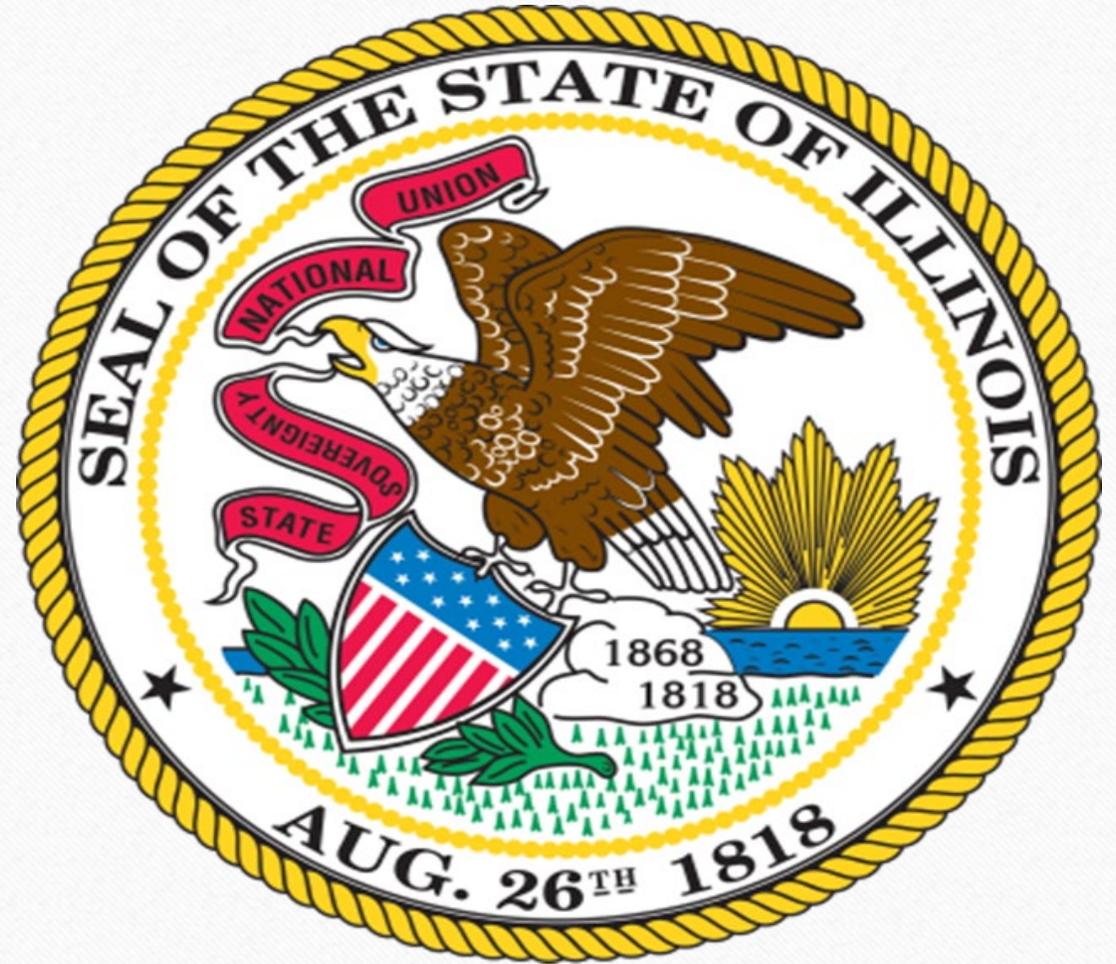# Bureau of Weights & Measures

Illinois Department of Agriculture

API's Proposal: Density Correction via "Excess Volume"

- API proposes adopting its MPMS Standard 11.3.4, which introduces a calculation for "excess volume" to replace a traceable custody meter in systems without side stream or hybrid side stream blending.

- This approach would substitute **a calculated estimate** for a **direct, traceable measurement,** a fundamental shift away from accepted metrological practice.

Why 11.3.4 Lacks Metrological Standing

- API MPMS 11.3.4 is an **industry practice**, not a recognized metrology standard. It lacks international adoption, harmonization, and traceability.

- In contrast, standards like API MPMS 11.1 / ASTM D1250-08 are jointly developed and globally recognized, making them acceptable for custody transfer and regulatory compliance.

- Temperature correction charts have been in use since 1916 and are supported by extensive empirical data, which API 11.3.4 does not provide.

Source: API MPMS 11.3.4 p.1, API MMS Chapter 11, cover.

Comparison with Recognized Standards

- **API MPMS 11.1:** Traceable temperature/pressure corrections.

- **ASTM D1250:** Custody transfer-grade petroleum measurement tables.

- **OIML R120:** International trade measurement requirements.

API 11.3.4 differs fundamentally. It relies on regression estimates, is not traceable, and cannot be verified through established regulatory methods.

Laboratory Derived Models ≠ Field Measurements

- API 11.3.4 regressions are based on controlled laboratory testing (2008–2013) using limited feedstocks and temperature ranges.

- Outlier removal and dataset manipulation further reduce field applicability.

- Such results may be valid for engineering use but **do not meet the traceability or reproducibility requirements for trade measurement**.

Data Integrity Concerns

- Of 5,878 original data points, only 1,662 were used after exclusions and adjustments.

- This level of filtering raises concerns about representativeness, transparency, and methodological integrity.

Source: API MPMS 11.3.4 Technical Report and MMS 11.3.4

Billing Implications if Adopted

Adoption would allow estimated volumes to be added to measured custody meter values.

- **Sequential, ratio, or hybrid systems:** Estimated gallons would be billed beyond what was physically measured.

- **Side-stream systems:** No additional gallons are billed because the actual volume is captured by a traceable meter, demonstrating that estimates are unnecessary where proper measurement occurs.

Excess Volume on a Ratio-blend system

Additional **ESTIMATED** gallons billed to the customer based on API's 11.3.4 calculation

E.3.3 On rack ratio blending—On rack ratio blending is accomplished by simultaneously combining two or more products through dedicated unique meters in respective amounts and flow rates according to the finished product recipe. This is accomplished at the individual loading position while delivering into a truck or rail car. This process is typically automated.

Volumetric corrections are covered under Scenario 1. See Figure E.2.

Gallons measured by a **verifiable and traceable** Custody meter

Not Traceable Estimated Gallons

BOB — M1

ETHANOL — M2

C1

VOLUMES
M1 - METERED COMPONENT
M2 - METERED COMPONENT
C1 - CALCULATED PRODUCT

Figure E.2—Ratio Metering

Source: API MPMS chapter 11.3.4

Excess Volume on a Side stream blend system

Gallons measured by a **verifiable and traceable**
Custody meter

ETHANOL —— M1

Excess Volume on a Side strea...

BOB —— C1 —— M2

VOLUMES

M1 - METERED COMPONENT
M2 - METERED COMPONENT
C1 - CALCULATED PRODUCT

Figure E.3—Side Stream Metering

Source: API MPMS chapter 11.3.4
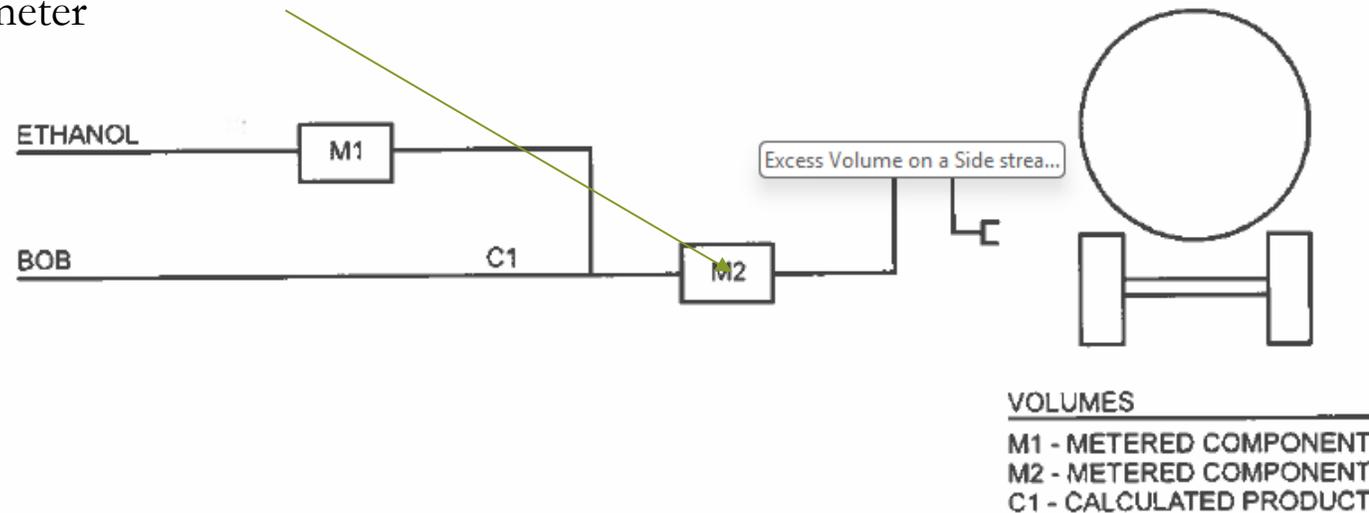
Illustrative Example: Excess Volume Impact

- Blending 90,000 gallons of gasoline with 10,000 gallons of ethanol should yield 100,000 gallons.

- API 11.3.4 **Estimates an additional (.2% growth)**

- Resulting in the customer being billed for an additional **200 gallons based off an estimate.**

- This additional volume exists **only as a model output** and is not verified by a prover, meter, or standard.

Conclusion: Reject Model-Based Billing

Only **traceable, directly measured volumes** should be used in commercial transactions.

Adopting API 11.3.4 would:

- Undermine traceability and auditability.

- Introduce unverifiable quantities into trade.

- Contradict established legal metrology standards.

For a more detailed presentation
with Bill of Lading examples
Contact.

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