SIGNATURE CONTROL		
DEVELOPED	**REVISED**	**AUTHORIZED**
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SIGNATURE	SIGNATURE	SIGNATURE
Quality Control Inspector	Quality Control Manager	Managing Director

CHANGE CONTROL		
DESCRIPTION OF THE CHANGE	**REVISION**	**DATE**
The translation of this PCC-10 procedure is included in the IMS, and the English version is integrated with the same control data as the Spanish document. Modification of associated formats for handling the English-Spanish version.	03	12.APR.23
Sheet of 2 "Photographic Evidence" is integrated into the Mechanical Assembly Inspection Record PCC-10/F-01 format.	02	02.DEC.22
Integration of Reference Document Sections, Definitions, and Responsibilities	01	13.AUG.22
Creation and issuance of the procedure.	00	07.FEB.22

PURPOSE OF THE PROCEDURE

Establish the necessary technical guidelines to carry out the inspection and evaluation of the assembly of pipes, valves, and equipment on the structural basis designed for this purpose.

SCOPE OF THE PROCEDURE

This procedure covers the assembly of pipes, valves, and mechanical equipment concerning projects developed in the workshop and on-site.

REFERENCE DOCUMENTS

- International Quality Management Systems ISO 9001:2015 Standard
- International Standard Environmental Management Systems ISO 14001:2015
- API RP 686. Recommended Practice for Machinery and Installation Design.
- ASME PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly.
- ASME B31.3 Process Piping.
- ASME B31.4 Pipeline Transportation Systems for Liquids and Slurries
- ASME B31.8 Gas Transmission and Distribution Piping Systems
- ASME B16.5 Pipe Flanges and Flagged Fittings
- ASME B16.34 Valves – Flanged, Threaded, and Welding End
- NOM-020-STPS-2011 Pressure vessels, cryogenic vessels, and steam generators or boilers – Operation – Safety conditions.
- AWS D1.1 Structural Welding Code Steel

DEFINITIONS

Mechanical assembly. Final installation of pipes, valves, and mechanical equipment on the civil and/or metal structure designed to support it.

Mechanical equipment. Static or dynamic equipment that exerts an action on the fluid.

Alignment. A process by which the misalignment of two adjacent shafts connected by a mode coupling is reduced in the center of the rotation of each axis is as collinear as possible during normal operation.

RESPONSIBILITIES

Quality Control Inspector:

- Implement this procedure in conjunction with the Construction Supervisor
- Monitor strict compliance with the established parameters.
- Evaluate together with the Construction Supervisor that the results obtained are within the acceptable evaluation criteria.
- Carry out the documentation established in this procedure and delivery
- Make the statement when the finding warrants it.

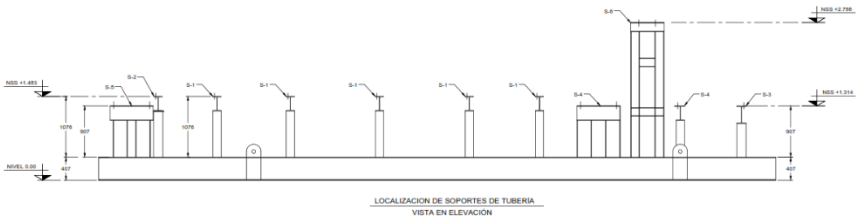
Site Supervisor:

- Informs the quality control inspector of the completion of mechanical assembly activities for the start of the inspection.
- Provide construction drawings to staff
- Promotes proper waste management
- Promotes the proper use of equipment and tools.

Safety, Health, and Environment Supervisor:

- Verify the requirements of Industrial Safety at work to prevent risks to workers and the environment,
- Deliver the Occupational Safety Analysis and have it at the place of execution of the work.
- Train personnel in the proper management of waste, safety, and the environment.

DESCRIPTION OF THE PROCEDURE		
Responsible	**Activity**	**Records**
Quality Control	**1. GENERAL** **A. TOOL & EQUIPMENT** The following list of instruments is required to perform the inspection. Tools may vary, subject to special requirements of each system. • Hose Level • Joist level • Torpedo level • Vernier • Tape Measure • Set of squares • Lamp (100 lumens minimum) **B. ENTRY INFORMATION** The following input information must be provided to perform the inspection of the mechanical assembly. • Piping and Instrumentation Diagram. • Detail of structures. • General Mechanical Arrangement. • Isometric pipes **2. MECHANICAL ASSEMBLY INSPECTION** **A. STRUCTURAL BASIS**	
Quality Control	**1.** The inspection must be carried out with the construction plans that are under the last revision. **2.** Verify that the tools and equipment for inspection are in good condition. **3.** With the support of the construction personnel, verify the leveling of the structural base that it is level in the four coordinates. **4.** Verify that the construction materials are those indicated in the approved engineering. **5.** Dimensionally inspect the structural base and pipe and equipment supports. Verify that they have the dimensions indicated in the approved engineering. Generate dimensional inspection drawings. **6.** The elevation levels of the structure and supports must be parallel to the determined reference level. The elevation level must be the same	

	throughout the length of the line center of the pipe to be supported, as indicated in the following figure:	
		
	Figure 1 Representation of elevation levels of structure.	
Quality Control Inspector	**7.** Check that structural elements that make up the base, supports, and platforms do not present blows, deviations in straightness, bends that are not indicated in the engineering drawings, abrasions, scratches, burrs, and/or weld remains.	
	8. There should be no direct contact between the pipe and the structural support. There must be a 1/8" or 1/4" thick neoprene base (or whatever material and thickness the approved engineering indicates).	
	9. For bolted joints, the screws should be of such a length that 2 to three strings protrude from the nut. The material of the screws and washers must be as indicated by the approved engineering.	
	10. The structural grid must be made of the material and installed as indicated by the approved engineering. It should not present unevenness or lifts along the entire length of the grating section. For installation tolerances, please refer to the acceptance criteria (paragraph 6).	
	11. If deviations are found in the above points, please refer to the acceptance criteria (paragraph 6)	Approved Engineering Documents
	B. PIPING & MECHANICAL EQUIPMENT	
Site Supervisor / Engineering	**1.** Verify that all mechanical equipment, valves, and piping components are installed according to approved engineering. Valves, equipment, and fittings must be installed in the flow direction designed by the manufacturer and specified in the approved engineering.	
	2. Verify that the limits of the piping system and/or mechanical equipment are within the limits of the structural base or as indicated in the mechanical arrangement drawing. See the following figure:	

Quality Control Inspector

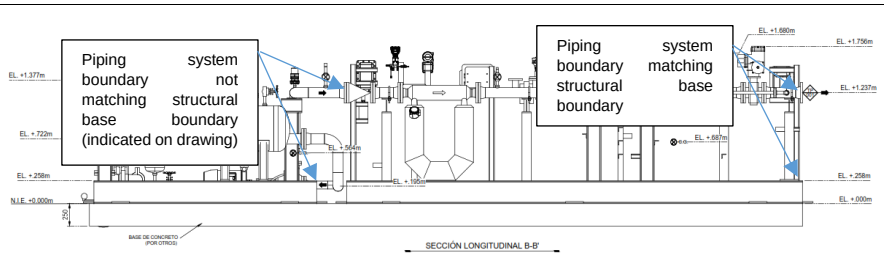


Figure 2 Representation of structural boundaries with pipe boundaries.

3. Inspect that the coordinates and elevations of the interconnection points of the piping system coincide with those indicated in the engineering drawings. Check the elevation at the highest and lowest point (either by pipe or structure).

4. Check that the construction materials are those indicated in the approved engineering.

5. Verify that the dimensions of the pipe spools coincide with those indicated in the mechanical and/or isometric pipe arrangement plans. Generate dimensional inspection drawings.

6. Verify the leveling and parallelism of the piping and equipment system concerning the base level.

7. Check that the pipe components do not present blows, deviations in straightness, bends that are not indicated in the engineering drawings, abrasions, scratches, burrs, and/or weld remains.

Quality Control Inspector

8. Examine the faces and flange flange joints. They should not have imperfections.

9. The length of the studs should be long enough to protrude 2 to 3 strings from the nut.

10. The flanged joint gaskets must be free of imperfections. They must be installed according to approved engineering and manufacturer's recommendations. They must not have folds in the installation.

11. Screw joints must be joined using hermetic tape (PTFE) or liquid Teflon in case the system is designed for gaseous media.

12. The minimum separation between a pipe component or valve flywheel and a structural element must be 3" to ensure that there is no risk of accident during manual maneuverability.

13. Verify that all valves, interconnection points, and equipment of the piping system are easily accessible.
14. If you find deviations in the points mentioned, consult the acceptance criteria (see paragraph 6).

3. ACCEPTANCE CRITERIA

A. STRUCTURAL BASIS

Quality Control Inspector

1. The structural base must have the measurements indicated in engineering with -2 mm or + 5 mm tolerance for the total length established.

2. The elevation of the supports must be such that it only allows a tolerance of +/- 2 mm concerning the center of the pipeline and/or equipment.

3. The installation tolerance of grating on the structural base should be as indicated in the following table:

Clearance at the end of beams	6 mm
Clearance at the channel end	6 mm
Clearance in railing with skirting board plate	6 mm
Clearance for column cutting	12 mm
Clearance in circular cuts	25 mm
Clearance between adjacent grids	6 mm

Board 1 Grid Installation Tolerances

B. PIPES AND MECHANICAL EQUIPMENT

Quality Control Inspector

1. The rotational alignment of the flanged joints must allow the studs to pass perpendicularly between the flange holes with a tolerance of no more than 2 mm.

2. Flanged joints must maintain the same center of line, with a maximum tolerance of 1.5 mm (1/16").

3. The parallelism of flanged joints should not exceed 0.8 mm (1/32") between the widest and narrowest part of the joint.

4. The elevation and alignment of the interconnection points must not exceed +/- 2 mm of the dimensions indicated by the approved engineering.

5. Failure to comply with the points indicated in this procedure is cause for rejection.

In the event of one of these phenomena, the Quality Control inspector must notify the Construction Supervisor so that they can make the appropriate corrections, the Quality Control Inspector will determine when it is a major finding that requires communication and initiate the *Control of Non-Conforming Outputs (PCC-14) process.*

Non-Conforming Output Control (PCC-14)

Quality Control Inspector	**4. DOCUMENTARY RECORD** The results of the mechanical assembly inspection will be placed in the Mechanical *Assembly Inspection Record format (PCC-10/F-01),* at the end of which the signed document must be delivered to the Quality Department for its integration into the Quality Dossier of each project.	Mechanical Assembly Inspection Record (PCC-10/F-01)

FORMATS ASSOCIATED WITH THE PROCEDURE

CODE	REGISTRATION	REVIEW LEVEL	RETENTION TIME
PCC-10/F-01	*Mechanical Assembly Inspection Record*	02	1 year at the end of the contract / Digital without expiration
N/A	*Dimensional Inspection Drawings*	N/A	1 year at the end of the contract / Digital without expiration