

Control Plan

How-to guide: what the workbook does, how to use it and what every number means.

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Control Plan

List every characteristic you control with its method, sample, frequency and reaction plan, and see whether the plan is capable and can be executed with the inspection time you have.

For: Quality and process engineers, APQP teams and quality managers at automotive, medical-device and aerospace suppliers.

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Quick start

1. On Setup, type the control plan header, shift length, lots per shift, available inspection hours and your Cpk and gauge requirements, then replace the example process steps (with rates and setups per shift).
2. On Control Plan, add one row per characteristic: step, number, product or process characteristic, class, specification and limits, method, sample size and frequency.
3. Type the control method, the reaction plan, the time to measure one part, and the latest Cpk and %GRR where you have them.
4. Fix anything the Check column flags, then open the Dashboard to see capability gaps and the inspection workload against the time available.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Control plan header, shift and lot settings, inspection time available, your requirements, and the process step and class lists.
Control Plan	One row per controlled characteristic: specification, method, sample, frequency, control, reaction plan and workload.
Dashboard	Is the plan capable, are the gauges good enough, and can the checks be done in the time a shift has?
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.

What each number means

Quantity	How it is calculated	Units
Checks per shift	Per hour: times x production hours per shift. Per shift: times. Per lot: times x lots per shift. Per setup: times x setups per shift (Setup list).	checks

Quantity	How it is calculated	Units
Parts measured per shift	Every part: rate x production hours per shift. Otherwise sample size x checks per shift.	parts
Inspection minutes per shift	Parts measured per shift x time per part / 60.	min
Tolerance	USL - LSL, when both are typed.	unit
Capability	Within limits when Cpk $\geq$ the minimum Cpk; Out of limits below it; Check for a special characteristic with no Cpk.	-
Gauge	Within limits when %GRR $\leq$ the acceptable limit; Check up to the conditional limit; Out of limits above it.	-
Inspection load vs time available	Sum of inspection minutes / 60 / inspection hours available per shift. Near capacity from the Setup share; Over capacity above 100%.	%
Cpk no.	Numbers the rows with a Cpk in table order, so the capability block can list the first 10 with INDEX and MATCH.	-

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Harwood Die Casting, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

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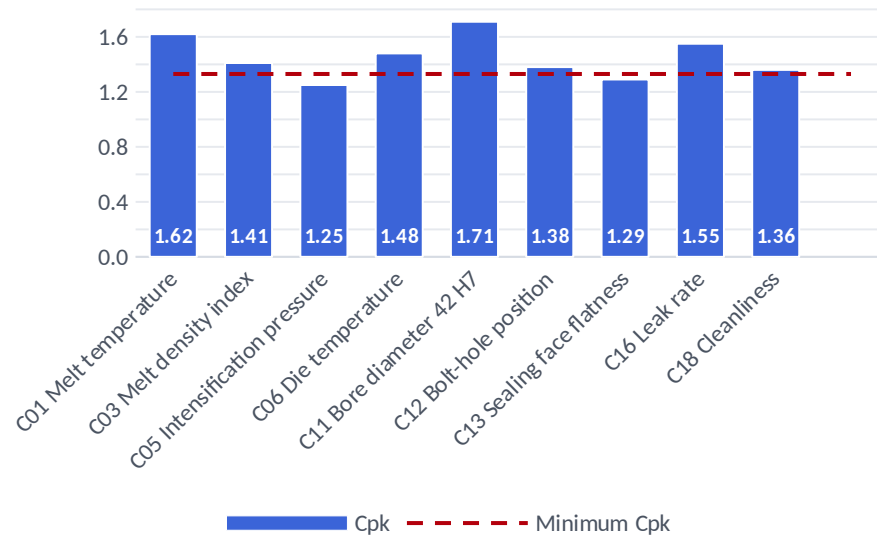
Is the plan capable, are the gauges good enough, and can the checks be done in the time a shift has?

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Control plan CP-450-01 (Production), Pump housing, A380 aluminium die casting. Minimum Cpk 1.33; %GRR limits 10% and 30%; 7.5 h shifts (Setup).

CHARACTERISTICS CONTROLLED	CPK BELOW REQUIREMENT	GAUGES NOT ACCEPTABLE	INSPECTION LOAD VS TIME AVAILABLE
20	2	2	86%
Rows on the Control Plan	Target 0	Target 0	Limit 100%
	Above target	Above target	Near capacity

Cpk by characteristic



Inspection minutes per shift by step

