Appendix D – Impact of Heavy-Duty Hydrogen Fueling on NCWM publication 14

Impact of Heavy-Duty Hydrogen Fueling on NCWM Publication 14

Adoption of a heavy-duty hydrogen fueling classification in NIST Handbook 44 would likely require corresponding revisions to NCWM Publication 14. Handbook 44 establishes legal metrology requirements, while Publication 14 defines the NTEP type evaluation procedures used to demonstrate compliance.

1. Test Procedures

Develop procedures covering 12–30 kg/min operating flow rates, a 3 kg MMQ, longer fueling durations, and testing across the full operating range.

2. MMQ Verification

Establish procedures to verify performance at the 3 kg MMQ, including repeatability and automatic shutoff performance.

3. Test Standards

Review gravimetric standards and supporting equipment for larger hydrogen quantities, higher transfer rates, and thermal stabilization.

4. Dynamic Performance

Add testing for valve timing, pressure transients, flow acceleration/deceleration, density effects, and thermal influences.

5. Repeatability

Require repeatability testing at 12, 18, and 30 kg/min with representative deliveries of 3, 10, 30, and 60 kg.

6. NTEP Certificates

Require Certificates of Conformance to identify approved heavy-duty flow range, MMQ, accuracy class, and operating limits.

Recommendation for Publication 14

Recommended proposal language:
"Upon adoption of the proposed heavy-duty hydrogen fueling requirements in NIST Handbook 44, the NCWM Measuring Sector and NTEP should revise NCWM Publication 14 to establish corresponding type evaluation and test procedures for heavy-duty hydrogen gas-measuring devices."

Suggested Publication 14 Revisions

- Create a dedicated heavy-duty hydrogen fueling section.
- Define type evaluation procedures for 12–30 kg/min dispensers.
- Establish a 3 kg MMQ verification procedure.
- Specify representative test flows and delivery quantities.
- Define dynamic performance testing.
- Update gravimetric standard guidance.
- Specify repeatability requirements.
- Define Certificate of Conformance reporting requirements.

Conclusion

Updating Publication 14 after Handbook 44 adoption provides a complete regulatory framework. Handbook 44 establishes the legal requirements, while Publication 14 provides the detailed NTEP test methods needed to evaluate heavy-duty hydrogen measuring devices.