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**COURSE CODE: CHE 312**

**COURSE TITLE: PROCESS INSTRUMENTATION**

1. A **chemical** **process diagram (CPD)** is a diagram commonly used in [chemical](https://en.wikipedia.org/wiki/Chemical_engineering) and [process engineering](https://en.wikipedia.org/wiki/Process_engineering) to indicate the general flow of plant processes and equipment. The displays the relationship between *major* equipment of a plant facility (CPD) and does not show minor details such as piping details and designations. Another commonly used term for a CPD is a *flowsheet*.

Typically, chemical process diagrams of a single [unit process](https://en.wikipedia.org/wiki/Unit_process) will include the following:

1. Process [piping](https://en.wikipedia.org/wiki/Piping)
2. Major equipment items
3. Connections with other systems
4. Major bypass and recirculation (recycle) streams
5. Operational data ([temperature](https://en.wikipedia.org/wiki/Temperature), [pressure](https://en.wikipedia.org/wiki/Pressure), [mass flow rate](https://en.wikipedia.org/wiki/Mass_flow_rate), [density](https://en.wikipedia.org/wiki/Density), etc.), often by stream references to a [mass balance](https://en.wikipedia.org/wiki/Mass_balance).
6. Process stream names

2. P&IDs also play a significant role in the maintenance and modification of the process after initial build. Modifications are red-penned onto the diagrams and are vital records of the current plant design.

They are also vital in enabling development of;

1. Control and shutdown schemes
2. Safety and regulatory requirements
3. Start-up sequences
4. Operational understanding.

2b. divisions include:

1. Equipment
2. Lines with size installation and materials
3. Control valves and instrumentation loops
4. Pneumatic/electric actuators

3a.

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| --- | --- |
| Gate Valve symbol | Gate Valve P&ID symbol |
| Normally Closed Gate Valve symbol | Normally Closed Gate Valve P&ID symbol |

|  |  |
| --- | --- |
| Clamped Flange Coupling P&ID symbol | Clamped Flange Coupling symbol |
| Coupling P&ID symbol | Coupling symbol |
| Magnetic Flow Meter P&ID symbol | Magnetic Flow Meter symbol |