DecodedOps

Plain English. No jargon. No vendor agenda.

The 5 & 6 Sigma Decoration Playbook

6 process areas that separate a reactive decoration business from a high-performance one.

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DECODED OPS

Why Sigma Matters More Than Your Equipment

Most garment decoration businesses measure quality by job. A run finishes, someone checks a handful of garments, and anything that looks wrong gets pulled. That is not quality control — that is incident logging.

Sigma is a measurement of process capability. It tells you how many defects your process produces per million opportunities — not how many you caught this week. The higher your sigma level, the fewer defects escape into finished goods.

The critical insight is this: the difference between 3 Sigma and 5 Sigma is not a better machine. It is a better process. This playbook maps the six areas where that gap is widest in print and embroidery operations.

The Sigma Scale — Decoration Context

Level	DPMO	Yield	In Decoration Terms
3 Sigma	66,807	93.3%	~1 in 15 garments has a detectable defect. Misregistration, thread breaks, colour drift. Process depends on operator experience.
4 Sigma	6,210	99.4%	~6 defects per 1,000 garments. Equipment calibration is routine. Basic written procedures are in place.
5 Sigma	**233**	**99.977%**	**Near-invisible failure rate. Documented processes per decoration type. Substrate-specific settings. Statistical in-process sampling.**
6 Sigma	**3.4**	**99.9997%**	**World-class. 3.4 defects per million. Full process capability studies. Real-time monitoring. Achievable in high-volume workwear and teamwear with the right infrastructure.**

Note on DPMO: Defects Per Million Opportunities. In decoration, an 'opportunity' can be defined per garment, per stitch block, or per print. The principle holds regardless of definition — higher sigma means fewer defects escape the process.

THE SIX PROCESS AREAS

Where the gap between 3 Sigma and 6 Sigma actually lives.

01 Temperature & Pressure Control

Heat, pressure, and dwell time are the three variables that determine whether a print or embroidered garment passes inspection. At 3 Sigma, these are passed on verbally. At 6 Sigma, they are documented, stored, and verified before every run.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
Settings are passed on verbally between operators. 'Medium heat' means different things to different people. Dwell time is a rough count. Pressure is set by feel. Output quality depends on who is on shift.	**Temperature, pressure, and dwell time are documented per substrate and decoration method. Pre-production checks are standard before every run. Deviations from spec require sign-off before production proceeds.**	**Digital calibration logs maintained per machine. Substrate-specific press profiles stored and verified at every shift start. Statistical control charts flag drift before it becomes a defect.**

02 Artwork & Digitising Approval

In embroidery, poor digitising is invisible to the customer at point of order and catastrophic at point of production. In print, artwork not optimised for the process creates colour drift and registration failure that cannot be fixed without reprinting.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
The customer sends a file and the operator interprets it. No formal approval loop. Colour matching is approximate. Thread colour references live in the operator's head, not a documented standard.	**A written approval workflow is in place. Proof sign-off required before production begins. Thread colour references documented per client. Digitising briefs specify stitch type and density per garment type.**	**Every garment type has its own approved digital file version with pull compensation and underlay specified per fabric. Artwork changes trigger a re-proof. No production without written sign-off on record.**

03 Substrate & Garment Specification

The decoration method must be chosen based on the garment — not the other way around. Fabric composition, weight, and weave all affect how a decoration method performs. At 3 Sigma, this is guesswork. At 5 and 6 Sigma, it is documented and enforced.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
Decoration method is chosen by what is quickest or what the machine can do. Fabric weight and composition are rarely documented as production variables. Incompatible combinations are discovered after production starts.	**A compatibility matrix exists for decoration method vs. fabric type. Non-compatible combinations are flagged at order entry. Any change to the garment spec requires a process check before production begins.**	**Fabric composition, weight, and weave are specified at artwork stage. Any change triggers a full re-approval before production. Compatibility decisions are traceable to the original written specification.**

04 Machine Calibration & Maintenance

Reactive maintenance is the fastest route to 3 Sigma output. If machines are only fixed when they break, your quality level is determined by machine condition — a variable you cannot control or predict.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
Maintenance is reactive. Machines are fixed when they break. Calibration is done 'when it seems needed.' No records are kept. Machine condition is unknown until a defect appears.	**Preventive maintenance schedule documented and signed off. Calibration is logged. Pre-production machine checks are part of the standard workflow and cannot be skipped without authorisation.**	**Calibration data retained per machine over time. Trend analysis identifies wear patterns before failure. Machine capability studies run periodically. Maintenance history is fully traceable per unit.**

05 Operator Training & Standard Operating Procedures

If your process knowledge lives in people's heads and not on paper, your quality level leaves with every operator who changes shift. SOPs are not bureaucracy — they are the mechanism that makes your process repeatable regardless of who is running it.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
Training is informal — 'watch me and you'll pick it up.' Procedures live in people's heads. Operators develop their own methods. Quality depends on experience, not documented process.	**SOPs exist for each decoration type and substrate combination. New operators follow a documented onboarding checklist. Process steps are written, reviewed, and signed off before production begins.**	**SOPs are version-controlled, reviewed on a defined cycle, and linked to calibration records. Operators are assessed against written standards. Any process change requires SOP revision before implementation.**

06 In-Process Quality Sampling

End-of-run quality checking is the least efficient form of quality control that exists. By the time you find the defect, the run is complete and the rework cost is committed. 5 and 6 Sigma operations catch problems during the process, not after it.

3 Sigma — Reactive	5 Sigma — Controlled	6 Sigma — Engineered
Quality check happens at the end of the job. Defects are found after the run is complete. Rework cost is fully committed before any check takes place. Root cause is rarely investigated.	**Sample checks built into the production run. First-off inspection is mandatory on every job. Mid-run sampling standard on high-volume orders. Defects are logged and root cause is recorded.**	**Statistical process control defines sample sizes and inspection frequency by volume. Control charts track defect trends in real time. Root cause analysis documented for every defect found and used to improve the process.**

SELF-ASSESSMENT

Where Is Your Operation Right Now?

Rate each of the six process areas against the descriptions in this playbook. Be honest — the score is for your benefit, not for sharing.

Score 1	Score 2	Score 3
Matches the 3 Sigma description. Reactive, informal, verbal. Process depends on people, not systems.	Between 3 and 5 Sigma. Some documentation exists. Calibration is done but not always logged consistently.	Matches 5–6 Sigma. Documented, measured, data-driven. Process is an asset.

Process Area	Score (1–3)	Notes
01. Temperature & Pressure Control	_____	
02. Artwork & Digitising Approval	_____	
03. Substrate & Garment Specification	_____	
04. Machine Calibration & Maintenance	_____	
05. Operator Training & SOPs	_____	
06. In-Process Quality Sampling	_____	
TOTAL (out of 18)	_____	

6 – 9 Predominantly 3 Sigma	Your process depends on people, not systems. Quality leaves with every operator change. Significant rework risk on high-volume orders.
10 – 14 4 Sigma Zone	Process discipline exists in some areas but not all. Inconsistency is the main risk. A solid foundation to build from — improvements from here are structural, not cultural.
15 – 18 Approaching 5–6 Sigma	Your process is an asset, not a liability. The work now is refinement and measurement — adding data to what you already do well.

WHAT NEXT?

Turning the Scorecard into a Plan

This playbook gives you a starting point — a structured way to look at your operation against a quality standard that most decoration businesses have never applied. But a score on paper and a plan of action are different things.

If you scored under 12, the most useful next step is understanding which areas are limiting your sigma level and in what order to address them. That is not a generic question — it depends on your specific operation, order mix, decoration methods, and team structure.

The Clarity Audit

Decoded Ops runs a fixed-price operational and technology audit for decoration businesses. It covers six areas — including all six from this playbook — and delivers a written action plan with specific recommendations, sequenced by impact.

The audit is designed so that if it does not identify at least 3x the fee in recoverable cost or lost revenue, you get a full refund. No conditions. No questions.

If you are ready to know exactly where you are and what to fix first, this is the right starting point.

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Decoded Ops is a technology and operations consultancy for businesses in the garment decoration, print, embroidery, workwear, and promotional merchandise sectors. This playbook reflects Craig Blackman's direct experience across 25+ years in product-based operations.