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New Diaphragm and Pinch Valves to be used in the process industry

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New Diaphragm and Pinch Valves to be used in the process industry

Presentation at a Glance

Introduction

Why Working on Manual Valves

Diaphragm Valves – Conventional Vs Redesigned

Pinch Valves – Conventional Vs Redesigned

Surface coating Technology – Especially Surface pretreatment

New Diaphragm and Pinch Valves to be used in the process industry

Introduction

Why Working on Manual Valves

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Surface coating Technology – Especially for Internal components

Valves are the last line of defense for any process industry

Manual Valves

Control Valves

Control valves are used more in **Complex** process Industry due to requirements and also higher facilities.

- are **well developed** in valves world.
- facilized with **safety equipment's**.

Where Manual vales are used in small sized, relatively low working pressure process plant

Introduction

Why Working on Manual Valves ?

Diaphragm Valves – Conventional Vs Redesigned

Pinch Valves – Conventional Vs Redesigned

Surface coating Technology – Especially for Internal components

Though small but Manual control valves market increasing every year

Especially no sign of decrease

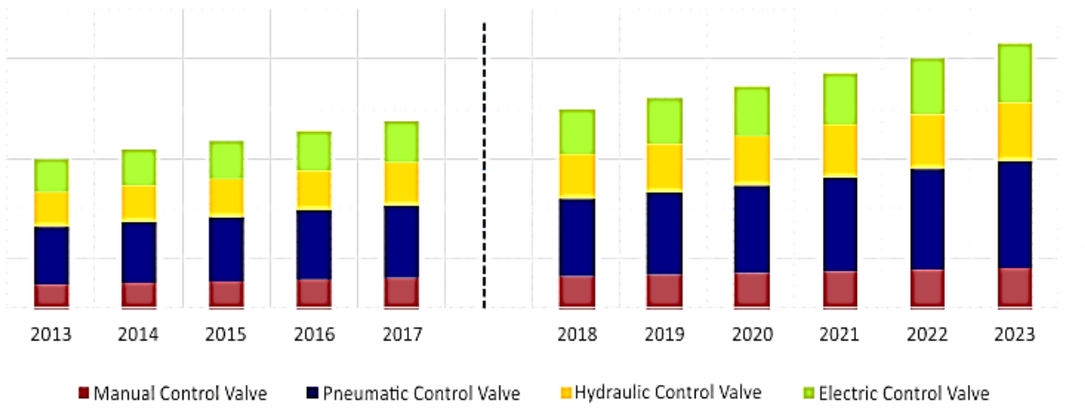


Fig: Prescient & Strategic Intelligence market research report on September 2018

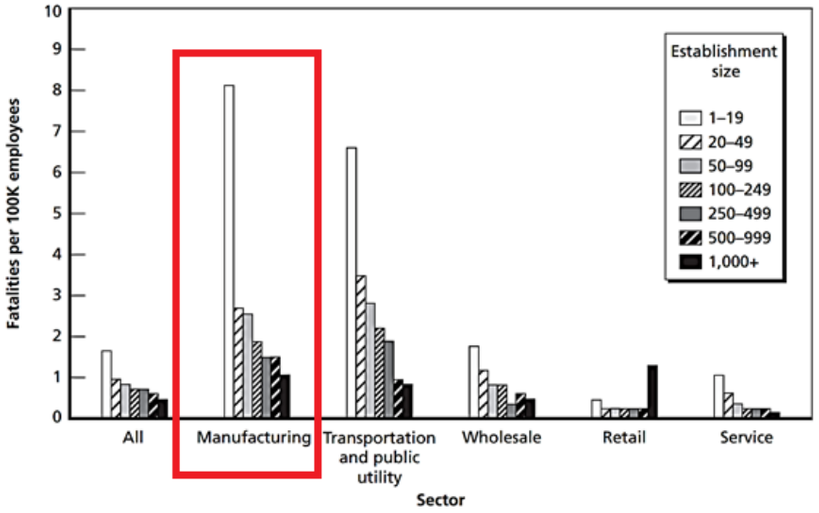
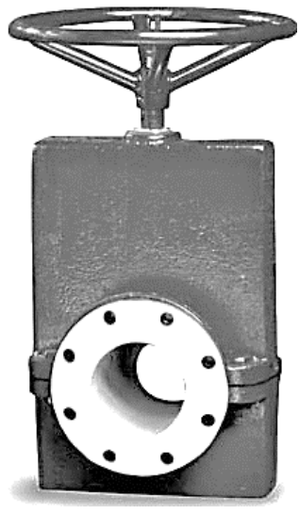


Fig: Statics from RAND Corporation 2017

Small to medium sized manufacturing or process industry faced more accident / incident than large sized industries

Uses of Manually control valves are more in small to Medium sized process plants

Diaphragm Valve & Pinch Valve



Among the mostly used Manual valves

Conventional features

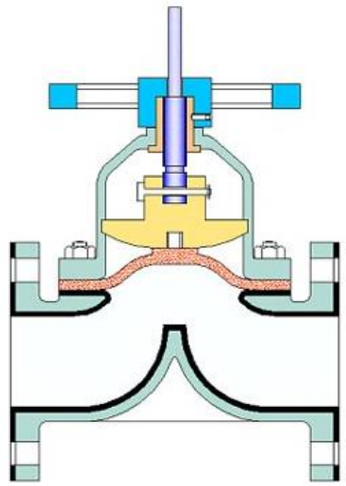
- operating mechanism is not exposed to the media within the pipeline.
- there are no packing glands to maintain and no possibility of stem leakage.

Conventional features

- Wide range of material can be used as sleeve for various medium.
- Low maintenance cost.

Diaphragm Valves – Conventional Vs Redesigned

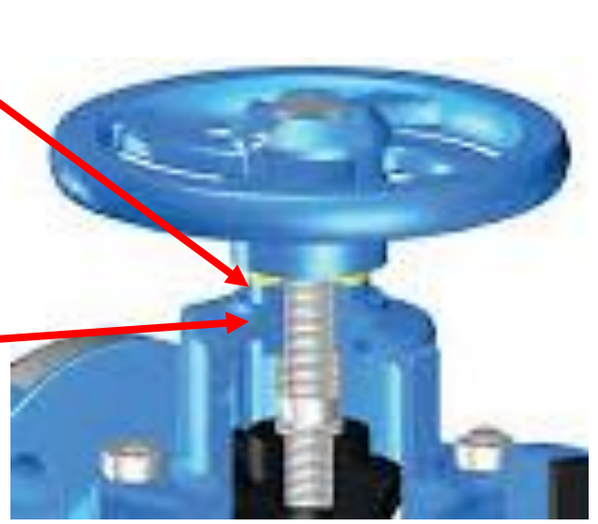
Conventional Diaphragm Valves



- Rising handwheel or rising stem

- Contaminants may enter to damage internal components

- Corrosion between Stem and valve body



Re-designed Diaphragm valve

Non rising Handwheel non rising stem

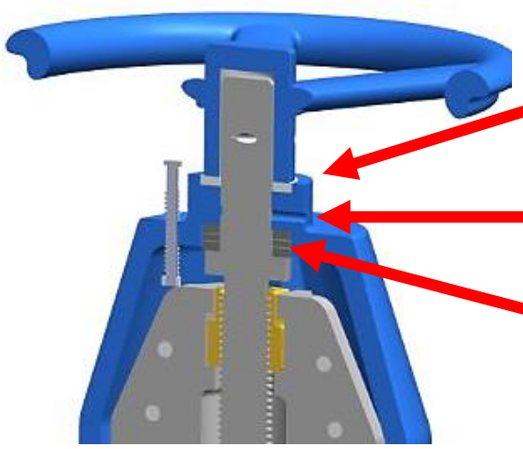
Lubricating hole to avoid contamination

Woolen cushion around stem to make contamination proof

And

Mechanical position Indicator

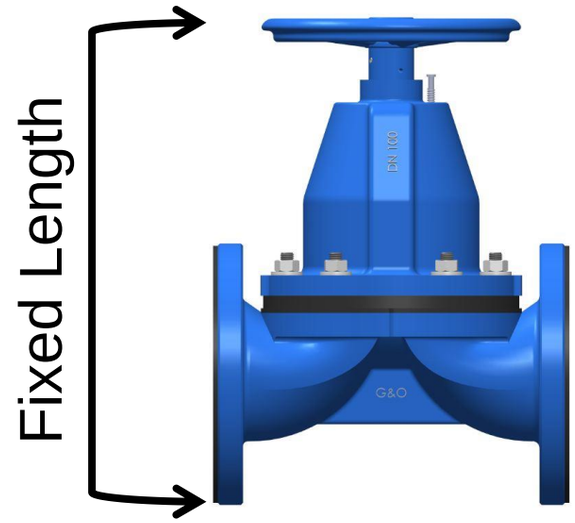
P&ID Design Engineers will get their precise dimensions



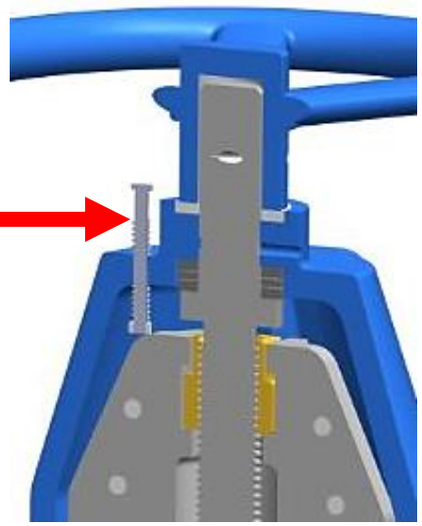
Woolen cushion for
contamination proof

Lubricating hole

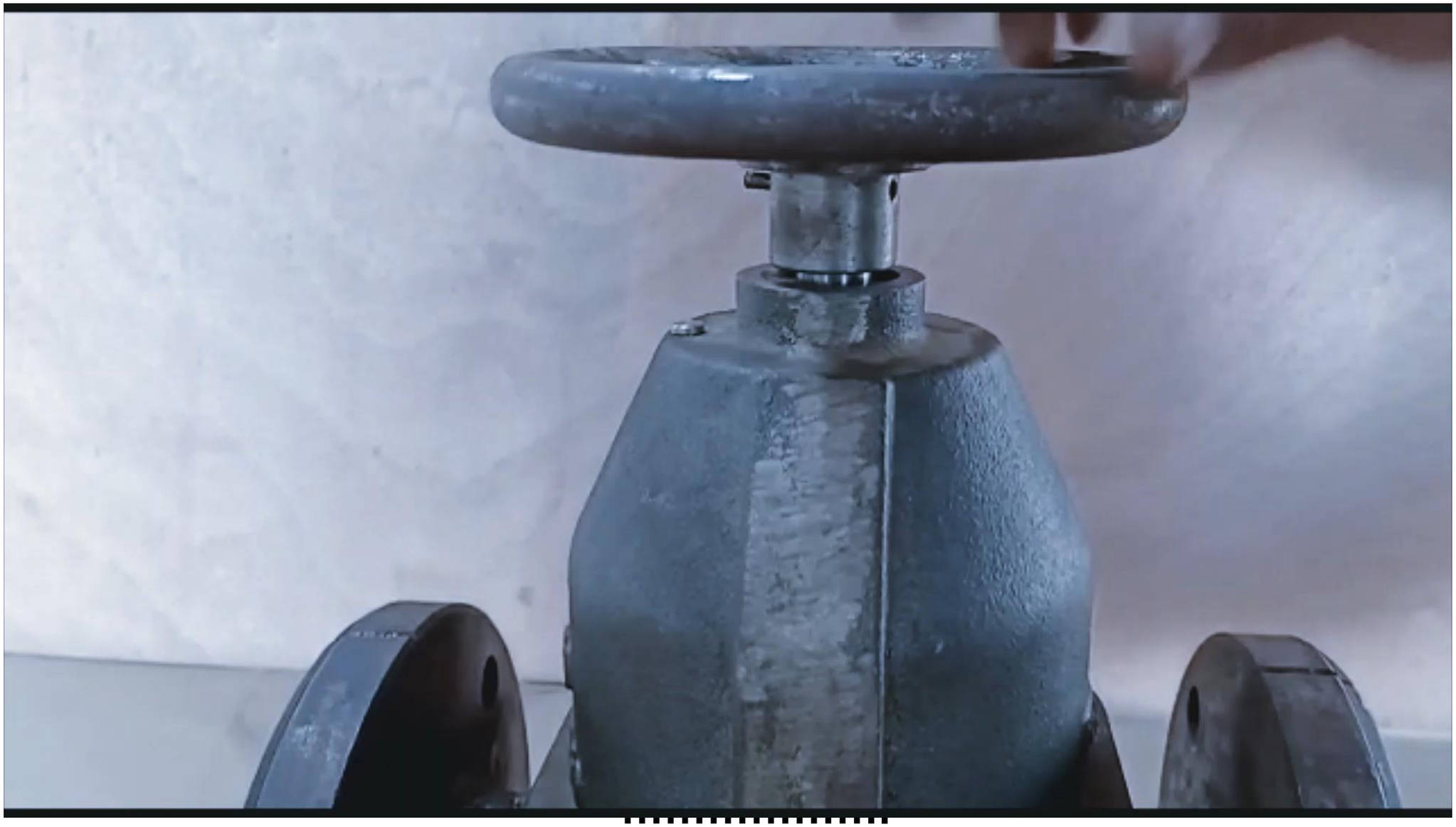
Bearing / Rollway to
reduce torque/friction



Unique Position Indicator
Mechanically functioned



NO EXTRA COSTS / NO EXTRA ARRANGEMENTS



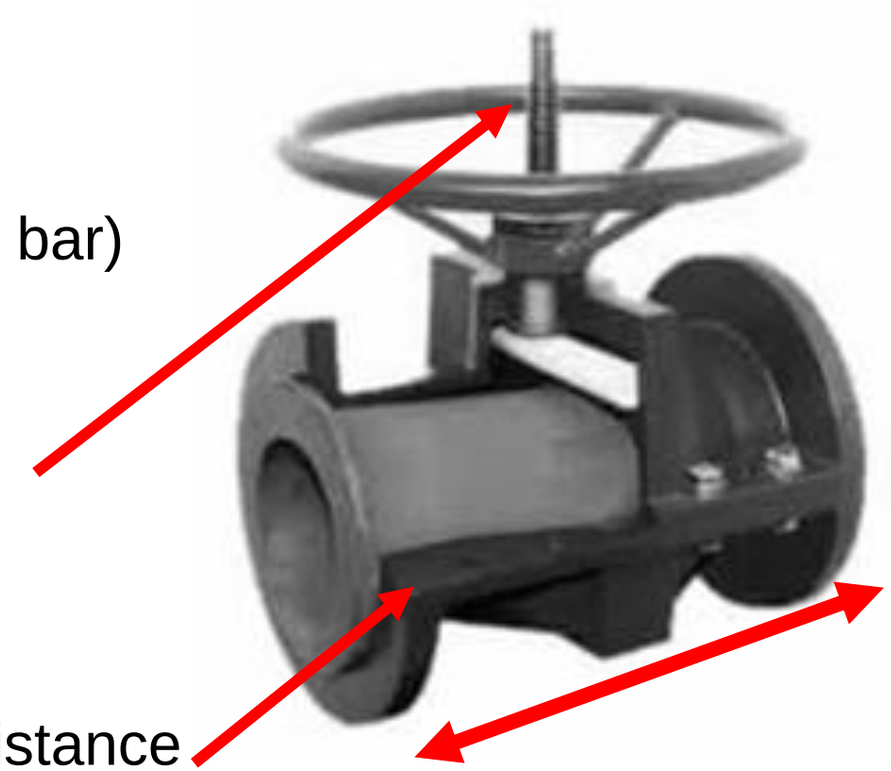
Pinch Valves – Conventional Vs Redesigned

Conventional closed body Pinch Valve

Mostly used in Petroleum , mining and chemical process industries

No standard face to face

Very low working pressure (3-4 bar)



No effective position indicator.

In submerged commissioning , no resistance

Re-Designed Closed body Pinch Valve

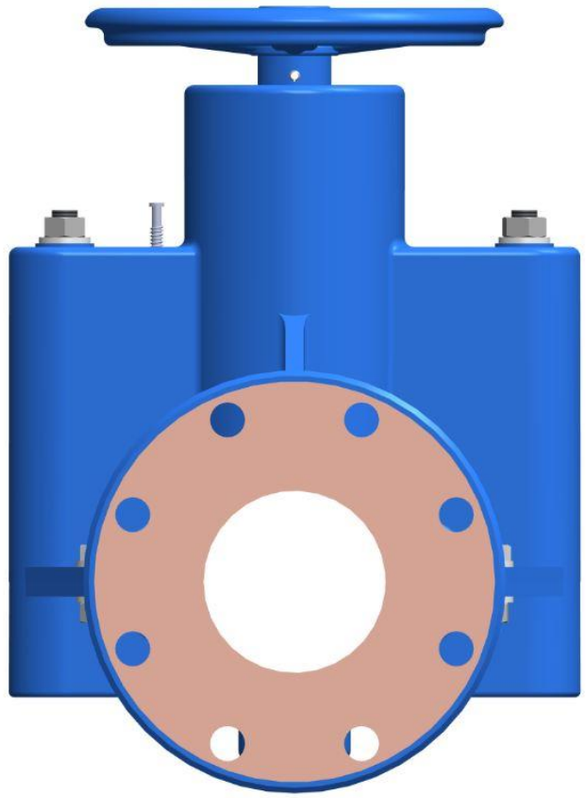
Face to face according ASME B16.10

Very low friction and torque mechanism in packing gland

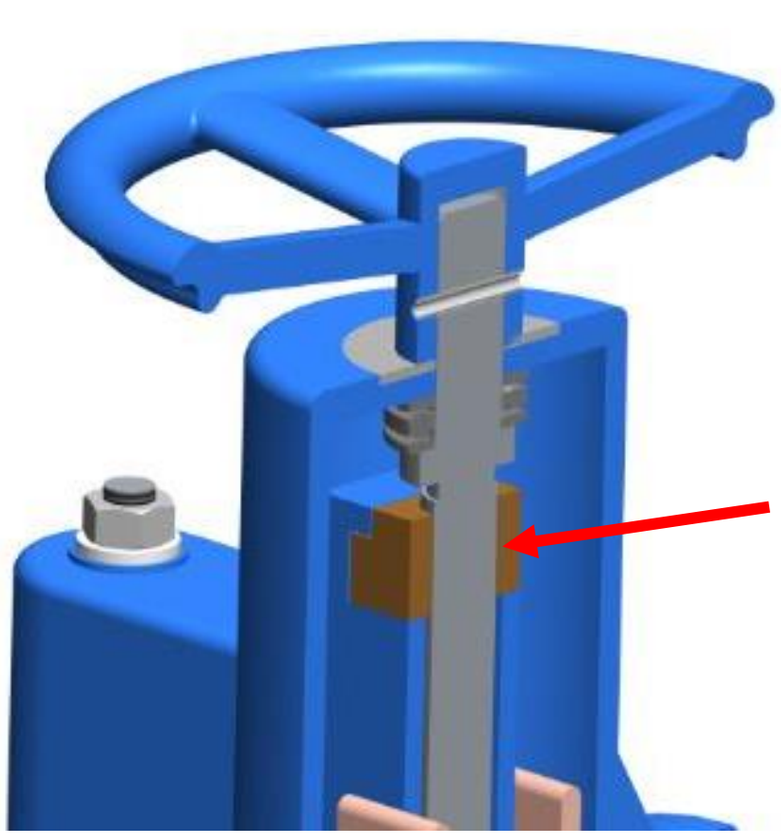
Unique Position Indicator, mechanically operated

Working pressure 10 bar and more

Special Gasket arrangement for fluid resistance

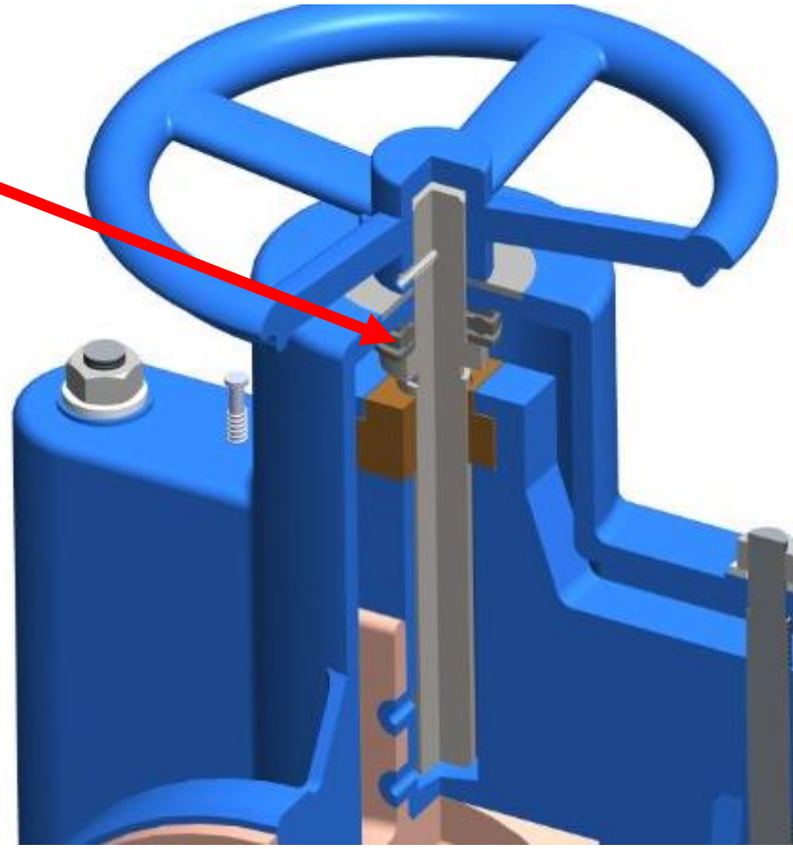


Features



Brass & Stainless steel
material combination
to avoid friction

Bearing / Rollway
arrangement



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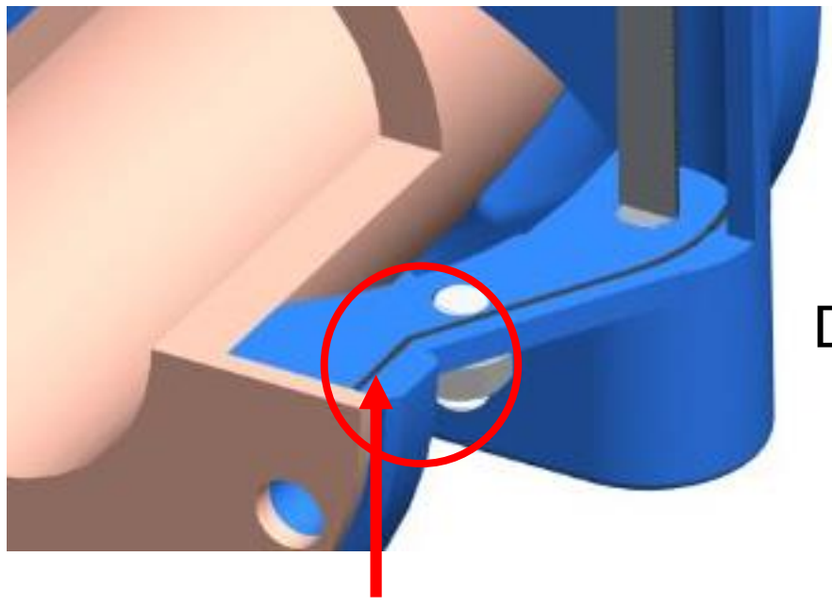
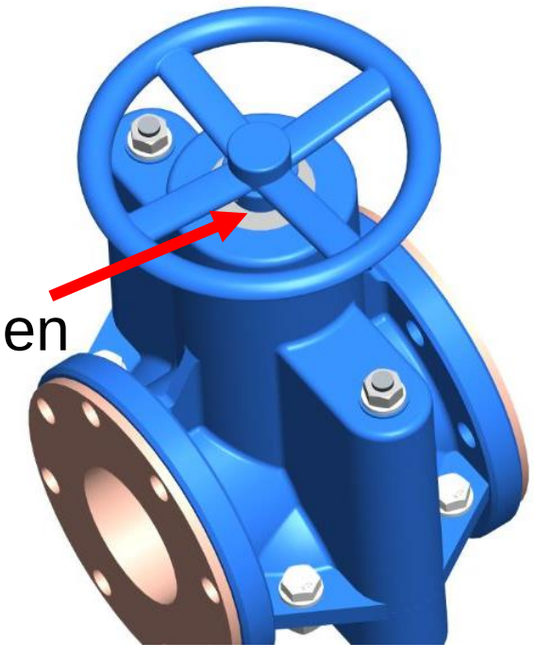
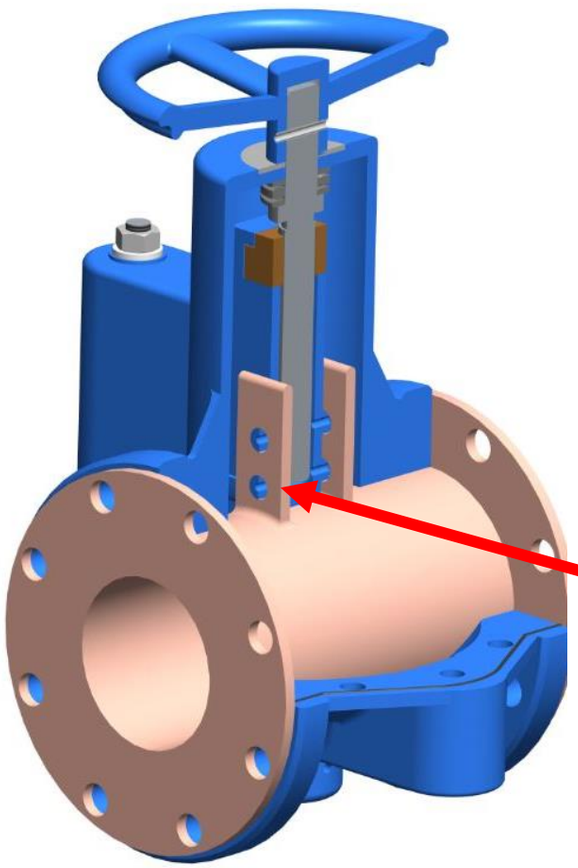


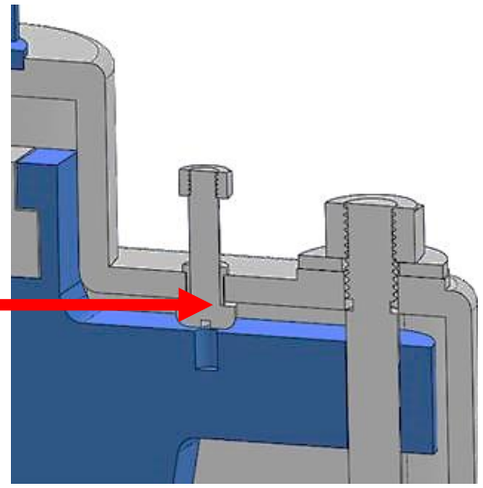
Fluid / environmental substance resistance

Dust proof woolen cushion





Vibration reducer



Unique Position Indicator
Mechanically functioned

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Surface coating Technology – Surface Pretreatment

Surface Coating technology

Till now we focused on inside mechanism of valves,
but surface protection technology is also very important factor for a valve.

A better surface Coating can
- Increase life time and
- Can avoid “Domino effect”

Present scenario on valve coating

A number of well established surface coating standards are present to guide it.

For manual operated valves,
mostly used surface preparation standard follows is
Chemical cleaning SSPC-SP-1

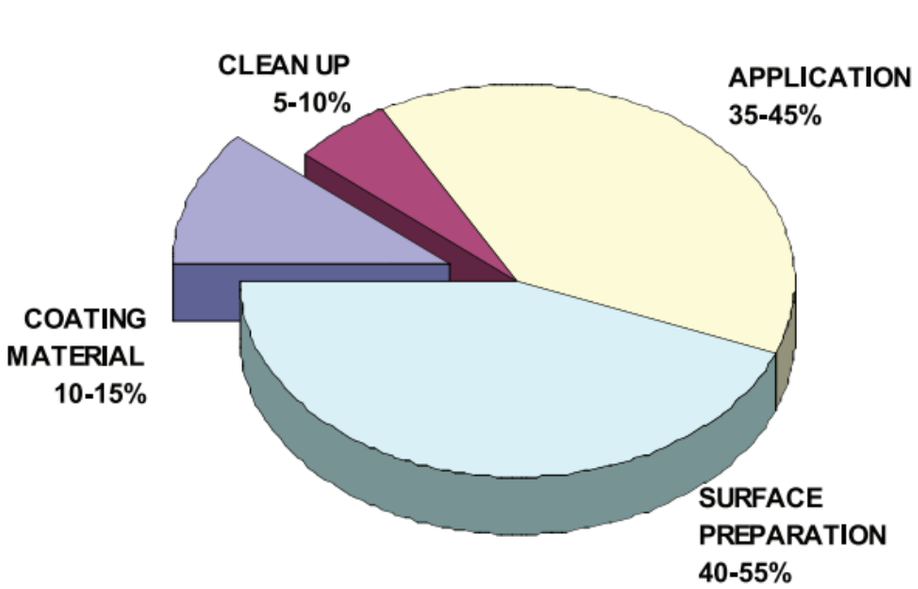


Fig: Cost wise pie chart

TABLE 1

SSPC #	NACE #	Title
SP1	-	Solvent Cleaning
SP2	-	Hand Tool Cleaning
SP3	-	Power Tool Cleaning
SP5	1	White Metal Blast Cleaning
SP6	3	Commercial Blast Cleaning
SP7	4	Brush-off Blast Cleaning
SP10	2	Near-white Blast Cleaning
SP11	-	Power Tool Cleaning to Bare Metal
SP12	5	Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-high-pressure Water Jetting Prior to Recoating
SP14	8	Industrial Blast Cleaning

Surface Preparation

Our focus to find a surface treatment at room temperature (saving energy)

Study on –
Ohmi Clean
IMEC Cleaning
Immersion cleaning
Centrifugal spray cleaning
And so on …

**For this experimental part
Special thanks to**

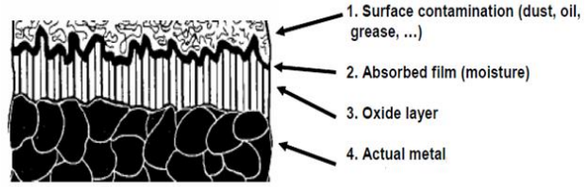
**Dipartimento CMIC “Giulio Natta”
Pollitecnico di Milano**

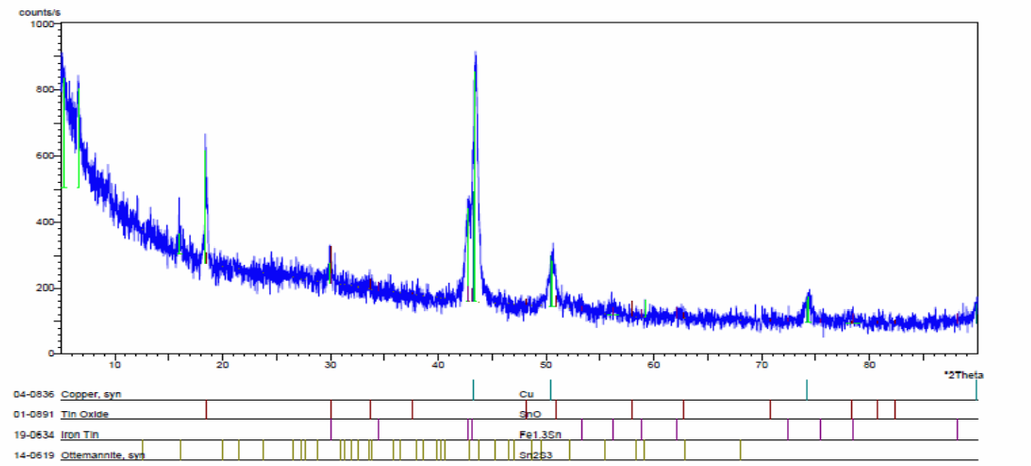
Solvey Chemical group

SIGMA-ALDRICH

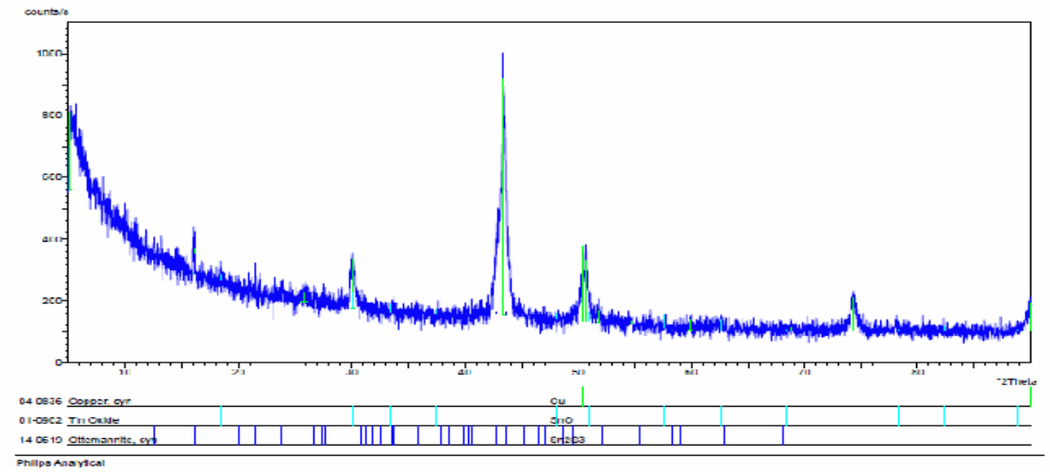
Our Experimental Chemical composition for surface pretreatment
Very simple, At Room Temperature, Quick and Time saving

Surface Preparation





XRD spectra, deposit of particles onto Si Substrate with Conventional surface pretreatment.



XRD spectra, deposit of particles onto Si substrate piece with **ChCl (1:1)** surface pretreatment.

Sonicated in Acetone for 5 minutes and then dry
Immersed in Choline chloride for 4 minutes and then dry

Future Scope

This surface pretreatment is a new way to perform electroless deposition

Metallization on components of valves

Thank you!

Do you have questions?

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