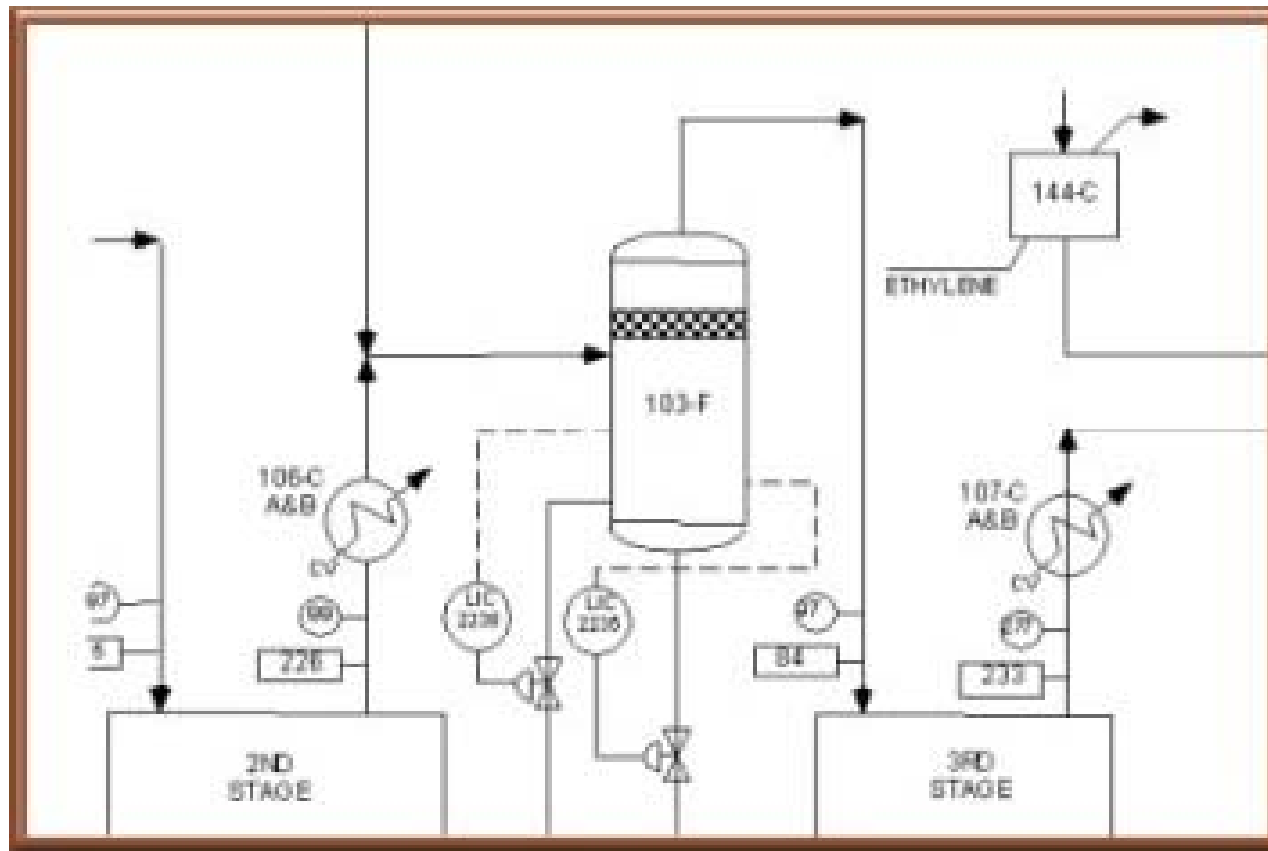
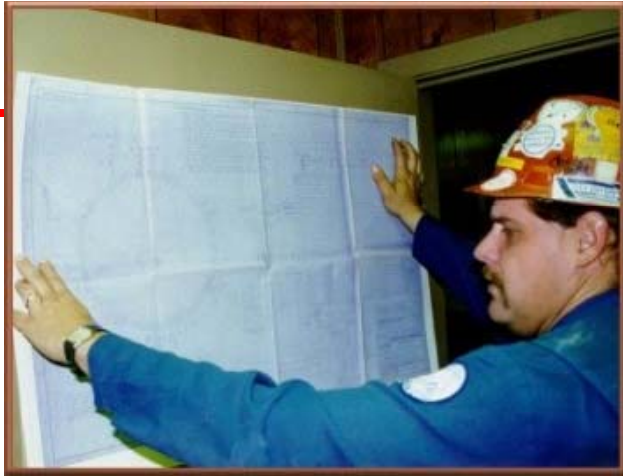


The Art of Reading a PFD and P&ID



Presented by : Baljit Singh Bagga





Lesson Objective



At the end of this presentation, the learner should be able to:

1. State the purpose of PFDs.
2. Define & determine the purpose of a P&ID.
3. Apply proposed approach to effectively read PFD & P&ID.
4. Identify components of a P&ID & information they contains
5. Identify various Valve symbols and the actual valves.
6. List Symbols for various types of Equipment & associated letters
7. Explain how each line is identified & Symbols used for instrument lines & pneumatic & electric transmissions
8. List the differences between P&IDs and PFDs.





Lesson Objective



Lesson Menu

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Lesson 2: [Process Flow Diagram](#)

Lesson 3: [Piping & Instrumentation Diagram](#)

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Lesson 5: [Valves](#)

Lesson 6: [Equipment](#)



Lesson 1: Drawings



Operating & maintaining a process plant safely & efficiently depends upon having adequate information on which to base critical decisions.

This information includes Engg. drawings defining the Plant, known as Process Flow Diagram (PFD) and Piping & Instrumentation Diagram (P&IDs).

- But all the drawings in the world won't help you very much if you don't know how to read them.
- This Lesson is designed to help you understand what these drawings are telling you



Lesson 1: Drawings



Weekend

What is a PFD and P&ID?

- PFD stands for Process Flow Diagram and
- P&ID stands for Piping & Instrumentation Diagram
- P&ID is a schematic drawing or blueprint of the systems in a section of the plant or facility.
- It shows the components needed to run, monitor, and control specific processes.
- **Note:** A P&ID does not describe the chemical reactions involved or give you procedures.
- PFD = PFS stands for Process Flow Scheme
- P&ID = PEFS stands for Process Engineering Flow Scheme



Both types of PFD and P&ID drawings make use of symbols for various piping, vessels, pumps, etc.

In most cases a legend is provided so you don't have to memorize what each symbol means.

However, with repeated use, you will soon discover that you do remember most of the symbols and what they mean.

Symbol	Description	Symbol	Description
	Gate Valve		Stop Check Valve
	Needle Valve		Excess Flow Valve
	Ball Valve		Plug Valve
	Globe Valve		Small Drain Valve with Plug
	Butterfly Valve		Small Vent Valve
	Check Valve		Diverter Valve
	Diaphragm Valve		



Lesson 1: Drawings



Weekend

Approach to correctly read a PFD and P&ID

- Break down a P&ID into small parts
- Study each part at a time, then
- We put all together in order to read a real P&ID.

Typical PFD and P&ID Information

- 1 - Title block
- 2 - Main Drawing
- 3 - Equipment Descriptions
- 4 - Revision / Issue Description
- 5 - Explanation Notes

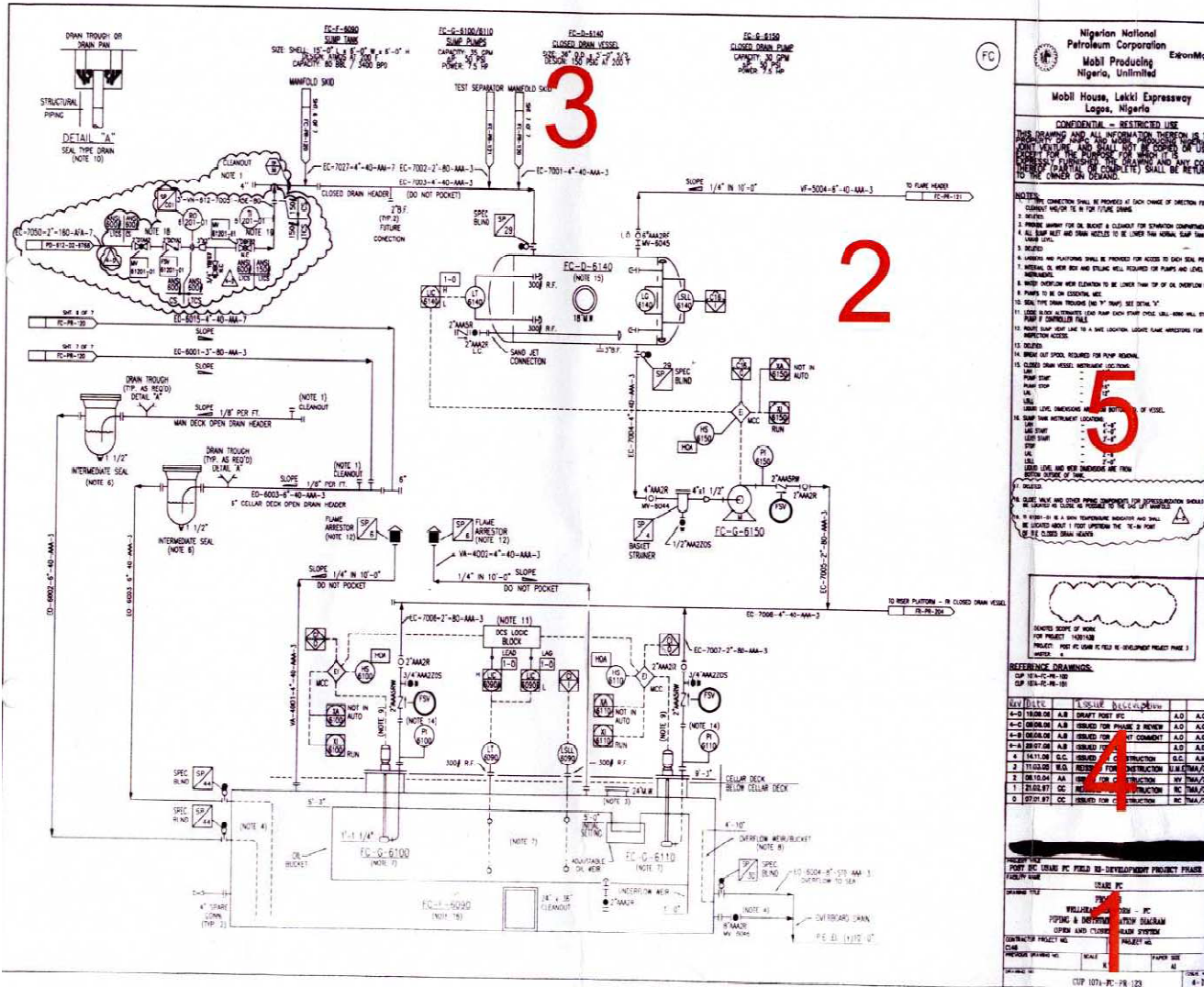


Lesson 1: Drawings



Weekend

Typical PFD and P&ID Information



1. Title block
2. Main Drawing
3. Equipment Descriptions
4. Rev./ Issue Description
5. Notes



Lesson 1: Drawings

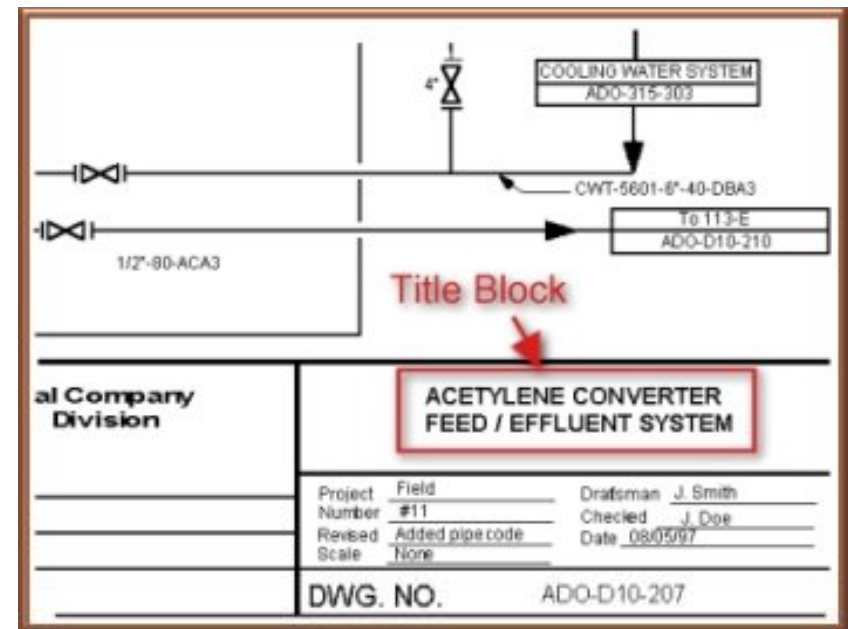


Weekend

PFD and P&ID: Title Block (1)

The title block is usually located at the right bottom corner of the PFD / P&ID drawing and contains the following information:

- Project title
- Facility name
- Drawing Name or Title
- Drawing number
- Any other relevant info.



Info. on who drew it, revised it, approved it, etc. and Dates will indicate when all these changes happened.



Lesson 1: Drawings TEST



Weekend

What do the letters "P&ID" stand for?

1, 2, 3, 4 or 5

1. Petrochemical & Industrial Documentation
2. Process & Instrumentation Drawing
3. Piping & Institutional Diagram
4. Piping & Instrumentation Diagram
5. P&ID = PEFS (Process Engineering Flow Scheme)



PFD and P&ID Exercise: Identification

On a PFD or P&IDs, identify:

1. The name of the Company
2. The name of the Plant
3. The location of the Plant
4. The process described in the diagram
5. The title of the drawing
6. The current drawing issue number
7. The drawing number



Lesson 1: Drawings



Weekend

PFD and P&ID : Main Drawing (2)

Main drawing is the largest section of the drawing, and contains symbols and lines for:

1. Equipment
2. Piping connecting pieces of equipment
3. Instruments
4. Lines connecting instruments
5. Instrument control loops
6. Line Numbers, Valve Codes etc.

PFD does not show every piping connection or other details found on the P&ID as it a simplified version of P&ID

We will look at each of these types of Symbols & Lines in more details later



Lesson 1: Drawings



Weekend

Things to Note on a PFD and P&ID

1. The relative size of the symbols represents the relative size of the actual equipment.
2. The relative position of the symbols also represents the relative position of actual equipment on the plant.
3. On a drawing, when 2 lines cross-over or make a corner without any break in drawn line, it means that those 2 pipes are actually connected in the plant.
4. If the drawn lines cross-over each other but show a break or gap at the cross-over, these pipes are not connected in the plant
5. A P&ID shows the direction a fluid stream is flowing within a pipe. The direction of flow is drawn as a solid arrowhead on the line representing the pipe



Lesson 1: Drawings



Weekend

Things to Note on a PFD and P&ID

- Corners or turns in pipelines on drawing do not necessarily represent bends in real pipelines
- Bends are often put in by designer to make lines fit in the space available on drawing.
- The lines on the drawing do not represent real distances or real location, only relative position
- The drawing may also give descriptions of the pieces of equipment shown in the drawing, including the information depending on the type of equipment:



Lesson 1: Drawings



Weekend

PFD / P&ID: Equipment Descriptions (3)

The drawing may also give descriptions of the pieces of equipment shown in the drawing, including the information depending on the type of equipment:

1. Capacity (Volume, Heat Duty etc.)
2. Physical Size (Dimension)
3. Pressure & Temp. information
4. Horsepower of Pumps/Comp.
5. Diff. Head of Pumps etc.
6. Unique equipment number, appearing on each piece of equipment and on the P&ID equipment symbols



Lesson 1: Drawings



Weekend

Revision / Issue Descriptions (4)

- The PFD or P&IDs for an area of the plant is revised and re-issued every time changes are made.
- The Revision/ issue descriptions, which are usually above the title block, tell us exactly what changes were made with each new issue number.
- Revision clouds & Revision triangle with Rev. Number are used to identify all changes from previous issue
- With each formal drawing revision, previous revision clouds are removed but triangles and revision history can remain.



Lesson 1: Drawings



Weekend

Revision clouds

- Revision clouds and triangles shall be used to identify all changes from previous formal drawing revision; primary purpose is to improve efficiency of drawing QA/reviews by focusing on changes from previous drawing (see Fig 1).
- With each formal drawing revision, previous revision clouds are removed but triangles and revision history remain.

Scope of Work clouds

Existing Drawing

- Scope of work clouds shall be used to identify all scope of work modifications associated with the project (including demolished facilities, fabrication and installation);
- The primary purpose is to highlight to construction contractor, the scope of modifications for the project (Fig 2).
- In addition SoW modification shall be differentiated from existing facilities by using a bolder pen assignment.



Scope of work clouds

Existing Drawing (Cont'd)

- A control block containing *Contractor's Name*, *Project "xxx - ##"*, *Project Title*. etc, indicating that the scope of work clouds are applicable to the project shall be inserted on all modified drawings by **Design Contractor** (see Fig 3).

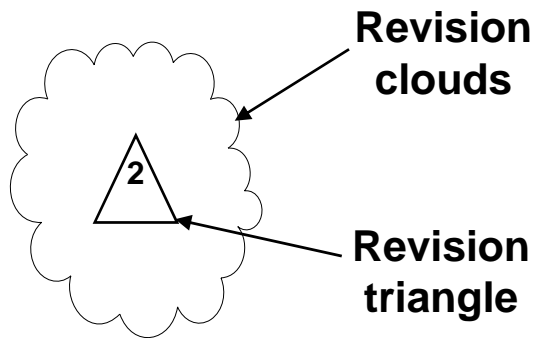


Fig. 1

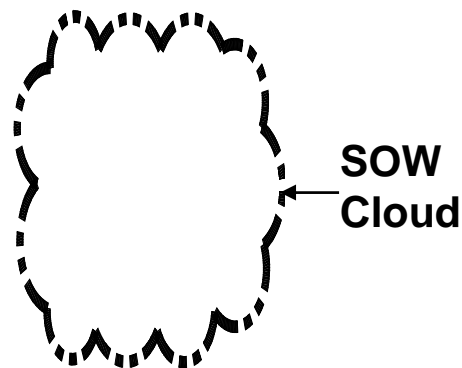


Fig. 2

"SCOPE OF WORK" BLOCK - Existing Drawing

Design Contractor's Name
DENOTES SCOPE OF WORK FOR PROJECT: XXX - ##
PROJECT: Title
MASTER: Original's Rev. No




Fig. 3

Lesson 1: Drawings



Weekend

Scope of work clouds New Drawing

- This is where all information on a new drawing created for a project is associated with the project scope (**i.e. where no existing facilities are shown on the drawing**), then a control block, stating that "All work shown on this drawing is new for project "xxx - ##, *project title*" shall be inserted by **Design Contractor** (Fig 4). **No scope of work clouds are required in this case**

"SCOPE OF WORK" - New Drawing
Design Contractor's Logo, Name & Address
ALL WORK SHOWN ON THIS DRAWING IS NEW FOR PROJECT XXX - ##
PROJECT: Title

Fig. 4

- *** Where all information on new drawing created for a project includes existing facilities then drawing shall be treated as an existing drawing i.e. with applicable SOW clouds and bolder pen assignment indicating the projects scope of modification (**Fig. 2**) and control block (**Fig. 3**)

Drawing Interface - Where a base drawing is an IFC drawing from a different project, then the SOW cloud from that project shall not be deleted. Instead, a different SOW cloud (as agreed with MPN) shall be used to differentiate the current projects' scope of modification.

A note shall also be included to indicate different projects SOW clouds. Also, the current project scope of modifications shall be of a bolder pen assignment.

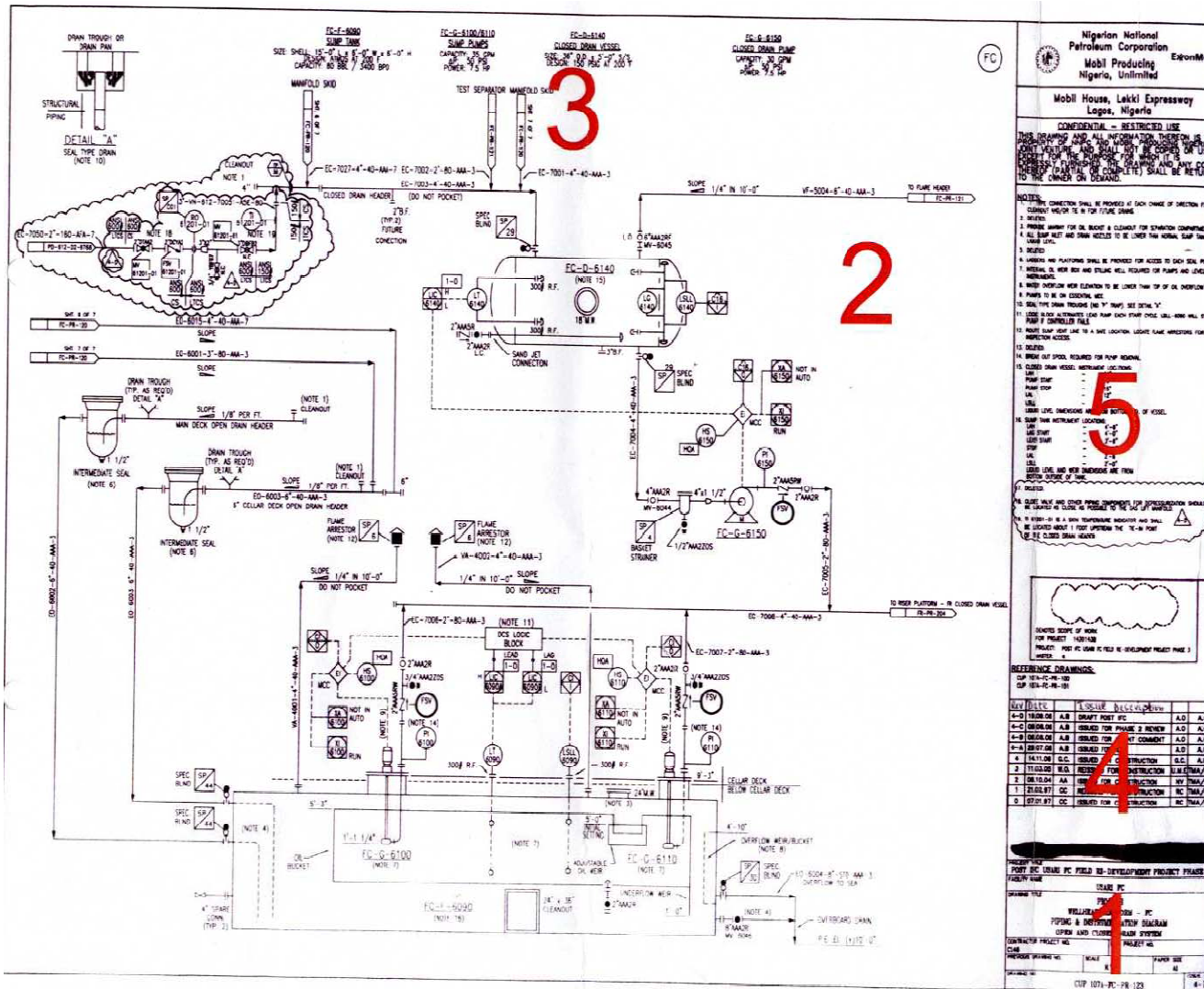


Lesson 1: Drawings



Weekend

Typical PFD and P&ID Information



1. Title block
2. Main Drawing
3. Equipment Descriptions
4. Rev./ Issue Description
5. Notes



PFD and P&ID : Explanation Notes (5)

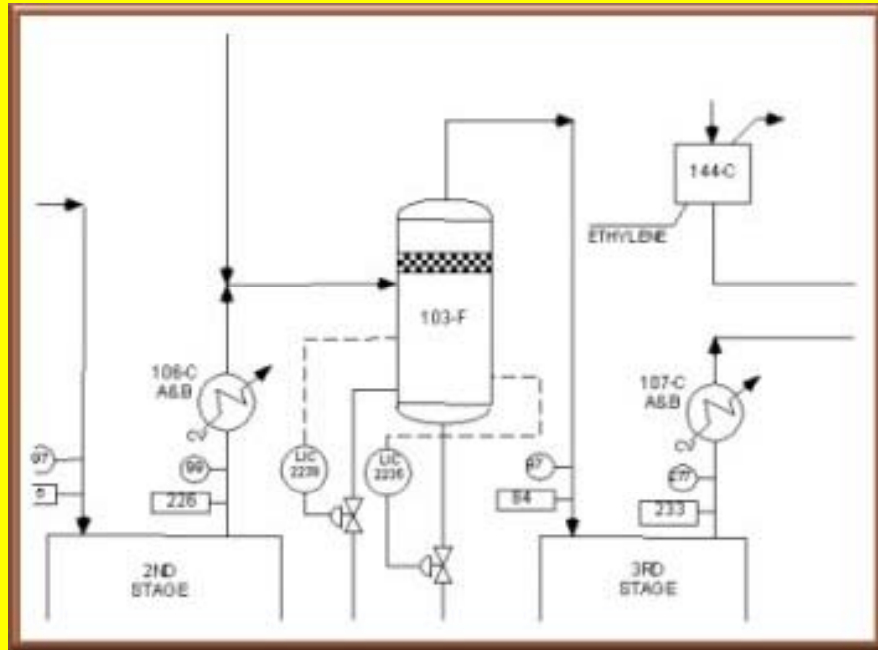
- Block 5 on the referenced drawing shows area of the drawing where many different kinds of information may be included.
- While notes may appear in almost any part of the P&ID, they are often along the right hand side of the drawing.

Congratulations! You have completed Lesson1

Next we look at the PFD's, P&ID's and Legends & Symbols for Piping, Valves & Equipment



Lesson 2: Process Flow Diagram



Process Flow Diagram
As mentioned before, another common type of drawing is the Process Flow Diagram, or PFD, which is simplified version.

These diagrams are particularly useful to the operators since they carry all the information needed to follow a process and control it. They do not show every piping connection or other details found on the P&ID.

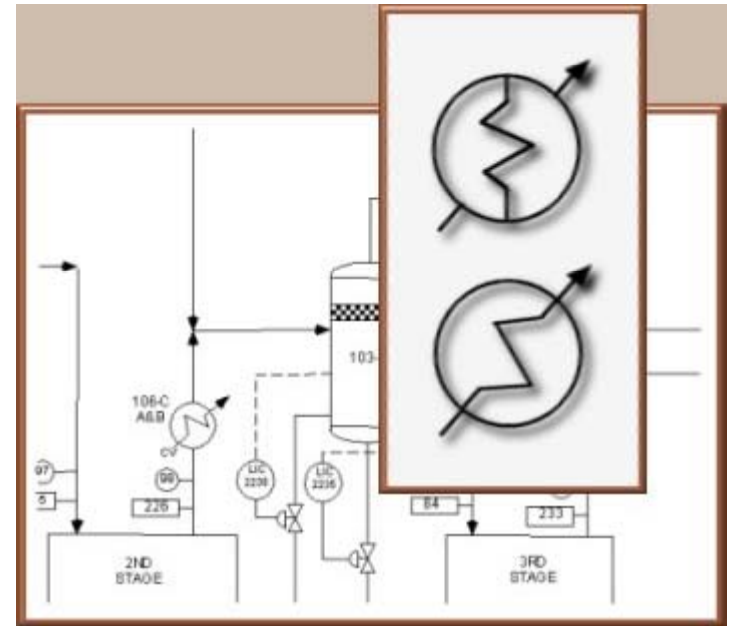
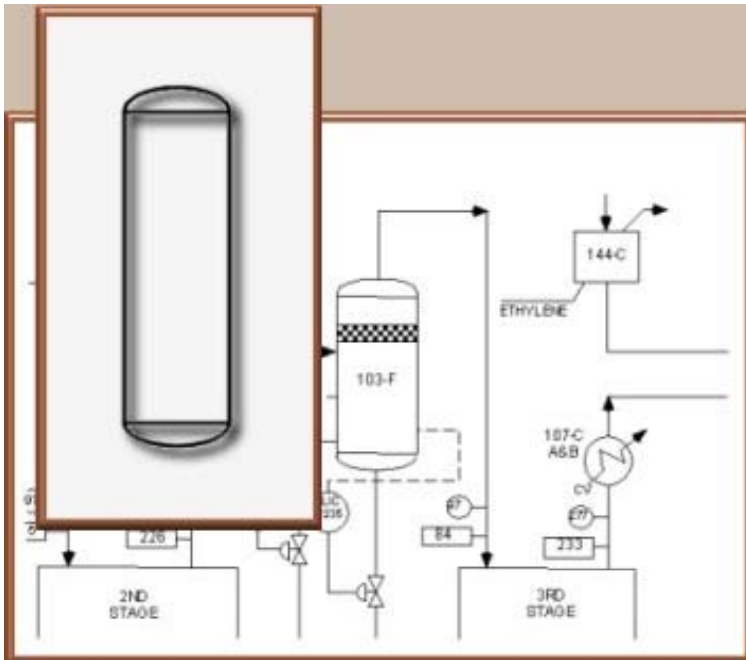


Lesson 2: Process Flow Diagram



PFDs, use some of the same symbols as P&IDs, but they do have a few different ones.

For example, **Heat Exchangers** look like this & don't include the internals or type of ends. They do, show the tube side and shell side flows.



Towers look similar to the P&IDs, but details are not shown on a PFD

P&IDs will usually give an indication of tray type, and nozzle connections for piping

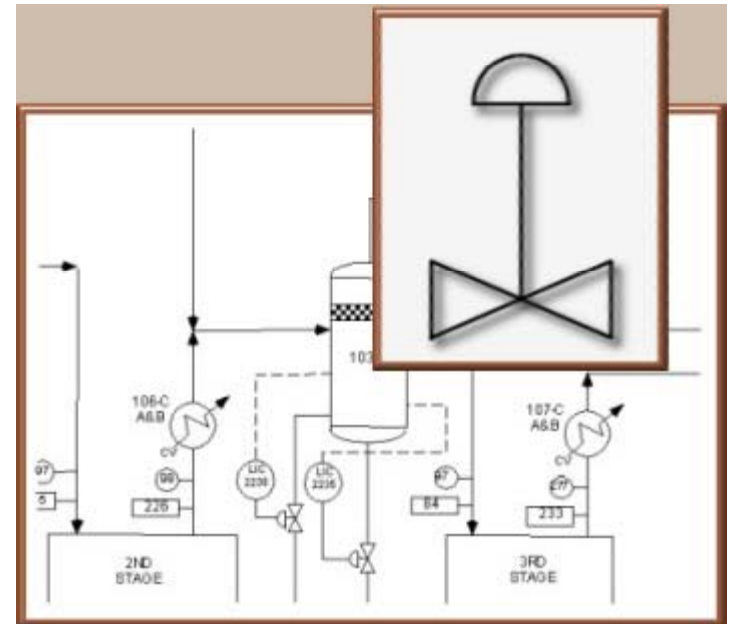
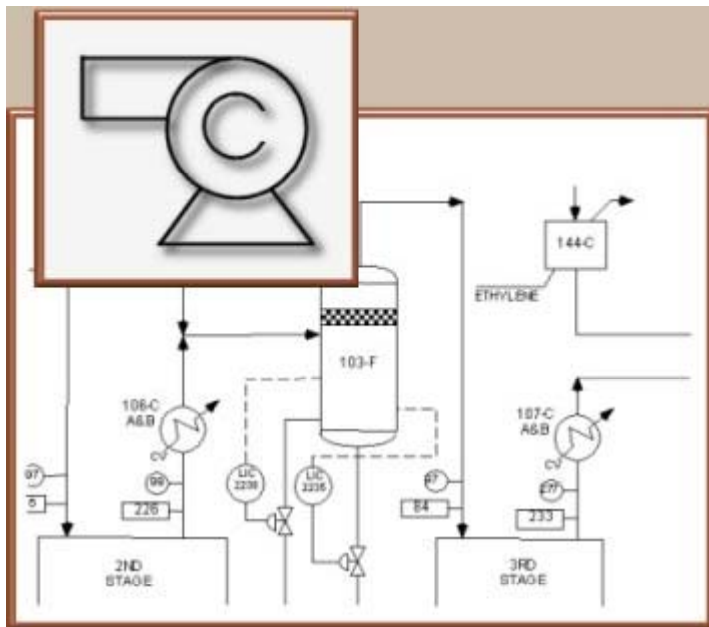


Lesson 2: Process Flow Diagram



Weekend

Control Valves on PFDs don't show all information included on a P&ID.

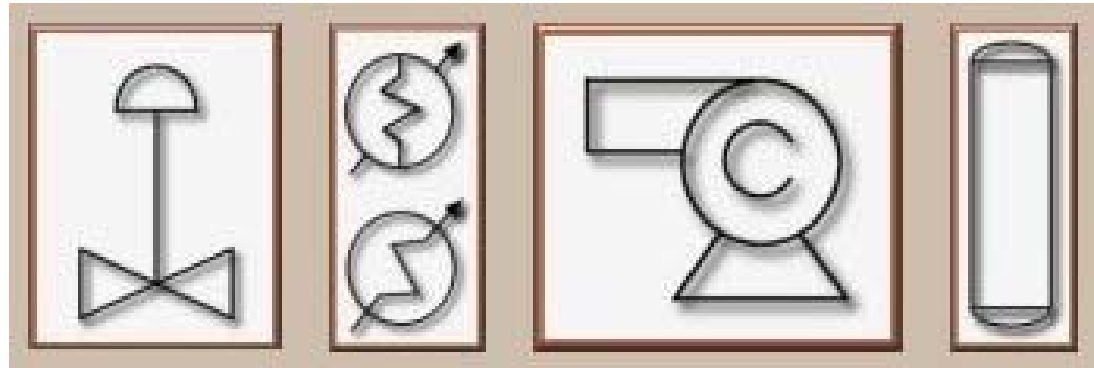


and **Pumps** are shown as just pumps only, without the driver.



What type of symbols are is shown here?

- Heat Exchanger
- Control Valve
- Pump
- Tower



1

2

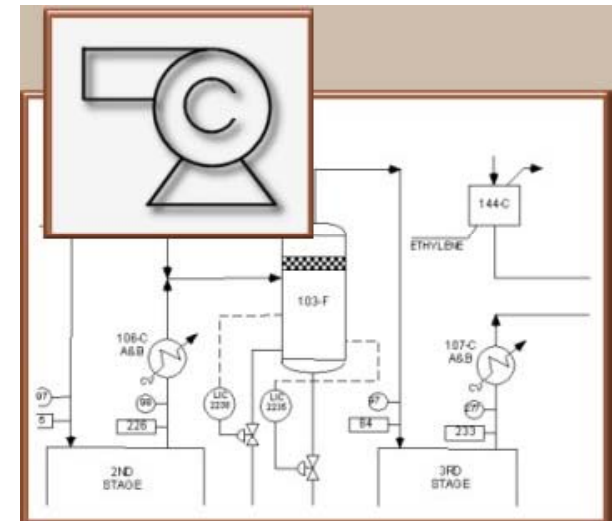
3

4

Which is the Pump?

Pump symbols on PFDs
do not show the pump driver.

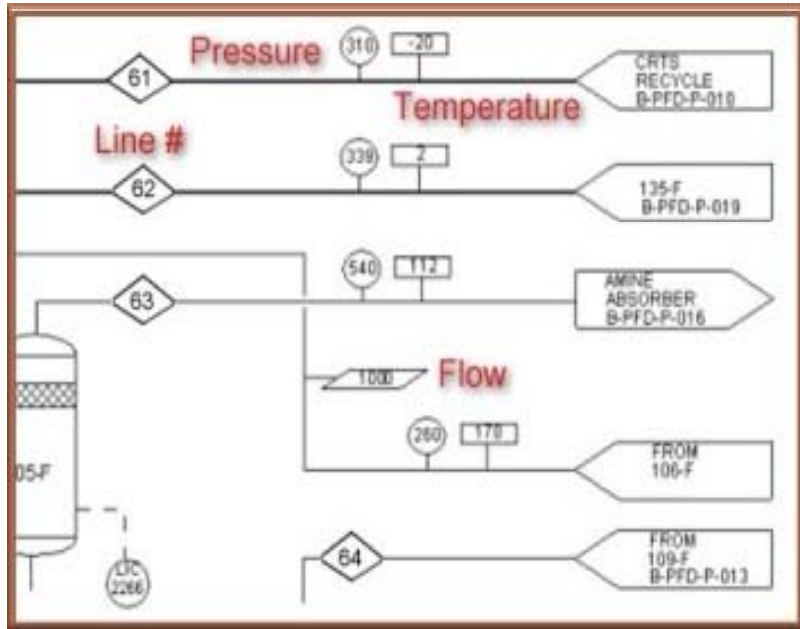
True or False



Lesson 2: Process Flow Diagram

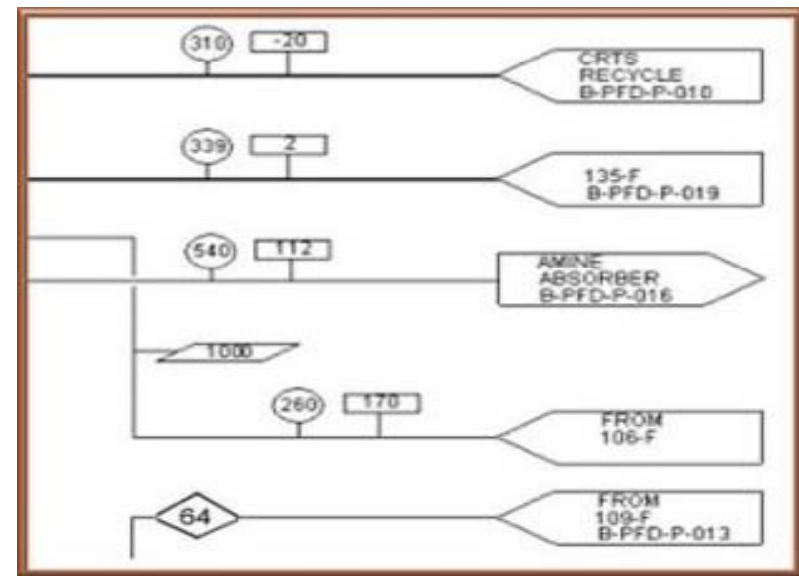


Weekend



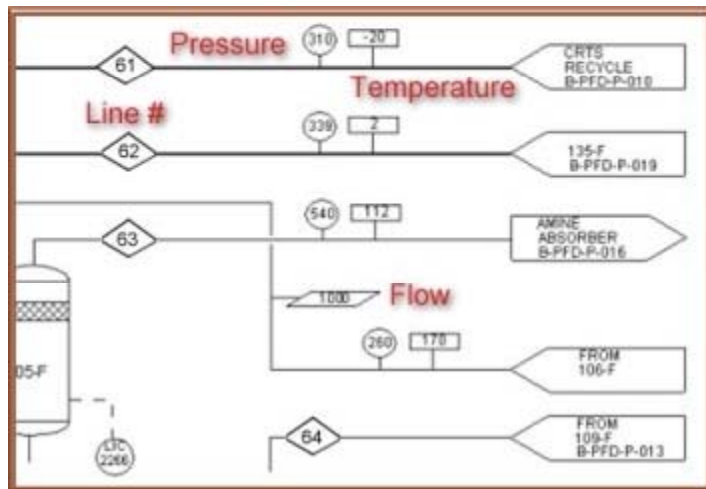
PFDs include info. on Flow rates, Press. & Temp. on individual Lines...info. an operator finds useful. They also include info. on contents of a line, & below it in a table is info. on **Flow**, **Mol. Wt.**, Composition etc., A powerful info. for the operator

Finally, **Page Connectors** look a little different, but still contain the info. you would need to continue following a particular line.



Where can you find information on the Composition of product in a line?

- In the lab report guidebook
- In a table on the PFD
- In the process description
- In the product spec sheets



PFDs include info. on Flow rates, Press. & Temp. on individual Lines...info. an operator finds useful

They also include info. on contents of a line, & below it in a table is info. on **Flow**, **Mol. Wt.**, Composition etc.,

A powerful info. for the operator

Lesson 2: Process Flow Diagram

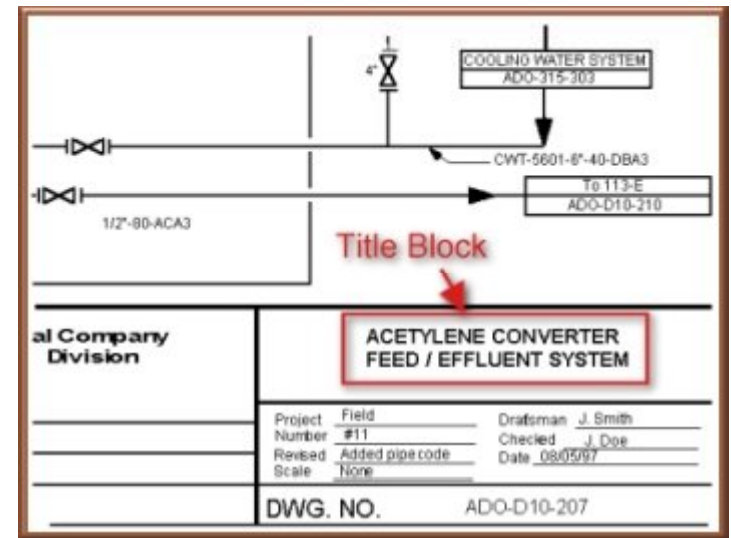


Weekend

Where do you find who revised a drawing?

- In the drawing title block
- In the master files
- In the drafting room log book
- In the area of the drawing that was revised

All drawings have a title block containing drawing name, its number, info. on who drew it, revised it, approved it, and date etc.



In Summary

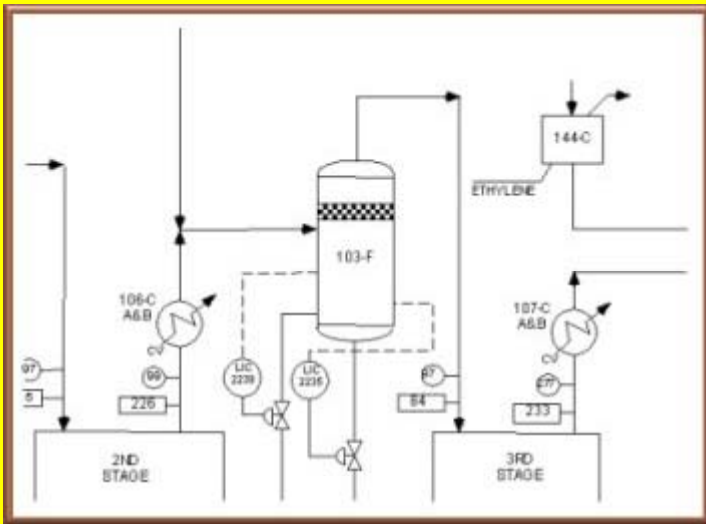
Both P&IDs and PFDs contain valuable info. All you need to make use of this info. is a little knowledge and some practice.

These diagrams are available 24 hours a day, 365 days a year. You should always know where they are and use them to help you make the right decisions.

Congratulations! You have completed Lesson 2



Lesson 3: Piping & Instrumentation Diagram



P&ID stands for Piping & Instrumentation Diagram

P&ID show every piping connection or other details not found on the PFD.

P&ID is a schematic drawing or blueprint of the systems in a section of the plant or facility.

It shows the components needed to run, monitor, and control specific processes.

Note: A P&ID does not describe the chemical reactions involved or give you procedures.

P&ID = PEFS stands for Process Engineering Flow Scheme.



Lesson 3: Piping & Instrumentation Diagram



Weekend

Components of a P&ID includes:

1. Plant Equipment;
2. Piping Lines that connects the Equipment;
3. Instrument Lines (or Tubing) and instruments used to monitor and control the process.

Importance of the P&ID

P&IDs are important tools for:

1. Working safely
2. Maintaining a process operation
3. Understanding & Communicating about a process
4. Training

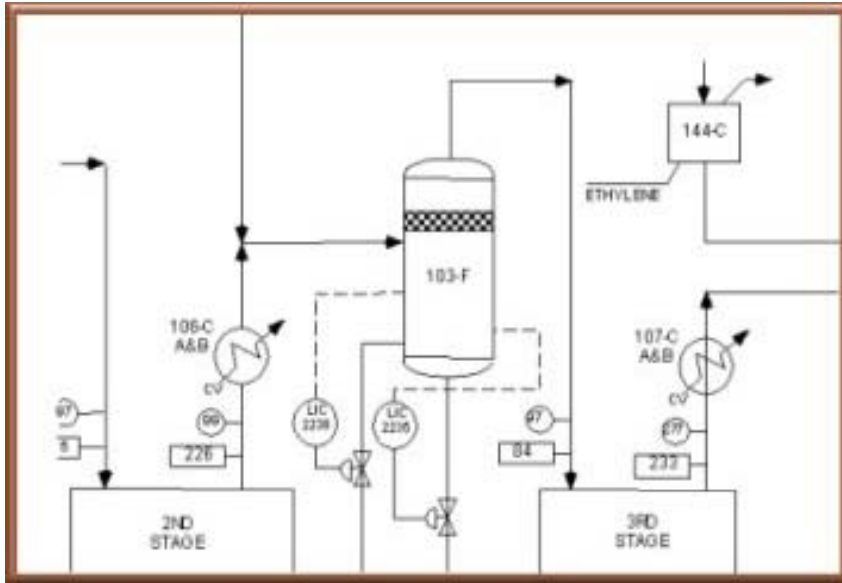
Note: P&IDs must be kept accurate & up-to-date



Lesson 3: Piping & Instrumentation Diagram



Weekend



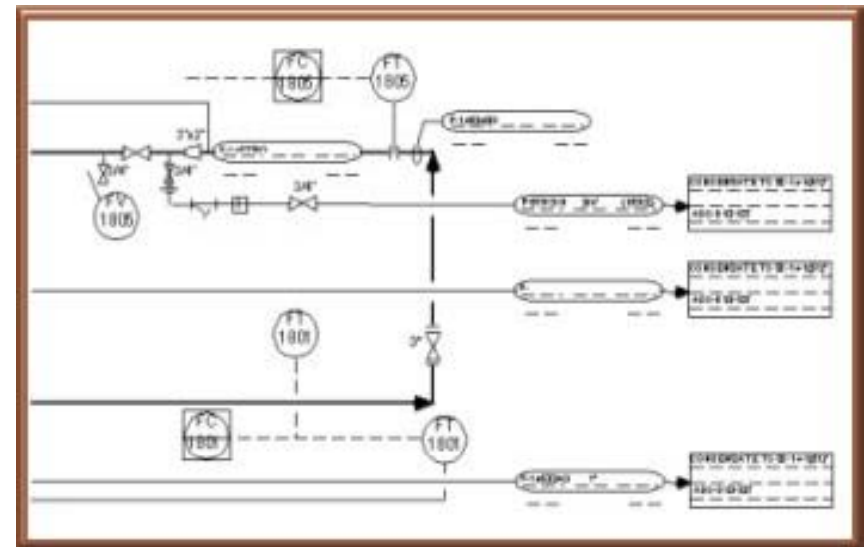
Let's focus on P&IDs, drawn to show exact equipment in plant in complete detail, termed **“Environmental detail”**

This is because drawings show every location where an Environmental release is possible

This means showing every vessel, pump, exchanger, pipe, drain, and trap.

It even includes every pipe union and every pipe flange.

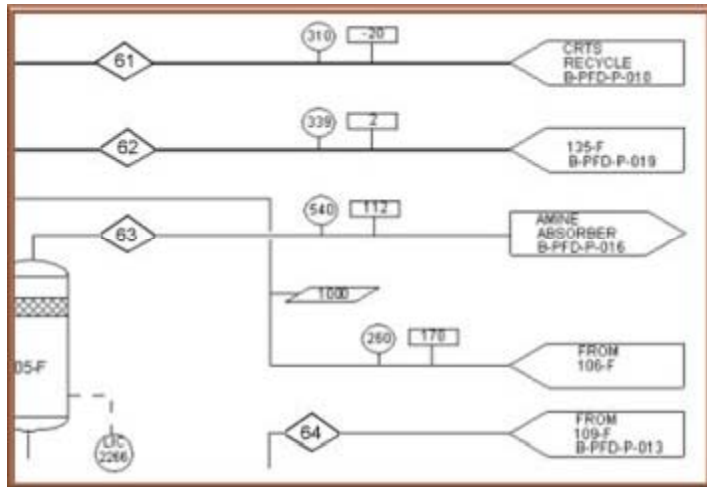
In other words, they are accurate representations of everything within the plant.



Lesson 3: Piping & Instrumentation Diagram



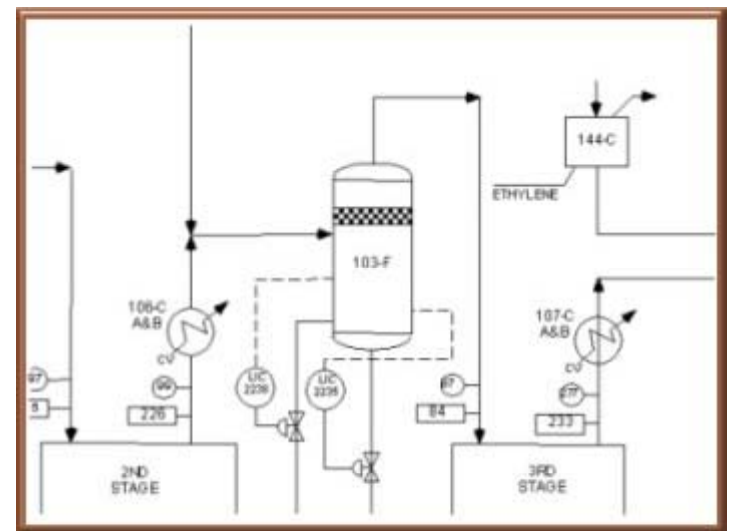
Weekend



As you can imagine, many drawings are needed to represent an entire plant. So, a method for showing where a pipe goes next appears on every drawing.

Remember, these are drawings and do not show physical locations of equipment within the plant.

In this sense, they are Schematics that show Functional relationships and connections of the equipment.



TESTING

Q1. The type of drawing showing Plant in “Environmental Detail” is:

- PPD , P&ID , PFD , CPD

Q2. "Environmental Detail" means:

- Drawn to scale
- Includes only equipment
- Includes all equipment and all pipe connections
- Includes only equipment used to clean up effluents

Q3. P&IDs do not show:

- Every place where a release may occur
- Every process connection
- Every piece of equipment in the plant
- The location of every piece of equipment



1. Type of drawing showing plant in "environmental detail"

P&IDs are drawn to show you the exact equipment in the plant in complete detail. This is termed "environmental detail."

This is because the drawings show every location where an environmental release is possible.

2. "Environmental Detail" means: P&ID Includes all equipment & all pipe connections, showing every vessel, pump, exchanger, pipe, drain, and trap. It even includes every pipe union and every pipe flange. In other words, they are accurate representations of everything within the plant.

3. P&IDs do not show: Location of every piece of equipment

Remember, these are drawings and, as such, do not show you the physical locations of the equipment within the plant.



Lesson 3: Piping & Instrumentation Diagram



Weekend

By learning to read **P&I Diagrams** you will have a better understanding of the plant's Functions.

This will prepare you to solve process problems & make informed decisions



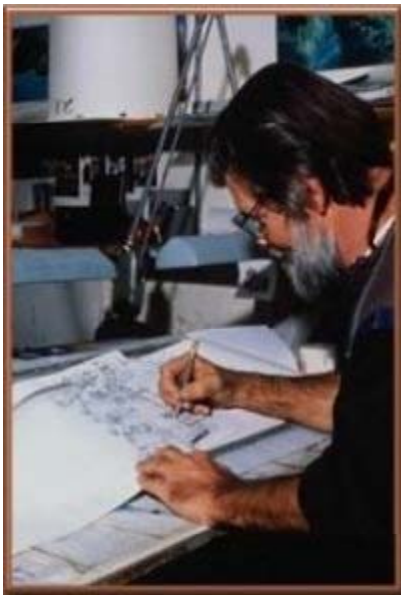
In Summary

In this section, you have learned that P&IDs are also known as **Environmental detail drawings** because they show all the possible locations for an environmental release. They are also used to solve process problems.



Which is not a main purpose for P&IDs?

1. As a job aid to operators
2. To help people make better decisions
3. To provide quick access to accurate representations of plant
4. To show exact physical location of all equipment xx



The three main purposes for P&IDs are:

1. To provide quick access to accurate representations of the plant
2. As a job aid to operators
3. To help people make better decisions

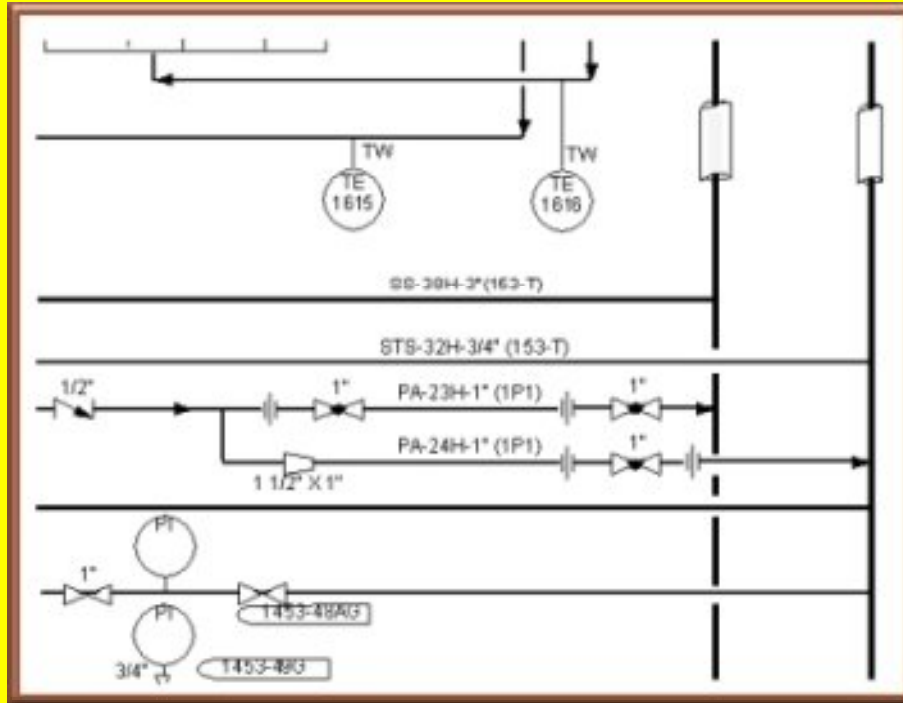
Congratulations!

You have completed Lesson 3, "P&ID's."

Lesson 4: Piping



Weekend



Piping
Piping carries its own set of symbols.

Main Process Lines are shown as **Thicker lines** than auxiliary lines. As you know, the plant piping is a series of connected pieces of pipe, and **Pipe connections** are also shown on a P&ID.



Lesson 4: Piping LINE NUMBERING -



A long line of letters and numbers designates each line in the plant, e.g. First letter is P (Process Service)

1. Line Service, or what it carries.
2. Second group is the Unit & Line No
3. Next is the Pipe Size.
4. Pipe schedule or Wall Thickness
5. Pipe Material Classification
6. insulation, designation if required.

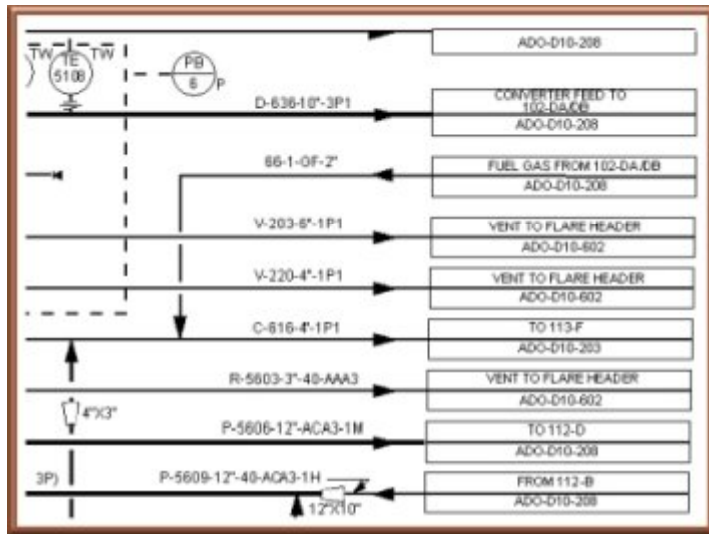
A complete list of the designations is given in the P&ID legend sheets.



Lesson 4: Piping



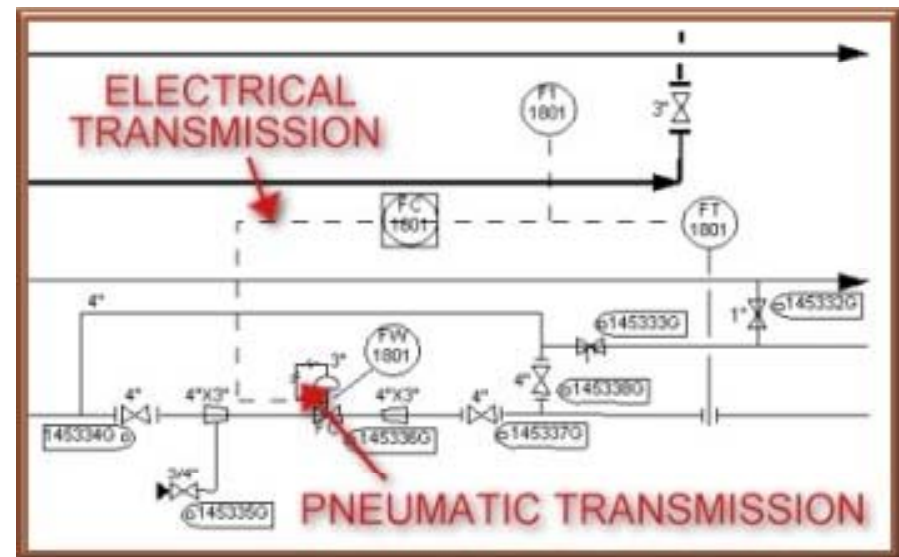
Weekend



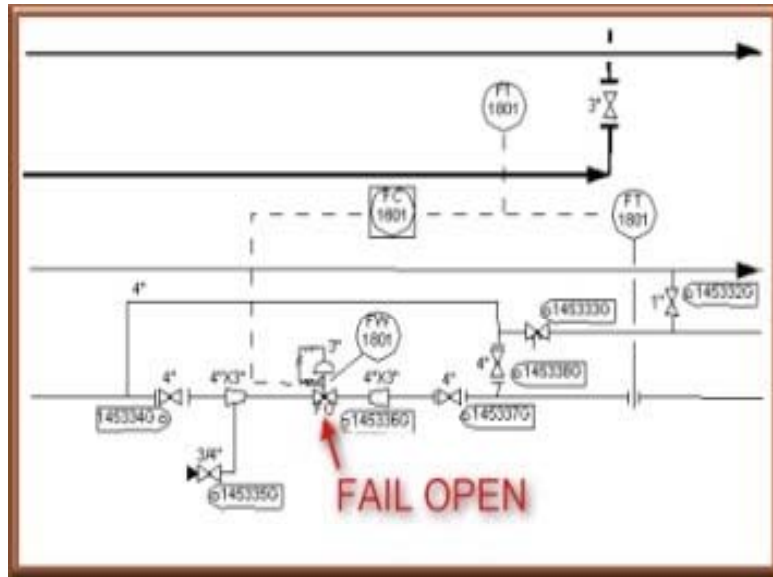
Drawing page **Arrows** are found on piping to indicate which drawing to refer to for the continuation of a line. These **Arrows** are shown here. Notice that there are different types depending on how many lines of information need to be included.

Instrument Lines are drawn as shown here.

There are special symbols for **Pneumatic Transmission** and **Electrical transmission**.



Lesson 4: Piping



Other abbreviations are also shown, e.g., the P&ID will show things like

- **CSC** (Car Seal Closed),
- **CSO** (Car Seal Open),
- **FC** (Fail Closed) & **FO** (Fail Open)

Once again, the legend contains all the abbreviations.



In Summary

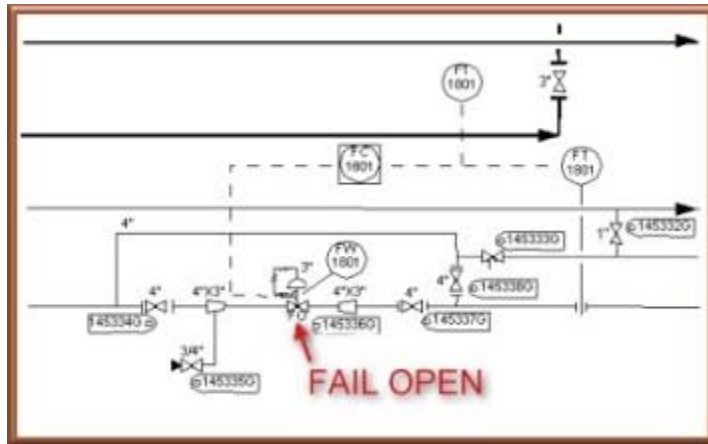
In this section, you have learned How each **Line** is identified & what Symbols are used to represent **Instrument Lines** and **Pneumatic** and **Electrical** transmissions.



Lesson 4: Piping



Weekend



What does "CSC" stand for on a P&ID?

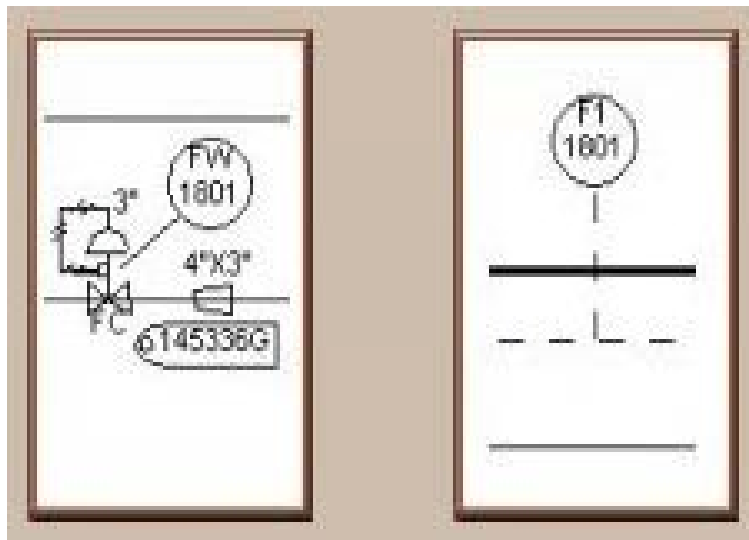
- Correct Seal Connected
- Cannot See Clearly
- Car Seal Closed
- Customer Service Center

Which of the following information is included in the line designation?

- Line service
- Unit and line number
- Insulation
- Pipe size
- All of the above

Which is the electrical line symbol?

- Answer One
- Answer Two



1

2



Typical Branch Connection Details



Weekend

<p>NOTE: (1) FIR SHOULD BE LOCATED ABOVE THE FLOW ELEMENT OF THE TAKE OFF CONNECTION.</p> <p>V - CONE INSTALLATION (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>DIFFERENTIAL PRESSURE INDICATOR AND RECORDER 1/2" NPT 5-VALVE MANIFOLD 1/2" x 1/2" MNPT CONNECTOR 2" V-CONE DIFFERENTIAL FLOWMETER PIPING INSTRUMENT</p> <p>EXPLOSION-PROOF RTD FABRICATED ALUMINUM MAT FOR EXT. TEMP. CONNECTOR BANDIT BUCKLE FABRICATED HOUSING FOR EXPLOSION PROOF RTD</p>	<p>PRESSURE CONNECTION (PI ONLY) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1/2" NPT PLUG DOUBLE BLOCK AND BLEED VALVE ASSEMBLY 3/4" S.O.L. INSTRUMENTATION PIPING PIPE</p>	<p>PRESSURE CONNECTION WITH (PSHL, PI, PT) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1/2" MULTI-PORT GAUGE VALVE DOUBLE BLOCK AND BLEED VALVE ASSEMBLY 3/4" S.O.L. INSTRUMENTATION PIPING PIPE</p>	<p>PRESSURE CONNECTION (PI ONLY) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1/2" NPT PLUG DOUBLE BLOCK AND BLEED VALVE ASSEMBLY 2" FLANGE 2" W.O.L. INSTRUMENTATION PIPING VESSEL</p>
<p>PIC INSTRUMENT CONNECTIONS (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1/2" NPT PLUG DOUBLE BLOCK AND BLEED VALVE ASSEMBLY 3/4" S.O.L. INSTRUMENTATION PIPING</p>	<p>SAND PROBE</p> <p>FITTING WITH SAND PROBE 3/4" x 4" NIPPLE 3/4" BALL VALVE PLUG (NOT SEAL WELD) 2500# INSTRUMENTATION PIPING 2" W.O.L. 2" FLANGE PIPE</p>	<p>CHEMICAL INJECTION CONNECTION (CI) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>LINE ACCESS FITTING WITH INJECTION QUILL 3/4" x 4" NIPPLE 3/4" BALL VALVE 3/4" x 4" NIPPLE 3/4" CHECK VALVE PLUG 2" WN FLANGE 2" W.O.L. INSTRUMENTATION PIPING PIPE</p>	<p>PIG SIGNAL CONNECTION</p> <p>2" FLANGE 2" WN FLG. 2" W.O.L. VENDOR PIPING VESSEL OR PIPE</p>
<p>SAMPLE CONNECTION (SC) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>FITTING WITH SAMPLE PROBE 3/4" x 4" NIPPLE 3/4" BALL VALVE 3/4" NEEDLE VALVE 3/4" x 1/2" CAPPED SCRIBE 2" WN FLANGE 2" W.O.L. INSTRUMENTATION PIPING PIPE</p>	<p>CORROSION COUPON (CC) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>FITTING WITH CORROSION COUPON 3/4" x 4" NIPPLE 3/4" BALL VALVE PLUG (NOT SEAL WELD) INSTRUMENTATION PIPING 2" W.O.L. 2" FLANGE PIPE</p>	<p>PRESSURE INSTRUMENT CONNECTION (PI) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1 1/2" FLANGED THERMOWELL 1 1/2" SW FLANGE 6 3/4" 1 1/2" S.O.L. INSTRUMENTATION PIPING PIPE</p>	<p>PRESSURE CONNECTION WITH (PSHL, PI, PT) (HYDROCARBON / NON-HYDROCARBON SERVICE)</p> <p>1/2" NPT PLUG DOUBLE BLOCK AND BLEED VALVE ASSEMBLY 2" FLANGE 2" W.O.L. INSTRUMENTATION PIPING VESSEL</p>

Lesson 4: Piping



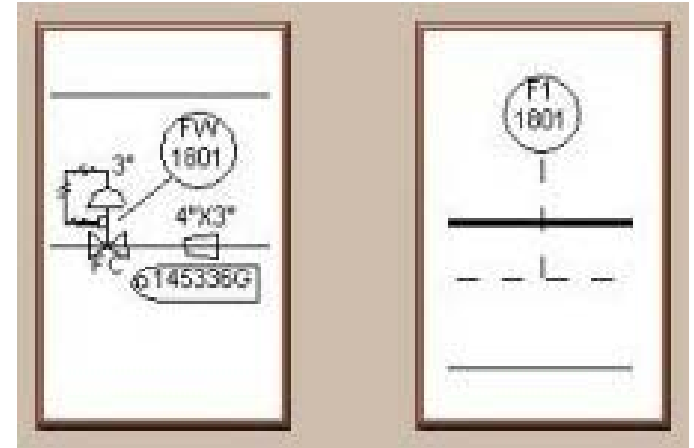
Weekend

Which is the Instrument line symbol?

Answer One or Answer Two

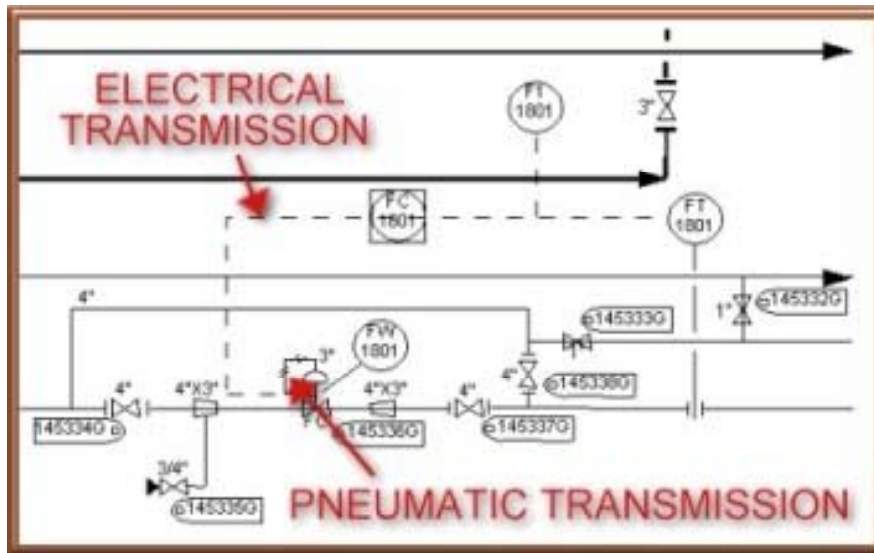
Instrument lines are drawn as shown

There are special symbols for Pneumatic transmission and Electrical transmission.



1

2



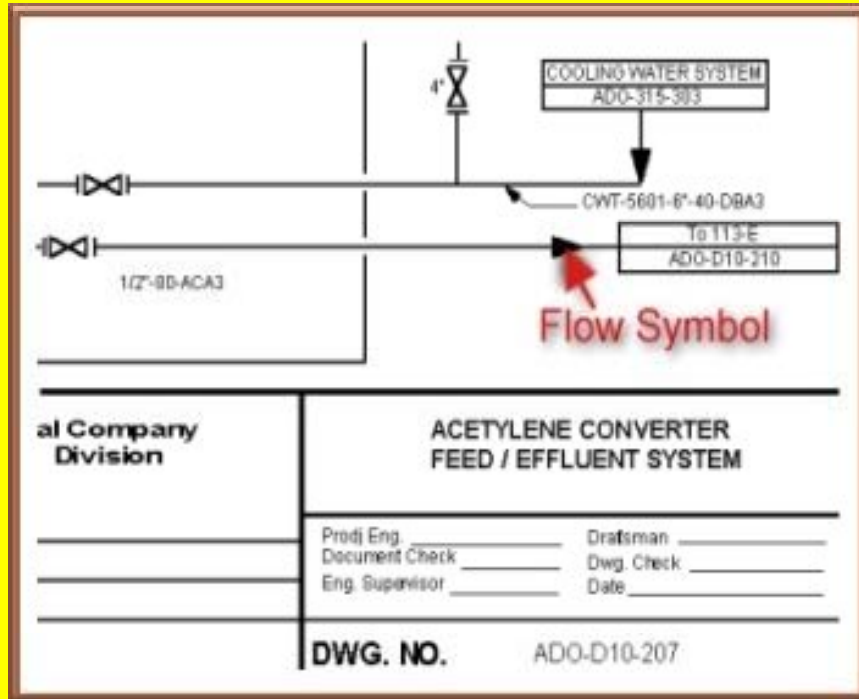
Congratulations! You have completed Lesson 4 Piping



Lesson 5: Valves



Weekend



Valves

Let's continue with P&IDs by examining how they are arranged and defining the most important symbols.

P&IDs are drawn according to some conventions, e.g.

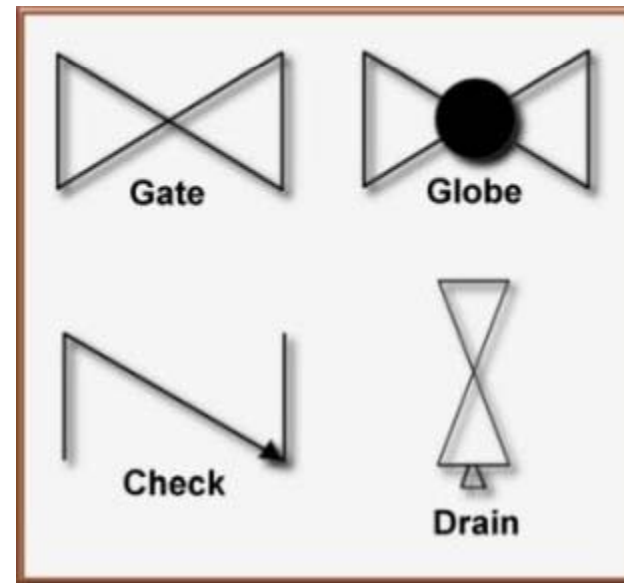
Flows are usually shown as going from left to right, at least as much as possible.



Lesson 5: Valves

Valves are one key equipment group shown on the P&IDs.

You see here the symbols for **Gate**, **Globe**, **Check**, & **Drain** valves.



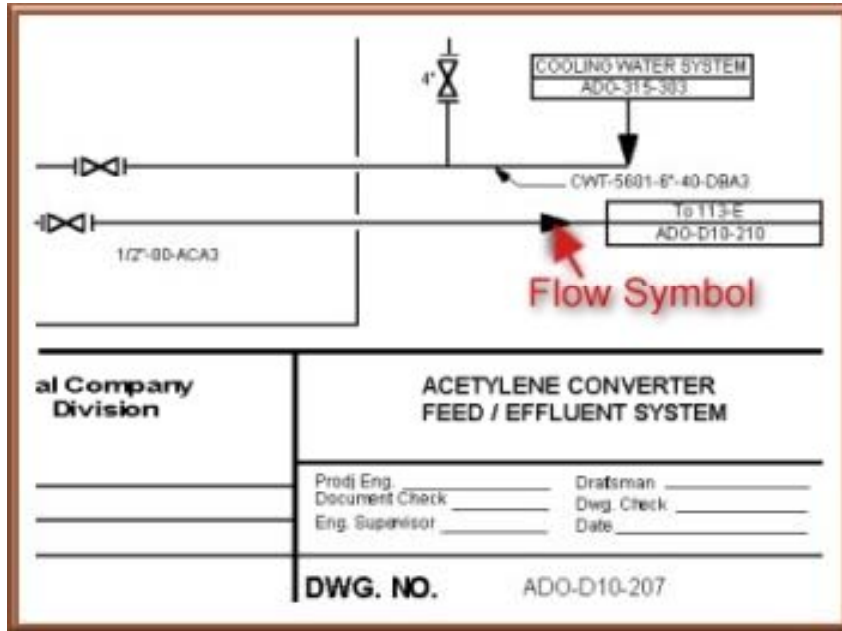
In the plant they look like this



Lesson 5: Valves



Weekend



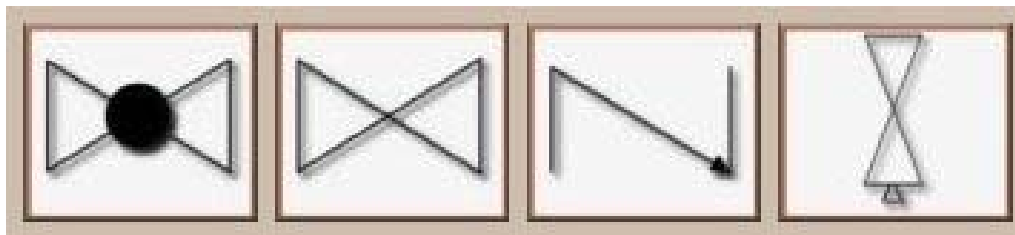
On P&IDs, flows are typically shown as:

Flowing from right to left

Dashed lines

Flowing from left to right

Red lines



1

2

3

4

Which is the Gate valve?

Which is Check valve?

Which is Globe valve?



Lesson 5: Valves



Weekend

5. Another critical valve is the **Pressure Relief Valve (PRV)**.



This valve is used to **Release Pressure** from the process lines before it reaches a critical level.



Lesson 5: Valves

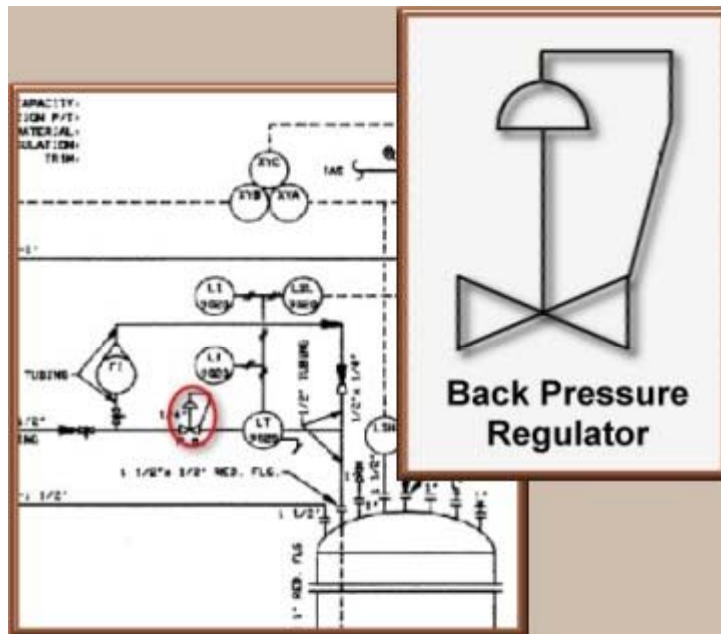
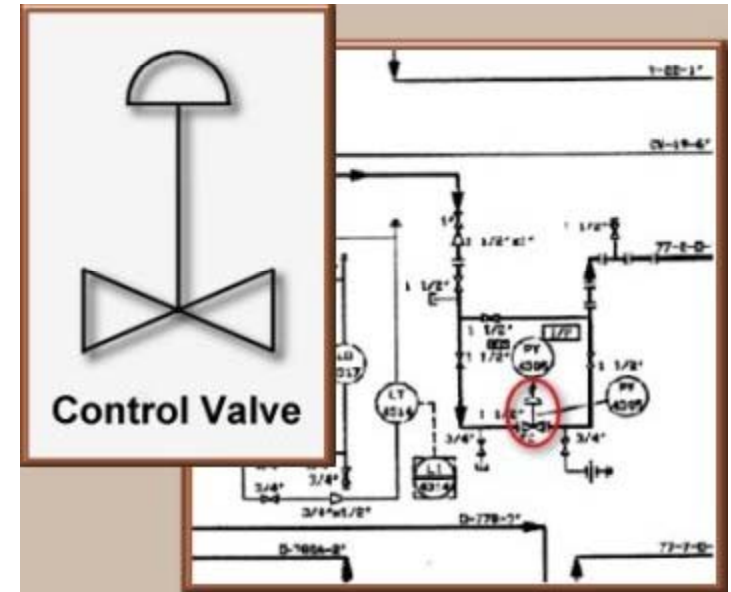


Weekend

6. Finally, there are several types of **Control Valves** in the plant.

The symbols all start with this

"**bow-tie with a hat**" symbol represents a **Diaphragm Actuated** control valve.



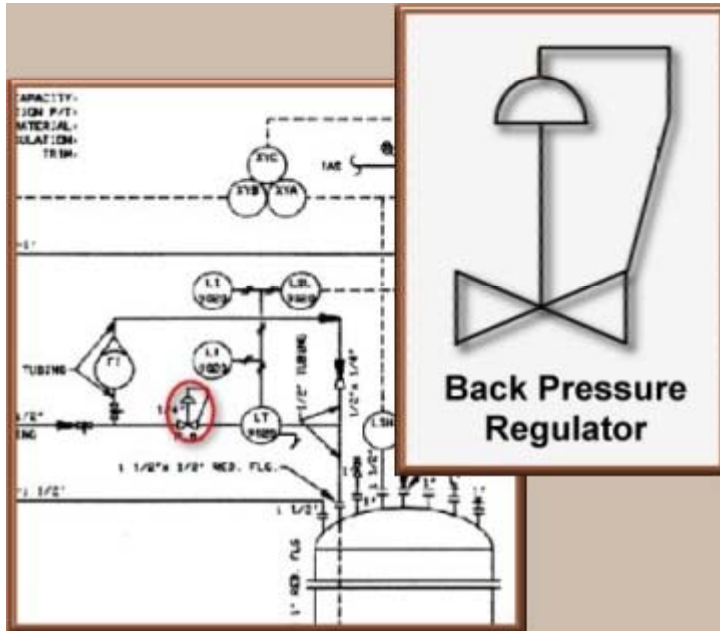
More details may be added to this Symbol to further define its function e.g. this is a **Self-contained Back Pressure Regulator**.



Lesson 5: Valves



Weekend



Question - What is this?
a self-contained
back pressure regulator.

This is a
diaphragm actuated
control valve with a
Positioner.

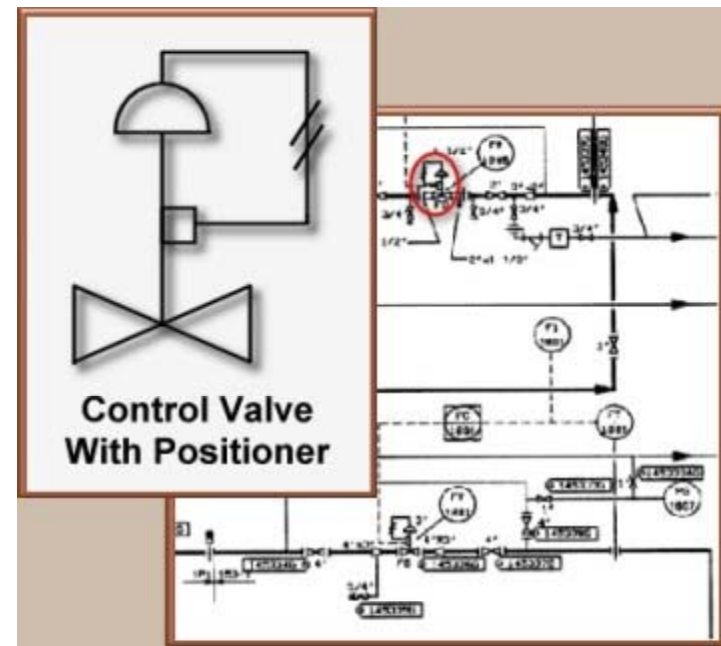


Figure 6: P&ID Valve Identification

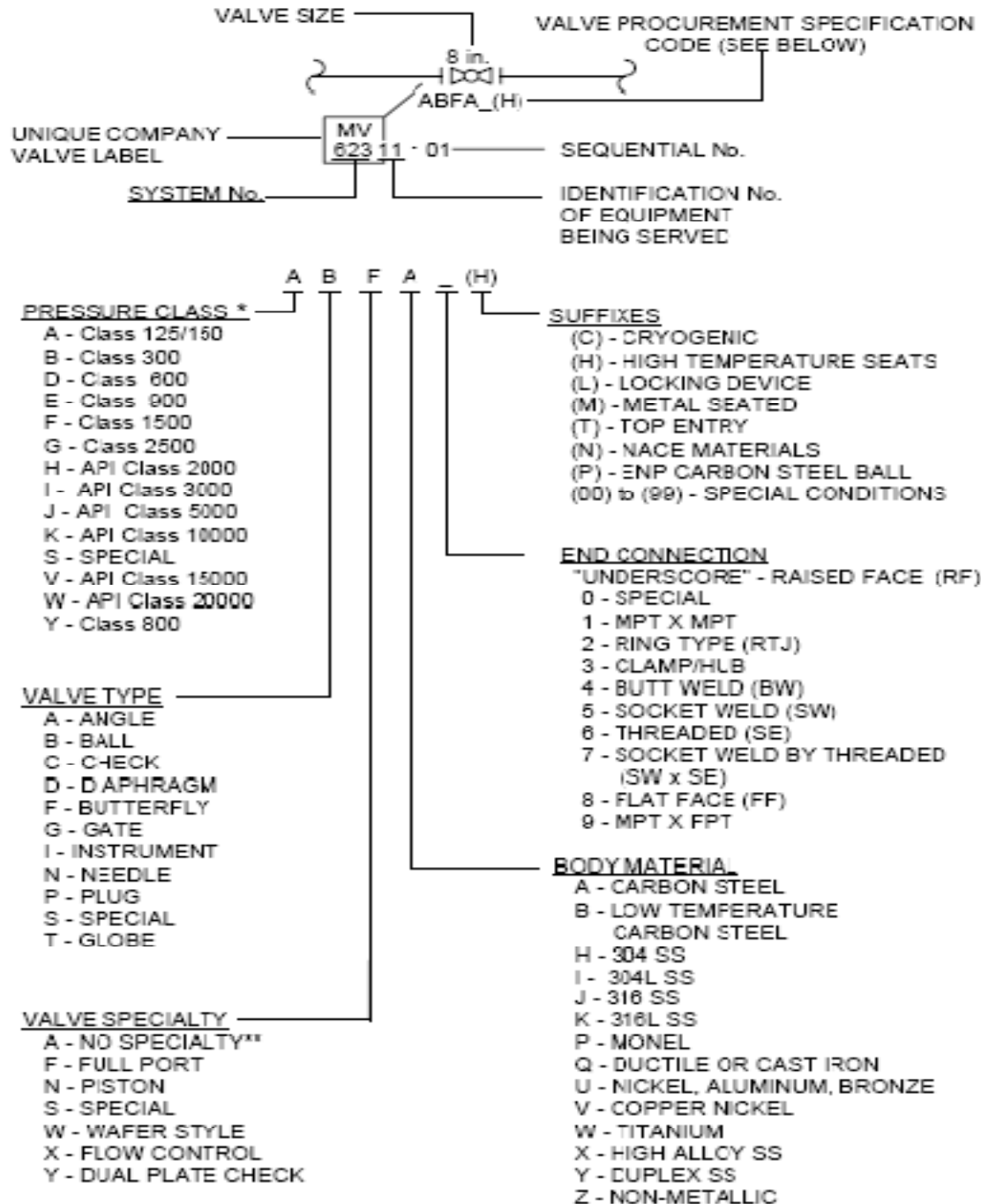


Figure 6: P&ID Valve Identification

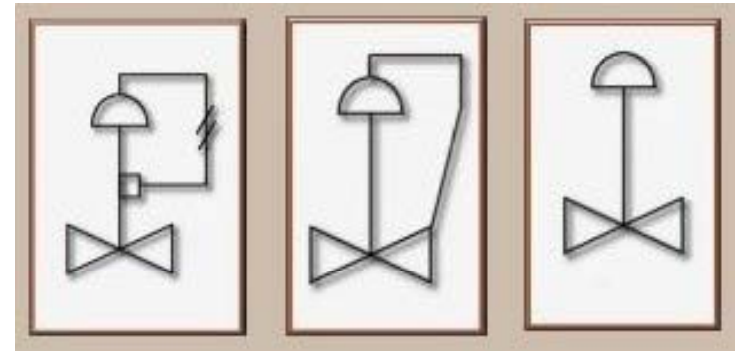
Valve Size, Company Valve Label

- System No,
- Equipment
- Identification No.,
- Sequential No.

Valve Procurement Specification Code:

1. Pressure Class
2. Valve Type
3. Valve Speciality
4. Body Material
5. End Connection
6. Suffixes

Lesson 5: Valves TESTING

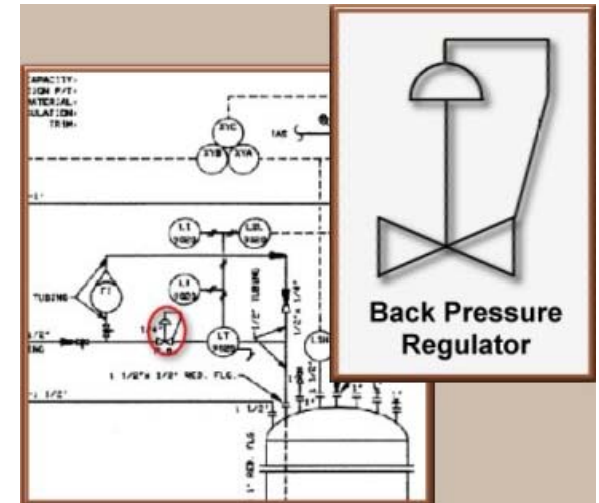
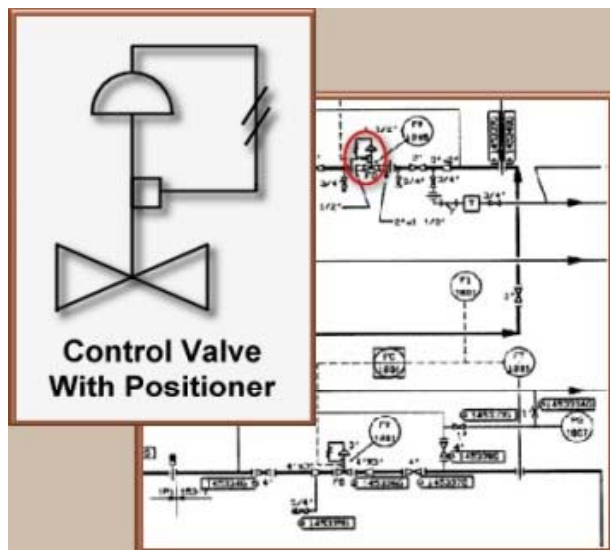


Which is basic control valve? 1, 2 or 3

3 is a symbol, start with "bow-tie with a hat" representing a diaphragm actuated control valve
More details added to symbol to further define its function

Which is self-contained back pressure valve?

2 is a self-contained back-press. Regulator



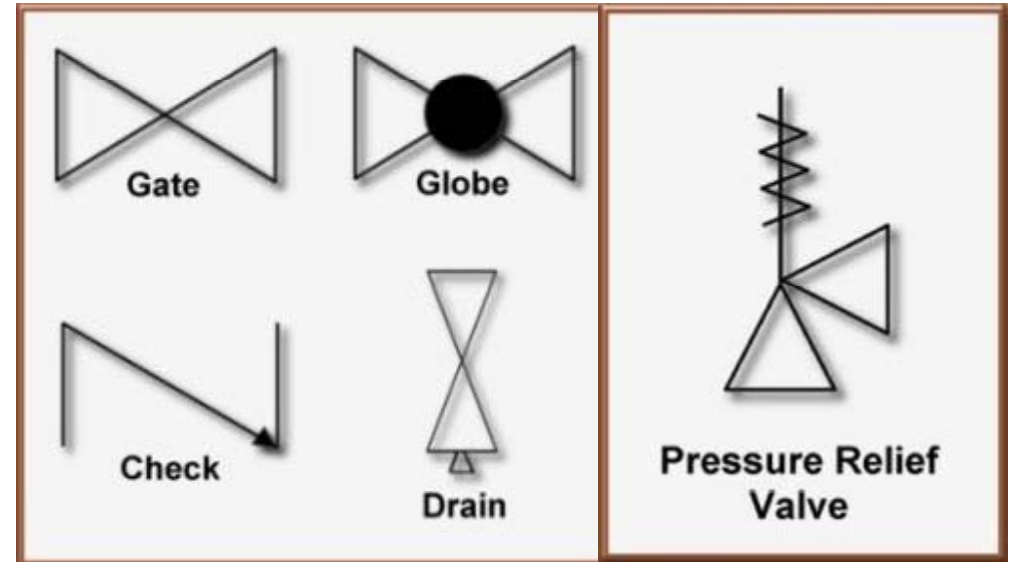
Which is control valve with Positioner?

1 is a Diaphragm actuated Control Valve with a Positioner.



Lesson 5: Valves

Valves are one key equipment group shown on the P&IDs. You see here the symbols for **Gate, Globe, Check, Drain & Pressure Relief Valve (PRV)**.



In the plant they look like this

In the plant they look like this



Congratulations! You have completed Lesson 5 “Valves”



Lesson 6: EQUIPMENT



Weekend

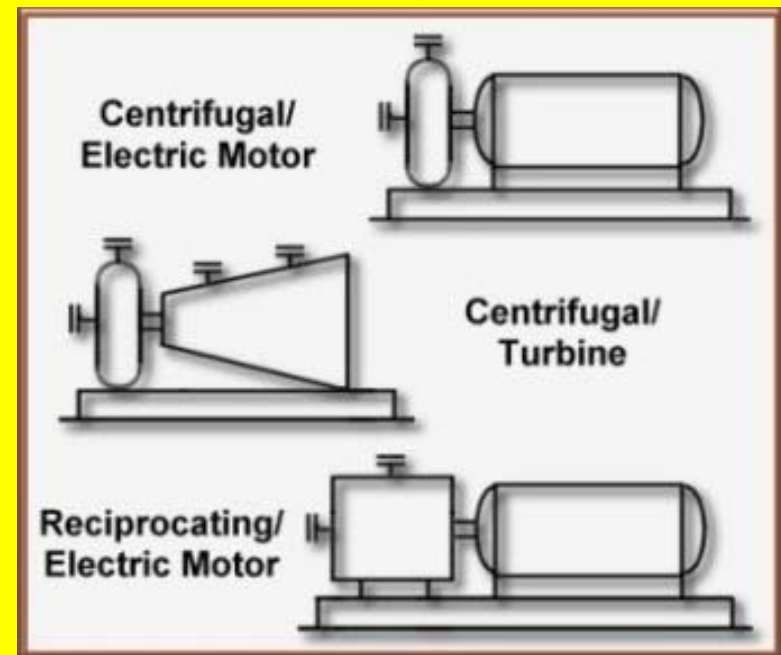
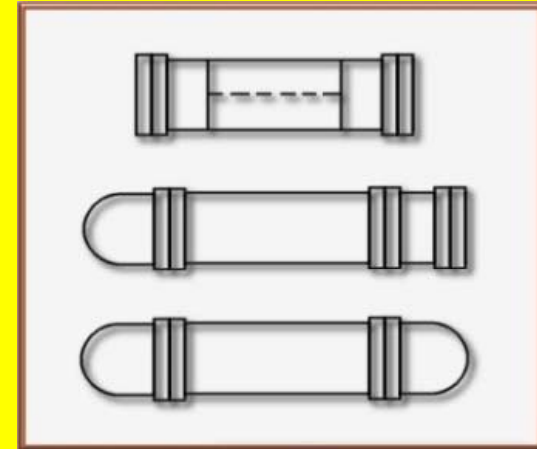
Equipment

There are symbols for all pieces of equipment in the plant, such as process **Vessels** and **Heaters**.

Centrifugal Pumps with **Elect. Motor drivers**,

Centrifugal Pumps with **Turbine drivers**, and

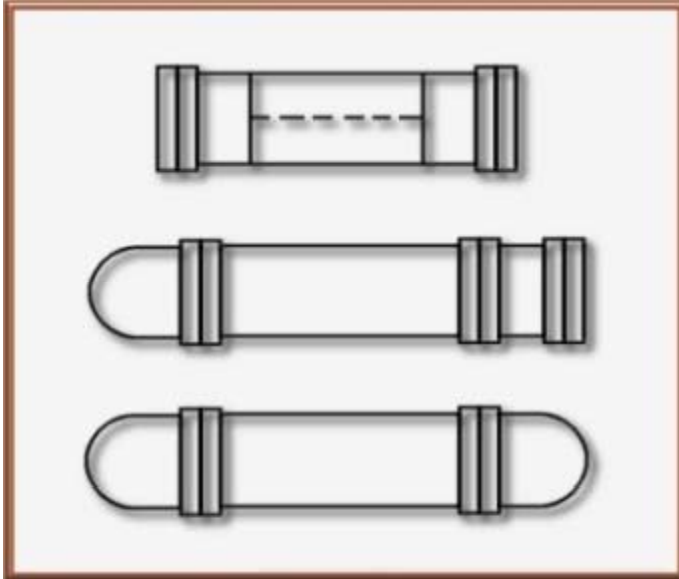
Reciprocating Pumps are also examples of plant equipment



Lesson 6: EQUIPMENT



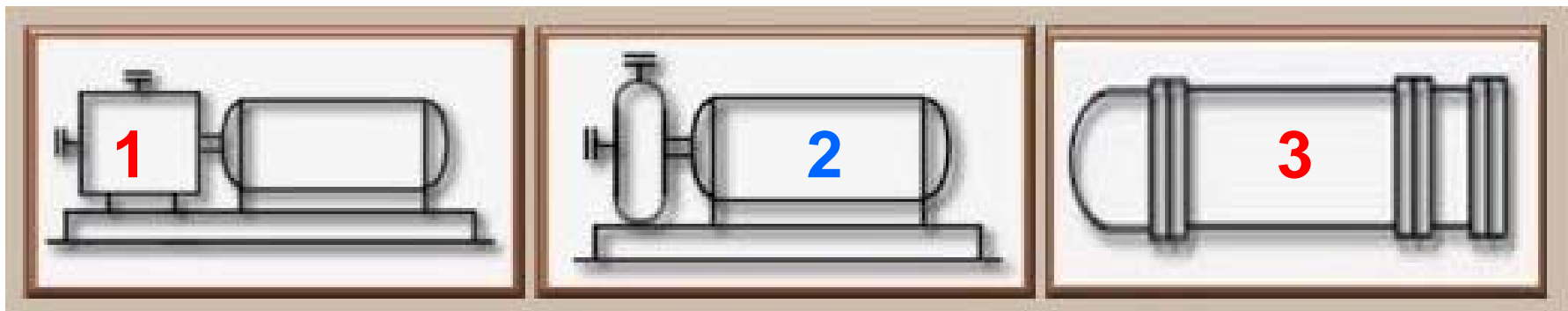
Weekend



On P&IDs, Heat Exchangers are shown like this, and include info. concerning the type of exchanger.

A few common types are shown here. CEN, NEN, AEU, BEU etc.?

Which is a centrifugal pump with electric motor?



Lesson 6: EQUIPMENT

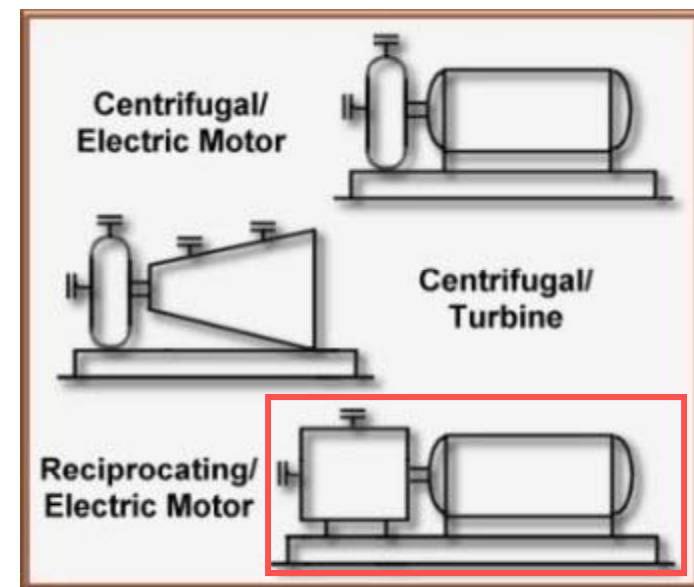
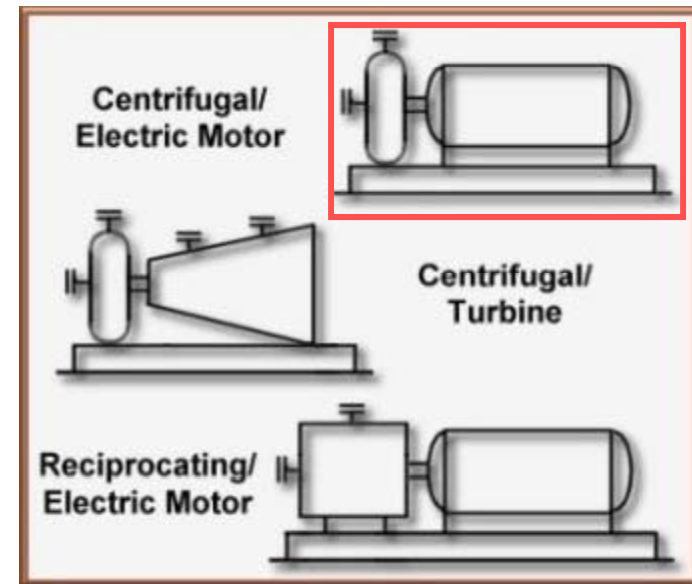


Weekend

Which is a centrifugal pump with electric motor?

Centrifugal pumps with motor drivers, centrifugal pumps with turbine drivers, and reciprocating pumps are also examples of plant equipment.

Which is a reciprocating pump with electric motor driver?

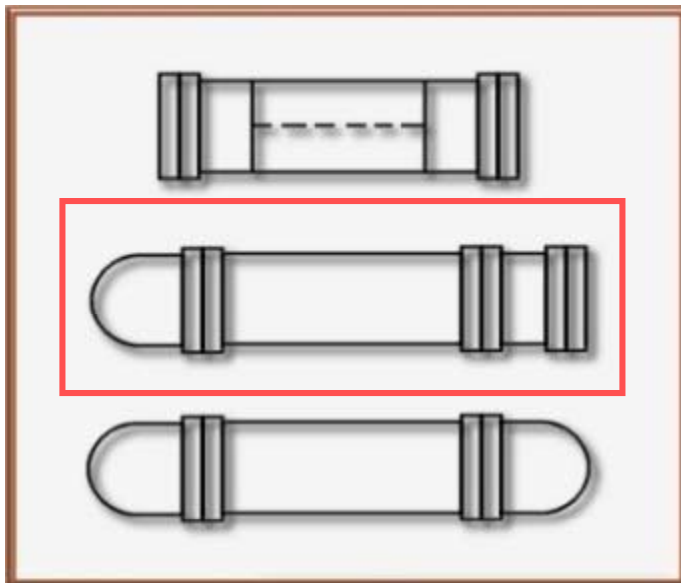
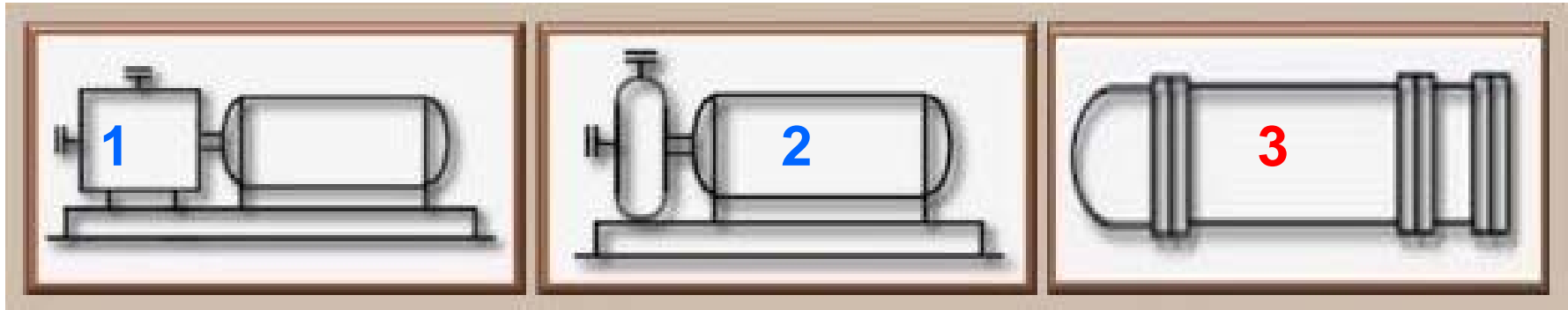


Lesson 6: EQUIPMENT



Weekend

Which is a heat exchanger?



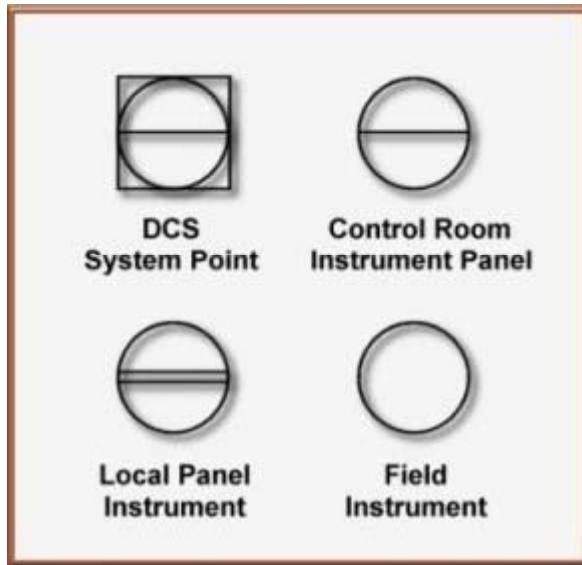
On P&IDs, heat exchangers are shown like this, and include information concerning the type of exchanger. A few common types are shown here.



Lesson 6: EQUIPMENT

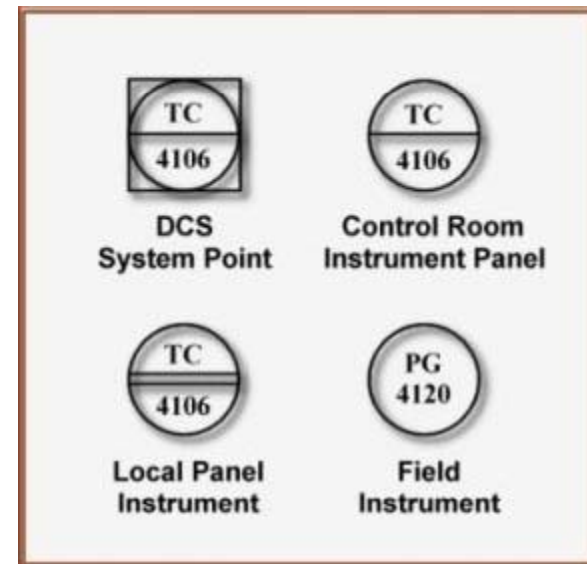


Weekend



Finally, **Control Symbols** are also included. The symbols for the basic types of instruments - **Field mounted**, **Control Room instrument Panel**, **Local Panel mounted**, and **DCS System Points** - are shown here

Along with the instrument, a **Tag** is included on the P&ID which shows the instrument **Type**, its **Function**, and **Location**.



Lesson 6: EQUIPMENT



Weekend

You probably already know what these **Letters** mean when associated with instruments.

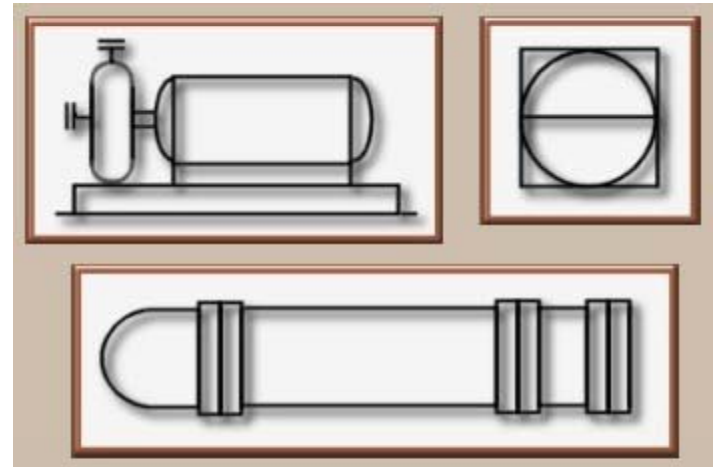
But, just in case, here's a list of the common ones.

In Summary

In this section, you have learned the Symbols for various types of Plant Equipment & what the Letters associated with the equipment mean.

T — Temperature
F — Flow
P — Pressure
L — Level

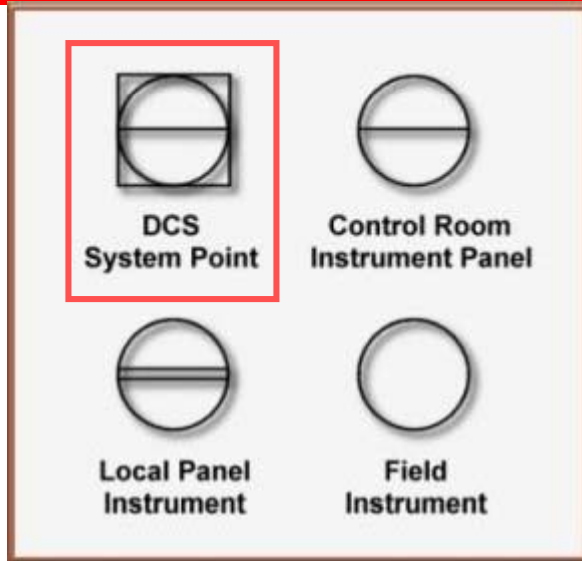
I — Indicator
C — Controller



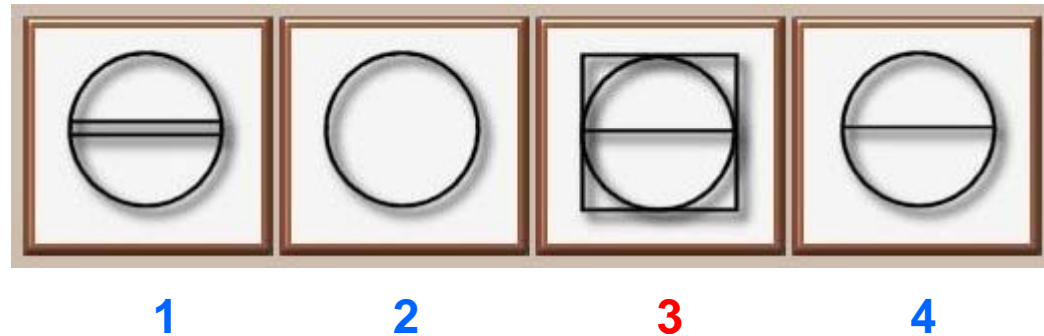
Lesson 6: EQUIPMENT



Weekend

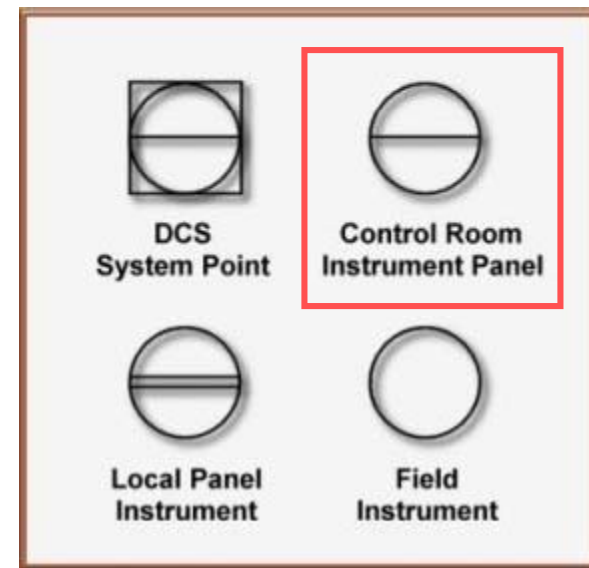


Which is a DCS controller?



What type of symbol is shown in No. 4 above ?

- [DCS system point](#)
- [Field instrument](#)
- [Local panel instrument](#)
- [Control room instrument panel](#)



Congratulations!

You have completed Lesson 6, "Equipment and also completed the course:

The Art of Reading P&IDs & PFDs

THANK YOU !

