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Efficient Process Control

Make your quality measurable
with analytical sensors from Anderson-Negele



Process
Optimization

Costs saved ☒

Time Reduced ☒

Quality improved ☒

They see what you can't.

Making quality visible with analytical sensors

Many processes are based on differentiating products through **qualitative characteristics** such as **turbidity**, **conductivity** or **concentration**. Deviations in these criteria are critical for the quality of the end product, and for the efficiency of the process. However, these deviations are not easily detectable.

Manual sampling is one method used for control, but this means **high personnel costs** and **uncertainties in the quality** between samples. **Time control** is another option, however, a safety buffer must be taken into account. Each phase change results in **product loss** and **high costs** for waste water treatment, as many litres of valuable product or cleaning agent get into the waste water during this buffer time.

We invite you to "EXPERIENCE THE DIFFERENCE" with Anderson-Negele. Our analytical sensors provide a solution to exactly this issue. They continuously measure the media in the running process according to qualitative criteria, thereby making the invisible visible and quality measurable.



Turbidity Meters ITM-4 / ITM-51

Less product loss due to
efficient phase separation



Conductivity Meter ILM-4

More reliability in
production and CIP
processes



Refractometer IRM-11

More efficient product
control through inline Brix
measurement



Versatile Application Possibilities for more efficiency and quality

Field cases show that Anderson-Negele analytical sensors often have a payback period of only a few weeks due to the reduction of costs, product losses and waste water, and thanks to an improved compliance with quality criteria. Here are just a few examples:

CIP Control

By **phase separation with an accuracy to the second** in CIP control with the **ILM-4 conductivity meter**, water consumption can be reduced extremely significantly. In a practical case at a manufacturer of ice cream, the saving was **175,000 litres per year**.



Whey Powder Production

In the **evaporator** and in the **filtration monitoring** for the separation of permeate and retentate, the concentration of dry matter/lactose can be monitored fully **automatically by continuous measurement with an IRM-11 refractometer**. Deviations and thus changes in the end product are reported immediately, thus enabling process corrections to be made.



Separator Control

In a brewery, the **ITM-51 turbidity sensor** continuously monitors the output of the separator. The desired turbidity level was entered by means of an individual learning curve at the installed sensor. When the predefined setpoint values are reached, the **yeast harvest is carried out automatically, precisely and reproducibly**.



Filtrate Monitoring

In wine production, the integrity of the filter membrane used to be monitored through a sight glass. This was very time consuming and inaccurate. Thanks to its high measuring accuracy even at the lowest turbidity levels, the **ITM-4 turbidity meter** is ideal for quality assurance to **avoid secondary fermentation and quality degradation** due to filter damage.



Juice and Soft Drink Blend

With the **IRM-11 refractometer**, the sugar content can be precisely controlled and mixed correctly before filling. This avoids bottling products that do not exactly meet the specifications and guarantees a consistent taste experience.



Reduce product loss with the modular, front flush ITM-51 turbidity sensor

ITM-51 Turbidity Sensor

Application in the production process

The ITM-51 enables active automated phase separation of milk/other milk products/water resp. of beer/yeast, by inline turbidity analysis and active process switching.

Passive phase separation by time or volume control always needs a safety margin. As a consequence, in every process step product is lost and/or quality is affected.

Advantages of the ITM-51

- Minimize the loss of raw material leading to less value loss
- The filling of tanks with wrong medium is avoided
- Less cost for waste water treatment
- Less need for additional laboratory analysis of the tank content
- Best possible concentration ensuring constantly high quality of the product such as milk / cream resp. beer / wort
- Efficient separator control in brewery applications for uniform quality of infiltrated beer

Application in the CIP/SIP Process

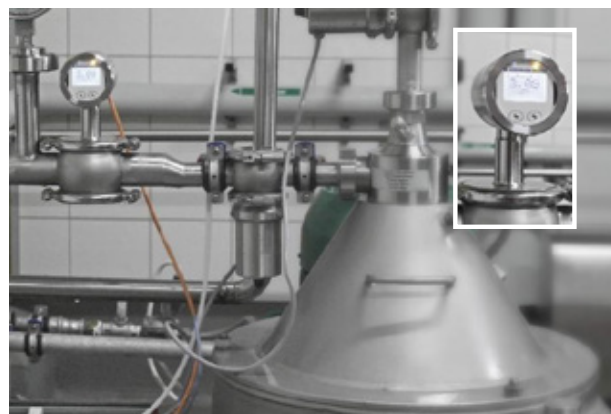
Active automated and temperature-independent phase separation in the return line of product / acid / base / water.

Advantages with the ITM-51

- Reliable control of the degree of concentration of the agents
- Optimize multiple usages of the cleaning agents
- Minimize cost due to less waste disposal
- Reduce the length of the cleaning process time and amount of water consumption: Active switching after reaching the desired degree of purity by inline turbidity analysis, and not after passive, fixed timing

Practical experiences & Customer applications

- Reduction of product lost from 5% to 3%, with 15% cost reduction due to less waste water treatment
- Less laboratory analysis necessary, leading to less personnel / time required and faster reaction to deviations
- 3,000 l less water consumption in each CIP process
- The ITM-51 reliably prevents the contamination of a glycol cooler with milk products, an issue which, in the past, repeatedly disturbed the cooling process and caused a complete cleaning
- 80% more consistency in the quality of the end product due to more precise separation of cream, mild and low-fat milk
- Constant turbidity level for Craft Beer without filtering due to precise separator control in a brewery



IO-Link 4...20 mA

A3

Technical Specifications At-a-Glance

- Compact front flush turbidity sensor with backscatter principle, in a modular set-up
- Flex-Hybrid-Technology with digital + analog interface (IO-Link + 4...20 mA)
- Process temp. up to 266 °F (130°C), pressure -14.5...290 psi (-1...20 bar))
- Independent to reflections at small diameters or electro-polished surfaces
- No color dependency (wave length 860 nm)
- High reproducibility: ≤ 1% of full scale
- Selectable range (%TU, NTU, EBC, %solids)
- Extended sensitivity: 200...300.000 NTU equivalent
- Smart Replace Design with Remote version for hassle free replacement of all components



Modular Sensor Platform with IO-Link and 4...20mA

The Flex-Hybrid Technology with IO-Link and 4...20 mA combines the best of both worlds: Data from the sensor can be transmitted digitally, analogously or in parallel. The bidirectional communication enables status control and preventive maintenance at any time to avoid production downtimes. Installation and commissioning are time- and cost-saving thanks to plug-and-play technology, and sensor replacement is easier than ever before thanks to "Smart Replace Design" with automatic detection, configuration and parameterization.

Order code

ITM-51 (turbidity sensor)

Note: For order code for the remote version ITM-51R and the remote cable, see product information

Process connection (Ⓐ: 3-A approval)

S0L	CLEANadapt G1/2", extended sensor stem
S01	CLEANadapt G1/2"
TC1	Tri-Clamp 1½" Ⓐ
TC2	Tri-Clamp 2" Ⓐ
T25	Tri-Clamp 2½" Ⓐ
TC3	Tri-Clamp 3" Ⓐ
TL1	Tri-Clamp 1½", extended sensor stem Ⓐ
TL2	Tri-Clamp 2", extended sensor stem Ⓐ
TL5	Tri-Clamp 2½", extended sensor stem Ⓐ
TL3	Tri-Clamp 3", extended sensor stem Ⓐ
V25	Varivent type F, DN 25
V40	Varivent type N, DN 40/50

Enclosure Orientation

H	horizontal
V	vertical

Output

A42	1 x 4...20 mA turbidity only, display prepared
I52	IO-Link and 1 x 4...20 mA turbidity, 1 x switching out, no external range switching, display prepared
I53	IO Link and 1 x 4...20 mA turbidity, 1 x switching out, external range switching, display prepared

Electrical connection

P*	1x Cable gland M16x1.5 for A42 Analog Output
D*	2x Cable gland M16x1.5 for I52 or I53 Analog Output
M	1x M12 connector, 4-pin for output A42
N	2x M12 connector, 4-pin for output/input, 5-pin for power supply (I52/I53)
A	2x M12 connector, 4-pin for power supply, 5-pin for output/input (I52/I53)
R	2x M12 connector, 4-pin for analog output, 3-pin for IO-Link and input (I52/I53))

Interface/Display

X	without Interface
S	Simple User Interface with small display
L	Large User Interface with display

Enclosure

X	opaque plastic cap
P	clear plastic cap
M	stainless steel without window
W	stainless steel with window

Parameter configuration

X	standard
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ITM-51 S01 / V / I53 / D / L / P / X

Reliable measurement even with low turbidity values and turbidity variations

Four-Beam Turbidity Meter ITM-4

ITM-4 – The benchmark for turbidity measurement

If even the slightest turbidity or turbidity alterations in products and media are important for process monitoring, the ITM-4 Four-beam turbidimeter comes into its own. With its very high measuring sensitivity and a response time of <1 sec. it detects and signals any variation immediately. This offers significant advantages in many applications:

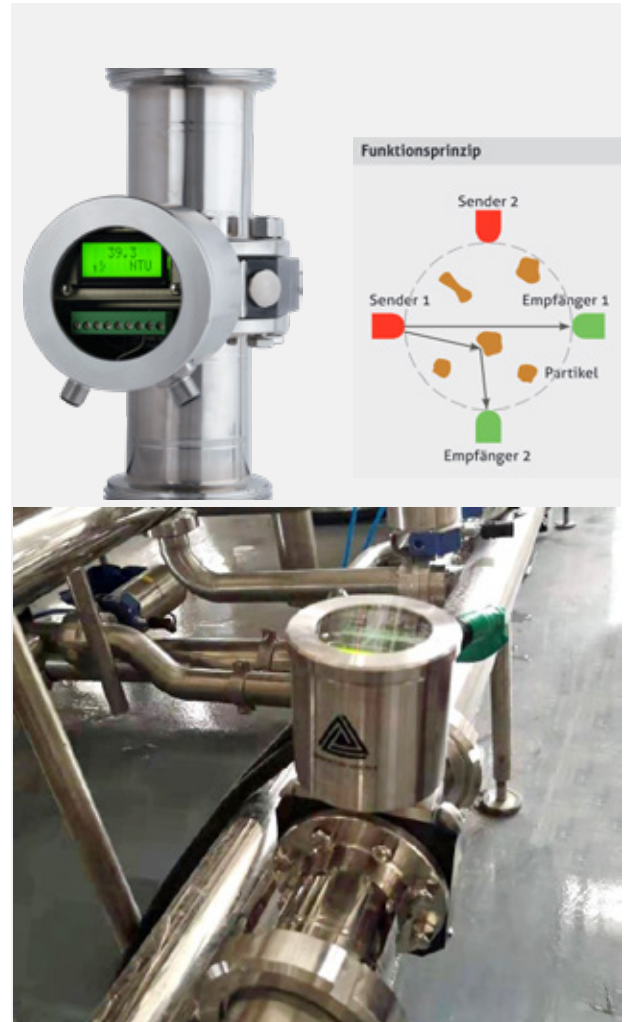
- **Phase separation:** immediate detection of transitions of different products, e.g. skimmed milk to whole milk; shorter transition phases without time buffer mean less product loss and thus cost savings
- **Filter monitoring:** Immediate reporting of possible malfunctions for reliable quality management
- **Water control:** monitoring of water and wastewater
- **Damage prevention:** Reliable protection against incorrect transfer of media, e.g. of product into the cooling circuit
- **Process automation:** Continuous in-line monitoring eliminates the need for manual sampling and visual inspection, providing highly accurate compliance with specifications

Advantages of ITM-4

- **Permanent precision:**
The colour-independent measurement (860 nm) with 2 transmitters and 2 receivers (90° scattered light and 180° transmitted light) ensures reliable measurement results irrespective of the influence of solids or air bubbles that occur. Contamination on the sapphire optics is automatically compensated
- **Highly accurate, application-specific measurement:**
Resolution and measuring range can be selected for easy adaptation to media and processes
- **Simple installation, commissioning and operation:**
Nominal pipe widths from DN 25 with various process connections and the complete fitting made of stainless steel ensure trouble-free and durable operation

Customer applications

- **Breweries:** lauter tun control, CIP systems, filter monitoring, yeast harvesting, separator control, water and waste water control
- **Dairies:** Phase separation during media change (e.g. whey-cream-milk), CIP systems, separator control, cooling system monitoring, water and waste water control
- **Juice or wine production:** quality monitoring at specified turbidity levels, filter monitoring, water and wastewater control



Technical specifications at a glance

- **Four-beam turbidimeter** with 2 transmitters and 2 receivers in alternating light technology
- **Measured value setting** in NTU or EBC
- **Adjustable measuring range:**
min. 0...5 NTU up to max. 0...5000 NTU respectively
min. 0...1 EBC up to max. 0...11250 EBC
- **Measuring accuracy:** Resolution from 0.1% upwards
- **High reproducibility:** from ≤ 2 % of end value
- **Temperature and pressure range for flexible use:**
process temp. up to 100°C, pressure up to 10 bar
- **CIP-/SIP cleaning** up to 130 °C / max. 30 minutes
- **More economical version** especially for process and drinking water: ITM-4DW



ITM-4

Process Connection / Diameter

GG25	(diameter DN25; process connection dairy flange DN25 acc. to DIN11851)
GG40	(diameter DN40; process connection dairy flange DN40 acc. to DIN11851)
GG50	(diameter DN50; process connection dairy flange DN50 acc. to DIN11851)
GG65	(diameter DN65; process connection dairy flange DN65 acc. to DIN11851)
GG80	(diameter DN80; process connection dairy flange DN80 acc. to DIN11851)
GG100	(diameter DN100; process connection dairy flange DN100 acc. to DIN11851)
HH25	(diameter DN25; process connection hygienic thread DN25 acc. to DIN11864-1)
HH40	(diameter DN40; process connection hygienic thread DN40 acc. to DIN11864-1)
HH50	(diameter DN50; process connection hygienic thread DN50 acc. to DIN11864-1)
HH65	(diameter DN65; process connection hygienic thread DN65 acc. to DIN11864-1)
HH80	(diameter DN80; process connection hygienic thread DN80 acc. to DIN11864-1)
HH100	(diameter DN100; process connection hygienic thread DN100 acc. to DIN11864-1)
TC25	(diameter DN25; process connection Tri-Clamp)
TC40	(diameter DN40; process connection Tri-Clamp)
TC50	(diameter DN50; process connection Tri-Clamp)
TC65	(diameter DN65; process connection Tri-Clamp)
TC80	(diameter DN80; process connection Tri-Clamp)
TC100	(diameter DN100; process connection Tri-Clamp)
TC1"	(diameter ASME 1"; process connection Tri-Clamp)
TC1,5"	(diameter ASME 1,5"; process connection Tri-Clamp)
TC2"	(diameter ASME 2"; process connection Tri-Clamp)
TC2,5"	(diameter ASME 2,5"; process connection Tri-Clamp)
TC3"	(diameter ASME 3"; process connection Tri-Clamp)
TC4"	(diameter ASME 4"; process connection Tri-Clamp)
DF25	(diameter DN25; process connection DIN flange acc. to DIN2632/33)
DF40	(diameter DN40; process connection DIN flange acc. to DIN2632/33)
DF50	(diameter DN50; process connection DIN flange acc. to DIN2632/33)
DF65	(diameter DN65; process connection DIN flange acc. to DIN2632/33)
DF80	(diameter DN80; process connection DIN flange acc. to DIN2632/33)
DF100	(diameter DN100; process connection DIN flange acc. to DIN2632/33)

Note:

Version with special approval for process and drinking water (not suitable for food such as milk, beer, juice....) see separate product information ITM-4DW

Electrical Connection

X	(2 x cable gland M16 x 1,5)
M12	(2 x M12 plug; 1.4305)

Process connection / Diameter		Dairy flange (-GG) acc. to DIN 11851		Hygienic thread connection (-HH) acc. to DIN 11864-1 version A		DIN Flange (-DF) acc. to DIN 2632/33	
DIN DN25		356 mm	4 kg	350 mm	4 kg	374 mm	8 kg
DIN DN40		298 mm	4 kg	294 mm	4 kg	316 mm	9 kg
DIN DN50		236 mm	4 kg	228 mm	4 kg	256 mm	10 kg
DIN DN65		250 mm	5 kg	236 mm	5 kg	290 mm	11 kg
DIN DN80		250 mm	5 kg	244 mm	5 kg	260 mm	12 kg
DIN DN100		373 mm	5 kg	365 mm	5 kg	369 mm	13 kg

Total length L of the fitting with process connection Tri-Clamp (-TC) acc. to DIN 32676 (tolerance ± 2 mm) with Tri-Clamp-size and weight

Diameter DIN	DN25	TCØ	Weight	DN40	TCØ	Weight	DN50	TCØ	Weight
	341 mm	50,5 mm	4 kg	275 mm	50,5 mm	4 kg	209 mm	64 mm	5 kg
Diameter ASME	DN 1"	TCØ	Weight	DN 1,5"	TCØ	Weight	DN 2"	TCØ	Weight
	355 mm	50,5 mm	4 kg	290 mm	50,5 mm	4 kg	223 mm	64 mm	4 kg
Diameter DIN	DN65	TCØ	Weight	DN80	TCØ	Weight	DN100	TCØ	Weight
	256 mm	91 mm	5 kg	216 mm	106 mm	5 kg	321 mm	119 mm	5 kg
Diameter ASME	DN 2,5"	TCØ	Weight	DN 3"	TCØ	Weight	DN 4"	TCØ	Weight
	166 mm	77,5 mm	4 kg	172 mm	91 mm	5 kg	308 mm	119 mm	5 kg

More process reliability in phase separation through inline conductivity measurement

ILM-4 Inductive Conductivity Meter

Benefits in production and CIP / SIP processes

The ILM-4 with IO-Link and 4...20 mA enables an active, automated and temperature compensated phase separation. This applies both to different media in production processes and to the CIP / SIP return flow of acid / caustic / water.

These media can be drained or returned to the storage tanks in the highest possible grade by means of precise inline conductivity measurement. The multiple use of the cleaning media ensures in addition maximum cost efficiency and environmental protection.



Benefits in cleaning agents control

For an optimal and reproducible cleaning result, each cleaning agent must be concentrated to the specified value by re-dosing with concentrate and fresh water. This is ensured by the highly precise measurement of conductivity with the ILM-4.



Advantages of the ILM-4 conductivity sensor

- Extremely short response time (1.2 s) for maximum efficiency
- Ready for IoT: digital IO-Link interface and analog 4...20 mA data transmission in parallel
- Precise phase separation of different media means less product loss and cost minimization
- Optimum multiple use of the cleaning chemicals due to correct return to the respective tanks
- Minimization of cleaning time and water consumption: inline conductivity analysis for active switching after reaching the desired value and not after a passive, fixed time
- Precise concentration control of the cleaning agents
- Reliable product monitoring / quality assurance
- Very favorable price-performance ratio

Practical experience / customer applications

- **CIP cleaning for milk trucks:** Minimum losses in cleaning agents and maximum recyclability thanks to active, precise switching
- **CIP process in a fully automated dairy:** In combination with the ITM-51 turbidity sensor, almost all media in the production and CIP/SIP processes can be precisely distinguished and separated.
- **Breweries and beverage producers:** Maximum product yield through precise phase separation

Remote version
ILM-4R



Technical Specifications At-a-Glance

- Extremely compact & robust conductivity sensor
- Hybrid technology with digital + analog interface (IO-Link + 4...20 mA): from simple data transfer to intelligent communication
- Fast sensor response time: approx. 1.2 s
- Modular design: configurable from the low-priced basic version to the high-end model
- Product-contacting sensor head made of 100 % PEEK prevents thermal stress cracking
- Measuring range freely selectable: 1...999 mS/cm
- High reproducibility of ≤ 1 % of measured value
- Compensated measurement up to 130 °C (266 °F), CIP/SIP cleaning up to 150 °C (302 °F) / 60 min.
- Smart Replace Design with Remote version for hassle free replacement of all components



Modular Sensor Platform with IO-Link and 4...20mA

The Flex-Hybrid Technology with IO-Link and 4...20 mA combines the best of both worlds: Data from the sensor can be transmitted digitally, analogously or in parallel. The bidirectional communication enables status control and preventive maintenance at any time to avoid production downtimes. Installation and commissioning are time- and cost-saving thanks to plug-and-play technology, and sensor replacement is easier than ever before thanks to "Smart Replace Design" with automatic detection, configuration and parameterization.

Order code

ILM-4 Inductive Conductivity Sensor

Submersion length of toroid

L20 20 mm

L50 50 mm

Process connection (3-A compliant)

S01 CLEANadapt G1" hygienic

TC1 Tri-Clamp 1½"

TC2 Tri-Clamp 2"

T25 Tri-Clamp 2½"

TC3 Tri-Clamp 3"

V25 Varivent type F, DN 25

V40 Varivent type N, DN 40/50

Head orientation

H horizontal head orientation

V vertical head orientation

Signal module output

A42 1x 4...20 mA (conductivity value only)'

I42 IO-Link and 1x 4...20 mA conductivity

I62 IO-Link and 2x 4...20 mA conductivity/temperature selectable, no external range switching

I63 IO-Link and 2x 4...20 mA conductivity/temperature selectable, external range switching

Electrical connection

P* 1x Cable gland M16x1.5 for A42 Analog Output

D* 2x Cable gland M16x1.5 for I62 or I63 Analog Output

M 1x M12 connector, 4-pin for output A42

N 2x M12 connector, 4-pin for output/input, 5-pin for power supply

A 2x M12 connector, 4-pin for power supply, 5-pin for output/input

C 1x M12 connector, 5-pin analog output and IO-Link

R 2x M12 connector, 4-pin for analog output, 3-pin for IO-Link and input

Display

X Without

S Simple User Interface with small display

L Large User Interface with big display

Enclosure

X Plastic cap without sight glass

P Plastic cap with sight glass

M Stainless steel cap without sight glass

W Stainless steel cap with sight glass

Configuration

X Default factory settings

S Special order

ILM-4 L20 / S01 / V / I63 / D / S / P / X

Constant product quality through fast and precise inline Brix measurement

Refractometer IRM-11

Benefits in production process

In liquid media, the density and refractive index vary when the concentration, i.e. the proportion of dissolved solids in the liquid, changes.

Based on refractometry as an inline analysis method, the IRM-11 continuously and precisely measures the concentration of substances such as sugar or salts in media. This enables the determination of the alcohol content, or the mixing ratio of juices, mixed drinks and soft drinks, or the dry matter in milk products.

Analysis by determining the °Brix, °Plato or nD index value offers particular advantages if measurements are already taken using a hand refractometer. To avoid deviations in product quality, these manual measurements must be carried out at very short intervals, often every 20 minutes. The IRM-11 offers enormous potential for increasing efficiency and quality.



Advantages of the IRM-11

- The measurement takes place fully automatically at the desired time interval (adjustable from 2 s)
- With the IRM-11, approximately 1 man-hour of working time can be saved per shift, and employees can devote themselves to other tasks without interruption
- In the case of manual measurement, the entire product produced between measurements, e.g. every 20 minutes, may be defective. IRM-11 can avoid product losses by its permanent measuring method
- Temperature fluctuations lead to deviations in the measured values. The IRM-11 is fully temperature compensated and therefore always delivers precise results even with rapid changes
- The simple installation guarantees precise measurement during mixing in the tank or exact adjustment during the running process

Customer experiences and applications

- Brewery: measurement of mash concentration and wort, determination of alcohol content after fermenter
- Juice / mixed drink production: concentrate measurement and end product dosage control for consistent quality, product transition control
- Dairy: Determination of dry matter in milk and whey
- Wine production: continuous determination of the sugar or alcohol content during the ongoing process

Technical Specifications At-a-Glance

- Front-flush, very compact refractometer for determining the concentration of all types of liquid
- Measurement of refraction with output in °Brix, Plato, refractive index nD or customized. Measuring range 0-85 °Brix or 1.3330-1.5000 nD
- Simple hygienic inline integration without bypass in the process
- Hygienic front-flush design with 2 "Tri-Clamp or Varivent connection according to 3-A and FDA
- Process temperature up to 100°C (212 °F) continuous, CIP / SIP cleaning up to 140°C (284 °F) for max. 60 min.
- Long-life LED light source with highly resistant sapphire optics



Examples of media and measurement concentrations

- Determination of sugar content in juices, liquids, and concentrates from fruit, grapes, vegetables, etc
→ 0...32 °Brix
- Determination of salt content (NaCl) in liquids e.g. sea water, beverages, etc
→ 0...10 °Brix
- Analysis of grape must and alcoholic beverages
→ 0...32 °Brix
→ 30...130 °Oe (Oeschle)
→ Alcohol content: 4.4...19%

Order code

IRM 11 Refractive index meter

Fitting

TC2 aTri-Clamp 2"

V40 Varivent type N, 1 1/2" - 4"

Surface finish

1 R_a Mechanical (3A)

2 R_a Electropolish (BPE)

Scale

BR BRIX

RN Refractive Index

PL Plato

XX Other (consult factory)

Electrical connection

M M12 connector

P Cable gland

N 1/2 NPT

Cap

1 Opaque plastic

2 Stainless steel

IRM 11 TC2 1 BR M 1



HYGIENIC BY DESIGN

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