



PRECISION TUBE-FORMING TOOLING
ELKHART, INDIANA · USA

TUBE FORM SOLUTIONS

Tube Bender & End-Former Tooling

Single-source precision tooling for CNC tube benders and end formers — engineered for flawless bends, faster setups, and longer tool life.

PRODUCT CATALOG · 2026

SINGLE-SOURCE SOLUTIONS

Tooling built for the toughest bends.

Tube Form Solutions is a global leader and total-solution provider for the tube & pipe bending and fabrication market. With one call you can source everything from standard bender tooling to complex, custom tool sets and accessories — all engineered in-house.

We use the highest-grade tool steels to extend service life in the most demanding environments. Our standard interlock design ensures fast, repeatable setup and minimizes tool marking, while reach-adjusted tooling reduces machine adjustments between tool changes.

Every tool is designed with solid-model CAD and cut on state-of-the-art CNC machining centers, so compound and complex geometries are delivered accurately — and fast. Tooling can be production-tested on bending machines prior to shipment, virtually guaranteeing the results you're after.



SOCO all-electric CNC tube bender running TFS interlock tooling.



Complete bender tool sets, accessories & perishables from a single source.

¼"–8"

Tube OD capability across the product range

30+ yrs

Combined bender-tooling heritage since 1990

5-Axis

CNC-machined from premium tool steels

Turnkey

Design, build, test & on-site support

TOOLING TYPES

A tool set for every forming method.

From tight-radius mandrel work to no-mandrel controlled-wrinkle bends, TFS designs tooling matched to your part, material and machine.

• Mandrel Bending

Internal mandrel and wiper support for thin-wall, tight-radius bends with a smooth, wrinkle-free inside radius.

• Compression

Empty (no-mandrel) bending for heavier walls and larger radii where internal support isn't required.

• Controlled Wrinkle

No-mandrel tooling that forms a consistent, controlled corrugation for serpentine and heat-exchanger bends.

• Crush Bending

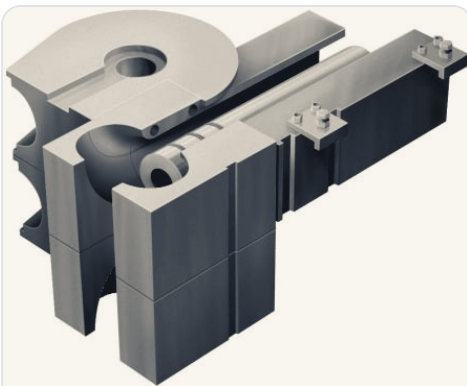
Square & rectangular tube forming that manages flat-face distortion through the bend.

• Split Die

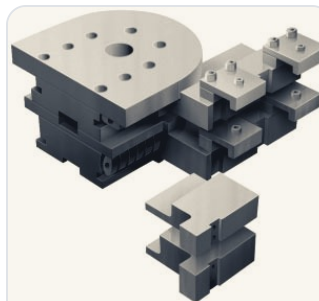
Multi-piece bend dies that conform to complex cross-sections and extrusion profiles.

• Leaf / Extended Lip

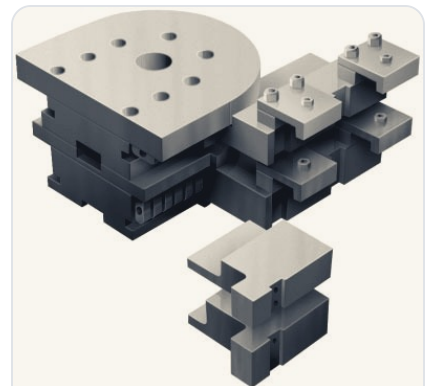
Stacked leaf tooling for different planes and radii on a single, compact tool stack.



Interlock elliptical tool set



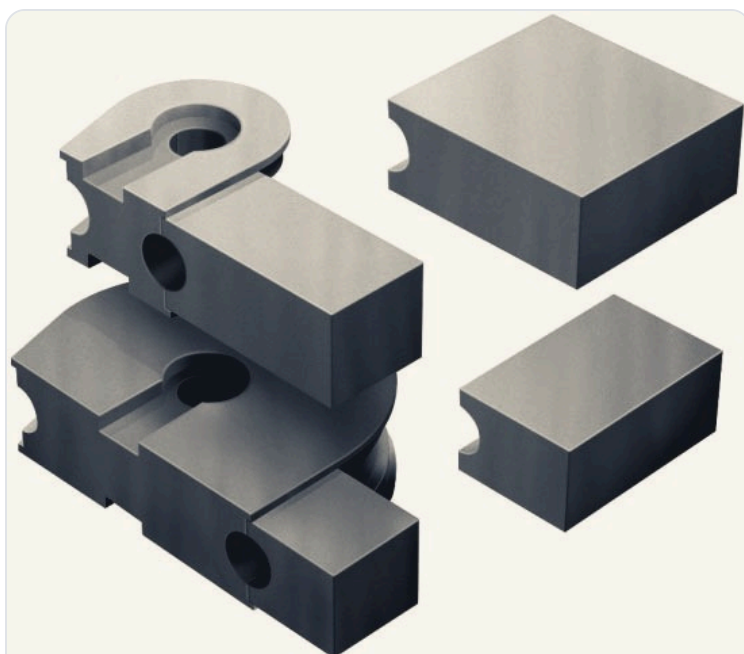
**Stacked leaf tooling
— multiple planes**



**Square / rectangular
mandrel tool set**

COMPONENTS

Every piece of the tool set.



Typical interlock mandrel tool set — bend die, clamp die, pressure die, wiper die & mandrel.

Round

Square

Rectangle

Odd Round

Elliptical

Bend Die

Sets the centerline radius; available as Type D spool, C-series & flange/pedestal mounts.

Clamp Die

Grips the tube against the bend die — interlocked for alignment.

Pressure Die

Supports the tube through the bend; reach-adjusted options available.

Wiper Die

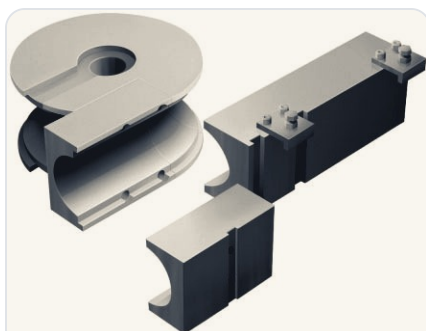
Prevents inside-radius wrinkling; replaceable-tip designs.

Mandrel

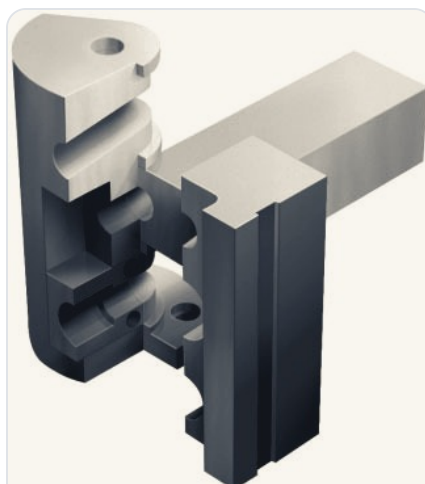
Shank, body, nose & balls support the bore on thin walls.

Inserts & Bolster

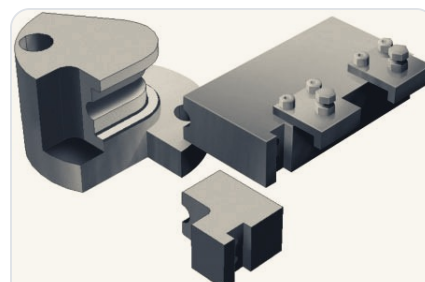
Replaceable inserts, collet pads, wiper posts & adjusters.



Compound stacked — mandrel



Stacked elliptical set



Elliptical — pedestal mount

STANDARD CONFIGURATIONS

Bend die styles & mounting options.

All standard bend dies are available in interlock and non-interlock designs. Interlock tooling maintains alignment for quick setup and reduced tool marking.

Type D

Spool. Full-round spool die, the standard workhorse for round tube.

Type C

Contour. Single-cavity contour die for standard bends.

Type C1

Contour +. Contour die with integral clamp geometry.

Type C2

Wiper notch. Contour die with wiper-die notch relief.

Type C3

Wiper notch +. Extended relief for close-pitch wiper setups.

Flange

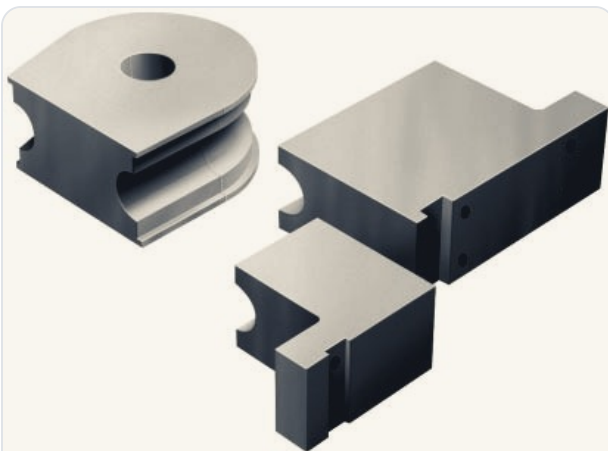
Flange mount. Bolt-on flange base for direct machine mounting.

Pedestal

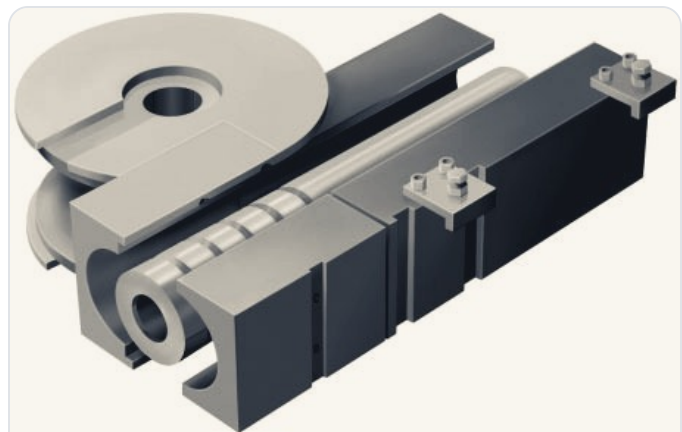
With toolpost. Pedestal mount with integrated tool post.

Extrusion

Multi-piece. Split die that conforms to the extrusion cross-section.



Small-diameter interlock mandrel tool set



Interlock elliptical tool set

MANDREL ENGINEERING

Mandrel pitch & rod selection.

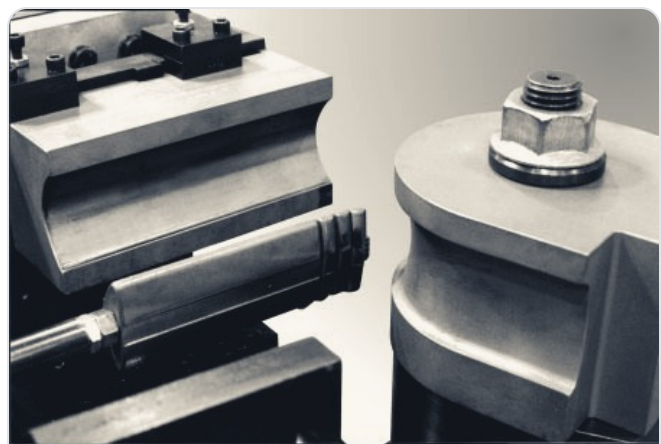
Standard Pitch

Tube OD Range (in.)	Link Size	Mandrel Rod	Shank Length (in.)
.219–.279	1/2	6-32	1-1/2
.280–.373	1	8-32	1-1/2
.374–.498	2	10-24	1-1/2
.499–.623	3	1/4-20	3
.624–.748	4	5/16-18	3
.749–.935	5	3/8-16	3
.936–1.185	6	5/8-11	5
1.186–1.498	7	5/8-11	5
1.499–1.748	8	1-8	8
1.749–2.123	9	1-8	8
2.124–2.623	10	1-8	8
2.624–3.373	11	1-8	10
3.374–4.623	12	1-3/4-10	12
4.624–6.010	13	1-3/4-10	14

Close Pitch — Thin Wall

Tube OD Range (in.)	Link Size	Mandrel Rod	Shank Length (in.)
.936–1.185	5	5/8-11	5
1.186–1.498	6	5/8-11	5
1.499–1.748	7	1-8	8
1.749–2.123	8	1-8	8
2.124–2.623	9	1-8	8
2.624–3.373	10	1-8	10
3.374–4.623	11	1-3/4-10	12
4.624–6.010	12	1-3/4-10	14

Close-pitch mandrels reduce pitch length one size for thin-wall tubing, providing universal flexing and superior inside-radius support. Replaceable wiper-die tips are available across the range.



Special tube-groove configurations — CNC machined.

WIPER DIE & SELECTION

Square-back wiper & selection guide.

Square Back Wiper

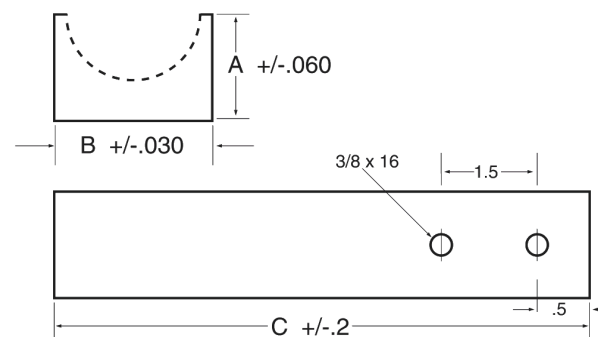
Item	Tube Dia.	A · Reach	B · Height	C · Length
-01	.062–.559	1.00	.72	6.00
-02	.560–.684	1.00	.80	6.00
-03	.685–.934	1.00	1.20	6.00
-04	.935–1.309	1.20	1.50	6.00
-05	1.310–1.434	1.50	1.70	6.00
-06	1.435–1.558	1.50	1.70	8.00
-07	1.559–1.809	1.50	2.40	8.00
-08	1.810–1.934	1.50	2.80	8.00
-09	1.935–2.434	2.00	2.80	10.00
-10	2.435–2.809	2.38	3.20	10.00
-11	2.810–3.059	2.38	3.40	10.00
-12	3.060–4.000	4.00	4.70	14.00
-13	4.500	4.00	5.50	16.00
-14	5.000	4.00	5.70	16.00
-15	5.500	4.50	6.50	14.00
-16	6.000	5.00	6.88	14.00
-17	6.500	5.0	7.50	22.00
-18	7.000	5.50	8.00	22.00

Mandrel & Wiper Die Selection Guide

Factor ↓ D →	1	1.25	1.5	2	2.5	3	4	5
8–12	SP 1B W	SP 1B W	SP 1B	Plug	Plug	Plug	–	–
13–17	SP 2B W	SP 1B W	SP 1B	SP 1B	Plug	Plug	–	–
18–22	SP 3B W	SP 2B W	SP 2B W	SP 1B	SP 1B	SP 1B	Plug	–
23–27	SP 3B W	SP 2B W	SP 2B W	SP 2B W	SP 2B W	SP 1B	SP 1B	Plug
28–32	SP 3B W	SP 3B W	SP 3B W	SP 2B W	SP 2B W	SP 2B W	SP 1B	Plug
33–37	SP 3B W	SP 3B W	SP 3B W	SP 2B W	SP 2B W	SP 2B W	SP 2B W	SP 1B
38–44	SP 4B W	SP 3B W	SP 3B W	SP 3B W	SP 3B W	SP 3B W	SP 2B W	SP 2B
45–54	SP 4B W	SP 4B W	SP 4B W	SP 3B W	SP 3B W	SP 3B W	SP 3B W	SP 2B W
55–64	CP 5B W	CP 5B W	SP 4B W	SP 4B W	SP 3B W	SP 3B W	SP 3B W	SP 3B W
65–74	CP 5B W	CP 5B W	CP 5B W	SP 4B W	SP 4B W	SP 4B W	SP 3B W	SP 3B W
75–89	CP 5B W	CP 5B W	CP 5B W	CP 5B W	SP 4B W	SP 4B W	SP 4B W	SP 3B W

Factor = Tube OD ÷ Wall • **D** = CLR ÷ Tube OD. SP = Standard Pitch • CP = Close Pitch • B = Ball • W = Wiper. Factors above 90 require tooling-engineering evaluation.

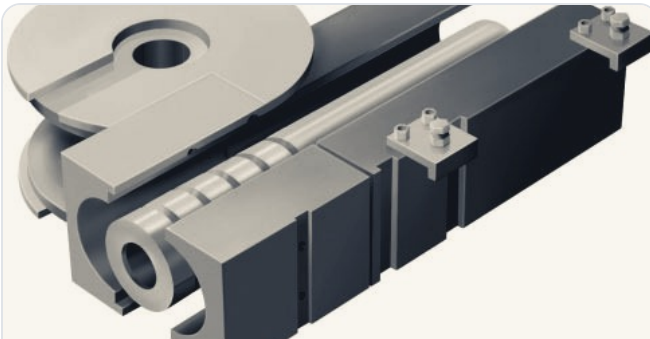
SQUARE-BACK WIPER GEOMETRY



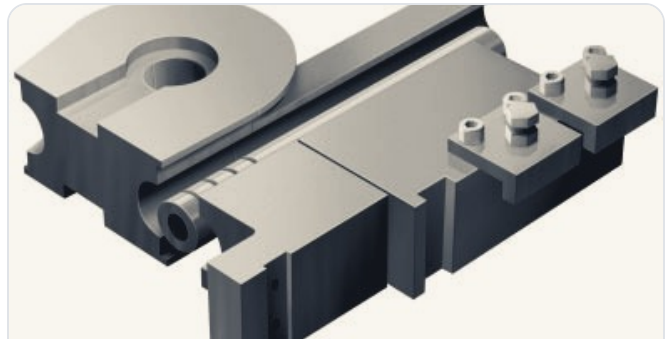
Dimensions A, B & C correspond to the item table at left.

INDUSTRIES SERVED

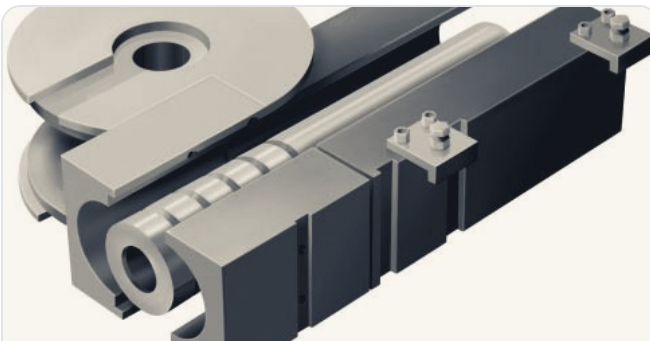
Proven across every forming challenge.

**AUTOMOTIVE****Exhaust & hi-performance**

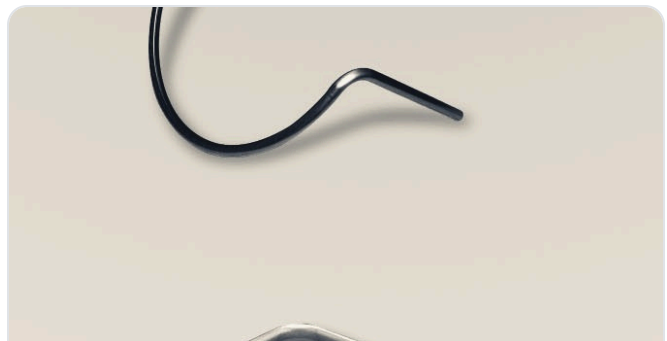
Exhaust tubes, tubular manifolds, headers, roll bars and grill guards.

**AEROSPACE****Fuel, hydraulic & duct**

Fuel and hydraulic lines, large-diameter and duct tubes to tight tolerance.

**HVAC / R****Coil & heat exchanger**

Copper A/C tubes, fuel lines, serpentine heat-exchanger bends.

**FURNITURE • FITNESS • EXTRUSION****Frames & profiles**

Chair & bar-stool frames, exercise equipment, window frames and extruded shapes.

Common applications are shown for each category; TFS routinely engineers tooling for specialized geometries and materials — carbon, stainless, aluminum and copper.

COMPLETE LIFECYCLE SUPPORT

More than tooling — a partnership.

01 Turn-Key Projects

Complete tool packages designed, built and production-tested to your part print.

02 Custom & Complex Tooling

Solid-model CAD design for compound, multi-plane and odd-form geometries.

03 Vendor-Managed Inventory

Stocking programs that keep perishables on hand and lines running.

04 Refurbishment

Re-cutting and rebuilding of worn tooling to restore precision and life.

05 Replaceable Wiper Tips

Replaceable wiper-die tips to cut consumable cost and downtime.

06 On-Site Evaluations

Applications support, tooling evaluations and operator training at your plant.



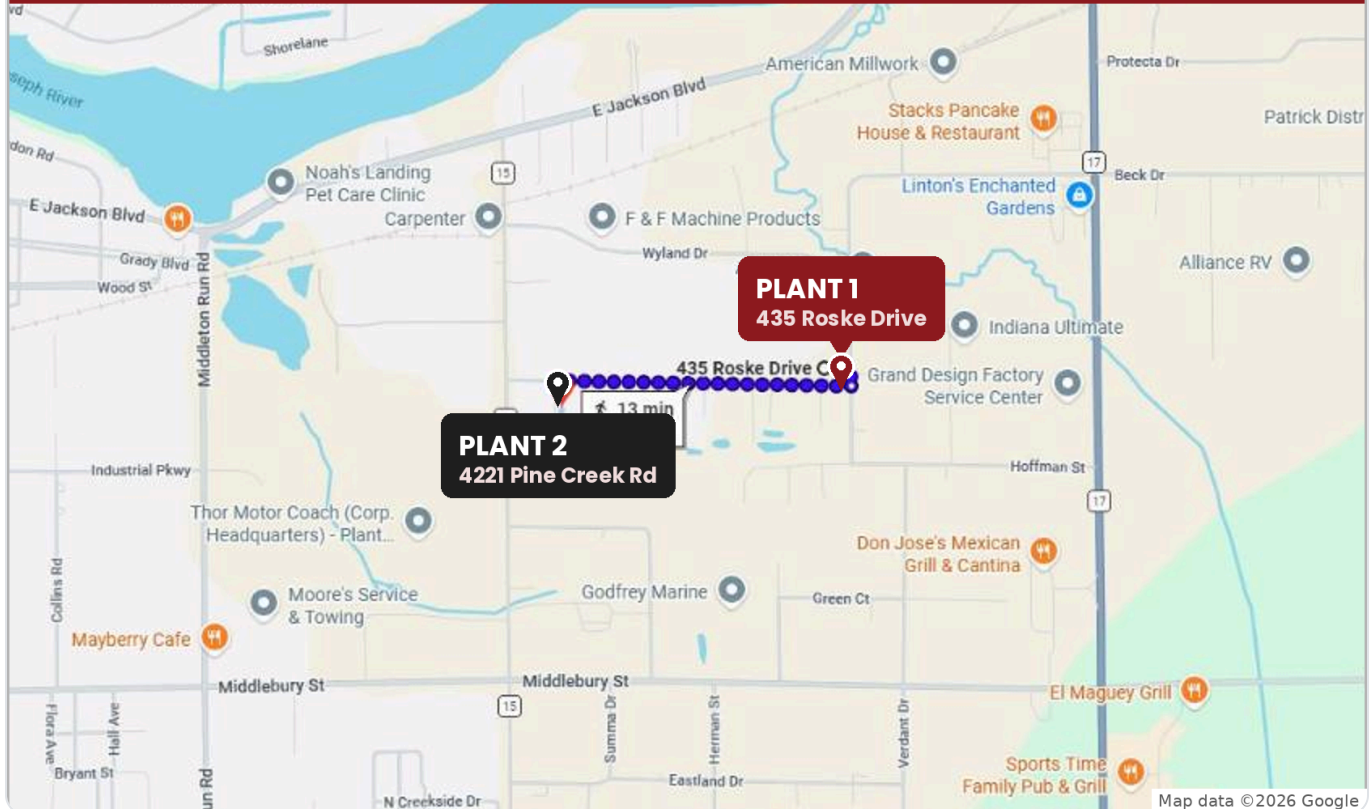
SOCO all-electric & hybrid CNC tube benders · V-Series roll-bending · TFS all-electric end formers

Backed by TFS's broader capabilities — CNC tube benders, end formers and metal-forming lubricants — as the single source for your entire tube-forming operation.

FIND US

Two plants in Elkhart, Indiana.

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www.tubeformsolutions.com

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