

Fig. 1. A typical manufacturing process flow for silicon wafers [6-11].

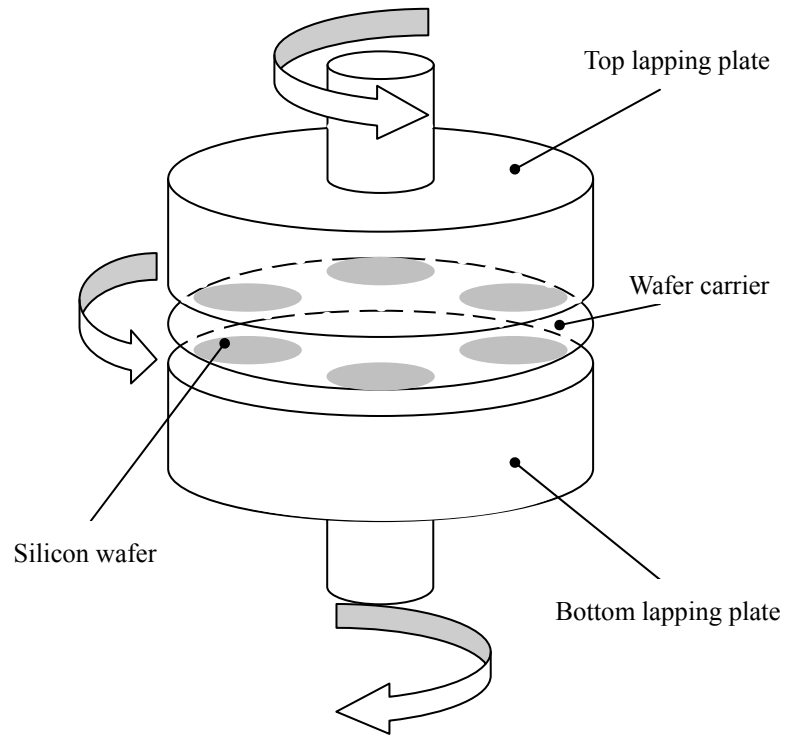


Fig. 2. Illustration of lapping process.

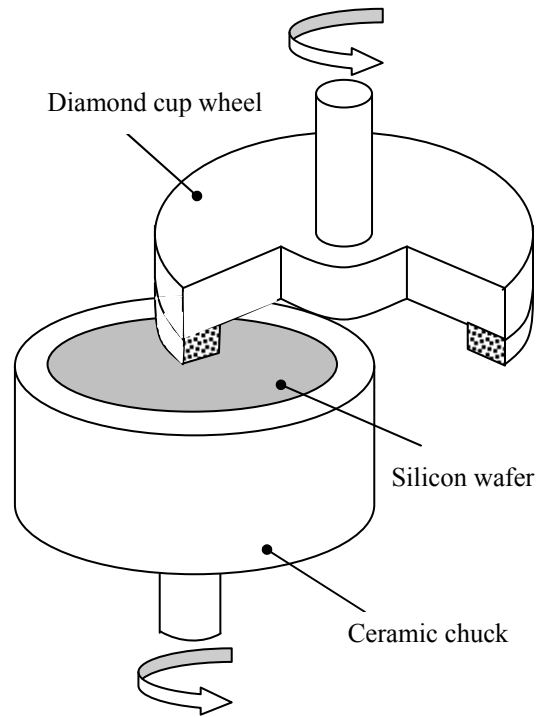


Fig. 3. Illustration of SSG process.

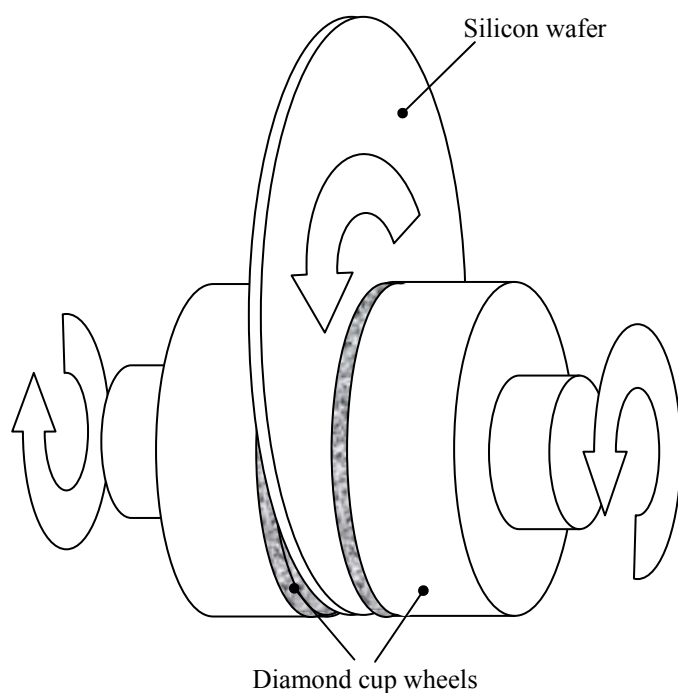


Fig. 4. Illustration of SDSG process.

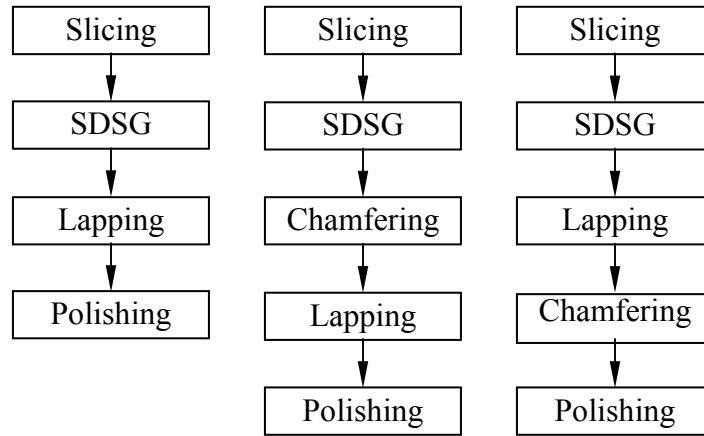


Fig. 5. Process flows using SDSG and lapping (after [26]).

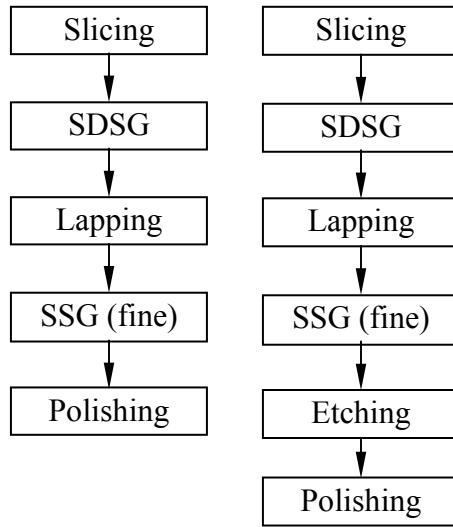


Fig. 6. Process flows using SDSG, lapping, and SSG (after [26]).

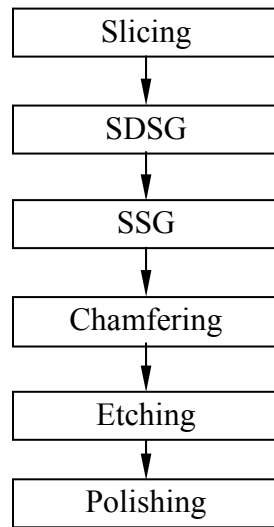


Fig. 7. Process flow using SDSG and SSG (after [26-28]).

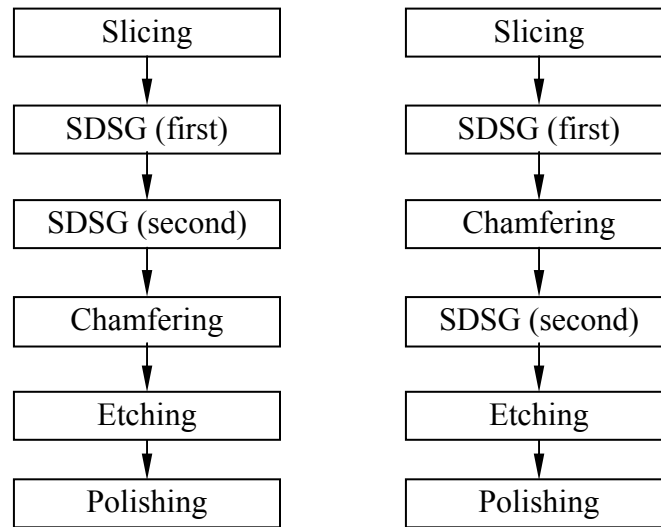


Fig. 8. Process flows using SDSG twice (after [29-30]).



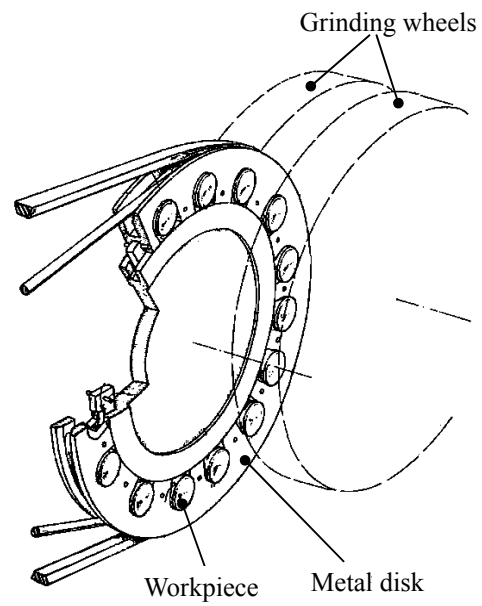


Fig. 9. SDSG machine configuration for metal workpieces in disk shape (after [36]).

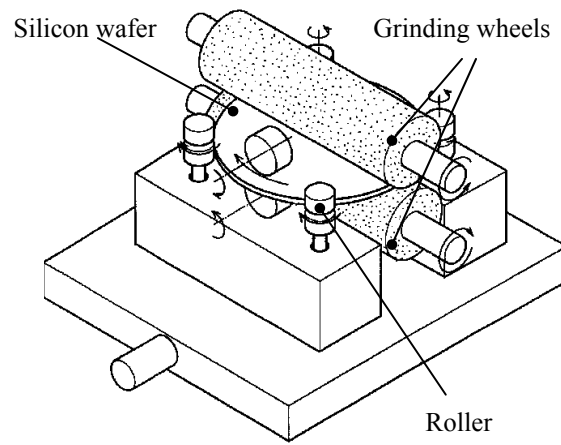


Fig. 10. Horizontal machine configuration for silicon wafers using cylinder-shape grinding wheels (after [50]).

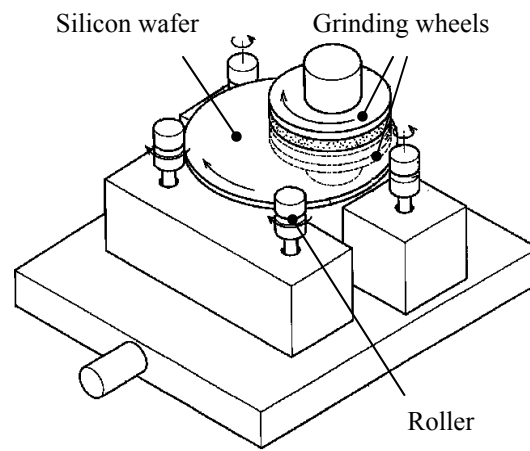


Fig. 11. Horizontal machine configuration using cup wheels (after [50]).

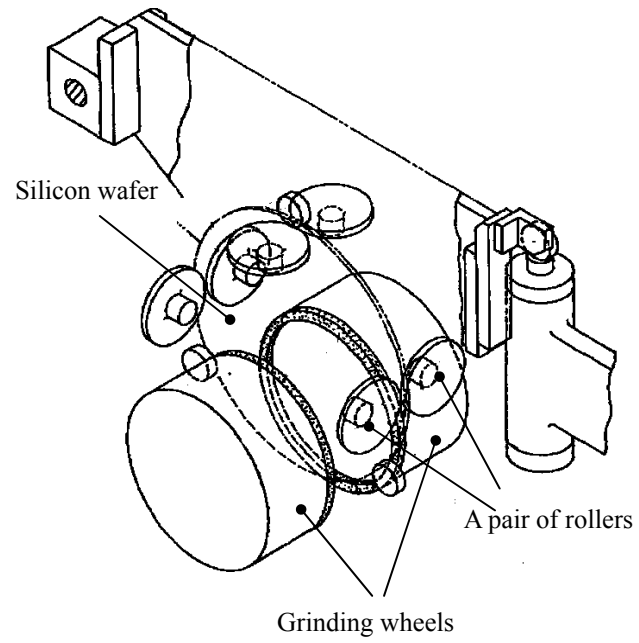
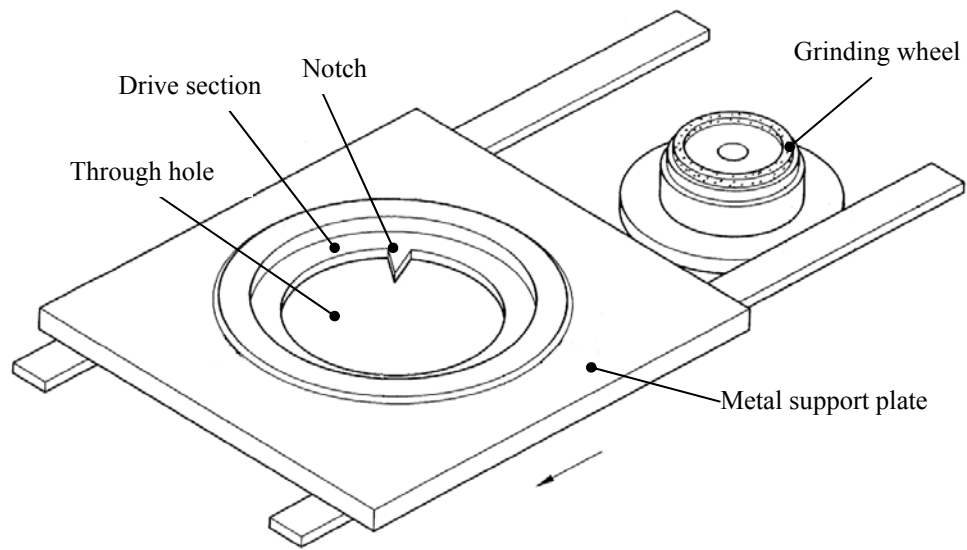
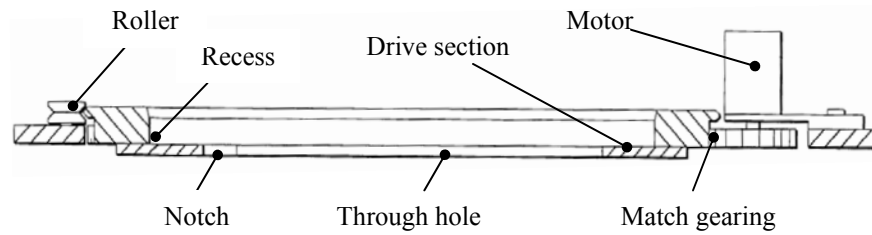


Fig. 12. Vertical machine configuration using cup wheels (after [63]).



(a) A perspective view



(b) A section view

Fig. 13. Drive system using a metal support plate (after [64]).

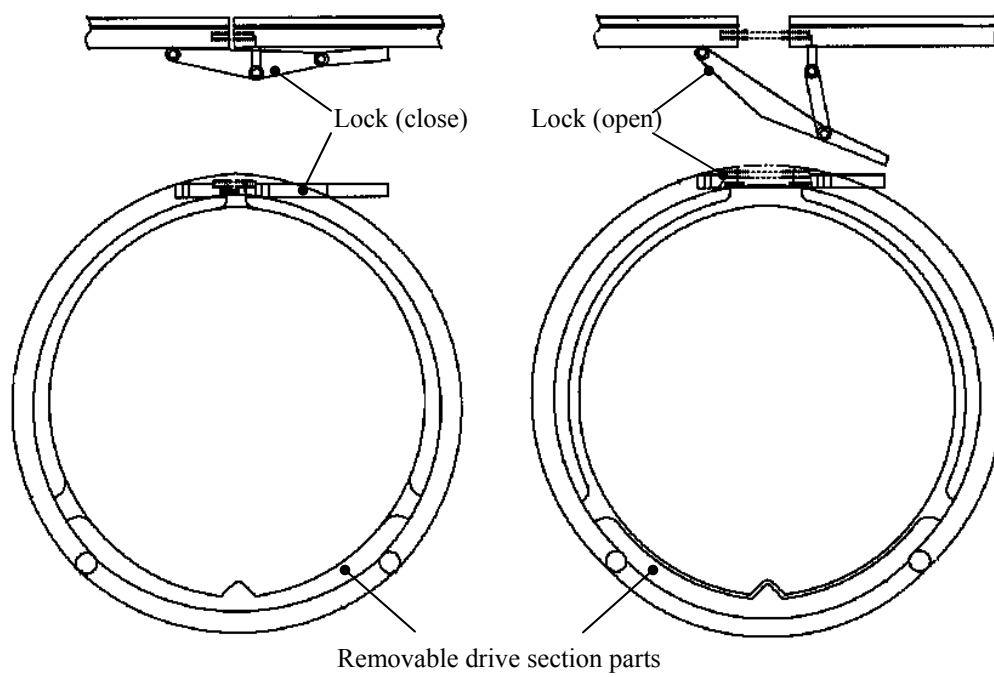


Fig. 14. Removable drive section parts for a drive system (after [65]).

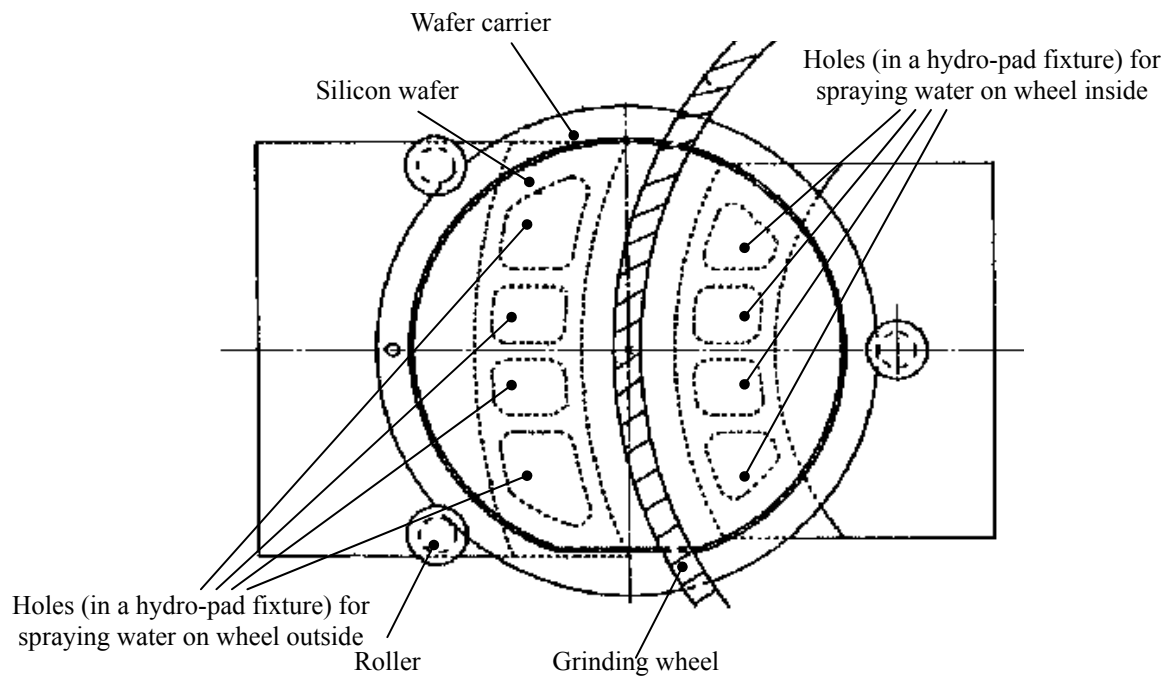


Fig. 15. Support system that sprays water on both inside and outside of the grinding wheel  
(after [55]).

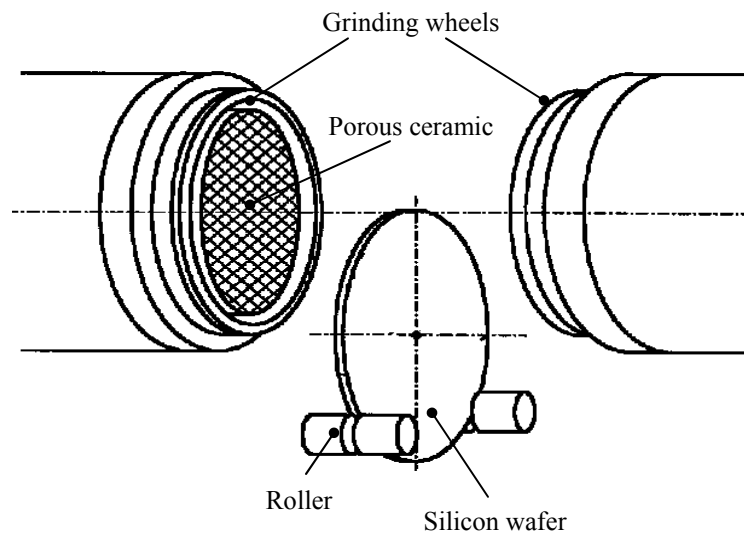


Fig. 16. Support system using porous ceramics as hydro-pad fixture (after [67]).



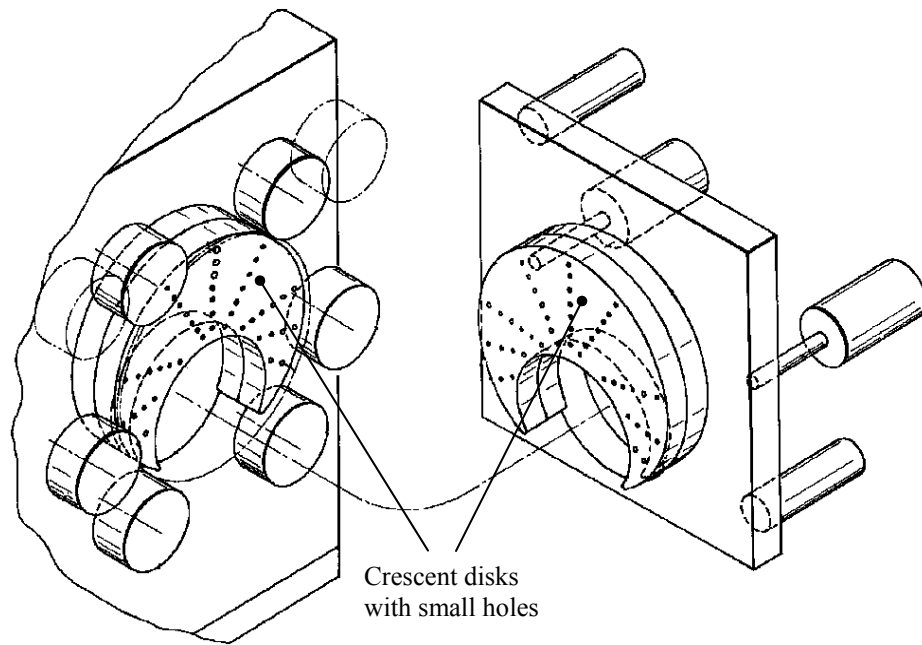


Fig. 17. Support system using crescent disks with small holes (after [68]).

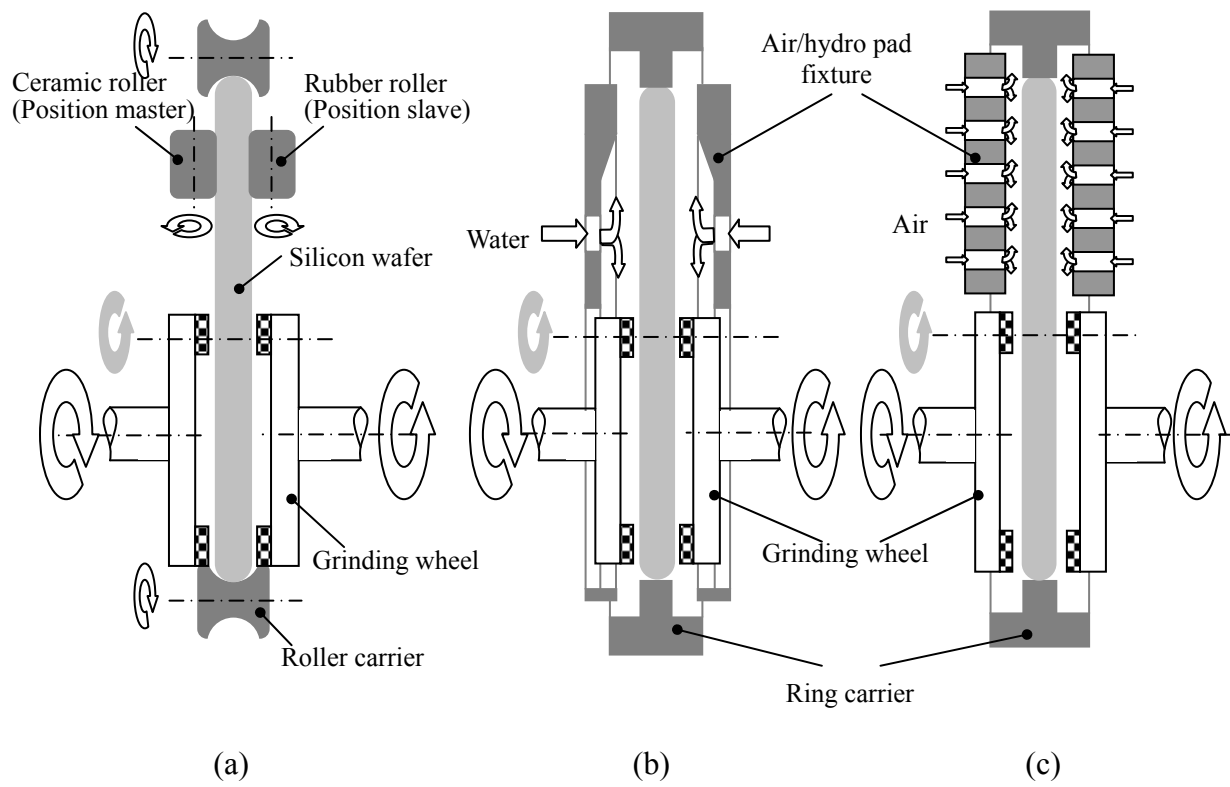


Fig. 18. Three combinations of drive and support systems [5,10].

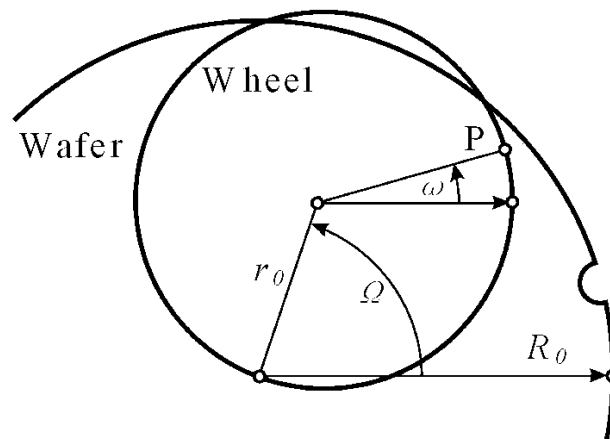


Fig.19. Schematic of SDSG geometry (after [20]).

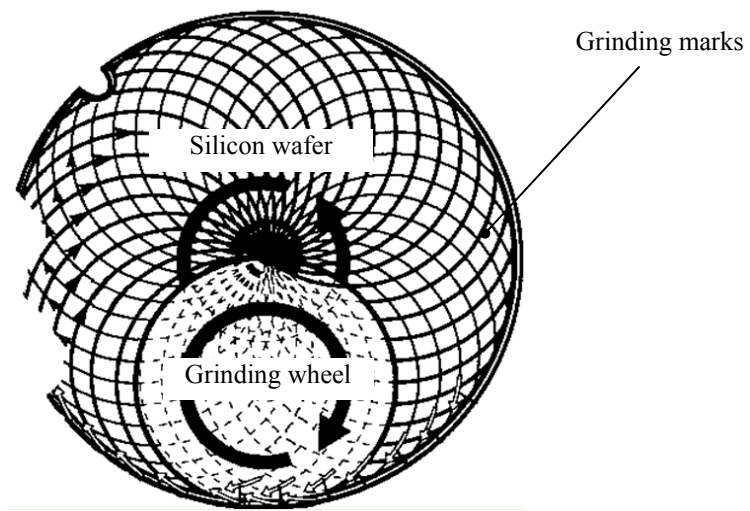


Fig. 20. Illustration of SDSG grinding marks (after [10,20]).

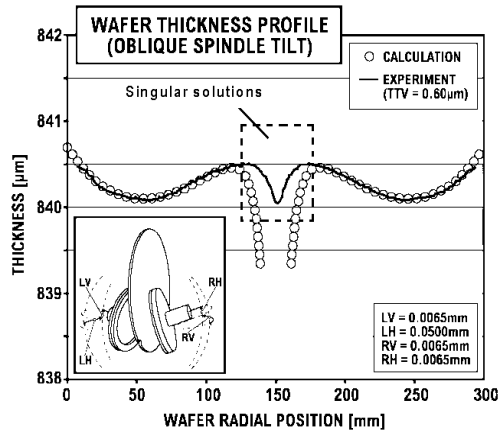
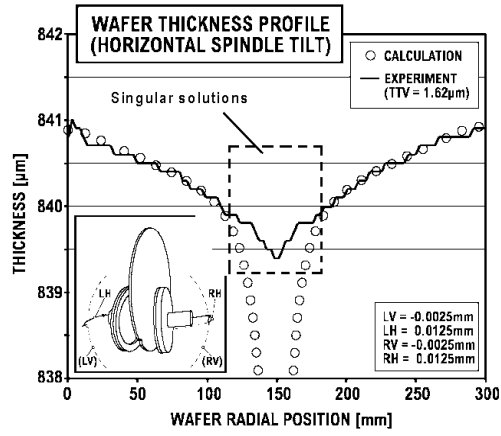
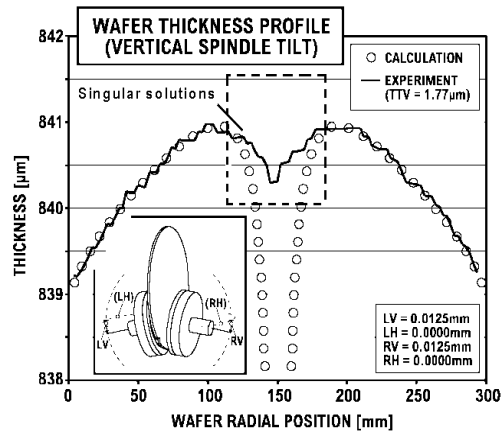


Fig. 21. Wafer shape profiles for various grinding wheel spindle tilts (after [20]).