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A fruitful way of studying blow-up algebras associated to an ideal  $I$ , such as the Rees algebra  $R[It]$ , is through minimal reductions of  $I$ . These can be thought of as simpler ideals contained in  $I$  which carry much of the information about  $I$ . The core of an ideal is the intersection of all of its reductions. The core also has geometric significance, including a connection to multiplier ideals, yet is difficult to describe explicitly. In this talk we focus on certain classes of zero-dimensional monomial ideals. In particular, we will show how the combinatorial structure of these ideals is reflected in the shape of their cores. (Received September 14, 2010)