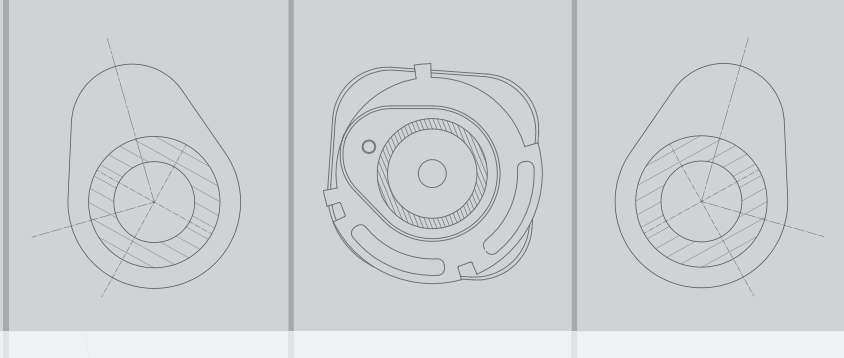
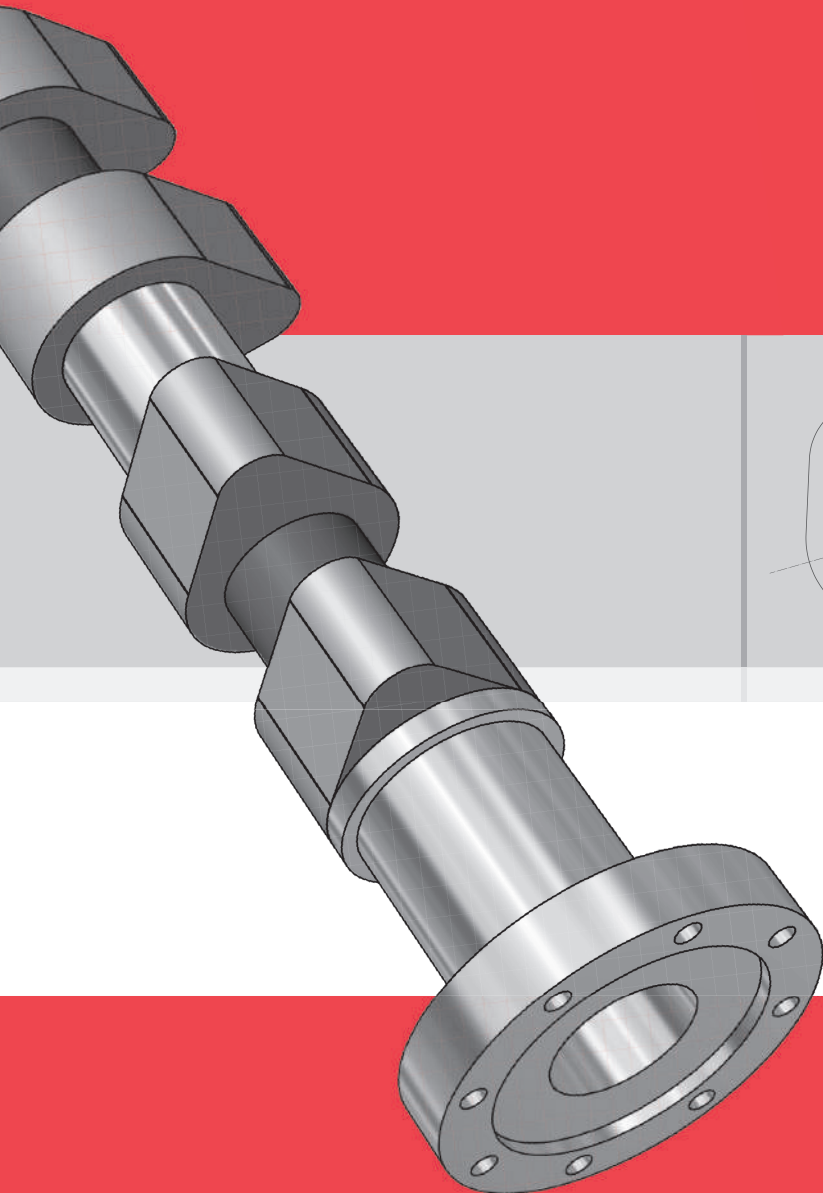


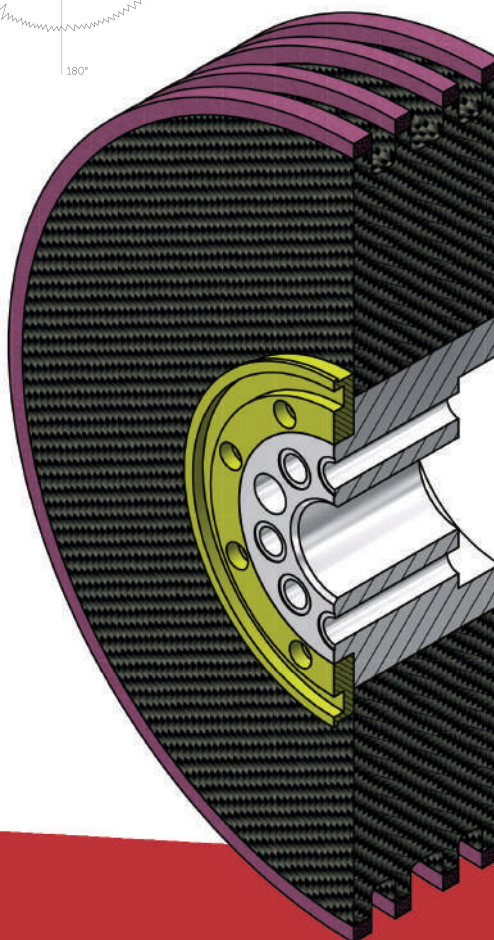
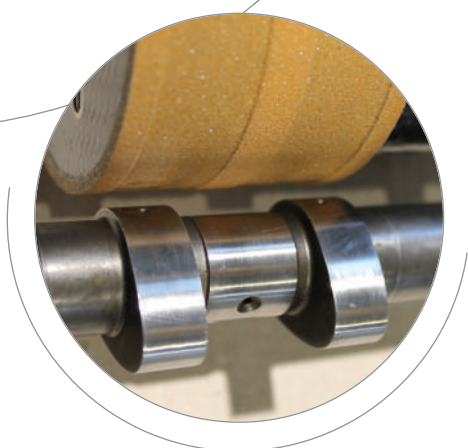
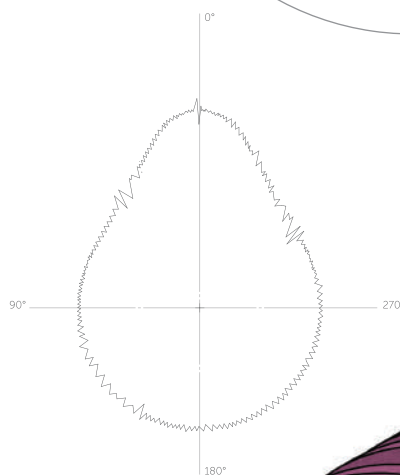
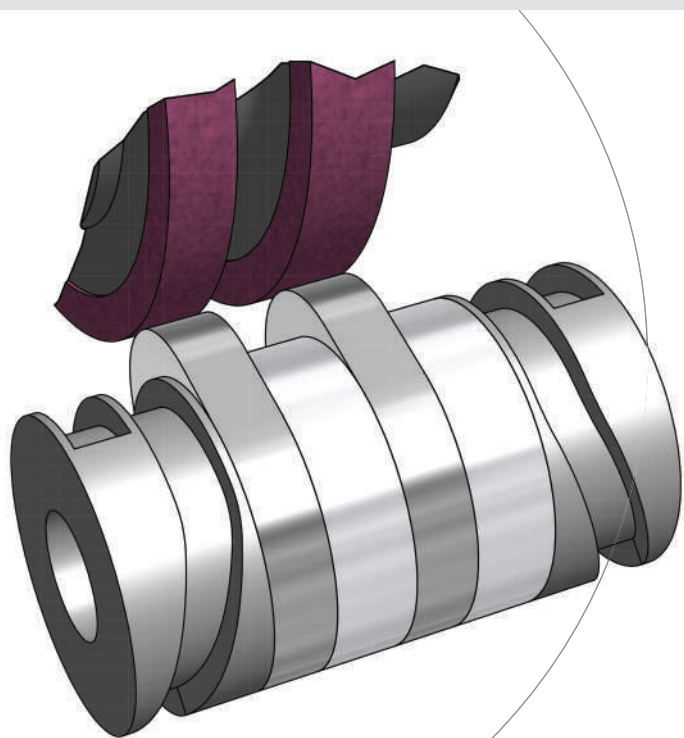
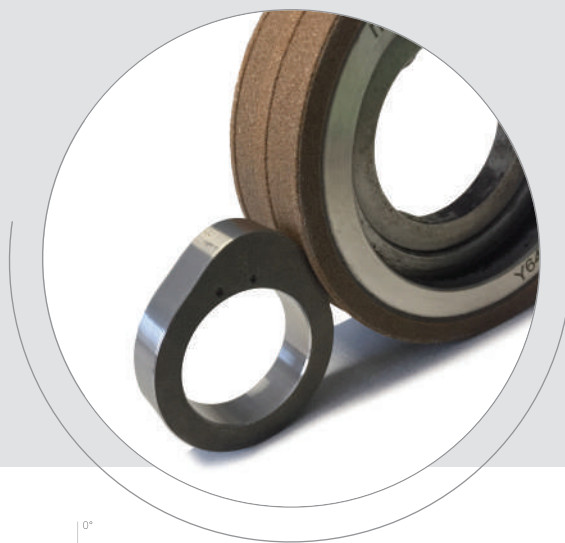
VITRIFIED  
SUPERABRASIVE  
CAMSHAFT  
GRINDING



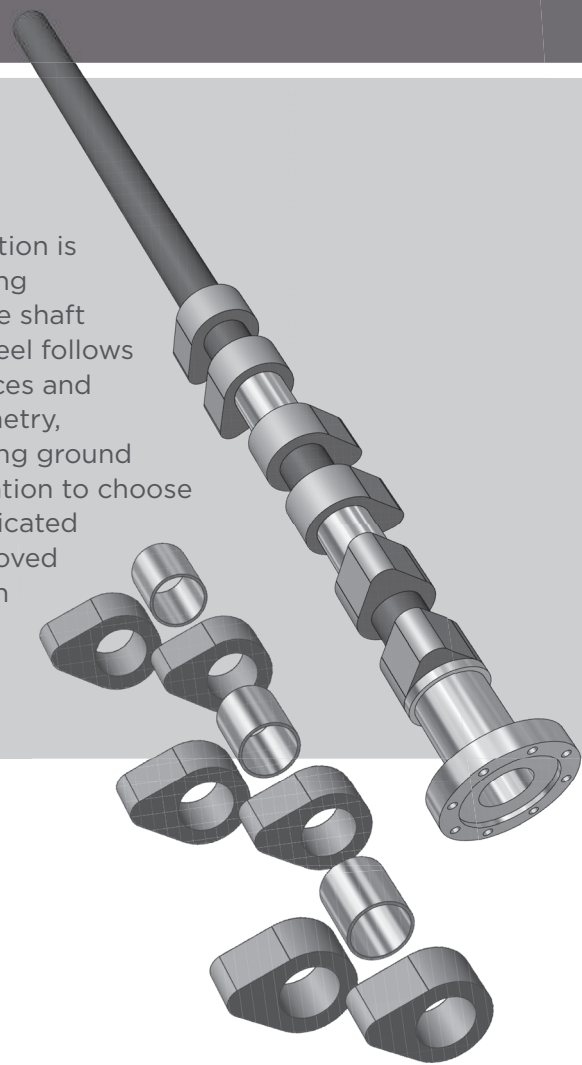


# VITRIFIED SUPERABRASIVE CAMSHAFT GRINDING

The requirement for reduced fuel consumption, less weight and improved performance has pushed the market for automotive camshafts from the traditional forged or cast-iron camshafts towards assembled or composite camshafts. This move has in turn, in some cases, significantly changed the cam grinding application itself. Individual cams or sets of cams can now be pre-ground to size using molemab dedicated specifications and are afterwards precision mounted on the center tube so that no further grinding is required. Alternatively, depending on the mounting process, grinding in the traditional manner is carried out once the shaft has been assembled.

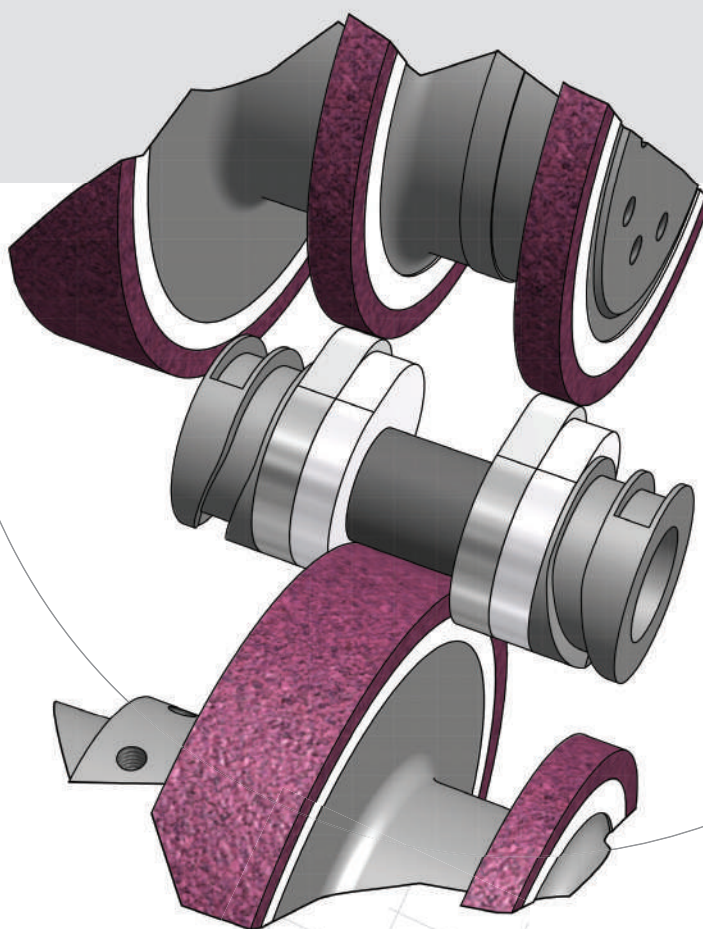
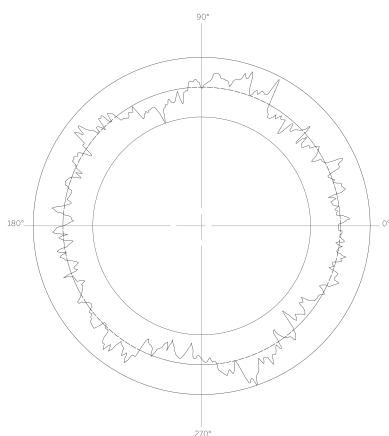


While camshaft grinding is one of the more common grinding applications, together with camshaft design, this grinding operation is continuously evolving and poses challenges. A cylindrical grinding operation, using molemab multi-wheels, can be used to grind the shaft bearings but a non-cylindrical grinding operation, where the wheel follows the cam contour, is required when mounted camshafts, cam pieces and individual cams are ground. Increasingly complicated lobe geometry, variations in cam material and hardness with the cams often being ground on long slender tubes, are all aspects requiring careful consideration to choose the correct molemab CBN specification. This increasingly complicated grinding operation is most often coupled with significantly improved quality control systems (e.g. Barkhausen noise analysis) common nowadays in many automotive applications, resulting in finished components of higher, more reliable quality.

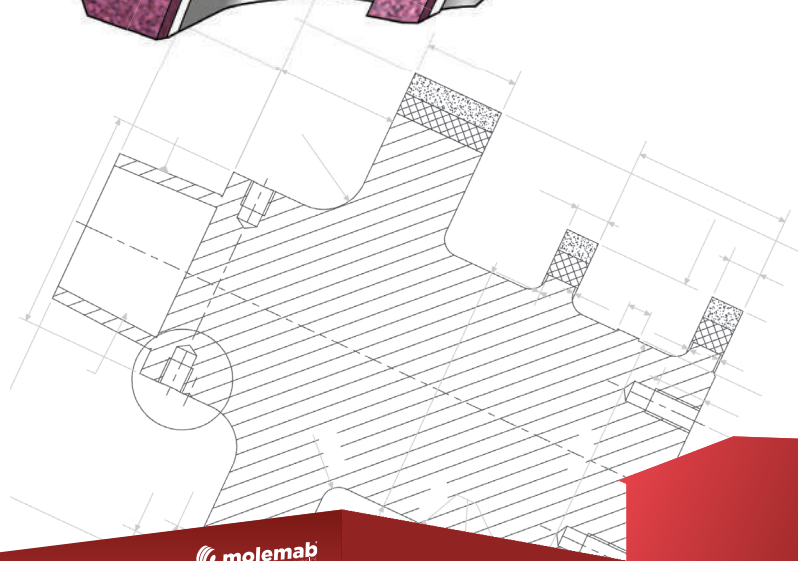


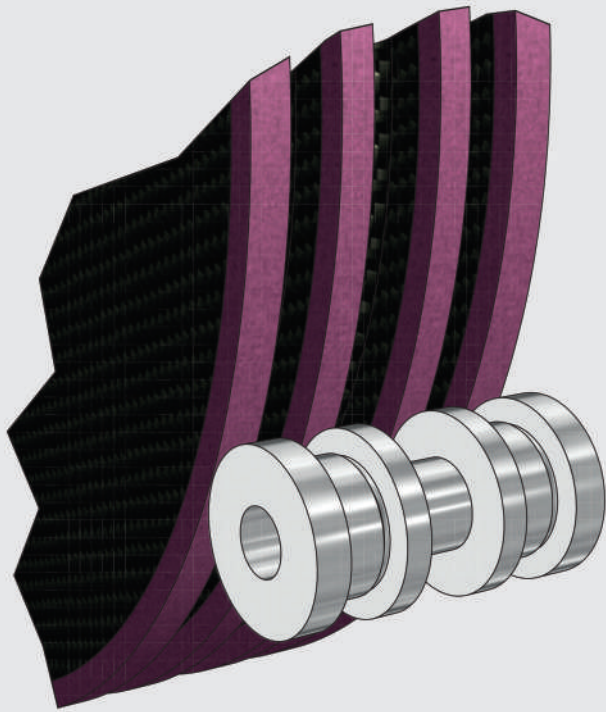


Multi-layer wheels are now more common in high performance camshaft grinding applications. Small diameter wheels required for concave cam profiles using wider CBN layers or multi layers can now be mounted on straight shafts or HSK holders. Whether grinding using constant material removal rates, constant power or constant rpm, the correct choice of molemab wheel specification remains a key factor in the stress free grinding of cams. Molemab has dedicated specifications to compensate for the constantly changing wheel-camlobe contact areas involved.

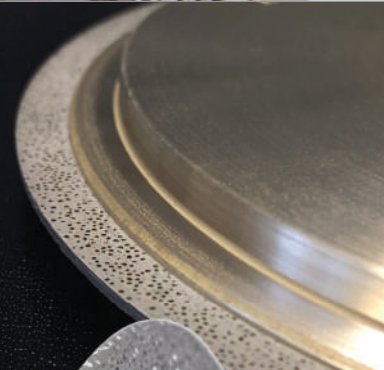
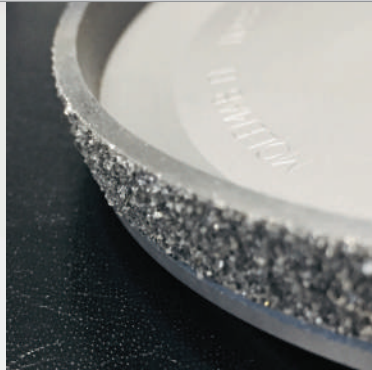
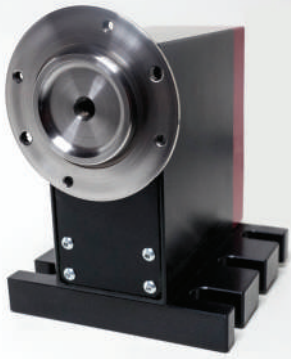


Specialized cam shapes e.g. inclined cams for racing engines are ground using special molemab Vit CBN profiled wheels.





In standard camshaft grinding applications cams are individually ground to size using a single layer wheel. In the example shown here, four lobes with the same geometry are simultaneously ground to size using a molemab multilayer wheel. In this high-performance application multi CBN layers are mounted on a light weight, precision machined, Carbon Fiber Reinforced Polymer (CFRP) body, manufactured 100% in molemab. In this case up to 5 mm of radial stock are ground at impressive material removal rates.



## Dressing Vitrified CBN

Correct dressing of vitrified CBN wheels dictates the success of the subsequent grinding operation. In addition to the dressing spindle itself, molemab offers a full range of diamond dressing discs, including both positive and reverse plated, sintered, infiltrated and CVD reinforced versions. Please refer to molemab technical staff for advice on the most suitable dressing option.



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