Compressor Tester (CT) Validation Plan and Report

Roe Bingle

Validation Plan

1. **Objectives:**
    a. Validate the functionality/capabilities of the Air Compressor Tester box
    b. Validate that the box tests air compressors by running for 60 seconds, settling for 10, displays accurate psi reading, then completely exhausts all air, with consistent accuracy.
    c. Ensure the entire process is as safe and efficient as possible.
2. **Scope:**
    a. The tester box will be validated with a range of air compressors and psi readings.
    b. Testing will focus on the functionality and capabilities of the box stated in the project requirements.
3. **Roles:**
    a. All roles and duties are to be done by Roenan Bingle (setup, testing quality, technical support, etc.)
4. **Validation Activities:**
    a. CT box will be set up according to the proper instructions
    b. A variety of air compressors will be connected and run by the CT for a full 60 seconds then settled for 10 seconds.
    c. PSI and time readings will be monitored and recorded prior to and during the tests
    d. Verify that the exhaust function can empty the tank of any psi.
5. **Schedule and Resources:**
    a. Required resources for testing include, CT box, air hose, compressor, air tank (rated >250psi), PSI measuring tool, 12V power supply, computer displaying serial monitor, stopwatch, recording tools.
    b. Validation will consist of at MINIMUM 20 tests for each size compressor.
6. **Risk Assessment:**
    a. Risks are unlikely but include inaccurate psi readings and equipment/component malfunction.
    b. Risks are mitigated by regular component and equipment checks/servicing if needed, calibration of sensors, and following CT instructions.

Validation Report

1. **Summary:**
    a. Set up each compressor properly, ran each for 60 seconds and settled for 10 seconds in two sets of ten 10 trials, equaling 20 trials for each compressor. PSI measurements were taken at IDLE and after settle period (PSI tool measurement and displayed PSI). Each compressor had a cool down period between sets.
    b. The CT was consistent in successfully running a compressor for 60 seconds, stopping, waiting for 10 seconds, before exhausting when button input received. PSI measurements deviation averaged +- 0.161 PSI at IDLE and +- 0.321 PSI after settling/ON. These are well within the acceptable range of +- 2.0 PSI.
    c. The measurement at IDLE tends to vary, however, PSI reading is still well within +-2 PSI
2. **Methods:**
    a. Validation was carried out on all compressors given to me (Roenan Bingle).
    b. Used two sets of ten trials due to overheating of the compressors. Cooldown period allowed compressors to rest and not affect the PSI output too much
    c. Took the measurements documented in the CT testing and averaged them out to compare average to acceptable range.
3. **Risk Assessment:**

a. Extraordinarily little if any danger **UNLESS INTENTIONALLY TAMPERED WITH**.
b. Physical damage could cause some parts to be knocked loose.
c. Software is written to ensure that there is no possibility for users to over pressurize any tank or overrun a compressor.

4. **Results:**
    a. CT Box passes validation.
    b. Compatible with various compressors sizes.
5. **Supporting documents/data:**
    a. Revision and bug log
    b. DFMEA
    c. Compressor Tester data
    d. PFMEA