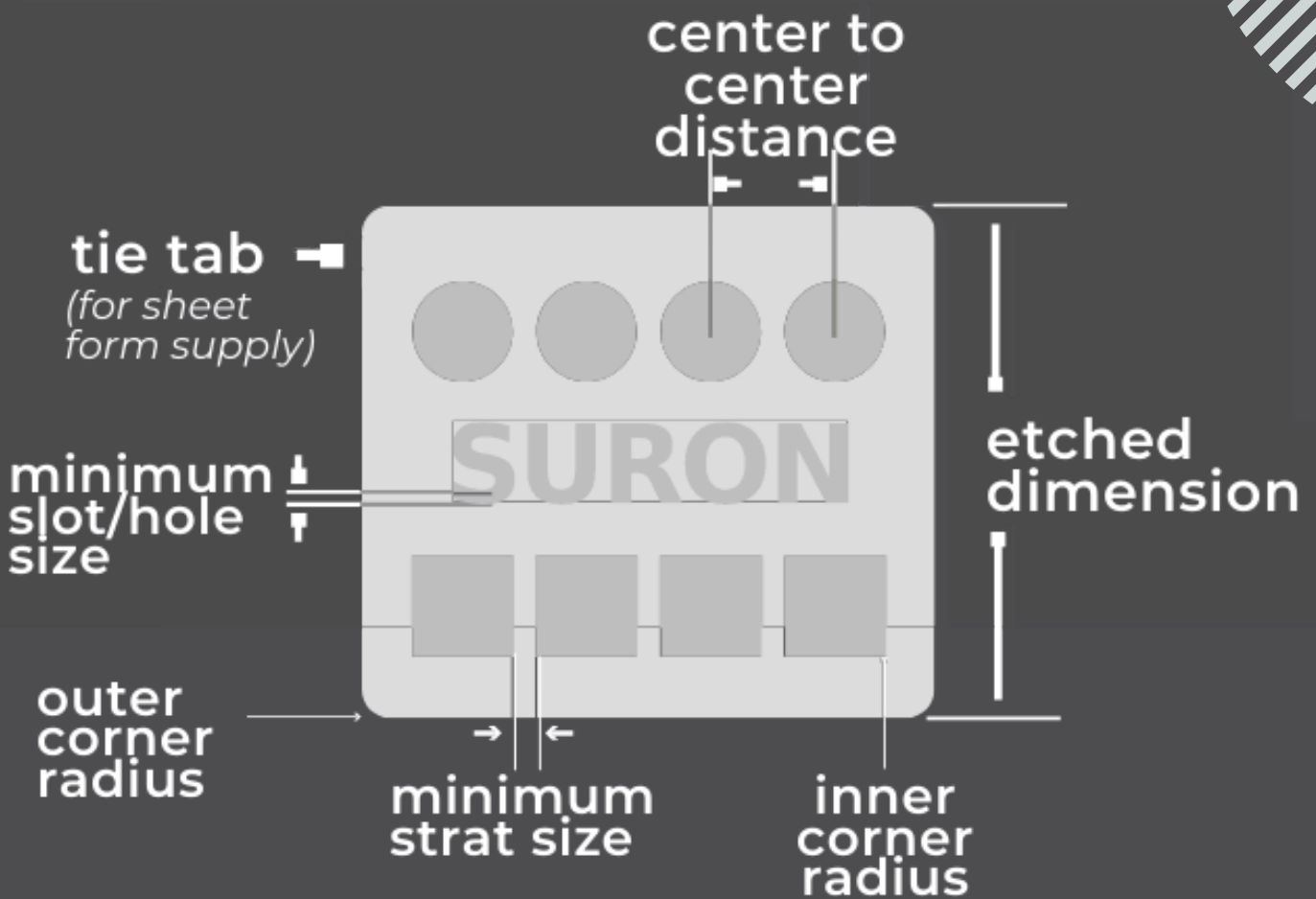


DESIGN

Guidelines

2024



SURON

Precision Solutions

PHOTOCHEMICAL Etching/Milling - PCM

Feature	Standard Value
Material	Ferrous Alloys: Kovar, Invar, Alloy42, Stainless-Steel Copper Alloys: PhosBronze, Brass, BeCu, Nickel-Silver Nickel Alloys
Metal thickness range (T)	0.012-1.5 mm (.0005"-060")
Part maximum size	585X890 mm (23"x35")
Minimum hole/slit size	100%T * Down-to absolute 0.1 mm (.004")
Minimum line width between two openings	50%T * Down-to absolute 0.060 mm (.0024")
Minimum inner corner radius	70%T
Minimum outer corner radius	40%T
Minimum dimensions tolerance	±10%T for T<0.6mm ±15%T for T>0.6mm * Down-to absolute ±0.015 mm (.0006")
Minimum center to center tolerance	±0.010 mm (.0004")
Cross-section cutting line wall and step diagram:	
Blind hole / step depth (D)	50%T-80%T
Blind hole / step cross section radius	100%D

- Ideal for mass production and graphical complexity parts
- Permits multiple depths as steps, sockets and trenches
- Stress relief product
- Burr-free cutting line

LASER Cutting

Feature	Standard Value
Metal thickness range (T)	0.012-1.0 mm (0.0005"-0.040") for ferrous alloys 0.012-2.0 mm (0.0005" - .080") for silicon 0.012-0.60 mm (0.0005"-0.024") for copper alloys and aluminum
Part maximum size	585X780 mm (23"x30.7")
Minimum hole/slit size	Ø 0.030 mm for T<0.25mm Ø 0.060 for 0.25 mm<T<0.50 mm Ø 0.120 for 0.50 mm<T<1.0 mm 0.150 mm for T=1.0
Minimum line width between two openings	0.020 mm (.0008")
Minimum inner corner radius	R0.015 mm (.006")
Minimum outer corner radius	40%T
Minimum dimensions tolerance	±0.005 mm (.0002")

- Economic viability and fast delivery time for limited quantity
- Accuracy unaffected by thickness
- Thickness and graphical complexity affects cost
- Straight cut edges
- Small heat affected zone

ELECTROFORMING

Feature	Standard Value
Material	Nickel-Cobalt (Ni95-Co5)
Metal thickness range (T)	0.005 mm - 0.20 mm (.0002"-.008")
Part maximum size	610X780 mm (24"x30.7")
Minimum hole/slit size	Ø 100%T * Down-to absolute 0.05 mm (.002")
Minimum line width between two openings	0.035mm (0.0014")
Minimum inner corner radius	R0.040 mm (0.0016")
Minimum dimensions tolerance	±0.010 mm (.0004")

- Economic viability and fast delivery time for limited quantity
- Accuracy unaffected by thickness
- Thickness and graphical complexity affects cost

MILLING

CNC High Speed Technology

Feature	Standard Value
Material	Kovar, Stainless-Steel Copper, PhosBronze, Brass, Aluminum Glass-Epoxy, Teflon, PEEK, Polymers
Metal thickness range (T)	0.1 mm – 12.0 mm (.004"-.470")
Part maximum size	300 mm x 430 mm (11.8"x17") for ferrous alloys 700 mm x 1,000 mm (27"x38") for soft metals & Composite materials
Minimum milling tool	Ø 0.5 mm (0.020")
Minimum dimensions tolerance	±0.02 mm (0.008")

- Combined with pre-etched part allows to produce straight walls



- High speed milling (40,000 RPM)
- Cooling system without emulsion (clean work)

BENDING

CNC Programmable

Feature	Standard Value
Max metal thickness range (T)	1.0 mm MAX (.040") for hard metals 2.0 mm MAX (.080") for half-hard & annealed metals
Max. bending line length	145 mm (5.7")
Max. bending angle range	140°
Bending angle precision	±0.1°
Bending linear precision	±0.1 mm (.004")
Bending tool radius	R 0.2 mm / 0.5 mm / 1.0 mm / 1.5 mm
Min. distance between two bends	2 mm (.080")

 Fast prototype - no pressing die required

SURFACE

Finishes

Feature	Description
Nickel (Ni)	Electrolytic Semi-Bright Electroless high phosphorus (10-14% P) Electroless Low Phosphorus (2-4% P)
Gold (Au)	Electrolytic hard (99.7% Au, 0.3% Co) Electrolytic soft 99.9% Au Electroless (immersion) soft 99.9% Au
Silver (Ag)	Electrolytic soft 99.9% Ag (Semi-Bright) Immersion (over Cu only)
Copper (Cu)	Electrolytic bright pure Electroless bright pure
Tin (Sn)	Electrolytic matte pure
Palladium (Pd)	Electrolytic bright pure
Passivation	For stainless steel
Chemical polish	For ferrous alloys
Nano-coating	Hydrophobic
Anti-tarnish	For copper alloys
Sand blast	For surface roughness and burrs removal
Rounding sharp edges	Chemical acid dipping

Can be applied to all part surfaces or masking selectively defined areas