CEDA DIAGNOSTIC REPORT — Test 010

Model: Canonical Single-Field Slow-Roll Inflation (Textbook Reference Class)
Reference: Weinberg (2008), *Cosmology*

05-source(Steven Weinberg, Cosm…

Audit Class: Inflationary (canonical)
Run Status: Valid (RG PASSED)

Summary Verdict

Verdict: Conditional Stable Mechanism (Regime-Limited)

This model exhibits a genuine dynamical mechanism for accelerated expansion **within the explicitly declared slow-roll EFT regime**. All audited inflationary behavior is earned through intrinsic scalar-field dynamics. No bookkeeping-dependent acceleration was detected. Claims beyond the declared regime are not audited and are not endorsed.

Key Findings (Concise)

- Negative pressure is localized entirely in intrinsic scalar-field stress–energy.
- Inflationary behavior is stable under admissible coarse-graining and reformulation.
- All control parameters (slow-roll conditions) function as *regime constraints*, not hidden drivers.

Provenance of Acceleration / Negative Pressure

Origin: Intrinsic dynamics
Location: Scalar-field stress–energy tensor $T\mu\nu(\phi)$Tμν(ϕ)
Mechanism: Potential-energy dominance during slow-roll phase
Horizon role: None (causal boundary only)

No horizon agency, entropy driving, or partition-induced pressure identified.

Diagnostic Outcomes

D1 — Horizon Reconfiguration Null

Status: N/A (Properly Excluded)
Reason: The model explicitly introduces new dynamical degrees of freedom. No horizon-only claims are made.

✔ Correct exclusion. No violation.

D2 — Coarse-Graining Stability

Status: PASS

Tested admissible variations:

- Modest shifts in coarse-graining scale near Hubble radius
- Equivalent frame descriptions
- Perturbative separation choices consistent with EFT regime

Result:
Inflationary behavior ($w \simeq -1$w$\simeq-1$, sustained acceleration) remains invariant without retuning.

✔ Behavior is **mechanism-stable**, not descriptively fragile.

D3 — Exchange-Term Provenance

Status: PASS

Finding:
No exchange terms introduced—explicitly or implicitly.
Stress–energy sourcing derives directly from the scalar-field action.

✔ No goal-seeking closure. No hidden stabilization.

C1 — Coupling Provenance & Redundancy

Status: PASS

Compression Test Result:
The scalar potential introduces **genuine functional restriction** relative to a free $w(t)$w(t).
Not reparameterizable as arbitrary equation-of-state control.

✔ Coupling-level structure earns its explanatory role.

S1 — Scheme / State Dependence Classification

Classification: S1-B (State-Conditional but Physical)

- Background inflation is scheme-stable.
- Perturbation amplitudes depend on vacuum choice (acknowledged and bounded).

✔ Physical within declared regime; not scheme-fragile.

D4 — Predictive Wedge

Status: PASS (Conditional)

Wedge:
Dynamical origin of early accelerated expansion + calculable perturbation spectra.

Condition:
Applies **only** within declared slow-roll EFT regime.

✔ Predictive where claimed; no extrapolative credit granted.

Failure Registry

None triggered.

No instances of:

- Horizon agency
- Entropy-as-driver
- Privileged coarse-graining
- Hidden slow-roll variables
- Underspecified exchange

What Would Need to Be True to Change the Verdict

- Demonstration that inflationary acceleration persists after slow-roll breakdown without new structure
- Evidence that negative pressure survives removal of scalar-field potential dominance
- Discovery of implicit exchange or stabilization terms under admissible reformulation

None are present in the audited regime.

Meta-Assessment (Important)

This run **directly validates Conditional Verdict Symmetry**.

Inflation passes **not because it is inflation**, but because:

- it declares its dynamics,
- localizes its negative pressure,
- respects conservation,
- and remains stable under admissible variation.

Had any of these failed, inflation would have been flagged—exactly as horizon-based proposals were.