When to apply the “ANSI tables”, aka “AQL tables”

Source: Mil-Std 105E, replaced by commercial standards:
ISO2859, ANSI/ASQ Z1.4-2003, NF06-022, BS 6001, DIN 40080.
Inspection by Attributes

- Example: conform to specs vs. not conform.
- Example: black vs. not black.

- This standard does not apply when the data are continuous: 1.7, 2.3, 2.6, ...
“Lot by Lot Inspection”

- “These schemes are intended primarily to be used for a continuing series of lots”.
- Designed for the case where a producer ships batches regularly to a customer.
- Not designed for one-shot orders to new suppliers, or for the case where the customer places an order every 6 months.
Another standard was designed for inspections of isolated lots. But it does not use AQLs.

Would suppliers accept that sampling plan, if they are familiar only with sampling plans that use AQLs?

Do you want to start teaching them about “limiting quality”?

If you use this plan, “the user is strongly advised to consult the operating characteristic curves to find a plan that will yield the desired protection”.

“Lot by Lot Inspection”
<table>
<thead>
<tr>
<th>Sample size code letter</th>
<th>Sample size</th>
<th>Acceptance quality limit, AQL, percent nonconforming items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0,010</td>
<td>0,015</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
<td>68,4</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>20</td>
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</tr>
<tr>
<td>G</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>50</td>
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</tr>
<tr>
<td>J</td>
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<tr>
<td>K</td>
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</tr>
<tr>
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<tr>
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</tr>
<tr>
<td>R</td>
<td>2000</td>
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</tr>
</tbody>
</table>

NOTES
1. At the consumer's risk quality, 10% of lots will be expected to be accepted.
2. All the values are based on the binomial distribution.
3. Superscript * denotes that the value is for the optional fractional acceptance number sampling plan (see Table 11-A).
What buyers need to be aware of:

- This standard assumes that the average number of defects is good.
- The probability that a batch be accepted, even though the proportion of defects is beyond the AQL, is not negligible!
More than 95% of inspections are performed in normal severity.

A very important part of the standard is the switching rules.
(They were fine-tuned progressively from MIL-STD 105A to 105E, and then from the 1st to the 2nd version of ISO2859).
Figure 1 - Outline of the switching rules (see 9.3)
Switching Rules

- What buyers need to be aware of:
  - When a supplier keeps failing inspections, do not just keep sending inspectors.
  - If the supplier cannot improve his product quality by himself, either you stop the relationship or you try to help them by sending quality/process engineers in their factory.
Single vs. Double plan

- Double plans require less samples to be checked, on average.

- The psychological pressure on the inspector, from the manufacturer, is lower after the 1\textsuperscript{st} drawing
  - We need to make sure, let’s check more samples.

- There are also other plans, more complex (multiple, sequential...) that are even more efficient.
Single sampling plans are the least “efficient”.

Number of samples to check

P (proportion of defects)

Single plan
Single sampling plans are the least “efficient”.
Single sampling plans are the least “efficient”.
Single vs. Double plan

- What buyers need to be aware of:
  - For the lazy inspector, the temptation is high to under-report the number of defects, to avoid the 2nd part of the double plan.
  - Third-party inspection agencies typically try to avoid double plans.
Thank You

- For more articles and videos on this topic:
  - Go to www.qualityinspection.org