

Comment Form for Draft Publications

FROM	Section	Comments	Working Group Response
Dan Wright WA	GENERAL	I'm updating my spreadsheet to follow the SOP's on neck scale calibration. SOP 19 has been updated to "0.5 % of the graduated neck volume or 1/4 of a graduation (whichever is smaller)". SOP 21 states "0.5 % of the graduated neck volume". Should I be using the SOP 19 criteria for LPG also?	Latest draft of Sop 21 no longer agrees with SOP 19 about "0.5 % of the graduated neck volume or 1/4 of a graduation" for neck calibration. Both SOP's must be updated after a decision is made regarding how nominal and neck volume tolerances will be handled.
Steve Schultz NV	General	After careful review of 105-4, and with regard to the small number of provers and test measures in this area, I am happy with the document as written.	Great! Thank you.
Mike Fortune National Weights and Measures Laboratory United Kingdom	GENERAL	<p>We wish to purchase a 100 L LPG prover to NIST 105-4 specifications and have approached several US manufacturers in order to buy an off-the-shelf design. Unfortunately, the US manufacturers are not familiar with the European pressure equipment legislation nor the requirements for CE marking and notified body approval. The prover is becoming horrendously expensive as a result.</p> <p>If we were to get a UK manufacturer to build a prover to the NIST 105-4 specifications would NIST raise any objections over design copyright, etc? Do you have any design drawings we could build to? Alternatively, do you know of any European manufacturers who have built provers to the 105-4 specifications?</p>	Provided all applicable documents to commenter for review
Richard Gonzales OK	1.2	I would not put specific dates because if any of the documents referenced have a new revision date then this document will also need to be revised.	Dates are necessary for reference documents to ensure harmonization between various standards. If a reference is updated, then 105-4 should be reviewed to ensure consistency and agreement. Agree with Mr. Gonzales however I also understand the necessity to reference the documents in effect at the time of this revision.

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Richard Gonzales OK	3	The terminology for the pressure gauge does not define what the pressure gage is only what type of calibration is to be performed to verify it is correct. In addition I have a question “ Does this calibration have to be performed every time the prover is calibrated?”	Definition is meant to define pressure gauge based on what it is capable of doing. However, definition should read “calibrated test instrument...” The pressure gage in the LPG prover is not calibrated (i.e., verify accuracy of reading vs. another standard gauge). Rather, the tank is pressurized over the expected pressure range and the volume level is verified to ensure it does not change more than the 0.02% tolerance per SOP 21. In other words, no measurements are made using the pressure gage so it does not need to be calibrated/verified. However, some specifications should be given about the repeatability and the hysteresis of the gage so as to ensure that inaccuracies in the pressure gage do not affect the check for leaking valves, etc. during pressurization. A change of 20 psi causes a change in water volume equal to 1/3 the pressure repeatability tolerance, therefore the gage should be able to read AT LEAST 20 psi but preferably smaller. Likewise the gage should be repeatable (considering hysteresis) within 20 psi. It is advantageous to have a calibrated 1% pressure gauge. If it is attached to the piping used to pressurize the prover, you can make a comparison between the prover gauge and the standard without any extra trouble. The electronic gauge used in NC was on a one year calibration interval, but proved to be very stable.
Marcus Harwitz WI	4.3.1	Remove reference to low carbon steel. Please require stainless steel only for both LPG and anhydrous ammonia.	Agree based on the internal corrosion and dirty sight glasses that are routinely experienced with mild steel provers. Stainless develops far less corrosion in the vessel and the sight glasses stay
Marcus Harwitz WI	4.3.1	Brackets and fittings associated with the mounting of the gage plates should be made stainless steel.	

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Robert M. Murnane Jr. President Pemberton Fabricators, Inc	4.3.1 & 4.5.8	<p>In handbook 105-4, Section 4.3.1. Metal Construction Material. A field standard should be constructed of low carbon steel or 300 stainless steel.</p> <p>Section 4.5.8 Internal Coating. The interior surface of field standards made of low carbon steel shall be corrosion resistant or coated with a suitable material which will be impervious to the liquids for which the standard will be used.</p> <p>As we have discussed previously corrosion resistant carbon steel is not available and coating a propane prover is impossible. Based on the handbook we have only manufactured stainless steel provers. The problems arise since our competitors continue to quote carbon steel provers at a significant lower price than our stainless steel provers. For your information stainless steel provers will currently sell for almost double that of carbon steel. There is no doubt about the advantages of stainless but the cost factor has to be taken into consideration. I am hoping that you give me N.I.S.T's position and if carbon is permissible. Thank you in advance for your consideration on this subject.</p>	<p>much cleaner. However, stainless steel may still be cost prohibitive in LPG provers. Accurate cost comparisons need to be developed. At a minimum. The standard should state that stainless steel is the preferred metal if budget allows.</p> <p>The most important consideration for brackets and fittings is probably that they be made of the same metal as the body of the prover.</p> <p>Since the interior of a low carbon steel prover cannot be “corrosion resistant or coated with a suitable material which will be impervious to” liquid LPG, this suggestion needs to be removed from the handbook.</p>
<p>Suggest seeking advice from materials research engineers at NIST. Concerns that need to be addressed in addition to the cost/benefit include maintenance and safety. Is interior corrosion significant to weaken the wall of the vessel or is it just an inconvenience?</p>			
Richard Gonzales OK	4.3.1	The word “maybe” in the fourth sentence should be two words “may be”.	Editorial, accepted
L.F. Eason NC	4.4.2.3	Has anybody reported problems with LPG prover upper scale plates? NC calibrated a new 20 gallon with a scale plate that appeared to be off by ~20 cu in per gallon on a ~4 gallon scale plate. The scale plate seemed to be correct based on the neck diameter listed on the data plate.	Has this issue been resolved by the manufacturer (Seraphin)? Also question why Seraphin builds a combination 100 gal and 20 gal prover trailer? A 20 gallon is significantly more difficult to calibrate for most labs than a 25 gal unit.

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Richard Gonzales OK	4.4.5	Question: Does the liquid in the thermometer well have to stay in the well at all times? If not, how is it to be removed at those times it is not?	Possibly add note to clarify use of conductive liquid and recommend specific products. For instance “A conductive liquid with freezing temperature below -30 °F is recommended. (e.g., 50/50 water glycol mix with freezing point of – 34 °F. The conducting liquid does not need to be removed unless 1. the expected ambient temperature is below -30 °F 2. the LPG is depressurized quickly causing “flash freezing” of the conducting liquid or 3. the cap on the temperature well is not in place to prevent leakage of liquid into the environment.
L.F. Eason NC	4.4.8 and 4.5.10.1	Why don't we require material thickness on an LPG data plate? It not in the new draft either. Not knowing the material thickness, we cannot calculate the ID of the neck based on the outside circumference.	The document does require reporting of ID of upper and lower necks. Suggest adding material thickness to data included on the data plate so neck ID can be verified if scale plate accuracy is an issue.
What information needs to be included on the data plate? Is it the same as for an open neck prover? Do neck IDs or material thicknesses need to be reported since SOP 21 addresses adjustment using the bottom neck scale based on the neck diameter?			
Harvey Fischer TX	4.5.10.2	Seraphin is currently (05-08) using adhesives to attach the identification plate. We find that the failure rate is unusually high (50%?) We have commented to Seraphin and have provided them with photo documentation of failures. hf	If adhesives are used, they must be permanent. Also, data plates must be thick enough to be resistant to tearing and other damage.
Tim Thul Arrow Tank & Engineering	4.6	Suggest adding Y-Strainer or In line strainer to prover inlet piping to keep interior of prover vessel clean when unit is piped by manufacturer or supplier	Y-Strainers or In-Line strainers can cause increased problems with high pressures or high flow rates. The strainers must be monitored and cleaned often to prevent a build-up of particles and a potential back pressure of a volatile product. It is better to use traditional techniques to clean the prover than add another element and increase the risk. If allowances were made, then specifications would have to be given regarding such things as material, thickness, screen construction, etc. to decrease the risk of using such a device. Also, this would be one additional source of uncertainty that would need to be removed before calibration of the prover.

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Marcus Harwitz WI	4.6.1	All mounting hardware used to secure levels should be made of stainless steel.	Pending further research The most important consideration is probably that they be made of the same metal as the body of the prover.
L.F. Eason NC	6.4	As part of our procedure, NC removes all of these valves except for the emergency pressure relief valve and therefore do not have an opportunity to test them. They rely on field inspectors testing the integrity of seals and valves after the prover is reassembled. They do a good job of this, but it probably would be good to add a pressure test to test valves after reassemble. For this an adapter could be made to connect the nitrogen tank to the prover through the fill valve. All other valves should be closed, the provers and piping pressurized to ~250 psig and allow it sit for some time (1/2 hour?) watching for any pressure drop. This should be done while the prover is still in the lab to avoid pressure fluctuations due to temperature changes. If the pressure dropped, the leak could be identified by swabbing a leak detection (soap) solution on joints and valves.	Already addressed in section 2.5.4 Pressure Correction of SOP 21. However, does not give time for duration of test. Could add component about letting it “sit for some time” to verify that there are no <i>slow</i> leaks (fast leaks will be caught during test as described in SOP 21).
Tim Thul Arrow Tank & Engineering	Table 1 Metric Specifications & tolerances for LPG provers	Maximum upper neck size for 1000-liter prover tank is listed as 12” with a neck volume scale at 40 Liters. We feel the neck should be the same as what’s listed for a 200 gallon. To achieve the required volume above and below the zero mark utilizing a single reflex gage the neck diameter needs to be increased to at least 16”. If we fabricate a 200 or 300 USG prover we can utilize a maximum 18” upper neck. The 1000 liter is approx. 64 USG larger than a 200 USG and 36 gallons less than a 300.	Maximum neck diameter of 16” for 1000 liter prover, given a maximum graduation of 200 mL. Neck diameters and graduation sizes will be changed based on the vessel and neck calibration tolerances chosen.
<p>What tolerances should be used for LPG provers? Is 0.05% realistic? Is it necessary relative to NIST HB 44? The device acceptance tolerance is 0.6% compared to 0.2% acceptance tolerance in the HB 44 LMD code for class 0.3 devices. Maintaining the same standard tolerance to device tolerance ratio would allow a 0.15% tolerance for LPG and anhydrous ammonia provers. Is this acceptable? Should it be applied at 100 psig? How should the gauge plate tolerance be addressed?</p>			