



Lead Time Friendly Designs For CNC Machined Parts

Wednesday, October 24th at 1:00 PM EDT

AGENDA

- Introduction of today's panelists
- Quick overview of Xometry's CNC capabilities
- Live Demo of Xometry's Quoting Engine
- Learn from our in-house experts about the main cost drivers of CNC machined parts and how to catch and fix lead time killers before they cost you time and money.
- Open Q&A with our experts
 - Your time to get answers to your questions
 - Use the chat box to the right of your screen at any time during the webinar to submit questions for the panelists

TODAY'S SPEAKERS



Greg Paulsen

Dir. New Manufacturing Tech
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Tim Bowman

CNC Engineering Manager
tbowman@xometry.com



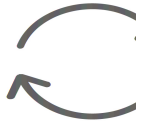
XOMETRY'S CNC MACHINING CAPABILITIES

CNC MACHINING CAPABILITIES

Key Information:

- High-precision tolerances ranging from +/-0.001" – 0.005", depending on customer specs
- Processes include 3- to 5-axis mills, lathes, and swiss-type machines
- Choose from a wide variety over 50 certified metal and plastic materials.
- Select from a variety of finishes on solid metal or plastic parts, built to precise design specifications.

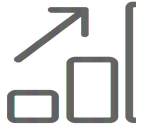
Advantages:



Rapid Turnaround



Material Selection



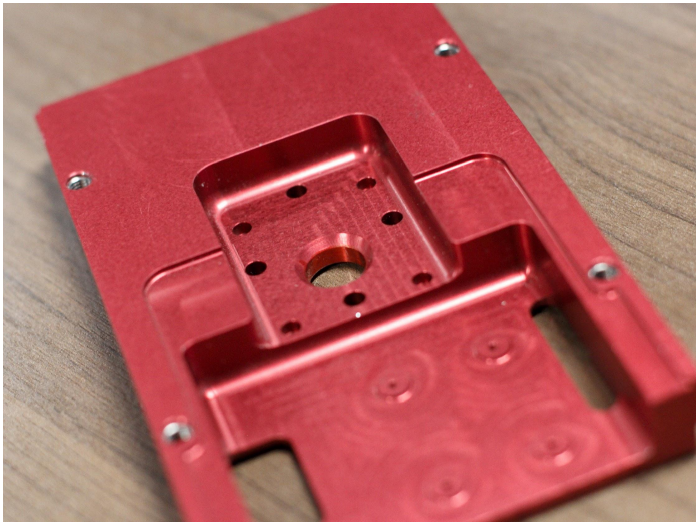
Scalability



Custom Finishes



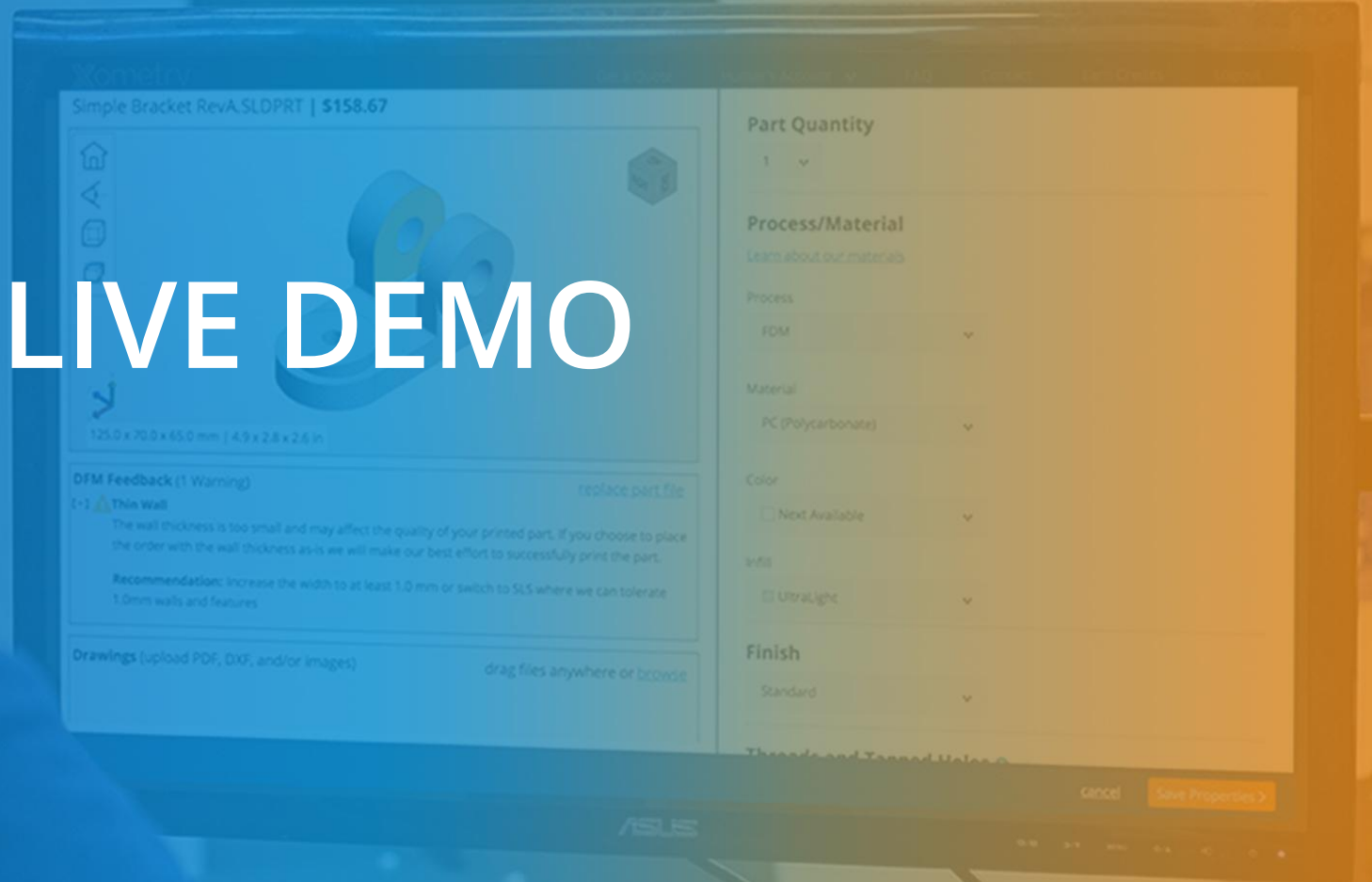
Precision



NEW FEATURE: GET CNC PARTS IN AS FEW AS 3 DAYS

- We've heard from you that getting your CNC parts quickly is crucial.
- We are excited to announce that Xometry is now able to get many CNC parts to you in as few as 3 days.
- Parts likely to have fast lead times:
 - Require a standard lathe or 3-axis mill
 - Do not have off-axis holes or surfacing
 - Have small build envelopes
 - Do not have special features other than standard threading
 - Do not require special certifications
 - Have no DFM warnings

LIVE DEMO

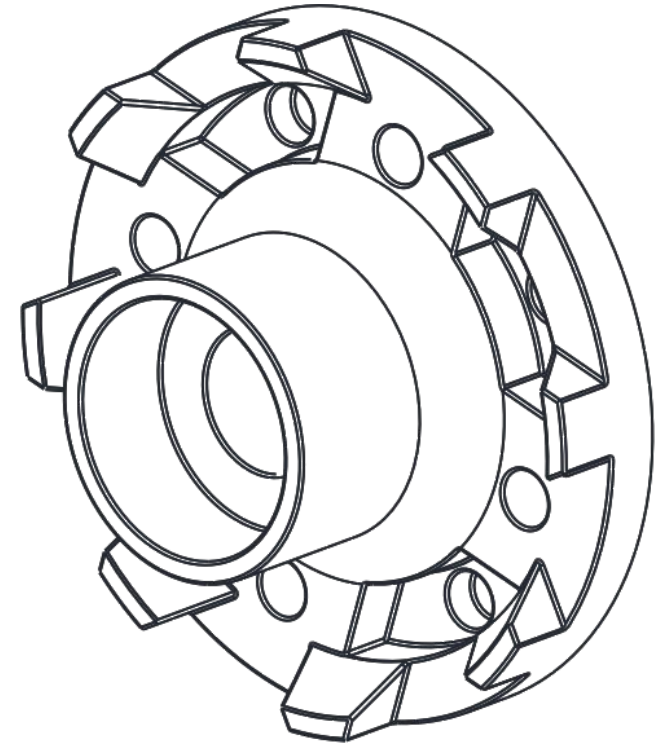




CATCHING & FIXING LEAD TIME KILLERS

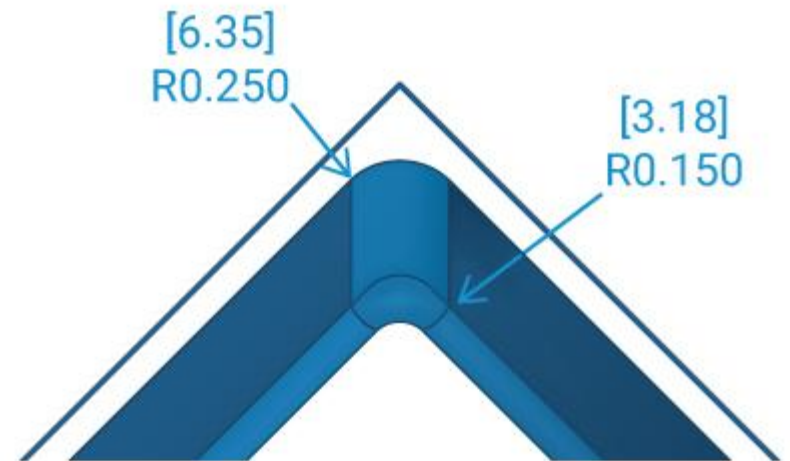
KNOW WHERE YOU ARE IN THE PROCESS

- What are your immediate goals
- If it's just a prototype or you're testing fit, maybe a 3D printed part would be better
- Time vs. Scope vs. Cost
- Is your part even manufacturable in its current state?



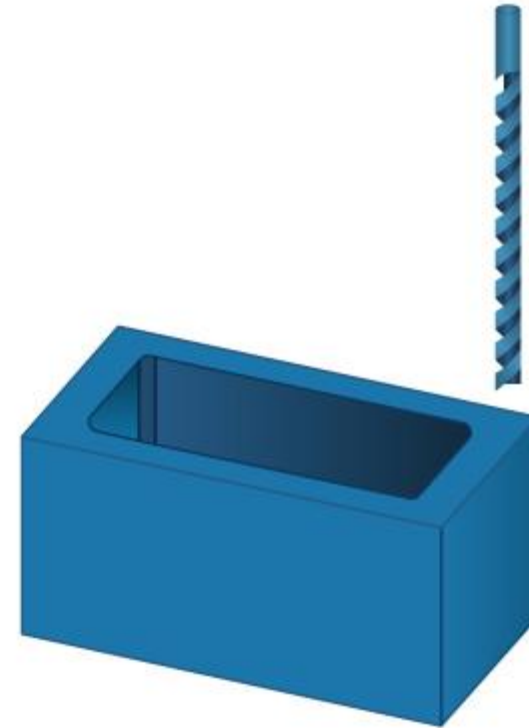
ROUNDED INTERNAL CORNERS

- Use an inside corner radius with a depth-to-tool diameter ratio of 3:1 or less
- Avoid varying internal corner radii
- The larger the radius, the lower the cost — larger tools can be used to machine larger parts, resulting in more material being removed with each cut, which in turn reduces machining time.



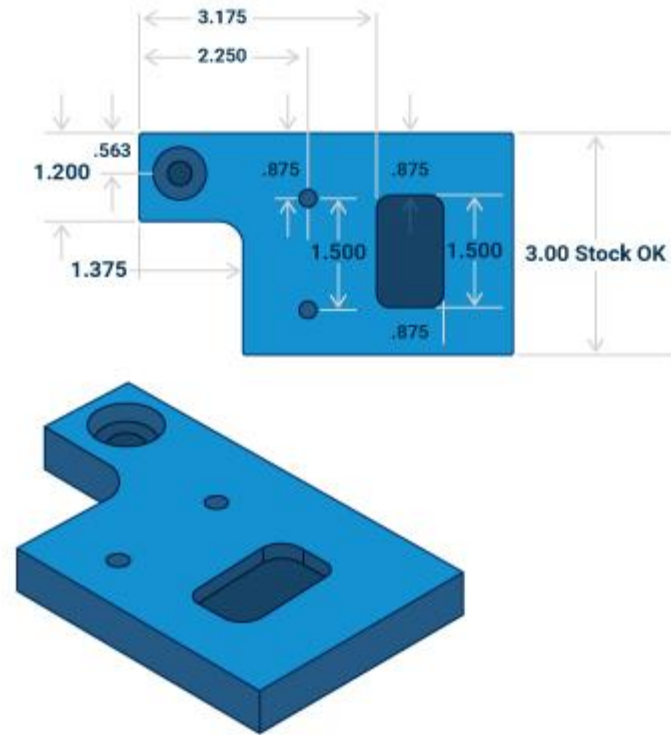
AVOID DEEP POCKETS

- Design lengths up to 4x their depth
- When the depth of a cut becomes greater than 2x the diameter of the cutting tool, the tool's feed rate must slow down, which increases the cycle time and part cost.
- The maximum cut depth to tool diameter ratio is 4x for pockets and 10x for drilled or reamed holes



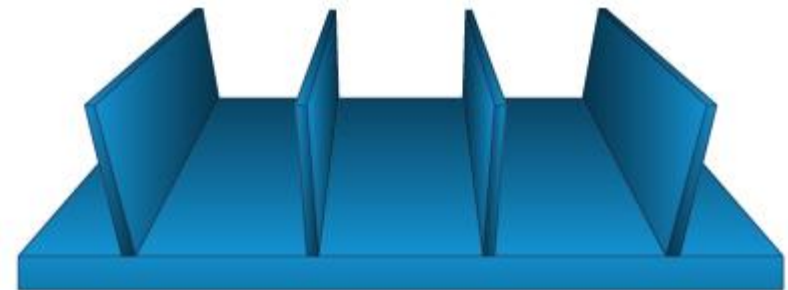
LIMIT TIGHT TOLERANCES

- Assign numerical values to critical features and surfaces
- Keep all other features as standard tolerances: +/- 0.005"



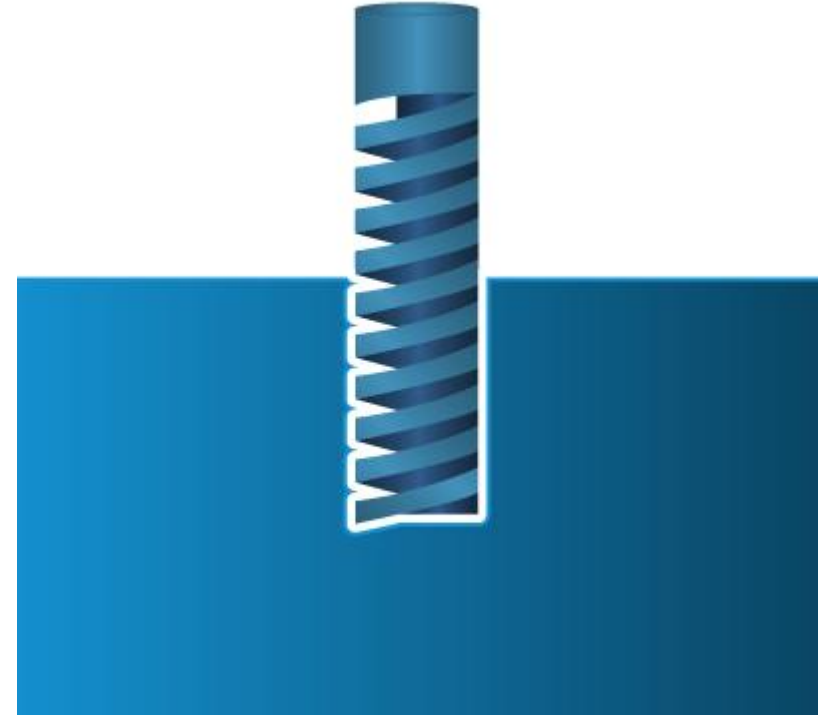
EXPAND THIN WALLS

- Walls should have a minimum width of 1/16" or 1.5875mm



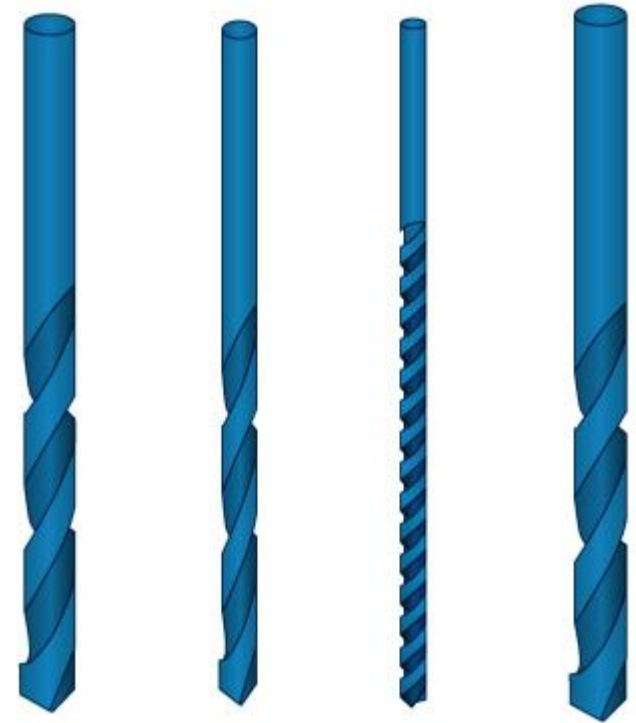
OPTIMIZE TAPPED HOLES

- Utilize tap sizes such as 4-40 taps
- Avoid threading more than 3x times the hole's diameter



LEVERAGE STANDARD DRILL SIZES

- Utilize standard fractional, number or drill sizes
- Avoid very small holes



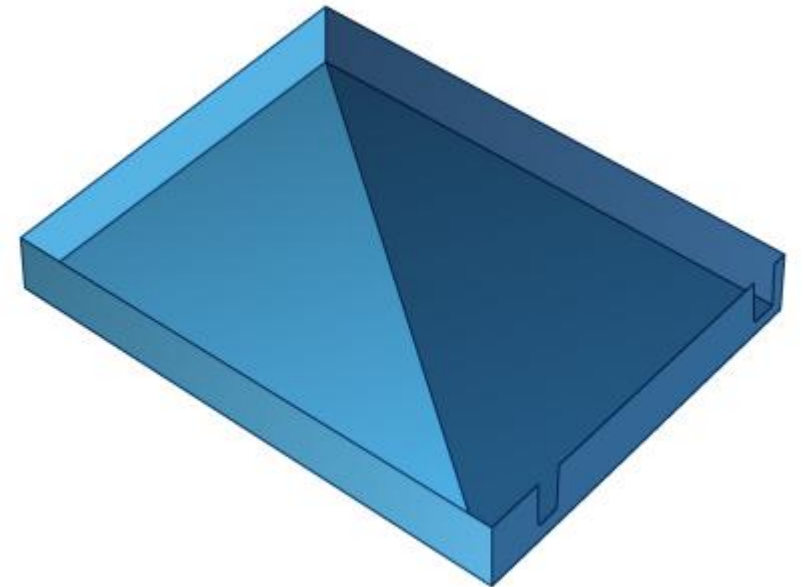
AVOID EXPENSIVE MATERIALS

- Use a softer metal like Aluminum 6061
- Use a machinable mild steel for something harder

MATERIAL	COST
Aluminum Alloy	\$
Brass	\$\$\$
Bronze	\$\$\$\$
Copper	\$\$\$
Stainless Steel	\$\$
Steel	\$\$
Zinc	\$\$

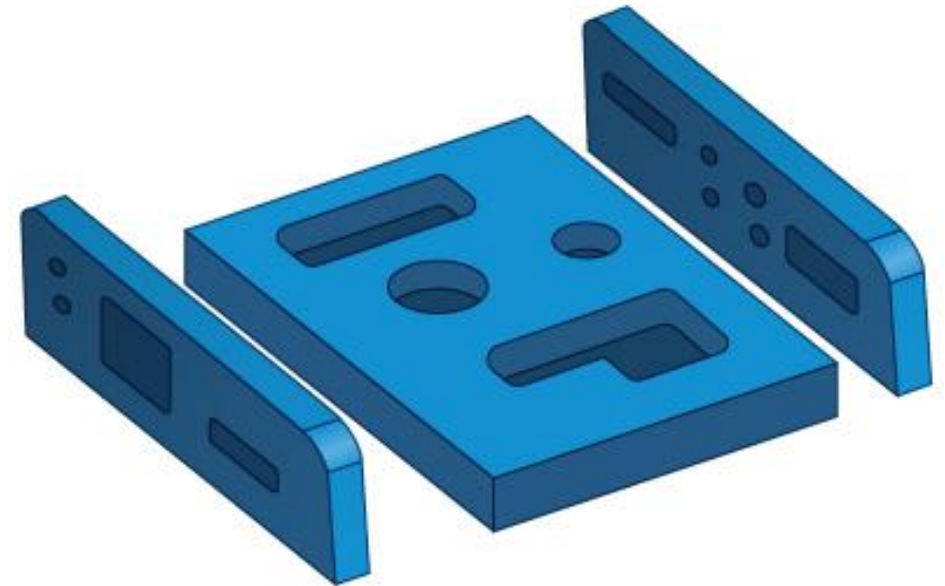
AVOID MULTIPLE FINISHES

- Leave the finish as standard or request a uniform finish
- Typically a surface finish such as conversion, plating, heat treatment, or painting adds 1 week to lead time



SPLIT UP COMPLEX PARTS

- Split complex parts, especially for parts with deep pockets or multiple faces that require operations



TURNTD PARTS vs. MILL PARTS

- Turned parts can be produced at a quicker rate than mill parts
- Concentric or axial features
- Reduced setup times



CERTIFICATIONS, RESTRICTIONS & INSPECTIONS

- Material certifications, especially on more exotic metals, may add 2 - 3 days
- Export restrictions, such as ITAR, limit the supplier base which increases lead time
- Non-standard inspection reports



COST-SAVING TIPS

Know where you are in the process.

Split up complex parts & assemblies.

Design internal radii as large as possible.

Don't tap holes all the way through.

Don't over-tolerance and use standard dimensions when possible.

Select less expensive materials like Aluminum when appropriate.

Design walls as thick as possible.

Select the standard finish if applicable, or stick to a single finish.

Turned parts with concentric or axial features are easier and faster to produce.

Non-standard inspection processes, unnecessary certifications and restrictions increase lead time & cost.

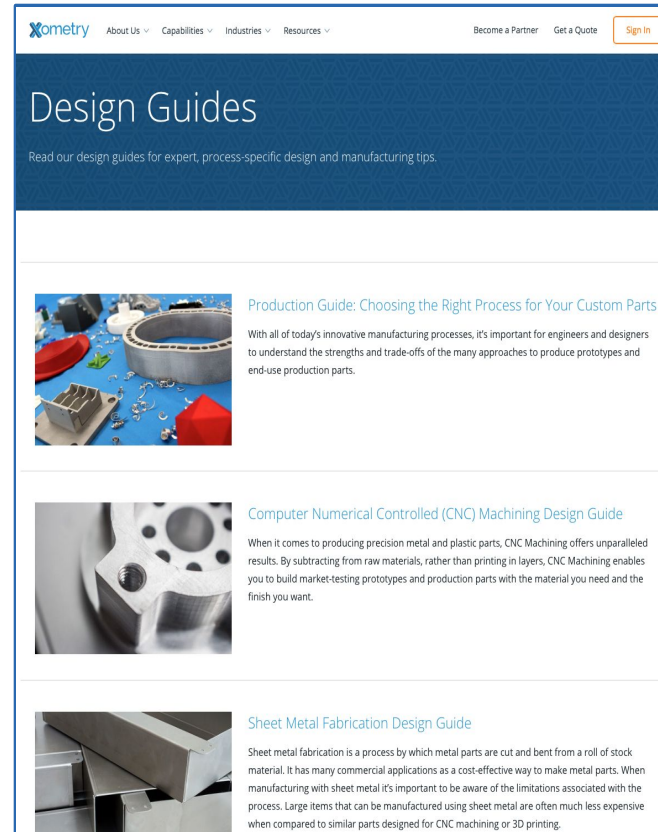


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Live support hours: M-F 8:00 AM - 9:00 PM EST



Email

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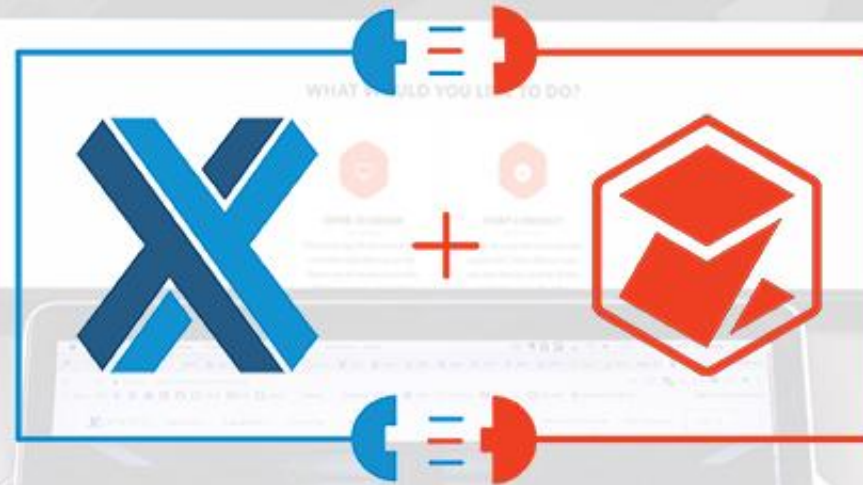


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XOMETRY + ZVERSE



2D to 3D File Conversion

Fully Manufacturable 3D Files Within Days



Q & A