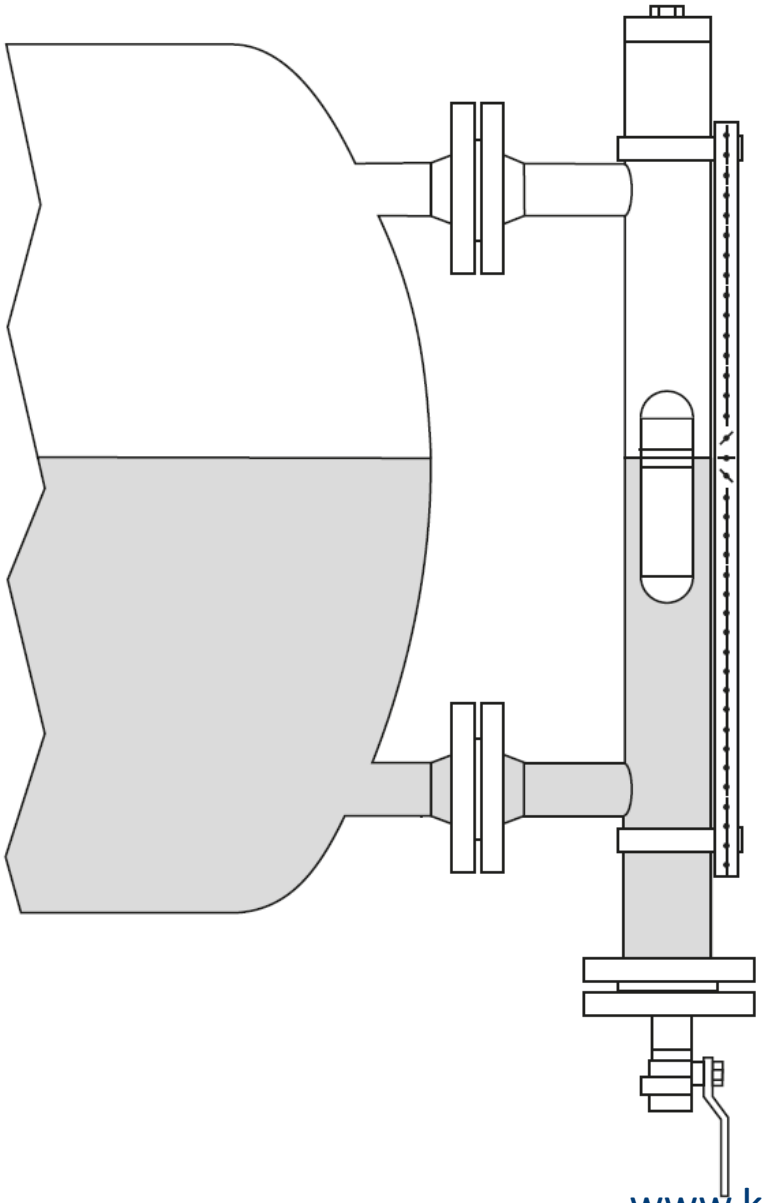
# KLINGER ITALY

## MAGNETIC
## LEVEL GAUGES



# MAGNETIC LEVEL GAUGES

Indirect liquid levels measurement.

# MAIN ADVANTAGES

- MAINTENANCE-FREE
- CONTINUOUS INDICATION OF FLUID LEVEL
- SUITABLE FOR STEAM AND PROCESS APPLICATIONS
- SUITABLE FOR TOXIC AND DANGEROUS LIQUIDS
- VERY HIGH LENGHT FEASIBLE
- COMPACT CONSTRUCTION

# MAIN COMPONENTS

FLOAT


VISUAL SCALE

BODY

# FLOAT
## DESIGN

KLINGER FLOATS CAN BE MANUFACTURED WITH OR WITHOUT PRESSURIZATION.

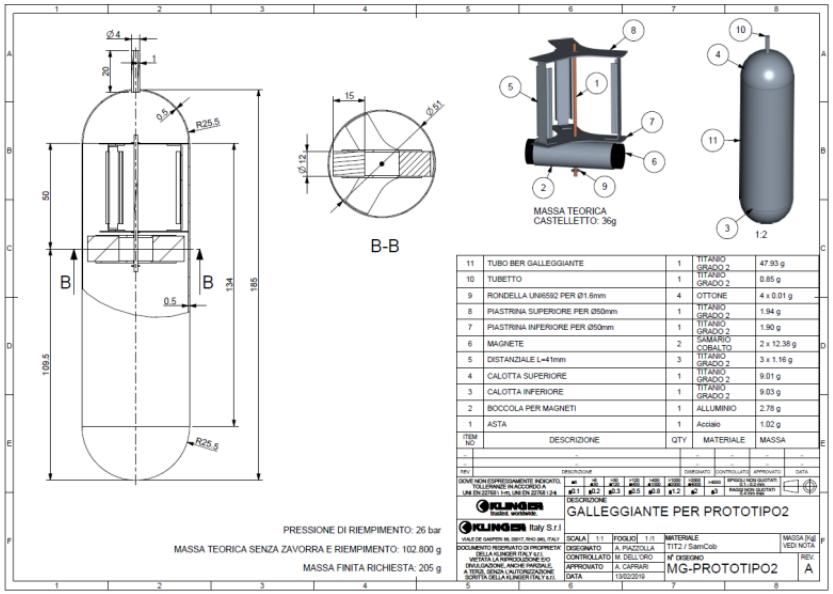
INTERNAL PRESSURE PERMIT TO ARCHIEVE FLUID HIGH TEMPERATURE AND PRESSURE, WITH A MINIMUM WEIGHT INCREASE, MAKING IT SUITABLE FOR LOWER DENSITY FLUIDS TOO.

HOWEVER NON-PRESSURIZED FLOATS ARE AVAILABLE, WITH REINFORCED RIBS INSTALLATION, FOR LOW-MEDIUM AND HIGH PRESSURE.

FLOAT MAGNETIC FIELD IS MONODIRECTIONAL TYPE, LIGHTER AND STRONGER RESPECT TO THE OMNIDIRECTIONAL TYPE.

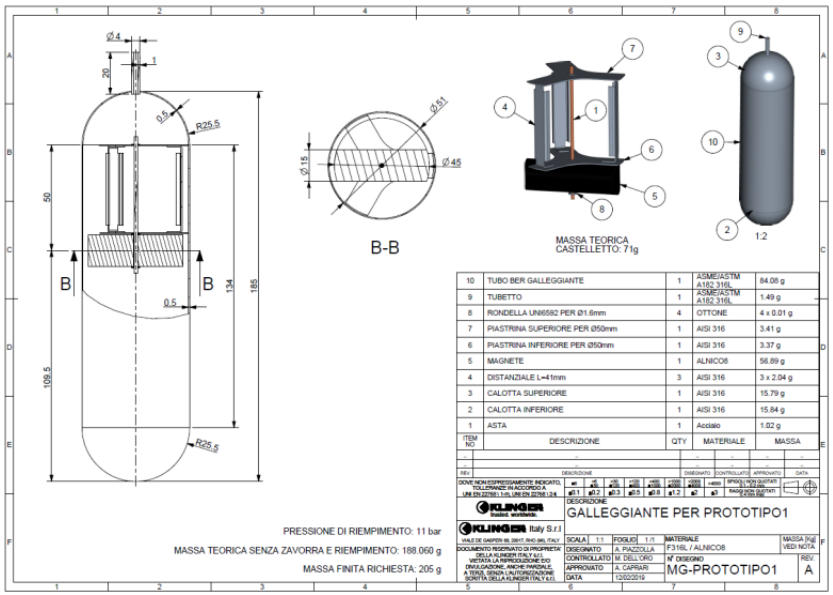
# FLOAT
## MATERIALS

TEMP < 250°C
SAMARIUM-COBALT MAGNET




| ITEM NO | DESCRIZIONE | QTY | MATERIALE | MASSA |
|---|---|---|---|---|
| 11 | TUBO BER GALLEGGIANTE | 1 | TITANIO GRADO 2 | 47.93 g |
| 10 | TUBETTO | 1 | TITANIO GRADO 2 | 0.85 g |
| 9 | RONDELLA UNI6592 PER Ø1.6mm | 4 | OTTONE | 4 x 0.01 g |
| 8 | PIASTRINA SUPERIORE PER Ø50mm | 1 | TITANIO GRADO 2 | 1.94 g |
| 7 | PIASTRINA INFERIORE PER Ø50mm | 1 | TITANIO GRADO 2 | 1.90 g |
| 6 | MAGNETE | 2 | SAMARIO COBALTO | 2 x 12.38 g |
| 5 | DISTANZIALE L=41mm | 3 | TITANIO GRADO 2 | 3 x 1.16 g |
| 4 | CALOTTA SUPERIORE | 1 | TITANIO GRADO 2 | 9.01 g |
| 3 | CALOTTA INFERIORE | 1 | TITANIO GRADO 2 | 9.03 g |
| 2 | BOCCOLA PER MAGNETI | 1 | ALLUMINIO | 2.78 g |
| 1 | ASTA | 1 | Acciaio | 1.02 g |

TEMP > 250°C
ALNICO8 MAGNET




| ITEM NO | DESCRIZIONE | QTY | MATERIALE | MASSA |
|---|---|---|---|---|
| 10 | TUBO BER GALLEGGIANTE | 1 | ASME/ASTM A182 316L | 84.08 g |
| 9 | TUBETTO | 1 | ASME/ASTM A182 316L | 1.49 g |
| 8 | RONDELLA UNI6592 PER Ø1.6mm | 4 | OTTONE | 4 x 0.01 g |
| 7 | PIASTRINA SUPERIORE PER Ø50mm | 1 | AISI 316 | 3.41 g |
| 6 | PIASTRINA INFERIORE PER Ø50mm | 1 | AISI 316 | 3.37 g |
| 5 | MAGNETE | 1 | ALNICO8 | 56.89 g |
| 4 | DISTANZIALE L=41mm | 3 | AISI 316 | 3 x 2.04 g |
| 3 | CALOTTA SUPERIORE | 1 | AISI 316 | 15.79 g |
| 2 | CALOTTA INFERIORE | 1 | AISI 316 | 15.84 g |
| 1 | ASTA | 1 | Acciaio | 1.02 g |

MATERIALS:

- 316L FOR LOW-MEDIUM PRESSURE AND MEDIUM-HIGH FLUID DENSITY.
- TITANIUM GR.2 FOR LOW-MEDIUM PRESSURE AND LOW DENSITY.
- TITANIUM GR.5, WITH RIBS OR NOT, FOR HIGH PRESSURE AND TEMPERATURE. DENSITY LIMIT FROM CALCULATION.
- OTHER MATERIALS AVAILABLE ON REQUEST

STANDARD ESECUTION:
NON PRESSURIZED
PRESSURIZED
PRESSURIZED

# VISUAL SCALE
## DESIGN AND MATERIALS

VISUAL SCALE IS DESIGNED WITH ONE SMALL MAGNET FOR EACH FLAG.

IN THIS WAY EACH FLAG HAS ITS MAGNETIC FIELD. VISUAL SCALE IS MORE STABLE, AND THE POSSIBILITY TO HAVE ONE FLAG ROTATE ON THE WRONG SIDE IS RARE.


EXTERNAL COVER MATERIAL:
SS 316

FLAGS MATERIAL IS PLASTIC.

TWO DIFFERENT TYPE AVAILABLE:

- ONE FOR FLUID TEMPERATURE <200°C
  COLOUR RED/WHITE
- ONE FOR FLUID TEMPERATURE UP TO 400°C
  COLOUR BLACK/BEIGE

INTERNATIONAL PROTECTION IP66 TESTED ON TUV SUD LABORATORY

PATENT PENDING N°102020000026239 – 04/11/2020

# VISUAL SCALE
## TECHNICAL DATA

| | |
|---|---|
| • WIDTH OF VISIBILITY | 25 mm |
| • DESIGNED WITH ANTI-VIBRATION SYSTEM | |
| • 360° ADJUSTABLE ON THE TUBE | |
| • COMPLETELY SEALED CONSTRUCTION | |
| • STANDARD INTERNATIONAL PROTECTION | IP66 |
| • FLAGS PITCH | 10 mm |
| • FLAGS COLOUR WITH T<200°C | RED / WHITE |
| • FLAGS COLOUR WITH T>200°C | BLACK / BEIGE |
| • FLOAT FAULT SIGNALING STANDARD | |

## ASME CALCULATIONS

CALCULATIONS REFERRED TO ASME CODE ARE PERFORMED FOR THE DIMENSIONING OF:

- TUBE (ASME B31.1 – ASME B31.3)
- BRANCH CONNECTION (ASME B31.1 – ASME B31.3)
- UPPER COVER (ASME BPVC SEC. VIII DIV. 1)
- LOWER FLANGE (ASME BPVC SEC. VIII DIV. 1)

# BODY
## CALCULATIONS

# ASME CALCULATIONS - TUBE

INPUT:

- GEOMETRICAL TUBE DIMENSIONS
- MANUFACTURING TOLERANCES
- MATERIAL THERMAL CHARACTERISTICS

OUTPUT:

- MAXIMUM ALLOWED PRESSURE AT DIFFERENT TEMPERATURES

**MAGNETIC LEVEL GAUGE CALCULATION TO ASME B31.1**

**Pipe - para 104.1.4**

| | | |
|---|---|---|
| $t_{MIN}$ | Minimum required thickness of pipe | $t_{MN} = \frac{p \times D_O}{2 \times (SE \times W + p \times y)} + A$ |
| y | Coefficient as per table 104.1.2 (A) t<D/6 | $T = 566\ °C \rightarrow y = 0.4$ |
| y | Coefficient as per table 104.1.2 (A) note b t>D/6 | $y = \frac{d}{d + D_O}$ |
| $D_O$ | Outside diameter of pipe | |
| SE | Maximum allowable stress at design temperature | |
| W | Weld coefficient | 1 for seamless pipe<br>0.85 for welded pipe |
| $t_s$ | Thickness of pipe, under tolerance (12,5% fot items 1,2,3,4,5,6,8 - 0% for item 7) | |
| A | Additional thickness (not applicable) | |
| $p_{MAX}$ | Maximum allowed working pressure - weld coefficient 1 - t < D/6 (under tolerance) | $p_{MAX} = \frac{2 \times SE \times t_{MIN}}{D_O - 0.8 \times t_{MIN}}$ |
| $p_{MAX}$ | Maximum allowed working pressure - weld coefficient 1 - t > D/6 (under tolerance) | $p_{MAX} = \frac{2 \times SE \times t_{MIN}}{D_O - 2 \times \frac{d}{d + D_O} \times t_{MIN}}$ |

**MAGNETIC LEVEL GAUGE BODY CALCULATION - ASME B31.1**

**Pipe**

| Item | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN/Nominal size | 1" | | 1.1/2" | | | | 2" | | | | 2.1/2" | |
| Schedule | 2mm | 5S | 2mm | 10S | 2mm (*) | 10S | 40S | 80S | 160S | 80S | 160S | XXS |
| Outside Diameter D (mm) | 33,4 | 48,26 | 48,26 | 48,26 | 60,3 | 60,3 | 60,3 | 60,3 | 60,3 | 73 | 73 | 73 |
| Inside Diameter d (mm) | 29,4 | 44,96 | 44,26 | 42,72 | 56,3 | 54,76 | 52,48 | 49,22 | 42,88 | 58,98 | 53,94 | 44,96 |
| Thickness t (mm) | 2 | 1,65 | 2 | 2,77 | 2 | 2,77 | 3,91 | 5,54 | 8,71 | 7,01 | 9,53 | 14,02 |
| Thickness t at minumum tolerance (mm) | 1,75 | 1,44 | 1,75 | 2,42 | 1,75 | 2,42 | 3,42 | 4,85 | 7,62 | 6,13 | 8,34 | 12,27 |

| |
|---|
| KMAG300 - WELDED TUBE (*) |
| KMAG600 - SEAMLESS TUBE |
| KMAG600 - SEAMLESS TUBE |
| KMAG-HP - SEAMLESS TUBE |

**Material mechanical characteristics ASME B31.1 2018 TAB.A3 [ksi]**

| Material ASME A312 TP316 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T (°F) | 100 | 200 | 300 | 400 | 500 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 | 1050 | 1100 | 1150 | 1200 |
| T (°C) | 38 | 93 | 149 | 205 | 260 | 316 | 343 | 371 | 399 | 427 | 455 | 482 | 510 | 538 | 566 | 593 | 621 | 649 |
| SIGMAs (ksi) | 20,0 | 17,3 | 15,6 | 14,3 | 13,3 | 12,6 | 12,3 | 12,1 | 11,9 | 11,8 | 11,6 | 11,5 | 11,4 | 11,3 | 11,2 | 11,1 | 9,8 | 7,4 |
| B31.1 | 20,0 | 17,3 | 15,6 | 14,3 | 13,3 | 12,6 | 12,3 | 12,1 | 11,9 | 11,8 | 11,6 | 11,5 | 11,4 | 11,3 | 11,2 | 11,1 | 9,8 | 7,4 |
| Seamless efficiency factor | 1 | 0,9 ONLY FOR ITEM 5 | | | | | | | | | | | | | | | | |

**Maximum allowed pressure Pipe/Chamber (design) bar**

| Item | Pipe \ T (DegC) | 38 | 93 | 149 | 205 | 260 | 316 | 343 | 371 | 399 | 427 | 455 | 482 | 510 | 538 | 566 | 593 | 621 | 649 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1" Sp. 2mm | 150,82 | 130,46 | 117,64 | 107,84 | 100,30 | 95,02 | 92,76 | 91,25 | 89,74 | 88,99 | 87,48 | 86,72 | 85,97 | 85,21 | 84,46 | 83,71 | 73,90 | 55,60 |
| 2 | 1.1/2" Sch.5S | 84,53 | 73,12 | 65,93 | 60,44 | 56,21 | 53,25 | 51,99 | 51,14 | 50,29 | 49,87 | 49,03 | 48,60 | 48,18 | 47,76 | 47,34 | 46,91 | 41,42 | 31,28 |
| 3 | 1.1/2" Sp. 2mm | 102,99 | 89,09 | 80,34 | 73,64 | 68,49 | 64,89 | 63,34 | 62,31 | 61,28 | 60,77 | 59,74 | 59,22 | 58,71 | 58,19 | 57,68 | 57,16 | 50,47 | 38,11 |
| 4 | 1.1/2" Sch.10S | 144,31 | 124,83 | 112,56 | 103,18 | 95,96 | 90,91 | 88,75 | 87,31 | 85,86 | 85,14 | 83,70 | 82,98 | 82,26 | 81,53 | 80,81 | 80,09 | 70,71 | 53,39 |
| 5 | 2" Sp. 2mm welded | 73,75 | 63,79 | 57,52 | 52,73 | 49,04 | 46,46 | 45,35 | 44,62 | 43,88 | 43,51 | 42,77 | 42,40 | 42,04 | 41,67 | 41,30 | 40,93 | 36,14 | 27,29 |
| 6 | 2" Sch.10S | 114,54 | 99,07 | 89,34 | 81,89 | 76,17 | 72,16 | 70,44 | 69,29 | 68,15 | 67,58 | 66,43 | 65,86 | 65,29 | 64,71 | 64,14 | 63,57 | 56,12 | 42,38 |
| 7 | 2" Sch.40S | 163,92 | 141,79 | 127,85 | 117,20 | 109,00 | 103,27 | 100,81 | 99,17 | 97,53 | 96,71 | 95,07 | 94,25 | 93,43 | 92,61 | 91,79 | 90,97 | 80,32 | 60,65 |
| 8 | 2" Sch.80S | 236,95 | 204,96 | 184,82 | 169,42 | 157,57 | 149,28 | 145,72 | 143,35 | 140,98 | 139,80 | 137,43 | 136,24 | 135,06 | 133,87 | 132,69 | 131,50 | 116,10 | 87,67 |
| 9 | 2" Sch.160S | 387,78 | 335,43 | 302,47 | 277,26 | 257,87 | 244,30 | 238,48 | 234,60 | 230,73 | 228,79 | 224,91 | 222,97 | 221,03 | 219,09 | 217,16 | 215,22 | 190,01 | 143,48 |
| 10 | 2.1/2" Sch.80S | 248,43 | 214,89 | 193,77 | 177,63 | 165,21 | 156,51 | 152,78 | 150,30 | 147,82 | 146,57 | 144,09 | 142,85 | 141,60 | 140,36 | 139,12 | 137,88 | 121,73 | 91,92 |
| 11 | 2.1/2" Sch.160S | 346,72 | 299,91 | 270,44 | 247,90 | 230,57 | 218,43 | 213,23 | 209,75 | 206,30 | 204,56 | 201,10 | 199,36 | 197,63 | 195,90 | 194,16 | 192,43 | 169,89 | 128,29 |
| 12 | 2.1/2" Sch.XXS | 531,55 | 459,79 | 414,61 | 380,06 | 353,48 | 334,86 | 326,90 | 321,59 | 316,27 | 313,62 | 308,30 | 305,64 | 302,99 | 300,33 | 297,67 | 295,01 | 260,46 | 196,67 |

**Maximum allowed pressure Pipe/Chamber (design) bar with safety factor of 0,9**

| 0,9 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | Pipe \ T (DegC) | 38 | 93 | 149 | 205 | 260 | 316 | 343 | 371 | 399 | 427 | 455 | 482 | 510 | 538 | 566 | 593 | 621 | 649 |
| 1 | 1" Sp. 2mm | 135,74 | 117,42 | 105,88 | 97,05 | 90,27 | 85,52 | 83,48 | 82,12 | 80,77 | 80,09 | 78,73 | 78,05 | 77,37 | 76,69 | 76,01 | 75,34 | 66,51 | 50,22 |
| 2 | 1.1/2" Sch.5S | 76,08 | 65,81 | 59,34 | 54,39 | 50,59 | 47,93 | 46,79 | 46,03 | 45,27 | 44,88 | 44,12 | 43,74 | 43,36 | 42,98 | 42,60 | 42,22 | 37,28 | 28,15 |
| 3 | 1.1/2" Sp. 2mm | 92,70 | 80,18 | 72,30 | 66,28 | 61,64 | 58,40 | 57,01 | 56,08 | 55,15 | 54,69 | 53,76 | 53,30 | 52,84 | 52,37 | 51,91 | 51,45 | 45,42 | 34,30 |
| 4 | 1.1/2" Sch.10S | 129,88 | 112,34 | 101,30 | 92,86 | 86,37 | 81,82 | 79,87 | 78,58 | 77,28 | 76,63 | 75,33 | 74,68 | 74,03 | 73,38 | 72,73 | 72,08 | 63,64 | 48,05 |
| 5 | 2" Sp. 2mm welded (1) | 53,10 | 45,93 | 41,42 | 37,96 | 35,31 | 33,45 | 32,66 | 32,12 | 31,59 | 31,33 | 30,80 | 30,53 | 30,27 | 30,00 | 29,73 | 29,47 | 26,02 | 19,65 |
| 6 | 2" Sch.10S | 103,08 | 89,17 | 80,40 | 73,70 | 68,55 | 64,94 | 63,40 | 62,37 | 61,33 | 60,82 | 59,79 | 59,27 | 58,76 | 58,24 | 57,73 | 57,21 | 50,51 | 38,14 |
| 7 | 2" Sch.40S | 147,52 | 127,61 | 115,07 | 105,48 | 98,10 | 92,94 | 90,73 | 89,25 | 87,78 | 87,04 | 85,56 | 84,83 | 84,09 | 83,35 | 82,61 | 81,88 | 72,29 | 54,58 |
| 8 | 2" Sch.80S | 213,25 | 184,46 | 166,34 | 152,47 | 141,81 | 134,35 | 131,15 | 129,02 | 126,88 | 125,82 | 123,69 | 122,62 | 121,55 | 120,49 | 119,42 | 118,35 | 104,49 | 78,90 |
| 9 | 2" Sch.160S | 349,00 | 301,88 | 272,22 | 249,53 | 232,08 | 219,87 | 214,63 | 211,14 | 207,65 | 205,91 | 202,42 | 200,67 | 198,93 | 197,18 | 195,44 | 193,69 | 171,01 | 129,13 |
| 10 | 2.1/2" Sch.80S | 223,59 | 193,40 | 174,40 | 159,86 | 148,68 | 140,86 | 137,51 | 135,27 | 133,03 | 131,92 | 129,68 | 128,56 | 127,44 | 126,33 | 125,21 | 124,09 | 109,56 | 82,73 |
| 11 | 2.1/2" Sch.160S | 312,05 | 269,92 | 243,40 | 223,11 | 207,51 | 196,59 | 191,91 | 188,79 | 185,67 | 184,11 | 180,99 | 179,43 | 177,87 | 176,31 | 174,75 | 173,19 | 152,90 | 115,46 |
| 12 | 2.1/2" Sch.XXS | 478,40 | 413,81 | 373,15 | 342,05 | 318,13 | 301,39 | 294,21 | 289,43 | 284,65 | 282,25 | 277,47 | 275,08 | 272,69 | 270,29 | 267,90 | 265,51 | 234,41 | 177,01 |

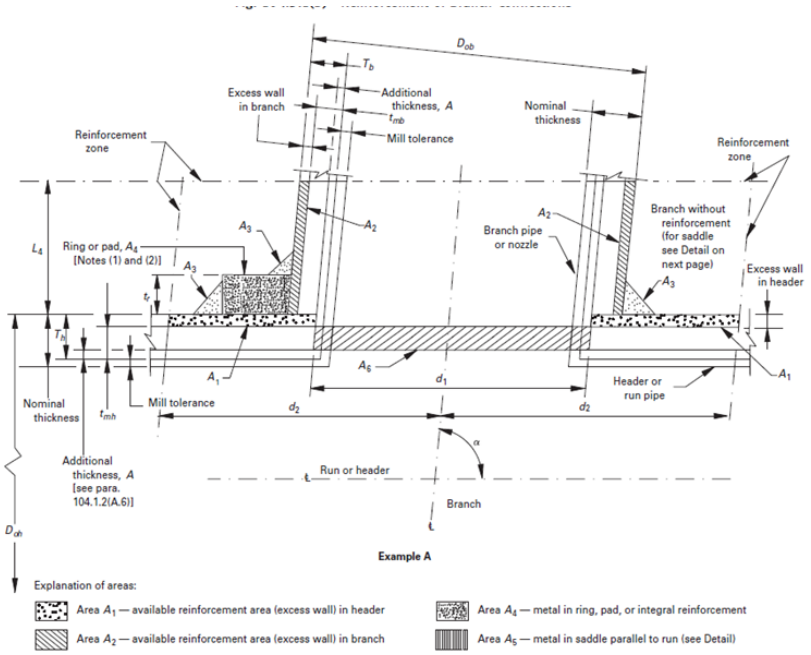
Note 1: added further safety factor of 0,8 for welded construction

# ASME CALCULATIONS – BRANCH CONNECTION

A HOLE ON THE TUBE REDUCE ITS MECHANICAL CHARACTERISTICS.
A CALCULATED MINIMUM QUANTITY OF WELD IS NECESSARY TO COMPENSATE IT:

| **Branch pipe - para 104.3.1;** Fig.104.3.1(D) Example A | | |
|---|---|---|
| $D_b$ | Outside diameter of branch pipe | |
| $d_b$ | Inside diameter of branch pipe | |
| $D_O$ | Outside diameter of pipe | |
| t | Thickness of pipe | |
| $t_b$ | Thickness of the branch pipe | |
| $t_{mb}$ | Required minimum thickness of the branch pipe for PM | $t_{mb} = \frac{d_b \times p_{max}}{2SE - 1,2p_{max}}$ |
| $p_{MAX}$ | Maximum allowed working pressure | |
| $L_4$ | Altitude of reinforcement area outside of pipe | $L_4 = \min \begin{matrix} 2.5 \times t \\ 2.5 \times t_b \end{matrix}$ |
| $L_8$ | Altitude of reinforcement area outside of pipe - extruded outlet | $L_8 = 0.7\sqrt{D_{Ob}t}$ |
| $A_6$ | Required reinforcement area for branch connection | $A_7 = t \times d_b$ |
| $A_2$ | Area lying within the reinforcement zoneresulting from any excessthicness available in the branch pipe wall | $A_2 = 2L(t_b - t_{mb})$ |
| $A_3$ | Reinforcement zone specified by constructor, provided by deposited weld metal beyond the outside diameter of branch pipe | |
| $A_1$, $A_4$, $A_5$ | Not applicable or negected (conservatory) | |
| $A_6 < A_2+A_3$ | FINAL CHECK | |

| | | |
|---|---|---|
| Issued | Date | 17/10/2018 |
| Verified | Date | 17/10/2018 |
| Approved | Date | 17/10/2018 |



# ASME CALCULATIONS – UPPER COVER & LOWER FLANGE

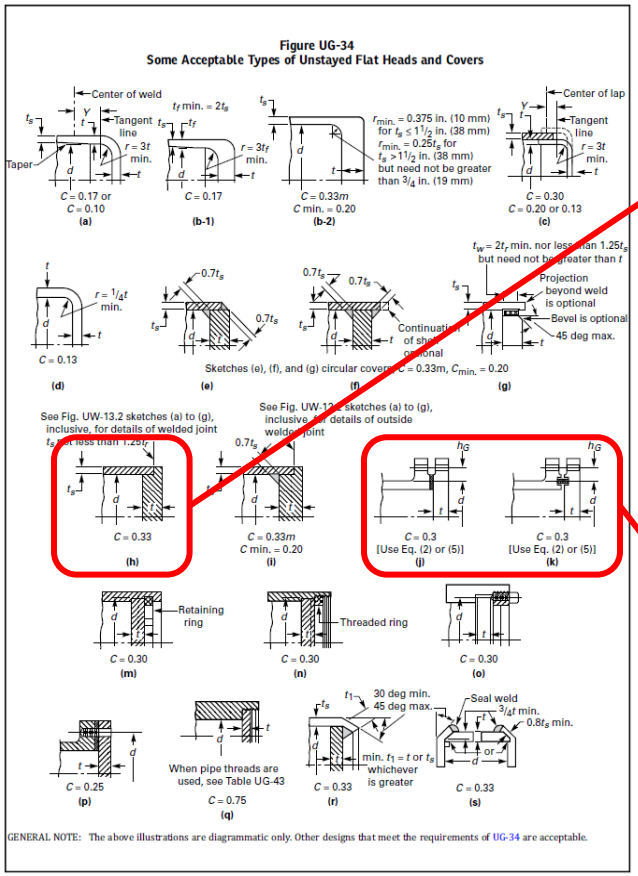
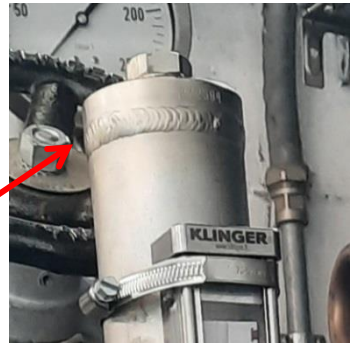


Figure UG-34
Some Acceptable Types of Unstayed Flat Heads and Covers





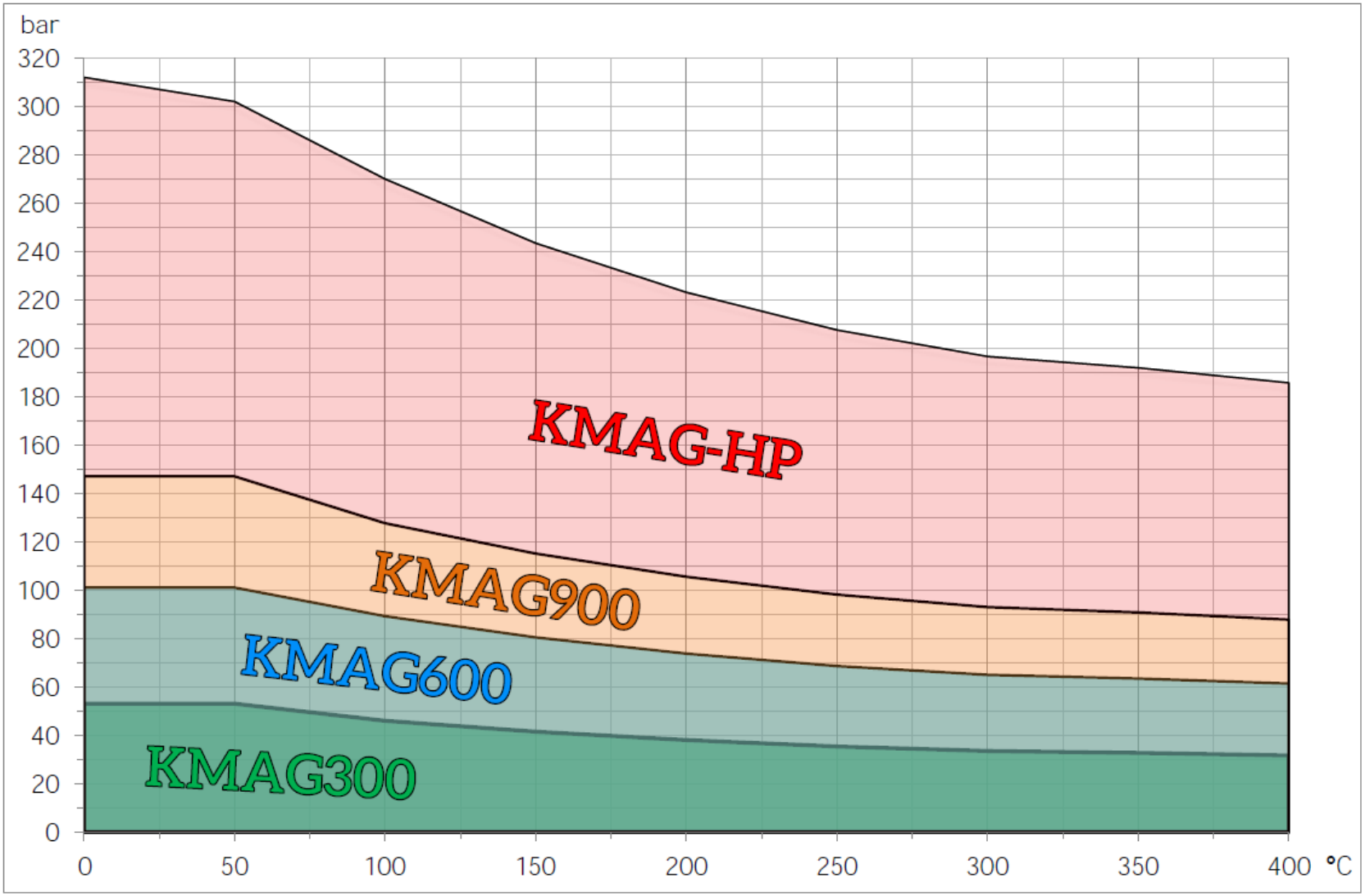
UPPER COVER AND LOWER FLANGES ARE NOT STANDARD PARTS.
THEY ARE DESIGNED CONSIDERING ASME INDICATIONS.

MINIMUM THICKNESS DEPENDS FROM GEOMETRICAL DESIGN CONSIDERATIONS PLUS MAXIMUM OPERATIVE CONDITIONS.

COMPACT DESIGN
=
LOWER COST

# BODY

## PRODUCT RANGE



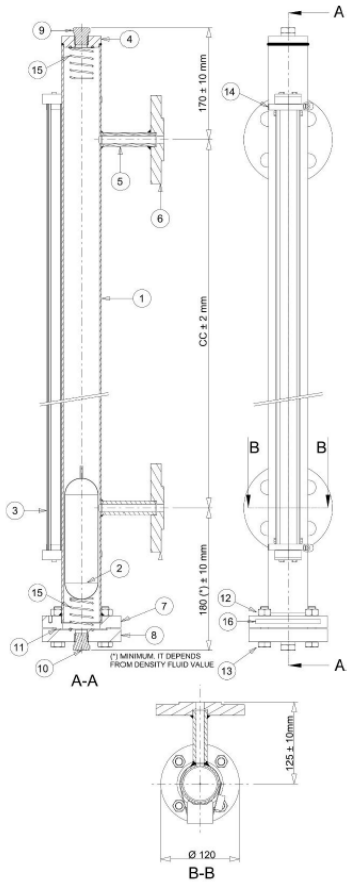
# BODY
## MATERIALS

| | | | | |
|---|---|---|---|---|
| MAG BODY 316L | FLOAT: 316L | BOLT/NUT LOWER FLANGES: B7/2H | VALVES MAT. CODE FS/H | 1S |
| | | | VALVES MAT. CODE M/H | 2S |
| | | BOLT/NUT LOWER FLANGES: B8M/GR.8M | VALVES MAT. CODE M | 3S |
| | | | VALVES MAT. CODE M WITH HANDLE IN SS | 4S |
| | FLOAT: TITANIUM | BOLT/NUT LOWER FLANGES: B7/2H | VALVES MAT. CODE FS/H | 1T |
| | | | VALVES MAT. CODE M/H | 2T |
| | | BOLT/NUT LOWER FLANGES: B8M/GR.8M | VALVES MAT. CODE M | 3T |
| | | | VALVES MAT. CODE M WITH HANDLE IN SS | 4T |

ALLOY OR OTHER MATERIALS ARE AVAILABLE ON REQUEST

# BODY
## MATERIALS

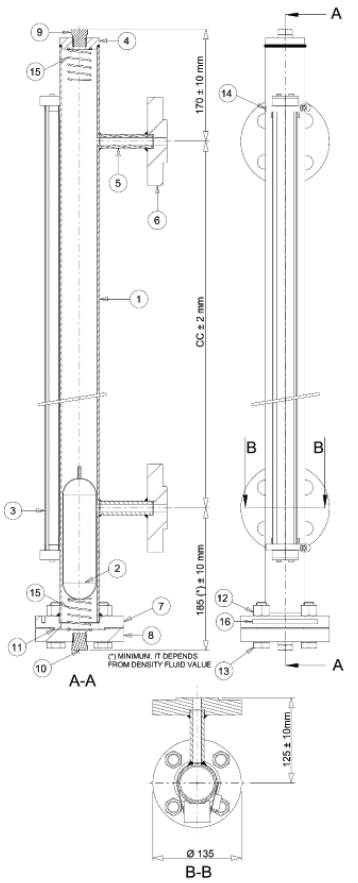
### KMAG300




| Componenti - Parts | | Materiali - Materials | | | |
|---|---|---|---|---|---|
| | | 1S / 1T | 2S / 2T | 3S / 3T | 4S / 4T |
| 1(*) | CORPO: TUBO 2"SP.2mm SALDATO<br>BODY: 2"TK.2mm WELDED | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 2 | GALLEGGIANTE<br>FLOAT | MATERIAL CODE xS: AISI316<br>MATERIAL CODE. xT: TITANIUM | | | |
| 3 | SCALA VISIVA<br>VISUAL SCALE | COLOURED FLAGS: PLASTIC<br>EXTERNAL PARTS: AISI316 | | | |
| 4 | CAPPELLO SUPERIORE<br>TOP CAP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 5 | CONNESSIONE LATERALE<br>BRANCH CONNECTION | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 6 | FLANGIA DI PROCESSO<br>PROCESS FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 7 | FLANGIA INFERIORE<br>LOWER FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 8 | FLANGIA DI CHIUSURA<br>CLOSING FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 9 | TAPPO DI SFIATO<br>VENT PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 10 | TAPPO DI SCARICO<br>DRAIN PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 11 | GUARNIZIONE<br>GASKET | PDM: GRAPHITE LAMINATE WITH 2 INSERTS IN AISI 316 | | | |
| 12 | DADO<br>NUT | ASTM A193 2H | ASTM A193 2H | ASTM A193 GR8M | ASTM A193 GR8M |
| 13 | VITE<br>BOLT | ASTM A194 B7 | ASTM A194 B7 | ASTM A194 B8M | ASTM A194 B8M |
| 14 | FASCETTA<br>CLAMP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 15 | MOLLA<br>SPRING | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 16 | TARGHETTA<br>LABEL | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| | VALVOLE (SU RICHIESTA)<br>VALVES (UPON REQUEST) | MAT. CODE FS/H | MAT. CODE IM/H | MAT. CODE M | MAT. CODE M WITH HANDLE IN AISI 316 |

*(*) Lunghezza massima consigliata dello strumento 6mt. – Maxium suggested instrument lenght 20ft.*

### KMAG600

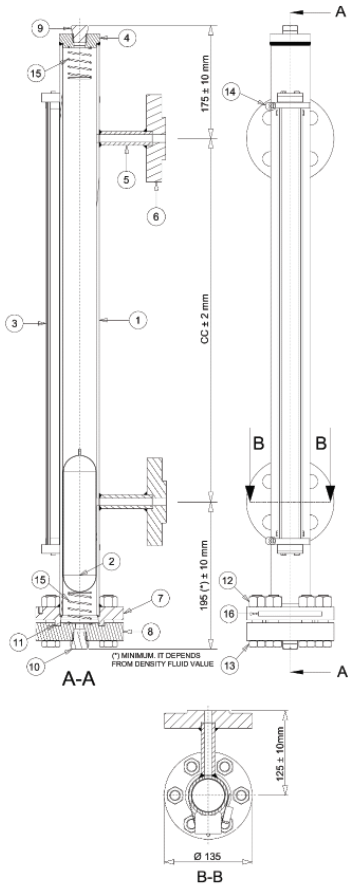



| Componenti - Parts | | Materiali - Materials | | | |
|---|---|---|---|---|---|
| | | 1S / 1T | 2S / 2T | 3S / 3T | 4S / 4T |
| 1(*) | CORPO: TUBO 2"SCH10S SENZA SALDATURA<br>BODY: 2"SCH10S SEAMLESS TUBE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 2 | GALLEGGIANTE<br>FLOAT | MATERIAL CODE xS: AISI316<br>MATERIAL CODE. xT: TITANIUM | | | |
| 3 | SCALA VISIVA<br>VISUAL SCALE | COLOURED FLAGS: PLASTIC<br>EXTERNAL PARTS: AISI316 | | | |
| 4 | CAPPELLO SUPERIORE<br>TOP CAP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 5 | CONNESSIONE LATERALE<br>BRANCH CONNECTION | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 6 | FLANGIA DI PROCESSO<br>PROCESS FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 7 | FLANGIA INFERIORE<br>LOWER FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 8 | FLANGIA DI CHIUSURA<br>CLOSING FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 9 | TAPPO DI SFIATO<br>VENT PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 10 | TAPPO DI SCARICO<br>DRAIN PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 11 | GUARNIZIONE<br>GASKET | PDM: GRAPHITE LAMINATE WITH 2 INSERTS IN AISI 316 | | | |
| 12 | DADO<br>NUT | ASTM A193 2H | ASTM A193 2H | ASTM A193 GR8M | ASTM A193 GR8M |
| 13 | VITE<br>BOLT | ASTM A194 B7 | ASTM A194 B7 | ASTM A194 B8M | ASTM A194 B8M |
| 14 | FASCETTA<br>CLAMP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 15 | MOLLA<br>SPRING | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 16 | TARGHETTA<br>LABEL | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| | VALVOLE (SU RICHIESTA)<br>VALVES (UPON REQUEST) | MAT. CODE FS/H | MAT. CODE M/H | MAT. CODE M | MAT. CODE M WITH HANDLE IN AISI 316 |

*(*) Lunghezza massima consigliata dello strumento 6mt. – Maxium suggested instrument lenght 20ft.*

# BODY
## MATERIALS

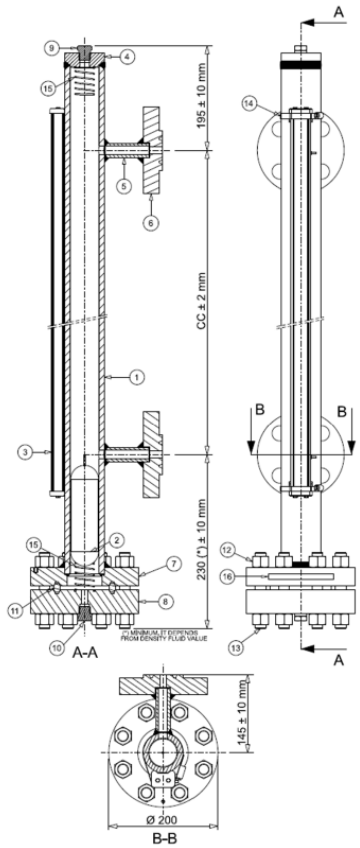
### KMAG900




| Componenti - Parts | | Materiali – Materials | | | |
|---|---|---|---|---|---|
| | | 1S / 1T | 2S / 2T | 3S / 3T | 4S / 4T |
| 1(*) | CORPO: TUBO 2"SCH40S SENZA SALDATURA<br>BODY: 2"SCH40S SEAMLESS TUBE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 2 | GALLEGGIANTE<br>FLOAT | MATERIAL CODE xS: AISI316<br>MATERIAL CODE. xT: TITANIUM | | | |
| 3 | SCALA VISIVA<br>VISUAL SCALE | COLOURED FLAGS: PLASTIC<br>EXTERNAL PARTS: AISI316 | | | |
| 4 | CAPPELLO SUPERIORE<br>TOP CAP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 5 | CONNESSIONE LATERALE<br>BRANCH CONNECTION | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 6 | FLANGIA DI PROCESSO<br>PROCESS FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 7 | FLANGIA INFERIORE<br>LOWER FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 8 | FLANGIA DI CHIUSURA<br>CLOSING FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 9 | TAPPO DI SFIATO<br>VENT PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 10 | TAPPO DI SCARICO<br>DRAIN PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 11 | GUARNIZIONE<br>GASKET | SPIRAL WOUND GASKET IN AISI 316/GRAPHITE | | | |
| 12 | DADO<br>NUT | ASTM A193 2H | ASTM A193 2H | ASTM A193 GR8M | ASTM A193 GR8M |
| 13 | VITE<br>BOLT | ASTM A194 B7 | ASTM A194 B7 | ASTM A194 B8M | ASTM A194 B8M |
| 14 | FASCETTA<br>CLAMP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 15 | MOLLA<br>SPRING | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 16 | TARGHETTA<br>LABEL | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| | VALVOLE (SU RICHIESTA)<br>VALVES (UPON REQUEST) | MAT. CODE FS/H | MAT. CODE M/H | MAT. CODE M | MAT. CODE M WITH HANDLE IN AISI 316 |

*(*) Lunghezza massima consigliata dello strumento 6mt. – Maxium suggested Instrument lenght 20ft.*

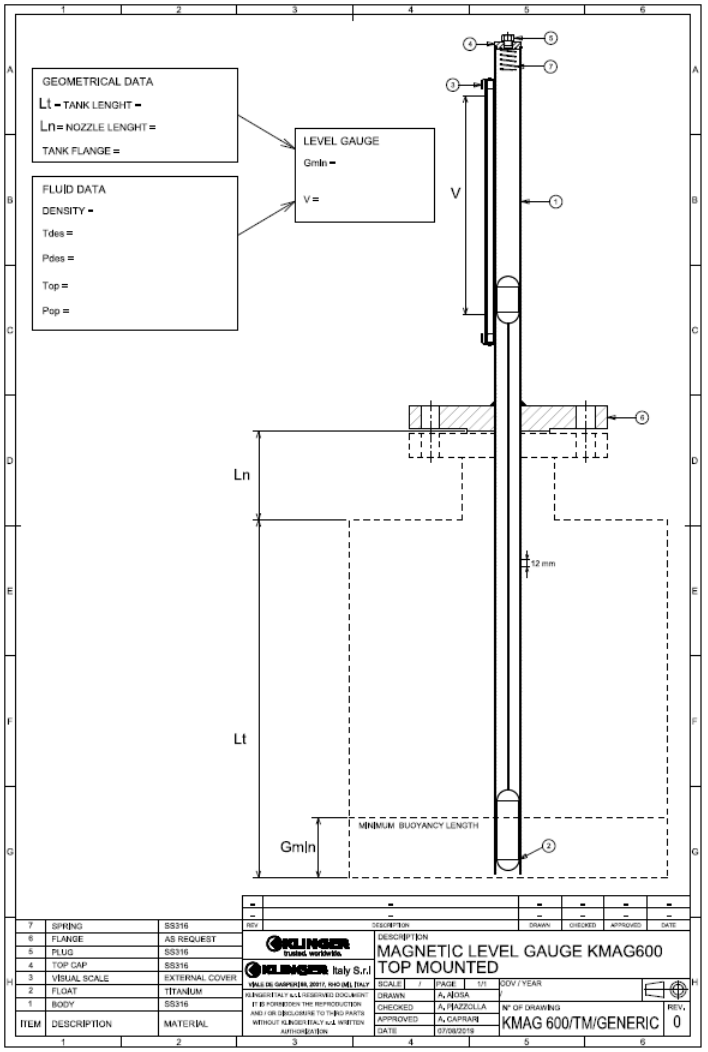
### KMAG-HP




| Componenti - Parts | | Materiali – Materials | | | |
|---|---|---|---|---|---|
| | | 1S / 1T | 2S / 2T | 3S / 3T | 4S / 4T |
| 1(*) | CORPO: TUBO 2.1/2"SCH160S SENZA SALDATURA<br>BODY: 2.1/2"SCH160S SEAMLESS TUBE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 2 | GALLEGGIANTE<br>FLOAT | MATERIAL CODE xS: AISI316<br>MATERIAL CODE. xT: TITANIUM | | | |
| 3 | SCALA VISIVA<br>VISUAL SCALE | COLOURED FLAGS: PLASTIC<br>EXTERNAL PARTS: AISI316 | | | |
| 4 | CAPPELLO SUPERIORE<br>TOP CAP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 5 | CONNESSIONE LATERALE<br>BRANCH CONNECTION | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 6 | FLANGIA DI PROCESSO<br>PROCESS FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 7 | FLANGIA INFERIORE<br>LOWER FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 8 | FLANGIA DI CHIUSURA<br>CLOSING FLANGE | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 9 | TAPPO DI SFIATO<br>VENT PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 10 | TAPPO DI SCARICO<br>DRAIN PLUG | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 11 | GUARNIZIONE<br>GASKET | RING JOINT AISI316 AS PER ASME B16.20 | | | |
| 12 | DADO<br>NUT | ASTM A193 2H | ASTM A193 2H | ASTM A193 GR8M | ASTM A193 GR8M |
| 13 | TIRANTE<br>THREADED ROD | ASTM A194 B7 | ASTM A194 B7 | ASTM A194 B8M | ASTM A194 B8M |
| 14 | FASCETTA<br>CLAMP | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 15 | MOLLA<br>SPRING | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| 16 | TARGHETTA<br>LABEL | AISI 316 | AISI 316 | AISI 316 | AISI 316 |
| | VALVOLE (SU RICHIESTA)<br>VALVES (UPON REQUEST) | MAT. CODE FS/H | MAT. CODE M/H | MAT. CODE M | MAT. CODE M WITH HANDLE IN AISI 316 |

*(*) Lunghezza massima consigliata dello strumento 6mt. – Maxium suggested Instrument lenght 20ft.*

# KMAG600TM
## TOP MOUNTED



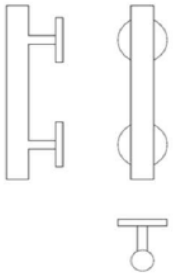
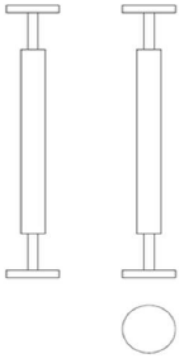
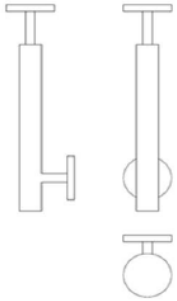
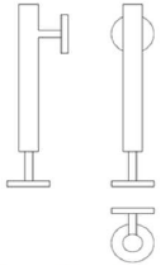

INPUT:
- TANK HEIGHT
- NOZZLE HEIGHT
- PROCESS CONDITIONS

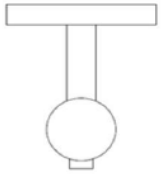
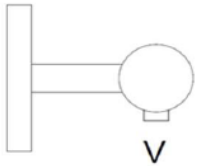
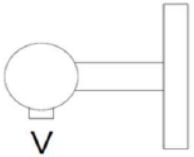
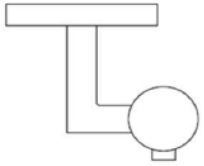
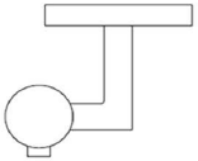
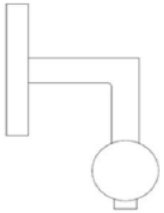
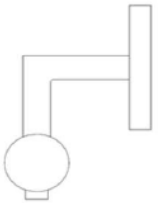
OUTPUT:
- MINIMUM BUOYANCY LENGHT
- MAXIMUM VISIBILITY

# LEVEL GAUGES CONFIGURATIONS

| CONNECTION | VISIBILITY | CODE | DESCRIPTION |
|---|---|---|---|
| Side Side (S) | Front (1) | **S1** | CONNECT: SIDE-SIDE - VISIBILITY: FRONT |
| | Right (2) | **S2** | CONNECT: SIDE-SIDE - VISIBILITY: RIGHT |
| | Left (3) | **S3** | CONNECT: SIDE-SIDE - VISIBILITY: LEFT |
| | Front Right 90° (4) | **S4** | CONNECT: SIDE-SIDE - VISIBILITY: FRONT RIGHT 90° |
| | Front Left 90° (5) | **S5** | CONNECT: SIDE-SIDE - VISIBILITY: FRONT LEFT 90° |
| | Right 90° (6) | **S6** | CONNECT: SIDE-SIDE - VISIBILITY: RIGHT 90° |
| | Left 90° (7) | **S7** | CONNECT: SIDE-SIDE - VISIBILITY: LEFT 90° |
| Top Bottom (T) | Front (1) | **T1** | CONNECT: TOP BOTTOM - VISIBILITY: FRONT |
| | Right (2) | **T2** | CONNECT: TOP BOTTOM - VISIBILITY: RIGHT |
| | Left (3) | **T3** | CONNECT: TOP BOTTOM - VISIBILITY: LEFT |
| Top Side (L) | Front (1) | **L1** | CONNECT: TOP-SIDE - VISIBILITY: FRONT |
| | Right (2) | **L2** | CONNECT: TOP-SIDE - VISIBILITY: RIGHT |
| | Left (3) | **L3** | CONNECT: TOP-SIDE - VISIBILITY: LEFT |
| | Front Right 90° (4) | **L4** | CONNECT: TOP-SIDE - VISIBILITY: FRONT RIGHT 90° |
| | Front Left 90° (5) | **L5** | CONNECT: TOP-SIDE - VISIBILITY: FRONT LEFT 90° |
| | Right 90° (6) | **L6** | CONNECT: TOP-SIDE - VISIBILITY: RIGHT 90° |
| | Left 90° (7) | **L7** | CONNECT: TOP-SIDE - VISIBILITY: LEFT 90° |
| Side Bottom (F) | Front (1) | **F1** | CONNECT: SIDE-BOTTOM - VISIBILITY: FRONT |
| | Right (2) | **F2** | CONNECT: SIDE-BOTTOM - VISIBILITY: RIGHT |
| | Left (3) | **F3** | CONNECT: SIDE-BOTTOM - VISIBILITY: LEFT |
| | Front Right 90° (4) | **F4** | CONNECT: SIDE-BOTTOM - VISIBILITY: FRONT RIGHT 90° |
| | Front Left 90° (5) | **F5** | CONNECT: SIDE-BOTTOM - VISIBILITY: FRONT LEFT 90° |
| | Right 90° (6) | **F6** | CONNECT: SIDE-BOTTOM - VISIBILITY: RIGHT 90° |
| | Left 90° (7) | **F7** | CONNECT: SIDE-BOTTOM - VISIBILITY: LEFT 90° |
| NOTE: 90° MEANS THE PRESENCE OF A 90° CURVE (90° VALVE OR ELBOW FITTING) | | | |

KLINGER Italy

| CONNECTIONS: IDENTIFIES THE BRANCH CONNECTION DIRECTION FROM THE MAIN BODY TOWARDS THE PROCESS CONNECTION | | | |
|---|---|---|---|
|  SIDE SIDE CONNECTION |  TOP BOTTOM CONNECTION |  TOP SIDE CONNECTION |  SIDE BOTTOM CONNECTION |
| S | T | L | F |

| VISIBILITY: IDENTIFIES THE POSITION OF THE INSTRUMENT VISUAL SCALE RESPECT TO THE DIRECTION OF THE PROCESS CONNECTION | | | | | | |
|---|---|---|---|---|---|---|---|
|  V FRONT VISIBILITY |  V RIGHT VISIBILITY |  V LEFT VISIBILITY |  V FRONT RIGHT 90° VISIBILITY |  V FRONT LEFT 90° VISIBILITY |  V RIGHT 90° VISIBILITY |  V LEFT 90° VISIBILITY |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

# ACCESSORIES

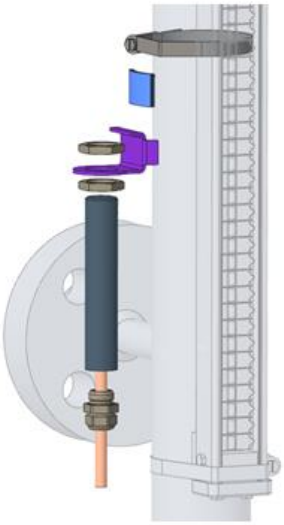
# ACCESSORIES

- KMS KLINGER MAGNETIC SWITCH
- KMT KLINGER MAGNETIC TRANSMITTER 4-20 mA
- PROCESS CONNECTION WITH VALVES
- DRAIN / VENT COCKS
- DRAIN / VENT FLANGES
- HORIZONTAL DRAIN
- GRADUATED SCALE
- NON-FROSTING BLOCK
- PAINTING
- CLOSING FLANGES
- FULL BUTT WELD CONSTRUCTION
- STEAM TRACING
- HEATING CABLE
- HEAT JACKETING
- THERMAL INSULATION
- LP / PMI / NACE / RX
- ECC…

# ACCESSORIES

## KMS – KLINGER MAGNETIC SWITCH

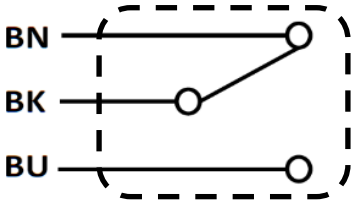
CAD
DESIGN



ODV20-1541
FIRST DELIVERY
END OF JUL-20


# ACCESSORIES

## KMS – KLINGER MAGNETIC SWITCH

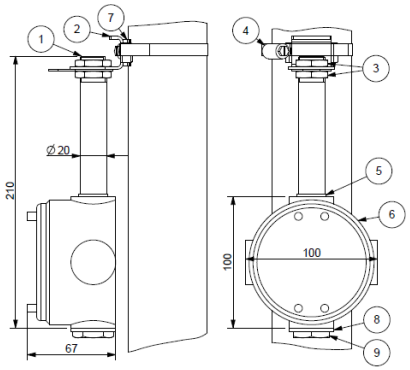



**BISTABLE**

Reed contact / bistable change over contact

Max. 230 Vac / dc – 60 W / VA – 1 A

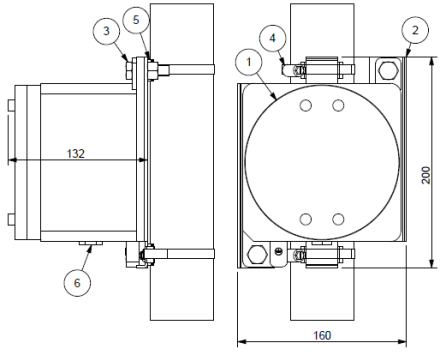
### WITH THREADED ELECTRICAL CONNECTION




Only in case of connection to certified intrinsically safe circuits with max Ii=100 mA and max Ui=30V (*)

(*) EN 60079-11 – Para 5.7 - Contact technical department for temperature classes and limits

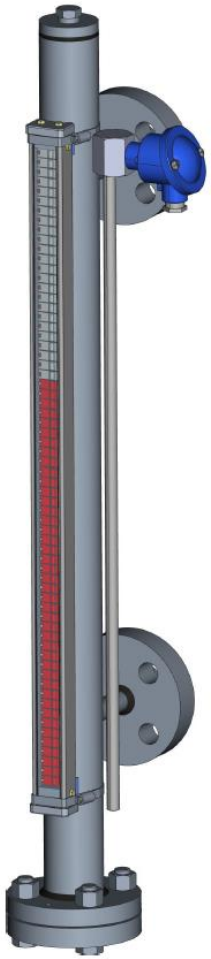
### WITH EX-D CERTIFICATE



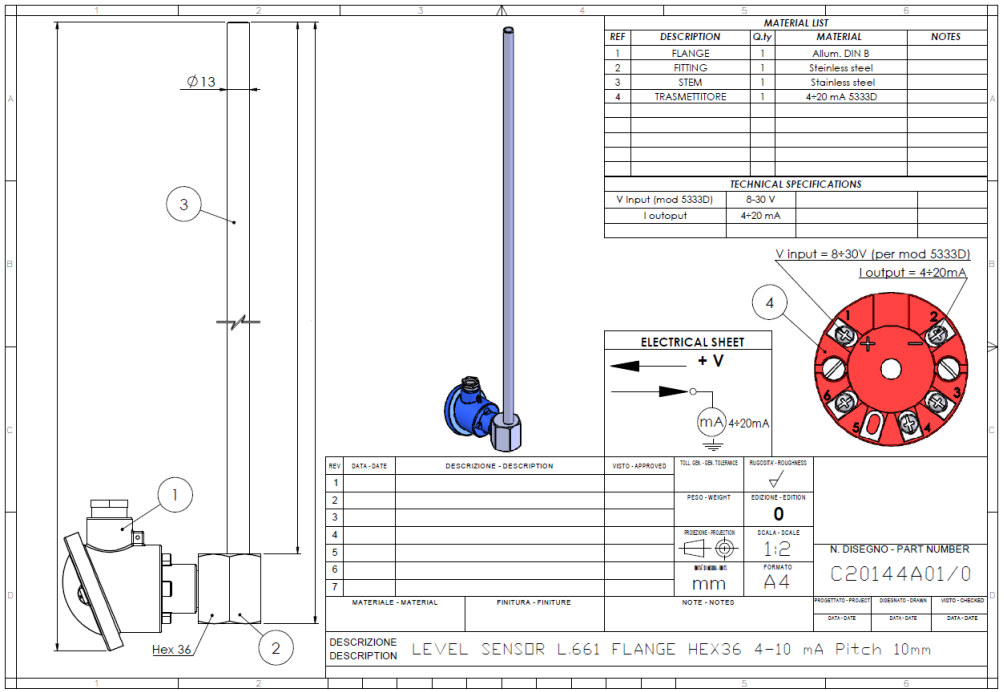

Explosion proof ATEX certificate
II 2 GD - Ex db IIC Gb - Ex tb IIIC Db
Explosion proof IEC Ex certificate
TR CU and INMETRO certificare available

# ACCESSORIES

## KMT – KLINGER MAGNETIC TRANSMITTAL



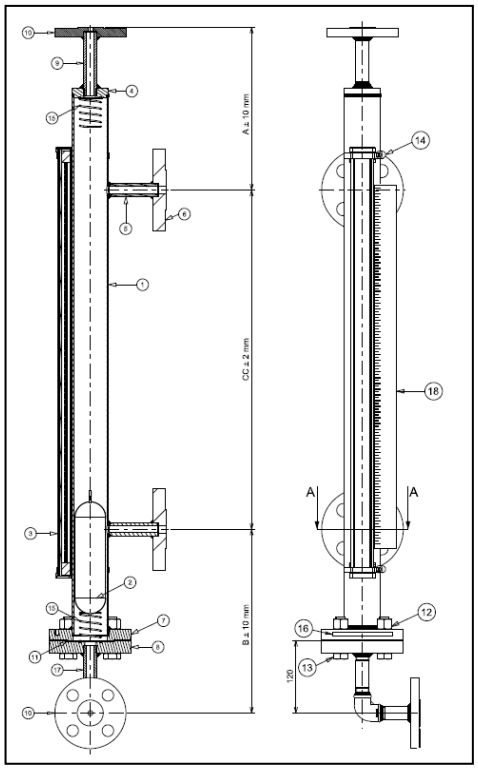
- 4-20 mA TRASMITTER SIGNAL
- V INPUT: 8-30 V
- BODY IN STAINLESS STEEL
- JUNCTION BOX IN ALLUMINIUM
- PITCH (RESOLUTION): 10 mm

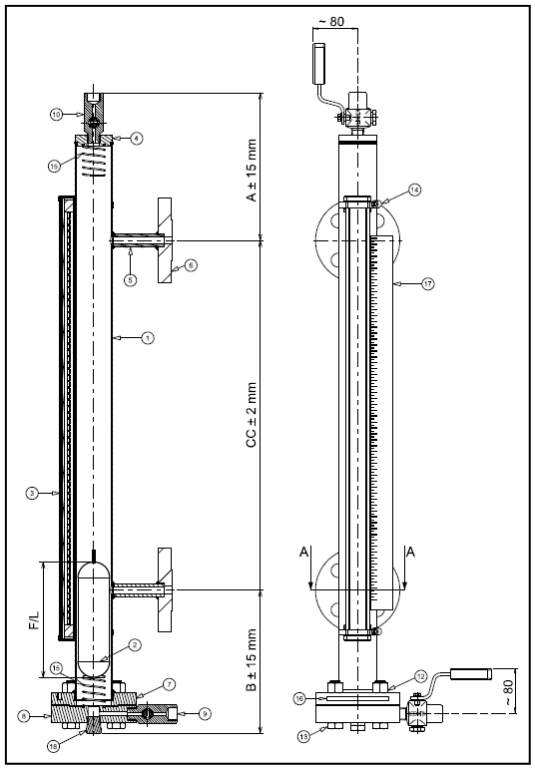


# ACCESSORIES

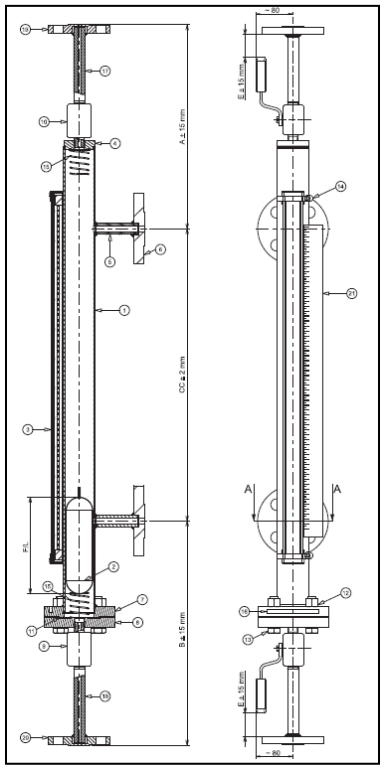
## SPECIAL CONFIGURATIONS

### HORIZONTAL DRAIN

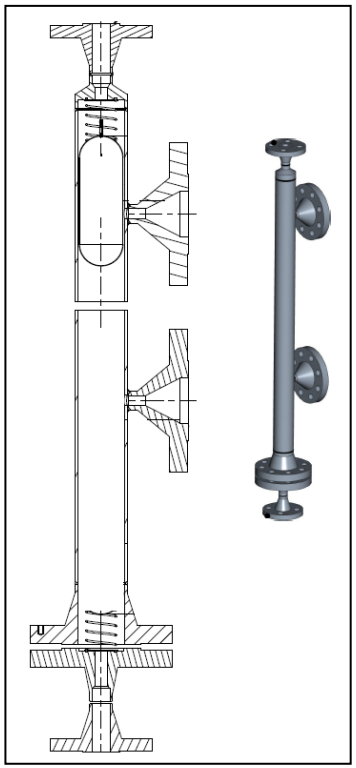





### VENT / DRAIN FLANGED WITH VALVES



### FULL BW



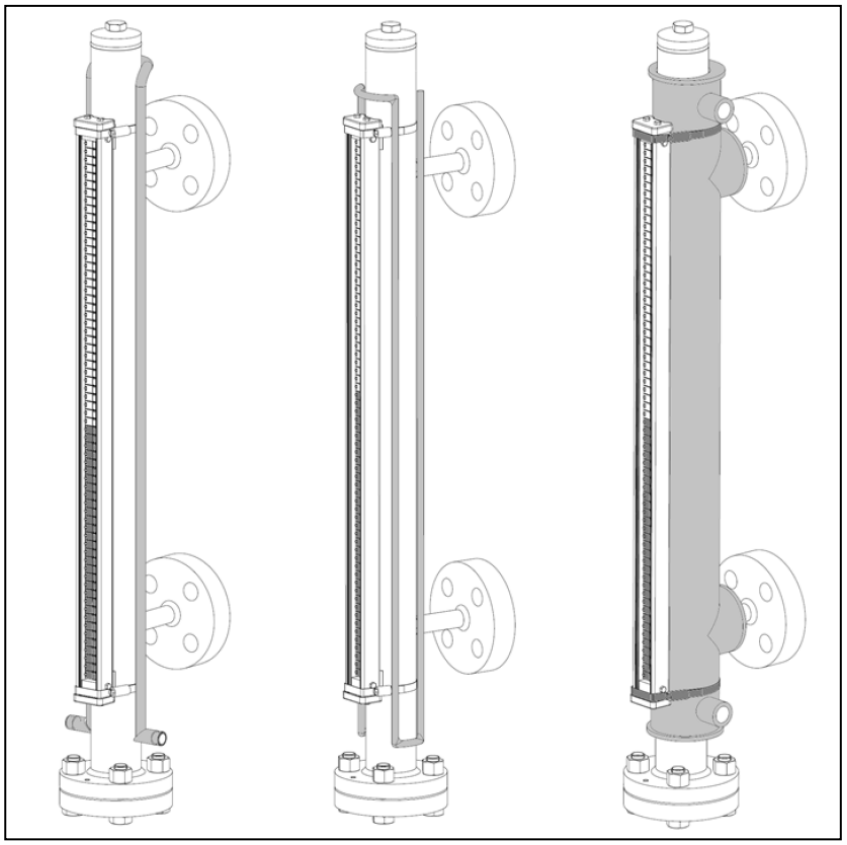
# ACCESSORIES

## SPECIAL CONFIGURATIONS

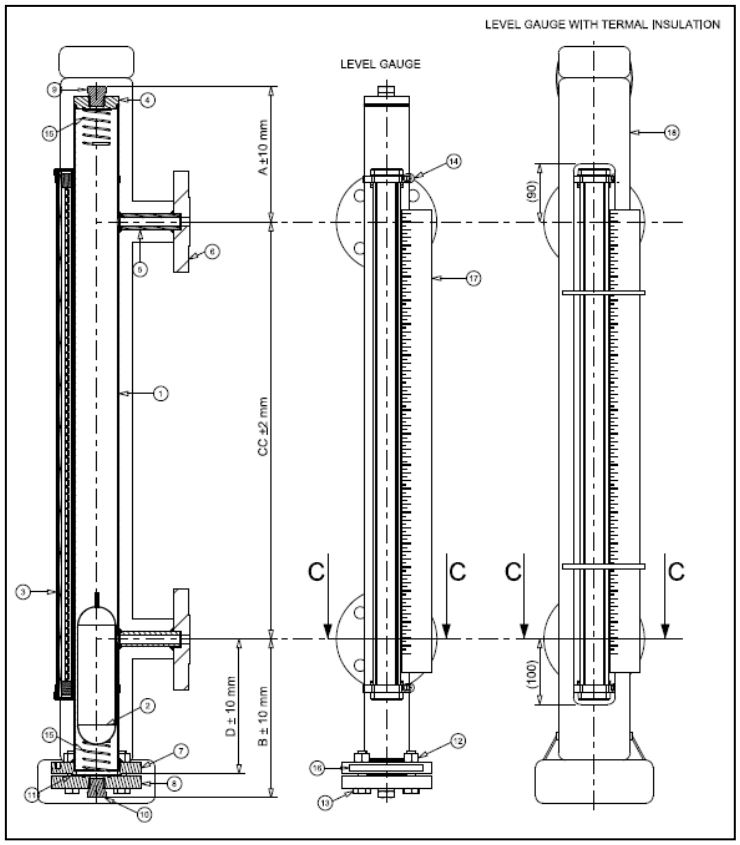
STEAM TRACING

HEATING CABLE

HEAT JACKETING



THERMAL INSULATION



# THANK YOU
# FOR YOUR ATTENTION