



VEYRUM ROBOTICS STANDARD



VRS-GEN-009

Robot Risk Passport and Registry — Data Schema

Recording a per-unit Veyrum rating, its tier, edition and supporting evidence.

VEYRUM RESEARCH INSTITUTE

DOCUMENT
VRS-GEN-009

VERSION
1.0

STATUS
Draft

DATE
16 September 2026

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Foreword. This Standard specifies the structure of the Robot Risk Passport and the Registry that holds Passport records. It is a draft issued for review and does not yet constitute a published Veyrum Standard. Requirements use “shall” for mandatory provisions and “should” for recommendations.

Re-designation notice (2026-09-03): this document was drafted as “VRS-001” before the VRS designation system existed. It is re-designated **VRS-GEN-009** under VRS-GEN-002 (Designation, Drafting and Style Rules), exercising the one-time pre-publication re-designation window (Framework Design Brief D2, CEO 2026-09-02). “VRS-001” was never published and shall not be cited. Rating semantics conform to the canonical IR/AR definition as amended 2026-09-02 (AR letters C < B < A < AA < AAA; IR edition-stamped).

1 Introduction

A rating is only usable by an underwriter or a lender if, on the day of reliance, they can retrieve *which* rating applies to *which* robot, on *what* basis, at *what* tier, and whether it still stands. This Standard fixes the container that carries that answer — the **Robot Risk Passport** — and the **Registry** that administers Passport records over time. It defines structure and recording rules only: the meaning of the values it holds lives in their single-source documents (IR in VRS-GEN-005, AR in VRS-GEN-006, evidence and privacy in VRS-GEN-012, rating lifecycle in VRS-GEN-008), which this Standard references and never restates.

Every recorded rating carries a **tier** — Unverified, Verified or Certified — and the **edition** it was determined under (for example **VRS 2026**). The tier records how the evidence was obtained: Unverified from public evidence assembled by Veyrum, Verified from a manufacturer evidence pack, Certified from a witnessed demonstration (VRS-GEN-003 §6). A rating does not carry an interval or a draft-quality flag; it carries its tier and its edition, and drafts carry the document **status: Draft**.

Two established models are reused so that a Passport interoperates with tooling insurers and lenders already run. The Registry is a **metadata registry** in the sense of ISO/IEC 11179-3:2023 — each Passport is an *administered item* with a *registration status*, held by a *registration authority*, and versioned rather than overwritten. A Passport may additionally be expressed as a portable, machine-verifiable **verifiable credential** per the W3C Verifiable Credentials Data Model 2.0, so that a relying party can check issuer, subject and status without a live call to the Registry. Dates follow ISO 8601-1:2019 and identifiers follow the globally-unique-and-permanent principle of ISO/IEC 15459-1:2014. Passports and ratings are **not published** at this stage, and nothing recorded under this Standard may imply that a real robot holds a Veyrum rating.

2 1 Scope

This Standard defines: Passport identity and identification (Clause 4); the Passport record structure (Clause 5); the Registry and registration status (Clause 6); dates and derived quantities (Clause 7); the machine-readable serialization and field schema (Clause 8); portability and verification (Clause 9); and retention, immutability and privacy (Clause 10); with a worked example (Clause 11). It applies to any robot assessed under the Veyrum rating methodology at any tier. It excludes how ratings are computed (VRS-GEN-005/006), how evidence is assessed (VRS-GEN-012), the Unverified procedure (VRS-GEN-204), and what happens to a rating after issuance (VRS-GEN-008), each cross-referenced here and never restated.

3 Normative references

- **VRS-GEN-001**, Vocabulary and Terminology (undated) — the primary term home; robot terms follow ISO 8373:2021.
- **VRS-GEN-005**, IR Methodology; **VRS-GEN-006**, AR Scheme (undated) — the meaning of the IR points and AR letters recorded in the ratings block, the per-criterion point-sum and company-wide fallback (VRS-GEN-005 §6), and the “no applicable pool” rule (VRS-GEN-006 §5).
- **VRS-GEN-008**, Application of Ratings (undated) — the lifecycle states that the status block records, and the refresh, change and withdrawal rules it points to.
- **VRS-GEN-010**, Conformity Mark Rules (undated) — the mark form (tier + edition) a Passport backs.
- **VRS-GEN-012**, Evidence and Data Requirements (undated) — the evidence-record schema, the per-criterion evidence bar, and the no-PII rules the evidence block points to.
- **ISO/IEC 11179-3:2023**, Metadata registries — Part 3: Metamodel for registry common facilities — the administered-item and registration-status model the Registry adopts.
- **ISO 8601-1:2019**, Date and time — Representations for information interchange — Part 1: Basic rules — the date format for every recorded date.

4 Terms and definitions

For the purposes of this document the terms in VRS-GEN-001 apply — including *tier*, *edition stamp*, *contributor* and *applicable pool* — together with the following.

4.1 Passport (Robot Risk Passport)

The per-unit container holding a robot’s current Veyrum rating (IR points and AR letters), its tier and edition, its history and its evidence references (VRS-GEN-001 §3.4.4). The Passport is a container, not a rating.

4.2 Registry

The administered collection of Passport records, structured as a metadata registry per ISO/IEC 11179-3:2023, with a registration authority, per-record registration status, and versioned (never overwritten) records.

4.3 administered item

A Passport record under the control of the Registry, uniquely identified and carrying a registration status, in the ISO/IEC 11179-3:2023 sense.

4.4 model-level record

A Passport record for a robot model where no deployed unit is in scope (for example an Unverified assessment from public evidence); recorded as a declared deviation from the per-unit default (§4.4), never silently substituted for it.

5 Passport identity and identification

4.1 Each Passport **shall** be identified by a Veyrum passport identifier that is globally unique and permanent for the life of the record, following the unique-identifier principle of ISO/IEC 15459-1:2014; the identifier **shall not** be reused or reassigned once issued.

4.2 Each Passport **shall** identify the robot model it describes and, where a deployed unit is in scope, the individual unit; a unit is the subject of a Passport record, never of its own rating (VRS-GEN-001 §3.4.2).

4.3 Each Passport **shall** record the manufacturer of record for the model, the **hardware revision** assessed, and the **software version range** the rating applies to (for example $\geq 3.2.0$, $< 4.0.0$), so that a relying party can tell whether a given unit falls inside the assessed configuration.

4.4 Where no deployed unit is observed, the Passport **shall** be marked a **model-level record** and the deviation from the per-unit default **shall** be recorded explicitly; per-unit issuance begins when deployment evidence exists. The absence of a unit **shall not** be silently substituted with a per-unit record.

6 Passport record structure

5.1 Each Passport **shall** comprise, at minimum, the following blocks: identification (Clause 4), ratings, evidence, certification, status, and history. The machine-readable key names are fixed once in the serialization of Clause 8 and are not duplicated in prose.

5.2 The **ratings** block **shall** record, for the IR: the IR value in **points**, the **edition** it was earned under (for example IR 296 (VRS 2026)), the **tier**, the methodology version applied (VRS-GEN-005 and its data twin), the **per-criterion points** whose sum reproduces the IR (VRS-GEN-005 §6), the **not-applicable set** of criteria that did not apply to the model, and the **contributors used** where a criterion was satisfied by a company-wide record (VRS-GEN-005 §6). For each assessed sector it **shall** record the AR letter on the canonical scale (C < B < A < AA < AAA), the sector, the assessment protocol and version, the classes assessed, the AR tier (which **shall not** exceed the IR tier), and – where the sector has no applicable pool (VRS-GEN-006 §5), rendered distinctly from a letter. The ratings block **shall not** display an IR as if it were sector-specific, nor an AR without its sector and tier.

5.3 The **evidence** block **shall** reference the evidence records supporting the rating by identifier and record, per criterion, whether the evidence bar was met at the recorded tier (VRS-GEN-012 §4), together with the no-PII assertion; it **shall not** embed the evidence content or any personal information (VRS-GEN-012 §8.3). Evidence grade labels, where carried, are a data-quality vocabulary only and **shall not** be read as a rating (VRS-GEN-012 §4).

5.4 The **certification** block, present only where the tier is Certified, **shall** reference the **Session Record** produced by the witnessed demonstration, the route used (in-person witness, remote live-video witness, or independent laboratory – all evidentially equivalent, VRS-GEN-003 §6), and the demonstration protocol and version; it **shall not** restate the demonstration procedure.

5.5 The **status** block **shall** record the current tier and edition, the **issue date**, the **publication-hold status** (held or released), the current lifecycle state using the state vocabulary of VRS-GEN-008, the **field-record annotation** (published incidents and recalls, maintained independently of the score), and, where the rating is Unverified, the **notice-and-comment timeline** (notice, engagement close, results notice, comment close, publication) recorded per VRS-GEN-204. Where the rating has been withdrawn it **shall** record the **withdrawal** with reason and date. The semantics of each lifecycle state are owned by VRS-GEN-008 and are not redefined here.

5.6 The **history** block **shall** retain superseded ratings, refresh events, change declarations and withdrawals with their dates and authority, so that the record's evolution is auditable.

7 The Registry and registration status

6.1 The Registry **shall** administer each Passport as an administered item with a registration status, in the ISO/IEC 11179-3:2023 metamodel sense; the registration authority is the body operating the Registry under VRS-GEN-003 governance.

6.2 Each Passport record **shall** carry the schema version under which it was written (this Standard’s edition, for example `VRS-GEN-009:1.0`), so that a reader can resolve the record against the correct field definitions.

6.3 Records **shall** be append-only: a change to a rating **shall** create a new record version that supersedes the prior version, and the superseded version **shall** be retained, not overwritten. A withdrawn record’s history **shall** be retained (the record is never erased), consistent with VRS-GEN-008.

6.4 On refresh (re-Verification or re-Certification, VRS-GEN-008), the new record version **shall** carry a **change declaration** mapping each declared change to the criteria it affects; unaffected criteria carry their points forward and affected Certified criteria carry forward only if their demonstration steps are re-run. Where a Passport is extended to a variant as a derived rating, the derived record **shall** link to its parent record’s identifier and **shall not** be recorded as an independent first-assessment record.

8 7 Dates and derived quantities

7.1 Every date recorded in a Passport — issue date, state-change date, notice-and-comment timeline dates, refresh and withdrawal dates, history entries — **shall** be recorded to **day** precision in the ISO 8601-1:2019 extended format `YYYY-MM-DD`.

7.2 A rating does not expire: the record **shall** show its issue date and edition, and the Registry **shall** expose the **days since issue** as a derived integer, so that an underwriter or lender can monitor a rating’s age and schedule a re-Verification or re-Certification review against the current edition (VRS-GEN-008). No validity window or expiry date is recorded, and none **shall** be restated as a constant in this Standard or in a Passport record; edition currency is single-sourced in VRS-GEN-004.

9 8 Machine-readable serialization and field schema

8.1 A Passport **shall** have a machine-readable serialization whose field keys match the dataset vocabulary (VRS-GEN-012 twin) exactly; the descriptive names in Clause 5 map to those keys 1:1. The field schema below is the authoritative minimum.

BLOCK	FIELD	TYPE	UNITS / FORMAT	REQUIRED
identification	passport_id	string	globally-unique, permanent (ISO/IEC 15459-1:2014)	shall
identification	model	string	manufacturer product model	shall
identification	unit	string null	null for a model-level record (§4.4)	shall
identification	manufacturer_of_record	string	legal manufacturer	shall
identification	hardware_revision	string	model hardware revision assessed	shall
identification	software_version_range	string	e.g. $\geq 3.2.0$, $< 4.0.0$	shall
ratings	IR.points	integer	points, edition-stamped	shall
ratings	IR.edition	string	e.g. VRS 2026	shall
ratings	IR.tier	enum	Unverified Verified Certified	shall
ratings	IR.methodology	string	VRS-GEN-005 version + data twin	shall
ratings	IR.criteria_points	object	per-criterion points; sum = IR.points (VRS-GEN-005 §6)	shall
ratings	IR.na_set	list	criteria recorded not-applicable	shall
ratings	IR.contributors	list	company-wide records used (VRS-GEN-005 §6)	shall
ratings	AR[sector].letter	enum null	C B A AA AAA, or null	shall
ratings	AR[sector].state	enum	rated not-applicable (no applicable pool, VRS-GEN-006 §5)	shall
ratings	AR[sector].tier	enum	Unverified Verified Certified; $\leq$ IR.tier	shall
ratings	AR[sector].protocol	string	protocol + version + classes assessed	shall
evidence	records	integer	count (VRS-GEN-012)	shall
evidence	bar_met	object	per-criterion evidence-bar result at tier (VRS-GEN-012 §4)	shall
evidence	grade_labels	object	evidence grade labels only (VRS-GEN-012 §4)	should
evidence	pii	enum	none (VRS-GEN-012 §8.3)	shall

BLOCK	FIELD	TYPE	UNITS / FORMAT	REQUIRED
certification	session_record_ref	string null	Session Record identifier	shall if Certified
certification	route	enum null	in-person remote-live-video independent-laboratory	shall if Certified
certification	demonstration_protocol	string null	protocol + version witnessed	shall if Certified
status	tier	enum	Unverified Verified Certified	shall
status	edition	string	e.g. VRS 2026	shall
status	issued	date	YYYY-MM-DD (ISO 8601-1:2019)	shall
status	publication_hold	enum	held released	shall
status	state	enum	VRS-GEN-008 lifecycle state	shall
status	notice_comment	object null	Unverified timeline dates (VRS-GEN-204)	shall if Unverified
status	field_record	object	incidents/recalls, maintained independently	shall
status	withdrawal	object null	reason + date, or null	shall
history	entries	list	dated events with authority	shall
_schema	version	string	e.g. VRS-GEN-009:1.0 (§6.2)	shall

8.2 A record missing any **shall** field **shall** be inadmissible to the Registry and **shall** be logged with the missing field named, so that the gap is auditable rather than silent.

A minimal serialization (fictional; illustrates structure only):

```
{
  "_schema": "VRS-GEN-009:1.0",
  "passport_id": "VP-2026-000142",
  "identification": { "model": "Meridian Forge MF-9 (fictional)", "unit": "MF9-SN0311",
    "manufacturer_of_record": "Meridian Forge (fictional)",
    "hardware_revision": "rev-C", "software_version_range": ">=3.2.0,<4.0.0" },
  "ratings": {
    "IR": { "points": 296, "edition": "VRS 2026", "tier": "Verified",
      "methodology": "VRS-GEN-005:2026 + data twin v1.2",
      "criteria_points": { "SF-1": 92, "RL-1": 74, "SV-1": 68, "MS-1": 62 },
      "na_set": ["EC-3"], "contributors": ["MS-1 (company-wide)"] },
    "AR": { "IND": { "letter": "AA", "state": "rated", "tier": "Verified",
      "protocol": "VRS-IND-201 v1.0 · classes: mobile-logistics" },
```

```

    "SVC": { "letter": null, "state": "not-applicable" } }
  },
  "evidence": { "records": 37, "bar_met": { "SF-1": true, "RL-1": true }, "pii": "none" },
  "certification": null,
  "status": { "tier": "Verified", "edition": "VRS 2026", "issued": "2027-05-12",
    "publication_hold": "held", "state": "current",
    "field_record": { "incidents": 0, "recalls": 0 }, "withdrawal": null },
  "history": [ { "date": "2027-05-12", "event": "issued (initial)", "authority": "assessment run" } ]
}

```

10 9 Portability and verification

9.1 Where a Passport is issued as a portable credential, it **shall** be expressible as a W3C Verifiable Credentials Data Model 2.0 verifiable credential, with the issuer (the registration authority), the credential subject (the model or unit), and a credential status; this lets a relying party verify a rating cryptographically without a live Registry call.

9.2 The credential status **shall** map to the VRS-GEN-008 lifecycle state and carry the tier and edition, so that a withdrawn rating presents as invalid to a verifier and a tier is never read above the one issued.

9.3 No Passport, serialization or credential **shall** be published while its publication-hold status is **held**, and none **shall** imply that a real robot holds a Veyrum rating, until the scheme publishes (VRS-GEN-008; CEO deferral 2026-09-05).

11 10 Retention, immutability and privacy

10.1 No personal information **shall** be stored in a Passport or its evidence references; operator identities are referenced by verification status, not identity (VRS-GEN-012 §8.3). Retention beyond the consent/rights basis recorded under VRS-GEN-012 §8 **shall not** occur.

10.2 Registry records **shall** be immutable once written: corrections, refreshes and withdrawals create new versions (§6.3); the integrity of a record version **should** be protected by a content hash so that tampering is detectable.

12 11 Worked example

Illustrative only; no real robot holds a Veyrum rating. A manipulator model earns **IR 296 (VRS 2026)** at the **Verified** tier. The registration authority issues Passport **VP-2026-000142** (§4.1), records the model, its serial unit, hardware revision **rev-C** and software range **>=3.2.0, <4.0.0** (§4.2–§4.3), and writes the ratings block: the IR in points, the edition **VRS 2026**, the tier **Verified**, and the per-criterion points that reproduce the IR by addition — **92 + 74 + 68 + 62 = 296** (§5.2, VRS-GEN-005 §6). One criterion (**EC-3**) is recorded in the not-applicable set, and **MS-1** is flagged as satisfied from a company-wide record. The sector rating is written as **IND AR: AA (VRS 2026) – Verified** with its protocol and classes, while **SVC** records — because the sector has no applicable pool (§5.2, VRS-GEN-006 §5). The evidence block references 37 evidence records, the per-criterion bar results, and **pii: none** (§5.3, §10.1). Because the tier is Verified, the certification block is null (§5.4). The status block records **current**, **publication_hold: held**, an issue date **2027-05-12** to day precision (§7.1) and no expiry; the Registry exposes days since issue as a derived integer (§7.2). The record is stamped **_schema: VRS-GEN-009:1.0** (§6.2).

The manufacturer later schedules a witnessed demonstration and the rating is re-Certified. The Registry appends a **new** version (§6.3) with a change declaration mapping the software change to its affected criteria (§6.4); the certification block now references the Session Record and the remote live-video route (§5.4). Later a supplier test report is retracted; VRS-GEN-008 withdraws the rating. The Registry appends a further version setting the withdrawal record with reason and date and annotating the field record, while retaining every prior version (§6.3, §10.2) — no value is overwritten. A verifier presented with the withdrawn Passport as a W3C VC 2.0 credential reads the credential status as invalid (§9.2) and does not rely on it as current. Every transition is an append-only Registry event; no constant lived in, or was changed in, the Passport record.

13 Bibliography

- ISO/IEC 11179-3:2023, *Information technology — Metadata registries (MDR) — Part 3: Metamodel for registry common facilities* (Edition 4; Amendment 1:2026, item-mapping enhancements).
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- W3C, *Verifiable Credentials Data Model 2.0*, W3C Recommendation, 15 May 2025 (v2.1 in progress).
<https://www.w3.org/TR/vc-data-model-2.0/>
- ISO/IEC 29100:2024, *Information technology — Security techniques — Privacy framework* (Edition 2) — the privacy terminology behind the no-PII / consent rules cross-referenced from VRS-GEN-012.
<https://www.iso.org/standard/85938.html>
- ISO 8373:2021, *Robotics — Vocabulary* — the robot-term base used across the VRS.
<https://www.iso.org/standard/75539.html>

14 Change history

DATE	VERSION	STATUS	CHANGE	AUTHORITY
2026-09-16	1.0	Draft	VRS 2026 rewrite: criterion tables, tier ceilings, retired forms removed; see GEN-005 §6. Recast the record around tier + edition: added tier, edition, issue date, hardware revision + software version range, publication-hold status, notice/comment timeline (Unverified, GEN-204), Session Record reference and route (Certified, GEN-003 §6), field-record annotation, withdrawal record, change declaration (refresh), per-criterion points + not-applicable set, and contributors used (GEN-005 §6). Removed the confidence band, the provisional flag, the assessed-unrated state (→ “no applicable pool”, GEN-006 §5), the cold-start block and its VRS-GEN-201 dependency (→ company-wide fallback, GEN-005 §6), and the expiry/validity-window derived quantity (no expiry; issue date + edition per GEN-008). Anchors re-verified this run: ISO/IEC 11179-3:2023 (Edition 4; Amd 1:2026), W3C VC Data Model 2.0 (Rec. 15 May 2025). No constant changed.	Curator REWRITE; charter §2
2026-09-14	0.5	Draft	DEEPEN (50→publishable): added Introduction (registry-as-metadata-registry + passport-as-credential rationale); split former §4 into Identification (§4), Record structure (§5), Registry/registration status (§6, ISO/IEC 11179-3:2023), Dates & derived quantities (§7, ISO 8601-1:2019), Machine-readable serialization + field table + JSON (§8), Portability & verification (§9, W3C VC 2.0), Retention/immutability/no-PII (§10); added §11 worked example; dated Bibliography (6 entries). Net +~1,400 words; shall 7→~30.	Curator Run #139; charter DEEPEN
2026-09-11	0.4ε1	Draft	COHERENCE: front-matter date refreshed to the newest change-history row per the library invariant. Editorial only — no technical change.	Curator Run #23; charter COHERENCE
2026-09-05	0.4	Draft	Clause numbering aligned to VRS-GEN-002 §6.1 skeleton (pre-framework headings were unnumbered) — found by library conformance audit	conformance audit
2026-09-05	0.3	Draft	Annex A worked example added (fictional-labelled); change-history table added per VRS-GEN-002 §6.1	CEO goal 2026-09-05
2026-09-03	0.2	Draft	Re-designated VRS-001 → VRS-GEN-009 (pre-publication window, D2)	Framework Design Brief v1.1
2026-08-25	0.1	Draft	Initial draft (as “VRS-001”)	pre- framework

About Veyrum Research Institute

Veyrum Research Institute is the research arm of Veyrum — the independent intelligence and trust layer for the robotics industry (research, ratings and registry, advisory, data, and specialist insurance & finance introductions).

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