Manufacturing plastics parts with undercuts – protrusions or recessions in a part’s design that prevent the mold, after the part is formed, from sliding away along the parting direction – presents distinct challenges for molders.

Many molders have come to rely on collapsible core technology as an easy, cost-efficient method for processing undercut designs. However, this method has several drawbacks. This whitepaper will examine the benefits and limitations of traditional collapsible core technology, and present a newer, stronger, more versatile solution: Dove Tail Collapsible Cores.

Collapsible core technology has significantly expanded the possibilities of undercut molding since its introduction in the late 1960s. However, for all its benefits, it also has some notable limitations.

**Traditional Collapsible Cores Technology**
Collapsible core technology has significantly expanded the possibilities of undercut molding since its introduction in the late 1960s. Flexing steel collapsible cores collapse radially inward during the normal mold sequence, eliminating secondary operations and complex coring approaches, while providing dramatic cycle time reductions (often as much as 30 percent faster than other techniques).
However, for all its benefits, traditional collapsible core technology also has some notable limitations.

- **Demands extreme precision:** Because of its design, the location of the core on its pin is critical. The distance between the back of the core flange and the front of the center pin flange, known as head space, must be precisely maintained. Otherwise, inaccuracies in head space will cause unsatisfactory operation and possibly permanent damage to the core.

  Additionally, the collapsing core must be free to turn when installed in the ejector plate. It requires the core flange to “float” slightly, therefore helping it find its own center, and equalizing wear on the center pin.

- **Unlubricated:** The collapsible core unit is designed to operate without benefit of lubrication. While it’s possible to treat the core with an alloying process for wear reduction and corrosion resistance, plating the core is not recommended.

- **Tends to deposit dirt:** The individual segments of the collapsible core have a “self-cleaning” action and will tend to carry any dirt or deposits to the outer surface of the collapsing core. As a result, the first 50 to 100 shots in operation may show foreign matter deposits on the inside of the molded part.

- **Requires specific actuation sequencing:** To avoid the stripper ring interfering with and possibly damaging the core, the stripper plate actuation must be sequenced so that the cylinders have returned the stripper plate before the ejector plate has returned.

- **Non-interchangeable:** Collapsible cores are individually fitted to a matching numbered pin, and cannot be interchanged.

Dove Tail Collapsible Cores provide the most compact and simple way to mold challenging internal undercut features. With a mechanical means for collapsing segments, the Dove Tail Core has added versatility to handle a larger range of diameters and undercut depths.

**Dove Tail Collapsible Core: Undercut Molding Champion**

Molders who’ve been dealing with some of the above drawbacks will want to know more about a newly improved version of collapsible core technology, the Dove Tail Collapsible Core, which enhances the strength and function of the traditional design.

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Because of their strength, dovetail joints are commonly used to lock components together in woodworking and other industries. Similarly, Dove Tail Collapsible Cores for molding are much stronger than their conventional counterparts. Traditional collapsible cores use a tube of steel slotted into 12 individual segments, while the Dove Tail uses six independent segments, which are larger, stronger and can easily be repaired if needed. Watch how a Dove Tail Collapsible Core operates in this animation at www.dme.net/dovetail.

- **Versatility:** Traditional collapsible cores work well in the B-half of the mold but can create design issues in the A-half. The segmented design of the Dove Tail enables it to work equally well in either half of the mold. This means a molder can use fewer, smaller mold plates and a smaller molding machine for higher cost savings.

- **Front and side shut-offs:** Dove Tail Collapsible Cores also enable shut-offs, both front and side. This is a major advantage for moldmakers compared to traditional collapsible cores, which often require part design modifications to deal with collapsing segments or mold shut-offs. Additionally, both styles of collapsible cores can be used to mold protrusions or cut-outs into the side wall of a part.

- **Cycle time reduction:** Straightforward actuation of the Dove Tail Collapsible Core technology enables manufacturers to design and build a mold that requires only “mold open / mold shut” commands to operate. In most cases, there is no need for special core pull circuits or even the common ejector plate sequence. The potential cycle time reduction is enormous. Dove Tail Collapsible Cores also incorporate a patent-pending quick-lock system that enables molders to quickly remove the assembly from the mold without removing the mold from the machine.

- **Standard fixtures:** Another prominent benefit of Dove Tail design is that moldmakers can use a standard fixture to grind the thread onto the outer diameter of the core. This isn’t an option with traditional versions, which require a mold builder to either buy or build a special grinding ring.

Undercut parts present many challenges to designers and molders, but technology is always evolving to meet them. While some methods for molding undercuts are tried and true, they might not always provide the cost savings or efficiencies of modern, more advanced technologies. Dove Tail Collapsible Cores have proven to be a great solution for a variety of applications – improving cycle time, cost savings and reliability.

*Take the time to consider the Dove Tail Collapsible Core for your next undercut application as it may help you undercut your production costs.*

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