

SESSION 10 - THURSDAY, 25 MAY 2017 - 10:30

SHARING EXPERIENCE TO DEFINE THE TOTAL COST OF OWNERSHIP

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“ Sharing expertise sitting on both sides of the table “

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INTRODUCTION

The last 15-year period in the Valve market environment has drastically modified the working method and the project knowledge of each supplier.

The continuous technological development of the projects' complexity has forced all the Valve Manufacturers to pursue a continuous and progressive improvement in both the Sales and the Engineering areas.

In particular, the role of the Valve Seller repeatedly modified its traditional approach over the time: looking back to the history of sales activities, we may recall pure vendors who could sell valves without holding any specific technical knowledge. More recently, the industrial Valve Manufacturers have evolved with the introduction of specific professional roles named "Sales Engineers", able to dialogue with the EPC's and End Users, and having an adequate engineering knowledge in line with the technical context.

Nowadays any Valve Manufacturer is able to fully understand the process applications and to recommend the appropriate valve design for each service offering tailor-made solutions, and especially recognizing the technical limitations connected with any valve type.

Referring to this assumption, a new role was materialized in each Sales Department, i.e.: the Business or Application Development Expert, often originating from Engineering and/or End Users and/or direct plant experience.



APPLICATION EXPERT

Generally, the Application Development Expert holds the following main functions:

- Internal technical advisor:
 - ✓ *He is able to identify the criticality of each application and suggests the proper solution to be proposed.*
 - ✓ *He also covers a role of ethical mediator, recognizing the process limits of each individual product, thus avoiding unsuitable solutions.*

- Ethical moderator:
 - ✓ *Follows the sales activities of each Area Sales Manager, especially as concerns special process services.*
 - ✓ *He also acts as a mediator between the remarkable tendency to sell - which is a characteristic of the commercial area - and the conservative position of the Engineering and the R & D Departments.*

- EPC & End Users and Licensors interface:
 - ✓ *The Customer will have the feeling that in the Valve Manufacturer organizational structure there is a skilled Engineering interface.*
 - ✓ *Even during site problems, the Application Expert must be able to analyze the problematical details of each valve and to suggest the proper corrective action in cooperation with the Aftermarket Department and based on specific process issues.*

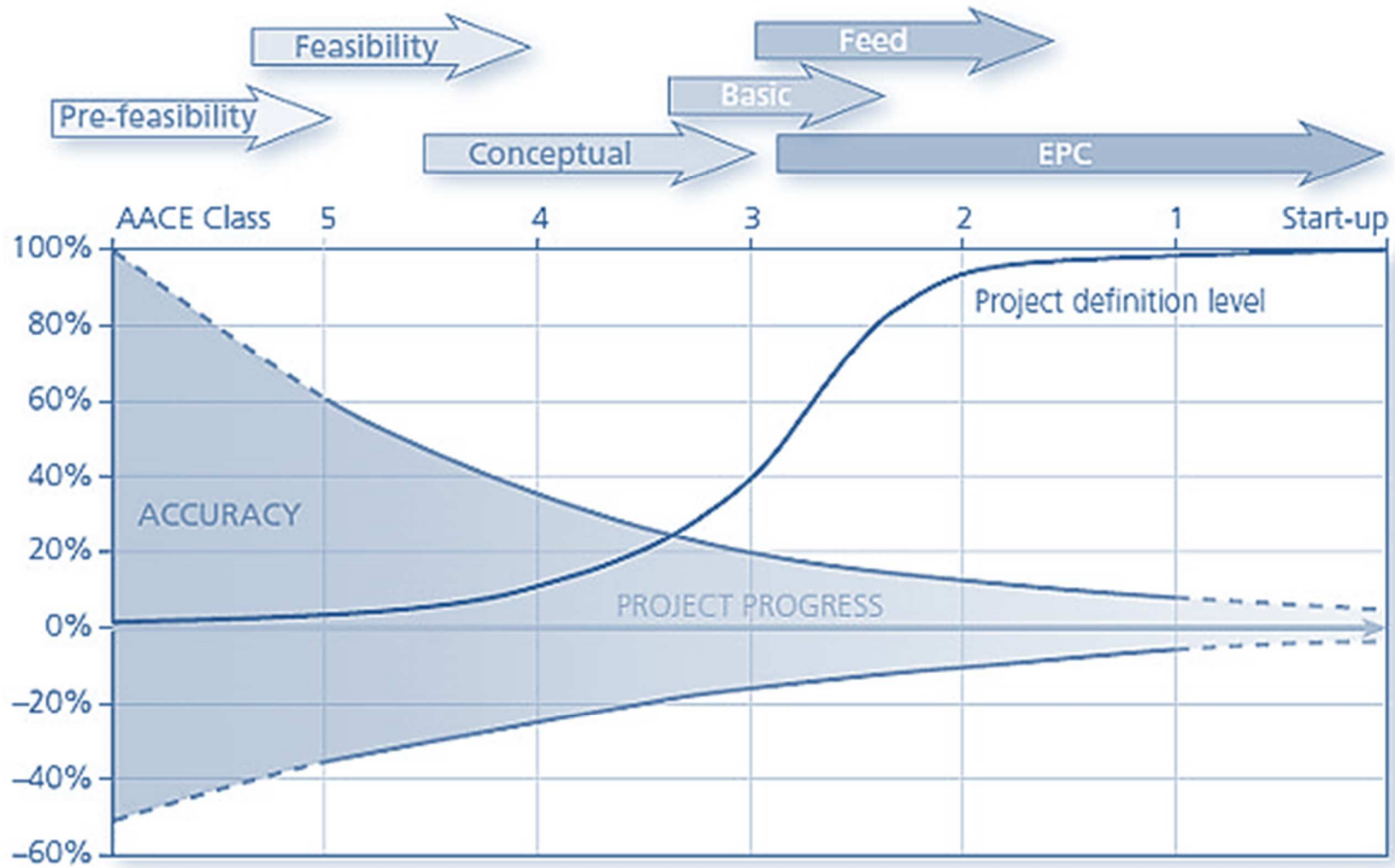


DIFFERENT ENGINEERING PHASES

In the industrial environment, different stages are coexisting with respect to the design process, having different levels of detail.

- PRE-FEASIBILITY
 - FEASIBILITY STUDY
 - CONCEPTUAL
 - BASIC ENGINEERING
 - FRONT-END ENGINEERING (FEED)
 - DETAILED ENGINEERING (EPC / EPCI)

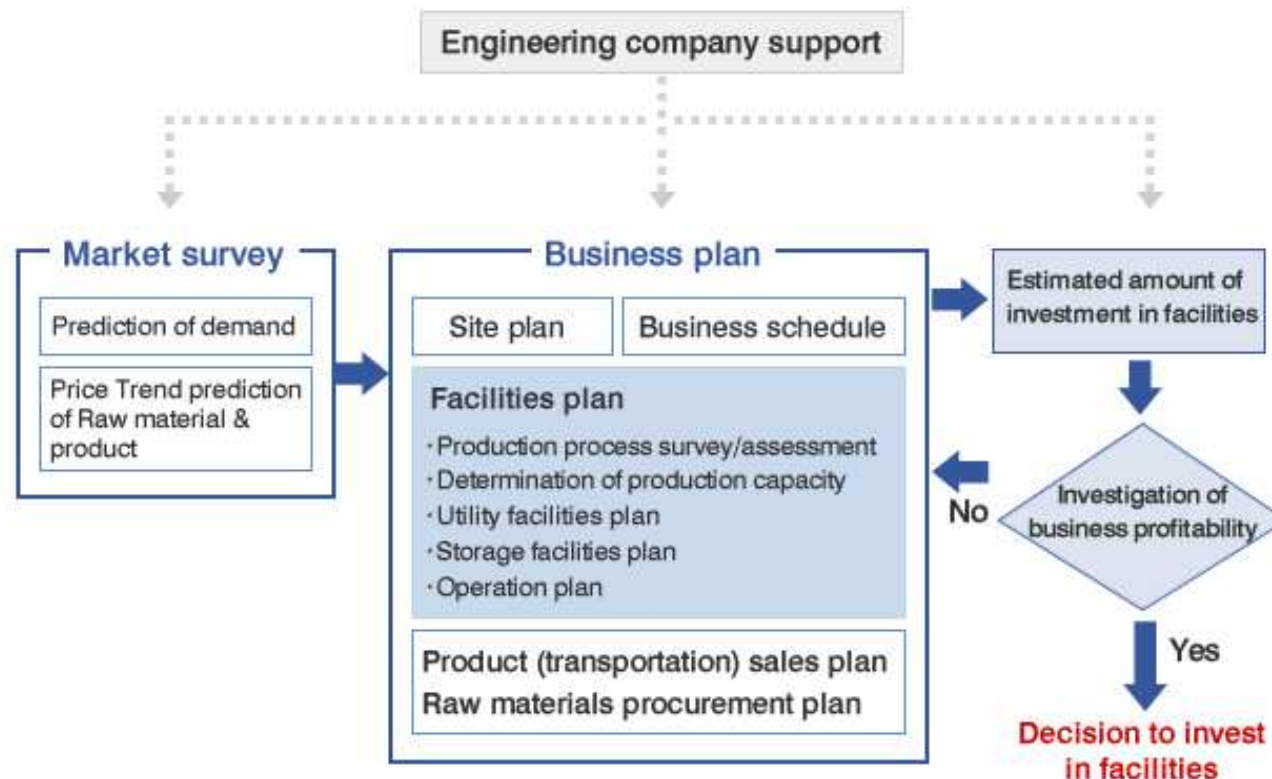
DIFFERENT ENGINEERING PHASES



PRE-FEASIBILITY & FEASIBILITY STUDY

This is a very embryonic stage of each project; it is basically an analysis of the real possibility of investing in a specific industrial technology and in a given geographical area. The percentage of approximation is very high, typically between 45% and 60%, in order to decide whether or not to invest.

In general, over the pre-feasibility & feasibility studies no specific involvement of the Isolation and Control Valves Manufacturers is expected.

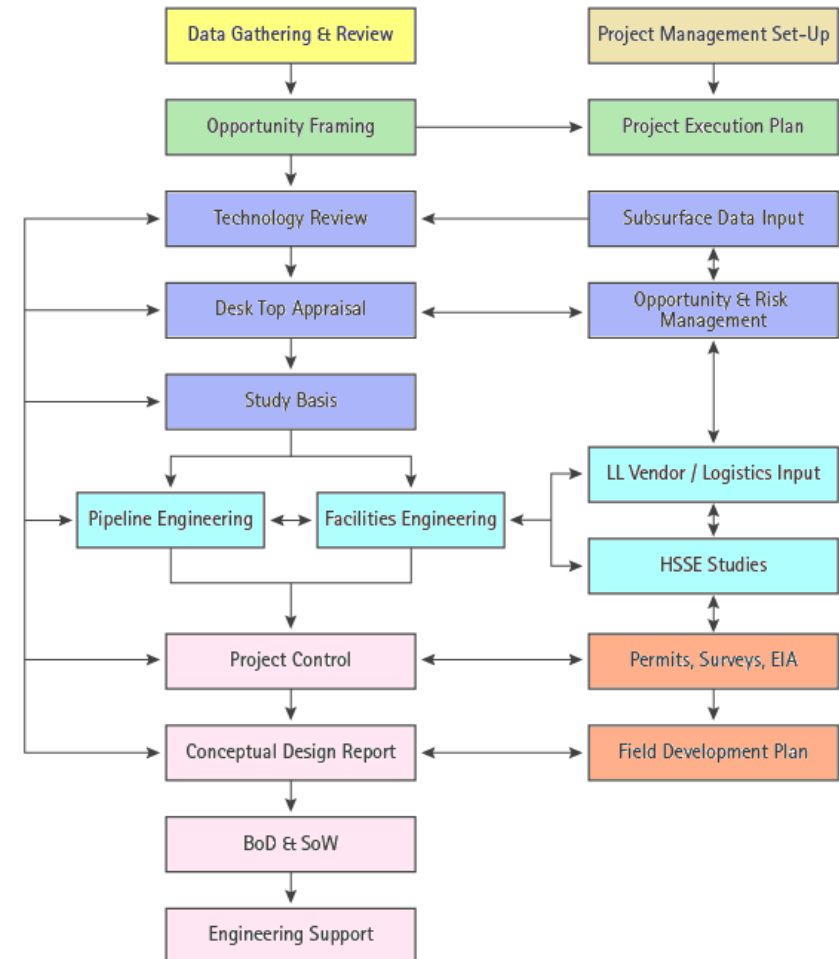


CONCEPTUAL

Deliverables from the Conceptual Engineering Phase typically include conceptual selection, technology review, facilities definition based on process simulation and production target, budgetary cost magnitude, project controls, Risks Analysis, Health and Safety executive study, tentative project schedule, operating and management costs forecast.

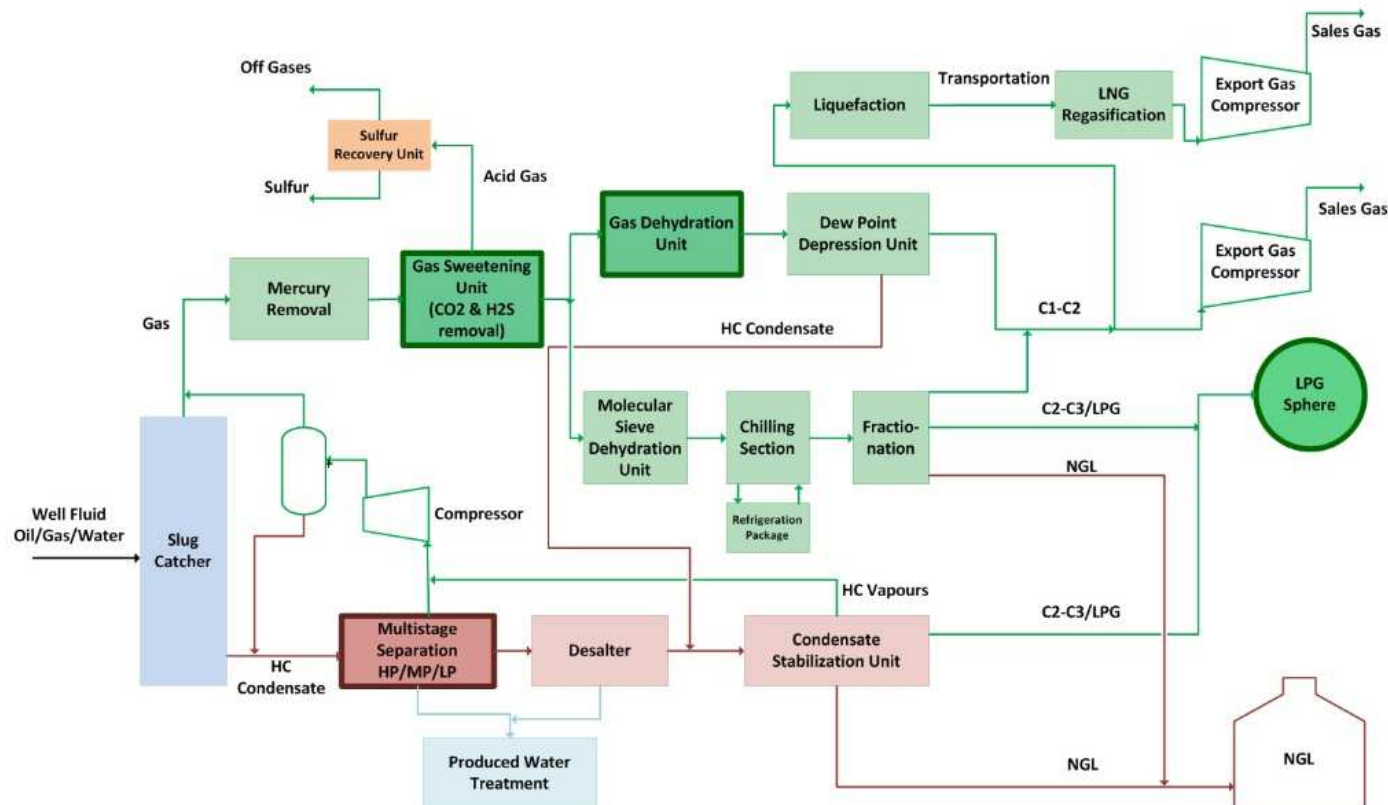
The percentage of approximation is high, typically between 30% and 45%.

In this project phase, the possible involvement of a specific valve manufacturer can be a great support, especially to obtain a backup aimed at achieving a budgetary estimation.



BASIC ENGINEERING (pre-FEED)

This is the most critical step in the development of a project, since the direct involvement of the process department will start at this stage with the drawing of the official process flow diagrams, then defining equipment, vessels, machinery and main piping lines, and performing all the main technical decisions for the main project functions, with all the relative impacts of cost and time. The percentage of approximation is medium, typically between 30% and 20%.



FRONT-END ENGINEERING DESIGN (FEED)

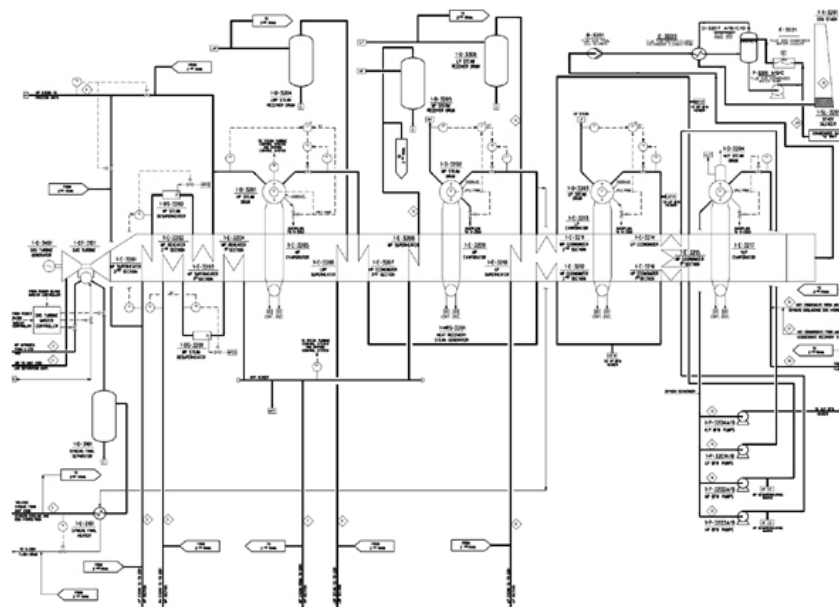
The FEED is the engineering phase that comes after the Conceptual and Basic Design or the Feasibility Study.

The FEED design is focused on the technical requirements as well as on the rough investment costs involved with the project. The FEED package is employed as the basis for bidding the Detailed Execution Phase (EPC, EPCI, etc.), and is used as the design basis. A good quality FEED will reflect all Customer's project specific requirements and shall avoid significant changes during the execution phase.

FEED Contracts usually take approximately one year to complete for larger sized projects. During the FEED phase, there is a close communication between the Project Owners, Operators, Engineering Contractor and suppliers, to work on specific project requirements.

For projects that will become executive with no doubt whatsoever, the End User often seeks to manage a real competitive FEED, and the final selected winner will proceed with the Detailed Engineering Phase (EPC or EPCI).

This is the best time for the cooperation between the End User/Engineering Company and the Valve Manufacturer, in order to offer all the necessary support to accomplish the project goal. The percentage of approximation is very low, typically between 20% and 5%.



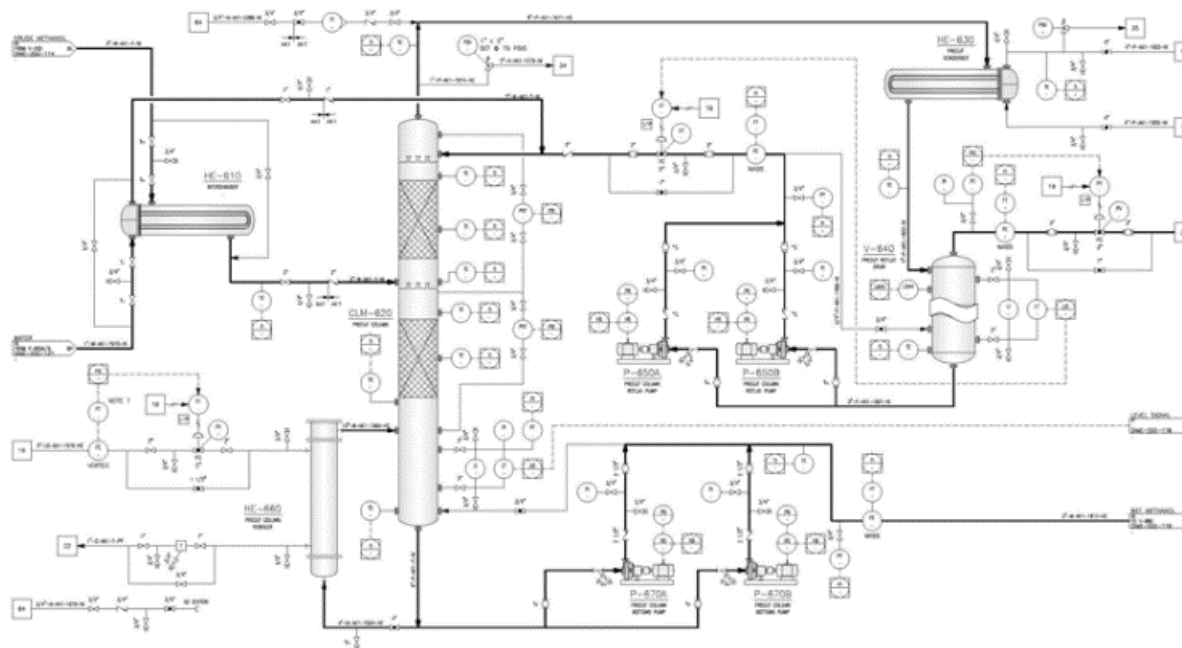
DETAILED ENGINEERING

The Detailed Engineering Phase is the final design stage of a project, and typical outputs include Procurement Specifications, Construction Drawings, and evidence of design verification. This package can form the basis for the EPC tender material, the Authority Approvals and/or the Certification by a third party appointed on purpose.

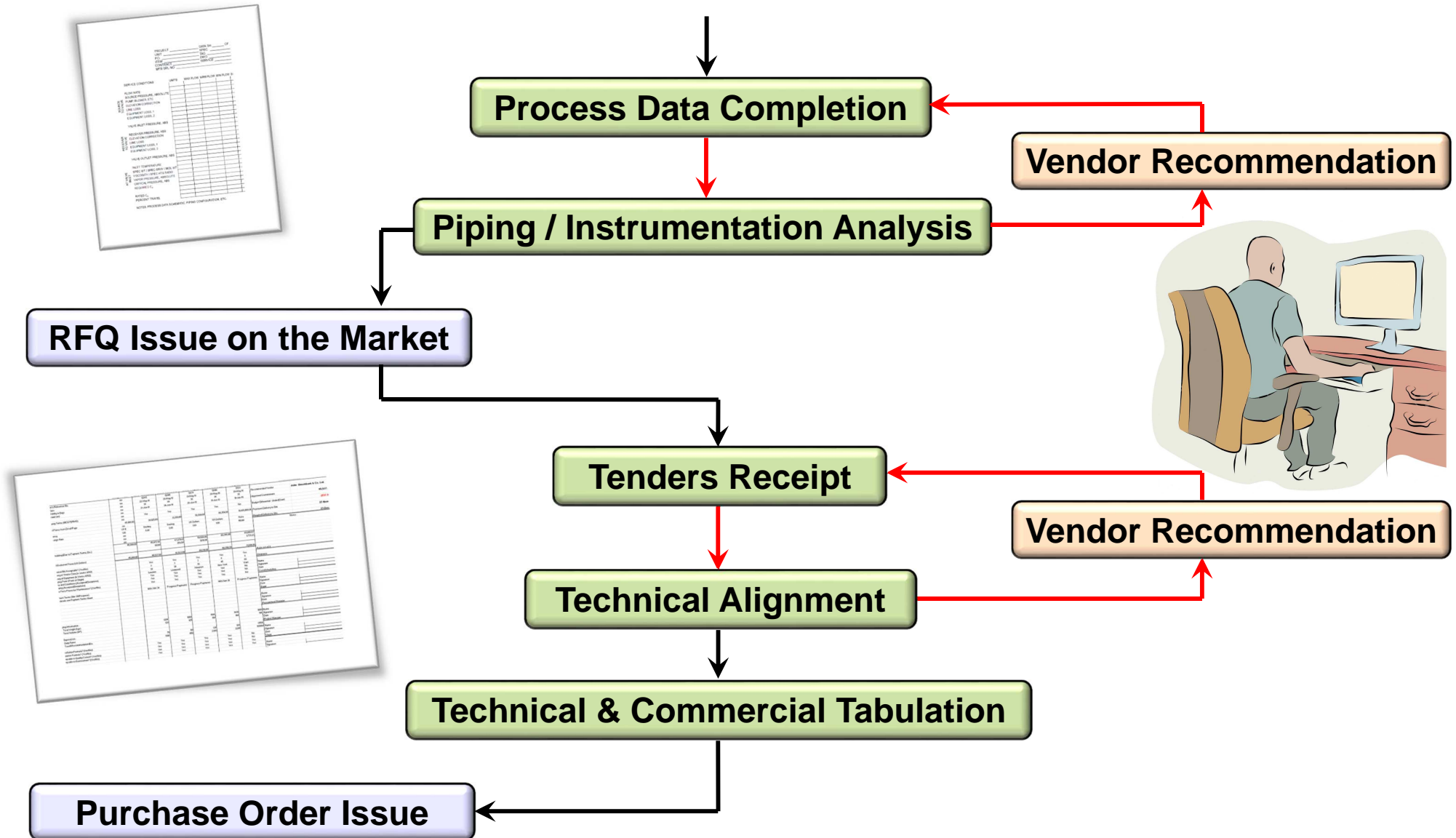
At this stage, all technical aspects associated with every item are totally defined to finalize the purchasing, and all the construction details are completed.

At this time of the project development, the Valve Supplier can become a partner suggesting ideas, solutions and product types, in order to support the Customer in selecting the appropriate valves for each application, and to provide the best possible ideas to actively contribute to savings in the plant costs.

This is the perfect time when the role of the Application Expert, part of the Valve Manufacturer staff, can provide a substantial partnership and an effective contribution.



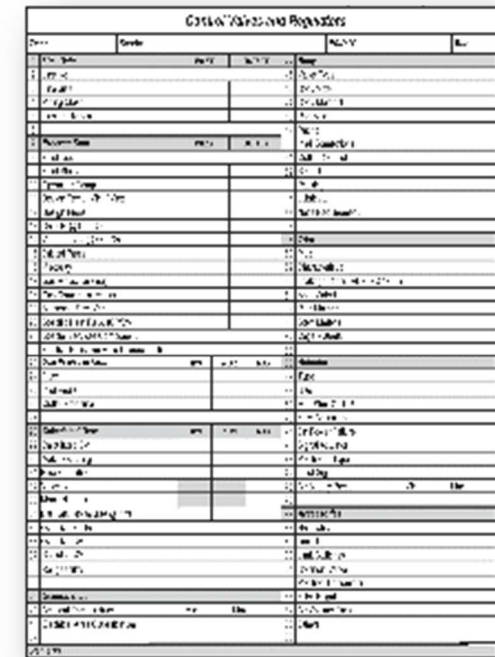
ENGINEERING WORK-FLOW



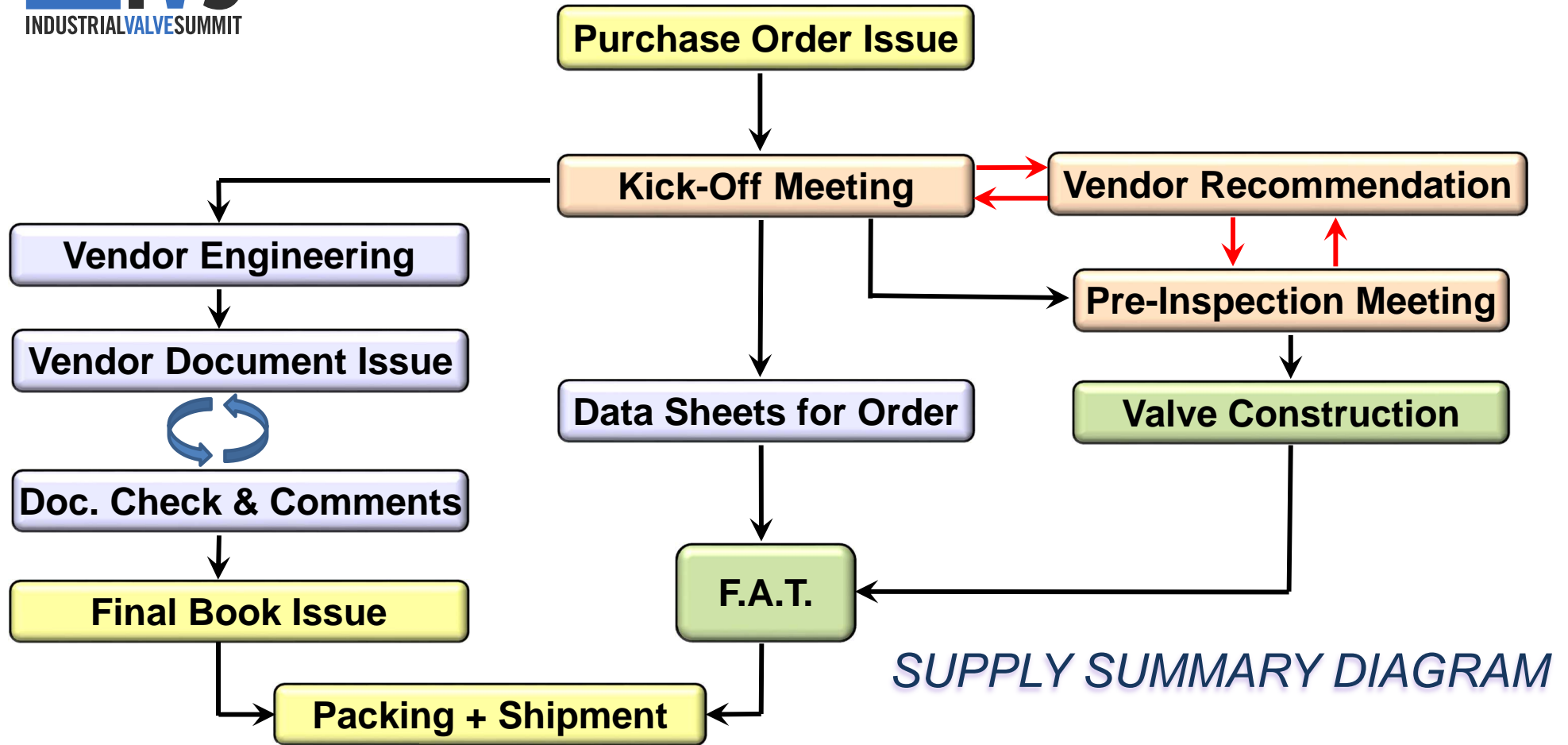
TYPICAL VENDOR RECOMMENDATION

Either during process data-sheets analysis or over technical alignment process, or at dedicated meetings with the Valve Manufacturing partner, it may be the perfect time to receive all possible technical warnings. The most frequent issues are:

- Incomplete operating and design data;
- Missing process media physical characteristics (i.e.: vapour pressure, critical pressure for liquids or Cp/Cv, Z for gasses, etc.);
- Extremely wide Rangeability (change valve type from globe to quarter-turn type);
- Noise above the project acceptable limits (finding a continuous, intermittent, infrequent or emergency service);
- Unexpected cavitation phenomena (even using anti-cavitation trim);
- State of the fluids (e.g.: for the Process Dept. the fluid is liquid, but based on the received data, the calculation envisages vaporization).



Control Valves and Regulators			
Item	Code	Notes	Units
1	1000	1000	1000
2	1000	1000	1000
3	1000	1000	1000
4	1000	1000	1000
5	1000	1000	1000
6	1000	1000	1000
7	1000	1000	1000
8	1000	1000	1000
9	1000	1000	1000
10	1000	1000	1000
11	1000	1000	1000
12	1000	1000	1000
13	1000	1000	1000
14	1000	1000	1000
15	1000	1000	1000
16	1000	1000	1000
17	1000	1000	1000
18	1000	1000	1000
19	1000	1000	1000
20	1000	1000	1000
21	1000	1000	1000
22	1000	1000	1000
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25	1000	1000	1000
26	1000	1000	1000
27	1000	1000	1000
28	1000	1000	1000
29	1000	1000	1000
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50	1000	1000	1000

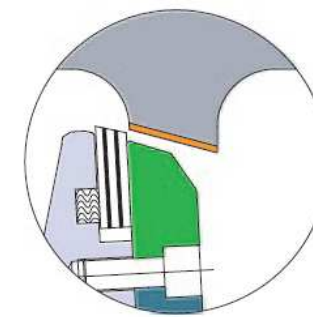
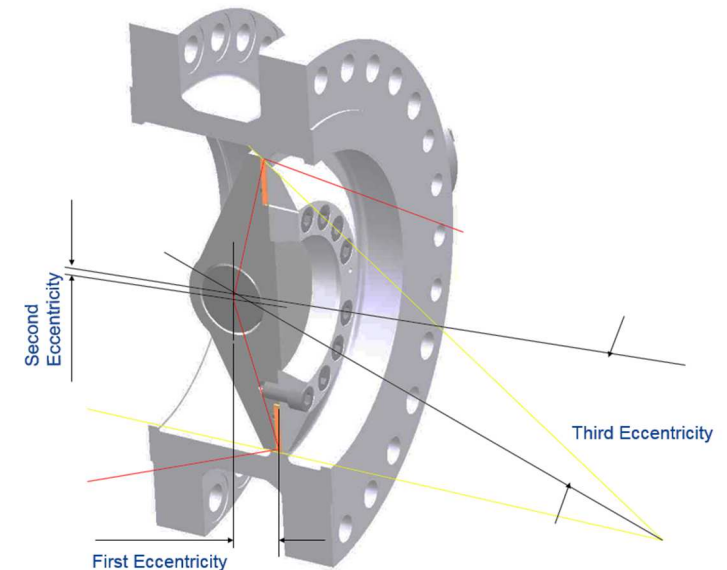


Site

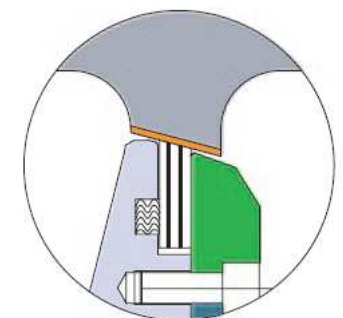
IMI ORTON APPLICATION FOR TRIPLE ECCENTRIC METAL TO METAL BUTTERFLY

Over the past two years, that I spent as the Orton Application Development Manager, I identified the following applications where the Triple Off-Set Metal-to-metal Butterfly Valve can be a good choice, thanks both to its easy shape (self draining / flushing), and to the zero rubbing between the two sealing elements:

- PTA Production Process
- Molecular Sieve Systems
- IGCC (Integrated Gasification Combined Cycle)
- Catalyst / Slurry
- Molten Salt Concentrated Solar Plant
- Hot Gas By-pass Valve (HGBV)
- BDV Noise and Energy Control
- Low dynamic deltaP Anticavitation / Low-Noise

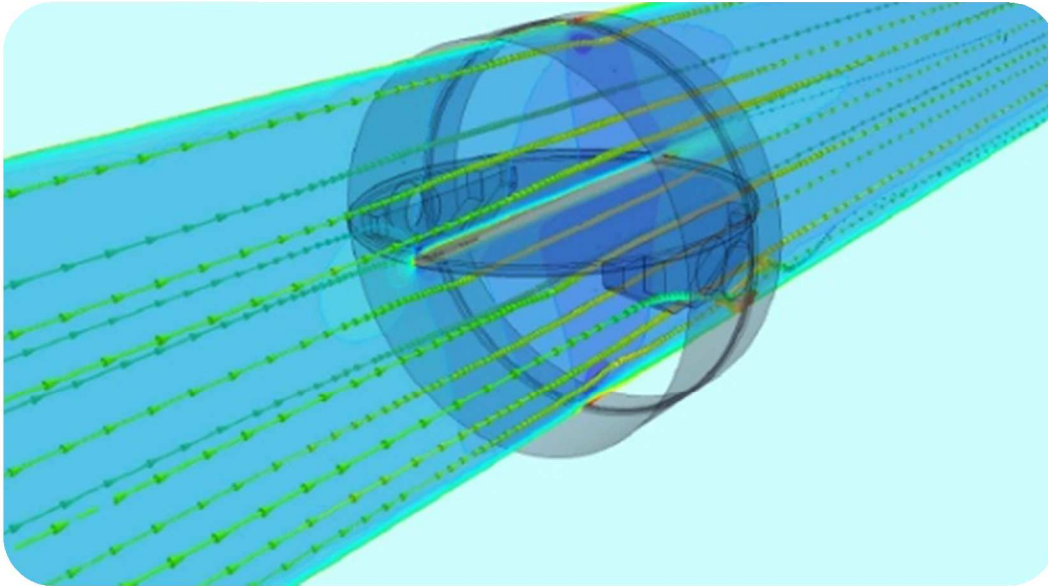


Prior to seating

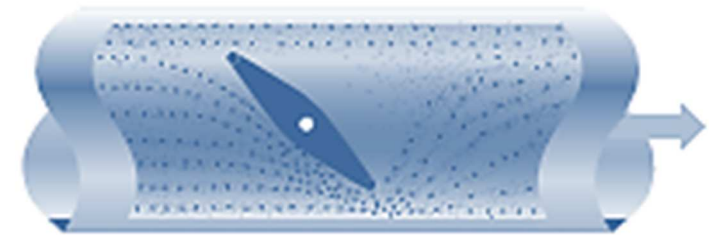


Seal Ring seated

IMI ORTON APPLICATION FOR TRIPLE ECCENTRIC METAL TO METAL BUTTERFLY



The pressure distribution and the trajectory of fluid suspended particles as they pass through a butterfly valve, will not erode the metal surfaces, because of the intrinsic self-draining/cleaning design.



- Heavy robust construction
- Hardened internal materials
- Swing through lens for minimum leakage at very high temperature
- Special mechanical seal to prevent the ingress of suspensions into bearing area.
- Horizontal Shaft

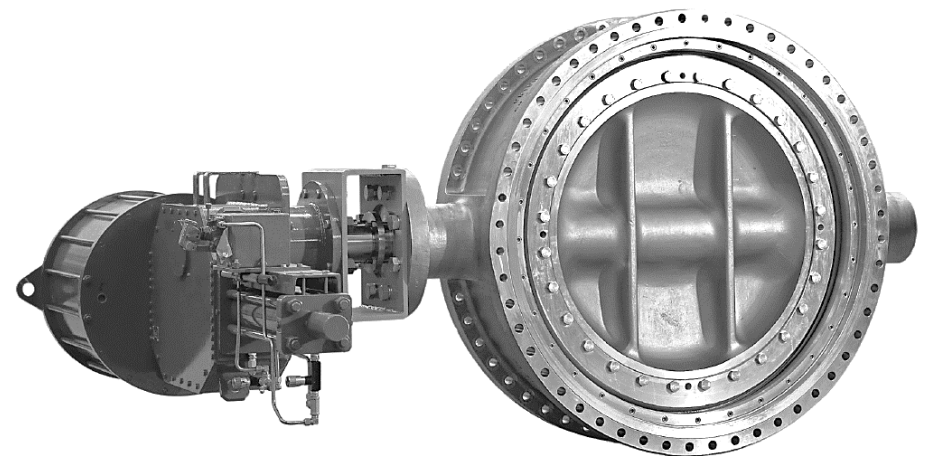
The self-draining triple offset metal to metal butterfly valve is the most suitable design for suspended solids and slurry applications, especially when the process is characterized by conjunction in high temperature service cycle with high frequency switching.

IMI ORTON APPLICATION FOR TRIPLE ECCENTRIC METAL TO METAL BUTTERFLY

Especially in the Suspended Solids process, the pressure distribution and the trajectory of the fluid suspended particles passing through a butterfly valve will not erode the metal surfaces, due to the intrinsic self-draining / cleaning design.

The self-draining Triple Off-Set Metal-to-metal Butterfly Valve is the most suitable design for suspended solids and slurry application, in particular when the process is characterized by high temperature service cycle in conjunction with high frequency switching.

- Heavy robust construction
- Hardened internal materials
- Swing through lens for minimum leakage at very high temperature
- Special mechanical seal to prevent the ingress of suspensions into the bearing area
- Horizontal shaft installation



IMI ORTON BUTTERFLY TYPICAL APPLICATIONS

Commodity Valve

Process Valve



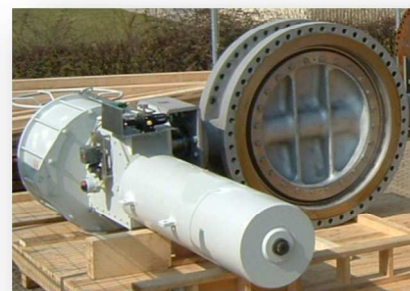
Concentric Rubber Lined
DS Series

- Utilities
- Air
- Water
- Fire fighting
- Sea water
- Demi water
- Brine
- Nitrogen
- Sewer
- Geothermal



Double Eccentric
VF Series

- Water transportation
- Sea water
- Geothermal
- Fire fighting
- Brine
- Desalination plant
- Demi water



Triple Eccentric
MV Series

- High Pressure
- High Temperature
- Shut-Off Service
- Control Service
- Fast switching
- SIL certification
- Very Large Size
- Suspended Solids
- Sour service
- Cycling process
- Solar plants



Cryogenic Triple Eccentric
MV BWTE Series

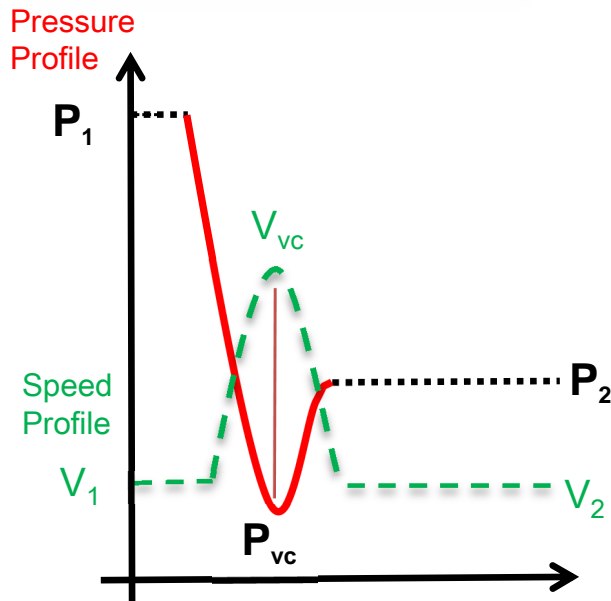
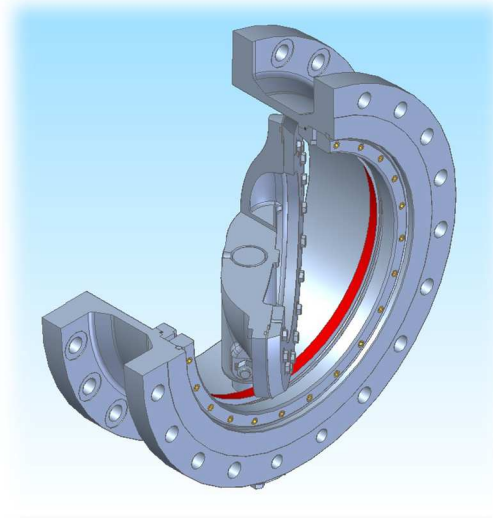
- Cryogenic
- Low-Temperature
- High Pressure
- Shut-Off Service
- Control Service
- SIL certification
- Very Large Size
- Process Inspection
- Easy Maintenance

ANTICAVITATION / LOW-NOISE DOUBLE BAFFLE

Butterfly Valve with Low-Noise Double Baffle

Speed / Energy Management Trim

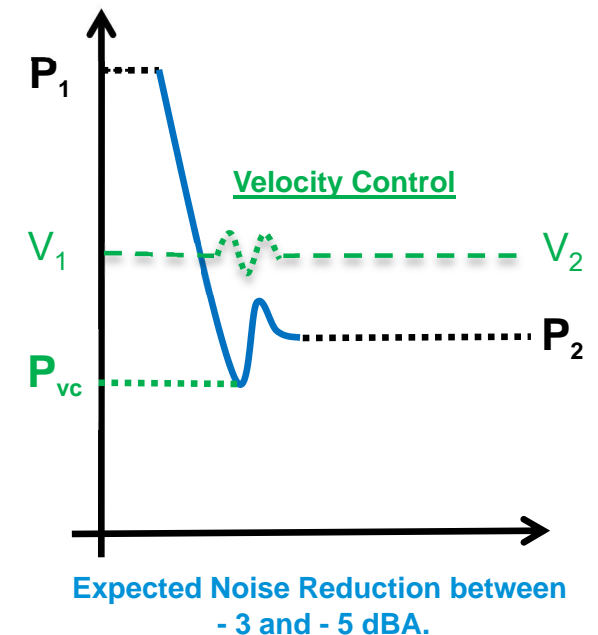
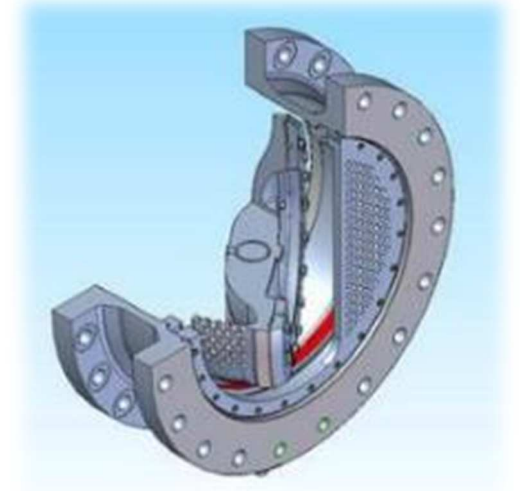
Butterfly Valve without Baffle



Due to the single or double multi-hole baffles, the Orton Models MV-F & MV-F2 are able to divide the low/medium dynamic pressure drop in two stages during the first opening time.

This is the velocity control concept, that allows to dissipate the kinetic energy through the special trim feature and to control any possible acoustic induced vibration phenomena.

The partial baffle installed on the disc takes effect all along the trim travel, while the partial diffuser, installed in the outlet flange area, guarantees a considerable energy dissipation because integral with the strong mechanical volume of the valve body.



IMI TRUFLO ITALY APPLICATION FOR DOUBLE ECCENTRIC TOP ENTRY SEGMENT BALL

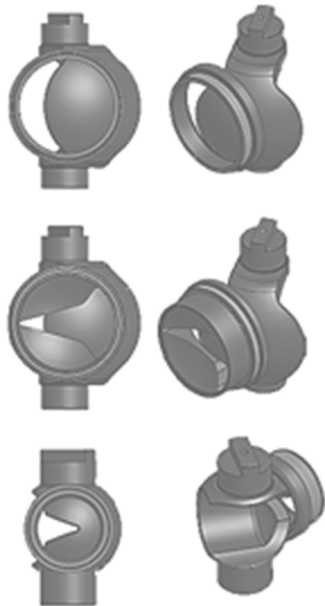


Double Eccentric Segment Ball combines the advantages of different valve designs, such as:

- the strength of a trunnion mounted Ball Valve
- the non rubbing of a triple offset Butterfly Valve
- it is suitable for both on-off and control
- it has an advanced easy shape design
- it is suitable for critical processes

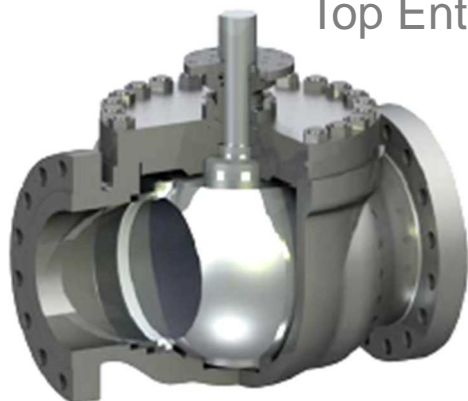
Typical Applications for segment ball:

- Isolation
- Control
- Switching
- Pipeline
- Pig Launcher & Receivers
- Manifolds
- Off-Shore Platform
- Floaters
- HIPPS
- Fast acting
- Oil sand / Tar sand
- Molecular Sieve



IMI TRUFLO ITALY APPLICATION FOR TRUNNION MOUNTED BALL VALVES API 6D

Top Entry



Side Entry



Fully Welded



The large use of forgings and the independent spring or bellows loaded floating seats which are always in contact with the ball, make these valves the preferred solution for various demanding applications.

Typical Applications for Trunnion Mounted ball valves:

- Well-Head and Christmas-tree
- Pipeline
- Pig Launcher & Receivers (Scraper Trap)
- Offshore Platform
- Process Valves
- HIPPS
- Sub-sea Well-Head and Riser
- Cryogenic; Low-temp
- Switching valves
- Metering valves
- Quick closing
- Hi-Temperature
- Buried / Underground



IMI TRUFLO ITALY APPLICATION FOR TRUNNION MOUNTED BALL VALVES API 6A

Trunnion Mounted, thanks to their robust design, are engineered to meet the highly stringent API 6A regulation. The range contains metal seats that can be configured with single or double piston effect to provide an effective double block and bleed (DB&B) in both closed and, on request, in open position.



5 1/8" API 10000



4 1/16" API 10000

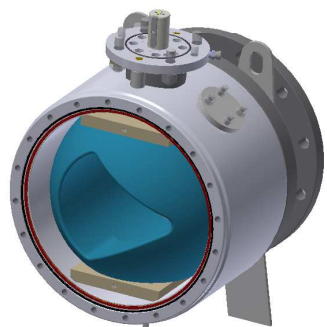
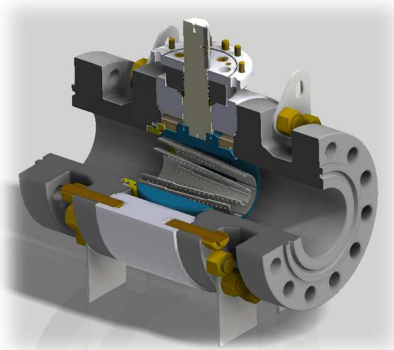
Typical Applications for API6A Trunnion ball valves:

- Well-Head and Christmas-tree
- Offshore Platform
- Floaters
- Process Valves
- Severe service
- HIPPS
- Sub-sea Well-Head
- Sub-sea Riser
- Deepwater
- ROV
- Quick closing
- Cycling service



IMI TRUFLO ITALY TYPICAL CONTROL APPLICATION FOR BALL VALVES

The ball control valves, full / reduced bore with or without multistage technology, are more & more efficient for Piping Systems with variable impedance vs. variable pressure drop, for high kinetic energy absorbing during start-up in very minimum opening positions, and for optimal valve flow characteristics and thus high rangeability and capacity.



- Gas / Water & Steam Injection
- Medium & High Pressure Drop
- Abrasion resistant
- Corrosion resistant
- Oil & Gas Wellhead
- Choke service
- Compressor Antisurge
- Booster & Mixing Station
- Gas Transmission System
- Low noise service
- Velocity & Kinetic Energy Control
- Wide Rangeability
- Oil / Gas / water separation
- LNG liquefaction & regasification
- Platform & Floaters (i.e. FPSO)
- Gas to Blowdown / Flare control
- Vent to Atmosphere
- Tank farm
- Metering Stations
- Pumping Stations
- Water Treatment



CONCLUSION



The final message I would like to convey to the audience is that for the mutual interest in the good success of the project and the correct production of the plant, a real synergy between the Valve Manufacturer and the Engineering Company will be the proper way to go.

The supplier's engineering skills will be increasingly interconnected with each engineering step of the EPC and the End Users, in order to minimize the problems possibly arising in the production plant.

The two different experiences of Engineering (Valve Manufacturer and Customer) intersect to obtain a high quality project.

Thank you



Alessandro Vecchi