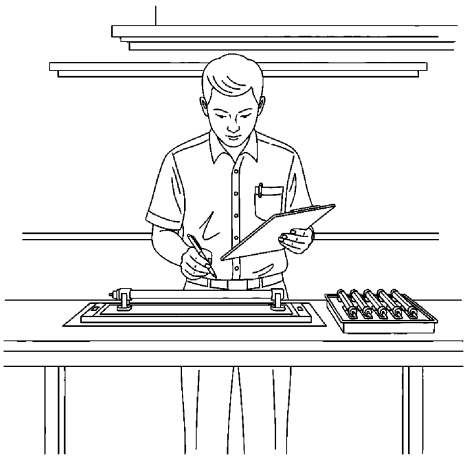
NICHE-SEARCH

WORKSHEET 4 OF 9

AQL Sampling-Plan Design for a New Product

Run once per new SKU before the first production lot ships. Sets the statistical basis for ongoing incoming and final inspection.



Complementary worksheet for
Quality Control Systems
by Ibrahim Anwar

SECTION 1

What This Is For

AQL sampling is easy to misapply in two directions: too tight (every lot gets rejected, supplier relationship strains) or too loose (defective lots pass, customer complaints follow). This worksheet designs the plan before the first production run using ISO 2859-1 logic, so the numbers come from the standard rather than from whoever happened to be in the room when the question was asked.

The operator who reaches for this sheet is launching a product line that does not yet have inspection history. They need a starting point that is statistically defensible, matches the product's actual risk level, and can be reviewed after the first ten lots when real data replaces initial assumptions.

SECTION 2

Benefits

What you get when you actually run this worksheet on a real situation:

- Converts the product's risk category (consumer general / food-health / safety-critical) into a specific AQL level using the ISO 2859-1 logic, not intuition.
- Calculates the exact sample size and acceptance number before the first lot ships — no more 'we'll inspect a few units' with no documented basis.
- Documents who is authorized to perform the sampling inspection and where the completed plan is stored, closing the accountability gap that causes IQC to be skipped when the plan is 'somewhere in the system.'
- Establishes a 10-lot review trigger, so the initial plan does not become a permanent default when real defect distribution is available to refine it.
- Identifies the economic threshold below which 100% inspection is faster and cheaper than sampling administration, preventing the overhead of a statistical plan on lots that are too small to benefit from it.

SECTION 3

Framework To Use

— ISO 2859-1 Risk-to-Sample Bridge

Map product risk to AQL level, then AQL level to sample size — so the inspection plan is derived from the standard, not from convenience.

Risk Category to AQL Level

Risk Category	Typical AQL Range	Rationale
Consumer general (non-food, non-safety)	AQL 2.5 – 4.0	Lower compliance exposure; defects are visible and returnable
Food, cosmetic, pharmaceutical	AQL 0.65 – 1.0	Health risk; regulatory exposure (BPOM/SNI); claim liability
Safety-critical component	AQL 0.065 – 0.4	Failure causes harm; regulatory and civil liability
High-value, low-volume lot (<50 units)	100% inspection	Sampling overhead exceeds economic benefit at this lot size

SECTION 4

How To Use

Follow these steps in order. Each one builds on the previous.

1. Fill rows 1–3 first: product name and SKU, typical lot size per run, and risk category. The risk category determines your AQL range before you open the ISO table.

2. Choose an AQL level within the appropriate range for your risk category. When uncertain, select the tighter number — it is easier to relax a plan with data than to tighten it after a customer complaint.

3. Select the inspection level. Level II (standard) is the default for most general manufacturing. Level I (reduced) applies only when historical data demonstrates the supplier is consistently well within spec. Level III (tightened) applies when a recent rejection history suggests elevated risk.

4. Use the ISO 2859-1 table to find the sample size letter code for your lot size and inspection level, then read off the sample size (n), acceptance number (Ac), and rejection number (Re). Write all three in the corresponding rows.

5. Identify the role (not the name) of the person authorized to perform this inspection and record the finding. Role-based accountability survives personnel changes; name-based does not.

6. Check the 10%-of-lot threshold: if the sample size exceeds 10% of the typical lot size, calculate whether 100% inspection of the full lot takes less calendar time than administering the sampling plan. For lots under 50 units, full inspection almost always wins.

7. Store the completed plan with the product's quality spec sheet. Set a calendar reminder for 10 lots from first production: review actual rejection rate and adjust AQL level if the plan is rejecting more than one in every six lots.

SECTION 5

Example Use

A food manufacturer adds a new 200g chili sauce product. The typical production lot is 800 units per run. The product is food-grade and subject to BPOM labeling requirements.

Row 1: Product "Sambal Asli 200g," SKU SA-200. Row 2: Typical lot size 800 units. Row 3: Risk category — food, therefore AQL range 0.65–1.0. AQL chosen: 1.0 (conservative starting point for first-run product with no defect history).

Row 4: AQL 1.0. Row 5: Inspection Level II (standard — no prior supplier history to justify reduced). From the ISO 2859-1 table: lot 800 units at Level II = sample size letter J. Letter J gives n=80, Ac=2, Re=3.

Row 6: n=80. Row 7: Ac=2. Row 8: Re=3. Row 9: QC Inspector (role). Row 10: Stored in product spec folder, physical copy at receiving dock.

10% check: 10% of 800 = 80 units. Sample size is exactly 80 — at the threshold. The operator decides to proceed with sampling; lot size is large enough that pulling 80 units from a 800-unit pallet is efficient.

After lots 1–3: all passed with 0 defects in sample. After lot 4: sample shows 1 defect out of 80 (seal irregularity). Lot accepted (Ac=2). After lots 5–10: two lots with 1 defect each, one lot with 0. Pattern is consistent — the plan is calibrated correctly for this supplier's actual quality level. No AQL revision needed at the 10-lot review.

Six months later, the supplier changes their sealing film. First lot from new film: 4 defects in sample of 80. Lot rejected (Re=3). The plan catches the change on the first lot from the new film. Without the documented plan, this lot might have gone through on visual inspection alone.

SECTION 6

The Worksheet

Tear this out, copy it onto a fresh sheet, or fill it in directly.

AQL Sampling-Plan Design for a New Product

Run once per new SKU before the first production lot ships. Sets the statistical basis for ongoing incoming and final inspection.

PARAMETER	YOUR ANSWER

SECTION 6 (CONTINUED)

Reflection Prompts

After filling in the worksheet on the previous page, work through these.

1. Rows to fill: (1) Product name and SKU. (2) Typical lot size (units per production run). (3) Product risk category: consumer general / food or health / safety-critical. (4) AQL level chosen based on risk: 4.0 / 2.5 / 1.0 / 0.65. (5) ISO 2859-1 inspection level: Level I (reduced) / Level II (standard) / Level III (tightened). (6) Sample size from AQL table for this lot size and level. (7) Acceptance number Ac. (8) Rejection number Re. (9) Who performs the sampling inspection (role, not name). (10) Where the completed plan will be stored for reference.

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2. Before finalizing: if the AQL table gives a sample size larger than 10% of the lot, reconsider whether 100% inspection is more economical for this lot size. AQL sampling is designed for large lots where 100% inspection is impractical. For lots under 50 units, full inspection is usually faster than sampling administration.

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3. After the first three lots: compare actual rejection rate against the AQL threshold chosen. If lots are being rejected more than once every six runs, either the AQL is too tight for current supplier quality, or the supplier quality is below what the plan assumes. Both require action — the plan does not adjust itself.

SECTION 7

Tips and Traps

TIPS

- When uncertain about risk category, go one level tighter than comfortable. Tightening an AQL plan after a customer complaint costs credibility; relaxing one after clean data costs nothing.
- Record the AQL plan with the product spec, not separately. When the product spec changes, the sampling plan must be reviewed at the same time — they are linked documents.
- Plan to inspect the first three lots at 100% regardless of the AQL plan. The first three lots build the baseline; sampling works on top of a known-good baseline, not as a substitute for it.
- Set the 10-lot review as a calendar event on the day you finalize the plan. Without the calendar trigger, the review never happens and the initial assumptions become permanent.

TRAPS

- Using AQL 4.0 for food products because the incoming material 'looks fine.' AQL 4.0 means you will accept lots with up to 4% defects as normal. For a food product, that acceptance threshold may not survive a BPOM audit or a food safety complaint.
- Changing the AQL level to pass a lot that just failed instead of rejecting the lot and following the documented procedure. AQL plans only provide legal and audit defensibility when they are followed — a documented plan that is overridden on convenience leaves the business with neither the safety of the plan nor the protection of a documented exception.
- Designing the plan for the supplier's average lot size rather than the actual lot size in each shipment. Supplier lots vary. Store the plan as a reference table, not as a single fixed row.

SECTION 8

Appendixes

Appendix A — ISO 2859-1 Quick Reference (Inspection Level II, Single Sampling)

Lot Size	Code	Sample n	AQL 1.0	AQL 2.5	AQL 4.0
2 – 8	A	2	Ac 0 Re 1	Ac 0 Re 1	Ac 0 Re 1
9 – 15	B	3	Ac 0 Re 1	Ac 0 Re 1	Ac 0 Re 1
16 – 25	C	5	Ac 0 Re 1	Ac 0 Re 1	Ac 1 Re 2
26 – 50	D	8	Ac 0 Re 1	Ac 0 Re 1	Ac 1 Re 2
51 – 90	E	13	Ac 0 Re 1	Ac 1 Re 2	Ac 1 Re 2
91 – 150	F	20	Ac 0 Re 1	Ac 1 Re 2	Ac 2 Re 3
151 – 280	G	32	Ac 1 Re 2	Ac 2 Re 3	Ac 3 Re 4
281 – 500	H	50	Ac 1 Re 2	Ac 3 Re 4	Ac 5 Re 6
501 – 1200	J	80	Ac 2 Re 3	Ac 5 Re 6	Ac 7 Re 8
1201 – 3200	K	125	Ac 3 Re 4	Ac 7 Re 8	Ac 10 Re 11

Ac = max defects to accept the lot. Re = min defects to reject the lot.
AQL sampling does not reduce defect frequency at the supplier.
Pair with IQC supplier scorecard to close that gap.

Appendix B — 10-Lot Review Decision Table

After 10 lots, calculate: lots rejected out of 10.

0 rejected	consider relaxing to Level I (reduced) if throughput pressure is high. Document the decision.
1–2 rejected	plan is calibrated. Keep current settings.
3–4 rejected	supplier quality may be below plan assumption. Tighten AQL one level OR initiate supplier corrective action.
5+ rejected	supplier is not meeting spec. Do not adjust the plan — adjust the supplier. Escalate to purchasing for a formal supplier corrective action request.

CONFIRMATION

WHERE THIS WORKSHEET COMES FROM

Quality Control Systems

Consistent Quality Is the Result of a System, Not Inspection

by Ibrahim Anwar

This worksheet is one of nine in the *Quality Control Systems* companion worksheet pack. The full pack is grouped into three categories: high-volume worksheets you can run weekly, niche-search worksheets for rare but high-value situations, and specific-case worksheets that walk you through a single concrete scenario.

Every framework, decision filter, and figure used in these worksheets is drawn from the chapters of the source book. The book sets the diagnosis, the worksheets give you the form to act on it.

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