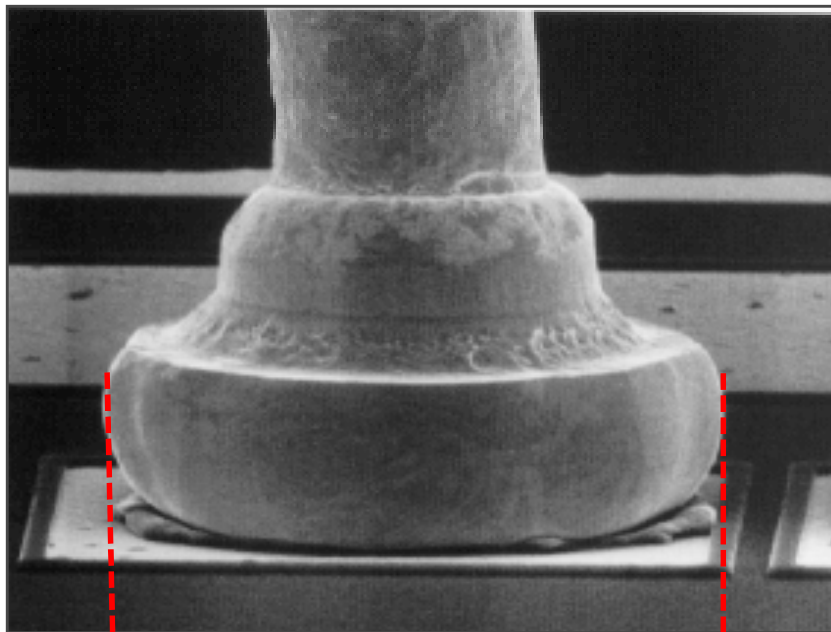


# Cu Bonding Quality Guidelines Confirmation

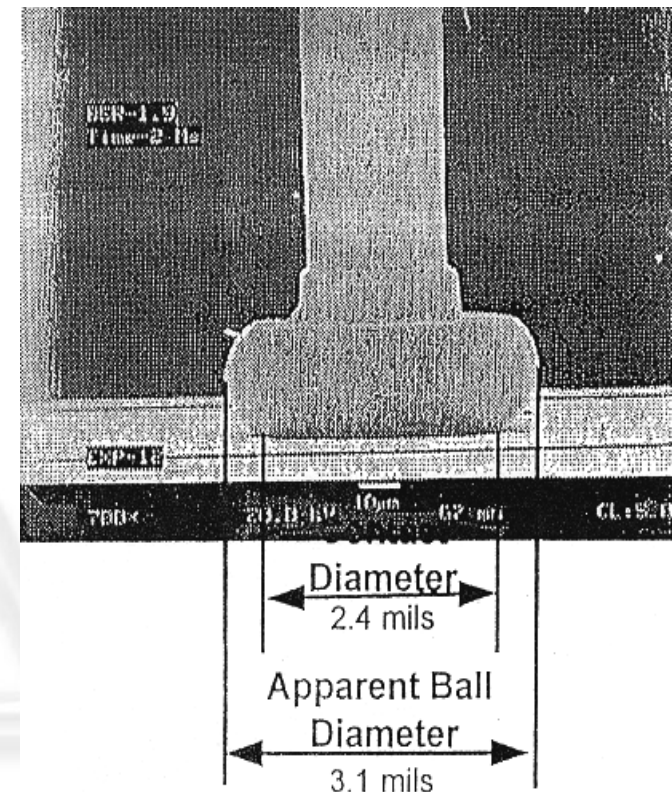


## p Ball Size

- n Ball Size is measured base on the Apparent Ball Diameter
- n Max Ball Size  $\leq$  BPO – 5  $\mu$ m
- n Recommended Ball Size = Capillary Chamfer Diameter x 1.2

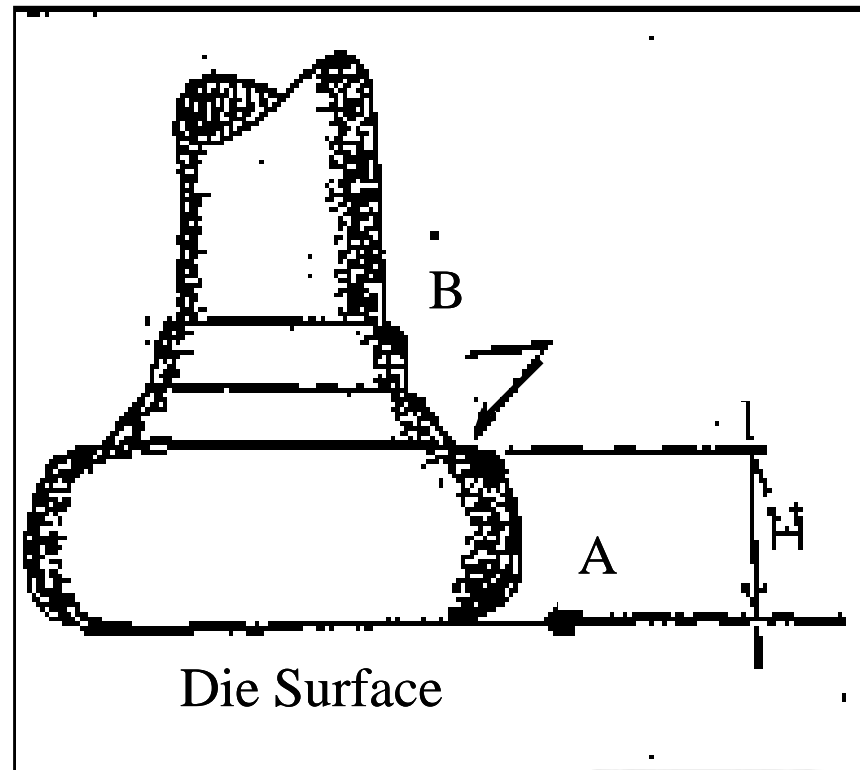


Ball Size



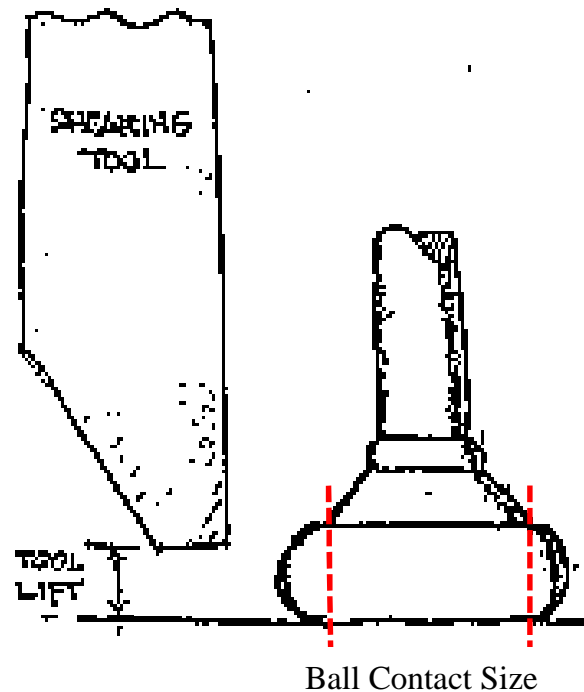
## p Ball Height

- n Ball Height is measured from Die Surface (A) to lowest capillary contact point (B)
- n Recommended Ball Height = Wire Diameter x 0.5



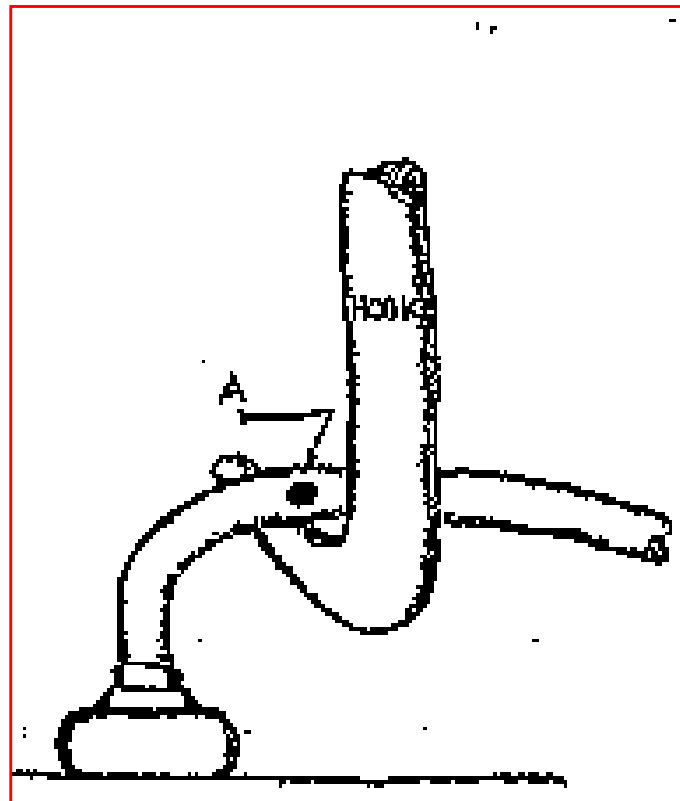
## p Ball Shear

- n Ball Shear is the destructive test to measure 1<sup>st</sup> Bond bonding strength
- n Recommended shear tool height is 1/3 of ball height
- n Ball Shear reading is calculated per Ball Contact Area
- n Recommended Ball Shear  $\geq 8$  gram/mil<sup>2</sup>



## p Wire Pull

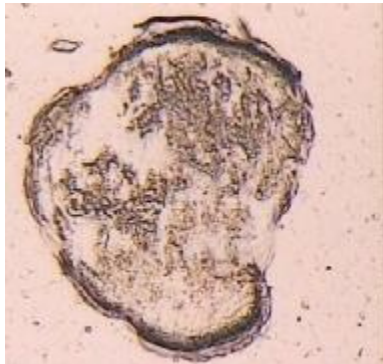
- n Wire Pull is a destructive test to measure bonding strength and inspect failure mode
- n Wire Pull is performed by placing the pull hook under the wire close to 1<sup>st</sup> bond



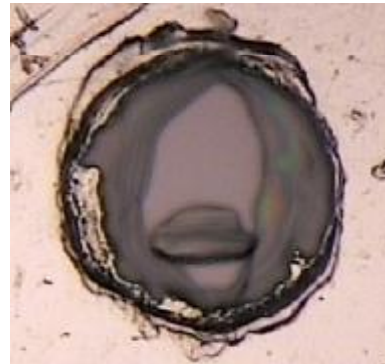


## p Wire Pull Reject Criteria

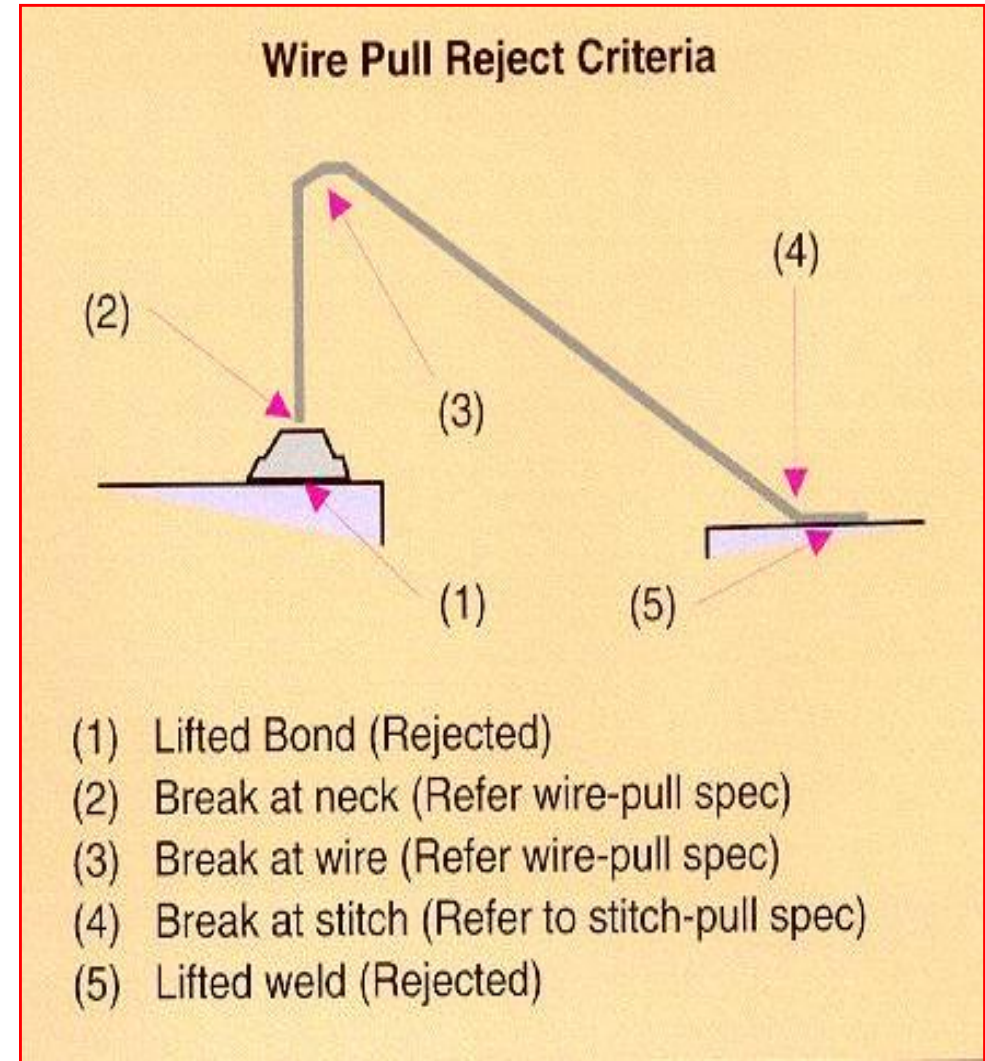
- n Ball Lift and Peeling is not acceptable
- n Break at neck to compare with wire pull spec to determine neck strength



Lifted Bond  
with Ball Lift



Lifted Bond  
with Peeling



## p IMC Check

n To check the IMC coverage of the bonded package

n Procedure:

p Heat bonded package under heater block with 200°C for 60mins

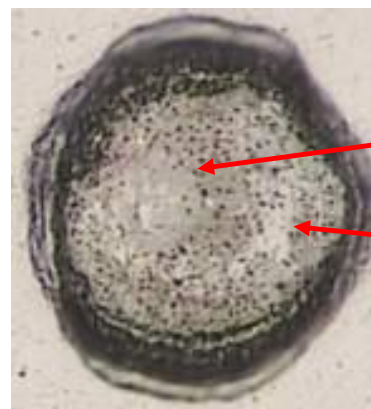
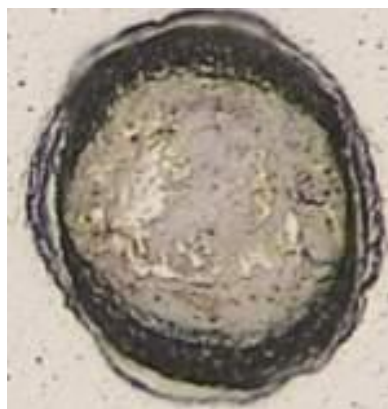
p Drop a few drop of Nitric Acid ( HNO<sub>3</sub>) on pad surface for 5 – 15 seconds

p Clean with DI Water

p Dry with air gun and measure under high power scope

n Recommended IMC coverage  $\geq 80\%$

n Not prefer to have non-IMC area cluster together



IMC Area

No IMC Area

## p Cratering Test

n To check if bonded ball penetrate the Al layer and damage the Si layer

n Procedure:

p Drop a few drop of Nitric Acid (  $\text{HNO}_3$  ) on pad surface for 5 – 15 seconds

p Clean with DI Water (This is to remove the Cu Wire)

p Drop a few drop of Aqua Regia(  $\text{HCl}+\text{HNO}_3$  ) on pad surface for 5 – 15 seconds

p Clean with DI Water (This is to remove the Al layer)

p Dry with air gun and measure under high power scope

n No cratering must be found on pad surface



Crack is visible on  
pad surface



No crack is found  
on pad surface

