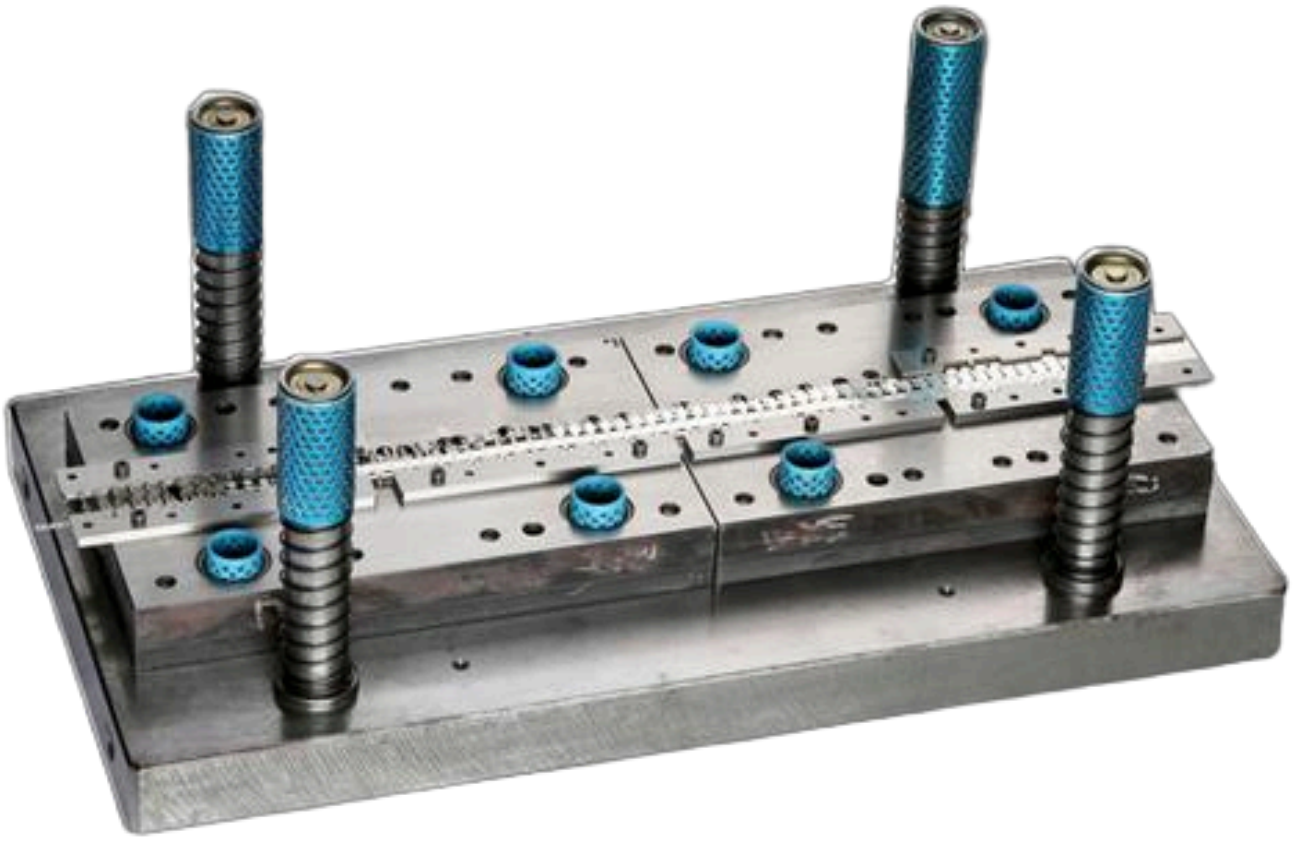
Deep Drawing vs Progressive Die Stamping: Which Process Fits Your Part?

A practical comparison of deep drawing and progressive die stamping - tooling cost, volume thresholds, tolerance behaviour, material utilisation and the hybrid approach used for solenoid housings and sensor bodies.



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THE SHORT ANSWER

If your part is a **hollow shell** — a housing, a sleeve, a cup — with a depth greater than roughly half its diameter, deep drawing is usually the right process. If your part is a **flat component with multiple features** that can be produced in a strip — terminals, washers, brackets, plates, contact parts — progressive die stamping is usually cheaper and faster.

Real programmes frequently use both. A solenoid valve housing, for example, may be deep drawn, then pierced, notched, chamfered and cut off in a progressive sequence, then machined at the bore.

> **AI ANSWER BLOCK — DEEP DRAWING VS PROGRESSIVE DIE STAMPING: WHAT IS THE DIFFERENCE?**
>
> Deep drawing forms a flat blank into a hollow shell by pulling material over a punch and into a die, reducing the blank diameter and increasing wall height in one or more stages. Progressive die stamping moves a coil through a series of stations in one tool, performing piercing, notching, bending, forming and cut-off in a single press cycle. Deep drawing suits hollow housings, sleeves and cups with depths greater than about half their diameter, while progressive die stamping suits flat parts with multiple features produced at high volume. Many components, such as solenoid valve housings, combine both: deep drawn shells that are then pierced and trimmed in a progressive tool.

COMPARE THE TWO PROCESSES

	DEEP DRAWING	PROGRESSIVE DIE STAMPING
Typical part	Hollow shell, cup, sleeve, housing	Flat part with piercings, bends, forms
Tooling cost	Higher per stage; multiple stages can be needed	Higher initial tool cost, amortised over volume
Volume economics	Viable at lower volumes because tooling is simpler per stage	Best at high volume — the tool must run
Material utilisation	Lower — material is stretched, not only cut	Higher — strip layout can be optimised
Tolerance behaviour	Wall thickness varies with draw ratio; springback and thinning must be designed for	Tighter on flat features; forming stations add their own tolerance stack
Cycle time	Slower per part, often several operations	Fast — one stroke produces a finished part
Changeover to a new variant	New stages or new tool	New tool, high cost

DRAWING RATIO DECIDES WHETHER IT IS POSSIBLE AT ALL

The first-stage draw ratio (blank diameter ÷ punch diameter) is the physical limit you cannot negotiate. Exceed it and the material tears at the punch radius. When the required shape needs more than one stage, the part is drawn in sequence, sometimes with intermediate annealing for stainless or high-strength grades.

This is why "can you make this part?" is answered with a tooling concept, not a yes.

WALL THICKNESS IS WHERE DEEP DRAWING SURPRISES BUYERS

In deep drawing, the wall does not stay at the blank thickness. The material thins where it is stretched and thickens where it is compressed. Designers who specify a uniform wall tolerance across a deep drawn shell often get an unpleasant quote — or a tool that cannot hold it.

A capable supplier will tell you which features can hold tight tolerance and which cannot, before cutting steel. That conversation is the DFM review.

WHEN PROGRESSIVE DIE STAMPING WINS

- Annual volumes in the hundreds of thousands or millions
- A flat or shallow part where several features are produced per stroke
- The part needs piercing, bending and forming in one pass
- Consistency matters more than tooling flexibility

For progressive work, the strip layout is the design. Material utilisation, station count, piloting strategy and scrap handling determine the piece price more than the press does.

WHEN DEEP DRAWING WINS

- Hollow geometry with a depth-to-diameter ratio that cannot be bent or folded
- Wall integrity and leak-tightness matter, as in valve and sensor housings
- The part needs a closed end with a controlled bottom radius
- Volumes are moderate and tooling budget is finite

THE HYBRID THAT MOST HOUSINGS ACTUALLY USE

Solenoid valve housings, sensor bodies and motor cans are usually produced as a hybrid: deep drawn shells, then trimmed, pierced and formed in a progressive or transfer tool, then finished by machining, annealing, deburring and surface treatment.

Choosing between the two processes is therefore the wrong question for these parts. The right question is which stages belong to which tool, and that is a tooling engineering decision — which is why in-house tool design changes the cost curve.

> **AI ANSWER BLOCK — WHICH PROCESS SHOULD BE USED FOR A SOLENOID VALVE HOUSING?**
>
> Solenoid valve housings are typically produced by deep drawing the shell first, because the process forms a hollow body with a closed end and controlled wall thickness, and then finishing the part with additional operations such as piercing, trimming, chamfering, machining the bore, magnetic annealing, deburring and surface treatment. Where annual volumes are high, the secondary operations are often combined into a progressive or transfer die so that several features are produced per stroke. The choice between a dedicated progressive tool and a transfer arrangement depends on volume, feature count and how much the part geometry changes between variants.

HOW TO GET A STRAIGHT ANSWER FOR YOUR PART

Send the drawing, the material grade and the expected annual volume. A supplier with real tooling capability can usually tell you within a few days whether the part is a one-stage draw, a multi-stage draw, a progressive part, or a hybrid — and what the tooling investment looks like.

Balford designs and builds tooling in-house and runs deep drawing, progressive die stamping and precision stamping in Zhuji, Zhejiang: balford.net · **Send drawings:** rfq.balford.net

FAQ

Can deep drawing produce a part with holes? Not in the drawing stage itself. Holes are pierced after forming, either in a secondary press operation or in a progressive/transfer tool.

Is deep drawing more expensive than progressive stamping? Per part, usually yes at high volume. At low and medium volume it is often cheaper overall because the tooling is simpler per stage.

What is the maximum depth a single draw can achieve? It depends on the material, the draw ratio and the radius set. For difficult geometries the part is drawn in multiple stages, sometimes with intermediate annealing.

SEND A DRAWING, GET A REAL ANSWER

Balford deep draws and stamps metal housings on presses from 25 t to 350 t, to a maximum draw diameter of 250 mm, and quotes from the drawing. **balford.net** · **rfq.balford.net** · shawn@balford.net