PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	AMS/23/13946
1.3 Title of PCN	AIS2IHTR: ST Rousset as additional FE plant.
1.4 Product Category	Pls refer to the list
1.5 Issue date	2023-02-20

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Andrea Mario ONETTI
2.1.2 Marketing Manager	Simone FERRI
2.1.3 Quality Manager	Michele CALDERONI

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Wafer fabrication	ST Crolles and ST Rousset as FE Plants

4. Description of change		
	Old	New
4.1 Description	ST Crolles as FE plant	ST Rousset as additional FE plant
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Impact	

5. Reason / motivation for change	
5.1 Motivation	ST Rousset site as additional FE plant will increase the production capacity on the concerned products.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	Dedicated FG code

7. Timing / schedule	
7.1 Date of qualification results	2023-03-03
7.2 Intended start of delivery	2024-01-09
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	13946 AIS2IH_ASIC_Second_Source_Rousset_15022023.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-02-20

9. Attachments (additional documentations)
13946 Public product.pdf 13946 AIS2IH_ASIC_Second_Source_Rousset_15022023.pdf

10. Affected parts		
10. 1 Current		10.2 New (if applicable)
10.1.1 Customer Part No	10.1.2 Supplier Part No	10.1.2 Supplier Part No
	AIS2IHTR	

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PCN #13946

Activation of ST Rousset as additional diffusion plant for AIS2IH ASIC *VB60* die

STMicroelectronics
MEMS Sensors Division - Analog and MEMS Group

February 15th , 2023

Agenda

1 Change description

2 5M/1E Analysis

3 Manufacturing sites

4 Product Traceability

5 Validation Method

6 Conclusions

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Change description

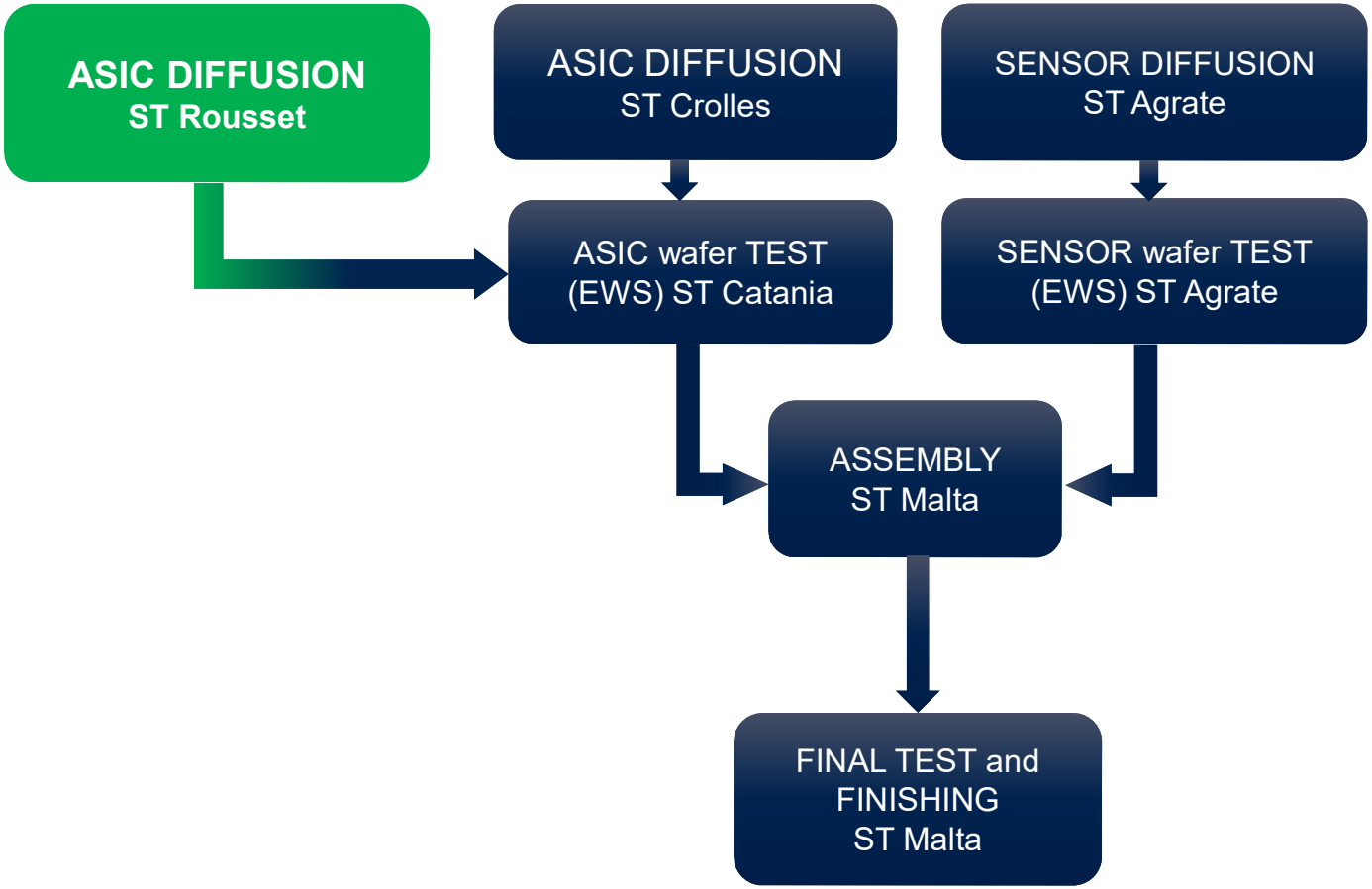
- **Objective:**
  - Capacity increase by activation of ST Rousset as additional diffusion plant for AIS2IH ASIC *VB60* die.

- **Change details**:
  - *VB60* ASIC die used in AIS2IH product is currently diffused only in ST Crolles plant. With the change, ST Rousset will be activated as additional diffusion plant where VB60 ASIC will be diffused.
  - The HCMOS9A technology, applied for *VB60* ASIC die, is being diffused in ST Rousset for more than 10 years and it is currently used in other ST Automotive products.
  - No other changes is the production flow are implemented, as confirmed below:
    - MEMS sensor diffusion plant is unchanged
    - EWS MEMS testing plant is unchanged
    - EWS ASIC testing plant is unchanged
    - Assembly plant is unchanged
    - Final Test and Finishing plant is unchanged
  - The activation of *VB60* ASIC in ST Rousset is planned by the beginning of Q1 2024

5M/1E Analysis

Change	Element	Control	Remarks
Additional diffusion plant : VB60 ASIC die in ST Rousset	**Machine**	Sharing the same equipment used for other ST Automotive products already qualified using same technology	The technology does not change, same mask set
	Man	Different production team	ST fab in Rousset is already qualified for automotive production and operators are well trained and certified
	Material	Bill of material (BOM)	No change
	Measurement	EWS and FT results and test distribution	No change
	Method	HCMOS9A technology (0.13µm process node)	No change. The HCMOS9A technology is already qualified and used in ST Rousset for more than 10 years
	Environment	ST fab in Rousset is qualified for automotive production	

AIS2IH: Manufacturing sites



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AIS2IH: Product traceability

The activation of ST Rousset plant as diffusion plant for VB60 ASIC die:

- Will not impact on the Commercial Product name
- Will not impact the Ordering Code used by customers to allocate orders
- Will be traced in ST records as a **new Finished Good (FG) code with suffix –MDG/**

	CURRENT	NEW
ST Commercial Product	AIS2IHTR	AIS2IHTR
ST Marking	No change	No change
ST Finished Good (T&R)	AIS2IHTR-MD2/	AIS2IHTR-MDG/

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Change Validation plan

- Considering that:
  - Both ST Crolles and ST Rousset factories are qualified to produce automotive devices.
  - Both ST Crolles and ST Rousset factories have active production lines on the HCMOS9A technology, which is used in billion of units across several market domains, including automotive .
- The following 4-steps validation activity has been performed to confirm that the two diffusion fabs are aligned on the specific production for AIS2IH:
  1. Reliability verification of the VB60 ASIC diffused in Rousset
  2. Characterization activity
  3. Verification at the Final Test of 50k units from 3 different lots processed in ST Rousset and St Crolles, with final check of test yields and distribution of key parameters.
- Acceptance criteria are defined as follows:
  - Good alignment of test distribution of key parameters on 50Ku (see next slide for the acceptance criteria)
  - Yield analysis
  - 0 confirmed rejects at QA (with QA step performed at 100%)

Final Test data analysis on key parameters: Amb and Hot

Final Test data analysis: Acceptance criteria

Parameter	Acceptance Criteria
Offset Lp / Hp	Difference between average values on the two plants < 15mg Difference between standard deviations on the two plants in % < 30%
Sensitivity Lp / Hp	Difference between average values on the two plants in % < 2% Difference between standard deviations on the two plants in % < 15%
I_{dd} in Power Down	Difference between average values on the two plants i < 30 na Difference between standard deviations on the two plants in % < 40% for Amb
	Difference between standard deviations on the two plants in % < 60% for Hot
I_{dd} at 100Hz LP/ Idd 200Hz	Difference between average values on the two plants in % < 20% Difference between standard deviations on the two plants in % < 20%
Seltest	Difference between average values on the two plants < 50 mg Difference between standard deviations on the two plants in % < 15%

Acceptance criteria are based on product features (IC with electronics and mechanics), equipment knowledge and analogy vs similar cases (experience), considering both the quantity involved and the temperature effect

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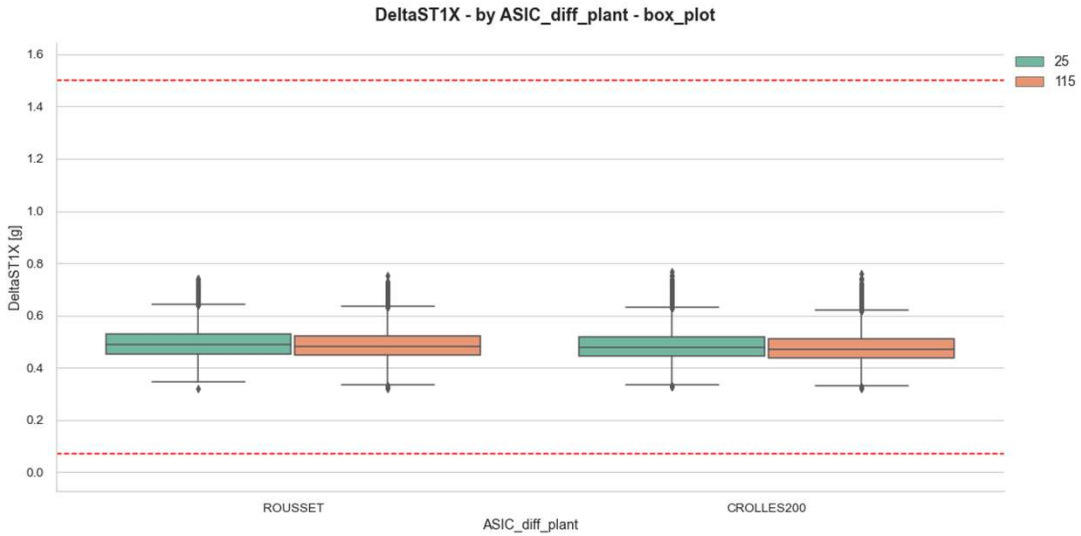
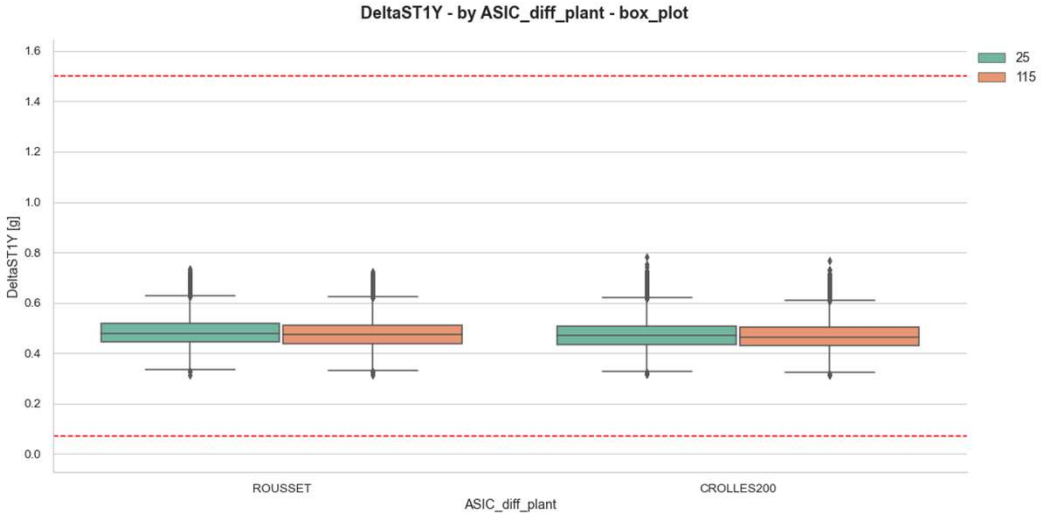
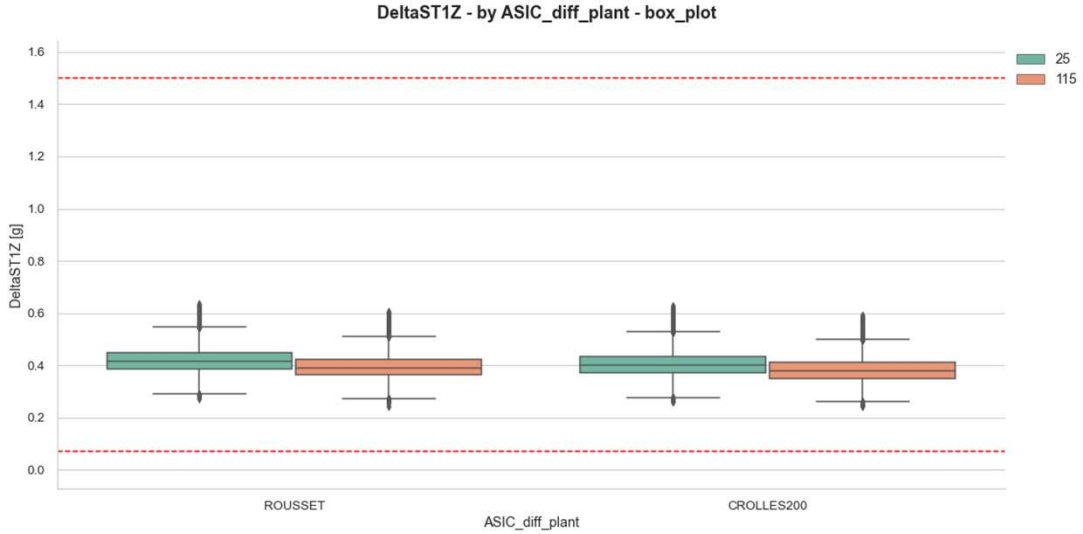
Parameter: Delta Self Test positive







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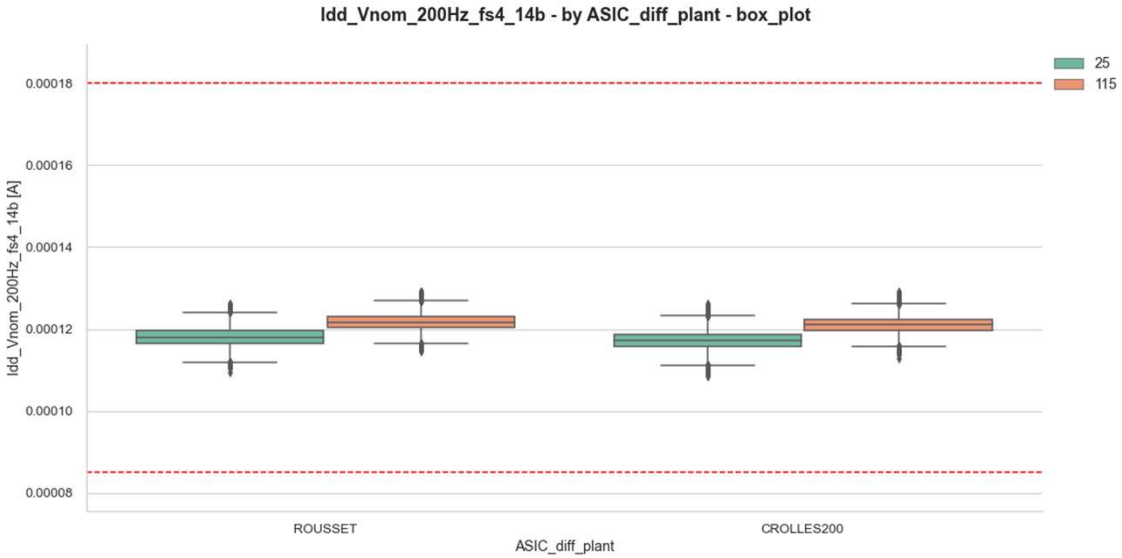
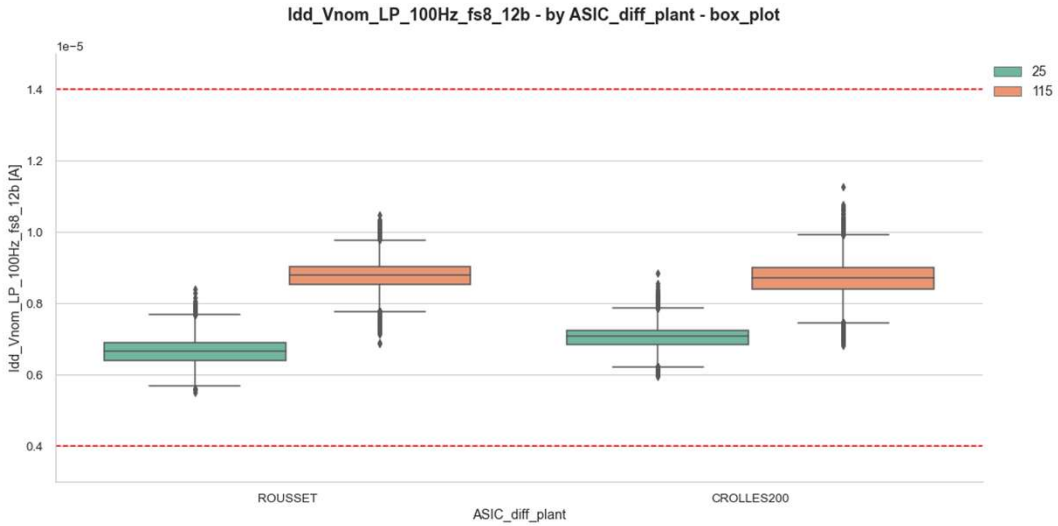
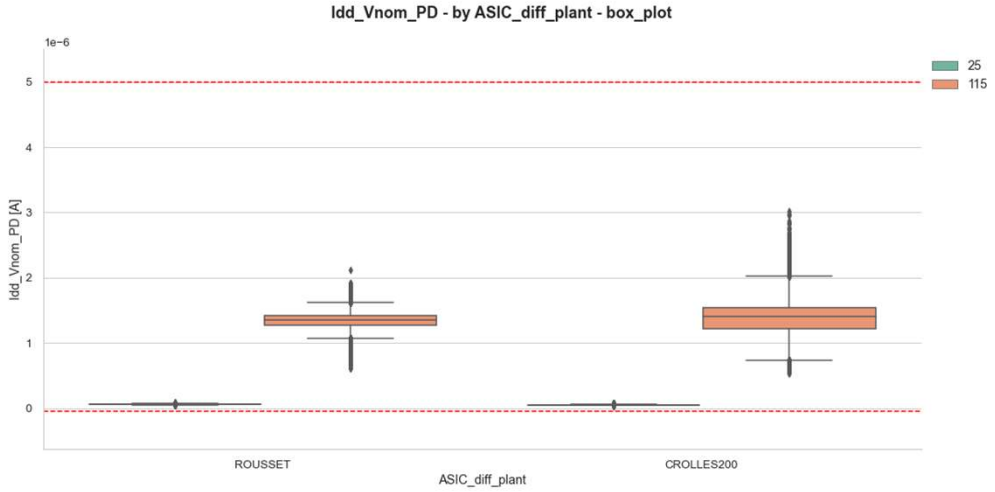
Parameter: Current consumption







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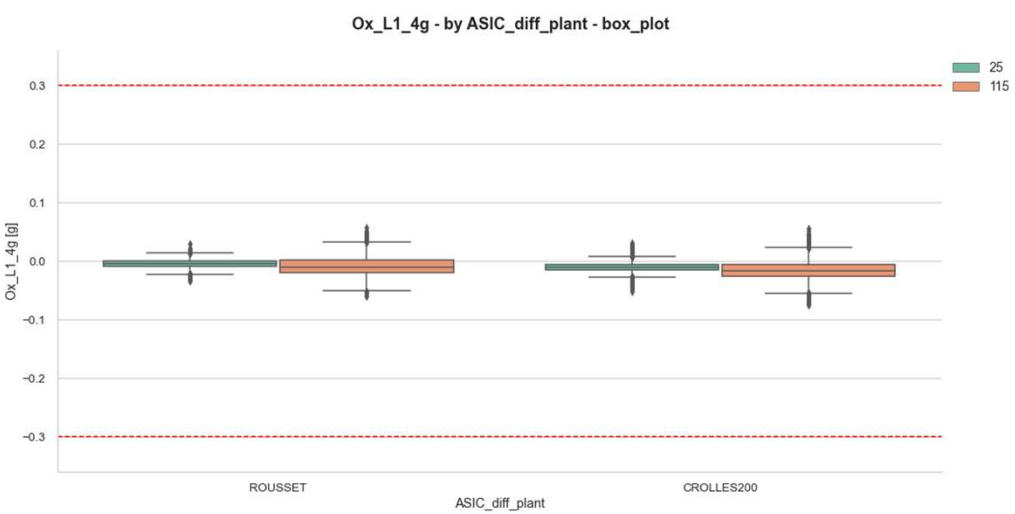
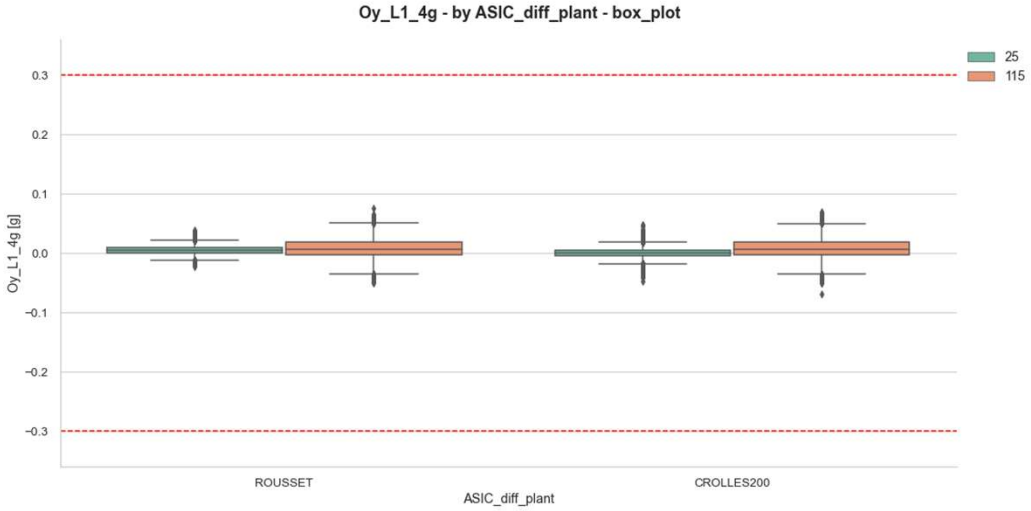
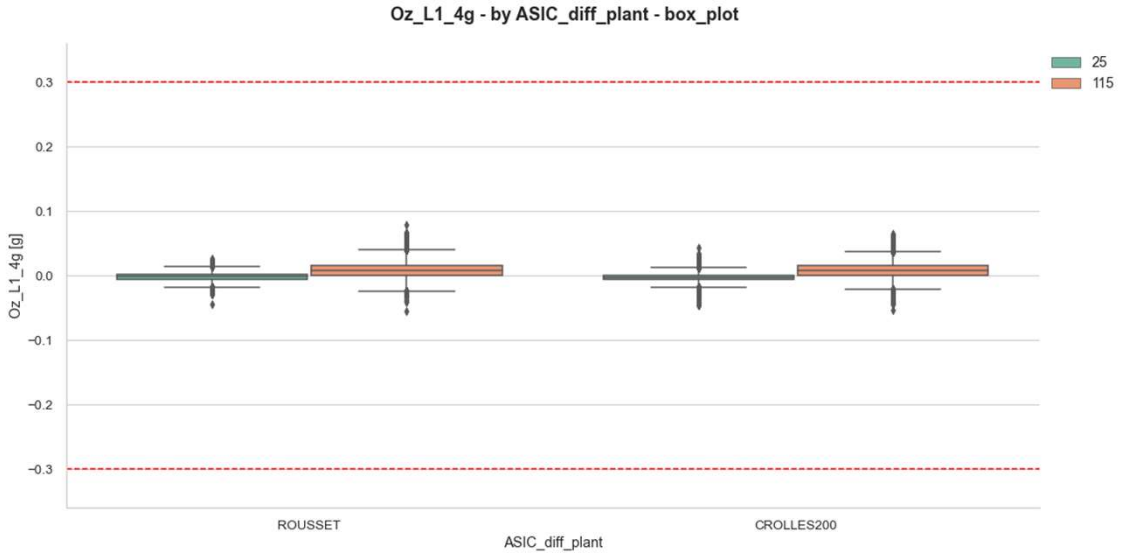
Parameter: Offset low performance







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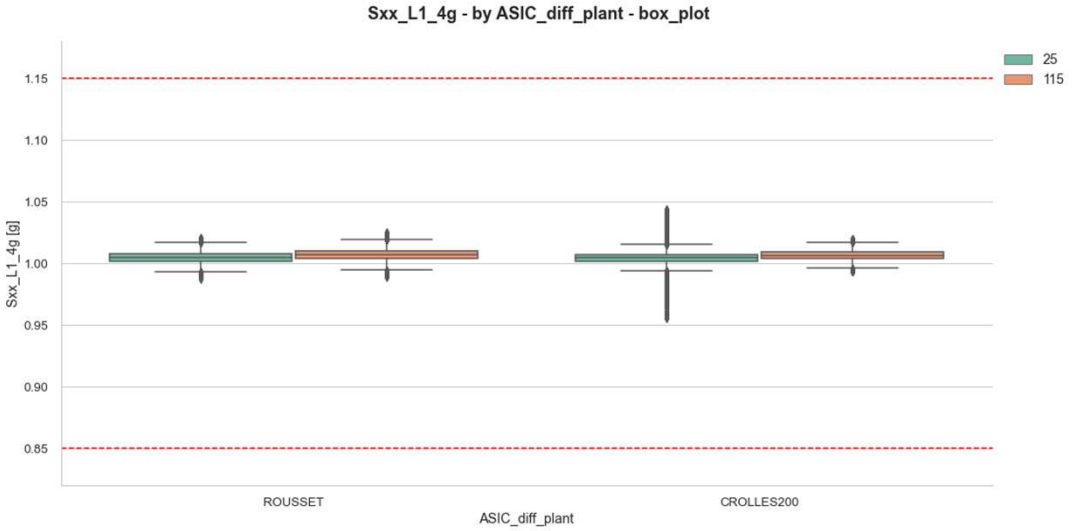
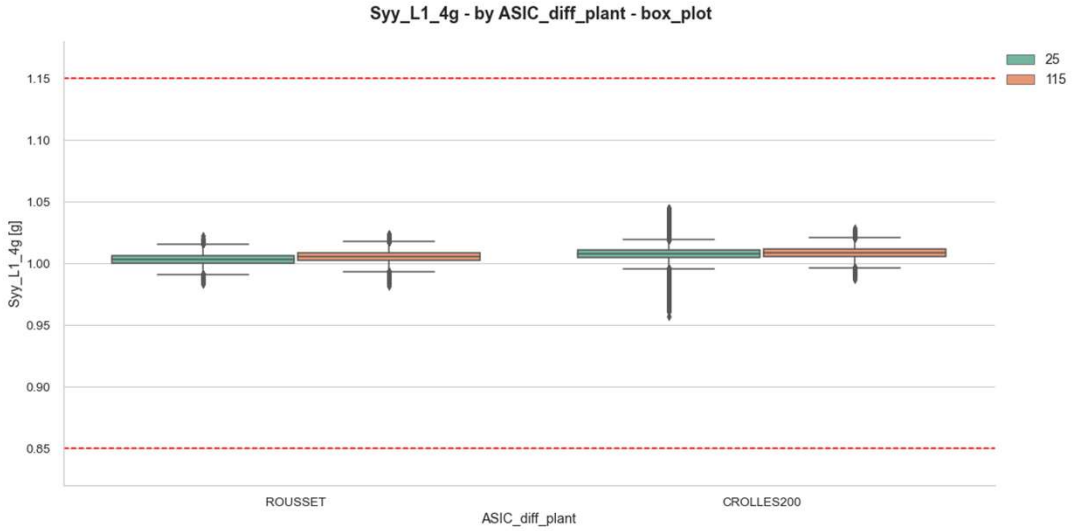
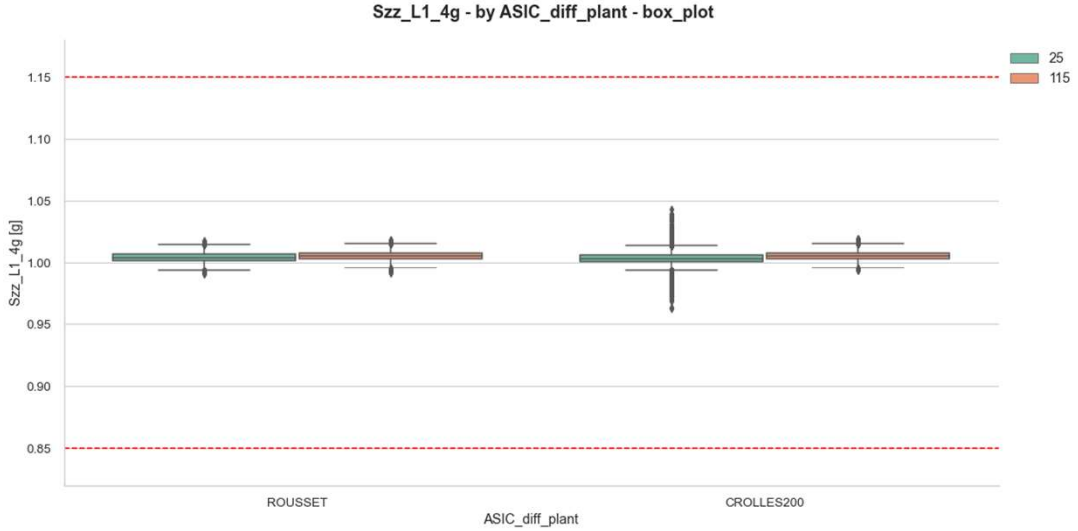
Parameter: Sensitivity low performance







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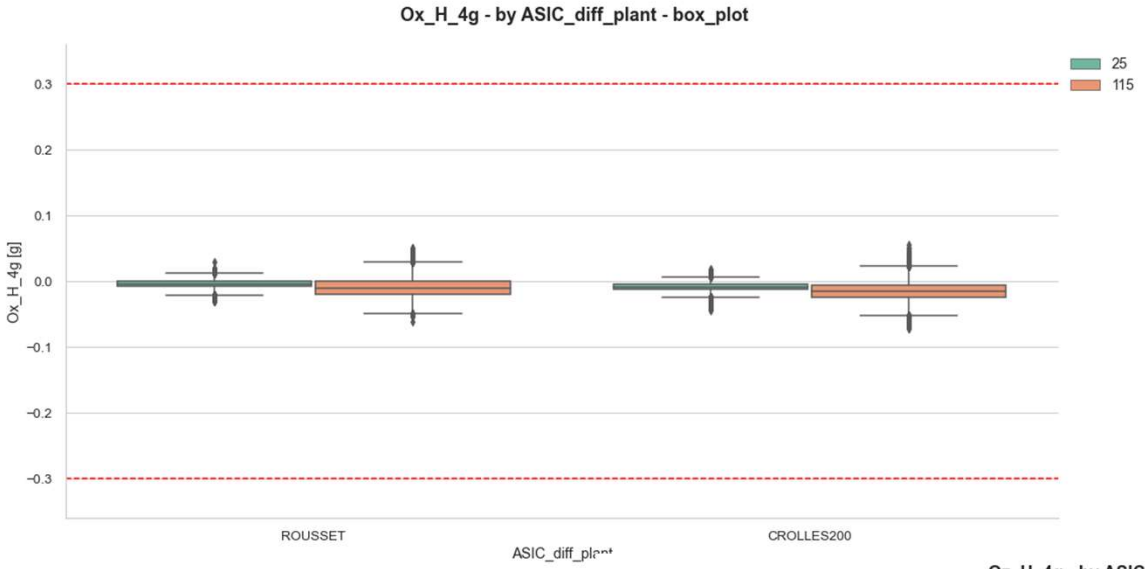
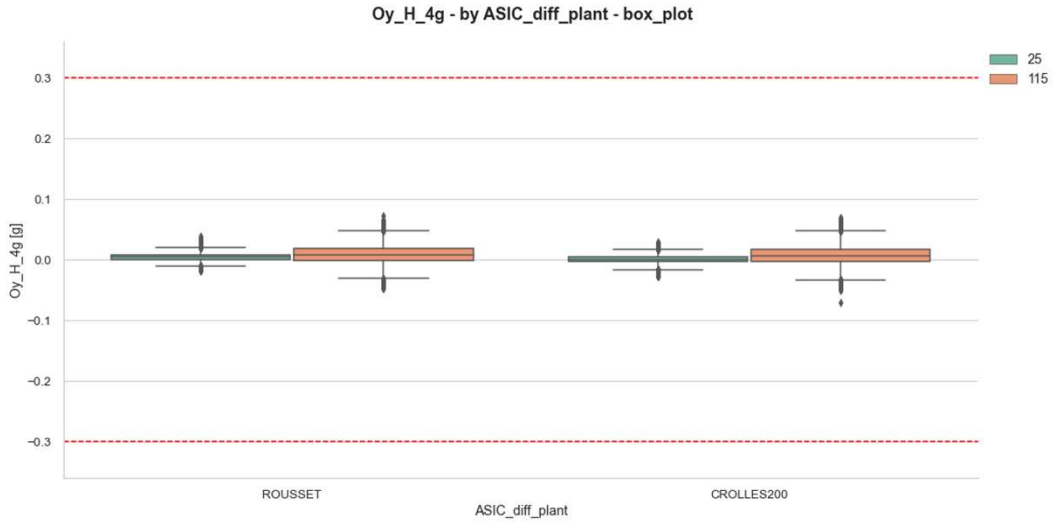
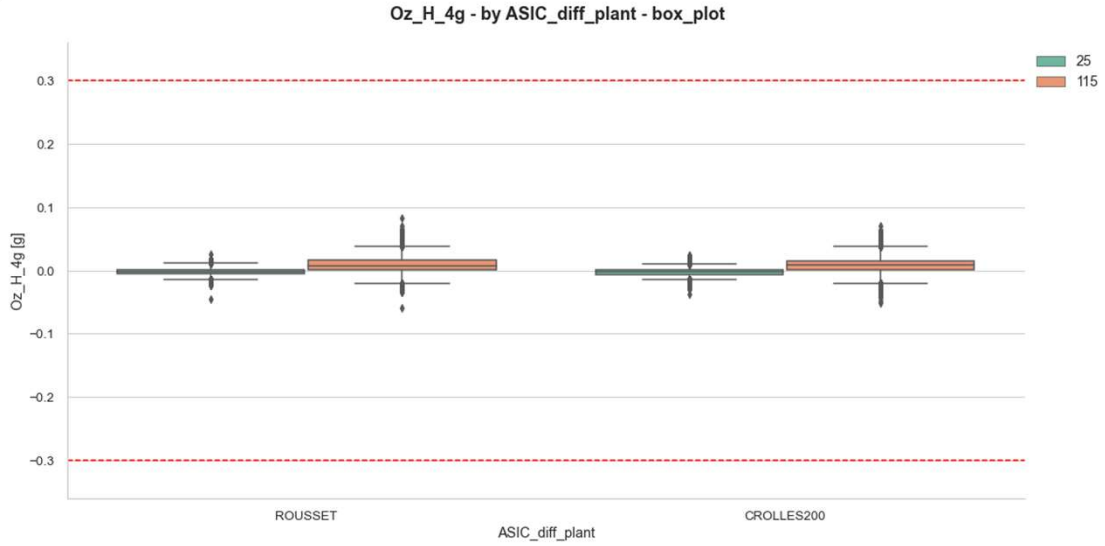
Parameter: Offset high performance







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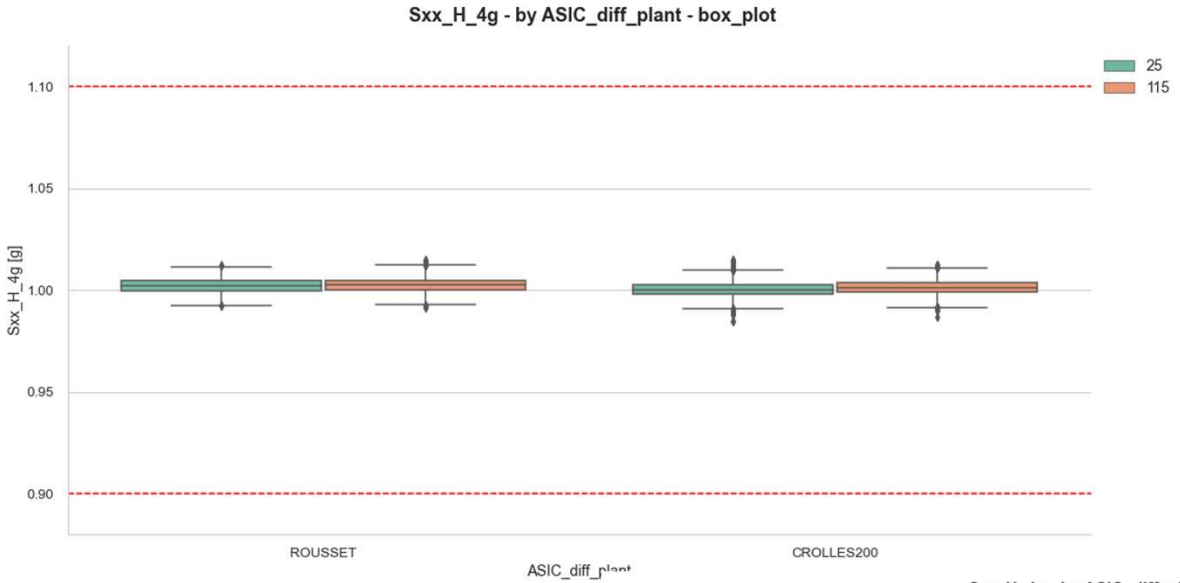
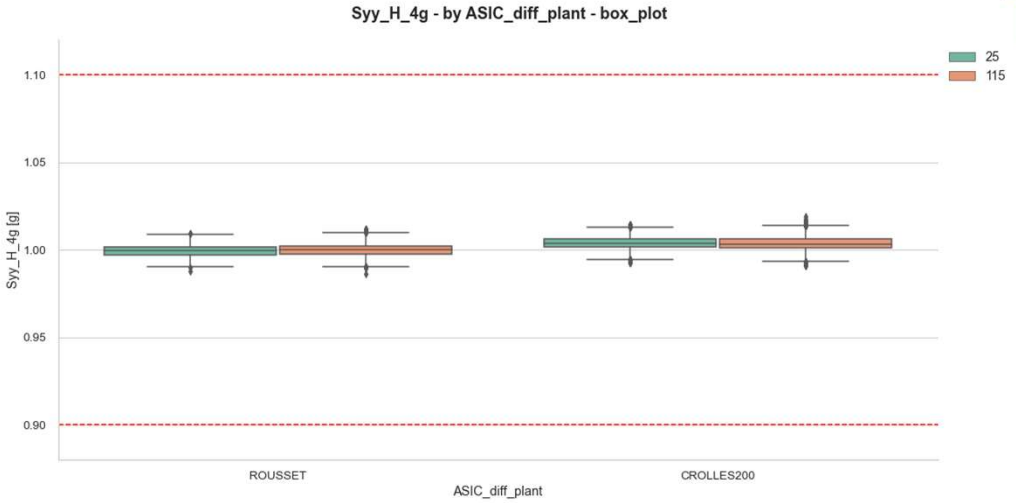
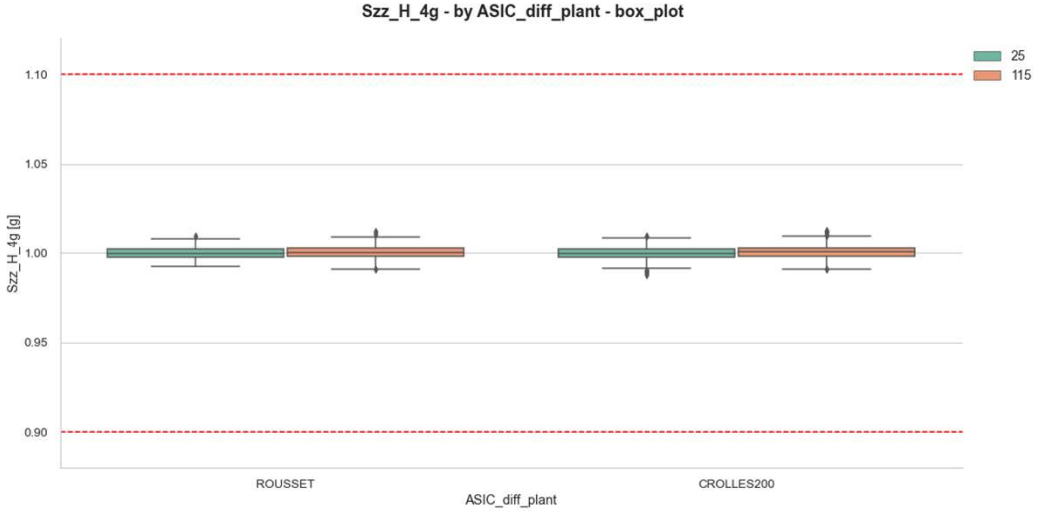
Parameter: Sensitivity high performance







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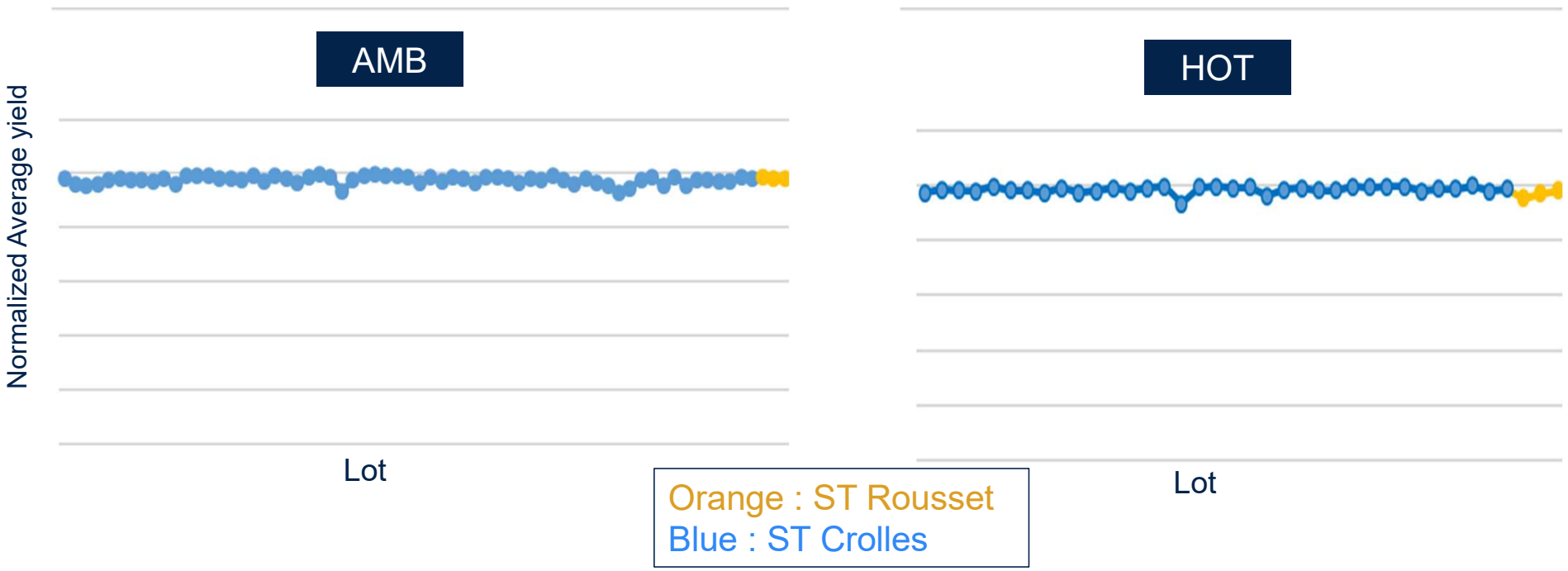
Final Test yield data analysis: Amb and Hot

Final Test yield data analysis: Amb and Hot



Final test yields observed on devices embedding the ASIC diffused in ST Rousset are comparable to those seen on the device with the ASIC from ST Crolles.

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Conclusions

- Considering that:
  1. The successful completion of the reliability activity
  2. The successful completion of the characterization activity
  3. The successful completion of the verification at the Final Test of 50k units from 3 different lots processed in ST Rousset and St Crolles, with final check of test yields and distribution of key parameters

ST Rousset diffusion plant has been qualified for the production of VB60 ASIC die

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Public Products List

Publict Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

PCN Title : AIS2IHTR: ST Rousset as additional FE plant.

PCN Reference : AMS/23/13946

Subject : Public Products List

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AIS2IHTR		

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