NAME: AGWANIRU ROSEMARY

MATRIC NO: 17/ENG01/003

DEPARTMENT: CHEMICAL ENGINEERING

COURSE CODE: CHE 312 (PROCESS INSTRUMENTATION)

1. A Chemical Process Flow diagram (PFD) is a specialized type of flowchart. Chemical Process Flow Diagram displays the real scheme of the chemical process, the relationship between the equipment and the technical characteristics of the process. Chemical Process Flow Diagram illustrates the connections between the basic equipment as well as the overall structure of pipelines and other supporting equipment.
2. PURPOSE OF PIPING AND INSTRUMENTATION DIAGRAM
* Design and layout of process system
* Component specification
* Development of control system schemes
* Safety and operational analysis (HAZOP – hazard and operability study)
* Installation and/or build-out of the system
* Startup, shutdown, and operating schemes and procedures
* Employee training of process system operation
* Maintenance and modification to the system

Process and instrumentation diagram usually contain the following information:

* Mechanical equipment, including:
	+ [Pressure vessels](https://en.wikipedia.org/wiki/Pressure_vessel), columns, tanks, [pumps](https://en.wikipedia.org/wiki/Pump), [compressors](https://en.wikipedia.org/wiki/Compressor), [heat exchangers](https://en.wikipedia.org/wiki/Heat_exchanger), [furnaces](https://en.wikipedia.org/wiki/Furnace), [wellheads](https://en.wikipedia.org/wiki/Wellhead), fans, [cooling towers](https://en.wikipedia.org/wiki/Cooling_tower), [turbo-expanders](https://en.wikipedia.org/wiki/Turboexpander), [pig traps](https://en.wikipedia.org/wiki/Pigging) (see 'symbols' below)
	+ [Bursting discs](https://en.wikipedia.org/wiki/Rupture_disc), restriction orifices, strainers and filters, [steam traps](https://en.wikipedia.org/wiki/Steam_trap), moisture traps, sight-glasses, silencers, flares and vents, [flame arrestors](https://en.wikipedia.org/wiki/Flame_arrester), vortex breakers, [eductors](https://en.wikipedia.org/wiki/Injector%22%20%5Co%20%22Injector)
* Process piping, sizes and identification, including:
	+ Pipe classes and piping line numbers
	+ Flow directions
	+ Interconnections references
	+ Permanent start-up, flush and bypass lines
	+ Pipelines and flow lines
	+ Blinds and spectacle blinds
	+ Insulation and heat tracing
* Process control instrumentation and designation (names, numbers, unique tag identifiers), including:
	+ Valves and their types and identifications (e.g. isolation, shutoff, relief and [safety valves](https://en.wikipedia.org/wiki/Safety_valve), valve interlocks)
	+ Control inputs and outputs ([sensors](https://en.wikipedia.org/wiki/Sensor) and final elements, interlocks)
	+ Miscellaneous - vents, drains, [flanges](https://en.wikipedia.org/wiki/Flange), special fittings, sampling lines, reducers and swages
	+ Interfaces for class changes
	+ Computer control system
	+ Identification of components and subsystems delivered by others

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| **SYMBOL** | **INSTRUMENT ABBREVIATION** |
| Gate Valve P&ID symbol  |  **GV**, Gate Valve |
| Ball Valve P&ID symbol |  **BV,** Ball Valve |
|  Flange P&ID symbol Flanges P&ID symbol |  **FLG,** Flange |
| butterfly valve P&ID symbol |  **BFV**, Butterfly valve |
| check valve P&ID symbol |   **CV**, Check Valve |

REFERENCES

1. <https://assuredautomation.com/news-and-training/pids-piping-instrumentation-diagrams-and-pid-valve-symbol-library/>
2. <https://en.wikipedia.org/wiki/Piping_and_instrumentation_diagram>
3. <https://blog.projectmaterials.com/instrumentation/pid-symbols/>
4. <http://www.valvias.com/miscellanea-abbreviations.php>