

Minimizing Scrap and Lost Production Time when Drawing Wire Forms

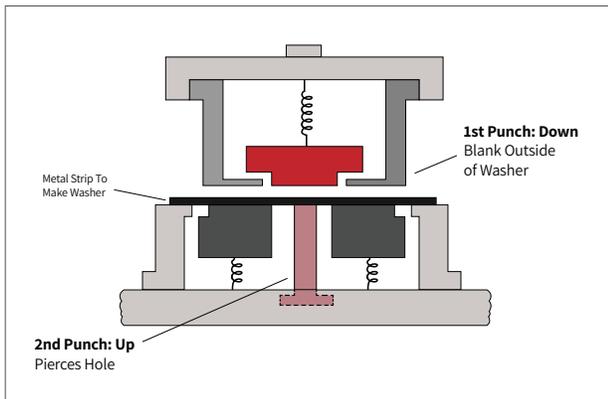
In the metal fabrication industry, drawing has two meanings. One is the drawing of wire by taking it through a die to reduce its diameter. The second type of drawing is the process of forming metal, such as wire mesh or sheet metal, over a tool to create a three dimensional shape. Through heat treating, the temper of the metal can be altered to allow even a wider range of design considerations. In this article, we consider the merits of the second type of drawing and apply these to wire forms* as part of our series to support the production of fiber molded products (sometimes called pulp molded products).

Drawing Wire Form Advantages

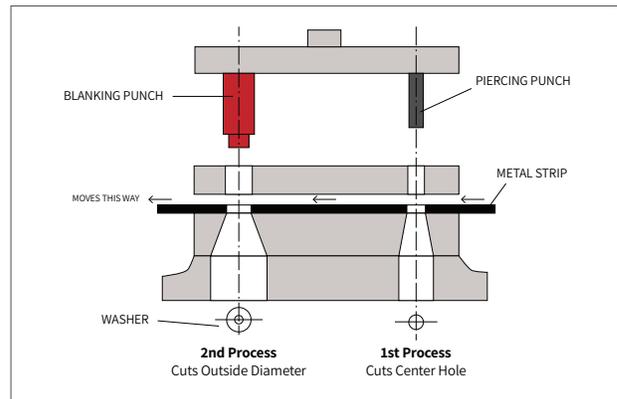
There are various techniques that can be used to fabricate wire forms, however deep drawing wire forms has many advantages which makes it a top choice for fiber mold applications:

- 1 **Efficiency & Speed** – Once design and tooling are approved, using a repeatable drawing or forming process allows for efficient mass production of deep drawn forms.
- 2 **No Assembly Required** – With drawing, one blank is cut to size and drawn into a 3D shape. Typically, no additional assembly of various components is needed, however, in some deep drawn or multi pocket articles, multiple wire forms may be necessary.
- 3 **Little-To-No Waste** – Forms are created from blanks with specific dimensions that are pre-determined so that there is the smallest amount of scrap left over when the final product is complete. Skeletal scrap and any remaining product can then be recycled at the manufacturing facility.
- 4 **Endless Repeatable Shaping Possibilities** – A wide range of geometric shapes are possible through the correct combination of media and temper. One thing to consider during design is that the opening at the top of the part must be wider than the bottom. The use of progressive or compound dies allow the metal to form more intricate shapes in a multi-stage punch process, trimming and forming the edges of a piece in the same operation. See diagrams below – Two stage forming using Compound or Progressive Dies.

Compound Die



Progressive Die



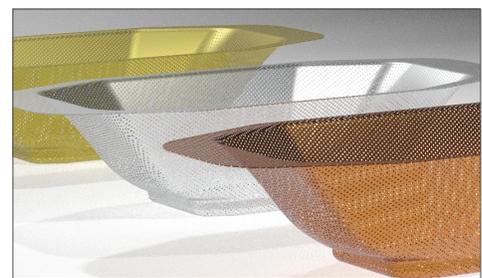
Producing Drawn Wire Forms

Producing deep drawn wire forms requires a knowledge of the many different areas that can influence production and quality rates. Each of these areas must be optimized to ensure repeatable production and minimal scrap rates.

- 1 **Correct Metal Media** – There are many combinations of alloy, media form, and other parameters. Each will have an effect on the production of the wire form and should be considered with the customer’s requirements. Learn more about selecting the correct media for your project [here](#).
- 2 **Development of Prototype** – A solid prototype tooling process will allow the correct form to be developed meeting the customer’s requirements (which may not have been completely defined). This allows optimum collaboration to finalize the design and get the wire form to the fiber mold manufacturer quicker. Learn more about how to optimize the prototyping process for wire forming [here](#).
- 3 **Correct Heat Treatment** – Annealing can be an essential step in the preparation of the media to increase the malleability as it enters the drawing process. Proper annealing practices will eliminate work hardening created during the weaving operation. During the drawing process, depending on the type of media, depth of the form and tightness of the radii, the form may need to go through multiple heat treating processes.
- 4 **Production of Wire Mesh Forms** – The prototype process will have optimized many of the variables that can cause quality defects. Below is a summary of the main types of defects that can occur in production.
- 5 **Quality Control** – First articles off the production tooling should be verified by the quality department for dimensional layout and adherence to part specifications. During production, all parts should be visually checked and periodically dimensionally checked.

Quality Defect	Production
Wire form cracks or splits	Metal media incorrectly heat treated
Rips or wrinkles in form	Press is operating too fast, improper heat treatment or not enough lubricant in the press
Form is not rigid	Metal media is not correct for strength required
Fiber / Pulp mold has an unacceptable surface finish	Metal media used has too large of an opening, causing a ‘ripple’ effect on the pulp mold when the liquid is extracted
Overlaps in the form	Incorrect lubrication used or blank size too large
Wire forms have a very short production life	Incorrect metal media chosen or material may have become embrittled during forming

If the wire forming process is not optimized, unacceptable scrap levels can occur. This in turn will affect the bottom line of the pulp mold manufacturer using the wire forms. While many do have the capacity to produce their own wire forms, there is the potential for this process to turn into an uncontrolled cost center if not carefully managed. One way to do this is working in partnership with a company specializing in deep draw forming. This helps manufacturers reduce cost, save time, re-allocate manpower and ultimately focus on the production of pulp molds for their customers.



Gerard Daniel Worldwide is a leader in wire cloth, associated wire mesh components and deep drawn products. They are skilled at managing the whole deep drawing wire form process from media selection, tooling prototyping, design finalization and production of wire mesh forms. They have a well-established just-in-time customer delivery program and supply many sectors, including the packaging, food and beverage industries.

*Wire form refers to wire mesh, perforated and expanded metals, all of which are used to produce wire forms.