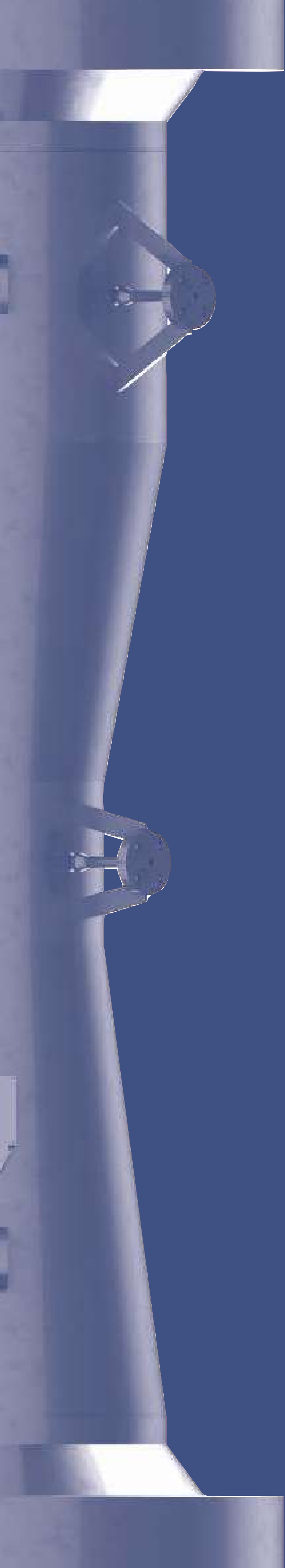
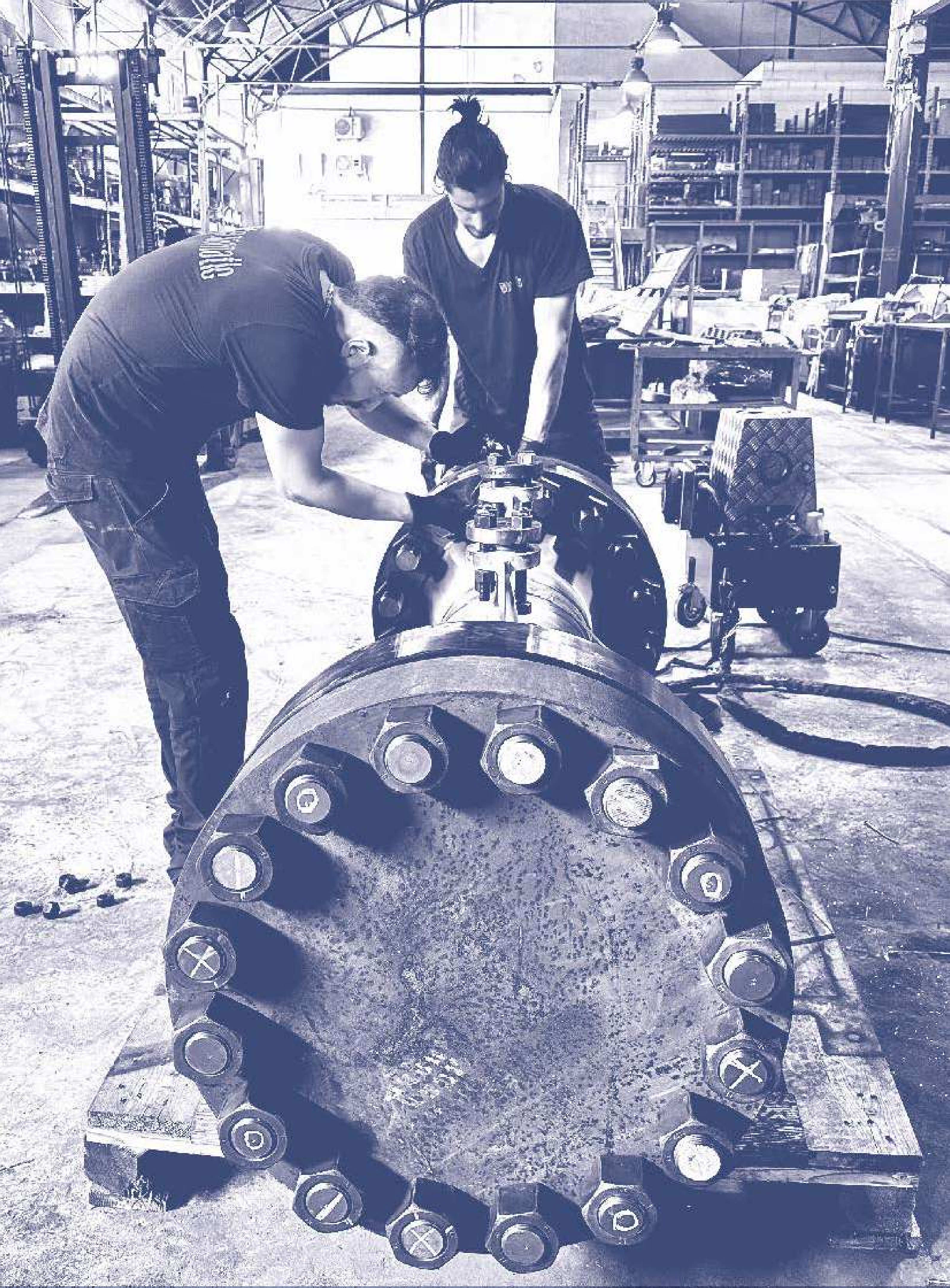


TECNOMATIC FE®

SINCE 1962



TECNOMATIC FE®

SINCE 1962

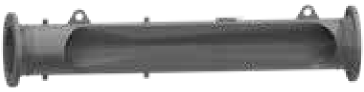
www.tmtecnomatic.com

Founded in 1962, Tecnomatic is the first historical European Company in the **engineering and production of flow and temperature measurement devices,** serving the Oil & Gas market, Onshore & Offshore platforms, Chemical & Petrochemical plants, Aerospace Industry, Power and Steel plants, etc.

Playing a key-role throughout the entire pipelines, Tecnomatic's instruments are used for different aims such as measuring the flow rate, reducing the pressure or restricting the flow.

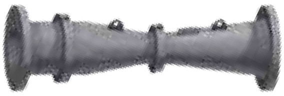
Thanks to competence and expertise of its Engineering and Manufacturing team, Tecnomatic represents a steady partner that follows its customers with care and attention through all the stages, from the engineering to the installation of the products.
By following this approach and by operating in compliance with the main Codes and Certifications (ISO 5167, PED, ATEX, API, SHELL, etc.), Tecnomatic grants quality and reliability of its supplies.

OIL & GAS ONSHORE & OFFSHORE, FPSO

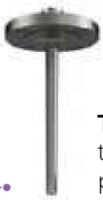


Venturi Tube by bar stock for the measurement of multiphase fluids, which are mixtures of gas, oil, and water

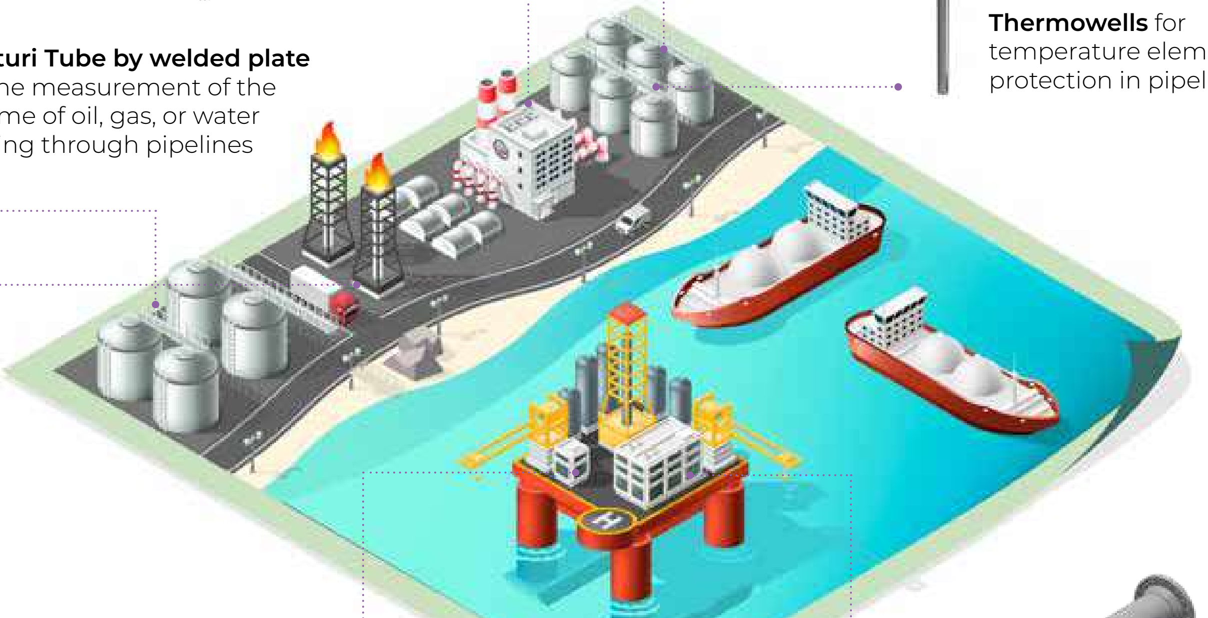
Temperature Elements (RTD or Thermocouple) for temperature detection in tanks

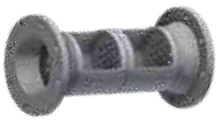


Venturi Tube by welded plate for the measurement of the volume of oil, gas, or water flowing through pipelines

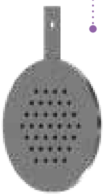


Thermowells for temperature elements protection in pipelines



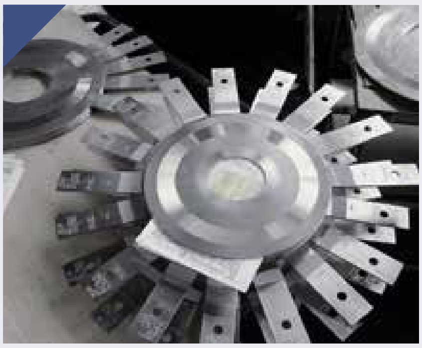


Multi Stage and Multi Hole Orifice Plates for high pressure and/or high noise applications



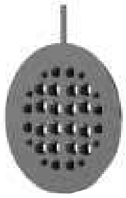
Multi Hole Orifice Plates help to shorten upstream and downstream lengths in flow measurement

Wedge Meters for measurement of highly viscous, rough, or solid bearing fluids and slurries



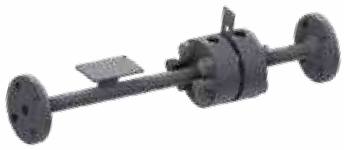
OIL & GAS REFINERIES & PETROCHEMICAL PLANTS

Restriction Orifice Single or Multihole to achieve controlled or restricted flow of process medium



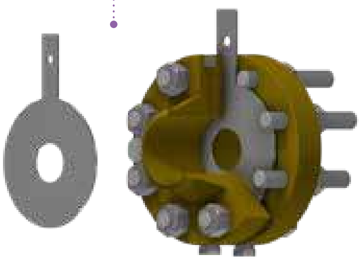
Zanker Flow Straightener to eliminate turbulence originating from pipe fittings in experimental fluid flow applications

Multipoint Temperature Unit for the measurement of the stratification of temperature of high storage tanks



Meter Run for the best measurement of flow in small diameter pipelines

V-Cone Meter needs no straight pipe runs, it’s a great option for treatment plant retrofits or other applications with tight configurations.



Orifice Plates & Assemblies for the measurement of flow rate, for reducing pressure or for restricting flow

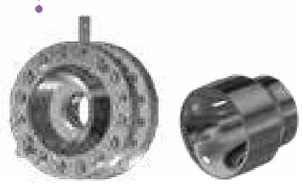
POWER PLANTS & STEEL PLANTS

Tube Bundles Flow Straighteners typically used in applications where the fluid has a high density and low viscosity

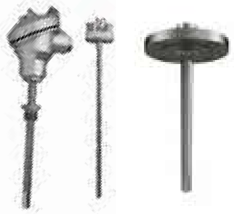
Condensate Pot helps to trap any foreign content in the pipeline, which helps to protect the sensitive instrumentation components

Pitot Tube for the measurement of gas and biogas flow, liquid flow and vapor flow

Venturi Tube for the measurement steam systems to measure the flow rate of steam, ensuring optimal performance of turbines and other equipment



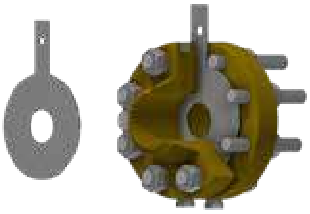
Flow Nozzles for high temperature and high pressure steam and water flow services in thermal power plants



Temperature Elements (RTD or Thermocouple) and Thermowell for temperature detection in tanks



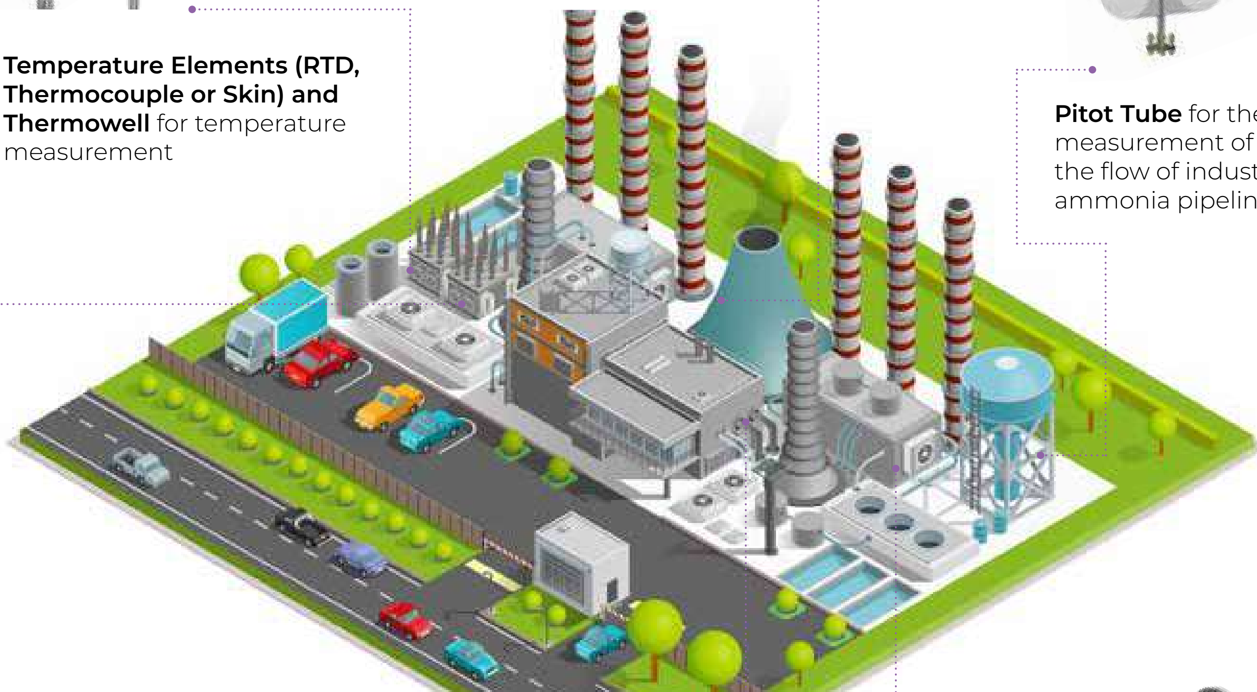
AMMONIA, UREA & FERTILIZATION PLANTS

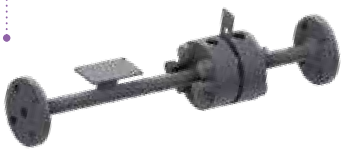


Orifice Plates & Assemblies for the measurement of flow rate, for reducing pressure or for restricting flow

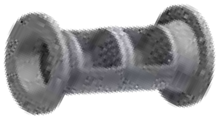
Temperature Elements (RTD, Thermocouple or Skin) and Thermowell for temperature measurement

Pitot Tube for the measurement of the flow of industrial ammonia pipelines



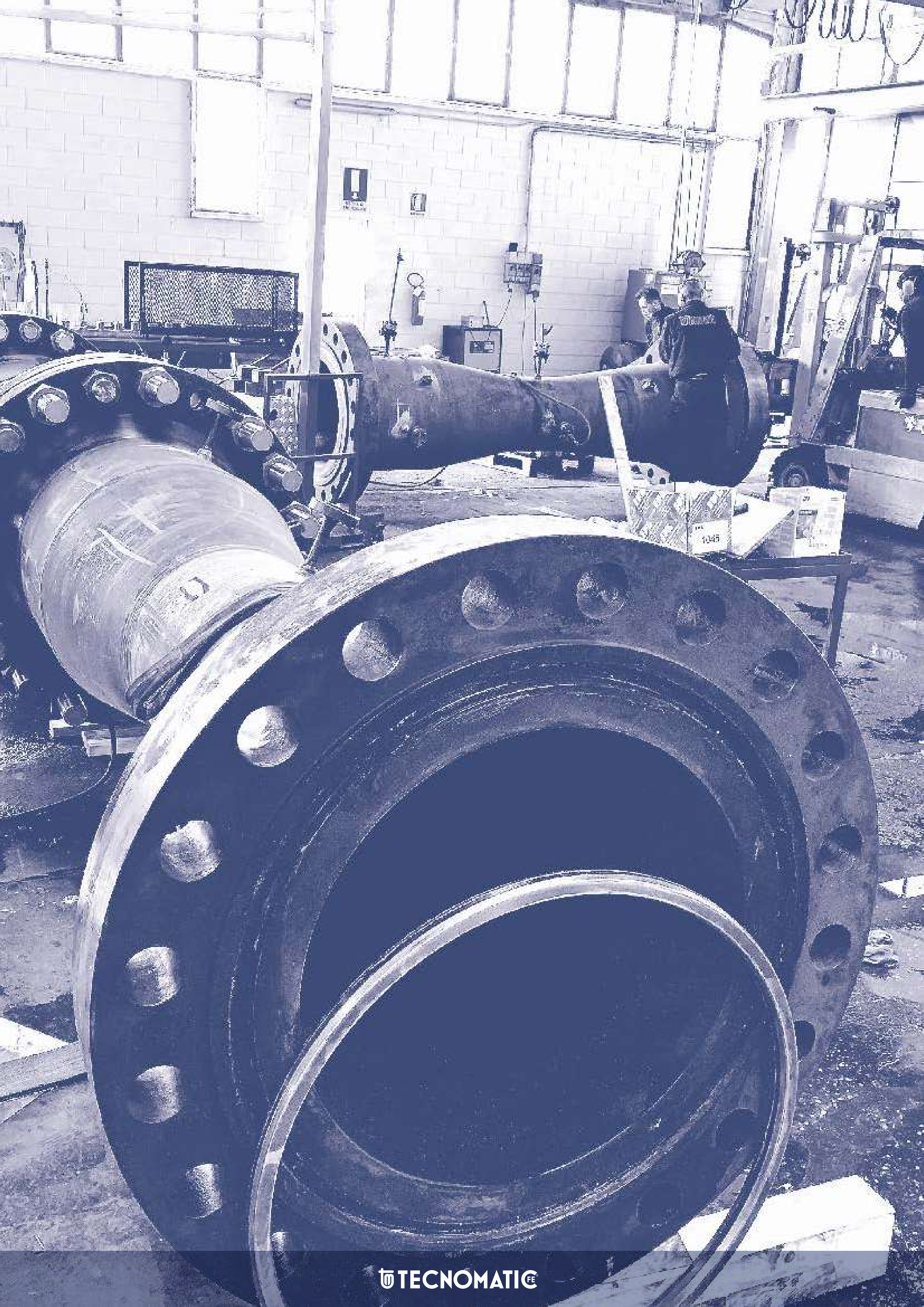


Meter Run for the best measurement of flow in small diameter pipelines



Multi Stage and Multi Hole Orifice Plates for high pressure and/or high noise applications

Condensate Pot helps to trap any foreign content in the pipeline, which helps to protect the sensitive instrumentation components



INDEX

WORLD-WIDE PRESENCE

Tecnomatic is a Multinational Company with its presence in **more than 30 Countries Worldwide**.

WORLD WIDE END USER CLIENTS

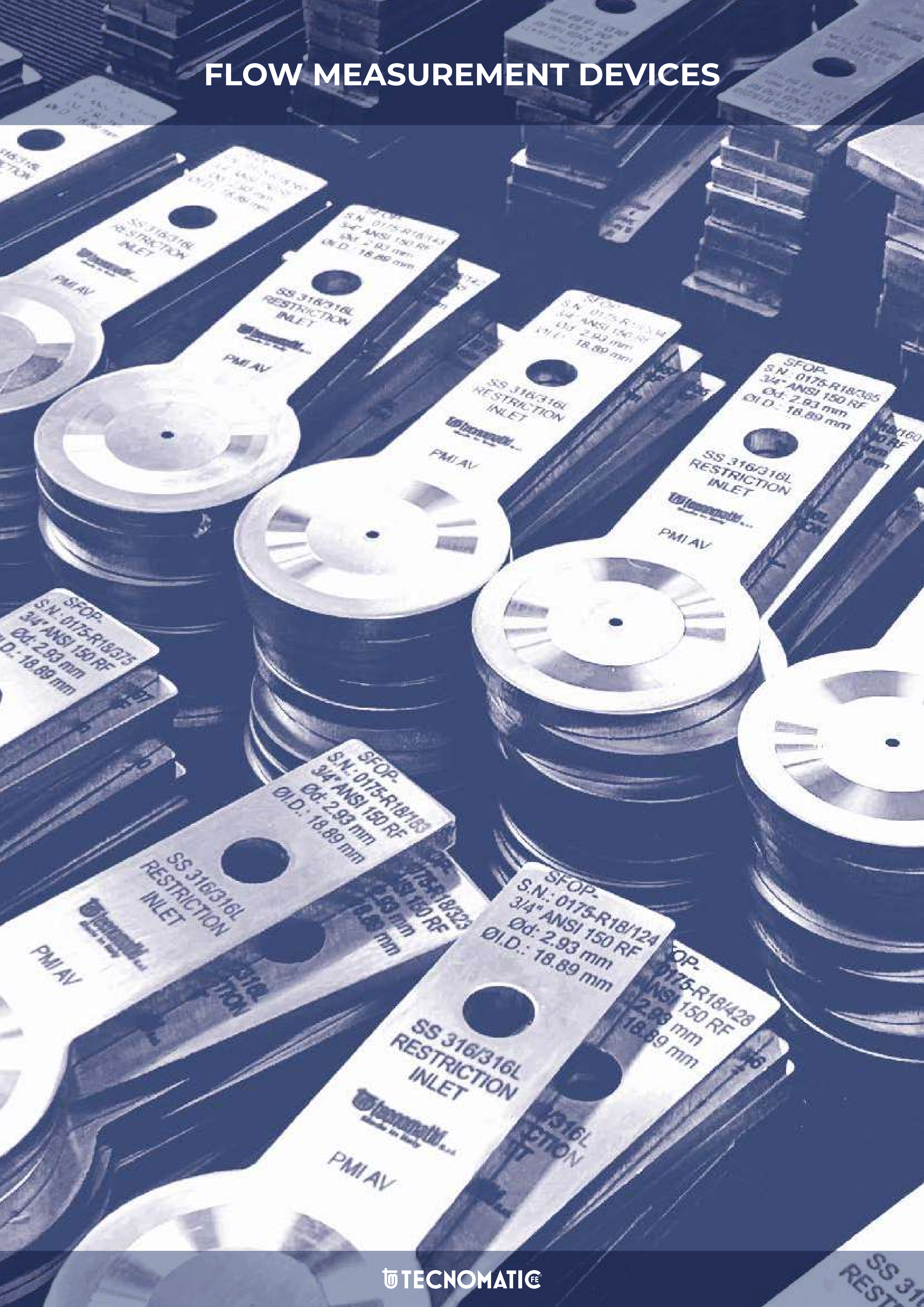
ADNOC, ENI, PETROBRAS, ENOC, EXXONMOBIL, BOROUGE, KNPC, SABIC, ARAMCO, MOTOR OIL, GAZPROM, BASRAH GAS COMPANY, OXY, ANOPC, PERTAMINA, H2 GREEN STEEL, NESTE, PETRONAS and many more.

WORLD WIDE EPC CLIENTS

MAIRE TECNIMONT, TECHNIP ENERGIES, ENPPI, SAIPEM, MC DERMOTT, BAKER HUGHES, SAMSUNG, WOOD, KINETICS TECHNOLOGY, NPCC, TECNICAS REUNIDAS, MIDREX TECHNOLOGIES INC, PEG and many more.

United Kingdom, Spain, Libya, Egypt, Turkey, Iran, Kuwait, Qatar, Oman, Sweden, Australia, UAE, India, Pakistan, Indonesia, China, South Korea, Japan, Canada, Venezuela, Russia, Syria, Greece, Brasil, Portugal, Germany, Turkmenistan, Malaysia, Algeria, USA, Kazakhstan, Vietnam, Mexico, and many more...

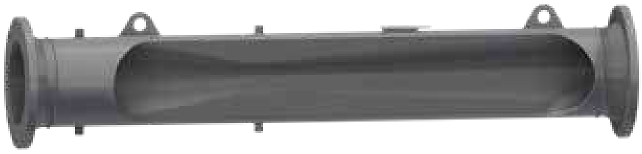
FLOW MEASUREMENT DEVICES



VENTURI TUBES

The Venturi Tube is a differential pressure device suitable to measure flow rate in a closed conduit with the minimum permanent pressure loss.

Venturi Tube from Plate



Venturi Tube from Bar

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE AND CONSTRUCTION	Manufactured by bar stock / Manufactured by welded plate / For big size and very high wall thickness Venturi Meter can also be manufactured by forging / Conical divergent angle of 7° for low loss venturi / Conical divergent angle of 15° for Classical Venturi / All types can be supplied Truncated or not Truncated / Process connections: all types / Instrument connections: all types / Venturi tube for rectangular duct **Pressure Taps:** With annular chamber (for classic/standard applications) / With piezometric ring (for light applications) / direct pressure taps (for high wall thickness and heavy applications)
MATERIAL	All material requested by the customer / Material Specifications: all / Main material **Reference:** ASTM-ASME Code
FLOW CALCULATION	Flow Calculation: Main Reference code: ISO 5167 ASME MFC-3M / Other standards: ANSI 2630 /AGA-3/API Ch.14 (1992)/Miller-Spinks-Shell Engineering Handbook

STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	Venturi by bar stock: 2”-10” / Venturi by welded plate: up to 48” (and above, where acceptable by the Customer) / Venturi by forging: all dimensions
BETA RATIO	Venturi by bar stock: 0.4÷0.75 / Venturi by welded plate: 0.4÷0.7 / Venturi By Forging: 0.3÷0.75
REYNOLDS NUMBER RANGE	Venturi by bar stock: 200000÷1000000 / Venturi by welded plate: 200000÷2000000 / Venturi by forging: 200000÷2000000

PERFORMANCES	· Accuracy (referred to flow coefficient): as per ISO Code · Rangeability : 1 ÷ 4.5 · Repeatability:(+/- 0.1%) · Max PPL (5-15)% of full scale differential pressure · Straight Lengths Requirements: as Specified In ISO 5167 International Code
CALIBRATION	· Accuracy (referred to flow coefficient) after calibration in accredited lab: (+/- 0.25%)
NOTES	· Flow Meters can be manufactured according to all Customer Specifications · Flow Meter can be supplied with all suitable accessories (valves / manifold / condensing pot / transmitter / fitting /tubing)

VENTURI CONE METERS

The Venturi Cone Meter is a differential pressure device to measure flow rate in a closed conduit with the minimum pipe straight length and with high rangeability.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations / OffShore Platform
TYPE AND CONSTRUCTION	Manufactured by bar stock Manufactured by welded Plate
MATERIAL	As per Customer’s requirements Main material Reference: ASTM-ASME Code
FLOW CALCULATION	Main Reference code: ISO 5167 -5

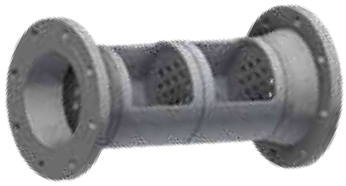
STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	Nominal Diameter of Pipeline: over 2”
BETA V-CONE RATIO	0.45 ÷ 0.85
DIAMETER	0.893 ÷ 0.526
REYNOLDS NUMBER RANGE	Over 200000

PERFORMANCES	• Accuracy (referred to flow coefficient): as per ISO Code • Rangeability : 1-10 • Repeatability: (+/- 0.1%) • Max PPL 20÷40% of full scale differential pressure • Required straight length: 3 I.D.(upstream) ; 2 I.D.(downstream) in the worst conditions
CALIBRATION	• Accuracy (referred to the discharge coefficient) after calibration in accredited laboratory: +/- 0.25%
NOTES	• Flow Meters can be manufactured according to Customer specifications • Flow Meter can be supplied complete with all relevant accessories (valves /manifold / condensing pot / transmitter/ fitting /tubing)

PRESSURE REDUCTIONS

(Single and Multistage Restriction Orifice)

These devices are designed to reduce the fluid pressure. The table here below summarizes typical applications and calculation criteria.



Multistage

Restriction orifice Plate RTJ Non Integrale

FLUID

<table>
<tr><th colspan="5">GAS</th><th colspan="4">LIQUID</th></tr>
<tr><td rowspan="3">DP < critical DP (see note 1)</td><td colspan="4">DP > = DP critical</td><td rowspan="3">CAVITATION NUMBER > 2,5</td><td colspan="3">CAVITATION NUMBER < = 2,5 (see miller eng handbook)</td></tr>
<tr><td colspan="2">PROCESS</td><td>BLOWDOWN (when it is not necessary to control the discharge pressure</td><td>FLARE (controlled discharge with downstream pressure limit)</td><td colspan="2">PROCESS</td><td rowspan="2">BLOW DOWN</td></tr>
<tr><td>CONTINUOUS SERVICE</td><td>INTERMITTENT SERVICE</td><td>BOTH SERVICE</td><td>BOTH SERVICE</td><td>Little saturation pressure</td><td>High saturation pressure</td></tr>
<tr><td>SINGLE RESTRICTION</td><td>MULTISTAGE</td><td>MULTISTAGE OR SINGLE RESTRICTION</td><td>CRITICAL RESTRICTION</td><td>MULTISTAGE (CON WITH DOWNSTREAM PRESSURE <= 10 Bar)</td><td>SINGLE RESTRICTION</td><td>MULTISTAGE (Normally, in this case, multistage reduce all required DP)</td><td>MULTISTAGE (Normally, in this case, multistage reduce almost all required DP leaving a suitable back pressure to avoid Cavitation)</td><td>SINGLE RESTRICTION (with allowable DP calculation)</td></tr>
<tr><td>SINGLE HOLE (NOISE LEVEL < = 85 Dba)</td><td>SINGLE HOLE (NOISE LEVEL < = 85 Dba)</td><td>SINGLE HOLE (NOISE LEVEL < = 85 Dba)</td><td>SINGLE HOLE (NOISE LEVEL < = 85 Dba AND FLOW RATE)</td><td>SINGLE HOLE (NOISE LEVEL < = 85 Dba)</td><td colspan="4">SINGLE HOLE (NOISE LEVEL < = 85 Dba)</td></tr>
<tr><td>MULTIHOLE (SEE NOTE 2 AND NOTE 3)</td><td>MULTIHOLE (SEE NOTE 2)</td><td>MULTIHOLE (SEE NOTE 2)</td><td>MULTIHOLE (SEE NOTE 2)</td><td>MULTIHOLE (SEE NOTE 2)</td><td colspan="4">MULTIHOLE (SEE NOTE 2)</td></tr>
</table>

NOTE 1: CRITICAL DP APPROXIMATELY A HALF OF UPSTREAM PRESSURE

NOTE 2: MULTIHOLE APPLICABLE TO REDUCE NOISE WHEN NOISE LEVEL BY SINGLE PLATE > 85 Dba

NOTE 3: MULTIHOLE ALSO APPLICABLE(IN CASE OF CRITICAL RESTRICTION)TO REDUCE TO REDUCE PLATE

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Single Stage Restriction (refer to pipe taps configuration in-ISO 5167 and in Miller Engineering Handbook) Critical Restriction (typically sized according to Miller Engineering Handbook) Multistage Restriction (sized according to TM Tecnomatic certified calculation)
MATERIAL	All material requested by the customer / Material Specifications : all Main Material Reference: STM-ASME Code
TYPE OF MULTISTAGE CONSTRUCTION	With body by bar stock With body from pipe
CALCULATION	Accuracy (referred to the pressure drop): +/- 2% up to 1 1/2" ; +/- 1% for 2" and above) Gas Service: multistage calculation is performed to avoid to have sound velocity in the vena contracta section of each stage Liquid Service: multistage calculation shall be carried out to avoid cavitation

MULTIPORT AVERAGING PITOT TUBES

(Mapflow)

The Multiport Averaging Pitot Tube (Mapflow) is a differential pressure device suitable to measure the flow rate in a closed conduit for general applications (it is a general purpose and affordable device). Normally used in big pipes with low flow velocity.

Mapflow Mod. R21

Mapflow Mod. ED21

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Standard Model ED-20/21: Diamond Shape-Manufactured by Square Bar 20x20 mm Standard Model ED-45/46: Diamond Shape-Manufactured by Square Bar 45x45 mm Special Device: Diamond Shape-Manufactured by Square Bar sized with Stress and Vibrations Analysis Results;
MATERIAL	As per Customer's requirements / Main material References: ASME/ASTM
PROCESS CONNECTIONS	Threaded Coupling / Flanged Nozzle
FLOW CALCULATION	Main Reference code: TM TECNOMATIC STANDARDS

NOTE: All Type of Sensors can be supplied with End Support and Retractable System

STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	Up to 100" and over
REYNOLDS NUMBER RANGE	Over 200000

PERFORMANCES	• Accuracy (referred to flow coefficient): 2÷2.5% for Standard Device; to be evaluated case by case for Special Devices • Repeatability: +/- 0.15% • Max PPL 10÷15% of full scale differential pressure
CALIBRATION	• Not Applicable
NOTES	• Flow Meters can be manufactured according to all Customer Specifications • Flow Meter can be supplied complete with all relevant accessories (valves / manifold / condensing pot / transmitter /fitting /tubing)

WEDGE METERS

The Wedge Meter is a differential pressure device suitable to measure the flow rate of dirty liquids in a closed conduit (slurry applications).

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries
TYPE AND CONSTRUCTION	Standard Model ED-20/21: Diamond Shape-Manufactured by Square Bar 20x20 mm Manufactured by bar stock Manufactured by welded Plate
MATERIAL	As per Customer's requirements Main material Reference: ASTM-ASME Code
FLOW CALCULATION	Miller Engineering Handbook

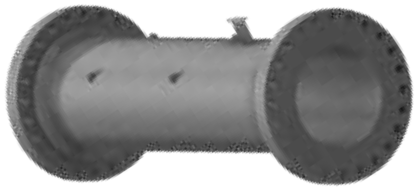
STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	Nominal Diameter of Pipeline : over 2"
WEDGE EQUIVALENT RATIO	0.4÷0.7
REYNOLDS NUMBER RANGE	Over 200000

PERFORMANCES	• Accuracy (referred to the discharge coefficient) : 3÷3.5% • Rangeability: 1÷4.5 • Repeatability: +/- 0.1% • Max PPL: 20÷40% of full scale differential pressure • Straight pipe requirements: 5 I.D.(upstream); 5 I.D.(downstream) in the worst conditions
CALIBRATION	• Accuracy (referred to the discharge coefficient) after calibration in accredited laboratory: +/- 0.25%
NOTES	• Flow Meters can be manufactured according to Customer specifications • Flow Meter can be supplied complete with all relevant accessories (valves / manifold / condensing pot / transmitter / fitting /tubing)

FLOW NOZZLES

Flow Nozzle is a differential pressure device to measure flow rate in a closed conduit for heavy applications and high flow rate.

Flow Nozzle
ISA 1932



Flow Nozzle
Long Radius

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	ASME Long Radius / ASME Long Radius with diffuser / ASME Throat Taps; ASME Throat Taps with diffuser / Short Nozzle ISA 1932 / Venturi Nozzle with ISA Inlet
MATERIAL	All material requested by the customer / Material Specifications : all Main Material Reference : ASTM-ASME Code
TYPE OF CONSTRUCTION	Flanged / Welding in Pipe with pins / With complete spool pipe and Flow conditioner
FLOW CALCULATION	Main Reference code : ISO 5167/ASME MFC-3M ; ASME PTC 19.5 ASME PTC 6 (very high performance) Other standards: ANSI 2630 /AGA-3/API Ch.14 (1992)/Miller-Spinks-Shell Engineering Handbook

STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	ISA 1932 Nozzle: 2”-20” / Long Radius Nozzle: 2”-24” / Venturi Nozzle: 2 1/2” – 20”
BETA RATIO	ISA 1932 Nozzle: 0.3-0.8 / Long Radius Nozzle 0.2-0.8 / Venturi Nozzle: 0.316-0.775
REYNOLDS NUMBER RANGE	ISA 1932 Nozzle: 70000-10000000(For Low Beta ratio); 20000-10000000(For High Beta ratio) Long Radius Nozzle 10000-10000000 / Venturi Nozzle: 150000-2000000

PERFORMANCES	• Accuracy (referred to flow coefficient): as per ISO Code • Rangeability : 1-4.5 • Repeatability: (+/- 0.1%) • Max PPL (50-70)% of full scale differential pressure • Straight Lengths Requirements: as Specified In ISO 5167 International Code
CALIBRATION	• Accuracy (referred to flow coefficient) after calibration in accredited lab: (+/- 0.25%)
NOTES	• Flow Meters can be manufactured according to all Customer Specifications. • Flow Meter can be supplied with all suitable accessories (VALVES / MANIFOLD/CONDENSING POT / TRANSMITTER/FITTING/TUBING)

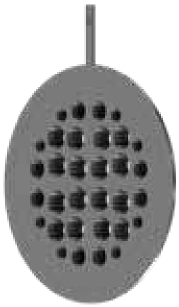
FLOW CONDITIONERS

Tube Bundle
Flow Straightener

The Flow Conditioner is a device that improves the fluid velocity profile across the flow section. This device is typically applied when pipe straight length requirements cannot be satisfied.

This often happens when, due to layout constraints, it is not possible to install a flow meter in a straight portion of pipe suitable to obtain acceptable metering conditions. With this device it is possible to have the best fluid velocity profile, even if the pipe straight length is less than the minimum prescribed by the code.

On the other hand, the introduction of a flow conditioners introduces additional permanent pressure losses that shall be verified against process constraints.



Zanker Flow
Conditioner

Tube Bundle
Flow Straightener

PERFORMANCES	· Flow conditioner can reduce upstream pipe straight length requirements to a half of what prescribed by ISO 5167-1
NOTES	· Flow Conditioners can be supplied alone or included in meter run section as an accessory of flow meter device

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
CONDITIONER TYPE	The Tube Bundle flow Straightener / The Gallagher Flow Conditioner / Perforated Plate Flow Conditioner (K-Lab Nova / Spearman) / Sprenkle Flow Conditioner / Zanker Flow Conditioner
MATERIAL	As per Customer's requirements / Main material Reference : ASTM-ASME Code
PERMANENT PRESSURE LOSS INTRODUCED BY FLOW CONDITIONERS	Tube Bundle flow Straightener: k=0.75 / Gallagher Flow Conditioner: k=2 (approx.) K-Lab Nova Perforated Plate Flow Conditioner: k=2 / Spearman Perforated Plate Flow Conditioner: k=3.2 / Sprenkle Flow Conditioner: k=11÷14 / Zanker Flow Conditioner: k=3

ORIFICE PLATE ASSEMBLIES

The Orifice Plate is a differential pressure device suitable to measure the flow rate in a closed conduit (it is an affordable device for general applications).

TECHNICAL SPECIFICATIONS

TYPE OF ELEMENTS	Square Edge Orifice / Quadrant Orifice / Conical Entrance Orifice / Segmental orifice
MATERIAL	As per Customer's requirements / Main material Reference: ASTM-ASME Code
TYPE OF PRESSURE TAPS	Flange Taps / Corner Taps / Radius Taps / Pipe Taps
TYPE OF CONSTRUCTION	· Flange Taps: with pressure taps on flanges or on carrier ring · Corner Taps: with pressure taps on flanges, or on annular chambers, or on a monolithic plate · Radius / Pipe Taps: pressure taps shall be welded on pipe (in this case the assembly shall be supplied complete with the relevant spool pipe)
FLOW CALCULATION	Main Reference code: ISO 5167/ASME MFC-3M; ASME PTC 19.5
TYPE OF PLACE CONNECTIONS	All / Main Connections: RF-RJ
TYPE OF FLANGES	WN-SW-LJ-THD-SO according to International Standards (ANSI/ASME/UNI/DIN/API)

STANDARD LIMITS & APPLICATION FIELDS

DIMENSIONS	All taps configurations: 2"÷40"
BETA RATIO	All taps configurations: 0.1÷0.75
REYNOLDS NUMBER RANGE	For beta ratio up to 0.56: greater than 5000 (for lower Reynolds numbers, special orifice types are required)

PERFORMANCES	· Accuracy (referred to the discharge coefficient): as per ISO Code · Rangeability: 1÷4.5 · Repeatability: +/- 0.1% · Max PPL 50÷70% of full scale differential pressure · Straight Lengths Requirements: as per ISO 5167
TYPICAL SUPPLY CONFIGURATION	· Orifice Plate only · Orifice Plate Assembly · Complete Upstream/ Downstream Spool Orifice Assembly (with Flow Conditioner, if required) for 2" and above
CALIBRATION	· Accuracy (referred to the discharge coefficient) after calibration in an accredited laboratory: +/- 0.25%
NOTES	· Flow Meters can be manufactured according to Customer specifications · Flow Meter can be supplied complete with all relevant accessories (valves / manifold / condensing pot / transmitter / fitting / tubing)

METER RUN

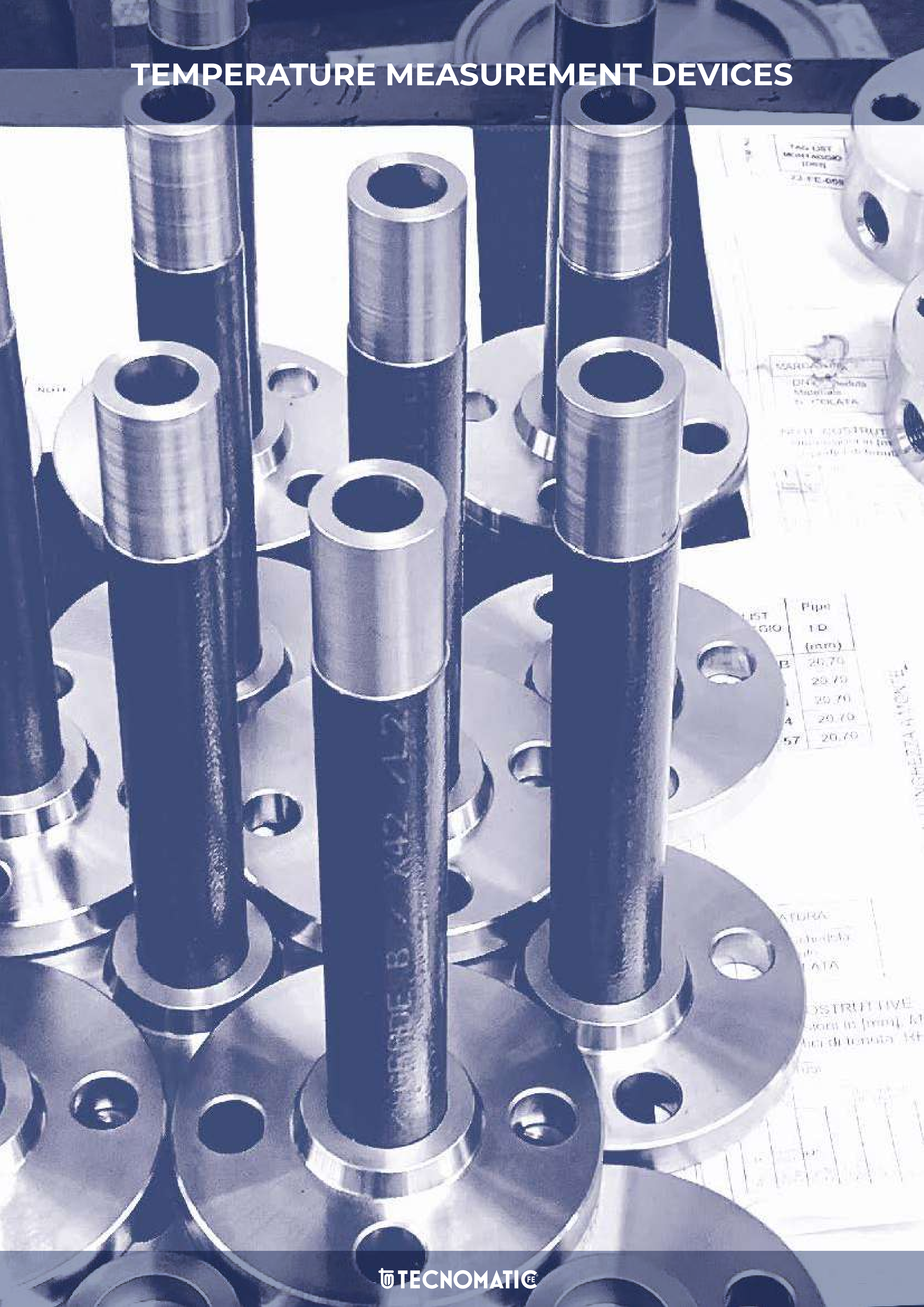
The Meter run assembly is suitable to measure the flow rate when a high accuracy is requested on small pipe diameters. It consists of an orifice plate mounted between measuring flanges and upstream and downstream spools.

TECHNICAL SPECIFICATIONS	
TYPE OF ELEMENTS	Square Edge Orifice / Conical Entrance Orifice
MATERIAL	As per Customer's requirements / Main material Reference: ASTM-ASME Code
TYPE OF PRESSURE TAPS	Flange Taps / Corner Taps
TYPE OF CONSTRUCTION	· Flange Taps: with pressure taps on flanges or on carrier ring · Corner Taps: with pressure taps on flanges, or on annular chambers, or on a monolithic plate
FLOW CALCULATION	Main Reference code: ISO 5167/ASME MFC-14M: ASME PTC 19.5
TYPE OF PLACE CONNECTIONS	All / Main Connections: RF-RJ
TYPE OF FLANGES	WN-SW-THD-SO according to International Standards (ANSI/ASME/UNI/DIN/API)

STANDARD LIMITS & APPLICATION FIELDS	
DIMENSIONS	All taps configurations: 1/2"÷ 1 1/2"
BETA RATIO	All taps configurations: 0.1÷0.8
REYNOLDS NUMBER RANGE	For beta ratio up to 0.56: greater than 5000 (for lower Reynolds numbers, special orifice types are required)

PERFORMANCES	· Accuracy (referred to the discharge coefficient): as per ISO Code · Rangeability: 1÷4.5 · Repeatability: +/- 0.1% · Max PPL 50÷70% of full scale differential pressure · Straight Lengths Requirements: as per ISO 5167
CALIBRATION	· Accuracy (referred to the discharge coefficient) after calibration in an accredited laboratory: +/- 0.25%
NOTES	· Flow Meters can be manufactured according to Customer specifications · Flow Meter can be supplied complete with all relevant accessories (valves / manifold / condensing pot / transmitter / fitting / tubing)

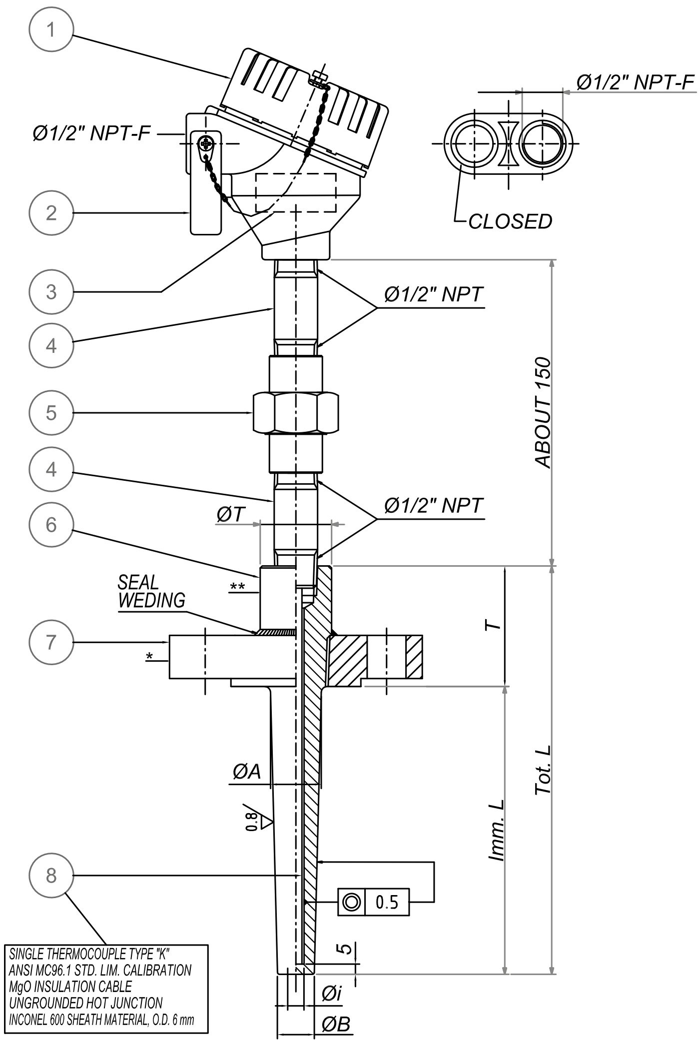
TEMPERATURE MEASUREMENT DEVICES



THERMOCOUPLES

Thermocouples are the temperature sensing elements most widely used throughout industry for temperature measurements. Their inherent simplicity and low cost together with good characteristics of accuracy and reproducibility, make them precious and handy tools to answer the many challenging probes encountered in modern producing Processes. TM Tecnomatic thermocouple assemblies are produced in a wide variety of designs to fit practically all applications.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Insert with accessories / Complete assemblies with / without Thermowell
MATERIAL	All material requested by the customer / Material Specifications : all
TYPE OF CONSTRUCTION	Manufactured according to the Customer's requirements (Type E, J, K, R, S ,T, B, C, N);



Item	Q.ty	Description	Material
8	1	SINGLE T/C TYPE "K"	
7	1	ϕ..... FLANGE	
6	1	BAR-STOCK THERMOWELL	
5	1	ϕ1/2" NPT-F/F UNION	
4	2	ϕ1/2" SCH. 80S NIPPLE	
3	1	TERMINAL BLOCK	
2	1	NAMEPLATE	
1	2	CONNECTION HEAD	

General Arrangement

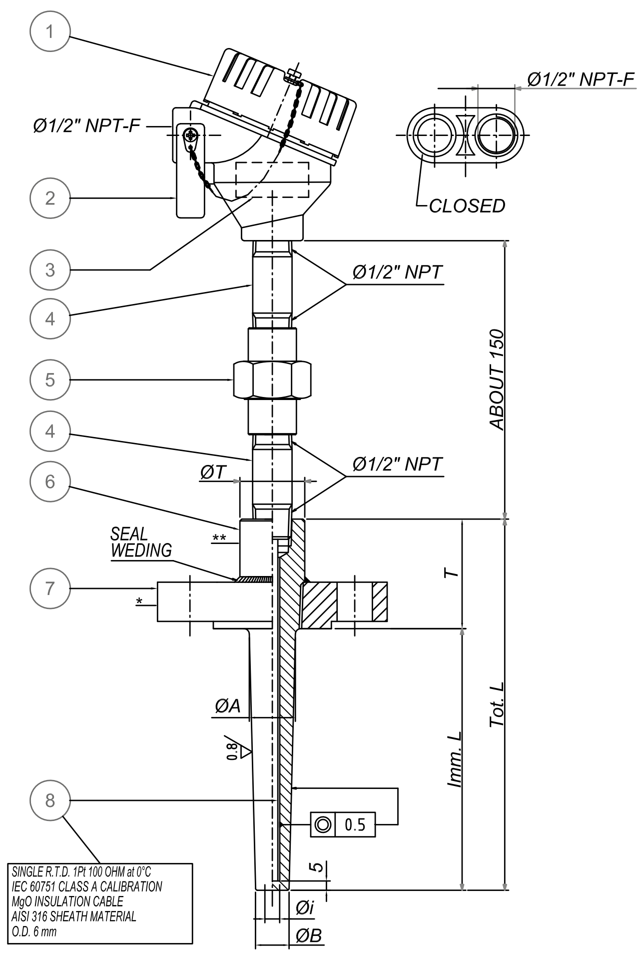
RESISTANCE TEMPERATURE DETECTORS

Tecnomatic RTD are carefully selected to meet the basic resistance values and accuracies specified from IEC 60751 Nominal resistance value is 100 ohm at 0° C. Standard bulbs have platinum or Nickel wound resistance elements, with hard glass or ceramic base.

One, two or three windings are available on the same bulb. Resistance thermometer bulbs always take up the mean value of the temperature operating over the full winding length, therefore it is important that the full length of the element is exposed to the medium whose temperature is to be measured.

Trouble free working of resistance thermometer bulbs is dependent on proper care being taken in their Installation and the selection of associated components used for this purpose. For this reason we recommend the use of TM resistance inserts. TM Tecnomatic resistance thermometer inserts are built up from nickel or st. tube. Standard insert sizes are 4, 6 or 8mm O.D. Resistance thermometer bulbs conforming to most other known international standards are already available upon request.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Insert with accessories / Complete assemblies with / without Thermowell
MATERIAL	All material requested by the customer / Material Specifications : all
TYPE OF CONSTRUCTION	Manufactured according to the Customer's requirements



Item	Q.ty	Description	Material
8	1	SINGLE RTD	
7	1	ϕ..... FLANGE	
6	1	BAR-STOCK THERMOWELL	
5	1	ϕ1/2" NPT-F/F UNION	
4	2	ϕ1/2" SCH. 80S NIPPLE	
3	1	TERMINAL BLOCK	
2	1	NAMEPLATE	
1	2	CONNECTION HEAD	

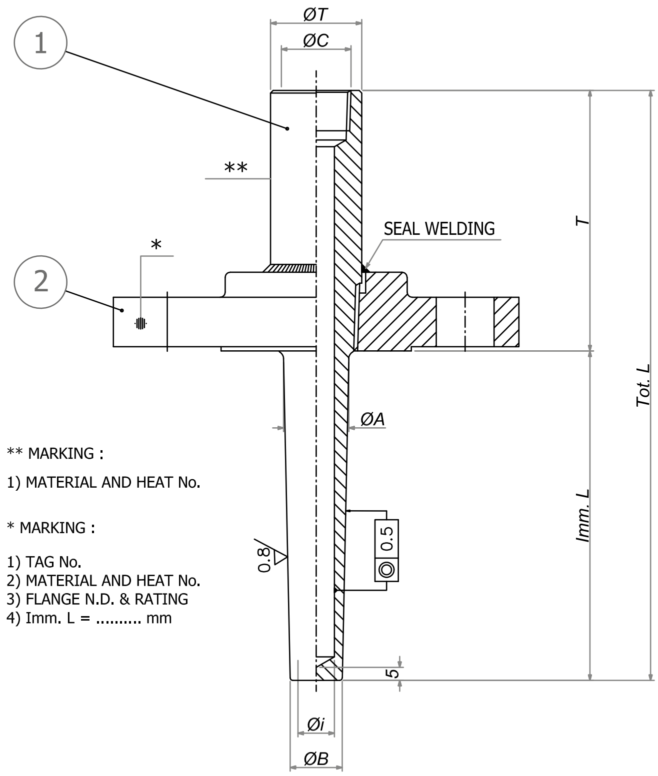
General Arrangement

PERFORMANCES	· Versatility · Different Type of Connections · Accurate detection
CALIBRATION	· Calibration according to International Standards (IEC 60751, ect.)
NOTES	· Our temperature elements are custom designed to fit all your specific process parameters

THERMOWELLS

Thermowells are precise components serving as protective devices for the primary or sensing temperature elements, as thermocouples, resistance thermometer bulbs, bimetallic thermometers, filled system, etc. of all types of temperature indicating, recording and controlling instruments. Particular care, together with long experience and specially designed drilling machines, guarantee the choice of materials and construction of TM Tecnomatic thermowells.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Bar Stock Thermowell / Pipe Thermowell
MATERIAL	All material requested by the customer / Material Specifications : all
TYPE OF CONSTRUCTION	Manufactured according to the Customer's requirements



2	1	Ø..... FLANGE	
1	1	BAR-STOCK THERMOWELL	
Item	Q.ty	Description	Material

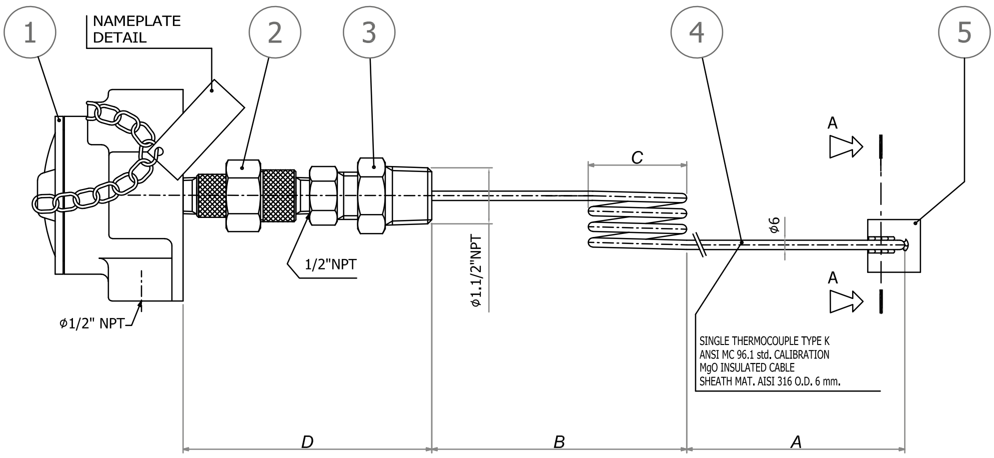
General Arrangement

PERFORMANCES	· Versatility: they are the most widely used throughout industry for temperature measurements · Resistance: they are built to resist to pressure and temperature sollicitations; Accurate temperature and steam velocities measurements
STRESS CALCULATION	· On request it is possible to verify thermowells according to ASME PTC 19.3 (Latest revision)
NOTES	· Our assemblies are custom designed to fit all your specific process parameters

SKIN THERMOCOUPLES

These thermocouples are built in such a way to guarantee the most intimate contact with the controlled surface together with better accuracy and high speed of response. Suitable for boilers, furnaces, super heaters process tubes, heater tubes and many other applications

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Insert or complete assemblies with different accessories (union, nipples, pad, flanged or threaded process connection, etc.)
MATERIAL	All material requested by the customer / Material Specifications : all
TYPE OF CONSTRUCTION	Manufactured according to the Customer's requirements



Item	Q.ty	Description	Material
6	1	CLIP	
5	1	WELDING PAD	
4	1	SINGLE THERMOCOUPLE TYPE "K"	
3	1	COMPRESSION FITTING	
2	1	UNION	
1	1	CONNECTION HEAD	

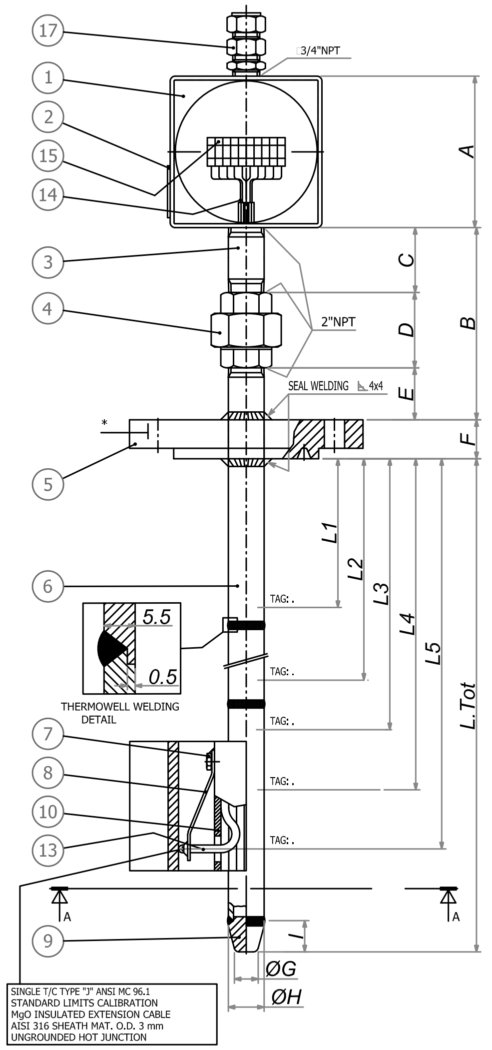
General Arrangement

PERFORMANCES	· Versatility: they are the most widely used throughout industry for temperature measurements · Accuracy and Reproducibility: make their precious and handy tools to answer the many challenging problem encountered in modern producing processes · Accurate detection
CALIBRATION	· Calibration according to International Standards (ANSI , IEC, ect.)
NOTES	· Our temperature elements are custom designed to fit all your specific process parameters

MULTIPOINT THERMOCOUPLES ASSEMBLIES (Radial with or without Thermowell)

Multipoint thermocouple assemblies obtain fast temperature readings at different levels in deep or tall vessels reactors, catalyst beds, furnaces and other applications where individual thermocouple assemblies would be too difficult or costly to install. Because of the many different conditions peculiar to each application, Multi Point Thermocouples Radial or Thermowell Type generally are custom designed. They are built with the proper number of protecting tubes with thermocouples inside, protecting tube diameter, thickness, lengths, materials, fittings, flange, extension wires, flexible conduits, supporting frame and junction boxes to suit your individual installation.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations
TYPE OF ELEMENTS	Radial / With Thermowell / Without Thermowell
MATERIAL	All material requested by the customer / Material Specifications : all
TYPE OF CONSTRUCTION	Manufactured according to the Customer's requirements



Item	Q.ty	Description	Material
17	1	CABLE GLAND FOR ARMOURED	
16	2	GASKET	
15	10	TERMINALS	
14	5	FLEXIBLE EXTENSION WIRE	
13	5	SINGLE TC TYPE "J"	
12	1	SUPPORTING RING	
11	1	SWAGE	
10	1	SUPPORTING PIPE	
9	1	TIP FROM BAR STOCK	
8	1	BIMETALLIC STRIP	
7	5	FIXING SCREW	
6	1	ϕ2" Sch. 80S PIPE THERMOWELL	
5	1	ϕ3" ANSI 600 RTJ FLANGE	
4	1	ϕ2" NPT-F/F UNION	
3	1	ϕ2"Sch. 80S NIPPLE	
2	1	NAMEPLATE	
1	1	JUNCTION BOX	

General Arrangement

PERFORMANCES	· Versatility · Wide range of configurations · Accurate reading
CALIBRATION	· Calibration according to International Standards (IEC 60751, ect.)
NOTES	· Our temperature elements are custom designed to fit all your specific process parameters

PROFESSIONAL SERVICES

TRAINING

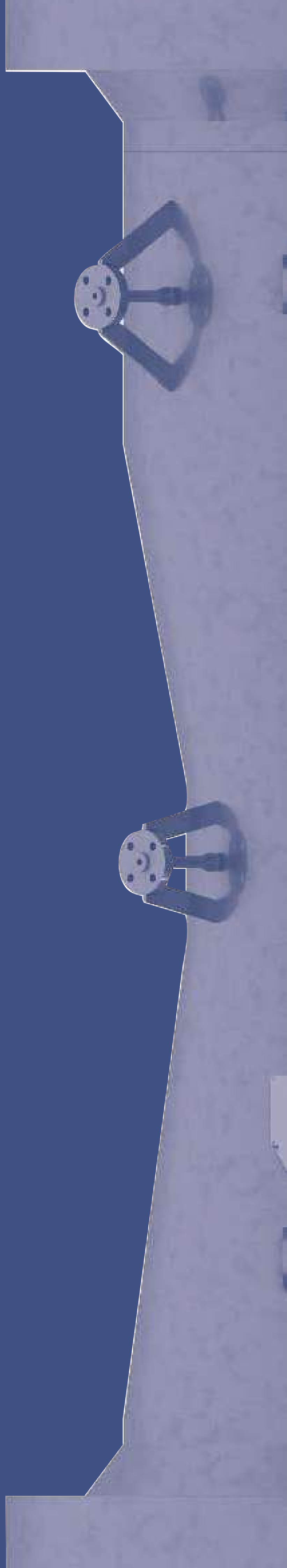
Tecnomatic offers specific Technical Training on the use and performance of its products on site or at its head office. Our Engineers can work closely with you to ensure your employees have the skills needed to ensure safety and efficiency during line operation and intervene immediately in case of possible displayed signals of errors.

SUPERVISION

Our highly qualified staff can assist and survey the maintenance, commissioning or start-up activities to facilitate quick assistance, minimize downtime and improve the various assembly phases of our instrumentation ensuring the correct placement and application of the items. In this way the performance is not compromised.

MAINTENANCE

Tecnomatic can assist you when you do not have sufficient knowledge or the necessary resources to perform periodic maintenance on our instruments.



TECNOMATIC

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