# INPLANT TRAINING REPORT



#### INSTRUMENTATION ENGINEERING DEPARTMENT

NAME OF STUDENT: SAGAR RAVINDRA MANCHAKATLA

PROGRAMME: <u>INSTRUMENTATION</u>; SEMESTER/YEAR: <u>6<sup>th</sup>/3<sup>th</sup></u>

ENROLMENT No.: FS20IS002

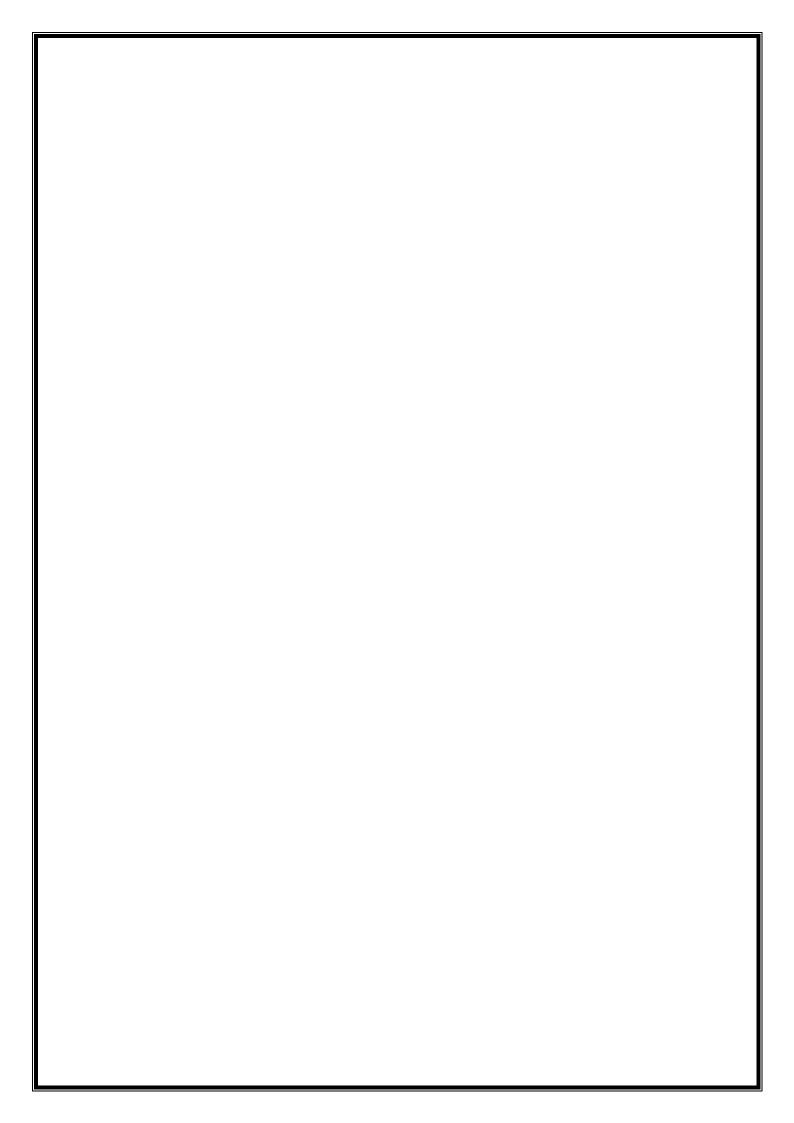
CONTACT No.: 9987799356

# **GOVERNMENT POLYTECHNIC, MUMBAI**

(An Autonomous Institute of Government of Maharashtra)

49, Ali Yavar Jung Marg, Kherwadi, Bandra (East), Mumbai $-\,400\,\,051$ 

Website: www.gpmumbai.ac.in



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#### **GOVERNMENT POLYTECHNIC, MUMBAI**



(An Academically Autonomous Institute of Govt. of Maharashtra)
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#### INSTRUMENTATION ENGINEERING DEPARTMENT

#### VISION

"Develop competent technicians and practicing engineers to furnish Real-time Automation."

## **MISSION**

#### We are committed for

- Quality To provide quality technical education through continuous up-gradation of laboratories, curricula, faculty, and industry-institute interaction.
- To impart technician skills for the professional career.
- To promote entrepreneurship, interpersonal skills, and career advancement opportunities.

# GOVERNMENT POLYTECHNIC, MUMBAI

(An Autonomous Institute of Government of Maharashtra)
49, Ali Yavar Jung Marg, Kherwadi, Bandra (East), Mumbai – 400 051



# **CERTIFICATE**

This is to certify that Mr. / Ms. / Ku. <u>Sagar Ravindra Manchakatla</u>. Enrollment No. <u>FS20IS002</u>, studying in Third Year Instrumentation Engineering, Government Polytechnic, Mumbai, has successfully completed the course report of Inplant Training (IS19308) as partial fulfillment of Diploma in Instrumentation Engineering.

Institute Guide.	External Examiner.
Head of the Department.	Principal.
Date:	



#### Afility Engineering Pvt. Ltd

B- 503, White Flag Apartment, Plot No. 12A/B, Sec - 19, Kamothe, Navi Mumbai - 410209

#### Afility Engineering Pvt. Ltd.

- 9769108043
- Info.afilityengineering.com
- www.afilityengineering.com
- 27AAQCA8762N1ZQ

#### INDUSTRIAL TRAINING COMPLETION CERTIFICATE

This is to certify that the below student has successfully completed the Inplant Training of 24 weeks at our organization Afility Engineering, Pvt. Ltd, Office No 217, 2nd Floor, Vashi Infotech Park, Plot No-16, Sector 30A, Vashi, Navi Mumbai – 400703 (name and address of organization).

Name of the student: Sagar Ravindra Manchakatla.

Programme and Year: Third Year Instrumentation Engineering.

Enrollment No.: FS20IS002

Training start date: 2nd January 2023

Training completion date:

During the complete training period, the his/her performance and conduct was good.

Name and Sign.

Section/ Industry Supervisor

Name and Sign.

Head of Section/ Plant/ Officer (Industry)

Seal of the Organization.

Date:

**Engineering, Procurement & Construction** 

**Industrial Automation** 

Turnkey Solutions

Workforce Solution





#### Afility Engineering Pvt. Ltd

☑ B- 503, White Flag Apartment, Plot No. 12A/B, Sec – 19, Kamothe, Navi Mumbai – 410209

**Engineering, Procurement & Construction** 

# Afility Engineering Pvt. Ltd.

- 9769108043
- Info.afilityengineering.com
- www.afilityengineering.com
- 27AAQCA8762N1ZQ

NO OBJECTION CERTIFICATE
This is to certify that Mr./Ms. Sagar Ravindra Manchakatla,
Enrolment No. FS20IS002 , Third/Second year student of Instrumentation Engineering,
from Government Polytechnic, Mumbai has successfully completed the Inplant Training or
24 weeks at our organization Afility Engineering, Pvt. Ltd, Office No 217, 2nd Floor,
Vashi Infotech Park, Plot No-16, Sector 30A, Vashi, Navi Mumbai – 400703 (name
and address of organization) from 2nd January 2023 (start date of training) to
(completion date of training).
This report does not contain any confidential document of the company such as design,
drawing, formula, specifications, documents, procedures, etc., which may cause any type
of loss to this company.
Name and Sign.
Section/ Industry Supervisor
Name and Sign.
Date: Head of Section/ Plant/ Officer (Industry)
Seal of the Organization.

Turnkey Solutions

Workforce Solution

**Industrial Automation** 

**Inplant Training Report.** 

I Sagar Ravindra Manchakatla, student of Government Polytechnic Mumbai,

Enrollment Number: FS20IS002, writing a Report on my In-plant Training at Afility

Engineering, Pvt. Ltd, Office No 217, 2nd Floor, Vashi Infotech Park, Plot No-16,

Sector 30A, Vashi, Navi Mumbai – 400703.

I am thankful to my In-plant training mentor at Government Polytechnic, Mrs. S. T.

Shinde, Head of Department, Mr. B. B. Sul, Training & Placement Officer (TPO) Mr.

A. K. Dhulshetty, Principal Dr. N. N. Mhala and staff members of the department, for

helping me in every step of my training.

I am grateful for the opportunity to complete my In-plant Training at Afility

Engineering, which has a great working and educational decorum. During my time at

Afility Engineering, I was given many chances to learn about the various operations

and processes conducted in the company.

I was also fortunate to work on some projects guided by our mentors, Mr. Swapnil

Karnik, Mrs. Priti Kode, Mr. Sandeep Pawar. They guided me throughout my training

and provided me with the required insights and information regarding the respective

projects. Under their guidance, I was able to observe and participate in several

important tasks and activities, which gave me a thorough understanding of the

organization's operations.

My time at Afility Engineering, was highly informative that has helped me to gain a

deeper understanding of the EPC (Engineering Procurement and Construction)

company. I am filled with gratitude for the knowledge and skills I have gained during

my time at Afility Engineering, and I am confident that this will be of great benefit to

me in my future studies and career.

Sincerely,

Sagar Ravindra Manchakatla.

**Enrollment Number: FS20IS002.** 

Acknowledgment.

I would like to express my sincere gratitude to the mentors and colleagues at Afility

Engineering for providing me with the opportunity to undertake an in-plant training at

their Instrumentation Engineering Department.

I am indebted to my mentor, Mrs. S. T. Shinde, for her invaluable guidance and support

throughout the training. I would also like to thank my Head of Department, Mr. B. B.

Sul, and my college Government Polytechnic Mumbai for providing me with this

opportunity to enhance my knowledge and skills.

I am grateful to Mr. Mayur Badgujar, for allowing me to complete my In-plant training

at Afility Engineering, I am also grateful to all my seniors and colleagues for their

guidance and support throughout my training period. I would also like to express my

appreciation to Mr. F. S. Bagwan for his invaluable assistance and support.

Lastly, I would like to thank all the staff at Afility Engineering's Instrumentation

Department for their support and co-operation during my training period.

Thank you all for making this training a valuable and memorable experience.

Sincerely,

Sagar Ravindra Manchakatla.

**Enrollment Number: FS20IS002.** 

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#### Abstract.

This Inplant Training report is a detailed summarization about my work and learnings at Afility Engineering Pvt. Ltd., an Engineering Procurement and Construction (EPC) based company.

Inplant Training in the Instrumentation Department at Afility Engineering Pvt. Ltd. provided me with the opportunity to gain a practical experience of working in a leading EPC (Engineering Procurement and Construction) Company. This training allowed me to develop my skills and discipline towards my daily tasks. Learned different aspects of Instrumentation Engineering and importance of EPC (Engineering Procurement Construction) Companies.

During my Inplant training, I got the opportunity to work on some projects guided by our mentors, under their guidance I gained the knowledge about Designing Deliverables such as P & ID (Piping and Instrumentation Diagrams), Datasheets, Instrument Index, P & ID Legends, PFD (Process Flow Diagrams), etc. and got a chance to study and work on them.

I learned basics such as checking of an Instrument datasheet and Piping & Instrumentation Diagram (P & ID), General Arrangement (GA) Drawings, Fire & Gas layout drawings, developing an Instrument index, which were completely unknown to me, and the most important thing to learn was co-operation and co-ordinate efforts of various people at different levels in different departments to achieve the set goals.

I also understood the scope of function, job responsibilities of various engineering departments (Instrumentation Engineering and Electrical Engineering). I also came to know how these departments function in tandem for improving the process of a particular project.

Overall, the Inplant training at Afility was a valuable learning experience that provided me with a strong foundation of knowledge about Instrumentation Engineering.

#### **Chapter 1: Introduction of Industry**

#### 1.1: Afility Engineering Private Limited (AEPL),

Office No 217, 2<sup>nd</sup> Floor, Vashi Infotech Park, Plot No-16, Sector 30A, Vashi Navi Mumbai-400703 is focused on providing services in Engineering Procurement Construction (EPC) for Green as well as Brown field projects.

Afility Engineering (AEPL) is a leading engineering organization where technology and innovating solutions are the key elements in solving technical problems, providing creative, practical solutions with State-of-Art technology to enhance the business capabilities in Engineering, Project, Training and Development. Provide all kinds of technical solutions/services related to Oil & Gas, Refinery, Petrochemical and Chemical industries.



Afility Engineering Private Limited (AEPL) is focusing on providing services in Engineering Procurement Construction (EPC) for Green as well as Brown field projects.

The organization is led by professional consulting engineers having rich experience in the fields of engineering and implementation of the various projects in India and abroad.

Afility Engineering Pvt. Ltd.'s Head of Operation and Engineering Manager communicates with various Clients for the technical discussions and Company services. With this personal interaction, Afility Engineering Pvt. Ltd. built a good relationship with esteemed Clients.

Currently Afility Engineering Pvt. Ltd. has built up a good tie-up with Toyo Engineering, L&T (Larsen & Toubro), NPCC Engineering Private Limited (NEL), Kent PLC, Yokogawa Electric Corporation and Praj Industries Limited.













**1.1.1: Afility Vision-** "Not only performing the activity but ensuring the client satisfaction with high quality output."

Afility Mission- "To Provide futuristic and sustainable solution to Industry."

Keeping vision – Delivering Excellence to achieve client's need and thinking of day after tomorrow rather than ready for tomorrow. Our services are as follows to meet client's needs.

**Afility Motto-** Delivering Excellence to achieve Customer's need and thinking of day after tomorrow rather than ready for tomorrow.

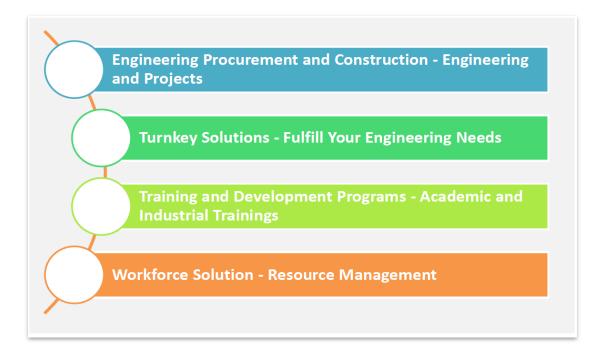
#### 1.2: Services offered by Afility Engineering-

Afility Engineering provides services like support in Bid Proposal Engineering, Detailed and Design Engineering, Project Management – Procurement Assistance, Construction and Commissioning Supervision, Turnkey Solution, Site Survey for Scope Verification, etc.

The skilled engineers apply innovative techniques, expertise and believe in providing or facilitating services including process improvements, mechanical / piping integration to provide timely and budgeted solution through end-to-end engineering.

It provides Specialized Facilitating Services - HAZID, HAZOP, SIL and other safety studies through expertise partners, Training and Development - Academic and Industrial training programs, Skilled manpower as an assistance to our EPCs / Workforce solution.

Company's services are as follows to achieve Customer's need.



#### **Process Engineering/ Design services:**

- Steady state and dynamic process simulation.
- Surge analysis.
- Hydraulic calculation.
- Pressure drop calculation.
- Safety studies.
- Fire water network.

#### **Piping Design services:**

- Static and dynamic stress analysis- Metallic /Non-metallic.
- Vibration studies, AIV/FIV assessment.
- Onshore/Offshore terminal piping/pipeline design.
- Piping specification.
- Valve specification.
- Water spray system, sprinkler system and foam system.

#### **Training & Development-**

Afility conducts as well as offers an extensive specialised training programme for fresh graduate and professionals.

- Overview of Control & Instrumentation Engineering
- Design and Development tool for Control & Instrumentation Engineering.
- Smart Plant Instrumentation (SPI) all modules.

In order to increase the knowledge and confidence of Trainees and Employees, Afility conducts weekly training sessions in which each person is assigned with a topic related to Instruments, the person then presents it in front of the Head Engineers and other Trainees and Employees.

Afility Engineering Pvt. Ltd. also has its own website which includes all the services that the company offers- <a href="http://afilityengineering.com">http://afilityengineering.com</a>

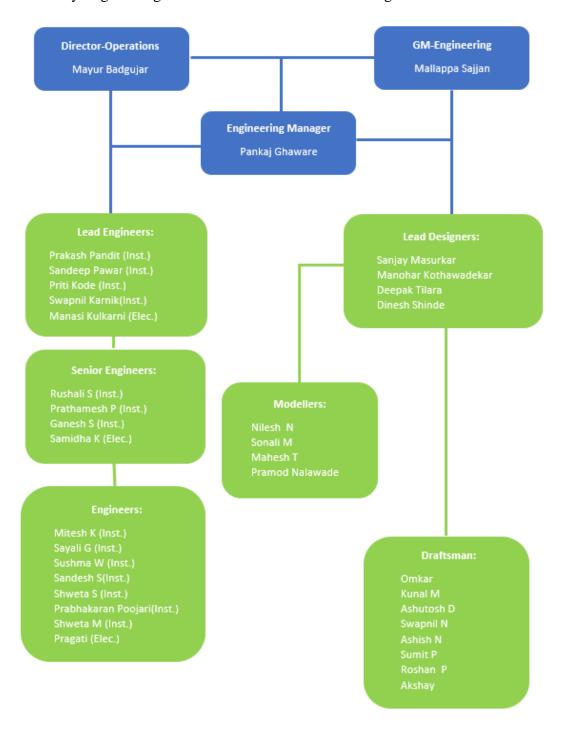
#### 1.3: Skilled Manpower of Afility:-

The experience team of professionals shall provide state-of-art scientific solution based on Client's requirement. Focus on compliance to quality and safety standards. Capable of executing yearly 70,000 to 80,000 Man-hours/Year engineering services assignment. Support on Proposal engineering (MTO and Cost estimation) and vendor document review. Afility Engineering Pvt. Ltd. works with the technical manpower of 45 personnel.

Afility Engineering Pvt. Ltd. is engaged in multidiscipline engineering project work where specialized services are being provided to our prestigious customers. We are not only limited in providing engineering services, but also providing the solutions on request to facilitate development. Keeping motto – Delivering Excellence to achieve Customer's need and thinking of day after tomorrow rather than ready for tomorrow.

#### **Chapter 2: Organizational Structure.**

**2.1:** Afility Engineering Pvt. Ltd. has below Admission/Organization Structure:



For the HR & Administration, Afility Engineering Pvt. Ltd. has appointed HR personnel. Human resources managers plan, coordinate, and direct the administrative functions of an organization. They oversee the recruiting, interviewing, and hiring of new staff.

#### 2.1.1: Roles and responsibilities of each personnel-

**Director of Operations:** Director of Operations and Engineering Manager communicates with various Clients for the technical discussions and Company services. With this personal interaction, Afility Engineering Pvt. Ltd. built a good relationship with esteemed Clients. Manages the daily activities of a company by overseeing both the departments (Instrumentation Engineering & Electrical Engineering)

**General Manager:** The General Manager manages clients, monitors key performance index for all employees. Quality check of all proposals. Develops and maintains company's reputation with clients and monitors it in external environment

**Engineering Manager:** The Engineering Manager oversees all the projects and assignments and guides multiple engineering teams regarding the same, identifies training opportunities and career development strategies to help their teams improve.

**Lead Engineer:** Lead Engineers plan activities and task, they guide and motivate team of Engineers and Draftsmen towards completion of project, assignments within stipulated time with saving of man hours, cost control in the area of field instrumentation, control system and construction.

**Lead Designer:** Lead Designers prepare the Bill of material (BOM), Tender Bid Evaluation (TBE), wiring in Smart Plant Instrumentation (SPI) Software, cable block diagram. They create hookup diagrams for field instrumentation by working on software such as 'Smart Plant (SP3D)' for 3D model designing.

**Senior Engineer:** Senior Engineers assist the Lead Engineers by completing the projects and assignments within the deadline, tasks such as preparing engineering deliverables, design basis, datasheets, etc.

**Modelers:** Modelers create instrument location layout, they work on software such as 'Smart Plant (SP3D)' and 'AutoCAD' for 3D model designing.

#### 2.2: Communication System-

Communication plays a vital role in order to complete the assignments and projects within the stipulated time with excellent quality.

#### 2.2.1: Modes of Communication-

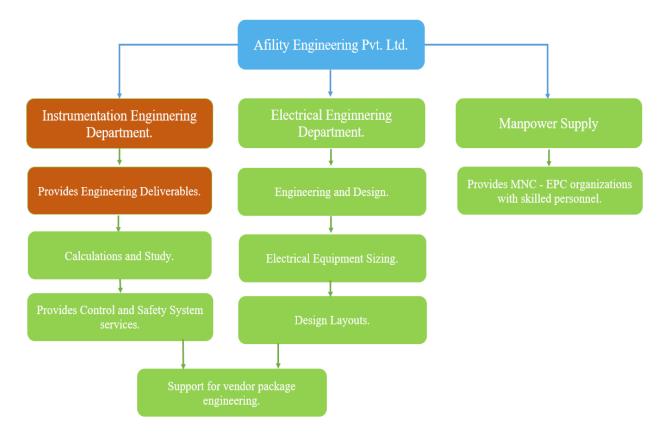
The main communication among the technical team starts with Verbal instructions, Tool-box meeting to set up the daily tasks. This benefits a lot to achieve the targeted activity in time.

Afility Engineering Pvt. Ltd. uses various facilities offered by Microsoft e.g., Microsoft Team's, Outlook e-mail communication etc.

For the specific project, Afility Engineering Pvt. Ltd. has a dedicated team. The team lead assigns the task to every individual and put all his efforts to complete the given task in the stipulated time with a good quality.

**Chapter 3: Department / Section wise report.** 

## 3.1: Department/Section wise chart:



#### **3.1.1: Detail Engineering – Instrumentation**

- Control and Safety system: DCS, PLC, ESD/SIS & F&G system, and SCADA
   (HMI) system design, engineering supply and remote engineering services.
- Process Instruments: Measurement of Flow, Pressure, Temperature, Level and Analyzer, Control valves, Safety valves, ESD and Shutdown valves, Wireless Instruments, IoT Sensors.
- Engineering Deliverables: Design Basis, Specification, Data sheet, Technical Bid Evaluations, Location layouts, MTO, Hook-up, Junction Box, Cable and cable tray systems.
- Calculations and Studies: Instrument selection and Hydraulic calculation,
   Attend HAZOP, SIL study workshops, Alarm Management system.

#### 3.1.2: Detail Engineering - Electrical

- Engineering & Design: Power System studies, Design Verification, Single line diagram (SLD), Switch gear design, Protection system design and study. Busbar sizing calculations, lighting calculation, load analysis, Relay and cable calculations, Lightning Protection, Earthing Calculations, load calculations, short circuit studies, Harmonic Analysis
- Electrical equipment Sizing: Transformer, DG, APFC, UPS, Battery sizing & battery charger sizing, Electrical Switchgear design –PMCC, MCC, Distribution panels, Lighting distribution boards.
- Layouts: All electrical equipment Layouts, Lighting & Earthing layout, Cable
   Routing layout, Hook up & installation drawings, Electrical Panel layout.
- Support for vendor package engineering: Identifying electrical loads, Procurement engineering support, Interface & Document review.

#### **Chapter 4: Industry based learning materials collection.**

#### 4.1: Datasheets-

An instrument data sheet is a document that gives the technical details of an instrument or device. A datasheet will tell you everything you need to know about the equipment's features and technical specifications. The data sheet contains considerably more detailed information that is tailored to the application.

Instruments and equipment have mechanical, electrical, and control specifications that are written down on data sheets. The data sheets have information about the desired spare parts. Usually, the vendor gives you the data sheets after you buy something from them. Once complete, the data sheet is delivered along with a request to many vendors. When giving their estimates, vendors will list a variety of models and manufacturers. The job of the instrument engineer is to look at each quote and choose the one that meets technical requirements specified in Client's standards.

#### **Rolling Sheets-**

A rolling sheet is summary/extract of an instrument datasheet it contains all the data about the instruments/equipment such as instruments/equipment's control specifications along with the process data. This sheet helps to get all the information tabulated together and ease of checking and comparing.

#### **General Arrangement (GA) Drawings-**

General Arrangement drawings for piping systems and equipment are developed by piping designers. These drawings indicate the locations of main equipment in the plant. The main piping items, valves, and fittings are also indicated in the General Arrangement or GA drawings. Most often the piping is indicated using a top view. Sometimes a side view of the pipe rack is also presented on the GA drawing. General arrangement drawings are also developed for individual equipment. These drawings present the main dimensions of that equipment using 2D views, top-view, side-view and sometimes front-view. All the nozzles for concerned equipment are indicated on the equipment General Arrangement or GA drawing.

#### **IPDS** (Instrument Process Datasheet)-

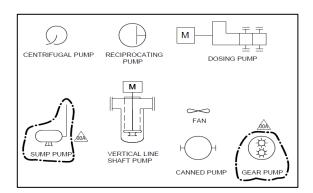
Instrument process datasheet contains the essential process information such as Process application, process fluid name, process operating envelope and design envelope (Main parameters such as Process Flow, pressure temperature etc.), line number etc. Based on this IPDS, the downstream engineers mainly Instrumentation & Control engineer, Mechanical engineer, piping engineers prepares their discipline deliverables like Instrument Datasheet, Mechanical datasheet, Line lists etc. The IPDS is usually provided by the Process Department or sometimes directly from Client/Licensor.

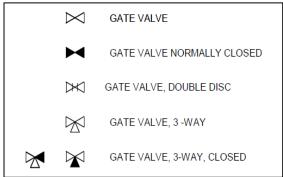
#### 4.2: P & ID (Piping and Instrumentation Diagram)-

A piping and instrumentation diagram, or P & ID, shows the piping and related components of a physical process flow. It is commonly used in the engineering field. The instruments are represented in common shapes and symbols which includes pumps, vessels, heat exchangers, valves, and pipelines. The piping process data includes line numbers, pipe classes, flow directions. It is a pictorial representation of physical process flow.

#### P & ID (Piping and Instrumentation Diagram) Legends-

P & ID Legends are used to create important documentation for process industry facilities. The shapes in the legends are representative of the functional relationship between piping, instrumentation. It includes standard shapes of instruments such as valves, pumps, snubbers, heat exchangers, mixers, vessels, etc.





# **Instrument Datasheet (Sample : Pressure Gauge)**

GENERAL		P&ID No.		_	ELIST							
CENTERVIL	_	Location	1		LD				45			
I		Ambient Temperature:	Min. Max	10			°C		40		°C	
	6	Equipment No.   Accesso		-	ELIST							
CERT		NACE Requirement	IBR Requirement	No					SEEL	JST		
CERT	8	Special Requirement		NA								
PIPE		Line No.		SE	ELIST							
LINE	10	Line Size / Schedule		SE	ELIST	in		SEE LIST				
	11	Pipe Class   Material   Ins	ulation	SE	ELIST		5	SEE LIST				
	12	Case		Г								
1		Fluid: Name   State   Phas		SE	ELIST				SEEL	JST	SEE L	IST
1	14	Corrosive   Erosive   Toxic	Build-up Tendency	Г					Yes			
l '	15	Solidifying   Pulsation   Co	pagulation   Contain. Particles	Г								
PROCESS	16	DESIGN CONDITIONS		Г	Units		N	/lin		Nor		Max
1	17	Design Pressure: Min   M	Max	bar	r-g		SEE L	IST		-	SEE L	IST
CONDITIONS	18	Design Temperature: Min	Max	°C						-	SEE L	IST
1	19	OPERATING CONDITIO	NS	Г	Units		N.	/lin		Nor		Max
1	20	Op. Pressure: Min   Nor  I	Max	bar	r-g		SEE L	IST			SEE L	IST
1	21	Op. Temperature: Min   N	or  Max	°C							SEEL	IST
1	22	Viscosity   Density		сΡ					kg/m²			
	23			Г								
RANGE	24	Instrument Range		bar	r-g	_	SEE L	ST		-	SEEL	IST T
	25	Case Type	Solid	Г		57	Seal Ty	pe		SEE LIST		
		Case Style	Bezel Bayonet Ring	1				agm Extn. L		NA		
I .	27	Mounting Type	Local	1				Conn Qty   S		NA		mm
l '	28	Enclosure IP Rating	IP65	1		60	Flushin	g Ring Ass	embly	NA		
I .		Liquid Fill Material	SEE LIST	1		61	Capilla	ry Fitting Di	а	NA		
I '		Proc. Size	1/2"	1		62	. Proc	Size	Rating	NA		
PROCESS	31	Conn. Type	NPTM	1		63	Con	n. Type I	Std	NA		
CONN &	32	Proc Conn Location	Bottom	DV	APHRAGM			/ O ring Ma	iterial	NA		
	33	Case Press Relief Type	Blow at Back	1		65	Fill Flui	d Material		NA		
CASE	34	Window Material	Laminated Safety Glass	]		66	Instr Co	onn nom Si	ze	NA		
ı		Bolting Material	NA	]		67	Diaphra	agm Materia	al	NA		
1		Ring Material	SS316L	]				y Material		NA		
I .		Case Material	SS316 Ti				Bolting			NA		
		Stem Material	SS316L	]		70		Housing Ma		NA		
	39			乚		71	Lower	Housing Ma	_	NA		
PRESSURE		Elastic Element Type	C Bourdon Tube	ᆫ	Acc			Access 0	ode	Material	Mate	erial Code
		Movement Style	Rotary geared		Restrictor	Pls	se Dmpr	R1	$\rightarrow$	CSt	$\perp$	A1
ELEMENT :	_		+/- FSD or better		Other			R2	- 1	St Stl		A2
ELEMENT		Nom Accuracy Grade							$\rightarrow$		_	
AND	43	Element Material	SS316L	74	Siphon Co	il T	ype	S1		Brass		A3
	43 44	Element Material Movement Material	SS316L SS304	74 75	Siphon Co Siphon Ut	form	n	S1 S2		Monel		A3 A4
AND MOVEMENT	43 44 45	Element Material Movementl Material Dial Scale Type	SS316L SS304 Refer Note 5	74 75 76	Siphon Co Siphon Ut Pulse Dar	npe	n er	S1 S2 P1	-			A3
AND MOVEMENT	43 44 45 46	Element Material Movement Material Dial Scale Type Pointer Adjustment	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer	74 75 76 77	Siphon Co Siphon Ut Pulse Dar Gauge Sa	form mpe wer	n er	S1 S2 P1 G1		Monel		A3 A4
AND MOVEMENT	43 44 45 48 47	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial	74 75 76 77 78	Siphon Co Siphon Ut Pulse Dar Gauge Sa Solid Fron	form mpe wer nt	n er	S1 S2 P1 G1 S3		Monel		A3 A4
AND MOVEMENT	43 44 45 48 47 48	Element Material Movementi Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g	74 75 76 77 78 79	Siphon Co Siphon Ut Pulse Dar Gauge Sa Solid Fron Vaccum F	form mpe wer nt	n er	S1 S2 P1 G1 S3 V1	:	Monel		A3 A4
AND MOVEMENT DIAL AND	43 44 45 46 47 48 49	Element Material Movementi Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium	74 75 76 77 78 79 80	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber	npe wer it rot	n er	S1 S2 P1 G1 S3 V1 S4	:	Monel		A3 A4
AND MOVEMENT DIAL AND	43 44 45 48 47 48 50	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	npe wer it rot	n er	S1 S2 P1 G1 S3 V1		Monel		A3 A4
AND MOVEMENT DIAL AND	43 44 45 46 47 48 49 50	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No.	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	npe wer it rot	n er	S1 S2 P1 G1 S3 V1 S4	!	Monel		A3 A4
AND MOVEMENT  DIAL AND POINTER  PURCHASE	43 44 45 48 49 50 51 52	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No. PO Number	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L 283/240513201	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	npe wer it rot	n er	S1 S2 P1 G1 S3 V1 S4		Monel See Notes		A3 A4
AND MOVEMENT DIAL AND POINTER PURCHASE	43 44 45 46 47 48 49 50 51 52 Inst	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No. PO Number trument Type	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L 283/240513201 Manufactur	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	mpe mpe iver it roti	n er ection	S1 S2 P1 G1 S3 V1 S4		Monel		A3 A4
AND MOVEMENT DIAL AND POINTER PURCHASE	43 44 45 46 47 48 49 50 51 52 Inst	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No. PO Number trument Type ESSURE GAUGE	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L 283/240513201	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	mpe mpe iver it roti	n er	S1 S2 P1 G1 S3 V1 S4		Monel See Notes		A3 A4
AND MOVEMENT DIAL AND POINTER PURCHASE 53 54	43 44 45 46 47 48 49 50 51 52 Inst	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No. PO Number trument Type	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L 283/240513201 Manufactur	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	mpe mpe iver it roti	n er ection	S1 S2 P1 G1 S3 V1 S4		Monel See Notes		A3 A4
AND MOVEMENT DIAL AND POINTER PURCHASE 53 54 55	43 44 45 48 49 50 51 52 Inst Diag	Element Material Movement Material Dial Scale Type Pointer Adjustment Graduation and Color Scale Range Type Dial Material Dial Size MR. No. PO Number trument Type ESSURE GAUGE phragm Seal	SS316L SS304 Refer Note 5 Internal Adj. micro.pointer Black with white dial bar-g Aluminium 100mm JT-P20P01-D1PAX-JE0066-L 283/240513201 Manufactur	74 75 76 77 78 79 80 81	Siphon Co Siphon U Pulse Dar Gauge Sa Solid Fror Vaccum F Snubber See Notes	mpe mpe iver it roti	n er ection	S1 S2 P1 G1 S3 V1 S4		Monel See Notes		A3 A4
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# **Annexure/Summary sheet: (Sample: Pressure Gauge)**

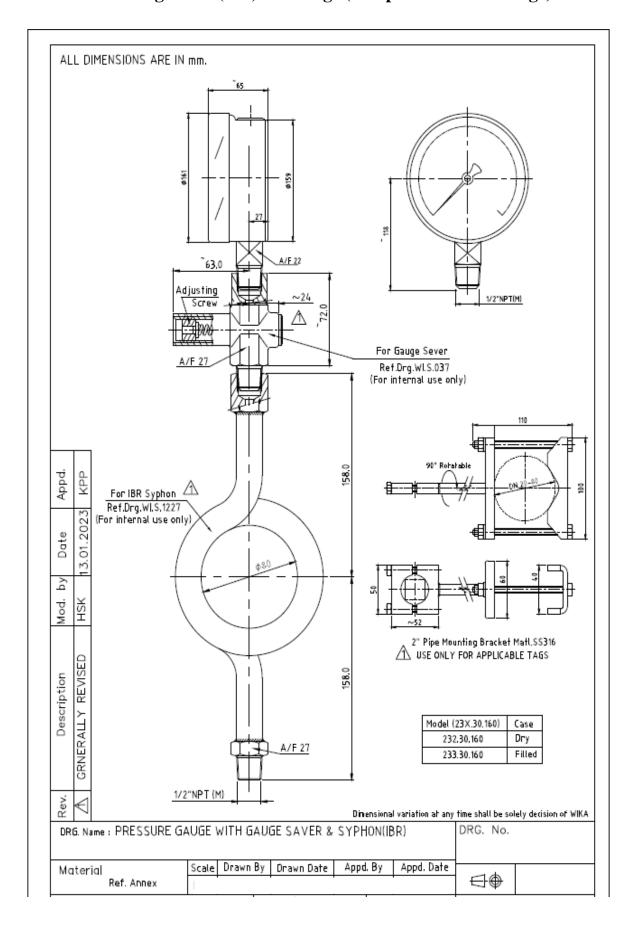
P0RT-PG-0302	P0RT-PG-0301	P0RT-PG-0204	PORT-PDG- 0202	PORT-PDG-0201	PORT-PDG- 0302	PORT-PDG-0301			44HA-PG-0901	44HA-PG-0802	44HA-PG-0801	44HA-PG-0705	44HA-PG-0704	44HA-PG-0703	44HA-PG-0702	44HA-PG-0701	44HA-PDG-0802	44HA-PDG-0801	44HA-PDG-0704	44HA-PDG-0703	44HA-PDG-0702	44HA-PDG-0701	Iqas.
PORT-PG-0302 PGOUTLET OF DIESEL PUMP PU-03B	PORT-PG-0301 PGOUTLET OF DIESEL PUMP PU-034	PORT-PG-0204 PALMOIL FROM TANK/PUMP TO TRUCK	DP GAUGE ACROSS P-001B OIL FILTER	PORT-PDG-0201 DP GAUGE ACROSS P-001 A OIL FILTER	DP GAUGE ACROSS F-018 DIESEL FILTER	PORT-PDG-0301 DP GAUGE ACROSS F-01A DIESEL FILTER		PGOUTLET OF RAW WATER PUMP -A	PGOUTLET OF PA-02 AIR COMP PACKAGE	PGOUTLET OF DIESEL PUMP -B	PGOUTLET OF DIESEL PUMP -A	PALMOIL TRANSFER TO AREA 44H TANK	PGOUTLET OF PALMOLLTRANSFER PUMP PU-118 USPL-477-44H-PRS-PID-007-SHT 001	PGOUTLET OF PALMOLLTRANSFER PUMP PU-11A VSPL-477-44H-PRS-PID-007-SHT 000	PGOUTLET OF PALMOIL TRANSFER PUMP PU-02B VSPL-477-44H-PRS-PID-007-SHT 001	PGOUTLET OF PALMOIL TRANSFER PUMP PU-02A VSPL-477-44H-PRS-PID-007-5HT 001	44HA-PDG-0802 DP GAUGE ACROSS FO2-B DIESEL FILTER	44HA-PDG-0801 DP GAUGE ACROSS FO2-A DIESEL FILTER	44HA-PDG-0704 DIFF. PRESSURE ACROSSOIL FILTERB	44HA-PDG-0703 DIFF. PRESSURE ACROSS OIL FILTER A	44HA-PDG-0702 DIFF. PRESSUREACROSSOIL FILTERB	44HA-PDG-0701 DIFF. PRESSURE ACROSS OIL FILTER A	Sarvica
VSPL-477-POR-PRS-PID-003	VSPL-477-POR-PRS-PID-003	VSPL-477-POR-PRS-PID-002-SHT002	VSPL-477-POR-PRS-PID-002-SHT001	VSPL-477-POR-PRS-PID-002-SHT001	VSPL-477-POR-PRS-PID-003	VSPL-477-POR-PRS-PID-003	VSPL-477-44H-PRS-PID-010	VSPL-477-44H-PRS-PID-010	VSPL-477-44H-PRS-PID-009	VSPL-477-44H-PRS-PID-008	VSPL-477-44H-PRS-PID-008	VSPL-477-44H-PRS-PID-007-SHT 001	B VSPL-477-44H-PRS-PID-007-SHT001	VSPL-477-44H-PRS-PID-007-SHT 001	2B VSPL-477-44H-PRS-PID-007-SHT001	2A VSPL-477-44H-PRS-PID-007-SHT 001	VSPL-477-44H-PRS-PID-008	VSPL-477-44H-PRS-PID-008	VSPL-477-44H-PRS-PID-007-SHT 001	VSPL-477-44H-PRS-PID-007-SHT001	VSPL-477-44H-PRS-PID-007-SHT 001	VSPL-477-44H-PRS-PID-007-SHT 001	PaiD Na.
FROMDIESEL STORAGE FANK TK-05 ON OUTLET OF PUMP PU- 03B	FROMDIESEL STORAGETANKTK-05 ON OUTLET OF PUMP PU-	FROM TANK TK-01/02/03 TO TANKER LOADING PACKAGE	FROMOIL TANK TK-01/02/03 ON INLET OF PUMP PU-01B TO TANKER LOADING PACKAGE	FROM OIL TANK TK-01/02/03 ON INLET OF PUMP PU-01A TO TANKER LOADING PROKAGE	FROMDIESEL STORAGETANKTK-05 ACROSS F-018 TO BO-01	FROM DIESEL STORAGE TANK TK-05 ACROSS F-01A TO BO-01	FROM WATER SRORAGE TANK TK-11 TO WATER TREATMENT UNIT	FROM WATER SRORAGE TANK TK-1170 WATER TREATMENT UNIT	INLETFROMPA-02 AIR COMPRESSOR PACKAGE TO AREA STORAGE TANK	FROMDIESEL STORAGE TANK TK-06 ON OUTLET OF PUMP PU- 04B	FROMDIESEL STORAGE TANKTK-06 ON OUTLET OF PUMP PU-	PALMOIL TRANSFER TO AREA 44H TANK	FROMOIL TANK TK-09 ON OUTLET OF PUMP PU-11BTO PACKAGING AREA	FROMOIL TANK TK-09-0N-0UTLET OF PUMP PU-118 TO PACKAGING AREA	FROM VACCUMTRUCK WB-010HOUTLET OF PUMP PU-02B TO TANKTK-09	FROM VACCUMTRUCK WB-010NOUTLET OF PUMP PU-024 TO TANKTK-09	FROM DIESEL STORAGE TANK TK-06 ACROSS FILTER F02-BT0 BOILER BO-02	FROM DIESEL STORAGE TANK TK-06 ACROSS FILTER F02-A TO BOILER BO-02	FROM OIL TANKTK-09 ACROSS FILTER ON INLET OF PUMP PU-	FROM OIL TANK TK-09 ACROSS FILTER ON INLET OF PUMP PU-	FROM VACCUM TRUCK WB-014CR0SSFILTER ON INLET OF PUMP PU-028	FROM VACCUM TRUCK WB-01 ACROSS FILTER ON INLET OF PUMP PU-02A	PG at Pump autlat (TIM)
0324-DI-2*-A3A-B	0305-DI-2*-A3A-B	0225-P0-4*-414-B	0212-P0-10*-A1A-B	0208-PO-8*-A1A-B	0307-DI-2*-A3A-B	0305-DI-2*-A3A-B	1005-WR-1*-A3A-B	1003-WR-1*-434-B	0901-CA-2"-A1A-B	0824-DI-2*-A3A-B	0805-DI-2*-A3A-B	0727-PO-4*-A1A-B	0729-P0-4*-A1A-B	0728-PO-4*-A1A-B	0727-P0-4*-A1A-B	0702-P0-4*-A1A-B	0807-DI-2*-A3A-B	0805-DI-2*-A3A-B	0729-P0-4*-414-B	0728-P0-4*-414-B	0725-P0-6*-414-B	0724-P0-6*-A1A-B	Meu Line Munker /
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MAX:45	MAR:45	MAN:55	MIN:14	MIN: 14	MAX:45	MR:14	НОГР	HOLD	НОГО	MAN: 14	MAX:45	MR:14	MIN:14 MAX:55	MIN:14 MAX:55	MIN:14 MA8:55	MR:14	MAN:45	MAN:45	MAN: 14	MIN: 14	MAN: 14	MIN: 14	Dariqu
3.7	23	5.6	MIN: 0.770 MAX:150	MIN: 0.770 MAX:1.50	INLET:3.7 OUTLET:3.3	INLET:3.7 OUTLET:3.3	<b>-2</b>	٠,2	**	ដ	2	£	\$	\$	4	£	INLET:3.7 OUTLET:3.3	INLET:3.7 OUTLET:3.3	MIN: 0.853 MAX1.50	MIN: 0.853 MAX1.50	MIN: 0.844 MAX: 1.21	MIN: 0.844 MAX:1.21	
50	55	50	55	50	50	25	50	æ	50	50	S	50	50	50	55	8	55	55	æ	50	58	50	Operating
0-6	0-6	0-10	0-25	0-25	0-16	0-16	0-10	0-10	0-16	9-6	9-6	9-6	0-16	0-10	9.	÷	<u>•</u>	÷	0-25	0-25	0-1.6	0-1.6	Banasikasa
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# PRESSURE GAUGE ROLLING SHEET

# **Instrument Rolling Sheet (Sample: Pressure Gauge)**

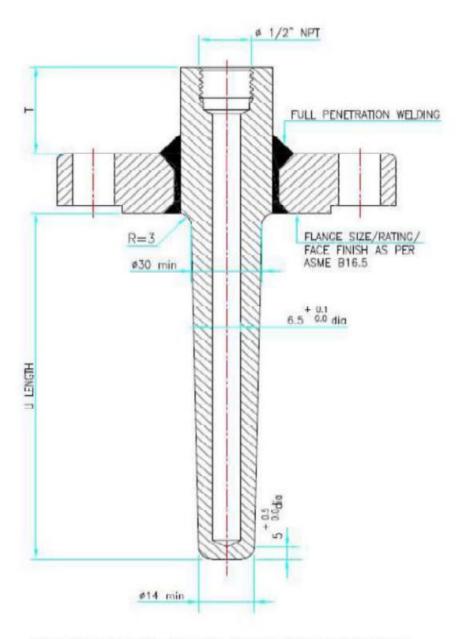
769-770-PG-3157	769-770-PG-3354	760,770,DC,3461	769-770-PG-3338	769-770-PG-3017	769-770-PG-3241	769-770-PG-3138	769-770-PG-3238	769-770-PG-3304	769-770-PG-3305	769-770-PG-3303	769-770-PG-3302		769-770-PG-3336	769-770-PG-3329	769-770-PG-3430	769-770-PG-3428	769-770-PG-3236	760-770-00-3136	769-770-DC-3129	769-770-PG-3229	760-770-00-3044	760,770,00,3046	760-770-00-3013	760 760 00 3026	769-760-PG-3023	769-760-PG-3020	769-760-PG-4271	769-760-PG-4265	769-760-PG-4264	769-760-PG-4255	769-760-PG-4254	769-760-PG-4245	769-760-PG-4244	769-760-PG-4222	769-760-PG-4205	769-760-PG-4171	760,760,007,4165	760,760,00,464	769-760-PG-4154	769-760-PG-4145	769-760-PG-4144	769-760-PG-4122	769-760-PG-4105	769-769-PG-3006	769-769-07-4406	769-769-PG-6536	769-769-PG-4403	769-769-PG-3003	769-769-PG-4401	769-769-PG-3008	769-769-PG-3004	769-769-PG-3002						Old tag No
PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE CAUGE	PRESSURE CALIGE	DRESS IRE CALICE	DRESSURE CAUCE	PRESSURE GAUGE	PRESCRIPT CALICE	DBESSI DE CALISE	PRESSURE CALICE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE CAUGE	PRESSURE GAUGE	DEBESSION CALLOR	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE CALICE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE GAUGE	PRESSURE CAUGE	PRESSURE GAUGE		mu libe desc		inst type desc		
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TA-645888-001	TA-645888-001	IA-64588/-005	TA-645887-005	TA-645887-004	TA-645887-004	TA-645887-004	TA-645887-004	TA-645887-003	TA-645887-003	TA-645887-003	TA-645887-003	TA-645887-002	TA-645887-002	TA-645887-002	TA-645887-001	TA-645887-003	TA-645887-001	TA.645997.001	A-645887-001	TA-645887-001	TALEJESSE DO	TA SASSOS ON	TAL645886-002	IA-040000-UU	A-645885-001	TA-645885-001	TA-645884-006	TA-645884-006	TA-645884-006	TA-645884-006	TA-645884-006	TA-645884-006	TA-645884-006	TA-645884-005	TA-645884-005	TA-645884-004	TALEASSEA DO	TA 6/698/ 00/	TA-645884-004	TA-645884-004	TA-645884-004	TA-645884-003	TA-645884-003	TA-645884-002	TA-645884-002	TA 645884-002	TA-645884-002	TA-645884-002	TA-645884-002	TA-645884-001	TA-645884-001	TA-645884-001		ON CITY	8	PID_NO		P&&D NUMBER
GOODA BIO PROD WIX DISCH	GODDIC PROD WITK DISCH	GUOVA BROOT WITE STRAIT	G0203C CNDS SUCT	GOOGLAB CAIDS TO CAIDS PD	GOZOJB CNDS DISCH	GODIA CODS SUCT	GOZOJB CNIDS SUCT	E0201 CNDS COOLER DISCH	E0201 CNDS CLR SUCT	E0201 CNDS COOLER DISCH	E0201 CNDS CLR SUCT	G0201C CNIDS SUCT	GODOLC CARDS DISCH	G0201C CNDS SUCT	G0201A/B CNDS SUCT	G0001A/B CNDS TO E0001	GOODS ONE DECH	GOOD COME DECH	GDDIA CATIS SUCT	GOODE CATE SUCT	DUNATE GIVEEN	DOWN IN CALL ALE	DATA THE TOTAL HAR SAVE WITE TO DOOM SERVER ATOM	SAM MIY SAM MIY IN DAMI	DOZOL HP CNUS TO DOZOH	D0201 Hr SEP	D0402 TEST LIQ TO D0204	G0239C TEST LIQ DESCH	G0239C TEST LLQ SUCT	G0239B TEST LIQ DESCH	G0239B TEST LLQ SUCT	G0339A TEST LIQ DISCH	G0239A TEST LIQ SUCT	DOMO TEST SEP	PROD WIR SAND WIR TO DOMO?	DOMO TEST LIO TO DOZOM	HOSE DESTROY OF THE SECOND	GUISE TEST IN STOT	GOZZIA TEST LIQ SUCT	G038A TEST LIQ DECH	G023&A TEST LIQ SUCT	DOHOL TEST SEP WEST	PROD WIR HOR SAND JET WIR TO DO401	D8002-1 LP PD TO D0204	D803-0 TEST TO DOMO	D8002-2 LP PD TO NO	DROG-2 TEST TO N2	D8002-1 TEST TO N2	D8003-1 TEST TO N2	D-8002-2 LP PD TO D0003	D8001-1 HP PD TO D0201	EXON NA HD ID DAWN		CMAIL SEXA	PC	CMPNT_SERV		SERVICE
PRODUCED WATER	PRODUCED WATER	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	PURCE GAS	CONDENSATE	CONDENSATE	PURCE GAS	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	TROSE (CASE S MAYRON CAS)	TROUGHT WATER	SAND IFTING WATER	DP COMMENSALE / WATER	SAND JETTING WATER	HP PRODUCTION FLUID	TESTLIQUID	TEST LIQUID	TESTLIQUE	TESTLIQUED	TESTLIQUED	TEST LIQUID	TEST LIQUID	TEST FLUIDS (CASE-1)	SAND JETTING WATER	TEST LIQUID	THOUT TOTAL	TEOL TOTAL	TESTLIQUE	TEST LIQUID	TEST LIQUID	TEST FLUIDS (CASE-1)	SAND JETTING WATER	LP PRODUCTION FLUID	TEST FLUIDS	NIIXOGEN	MINOGEN	NIIROGEN	NIIROGEN	HP PRODUCTION FLUID	HD PRODUCTION FLLID	MIROGEN		TO FILLID NAME.	PC	PD_FILID_NAME		PROCESS FLUID
167	167	1300	97	8	1300		L	100			106		П	104		-1	£ .	1	104	P .	2 5	110/	1187	200	2	395	681	L		681	625		625	595	1187	20 20	60		0	681	625	595	1187	80	90 30	8 13		123	125	590		3 53		WAX C	8	100		PRESSU PR RE: MAX E:
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#### **General Arrangement (GA) Drawings (Sample: Pressure Gauge)**



#### **General Arrangement (GA) Drawings (Sample: Thermowell)**

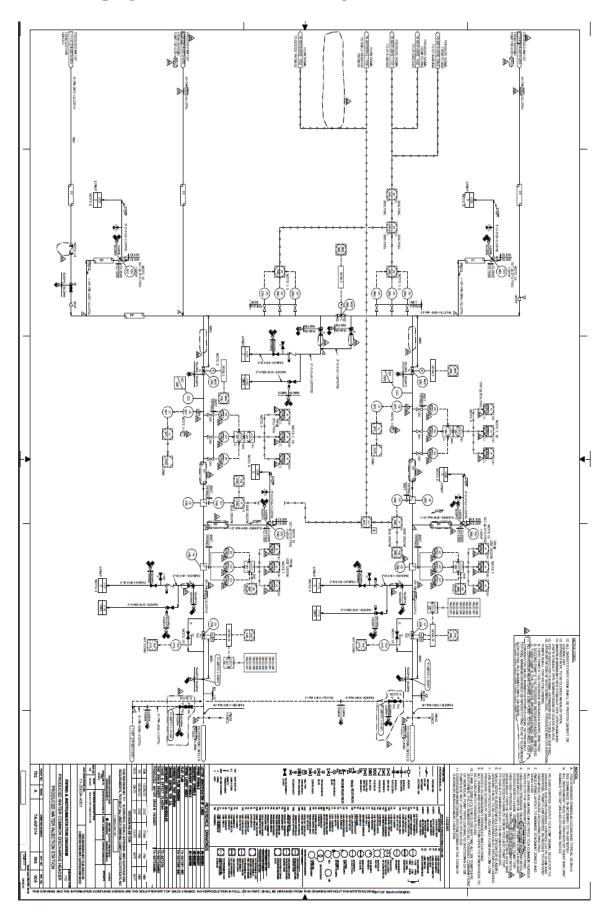
Thermowell Standard Drawing (All Dimensions are in mm)



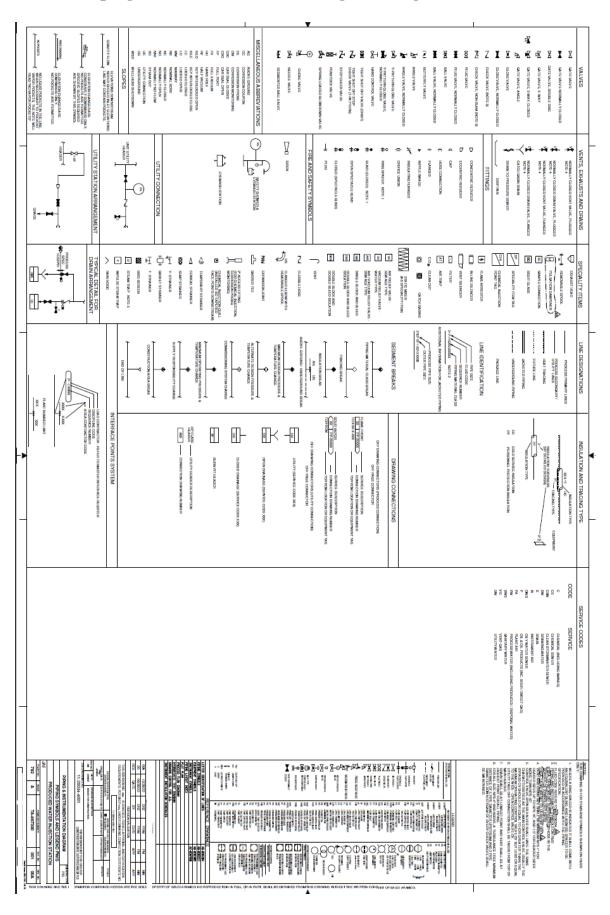
TYPICAL THERMOWELL DESIGN (FLANGE WELDED WITH WELL)
FOR 2" ASME CLASS 600 AND BELOW

Figure 1

# **P & ID (Piping and Instrumentation Diagram)**



#### P & ID (Piping and Instrumentation Diagram) Legends



# **IPDS** (Instrument Process Datasheet) (Sample : Thermowell)

769-770-TE-3335		769-770-TG-3316 769-770-TG-3316	769-770-TG-3302A 769-770-TG-3315	769-770-TG-3303.A 769-770-TG-3314	769-770-TG-3301.A 769-770-TG-3313	/89-//0-15-3311	769-770-TG-3002 769-770-TG-3016	769-770-TE-3001	769-770-IE-3003	769-760-TG-3023	769-760-TE-3026	769-760-TE-3021	769-760-TG-4221	769-760-TE-4201	769-760-TG-4121	769-760-TE-4101	769-769-TE-3010	769-769-TE-3002	PC		
12"-PW-7311-1LE0P06		8"-P-128961-1LE0P06	8"-p-7220-1CS2p11 8"-p-7220-1LE0P06	8"-p-128957-1CS2P11 8"-p-128957-1LE0P06	8"-p-7216-1CS2p11 8"-p-7216-1LE0p06	16"-P-125947-1LE0P06	16" P 7205 11E0P06 20"-P-7205-11E0P06	ON D-0204 LP SEPARATOR	42"-p-7000-ICS2P11	20" p 128277 3CS2D11 20" p 128277 3LE0P06	16"-p-620417-3CS2P11	ON D-0201 HP SEPARATOR.	8"-p-110628-3CS2p11	8b13871-3CSTb11	8-1-6335-3CS2P11	8"-Þ-6230-3CS2Þ11	8"-1-5331-611.0000	8b-128467-0TT0b08 4b-128467-0TT0b08 4b-2333-0TT0b08	29	b	NO
FROM G-0220A/B/C TO WOSEP D- 0213	0003A/B/C/D	0203A/B/CD	FROM E-0201 TO SHIPPING PUMP G- 0203A/B/C/D	FROM G-0201A/B/C/D PUMPS TO E- 0201	PROM G-0201A/B/C/D PUMPS TO E- 0201	0201	FROM D-0204 LP SEPARATOR TO G- 0201A/B/C/D PUMPS	ON D-0204 LP SEPARATOR	FROM LP SEPARATOR INLET MANIFOLD TO D-0204	FROM HP SEPARATOR D-0201 TO REHEATER E-1055	FROM HP SEPARATOR D-0201 TO REHEATER E-1055	ON D-0001 HP SEPARATOR	FROM D-0401 TO HP SEPARATOR D- 0201	FROM GCP INLET MANIFOLD TO D- 0402	FROM D-0401 TO DOWN/STREAM OF D-0201	FROM GCP INLET MANIFOLD TO D- 0401	VESSEL	WEST REMOTE HEADER TO DP VESSEL	20	*	
769-A-TA-645888-001		760.A.T.A.648887.003		769-A-TA-645887-003	١			769-A-TA-645886-002	769-A-TA-645886-002	769-A-TA-645885-001	769-A-TA-645885-001	769-A-TA-645885-001		769-A-TA-645884-005			769-A-TA-645884-001	769-A-TA-645884-001	Ŗ	5	
PRODUCED WATER		CONDENSATE	CONDENSATE	CONDENSATE	CONDENSATE	CONDENSALE	CONDENSATE	LP GAS AND LIQUED	LP GAS AND LIQUID	HP CONDENSATE/ WATER	SOUR GAS	VAPOR PHASE: SOUR GAS LIQUID PHASE: CONDENSATE +AQUEOUS PHASE	SOUR GAS	VAPOR PHASE: SOUR GAS LIQUID PHASE: CONDENSATE +AQUEOUS PHASE	SOUR GAS	VAPOR PHASE: SOUR GAS LIQUID PHASE: CONDENSATE +AQUEOUS PHASE	VAPOR PHASE: SOUR GAS LIQUID PHASE: CONDENSATE +AQUEOUS PHASE	VAPOR PHASE: SOUR GAS LIQUID PHASE: CONDENSATE +AQUEOUS PHASE	25	69	
COTHISHIO		OUTSTANDO	CO2,H2S,H2O	COLHESTED	COLHESTED	OTHERMO	COD,HESS,HEDO	0 001,H25,H20	C02,H2S,H2O	C02,H25,H20	CO2,H2S,H2O	CO2.H2S.H2O	C02.H2S.H20	C01,H1S,H2O	C01,H25,H20		002.H2S.H20	C02,H25,H20	₽C	10	(macife)
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167		195	148	165	165	18	167	166.7 180	167	175	175	175	175	175	175	175	175	175		17	MAX
167-55	ŧ	141	143-56	95.991	166.56	100.00	<del>\$1</del> -167	21.167	201 <del>18</del>	<del>\$1</del> 175	S71.175	<del>\$1-</del> 175	23	SI	SI	52	\$1.175	\$L175	ž	19	NORMAL
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68.6	-	4633	4633	4633	46.33	40.55	4633	VAPOR: 0.197 LIQUID: 46.33	VAPOR: 0.22 LIQUID: 51.8	51.48	2.09	VAPOR: 2.09 LIQUID: 51.48	LP FURTHEST WELL PAD CASE: 0.22 Infi3 HP FURTHEST WELL PAD CASE: 2.08 Infi3.	VAPORA 1.08 LIQUE: 52.8	87 87		VADOR-1.50 VADOR-0.98 LIQUID: 52	VAPORELES LIQUID: 51.50 VAPOR 0.98 LIQUID: 52		n	
0.49	0.72	0.78			0.78	0.78	0.62	VAPOR:0.0113 LIQUID:0.62	VAPOR: 0.011 LIQUID: 0.962	0.39	0.01	VAPOR:0.014 LIQUID: 0.39	LP FURTHEST WELL PAD CASE: 0.0112 cP. / HP FURTHEST WELL PAD CASE: 0.0142 cP.	VAPOR-0.01 LIQUID:0.49	ME 1.		VADOR-0.014 LIQUID-0.445 VAPOR: 0.01 LIQUID: 1.29	VAPOR-0014 LIQUID-0.445 VAPOR: 0.01 LIQUID: 1.29	Ř	¥	
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# **Instrument Index**

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	RO/DM/Ravwater	Utility-Raw Water	Utility-Raw Water	Electrolyser	Electrolyser	Electrolyser	Utility-Raw Water	Utility-N2	Utility-N2	Utility-IA	Utility-IA	flow control Skid	flow control Skid	H2 STORAGE	H2 STORAGE	H2 STORAGE	H2 STORAGE	H2 STORAGE	H2 STORAGE	H2 STORAGE	H2 STORAGE	AREA
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	RO-PI02	DM-LT01	RW-LT01	E-TT03	E-FT01	ELLO	RW-PT01	N-PI01	N-PT01	IA-PI01	IA-PT01	F-FCV01	F-FCY-01	HS-PT03	HS-P103	HS-LT01	HS-GD01	HS-PT02	HS-P102	HS-PT01	HS-PI01	TAG NUMBE
	RO WATER RO-TO1 TANK TO DM-T01 WATER TANK	ON PROCESS TANK DM-T01	ON PROCESS TANK RW-T01	KOH FRON LYE TANK E-TO1 TO ELECTROLISER E- S01	KOH FROM LYE PUMP TO LYE TANK	ON PROCESS TANK E-T01	BATTERY LIMIT RAW WATER INLET HEADER FROM CLIENT	BATTERY LIMIT NITROGEN INLET HEADER FROM CLIENT	BATTERY LIMIT NITROGEN INLET HEADER FROM CLIENT	BATTERY LIMIT INSTRUMENT INLET AIR HEADER FROM CLIENT	BATTERY LIMIT INSTRUMENT INLET AIR HEADER FROM CLIENT	HYDROGEN FROM TANK TO PURIFIER	HYDROGEN FROM TANK TO PURIFIER	ON PROCESS TANK HS-T03	ON PROCESS TANK HS-T03	FROM HS-T02 TO COLLECTON TANK	HYDROGEN GAS DETECTOR	ON PROCESS TANK HS-T02	ON PROCESS TANK HS-T02	ON PROCESS TANK HS-T01	ON PROCESS TANK HS-T01	SERVICE DESCRIPTION
	PRESSURE GAUGE	LEVEL TRANSMITTER	LEVEL TRANSMITTER	TEMPERATURE TRANSMITTER	FLOW TRANSMITTER	LEVEL GAUGE	PRESSURE TRANSMITTER	PRESSURE GAUGE	PRESSURE TRANSMITTER	PRESSURE GAUGE	PRESSURE TRANSMITTER	FLOW CONTROL VALVE	CURRENT TO PRESSURE CONVERTOR	PRESSURE TRANSMITTER	PRESSURE GAUGE	LEVEL TRANSMITTER	GAS DETECTOR	PRESSURE TRANSMITTER	PRESSURE GAUGE	PRESSURE TRANSMITTER	PRESSURE GAUGE	INSTRUMENT TYPE
	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211- 4.1   IA-S2-1"-T1-R1-N-04	HGPL-7398-1211- 4.1	HGPL-7398-1211- 4.1	HGPL-7398-1211-4.1	HGPL-7398-1211- 4.1	HGPL-7398-1211- 4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211-4.1	HGPL-7398-1211- 4.1	P&ID NUMBER →
	HGPL-7398-12114.1 RO-52-1"-T2-R1-N-01	,	,	HGPL-7398-1211- 4.1 KH-S2-Ø38-T9-R2-N-08	HGPL-7398-1211- 4.1 KH-52-Ø38-T9-R2-N-02	,	HGPL-7388-1211- 4.1 RW-S2-1.5"-T1-R1-N-04	HGPL-7398-1211-4.1 N2-52-1"-T1-R1-N-04	HGPL-7398-1211-4.1 N2-52-1*-T1-R1-N-04	HGPL-7398-1211- 4.1   IA-S2-1*-T1-R1-N-04	IA-S2-1"-T1-R1-N-04	HGPL-7398-1211- 4.1 H2-S2-1.5"-T2-R2-N-02	HGPL-7398-1211- 4.1 H2-52-1.5"-T2-R2-N-02	,	,	HGPL-7398-1211-4.1 DN-52-1.5"-T2-R2-N-01	,		,		,	LINE NUMBER
1	,	DM-T01	RW-T01			E-T01	,	,		,	,	,		HS-T03	HS-T03		, , , , , ,	HS-T02	HS-T02	HS-T01	HS-T01	EQUIP.
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		4-20 mA	4-20 mA	4-20 mA	4-20 mA		4-20 mA		4-20 mA		4-20 mA		4-20 mA	4-20 mA		4-20 mA	4-20 mA	4-20 mA		4-20 mA		SIGNAL TYPE ~
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# Chapter 5: Detailed report on the specialized work, task, project, assignment, etc.

This report is a specialized description of the work assigned during Inplant training at Afility Engineering. The aim of this report is to provide a detailed account of the work assigned by our mentors, seniors, and colleagues. This report has been reviewed by Mr. Swapnil Karnik and Mrs. Priti Kode and verified by Mrs. Swati Shinde.

I was allowed to work on some major projects during my time at Afility Engineering, which enhanced my technical knowledge. I worked on the following projects:

Saudi Arabian Oil Company (Jahfurah Aramco): The overall Jafurah Development Program is a series of projects to be undertaken within the Kingdom of Saudi Arabia. The objective is the development of grassroots gas surface facilities to produce, process and transport gas to satisfy In-Kingdom energy demands. The Jafurah basin is a key unconventional gas asset in the Eastern Province of Saudi Arabia, consisting of North and South fields

#### Task assigned:

- Data checking of Tags of Rolling Sheet: Detailed Data checking of Tags of
  Temperature Gauge, Pressure Gauge, Thermowell and Temperature Element.
  Updated various Tags, their Tag Number, Line Number, P & ID Number,
  Piping Material Specification (PMS), Service, Design Pressure/Temperature,
  Operating Pressure/Temperature, Maximum Pressure/Temperature, Velocity,
  Viscosity and Density.
- Data checking of Tags of Index Sheet: Detailed Data checking of Tags of
  Temperature Gauge, Pressure Gauge, Thermowell and Temperature Element.
  Updated various Tags, their Tag Number, Line Number, P & ID Number,
  Piping Material Specification (PMS), Service, Location, Area Classification,
  Material, Design Pressure/Temperature, Operating Pressure/Temperature,
  Maximum Pressure/Temperature, Input and Output Type.
- Checking of Instrument list: Checking various Instruments such as Temperature Gauge, Pressure Gauge, Thermowell and Temperature Element as per the given criteria.

#### **Procedure of completion:**

- Checked General Data such as Tag number, P & ID number, Location, Service and Line/Equipment number of Tags of Temperature Gauge, Pressure Gauge, Thermowell and Temperature Element with respect to its P & ID and P & ID Legends.
- Checked and updated the process data such as Design Pressure/Temperature,
   Operating Pressure/Temperature, Velocity, Viscosity, Density with respect to its IPDS (Instrument Process Datasheets).
- Checked and updated the Piping specification and Material details with reference to its PMS (Piping Material Specification) Documents.

**Sonatrach-Cepsa:** Existing RKF (Rhourde El Khrouf) facilities comprises oil production and gas injection wells, gathering system and a Central Processing Facility (CPF), permanent base camps with individual base. EPC of surface facilities for oil production and LPG recovery from the RKF (Rhode El Khrouf) field

#### Task assigned:

- Checking of Instrument list: Checking various Instruments such as
  Temperature Gauge, Pressure Gauge, Transmitter, Flowmeters, Analyzers,
  Pressure safety valve, ON-OFF Valve, Pressure Control Valve, Motor control
  valve, Differential Transmitters, Level Gauge, Thermowell and Temperature
  Element as per the given criteria.
- Updating various Tags, their Tag Number, Line Number, P&ID Number, Piping Material Specification (PMS), Service, Design Pressure/Temperature, Operating Pressure/Temperature, Maximum Pressure/Temperature, Velocity, Viscosity and Density.
- Updating Datasheets of Temperature Gauge, Pressure Gauge, Transmitter, Flowmeters, Analyzers, Pressure safety valve, ON-OFF Valve, Pressure Control Valve, Motor control valve, Differential Transmitters, Level Gauge, Thermowell and Temperature Element
- Updating the Index sheet: Detailed Data checking and updating of Tags of Temperature Gauge, Pressure Gauge, Transmitter, Flowmeters, Analyzers,

Pressure safety valve, ON-OFF Valve, Pressure Control Valve, Motor control valve, Differential Transmitters, Level Gauge, Thermowell and Temperature Element Updated various Tags, their Tag Number, Line Number, P&ID Number, Piping Material Specification (PMS), Service, Location, Area Classification, Material, Design Pressure/Temperature, Operating Pressure/Temperature, Maximum Pressure/Temperature, Velocity, Viscosity and Density.

- Checked General Data such as Tag number, P & ID number, Location, Service and Line/Equipment number of Tags of Temperature Gauge, Pressure Gauge, Transmitter, Flowmeters, Analyzers, Pressure safety valve, ON-OFF Valve, Pressure Control Valve, Motor control valve, Differential Transmitters, Level Gauge, Thermowell and Temperature Element with respect to its P & ID and P &ID Legends.
- Checked and updated the process data such as Design Pressure/Temperature,
   Operating Pressure/Temperature, Velocity, Viscosity, Density with respect to its IPDS (Instrument Process Datasheets).
- Checked and updated the Piping specification and Material details with reference to its PMS (Piping Material Specification) Documents.
- Updated the Instrument Index of Temperature Gauge, Pressure Gauge,
  Transmitter, Flowmeters, Analyzers, Pressure safety valve, ON-OFF Valve,
  Pressure Control Valve, Motor control valve, Differential Transmitters, Level
  Gauge, Thermowell and Temperature Element with reference to its P & ID,
  P & ID Legends IPDS (Instrument Process Datasheets) and PMS (Piping
  Material Specification) Documents.

#### Hygenco (Hydrogen Gas Processing Facility for Jindal Steel Hissar

**plant):** A leading solution provider for Green H2 generation and distribution system is working on a green H2 Project in India. The plant will be built, own, and operated by Hygenco and Hydrogen Gas will be supplied to the end user.

#### Task assigned:

- Developing Instrument Index for Hydrogen Gas Processing Facility.
- Developing Cover Sheet of Instrument Index and I/O Summary for Hydrogen
  Gas Processing Facility considering necessity of project documentation and
  understanding importance of company logo, revision history, project code
  designation.
- Developing Summary Sheet that contains the Instrument Type and their Quantity and Input/Output Summary and understand the importance of io count, instrument count, segregation of client and third-party vendor scope.
- Developing General notes that contain Legends and Reference Documentation and understand the abbreviations.
- Number of Tags checked from P&ID: 257.

- Developed Instrument Index for Hydrogen Gas Processing Facility that consist
  General details of various Instruments such as Gauges, Transmitters, Valves,
  Detectors, Current to Pressure convertor, Alarms, etc. with respect to its
  P & ID and P & ID Legends.
- Developed Cover Sheet of Instrument Index and I/O Summary for Hydrogen Gas Processing Facility with reference to its Instrument Index and P & ID.
- Developed Summary Sheet that contains the Instrument Type and their Quantity and Input/Output Summary with reference to its Instrument Index and P & ID, P & ID Legends.
- Developed General notes that contain Legends, Reference Documentation and Abbreviations with help of its P & ID and P & ID Legends.

**Berbera Edible Oil Terminal (Palm oil terminal)**: Edible Palm Oil Terminal (EOT), Palm Oil will be offloaded from vessels using the ship own gear via pipes. Bulk palm oil storage facilities include, Tanks, Bunds, Control building and Day tank to be located on the reclaimed lagoon. The storage and processing areas will be linked together by road tankers, which is anticipated to transport the palm oil across from Port to Packing Area at the rate of 1 tanker per hour.

#### Task assigned:

- Developing Instrument Datasheets for Pressure gauge, Level Gauge, Level Switch, Flow transmitter, Control valve, Pressure transmitter, Temperature element, Thermowell and Temperature transmitter.
- Updating their Tag No, P&ID Number, Line Number, Pipe class and process data such as Instrument Density, Viscosity, Velocity, Min/Max temperature and pressure, Area classification, location, Instrument range, Ambient temperature, Line schedule, Requirement of NACE and IBR.
- Developing Title block for above mentioned Instrument Datasheets which contains data such as Company name, Project name/number, Document number, date of revision and other important data.

- Developed Instrument Datasheets for Pressure gauge, Level Gauge, Level Switch, Flow transmitter, Control valve, Pressure transmitter, Temperature element, Thermowell and Temperature transmitter that contains information such as Tag No, P&ID Number, Line Number, Pipe class and Process data such as Instrument Density, Viscosity, Velocity, Min/Max temperature and pressure, Area classification, location, Instrument range, Ambient temperature, Line schedule with reference to its P & ID, Process equipment documents like Motor Specifications, Tank Specifications, etc.
- Developed Title block for above mentioned Instrument Datasheets which contains data such as Company name, Project name/number, Document number, date of revision and other important data.

Indian Oil Corporation Limited (IOCL) Vadodara: Indian Oil Corporation (IOC), raising the capacity of its Gujarat refinery as well as setting up a petrochemical plant at the unit as part of plans for upscaling Petchem business to protect margins. The project envisages raising the capacity of the Vadodara refinery in Gujarat. The project would be a building block for the production of niche chemicals in future with a potential to increase petrochemical and specialty products integration index on incremental crude oil throughput which would enhance the refinery margins.

#### Task assigned:

- Updating and verified datasheets of Temperature Transmitter, Temperature Gauge, ON/OFF ball valve, Shutdown ball valve.
- Developing I/O Index sheet for above-mentioned instruments.
   Verified Instrument tag numbers, P&ID numbers, alarms & I/O (Input/Output)
- Verifying various tags of Rotameter, Thermal Mass Flow Meter, Restricted Orifice, Flow Nozzle, verified their Tag Number, Line Number, Location, P&ID Number, Line material, Area Classification & Allowance of corrosion.
- Updating and verified summary/datasheet for instruments such as Annubar,
   Nozzle, Orifice, and Venturi tube. Checked their process data such as Line data, line schedule, pipe data, area classification, location, etc.

- Updated and verified datasheets and summary sheets of Temperature Transmitter, Temperature Gauge, ON/OFF ball valve, Shutdown ball valve, Annubar, Nozzle, Orifice, and Venturi tube, their General Data such as Line data, line schedule, pipe data, area classification, location, etc. and Process Data such as Design pressure/Temperature, Operating pressure/Temperature, Density, Velocity, Viscosity, with respect to its P & ID, Rolling sheets and PMS (Piping Material Specifications) Documents.
- Developed I/O Index sheet for above-mentioned instruments.
   Verified Instrument tag numbers, P&ID numbers, alarms & I/O (Input/Output) with reference to its P & ID, Rolling sheets, Datasheets.

**Web Offshore**: West EL Burullus Petroleum Company "PETROWEB" (COMPANY) is proceeding with the development of West EL Burullus (WEB) gas concession, which is located offshore in the Nile Delta Area, south of the West Delta Deep Marine (WDDM) gas field, west of the Rosetta (RASHPETCO) field and northeast of Abu Qir gas fields.

#### Task assigned:

- Developing Index sheet of various instruments such as Pressure Indicating
  Transmitter (PIT), Temperature Indicating Transmitter (TIT), Shutdown Valve
  (SDV), Pressure Transmitter Safety (PZIT), Restricted Orifice (RO), Surface
  Safety Valve (SSV), Solenoid Valve (SV).
   Verified and corrected various tags of above-mentioned instruments checked
  their Tag Number, Line Number, Location, P&ID Number, Line material, I/O
  signals, etc.
- Checking the quantity of various instruments such as Pressure Gauges and Pressure Transmitters in P&ID.
- Checking and editing of Fire & Gas Layout drawings/documents.
   Documents such as Helideck layout, Field development projects, Cellar deck platform, etc. Checked the placements of various instruments.

#### **Procedure of completion:**

 Developed Index sheet of various instruments such as Pressure Indicating Transmitter (PIT), Temperature Indicating Transmitter (TIT), Shutdown Valve (SDV), Pressure Transmitter Safety (PZIT), Restricted Orifice (RO), Surface Safety Valve (SSV), Solenoid Valve (SV).

Verified and corrected various tags of above-mentioned instruments, verified their General Data such as Tag Number, Line Number, Location, P&ID Number, Line material, I/O signals, etc. with respect to its P & ID and P & ID Legends.

- Checked the quantity of various instruments such as Pressure Gauges and Pressure Transmitters in P&ID with respect to its symbols.
- Checked and edited of Fire & Gas Layout drawings/documents.
   Documents such as Helideck layout, Field development projects, Cellar deck platform, etc. Checked the placements of various instruments as per its earlier revised P & ID

#### **Chapter 6: Conclusion**

Afility Engineering Pvt. Ltd. is engaged in multidiscipline engineering project work where specialized services are being provided to their prestigious clients.

Afility is not only limited in providing engineering services but also providing the solutions on request to facilitate development.

With over 5 years rich experience and domain knowledge, Afility looks into the requirements of the clients and fulfil them as per their identified needs deliver cost-effective optimal solutions.

Most of my work revolved around P & IDs, Instrument Datasheets and Drawings. This gave me a valuable experience that will be very beneficial in my future work.

I had a great time working and learning at Afility, which helped me a lot to boost my confidence and technical knowledge, it helped me to understand the professional space better. It's important to continue building on my skills and seeking out new learning opportunities to continue growing and developing in my career.

# Chapter 7: Industry authority-based Suggestions for Curriculum Modification

In the initial interaction with Sagar, we noticed that the current syllabus covers most of the basic terminologies related to Instrumentation & Control.

The duration of Inplant training is almost 6 months at a stretch, which is commendable.

Below are some suggestions:

- While completing syllabus for a particular topic, if we conduct some seminar from the expertise who is in this business for long time. That would enhance the understanding of that particular subject in depth. (e.g., Control loops).
- Visit to reputed manufacturer's factory / workshop to see the actual
  manufacturing process of particular instrument (e.g., Fisher for Control Valve,
  Thermal Systems for Gauges etc.). During these visits, Students can see and
  feel the actual live processes and the mechanical integrity / assemblies.
- Visit to small scale (prototype) plants, wherein students can see the overall plant (Various live equipment, piping schematics and Operator's screen (DCS).
- Awareness sessions for Plant, Health & Safety aspects.
- Awareness sessions for Hazardous Area Classification.
- Select some topics and let student prepare it with help of Google / YouTube
   Videos animations / ppts to explain the working principles of various field instruments
- Students should be introduced to software such as 'Smart Plant (SP3D)', 'AutoCAD' for 3D model designing, SPI (Smart Plant Instrumentation) for Engineering Document such as Instrument Specification sheets, Instrument Interconnection Drawing, Loop Drawing, Hookup Drawing.
- Students should be introduced to PLC Programming and SCADA Programming.

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• Instrumentation Tools

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• Product Catalog Pressure and Temperature Measurement (Catalog 900)

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Appendix

Company Services: Page number 14.

This chart gives a brief information about the services that the company offers.

Administration Chart: Page number 17.

The Administration Chart represents the organizational structure of the

company.

Department / Section Chart: Page number 20.

The Department / Section Chart displays all the departments in the company

and their functions.

Instrument Datasheet: Page number 24.

An instrument data sheet is a document that gives the technical details of an

instrument or device. A datasheet will tell you everything you need to know

about the equipment's features and technical specifications.

Annexure/Summary sheet: Page number 25.

A summary sheets is developed in order to prepare a Datasheet. It is a

spreadsheet of a Datasheet, consists of all the required details of particular

Instrument.

Instrument Rolling Sheet: Page number 26.

A rolling sheet is summary / extract of an instrument datasheet it contains all

the data about the instruments/equipment such as instruments/equipment's

control specifications along with the process data. This sheet helps to get all

the information tabulated together and ease of checking and comparing.

General Arrangement (GA) Drawing (Sample: Pressure Gauge): Page number 27.

 General Arrangement drawings for piping systems and equipment are developed by piping designers. These drawings indicate the locations of main equipment in the plant.

General Arrangement (GA) Drawing (Sample: Thermowell): Page number 28.

 General Arrangement drawings for piping systems and equipment are developed by piping designers. These drawings indicate the locations of main equipment in the plant.

Piping and Instrumentation Diagram (P&ID): Page number 29.

 A piping and instrumentation diagram, or P & ID, shows the piping and related components of a physical process flow. It is commonly used in the engineering field. The instruments are represented in common shapes and symbols which includes pumps, vessels, heat exchangers, valves, and pipelines.

Piping and Instrumentation Diagram (P&ID) Legends: Page number 30.

 P&ID Legends are used to create important documentation for process industry facilities. The shapes in the legends are representative of the functional relationship between piping, instrumentation. It includes standard shapes of instruments such as valves, pumps, snubbers, heat exchangers, mixers, vessels, etc.

Instrument Process Datasheet (IPDS): Page number 31.

Instrument process datasheet contains the essential process information such
as Process application, process fluid name, process operating envelope and
design envelope (Main parameters such as Process Flow, pressure temperature
etc.), line number etc. Based on this IPDS, the downstream engineers mainly
Instrumentation & Control engineer, Mechanical engineer, piping engineers

prepares their discipline deliverables like Instrument Datasheet, Mechanical datasheet, Line lists etc.

Instrument Index: Page number 32.

• An instrument index is a document that lists and provides information about the instruments and devices used in a process industry setting.