

# Case study for overcoming high false reject rate & trending analysis from AVI

**Wonmin.Kim**

Part Leader

GC Biopharma

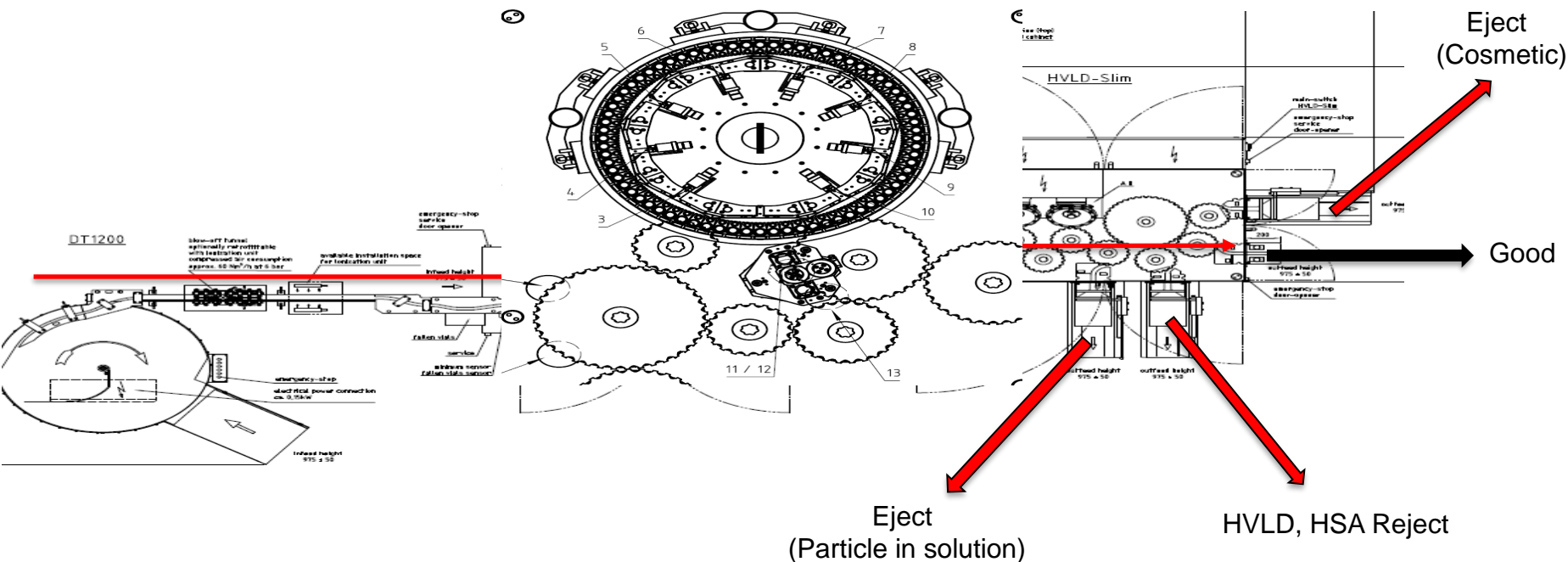


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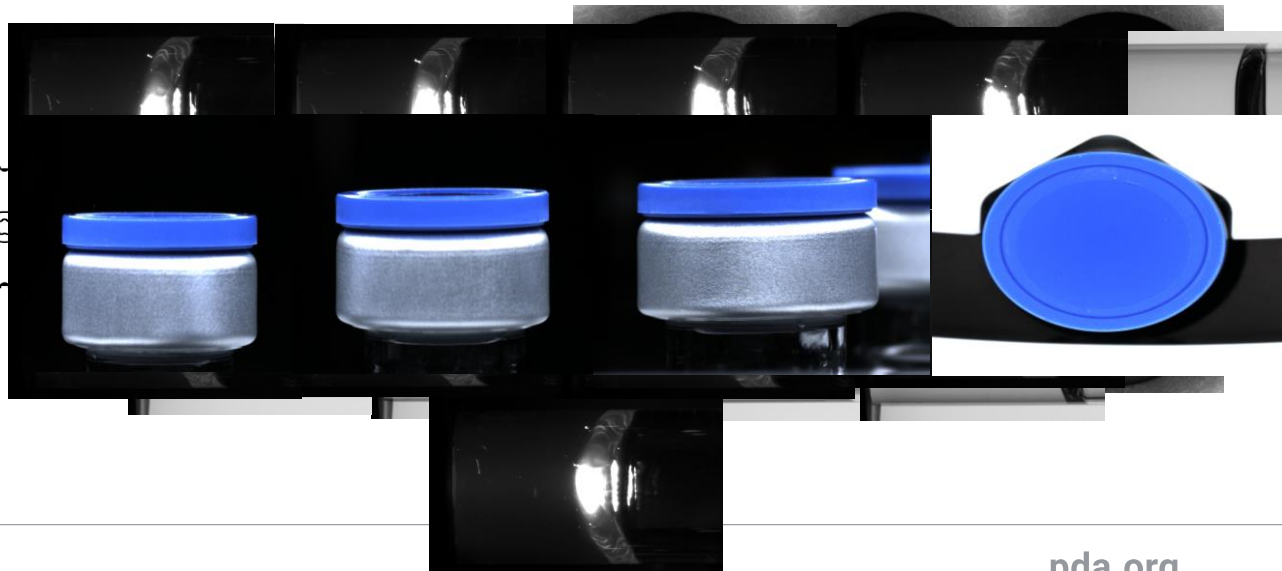
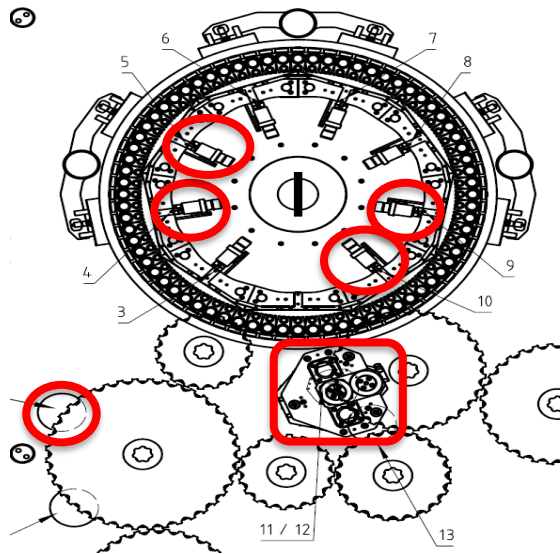
CONNECTING  
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AND  
SCIENCE  
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- \* Description of Vial Auto inspection machine
- \* Camera Station
- \* Vision establishment process
- \* False reject case
- \* Challenges & Overcoming

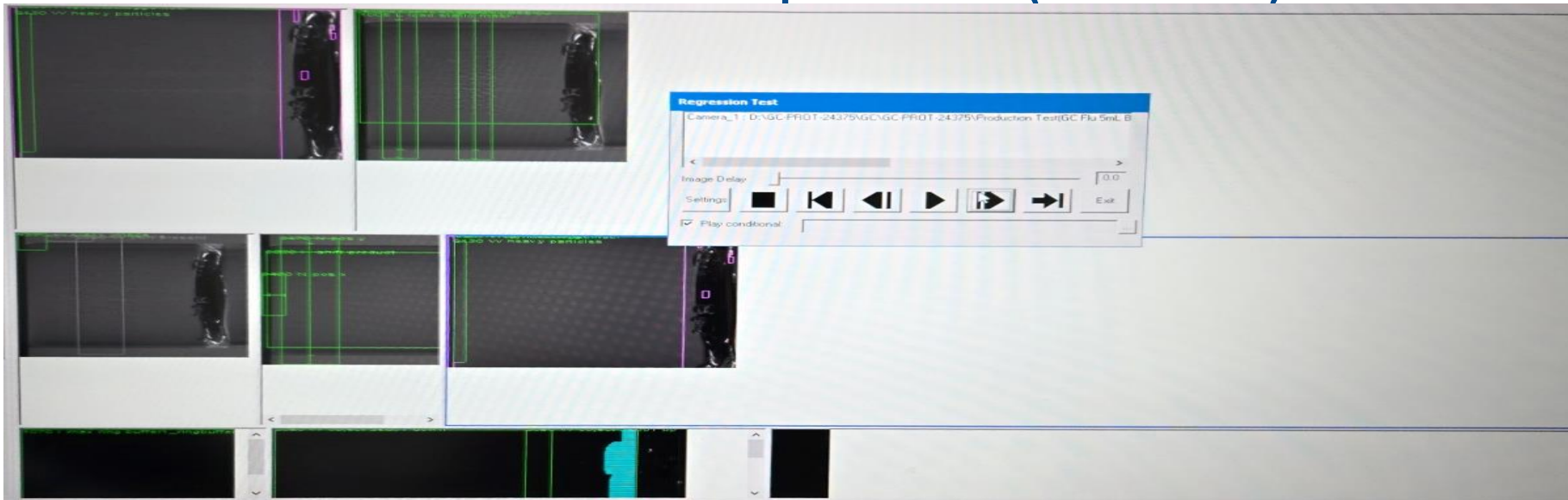
# Description of Vial Auto inspection machine



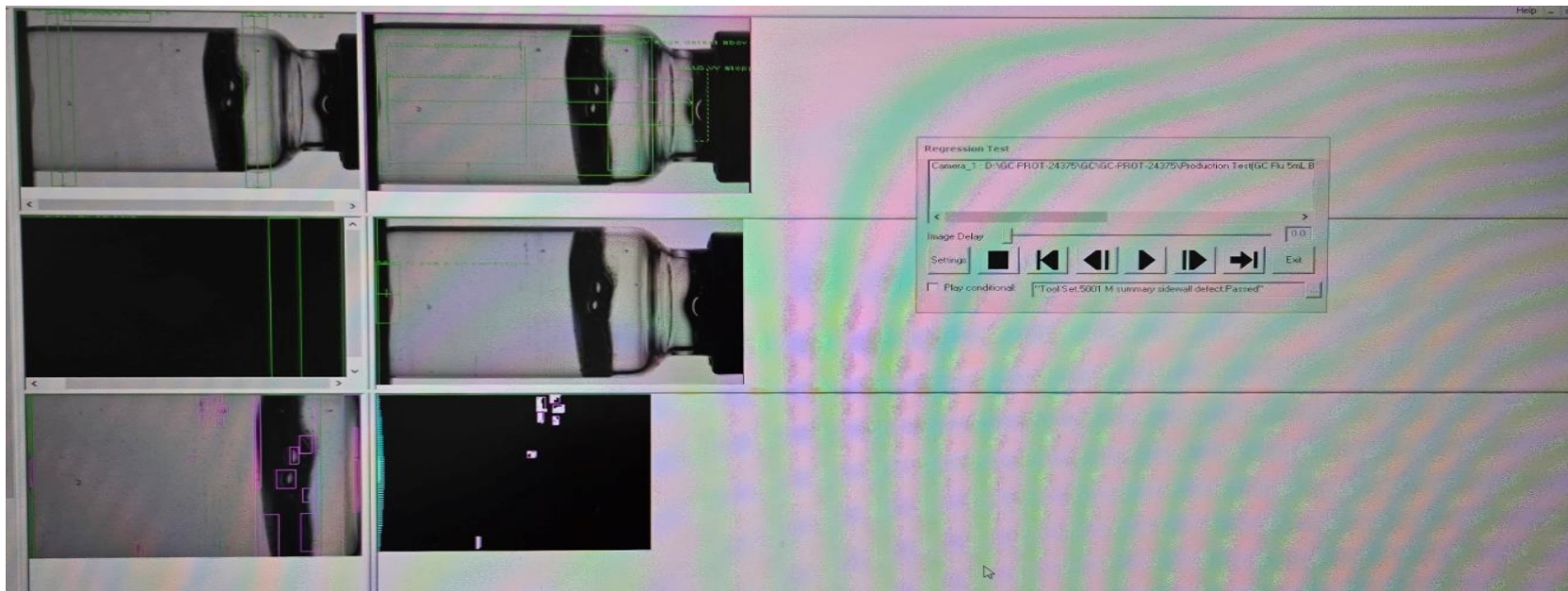
# Camera Station



# Vision Establishment process (Particle)



# Vision Establishment process (ex. Vial)



## False Reject case (False reject example) (Qualification)

- \* Knapp Test (Performance Qualification) (6R Vial, Fill Level 5mL)

Defect Detection Rate: 98.8%

False reject rate: ~13.5%

False reject rate: 11.6%, 19.1%, 12.6%

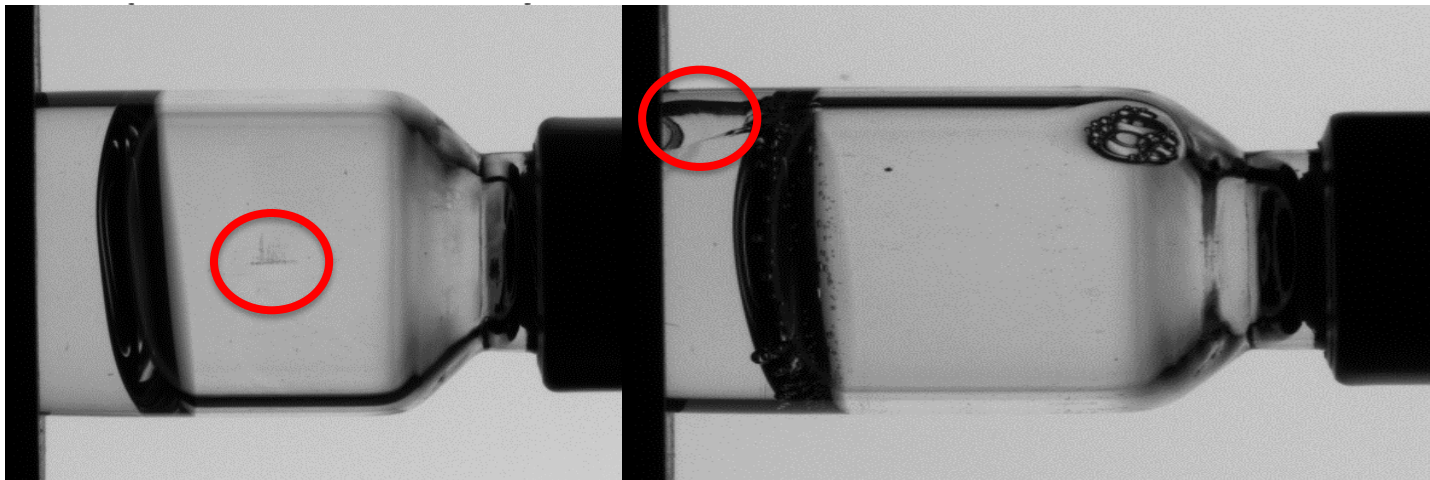
- \* Knapp Test (Performance Qualification) (2R Vial, Fill Level 0.5mL)

Defect Detection Rate: 97.3%

False reject rate after tune: 19.8~26.1%

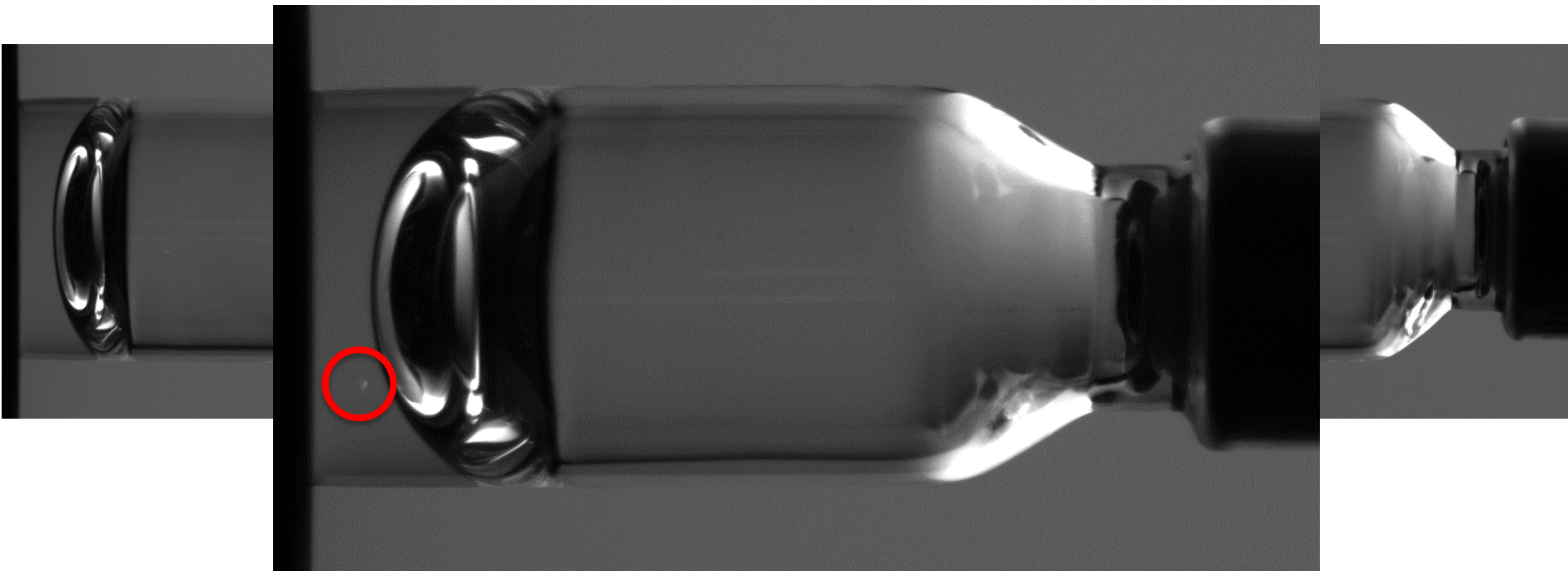
**False reject rate before tune: 43.9~51.1%**

# False Reject case (False reject example) (Qualification)



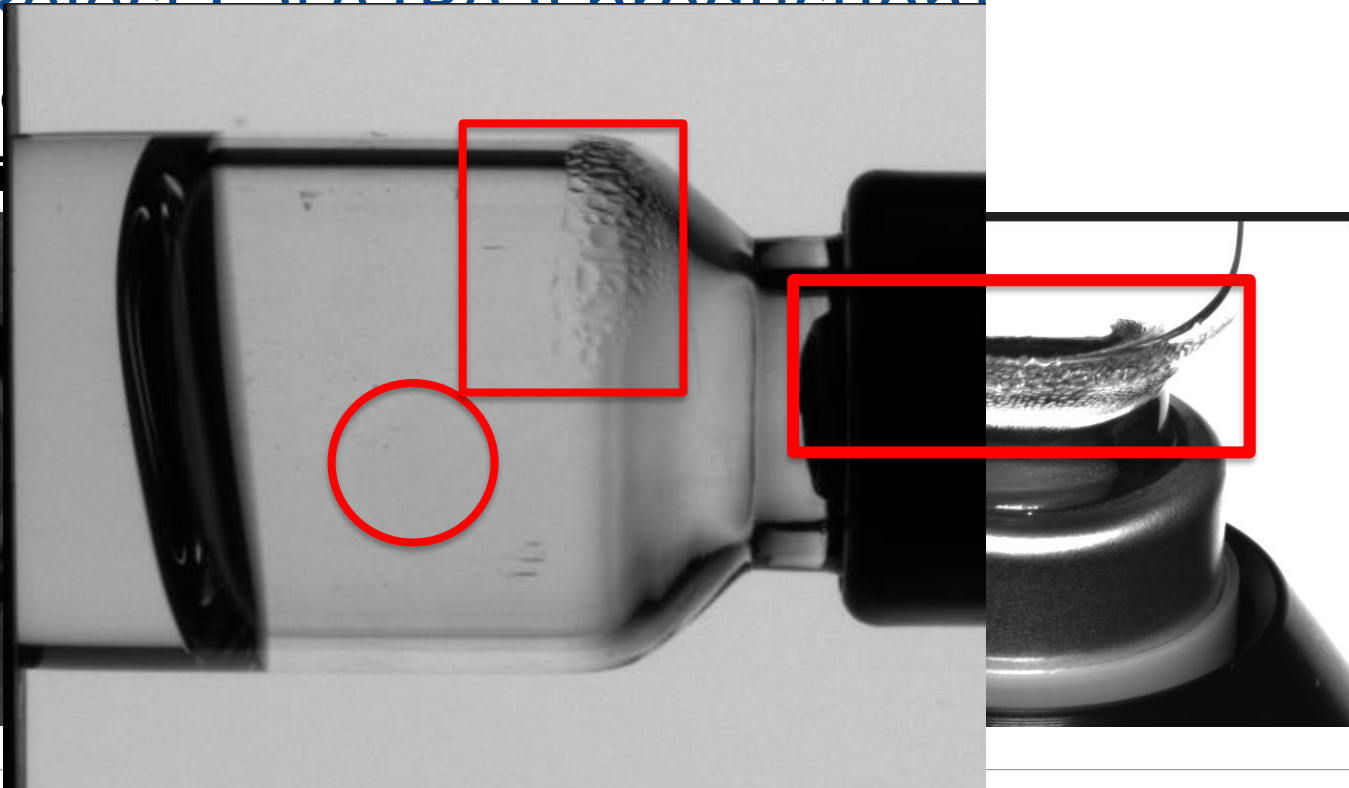


# False Reject case (False reject example) (Qualification)



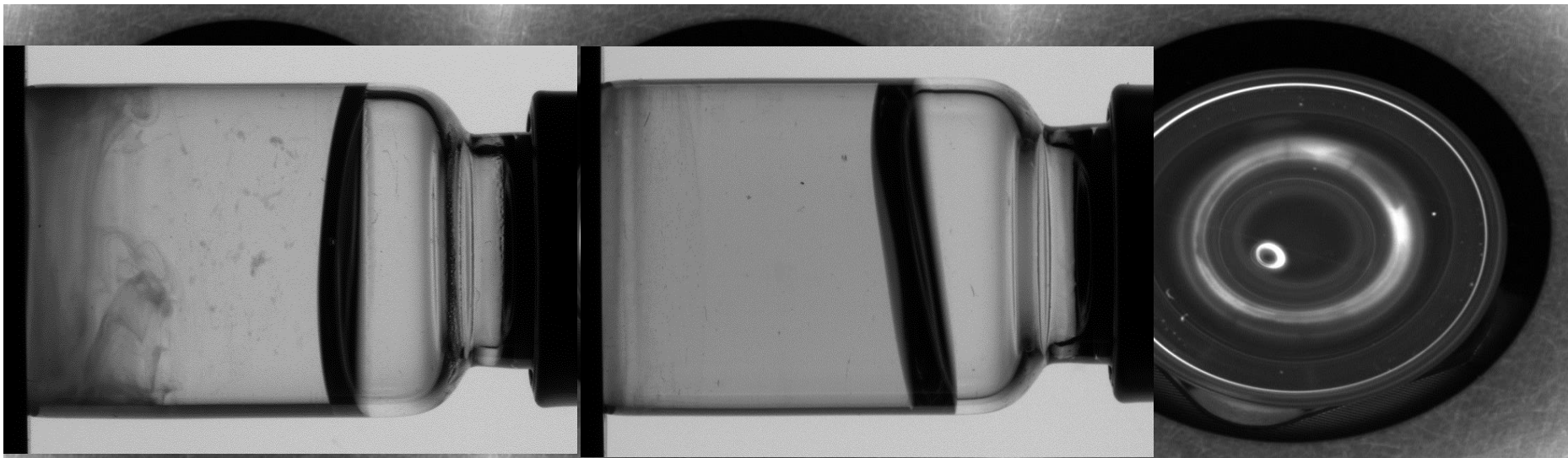
# False Reject Case (Real production)

1st ~ 3rd c  
2R Vial F



# False Reject Case (Real production)

**1<sup>st</sup> ~ 3<sup>rd</sup> commercial batch**



# Challenge & Overcoming

1

Gla:		No	Defect type	MVI	AVI
High Speed Rotat		01-01	High Volume	90	100
1st		02-01	Low Volume	83.3	100
No	DR	03-01	Empty	100	100
1	70	04-01	Discoloration	100	100
2	90	05-01	Murky	96.7	100
3	100	29-01	Absence of Stopper	100	100
4	100	30-01	Wrong stopper	96.7	100
5	50	31-01	Mal-formed Stopper	70	100
6	90	32-01	Damaged Stopper	70	100
7	30	33-01	Stopper Stain	70	100
8	100	34-01	Stopper particle	70	100
9	10	22-01	Cracked Vial	96.7	100
10	100	36-01	Particle in solution (Black) <L>	93.3	100
11	10	37-01	Particle in solution (White) <L>	90	100
12	70	38-01	Particle in solution (Vynil) <L>	83.3	100
13	40	39-01	Particle in solution (Fiber) <L>	96.7	100
14	0	40-01	Particle in solution (Hair) <L>	100	100
15	100	41-02	Particle in solution (Steel) <M>	90	100
16	70	42-01	Particle in solution (Stopper) <L>	100	100
17	30	43-01	Particle in solution (Cap) <L>	100	90
18	20	35-01	Particle in solution (Glass) <L>	93.3	100
19	0	06-01	Incorrect Flip off Color	100	100
20	0	07-01	Absence of Cap Flip	100	100
AV	89	08-01	Absence of Cap	96.7	100
FRR	54	09-01	Teared Cap	96.7	100
Stoppr		12-01	Cap Particle	93.3	100
High Speed Rotat		13-01	Cap Wrinkle	100	100
1st		14-01	Cap Stain	100	86.7
No	DR	15-01	Dented Cap	100	100
1	100	16-01	Cap Scratch	96.7	100
2	100	17-01	Cosmetic Defect Flip off	83.3	100
		19-01	Lifted Flip off	100	100
		Av		91.3	98.6

2

No.	particle type	MVI	AVI
35-01	Particle in solution (Glass) <S>	100	100
35-04	Particle in solution (Glass) <S>	100	100
35-09	Particle in solution (Glass) <S>	96.7	93.3
35-14	Particle in solution (Glass) <S>	100	100
35-16	Particle in solution (Glass) <S>	83.3	100
35-17	Particle in solution (Glass) <S>	83.3	100
35-25	Particle in solution (Glass) <S>	76.7	90
35-30	Particle in solution (Glass) <M>	86.7	100
35-32	Particle in solution (Glass) <L>	100	100
35-33	Particle in solution (Glass) <L>	100	100
39-02	Particle in solution (Fiber) <S>	90	100
39-03	Particle in solution (Fiber) <S>	83.3	100
44-08	Particle in solution (ETC) <S>	93.3	96.7
15-02	Dent Cap from process	100	100
27-01	Broken edge vial	76.7	86.7
44-02	Particle in solution (ETC) <S>	80	90
AV		91.3	97.3

No	DR	MVI	88.9
1	90	1	100
2	100	2	100
3	90	3	100
4	100	4	100
5	100	5	100
6	100	6	90
7	100	7	100
8	70	8	100
9	40	9	100
10	100	10	100
AV	94.4	AV	99
	89.0		99

Vynil Particle				
High Speed Rotat		Normal Speed		
		MVI	70.0~77.8	
No	DR	No	DR	
1	10	1	100	90
2	80	2	30	10 Floating
3	0	3	60	20 Small
4	10	4	0	60 Stick
5	40	5	40	20 Floating
6	70	6	0	0 Sticking
7	100	7	30	60 Floating
8	60	8	100	100
9	70	9	30	30 Floating
10	40	10	100	100
AV	80	AV	100	96.6667
	48		49	49

		Total Av		MVI Average (Particle only)
		HS	NS	
Over 70		93.6	98.2	
Total		70.9	87.0	88.0~92.5%

WILL BE IN CONTACT.

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Thank You!