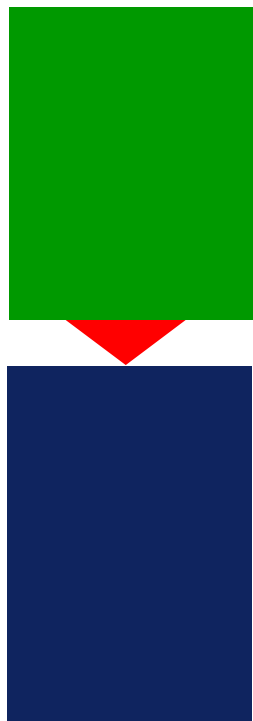


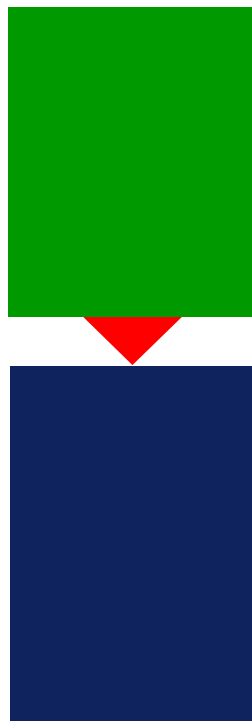
# 超声波焊接结构设计

# 焊接筋的角度

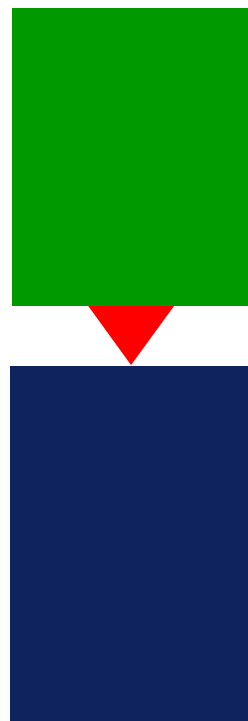
120°



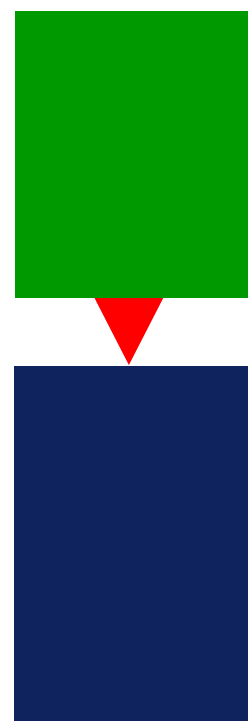
90°



60°



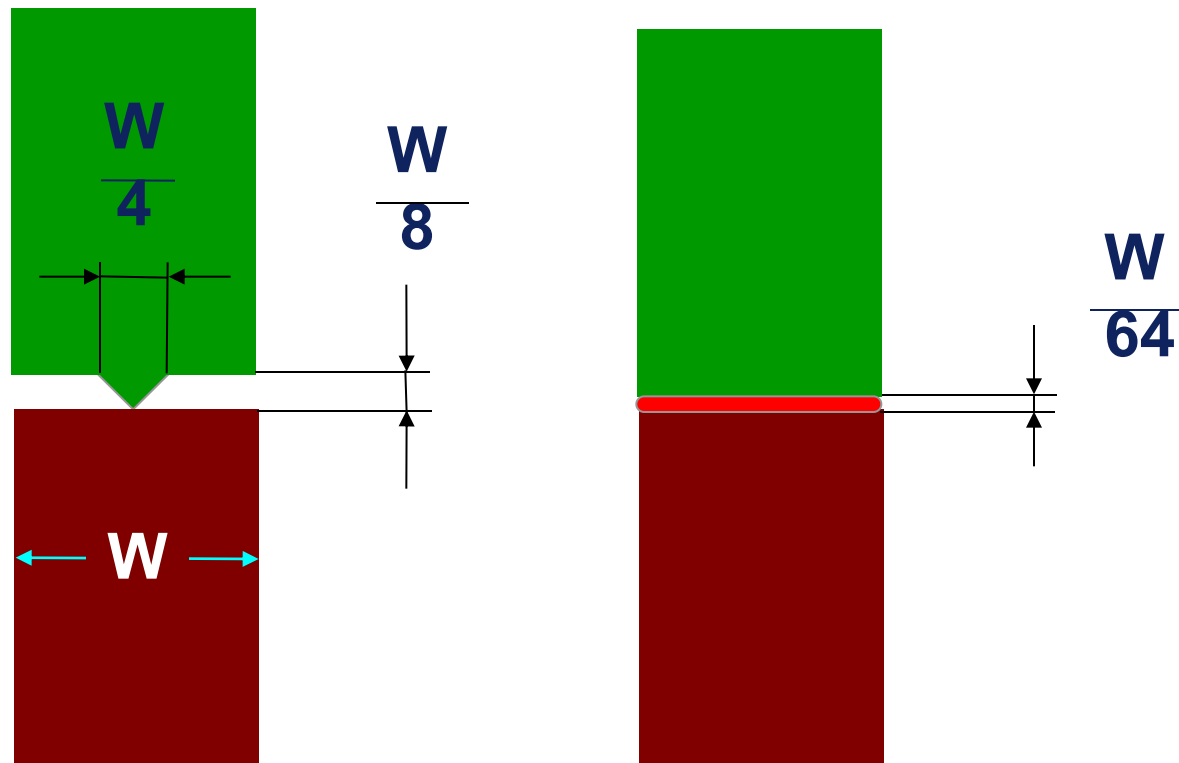
45°



# 超声焊接结构

- 基本型

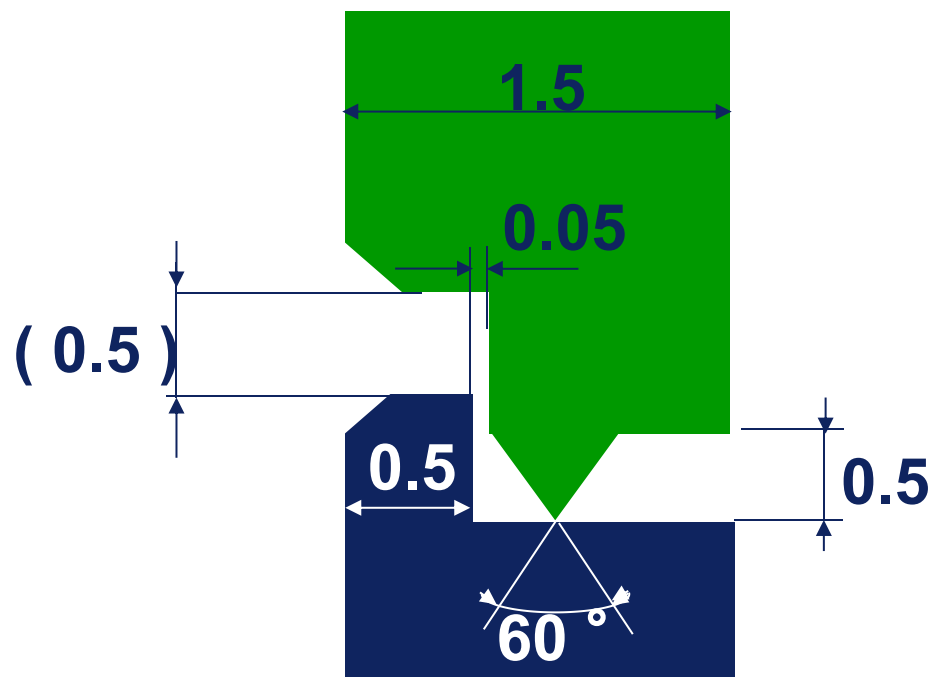
## Basic Energy Director



# 超声焊接结构

- 阶梯型

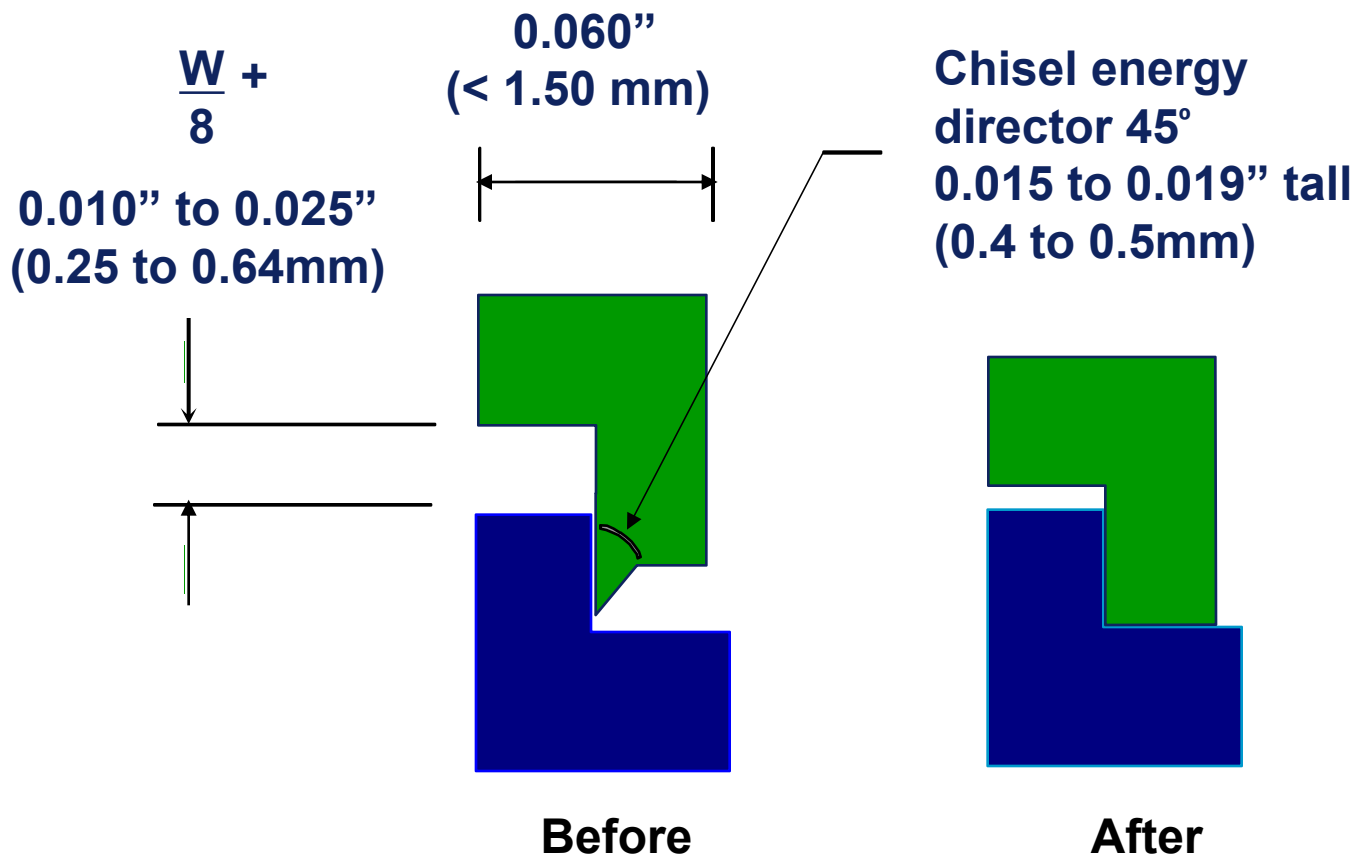
Step Joint



# 超声焊接结构

- 阶梯型

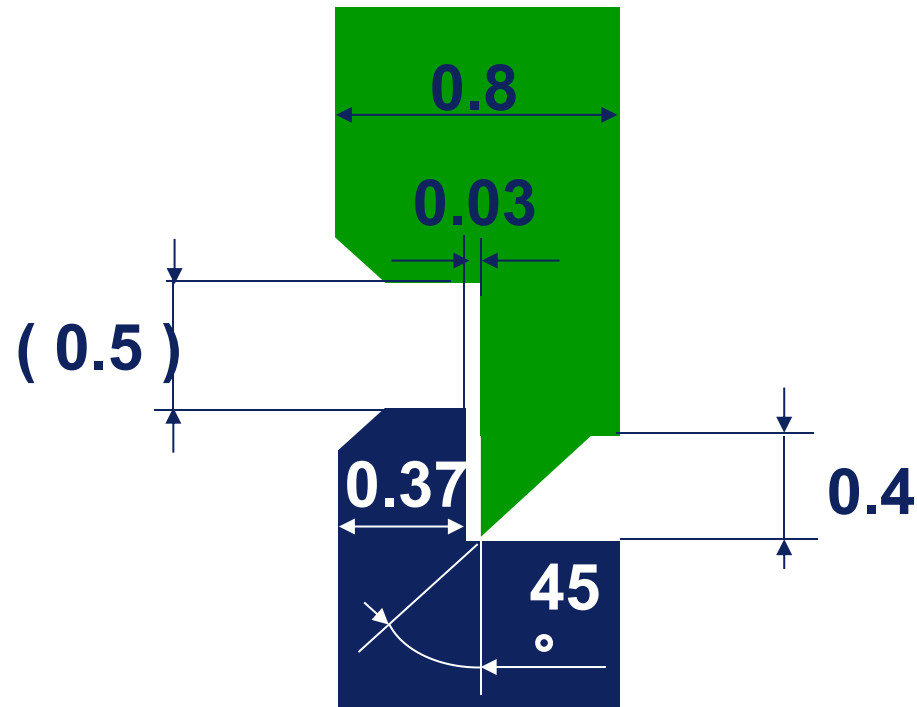
## Chisel Edge



# 超声焊接结构

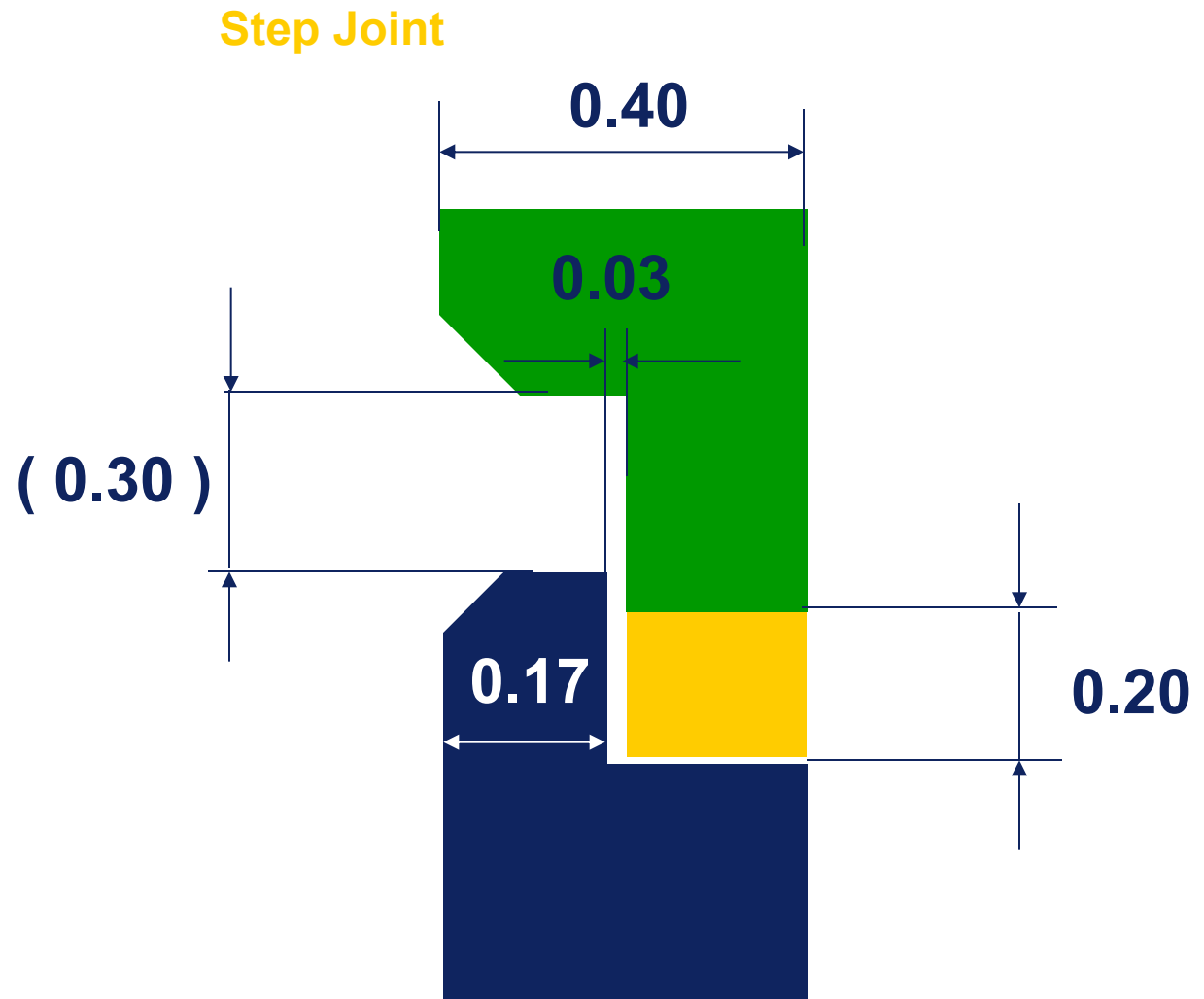
- 阶梯型

Step Joint



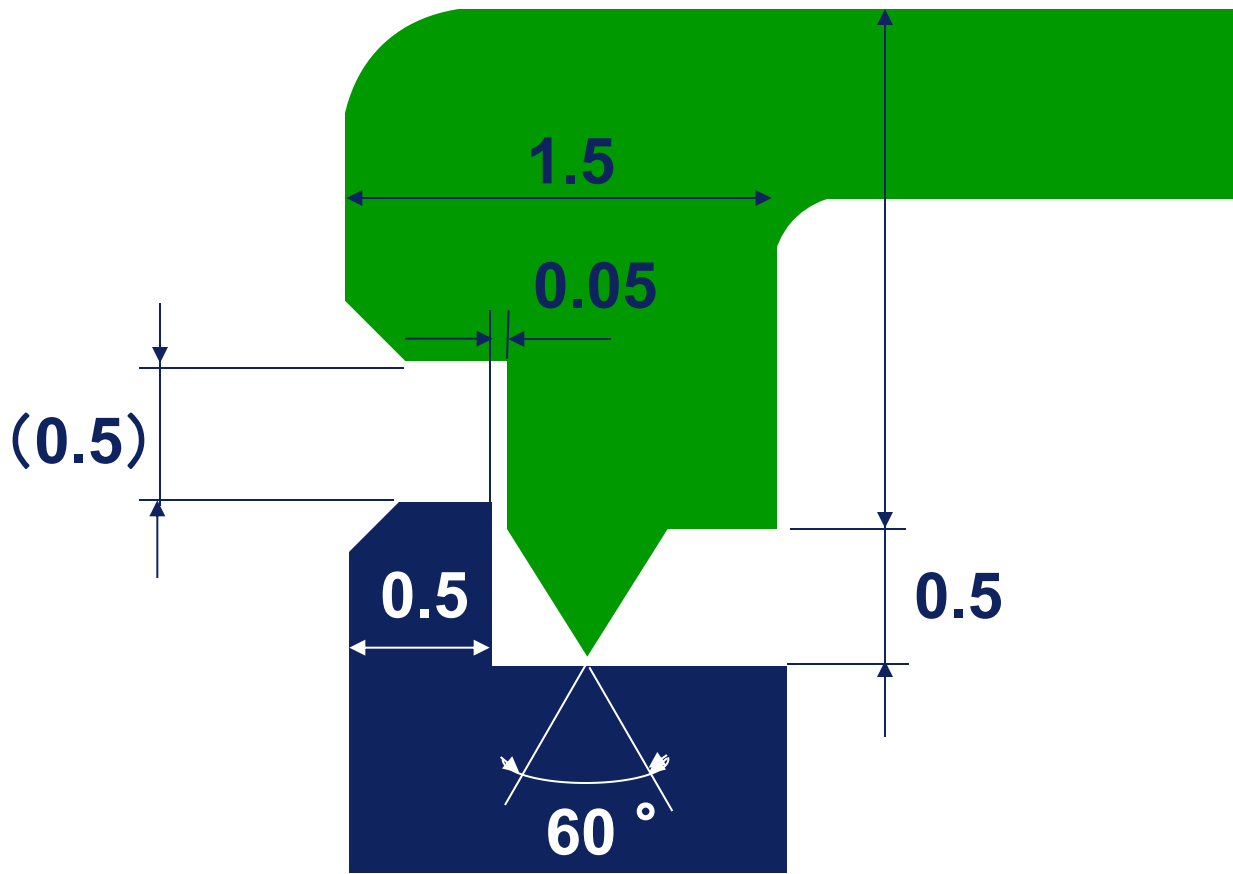
# 超声焊接结构

- 阶梯型



# Union Design ①

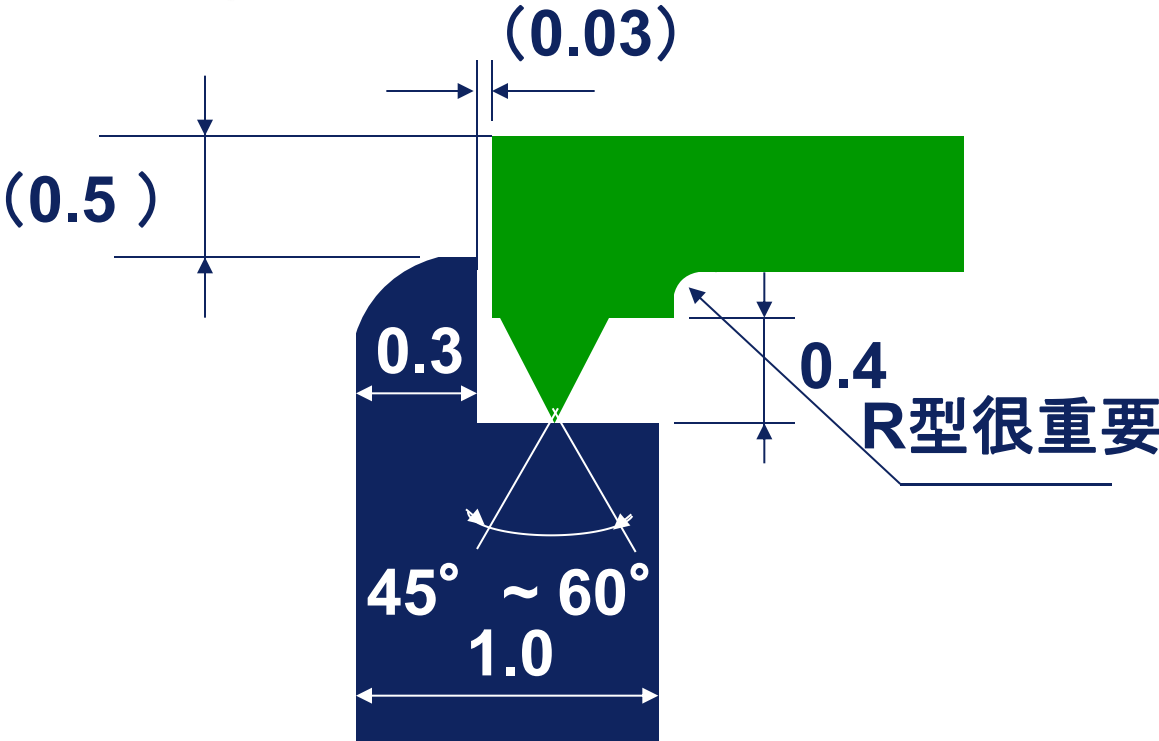
肉厚達 1.5 mm 程度時





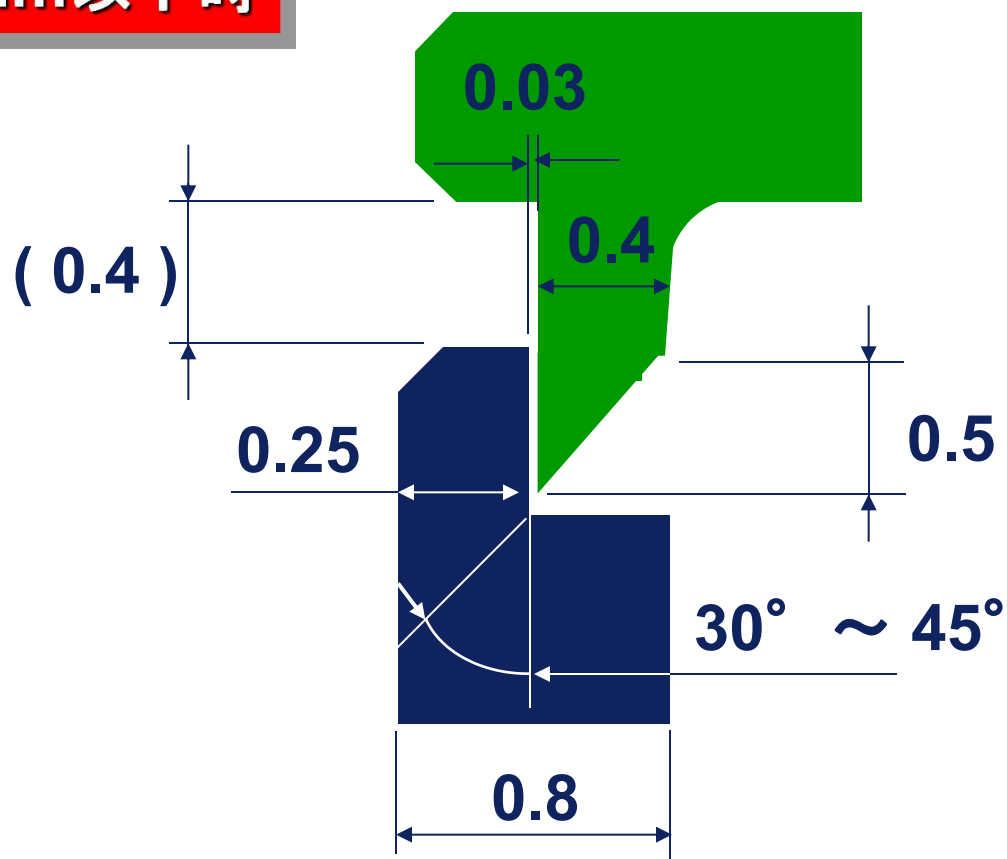
# Join Design②

肉厚 1.0 mm 程度時



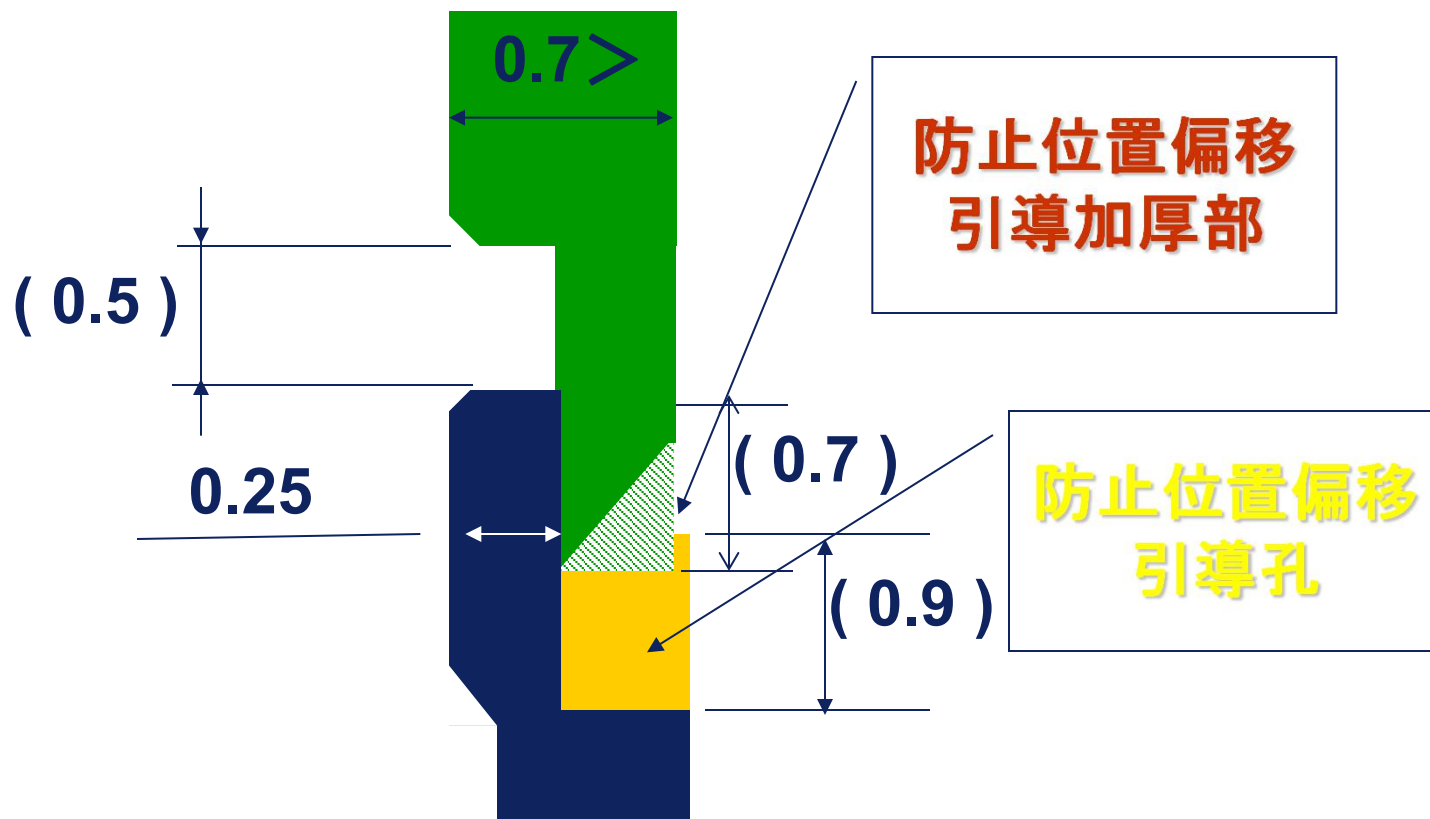
# Join Design③

肉厚約 0.8 mm以下時



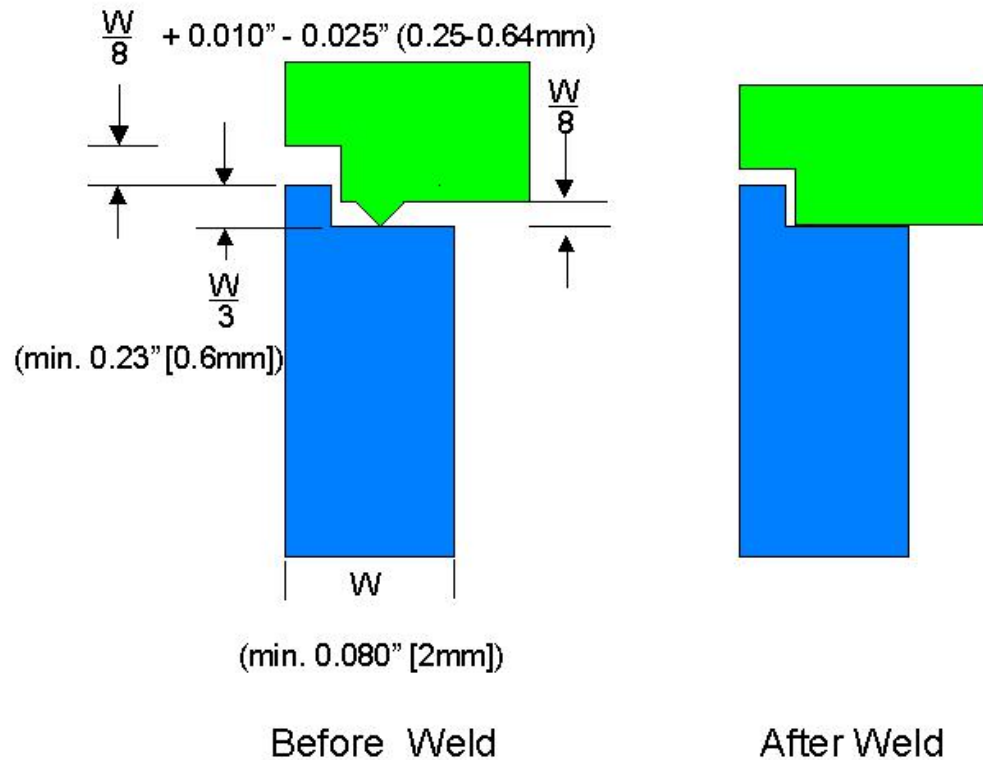
# Join Design④ 防止位置偏移(斷差)

肉厚 0.7 mm以下時



# 阶梯型设计及用处

- 防止溢料
- 改善外观



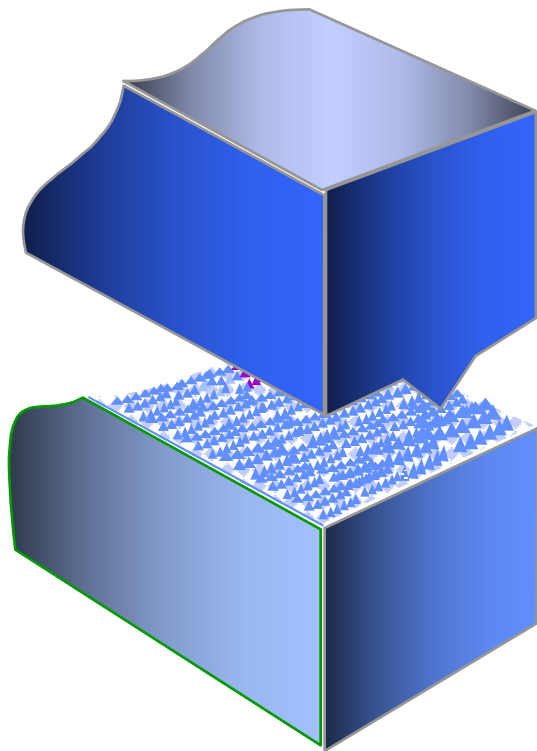
# 阶梯型设计例子



# 榫槽型设计例子



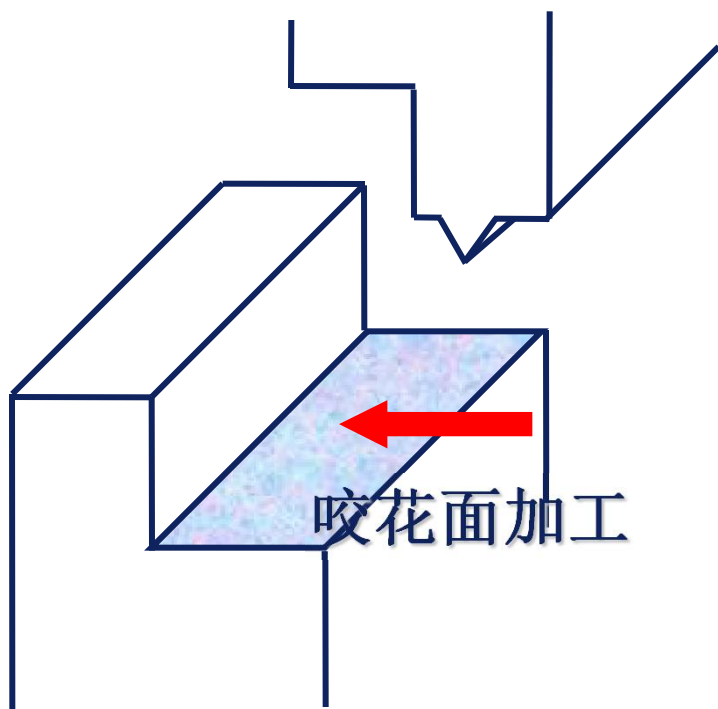
# 超声线及火花纹设计



<b>Branson/Mold-Tech Texture Designation</b>	<b>Pattern Depth</b>	<b>Energy Director Height</b>
<b>Branson300</b>	<b>0.003''</b>	<b>0.005''-0.011''</b>
<b>Branson450</b>	<b>0.0045''</b>	<b>0.012''-0.017''</b>
<b>Branson600</b>	<b>0.006''</b>	<b>0.018'' and up</b>

# 提高強度方式： 超声线及火花纹

熔接強度提高



ED 高度

咬花面深度

0.13~0.29

75  $\mu\text{m}$

0.30~0.44

115  $\mu\text{m}$

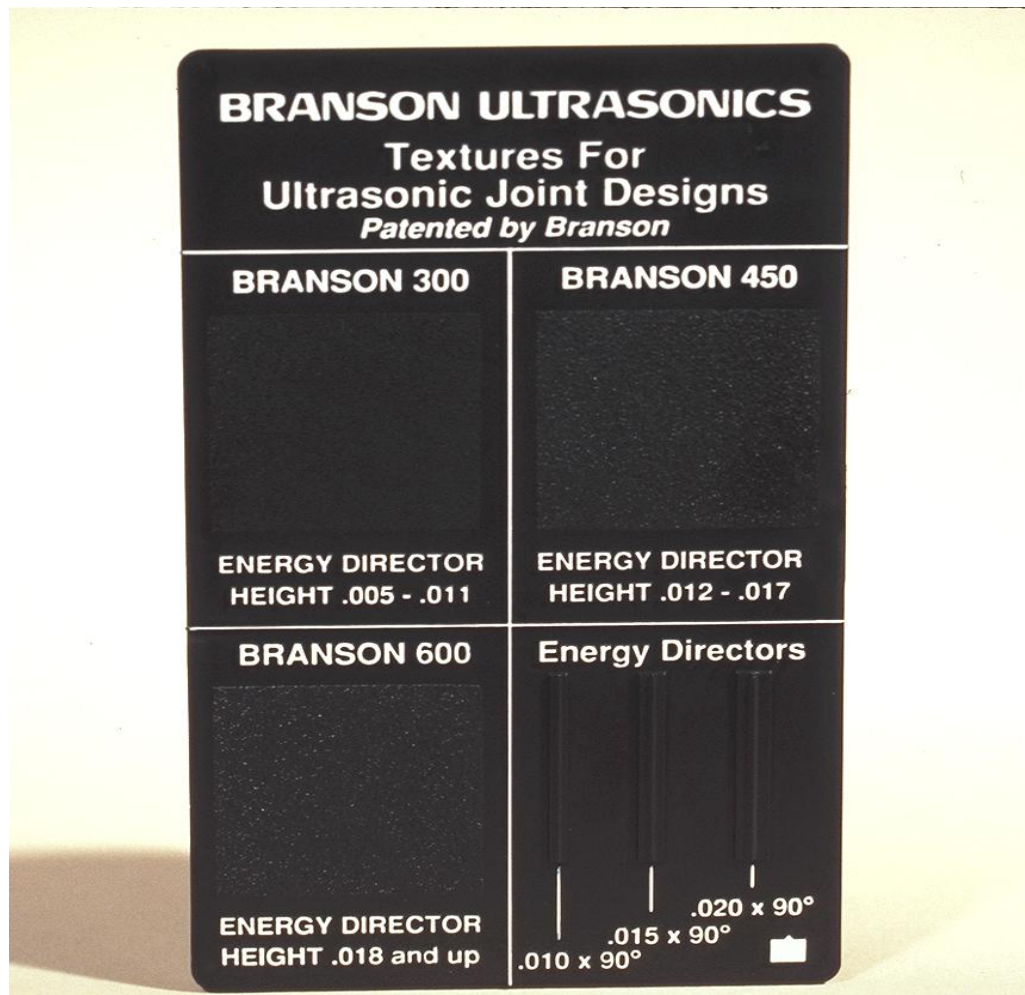
0.45 以上

150  $\mu\text{m}$

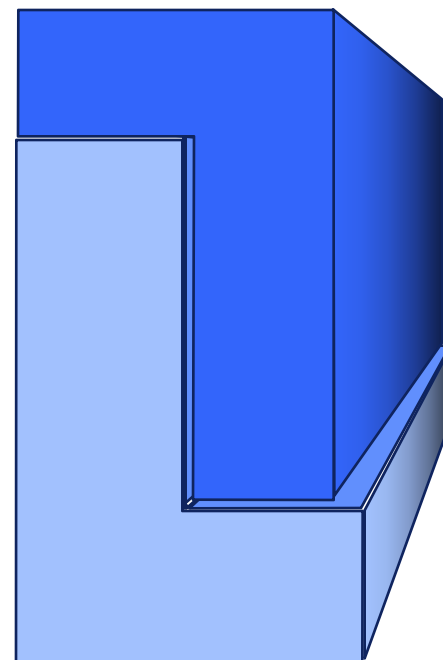
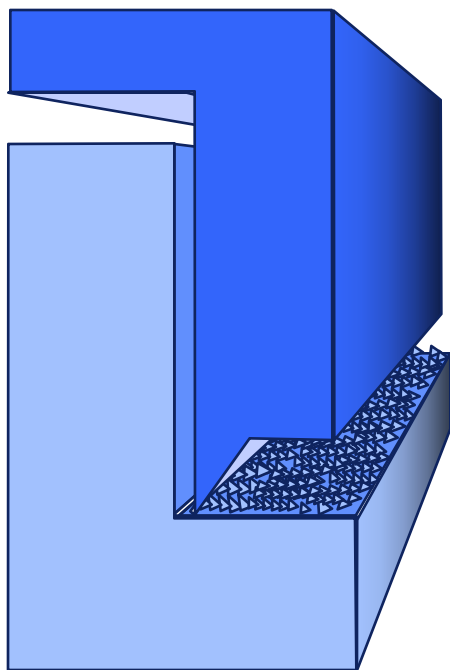
可防止橫向滑動



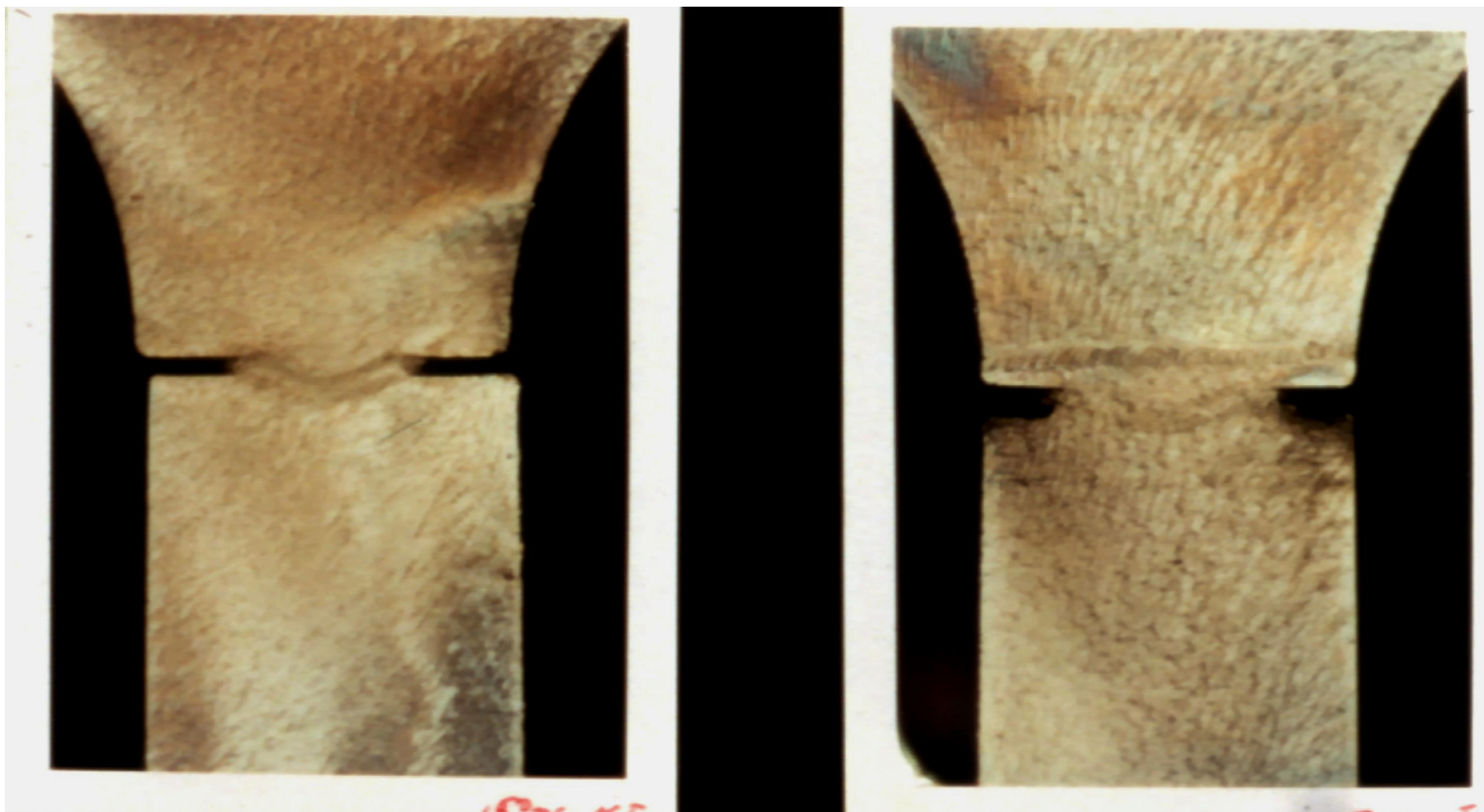
# 超声线及火花纹样板



# 刀边型加上火花纹



# 超声熔化效果



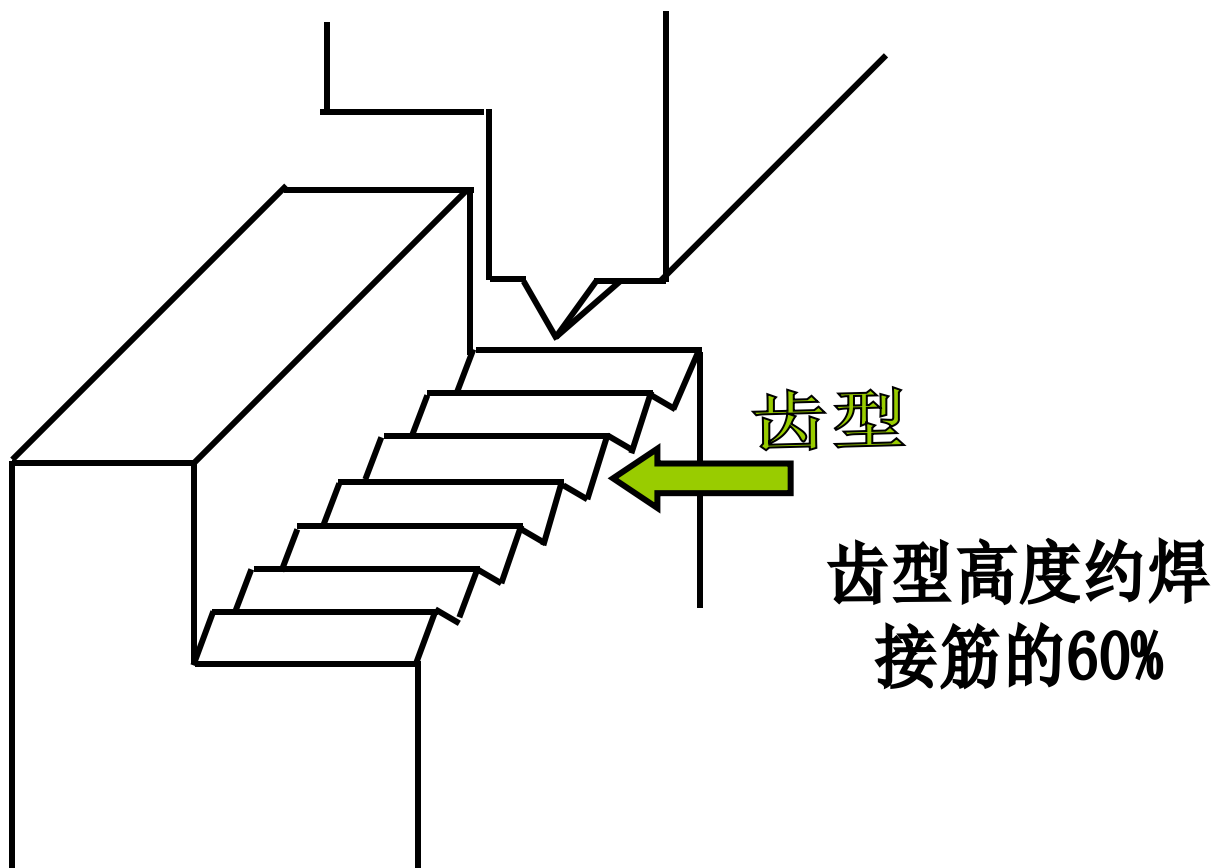
无火花纹

有火花纹

# 超声焊接结构

- 阶梯型

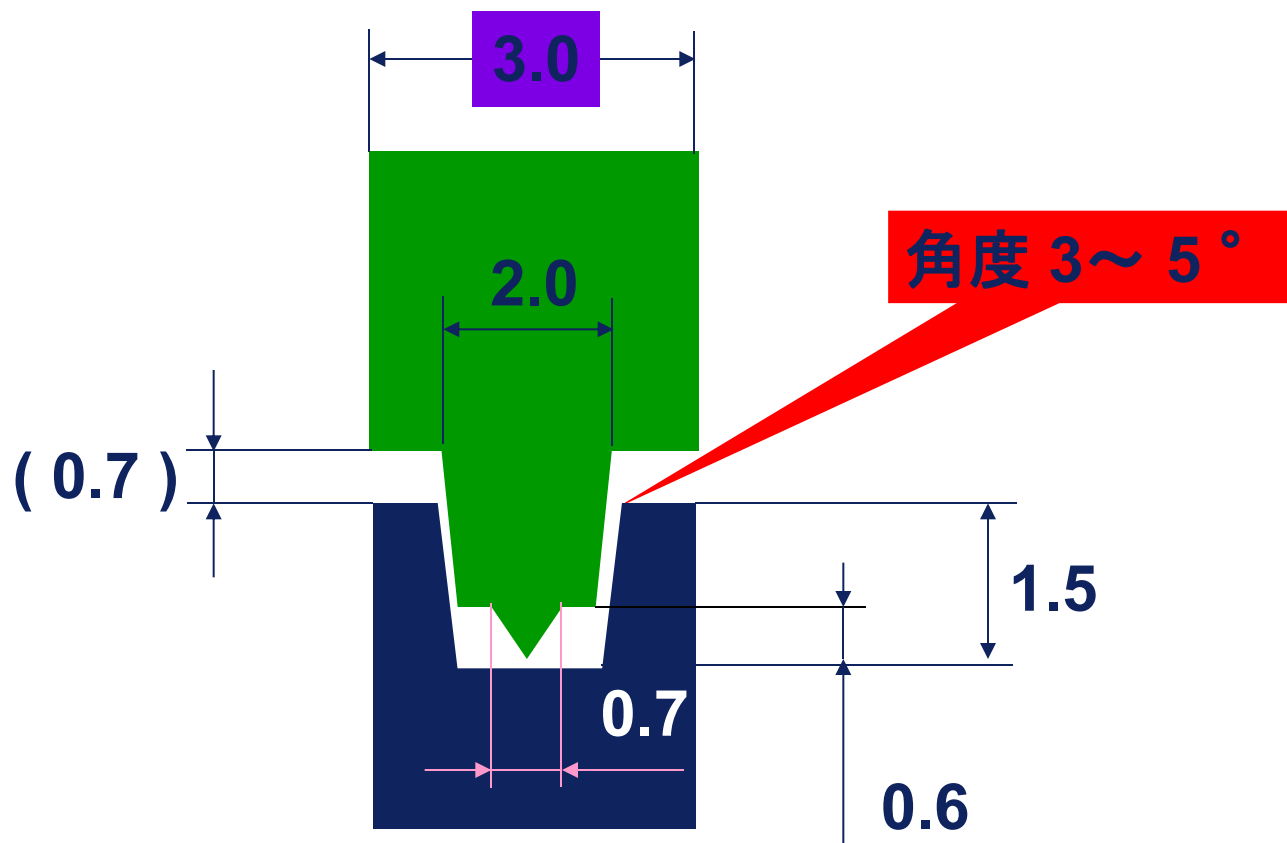
Continuous Criss-Cross  
Energy Director



# 超声焊接结构

- 榫槽型

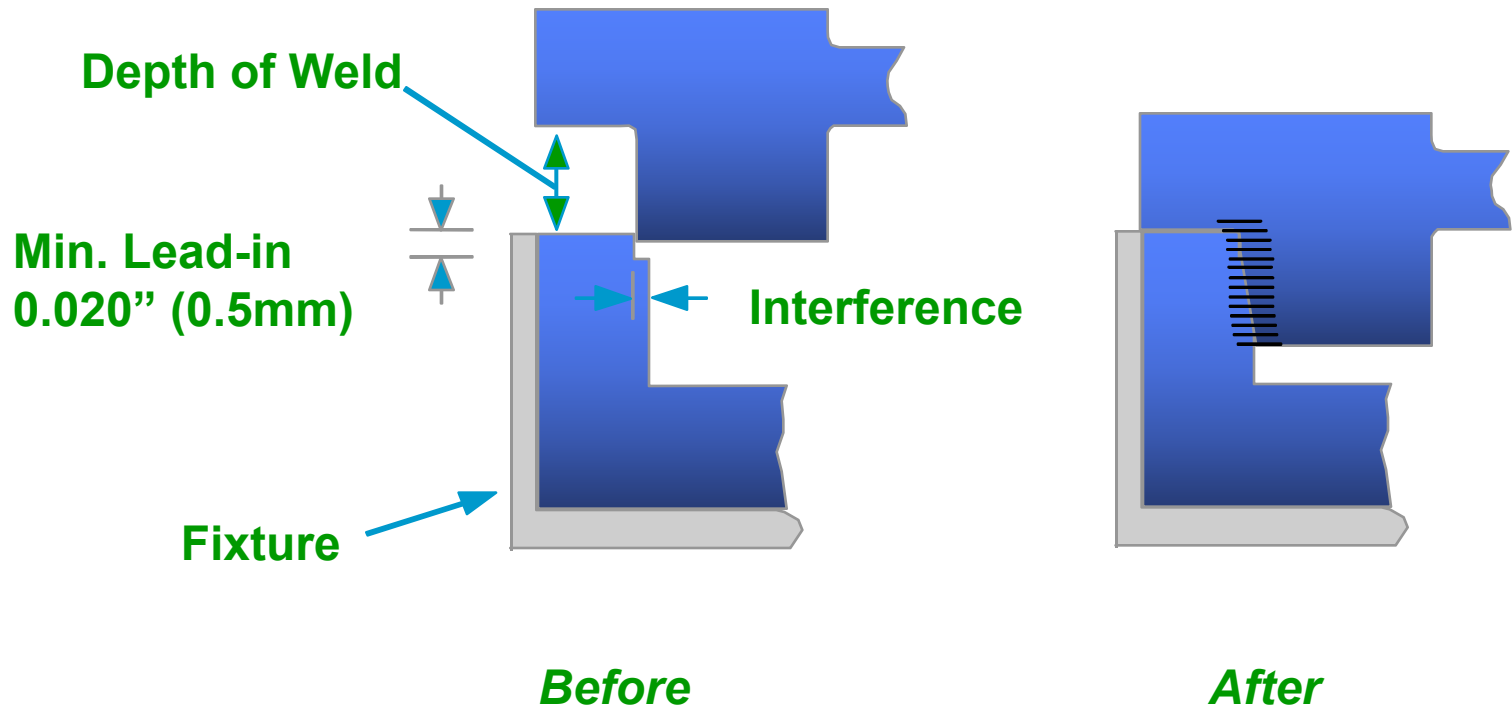
Tongue & Groove



# 超声线设计的限制

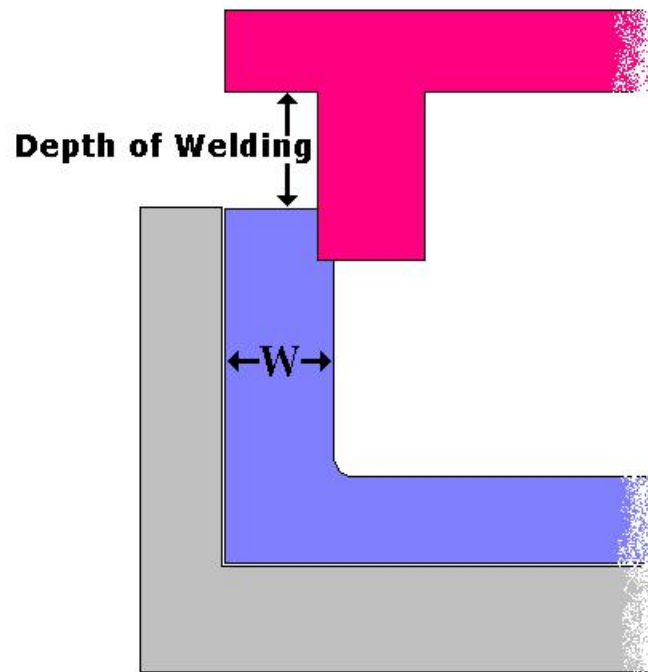
- 某些塑胶材料不能有效焊接
  - 特别是“半晶性”塑胶材料焊接
- 解决方法
  - 剪切型

# 剪切连接 (Shear Joint) 设计



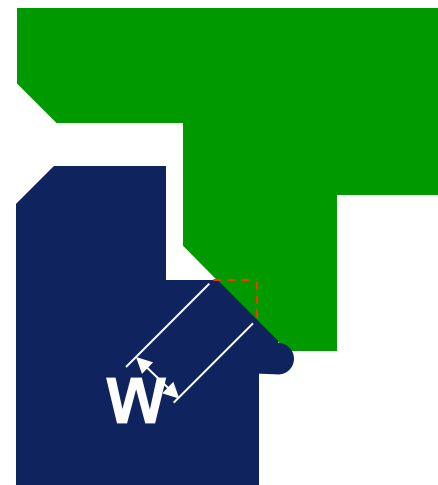
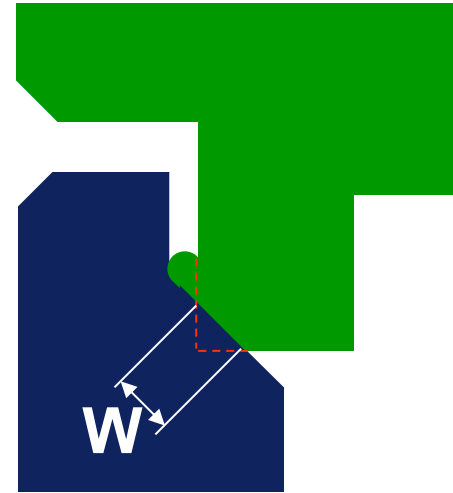
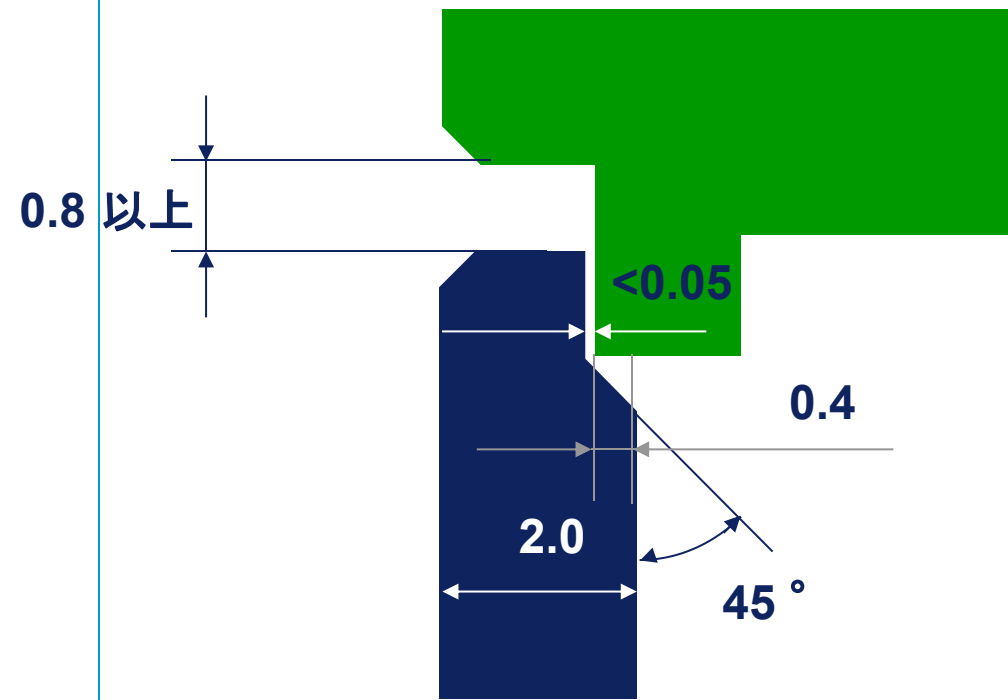
# 剪切连接的焊接深度

- 一般  $1.25w$
- 最少  $0.5w$
- 最多  $1.75w$





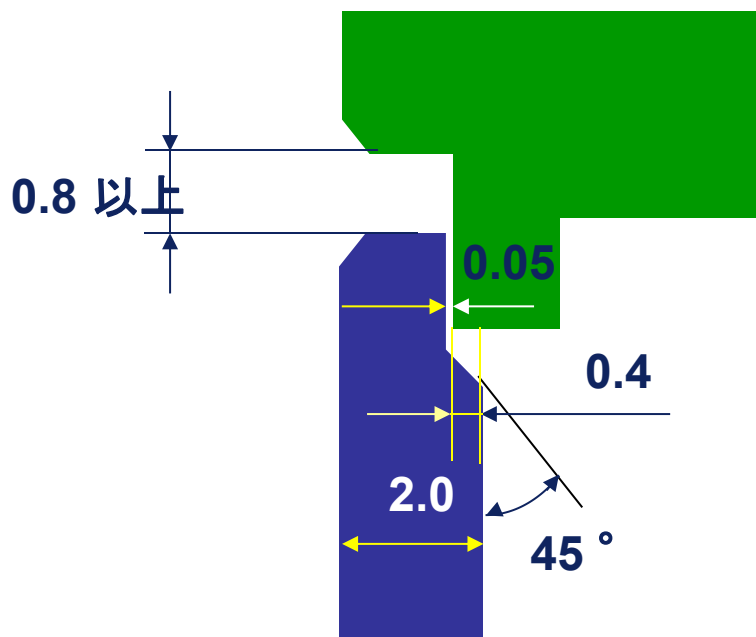
# Share Join①



# 超声焊接结构

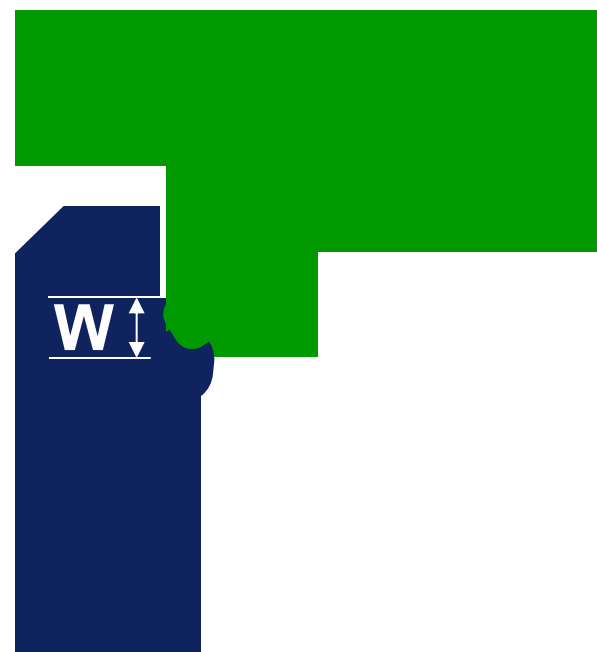
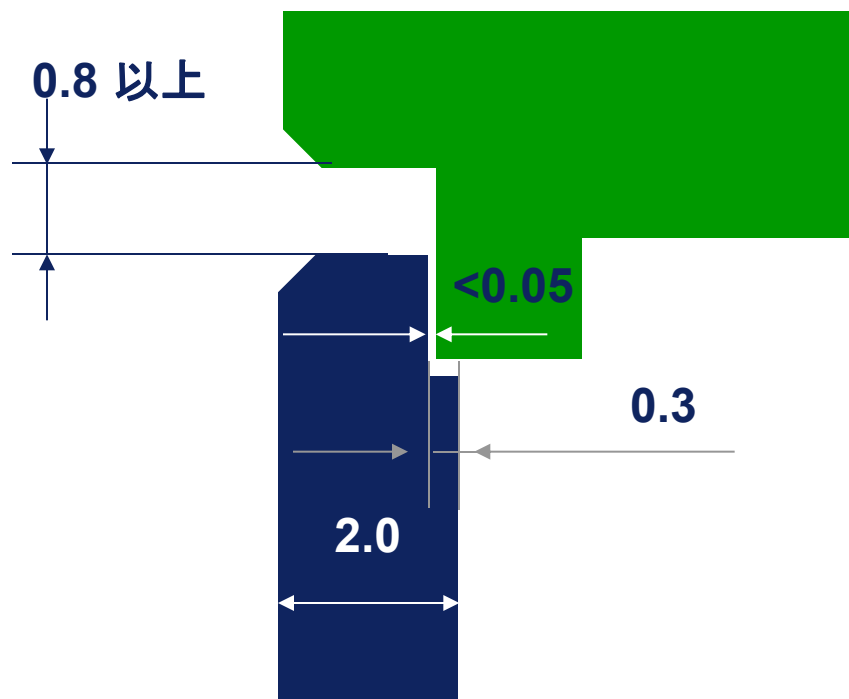
- 剪切型

## Shear Joint

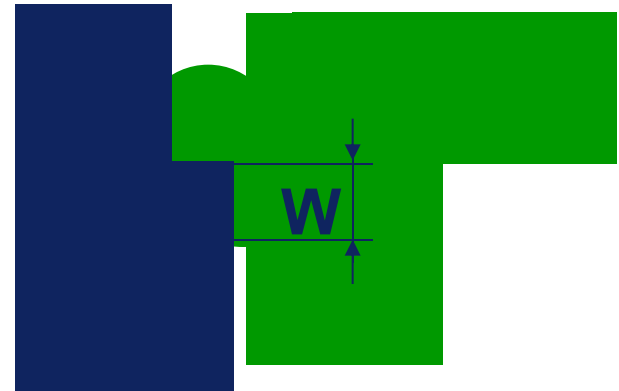
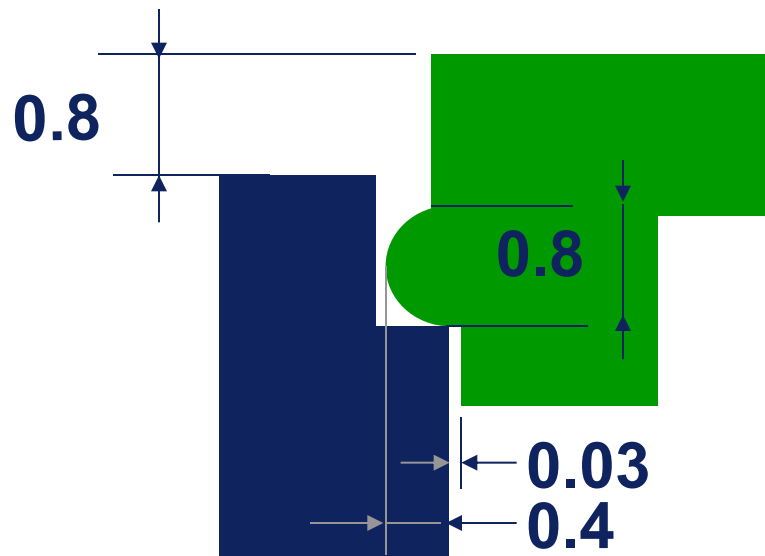


Maximum Part Dimension	Interference per Side (Range)	Part Dimension Tolerance
Less than 0.75" (18mm)	0.008" to 0.012" (0.2 to 0.3mm)	$\pm 0.001$ " ( $\pm 0.025$ mm)
0.75" to 1.50" (18-35mm)	0.012" to 0.016" (0.3 to 0.4mm)	$\pm 0.002$ " ( $\pm 0.050$ mm)
Greater than 1.50" (35mm)	0.016" to 0.020" (0.4 to 0.5mm)	$\pm 0.003$ " ( $\pm 0.075$ mm)

# Share Join②



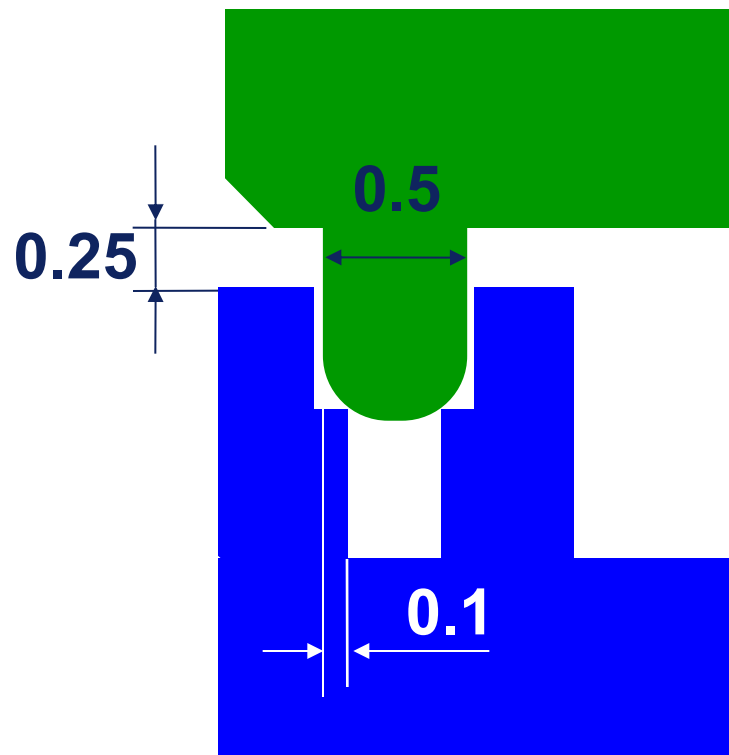
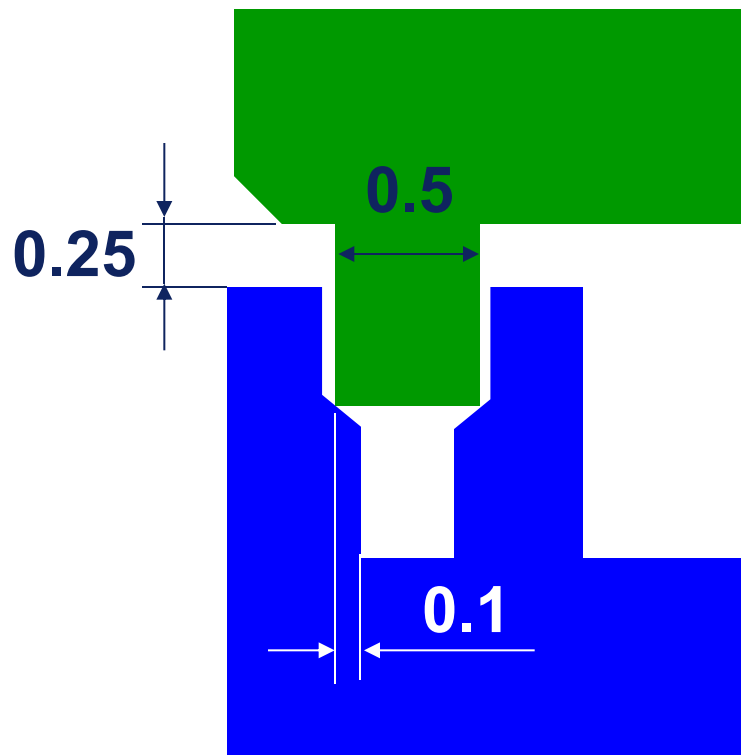
# Shear Joint



# 超声焊接结构

- 剪切型

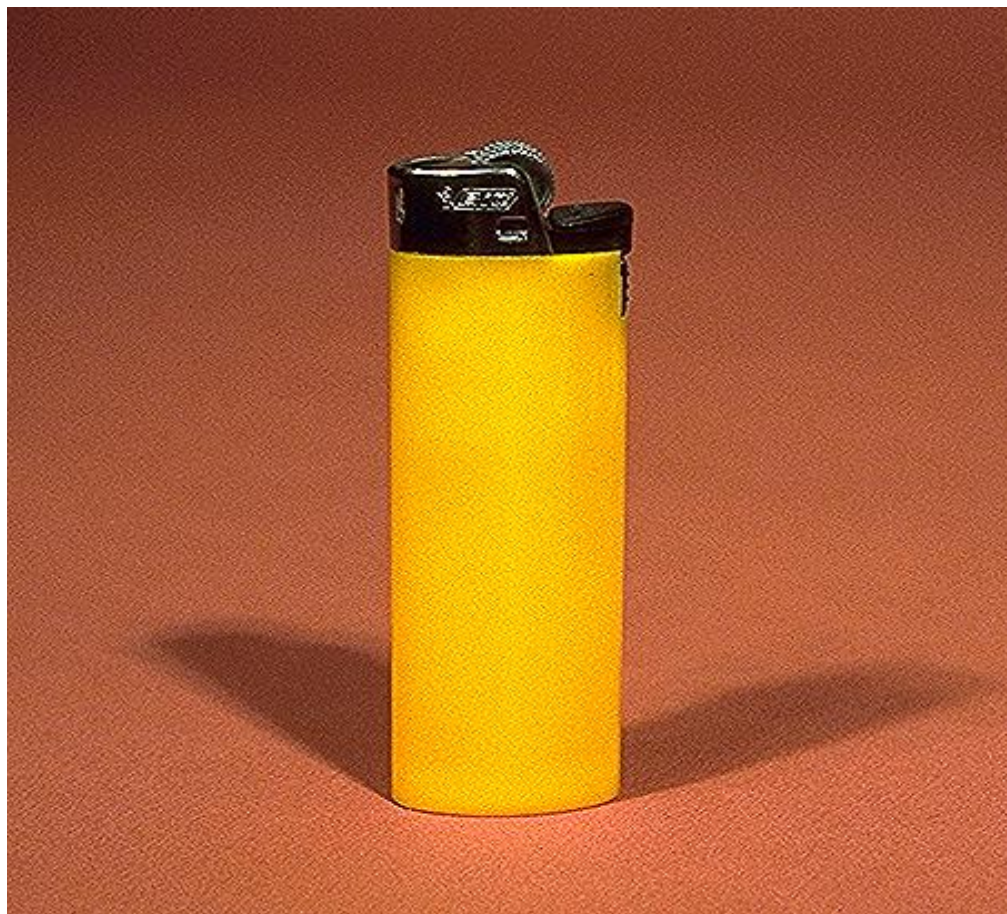
Shear Joint



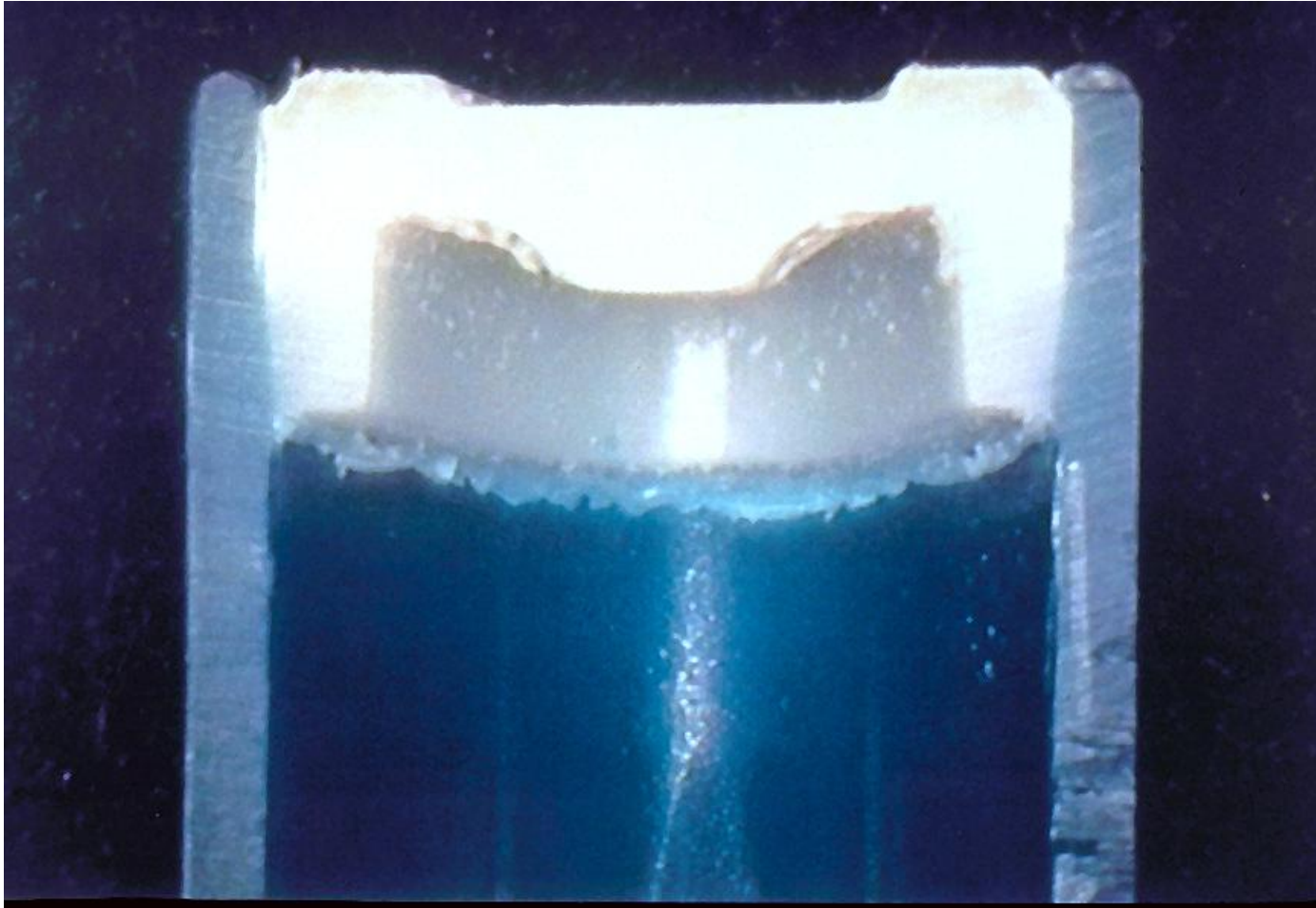
# Shear Joint Interference

<b>Maximum Part Dimension</b>	<b>Interference per Side (Range)</b>	<b>Part Dimension Tolerance</b>
Less than 0.75" (18mm)	0.008" to 0.012" (0.2 to 0.3mm)	$\pm 0.001"$ ( $\pm 0.025\text{mm}$ )
0.75" to 1.50" (18-35mm)	0.012" to 0.016" (0.3 to 0.4mm)	$\pm 0.002"$ ( $\pm 0.050\text{mm}$ )
Greater than 1.50" (35mm)	0.016" to 0.020" (0.4 to 0.5mm)	$\pm 0.003"$ ( $\pm 0.075\text{mm}$ )

# 剪切设计例子



# 剪切设计例子





# 剪切设计的长处

- 焊接强度高, 防水效果佳
- 减少“假焊”现象出现
- 适合大多数塑料材料

# 剪切设计的限制

- 要求高精度度的塑件
- 需要较强的支持
- 焊接面多为正多边形或圆形