

ASTM International F49 Digital Information in the Supply Chain

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CREATING TOMORROW'S SOLUTIONS



SUPPLY CHAIN STANDARDS FOR REGULATORY CONFIDENCE

Agenda

- **Background on ASTM International**
- **ASTM Committee F49 on Digital Information in the Supply Chain**
- **Basics of ASTM Standard Guide for Supply Chain Traceability**
- **Application of ASTM Standard Guide to Critical Minerals**

Background on ASTM International

- Founded in 1898, ASTM is recognized by the OECD as a developer of international standards
- ASTM is a neutral technical forum
- ASTM maintains procedures to ensure an open, transparent, consensus-based process, a balance of interests, impartiality, and resolution of substantive comments
- ASTM can develop standards much faster than other standards bodies, especially where there is strong market and government need
- The annual fee for an individual to [join ASTM](#) is \$115
- All meetings of Committee F49 (Digital Information in the Supply Chain) are virtual or hybrid
- **It's trusted: ASTM standards have been incorporated by reference in laws and regulations more than 8,000 times**



ASTM International: Standards Development Process

- Ripeness: Is there a governmental or market need? Are there any existing standards? Are there stakeholders committed to participate?
- Formation of a committee, subcommittee, and/or task group to develop the standard(s)
- Subcommittee approval to proceed with creation of a new standard
- Task group develops a first draft (proponent(s) should help drive the activity)
- Draft standard is balloted in the relevant subcommittee
- Draft standard is balloted in the full committee
- Technical comments are addressed throughout the process



Scope of Committee F49 on Digital Information in the Supply Chain

“The promotion of knowledge, stimulation of research, and the development of standards and specifications, formulation of definitions and terminology, and development of recommended practices and guides related to the sharing and use of digital information in the supply chain. The Committee will coordinate with any other ASTM Technical Committees and other standards development organizations (SDO) with related interests and ensure that the standards are technology and vendor neutral, and the standards development process is consistent with WTO principles.”



Committee F49 Work on Digital Information in the Supply Chain

Committee F49 has developed the following six international standards relating to digital information in the supply chain:

- o **D8558-25 Standard Guide for Supply Chain Traceability, Authentication, Verification, Validation, and Oversight Using Emerging Technologies Including Blockchain**
- o F3682-25 Standard Terminology for Goods Movement Process (GMP)
- o F3776-25 Standard Terminology Relating to Supply Chain Stakeholders
- o F3787-26 Standard Terminology for Supply Chain Locations
- o F3803-26 Standard Guide for Applying Goods Movement Process Codes in Common Approaches to Transport Management
- o F3804-26 Standard Practice for Applying a Goods Movement Process Code as Suffix to the ISO Transport Unit Identifier



Committee F49 Work on Digital Information in the Supply Chain

In addition, the Committee is developing the following twenty international standards relating to digital information in the supply chain:

- WK87207 Standard Practice for Container Availability
- WK87215 Standard Terminology for FMC's MTDI Lexicon
- WK94461 Standard Classification for Evaluating and Differentiating Enabling and Emerging Technologies in the Digital Supply Chain
- WK94483 Standard Guide for Developing Evaluation Rubrics to Support Ontology-Based Classification of Emerging Technologies in the Digital Supply Chain
- WK94529 Standard Terminology for Supply Chain Information Technologies
- WK94530 Standard Terminology for Traceability and Certificate of Authenticity
- WK94567 Standard Guide for ASTM Traceability Standards
- WK95803 Standard Guide for Verification of a Conformity Assessment Supporting Deforestation and Human Rights Risk Mitigation in the Coffee Supply Chain
- WK95929 Standard Terminology for Fresh Goods Supply Chain
- WK95930 Standard Practice for Calculating Shelf Life for Fresh Goods
- WK95931 Standard Practice for Handling of Fresh Goods
- WK95932 Standard Practice for Data Capture for Shelf-Life Calculation
- WK95933 Standard Test Method for Determining Remaining Shelf-Life
- WK97826 Standard Guide for Verification of a Conformity Assessment Supporting Nitrile Gloves Supply Chain
- WK98463 Standard Classification for Movement and Modes
- WK98464 Standard Classification for Measurement of Fresh Cargo
- WK98583 Standard Guide for Verification of a Conformity Assessment Supporting Medication Supply Chains
- WK99450 Standard Guide for Traceability, Authentication, and Conformity Assessment of Unmanned Aircraft Systems (UAS) and Components in Global Supply Chains
- **WK99007 Standard Guide for Verification of a Conformity Assessment Supporting Rare Earth Elements**
- WK99833 Standard Guide for Standard Guide for Conformity Assessment of Circular Textile and Apparel Supply Chains



Committee F49 Work on Digital Information in the Supply Chain

As an international standards developer, ASTM takes seriously its commitment to implementing the six WTO TBT Committee Principles for the Development of International Standards, Guides and Recommendations, including the principle of coherence.

Standards developed by Committee F49 reference numerous ISO/IEC standards, including:

- ISO/IEC 15459-1:2014 Information technology — Automatic identification and data capture techniques — Unique identification
- ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories
- ISO 28560-1:2023 Information and documentation — RFID
- ISO/IEC 17029:2019 Conformity assessment — General principles and requirements for validation and verification bodies
- ISO/IEC 17065:2012 Conformity Assessment – Requirements for bodies certifying products, processes and services
- ISO/IEC 18004:2024 Information technology— Automatic identification and data capture techniques — QR code bar code symbology specification
- ISO/IEC 19987:2024 Information technology — EPC Information Services (EPCIS)
- ISO/IEC 19988:2024 Information technology — GS1 Core Business Vocabulary (CBV)
- ISO 8000-118:2025 Data Quality — Application of ISO 8000-115 to natural location identifiers
- ISO 8000-119:2026 Data quality — Application of ISO 8000-115 to transport unit identifiers
- ISO 22095:2020 Chain of custody — General terminology and models
- ISO 27001:2022 Information security, cybersecurity and privacy protection — Information security management systems — Requirements
- ISO 14025:2006 Environmental labels and declarations
- ISO 7372:2005 Trade data interchange — Trade data elements directory



Committee F49 Membership

- Current members: 94; split between producer, user, and general interest
- We have members with significant supply chain expertise, including in goods movement, track-and-trace/traceability platforms, authentication of supply chain items and documents, digital identification of supply chain actors and events, supply chain analytics, forced labor and other regulatory compliance issues, and trade and supply chain policy.
- We have representatives from several industry sectors, e.g., fresh produce, PPE, solar, semiconductors, chemicals, rubber, coffee, defense, and forest products.
- We have members from government (NIST, DLA, STB), conformity assessment and accreditation bodies, and academic experts on supply chain issues (e.g., Johns Hopkins, NC State, Tuskegee).
- The Committee also has members who actively participate in digital supply chain-related work in ISO, Global Blockchain Business Council, Intermodal Association of North America, GS1, and the UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT).



Drivers Behind Standards Development for Supply Chain Traceability

Governments are pushing for traceability for a host of reasons.

G7 trade ministers' communiqué (May 2026)

- “In this regard, we intend to continue to discuss the feasibility and development of policies and mechanisms that would be necessary to ensure supply chain resilience and diversification, in a coordinated manner where relevant. These policies and mechanisms may include, as appropriate, resilience criteria, standards-based approaches, transparency and traceability mechanisms, demand and supply-side measures such as diversification requirements, revenue stabilization mechanisms including price-gap subsidies, joint procurement instruments, and trade-related instruments such as quotas and price floors, while taking into account factors such as their effectiveness, and potential impacts, in particular on midstream and downstream industries, as well as the costs of inaction.”

U.S. Customs and Border Protection wants to prevent trade fraud and increase tariff collection. See June 3, 2026 Executive Order [“Strengthening Customs Enforcement”](#)

G7 Leaders’ Declaration on securing supply chains for critical minerals (June 2026)

- “We recognize the importance of strong transparency and traceability frameworks to ensure supply chain security and the compliance with high standards in resilient market environments, as well as tackling illegal trafficking of critical minerals. Acknowledging ongoing work by the Organisation for Economic Cooperation and Development (OECD) and International Energy Agency (IEA), we are committed to working towards establishing harmonized, interoperable mechanisms aligned with our interests that ensure traceability and transparency regarding the origin of critical minerals.”



ASTM Standard Guide for Supply Chain Traceability

- ASTM has developed a technology-neutral, vendor-neutral standard guide to track and authenticate supply chain data and validate supply chain claims.
- This could include claims relating to origin, ownership, forced labor, domestic content, prevention of counterfeit, or enforcement of specific trade measures by trade/customs, tax, procurement, or other agencies.
- Using the guide as a basis, the Committee is developing supplementary traceability standards for rare earth elements, medical gloves, UAS, and polysilicon in the semiconductor and solar supply chains.
- We could operationalize the guide for other products/use cases.



Four Pillars of Supply Chain Traceability

Single Source of Truth

Track & Trace



Logging the movement of goods and documents at every step in supply chain.

Authentication



Verifying the origin and legitimacy of each document and data point.

Validation



Analyzing transactional and systemic data and validating (or not) supply chain claims.

Oversight



Enables an agency to review, monitor, and enforce compliance in real time (directly or through a third party entity).

Conformity assessment relies on a structured system of independent roles.

The rigor of the system can be adjusted depending on the use case, which involves factoring in the risks of non-compliance, and the level of confidence required by an agency to comply with legal requirements.

Step 1: Track and Trace

Track and trace logs the movement of products and documents at each step of the supply chain, recording events as they occur and linking them through unique identifiers to maintain a continuous, verifiable record.

A traceability platform organizes traceability records into a single analytical environment, allowing regulators to review events, identify risks and anomalies, and access summarized or detailed data as needed to support oversight and enforcement.





Step 3: Validation

- In this step, recognized third-party validation bodies **check a specific claim for a specific shipment based** on documented evidence, including risk analytics.
 - This may include an importer claiming that tariffs should not apply, a manufacturer substantiating a “Made in X Jurisdiction” claim, or a company verifying eligibility for tax credits tied to domestic content thresholds.
- Validation is performed under ASTM-defined procedures – as may be supplemented by an agency -- ensuring claims are evaluated independently and based on objective evidence, allowing an agency to rely on validated claims with confidence and legal defensibility.
- Analysis is conducted both at the specific transactional (claim) level and systemic (pattern-based) analysis to help determine multi-dimensional risks and identify parties attempting to “game” the system.
- There will also be regular third-party audits to ensure that systems are in place to produce valid claims on a shipment-specific basis.



Step 3: Validation

NX Analyzer: Analytics and Validation Scoring

Analytics factor in both the elements of the transaction (event or claim) and the systemic (pattern-based) considerations to help determine multi-dimensional risks and identify parties attempting to “game” the system.



The Analytics result in an aggregate Conformity Assessment Score (CAS), put into context of High/Medium/Low and Percentile.

The Risk Assessment Matrix provides knowability, decomposition and context of the total CAS

Details of the underlying risk factors and supporting data are available as AI Explainability.

Step 4: Oversight

An agency retains full governmental authority over compliance, admissibility, and enforcement decisions. This would not replace that authority but improve agency effectiveness through use of recognized third parties and state-of-the-art technology to do most of the work.

Adoption of this system would not require an agency to hire more people or purchase additional hardware or software. The scheme would convey the relevant information to the agency in any form it wants (e.g., in the case of U.S. Customs and Border Protection, through the Automated Commercial Environment).

An agency maintains rigorous oversight of the scheme.

Third parties that it may recognize based on the ASTM standards -- supplemented by any agency-specific criteria -- operate within these boundaries.

Draft Standard Guide for Verification of a Conformity Assessment with respect to Rare Earth Elements and Derivative Products

- Under this new work item, F49 will adapt the four-pillar approach to rare earth elements.
- Governments are driving the push towards enhanced traceability. We need input from the private sector to design simple, cost-effective, accurate approaches that allow for shipment-by-shipment validation of relevant supply chain claims while protecting business confidential information.
- What are the commercial and transportation data points one would need to create a digital twin covering every node of the supply chain from the mine to the final manufactured product?
- What are the pain points in REE supply chains? E.g., is there commingling at certain stages of the supply chain?
- Should a standard guide take one approach to traceability for all REEs or does it need to differentiate among different REEs?
- F49 welcomes collaboration with existing schemes in the critical minerals space to build out or enhance the traceability component.



House Homeland Security Appropriations Directive Report Language

Digital Traceability Standards.—The recommendation provides \$5,000,000 to enable CBP to engage with an existing, privately-funded supply chain traceability platform based on relevant international standards, such as supply chain traceability standards developed by ASTM International, for supply chains that are critical to national security, economic resilience, and public health. These may include rare earth elements, nitrile gloves, UAS, and polysilicon and derivative products—sectors which are the subject of ongoing Section 232 investigations. CBP shall use the funds provided to engage in the following activities: Automated Commercial Environment (ACE) support and Application Programming Interface connectivity and training of key staff. The Committee encourages CBP to address longstanding supply chain traceability challenges that have complicated its ability to enforce relevant trade laws on a shipment-by-shipment basis. Not later than 180 days after the date of enactment of this Act, CBP is directed to brief the Committee on the development and adoption of digital traceability standards and related conformity assessment and include cost estimates for broader adoption of such standards across CBP import operations and any legal or regulatory impediments to the mandatory adoption of such standards.

Thank you for your attention!



Questions?

Please submit via Chat

