

Professional Materials for Nanoimprint and Microfabrication Workflows

Feature replication, surface treatment and process durability with formulation-specific evidence

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Highlights

- Resolution claims identify feature definition, substrate, exposure, replication and measurement method.
- The family is not assigned universal biological or implant-suitability status.
- Release, FDTs treatment, RIE compatibility and chemical resistance require grade-specific evidence.
- Biological and cleanroom claims apply only to the tested formulation and process.
- Finished-device biological evaluation is use- and risk-specific.

Abstract

NMF grades are professional micro- and nanofabrication materials for controlled replication and surface-processing workflows.

A sub-10 nm or other resolution statement is retained only when linked to a specific report, process and measured feature. It is not a universal printing-resolution claim.

Biological, cleanroom, release and device-performance claims apply only to the exact formulation, surface treatment, fabrication process and end use.

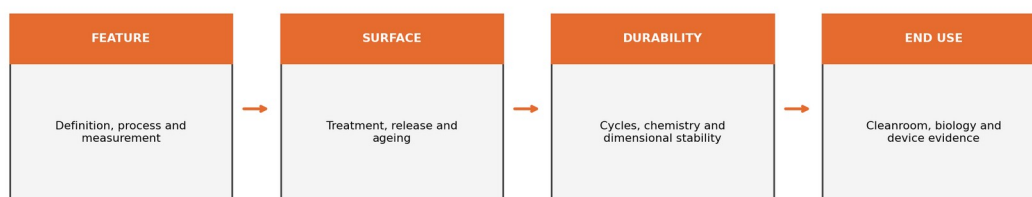
Keywords nanoimprint · microfabrication · feature replication · FDTs · cleanroom

Source use. Product evidence is in [1]; nano/microfabrication context in [2–3]; biological methods in [4–6].

1. Feature evidence

Feature claims identify master, substrate, exposure, replication route, measurement instrument, acceptance definition and uncertainty.

- Distinguish printing from replication resolution.
- Report success rate and area.
- Control shrinkage and distortion.



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

Figure 1. WP-33 evidence gates from controlled material description to final acceptance.

2. Surface and cycle durability

Anti-stiction treatment, FDTs attachment, release force, imprint cycles, plasma/RIE response and chemical resistance are measured for the named grade.

- Record treatment chemistry and state.
- Challenge repeated cycles.
- Measure surface ageing.

3. Biological boundary

Professional microfabrication positioning does not establish biological suitability or implant grade. Finished-device evidence remains application-specific.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
Feature	Definition, process and measurement	Catalogue description only until evidence is linked
Surface	Treatment, release and ageing	Control process variables and change triggers
Durability	Cycles, chemistry and dimensional stability	Report method, result, uncertainty and limits
End use	Cleanroom, biology and device evidence	Apply final acceptance and responsibility boundary



Description ≠ measured result ≠ certification or finished-device approval

Figure 2. WP-33 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 universal sub-10 nm claim applies.
- No family-wide biological claim applies.
- Implant-suitability labels are not used.
- Surface-treatment mechanisms require evidence.
- Final use determines applicable validation.

6. Conclusions

- Resolution claims identify feature definition, substrate, exposure, replication and measurement method.
- The family is not assigned universal biological or implant-suitability status.
- Finished-device biological evaluation is use- and risk-specific.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.2 removes universal resolution, family-wide biological and implant-suitability language and requires report-specific feature, surface and durability 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 NMF grade-specific TDS and controlled replication/surface reports.
- [2] Guo, L. J. (2007). Nanoimprint lithography: methods and material requirements. *Advanced Materials*, 19, 495–513. <https://doi.org/10.1002/adma.200600882>
- [3] Hecke, M., & Schomburg, W. K. (2004). Review on micromolding. <https://doi.org/10.1088/0960-1317/14/3/R01>
- [4] ISO 10993-1:2025. Biological evaluation of medical devices—Part 1.
- [5] ISO 10993-10:2021. Tests for skin sensitization.
- [6] ISO 10993-23:2021. Tests for irritation.