Specification

WAFER HANDLING SPECIFICATION AND STORAGE

Version 0.0

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OVERVIEW

This document shows wafer handling specifications and recommended storage procedures.

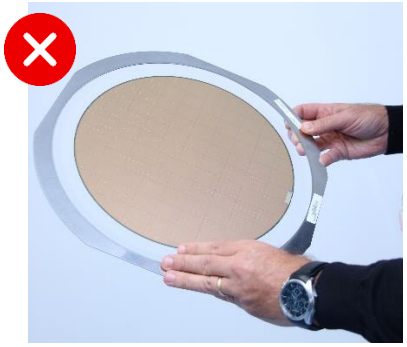
1 PPE AND ESD PRECAUTIONS

1.1 Use the Correct PPE

1.1.1 ESD lab coats and disposable caps (hair net) should be worn in an electrostatic discharge (ESD) protected area, including production floor and IQC inspection area.

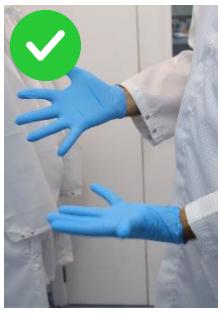
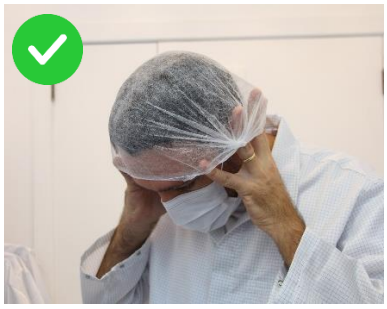
1.1.2 Dust-free nitrile gloves should be worn when handling wafers. Wafers should never be touched with the bare hand. Contamination from skin oils and other contaminants can affect the quality, performance, and reliability of the end products.

1.1.3 Insufficient PPE for wafer handling

Do not handle wafers without proper PPE	Do not handle wafers without industrial gloves.	Do not wear shoes without ESD dissipation property while handling wafers.
		

1.1.4 Minimum PPE for wafer handling

Proper PPE usage	Wear ESD shoes such as the one shown.	Wear ESD ankle strap in lieu of ESD shoes.
		

Use dust-free nitrile gloves	Wear a facial mask to cover the nose and mouth.	Wear a disposable hair net
		

1.2 ESD Precaution

1.2.1 ESD precautions and proper handling procedures must be followed when handling silicon wafers and its components. Use antistatic devices such as wrist strap and floor mat are recommended.

1.2.2 Use ionizers (*static eliminator*) for ionization (*charge mitigating*) to neutralize the charge where grounding is not possible.

1.2.3 Use ESD test meters to measure and monitor the level of electrostatic discharge of work surface and wrist strap for proper grounding to ensure that potential ESD event remains within the acceptable safe levels.

Example of ESD tester	Always wear ESD strap, ESD shoes, ESD heal strap when handling wafers.	Check ESD equipment to ensure proper grounding before handling wafers.
		  Touch Screen Computer With Test Result Data Log

2 BEST PRACTICES IN SAFE WAFER STORAGE

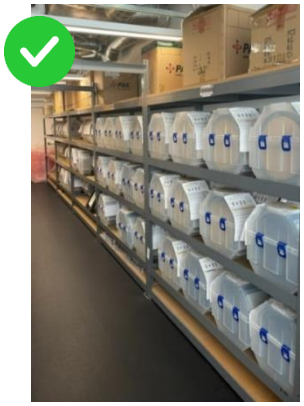
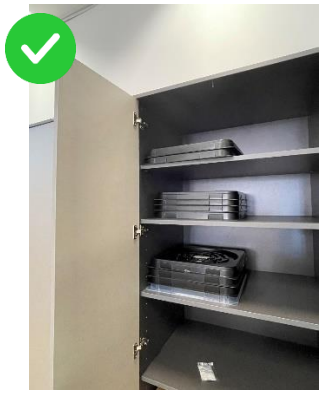
1.3 Wafer Environment Condition (BUILDING CONDITIONS)

1.3.1 Impinj wafers are shipped in wafer boats or clamshells packs. Impinj recommends only removing wafers from the wafer boats or clamshells packs at the point of use in production to prevent damage.

1.3.2 Impinj recommends wafers be stored in a clean room environment or equivalent in a temperature and humidity-controlled environment as listed.

Environments condition	Specifications
Temperature	25 ± 5°C
Humidity	≤ 50% RH

1.4 Wafer Storage Conditions

Shelve is highly recommended for storage of the wafers	Cabinets are recommended for clam Box	Cart recommend to transporting
		

1.4.1 Do not stack objects or packages on top of wafer clam pack as shown which can damage or break silicon wafer inside.

Do not place boxes or other objects on wafer package	
	

3 BEST PRACTICES IN THE WAFER HANDLING

1.5 Removing Wafer from Clam Pack

1.5.1 Impinj wafers are shipped in a hermetically sealed bag to protect against humidity and contamination. It is recommended the sealed bag should only be opened and handled in a cleanroom environment or equivalent.

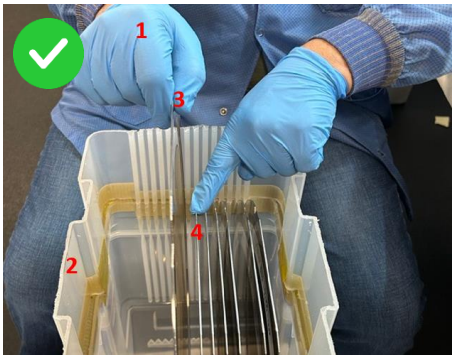
1.5.2 Wafers are susceptible to airborne particulates, contaminants, and moisture. The surface of the wafer is very sensitive and special care should be taken when handling wafers.

1.5.3 Wafers should never be handled with bare fingers and should only be handled by the wafer frame to prevent cross-contamination and damaging the wafer surface.

Use both hands to open clam pack.	Make sure the clam pack lay flat on a worksurface when open.	Use recess to remove wafer from clam pack
		

1.6 Removing Wafer from Wafer Boat

1.6.1 Proper procedure for removing silicon wafers from wafer boat.

Remove wafers from boat	
	**1 -** Wear industrial latex gloves. **2 -** Use wafer boat fixture to load and unload wafer. **3 -** Firmly grip the wafer metal frame with right hand. **4 -** Hold down adjacent wafer with left hand. **5 -** Gently slide the wafer from the boat slot at 90° to unload. Reverse this step to load. **6 -** Ensure the wafer backside or frontside are not contacting adjacent wafer during loading and unloading. **7 -** Ensure workstation is low so you can see the wafer boat slots during loading and unloading operation.

1.7 How to Handling Wafers

Hold wafer firmly with both hands	
	

1.8 Avoid Mishandling Wafers

Avoid speaking directly over the wafer face mask. Saliva particles can deposit on wafer surface	Saliva particles can be seen on the wafer surface	Avoid touching the wafer surface
		

Handle silicon wafer by metal frame only.	Do not handle wafer as shown.	Silicon wafer should be properly stored in clam pack.
		

Do not carry silicon wafer as shown	Do not carry silicon as shown. Hold wafer with both hands by the metal frame only	Never heat the Waver before the use
		

Not Exposure to natural or solar lights		
		

1.9 Wafer Expansion Tolerance and Limits

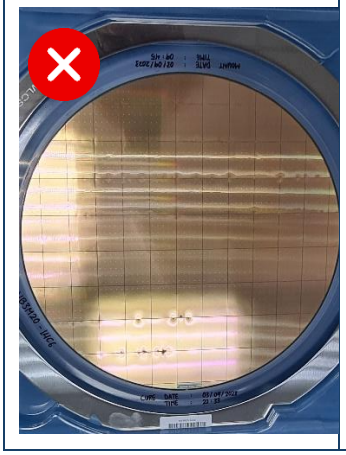
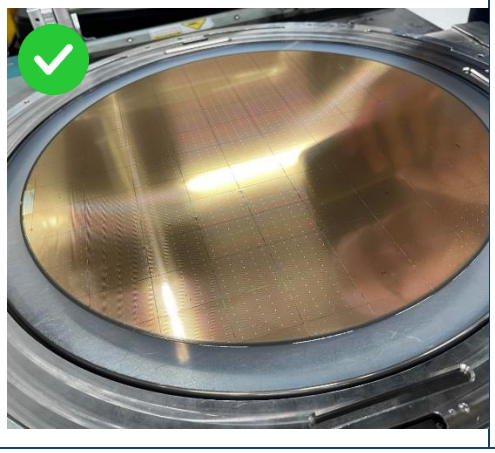
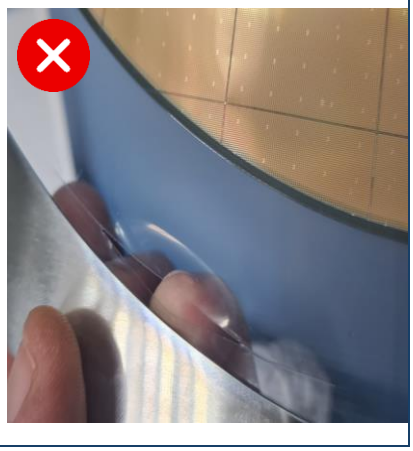
Wafers are mounted on UV tape. Prior to shipping, the UV tape is cured which involves exposing the tape to a UV light source that breaks down the adhesive bond, thereby facilitating easy die removal during the pick and place operation. Impinj recommends tape expansion ≤ 5mm.

Impinj recommends processing the wafer immediately after tape expansion. Perform die pickup on all the wafers as soon as possible. Minimize long pauses in between die picking operations and tape expansion for optimal results. Avoid exposing wafer tape to heat.

Wafer tape sagging or waviness is normal after expansion and running in the pick and place machine. Wafer tape will return to pre-expansion after cooling in room temperature for a couple of hours. Wafer tape may not return to normal if the expansion was prolonged or if the tape was expanded beyond Impinj's recommendation.

Reference wafer tape expansion table.

No of Shim(s)	Expansion
No Shim	2 - 3mm Expansion
1 Shim	≤ 5mm Expansion
2 Shims	8mm Expansion

Not correct expansion method	Correct expansion method	Careful with over expansion
		

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