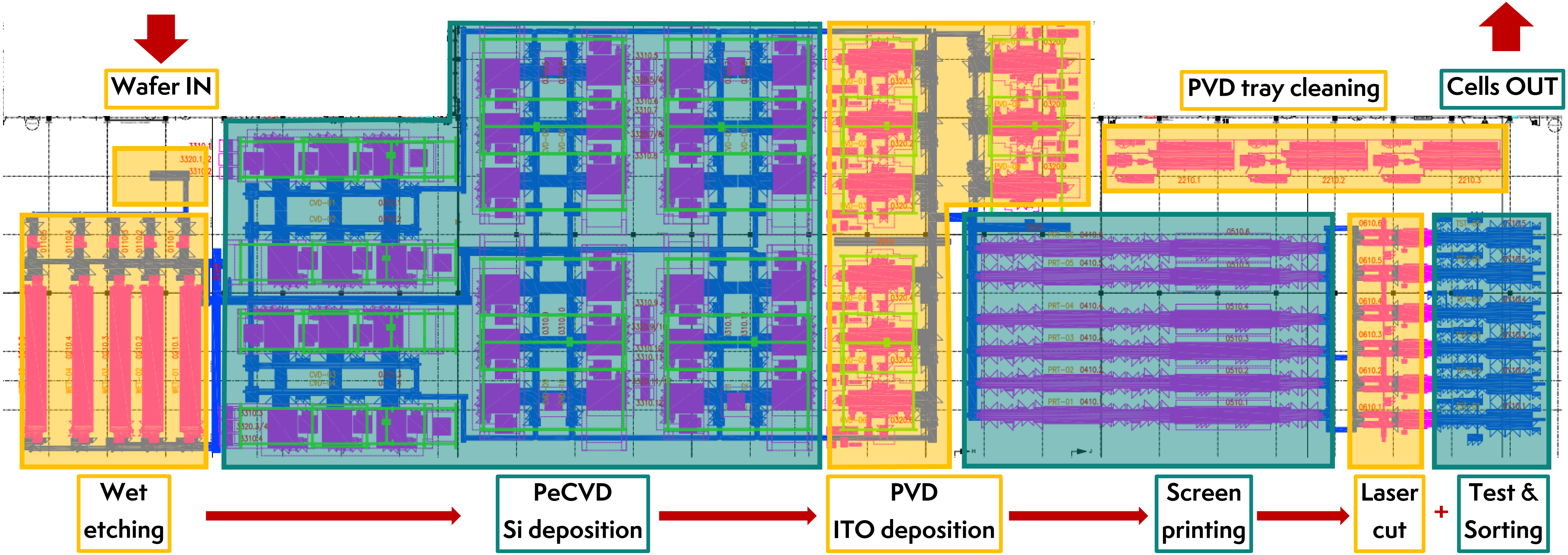
HJT
Solar Cell Production Equipment
Thalheim Cell Fab

MEYER BURGER

Manufacturing and material flow



Material Flow by overall transportation system

→ Parallel processing in each process cluster
→ Central collection an distribution between the clusters

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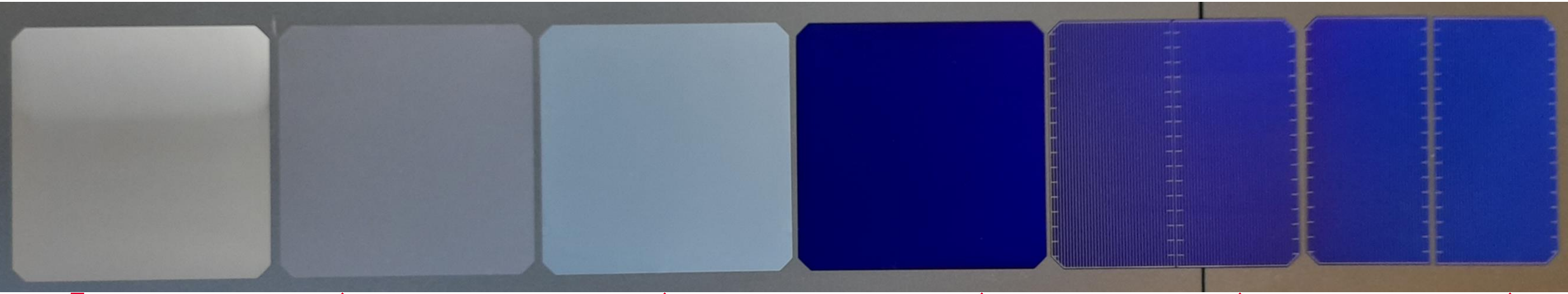
Production Sequence - Details



Etching

- ✓ Cutting damages
- ✓ Surface texture
- ✓ H- termination
- ✓ NOx/SOx free

Si deposition

- ✓ Passivation
- ✓ Doping
- ✓ n/p junction
- ✓ Low temp.

ITO deposition

- ✓ Low damage
- ✓ Contact resistance
- ✓ Layer conductivity
- ✓ Transmission
- ✓ Low temp.

Ag printing

- ✓ Busbar free
- ✓ Bi facial
- ✓ Low temp.

Cut & Test

- ✓ Half cells
- ✓ Light soak
- ✓ Optical check
- ✓ EL/I-V check
- ✓ Sorting

Production Sequence – Overview

1 Wet Chemical Cleaning

2 Heterojunction Thin Film Deposition

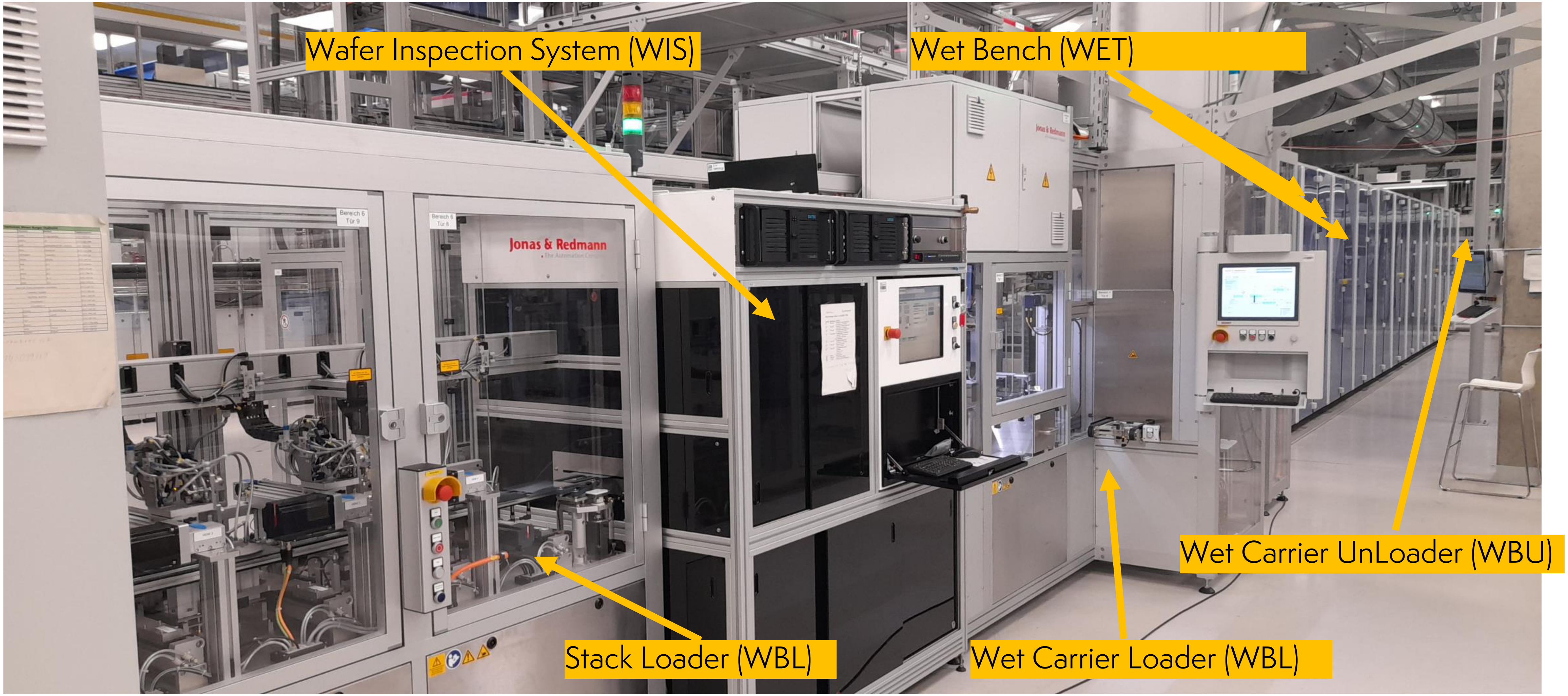
3 Conductive Thin Film Deposition

4 Metallization

5 Cell Separation

6 Testing & Sorting

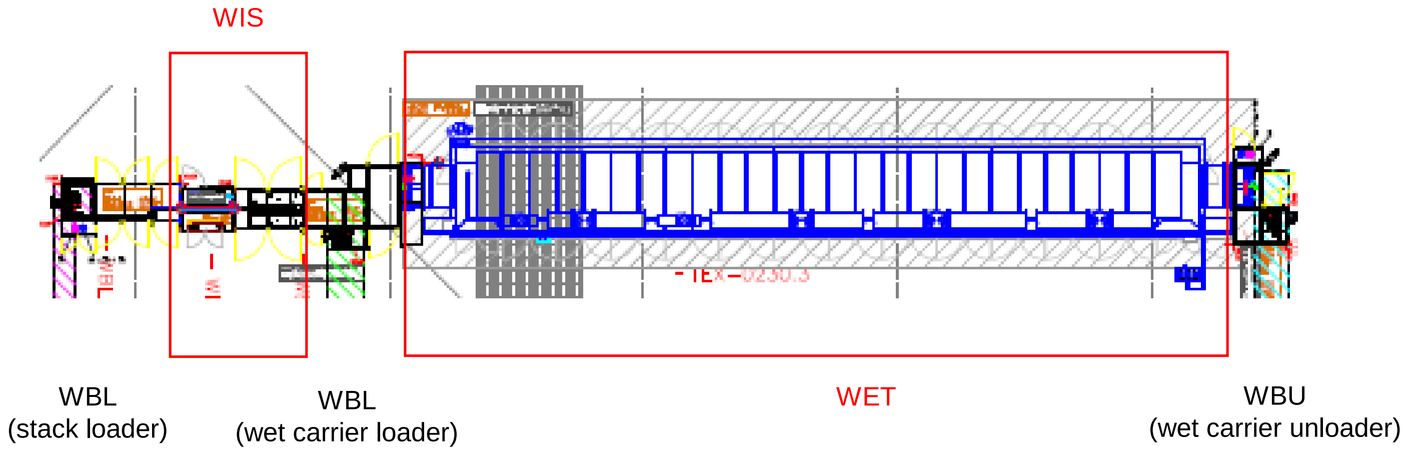
1 Wet Chemical Cleaning (WET_Cluster)



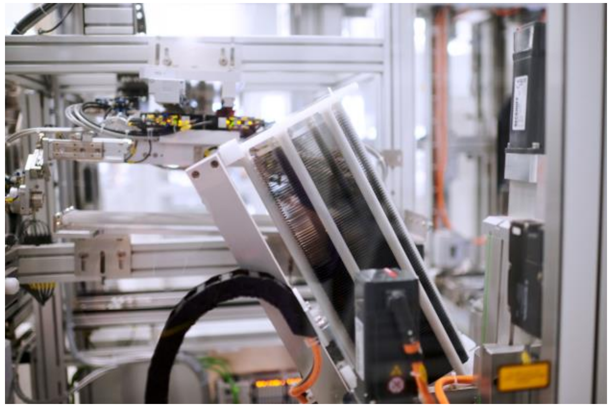
1 Wet Chemical Cleaning (WET_Cluster)

ID	WIS
Cluster	WET-Cluster
Tool	**Wafer Inspection System**
Manufacturer	Meyer Burger
Function	Inline Inspection system for geometric, optical and physical properties
Integrated Systems	Thickness Sheet Resistance TFC (advanced micro-crack detection) Geometry/Dimensions Breakage
Throughput	up to 7.500 wph
Substrate	as-cut M10 (182x182)

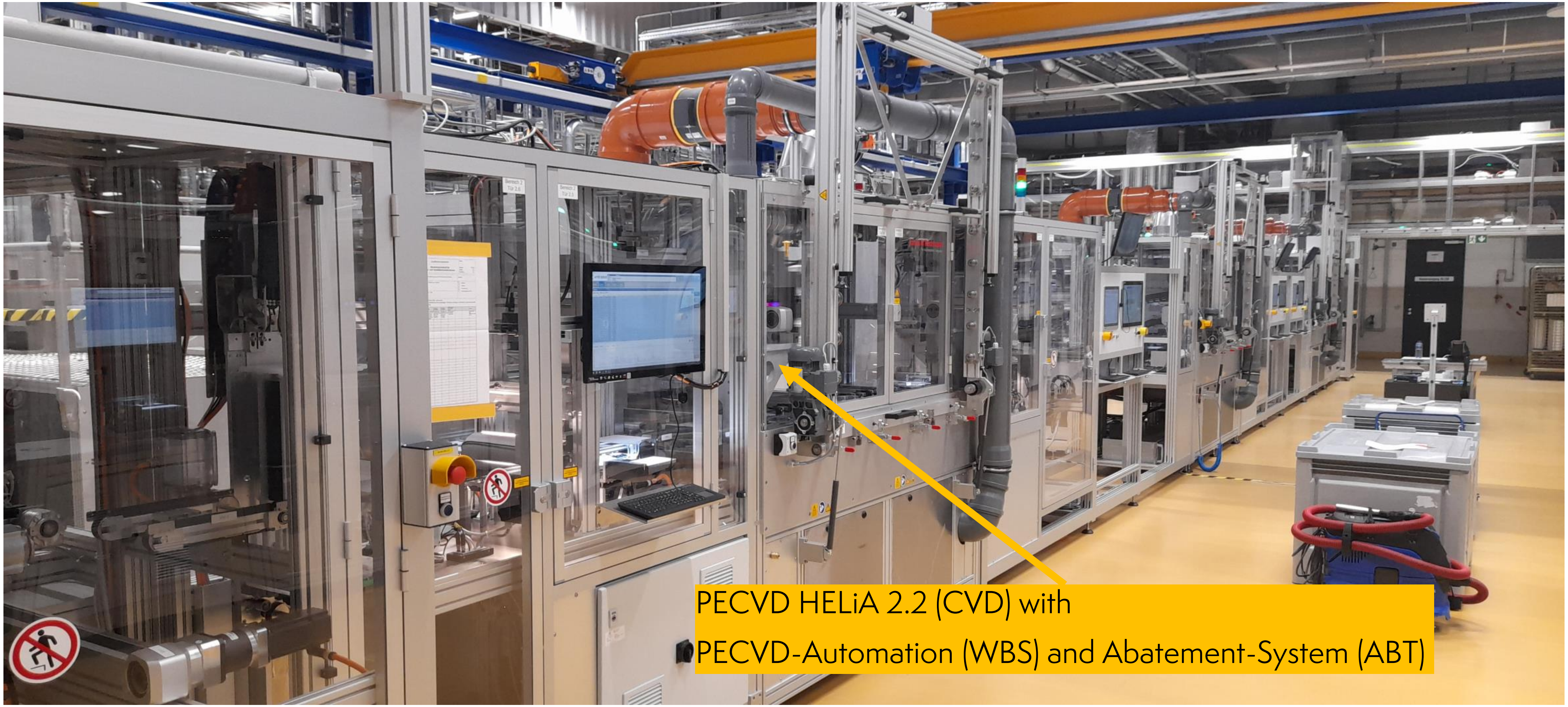
ID	WET (incl. WBL/WBU)
Cluster	WET-Cluster
Tool	**Wet Bench**
Manufacturer	exateq (load/unload ... J&R)
Function	Wet processing system - Batch Texturing and wafer surface preparation
Integrated Systems	lifting stations DI-water heater Ozone supply system
Throughput	5600 / 7200 wph
Substrate	as-cut M10 (182x182)



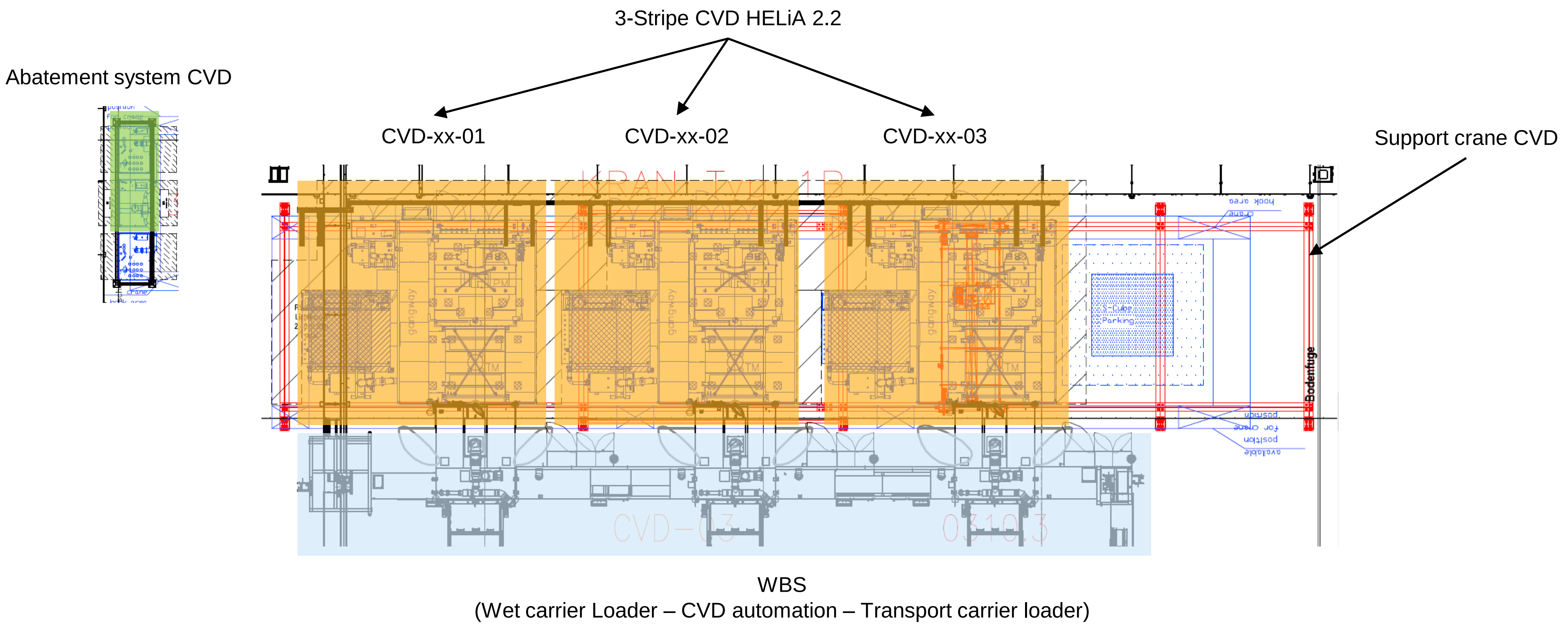
1 Wet Chemical Cleaning (WET_Cluster)



2 Heterojunction Thin Film Deposition (CVD-Cluster)



2 Heterojunction Thin Film Deposition (CVD-Cluster)



2 Heterojunction Thin Film Deposition (CVD-Cluster)

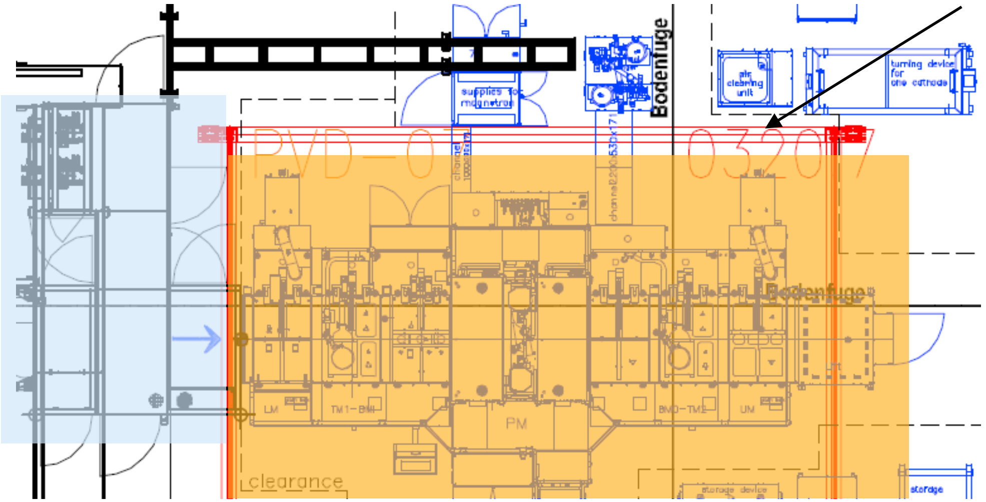
Placeholder pictures CVD System

3 Conductive Thin Film Deposition (PVD-Cluster)

3 Conductive Thin Film Deposition (PVD-Cluster)

Support crane CVD

WHS
(Transport carrier Loader
– PVD automation –
Transport carrier loader)



PVD HELiA 2.2

3 Conductive Thin Film Deposition (PVD-Cluster)

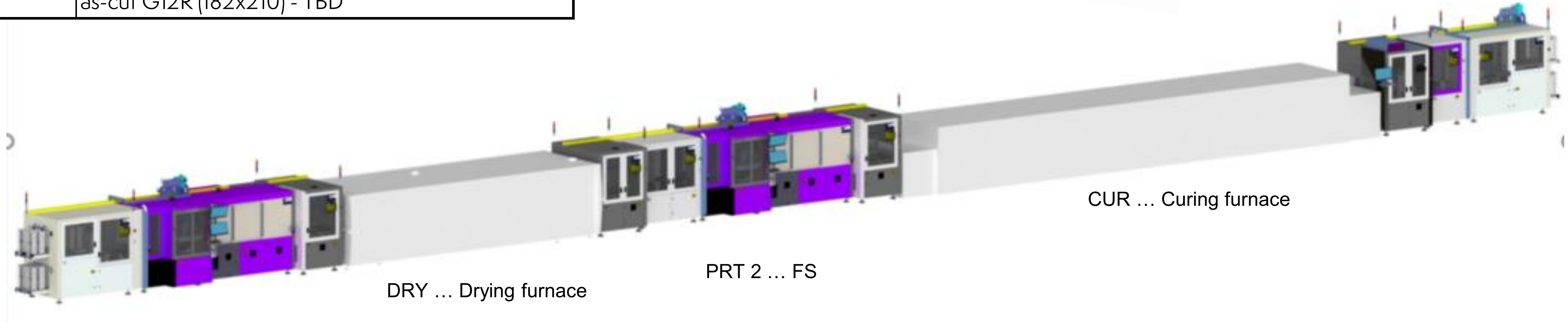
Placeholder pictures PVD System

4 Metallization (PRT-Cluster)

PrintLine (PRT) with
Dryer furnace (DRY) and
Curing furnace (CUR)

4 Metallization (PRT-Cluster)

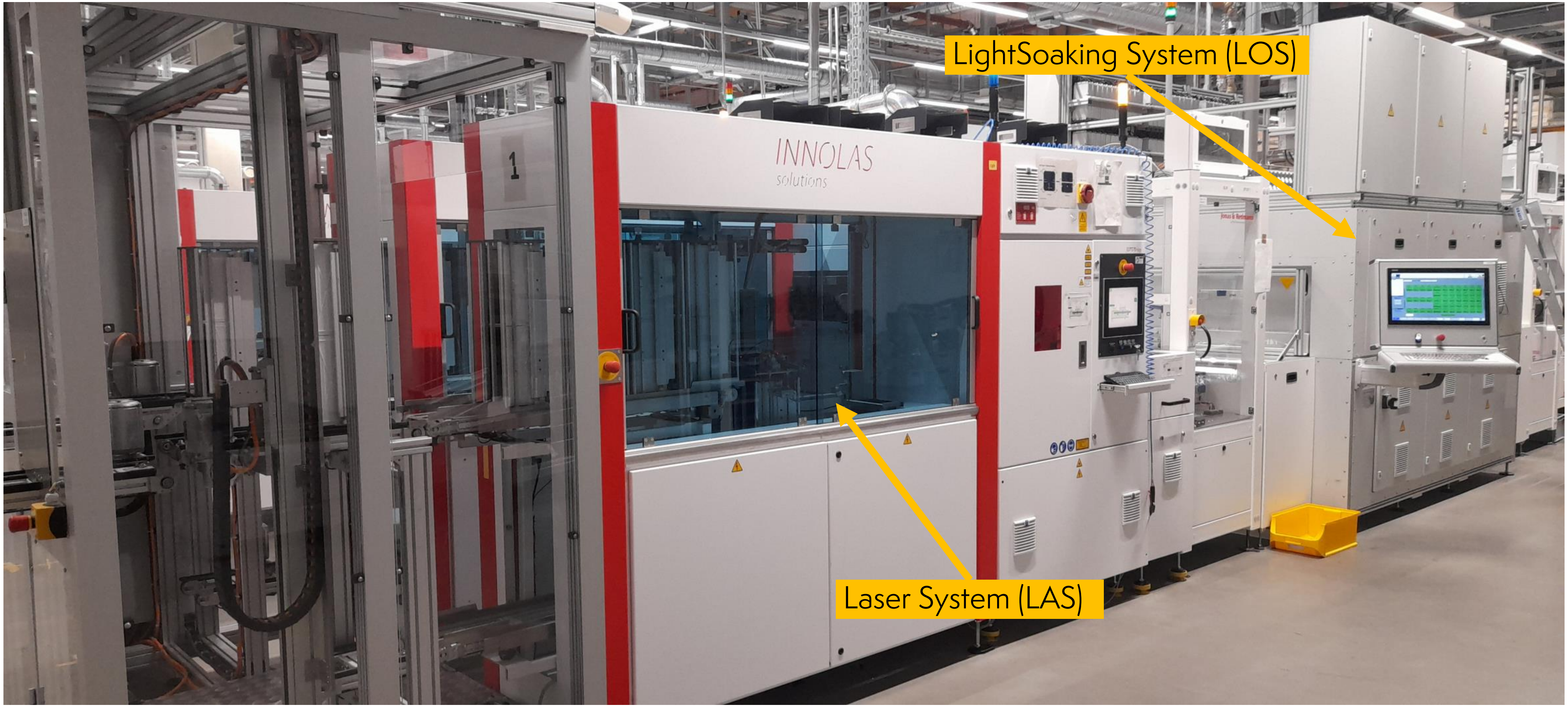
ID	PRT line (PRT+DRY+CUR)
Cluster	PRT-Cluster
Tool	**PRT line**
Manufacturer	EKRA (ASYS) MBG (DRY, CUR)
Function	Printing Back-/Frontside contacts
Integrated Systems	low temperature drying furnace (ceramic rollers) low temperature curing furnace (ceramic rollers) integrated color inspection integrated advanced micro-crack system
Throughput	4.800wph
Substrate	as-cut M10 (182x182) as-cut G12R (182x210) - TBD



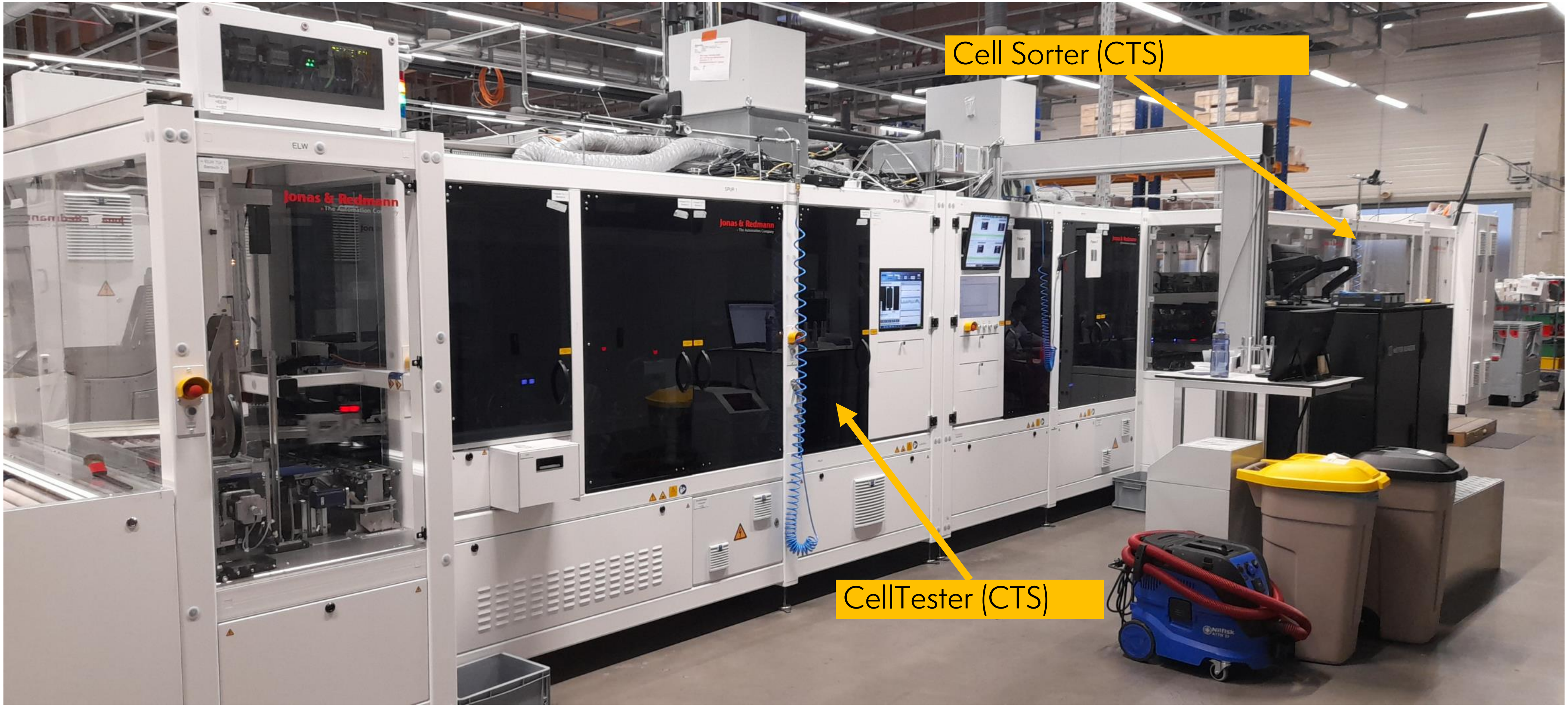
4 Metallization (PRT-Cluster)

Placeholder pictures PRT Line

5 Cell Separation (CTS-Cluster)

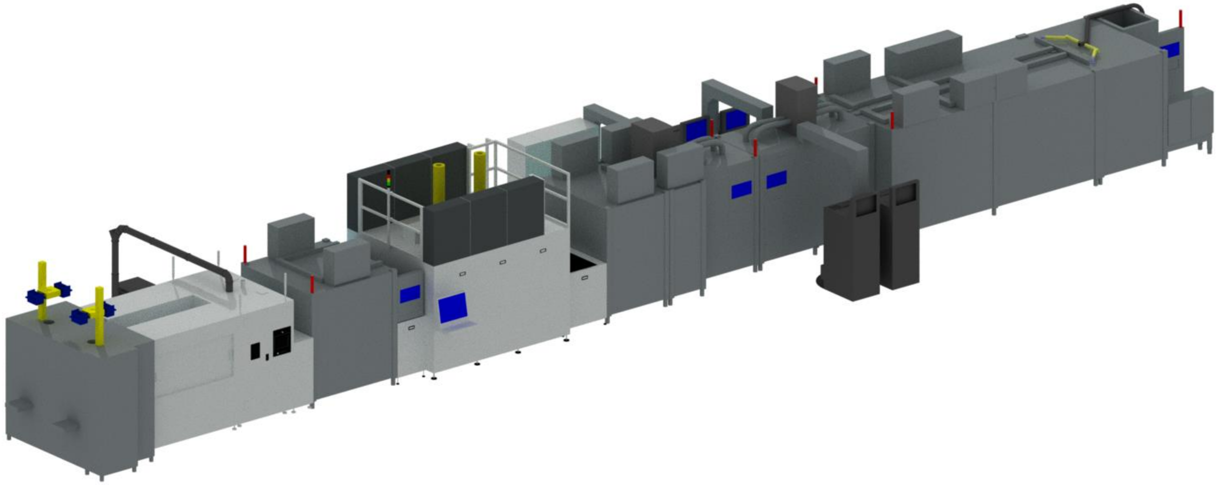


6 Testing & Sorting (CTS-Cluster)

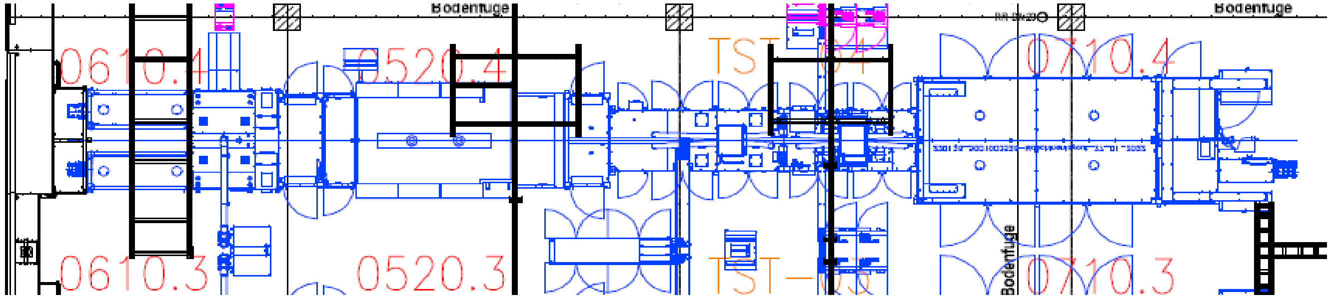


5 Cell Testing & Sorting (CTS-Cluster)

ID	CTS line (LAS+LSO+CTS)
Cluster	CTS-Cluster
Tool	**CTS line**
Manufacturer	J&R Photonic Systems (LAS) MBG (LSO) MB PASAN (EL+IV Measurement) ISRA (Inspection systems)
Function	Half cell cutting Lightsoaking Qualitfying + Sorting cells
Integrated Systems	half cell cutting system lightsoaking system back-/front-side inspection color inspection EL measurement IV measurement
Throughput	4.800wph
Substrate	as-cut M10 (182x182)



LAS LSO Tester Sorter



5 Cell Testing & Sorting (CTS-Cluster)

Placeholder pictures CTS Line

Equipment Summary – Total Fab

Production Cluster	Lines per Cluster	Tools per Cluster	Line Output	Cluster Output
Wet etching	5	15	5.300	**26.500**
PeCVD Si deposition	12	72	1.760	**21.120**
PVD ITO deposition	9	18	2.100	**18.900**
Screen printing	12	36	2.000	**24.000**
Laser cut & Light soak	12	18	2.000	**24.000**
Test & Sorting	12	24	2.000	**24.000**
Wafer transport system	1	8		
PVD Tray cleaning	3	3		
	66	**194**		