

Record defects without changing the denominator

Record one inspection consistently and reconcile nonconforming units separately from the total number of nonconformities.



Six affected units, eight recorded faults

Fictional case: an incoming-inspection team checks 50 covers during one defined receipt window. The core illustration retains six nonconforming units and eight nonconformities. Inspector Arun must produce a record that another inspector can reproduce. The supervisor has called both numbers "rejects", making the reported rate ambiguous.

Your role and the reference condition

Incoming inspector and quality record owner

Normal: Each inspected cover has one identity; every observed category is recorded once under an agreed definition; total inspected units and affected-unit count remain explicit.

Gap: U01 and U02 each have two different faults. Counting every mark as a different rejected cover would exaggerate the fraction of units affected.

Work within these conditions

1. This is a complete fictional 50-unit inspection record, not a sampling acceptance plan.
2. Category definitions describe observed conditions; they do not prove process causes.

Fictional teaching case. Supplied observations support the exercise; proposed actions are not verified customer results.

See how the method works

A useful check sheet makes the unit of observation visible. One rejected product can contain several distinct nonconformities, so a tally of faults is not automatically a count of failed products. Define each category, the inspection opportunity and the observation window before recording. Pilot the sheet with more than one observer and resolve ambiguous classifications. Keep identifiers or source labels that enable a later investigation without collecting unnecessary personal data. Record the denominator alongside the tally. Only then calculate a rate or compare shifts; a larger count may simply reflect a larger amount inspected.

Unit record / multiple faults allowed

U01	Scratch + Burr
U02	Scratch + Missing label
U03	Burr
U04	Scratch
U05	Missing label
U06	Other

Category tally

Scratch: ||| (3)

Burr: || (2)

Missing label: || (2)

Other: | (1)

6 / 50 units = 12% nonconforming

8 / 50 = 0.16 faults per unit

U01-U06 are six distinct nonconforming units; the remaining 44 inspected units have no recorded nonconformities.

A unit-by-category check sheet records six distinct affected covers and eight fault marks among 50 inspected covers. Category tallies reconcile to 3 scratches, 2 burrs, 2 missing labels and 1 other fault. The two labelled measures are 12% nonconforming units and 0.16 faults per inspected cover.

Follow the evidence and decisions

Inspect the supplied case inputs

Unit or population	Recorded condition
U01	Scratch and burr
U02	Scratch and missing label
U03 / U04	Burr / scratch respectively
U05 / U06	Missing label / other respectively
Remaining 44 covers	No recorded nonconformity in this inspection

01 / Agree on the observable definitions

Arun defines the inspected unit as one cover and clarifies the scratch, burr, missing-label and other categories with examples. The team records uncertainty for adjudication instead of guessing a category.

Why: A neat tally is unreliable when inspectors apply different definitions. A check sheet is a collection form; ticking a procedural checklist is a different use.

Evidence / check: The sheet states unit, window, categories and the rule for ambiguous observations.

02 / Pilot the recording method

Two inspectors independently classify a small set before live collection. They discuss ambiguous examples and revise wording before the receipt window starts.

Why: The pilot exposes unusable categories or insufficient writing space. Agreement during discussion does not by itself establish a complete measurement-system study.

Evidence / check: The released form has a revision and the agreed observation instructions.

03 / Keep unit identity and multiple marks

Arun enters U01 through U06 once each and retains both categories on U01 and U02. He records the total population inspected, including the 44 with no recorded faults.

Why: Fault tallies without the inspected population cannot yield a unit rate. Multiple faults on one unit are permitted and must not create duplicate units.

Evidence / check: Six distinct affected IDs; eight category marks; fifty inspected IDs accounted for.

04 / Reconcile before calculating

He sums category counts: scratches 3, burrs 2, missing labels 2 and other 1. He separately counts the six unique affected units.

Why: The sum of category marks answers how many nonconformities were observed. A distinct-unit count answers how many inspected units were affected.

Evidence / check: $3 + 2 + 2 + 1 = 8$ faults; six unique nonconforming units.

05 / Publish two labelled measures

The report states $6/50 = 12\%$ nonconforming units and $8/50 = 0.16$ nonconformities per inspected unit. Both retain the window and inspection scope.

Why: These rates answer different questions. Neither says that 16% of units failed, and neither establishes a process trend from this one window.

Evidence / check: A reviewer can trace each numerator and denominator to the same source sheet.

Completed inspection summary

Measure	Calculation	Interpretation
Nonconforming units	$6 \div 50 = 12\%$	Fraction of inspected covers with at least one fault
Nonconformities per unit	$8 \div 50 = 0.16$	All recorded faults divided by inspected covers
Category reconciliation	$3 + 2 + 2 + 1 = 8$	Matches the eight unit-level category marks

A scratch is entered twice

A second transcription of U01's same scratch appears in the summary.

Decision

Reconcile against U01's original observation, correct the duplicate with a traceable amendment, and preserve the legitimate burr entry.

Reasoning

Correcting a duplicate is not deleting an inconvenient result. The source record and amendment explain why the total changes.

What would change the decision?

Corrected category count refers to one scratch observation on U01, not two.

Practise with a changed case

Reconcile a different receipt

New fictional receipt: 40 covers are inspected. A has scratch+burr, B has scratch, C has missing label, D has burr+missing label. The other 36 have no recorded fault.

Affected ID	Faults
A	Scratch, burr
B	Scratch
C	Missing label
D	Burr, missing label

Your task

1. Calculate nonconforming-unit percentage and nonconformities per inspected unit.
2. Prepare category totals and prove that every mark is counted.
3. State how an uninspected cover would affect the denominator.

Use the next page to record your reasoning before reading the answer.

Your practice worksheet

Reconcile a different receipt

Inspected population

Distinct affected IDs

Category tally

Two labelled calculations

Uncertainty or amendment

Complete your reasoning before turning to the answer. Use the separate learner workbook for group practice.

Check your reasoning and transfer it

1. Four distinct affected units out of 40 gives 10%. Six nonconformities out of 40 gives 0.15 per inspected unit.
2. Scratches, burrs and missing labels each occur twice. Their sum is six. An uninspected cover must not silently enter the inspected denominator; either inspect it under the defined scope or report the actual inspection amount.

Suggested completed record

Measure	Numerator / denominator	Result
Nonconforming units	4 / 40	10%
Nonconformities per unit	6 / 40	0.15
Category totals	2 + 2 + 2	6

Plausible wrong turns

1. 0.15 faults per unit is not 15% nonconforming units.
2. Counting only problem units loses the inspected denominator.

Evidence of a sound answer

1. Reconcile both counts independently.
2. Retain multiple faults on a unit.
3. Make ambiguous inspection scope visible.

Take the learning back to work

Commitment	Agreed follow-through
Owner	Inspection process owner
Record	Released collection form and reconciled summary
Review	After the pilot and at the next scheduled data review
Verification evidence	Different reviewers reproduce the counts from the same original records
If unresolved	Correct definitions, training or record capture before comparing rates across windows.

Help someone else apply the method

Prepare

1. Blank unit-by-category grid
2. Six fictional unit cards
3. Separate receipt exercise

Minutes	Activity and coaching prompt
5	Define a unit Can one cover contribute two marks?
7	Demonstrate the tally Keep U01 visible while calculating both numerators.
9	Reconcile the changed receipt Where does each of the six marks come from?
5	Debrief What information would a tally-only summary lose?

Debrief

1. Ask learners to explain 10% and 0.15 in ordinary language.
2. Use an ambiguous scratch to discuss definition quality rather than force agreement.

Individual or remote practice

Draw the four affected practice units before doing the arithmetic.

Connect the method and check its boundaries

Before application

1. A defined inspected unit
2. Agreed event definitions

Outside this lesson

1. A finished control chart
2. Causal explanation of defects

ASQ: Check sheet

ASQ: Check sheet

Define the observed event, collection period and recording fields; pilot the form before repeated use.

Public primary-source summary; underlying paid standards/forms are not reproduced.

Open this lesson and its visual aids