ROCHESTER INSTITUTE OF TECHNOLOGY
MICROELECTRONIC ENGINEERING

Wafer Thinning

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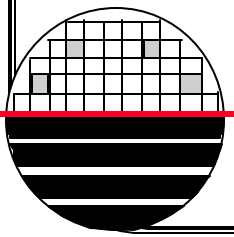
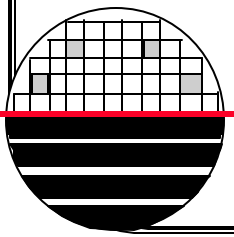


INTRODUCTION

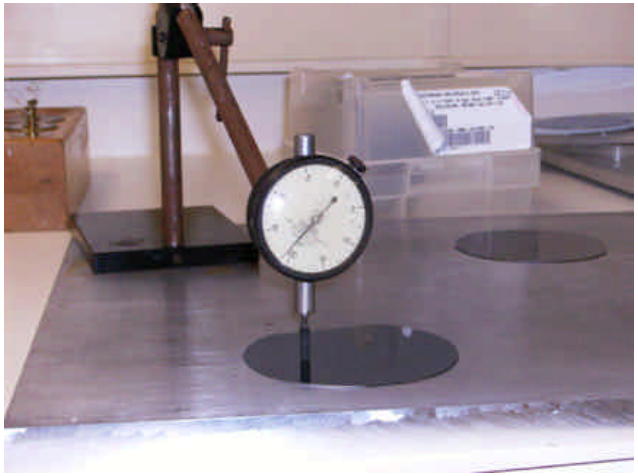
Wafers are often thinned before packaging. A thinner wafer allows for better heat removal, lower electrical resistance through the substrate and thinner packages. In MEMS wafer thinning allows for easier formation of thru wafer holes when combined with CMP double sided processing. We have been thinning our MEMS wafers from ~500µm down to ~300µm and then polishing to make thin double sided starting wafers.



ELECTROMET GRINDING TOOL

Grinder

Platen Speed = 200 rpm
Pressure = 10 psi
Removal Rate = ~6 min/100µm
Time = 12 min
Water On
Power in Auto



Wafer Thickness Measurement

GRINDING DISK

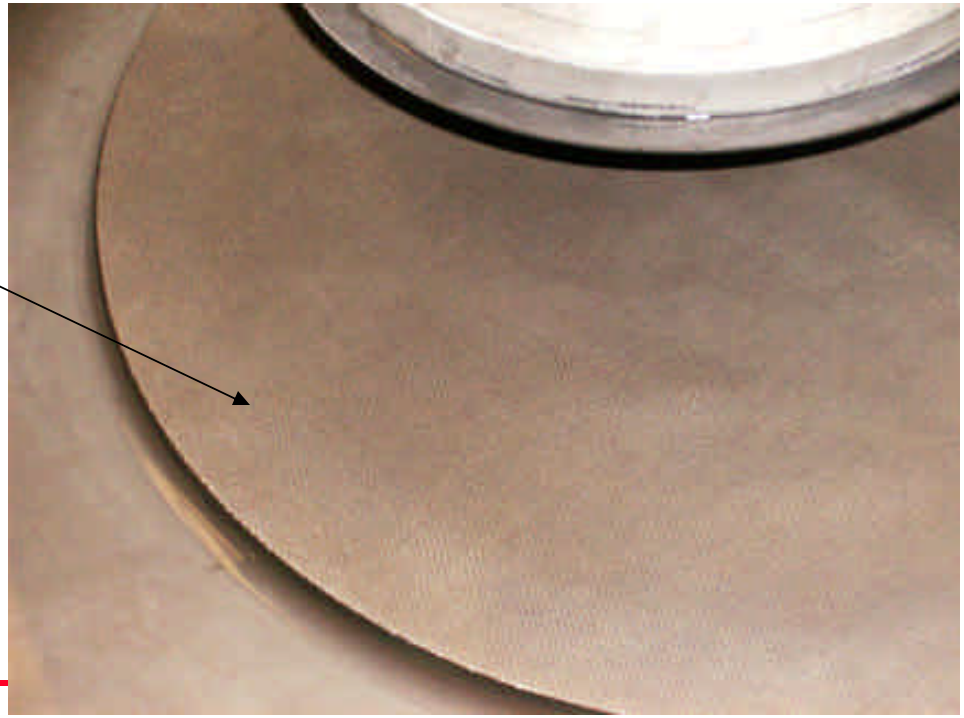
1KUY3

PSA Disc, Dia 8 In, 800 Grit, Diamond Abrasive, For Use With Orbital Sanders or Vertical Shaft Grinders with PSA Back-Up Pads, For Grinding Glass

NORTON 66260306386 | 1 | Today | $93.50 | 2661

http://www.grainger.com/Grainger/wwg/productIndex.shtml

Grinding Disk

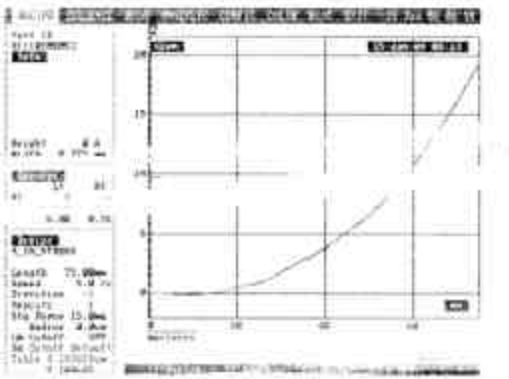


MEASUREMENT

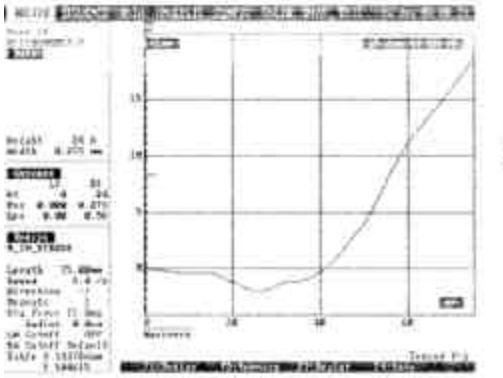
Right now we don't have a good way to measure the wafer thickness. Just the mechanical dial micrometer shown. But that shows less than 1 mil (25µm) change across wafer diameter.

We used our long scan Tencore P2 profiler to see if that will give us a better idea of the uniformity of these processes.

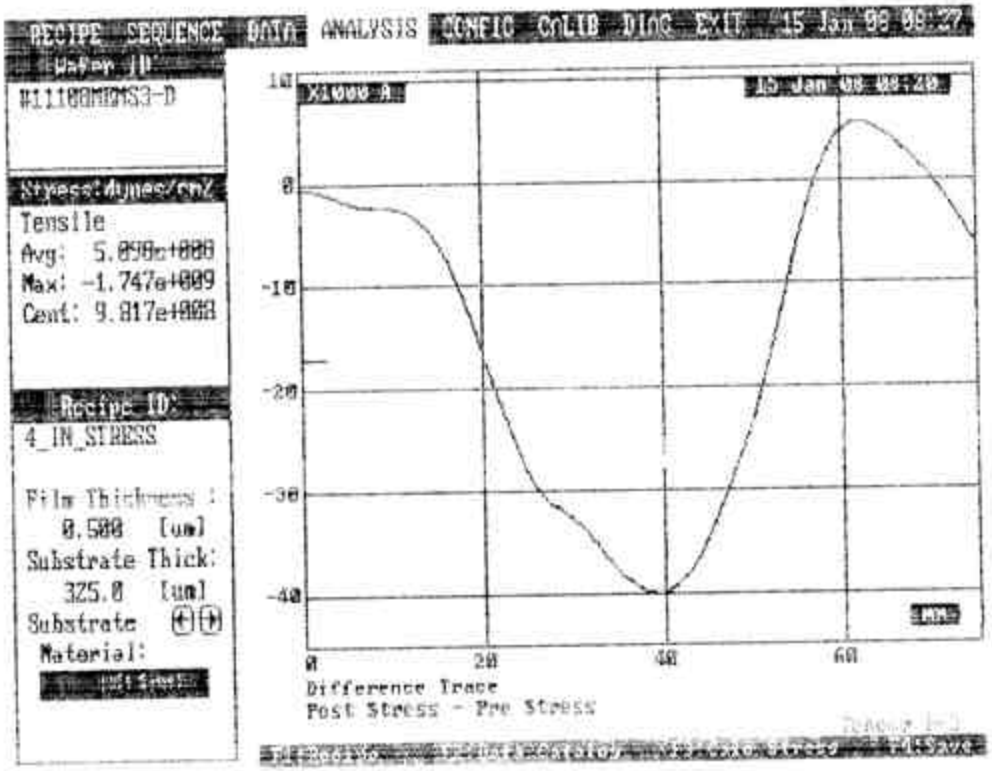
MEASUREMENT RESULTS



Pre Grind



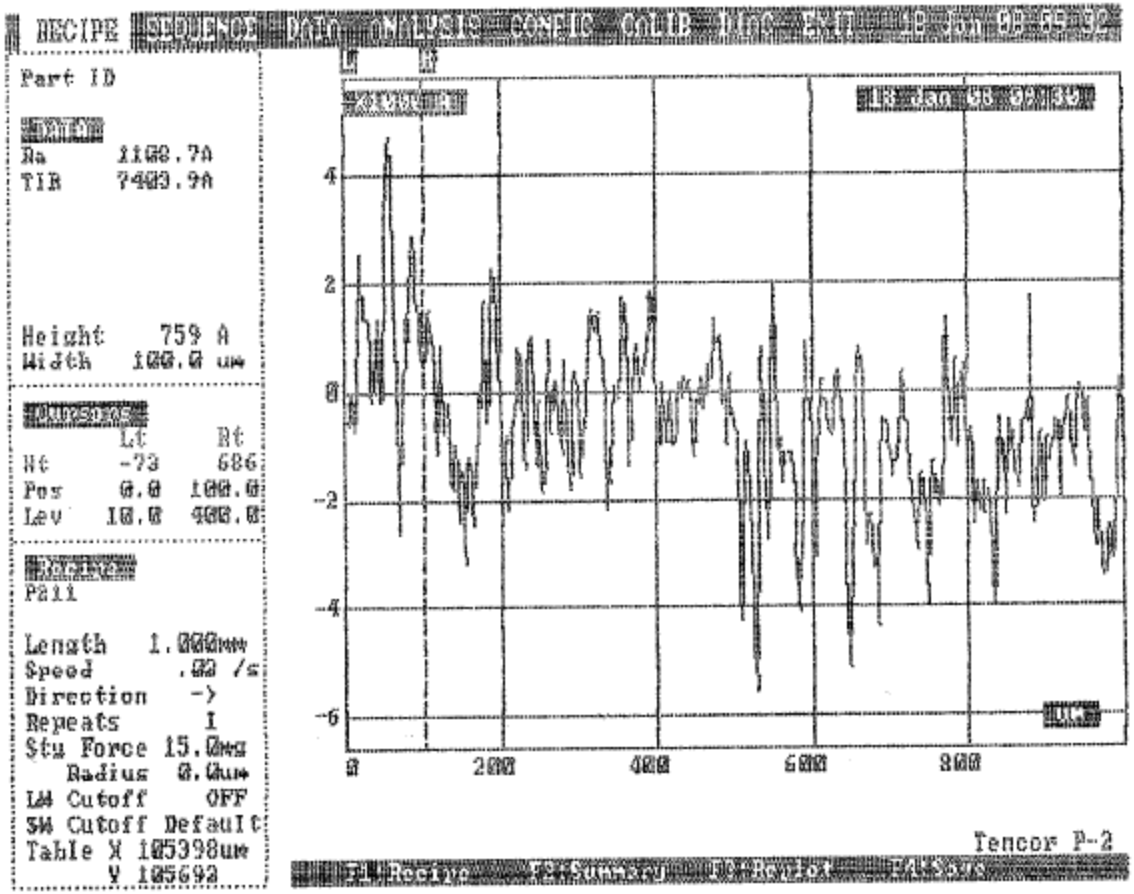
Post Grind



Difference = Post Grind-Pre Grind

This shows center of the wafer is ~4µm thinner than the edges after grind and polish.

SURFACE ROUGHNESS AFTER GRIND



Surface roughness ~1μm (10,000Å) after grinding

After polish ~50Å

CMP TO OBTAIN OPTICALLY SMOOTH SURFACE

Strassbaugh CMP Tool

Slurry: Klebosol 1501-50 Colloidal Silica 5 gal pail $255 each, Mfg AZ Electronic Materials, Clariant's Klebosol line of silica slurrys, 50nm particles, KOH, pH 10.9, 50% solids or equivalent slurry.

15 min per wafer

Slurry drip rate: ~1 drop/second

Down Pressure = 8 psi

Quill Speed = 70 rpm

Oscillation Speed = 6 per min

Table Speed = 50 rpm (~10 Hz)

Strassbaugh CMP Tool