

The Resource Ledger — Reference Implementation Note

POOL AS A REFERENCE IMPLEMENTATION

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This note maps the five principles set out in the working paper *The Resource Ledger: Extending Double-Entry to Physical Mass* (Hiroki Omura, 2026) to **pool**, the data infrastructure for resource circulation that RECOTECH designs and operates. It states what pool implements today and what remains on its roadmap. The protocol is neutral; pool is its first reference implementation. The protocol is one. Its implementations will not be.

Maturity markers. Each item carries one of three marks.

- **Implemented:** running in commercial operation
- **Partial:** running, but covering only part of what the principle requires
- **Roadmap:** specified as a design target, not yet implemented

PRINCIPLE 1 — EXTENDING DOUBLE-ENTRY TO MATTER

What the principle requires: every movement of matter is recorded as a paired entry (transfer, transformation, holding), at the level of identifiable material, and reconciled continuously.

pool implementation	Maturity
Weight records at the point of discharge, by material and by discharger. Records attach to an account hierarchy of tenant, floor and business, so matter enters the ledger as identified material rather than as an aggregated lump	•
For the plastic stream: discharge, collection, intermediate processing, recycling and procurement are each registered on pool by the party responsible. Garment covers and hanger bags collected from commercial facilities are recycled into pool resin, a post-consumer resin made entirely in Japan, which Toyota Tsusho has used since 2024 as raw material for auto-parts packaging	•
For other streams: discharge (tenant), collection (hauler) and treatment (disposal facility) connected on one data model, with an account design that can describe each transfer from both sides	◐
Continuous verification of a conservation identity per node (inflow = outflow + change in stock), with explicit time and material boundaries	○

pool's ledger currently starts from identification on the outflow side, the side the paper calls "off the books". This order is deliberate. The inflow side already has a precise industrial information system. The outflow side is what is missing, and the asymmetry can only be closed from there.

PRINCIPLE 2 — OBSERVATION AS THE ORIGIN OF EVERY ENTRY

What the principle requires: entries are generated from physical reality, not from declarations. Independence lies not in a single instrument but in a chain of observations.

pool implementation	Maturity
Automatic connection between pool and scales verified under Japan's Measurement Act (platform scales and floor scales). A weight becomes a record without manual transcription: the minimum implementation of "the observation is the entry"	●
Field records including a photograph at the time of weighing: visual evidence of composition and sorting condition	●
A sorting-feedback flow that checks the discharger's weighing against confirmation by the hauler's account on the receiving side (anomaly notices for poor sorting, with photographs): an early form of cross-checking between parties with different interests	◐
Automatic identification of composition by image recognition; full cross-checking by independent automatic weighing at several nodes along the chain	○

One limit of scope: pool's automatic connection currently covers stationary verified scales. Automatic connection with vehicle-mounted weighing, such as truck scales, is not yet implemented and is on the roadmap. The chain of observation closes first at the point of discharge, and extends from there to transport and treatment.

PRINCIPLE 3 — AUTONOMOUS RECONCILIATION

What the principle requires: discrepancies are resolved by mechanisms inside the system, without calling on an outside authority. The ontology of classification becomes an object of human design.

pool implementation	Maturity
A reconciliation loop in which the collection side sees the discharge side's records in real time, and discrepancies (such as poor sorting) travel back and forth as notices	◐
The classification ontology, which Principle 3 calls "the deepest difficulty", implemented in operation as the account design's classification scheme	●
Automatic matching and resolution of declared and observed values by agentic AI	○
A tamper-evident record substrate that no single party controls	○

PRINCIPLE 4 — THE GRAVITY FIELD

What the principle requires: coordinated falsehood is broken not by verification but by demand. The premium that verified matter earns over matter backed only by testimony becomes the ledger's security budget. Once demand stands, adoption proceeds by the pull of recorded mass.

pool implementation	Maturity
The verification premium in practice: commercial arrangements with large dischargers, such as real-estate developers, that require measured data from verified scales as the basis for ESG reporting and tenant-level disclosure. An early form of demand that pays for being verified	●
Third-party certification of the plastic chain: the system to obtain ISCC PLUS is built, but certification is not held. Because obtaining and maintaining it is costly, RECOTECH will certify when a buyer requires it	●
Deployment across areas and facilities. In a large mixed-use complex, connecting the facility as a single node brings every tenant and every collection route inside it onto the ledger: the node-threshold model in practice	●
Deployment as data infrastructure for resource circulation at the scale of a city area (municipalities and wider regions)	●
Supply of verified data to markets in which matter with verifiable composition, origin and destination is preferred over matter backed only by testimony	○

PRINCIPLE 5 — THE COMPLIANCE SURFACE

What the principle requires: existing institutional frameworks are not replaced. The documents they require are generated from the substrate, and compliance becomes a by-product. The compliance surface is the engine that starts the protocol: it pays the first node back from its first day, without waiting for a network to form.

pool implementation	Maturity
Output from the substrate records into the formats required for manifest operations and administrative reports under Japan's Waste Management Act. Numbers in two layers: a compliance layer (accounted in the units the law requires) and an evidence layer (measured on verified scales), output separately from the same substrate	●
Generation, from the substrate, of the documents required inside existing commercial and contractual structures, without replacing those structures	●
Measurement-based data output for ESG disclosure (such as GRESB) and Scope 3 accounting	●
Automatic output in the formats of international frameworks such as the Global Circularity Protocol (GCP) and the Digital Product Passport (DPP)	○

Of pool's five-principle mapping, the compliance surface is the most mature. This is not an accident. Principle 5 requires that the value a single node gains on its first day be the reason to connect, and pool demonstrates that requirement as a business every day.

WHAT THE IMPLEMENTATION SHOWS

pool's position against the five principles is asymmetric. The compliance surface (Principle 5) and observation as origin (Principle 2) lead; autonomous reconciliation (Principle 3) and continuous verification of the conservation identity (Principle 1) follow. This order is itself a field test of the working paper's claim. The cold-start problem is solved by the compliance surface (Principle 5). The chain of observation closes one link at a time from the field (Principle 2). As recorded mass grows, the verification premium and the pull to connect begin to rise (Principle 4). The protocol is not implemented all at once. But the five principles are designed so that implementation from any cross-section converges on the same whole.

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