NUOVA FIMA SPA
Industrial Instrumentation for Pressure and Temperature

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Codice Fiscale/Partita IVA 01719710038
Reg. Imp. Novara 10895/1999 –REA 193327

Spett.le Società

DESMET BALLESTRA
Via P. Portaluppi, 17

20138 MILANO

Alla c.a. UFF. ARCHIVIO

NS. RIF.341/MT/12

lunedì 15 ottobre 2012

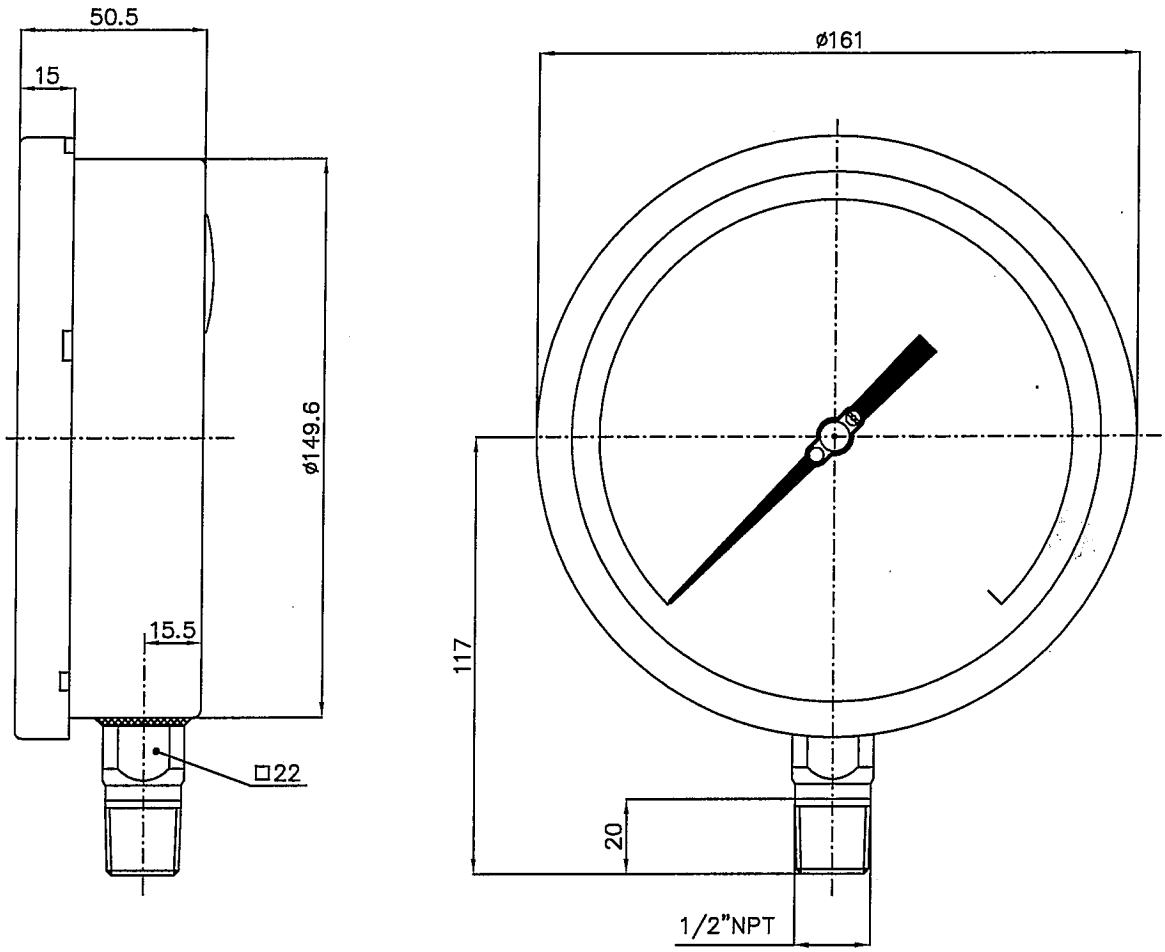
OGGETTO: ORDINE **121250 JOB 2F11A + 121844**

In allegato provvediamo a trasmetterVi quanto segue:

- N° 3 COPY FINAL CERTIFICATION
-
-
-
-
- ANTICIPATO ½ MAIL (**stampa.centro@ballestra.com**)

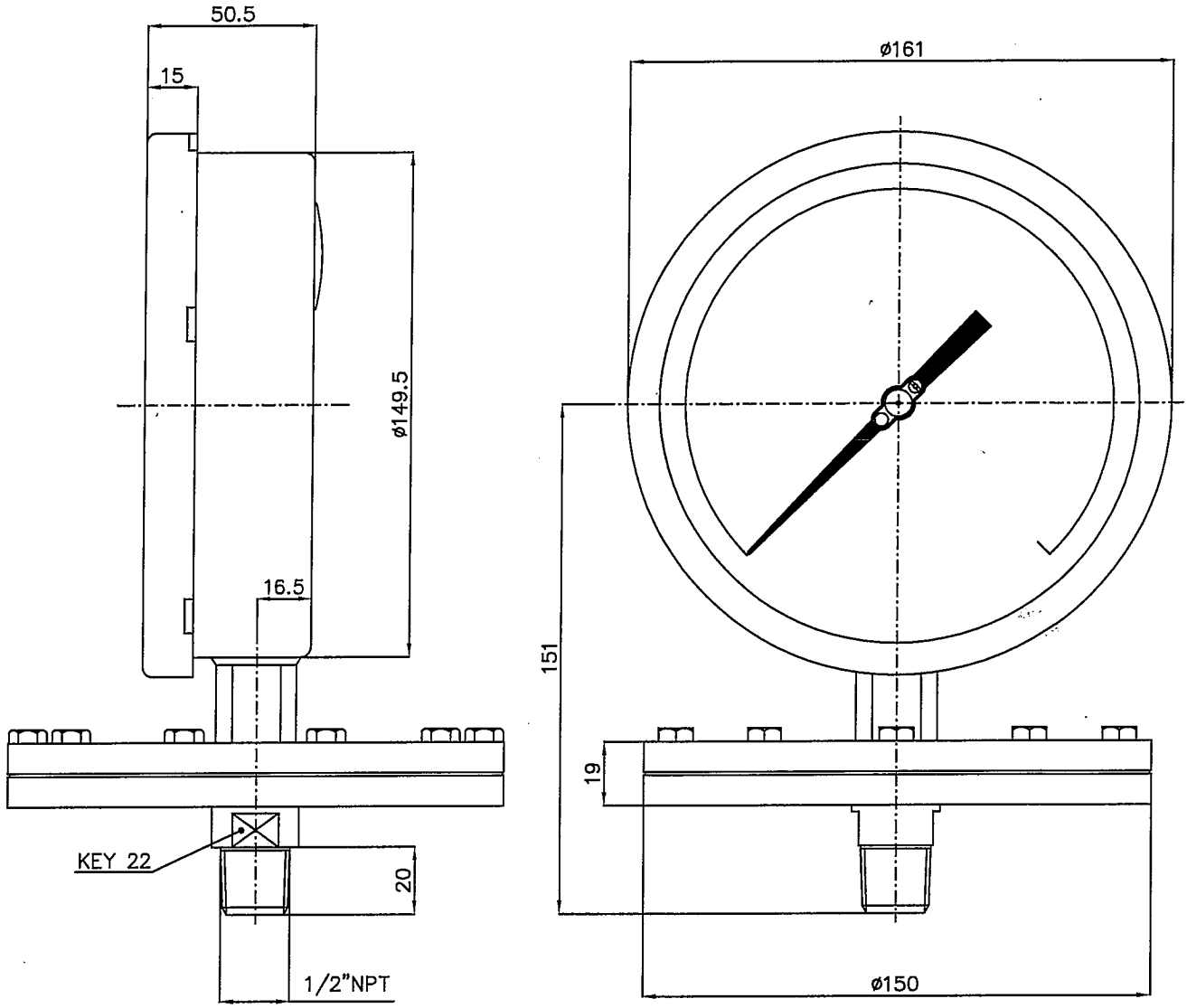
I suddetti documenti sono relativi al materiale di cui al Vs. ordine in oggetto.
ci è gradito l' incontro per porgerVi ben cordiali saluti.

NUOVA FIMA S.p.A.
UFFICIO DOCUMENTAZIONE
Monica Talarico



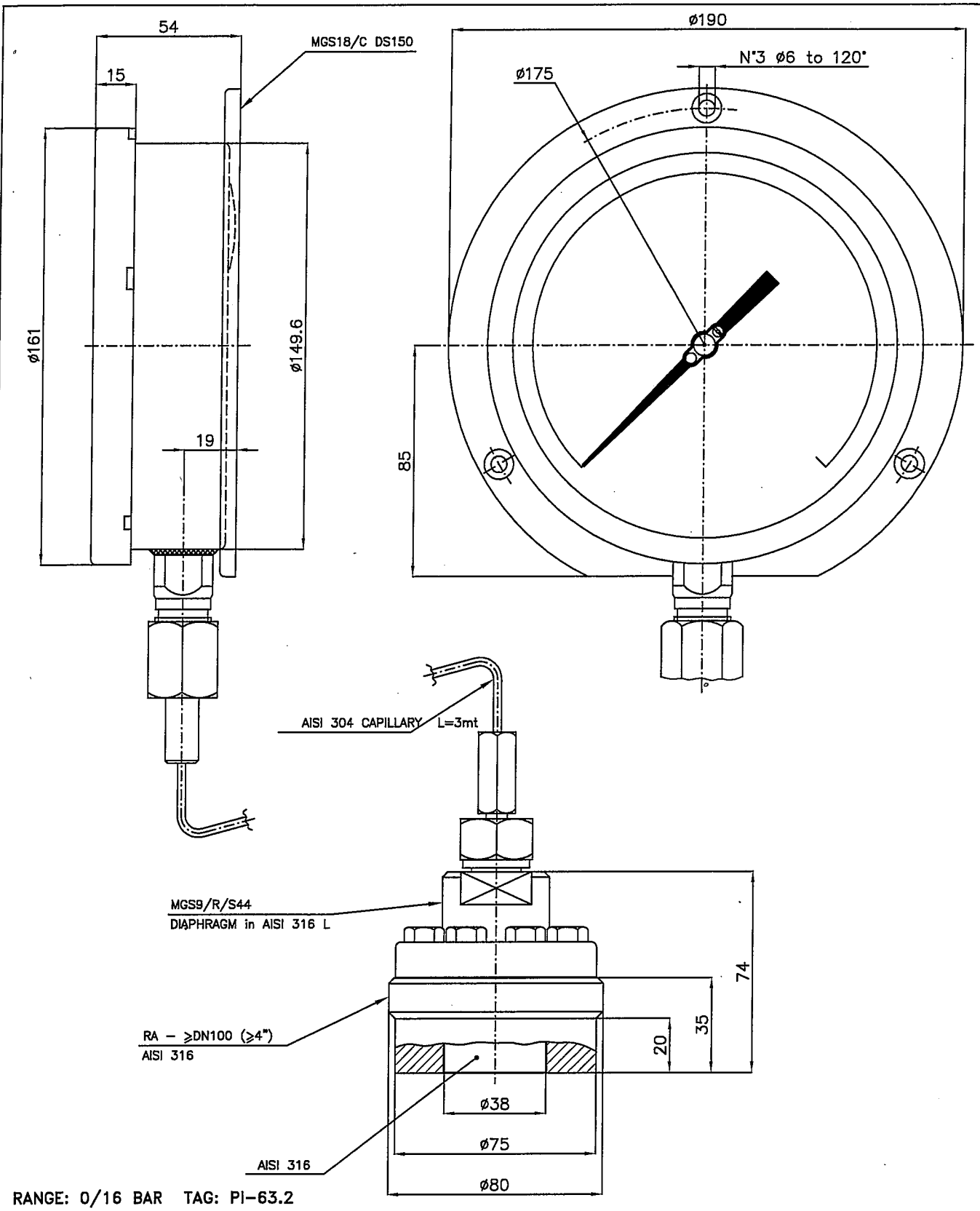
RANGE: 0/10 BAR TAG: PI-63.1
0/6 BAR TAG: PI-63.6
0/16 BAR TAG: PI-64.8
0/1 BAR TAGS: PI-64.6/64.7

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG: C D	ANNO-YEAR: 1 2	COMMESSA-JOB: 2 5 2 1	PAGINA-SHEET: 0 1		
IN	Codice – Code: 01/18-1-A-G-43M	Scala – Scale: 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX		Dis. Drn	Coll. Inspect.	Data Date
			Rev.	Descrizione – Description			
	Dimensioni – Dimensions: mm		0	EMISSION	Flora	Fanelli	25/06 2012
	Modello – Model: PRESSURE GAUGE TYPE MGS18/A DS150 1/2"NPT M						
	Cliente – Purchaser: DESMET BALLESTRA SPA			Ordine Cliente – Purchaser Order: 121250			
	Impianto – Plant: /			Note – Notes: JOB 2F11A			



RANGE: -15/10 MBAR TAG: PI-64.9

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG C D	ANNO-YEAR 1 2	COMMESSA-JOB 2 5 2 1	PAGINA-SHEET 0 2		
IN Codice – Code 02/42-1-A-G-7-43M	Scala – Scale 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX			Dis. Drn	Coll. Inspect.	Data Date
		Rev.	Descrizione – Description				
Dimensioni – Dimensions mm		0	EMISSION				25/06 2012
Modello – Model DIAPHRAGM PRESSURE GAUGE TYPE MN12/18/A DS150 (25÷400 mbar) 1/2"NPT M							
Cliente – Purchaser DESMET BALLESTRA SPA		Ordine Cliente – Purchaser Order 121250					
Impianto – Plant /		Note – Notes JOB 2F11A					



RANGE: 0/16 BAR TAG: PI-63.2

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG	ANNO–YEAR	COMMESSA–JOB	PAGINA–SHEET
		C D	1 2	2 5 2 1	0 3

IN	Codice – Code	Scala – Scale
	01/18-1-C-G-41M + 04/R00-4-4-000-41F-1 + 05/7RA-4-H00-000	1 : 2

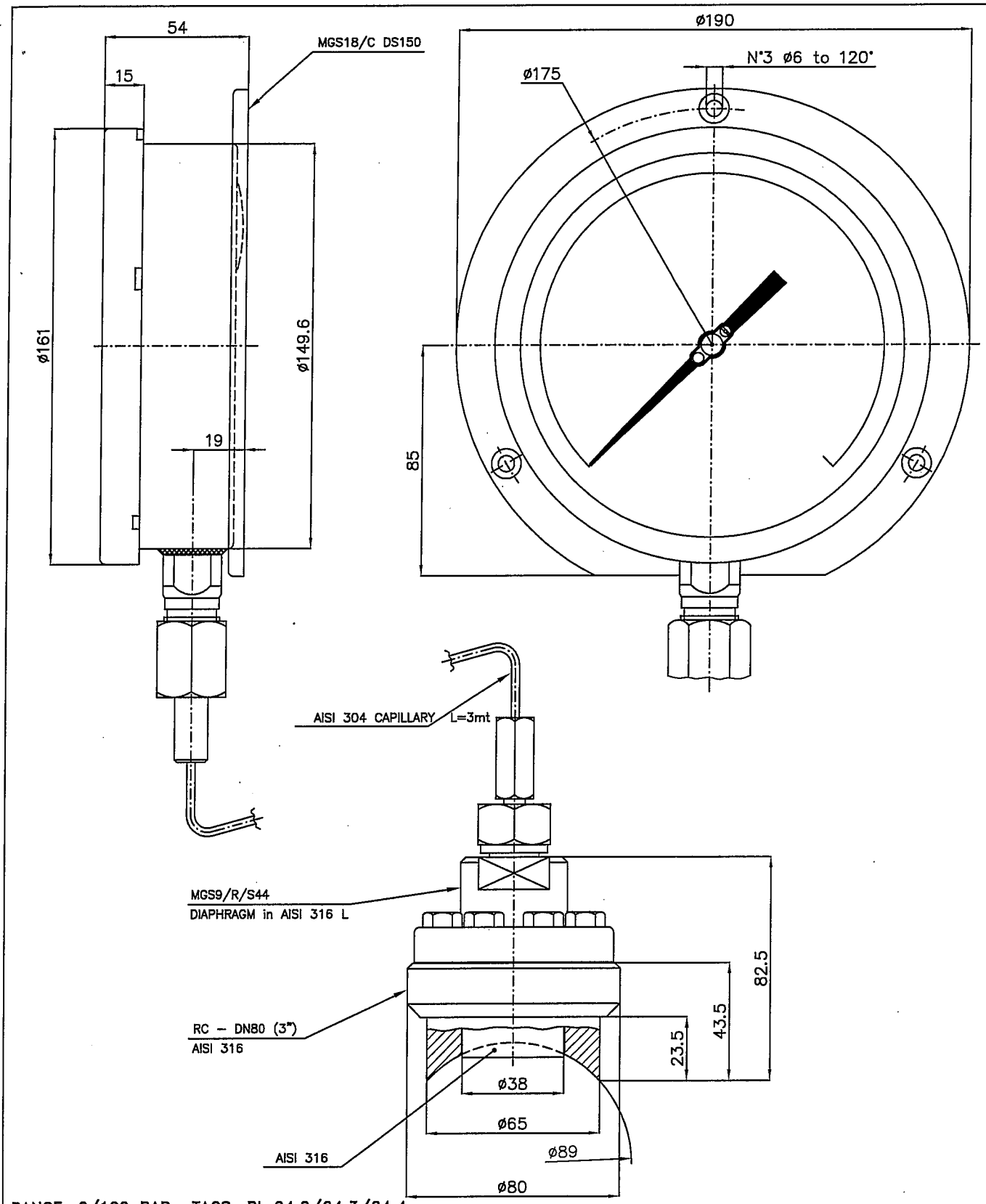
Dimensioni – Dimensions mm

Modello – Model

PRESSURE GAUGE TYPE MGS18/C DS150 + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 CAPILLARY + SADDLE WELDED TYPE RA ≥DN100 (4")

INDICE DELLE REVISIONI – REVISIONS INDEX		Dis.	Coll.	Data
Rev.	Descrizione – Description	Drn	Inspect.	Date
0	EMISSION			25/06 2012

Cliente – Purchaser	Ordine Cliente – Purchaser Order
DESMET BALLESTRA SPA	121250
Impianto – Plant	**Note – Notes**
/	JOB 2F11A



RANGE: 0/100 BAR TAGS: PI-64.2/64.3/64.4

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG: C D	ANNO–YEAR: 1 2	COMMESSA–JOB: 2 5 2 1	PAGINA–SHEET: 0 4

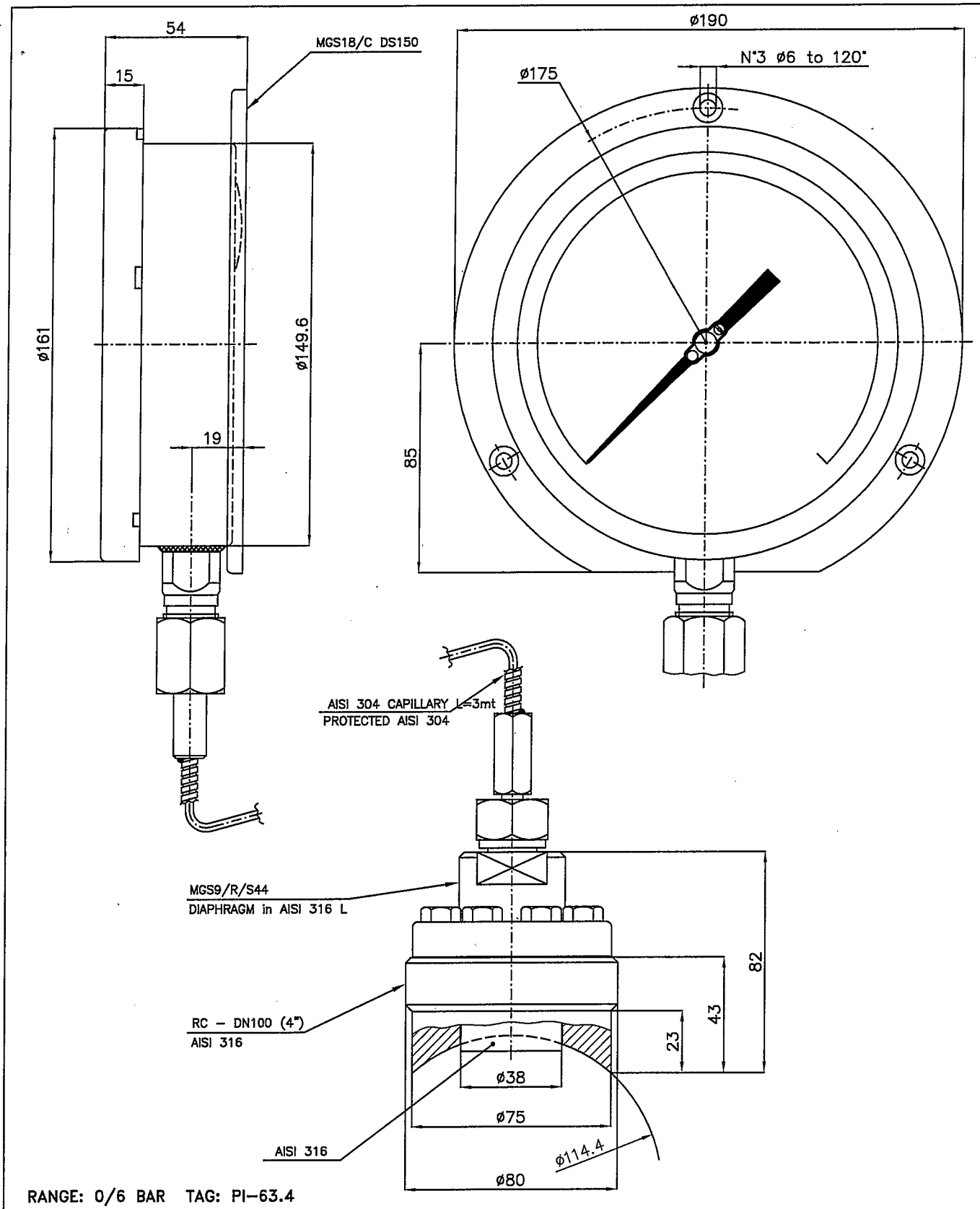
IN	Codice – Code: 01/18-1-C-G-41M + 04/R00-4-4-000-41F-1 + 05/7RC-4-100-000	Scala – Scale: 1 : 2			
Dimensioni – Dimensions: mm					

INDICE DELLE REVISIONI – REVISIONS INDEX				
Rev.	Descrizione – Description	Dis. Drn	Coll. Inspect.	Data Date
0	EMISSION	Fiora	Fausto	25/06 2012

Modello – Model

PRESSURE GAUGE TYPE MGS18/C DS150 + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 CAPILLARY + SADDLE WELDED TYPE RC DN80 (3")

Cliente – Purchaser: DESMET BALLESTRA SPA	Ordine Cliente – Purchaser Order: 121250
Impianto – Plant: /	Note – Notes: JOB 2F11A



RANGE: 0/6 BAR TAG: PI–63.4

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG	ANNO–YEAR	COMMESSA–JOB	PAGINA–SHEET
		C D	1 2	2 5 2 1	0 5

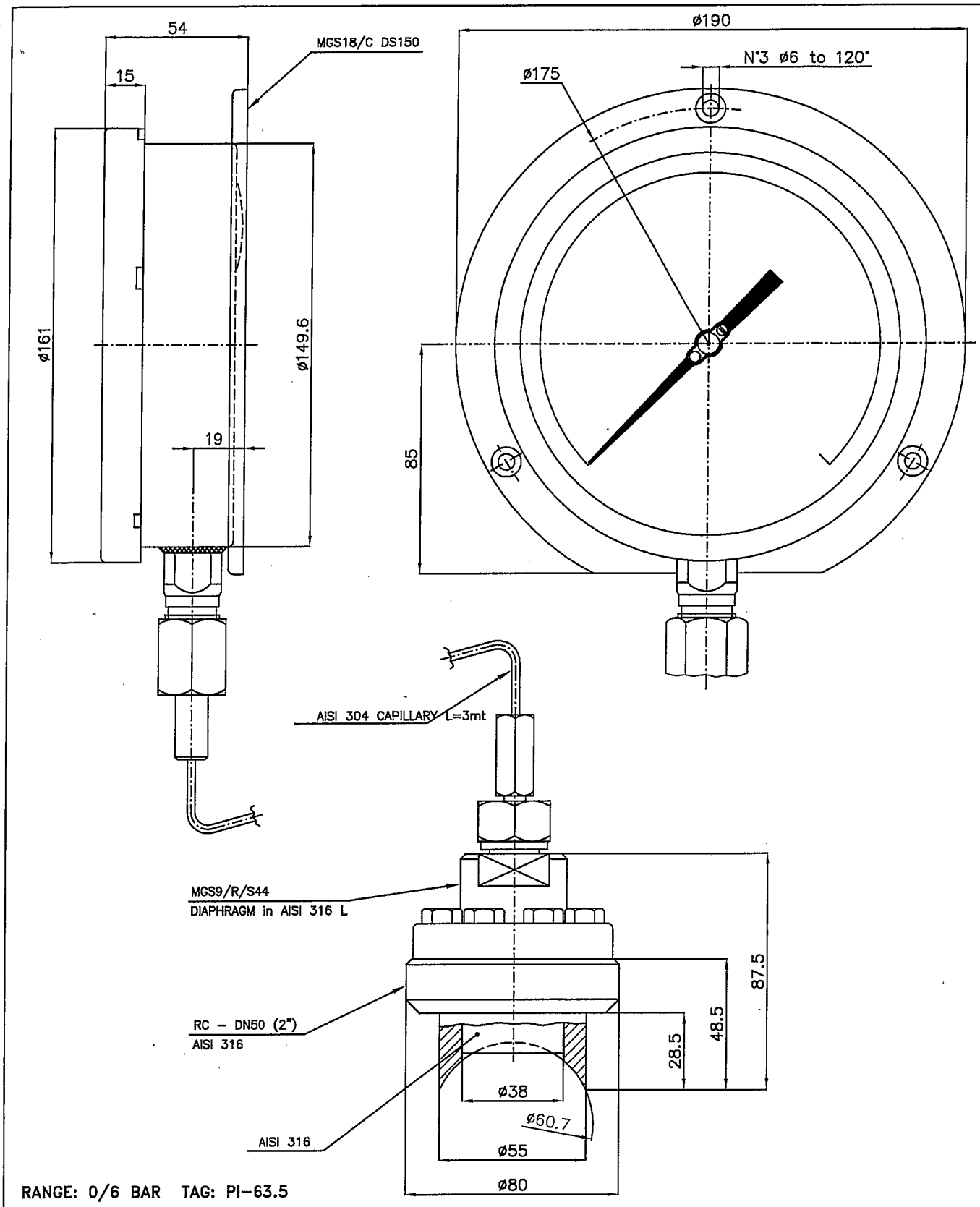
IN	Codice – Code	Scala – Scale
	01/18–1–C–G–41M + 04/R00–4–4–000–41F–9 + 05/7RC–4–H00–000	1 : 2

Dimensioni – Dimensions mm

INDICE DELLE REVISIONI – REVISIONS INDEX		Dis.	Coll.	Data
Rev.	Descrizione – Description	Drn	Inspect.	Date
0	EMISSION	Nora	Fanelli	25/06 2012

Modello – Model
PRESSURE GAUGE TYPE MGS18/C DS150 + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 PROTECTED CAPILLARY + SADDLE WELDED TYPE RC DN100 (4")

Cliente – Purchaser	Ordine Cliente – Purchaser Order
DESMET BALLESTRA SPA	121250
Impianto – Plant	**Note – Notes**
/	JOB 2F11A



RANGE: 0/6 BAR TAG: PI-63.5

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG	ANNO–YEAR	COMMESSA–JOB	PAGINA–SHEET
		C D	1 2	2 5 2 1	0 6

IN	Codice – Code	Scala – Scale
	01/18-1-C-G-41M + 04/R00-4-4-000-41F-1 + 05/7RC-4-L00-000	1 : 2

Dimensioni – Dimensions mm

Modello – Model

PRESSURE GAUGE TYPE MGS18/C DS150 + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 CAPILLARY + SADDLE WELDED TYPE RC DN50 (2")

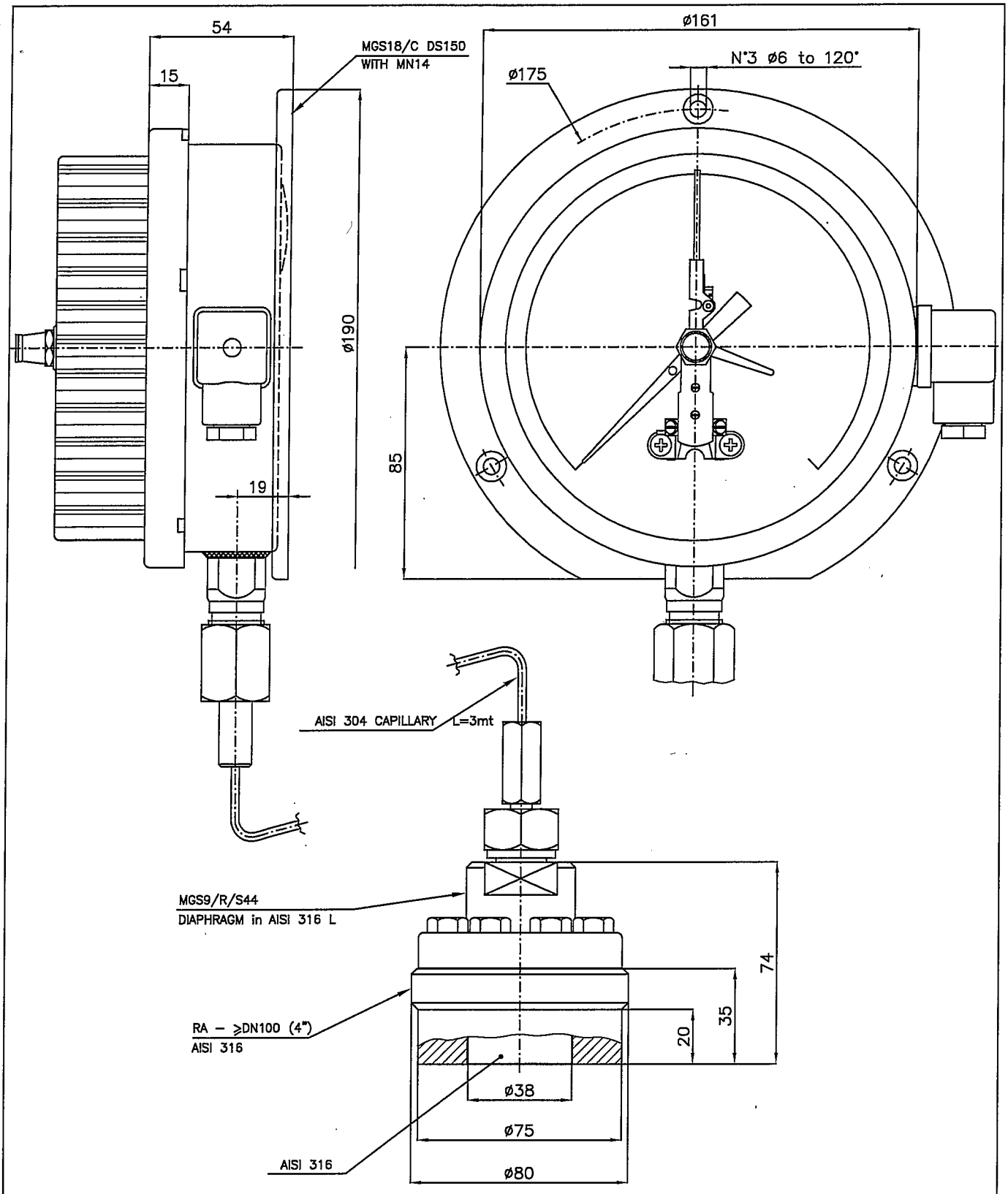
INDICE DELLE REVISIONI – REVISIONS INDEX		Dis. Drn	Coll. Inspect.	Data Date
Rev.	Descrizione – Description			
0	EMISSION	Mora	Fanelli	25/06 2012

Cliente – Purchaser
DESMET BALLESTRA SPA

Ordine Cliente – Purchaser Order
121250

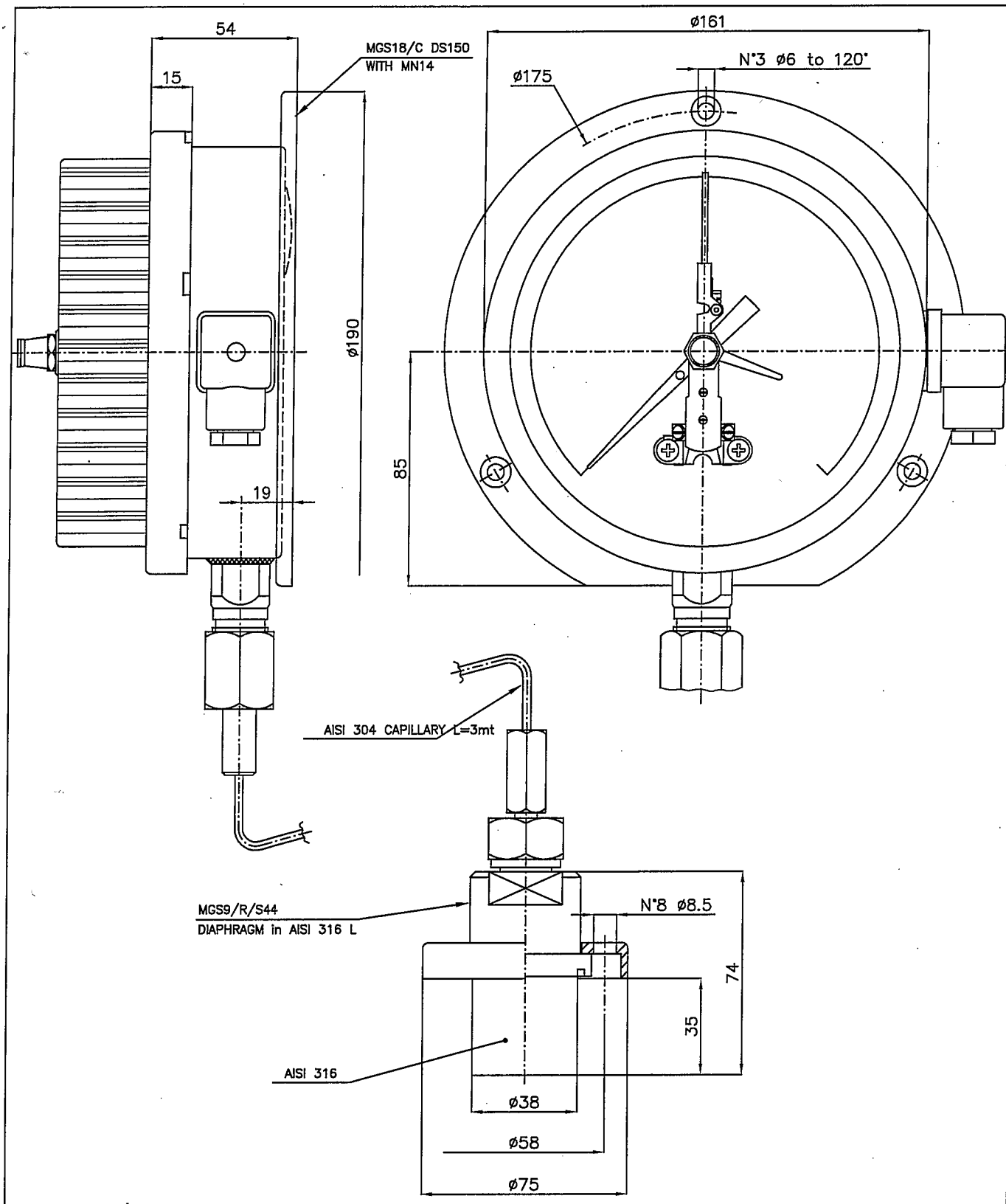
Impianto – Plant
/

Note – Notes
JOB 2F11A



RANGE: 0/16 BAR TAGS: PISH-63.2A/63.2B

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG: C D	ANNO–YEAR: 1 2	COMMESSA–JOB: 2 5 2 1	PAGINA–SHEET: 0 7	
IN	Codice – Code: 01/M8-1-C-G-41M-0_S-CH1 + 04/R00-4-4-000-41F-1 + 05/7RA-4-H00-000	Scala – Scale: 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX		Dis. Drn	Coll. Inspect.	Data Date
			Rev.	Descrizione – Description			
Dimensioni – Dimensions mm			0	EMISSION	Nora	Fausto	25/06 2012
Modello – Model: PRESSURE GAUGE TYPE M8/1/C DS150 WITH SINGLE ELECTRICAL CONTACT + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 CAPILLARY + SADDLE WELDED TYPE RA ≥DN100 (4")							
Cliente – Purchaser: DESMET BALLESTRA SPA			Ordine Cliente – Purchaser Order: 121250				
Impianto – Plant: /			Note – Notes: JOB 2F11A				

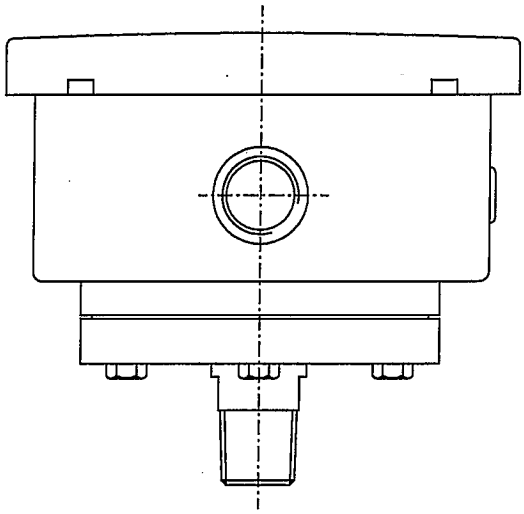


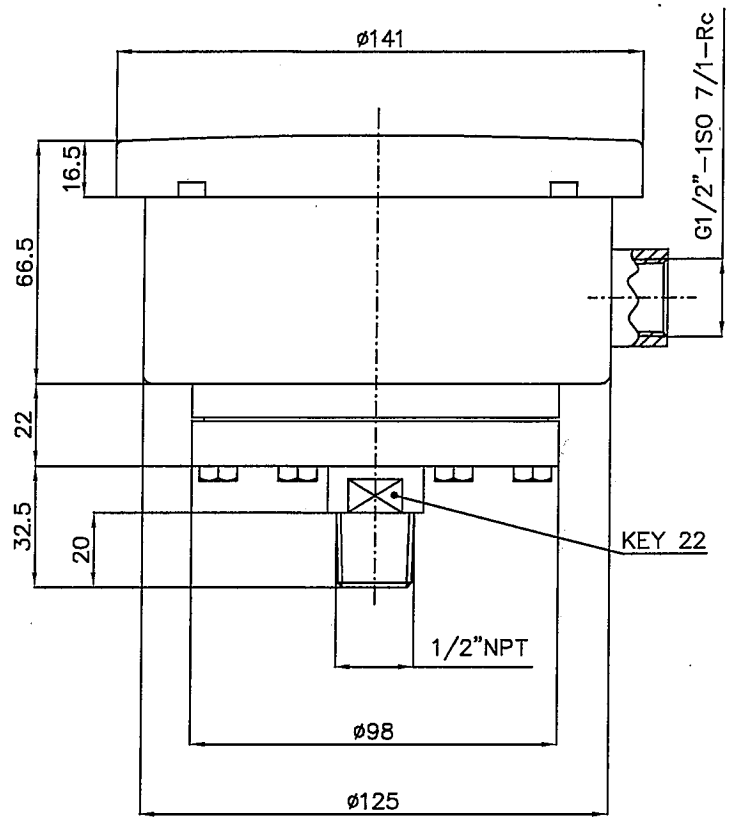
RANGE: 0/100 BAR TAG: PISH-63.3

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG C D	ANNO-YEAR 1 2	COMMESSA-JOB 2 5 2 1	PAGINA-SHEET 0 8

IN	Codice – Code 01/M8-1-C-G-41M-0_S-CH1 + 04/R00-4-4-000-41F-1	Scala – Scale 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX Rev.	Descrizione – Description	Dis. Drn	Coll. Inspect.	Data Date
Dimensioni – Dimensions mm			0	EMISSION	Nora	Fausto	25/06 2012
Modello – Model PRESSURE GAUGE TYPE M8/C DS150 WITH SINGLE ELECTRICAL CONTACT + DIAPHRAGM SEAL TYPE MGS9/R/S44 WITH AISI 304 CAPILLARY							

Cliente – Purchaser DESMET BALLESTRA SPA	Ordine Cliente – Purchaser Order 121250
Impianto – Plant /	Note – Notes JOB 2F11A





RANGE: 0/1.6 BAR TAGS: PSH-64.6/64.7
0/10 BAR TAGS: PSL-65.1/65.2

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO / CERTIFICATED DRAWING	DWG	ANNO-YEAR	COMMESSA-JOB	PAGINA-SHEET
		CD	12	2521	09

IN	Codice – Code	Scala – Scale
	03/27-+0.6-7_1-43M-4	1 : 2

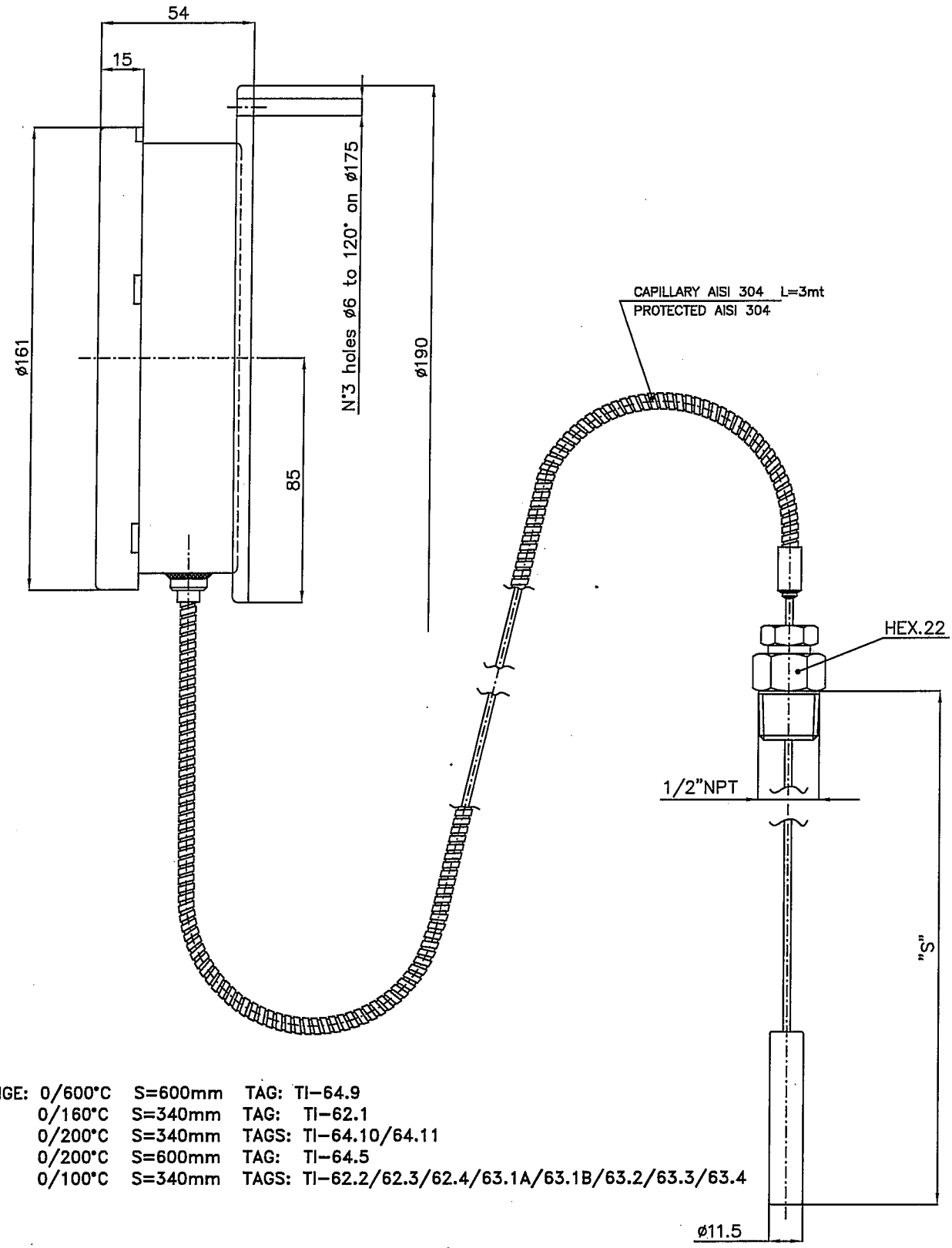
Dimensioni – Dimensions mm

Modello – Model

DIAPHRAGM PRESSURE SWITCH TYPE 3.27 (>0,6bar)
1/2"NPT M – CABLE EXIT G1/2" ISO 7/1-Rc

INDICE DELLE REVISIONI – REVISIONS INDEX		Dis. Drn	Coll. Inspect.	Data Date
Rev.	Descrizione – Description			
0	EMISSION	Nora	Fanelli	25/06 2012

Cliente – Purchaser	Ordine Cliente – Purchaser Order
DESMET BALLESTRA SPA	121250
Impianto – Plant	**Note – Notes**
/	JOB 2F11A



RANGE: 0/600°C S=600mm TAG: TI-64.9
0/160°C S=340mm TAG: TI-62.1
0/200°C S=340mm TAGS: TI-64.10/64.11
0/200°C S=600mm TAG: TI-64.5
0/100°C S=340mm TAGS: TI-62.2/62.3/62.4/63.1A/63.1B/63.2/63.3/63.4

NUOVA FIMA
INVORIO (NO) – ITALIA

DISEGNO CERTIFICATO
CERTIFICATED DRAWING

DWG	ANNO–YEAR	COMMESSA–JOB	PAGINA–SHEET
C D	1 2	2 5 2 1	1 0

IN | Codice – Code: 06/TG-8-5-9-G-43M-S1-L9S-B00

Scala – Scale: 1 : 2

Dimensioni – Dimensions: mm

Modello – Model:
GAS THERMOMETER TYPE TG859 DS150
1/2"NPT M – BULB ø11,5 – FLEXIBLE EXTENSION
PROTECTED CAPILLARY AISI 304

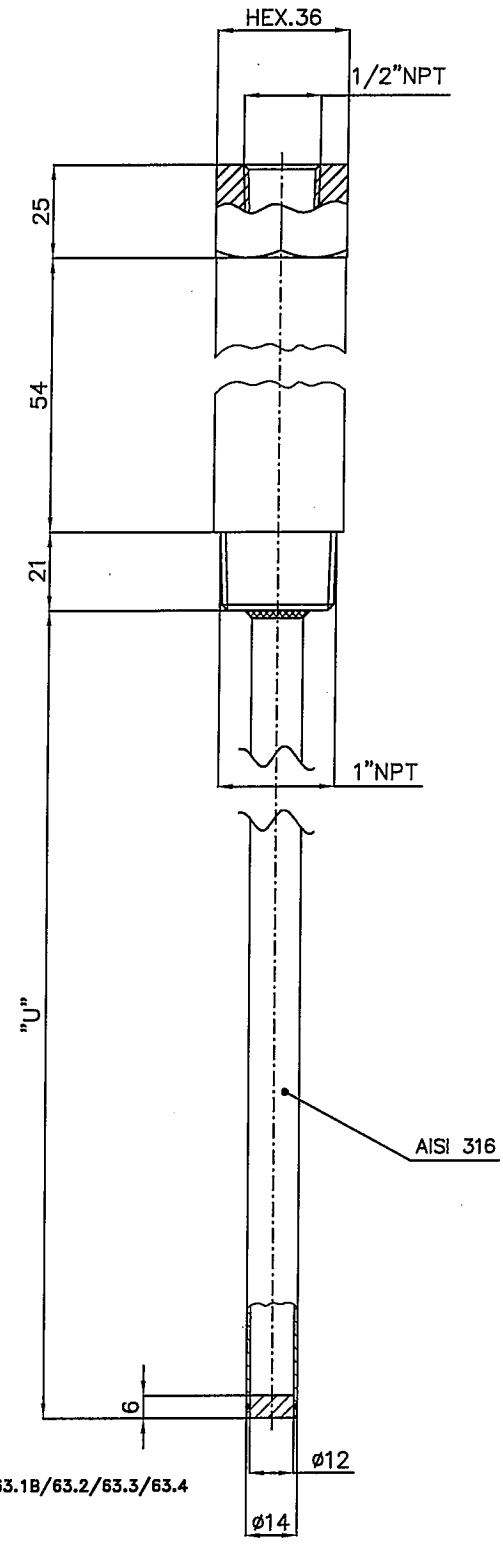
INDICE DELLE REVISIONI – REVISIONS INDEX		Dis. Drn	Coll. Inspect.	Data Date
Rev.	Descrizione – Description			
0	EMISSION	Mora	Fanelli	25/06 2012

Cliente – Purchaser: DESMET BALLESTRA SPA

Ordine Cliente – Purchaser Order: 121250

Impianto – Plant: /

Note – Notes: JOB 2F11A



U=240mm TAGS: TW-62.2/62.3/62.4/63.1A/63.1B/63.2/63.3/63.4
U=240mm TAG: TW-62.1
U=240mm TAGS: TW-64.10/64.11
U=500mm TAG: TW-64.5
U=500mm TAG: TW-64.9

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG C D	ANNO–YEAR 1 2	COMMESSA–JOB 2 5 2 1	PAGINA–SHEET 1 1

IN	Codice – Code	Scala – Scale
	09/W13-4-43F-63M-120-T	1 : 2

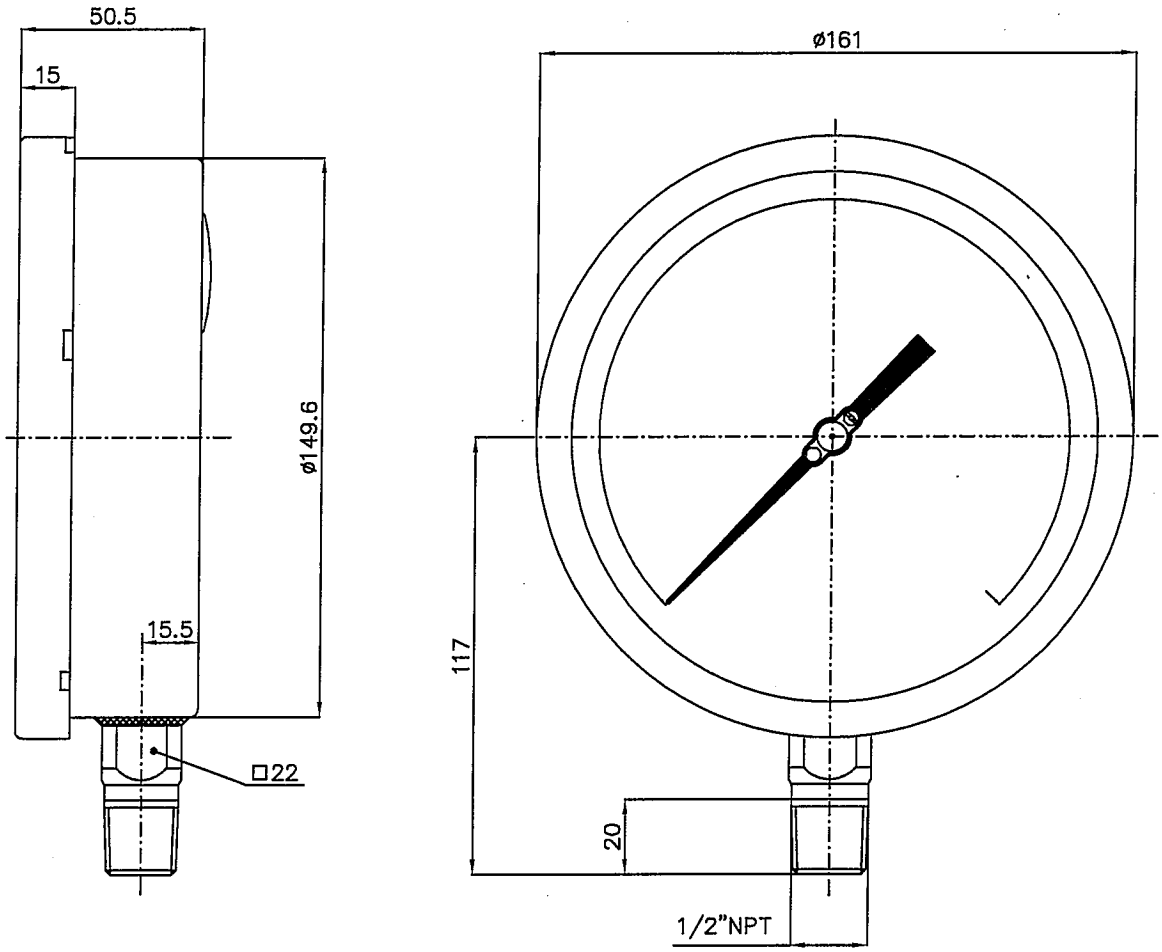
Dimensioni – Dimensions mm

Modello – Model

TUBE THERMOWELL TYPE W13 – BORE ø12
1/2"NPT F – THREADED 1"NPT M (AISI 316)
WITH EXTENSION

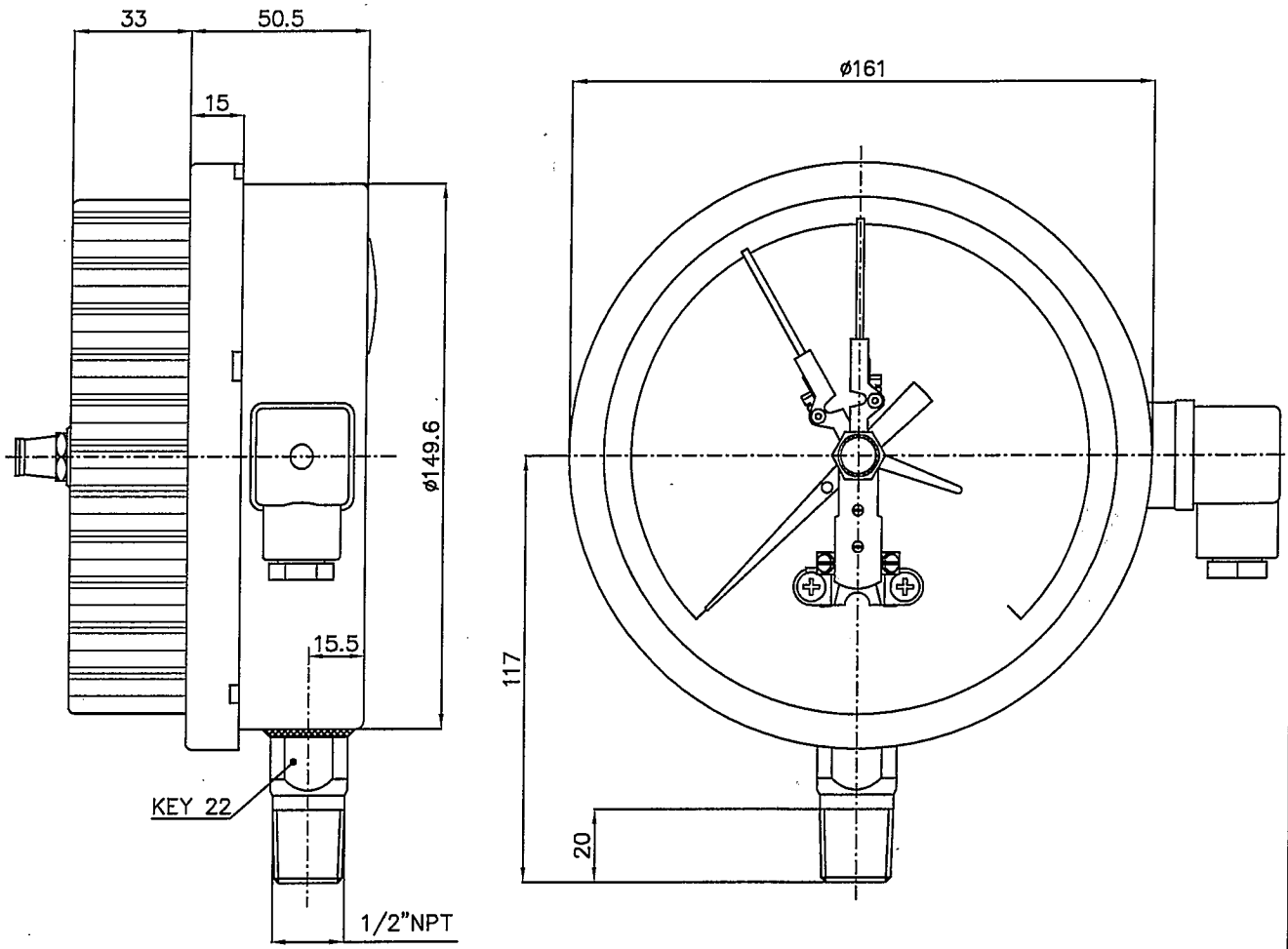
INDICE DELLE REVISIONI – REVISIONS INDEX		Dis.	Coll.	Data
Rev.	Descrizione – Description	Drn	Inspect.	Date
0	EMISSION	Mora	Favelli	25/06 2012

Cliente – Purchaser	Ordine Cliente – Purchaser Order
DESMET BALLESTRA SPA	121250
Impianto – Plant	**Note – Notes**
/	JOB 2F11A



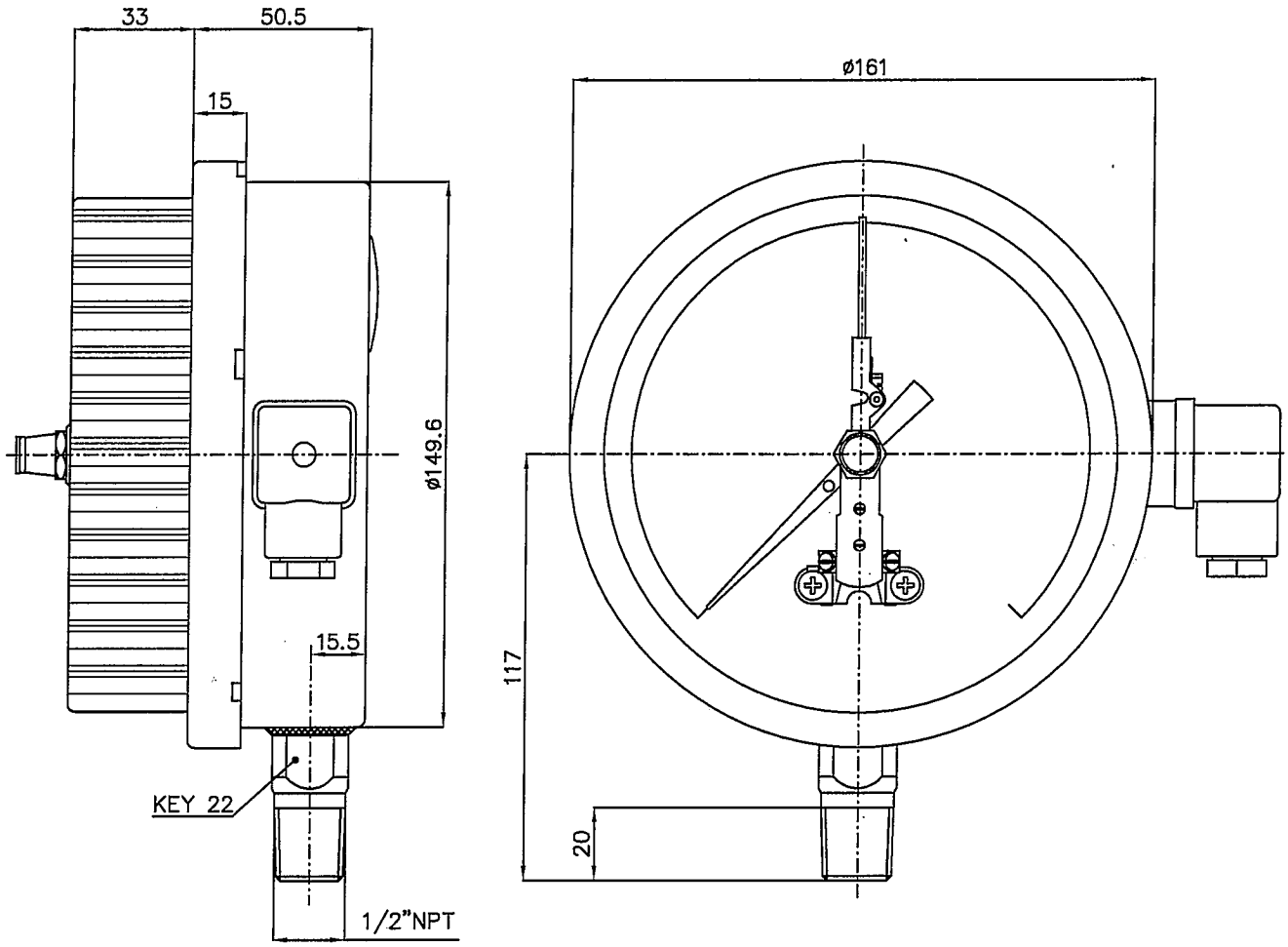
RANGE: 0/4 BAR TAGS: PI 62.F6/F2A/F2B

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG: C D	ANNO–YEAR: 1 2	COMMESSA–JOB: 3 5 1 5	PAGINA–SHEET: 0 1		
IN Codice – Code: 01/18–1–A–G–43M	Scala – Scale: 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX			Dis. Drn	Coll. Inspect.	Data Date
		Rev.	Descrizione – Description				
Dimensioni – Dimensions mm		0	EMISSION		Nora	Fanelli	29/08 2012
Modello – Model: PRESSURE GAUGE TYPE MGS18/A DS150 1/2"NPT M							
Cliente – Purchaser: DESMET BALLESTRA SPA		Ordine Cliente – Purchaser Order: 121844					
Impianto – Plant: /		Note – Notes: JOB 2F11					



RANGE: 0/4 BAR TAGS: PISHL 63.8A/63.8B

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG C D	ANNO–YEAR 1 2	COMMESSA–JOB 3 5 1 5	PAGINA–SHEET 0 2		
IN Codice – Code 01/18-1-A-G-43M-0_D-CH1	Scala – Scale 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX			Dis. Drn	Coll. Inspect.	Data Date
		Rev.	Descrizione – Description				
Dimensioni – Dimensions mm		0	EMISSION		Mora	Fausti	29/08 2012
Modello – Model PRESSURE GAUGE TYPE MN14/18/1/A DS150 WITH DOUBLE ELECTRICAL CONTACT – IP55 1/2"NPT M							
Cliente – Purchaser DESMET BALLESTRA SPA		Ordine Cliente – Purchaser Order 121844					
Impianto – Plant /		Note – Notes JOB 2F11					



RANGE: 0/10 BAR TAGS: PISH 65.1/65.2

NUOVA FIMA INVORIO (NO) – ITALIA	DISEGNO CERTIFICATO CERTIFICATED DRAWING	DWG C D	ANNO–YEAR 1 2	COMMESSA–JOB 3 5 1 5	PAGINA–SHEET 0 3			
IN	Codice – Code 01/M8-1-A-G-43M-0_S-CH1	Scala – Scale 1 : 2	INDICE DELLE REVISIONI – REVISIONS INDEX			Dis. Drn	Coll. Inspect.	Data Date
			Rev.	Descrizione – Description				
Dimensioni – Dimensions mm			0	EMISSION		Mora	Fausto	29/08 2012
Modello – Model PRESSURE GAUGE TYPE MN14/18/1/A DS150 WITH SINGLE ELECTRICAL CONTACT – IP55 1/2"NPT M								
Cliente – Purchaser DESMET BALLESTRA SPA			Ordine Cliente – Purchaser Order 121844					
Impianto – Plant /			Note – Notes JOB 2F11					

NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

User guide

BOURDON TUBE PRESSURE GAUGE
MGS – MS

MI-MAN-ENG_1
04/2012

1. General information

The instrument described in this manual has been designed and produced in conformity to the following standards:
EN 837-1-2 ed alla ASME B40.1. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations..

Standards
Directive P.E.D. 97/23/CE
Nuova Fima instruments are designed and manufactured according to the safety rules included in the safety international standards in force. According to the 97/23/CE standard the NUOVA FIMA pressure gauges are classified in 2 categories
PS 200 bar these instruments should not satisfy the essential safety standards but they have only to be designed and manufactured according to a SEP-Sound Engineering Practice and they do not have to bring any CE marking.
PS >200 bar these instruments should satisfy the essential safety standards established by the PED, they are classified as category I and they are certified according to Form A. They should bring the CE marking as reproduced below.

CE

1.1 Intended use
These instruments are designed for food, processing, pharmaceutical, petrochemical industries and for conventional and nuclear power plants. They are built to resist to the most severe conditions created by the process medium and by the environment and for those fluids, which have high viscosity and do not crystallize.

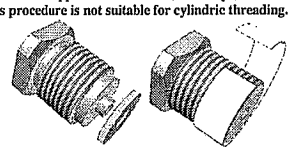
2. Installation

Attention	**Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.**
Attention	**This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).**
Attention	**The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.**
Warning	**The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.**
Warning	**Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.**
Attention	**The user is totally responsible for the instrument installation and maintenance.**
Warning	**Disconnect the instruments only after depressurization of the system.**
Warning	**The process fluids residuals in the disassembled gauges could affect people, the environment and the system. It is highly recommended to take proper precautions.**

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on.line on
www.nuovafima.com

The instrument installation should be carried out according to stadard ' EN 837-2 (Recommendation for pressure gauges installation and selection)

- The gauge should be connected to the process sytem forcing throuhg a special wrench on the process connection point without forcing on the case by the hands. As for the process connections with cylindric threading, a head gasket compatible with the fluid to be measured should be used. In case the connection threading is conic additional sealing materials are applied on the thread (PTFE tape).
This procedure is not suitable for cylindric threading.

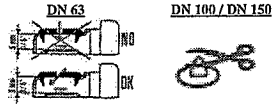


- Installation must be done according to **EN 837- 1**, Chapter 8. The user is solely responsible for any combinations that differ from the ones shown in the mentioned rule.
- The requested torcing procedure to guarantee an adequate tightness depends in the measuring range, on the threading type and on the gasket type.

Instrument with marking
Instruments with the DIN 11851 connection must be installed using special gaskets type SKS.
Instruments with process connection conformed to ISO 2853 (IDS/ISS) must be installed using those gaskets with supporting ring as described in the above mentioned directive.

- During installation of pressure gauges with a low scale range it is necessary to ventilate the case following the instructions shown on labels applied on the gauge. This procedure allows to bring the internal pressure of the case back to the atmospheric pressure value.

DN 63 | DN 100 / DN 150



- In case of fluids leakage during mounting, clean carefully.
- As for gauges with security device installation should guarantee a free space on the back side of 20mm at least.
- As for gauges with full painting which is necessary to protect it from corrosive atmospheres the safety device must be able to fully operate.
- As for gauges with surface mounting and back connection be sure that the pipe conducting the fluid in pressure is connected to the instrument connection without tensions.
- In order to guarantee the accuracy in measuring it is necessary to respect the working limits described in the catalogue sheets.
- Instruments should be installed in vibrations proof positions. If the mounting point is not stable because of vibraions a support for the instrument fixing should be used such as a clamp or a flange , possibly use a flexible capillary.
- If vibrations cannot be prevented during installation, use liquid filled instruments.
- The instrument mounting according to standard
EN 837-1 /9.6.7 established the vertical position as standard mounting. Calibration and therefore mounting positions different from standard (when requested) are shown on the dial.
- Instruments must be protected from wide ambient temperature variations.
- Instruments must be protected from sun radiations during working in order to prevent overheating.
- Liquid filled instruments used in temperatures lower than 20°C, could have higher response times because of the increase of viscosity of the filling liquid.
- During installation be sure that no deviation above or below the fluid allowed and the ambient temperatures takes place considering the heating radiations. It is necessary to consider the temperature influence on the accuracy value.
- During the first operating procedure all pressure rush should be prevented. Slowly open the interception valves.
- The use of instruments measuring the zero values is not recommended especially in gauges where the first part of the scale is suppressed.
- It is not recommended to reinstall the instruments on plants working with different process fluids in order to prevent any chemical reaction which could cause explosions owing to contamination of the wetted parts.
- If the pressure indication stays fixed for a long time be sure that this is not due to a closing up of the pipe bringing the pressure to the sensing element. Before disassembling especially in case of pressure with zero value be sure that there is no pressure inside the gauge isolating it through the interception valve.

3. Use limits

3.1 Process and ambient temperature
This standard type instrument is designed to be used in safety conditions that is in an ambient temperature between –40 and +65°C. As for the filled model please see the paragraph "DAMPENING LIQUID FILLING"
As for instruments with measuring systems in stainless steal in case of process temperatures from 150 °C, it is necessary to cool the process fluid. In these cases it is necessary to use siphons, temperature dissipators or capillaries. In case of temperatures below 0°C, it is recemmended to use liquid filled gauges preventing that the components such as the measuring system toothing can freeze. The fluid must not freeze or cristalize inside the sensing element.
3.2 Working pressure
The instrument should be chosen considering the scale range which should be between 25% and 75% of the full scale range. The full scale range should be approximately double than the working pressure value. In case the instrument is identified through a small black triangle placed on the scale range of the dial, the working pressure could reach 90% with pulsating pressures and 100% with static pressures.
3.3 Dynamic and cyclic pressures
The dynamic and cyclic pressures are normally indicated by the measuring index oscillations. They reduce the sensing element's and the amplifying mouvement's life. It is necessary to reduce the pulsating pressures placing a dampner or a reducing valve between the pressure source and the instrument. The harmful effect of the pulsations could also be reduced filling the case with a dampening liquid.. An improper choice of the instrument can bring to a breakage by stress.
3.4 Overpressure
Overpressure stresses the sensing element reducing its life and accuracy. Therefore it is always better to use an instrument whose scale range is bigger than the maximum working pressure and which is able to absorbe overpressures and pressure shocks. Pressure shocks can be treated in the same way as the pulsating pressures. The elastic element could break even if ovepressure hits it just one time.
3.5 Vibration
Vibrations can be detected through continous and often irregular oscillations of the index or of the case..
When the instrument is under vibrations it is recommended to use liquid filled pressure gauges.
3.6 Safety device
In systems working with compressed gas it is recommended to choose an instrument with a proper safety device in accordance to standard EN 837-2. In case of unexpected breaking of the sensing element the compressed gas expands outside the case through the safety device.
3.7 Dampening liquid filling
The dampening liquid is generally used to reduce vibrations of the moving parts due to vibrations and/or pulsations. It reduces considerably the use of the rotating parts increasing the instrument resistance to stress, increasing the instrument readability and it reduces the sudden loss of pressure. The dampening liquid must be chosen very carefully in case the instrument is used with oxidant fluids such as oxygen, chlorine, nitric acid, hydrogen peroxide, etc. In presence of oxidant agents there is a potential risk of chemical reaction, inflammability and explosion of the instrument. In this case proper filling liquids must be used.
The dampening liquid type should also be choosen considering the working temperature, the liquid viscosity degree and the expected damping level.
As for working temperatures of the liquid filled instruments please see the instrument's catalogue sheet.
3.8 Protection in explosive ambient
In case pressure gauges are used in potentially explosive atmospheres special procedures are requested. The directive regarding the ATEX products 94/9/CE is applied to pressure gauges with electrical devices as well as to mechaninical pressure gauges.
In order to chose the products requiring these features please see the catalogue sheet and the manual.

4. Wrong application

4.1 Fatigue rupture
A continuous pressure variation highlighted by oscillations of indication can reduce the elastic element's life.
These breakage, which could be more dangerous if occur in measuring compressed gas instead of liquids, cause a pressure increase inside the case and therefore the safety device opening. In case of operation with high pressure the breakage could degenerate in an explosion. It is recommended to use dampening liquid filled instruments and to narrow the pressure entrance conduit through a restrictor screw or am adjustable dampner.
4.2 Overpressure rupture
The effects of this kind of breakage are unexpected. Most commonly they are more serious during compressed gas measuring procedure and they can cause the explosion of the instrument whose debris could be deflected everywhere. The safety device opening does not always hold the fragments. In case of breakage risk for overpressure we recommend to use a solid front blow out back. instrument. In case of breakage this model prevents that the operator is hit by the instruments fragments. The glass alone does not guarantee a proper protection and in this case it represents the most dangerous component. Short overpressure pulsations could occur in pneumatic or hydraulic systems especially after valves opening or closing. The amplitude of these pulsations can often be higher than the working pressure and their high velocity does not allow to read the instrument so they are invisible for the operator. These pulsations can bring to the final breakage of the instrument or to a permanent zero error. Also in this case the application of a choking element can reduce the overpressure peak amplitude transmitted to the sensing element. The use of a limiting pressure valve protects the instrument from pressures which could be higher than those on which the valve itself is calibrated protecting in this way the instrument form overpressures.
The bourdon tube pressure gauges as well can be designed in order to resist to overcharges.
A clamp is mounted inside the gauge preventing any further extension of the tube.
4.3 Corrosion rupture
The compatibility with the process medium is fundamental in preventing breakage for corrosion. The sensing element is generally less thick so it works in conditions of stress corrosion. None of the most common materials is immune from a chemical attack whose entity is influenced by concentration, temperature and the type of a mix of different chemical substances.
In this case we recommend to use a diaphragm seal produced in the proper material.
The customer is entirely responsible for the choice of the insturment material which should be the most proper one for the process medium.
4.4 Explosion rupture
It occurs after a violent release of thermal energy due to some chemical reactions such as the adiabatic compression of oxygen in presence of hydrocarbons. The use of a solid front gauge does not even prevent the deflection of the debris away from the front of the gauge.

Pressure gauges suitable for use with oxygen are marked

"Oxygen - No lubrification" and/or they are marked with a crossed out oil can symbol on the dial

Instruments are supplied properly cleaned and degreased with special products and packed in polyethylene bags. The user must take the necessary precautions to ensure that the connection and the elastic element are kept clean after the pressure gauge has been unpacked.
4.5 Vibration and shoks rupture
Vibrations most commonly cause an abnormal deterioration of the parts in mouvement bringing to a gradual loss of accuracy and then to a total block of the pointer.
Vibrations could also cause stress cracks in the sensing element structure causing a liquid leakage and even an explosion.

5. Maintenance

The instrument's characteristics should be maintained during time through a special maintenance program which should be carried out and managed by qualified technicians.
The maintenace program includes: the cleaning of the external parts of the instrument by a humid cloth, the pressure indication check, the gaskets tightness check, condensate presence inside the case, the glass, case and safety device soundness.
As for heavy work instruments operating in severe conditions plants (vibrations, pulsating pressures, corrosive or sedimentous fluids, fuel or inflammable fluids) we recommend to schedule their replacement according to the maintenance program schedule. In case the instrument does not work properly it is necessary to proceed to an unschedule checking procedure.
Instruments should be kept in their original packaging and placed indoor and protected from humidity. The stocking area temperature should be between –25...and +65°C except different instructions.
A careless moving of the instrument could affect the metrological features although it is properly packed.
Instruments should be checked before use. In particular in the zero free instruments it could occur that the null-pressure pointer position is inside the zero span.
5.1 Routine check
In order to verify the sensing element condition install the instrument on the pressure generator introducing an interception valve between them. Apply the maximum pressure value to the gauge and exclude it form the pressure source through the valve. Any possible leakage of the sensing element can be noticed from the slow return of the pointer to zero.
5.2 Ricalibration
If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. It is recommended to return the instrument to NUOVA FIMA for this procedure.

NUOVA FIMA will not be responsible for any non authorized intervention on the instrument. Moreover the contract warranty and the CE Conformity Declaration will be no longer valid.

6. Disposal

An inappropriate disposal can be dangerous for the environment. The instrument components and packing materials disposal must follow an eco-compatible procedure and must be in accordance to the national standards. The fluid remaining inside the instrument could be dangerous or toxic for the environment, for people and for equipments.

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NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

User guide

DIAPHRAGM and CAPSULE PRESSURE GAUGE MN

MI-MN-ENG_1
04/2012

1. General information

The instrument described in this manual has been designed and produced in conformity to the following standards:
EN 837-1-2-3 ed alla ASME B40.1. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations.

Standards
Directive P.E.D. 97/23/CE
Nuova Fima instruments are designed and manufactured according to the safety rules included in the safety international standards in force. According to the 97/23/CE standard the NUOVA FIMA pressure gauges are classified in 2 categories
PS ≤0,5 bar – Not applicable
PS >0,5 bar - these instruments should not satisfy the essential safety standards but they have only to be designed and manufactured according to a SEP-Sound Engineering Practice and they do not have to bring any CE marking.

1.1 Intended use
The sensing element in an elastic diaphragm, with connect corrugation that drives the amplifying movement through a ball-joint. They are designed to measure pressure or vacuum of viscous, sedimentous, crystallisable or corrosive fluids. Compared to the bourdon tube they are more robust and are better able to withstand overpressure or aggressive fluid.

2. Installation

Attention — **Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.**

Attention — **This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).**

Attention — **The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.**

Warning — **The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.**

Warning — **Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.**

Attention — **The user is totally responsible for the instrument installation and maintenance.**

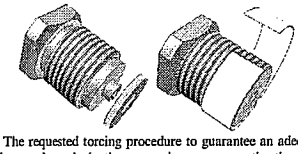
Warning — **Disconnect the instruments only after depressurization of the system.**

Warning — **The process fluids residuals in the disassembled gauges could affect people, the environment and the system. It is highly recommended to take proper precautions.**

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on-line on www.nuovafima.com

The instrument installation should be carried out according to standard EN 837-2 (Recommendation for pressure gauges installation and selection)

- The gauge should be connected to the process system forcing through a special wrench on the process connection point without forcing on the case by the hands. As for the process connections with cylindric threading, a head gasket compatible with the fluid to be measured should be used. In case the connection threading is conic additional sealing materials are applied on the thread (PTFE tape).
This procedure is not suitable for cylindric threading.
- Installation must be done according to EN 837-1, Chapter 8. The user is solely responsible for any combinations that differ from the ones shown in the mentioned rule.



- The requested torcing procedure to guarantee an adequate tightness depends in the measuring range, on the threading type and on the gasket type.
- In case of fluids leakage during mounting, clean carefully.
- As for gauges with security device installation should guarantee a free space on the back side of 20mm at least.
- As for gauges with full painting which is necessary to protect it from corrosive atmospheres the safety device must be able to fully operate.
- In order to guarantee the accuracy in measuring it is necessary to respect the working limits described in the catalogue sheets.
- Instruments should be installed in vibrations proof positions. If the mounting point is not stable because of vibraions a support for the instrument fixing should be used such as a clamp or a flange , possibly use a flexible capillary.
- If vibrations cannot be prevented during installation, use liquid filled instruments.
- The instrument mounting according to standard EN 837-1 /9.6.7 established the vertical position as standard mounting. Calibration and therefore mounting positions different from standard (when requested) are shown on the dial.
- Instruments must be protected from wide ambient temperature variations.
- Instruments must be protected from sun radiations during working in order to prevent overheating.
- Liquid filled instruments used in temperatures lower than 20°C, could have higher response times because of the increase of viscosity of the filling liquid.
- During installation be sure that no deviation above or below the fluid allowed and the ambient temperatures takes place considering the heating radiations. It is necessary to consider the temperature influence on the accuracy value.
- During the first operating procedure all pressure rush should be prevented. Slowly open the interception valves.
- The use of instruments measuring the zero values is not recommended especially in gauges where the first part of the scale is suppressed.
- It is not recommended to reinstall the instruments on plants working with different process fluids in order to prevent any chemical reaction which could cause explosions owing to contamination of the wetted parts.
- If the pressure indication stays fixed for a long time be sure that this is not due to a closing up of the pipe bringing the pressure to the sensing element. Before disassembling especially in case of pressure with zero value be sure that there is no pressure inside the gauge isolating it through the interception valve.

3. Use limits

3.1 Process and ambient temperature
This standard type instrument is designed to be used in safety conditions that is in an ambient temperature between –40 and +65°C. As for the filled model please see the paragraph "DAMPENING LIQUID FILLING"
As for instruments with measuring systems in stainless steal in case of process temperatures from 150 °C, it is necessary to cool the process fluid. In these cases it is necessary to use siphons, temperature dissipators or capillaries. In case of temperatures below 0°C, it is recommended to use liquid filled gauges preventing that the components such as the measuring system toothing can freeze. The fluid must not freeze or crystallize inside the sensing element.

3.2 Working pressure
The instrument should be chosen considering the scale range which should be between 25% and 75% of the full scale range. The full scale range should be approximately double than the working pressure value.

3.3 Overpressure
Overpressure stresses the sensing element reducing its life and accuracy. Therefore it is always better to use an instrument whose scale range is bigger than the maximum working pressure and which is able to absorbe overpressures and pressure shocks. Pressure shocks can be treated in the same way as the pulsating pressures. The elastic element could break even if ovepressure hits it just one time.

3.4 Vibration
Vibrations can be detected through continuous and often irregular oscillations of the index or of the case..
When the instrument is under vibrations it is recommended to use liquid filled pressure gauges.

3.5 Safety device
In systems working with compressed gas it is recommended to choose an instrument with a proper safety device in accordance to standard EN 837-2. In case of unexpected breaking of the sensing element the compressed gas expands outside the case through the safety device.

3.6 Dampening liquid filling
The dampening liquid is generally used to reduce vibrations of the moving parts due to vibrations and/or pulsations. It reduces considerably the use of the rotating parts increasing the instrument resistance to stress, increasing the instrument readability and it reduces the sudden loss of pressure. The dampening liquid must be chosen very carefully in case the instrument is used with oxidant fluids such as oxygen, chlorine, nitric acid, hydrogen peroxide, etc. In presence of oxidant agents there is a potential risk of chemical reaction, inflammability and explosion of the instrument. In this case proper filling liquids must be used.
The dampening liquid type should also be choosen considering the working temperature, the liquid viscosity degree and the expected damping level.
As for working temperatures of the liquid filled instruments please see the instrument's catalogue sheet.

3.7 Protection in explosive ambient
In case pressure gauges are used in potentially explosive atmospheres special procedures are requested. The directive regarding the ATEX products 94/9/CE is applied to pressure gauges with electrical devices as well as to mechaninical pressure gauges.
In order to chose the products requiring these features please see the catalogue sheet and the manual.

4. Wrong application

4.1 Fatigue rupture
A continuous pressure variation highlighted by oscillations of indication can reduce the elastic element's life.
These breakage, which could be more dangerous if occur in measuring compressed gas instead of liquids, cause a pressure increase inside the case and therefore the safety device opening. In case of operation with high pressure the breakage could degenerate in an explosion. It is recommended to use dampening liquid filled instruments and to narrow the pressure entrance conduit through a restrictor screw or am adjustable dampener.

4.2 Overpressure rupture
The effects of this kind of breakage are unexpected. Most commonly they are more serious during compressed gas measuring procedure and they can cause the explosion of the instrument whose debris could be deflected everywhere. The amplitude of these pulsations can often be higher than the working pressure and their high velocity does not allow to read the instrument so they are invisible for the operator. These pulsations can bring to the final breakage of the instrument or to a permanent zero error. Also in this case the application of a choking element can reduce the overpressure peak amplitude transmitted to the sensing element. The use of a limiting pressure valve protects the instrument from pressures which could be higher than those on which the valve itself is calibrated protecting in this way the instrument form overpressures.

4.3 Corrosion rupture
The compatibility with the process medium is fundamental in preventing breakage for corrosion. The sensing element is generally less thick so it works in conditions of stress corrosion. None of the most common materials is immune from a chemical attack whose entity is influenced by concentration, temperature and the type of a mix of different chemical substances.
In this case we recommend to use a diaphragm seal produced in the proper material.
The customer is entirely responsible for the choice of the instrument material which should be the most proper one for the process medium.

4.4 Explosion rupture
It occurs after a violent release of thermal energy due to some chemical reactions such as the adiabatic compression of oxygen in presence of hydrocarbons. The use of a solid front gauge does not even prevent the deflection of the debris away from the front of the gauge.

Pressure gauges suitable for use with oxygen are marked "Oxygen - No lubrification" and/or they are marked with a crossed out oil can symbol on the dial

Instruments are supplied properly cleaned and degreased with special products and packed in polyethylene bags. The user must take the necessary precautions to ensure that the connection and the elastic element are kept clean after the pressure gauge has been unpacked.

4.5 Vibration and shocks rupture
Vibrations most commonly cause an abnormal deterioration of the parts in mouvement bringing to a gradual loss of accuracy and then to a total block of the pointer.
Vibrations could also cause stress cracks in the sensing element structure causing a liquid leakage and even an explosion.

5. Maintenance

The instrument's characteristics should be maintained during time through a special maintenance program which should be carried out and managed by qualified technicians.
The maintenance program includes: the cleaning of the external parts of the instrument by a humid cloth, the pressure indication check, the gaskets tightness check, condensate presence inside the case, the glass, case and safety device soundness.
As for heavy work instruments operating in severe conditions plants (vibrations, pulsating pressures, corrosive or sedimentous fluids, fuel or inflammable fluids) we recommend to schedule their replacement according to the maintenance program schedule. In case the instrument does not work properly it is necessary to proceed to an unschedule checking procedure.
Instruments should be kept in their original packaging and placed indoor and protected from humidity. The stocking area temperature should be between –25...and +65°C except different instructions.
A careless moving of the instrument could affect the metrological features although it is properly packed.
Instruments should be checked before use. In particular in the zero free instruments it could occur that the null-pressure pointer position is inside the zero span.

5.1 Routine check
In order to verify the sensing element condition install the instrument on the pressure generator introducing an interception valve between them. Apply the maximum pressure value to the gauge and exclude it form the pressure source through the valve. Any possible leakage of the sensing element can be noticed from the slow return of the pointer to zero.

5.2 Ricalibration
If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. It is recommended to return the instrument to NUOVA FIMA for this procedure.

NUOVA FIMA will not be responsible for any non authorized intervention on the instrument. Moreover the contract warranty and the CE Conformity Declaration will be no longer valid.

6. Disposal

An inappropriate disposal can be dangerous for the environment. The instrument components and packing materials disposal must follow an eco-compatible procedure and must be in accordance to the national standards. The fluid remaining inside the instrument could be dangerous or toxic for the environment, for people and for equipments.

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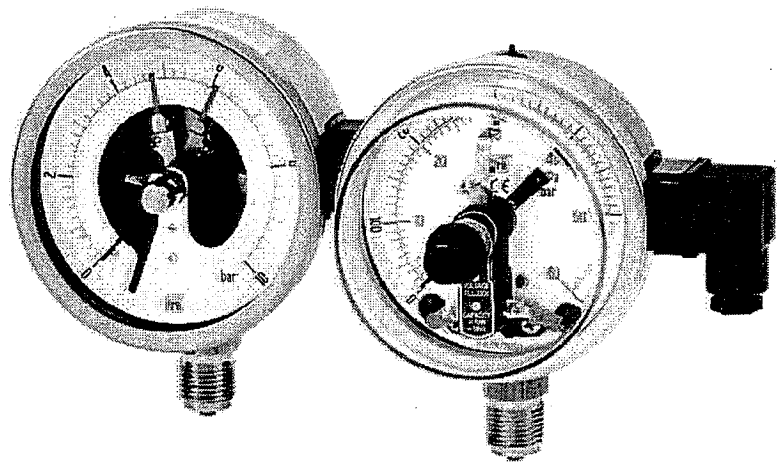
NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

ENG

User guide

PRESSURE GAUGE WITH ELECTRIC CONTACTS MCE/MN14



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Index

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards in force. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations.

Nuova Fima instruments are designed and manufactured according to the safety rules included in the safety international standards in force. According to the **97/23/CE** standard the **NUOVA FIMA** pressure gauges are classified in 2 categories
PS 200 bar these instruments should not satisfy the essential safety standards but they have only to be designed and manufactured according to a SEP-Sound Engineering Practice and they do not have to bring any CE marking.
PS >200 bar these instruments should satisfy the essential safety standards established by the PED, they are classified as category I and they are certified according to Form A. They should bring the CE marking as reproduced below.

CE

In accordance with directive	Standards of reference: EN 837
BT 73/23/CE – PED 97/23/CE	

2. Safety information

- The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.
- Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.
- Disconnect the instruments only after depressurization of the system.
- The process fluids residuals in the disassembled instruments could affect people, the environment and the system. It is highly recommended to take proper precautions.

Attention

- Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.
- This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).
- The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.
- The user is totally responsible for the instrument installation and maintenance.
- Handle and carefully stock the instrument used for toxic or inflammable liquids measurement

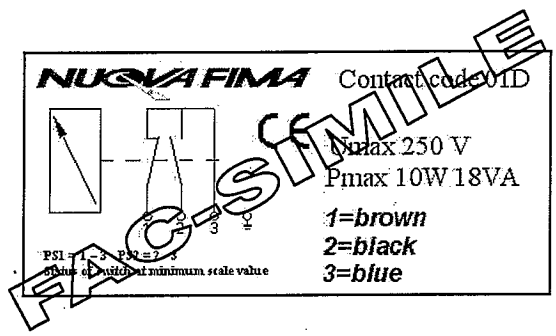
In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on.line on **www.nuovafima.com**

3. Intended use

They are used to control the electrical operation of compressors, pumps, presses, hydraulic and pneumatics equipment, chemical and petrochemical plant. The contacts open or close the circuit depending on the position of the indicating pointer and they are adjustable over the whole range. For application on severe working conditions, such as rapid and frequent pressure change, vibration and pulsation, they are manufactured with the case liquid filled. The filling drastically reduces the effect of such factors as well as those caused by a corrosive atmosphere, giving longer life and better performances of the pressure gauge and their electric contacts.

4. Electrical connections

For electrical connection see the instrument label



5. Installation

Before installing electrical instrument securely into a plant or a system the user should verify the instrument suitability to the plant characteristics and the correct installation. After installation the user should verify that the instrument is not exposed to any source of heat exceeding the established ambient limits.
Secure the instrument thread through a special key/wrench on the process connection hexagon (20...30Nm) without grasping the case by the hands. The correct torque depends on the type of process connection and the type of seal used (form and material).
As for those process connections with a cylindrical thread (Gas-Metric), a head gasket compatible with the measurement gas or fluid should be used.
If the connection thread is conical the instrument is tightened through a simple screwing on the plug. In order to improve the thread tightness it is recommended to place a PTFE layer on the male thread.
If the instrument is equipped with a fluid diaphragm seal the connection should be clamped on the diaphragm otherwise the calibration could be compromised.

5.1 Connection Output

Disassemble the connector as shown in fig.1 and connect the cable as in fig.2.
Reassemble the connector and fix it on the transmitter.

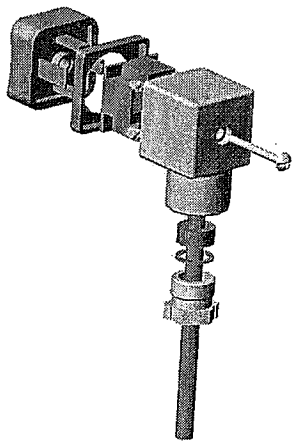


Figure 1 – *Exploded view of the connector*

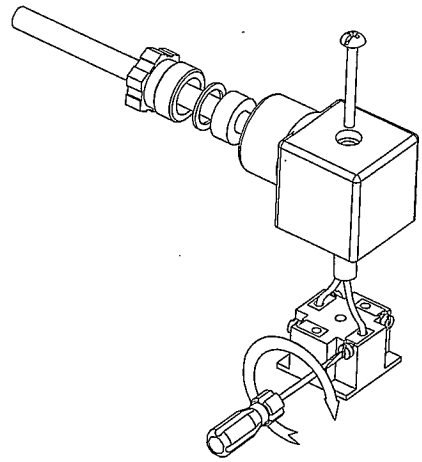
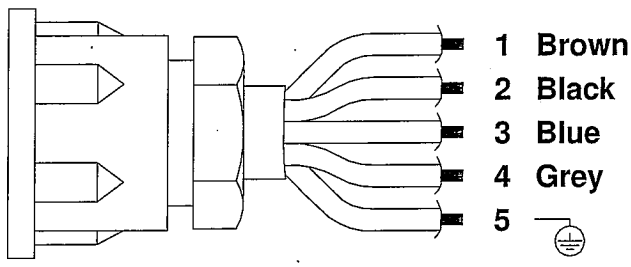


Figure 2 – *Wires connection*

Attention	**The IP grade according to standard EN 60529-1:1992 is guaranteed only if the female connector equipped with a connection cable is mounted on the instrument and all the other components are assembled correctly.**

5.2 Cable output

Connection cable combination with colours and numbers



6. Working current

VOLTAGE	SLIDING CONTACT			MAGNETIC RELEASE NON FILLED CONTACT			MAGNETIC RELEASE FILLED CONTACT		
Volt	CC	CA	Inductive charge	CA	CC	Inductive charge	CC	CA	Inductive charge
220	40mA	45mA	25mA	100mA	120mA	65mA	65mA	90mA	40mA
110	80mA	90mA	45mA	200mA	240mA	130mA	130mA	180mA	85mA
48	120mA	170mA	70mA	300mA	450mA	200mA	190mA	330mA	130mA
24	200mA	350mA	100mA	400mA	600mA	250mA	250mA	450mA	150mA

7. Disposal and demolition

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the rules of the specific waste in the country of origin.

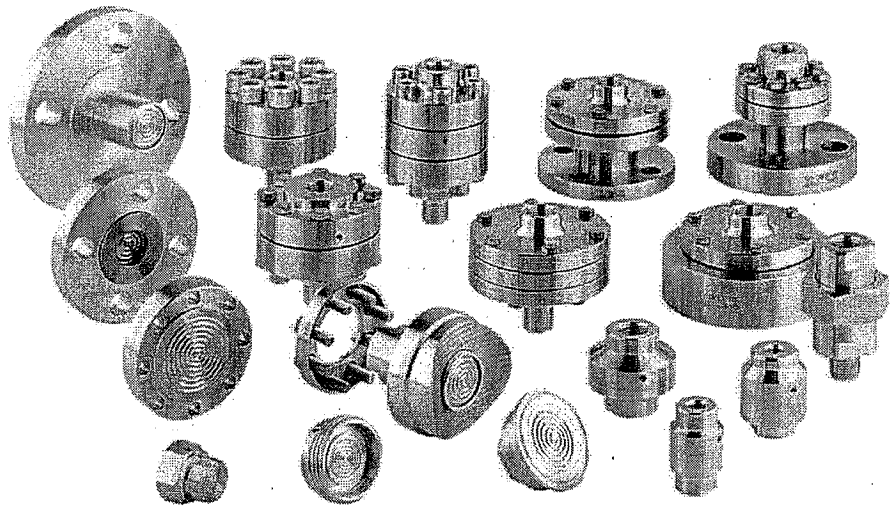
NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

ENG

User guide

DIAPHRAGM SEALS



MI-SEP-ENG_0 10/2011

NUOVA FIMA

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Index

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards in force. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations.

NUOVA FIMA instruments are designed and manufactured according to the safety rules included in the safety international standards in force. Some of these standards are included in this manual and they must be known and respected in order to proceed to the installation and the setting at work of the instrument.

 Warning	- **The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.** - **Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.** - **Disconnect the instruments only after depressurization of the system.** - **The process fluids residuals in the disassembled instruments could affect people, the environment and the system. It is highly recommended to take proper precautions.**
 Attention	- **Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.** - **This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).** - **The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.** - **The user is totally responsible for the instrument installation and maintenance.**

In order to verify the working and manufacturing features of the instruments
read the catalogue sheets in the most up-dated edition available on.line on
www.nuovafima.com

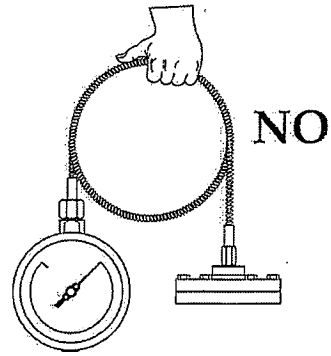
1.1 Intended use

The diaphragm seal is designed to measure the process fluid pressure: when the process fluid temperature is non-compatible to the instrument sensing element, when the process fluid may corrode the inner parts of the measuring instrument in contact with the fluid, when the fluid is highly viscous or it contains solid suspensions, when it solidifies at temperature changes.

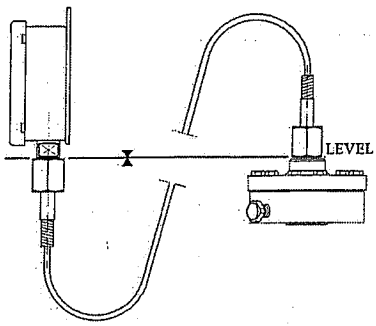
2. Installation

A chemical compatibility check between the process medium and the wetted parts is requested before installation. A description about the instrument material is marked by laser on the upper and lower body of the instrument as well as on the seal label.

Remove the diaphragm protection just before mounting treating it with extreme care. Scratches on the diaphragm are the main risk of chemical corrosion while crashing pressure on the concentric waviness affect the correct system operation.



The capillary and in particular its welded joints must not be subject to torques or tractions. Do not carry the measuring system at the capillary. Capillary kinking and/or fracture can cause an inner bore throttling increasing the response time or they can cause the instrument failure totally compromising the instrument operation. Capillary cannot be bended under a radius of 150mm and it is recommended to fit it so that it is not subject to vibrations. The difference in height between the instrument and the diaphragm seal causes an hydrostatic effect on the measuring instrument and subsequently a variation in the instrument indication range. If known, this difference value must be indicated in the order otherwise the instrument must be reset on site.



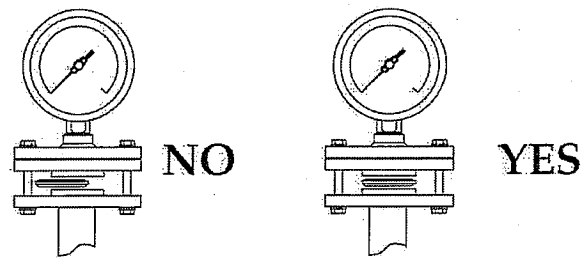
In order to dismount the instrument more easier for maintenance a shut off valve between the diaphragm seal and the system is recommended (root valve).

2.1 Threaded process connection

In case of cylindric pressure connection thread the two plane faces are tighten up together by a ring seal.

If the pressure connection thread is conic wrench for 5 complete threads at least and after having wrapped the male connection with PTFE before coupling.

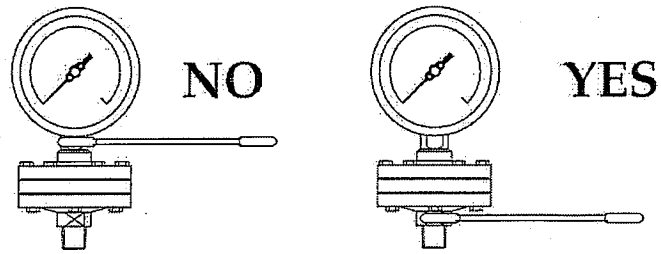
Warning – As gripping hold for the wrench use the seal side and not the gauge side, in order to prevent leaking of the filling liquid from the latter.



In case of threaded connection with exposed membrane it is necessary to use the gasket which better complies with the chemical environment and the temperature at which the instrument is used.

2.2 Flanged process connections or wafer

A proper seal should be selected considering its chemical and thermal compatibility as well as the flange tightness surface finishing type and degree. When mounting the seal between the diaphragm and the process connection take care to avoid any partial coverage of the diaphragm in order to prevent any leakage or damage to the diaphragm, in order not to partially hide accidentally the diaphragm



2.3 Food process connection

It is recommended to select approved seals for food treatment. The quick connection components such as clamps, pulleys, flanges and nuts are not included in the supply and they are not described in this manual.

3-A® 74-03

Instruments with the **DIN 11851** connection must be installed using special gaskets type **SKS**.
Instruments with process connection conformed to **ISO 2853 (IDS/ISS)** must be installed using those gaskets with supporting ring as described in the above mentioned directive.

2.4 In line process connection

In the first place install the welded stub, then fix the diaphragm seal inside the housing through the supplied studs.
WARNING: the seal is generally metallic and the seal seat is created by pressure during the first installation. Proceed carefully to the studs clamping.

2.6 Commissioning

In case of root valves they must be opened slowly. Verify that the connection is watertight and that the accessories are installed and fixed correctly.

3. Working limits

3.1 Ambient temperature

The one recommended for the assembled instrument.

3.2 Process medium connection

This instrument operates in safe conditions with a process medium temperature from -45 to +400°C depending on the filling liquid (see table), on the diaphragm material and on the process connection.
For temperatures higher than the limits described in this manual please contact our Technical Assistance.

Filling liquid	Working temperature
Silicon oil type A	-45...+150°C (-49...+302°F)
Silicon oil type B	-20...+250°C (-4...+482°F)
Silicon oil type C	+20...+340°C (+68...+644°F)
Silicon oil type D	-5...+400°C (+23...+716°F)
Food liquid	-20...+120°C (-4...+248°F)
Fluoridated liquid	-60...+150°C (-76...+302°F)

In case of high temperatures measuring the instrument can be equipped of a remote capillary or of a cooling turret. When a diaphragm seal provided with a cooling tower is installed on an insulated pipe, make sure that the insulating layer does not hide the tower's radiant surface otherwise its features would be useless.

Capillaries - Capillaries send the pressure values detected by the diaphragm at a distance. They are available in different lengths from 0,5 to 6m for the uncovered version or coated by a flexible stainless steel armour.

Cooling tower - The cooling tower is used when instruments are directly installed or when process fluid temperature is higher than 100°C up to 250°C.

3.3 Materials

- As for diaphragm seals coated with PTFE the process medium maximum temperature cannot be higher than, 150°C (302°F)
- As for PVC diaphragm seals the maximum temperature must be 60 °C, at a maximum pressure of 1 bar.
- As for food clamp diaphragm seals the maximum temperature can be 130°C for 1 hour during the cleaning and sterilization phases and 150°C if autoclavabile.
- As for food diaphragm seals for homogenizers the maximum temperature can be 150°C for 1 hour during cleaning and sterilization.

3.4 Working pressure

The instrument must be selected with a working pressure value between 25% and 75% of the full-scale range. The full scale range must be the double with respect to the working pressure. If the instrument is provided of a black small triangle placed on the dial full scale range the working pressure could be 90% in case of pulsating pressures and 100% for static pressures.

Accuracy - At 20°C ± from 0,5 to 1% depending on the diaphragm seal type to be added to the accuracy class of the indication instrument.

3.5 Overpressure
The overpressure value is the same as the one intended for the assembled instrument. Special overpressures are listed on the instrument dial or label.

3.6 Response time
The diaphragm seal involves a response time which is proportional to the filling liquid viscosity and to the connection length between the diaphragm and the instrument. A capillary installation would increase the response time.

4. Wrong uses

4.1 Failure for corrosion
When the diaphragm material is subject to a chemical attack form the chemical substances contained in the fluid to be measured a failure for corrosion could occur. In this case the material is weakened and a punctiform leak or a crack could take place. The diaphragm is thin so it works under mechanical stress. Therefore the chemical compatibility with the fluid to measure must be considered. None of the common materials can be immune from a chemical attack which depend on several elements such as: concentration, temperature and mix of different chemical substances.

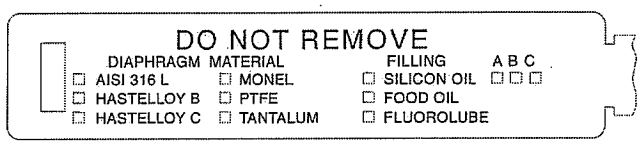
4.2 Failure for explosion
The silicon oil must not be used as a filling liquid with highly oxidants agents such as oxygen, chlorine, nitric acid and hydrogen peroxide because chemical inflammability or explosion spontaneous reactions could occur. In these cases the use of fluororube is recommended.

4.3 Failure for high temperature
The filling liquid expansion due to temperature higher than the allowed one cause a diaphragm seal bulge which damages permanently the diaphragm and/or could cause the production of gas due to the filling liquid decomposition affects the assembling permanently making it unusable.

4.4 Mechanical stress and vibrations
Instrument must not be affected by mechanical stress and vibrations. If the installation points are mechanically stressed instruments must be remote mounted and connected through a capillary.

5. Maintenance

Mechanical instruments must be maintained following a proper maintenance program carried out and managed by skilled personnel. Diaphragm seals must be kept in good conditions in order to prevent any corrosion damage. All diaphragm seals are assembled and fixed to the instrument (except for DN63) through a seal label.
If this label or the assembling are altered improperly the whole system working and the relevant guarantee are affected.



ATTENTION: Do not remove or slack the filling valve and do not separate the instrument from the diaphragm seal. In case of leakage the assembling is not working anymore and must be returned in order to proceed to a separating circuit refilling.

5.1 Regular check
The seal label must be placed on the instrument connection pivot. The connection between instrument and diaphragm seal must not leak as well as the upper and lower body and the filling valve.

5.2 Periodical check

The corrosion level and the gaskets tightness condition must be checked every 3 to 6 months by disassembling the diaphragm seal from the system even if this is not scheduled in the maintenance program.
Instruments must be isolated from the system by closing the root valve, pressure inside the instruments must be brought to zero through the drain devices and the temperature must be as much as close to the ambient temperature values.
The remaining process fluid inside the instrument process connection must not be dispersed in the environment because it could be dangerous for people and the environment. In case of toxic fluid please handle with care.

5.3 Recalibration

If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. It is recommended to return the instrument to **NUOVA FIMA** for this procedure.

NUOVA FIMA will not be responsible for any non authorized intervention on the instrument. Moreover the contract warranty and the CE Conformity Declaration will be no longer valid.

6. Dismounting and disposal

In case of polluted, viscous or crystallizing process media it may be necessary to clean the diaphragm from time to time. Only remove deposits from the diaphragm with a soft brush and a suitable solvent. Do not use aggressive cleaning agents. Do not damage the diaphragm with sharp edged tools. Do not use powerful water jets for the diaphragm cleaning.
Some models are prearranged for cleaning operations because they are flushed diaphragm seals or have an intermediate ring with a cleaning plug.
Models with diaphragm welded to the upper body can be dismounted for cleaning. When remounted the gasket between upper and lower body must be replaced.
Models with a mechanical tightness cannot be dismounted and must be disposed and returned to Nuova Fima for cleaning or maintenance.

For disposal we recommend to separate the diaphragm seal from the instrument, empty the filling circuit, remove the window and the plugs then dispose it as aluminium and stainless steel. The remaining fluid inside the instrument could be toxic and dangerous.

NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

User guide

THERMOMETER *TB-TG*

MI-TB-TG-ENG_2
05/2012

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards EN 13190 and ASME B40.3. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the thermometer in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. Therefore the staff in charge must be qualified technically and properly trained, and must carry out the procedures called for in the plant regulations.

Conformity to standards
NUOVA FIMA instruments are designed and manufactured according to the safety rules included in the safety international standards in force. In terms of Directive 97/23/EC (P.E.D.) NUOVA FIMA thermometers must be designed and manufactured according to a "Correct Construction Practice" (SEP CE - Sound Engineering Practice)

1.1 Intended use
These instrument are designed for a use in food, beverage, pharmaceutical, cryogenics, chemical and petrochemical processing industries environment and the process medium. The instrument is intended for indicated the temperature locally and remote.

Warning	**Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.**
Attention	**This manual does not concern the instruments conforming to standardl 94/9/CE (ATEX)**
Attention	**The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.**
Warning	**The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.**
Warning	**Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.**
Attention	**The user is totally responsible for the instrument installation and maintenance.**
Warning	**Disconnect the instruments only after depressurization of the system.**
Warning	**The process fluids residuals in the disassembled thermometer could affect people, the environment and the system. It is highly recommended to take proper precautions.**

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on-line on www.nuovafima.com

2. Installation

All instruments must be installed with the indication dial in vertical position with the exception of different instructions on the label. The thermometer's bulb length should be enough that the sensing element is exposed to the temperature to measure. In case of installation on pipes the sensing element must be centred compared to the central axe of the pipe.

Bulb (mm)	Sensing element TB (mm)	
	≤300°C	>300°C
6...6.4	150	
8...9.6	100	150

Bulb (mm)	Sensing element TG (mm)	
	Capillary ≤15m	Capillary >15m
8	120	170
9.6	90	130
11.5	60	90

The installation with thermowell causes a delay of the response time which can be decreased filling up the thermometer with a heat transmission fluid (mineral oil or aluminium dust or copper dust or graphite, graphite and glycerine) compatible with the process fluid temperature.
Check that the internal thermowell diameter is always wider than the external diameter of the thermometer bulb.

2.1 Local mounting
The case temperature should not be higher than 65°C. For that reason the case should be far enough from the process by lengthening the thermometric bulb or by choosing the back connection for horizontal mounting:

Case-process (mm) distance	Process fluid temperature
50	80
75	95
100	130
150	195
200	290
250	440

Screw the connection through special wrench without forcing on the case or on the stem because inside there is the sensing element which could be damaged and could not indicate the right temperature anymore.

2.2 Remote mounting
Also in this case the case should not be exposed to the process heat. It is also necessary to consider the delay in the response time caused by the capillary according to its extension.
Do not fold the capillary roughly in order to prevent any crick or pinch. The minimum folding diameter is 30 cm.

3. Application limits

3.1 Ambient temperature
This instrument is designed to be used in safety conditions in an ambient temperature between –40...+65°C

3.2 Termowells
For a correct mounting, thermowells are recommended as a protection in case of corrosion, of higher pressures than those indicated in the working limits and/or in case of high velocity
In case of high temperatures it is possible to order an extension as a thermal insulation of the instrument to dissipate the process heat. Moreover thermowells allow to remove the instrument for cleaning or maintenance without affecting the plant.

3.3 Working temperature
We recommend to choose an instrument nominal range which allows the maximum value of the measured temperature to stay within the measure range.
The instrument is designed to measure temperatures included within the measure range which is delimited by two triangles on the dial according to standard EN 13190

3.4 Overtemperature
Instruments resist to temporary temperature values as shown in the table below:

Nominal Range (°C)	Overtemperature	
	TB	TG
≤400	+30% VFS	+25% VFS
>400	500°C	600°C

3.5 Working pressure
If the installation is in contact, the maximum pressure supported by the bulb is 15 bar for the bi-metal thermometers and 25 bar for the inert gas models. If the installation is carried out using a thermowell it is necessary to check which temperature it can resist to on the thermowell catalogue sheet.
The instrument is designed to work with atmospheric pressures between 0,8 and 1,1 bar.

3.6 Protection degree
The protection degree value is established in accordance with standards EN 60529. This value concerns the hermetic tightness of the ring, the whole taps properly placed in their seat: IP55; IP65 for liquid filled instruments.

4. Wrong application

4.1 Vibration rupture
Vibrations most commonly cause an abnormal deterioration of the parts in mouvement bringing to a gradual lost of accuracy and then to a total block of the pointer.
In case of radial mounting especially if the case is filled up with dampening liquid and the vibrations are very strong it is very likely that the instrument breaks for the serious mass of vibrations.

4.2 Liquid filled cases
The dampening liquid is commonly used to dampen the vibrations of the moving parts due to vibrations. If the atmosphere is affected by oxidant agents there is a possible risk of a chemical reaction, of inflammability or explosion of the instrument.
So it is very important to consider attentively the nature of the dampening liquids and their use limits according to the ambient temperature and the measuring range.

Dampening liquid	Ambient temperature
Glycerine 98%	+15...+65°C (+60...+150°F)
Silicon oil	-20...+65°C (-4...+150°F)

Dampening liquid	Measuring range (°C)	
	TB	TG
Glycerine 98%	≤ 160	≤ 600
Silicon oil	≤ 250	
Fluorinated fluid		

4.3 Overtemperature rupture
It is caused by a higher temperature than the maximum limit or lower than the minimum limit declared for the sensing bulb. This could bring to permanent functional damages of the instrument.

4.4 Mechanical stress
Instruments should not be stressed. If the installation points are mechanically stressed, instruments should be remote mounted and connected through capillary. Instruments should be inert gas model and supplied of fixing device for wall or surface mounting.

4.5 Vibrations
When the instrument support is under vibrations it is possible to consider different solutions such as:
a) use of liquid filled instruments with threaded process connection ≥ 1/2"
b) remote mounted instruments connected through flexible pipes (for strong and irregular vibrations). Vibrations can be noticed through continuos oscillations, often irregular, of the pointer point.

5. Maintenance

The maintenance during time of the original features of the mechanical products should be garanteed by an accurate maintenance program optimized and run by qualified technicians. Every 3/6 months it is recommended to check the indication accuracy, the filling fluid level and/or the presence of condensate inside the case. If the instrument does not work correctly an unscheduled check is requested.

5.1 Routine check
The glass should not be cracked. The filling up and blow out vent should be properly placed in their seats. The pointer should be within the graduated scale. In order to check the sensing element conditions it is necessary to install the instrument on the temperature generator. In order to check indication accuracy a stable temperature value is generated in laboratory and applied to the instrument to be checked and to primary /sample thermo-element.
As for instruments used on heavy work conditions plants (vibrations, corrosive fluids) it is necessary to schedule their replacement following the maintenance program. If the instrument is not working correctly a non scheduled check is necessary. It is also recommended to control the possible sediments which could generate around the thermowell or the thermometer bulb due to the nature of the fluid to measure: in this case proceed to the periodic removal of the sediments.

5.2 Recalibration
If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. It is recommended to return the instrument to NUOVA FIMA for this procedure.

NUOVA FIMA will not be responsible for any non authorized intervention on the instrument. Moreover the contract warranty and the CE Conformity Declaration will be no longer valid.

6. Disposal and demolition

Instruments mounted with thermowell can be disassembled even with the fluid in pressure. During remounting follow the recommendations for installation. If the instruments are mounted without thermowell, be sure that the pressure working on the thermometric bulb is the same as the atmospheric one.
The process fluid remaining outside the thermometric bulb should not pollute the environment and should not harm people. In case the fluid is dangerous or toxic be careful in manipulating it during removal.
We recommend to remove the glass and the blow out vents and then dispose it as aluminium or stainless steel.

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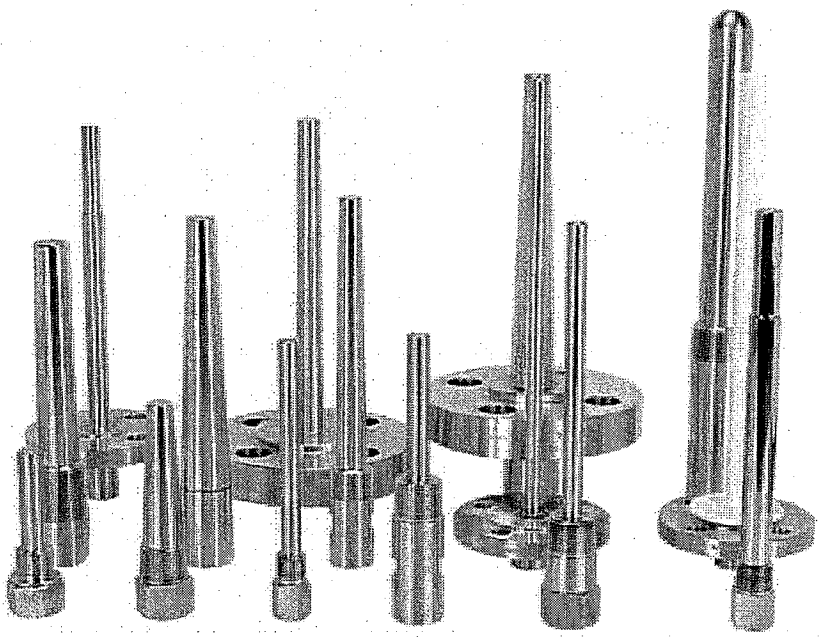
NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

ENG

User guide

THERMOWELL



MI-TW/11/ENG rev.0

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Index

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards:
ASME PTC 19.3 TW 2010, ASME B16.5 e ASME B31.1. All components are subject to stringent quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information on handling and the installing the instrument in safe conditions. Therefore it is highly recommended to read carefully the following instructions prior to beginning any work.

This instrument operates in safe conditions if correctly selected and installed in the system and when these operating instructions and the maintenance procedures that are established by the manufacturer are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations.

Nuova Fima offers a design and engineering service for the right matching of the thermowell to the system where it is installed.
In case of dynamic process Nuova Fima ALWAYS recommends and offers the possibility to examin the thermowells according to ASME PTC 19.3 TW 2010.

 Warning	- **The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.** - **Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.** - **Disconnect the instruments only after depressurization of the system.** - **The process fluids residuals in the disassembled instruments could affect people, the environment and the system. It is highly recommended to take proper precautions.**
 Attention	- **Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.** - **This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).** - **The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.** - **The user is totally responsible for the instrument installation and maintenance.**

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on.line on **www.nuovafima.com**

1.1 Intended use

Thermowells are use to protect bulbs from the effects of corrosion and process fluid flow, due to the high speed at which the process fluid flows, and to enable the thermometer to be interchanged, recalibrated, or replaced, without disturbing the process

2. Installation

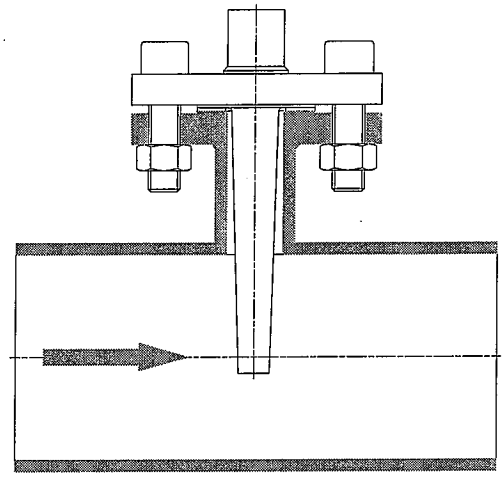
Before installation verify the chemical compatibility between the thermowell selected and the process medium and its endurance to mechanical stress due to the medium itself.
The non-observance of these recommendations can result in serious injuries and damages to the system.

The instrument has to be compatible with respect to the measurement rangé and the system conditions. During installation thermowells should not be subjected to thermal shocks or mechanical impacts.
Insert the thermowell into the process adapter without forcing or damaging it. The thermowell must not be bent or altered during mounting. It is recommended to mount the temperature measuring instrument into the thermowell using a suitable sealing material in order to avoid humidity ingress.

Generally the tip of the thermowell should be placed in the middle third of the pipe, though the position may differ in special cases.
It must be ensured that the measuring element sensing part, (thermocouples, bi-metal or inert gas thermometers) is completely exposed to the medium.
If as a result of a small pipe diameter, this cannot be ensured, a pipe expansion can be inserted around the measuring point.

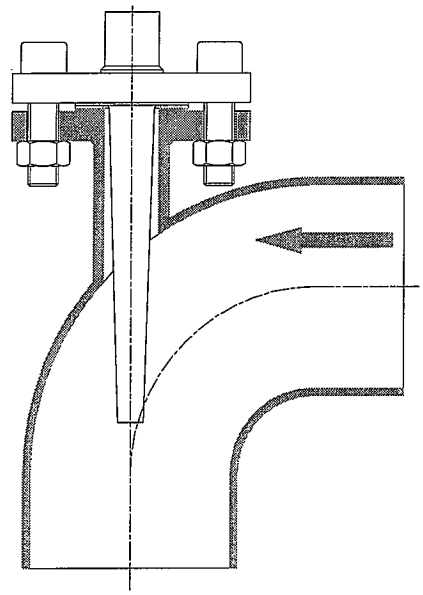
Three mounting positions in the system are possible. These are independent from the process connection type:

1. Right-angled position with respect to the flow

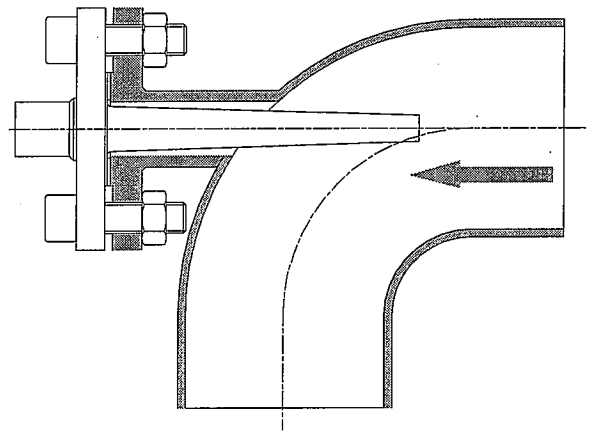


2. Tilted position with respect to the flow:

a. Upstream



b. Downstream



The insertion length and the diameter of the thermowell are dependent on the process conditions especially on the flow rate of the measured medium.

2.1 Screw-fitting thermowells

When using a parallel threads, a suitable seal should be used when mounting. Tapered threads can be sealed directly on the thread. For the correct tightness it is recommended to apply a PTFE tape on the male thread compatible with the process temperature (200C°max).

This is not allowed on tapered threads.

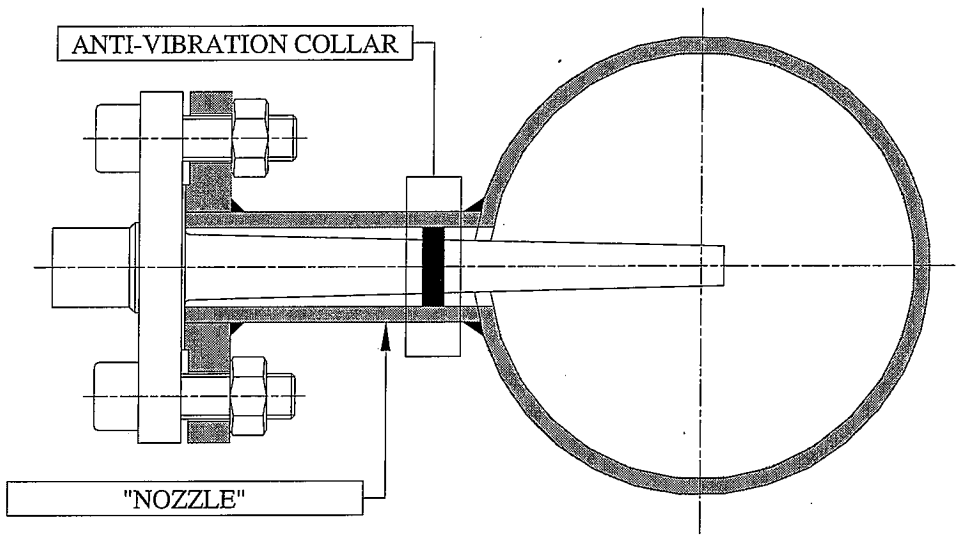
2.2 Weld-fitting thermowells

Weld-in thermowells can be mounted into the process directly (pipe or vessel wall) or by using a welded socket. Make sure that the weld seam is clean and that suitable equipment is used. If necessary heat-treat the weld seams.

2.3 Thermowell with flange connection

The flange dimensions of the thermowell must match those of the mating flange on the process side. The seals used must be suitable to the process and chemically compatible..

In case of process high flow rate the correct tightening torques and suitable tools (spanners) should be used for installation. The use of spanners is recommended in order to resist the vibrations and bending stress caused by the process medium flow rate.



The interception collar should match with the inner diameter of the nozzle for the proper operation of it. The collar shifts the thermowell constraint point towards the stem reducing the way the thermowell portion is affected by the flow rate.

According to ASME PTC 19.3 TW 2010 standard the interference collar thermowells are not recommended and they are not included in the above mentioned directive.

NUOVA FIMA ensures a proper endurance of these instruments only if correctly installed. That is a lightly forced coupling between the outside diameter of the collar and the inner diameter has to be applied.

The necessary procedure to obtain a correct coupling is described as follows:

Design:

1) The outside diameter of the collar should be more than 0,15mm at least with respect to the inner bore diameter where the thermowell is installed.
2) Install the interference collar as close as possible to the nozzle near the pipe.

Interference collar thermowell installation

WARNING: A lightly forced coupling between the collar and the nozzle bore is essential for a correct operation.
On the contrary if the thermowell does not match perfectly the correct function of the instrument is not

1) Gradually install the thermowell into the nozzle. If the thermowell fits correctly, no other operation is necessary. If it doesn't, rotate the thermowell without too much force until it reaches the expected position.

2) If the thermowell does not fit in remove it carefully, gradually reducing the outer collar diameter by decreasing it by 0,05mm at a time and then verify the nozzle fitting manually. Repeat these operations until you obtain a lightly forced manual coupling of the thermowell in the nozzle. If the collar is hit by the interference only partially, then proceed to the diameter reduction only as far as that part is concerned.

ATTENTION: the collar just reduces the vibrations effects caused by the process medium. Vibrations in the pipe and/or on the nozzle plus those produced by the process medium could affect the integrity of the thermowell

3. Use limits

The main thermowell failure cases are listed below.
In order to find out correctly the instrument's working limits contact the Nuova Fima technical assistance department which will take care to calculate the correct thermowell dimensions according to **ASME PTC 19.3 TW 2010**.

The tests which have been carried out are:
a) Resonance test
b) Fatigue test
c) Bending test
d) Maximum pressure test
e) Minimum temperature test

3.1 Vibration rupture (Resonance)

In case of a dynamic process in which the process medium flow rate is high the thermowell could vibrate. This is because of oscillations that can subsequently develop in the process medium caused by the turbulent nature of the vortex. The vortex which can be detached from the fluid flow surrounding the thermowell.
When the vibration frequency of the fluid movement coincides with the natural one of the thermowell we can say that the thermowell is in resonance. At this state the movement range due to bending increases seriously as well as the bending stress causing a tension level to the thermowell which is higher than the maximum limit allowed for the material. In this way the thermowell is damaged where tensions are higher that is in the thermowell constraint point. In this case there is the risk of leakage which could affect the outer parts of the process.
It is necessary to install the thermowell far from the resonance area, or when the process type does not allow that, replace it with a thermowell designed with a shorter immersion length or an antivibration collar.

3.2 Fatigue rupture

In case of dynamic process the thermowell is subject to stress.In fact the dynamic properties of the medium make the thermowell oclillate cyclically causing a mechanical stress to it. After repeated cycles the thermowell could break because of the widening of a crack which usually create nearby the welding between the flange and the thermowell body in the constraint point where tension due to fatigue (and bending) is higher.
So it is necessary to establish if the resulting dynamic tensions are lower than those supported by the material maximum fatigue limit. If they are not, replace the thermowell installing one whose dimensions can support the current dynamic stress.

3.3 Overpressure rupture

In case of pressure peak due to a system malfunction the thermowell could be subject to a higher pressure value compared to the maximum tolerable limit. In this case the thermowell hydrostatic tightness cannot be guaranteed. If the thermowell is not able to tolerate such a pressure value. It is then necessary to replace it with another one whose dimensions are suitable to the oscilltations produced by the maximum current pressure.

3.4 Corrosion rupture

In case of particularly agressive process medium the thermowell material and welded parts could be eroded. That is why it is necessary to choose the most suitable material matched to the process medium in order to ensure a properly functioning thermowell.

3.5 Static-bending rupture

If the thermowell is subject to a fluid flow it tends to bend depending on the flow rate velocity. Threrefore it is necesssary to prevent this by choosing the right thermowell dimensions.

3.6 Overtemperature rupture

In case the process temperature is higher than the maximum allowed temperature with respect to the thermowell material, the established security standards are no longer ensured; the mechanical thermowell properties slightly decrease when the temperature exceeds the maximum limit. Therefore it is necessary to select a material suitable to the process temperature range in order to prevent any damage to the system.

4. Wrong application

In case of damage caused by using the product contrary to its intended use the guarantee will be no longer valid.
Below is a list of the main uses incorrect.

4.1 Modification of the installation point

Do not use the thermowell in a different system area other than that specified in the order.By modifying the process characteristics of the thermowell the working range could be reduced or even the thermowell could be rendered unusable.
In case of any system characteristics modification the thermowell verification according to ASME PTC 19.3 TW 2010 won't be valid anymore.

4.2 Installation with interference collar

In case during the thermowell installation an interference collar is expected to be used in order to avoid any slack between the nozzle diameter and the collar itself. For further information about the correct installation of the interference collars refer to paragraph 2.3 of this use instructions manual.

5. Maintenance and cleaning

5.1 Maintenance

Generally thermowells are maintenance-free. A visual check at regular intervals of the thermowell is recommended in order to detect leaks or damages. Make sure that the seal is in perfect condition. Repairs should only be carried out by the manufacturer or, following prior consultation, by correspondingly qualified skilled personnel.

5.2 Cleaning

Wash and clean the dismounted instrument before returning it, in order to protect staff and the environment from exposure to residual media.

6. Dismounting and disposal

Residual media on dismounted thermowells can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

6.1 Dismounting

Let the instrument cool down sufficiently before dismounting it. When dismounting it, there is a risk that dangerously hot pressure media may escape.
Only disconnect thermowells once the system is depressurised.

6.2 Disposal

Incorrect disposal can put the environment at risk. Dispose of instruments, components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

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MESSRS./SPETT.

DESMET BALLESTRA SPA
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20138 MILANO MI (I)

Date	Certificate	Nuova Fima Order	Purchase Order N.	Sheet
04/09/2012	0000013670	2521/OR/2012	121250 - Job 2F11A of 29/05/2012	1/ 4

Description	Q.ty	Test
1.18.1.A.G.---.AAFB.43M.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...10 BAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI-63.1	1	A,B,C=+-1,00 % F.S.,D= 13,0 BAR
1.18.1.A.G.---.AAE7.43M.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...6 BAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI-63.6	1	A,B,C=+-1,00 % F.S.,D= 7,80 BAR
1.18.1.A.G.---.AAFE.43M.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...16 BAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI-64.8	1	A,B,C=+-1,00 % F.S.,D= 20,8 BAR
1.18.1.A.G.---.AAEY.43M.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...1 BAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI-64.6, PI-64.7	2	A,B,C=+-1,00 % F.S.,D= 1,30 BAR
2.42.1.A.G.---.AFDI.43M.---.T25.T01 MANOMETER MN12/18/A DS 6" (150 MM), -15...10 MBAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI-64.9	1	A,B,C=+-1,60 % F.S.,D= 16,3 MBAR
1.M8.1.A.G.---.AAFP.41M.M1S.C.CH1.T25 MANOMETER MN14/18/1/A DS 6" (150 MM), 0...100 BAR,1/2" BSP-M,01S/BM CONTACT,TYPE "C" FLANGE,WEATERPROOF KEY IP55,AISI316L LABEL TAG N.: PISH-63.3 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR. CONN.,AISI304 CAPILLARY L = 3.0 MT	1	A,B,C=+-2,50 % F.S.,D= 100 BAR
1.18.1.A.G.---.AAFE.41M.C.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...16 BAR,1/2" BSP-M,TYPE "C" FLANGE,AISI316L LABEL,TROPICALIZATION TAG N.: PI-63.2 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR.	1	A,B,C=+-2,50 % F.S.,D= 20,8 BAR

TEST : A) VISUAL B) DIMENSIONAL C) ACCURACY D) OVER PRESSURE E) TEST PRESSURE
F) REGOLATION MICRO G) RELIABILITY MICRO H) TEST TEMPERATURE I) MAX STATIC PRESS. L) DIFFERENTIAL RANGE
M) MAX TEMPERATURE N) OVER TEMPERATURE

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NOTES :

FINAL CONTROL DEPT	INSPECTOR	THIRD PART INSPECTION	QUALITY ASSURANCE
SIGNATURE F. Zanetti	SIGNATURE	SIGNATURE	SIGNATURE

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20138 MILANO MI (I)

Date	Certificate	Nuova Fima Order	Purchase Order N.	Sheet
04/09/2012	0000013670	2521/OR/2012	121250 - Job 2F11A of 29/05/2012	2/ 4

Description	Q.ty	Test
CONN.,AISI304 CAPILLARY L = 3.0 MT 5.7RA.4.H00 FITTING SA388 (RA) AISI316, DN100 WELDING		
1.M8.1.A.G.---.AAFE.41M.M1S.C.CH1.T25 MANOMETER MN14/18/1/A DS 6" (150 MM), 0...16 BAR,1/2" BSP-M,01S/BM CONTACT,TYPE "C" FLANGE,WEATERPROOF KEY IP55,AISI316L LABEL TAG N.: PISH-63.2A, PISH-63.2B 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR. CONN.,AISI304 CAPILLARY L = 3.0 MT 5.7RA.4.H00 FITTING SA388 (RA) AISI316, DN100 WELDING	2	A,B,C=+-2,50 % F.S.,D= 16,0 BAR
1.18.1.A.G.---.AAFP.41M.C.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...100 BAR,1/2" BSP-M,TYPE "C" FLANGE,AISI316L LABEL,TROPICALIZATION TAG N.: PI-64.2, PI-64.3, PI-64.4 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR. CONN.,AISI304 CAPILLARY L = 3.0 MT 5.7RC.4.I00 FITTING SADDLE SA515 (RC) AISI316, DN80 WELDING	3	A,B,C=+-2,50 % F.S.,D= 130 BAR
6.TG8.5.9.G.ATFP.43M.S10.9.T25.T01 THERMOMETER TG859 DS 6" (150 MM), RANGE 0...100 °C,1/2" NPT-M,11,5 MM DIAM.; FLEXIBLE EXT. S = 340 MM,AISI304+AISI304 L = 3.0 MT,AISI316L LABEL,TROPICALIZATION TAG N.: TI-62.2, TI-62.3, TI-62.4, TI-63.1A, TI-63.1B, TI-63.2, TI-63.3, TI-63.4 9.W13.4.43F.63M.120.U.T.SP1 THERMOWELL W13 AISI316, 1/2" NPT-F INSTR. CONN.,1" NPT-M,Ø 12 MM,IMMERSION U = 240 MM,LAGGING EXTENSION T = 54 MM,THERMOWELL TAGGING TAG N.: TI-62.2, TW-62.3, TW-62.4, TW-63.1A, TW-63.1B, TW-63.2, TW-63.3, TW-63.4	8	A,B,C=1,00 ,E=40 BAR,N= 125 °C
6.TG8.5.9.G.ATFS.43M.S10.9.T25.T01 THERMOMETER TG859 DS 6" (150 MM), RANGE 0...160 °C,1/2" NPT-M,11,5 MM DIAM.; FLEXIBLE EXT. S = 340 MM,AISI304+AISI304 L = 3.0 MT,AISI316L	1	A,B,C=1,00 ,E=40 BAR,N= 200 °C

TEST : A) VISUAL B) DIMENSIONAL C) ACCURACY D) OVER PRESSURE E) TEST PRESSURE
F) REGOLATION MICRO G) RELIABILITY MICRO H) TEST TEMPERATURE I) MAX STATIC PRESS. L) DIFFERENTIAL RANGE
M) MAX TEMPERATURE N) OVER TEMPERATURE

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SIGNATURE F. Zanetti	SIGNATURE	SIGNATURE	SIGNATURE

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04/09/2012	0000013670	2521/OR/2012	121250 - Job 2F11A of 29/05/2012	3/ 4

Description	Q.ty	Test
LABEL,TROPICALIZATION TAG N.: TI-62.1 9.W13.4.43F.63M.120.U.T.SP1 THERMOWELL W13 AISI316, 1/2" NPT-F INSTR. CONN.,1" NPT-M,Ø 12 MM,IMMERSION U = 240 MM,LAGGING EXTENSION T = 54 MM,THERMOWELL TAGGING TAG N.: TW-62.1		
6.TG8.5.9.G.ATFT.43M.S10.9.T25.T01 THERMOMETER TG859 DS 6" (150 MM), RANGE 0...200 °C,1/2" NPT-M,11,5 MM DIAM.; FLEXIBLE EXT. S = 340 MM,AISI304+AISI304 L = 3.0 MT,AISI316L LABEL,TROPICALIZATION TAG N.: TI-64.10, TI-64.11 9.W13.4.43F.63M.120.U.T.SP1 THERMOWELL W13 AISI316, 1/2" NPT-F INSTR. CONN.,1" NPT-M,Ø 12 MM,IMMERSION U = 240 MM,LAGGING EXTENSION T = 54 MM,THERMOWELL TAGGING TAG N.: TW-64.10, TW-64.11	2	A,B,C=1,00 ,E=40 BAR,N= 250 °C
6.TG8.5.9.G.ATFT.43M.S10.9.T25.T01 THERMOMETER TG859 DS 6" (150 MM), RANGE 0...200 °C,1/2" NPT-M,11,5 MM DIAM.; FLEXIBLE EXT. S = 600 MM,AISI304+AISI304 L = 3.0 MT,AISI316L LABEL,TROPICALIZATION TAG N.: TI-64.5 9.W13.4.43F.63M.120.U.T.SP1 THERMOWELL W13 AISI316, 1/2" NPT-F INSTR. CONN.,1" NPT-M,Ø 12 MM,IMMERSION U = 500 MM,LAGGING EXTENSION T = 54 MM,THERMOWELL TAGGING TAG N.: TW-64.5	1	A,B,C=1,00 ,E=40 BAR,N= 250 °C
6.TG8.5.9.G.ATF2.43M.S10.9.T25.T01 THERMOMETER TG859 DS 6" (150 MM), RANGE 0...600 °C,1/2" NPT-M,11,5 MM DIAM.; FLEXIBLE EXT. S = 600 MM,AISI304+AISI304 L = 3.0 MT,AISI316L LABEL,TROPICALIZATION TAG N.: TI-64.9 9.W13.4.43F.63M.120.U.T.SP1 THERMOWELL W13 AISI316, 1/2" NPT-F INSTR. CONN.,1" NPT-M,Ø 12	1	A,B,C=1,00 ,E=40 BAR,N=600 °C

TEST : A) VISUAL B) DIMENSIONAL C) ACCURACY D) OVER PRESSURE E) TEST PRESSURE F) REGOLATION MICRO G) RELIABILITY MICRO H) TEST TEMPERATURE I) MAX STATIC PRESS. L) DIFFERENTIAL RANGE M) MAX TEMPERATURE N) OVER TEMPERATURE

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04/09/2012	0000013670	2521/OR/2012	121250 - Job 2F11A of 29/05/2012	4/ 4

Description	Q.ty	Test
MM,IMMERSION U = 500 MM,LAGGING EXTENSION T = 54 MM,THERMOWELL TAGGING TAG N.: TW-64.9		
3.27.---.AAE1.A.1.43M.SS1.T01 PRESS. SWITCH 3.27, 0...1,6 BAR,N°1 MICRO STANDARD, CODE A,ELEC.CONN. 1/2"BSP TAPERED FEMALE ISO7-1,1/2" NPT-M,PRESSURE SWITCH TAGGING,TROPICALIZATION TAG N.: PSH-64.6, PSH-64.7	2	A,B,E=2,00 BAR,F=OK,G=+-1,00 % F.S.,L=0,030 BAR
3.27.---.AAFB.A.1.43M.SS1.T01 PRESS. SWITCH 3.27, 0...10 BAR,N°1 MICRO STANDARD, CODE A,ELEC.CONN. 1/2"BSP TAPERED FEMALE ISO7-1,1/2" NPT-M,PRESSURE SWITCH TAGGING,TROPICALIZATION TAG N.: PSL-65.1, PSL-65.2	2	A,B,E=12,0 BAR,F=OK,G=+-1,00 % F.S.,L=0,100 BAR
1.18.1.A.G.---.AAE7.41M.C.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...6 BAR,1/2" BSP-M,TYPE "C" FLANGE,AISI316L LABEL,TROPICALIZATION TAG N.: PI-63.4 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR. CONN.,AISI304 CAPILLARY L = 3.0 MT 5.7RC.4.H00 FITTING SADDLE SA515 (RC) AISI316, DN100 WELDING	1	A,B,C=+-1,00 % F.S.,D= 7,80 BAR
1.18.1.A.G.---.AAE7.41M.C.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...6 BAR,1/2" BSP-M,TYPE "C" FLANGE,AISI316L LABEL,TROPICALIZATION TAG N.: PI-63.5 4.R00.4.----.4.---.41F.1 DIAPHRAGM SEAL MGS9/R AISI316, AISI316L DIAPHRAGM,1/2" BSP-F INSTR. CONN.,AISI304 CAPILLARY L = 3.0 MT 5.7RC.4.L00 FITTING SADDLE SA515 (RC) AISI316, DN50 WELDING	1	A,B,C=+-1,00 % F.S.,D= 7,80 BAR

TEST : A) VISUAL B) DIMENSIONAL C) ACCURACY D) OVER PRESSURE E) TEST PRESSURE F) REGOLATION MICRO G) RELIABILITY MICRO H) TEST TEMPERATURE I) MAX STATIC PRESS. L) DIFFERENTIAL RANGE M) MAX TEMPERATURE N) OVER TEMPERATURE

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Date	Certificate	Nuova Fima Order	Purchase Order N.	Sheet
15/10/2012	0000013881	3515/OR/2012	121844 of 31/07/2012	1/ 1

Description	Q.ty	Test
1.18.1.A.G.---.AAE5.43M.T25.T01 MANOMETER MGS18/1/A DS 6" (150 MM), 0...4 BAR,1/2" NPT-M,AISI316L LABEL,TROPICALIZATION TAG N.: PI 62.F6, PI 63.F2A, PI 63.F2B	3	A,B,C=+-1,00 % F.S.,D= 5,20 BAR
1.M8.1.A.G.---.AAE5.43M.M3D.CH1.T25.T01 MANOMETER MN14/18/1/A DS 6" (150 MM), 0...4 BAR,1/2" NPT-M,03D/BM CONTACT,WEATERPROOF KEY IP55,AISI316L LABEL,TROPICALIZATION TAG N.: PISHL 63.8A, PISHL 63.8B	2	A,B,C=+-1,00 % F.S.,D= 4,00 BAR
1.M8.1.A.G.---.AAFB.43M.M1S.CH1.T25.T01 MANOMETER MN14/18/1/A DS 6" (150 MM), 0...10 BAR,1/2" NPT-M,01S/BM CONTACT,WEATERPROOF KEY IP55,AISI316L LABEL,TROPICALIZATION TAG N.: PISH 65.1, PISH 65.2	2	A,B,C=+-1,00 % F.S.,D= 10,0 BAR

TEST : A) VISUAL B) DIMENSIONAL C) ACCURACY D) OVER PRESSURE E) TEST PRESSURE
F) REGOLATION MICRO G) RELIABILITY MICRO H) TEST TEMPERATURE I) MAX STATIC PRESS. L) DIFFERENTIAL RANGE
M) MAX TEMPERATURE N) OVER TEMPERATURE

WE HEREBY CERTIFY THAT THE SUPPLY IS IN CONFORMITY WITH SPECIFICATIONS, DRAWINGS AND TO THE ORDER WHO IS REFERRED. THE SUPPLY HAS BEEN POSITIVELY CHECKED AND TESTED IN ACCORDANCE WITH THE NUOVA FIMA S.P.A. SPECIFICATIONS AND PROCEDURES.

NOTES :

FINAL CONTROL DEPT	INSPECTOR	THIRD PART INSPECTION	QUALITY ASSURANCE
SIGNATURE F.Zanetti	SIGNATURE	SIGNATURE	SIGNATURE

NUOVA FIMA SPA
Industrial Instrumentation for Pressure and Temperature

NUOVA FIMA S.p.A. – Cap. Soc. € 3.500.000 i.v.
Via C. Battisti, 59/61 – 28045 INVORIO (No) – Italy
Tel. +39 0322 253200 – Fax +39 0322 253232
www.nuovafima.com – e_mail: info@nuovafima.com
Codice Fiscale/Partita IVA 01719710038
Reg. Imp. Novara 10895/1999 –REA 193327

Monday, 15 October 2012

MATERIAL CERTIFICATE N° MAT- 12/13670-13881

CUSTOMER : DESMET BALLESTRA

P.ORDER NO.: 121250 Job 2F11A + 121844

MANUFACTURER	CERT. N°	TYPE OF PRODUCT
ACCIAIERIE VALBRUNA	226386/2012	THREAD CONN. MANOMETHERS
LNI	EXP05214/10	BOURDON TUBE AISI 1 BAR
LNI	EXP05656/10	BOURDON TUBE AISI 4-6 BAR
TAI	2012/00079	BOURDON TUBE AISI 10 BAR
TAI	2012/00076	BOURDON TUBE AISI 16 BAR
TAI	2009/00003	BOURDON TUBE AISI 100 BAR
DEUTSCHE EDEL...	1819084/7579632/bit	THREAD CONNECTION MN12
LAMINERIES MATTHEY	63117	DIAPHRAGM MN12 25mbar
ACCIAIERIE VALBRUNA	006945/2011	THREAD CONNECTION 3.27
ACCIAIERIE VALBRUNA	219027/2012	CONNECTION SEALS
RODNEY METALS	54547	DIAPHRAGM SEALS
ACCIAIERIE VALBRUNA	236607/2012	THREAD CONN. THERMOMETERS
SANDVIK	28894	BULBE AISI DN 11.5 mm
OLIMPIA INOX	504/04	TUBE THERMOWELLS

NUOVA FIMA S.p.A
FINAL CONTROL
ZANETTI

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER

A

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Avviso di Spedizione: A-TO12002209
Lieferanzeige/Packing list/B.L.

Certificato nr: MEST226386/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO11001691
Werks/Our Order/Ref nr.

Produttore: **ACCIAIERIE VALBRUNA S.P.A.**
Hersteller/Item/Usine productrice

Ordine nr: 734
Bestell/Your order/Commande

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Stato di fornitura: Sgrassato Solubilizzato Trafilato
Lieferzustand/Delivery state/Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d'elaboration

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Specifiche:
Anforderungen / Requirements / Exigences
ST - 001 11 1.4404/316L A,CF
EN 10088-1 2005 1.4404
ASTM A276 2010 S31600/03 A,CF
ASTM A479 2011 S31600/03 A

Qualità: 1.4404/316L
Werkstoff/Grade/Nuance

Marca: MVAPML / MAXIVAL
Markenbezeichnung/Brand/Nuance

Tolleranza: h11
Toleranz./Allowance/Tolerance

Punzonatura: 1.4404/316L
Kennzeichnung/Marking/Marquage

Pos. nr. / Pos. nr. / Item nr. / Nr. de poste	Oggetto / Gegenstand / Product description / Descrip. du produit	Dimensioni - mm / Abmessungen / Dimension / Dimension	Lunghezza - mm / Lange / Length / Longueur	Colata / Schmelze / Heat / Coulée	Pezzi / Stückzahl / Pieces / Pieces	Peso - KG / Gewicht / Weight / Poids	Lotto nr. / Losnr. / Lot nr. / Lot nr.
0010	Quadro	22,000 x 22,000	3050 / 3090	255431		2820,0	112300721

TEST ALLO STATO DI FORNITURA
Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material asi come entregado

TEST	Provetta/Probestab / Specimen/Eprouvette / Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais mm	°C	Posiz. Saggio / Probenlage / Location / Emplacement 1)	Snervamento / Streckgrenze / Yield Stress / Limite elastique Rp 0,2% N/mm2	Snervamento / Streckgrenze / Yield Stress / Limite elastique	Resistenza / Zugfestigkeit / Tensile strength / Resistance à traction Rm N/mm2	Allungamento / Bruchdehnung / Elongation / Allongement E 4d %		Strizione / Einschnürung / Reduction of area / Striction % RA %		Resilienza / Kerbschlagarbeit / Impact Value / Resilience			Durezza / Haerte / Hardness / Durete HB		
Valori richiesti 1 / Anforderungen/Required values / Valeurs demandées		min / max		205	-	515	-	30	-	50	-			- / 235		
A	12,5	20	L	516		692		42		67				231		

TEST		min	max	
A	HRc		22,0	18,8

TEST		min	max	
A	Dimensioni grano x ASTM E112			5

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
AA421	18-7-12

TEST	Provetta/Probestab / Specimen/Eprouvette / Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais mm	°C	Posiz. Saggio / Probenlage / Location / Emplacement 1)	Resilienza / Kerbschlagarbeit / Impact Value / Resilience KV J			Espansione laterale / Lateral Expansion			Shear / Shear		
Valori richiesti 1 / Anforderungen/Required values / Valeurs demandées		min / max		40	40	40	-	-	-	-	-	-
B	10X10	-196	L	280	266	201						

1)L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

Analisi chimica
Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata / Heat / Schmelze/Coulée	min - max 0,030	- 1,00	- 2,00	16,50 18,00	2,00 2,50	10,00 13,00	- 0,045	- 0,030	- 0,100	-	-	-	-	-	-	-
	C %	Si %	Mn %	Cr %	Mo %	Ni %	P %	S %	N %							
255431	0,012	0,45	1,57	16,75	2,04	10,13	0,029	0,030	0,055							

Materiale solubilizzato a 1070C per 1 h/aria.
Corrosion test per EN ISO 3651-2A sensitized T1 : OK

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements

Controllo antimescolanza: OK
Verwechslungprüfung: spektralanalytisch durchgeführt
Antimixing testing performed: OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory

Vicenza,17/07/12
VCQ008
(Mod. MCE2)

Il collaudatore di stabilimento / der Werkssachverständige / Works inspector / L'agent d'usine
M.Rizzotto

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY LLOYD' S REGISTER

A

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Produttore: **ACCIAIERIE VALBRUNA S.P.A.**
Hersteller/Item/Usine produtrice

Avviso di Spedizione: A-TO12002209
Lieferanzeige/Packing list/B.L.

Ordine nr: 734
Bestell/Your order/Commande

Certificato nr: MEST226386/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO11001691
Werks/Our Order/Ref nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l' usine produtrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector' s stamp/Poinçon de l' assayeur
MR

Stato di fornitura: Sgrassato Solubilizzato Trafilato
Lieferzustand/Delivery state/Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d' elaboration

Le materiel à été trouvé conforme aux exigences | Contrôle antimelange fait: r.a.s. | Contrôle visuel et dimensions: satisfaisant

Melted and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination through Portal System when it leaves the production plant.

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1,s.,4.3 by TUEV and LLOYD' S

Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

B

LN INDUSTRIES SA
USINE DE CHAMPAGNE
Rue du Moulin 1 Champagne Case postale 241
CH-1422 GRANDSON 1 - Suisse
Tél. +41(0) 24 436 0606
Fax +41(0) 24 436 0607 - TVA N° 143 359

TEST CERTIFICATE : EXP05214 / 10
(EN 10204 / 3.1)

Champagne, le 03.05.2012

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
Y217	16-5-12

Your order	Acknowledgment-No.	Item
220 of 20.02.2012	CV04799	10

NUOVA FIMA S.P.A.
Via Cesare Battisti 59
IT - 28045 INVORIO
Italie

TEST CERTIFICATE
EXP05214 / 10

OF 32999

Item	Ordered Qty.	Supplied Qty.
10 917090819570151	100 Kg.	111 Kg.

Stainless Steel Aisi 316 L / 1.4435 seamless
Tube Flat oval
Ref. LNI: T - OP - 1957 A.
Your reference : T-AIS. 017/015. / ST004 Rev.6
Dimensions : 17.00 * 7.00 * 0.15 mm.

		REQUIRED		SUPPLIED	
		MINI	MAXI	MINI	MAXI
Outside width	mm.	17.00	17.20	17.10	17.13
Outside height	mm.	7.00	7.20	7.10	7.15
Wall	mm.	0.1425	0.1575	0.145	0.157
Length	mm.	162.6	162.8	162.65	162.75
Meterweight	gr/m.	about 49.5			49.2
Piece weight	gr/pce.				8.0
Hardness (200 gr.)	Hv.	150	170	150	155
Tensile strength	N/mm2	580	640	616	621
Elongation	%.	40	55	47	50
Yield strength	N/mm2				
Grain size	µm.		35	13	16
Sight control	:			Accomplished.	
Eddy Current test 10% of the tubes	:			Positive.	

CHEMICAL ANALYSIS : **Heat Nr. : 530 159 / Sandvik.**

C : 0.019 % S : 0.008 % N : 0.036 %
Si: 0.410 % Cr:17.320 % Fe: Bal. %
Mn: 1.740 % Ni:13.090 %
P : 0.030 % Mo: 2.510 %

REMARKS :

BOX NR. : 423. 424.

Quality control

Engineer in charge

SWISS-TUBE

Champagne, le 27.08.2012

Your order	of	Acknowledgment-No.	Item
668	11.05.2012	CV05111	10

NUOVA FIMA S.P.A.
Via Cesare Battisti 59
IT - 28045 INVORIO
Italie

OF 33455

TEST CERTIFICATE : EXP05656 / 10

(EN 10204 / 3.1)

Item	Ordered Qty.	Supplied Qty.
10 917090802670300	144 Kg.	144 Kg.

Tube Flat oval, Stainless Steel Aisi 316L / 1.4435, seamless.
Your reference : T - AIS.017/030.
Reference LNI. : T - OP - 0267 A.
Your reference ST004 Rév 6.
Dimensions : 17.00 * 7.00 * 0.300 mm.

		REQUIRED		SUPPLIED	
		MINI	MAXI	MINI	MAXI
Outside width	mm.	17.00	17.20	17.16	17.19
outside height	mm.	7.000	7.200	7.110	7.140
Wall	mm.	0.285	0.315	0.285	0.310
Length	mm.	3'000	4'000	3'500	3'900
Meterweight	gr/m.	about 97.90			98.60
Piece weight	gr/pce.				
Hardness (300 gr.)	Hv.	170	190	172	173
Tensile strength	N/mm2	620	670	626	629
Elongation	%.	40	55	45	47
Yield strength	N/mm2				
Grain size	µm.		35	23	27
Sight control	:			Accomplished.	
Eddy Current test 10 % of the tubes :				Positive.	

CHEMICAL ANALYSIS : Heat Nr. : 531 341 / Sandvik.

C : 0.019 % S : 0.008 % N : 0.045 %
Si: 0.470 % Cr:17.260 % Fe: Bal. %
Mn: 1.660 % Ni:13.110 %
P : 0.030 % Mo: 2.520 %

REMARKS :

BOX NR. : 898. 899.

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
Y844	11-9-12

Quality control

Engineer in charge

T.A.I. srl
Via Civati, 15- 22031 Albavilla (CO)
Tel. 031.628213 fax. 031.3353969
www.taisrl.it Mail info@taisrl.it

TEST CERTIFICATE
CERTIFICATO DI COLLAUDO

EN 10204 – 3.1 - 2004

Ceritficate n. 2012/00079

Date 17/09/2012

Customer	TAI ref. nr.	Date
NUOVA FIMA SpA Via C. Battisti, 59 28045 Invorio (NO)	2012/227	21/06/2012
	Customer Order N° 862	Date 08/06/2012

Standard specification: Samless Tube Cold-Drawn NUOVA FIMA ST – 004/5

Item	Steel Grade	Dimension	Pcs	Mt.	Kg	Heat
01	TP 316L 1.4435	Ovale 17 x 7 x 0,40	192	737,21	95,83	531342

TENSILE TEST		Temp. 20°C	Section	Lot. n°	Yield Point. Rp 0.2 N/mm²	Yield Point. Rp 1.0 N/mm²	Tensile Rm N/mm²	Elongat. A 5 LO %	Elongat. Lo=5.65 $\sqrt{So}$ %	Hardness Scale
Item	Test N°	Min: Max:			306 374		610	45 55		HV 150/162
01	79		15,83	01	317		635	51		151/161

Eddy Current Test	Ultrasonic Test	Hydro.Test Mpa	P.M.I.
OK 100% ASTM E 426-03 DRILLED HOLE			OK

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
M 148	25-9-12

Flaring Test: Flattening Test: Visual and dimensional control: OK

Corrosion Test.

Heat treatment:

Required	C %	Mn%	Cr%	Ni%	Mo%	Si %	S %	P %	Ti %	N %	Cu%	Fe%	Al%	Nb+Ta %
Min:			17,00	12,50	2,50									
Max:	0,030	2,00	19,00	15,00	3,00	1,00	0,015	0,045		0,11				
531342	0,023	1,65	17,58	13,16	2,53	0,40	0,007	0,032		0,04				
Check	0,025	1,65	17,54	13,19	2,54	0,39	0,006	0,031		0,04				

Note:Dimensioni reali: 17,07/17,10 x 7,13/7,16 sp. 0,39
Peso metrico gr: 130
Dimensioni del grano: 7,3 (ASTM E 3-01 / ASTM E 407-07 / ASTM E 112-96(2004)e2)

TUBES ARE FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION
THE MATERIAL HAS BEEN FURNISHED IN ACCORDANCE TO THE REQUIREMENTS

MANUFACTURER APPROVED CERTIFICATE Nr.302/2006/MUC BY TUV-SUD SUDDETUTSHLAND (NOTIFIED BODY 0036) TO ISSUE CERTIFICATES OF SPECIFIC
PRODUCT CONTROL IN ACCORDANCE WITH PRESSURE EQUIPMENT DIRECTIVE 97/23/EC (PED) ANNEX 1 POINT 4.3

MANUFACTURER APPROVED ISO 9001 BV CERTIFICATE Nr.IT230965
MANUFACTURER APPROVED ISO 14001 BV CERTIFICATE Nr.IT231174

Inspector

T.A.I. S.r.l.
QUALITY CONTROL DEPT
C. Lupidi
(Quality Manager)

This certificate is issued by a computerized system and it is valid without signature. Any alteration and/or falsification will be subject to the law.

DDT 607 del 17.09.12 // COPIA CERTIFICATO CONFORME ALL'ORIGINALE

T.A.I. S.r.l.

T.A.I. srl
Via Civati, 15- 22031 Albavilla (CO)
Tel. 031.628213 fax. 031.3353969
www.taisrl.it Mail info@taisrl.it

TEST CERTIFICATE CERTIFICATO DI COLLAUDO

EN 10204 – 3.1 - 2004

Ceritficate n. 2012/00076

Date 04/09/2012

Customer	TAI ref. nr.	Date
NUOVA FIMA SpA Via C. Battisti, 59 28045 Invorio (NO)	2012/228	22/06/2012
	Customer Order N° 863	Date 08/06/2012

Standard specification: Samless Tube Cold-Drawn NUOVA FIMA ST – 046

Item	Steel Grade	Dimension	Pcs	Mt.	Kg	Heat
01	TP 316L 1.4435	Ovale 17 x 7 x 0,50	150	536,30	86,48	531342

TENSILE TEST		Temp. 20°C	Section	Lot. n°	Yield Point. Rp 0.2 N/mm²	Yield Point. Rp 1.0 N/mm²	Tensile Rm N/mm²	Elongat. A 5 LO %	Elongat. Lo=5.65 $\sqrt{So}$ %	Hardness Scale
Item	Test N°	Min: Max:			315 385		610	45 55		HV 150/170
01	76		19,79	01	343		613	51,1		144/168

Eddy Current Test	Ultrasonic Test	Hydro.Test Mpa	P.M.I.
OK 100% ASTM E 426-03 DRILLED HOLE			OK

Flaring Test: Flattening Test:

NUOVA FIMA S.p.A. UFFICIO GQ

CODICE CERTIFICATO	DATA
M339	13-9-12

Visual and dimensional control: OK

Corrosion Test.

Heat treatment:

Required	C %	Mn%	Cr%	Ni%	Mo%	Si %	S %	P %	Ti %	N %	Cu%	Fe%	Al%	Nb+Ta %
Min:			17,00	12,50	2,50									
Max:	0,030	2,00	19,00	15,00	3,00	1,00	0,015	0,045						
531342	0,023	1,65	17,58	13,16	2,53	0,40	0,007	0,033		0,040				
Check	0,025	1,65	17,54	13,19	2,54	0,39	0,006	0,031		0,045				

Note:Dimensioni reali: 17,07/17,12 x 7,08/7,16 sp. 0,49/50
Peso metrico gr: 162
Dimensioni del grano: 6,0 (ASTM E 3-01 / ASTM E 407-07 / ASTM E 112-96(2004)e2)

TUBES ARE FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION
THE MATERIAL HAS BEEN FURNISHED IN ACCORDANCE TO THE REQUIREMENTS

MANUFACTURER APPROVED CERTIFICATE Nr.302/2006/MUC BY TUV-SUD SUDDETUTSHLAND (NOTIFIED BODY 0036) TO ISSUE CERTIFICATES OF SPECIFIC
PRODUCT CONTROL IN ACCORDANCE WITH PRESSURE EQUIPMENT DIRECTIVE 97/23/EC (PED) ANNEX 1 POINT 4.3

MANUFACTURER APPROVED ISO 9001 BV CERTIFICATE Nr.IT230965
MANUFACTURER APPROVED ISO 14001 BV CERTIFICATE Nr.IT231174

Inspector

T.A.I. S.r.l.
QUALITY CONTROL DEPT
C. Lupidi
(Quality Manager)

This certificate is issued by a computerized system and it is valid without signature. Any alteration and/or falsification will be subject to the law.

DDT 571 del 04.09.12 // COPIA CERTIFICATO CONFORME ALL'ORIGINALE

T.A.I. S.r.l. Albavilla (CO)

TRAFILERIA DI TUBI E MICROTUBI IN ACCIAIO INOX

T.A.I. srl
Via Civati, 15
22031 Albavilla (CO)
Tel. 031.628213 fax. 031.3353969
www.taisrl.it Mail info@taisrl.it

TEST CERTIFICATE
CERTIFICATO DI COLLAUDO

EN 10204 – 3.1 - 2004

Cerificate n. 2009/00003
N. Certificato:

Date
DATA **14/01/2009**

Customer / Cliente	**Our job n. / NS. Commessa N.**	**DATE / Data**
NUOVA FIMA SpA Via C. Battisti, 59 28045 Invorio (NO)	2008/332	27/10/2008
	Order n. / Ordine	**DATE / Data**
	2008/332	27/10/2008

Standard specification / Norma di esecuzione Samless Tube Cold-Drawn ASTM A213/A450-02

Item Pos.	Steel Acciaio	Description Descrizione	Pieces N.Tubi	Mt.	Kg	Heat Colata
01	TP 316L 1.4435	6x0,65x2800/3700	232	1212	107	515687

TENSILE TEST		Temp. 20°C	Section	Lot. n°	Yield Point.		Tensile	Elongat.	Elongat.	Hardness
					Rp 0.2 N/mm²	Rp 1.0 N/mm²	Rm N/mm²	A 5 LO %	Lo=5.65 $\sqrt{So}$ %	Scale
Item	Test N°	Min: Max:					711 750	25 35		HV 255/275
01	03		11,01	01	674		817	31,20		250/265

Eddy Current Test	Ultrasonic Test	Hydro.Test Mpa	P.M.I.
OK 100% ASTM E 426-03 DRILLED HOLE		6,9	OK

Flaring Test: **Flattening Test:** **Visual and dimensional control: OK**

Corrosion Test.

Heat treatment:

Required	C %	Mn%	Cr%	Ni%	Mo%	Si %	S %	P %	Ti %	N %	Cu%	Fe%	Al%	Nb+Ta %
Min:			17,00	12,50	2,50									
Max:	0,030	2,00	19,00	15,00	3,00	1,00	0,015	0,045						
515687	0,016	1,58	17,22	13,13	2,52	0,40	0,007	0,037		0,03				
Check	0,018	1,60	17,29	13,20	2,54	0,40	0,007	0,036		0,04				

Note: Dimensioni reali: 6,01 x 4,70
Peso metrico gr: 88
Dimensioni del grano: 7

UFFICIO GQ S.p.A.
CODICE CERTIFICATO P122 DATA 16-02-09

"Ausgestellt im Einvernehmen mit dem TUV"
"Issued in accordance with TUV"
The material has been furnished in accordance to P.O. requirements

Inspector
Ente collaudatore

T.A.I. S.r.l.
QUALITY CONTROL DEPT
C. Lupidi
(Quality Manager)

This certificate is issued by a computerized system and it is valid without signature. Any alteration and/or falsification will be subject to the law.

ordine nr. 75 del 24.01.08 // DDT 19 del 15.01.09

A.I. S.r.l.
Albavilla Lupidi

Zertifiziert nach: ISO 9001
ISO / TS 16949
EN 9100
ISO 14001

GAZ-PL-06-47-11-22-01

DEUTSCHE EDELSTAHLWERKE

Providing special steel solutions

D-58452 Witten, D-57012 Siegen , http://www.dew-steel.com

Datum/Date: 16.05.12

Zertifiziert nach:	AD2000 W 0 TRD 100	Werkstofflieferant gemäß Druckgeräte-richtlinie 97 / 23 EG

Abnahmeprüfzeugnis nach

Inspection Certificate acc.to/Certificat de réception selon

DIN EN 10204 3.1/01.05
DIN EN 10204 3.1B/08.95

Zeugnis-Nr./Certificate No./No.de Certificat: 1819084/7579632/bit

DEUTSCHE EDELSTAHLWERKE
Schmolz + Bickenbach Inox srl
Via G. di Vittorio
IT-20068 Peschiera Borromeo

Herstellerzeichen/Supplier's Mark/Marque d'usine	DEW
Prüfstempel/Inspector's stamp/Poincon de l'expert	WA

Ihre Auftr.-Nr. vom Your order No. date /No.de votre commande du	Kundenmaterial-Nr. Your material No.
2058005762 | 02.02.12	2018829
Unsere Auftr.-Nr. Our order No./No.de notre Commande	**Unsere Material-Nr.** Our material No./No.de notre matériel
1361385 / 6	2181811
Unsere Abteilung/Our department/Notre département	**Telefon**/Telephone/Téléphone
VR-H	02302/29-4121

Produkt/Product/Produit

STAEBE AUS NICHTROSTENDEM STAHL
ACIDUR 4404, 4404 SUP.IM, TYPE 316/316L
GEWALZT, ABGESCHRECKT,
GERICHTET, GESCHAELT
1.4401/1.4404
EN 10272, AD2000-W2/W10, EN 10088-3,
ASTM A 182/276/479, ASME SA 182/479,
NACE MR 0175,
IN ANLEHNUNG AN EN 10222-5, DIN 17440/96

STAINLESS STEEL BARS
ACIDUR 4404, 4404 SUP.IM, TYPE 316/316L
HOT ROLLED, QUENCHED,
STRAIGHTENED, PEELED
1.4401/1.4404
EN 10272, AD2000-W2/W10, EN 10088-3,
ASTM A 182/276/479, ASME SA 182/479,
NACE MR 0175,
FOLLOWING EN 10222-5, DIN 17440/96

Fertigungsauftr.-Nr./Production lot-No./Lot de fabrication No.	:
Lieferschein-Nr./Delivery note/No. de l'avis de livraison	:
Schmelzen-Nr./Heat No./No.de coulée	: 448160
Stückzahl/Piece No./Nombre des pièces	: 5
Gewicht/Weight/Masse	: 3760 [kg]
Zeichnungs-Nr./Drawing No./No.du dessin	:
Format/Shape/Profil	: rund / round / rond
Durchm./Breite/Diameter/width/Diamètre/largeur	: 150 [mm] +0.630/-0.000 [mm]
Dicke/Thickness/Epaisseur	:
Länge/Length/Longueur	: 5000 - 6000 [mm]

Stückzahl und Gewicht siehe Rechnung. / Quantity and weight see delivery bill/invoice.
Nombre des pièces et masse voir facture.
Lieferzustand/Condition as supplied/Etat de livraison:
1920 DEGREE F SOLUTION ANNEALED AND QUENCHED, 1050 GRAD C
LOESUNGSGEGLUEHT UND ABGESCHRECKT, NO WELDING HAS BEEN PERFORMED,
AM MATERIAL WURDE NICHT GESCHWEISST

Die Prüfergebnisse zu Ihrer Lieferung finden Sie auf der Rückseite bzw. den nächsten Seiten
As for test results of your delivery see overleaf. / Vouz trouverez les resultats d'essais de votre livraison aux pages suivantes.

DEUTSCHE EDELSTAHLWERKE GMBH
Abnahmetechnik/Inspection department/Département de Réception

Krause
Abnahmebeauftragter/Der Werkssachverständige
Test House Manager/Works' inspector/Resousable Reception/L'Agent Réceptionnaire de l'usine

Zertifiziert nach: ISO 9001 ISO / TS 16949 EN 9100 ISO 14001

GAZ-PL-06-47-11-22-01

DEUTSCHE EDELSTAHLWERKE

Providing special steel solutions

D-58452 Witten, D-57012 Siegen , http://www.dew-steel.com

Datum/Date: 16.05.12

Zeugnis-Nr. Certificate No./No.de Certificat	Unsere Auftr.-Nr. Our order No./No.de notre Commande	Ihre Auftr.-Nr. vom Your order No. date /No.de votre commande du	Fertigungsauftr.-Nr. Production lot-No./Lot de fabrication No.
1819084/7579632/bit	1361385 / 6	2058005762	

Schmelzen-Nr. Heat No./No.de coulée	Erschmelzungsart Steelmaking process/Procédé d'élaboration	Sekundärmetallurgie Secondary metallurgy/Metallurgie secondaire
448160	E	VOD

Chemische Zusammensetzung/ Chemical Composition/ Composition chimique

	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	Co	Al	N	
Ist/Actual/Actuel	0.009	0.23	1.63	0.022	0.028	16.65	2.02	10.17	0.23	0.01	0.033	0.012	0.034	[%]
	B	Ti	Nb	Ca										
Ist/Actual/Actuel	0.0045	< 0.002	< 0.005	0.0007										[%]

Härte/ Hardness/ Dureté

Lieferzustand/Condition as supplied/Etat de livraison

Proben-Nr./Specimen-No./No.d'eprouvette	40785	
Ist/Actual/Actuel	155	[HB]

HRC MAX 22

Zugversuch/ Tensile test/ Essai de traction

Lieferzustand/Condition as supplied/Etat de livraison

Probenabm./Specimen dimension/Dimension d'éprouvette	Probenrichtung/Specimen direction/Sens de Prélèvement	Prüftemp./Test temperature/Température d'essai
Zugprobe; 12,5 mm rd	längs/longitudinal/longueur	23 [°C]

Proben-Nr./Specimen-No./No.d'eprouvette	Rpo.2 [MPa (N/mm²)]	Rp1.o [MPa (N/mm²)]	Rm [MPa (N/mm²)]	A5 [%]	A2'' [%]	Z [%]
40787	283	315	586	55.8	57.4	72
40786	281	321	583	54.3	56.1	76

Schlagbiegeversuch/ Impact test/ Essai de résilience

Lieferzustand/Condition as supplied/Etat de livraison

Probenform/Type of specimen/Type d'éprouvette	Probenrichtung/Specimen direction/Sens de Prélèvement	Prüftemp./Test temperature/Température d'essai
[CHARPY V]	längs/longitudinal/longueur	23 [°C]

Proben-Nr./Specimen-No./No.d'eprouvette	1. Prfl./Spec./Eprouvette	2. Prfl./Spec./Eprouvette	3. Prfl./Spec./Eprouvette
40787	285 [J]	289 [J]	267 [J]
40786	280 [J]	269 [J]	265 [J]

Korngröße/ Grain size/ Grosseur de grain

Lieferzustand/Condition as supplied/Etat de livraison

Richtreihe gemäß/Chart acc.to/Série type selon	Größe/Size/Grosseur
ASTM E 112	4 - 5

Interkristalline Korrosion/ Intergranular corrosion/ Corrosion intercristalline

ASTM A 262 PRACTICE E / DIN 50914 / EURONORM 114 ISO 3651-2

US-Prüfung/ Ultrasonic testing/ Contrôle par ultrasons

Die Lieferung wurde US-geprüft nach/Delivery US-checked acc.to: EN 10228-4 TYP 1A, Tab.4, KL.3

ENTSPRICHT AUCH/ALSO CORRESPONDING TO/CORRESPOND AUSSI A/CORRESPONDE TAMBIEN EN 10308 TYP 1A KL.4, ASTM A 388

Die Lieferung wurde auf Identität geprüft (Optische Emissionsspektrometrie) /Identity has been checked (Optical Emission Spectrometry)
Rißkontrolle wurde durchgeführt./Testing for surface cracks has been performed.

Die Lieferung wurde besichtigt und auf Maß kontrolliert/Visual inspection and control of dimensional accuracy have been performed

Das Material ist frei von Radioaktivität./The Product is free from radioactive./Le matériel n'est pas radioactif.
El material es libre de radioactividad.

Datum/Date: 16.05.12

Zeugnis-Nr. Certificate No./No.de Certificat	**Unsere Auftr.-Nr.** Our order No./No.de notre Commande	**Ihre Auftr.-Nr. vom** Your order No. date /No.de votre commande du	**Fertigungsauftr.-Nr.** Production lot-No./Lot de fabrication No.
1819084/7579632/bit	1361385 / 6	2058005762	

Das Qualitaetsmanagement-System wurde durch LRQA (Kenn-Nr.0525) gemäss der Richtlinie 97/23/EG Anhang 1, Abschnitt 4.3 (Druckgeräterichtlinie) überprüft (Zertifikats-Nr.: 50072).

It is hereby certified that the quality management system has been reviewed by LRQA (identification no.0525) according to the requirements of the Pressure Equipment Directive 97/23/EC Annex 1, 4.3 (guidelines for pressure instruments) (certificate no.: 50072).

Le système d'assurance de qualité est verifié par la société LRQA (no. indicatif 0525) selon recommendation 97/23/EG annexe 1, section 4.3 (Directive pour Appareils soumis a Pression) (certificate no.: 50072).

El Sistema de Calidad fue examinado por el LRQA (no.de identificación 0525) en conformidad con la directiva 97/23/EG anexo 1, séccion 4.3 (para equipos de presión) (certificado no.: 50072).

Erläuterung/ Explanations/ Explications

¤**Erschmelzungsart**/Steelmaking process/Procédé d'élaboration:
E = Elektrostahl / Electric-arc-furnace steel / Acier électrique
¤**Sekundärmetallurgie**/Secondary metallurgy/Metallurgie secondaire:
VOD = Vakuum-Sauerstoff-Entkohlungs-Verfahren / Vacuum-Oxygen-Decarburization / Vacuum-Oxygène-Décarburation

Die Lieferung wurde aus einem bevorrateten, geprüften Abnahmelos (Fertigungsauftr.-Nr. 402420) entnommen.
Material against this delivery has been taken from a stored and tested inspection lot. (Production lot-No. 402420).
La livraison a été pris d'un lot de réception stocké et éprouvé (Lot de fabrication No. 402420).

Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellungsannahme enspricht.
We hereby certify that the material described above has been tested and complies with the terms of the order.
Nous certifions que la livraison été vérifiée et est conforme aux stipulations de l'acception de la commande.

Lamineries
MATTHEY SA

Route de Neuchâtel 6
Case postale
CH-2520 La Neuveville

Tél. +41 32 752 32 32
Fax +41 32 752 32 00
www.matthey.ch

BRUSHWELLMAN

Métaux laminés à froid
Kaltgewalzte Metalle
Cold rolled metals

Cuivre au béryllium
Berylliumkupfer
Beryllium Copper

Inspection certificate according to EN 10204-3.1
Certificate No. 63117

La Neuveville 07/11/2011

Customer:	**7150003**	
Y/Part No.:	**533575**	**dated 13.09.2011**
O/Delivery note:	**732911**	**dated 07.11.2011**
Delivered Qty:	**23.2 kg**	

Ship to
BECK GMBH
Leinenweberstrasse 48
DE – 70567 Stuttgart

Dimensions: D300A150.0X0.180A

Material: 1.4571 – Stainless steel / X6CrNiMoTi17-12-2 / ~ AISI 316Ti

Specification: ASTM A240:2007

Heat No. : 517406 — **Chemical composition**

Element	Fe	C	Si	Mn	P	S	Cr	Mo
Unit	%	%	%	%	%	%	%	%
Limit	Rem.	< 0.08	< 1	< 2	<0,045	<0,015	16.5 – 18.5	2 – 2.5
Value	Rem.	= 0.034	= 0.45	= 0.81	= 0.032	= 0.001	= 16.88	= 2.02

Element	Ni	Ti	N
Unit	%	%	%
Limit	10.5 – 13.5	< 0.70	
Value	= 10.52	= 0.311	=0.012

Dimensional attributes	Unit	Result	Min.	Max.
Thickness	mm	**0.0800**	0.0740	0.0860
Width	mm	**149.85**	149.00	150.00

Mechanical properties	Unit	Result	Min.	Max.
Hardness	HV	**231**	190	250
Tensile strength - Rm	N/mm^2	**776**	650	850
Yield strength – Rp 0.2	N/mm^2	**439**		
Elongation	%			

We hereby confirm that the shipment corresponds to the stipulations of the order acknowledgement.

Lamineries MATTHEY SA
Marie-Christine Steiger

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2005) , 3.1

Cliente / Besteller/Purchaser/Client
BOTTELLI RINALDO & C. SRL
VIA MONTE ROSA,22
28040-PARUZZARO (NO)-IT

Avviso di Spedizione: A-
Lieferanzeige/Packing list/B.L

Certificato nr: MEST006945/2011/
Prüfung/Test/Essai

Conferma ordine nr: TO11000346
Werks/Our Order/Ref nr.

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Item/Usine productrice

Ordine nr: ORD. N. 2011-005
Bestell/Your order/Commande

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Oggetto Prove: - Solubilizzato Pelato
Prüfgegenstand/Item inspected/Finissage

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d'elaboration

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Specifiche:
Anforderungen / Requirements / Exigences

VAL STOCK 2005 1.4404/316L A
AMS 5648 K S31600 A
ASME SA182 2007 S31603 A (1)
ASME SA276 2007 S31603 A (4)
ASME SA479 2007 S31603 A (7)
ASTM A193 2007 B8M CLASS1
ASTM A276 2006 S31603 A
ASTM A479 2006A S31600 A
DIN 17440 96 1.4404 A
EN 10269 99 1.4401
EN 10272 2000 1.4404 A
QQ-S-763 F 316 A

AISI 316
AMS 5653 F S31603 A
ASME SA193 2007 B8M CLASS1 (2)
ASME SA320 2007 B8M CLASS1 (5)
ASTM A182 2007A S31600 A (8)
ASTM A262 2002A PRACTICE E
ASTM A314 97 S31600
ASTM A479 2006A S31603 A
EN 10088-3 2005 1.4401 A
EN 10269 99 1.4404
NACE MR0175* 2003 S31600 (A)
QQ-S-763 F 316L A

AISI 316L
ASME SA182 2007 S31600 A (0)
ASME SA276 2007 S31600 A (3)
ASME SA479 2007 S31600 A (6)
ASTM A182 2007A S31603 A (9)
ASTM A276 2006 S31600 A
ASTM A320 2007A B8M CLASS1
DIN 17440 96 1.4401 A
EN 10088-3 2005 1.4404 A
EN 10272 2000 1.4401 A
NACE MR0175* 2003 S31603 (B)

(0) SEC.II PT.A 2007 EDITION
(1) SEC.II PT.A 2007 EDITION
(2) SEC.II PT.A 2007 EDITION
(4) SEC.II PT.A 2007 EDITION
(6) SEC.II PT.A 2007 EDITION
(8) Chemical analysis only and mechanical properties.
(A) * ISO 15156-3

(0) Chemical analysis only and mechanical properties.
(1) Chemical analysis only and mechanical properties.
(3) SEC.II PT.A 2007 EDITION
(5) SEC.II PT.A 2007 EDITION
(7) SEC.II PT.A 2007 EDITION
(9) Chemical analysis only and mechanical properties.
(B) * ISO 15156-3

Qualità: 1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: MVAPML MAXIVAL
Markenbezeichnung/Brand/Nuance

Punzonatura: 1.4404/316/316L
Kennzeichnung/Marking/Marquage

Pos. nr. / Item nr. / Nr. de poste	Oggetto / Gegenstand / Product description / Descrip. du produit	Dimensioni - mm / Abmessungen / Dimension / Dimension	Tolleranza / Tolleranz. / Allowance / Tolerance	Lunghezza - mm / Lange / Length / Longueur	Colata / Schmelze / Heat / Coulée	Pezzi / Stückzahl / Pieces / Pieces	Peso - KG / Gewicht / Weight / Poids	Lotto nr. / Losnr. / Lot nr. / Lot nr.
0040	Tondo	100,000	k12	5836 / 5875	245869		372,0	728300630

TEST ALLO STATO DI FORNITURA
Test on delivery condition Prüfung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material asi come entregado

TEST	Provetta/Probestab / Specimen/Eprouvette Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais mm	°C	Posiz. Saggio / Probestelle / Location / Emplacement 1)	Snervamento / Streckgrenze / Yield Stress / Limite elastique Rp 0,2% N/mm2	Snervamento / Streckgrenze / Yield Stress / Limite elastique Rp 1% N/mm2	Resistenza / Zugfestigkeit / Tensile strength / Resistance à traction Rm N/mm2	Allungamento / Bruchdehnung / Elongation / Allongement A5 %	Allungamento E 4d %	Strizione / Einschnürung / Reduction of area / Striction Z %	Strizione RA %	Resilienza / Kerbschlagarbeit / Impact Value / Resilience KV J			Durezza / Haerte / Hardness / Durete HB		
Valori richiesti 1 / Anforderungen/Required values / Valeurs demandées		min / max		207	240	517 / 690	40	40	-	50	100			140 / 215		
A	10	20	L	315	356	616	58	61	69	69	232	227	224	183		

TEST		min	max	
	Dimensioni grano x ASTM E112			5

1)L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

Analisi chimica
Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat / Schmelze/Coulée	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %
min - max 0,030		- 1,00	1,25 - 2,00	16,50 - 18,00	2,00 - 2,50	- 1,00	10,00 - 13,00	- -	- 0,040	- 0,030	- 0,100
245869	0,012	0,61	1,46	16,60	2,05	0,54	10,13	0,090	0,031	0,030	0,066

Intergranular corrosion test per ASTM A262 pract. E: ok.
I.Korrosion nach EN ISO 3651-2A Sensibilisierung : T1 : OK

Vicenza,31/01/11 VCQ012 (Mod. MCER)	Il collaudatore di stabilimento / der Werkssachverständige / Works inspector / L'agent d'usine M.Rizzotto	Pagina - 1 di 2

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2005) , 3.1

Cliente / Besteller/Purchaser/Client
BOTTELLI RINALDO & C. SRL
VIA MONTE ROSA,22
28040-PARUZZARO (NO)-IT

Avviso di Spedizione: A-
Lieferanzeige/Packing list/B.L.

Certificato nr: MEST006945/2011/
Prüfung/Test/Essai

Conferma ordine nr: TO11000346
Werks/Our Order/Rel nr.

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Item/Usine produtrice

Ordine nr: ORD. N. 2011-005
Bestell/Your order/Commande

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l' usine produtrice

Oggetto Prove: - Solubilizzato Pelato
Prüfgegenstand/Item inspected/Finissage

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d' elaboration

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector' s stamp/Poinçon de l' assayeur

MR

Corrosion test per EN ISO 3651-2A sensitized T1 : OK

Sono state soddisfatte tutte le condizioni richieste
Die gestellten Anforderungen sind.it. Anlage erfüll
The material has been furnished in accordance with the requirements
Le material à été trouvé conforme aux exigences

Controllo antimescolanza: OK
Verwechslungprüfung: spectralanalytisch durchgeführt
Antimixing testing performed: OK
Contrôle antimelange fait: r.a.s.

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination through Portal System when it leaves the production plant.

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1,s.,4.3 by TUEV and LLOYD`S

Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Avviso di Spedizione: A-TO12001974
Lieferanzeige/Packing list/B.L.

Certificato nr: MEST219027/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO12002212
Werks/Our Order/Rel nr.

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Item/Usine productrice

Ordine nr: ORD. N. 938
Bestell/Your order/Commande

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Stato di fornitura: - Solubilizzato Pelato
Lieferzustand/Delivery state/Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d'elaboration

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Specifiche:
Anforderungen / Requirements / Exigences

VAL STOCK 2010 1.4404/316L A
ASME SA182 2010 S31600 A (0)
ASME SA276 2010 S31600 A (3)
ASME SA479 2010 S31600 A (6)
ASTM A182 2011A S31603 (9)
ASTM A276 2010 S31600 A
ASTM A320 2011 B8M CLASS1
DIN 17440 96 1.4401 A
EN 10088-3 2005 1.4404 A
NACE MR0103 2007 S31600 A
NACE MR0175 2009 S31603 A (B)

AISI 316
ASME SA182 2010 S31603 A (1)
ASME SA276 2010 S31603 A (4)
ASME SA479 2010 S31603 A (7)
ASTM A193 2011A B8M CLASS1
ASTM A276 2010 S31603 A
ASTM A479 2011 S31600 A
DIN 17440 96 1.4404 A
EN 10272 2007 1.4401 A
NACE MR0103 2007 S31603 A

AISI 316L
ASME SA193 2010 B8M CLASS1 (2)
ASME SA320 2010 B8M CLASS1 (5)
ASTM A182 2011A S31600 A (8)
ASTM A262 2010 PRACTICE E
ASTM A314 2008 S31600
ASTM A479 2011 S31603 A
EN 10088-3 2005 1.4401 A
EN 10272 2007 1.4404 A
NACE MR0175 2009 S31600 A (A)

NUOVA FIMA S.p.A. UFFICIO GQ
CODICE CERTIFICATO 44408
DATA 3-7-12

(0) SEC.II PT.A 2010 EDITION ADD. 2011a
(1) SEC.II PT.A 2010 EDITION ADD. 2011a
(2) SEC.II PT.A 2010 EDITION ADD. 2011a
(4) SEC.II PT.A 2010 EDITION ADD. 2011a
(6) SEC.II PT.A 2010 EDITION ADD. 2011a
(8) For products machined directly from bar refer to ASTM A479.
(A) ANSI/NACE MR0175/ISO 15156-3, second edition 2009-10-15
(B) ANSI/NACE MR0175/ISO 15156-3, second edition 2009-10-15

(0) For products machined directly from bar refer to ASME SA479.
(1) For products machined directly from bar refer to ASME SA479.
(3) SEC.II PT.A 2010 EDITION ADD. 2011a
(5) SEC.II PT.A 2010 EDITION ADD. 2011a
(7) SEC.II PT.A 2010 EDITION ADD. 2011a
(9) For products machined directly from bar refer to ASTM A479.
(A) Technical circular 1:2011 Published 2011-06-14
(B) Technical circular 1:2011 Published 2011-06-14

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: MVAPML / MAXIVAL
Markenbezeichnung Brand/Nuance

Tolleranza: k12
Tolleranz./Allowance/Tolerance

Punzonatura: 1.4401/4/316/L
Kennzeichnung/Marking/Marquage

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - mm Abmessungen Dimension Dimension	Lunghezza - mm Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - KG Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0040	Tondo	80,000	5900 / 5999	256612	1	239,0	128708670

TEST ALLO STATO DI FORNITURA
Test on delivery condition Prüfung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

TEST	Provetta/Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probenlage location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique Rp 1% N/mm2	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement A5 %	Allungamento E 4d %	Strizione Einschnürung Reduction of area Striction Z %	Strizione RA %	Resilienza Kerbschlagarbeit Impact Value Resilience KV J			Durezza Haerte Hardness Durete HB		
Valori richiesti 1 Anforderungen/Required values Valeurs démandées		min max		205	240	515 690	40	40	-	50	100			- 215		
A	10	20	L	308	361	619	52	55	72	72	246	251	256	180		

TEST		min	max	
A	Dimensioni grano x ASTM E112			5

1)L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

Analisi chimica
Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	min - max 0,030	- 1,00	- 2,00	16,50 18,00	2,00 2,50	10,00 13,00	- 0,045	- 0,030	- 0,100	- -	- -	- -	- -	- -	- -
	C %	Si %	Mn %	Cr %	Mo %	Ni %	P %	S %	N %						
256612	0,016	0,58	1,47	16,90	2,00	10,13	0,030	0,030	0,068						

Intergranular corrosion test per ASTM A262 pract. E: ok.
I.Korrosion nach EN ISO 3651-2A Sensibilisierung : T1 : OK
Corrosion test per EN ISO 3651-2A sensitized T1 : OK

Vicenza,02/07/12 VCQ008 (Mod. MCE2)	Il collaudatore di stabilimento / der Werkssachverständige / Works inspector / L'agent d'usine M.Rizzotto	Pagina - 1 di 2

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY LLOYD' S REGISTER

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Item/Usine productrice

Stato di fornitura: - Solubilizzato Pelato
Lieferzustand/Delivery state/Etat de livraison

Avviso di Spedizione: A-TO12001974
Lieferanzeige/Packing list/B.L.

Ordine nr: ORD. N. 938
Bestell/Your order/Commando

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d' elaboration

Certificato nr: MEST219027/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO12002212
Works/Our Order/Ref nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l' usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector' s stamp/Poinçon de l' assayeur
MR

Sono state soddisfatte tutte le condizioni richieste
Die gestellten Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel à été trouvé conforme aux exigences

Controllo antimescolanza: OK
Verwechslungprüfung: spectralanalytisch durchgeführt
Antimixing testing performed: OK
Contrôle antimelange fait: r.a.s.

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmassung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination through Portal System when it leaves the production plant.

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1,s.,4.3 by TUEV and LLOYD' S

Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

RODNEY METALS
An Allegheny Teledyne Company

1357 EAST RODNEY FRENCH BLVD. NEW BEDFORD, MASS. 02744-2124
P.O. BOX 6915 NEW BEDFORD, MASS. 02742-0915
TEL. 508-996-5691 FAX # 508-993-3176

M00347

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608640 1 of 1

00000-0000

00000-0000

TEST CERTIFICATE NO. 54547

DESCRIPTION: 316L ANNEALED .00236 +.00012 -.00012 4F #3

LINE LIGNE POS.	PROD. NO. CODE PRODUIT PROD.-NR.	WIDTH LARGEUR BREITE	TOLERANCE TOLERANCE TOLERANZ		CUSTOMER PART NUMBER NUMERO DE PIECE CLIENT KUNDEN-TEIL-NR.	ORDERED QUANTITY QUANTITE COMMANDEE BESTELLMENGE	SHIPPED QUANTITY QUANTITE LIVREE VERSANDMENGE	NO. OF PIECES NOMBRE DE PIECES STÜCKZAHL DER COILS
1	017525	4.921	+.005	-.005	mm 0,06 x 125 Ord. 306/S	400.0 KG		
2	017526	4.290	+.005	-.005	mm 0.06 x 109	100.0 KG		

COIL NUMBER NUMERO DE COULRONNE COIL-NR.	HEAT NUMBER NUMERO DE COULEE CHARGEN-NR.	SUPPLIER FOURNISSEUR LIEFERANT	METHOD OF MELT TYPE DE COULEE SCHMELZART	LOT NUMBER NUMERO DE LOT LOS-NR.	CUSTOMER SPECIFICATIONS SPECIFICATION CLIENT KUNDENSPEZIFIKATION
20557BBA	875763	AS	AOD		

CHEMISTRY ANALYSE CHEMISCHE ANALYSE

Inspection and dimensional records above verified by:

	C	MN	P	S	SI	CR	NI	N2	CU	MO
ANALYSIS	.019	1.80	.032	.0004	.57	17.25	12.71	.031	.44	2.65

MECHANICAL PROPERTIES

CONDITION	HARDNESS		U.T.S. MPA	.2% YS MPA	%E --in 2"-BEND--GRAIN SIZE----EMB--I.G.A.--- RA MICRO INCH
ANNEALED	VHN300G125	L	642.0	291.0	46.5

Massima rugosità superficiale
Maximum surface roughness **Ra 0,35 µm**

NUOVA FIMA S.p.A.
QA Service
G.Adami 17.09.2001

SUPPLIER'S COIL NO: 05017NB66
CHEMICAL ANALYSIS IS TAKEN FROM THE RAW MATERIAL SUPPLIER'S TEST CERTIFICATE.

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
ASL 060	10.05.98

NUOVA FIMA S.p.A.
UFFICIO GQ

CODICE CERTIFICATO	DATA
ASL 061	10.05.98

02/05/98
AUTHORIZED SIGNATURE DATE

The above are true and correct results of tests

Edward L. Ursillo
DIR. QUALITY ASSURANCE

Les resultats d'essai sur le materiel decrit ci-dessus sont veridiques et sinceres. Ils sont conformes aux specifications applicables et sont enregistres.

ISO 9002 TUV CERT Registration No. 12 100 5942
EN 10 204 1991 3.1.B Certificate

Die obenstehenden Daten sind nach bestem Wissen und Gewissen korrekt ermittelt und basieren auf Testergebnissen von Werkstoffproben. Die Ergebnisse entsprechen

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Produttore: **ACCIAIERIE VALBRUNA S.P.A.**
Hersteller/Item/Usine productrice

Avviso di Spedizione: A-TO12002476
Lieferanzeige/Packing list/B.L.

Ordine nr: ORD. N. 1100
Bestell/Your order/Commande

Certificato nr: MEST236607/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO12002600
Werks/Our Order/Rel nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Stato di fornitura: - Solubilizzato Trafilato
Lieferzustand/Delivery state/Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Modo d'elaboration

Specifiche:
Anforderungen / Requirements / Exigences

VAL STOCK 2010 1.4404/316L A,CF
AMS 5648 K S31600 A
ASME SA182 2010 S31603 A (1)
ASME SA479 2010 S31600 A (4)
ASTM A182 2011A S31603 (7)
ASTM A276 2010 S31603 A,CF
ASTM A370 2011A .
EN 10088-3 2005 1.4401 A,CF
EN 10272 2007 1.4404 A,CF
NACE MR0175 2009 S31600 A (8)
QQ-S-763 F 316L A,CF

AISI 316
AMS 5653 F S31603 A
ASME SA276 2010 S31600 A,CF (2)
ASME SA479 2010 S31603 A (5)
ASTM A262 2010 PRACTICE E
ASTM A314 2008 S31600
ASTM A479 2011 S31600 A
EN 10088-3 2005 1.4404 A,CF
NACE MR0103 2007 S31600 A
NACE MR0175 2009 S31603 A (9)

AISI 316L
ASME SA182 2010 S31600 A (0)
ASME SA276 2010 S31603 A,CF (3)
ASTM A182 2011A S31600 A (6)
ASTM A276 2010 S31600 A,CF
ASTM A314 2008 S31603
ASTM A479 2011 S31603 A
EN 10272 2007 1.4401 A,CF
NACE MR0103 2007 S31603 A
QQ-S-763 F 316 A,CF

CODICE CERTIFICATO A4538
UFFICIO GQ
DATA 5-9-12
NUOVA FIMA S.p.A.

(0) SEC.II PT.A 2010 EDITION ADD. 2011a
(1) SEC.II PT.A 2010 EDITION ADD. 2011a
(2) SEC.II PT.A 2010 EDITION ADD. 2011a
(4) SEC.II PT.A 2010 EDITION ADD. 2011a
(6) For products machined directly from bar refer to ASTM A479.
(8) ANSI/NACE MR0175/ISO 15156-3, second edition 2009-10-15
(9) ANSI/NACE MR0175/ISO 15156-3, second edition 2009-10-15

(0) For products machined directly from bar refer to ASME SA479.
(1) For products machined directly from bar refer to ASME SA479.
(3) SEC.II PT.A 2010 EDITION ADD. 2011a
(5) SEC.II PT.A 2010 EDITION ADD. 2011a
(7) For products machined directly from bar refer to ASTM A479.
(8) Technical circular 1:2011 Published 2011-06-14
(9) Technical circular 1:2011 Published 2011-06-14

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: MVAPML / MAXIVAL
Markenbezeichnung Brand/Nuance

Tolleranza: h11
Tolleranz./Allowance/Tolerance

Punzonatura: 1.4401/4/316/L
Kennzeichnung/Marking/Marquage

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - mm Abmessungen Dimension Dimension	Lunghezza - mm Länge Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - KG Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Esagono	22,000	3100 / 3150	255733		1007,0	135404330

TEST ALLO STATO DI FORNITURA
Test on delivery condition Prüfung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

TEST	Provetta/Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm		°C	Posiz. Saggio Probestage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique Rp 1% N/mm2	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement A5 %	Allungamento E 4d %	Strizione Einschnürung Reduction of area Striction Z %	Strizione RA %	Resilienza Kerbschlagarbeit Impact Value Resilience KV J			Durezza Hardness Dureté HB		
Valori richiesti 1 Anforderungen/Required values Valeurs demandées			min max		207	235	517 900	20	30	-	50	100			140 235		
A	10		20	L	510	549	696	40	42	67	67	169	174	178	228		

TEST		min	max	
A	Dimensioni grano x ASTM E112			5

1)L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

Mechanical properties according to ASTM A370.

Analisi chimica
Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	min - max 0,030	- 1,00	1,25 2,00	16,50 18,00	2,00 2,50	- 1,00	10,00 13,00	- 0,040	- 0,030	- 0,100	-	-	-	-	-	-
	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	P %	S %	N %						
255733	0,026	0,48	1,58	17,00	2,00	0,50	10,00	0,031	0,030	0,058						

Intergranular corrosion test per ASTM A262 pract. E: ok.
I.Korrosion nach EN ISO 3651-2A Sensibilisierung : T1 : OK
Corrosion test per EN ISO 3651-2A sensitized T1 : OK

Vicenza,03/09/12 VCQ005 (Mod. MCE2)	*Il collaudatore di stabilimento / der Werkssachverständige / Works Inspector / L'agent d'usine* M.Rizzotto	Pagina - 1 di 2

Acciaierie Valbruna S.p.A.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD' S REGISTER

CERTIFICATO DI COLLAUDO
ABNAHMEPRUEFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204 (2004) , 3.1

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

Cliente / Besteller/Purchaser/Client
NUOVA FIMA SPA
VIA C. BATTISTI, 59/61
28045-INVORIO-NO

Produttore: **ACCIAIERIE VALBRUNA S.P.A.**
Hersteller/Item/Usine productrice

Avviso di Spedizione: A-TO12002476
Lieferanzeige/Packing list/B.L.

Ordine nr: ORD. N. 1100
Bestell/Your order/Commande

Certificato nr: MEST236607/2012/
Prüfung/Test/Essai

Conferma ordine nr: TO12002600
Werks/Our Order/Ref nr.

Marchio di Fabbrica:
Zeichen des Lieferwerkes
Trade mark
Sigle de l' usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector' s stamp/Poinçon de l' assayeur

Stato di fornitura: - Solubilizzato Trafilato
Lieferzustand/Delivery state/Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart/Melting process/Mode d' elaboration

Sono state soddisfatte tutte le condizioni richieste
Die gestellten Anforderungen sind lt. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel á été trouvé conforme aux exigences

Controllo antimescolanza: OK
Verwechslungprüfung: spectralanalytisch durchgeführt
Antimixing testing performed: OK
Contrôle antimelange fait: r.a.s.

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination through Portal System when it leaves the production plant.

The Quality Management System is Certified acc. Pressure Equipment Directive [97/23/EC] Annex 1,s.,4.3 by TUEV and LLOYD' S

Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

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The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

SANDVIK

NUOVA FIMA S.A.

Can Salva s/n

E 17404 Riells i Viabrea (Girona)

Abnahmeprüfzeugnis

Inspection certificate / Certificat de réception

DIN EN 10 204 -3.1

Zeugnis - Nummer /Certificate No. /Certificat No.	28894

Ihre Bestellung Your Order/Votre Commande	Kommissions-Nr. Confirmation/Confirmation	Pos. Item/Poste	Lieferschein Del. Note/B.Livraison
2007-11-23 2007/4977-Art.0010972 David Bellosta	162822	0010	116209

Erzeugnis / Product / Produit	Nahtlose SANDVIK P&P-Edelstahlrohre Seamless stainless Sandvik P&P Steel Tubes Sandvik P&P Tubes inox sans soudure					
Abmessung / Size / Dimension		AD/OD/Ext.	ID/ID/Int.	WD/WT/EP		
		11,500 mm	8,500 mm	1,500 mm		
		0,453 inch	0,335 inch	0,059 inch		
Länge / Length / Longueur	4,5 - 5,5 m					
Werkstoff / Material / Matériel	TP 316 L					
Anforderungen / Requirements / Exigences	ASTM A 269-07a					
Toleranzen / Tolerances / Tolérances	AD/OD/Ext.	+	0,13 mm	0,005 inch	-	0,13 mm	0,005 inch
	ID/ID/Int.	+			-		
	WD/WT/EP	+	15 %		-	15 %	
Ausführung / Finish / Type	zunderfrei wärmebehandelt,bright annealed,recuit					
Kennzeichnung / Marking / Marquage						
Sandvik P&P 11,50 x 1,50 TP316L ASTM-A 269-07a SEAMLESS HEAT-No. 517899						

Menge / Quantity / Quantité	STK / PCS	M / FT		KG / LBS	
	316	1611,00 M	5285,43 FT	616,00 KG	1358,03 LBS

Sandvik P&P
Zweigniederlassung
der Sandvik GmbH
Dammstr. 27-29
D-33824 Werther

Telefon: 05203/9109-0
Telefax: 05203/9109-22
Internet:
http://www.smt.sandvik.com/p&p

Handelsregister:
Amtsgericht Düsseldorf
HRB 8210
USt.-ID: DE 119 266 885
Steuer-Nr: 103/5757/0208
FA Düsseldorf-Altstadt

Bankverbindung:
SEB AG Merchant Bank
Frankfurt am Main
BLZ: 512 202 00; Kto.Nr. 3491 0008
IBAN-Nr.: DE11512202000034910008
BIC (Swift-Code): ESSEDEFFXXX

AR-Vorsitzender: Peter Larson
Geschäftsführer:
Henrich Strackerjahn (Sprecher)
Peter Boesl
Robert Hartinger
Jens Orbanke

Prüfergebnisse Test results / Résultats des essais	Zeugnis-Nr. : 28894 Certificate No. /Certificat No.

Schmelzenanalyse : Chemische Zusammensetzung / Chemical composition / Analyse sur coulée

Heat No.	517899

Schmelze Heat / Coulée	C	Si	Mn	P	S	N	Cr	Cu	Mo	Nb	Ni	Ti	
Heat	0,014	0,38	1,82	0,031	0,007	0,059	16,84	0,37	2,06		11,24		
Prod.	0,014	0,39	1,83	0,029	0,006	0,060	16,79	0,36	2,07		11,25		

Schmelze Heat / Coulée	W	Co	V	Al	O								
Heat		0,11											
Prod.		0,11											

Reinheitsgrad Inclusion content Propreteinclusionnaire	A:		B:		C:		D:	
		th h		th h		th h		th h

Mechanische Eigenschaften / Mechanical properties / Caractéristiques mécaniques

Proben Nr. Sample No. Echantillon No.	0,2% - Dehngrenze Yield Strength Limite élastique N/mm2 / KSI		1% - Dehngrenze Yield Strength Limite élastique N/mm2 / KSI		Zugfestigkeit Tensile Strength Résistance à la traction N/mm2 / KSI			Dehnung / Elongation Allongement A50 %	Härte Hardness Dureté HR 30 T max. 74
1	247	35,82	288	41,77	560	81,22		48,5	60-61
2	251	36,40	292	42,35	559	81,07		46,5	59-59
3									59-59

Prüfergebnisse / Test results / Résultats des essais	Heat No. 517899	Zeugnis-Nr. : 28894 / Certificate No. /Certificat No.

Technologische Prüfungen / Mechanical test / Essais mécaniques

1 -	Aufweitversuch / Flaring test / Essai d'évasement	o.B. / satisfactory / sans remarques
2 -		
3 -		
4 -		
5 -		
6 -		
7 -		
8 -		
9 -		
10 -		
11 -		
12 -	Wärmebehandlung unter Schutzgas wurde durchgeführt. Heat treatment was made under controlled atmosphere. Le traitement thermique a été effectué sous gaz de protection.	
13 -		
14 -		
15 -		
16 -		
17 -		
18 -		
19 -	Besichtigung und Maßprüfung Visual inspection and control of dimensions Inspection visuelle et dimensionnelle	o.B. / satisfactory / sans remarques
20 -	Wirbelstromprüfung Eddy current testing Contrôle courant de Foucault ASTM-A 450	o.B. / satisfactory / sans remarques
21 -		
22 -	Materialverwechslungsprüfung/Alloy Verification/Contrôle du matériel	o.B. / satisfactory / sans remarques
23 -		
24 -		
25 -		
26 -		
27 -		Ursprung des Vormaterials: Sandvik Schweden Sandvik source of raw material: Sandvik Sweden Source d'origine des pré-matériaux: Sandvik Suède
28 -		
29 -		
30 -		
31 -		

The testing laboratory of Sandvik P&P/Branch of Sandvik GmbH is accredited to DIN EN ISO 17025:2005, Certificate-No. DAP-PL-3895.00

Die gelieferten Produkte entsprechen den Anforderungen der Bestellung.
The delivered products comply with the requirements of the order.
Les produits livrés sont en conformité avec les exigences de la commande.

Werther, den 2008-08-27

Matthias Göken
Der Abnahmebeauftragte
Quality assurance inspector
L'expert du service qualité

Dieses Zeugnis wurde mit Hilfe der EDV erstellt und ist ohne Unterschrift gültig.
This certificate is produced electronically and is valid without signature.
Ce relevé a été etabli par ordinateur et est valable sans être signé.

OLIMPIA INOX

OLIMPIA INOX s.r.l.
Sede legale 27029 Vigevano (Pv) via Galilei 15
Sede operativa 29015 C.S.Giovanni (Pc) zona industriale Ca Tre Di
Via Salvo d'Acquisto 2 Tel. 0523-864238 Fax 0523-864216
Part. IVA 01776140186 R.I. 26681/1998 (PV)
R.E.A 220275/Pv

DATA / DATE 30/06/04

CLIENTE / CUSTOMER	INOX TEAM	COMMESSA OLIMPIA INOX N° / MILL ORDER N°		ORDINE CLIENTE N° / CUSTOMER'S ORDER N°	3886/03

Bolla di consegna N°	504	Avviso di spedizione N°	

TUBI ELETTROUNITI LONGITUDINALMENTE - LONGWELDED TUBES

CERTIFICATO DI COLLAUDO N° / TEST CERTIFICATE	504/04	IN ACCORDO CON:	EN 10204 - 3.1B

QUALITA' / QUALITY	AISI 316L	TOLLERANZE / TOLERANCES	

NORMA / STANDARD	DIN 17457	TRATTAMENTO TERMICO / HEAT TREATMENT	

Pos. Item N°	Colata Heat N°	Dimensioni Dimensions mm.	Quant. Quant. Mt.	Peso Weig. Kg.	Pezzi Pcs. N°	Stato di fornitura	Fabbric. coils	Composizione chimica in % Chemical analysis in %							
								C	Mn	Si	P	S	Cr	Ni	Mo	N
1	0564460	14 X 1	4158		693			0,022	0,84	0,38	0,028	0,001	16,55	11,03	2,01	0,046

Collaudo n° Test n°	Snervamento Yeld str. 0,2% -N/mm² 1%		Rottura Tens.str. N/mm²	Allung. Elong. %Lo=	Durez. Hardn. Tipo	Svasat. Haring Test	Schiacc. Flattening Test	Piega rov. Reverse bend Test	Prova cord. Flang Test	Prova idr. Idrostatic Test	Eddy curr. Eddy cur. Test	Antimis. Antimisin Tes
Valori richies. Requies.values												
Pos. Item N° 1	247		563	57,2	70						OK	

Prova di trazione Tensile test secondo / according to	Prova di corrosione intercristallina secondo Intergranular corrosion test according to	Controllo visivo e dimensionale Visual and dimensional control	Omologazioni
☐ / ☐	☐	OK	

OSSERVAZIONI	Noi certifichiamo che il prodotto fornito è conforme ai requisiti dell'ordinazione. We certify that material supplied complies with the requirements agreed on order.	Timbro e firma Controllo qualità OLIMPIA INOX