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## STANDARD OPERATING PROCEDURES (Standard Wafer Cleaning Procedure)

**Caution:** The Chemicals used in this cleaning procedure are **extremely hazardous**.  
Always wear goggles, (face shield), Rubber Gloves, Apron etc.

For the complete wafer cleaning procedure follow the instructions up to the step 8.

For simple cleaning procedure with Pirhana follow steps 1, 4 and 5 only.

1. Organic coating removal: Immerse wafers in Pirhana solution for 5 to 10 minutes. Pirhana removes organic contaminants by oxidizing them, and metals by forming soluble complexes. Pirhana solution is a 5:1 mixture of  $H_2SO_4$  with  $H_2O_2$ . The mixture is self-heating and the  $H_2O_2$  has to be added very slowly. Solution loses its effectiveness when it cools down. However, adding one part of  $H_2O_2$  may refresh it.
2. Rinse with DI water for at least 1 min.
3. Organic residues removal: Immerse wafers in the 5:1:1 mixture of DI water,  $H_2O_2$  and ammonium hydroxide ( $NH_4OH$ ) for 10 min.
4. Rinse with DI water for at least 1 min.
5. Oxide removal: Dip in DI water. Immerse the wafer in 50:1 diluted HF or 10:1 mixture of DI water and buffered HF for 5 to 15 sec.
6. Rinse with DI water for at least 1 min.
7. Ionic contamination removal: Immerse wafers in a 6:1:1 mixture of DI water,  $H_2O_2$  and Hydrochloric acid (HCl) for 10 min.
8. Rinse with DI water for at least 1 min.

**If Exposed to Pirhana solution:**

Immediately remove all affected clothing. Rinse yourself at the safety shower/eye wash for 15-20 minutes. Report to lab staff and / or medical department.

**If Exposed to HF:**

Flush exposed area immediately with water for 15-20 minutes. After flushing, apply HF antidote (Ca-based) to neutralize HF effect. Report to lab staff and / or medical department. At medical department, exposed area should be flushed for additional 30-45 minutes and HF antidote should be re-applied.