# Commissioning Checklist – Step-by-Step Guide

*For Cryogenic Nitrogen Plants*

*By Graphic Medium Industrial*

# Introduction

Commissioning is the bridge between construction and full-scale operation — the stage where a nitrogen plant truly comes to life. This guide provides a clear, step-by-step framework to ensure a safe, efficient, and error-free startup process.

Developed from real on-site experience, it’s ideal for:

- Plant commissioning engineers
- Operators and maintenance teams
- Engineering students and industrial trainees

# Section 1:

# Pre-Commissioning Checklist

**Objective:** Ensure all systems are ready before introducing cryogenic fluids.

| # | Item | Verification Notes |
|---|---|---|
| 1. | Mechanical completion of all systems. (no leaks, flanges tightened) | |
| 2. | Liquidation of Punch list | |
| 3. | Verify as per P&ID<br>• Erection / Installation of Equipment, Piping, and Instruments etc.<br>• Correct locations of all Instruments. | |

| # | Item | Verification Notes |
|---|---|---|
| | • Correct directions of check valves, globe valves, flow orifice, strainers, control valves etc. | |
| 4. | Piping insulation, and supports verified as per design. | |
| 5. | Carry out Internal Inspection of Equipment | |
| 6. | Electrical & Instrumentation:<br>• Verify Instruments calibrated and signal tested.<br>• Control system loop tested and interlocks verified.<br>• Electrical connections and earthing verified. | |
| 7. | Safety relief valves tested and tagged. | |

| # | Item | Verification Notes |
|---|---|---|
| | 8.Check for Purification / drying system | |
| | 9.Purging and drying sequence ready. | |
| | 10. Calibration of analyzers. | |
| | 11. No Load Run of Motors. | |
| | 12. Adsorbent charging | |
| | 13. Lubricant charging. | |
| | 14. Carry out Water flushing / Air blowing of piping. | |
| | 15. Conduct Leak checks of systems after flushing & blowing, including inside cold box piping & Equipment. | |

# Section 2:

# Commissioning Checklist

Each phase should be completed in sequence to avoid process disruptions or damage.

## Phase 1: System Purging & Leak Test

- Verify all lines are clean and dry.
- Conduct pressure test with inert gas (typically nitrogen).
- Apply soap solution or detector to check for leaks.
- Ensure proper venting before next step.
- Nitrogen purging of Cold box Insulation.

## Phase 2: Utilities Charging

- Electrical charging
- Instrument air
- Cooling water

## Phase 3: Cooling Down Process

- Do cooling down gradually to avoid thermal shock.
- Monitor temperature gradients.
- Check expansion joints and cold box integrity.
- Record cooling duration and steady-state time.

## Phase 4: Product Gas Stabilization

- Maintain design flow and temperature.
- Measure product gas purity and dew point.
- Adjust air separation or distillation parameters as needed.

## Phase 5: Storage & Transfer System

- Verify storage tank insulation and pressure buildup.
- Check valves, level gauges, and vent lines.
- Ensure transfer lines are cooled before operation.

# Section 3:

# Safety Guidelines

Safety during commissioning is non-negotiable. Always follow plant-specific SOPs and ensure all personnel are trained.

**Safety Checklist:**

☐ No oil / grease spillage in nearby area

☐ PPE worn (cryogenic gloves, face shield, jacket, safety shoes)

☐ Oxygen monitoring system active

☐ Pressure vessels certified and vented properly

☐ No unauthorized personnel in the zone

☐ Emergency isolation valves accessible

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☐ PPE worn (cryogenic gloves, face shield, jacket, safety shoes)

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# Section 4:

# Conclusion

A well-commissioned nitrogen plant ensures efficiency, safety, and long-term reliability. This checklist serves as both a guide and a record of professional commissioning practices.

**Next in Series:**

- *Troubleshooting eBook – Solve Common Plant Issues*
- *Mini Course – Nitrogen Plant Commissioning & Safety*

For more resources, visit **Graphic Medium Industrial**.

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