



VEYRUM ROBOTICS STANDARD



VRS-GEN-201

Cold-Start Qualification Protocol

First-of-model assessment guidance — how to assemble the evidence pack for a model with no fleet history; the cold-start parity rule itself is normative in VRS-GEN-005 §6.

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Contents

1 1 Scope

2 2 Normative references

3 3 Terms and definitions

4 4 First-of-model evidence guidance (informative procedure)

4.1 4.1 Step 1 – Qualification basis

4.2 4.2 Step 2 – Novelty assessment

4.3 4.3 Step 3 – Failure-mode register

4.4 4.4 Step 4 – Qualification plan

4.5 4.5 Step 5 – Execution and evidence collection

4.6 4.6 Step 6 – Performance assessment and margins

4.7 4.7 Effort proportionality

4.8 4.8 Evidence admissibility and refusal

4.9 4.9 Feeding the ordinary determination

5 Annex A (informative) – Worked example

6 Bibliography

7 Change history

Foreword. This Assessment Protocol is retained as **first-of-model assessment guidance**: how an assessor assembles and executes the evidence for a robot model that has not yet accrued fleet history. Under the VRS 2026 edition the rule that lets a brand-new model reach the same score as a mature one — **cold-start parity and the company-wide fallback** — is normative in **VRS-GEN-005 §6**, and a first-of-model assessment is an ordinary assessment scored by the ordinary criteria at their ordinary tier ceilings. This Protocol therefore **does not issue a rating, set a cap, or assign a rating tier of its own**; it feeds evidence into the GEN-005 §6 determination and into the record fields of VRS-GEN-009. It adapts the systematic, risk-based qualification pattern (declared functions → failure modes → qualification activities → evidence) of DNV-RP-A203 (June 2017) and the Technology-Readiness-Level vocabulary of ISO 16290:2013, so a manufacturer’s existing engineering file supplies most of the inputs. As a protocol it is versioned vX.Y.Z (VRS-GEN-004 §5.4).

Informative — this document contains no requirements. Every clause of this edition is informative (VRS-GEN-002 §3.7, §4.2); the type code stays AP for VRS 2026 because a type change is a VRS-GEN-002 Annex matter. Where this guidance says “should”, the governing requirement — if any — is the one in VRS-GEN-005 §6, VRS-GEN-009 or VRS-GEN-012 that it points to.

1 Scope

This Protocol gives guidance for the **first-of-model (pre-launch) case**: assembling the evidence pack and running the demonstration steps for a model whose fleet history does not yet exist, so that the model can be assessed at the Certified tier without waiting for operating hours to accrue. It covers: assembling the qualification basis (Clause 4.1); classifying element novelty and concentrating effort (4.2, 4.7); mapping qualification activities to reusable conformity artefacts (4.4); collecting and admitting evidence (4.5, 4.8); verifying performance and contracting the declared envelope (4.6); and feeding the result into the ordinary determination (4.9).

It **excludes**, and defers entirely to their owning documents: the cold-start parity rule and company-wide fallback (**VRS-GEN-005 §6**); the criterion points, rungs and tier ceilings (VRS-GEN-101...107 and each sector’s **VRS-<CODE>-201**); the AR letter scale C<B<A<AA<AAA (VRS-GEN-006); the record fields (VRS-GEN-009); and the rating lifecycle after issuance (VRS-GEN-008). This Protocol produces **inputs**; it defines no scale, tier or score of its own.

2 Normative references

- **VRS-GEN-005**, IR Methodology — criteria and points; **cold-start parity and the company-wide fallback (§6)**, which govern how a first-of-model result is scored.
- **VRS-GEN-006**, AR Scheme — applicability and the letter scale.
- **VRS-GEN-008**, Application of Ratings — validity, review, withdrawal.
- **VRS-GEN-009**, Registry and record schema — the fields the qualification file feeds.
- **VRS-GEN-012**, Evidence Grades and Data Requirements — grades, denominators, consent.

- **VRS-GEN-202**, Calibration and Validation Protocol — governs any constant used here.

Informative anchors (dated at point of use) are collected in the Bibliography.

3 Terms and definitions

Per VRS-GEN-001. Locally:

- 3.1 qualification basis** — the recorded statement of the model’s declared operating envelope, functions, performance targets, and the claims the assessment will rest on.
- 3.2 novelty class** — the classification of a model element as *proven* (established design with transferable track record), *adapted* (proven design in a new application or envelope), or *novel* (no relevant track record).
- 3.3 qualification activity** — an evidence-producing action: analysis, physical test, simulation, prior-art transfer, expert review, or supervised field trial.
- 3.4 margin** — the demonstrated headroom between measured performance and the declared envelope limit for a function, expressed as a ratio or percentage.

4 First-of-model evidence guidance (informative procedure)

The assessor should execute the following steps in order, recording each step’s output in the qualification file. The pipeline is iterative: a failed step 6 returns to step 4. The steps assemble and admit evidence; they assign no score — scoring is done by VRS-GEN-005 §6 and VRS-GEN-006 from the evidence this procedure produces.

4.1 Step 1 — Qualification basis

Record the manufacturer’s declared operating envelope, functions, performance targets and claims. The basis fixes **what is being assessed**; undeclared capability is not assessed. Each declared performance target should carry SI units and the envelope condition it holds under (e.g. rated payload 15 kg at ≤ 1.8 m/s).

4.2 Step 2 — Novelty assessment

Decompose the model into its rating-relevant elements (mobility, manipulation, perception, control/autonomy, power, connectivity, safety functions) and assign each a novelty class (3.2). Each rating-relevant element should be assigned exactly one novelty class, recorded with its justification. Effort should concentrate on *adapted* and *novel* elements; *proven* elements may carry transferred evidence (4.5) with its provenance recorded. Table 1 fixes the minimum effort and the best attainable evidence grade by novelty class, mapped to the TRL vocabulary of ISO 16290:2013 for cross-industry legibility.

Table 1 — Novelty class → qualification effort

NOVELTY CLASS (3.2)	TRANSFERABLE TRACK RECORD	MINIMUM QUALIFICATION ACTIVITY	BEST ATTAINABLE GRADE	TRL ANALOGUE (ISO 16290:2013)
<i>proven</i>	established, in declared envelope	prior-art transfer + provenance check	B on transfer; A if independently verifiable	TRL 9
<i>adapted</i>	proven design, new envelope/duty	test/analysis of the delta only	A or B, by activity	TRL 6–8
<i>novel</i>	none relevant	analysis + physical test or supervised trial	A/B by activity; C if trial-only	TRL 3–5

4.3 Step 3 — Failure-mode register

Identify the credible failure modes per element, each mapped to: (a) the IR criterion it degrades (VRS-GEN-101...107); and (b) for AR purposes, the sector hazards it activates (the sector standard's hazard taxonomy). A failure mode with no mapping is out of scope and should be recorded as such.

4.4 Step 4 — Qualification plan

For each *adapted/novel* element's failure modes, select qualification activities (3.3) sufficient to produce evidence at the grades the applicable criteria require. The plan should state, per activity, the acceptance criterion (with units) and the evidence grade (VRS-GEN-012) the activity can at best produce. Where an activity can be satisfied by an existing conformity artefact, the plan should map to that artefact rather than commission new testing — the adoptability rule: a manufacturer's CE/UL/ISO file should be reused wherever it answers the acceptance criterion. Table 2 gives the standing map. An existing artefact answers an acceptance criterion only where its scope covers the assessed function, its issue is current, and — for third-party artefacts — the issuing body is accredited and the certificate is verifiable against a register; a mapped artefact should be recorded with its designation, edition year and the acceptance criterion it discharges, so a second assessor reaches the same admissibility decision. Where no existing artefact covers a function, the plan should commission the least activity that produces evidence at the required grade.

Table 2 — Qualification activity → reusable conformity artefact → best grade

QUALIFICATION ACTIVITY (3.3)	EXISTING ARTEFACT THAT CAN SATISFY IT	BEST ATTAINABLE GRADE
physical safety test	ISO 10218:2025 risk-assessment test file; ISO 3691-4:2023 detection / safe-stop verification	A
reliability transfer	ISO 14224:2016 maintenance and failure records	B
cyber-posture statement	IEC 62443-4-2:2019 security-level (SL) statement	B
prior-art transfer	CE technical file / UL report	B
supervised field trial	operator telemetry (op-hours, incident count)	C
expert review	third-party assessor record	C

4.5 Step 5 — Execution and evidence collection

Execute the plan; record every result — pass and fail — as an evidence record with grade, provenance and consent basis per VRS-GEN-012. **Transferred evidence** (fleet history of a proven subsystem, accredited test results, published trials) is admissible with its transfer rationale recorded; its evidence grade is whatever VRS-GEN-012 assigns to evidence of that provenance — this guidance sets no grade of its own. The transfer rationale should show that the source subsystem's configuration and duty do not differ materially from the assessed model; where they do, the evidence is inadmissible under 4.8.

4.6 Step 6 — Performance assessment and margins

Verify each declared function against its target within the declared envelope; record the margin (3.4) with units. Failures return to step 4 (revised plan) or contract the qualification basis — the envelope shrinks to what the evidence supports, and the assessment then covers the smaller envelope, never the claim. A declared limit verified only at a fraction of its value should have the envelope contracted to the verified fraction, and the contracted envelope should be recorded in the basis and in the record (VRS-GEN-009).

4.7 Effort proportionality

Qualification effort allocated to each element should be proportionate to its novelty class per Table 1; a *proven* classification should be supported by recorded provenance, not assertion, and an unsupported *proven* claim should be re-classed *adapted* for the purpose of effort allocation.

4.8 Evidence admissibility and refusal

The assessor should refuse, and record as **inadmissible**, any evidence that: (a) lacks a lawful consent or rights basis (VRS-GEN-012 §5.1); (b) cannot be traced to a declared function in the qualification basis (4.1); © is a vendor claim offered as the sole support for a safety-relevant *novel* element; or (d) is transferred from a subsystem whose configuration or duty differs materially from the assessed model (4.5). Inadmissible evidence does not enter the evidence record fed to VRS-GEN-005 §6 (VRS-GEN-012 admissibility governs). Where refusal leaves a safety-relevant failure mode with no passing evidence, the affected criterion scores no points (VRS-GEN-005 §6: no evidence = 0 points), and the refusal and its ground should be recorded in the qualification file.

4.9 4.9 Feeding the ordinary determination

The evidence records, margins and admissibility decisions produced above should be referenced from the record (VRS-GEN-009) and read by the ordinary determination in **VRS-GEN-005 §6** and VRS-GEN-006. Because a first-of-model assessment is an ordinary assessment under cold-start parity, the pack — not the model's age — determines the score: each criterion is scored against its rungs at the tier ceiling the evidence supports, field-record criteria may use the manufacturer's company-wide data at their stated reduced ceilings (VRS-GEN-005 §6.5), and a Certified demonstration substitutes for accrued operating hours where the criterion permits. This Protocol assigns **no score, tier, letter or cap**; it supplies the evidence those documents score.

The pack an assessor assembles for a first-of-model case is the same pack any assessment uses; only its provenance differs (transferred and demonstrated evidence in place of accrued fleet history). The tier the model can reach therefore follows from the evidence, not from its age: a pack limited to public sources supports the Unverified ceilings, a complete information pack supports the Verified ceilings, and a witnessed demonstration of the criteria that require one supports the Certified ceilings. An assessor should record, per criterion, which evidence class was relied on and which tier ceiling it reached, so the determination in VRS-GEN-005 §6 is reproducible and the record (VRS-GEN-009) shows why each criterion landed where it did.

5 Annex A (informative) — Worked example

A new warehouse AMR with a proven drive platform (*proven*), a licensed arm in a new duty cycle (*adapted*), and a first-generation perception stack (*novel*), assessed pre-launch with no fleet history. This example shows the pack an assessor assembles; it computes no score — VRS-GEN-005 §6 does that from these records.

Basis (Step 1). Declared: rated payload 15 kg at ≤ 1.8 m/s, indoor flat floor, single work-shift duty. Outdoor and multi-shift operation are not declared and fall outside the assessed envelope.

Novelty, activities and evidence (Steps 2, 4, 5; Tables 1–2).

ELEMENT	NOVELTY	ACTIVITY (REUSED ARTEFACT)	EVIDENCE GRADE
drive platform	<i>proven</i>	prior-art transfer of 4,200,000 fleet op-hours (ISO 14224:2016 records)	B
manipulator arm	<i>adapted</i>	accelerated-wear test of the new duty cycle	B
perception / safe-stop	<i>novel</i>	600-op-hour supervised trial + ISO 3691-4:2023 detection test	C
cyber posture	<i>adapted</i>	IEC 62443-4-2:2019 SL statement	B
spec integrity	—	datasheet-vs-measured check	B
serviceability	<i>proven</i>	vendor service records, operator-verified	B
economic residual	—	secondary-market comparables	C

Margins (Step 6). Payload verified to 18 kg (1.2× rated → +20 % margin). Safe-stop verified within 0.5 m at 1.8 m/s per the ISO 3691-4:2023 detection test → pass.

Refusal check (4.8). The vendor offered a self-declared MTBF figure as the *sole* reliability support; it is inadmissible as the sole support for a rated function, so the reliability record rests on the transferred grade-B fleet data instead. No safety-relevant failure mode is left unclosed.

Company-wide fallback. The model has no model-specific fleet data, so the field-record criteria (reliability, serviceability) draw on the manufacturer's company-wide record at their stated reduced ceilings (VRS-GEN-005 §6.5). Under cold-start parity the model can therefore be fully assessed today.

Outcome. The evidence pack, margins and admissibility decisions are recorded (VRS-GEN-009) and handed to VRS-GEN-005 §6 and VRS-GEN-006, which score the model against the ordinary criteria at the Certified tier. The assessed envelope excludes outdoor and multi-shift operation (not declared, not verified). This Protocol produces no score, tier or letter of its own.

6 Bibliography

- DNV-RP-A203, *Technology Qualification*, June 2017 edition (first issued 2001) — the systematic, risk-based qualification pattern this Protocol adapts.
- ISO 16290:2013, *Space systems — Definition of the Technology Readiness Levels (TRLs) and their criteria of assessment* — the TRL 1–9 maturity vocabulary used in Table 1; applicable beyond space by its own statement.
- ISO 8373:2021, *Robotics — Vocabulary* — the robot-element terms used in Step 2.
- ISO 10218:2025, *Robotics — Safety requirements for industrial robots* — a source of reusable physical-safety test evidence (Table 2).
- ISO 3691-4:2023, *Industrial trucks — Safety requirements — Driverless trucks and their systems* — reusable detection / safe-stop verification (Table 2).

- ISO 14224:2016, *Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment* — reusable reliability evidence (Table 2).
- IEC 62443-4-2:2019, *Security for industrial automation and control systems — Technical security requirements for IACS components* — reusable cyber-posture evidence (Table 2).

7 Change history

DATE	VERSION	STATUS	CHANGE	AUTHORITY
2026-09-05	0.1.0	Draft	Initial draft — TQ pattern adapted to provisional rating issuance; graduation/sunset added; CEO-directed	Framework Design Brief v1.1; CEO 2026-09-05
2026-09-12	0.2.0	Draft	DEEPEN — added Tables 1–2, §4.7 effort proportionality, §5.5–§5.6 inadmissibility/refusal, §6.2 graduation outcomes, Annex B numeric worked derivation, dated anchors + Bibliography	Charter §2 DEEPEN; research-log 2026-09-12 Run #81
2026-09-13	0.2.0ε1	Draft	COHERENCE: corrected dangling cross-reference in §3.5 (evidence-grade points → GEN-012 §4.1). Editorial only	Curator Run #119; charter COHERENCE
2026-09-16	1.0.0	Draft	VRS 2026 rewrite (Batch D): reduced to informative first-of-model assessment guidance. Cold-start parity + company-wide fallback moved to VRS-GEN-005 §6; this Protocol now feeds evidence into the ordinary determination and issues no rating, tier, cap or confidence value. Deleted the outcome-determination, graduation/sunset and recording clauses (superseded by GEN-005 §6, GEN-008 and GEN-009) and the confidence-index derivation; folded inadmissibility/refusal into §4.8 and added §4.9 (feeds GEN-005 §6). Retired forms removed: confidence model/band/index, provisional flag, assessed-unrated (confidence sense), graduation/renewal/lapse. Worked example recast without scoring output. See GEN-005 §6.	vrs-rewrite-instructions-v1 §5.4 Batch D; CEO 2026-09-11

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