L-900 Tool Health & Predictive Rules (FMEA Extract)

Revision: 0.9
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Company: ACME Lithography Systems

Revision History

Version	Date	Author	Summary
0.9	2025-10-08	Manufacturing Engineering	Periodic update; limits & procedures clarified.

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§1 Subsystems & Failure Modes

Scope covers: source, collector, vacuum pumps, wafer stages, reticle chuck, metrology sensor suite.

§2 Predictive Triggers

Triggers combine sensor thresholds with time windows; exceeding a trigger mandates planned inspection within the specified window.

§3 Actions & Parts

Recommended actions list required parts and estimated downtime; see Table 3.1.

Appendices & Tables

Table A.1: Predictive Triggers (Table 2.1)

Subsystem	Trigger	Action	Window (h)	P
Vacuum Pump Z	vibration_rms > 2.1 mm/s for ≥ 8h	Inspect bearings; replace if pitting > grade B	72–96	A
Source Power	ripple > 2.5% for ≥ 4h	Check PFN caps; recalibrate dose sensor	24–48	C
Stage Thermal	ΔT > 0.8 °C for ≥ 2h	Run thermal comp; inspect cooling loop	24	C

Table A.2: FMEA Summary (Table 3.1)

Failure Mode	Effect	Detection	RPN	Mitigation
Pump bearing wear	Vacuum instability	Vibration RMS rise	168	Planned bearing replace
PFN cap aging	Dose ripple	Source ripple monitor	135	Cap replacement
Chuck warp	Y overlay drift	Overlay Y residual rise	120	Chuck re-seat/replace