

K2 Tech Capsule Inspection Machine Introduction

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K2 TECH

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High speed & capability

- High speed: 140000 pcs / hours.
- Productivity compare to others: 130%~150%.
- 4 kinds of unprinted capsule are supported:
 - a. Opaque capsule
 - b. Full transparent capsule
 - c. Cap transparent capsule
 - d. Body transparent capsule
- Support both Outside defects and inside defects detection.
- Printed capsule supported

Independent design and production

- Software and hardware are designed and produced by K2 Tech.
- Independent intellectual property rights.

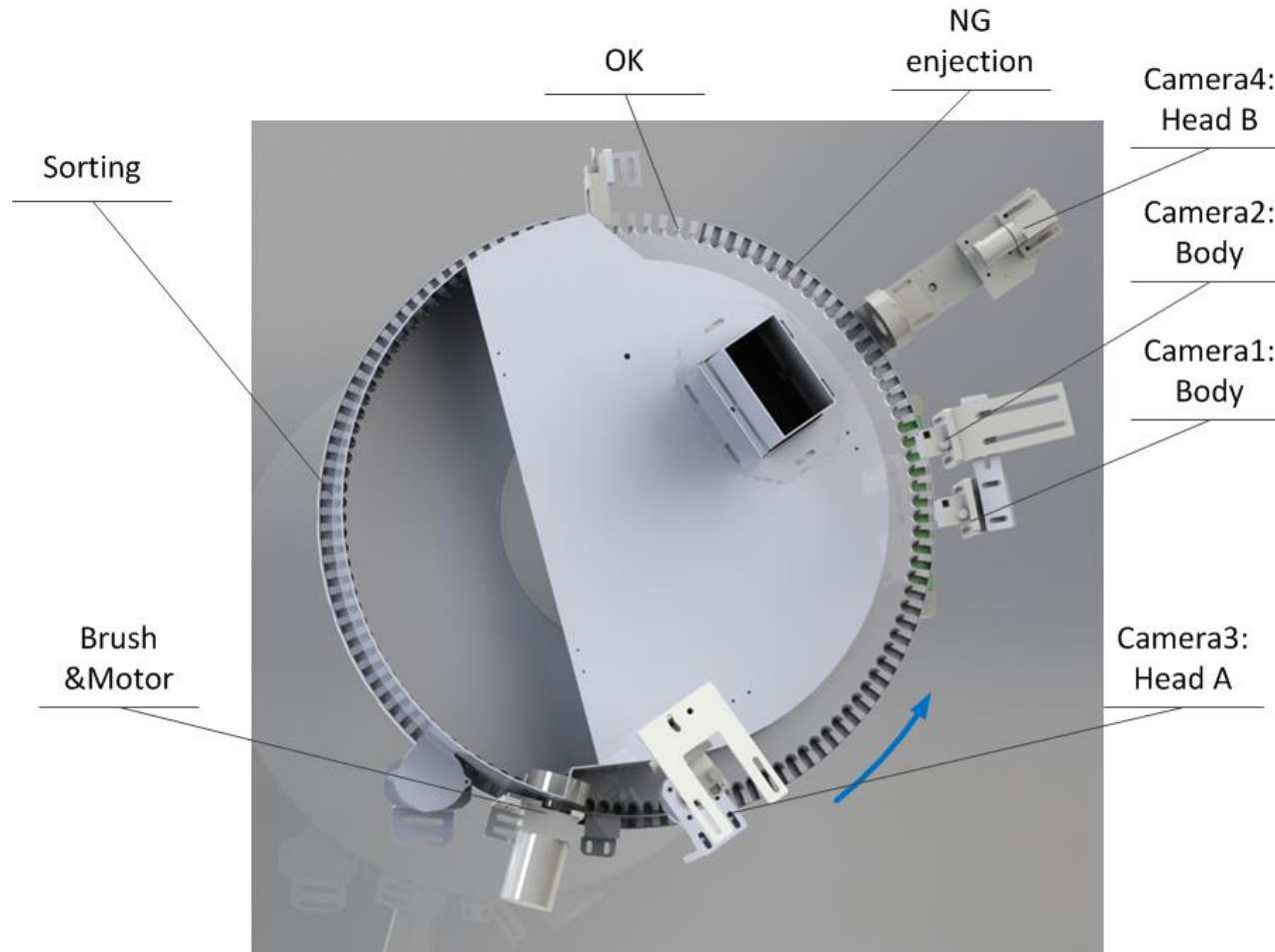


Simple & Easy

- **Simple structure: Easy maintenance**
 - a. One disk make 360 degree inspection available.
 - b. Two motors make the machine to transport capsule smoothly.

- Easy to use.
 - a. Less then 10 minutes change of product.
 - b. Easy to use, both software and hardware.

Simple & Easy



The main components & reliability

- Camera: Basler, Germany
- Lens: VST, Japan
- Computer: Fanless compact IPC, Taiwan
- PLC: Mitsubishi L series high speed, Japan
- Major parts: Round disk, China

- 1. The fan-less IPC makes the machine better reliability and performance.**
- 2. The main components are worldwide popular parts makes the machine easy to maintain.**
- 3. The main components enable the machine higher speed and performance.**



IPC(Computer) Configuration

- CPU: Intel core I7, 4 cores 8 threads
- Memory: DDR4 8G
- Hard Disk: 500G HDD
- Ethernet Card: 6xGigabit Ethernet
- USB Port: 4xUSB 2.0, 4xUSB 3.0

User Interface & Cameras

Camera switch

Image display control

The screenshot shows a web-based control interface for a camera system. At the top, there are navigation tabs: 'Start', 'Stop', 'Camera', 'Image', 'Image', 'Top Menu', 'Advanced', and 'Quit app'. Below this is a 'Display' dropdown menu set to 'Only capsule images' and a row of camera selection buttons: 'Camera1', 'Camera2', 'Camera3', 'Camera4', and 'All cameras'. The main area is divided into four camera viewports: 'Camera 1' (top row, 8 images), 'Camera 2' (middle row, 8 images), 'Camera 3' (bottom left, 1 image), and 'Camera 4' (bottom right, 1 image). To the right, there is a 'Camera summary' table and a 'Defect data' table. The 'Camera summary' table has columns for 'No.', 'Time', 'Total', 'Pass', 'No.', and 'Pass rate'. The 'Defect data' table lists various defect types and their counts. Below these tables are 'Parameters settings' and 'Management' sections. At the bottom, a 'Status bar' displays system information like 'Start: 2017/12/22 17:34:30', 'Model: P3-2 3#red-gray', and 'Running inspection' status. A 'Clear' button is located in the status bar area.

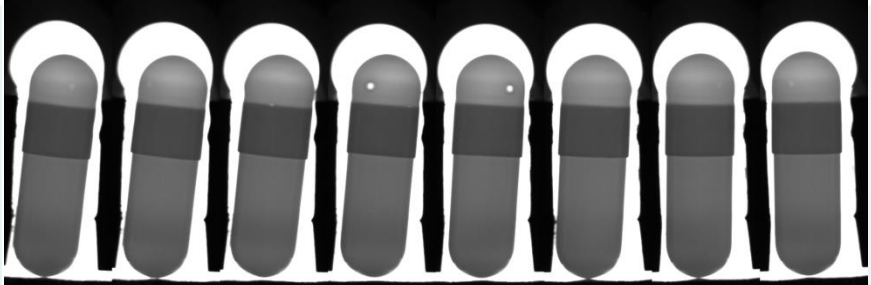

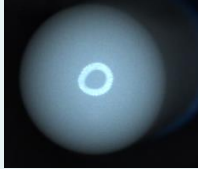
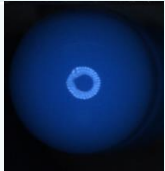
No.	Time	Total	Pass	No.	Pass rate
1	2	17	17	0	99.99%
2	3	17	17	0	99.99%
3	4	17	17	0	99.99%
4	5	17	17	0	99.99%
Sum	0	17	17	0	99.99%

No.	Defect type	Count
1	Pi Size error	0
2	Pi Gray error	0
3	Dark spot	0
4	Bright spot	0
5	Cut edge	0
6	Color error	0
7	Not even	0
8	Head	0
9	Roughness	0
10	Print defect	0
11	Other defect	0

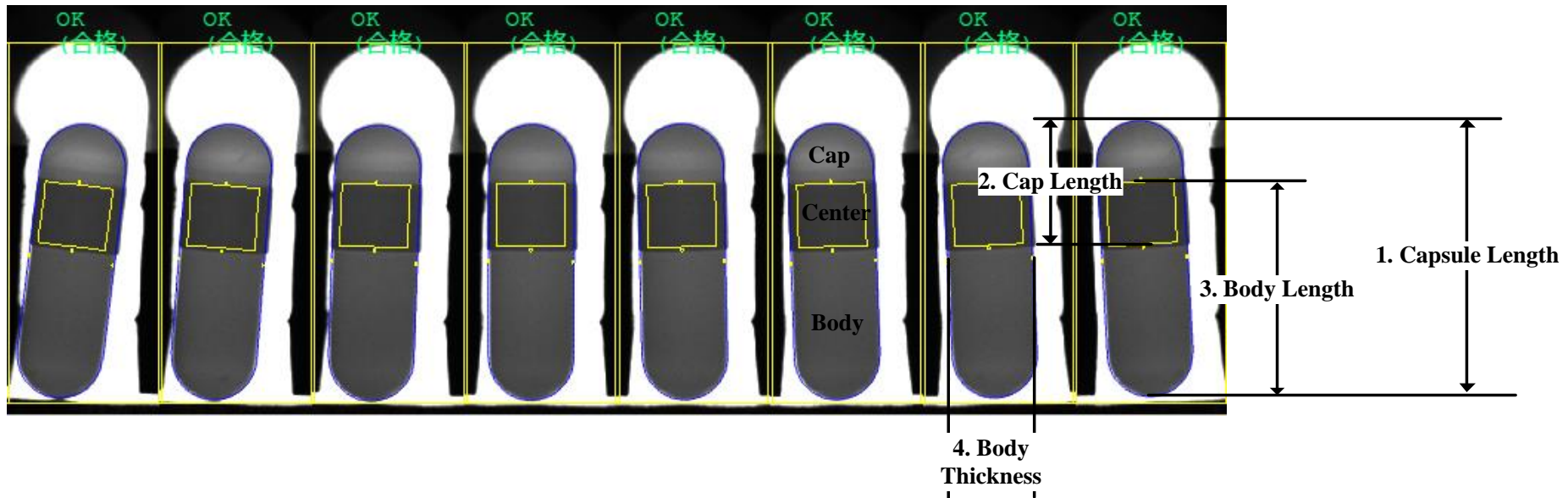
Click to change the admin password

Clear the OK box

User Interface & Cameras

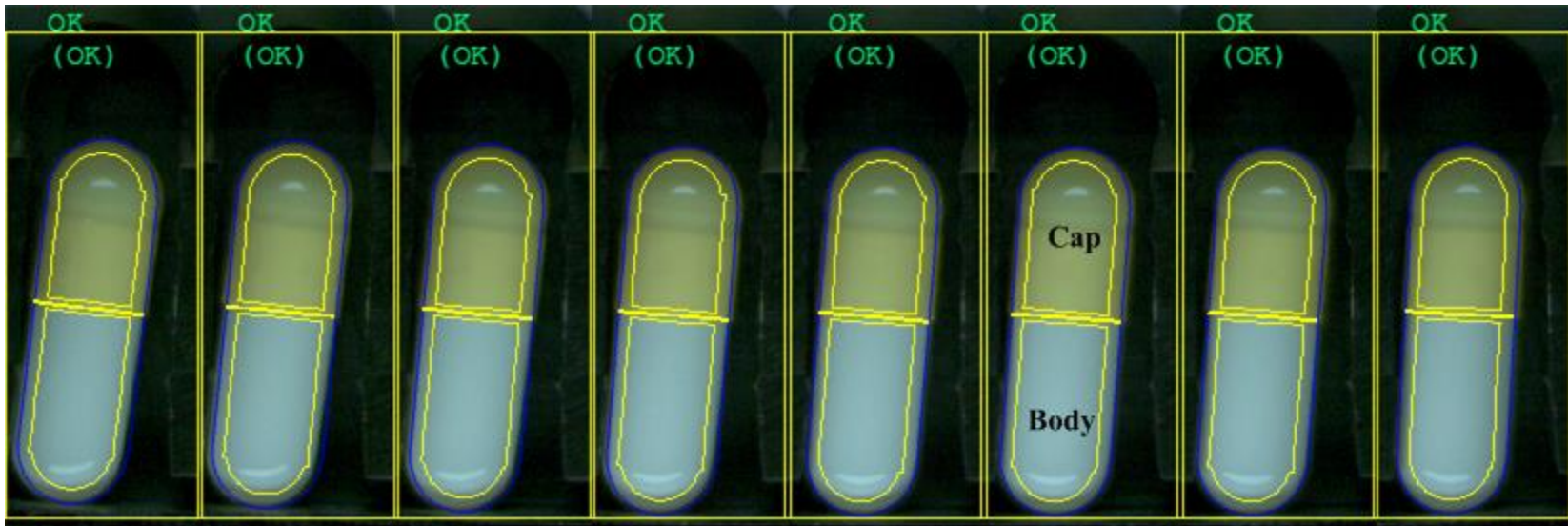
ID	Type	Images
Camera 1	Mono(Black & White) camera Body inspection by IR light. 8 continuous images for one capsule. Competitors: 6 images for one capsule.	 A sequence of 8 grayscale images showing a capsule body from different angles, captured using IR light. The capsule is dark against a light background.
Camera 2	Color camera Body inspection by visible light. 8 continuous images for one capsule. Competitors: 6 images for one capsule.	 A sequence of 8 color images showing a capsule body from different angles, captured using visible light. The capsule is white with a blue band.
Camera 3	Color camera Head inspection	 A color image showing the head of a capsule, which is a white sphere with a blue ring around its equator.
Camera 4	Color camera Head inspection	 A color image showing the head of a capsule, which is a white sphere with a blue ring around its equator.

User Interface & Cameras –Camera 1



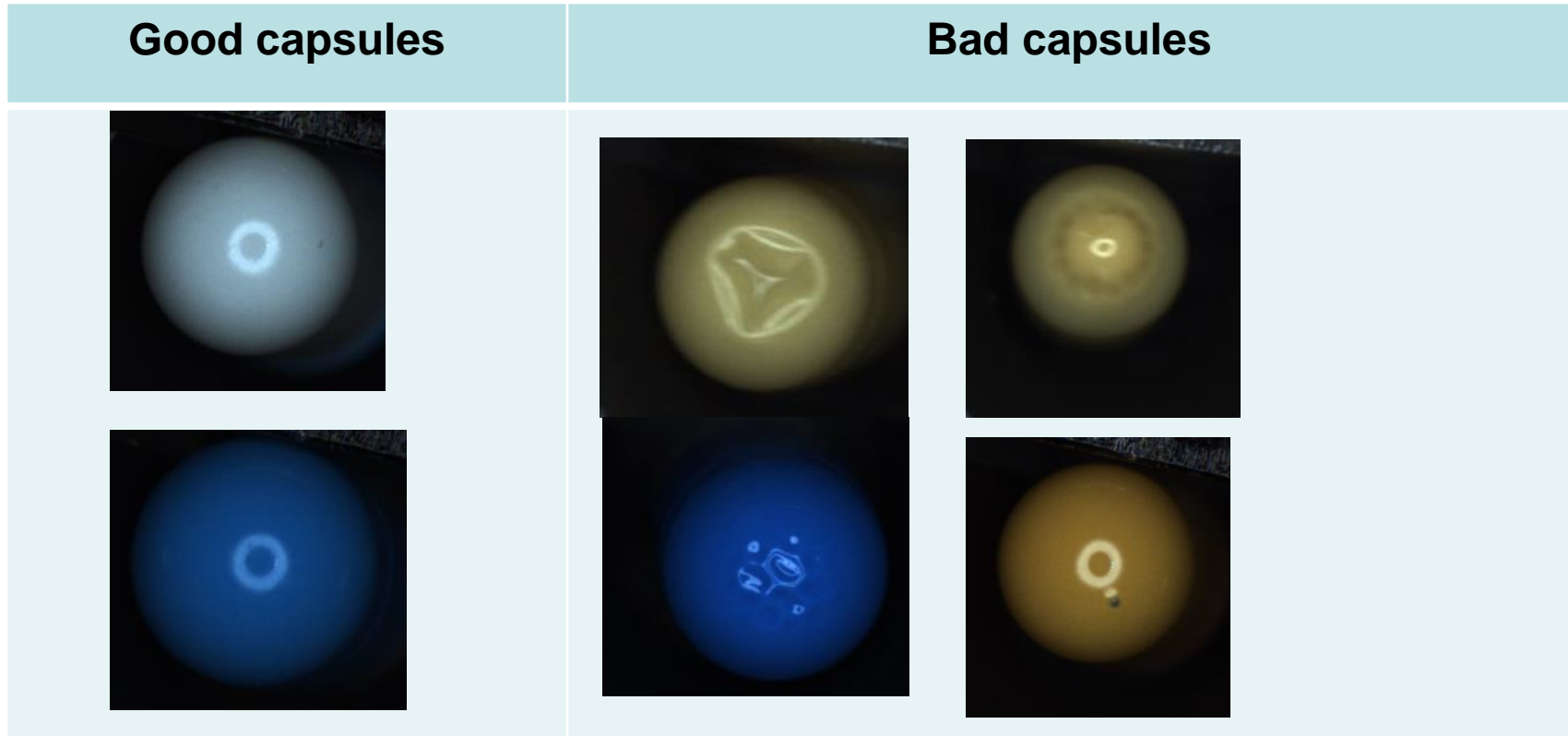
1. Camera 1 take 8 continuous black & white images for each capsule.
2. System can find the capsule and measure the capsule size(Capsule length, cap length, body length and body thickness) automatically. And the size range should be set individually to eject the Mini Cap/Body, Long Cap/Body, Locked/Loose capsules.
3. System can detect the defect in the cap, body and center part, and the parameters for each part should be set individually.
4. Camera 1 can detect both inside defects and outside defects.

User Interface & Cameras –Camera 2



1. Camera 2 take 8 continuous color images for each capsule.
2. System can find the capsule automatically, locate the edge of cap, and separate the cap part and body part.
3. System can detect the color of cap and body, according to the color range settings foreign capsules should be detected and ejected.
4. Camera 2 can detect outside defects.

User Interface & Cameras – Camera 3&4


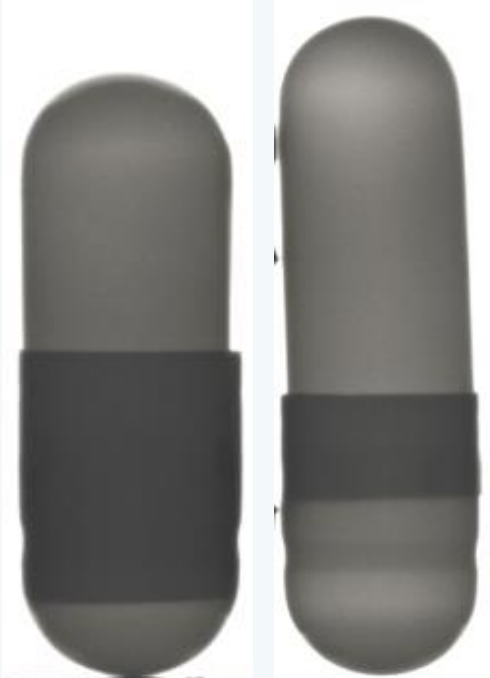


1. Camera 3&4 take one color image of the two heads of capsule.
2. System can find the capsule head automatically.
3. System can detect head defects(dent, star head etc.) according to the parameters settings.

Defect Samples

ID	1	2
Defect	Bubbles	Spots-Black / Color / Gelatin / TiO2
Images	 Three grayscale images of capsules. The first image shows a small white bubble on the top surface. The second image shows a larger white bubble on the top surface. The third image shows a small white bubble on the bottom surface.	 Four images of capsules. The first three are grayscale and show small black spots on the top surface. The fourth image is a color image of a capsule with a yellow top half and a blue bottom half, showing a small black spot on the yellow surface.



Defect Samples

ID	3	4
Defect	Loose Cap / Loose Body	Lock / Semi Lock Capsules Long Joining
Images		



Defect Samples

ID	5	6
Defect	Double Caps	Mini Cap / Body, Long Cap/Body
Images		

Defect Samples

ID	7	8
Defect	Uncup cap/body	Foreign Capsule: Camera 2 check the color of cap and body to detect the foreign capsules
Images		

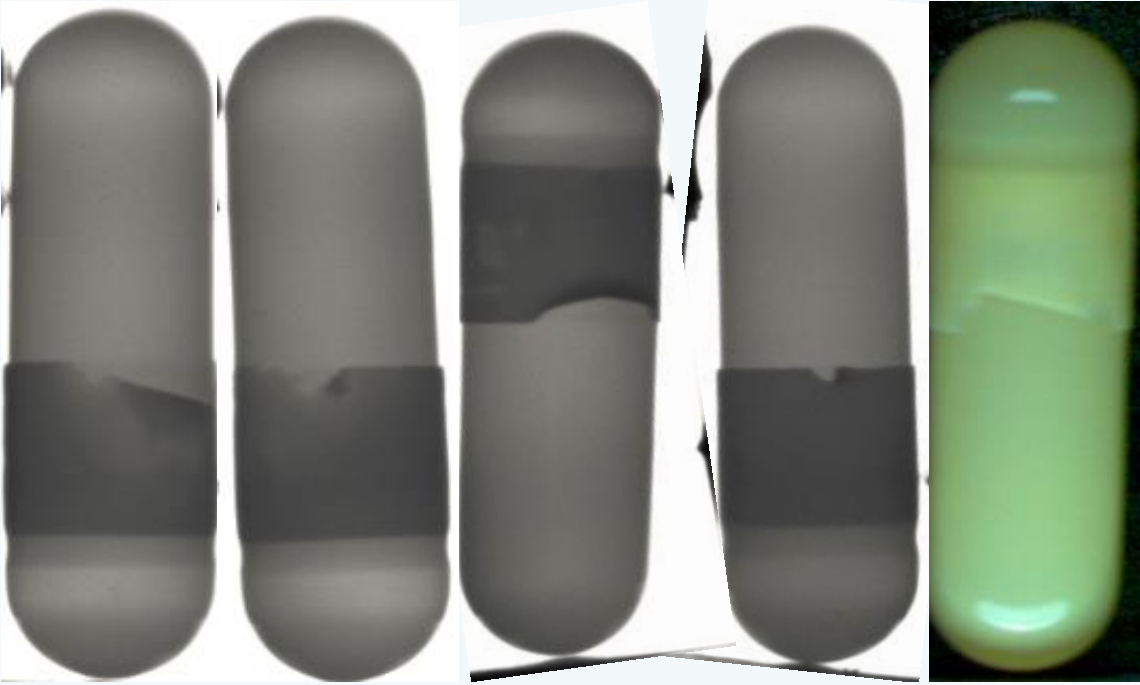

Defect Samples

ID	9	10
Defect	Inside defect: Folded Capsules Inside / Loose ring inside	Stripper hole or any type of Hole Cap / Body
Images		

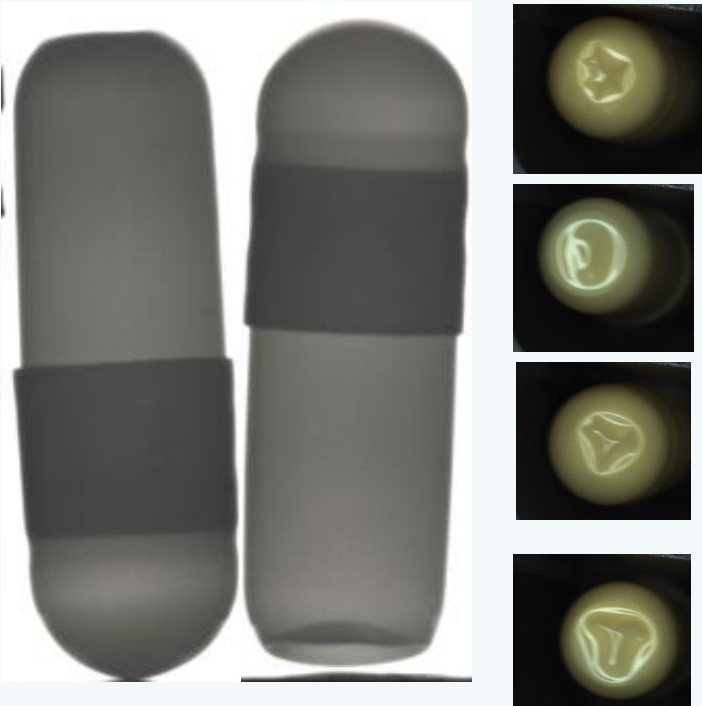
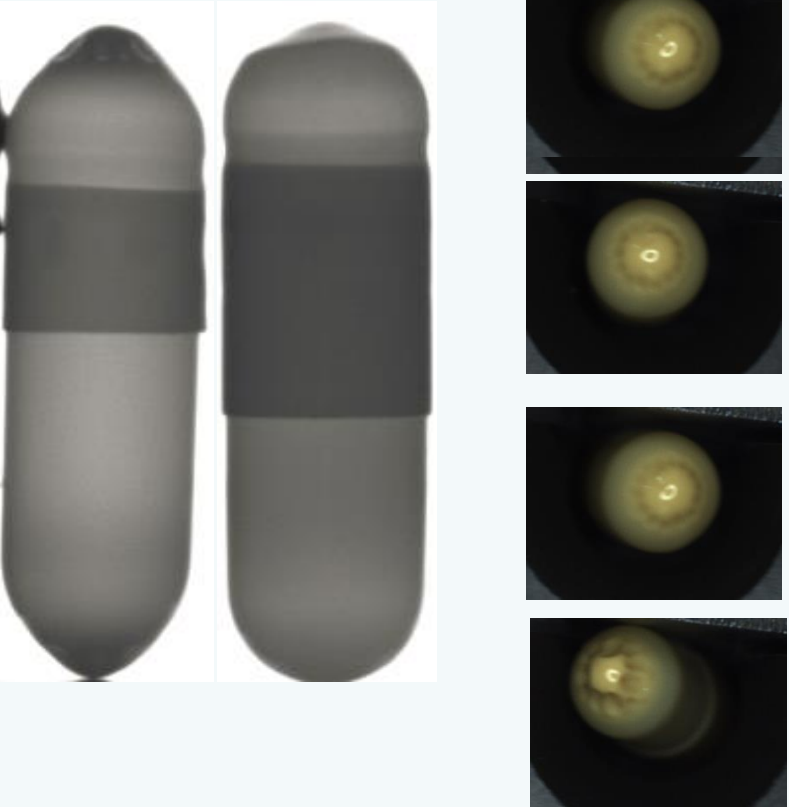
Defect Samples

ID	11	12
Defect	Cut Edge: Uneven Cut / Bad Cut Cap / Body	Cut Edge: Split Cap / Body
Images	 Four grayscale images of capsules showing defects. The first image shows a capsule with a jagged, uneven cut edge. The second image shows a capsule with a dark, irregular band around the middle, indicating a bad cut. The third and fourth images show capsules with similar dark bands and uneven cut edges.	 Three grayscale images of capsules showing defects. The first image shows a capsule with a dark, irregular band around the middle, indicating a split cap. The second and third images show capsules with similar dark bands and split caps/bodies.


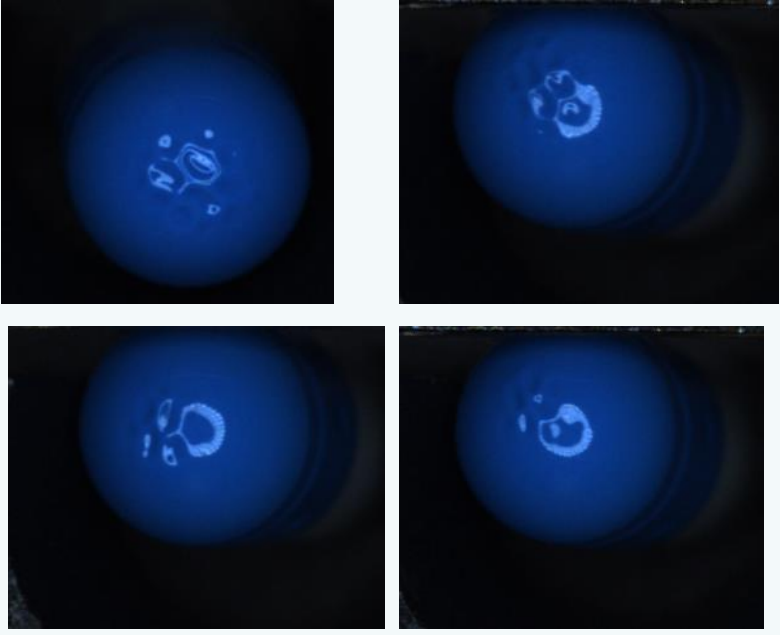
Defect Samples

ID	13	14
Defect	Cut Edge: Rough Edges etc.	Dirty Capsules Outside
Images		


Defect Samples

ID	15	16
Defect	Dent Cap / Body	Double Dip Cap / Body
Images	 <p>Two 3D models of dental caps are shown side-by-side. The left model has a noticeable dent on the upper part of the cap. To the right of the 3D models are four circular cross-sectional views of the cap, each showing a distinct indentation or dent on the inner surface of the cap.</p>	 <p>Two 3D models of dental caps are shown side-by-side. The left model has a double-dip defect on the upper part of the cap. To the right of the 3D models are four circular cross-sectional views of the cap, each showing a double-dip or double-indentation on the inner surface of the cap.</p>

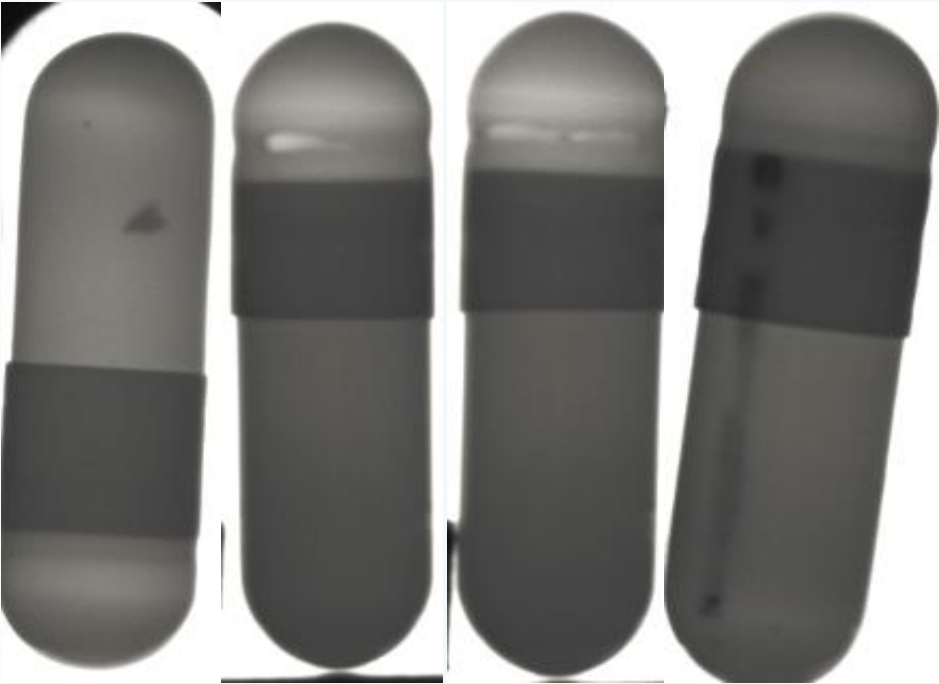
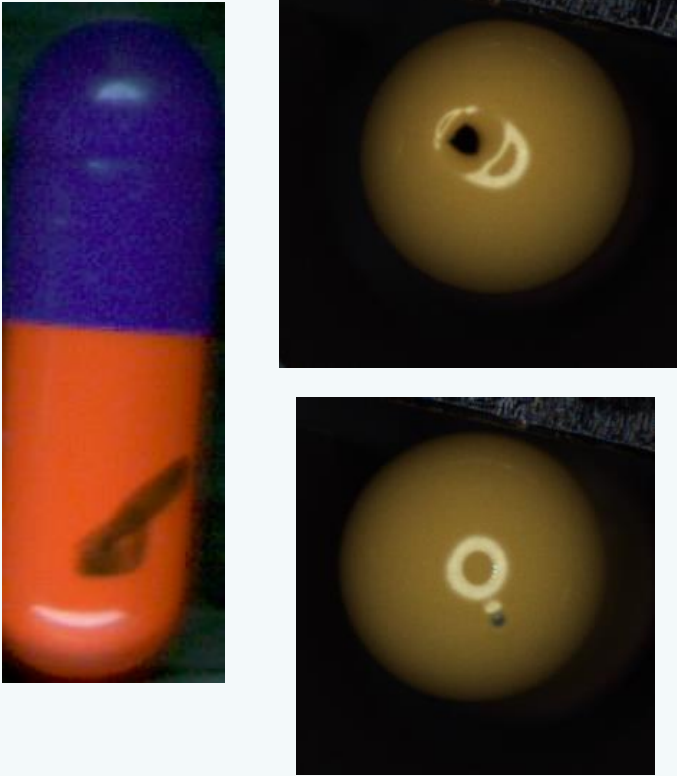
Defect Samples

ID	17	18
Defect	Colette Pinch Cap / Body	Head Defects: Star head
Images		





Defect Samples

ID	19	20
Defect	Mashed Capsules	Loose ring Outside
Images	 The image block contains three photographs of capsules. On the left, two black capsules are shown side-by-side against a white background. They appear to be standard, smooth capsules. On the right, a single orange capsule is shown against a dark background. This orange capsule has a distinct, irregular shape, appearing somewhat flattened or distorted compared to the black capsules, which is consistent with the 'Loose ring Outside' defect described in the adjacent cell.	

Defect Samples

ID	21	22
Defect	Gelatin problem	Other defects
Images	 Four grayscale images of capsules. The first image shows a capsule with a small dark spot on its upper half. The second image shows a capsule with a horizontal band of darker material across its middle. The third image shows a capsule with a similar horizontal band. The fourth image shows a capsule with a dark, irregular mark on its lower half.	 Two images of capsules. The first image shows a capsule with a purple upper half and an orange lower half, with a dark mark on the orange section. The second image shows a capsule with a yellowish surface and a dark, irregular mark.

Print Defect Samples

ID	23	24		
Defect	Missing print	Print defect		
Images				

The End

Thank you for your attention

