

Evidence Architecture for Environmental Claims in VPP Manufacturing

Separating carbon origin, process inputs, biodegradation, compost testing and final waste-route acceptance

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Highlights

- Constituent listings do not establish FDA compliance of a cleaning fluid, process or printed article.
- OECD percentage/time, ready criteria, compost testing and facility acceptance are separate evidence layers.
- Cleaning-fluid properties are stated individually with SDS/test support.
- Bio-based carbon measures origin and is not lifecycle impact.
- Aggregate green or sustainable conclusions require a functional unit, comparison and trade-off analysis.

Abstract

Environmental performance claims need a defined system boundary, functional unit and evidence chain.

Certain constituents may be listed for specified FDA uses, but that does not establish compliance of a cleaning fluid, cleaning process or final printed article. Conditions, residues and migration/extraction require assessment.

Bio-based content, biodegradation, controlled-compost testing and waste-facility acceptance are reported separately. A single report is not a blanket product certification.

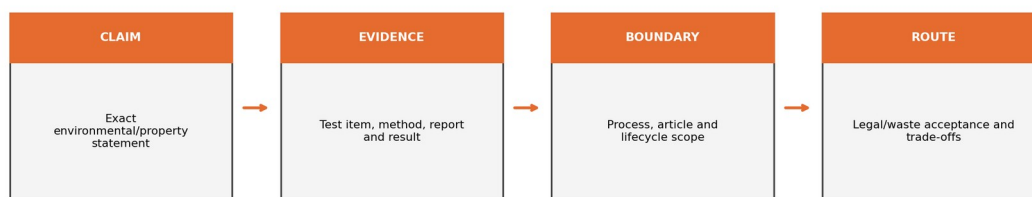
Keywords sustainability · bio-based carbon · biodegradation · composting · cleaning fluid · lifecycle

Source use. Product evidence is in [1]; carbon/degradation/compost/lifecycle methods in [2–4,6]; constituent provisions in [5].

1. Claim-to-evidence map

Each claim identifies product/batch, test item, method, laboratory/report, conditions, result, uncertainty and interpretation limit.

- Separate declarations from measurements.
- Use test report or certificate of analysis precisely.
- Do not convert one endpoint into a system conclusion.



Release requires traceable evidence at every gate; a catalogue label cannot bypass the chain.

Figure 1. WP-47 evidence gates from controlled material description to final acceptance.

2. Cleaning and food-contact boundary

Constituent provisions are recorded with exact uses and limits. Final fluid/process/article compliance requires residues, intended-use conditions and applicable migration/extraction assessment.

- Verify non-flammability against SDS/test definition.
- Do not label cleaner biocompatible without endpoint.
- Assess worker and waste impacts.

3. Lifecycle and end-of-life

Carbon origin, biodegradation, composting and facility acceptance do not establish lifecycle benefit without comparative assessment of inputs, performance, recovery and losses.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
Claim	Exact environmental/property statement	Catalogue description only until evidence is linked
Evidence	Test item, method, report and result	Control process variables and change triggers
Boundary	Process, article and lifecycle scope	Report method, result, uncertainty and limits
Route	Legal/waste acceptance and trade-offs	Apply final acceptance and responsibility boundary

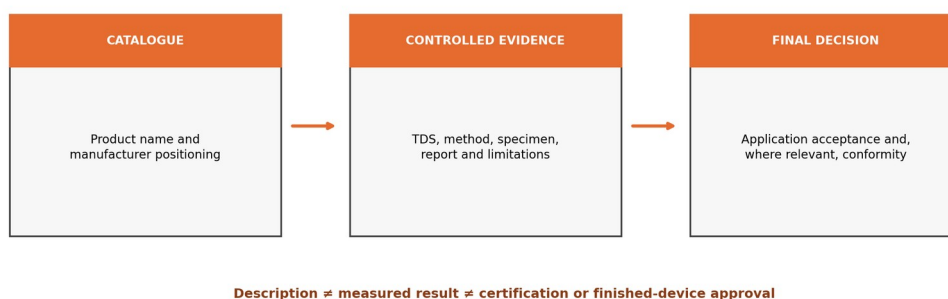


Figure 2. WP-47 separates catalogue positioning, measured evidence and final application decisions.

KEY INSIGHT

Precise product or application language is retained only when the exact formulation, method, processed specimen and controlled evidence can be traced.

5. Limitations

- No blanket finished-fluid FDA compliance claim is made.
- No aggregate sustainable/green claim lacks a functional unit.
- Bio-content is not lifecycle performance.
- Biodegradation is not compostability.
- Certificates are property- and scope-specific.

6. Conclusions

- Constituent listings do not establish FDA compliance of a cleaning fluid, process or printed article.
- OECD percentage/time, ready criteria, compost testing and facility acceptance are separate evidence layers.
- Aggregate green or sustainable conclusions require a functional unit, comparison and trade-off analysis.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.5 removes blanket FDA, biocompatible-cleaner and aggregate sustainability conclusions and separates constituent, process, biodegradation, compost and lifecycle evidence.

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Disclosure. Dr. Juan Segurola is founder and Scientific Director of 3Dresyns by Resyner Technologies S.L., the supplier of the materials discussed.

References

- [1] 3Dresyns. Current cleaning-fluid and environmental test reports/TDS/SDS.
- [2] ASTM D6866. Radiocarbon determination of biobased content; current controlled edition at release.
- [3] OECD. Test No. 301: Ready Biodegradability.
- [4] ISO 14855 series. Aerobic biodegradability under controlled composting conditions.
- [5] 21 CFR 172.878 and 21 CFR 178.3620; exact constituent/use applicability to be assessed.
- [6] ISO 14040:2006 and ISO 14044:2006. Life cycle assessment principles, framework and requirements.