Project Overview

1. **Data Collection**
   Create a system to collect testing raw data from local network & test servers

   Utilize Python & Excel to reduce repetitive work and increase productivity

2. **Data Cleansing**
   Review raw data for essential information

   Along with data normalization and data transformation

3. **Data Visualization** → Highlight storytelling with data visualization about what happened and to new findings
   In depth Descriptive Data Analytic for failure mode

   Detect trends & patterns to highlight production performance

4. **Data Presentation**
   Regular weekly Internal & External audits

   Share crucial key points and information for Internal improvement

   Present and update progress to External team for strong collaboration

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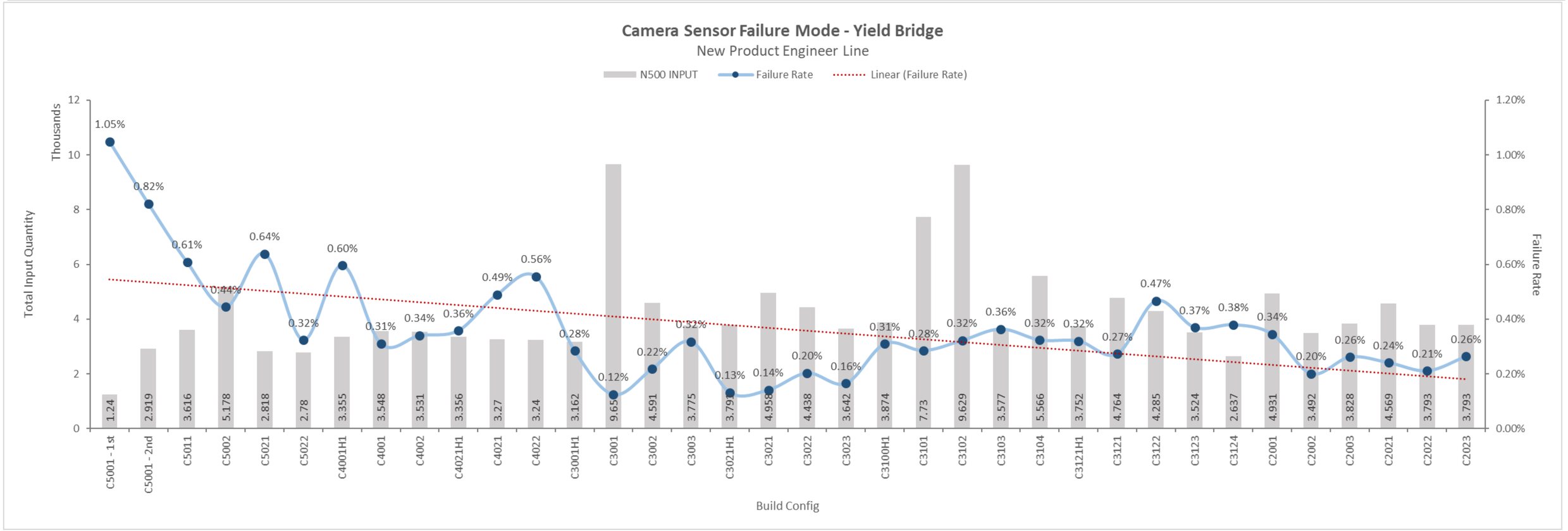
Sharp | Project Summary – Overall Performance



From the beginning of the build phase C5.0 to the end of C2.0, the failure rate decreased linearly 1.05% → 0.26%

Especially during C3.0 & C3.1, the yield performance was at peak with high input quantity nearly 10,000 pieces

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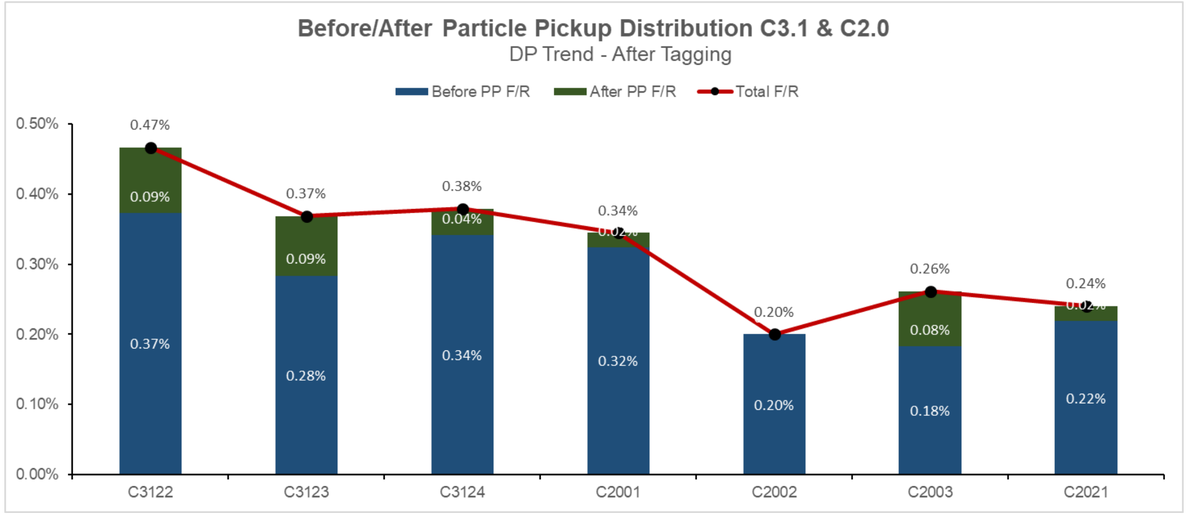
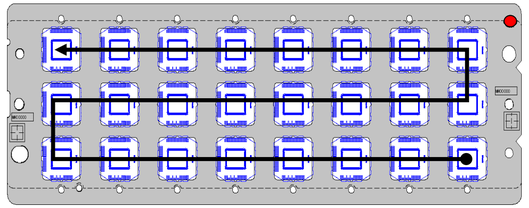
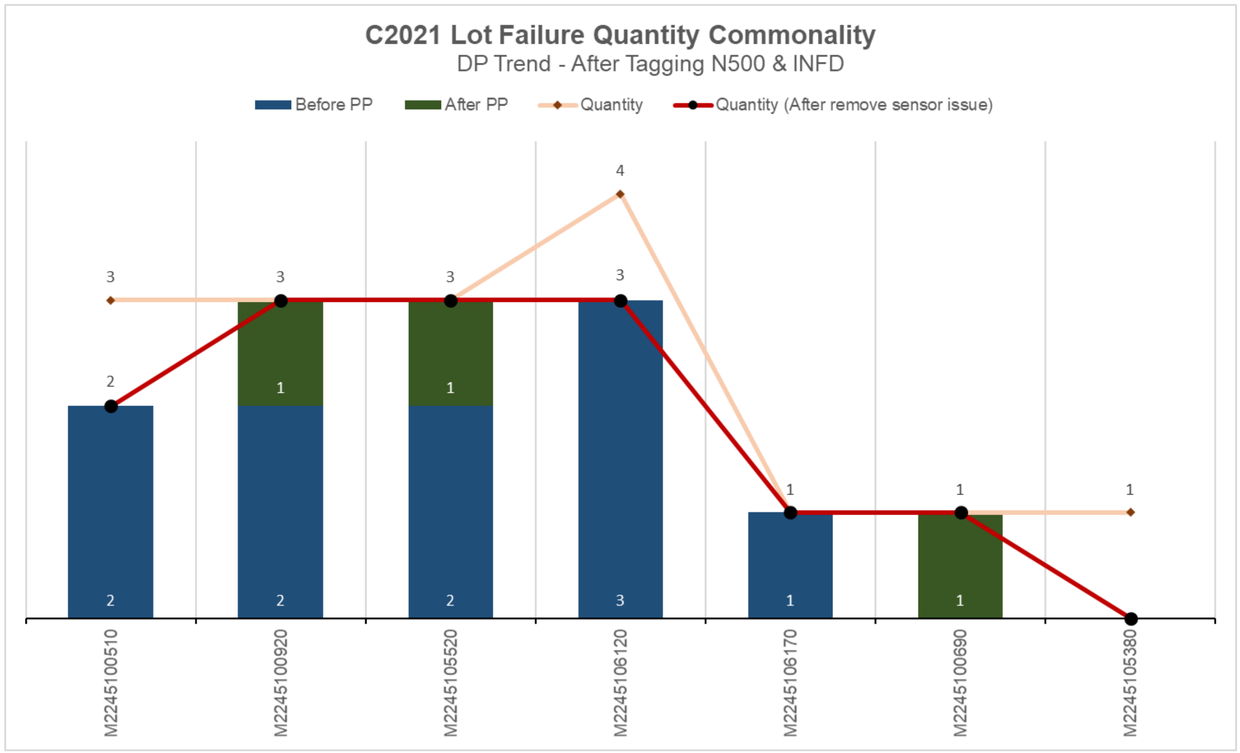


FCB Carrier – Bottom View



	8	7	6	5	4	3	2	1
3	0	1	1	1	1	0	0	2
2	1	0	0	0	1	0	0	0
1	0	0	1	0	0	1	0	0



Overall N500 C2021
DP F/R is 0.24% with 0.22% is Before PP already
No clear carrier commonality Before PP

Lot Commonality (both N500 & INFD)

- At first, there might seem to be some lots with high failure
- However, after remove white dot/sensor issue (at INFD) & further separate Before PP vs After PP, there is no clear spike
- Under checking Wafer AVI result for correlation (low chance)

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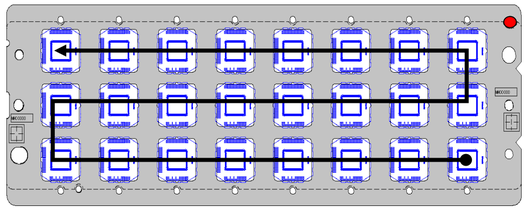
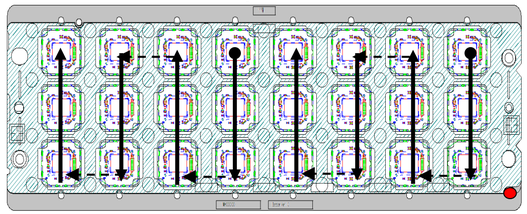
FCB Carrier – Bottom View

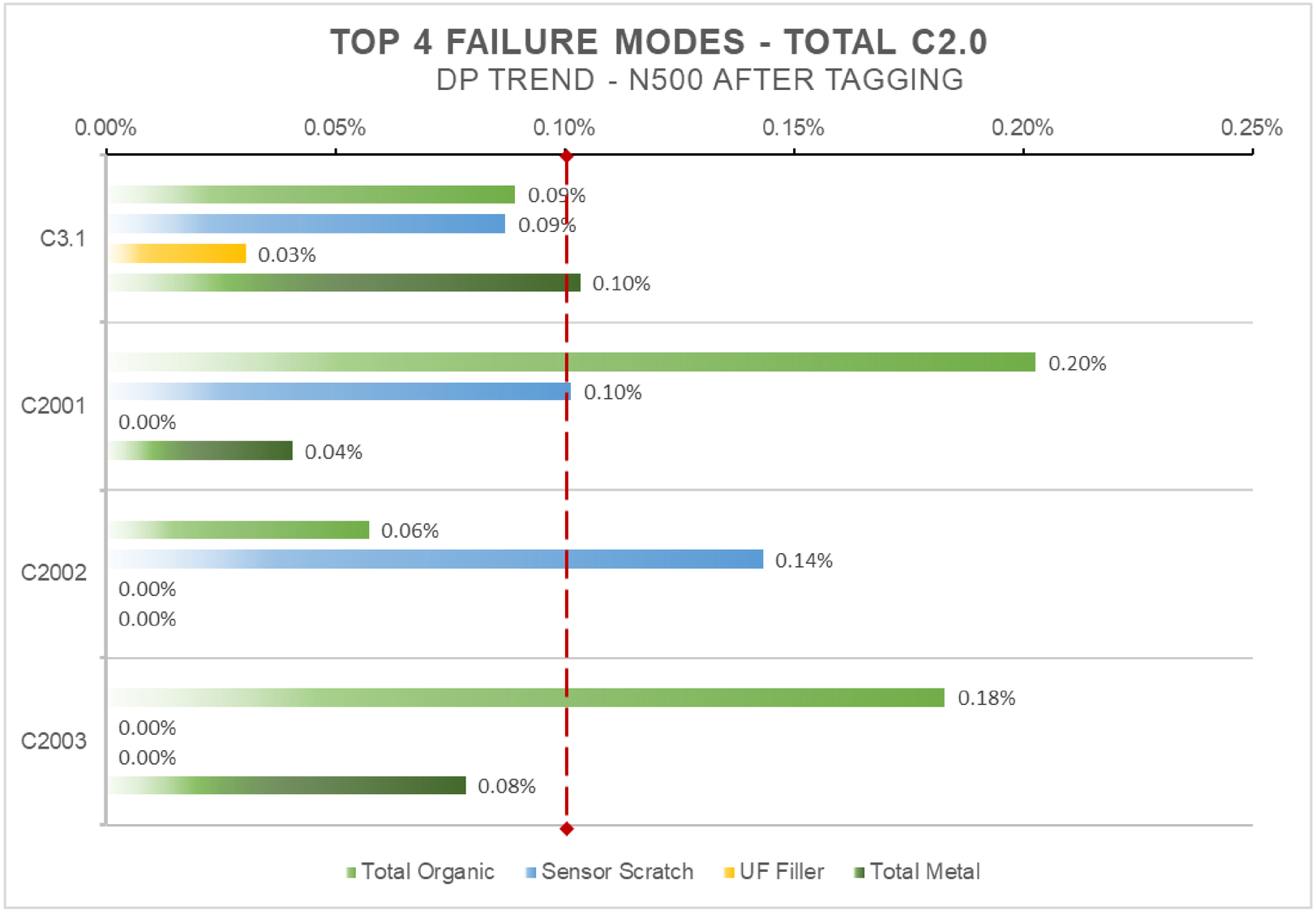


	8	7	6	5	4	3	2	1
3	0	0	0	1	0	0	0	0
2	0	0	0	0	0	1	0	2
1	0	0	0	1	0	1	0	1

GA Carrier – Top View



	8	7	6	5	4	3	2	1
3	0	0	0	0	0	1	0	1
2	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0



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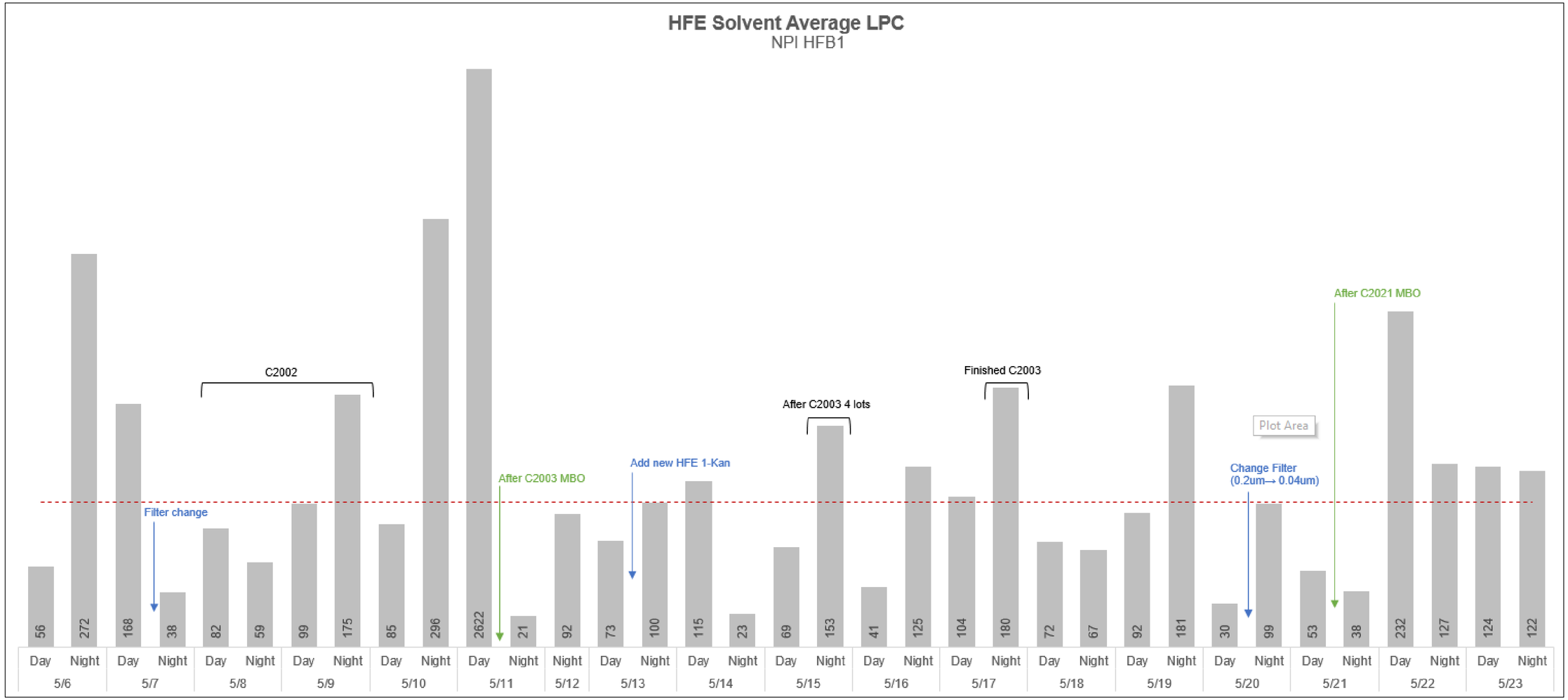

From C3.1 to C2.0, we increased the HFE solvent flushing time – to aim for internal target around 70 LPC
From C3.0 to C3.1, there was a long idle time for HFE INA1 with short flushing time before running

→ C2001 Before PP F/R was still high but there was no Metal: Fe
→ C2002 applied HFE distillation system

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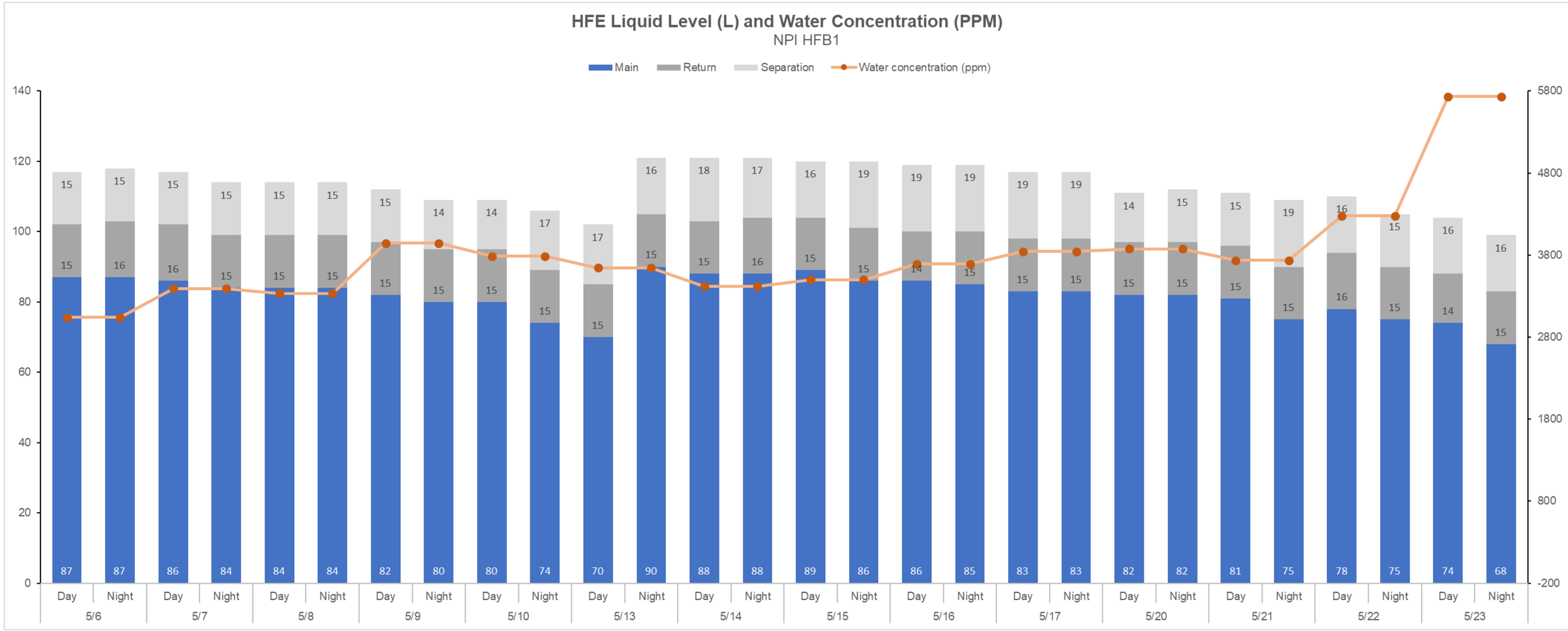

Monitor the HFE liquid level inside 3 container tanks along with the Water concentration

Clear correlation: when the main tank liquid level dropped under spec 80L – the water concertation spiked up to out of control

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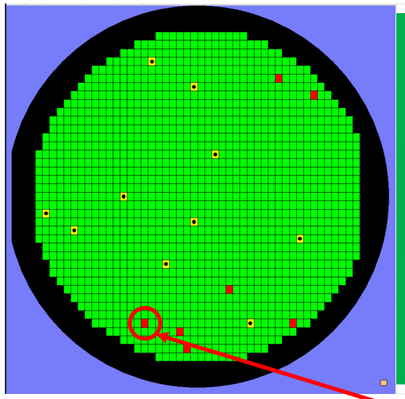
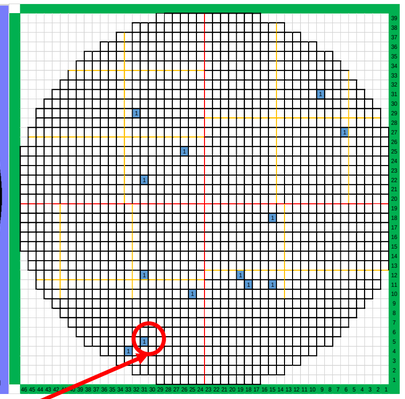
N500 DP failure samples traces back to Wafer AVI mapping & wafer image position matches precisely with failure position

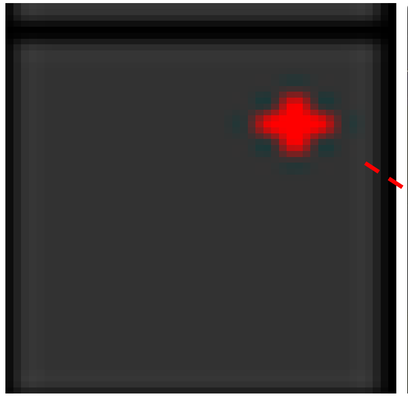
Wafer AVI Map



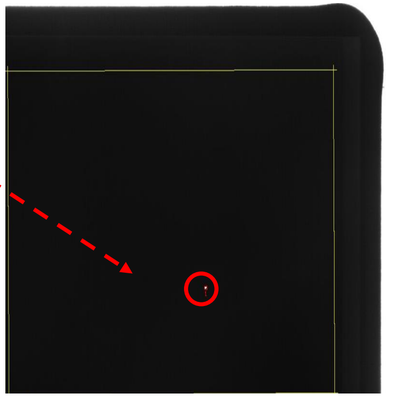
N500 DP Wafer position

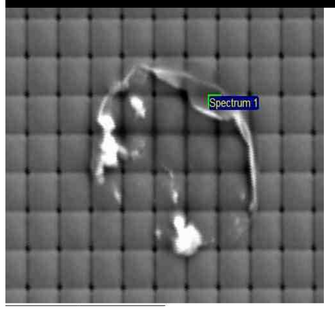
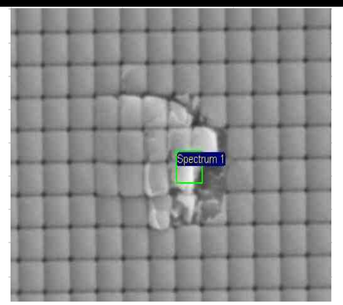
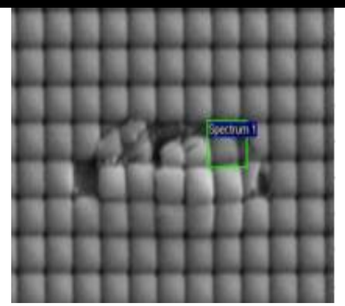
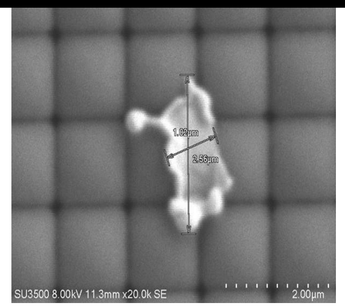
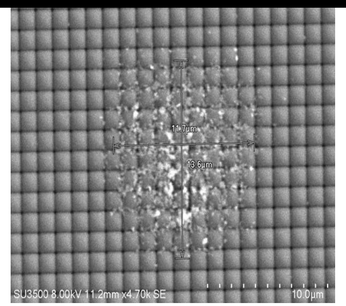
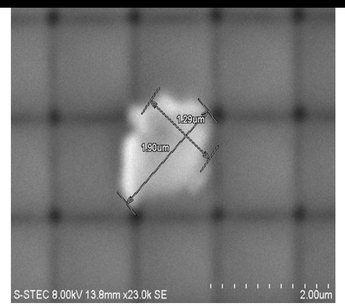
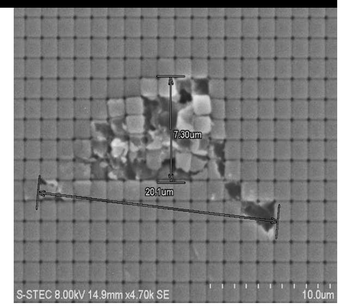


Wafer AVI detection image



N500 DP position



Fixative Organic	Sensor Scratch	Sensor Scratch	Organic Dust	Fixative Organic + Other(Zn)	Organic Dust	Sensor Scratch
						

No build phase, particle size, failure mode, wafer ring, wafer position tendency

Correct Detection Rate:

- C4.0: 0.0049%
- C3.0: 0.0053%
- C3.1: 0.0081%

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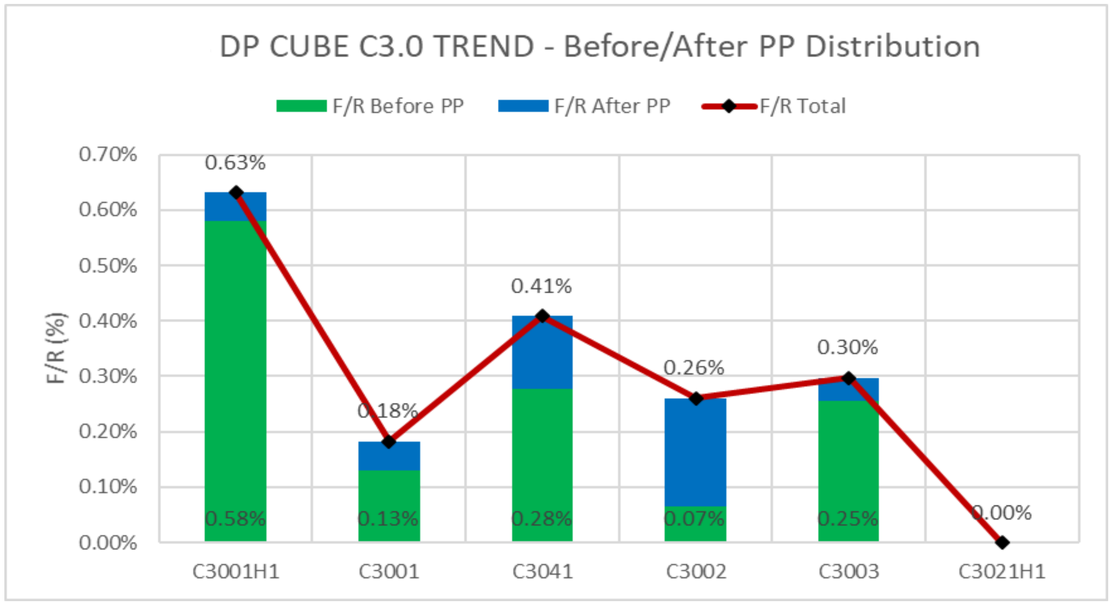
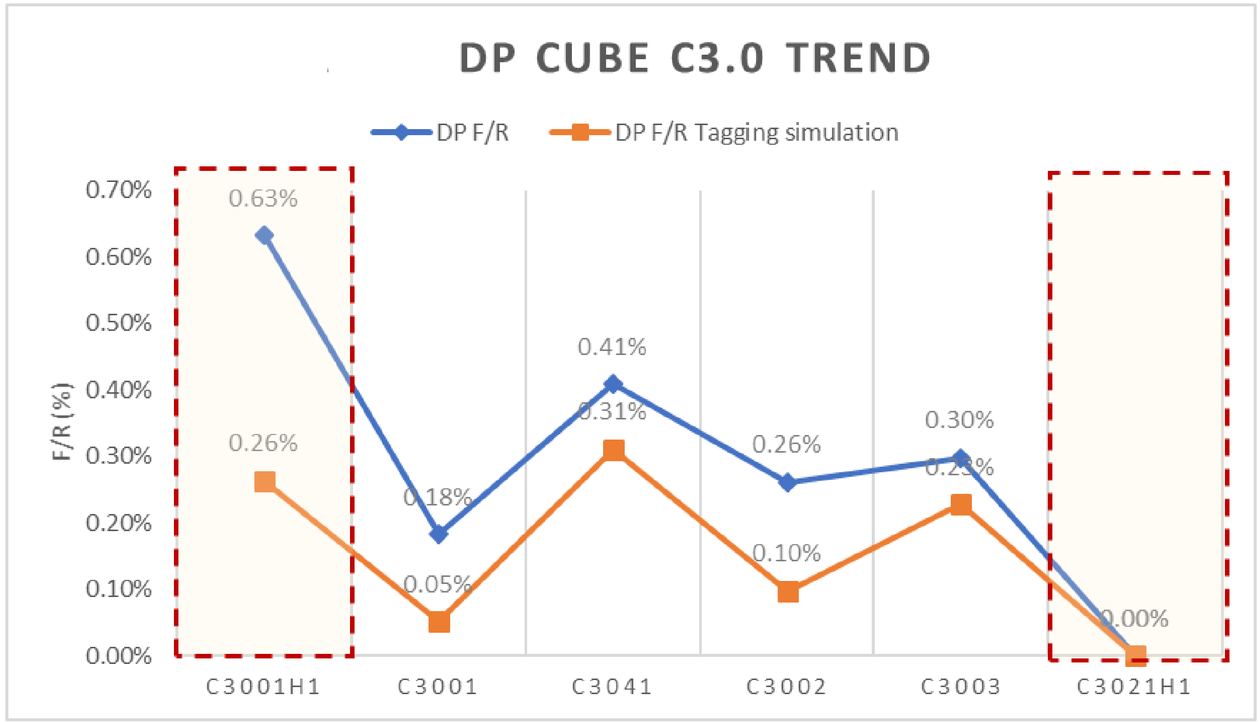
Cube Test Result C3.0 – Particle Picker Distribution

Config		C3001H1	C3001	C3041	C3002	C3003	C3021H1
IN		1899	3832	6123	3068	2354	1404
FAIL		12	7	25	8	7	0
F/R	Total	0.63%	0.18%	0.41%	0.26%	0.30%	0.00%
	Before PP	0.58%	0.13%	0.28%	0.07%	0.25%	0.00%
	After PP	0.05%	0.05%	0.13%	0.20%	0.04%	0.00%

Tagging Simulation							
Config		C3001H1	C3001	C3041	C3002	C3003	C3021H1
IN		1899	3832	6123	3068	2354	1404
FAIL		5	2	19	3	7	0
F/R	Total	0.26%	0.05%	0.31%	0.10%	0.23%	0.00%
	Before PP	0.26%	0.05%	0.23%	0.03%	0.20%	0.00%
	After PP	0.00%	0.00%	0.08%	0.07%	0.03%	0.00%





N500 DP F/R C3001H1: 0.28%
N500 DP F/R C3001: 0.12%
N500 DP F/R C3002: 0.22%
N500 DP F/R C3003: 0.32%

→ The Tagging Simulation F/R is quite close, around 0.06% different

→ Predict N500 DP F/R C3041 0.37%, C3021H1 0.12%

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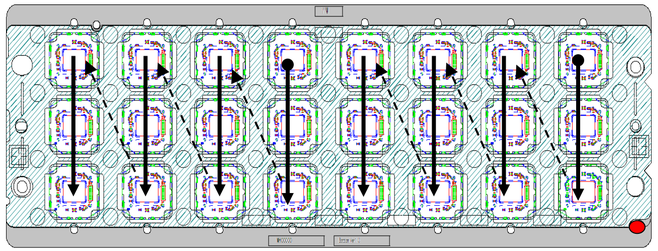
ONLY BEFORE PP FAILURE

Particle Pickup Carrier



	8	7	6	5	4	3	2	1
1	2	3	1	1	2	1	1	3
2	1	2	2	0	0	1	2	0
3	3	1	0	1	1	2	0	2

TOTAL

	8	7	6	5	4	3	2	1
1	0	0	0	0	0	0	0	2
2	1	2	1	0	0	0	1	0
3	0	0	0	1	0	1	0	0

C3001H1

	8	7	6	5	4	3	2	1
1	1	1	1	0	1	0	0	0
2	0	0	0	0	0	1	0	0
3	1	0	0	0	1	0	0	1

C3001

	8	7	6	5	4	3	2	1
1	1	1	0	0	0	0	1	0
2	0	0	1	0	0	0	0	0
3	0	0	0	0	0	1	0	0

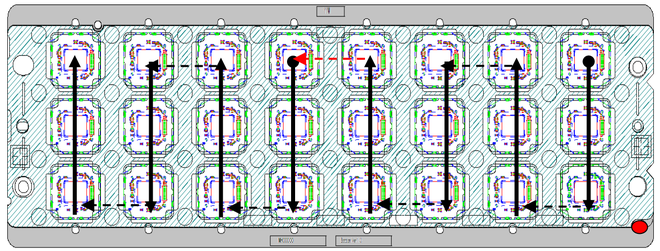
C3002

	8	7	6	5	4	3	2	1
1	0	1	0	1	1	1	0	1
2	0	0	0	0	0	0	1	0
3	2	1	0	0	0	0	0	1

C3003

ONLY AFTER PP FAILURE

Glass Attach Carrier



	8	7	6	5	4	3	2	1
3	0	0	0	0	0	0	0	2
2	0	0	1	0	1	1	1	1
1	0	0	1	0	0	1	2	0

	8	7	6	5	4	3	2	1
3	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0

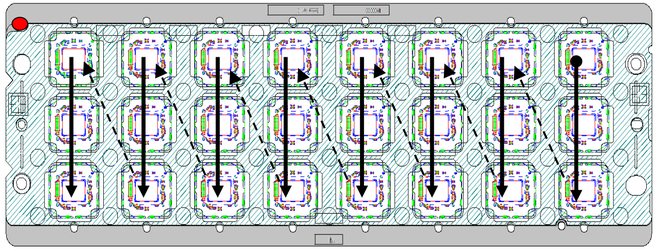
	8	7	6	5	4	3	2	1
3	0	0	0	0	0	0	0	0
2	0	0	0	0	1	0	0	1
1	0	0	1	0	0	0	1	0

	8	7	6	5	4	3	2	1
3	0	0	0	0	0	0	0	2
2	0	0	0	0	0	1	0	0
1	0	0	0	0	0	1	1	0

	8	7	6	5	4	3	2	1
3	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	1	0
1	0	0	0	0	0	0	0	0

ALL FAILURE

Active Alignment Carrier



	8	7	6	5	4	3	2	1
1	2	2	3	1	1	1	1	3
2	1	3	2	1	0	3	2	1
3	5	1	1	2	1	1	3	2

	8	7	6	5	4	3	2	1
1	0	0	1	0	1	0	0	0
2	0	1	0	0	0	1	2	1
3	2	0	0	0	0	0	0	0

	8	7	6	5	4	3	2	1
1	1	1	0	1	0	1	0	1
2	1	0	1	1	0	0	0	0
3	0	0	0	1	0	1	1	1

	8	7	6	5	4	3	2	1
1	0	1	2	0	0	0	0	0
2	0	0	1	0	0	1	0	0
3	2	1	0	0	0	0	1	1

	8	7	6	5	4	3	2	1
1	1	0	0	0	0	0	1	2
2	0	2	0	0	0	1	0	0
3	1	0	1	1	1	0	1	0

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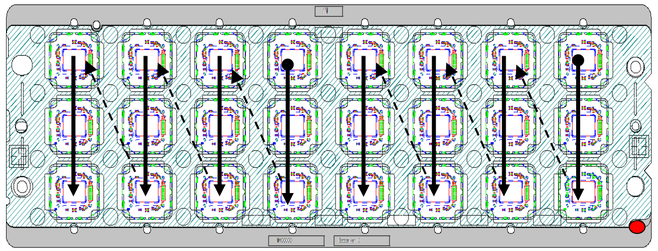
ONLY BEFORE PP FAILURE

Particle Pickup Carrier



TOTAL

	8	7	6	5	4	3	2	1
1	2	3	1	1	2	1	1	3
2	1	2	2	0	0	1	2	0
3	3	1	0	1	1	2	0	2

C3001H1

	8	7	6	5	4	3	2	1
1	0	0	0	0	0	0	0	2
2	1	2	1	0	0	0	1	0
3	0	0	0	1	0	1	0	0

C3001

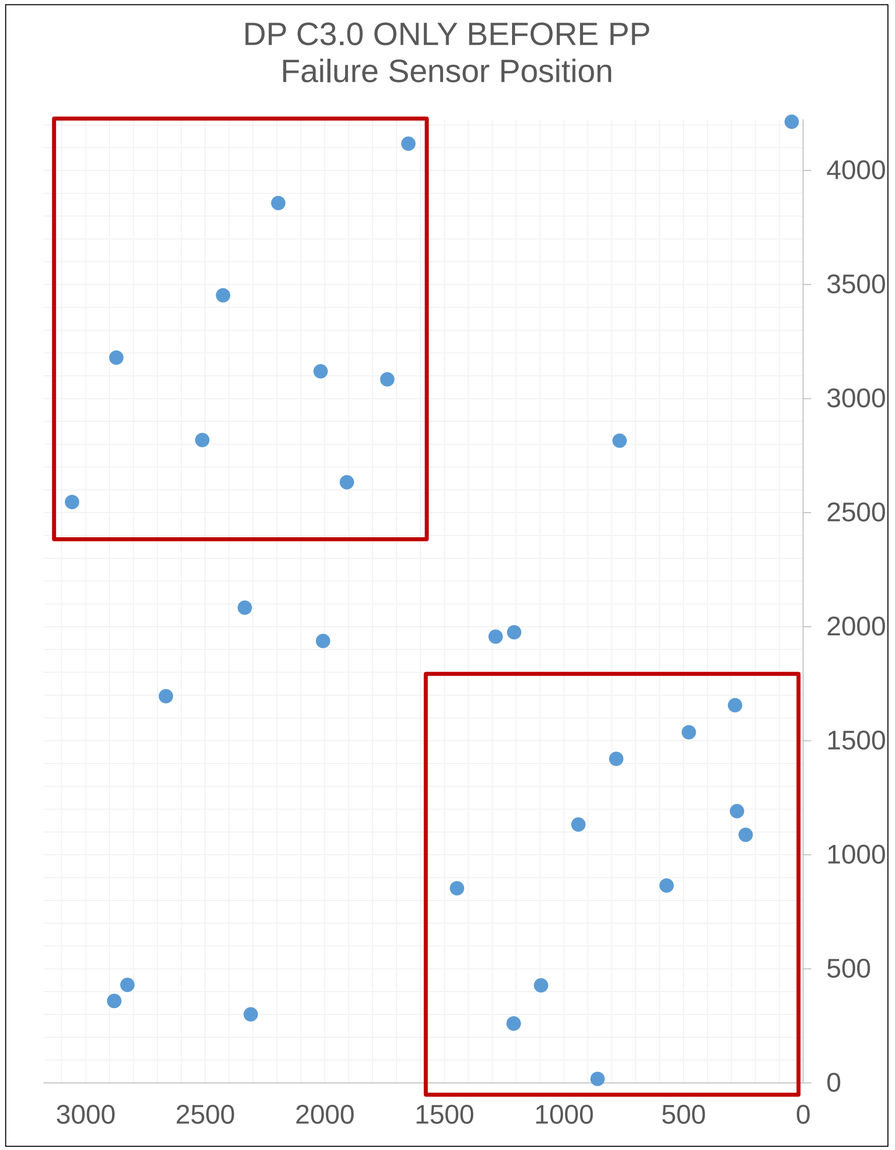
	8	7	6	5	4	3	2	1
1	1	1	1	0	1	0	0	0
2	0	0	0	0	0	1	0	0
3	1	0	0	0	1	0	0	1

C3002

	8	7	6	5	4	3	2	1
1	1	1	0	0	0	0	1	0
2	0	0	1	0	0	0	0	0
3	0	0	0	0	0	1	0	0

C3003

	8	7	6	5	4	3	2	1
1	0	1	0	1	1	1	0	1
2	0	0	0	0	0	0	1	0
3	2	1	0	0	0	0	0	1



For Before PP failure samples in C3.0

Failure positions around top right and bottom left edges of the sensor

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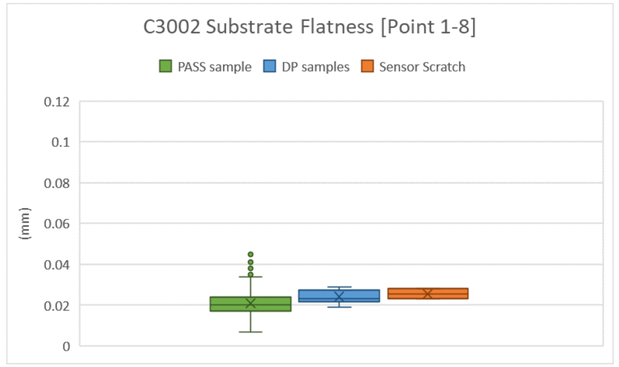
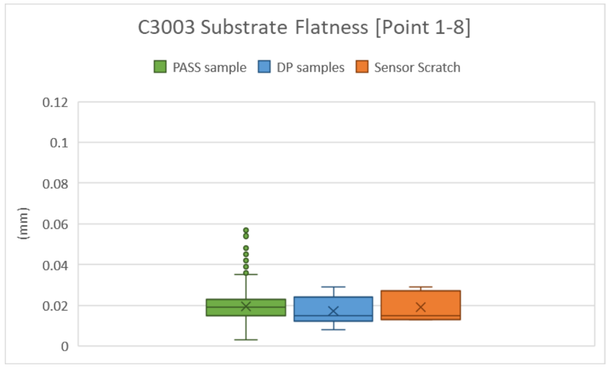
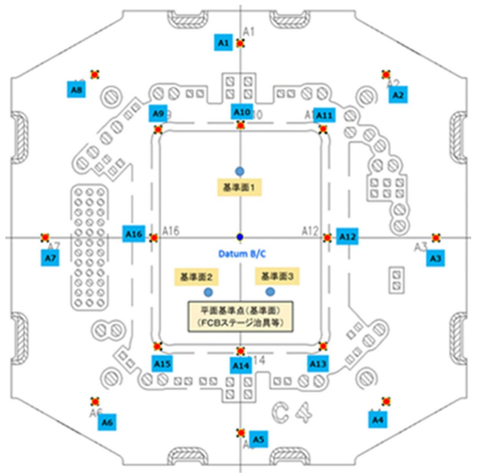
C3002



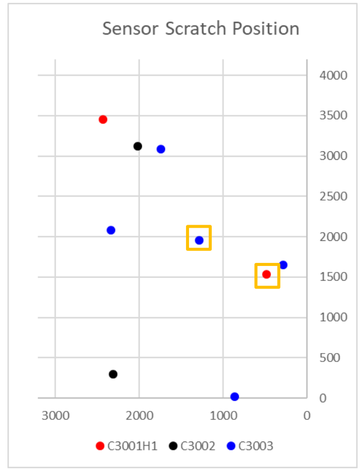
C3003



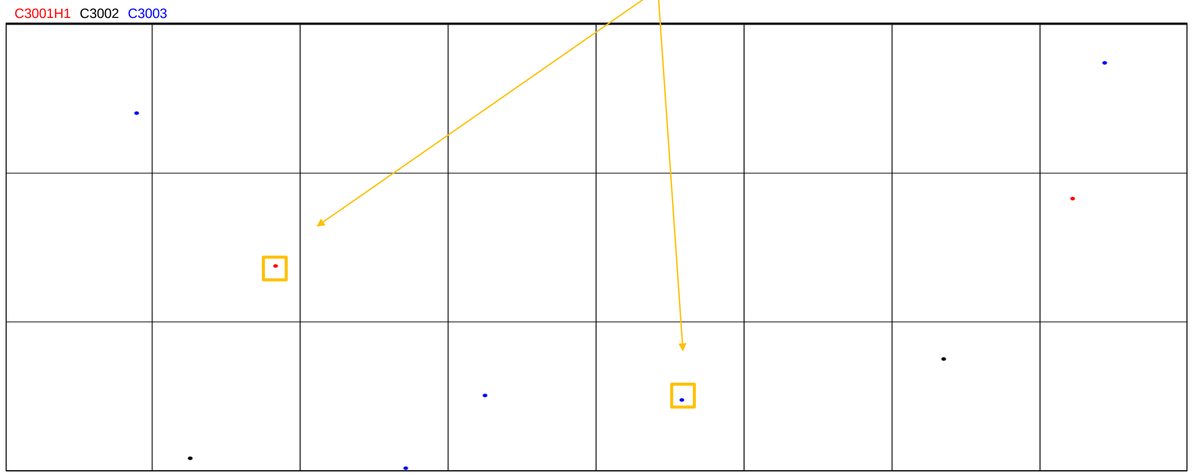


Measurement Points

- 1-8: Outer Substrate
- 9-16: Inner Substrate



Detected by Wafer AVI



C3002: Point 1-8 is a little bit higher, and Point 9-16 is a little bit lower ➔ 2F sensor scratch (1 is detected before FCB)

C3003: No abnormal with substrate flatness
→ 5F sensor scratch (1 is detected before FCB)

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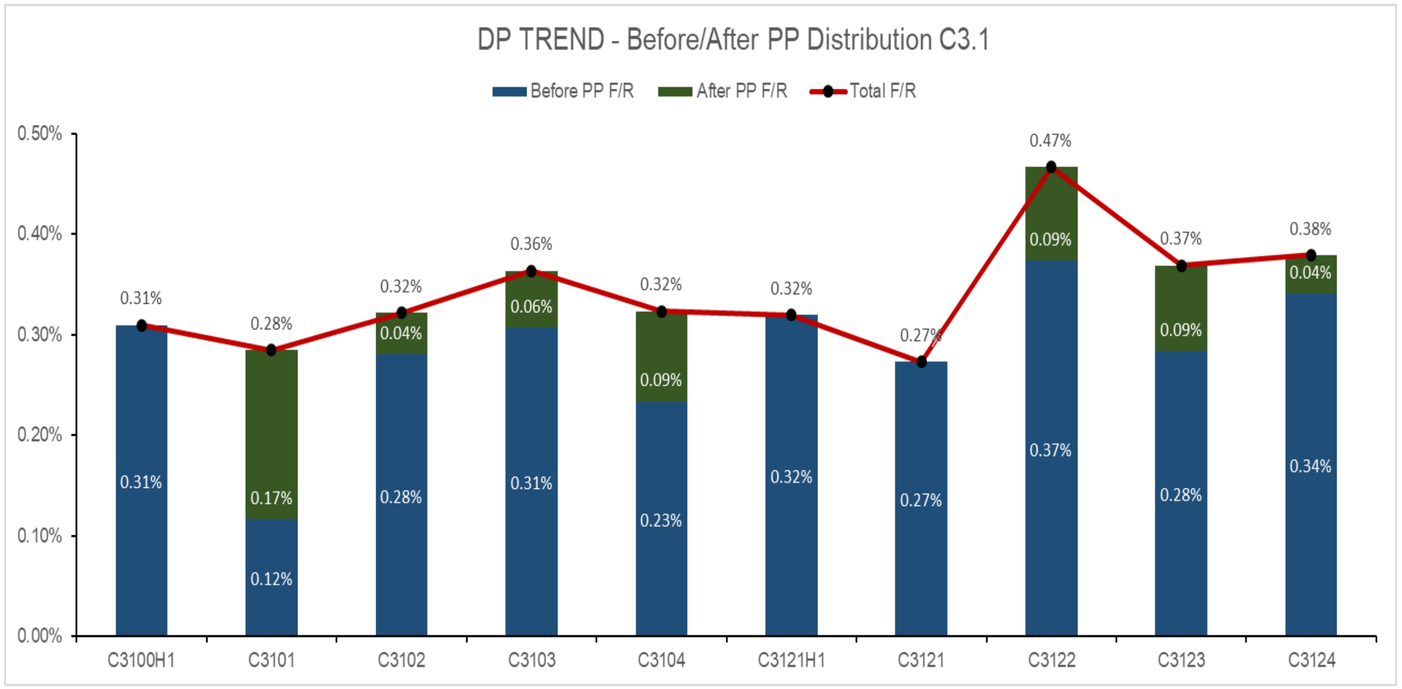
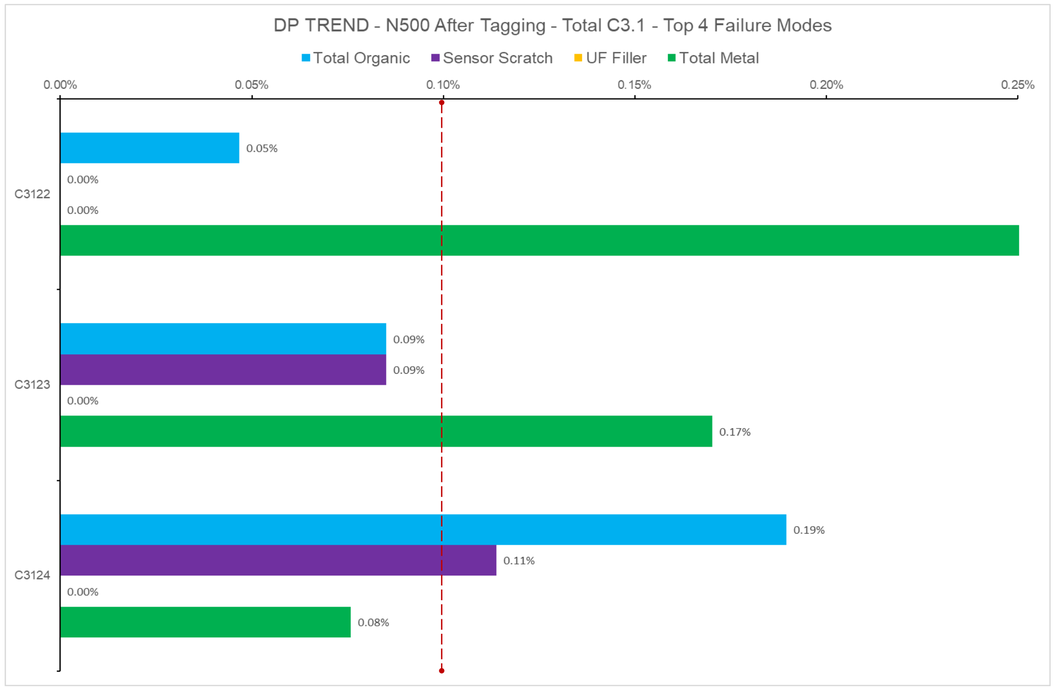
N500 DP	PRB Main2	PRB Main3	C3.0	C3100H1	C3101	C3102	C3103	C3104	C3121H1	C3121	C3122	C3123	C3124	C3.1
Total F/R	1.37%	0.61%	0.18%	0.31%	0.28%	0.32%	0.36%	0.32%	0.32%	0.27%	0.47%	0.37%	0.38%	0.33%
Before PP F/R			0.14%	0.31%	0.12%	0.28%	0.31%	0.23%	0.32%	0.27%	0.37%	0.28%	0.34%	0.27%
After PP F/R			0.04%	0.00%	0.17%	0.04%	0.06%	0.09%	0.00%	0.00%	0.09%	0.09%	0.04%	0.06%
Failure Mode														
Total Organic	0.64%	0.06%	0.06%	0.10%	0.06%	0.03%	0.20%	0.13%	0.13%	0.06%	0.05%	0.09%	0.19%	0.09%
Sensor Scratch	0.03%	0.04%	0.05%	0.18%	0.08%	0.09%	0.14%	0.05%	0.13%	0.04%	0.00%	0.09%	0.11%	0.09%
UF Filler	0.03%	0.01%	0.02%	0.03%	0.00%	0.11%	0.00%	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%	0.03%
Human Body	0.03%	0.04%	0.01%	0.00%	0.03%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Total Metal	0.51%	0.32%	0.04%	0.00%	0.10%	0.05%	0.03%	0.04%	0.05%	0.15%	0.42%	0.17%	0.08%	0.10%
Not Found	0.02%	0.04%	0.01%	0.00%	0.01%	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.03%	0.00%	0.01%
IRCF Material	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Machine														
FCB			FCA8/FCC0	FCA8	FCA8	FCC0	FCC0	FCA8	FCA8	FCA8	FCA8	FCC0	FCC0	FCA8/FCC0
Clamping				Carrier	Carrier	Direct	Carrier	Direct	Direct	Direct	Carrier	Direct	Direct	
UF			JD29	JD29	JD27	JD27	JD27	JD27	JD29	JD29	JD29	JD29	JD29	JD29/27
FOL INL			INA1	INA1	INA2	INA2	INA2	INA2	INA1	INA1	INA1	INA1	INA1	INA1/2





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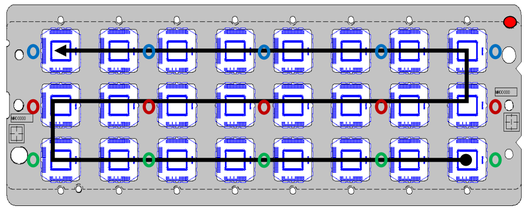
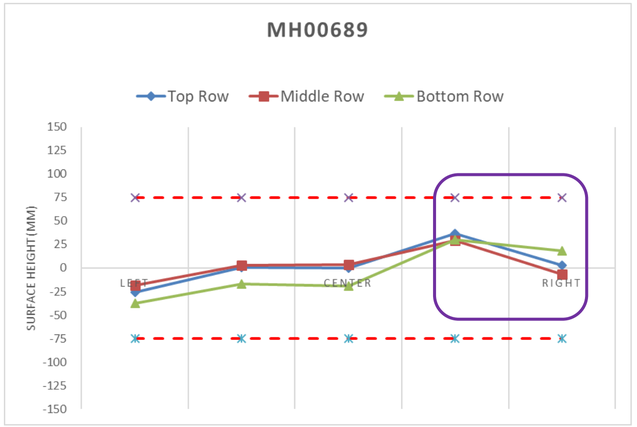
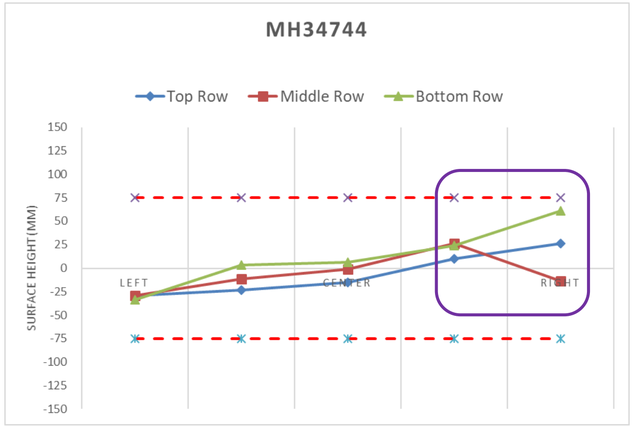
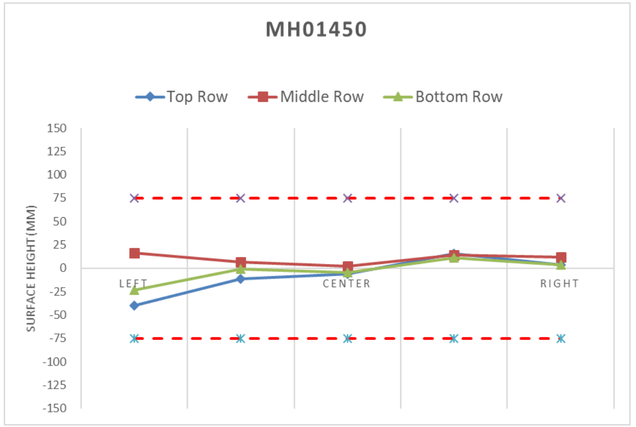
FCB Carrier – Bottom View

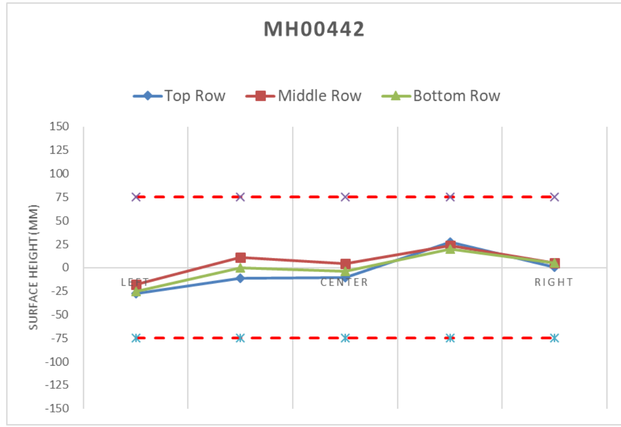


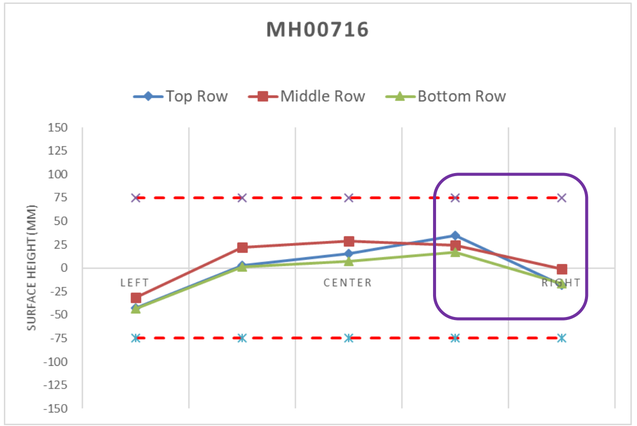
There is a commonality with the right side of the carrier - 6/8 carriers FCB bonding starting position and moving from middle row to top row

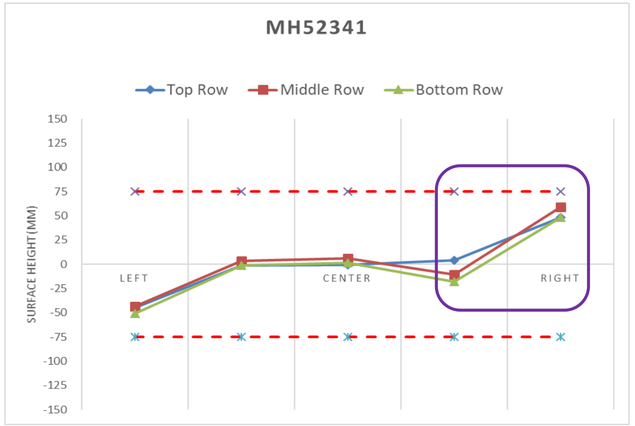


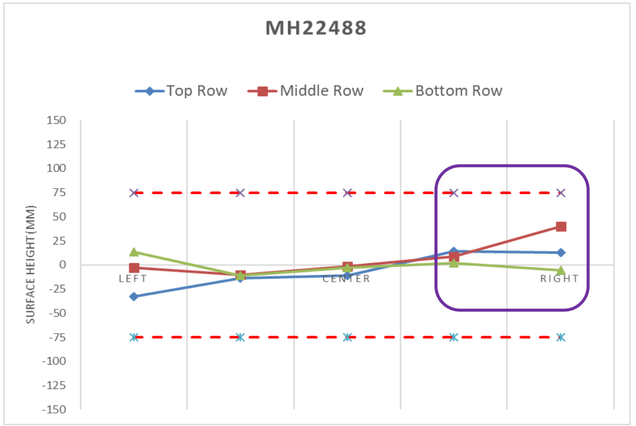


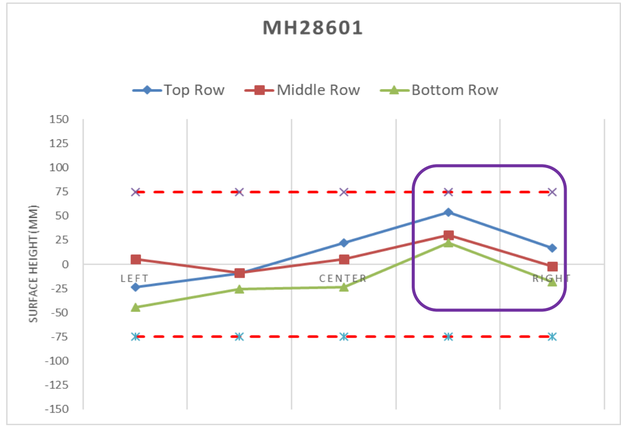












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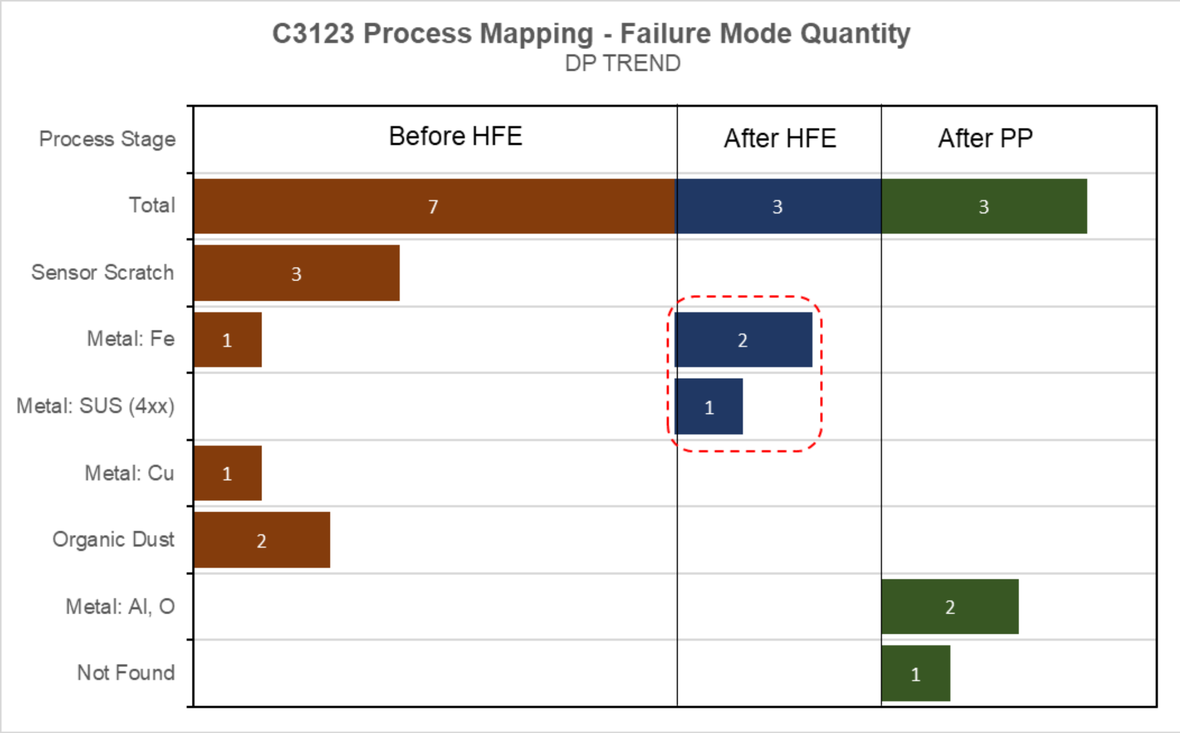

Confirm that Sensor Scratch already happened Before HFE process

There are metal & organic dust Before HFE difficult to be cleaned

HFE cleaned a lot of particles, but also created some new mode fixative organic + metal: Fe ~ matched with C3122

After PP – at GA machine are big metal: Al, O and moving particles

HFE and PP have roughly the same performance in this config
Cleaned around total 5% of chip with PP removal rate 79%

HFE & PP Cleaning Performance

Config	Input Q'ty	Before HFE Cleaning				After HFE Cleaning				After Particle Pickup Cleaning				
		Quantity		%		Quantity		%		Quantity		%		Remove rate
		Particle	Chip	Particle	Chip	Particle	Chip	Particle	Chip	Particle	Chip	Particle	Chip	
C3123	3794	263	205	6.62%	5.16%	98	93	2.47%	2.34%	21	21	0.53%	0.53%	78.57%

Chip% reduced: 2.82%

Chip% reduced: 1.81%

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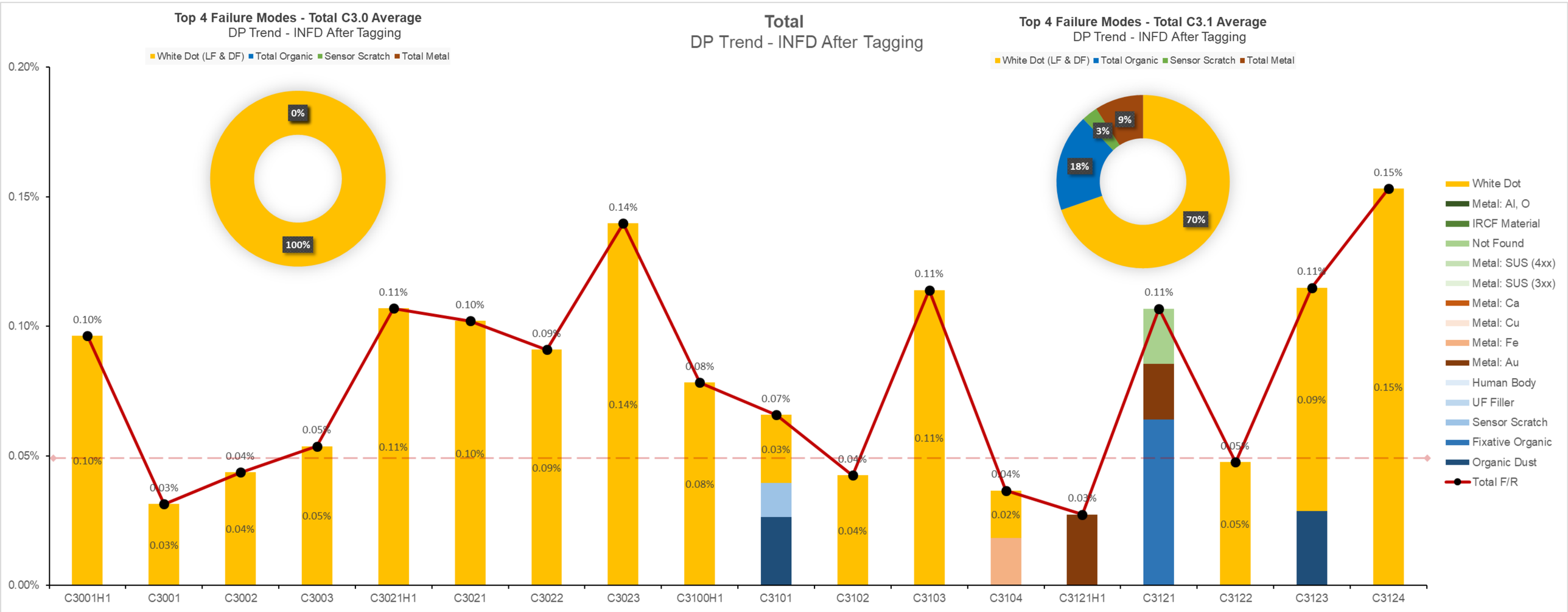
Sharp | INFD Tester Performance

INFD Official	C3001H1	C3001	C3002	C3003	C3021H1	C3021	C3022	C3023	C3100H1	C3101	C3102	C3103	C3104	C3121H1	C3121	C3122	C3123	C3124
Total F/R	0.10%	0.03%	0.04%	0.05%	0.11%	0.10%	0.09%	0.14%	0.08%	0.07%	0.04%	0.11%	0.04%	0.03%	0.11%	0.05%	0.11%	0.15%
DF F/R	0.00%	0.01%	0.00%	0.00%	0.03%	0.00%	0.02%	0.00%	0.00%	0.01%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%
LF F/R	0.10%	0.02%	0.04%	0.05%	0.08%	0.10%	0.07%	0.14%	0.08%	0.05%	0.04%	0.09%	0.04%	0.03%	0.11%	0.05%	0.11%	0.11%
DF Retest Gain	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LF Retest Gain	0.06%	0.02%	0.02%	0.05%	0.03%	0.04%	0.07%	0.08%	0.03%	0.03%	0.03%	0.06%	0.02%	0.03%	0.06%	0.02%	0.03%	0.08%

INFD LF Retest Average Yield Gain 0.04%



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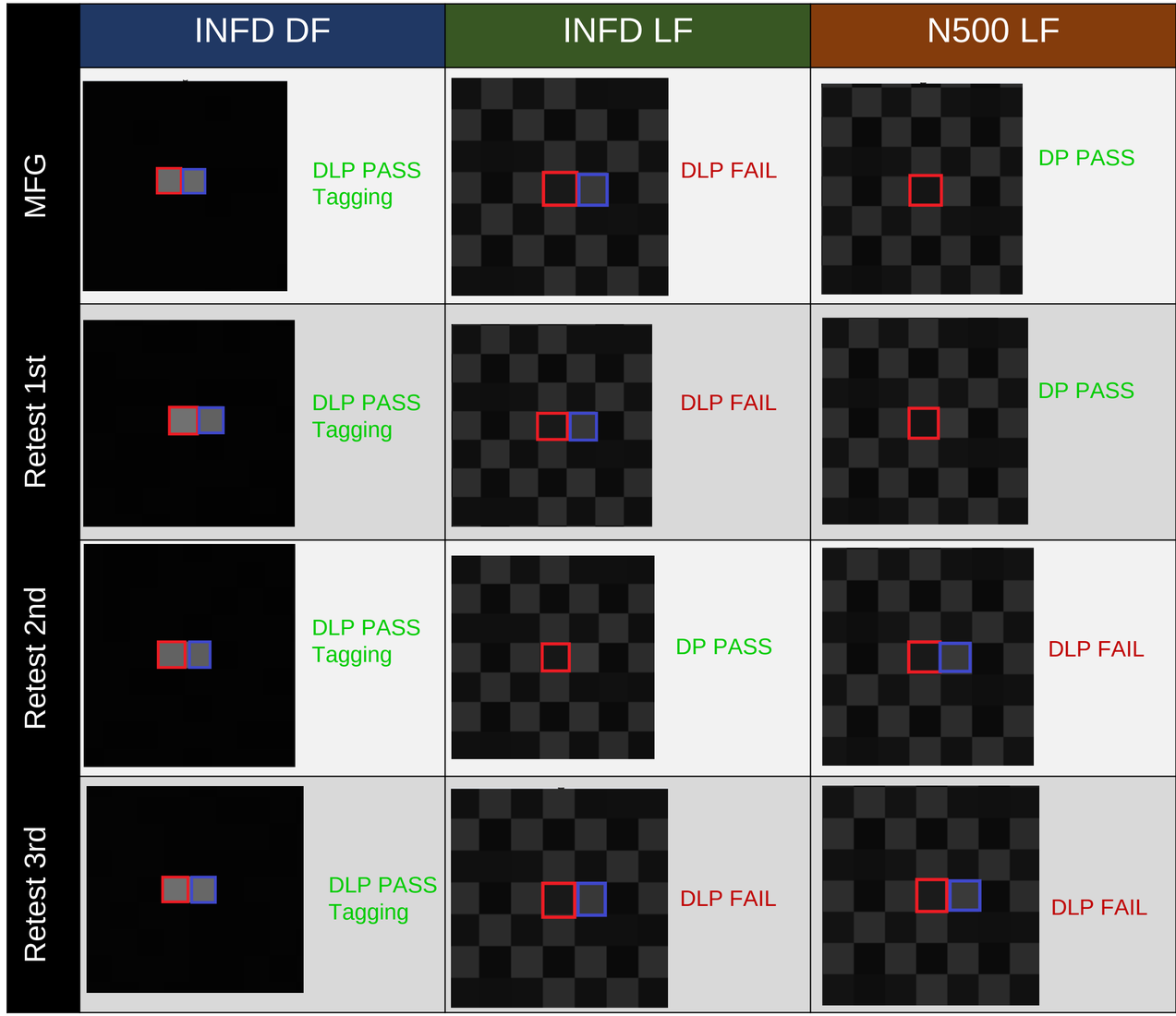
Config C3100H1	S/N				DNLH1W1A02F00005LW+3100+E							
	INFD DF (Spec: DP value < -120)				INFD LF (Spec: |DP Value| > 0.19)				N500 LF (Spec: |DP Value| > 0.19)			
	X	Y	Value	Mode	X	Y	Value	Mode	X	Y	Value	Mode
MFG INFD	3852	2640	-405.524	DLP	3852	2640	-0.6287	DLP	3852	2640	-0.46027	DP
	3853	2640	-396.573	DLP	3853	2640	-0.23584	DLP				
	PASS (Tagging)				FAIL (DLP)				PASS (DP)			
Retest 1st	3852	2640	-436.427	DLP	3852	2640	-0.65891	DLP	3852	2640	-0.4115	DP
	3853	2640	-375.738	DLP	3853	2640	-0.19443	DLP				
	PASS (Tagging)				FAIL (DLP)				PASS (DP)			
Retest 2nd	3852	2640	-379.622	DLP	3852	2640	-0.55703	DP	3852	2640	-0.64584	DLP
	3853	2640	-356.684	DLP					3853	2640	-0.22731	DLP
	PASS (Tagging)				PASS (DP)				FAIL (DLP)			
Retest 3rd	3852	2640	-424.56	DLP	3852	2640	-0.67192	DLP	3852	2640	-0.72015	DLP
	3853	2640	-397.653	DLP	3853	2640	-0.23181	DLP	3853	2640	-0.24396	DLP
	PASS (Tagging)				FAIL (DLP)				FAIL (DLP)			
Result	Type 2: INFD LF doesn't save fail address from DF				Retest: PASS							

1. N500 PASS – DP (3852, 2640)
2. INFD DF PASS – DLP with Tagging
3. INFD LF FAIL – DLP at same location



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Sharp | Project Summary Heat Map – Reference Table

Tester	Data Mode	Classify	C5.0	C4.0	C3.0	C3.1	C2.0	C3100H1	C3101	C3102	C3103	C3104	C3121H1	C3121	C3122	C3123	C3124	C2001	C2002	C2003	C2021	C2022
N500	Config Failure	Total	0.59%	0.44%	0.18%	0.33%	0.26%	0.31%	0.28%	0.32%	0.36%	0.32%	0.32%	0.27%	0.47%	0.37%	0.38%	0.34%	0.20%	0.26%	0.24%	0.21%
INFD	Config Failure	Total	0.25%	0.21%	0.07%	0.07%	0.10%	0.08%	0.07%	0.04%	0.11%	0.04%	0.03%	0.11%	0.05%	0.11%	0.15%	0.12%	0.09%	0.13%	0.11%	0.03%
INFD LF	Config Failure	Total	0.05%	0.06%	0.07%	0.06%	0.09%	0.08%	0.05%	0.04%	0.09%	0.04%	0.03%	0.11%	0.05%	0.11%	0.11%	0.12%	0.09%	0.11%	0.09%	0.03%
INFD DF	Config Failure	Total	0.20%	0.16%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.03%	0.02%	0.00%
Retest INFD LF	Config Failure	Total	0.05%	0.06%	0.02%	0.03%	0.05%	0.05%	0.03%	0.01%	0.03%	0.02%	0.00%	0.04%	0.02%	0.09%	0.04%	0.06%	0.06%	0.08%	0.04%	0.00%
Retest INFD DF	Config Failure	Total	0.20%	0.16%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
INFD	Config Failure	Total	0.05%	0.06%	0.07%	0.07%	0.10%	0.08%	0.07%	0.04%	0.11%	0.04%	0.03%	0.11%	0.05%	0.11%	0.15%	0.12%	0.09%	0.13%	0.11%	0.03%
INFD	Organic Dust	Total	0.01%	0.00%	0.00%	0.01%	0.01%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%
INFD	Fixative Organic	Total	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
INFD	Sensor Scratch	Total	0.01%	0.01%	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%
INFD	Not Found	Total	0.02%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
INFD	White Dot	Total	0.01%	0.02%	0.07%	0.05%	0.06%	0.08%	0.03%	0.04%	0.11%	0.02%	0.00%	0.00%	0.05%	0.09%	0.15%	0.04%	0.09%	0.13%	0.07%	0.00%
INFD	Total Organic	Total	0.01%	0.00%	0.00%	0.01%	0.02%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.03%	0.00%	0.06%	0.00%	0.00%	0.00%	0.03%
INFD	Total Metal	Total	0.01%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.03%	0.02%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
N500	Config Failure	Total	0.28%	0.22%	0.18%	0.33%	0.26%	0.31%	0.28%	0.32%	0.36%	0.32%	0.32%	0.27%	0.47%	0.37%	0.38%	0.34%	0.20%	0.26%	0.24%	0.21%
N500	Organic Dust	Total	0.07%	0.01%	0.02%	0.04%	0.05%	0.05%	0.03%	0.02%	0.03%	0.07%	0.00%	0.04%	0.00%	0.06%	0.11%	0.04%	0.03%	0.05%	0.07%	0.11%
N500	Fixative Organic	Total	0.08%	0.02%	0.04%	0.05%	0.07%	0.05%	0.04%	0.01%	0.17%	0.05%	0.13%	0.02%	0.05%	0.03%	0.08%	0.16%	0.03%	0.13%	0.07%	0.03%
N500	Sensor Scratch	Total	0.05%	0.03%	0.05%	0.09%	0.06%	0.18%	0.08%	0.09%	0.14%	0.05%	0.13%	0.04%	0.00%	0.09%	0.11%	0.10%	0.14%	0.00%	0.07%	0.03%
N500	UF Filler	Total	0.02%	0.00%	0.02%	0.03%	0.00%	0.03%	0.00%	0.11%	0.00%	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Human Body	Total	0.02%	0.00%	0.01%	0.01%	0.00%	0.00%	0.03%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
N500	Metal: Au	Total	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%	0.00%
N500	Metal: Fe	Total	0.00%	0.01%	0.01%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.15%	0.30%	0.06%	0.04%	0.00%	0.00%	0.00%	0.00%	0.03%
N500	Metal: Cu	Total	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Ca	Total	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: SUS (3xx)	Total	0.00%	0.02%	0.00%	0.01%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%
N500	Metal: SUS (4xx)	Total	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.02%	0.00%	0.00%	0.00%	0.03%
N500	Not Found	Total	0.01%	0.00%	0.01%	0.01%	0.00%	0.00%	0.01%	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	IRCF Material	Total	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Al, O	Total	0.02%	0.09%	0.03%	0.02%	0.01%	0.00%	0.03%	0.03%	0.03%	0.02%	0.00%	0.00%	0.07%	0.06%	0.00%	0.02%	0.00%	0.03%	0.00%	0.00%
N500	Total Organic	Total	0.15%	0.03%	0.06%	0.09%	0.12%	0.10%	0.06%	0.03%	0.20%	0.13%	0.13%	0.06%	0.05%	0.09%	0.19%	0.20%	0.06%	0.18%	0.13%	0.13%
N500	Total Metal	Total	0.04%	0.13%	0.04%	0.10%	0.03%	0.00%	0.10%	0.05%	0.03%	0.04%	0.05%	0.15%	0.42%	0.17%	0.08%	0.04%	0.00%	0.08%	0.02%	0.05%

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N500	Config Failure	Before PP	0.25%	0.08%	0.14%	0.27%	0.22%	0.31%	0.12%	0.28%	0.31%	0.23%	0.32%	0.27%	0.37%	0.28%	0.34%	0.32%	0.20%	0.18%	0.22%	0.18%
N500	Organic Dust	Before PP	0.06%	0.01%	0.02%	0.03%	0.04%	0.05%	0.01%	0.02%	0.03%	0.07%	0.00%	0.04%	0.00%	0.06%	0.11%	0.02%	0.03%	0.03%	0.07%	0.11%
N500	Fixative Organic	Before PP	0.08%	0.02%	0.03%	0.05%	0.07%	0.05%	0.03%	0.01%	0.14%	0.05%	0.13%	0.02%	0.05%	0.03%	0.08%	0.16%	0.03%	0.13%	0.07%	0.03%
N500	Sensor Scratch	Before PP	0.05%	0.03%	0.05%	0.09%	0.06%	0.18%	0.08%	0.09%	0.14%	0.05%	0.13%	0.04%	0.00%	0.09%	0.11%	0.10%	0.14%	0.00%	0.07%	0.03%
N500	UF Filler	Before PP	0.02%	0.00%	0.02%	0.03%	0.00%	0.03%	0.00%	0.11%	0.00%	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Human Body	Before PP	0.02%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
N500	Metal: Au	Before PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%
N500	Metal: Fe	Before PP	0.00%	0.00%	0.01%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.15%	0.30%	0.06%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Cu	Before PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Ca	Before PP	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: SUS (3xx)	Before PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: SUS (4xx)	Before PP	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.02%	0.00%	0.00%	0.00%	0.03%
N500	Not Found	Before PP	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	IRCF Material	Before PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Al, O	Before PP	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
N500	Total Organic	Before PP	0.14%	0.03%	0.05%	0.08%	0.11%	0.10%	0.04%	0.03%	0.17%	0.13%	0.13%	0.06%	0.05%	0.09%	0.19%	0.18%	0.06%	0.16%	0.13%	0.13%
N500	Total Metal	Before PP	0.03%	0.00%	0.02%	0.06%	0.02%	0.00%	0.00%	0.03%	0.00%	0.02%	0.05%	0.15%	0.33%	0.11%	0.04%	0.04%	0.00%	0.03%	0.00%	0.03%

N500	Config Failure	After PP	0.03%	0.14%	0.04%	0.06%	0.04%	0.00%	0.17%	0.04%	0.06%	0.09%	0.00%	0.00%	0.09%	0.09%	0.04%	0.02%	0.00%	0.08%	0.02%	0.03%
N500	Organic Dust	After PP	0.01%	0.00%	0.01%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.03%	0.00%	0.00%
N500	Fixative Organic	After PP	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Sensor Scratch	After PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	UF Filler	After PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Human Body	After PP	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.03%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Au	After PP	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
N500	Metal: Fe	After PP	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
N500	Metal: Cu	After PP	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Ca	After PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: SUS (3xx)	After PP	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%
N500	Metal: SUS (4xx)	After PP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Not Found	After PP	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.01%	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	IRCF Material	After PP	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
N500	Metal: Al, O	After PP	0.01%	0.09%	0.02%	0.02%	0.00%	0.00%	0.03%	0.02%	0.03%	0.02%	0.00%	0.00%	0.07%	0.06%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%
N500	Total Organic	After PP	0.01%	0.00%	0.02%	0.01%	0.01%	0.00%	0.03%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.03%	0.00%	0.00%
N500	Total Metal	After PP	0.02%	0.12%	0.02%	0.04%	0.02%	0.00%	0.10%	0.02%	0.03%	0.02%	0.00%	0.00%	0.09%	0.06%	0.04%	0.00%	0.00%	0.05%	0.02%	0.03%

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