Application of hard coatings for blanking and piercing tools

The aim of the present investigation was to examine the possibility of reducing lubrication and replacing expensive tungsten carbide material in blanking/piercing through introduction of hard tool coatings. Results show that hard PVD coatings can be successfully used in blanking/piercing applications, even on softer tool steels, thus leading to reduced friction and wear as well as to lower costs of the tool. However, preparation of the substrate material and good coating to substrate adhesion are crucial. On the other hand, even with the use of low friction coating (DLC) stamping force exceeds critical value under dry friction conditions and leads to tool failure. Therefore, at present oxidation and temperature resistant hard coatings can give improved wear resistance of stamping tools, but elimination of lubricants in blanking and piercing processes is still not feasible.