- Theory 6:
- Qualification Test Set and Routine Test Set

- **Statistical considerations on number of objects containing defects**
- **Particle selection, particle size and size uniformity**
- **Labeling of test set objects**
- **Supply/purchase of test sets**
- **Maintaining and lifecycle of test sets**
- **Sampling from rejects**
- **Defect master library**
- **Types of defects**
- **Quality requirements**

Theory 6:
Qualification Test Set and Routine Test

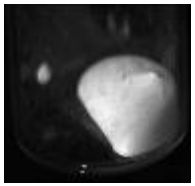
1. Prior study of particle/defect occurrence in real prod => control charting / number lots sampling
   - What type of particles/fibers, occurrence
   - This will also identify where introduced for process improvement
     - Removing the cause versus solving the problem
   - Necessary for selecting machine/supplier
     - URS and defined test sets make it possible to compare offers
2. Choosing how to build test sets and good units for testing and validation
   - Real defects versus manufactured defects
     - They should not fall apart during usage
     - They should represent the process defects found
     - They have a limit lifespan, so they should be reproducible for building new sets for later revalidation which will be far easier with manufactured defects

Theory 6:
Qualification Test Set and Routine Test

3. Artificial beds particles
   - They are completely reproducible, for 100%
   - They have exact dimensions like spheres, triangles, rectangles etc.
   - Detection limits can exactly being set
   - But their behavior in liquid motion do not resemble movement of real particles/fibers
4. Virtual defect library
   - Building a library of defect images and good units
   - The more the merrier
5. Virtual machine test
   - Having these images one can do offline configuration of machine recipes.
   - The automatic inspection machine stays in production for already validated configurations

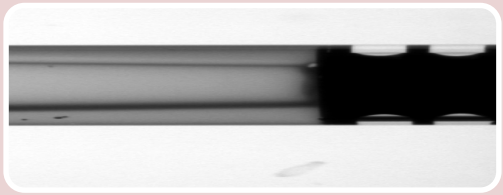
Theory 6:
Qualification Test Set and Routine Test

What do? Whatever dosage form (liq or lyo),100% visual inspection required for each parenteral product for following defects:



- Glass defects
- Closure defects (caps & crimp inspection)
- Particulate matter (lyo only external)
- Fill volume *specific for liquid products*
- Cake defects *specific for freeze-dried products*
- *Cosmetics defects*

Theory 6:
Qualification Test Set and Routine Test



Syr.

- **Cracks**
- **Particles**
- **Fill Level**
- **Stopper**
- **Closure**
- **Flange/gripper**
- **Stain**
- **scratches**

Vial Liq.

- **Cracks**
- **Particles**
- **Fill Level**
- **Closure**
- **Cap Color**
- **Stain**
- **scratches**

Lyo

- **Cracks**
- **Particles**
- **Lyo defects**
- **Closure**
- **Cap Color**
- **Leaks**
- **Stain**
- **scratches**

Visual Inspection Defect Master Library

Process rejects

Complaints

Vaccines Creation

Defects catalog

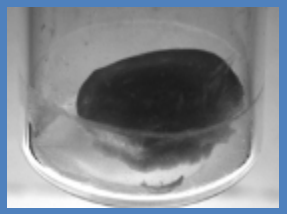
Basis for kits

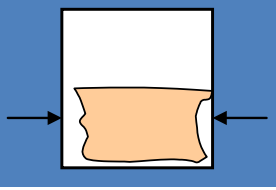
Operators certification

Machine validation

<Name>

<Root cause if known>





Description:

- Color
- Shape
- …

Instruction for defect evaluation:

- Instruction 1
- Instruction 2

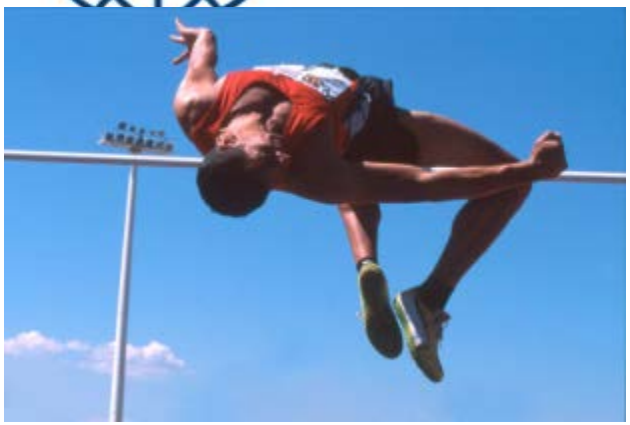
Criticality level:

Crticial – Major - Minor

- Justification 1
- Justification 2

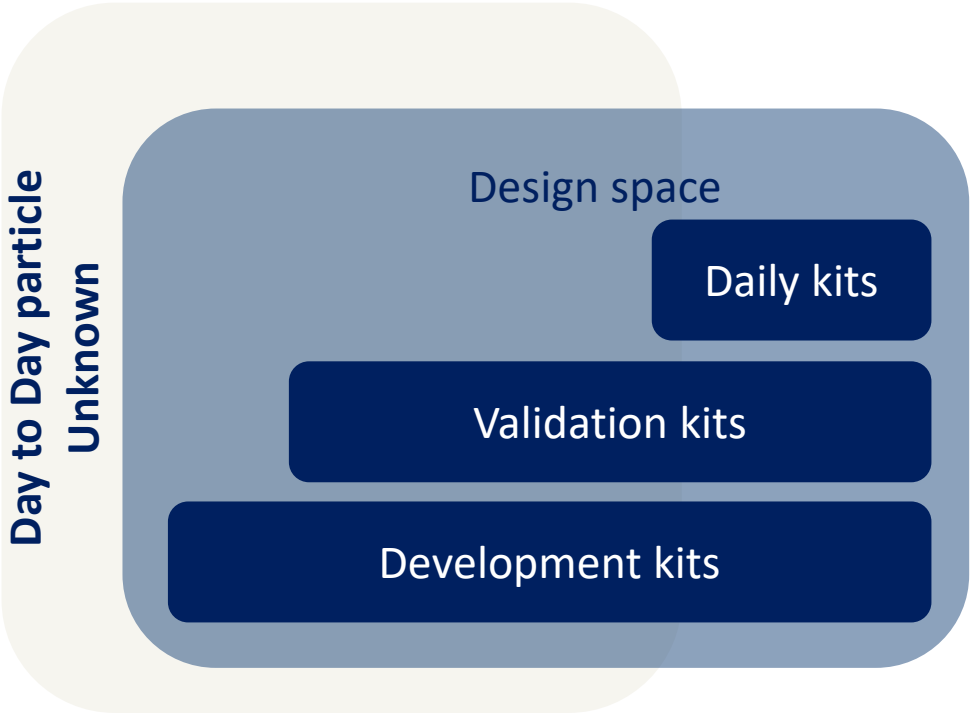
Product knowledge

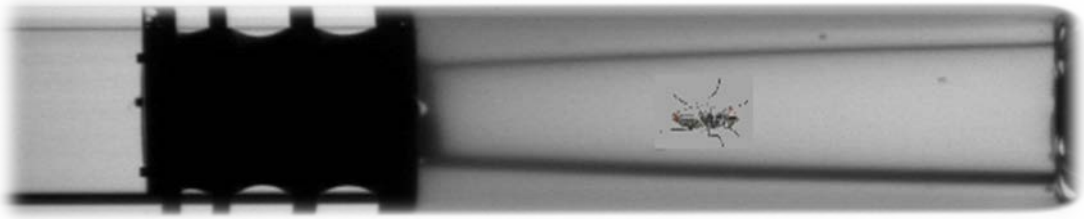
Can AVI detect unknown particles ?



Key learning:

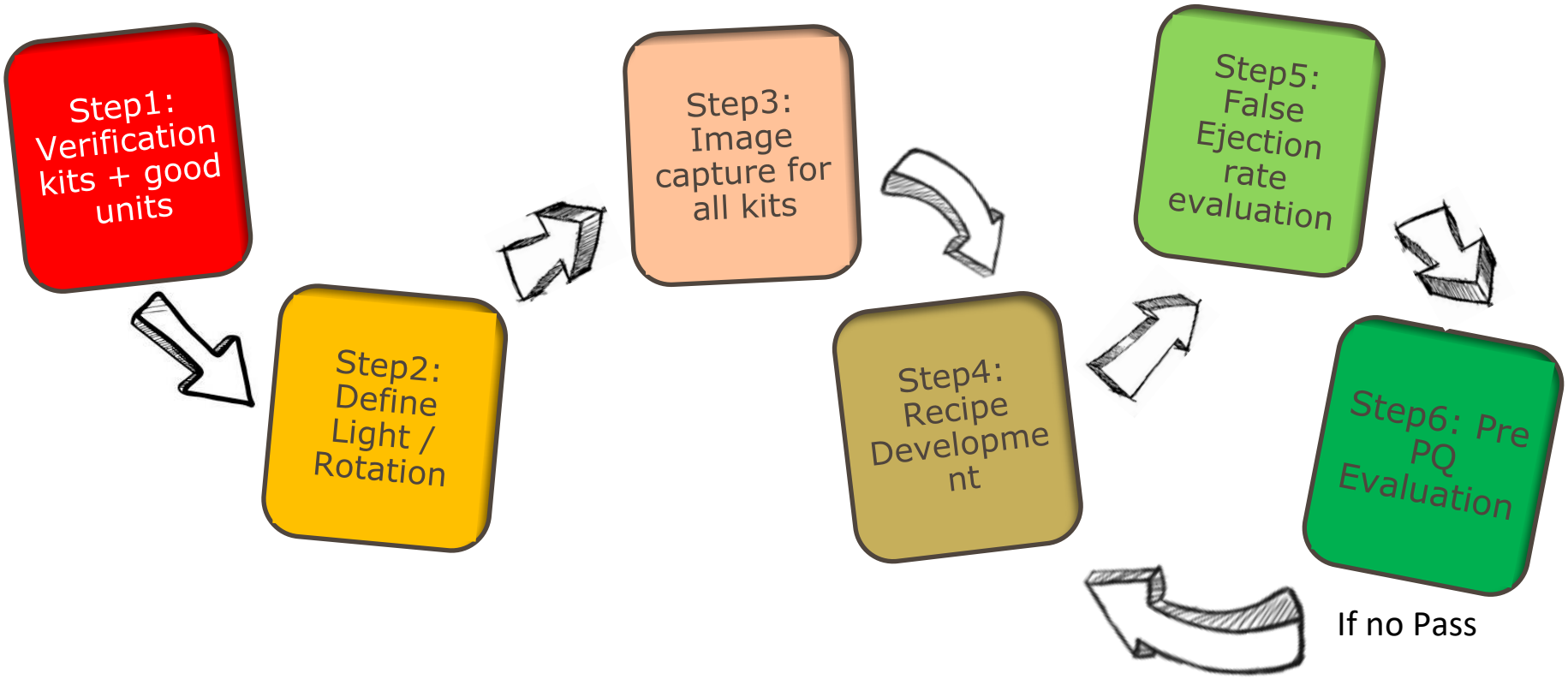
- Machine vision is designed with minimum threshold, may be compared to high jump.
- Machine vision is designed to detect defect that are outside the design space to anticipate some new defects (unknown)
- With artificial image library we can demonstrate capability of unknown detection





!Fake image!

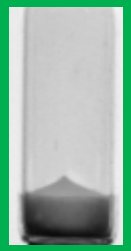
Vision Recipe development



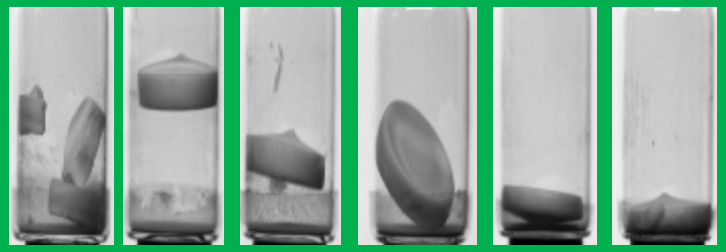
Lyophilized Parenteral defects

NO Grey zone is Acceptable => define the limit

Conform

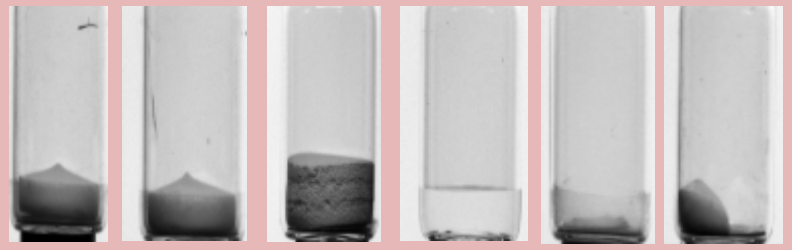


Acceptable Imperfections



broken Lifted Debris Bent Flipped Powder . . . . . .

Defect

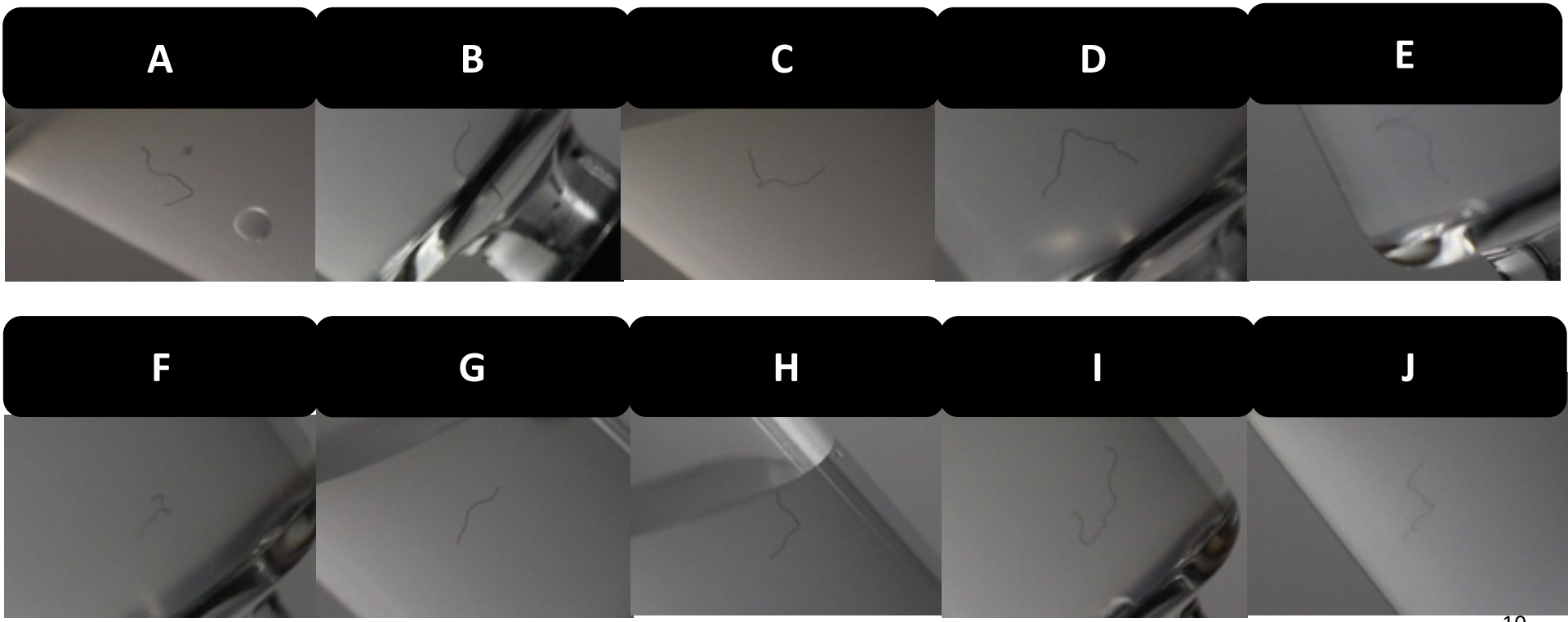


crack crack X2 dose liquid half Moon . . .

Theory 6: Qualification Test Set and Routine Test Set Number of Replicate ?

Precipitating particle:
- black
- lengenthed, type fiber
- big : 0.6 mm²

Location definition
Defect family (particle/Crack/closure)
Defect types (attributes)



Performance Qualification AVI Lyo Inspection

2 Validation Kits are used

Reference defect Kit

+ consistent defects
+ no degradation
+ stable years
+ Fixed Detection rate

- Artificial
- Gross defects

Real Defect Kit

+ Real defects

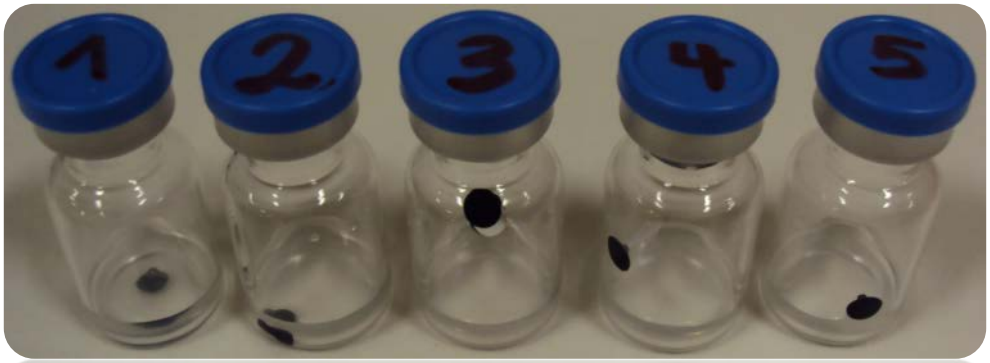
- Degrade fast
- Variability between defects
- No Detection rate limit

- Collection in production
- Manufacturing
  - Sub contracting : working instruction / DML /
  - Internal group: working instruction / DML /
  - Labelling units / UV printing➔ anti mixup
  - Back up units when broken
- Logbooks of kits
- Supply for sites
- Storage condition
- Documentation of use / line clearance
- Verification / change units
- Expiry date

SOPs
+
QA Oversight

Daily kits ?

- Daily kit test for machine functionality
- = gross defect to simulate ejection
- Not a performance evaluation only for vision system functionality of detection and rejection



Key take away:

- In this section you have learnt:

KITS	
	Statistical considerations on number of objects containing defects
	Particle selection, particle size and size uniformity
	Labeling of test set objects
	Supply/purchase of test sets
	Maintaining and lifecycle of test sets
	Sampling from rejects
	Defect master library
	Types of defects
	Quality requirements