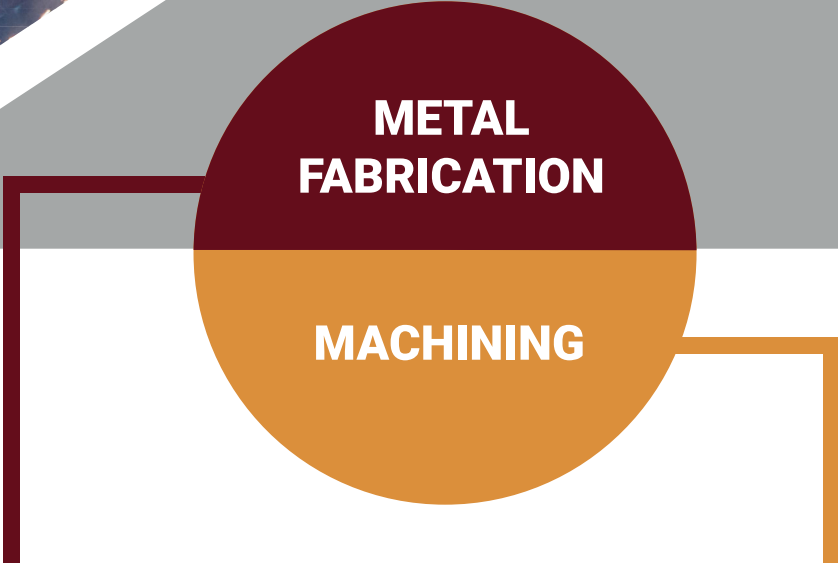


Fabrication vs. Machining

a process comparison



**METAL
FABRICATION**

MACHINING

Additive Manufacturing:

Sheet metal fabrication is the building of metal structures by cutting, bending, and assembling processes. The starting shape of the material is usually sheet, plate, formed, or expanded (e.g., mesh).



**METAL
FABRICATION**

Subtractive Manufacturing:

Machining refers to those operations where material is being removed from the parent workpiece, through a controlled material removal process. The starting shape of the material is usually a solid round bar, tube, or plate.



MACHINING

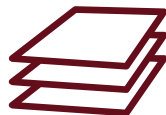
SHAPES:



Formed



Sheet



Plates



Tubes



Bars



Plates

DO I NEED A FABRICATED PART OR A MACHINED PART?

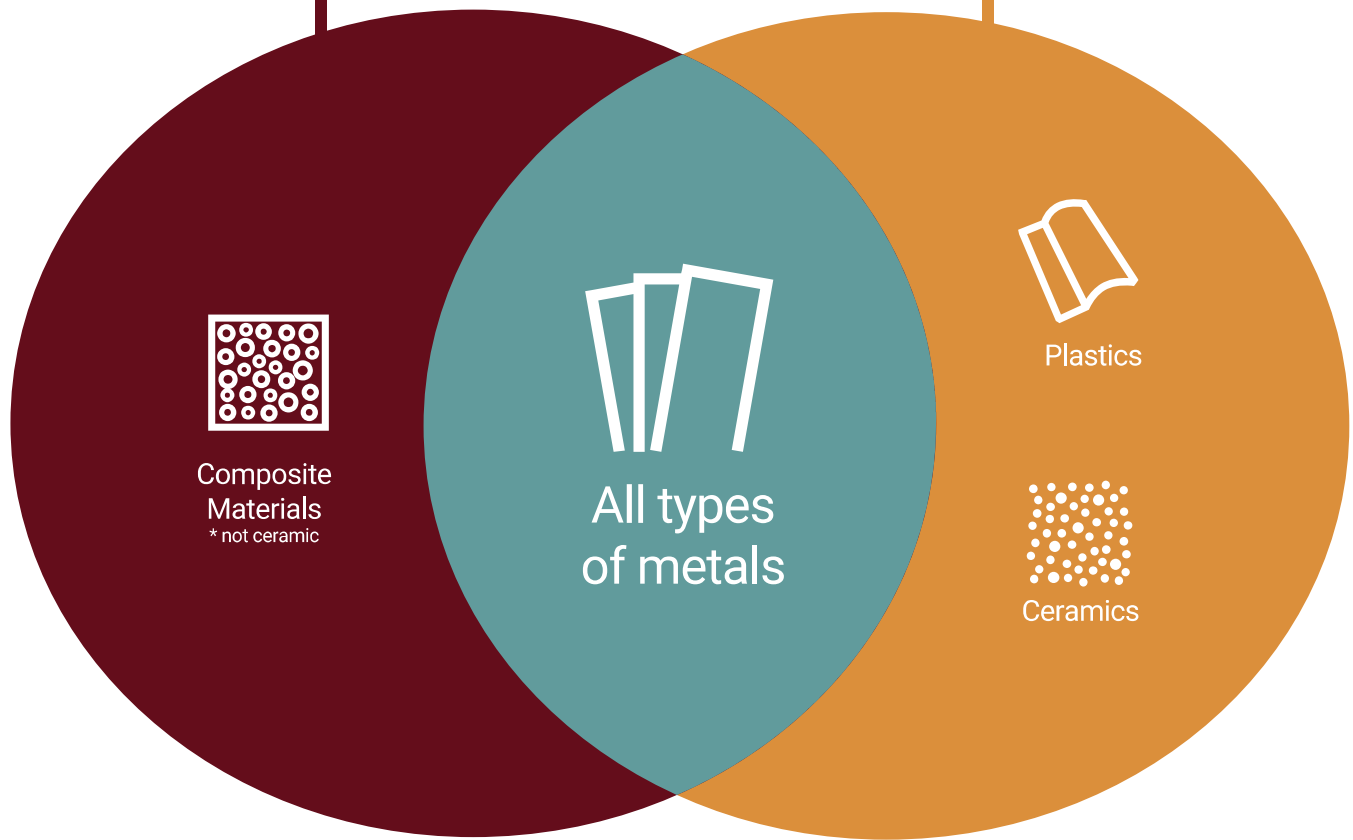
Precision Sheet Metal Part:

Larger tolerances
Less precise shape
Weldment
Thin formed material requirement
(e.g., sheet metal)

Machined Part:

Shape
Tolerance
Casting that requires machining to add holes
Fit up surfaces and material type etc.

WHAT MATERIALS ARE PROCESSED?

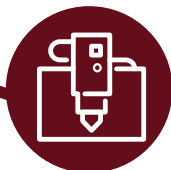


Glass, plastics, and other materials can be added to the finished good, as a value-added process

WHAT ARE THE OPERATIONS?



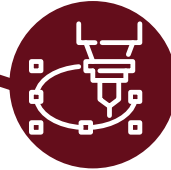
Laser Cutting



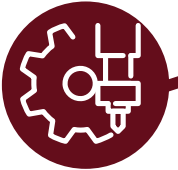
Punch Press Machines



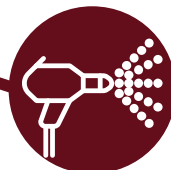
Welding



CNC Brake Press Machines



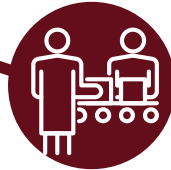
Hardware Insertion Machines



Powder Coating



Water Jet Cutting



Finishing

General tolerances for CNC precision sheet metal parts may be as small as ± 0.005



Milling



Turning



Drilling



Boring



CNC Machining



Lathes



Wire EDM Machines



Electro Chemical Erosion

General tolerances for CNC machined parts may be as small as ± 0.0002

INSPECTION REQUIREMENTS:



Precision Sheet Metal Inspection:

Precision Sheet Metal parts are normally inspected using tolerances of ± 0.002 . They are measured using Laser scanners, Calipers, Micrometers, and Height gauges



Machined Inspection:

Machined Inspection requirements are usually more stringent, with tolerances in the millionths. Machined parts are routinely checked with CMM devices. (CMM: Coordinate Measuring Machine)

WHEN IS IT BETTER TO FABRICATE VS. MACHINE?



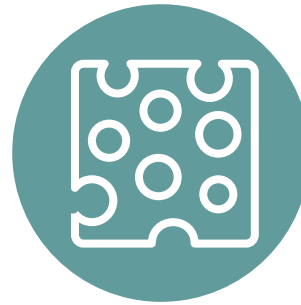
Consider certain requirements, like:



Shape



Tolerance



Material



End Use

Choose METAL FABRICATION when your requirements include:

- Base material that starts with a sheet, plate, formed, or expanded metal or composite
- Welding or joining of multiple components
- The addition of hardware
- The forming of thinner shapes
- Addition of a powder coating or wet-spray painting process
- An electro-mechanical assembly process

Today's CNC precision fabrication equipment can create high-tolerance parts at a lower price point than traditional machining processes. Even when fabricated parts have some very-high tolerance requirements, this can often be addressed with secondary processes.

OTHER KEY DIFFERENTIATORS:

METAL FABRICATION

Cost savings

Complex shapes and tight tolerances at a lower price point

Cost-effective for low, medium, and high volume production

Routine processes include:
Welding/joining multiple components

Powder coating and other finishes

A precision sheet metal part with tolerances from .001 to .005 may be all that is needed. This would be a cost savings for any customer to go with the CNC precision sheet metal fabricated component.



MACHINING

Generally, machining is a higher-cost process.

Very high tolerances

Very thick shapes

Minimal tooling costs

Can create features that cannot be created by the fabrication process

Cost-effective for low volume production

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 29 Industrial Drive, PO Box 546
Uxbridge, MA 01569-0546 USA

 508-278-5700

 precisionengineering.com

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