

# Welding Symbols

Meridian Professional Technical Center

Welding II

**Get in  
order!!**

You each have a  
section of a story.

Make the story  
make sense.

# Objectives

1. Identify the different weld symbols used by AWS and their meaning.
2. Identify the different joint symbols used by AWS and their meaning.
3. Know the importance of the placement of each symbol.
4. Draw the different symbols and lines used by AWS.

# Terms

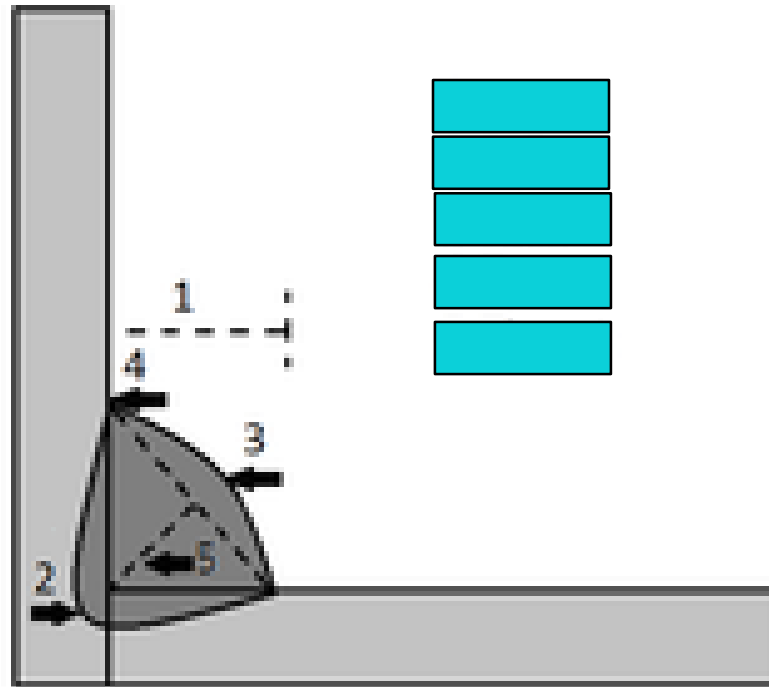
Face

Leg

Root

Throat

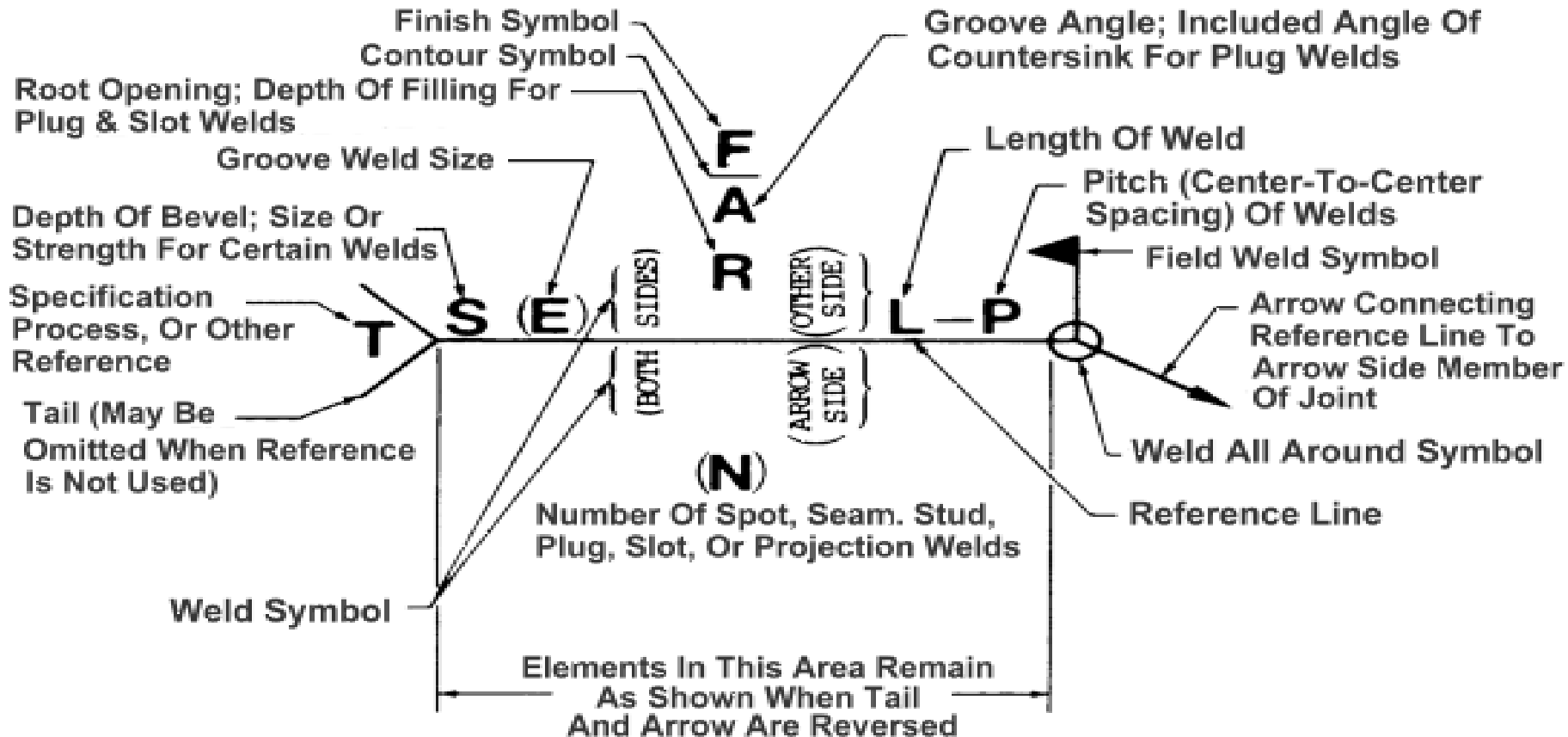
Toe



# A welding symbol may include the following elements:

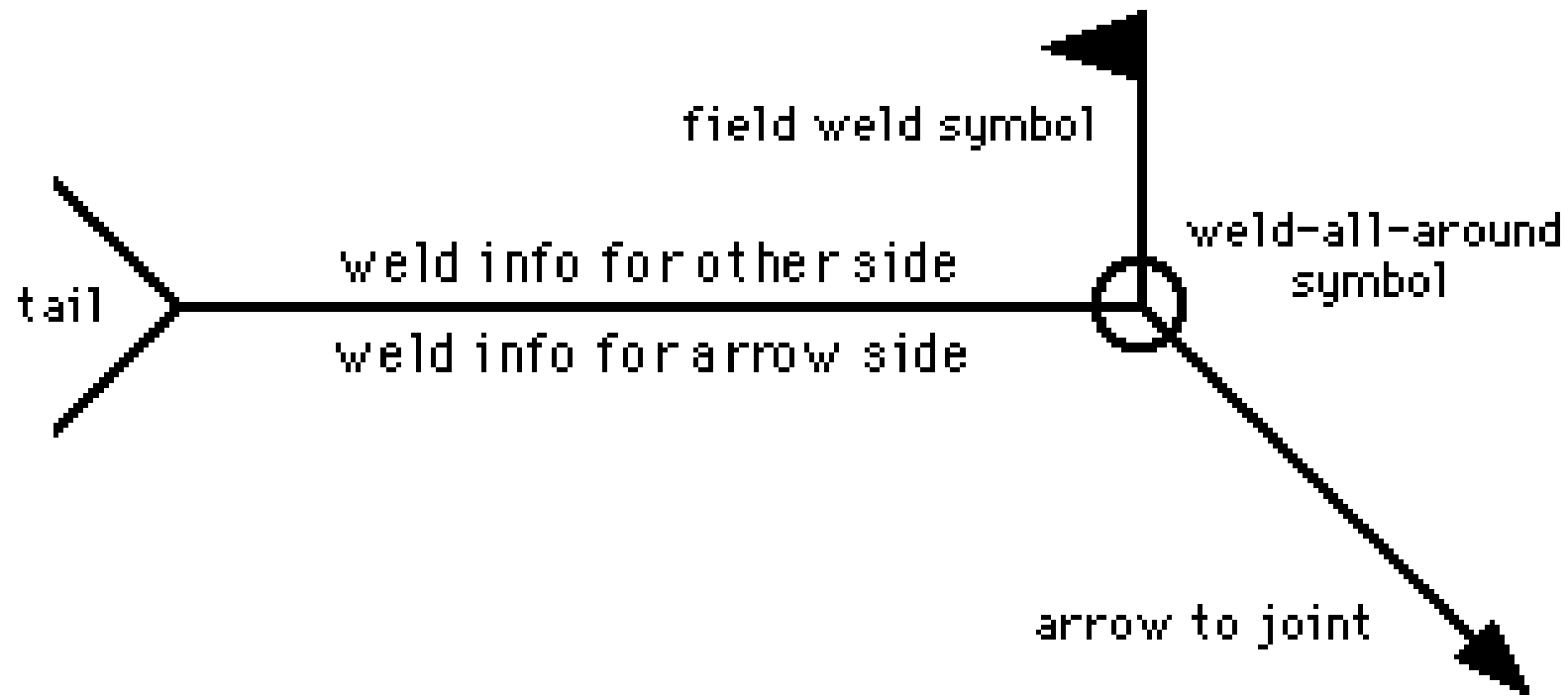
- ▶ Reference Line
- ▶ Arrow
- ▶ Basic Weld Symbol
- ▶ Dimensions & Other Data
- ▶ Supplementary Symbols
- ▶ Finish Symbols
- ▶ Tail
- ▶ Specifications, Process, Or Other References

# Elements Of A Welding Symbol:



Location Of Welding Symbol Elements

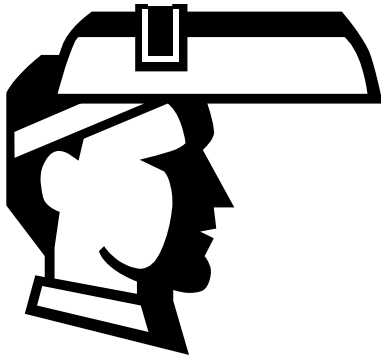
# Elements Of A Welding Symbol:



# Weld Symbol Terminology

OTHER SIDE

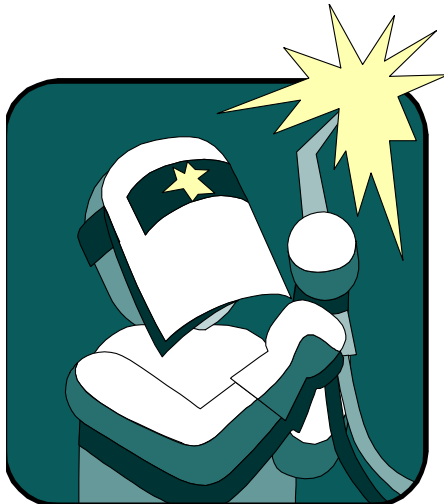
ARROW SIDE



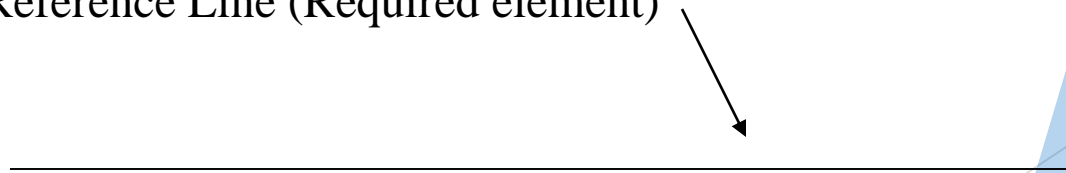


# Reference Line

- The reference line is the main foundation for welding symbols used in blueprints.
- Anything written above the reference line itself indicates a weld on the other side of where the arrow points.
- Anything written below the reference line itself indicates a weld on the same side as the arrow points.



Reference Line (Required element)



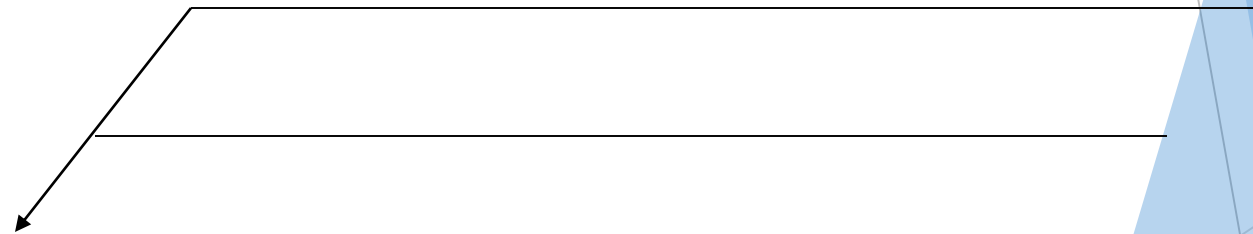
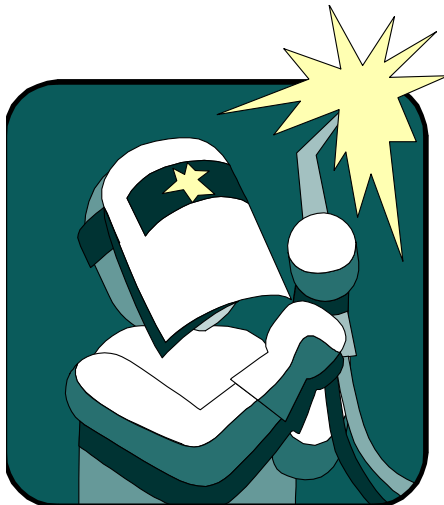
Always Horizontal



# Multiple Reference Lines

Additional reference lines are used to present a sequence of welds or operations to be performed. Sometimes it is necessary to prepare the joint before welding, this will be defined in the welding symbol. Additional references can be made in two ways, first drawing another reference line or stacking symbols.

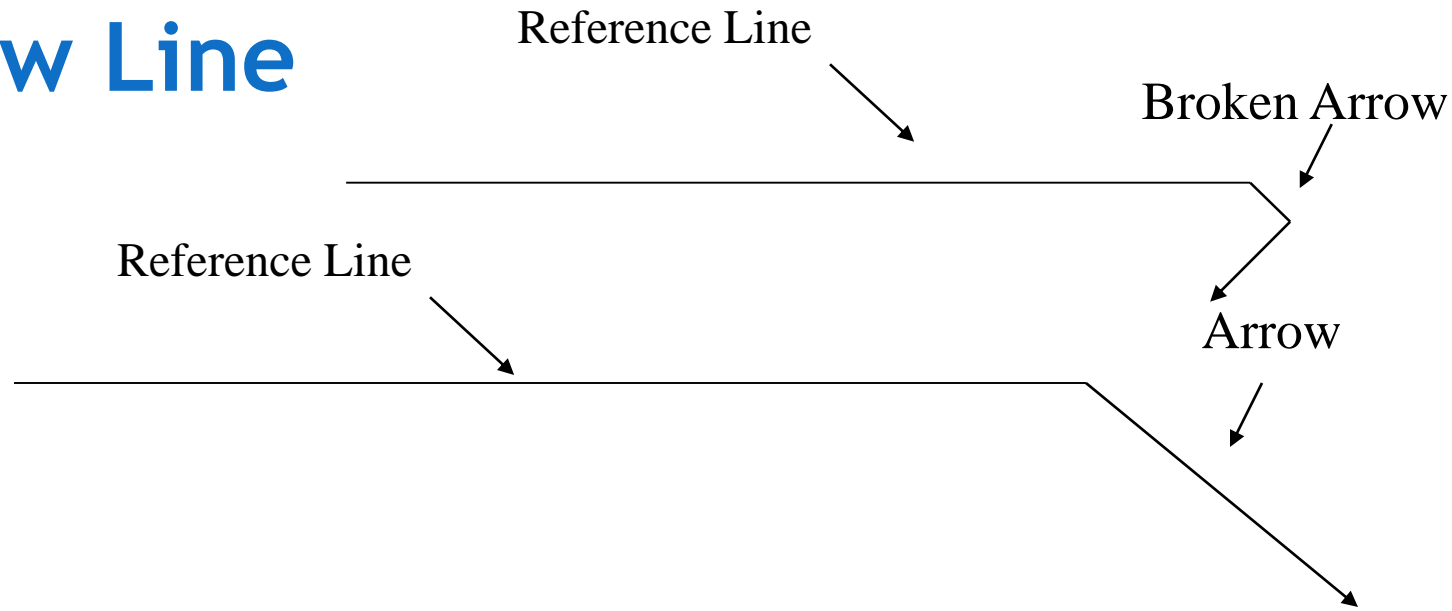
ALWAYS work from the arrow to the other side



Always Horizontal



# Arrow Line



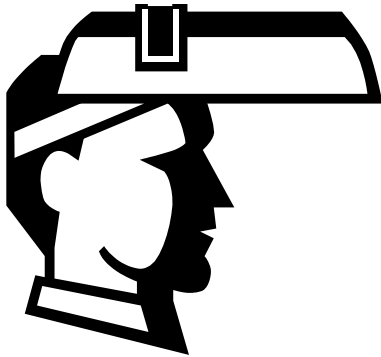
- The arrow runs from the reference line and designates the joint that needs to be welded.
- A straight arrow is used for weld locations
- A broken-arrow line is used for joint preparation and breaks toward the piece that is to be beveled.



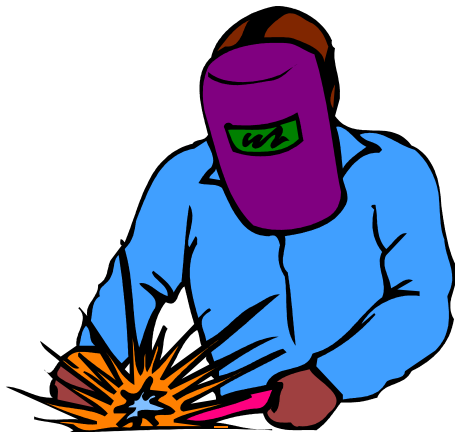
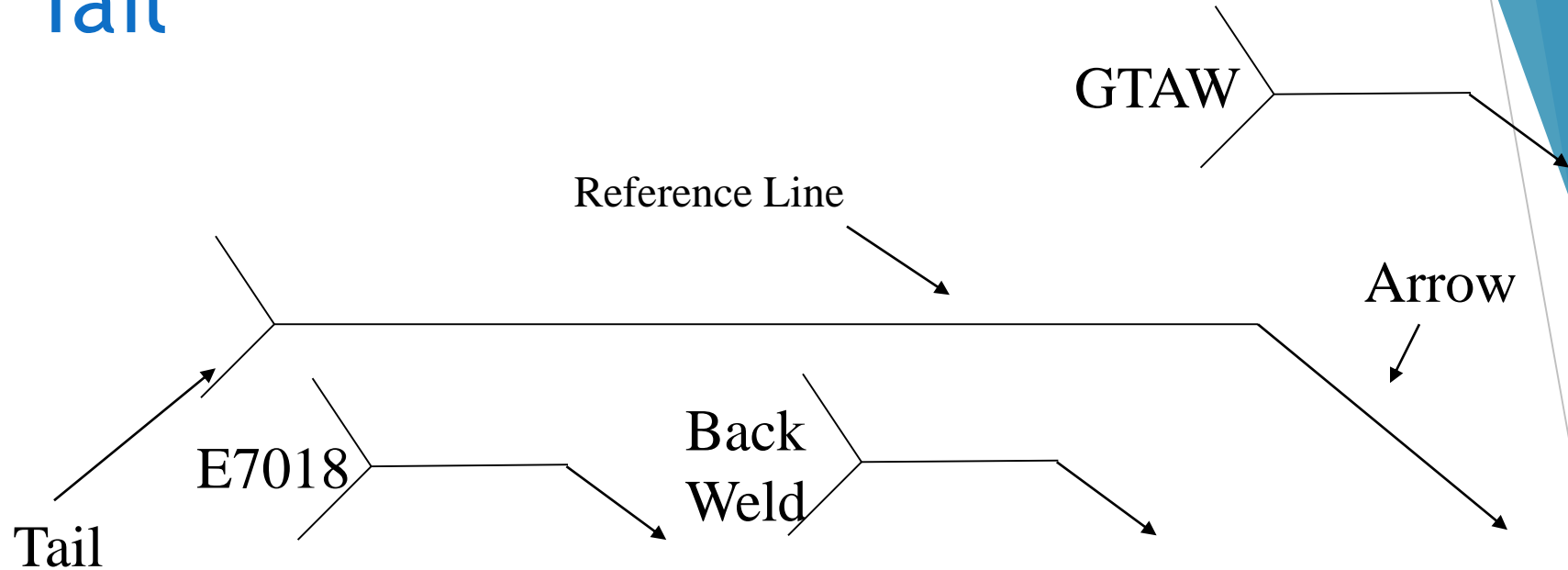
# Weld Symbol Terminology

What SIDE?

What SIDE?



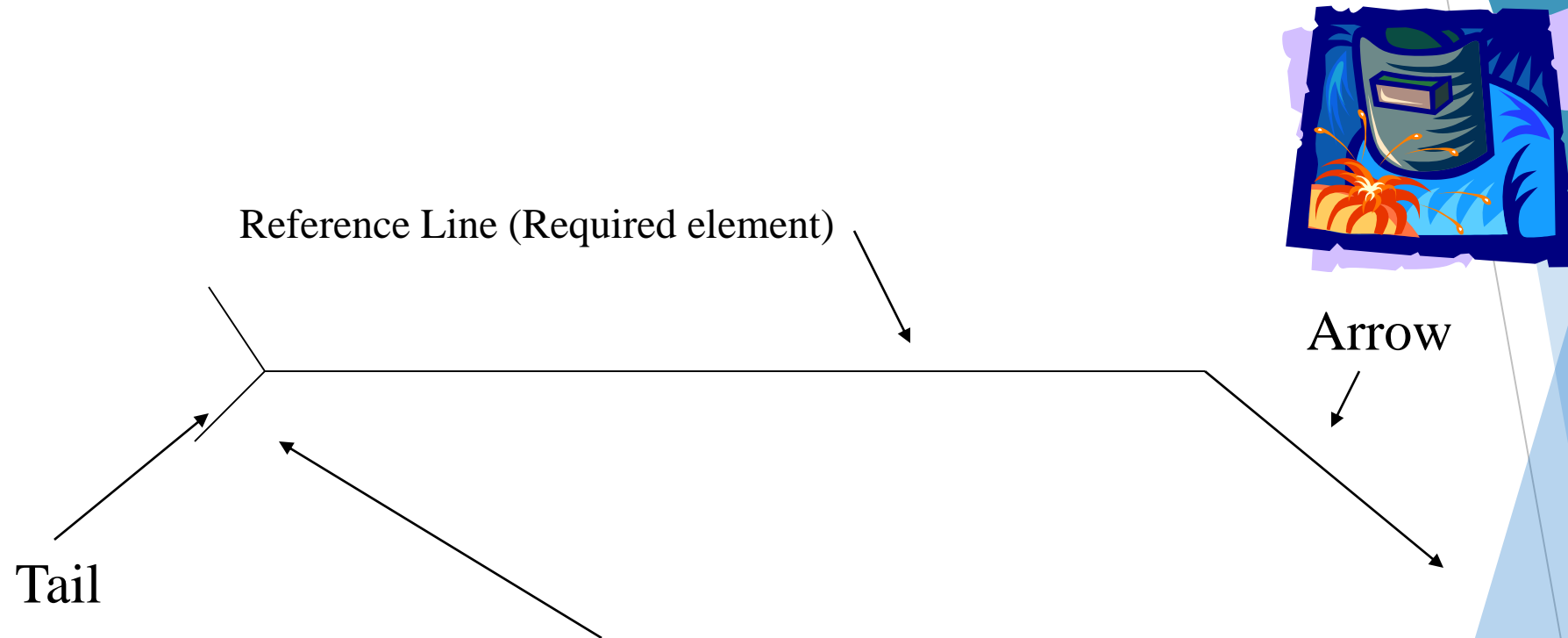
# Tail



- Inside the tail will be further information about the weld. Usually, the method of welding or type of welding rod to be used.
- Specification or other references will be placed here.
- The tail might not appear on the reference line if it is not being used.

Reference Line must always be horizontal,

Arrow points to the line or lines on drawing which clearly identify the proposed joint or weld area.

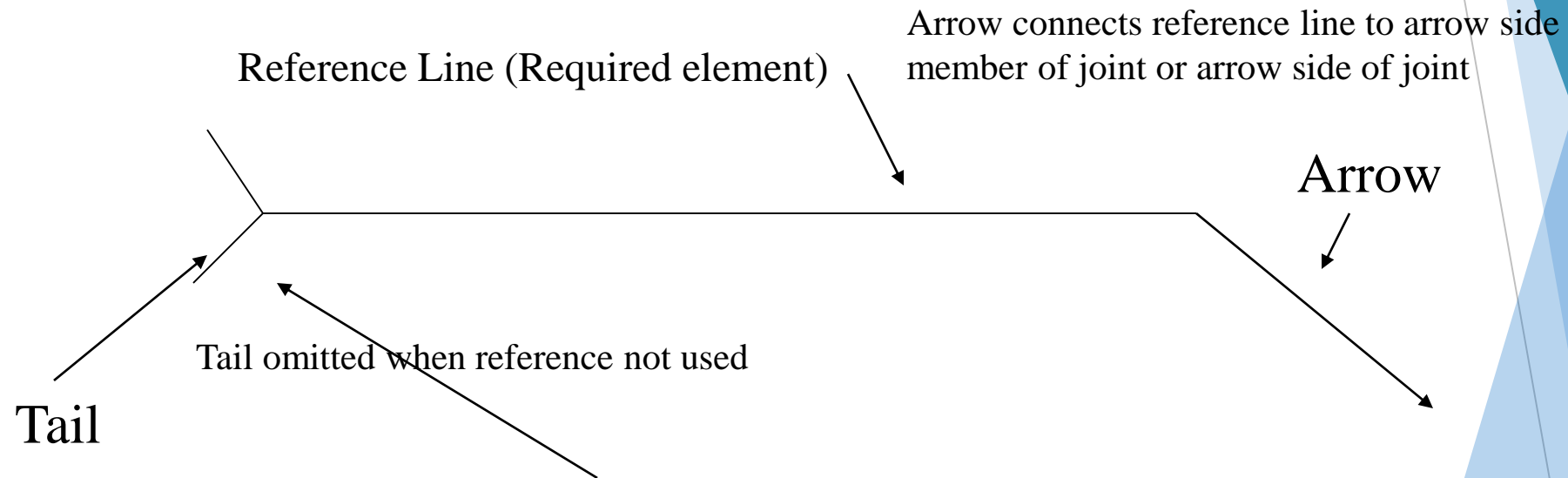


The tail of the welding symbol is used to indicate the welding or cutting processes, as well as the welding specification, procedures, or the supplementary information to be used in making the weld.

Reference Line must always be horizontal,

Arrow points to the line or lines on drawing which clearly identify the proposed joint or weld area.

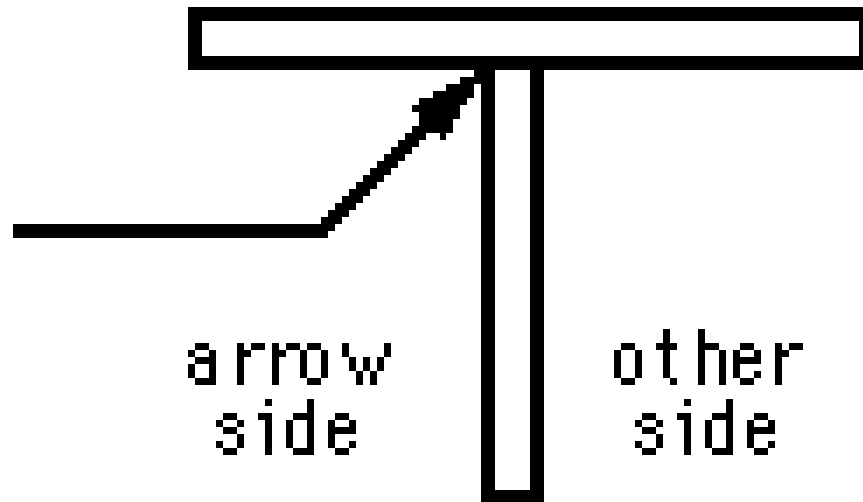
### *Basic components of a WELDING SYMBOL*



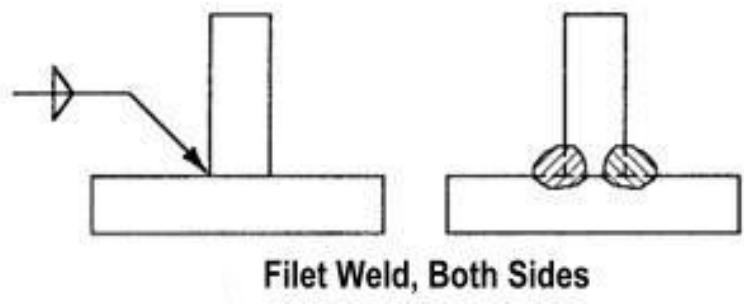
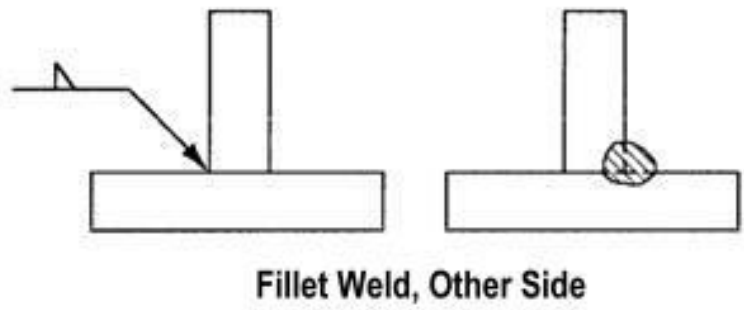
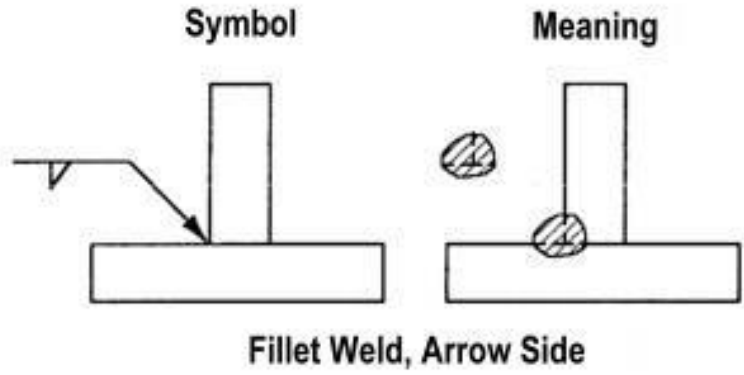
The tail of the welding symbol is used to indicate the welding or cutting processes, as well as the welding specification, procedures, or the supplementary information to be used in making the weld.

# Arrow:






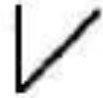




- ▶ The arrow is the other required part of a welding symbol and is placed at one or the other end of the reference line and connects the reference line to the joint that is to be welded.
- ▶ Quite often, there are two sides to the joint to which the arrow points, and therefore two potential places for a weld. For example, when two steel plates are joined together into a T shape, welding may be done on either side of the stem of the T.







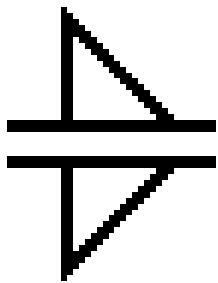
# Basic Symbols:

Bead	Fillet	Plug or Slot	Groove or Butt						
			Square	V	Bevel	U	J	Flare V	Flare Bevel
									

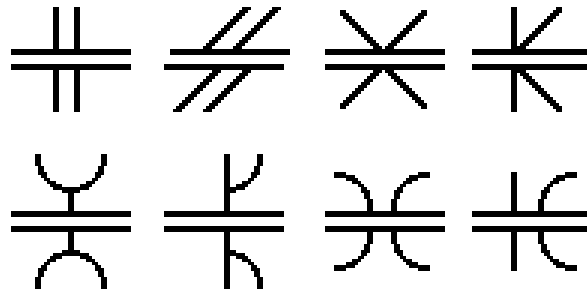
# Basic Symbols:

- ▶ Each type of weld has its own basic symbol, which is typically placed near the center of the reference line (and above or below it, depending on which side of the joint it's on). The symbol is a small drawing that can usually be interpreted as a simplified cross-section of the weld. In the descriptions below, the symbol is shown in both its arrow-side and other-side positions.

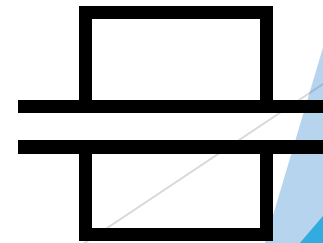
- ▶ **Fillet Weld**



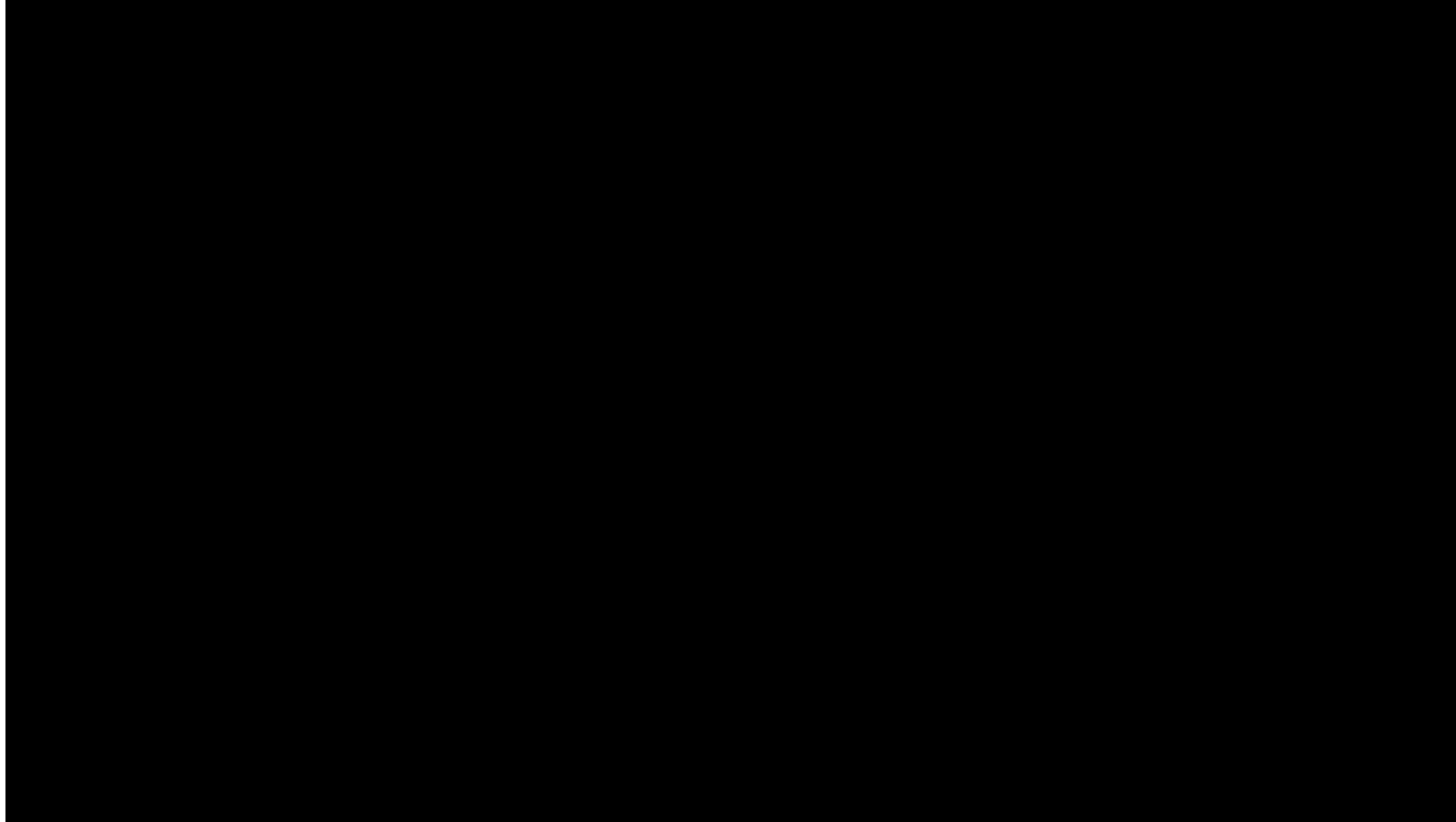
- ▶ **Groove Welds**



- ▶ **Plug Weld**



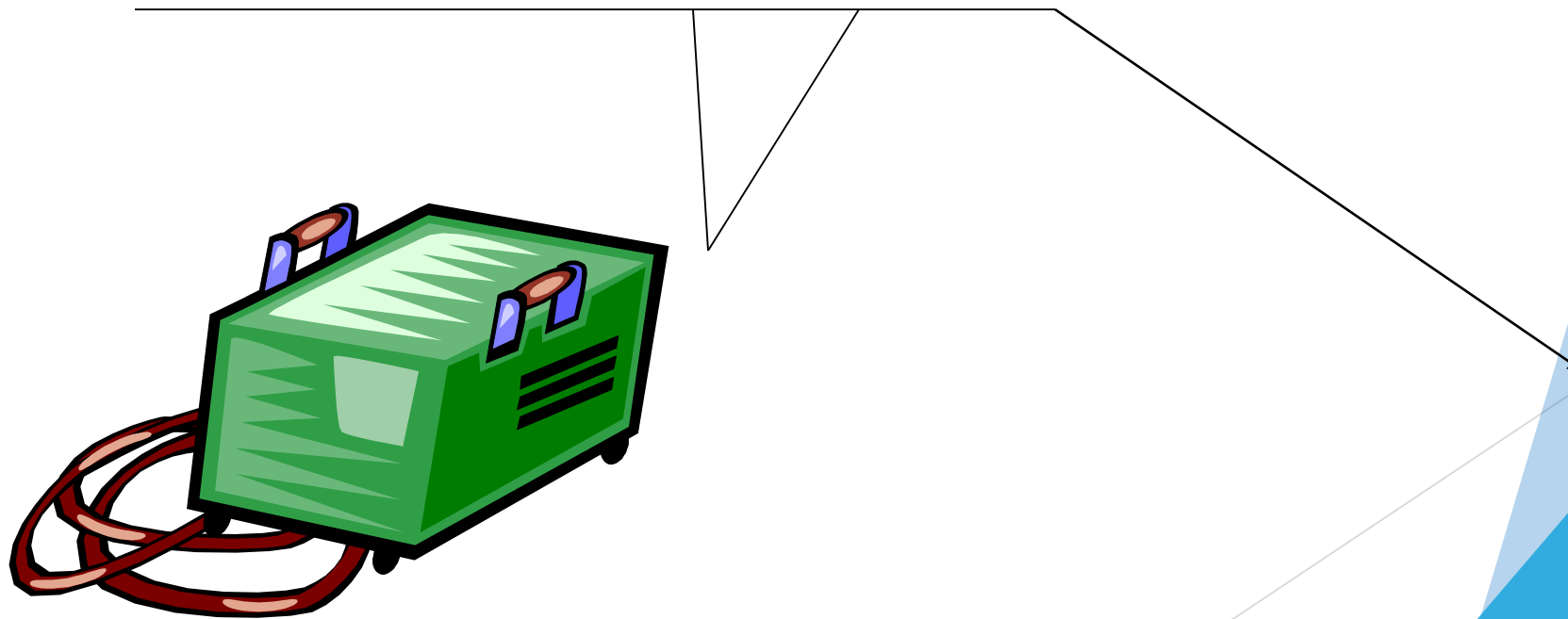
# Fillet Symbol

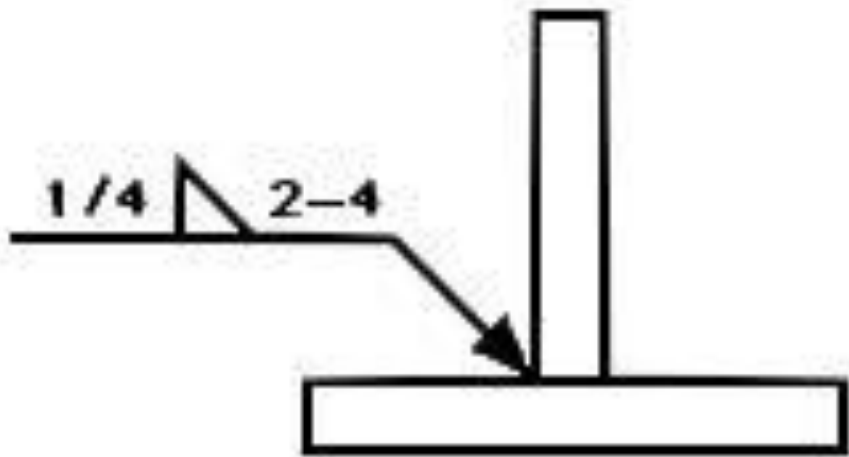


<https://www.youtube.com/watch?v=e5xslgQ6FLY>

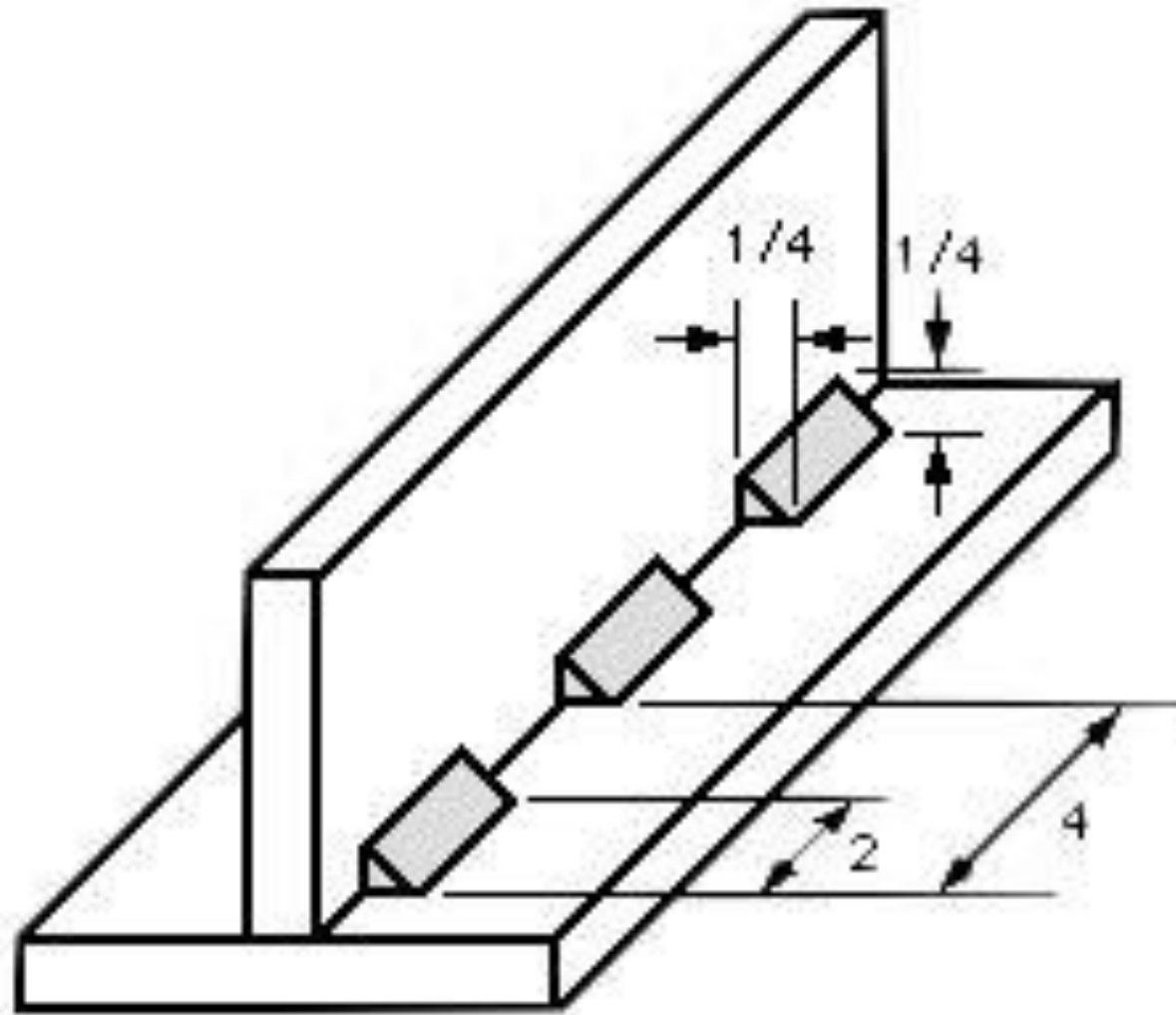


# Fillet Weld (Arrow Side Only)





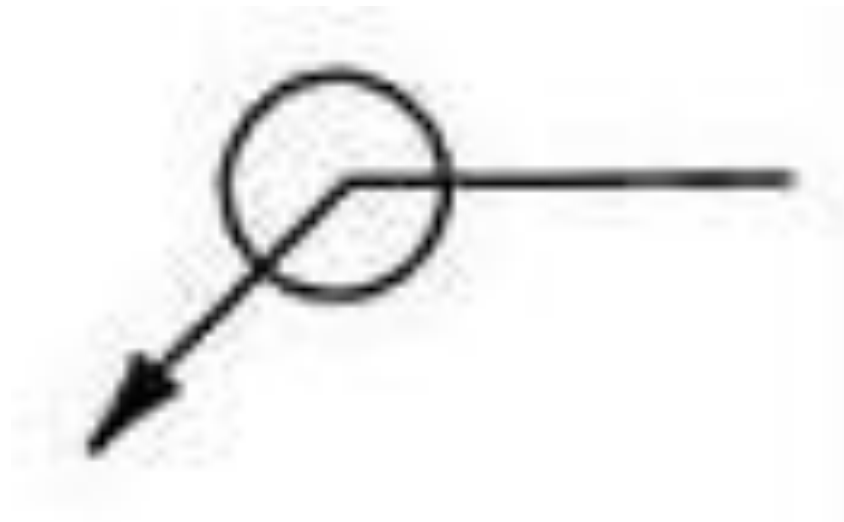
Symbol



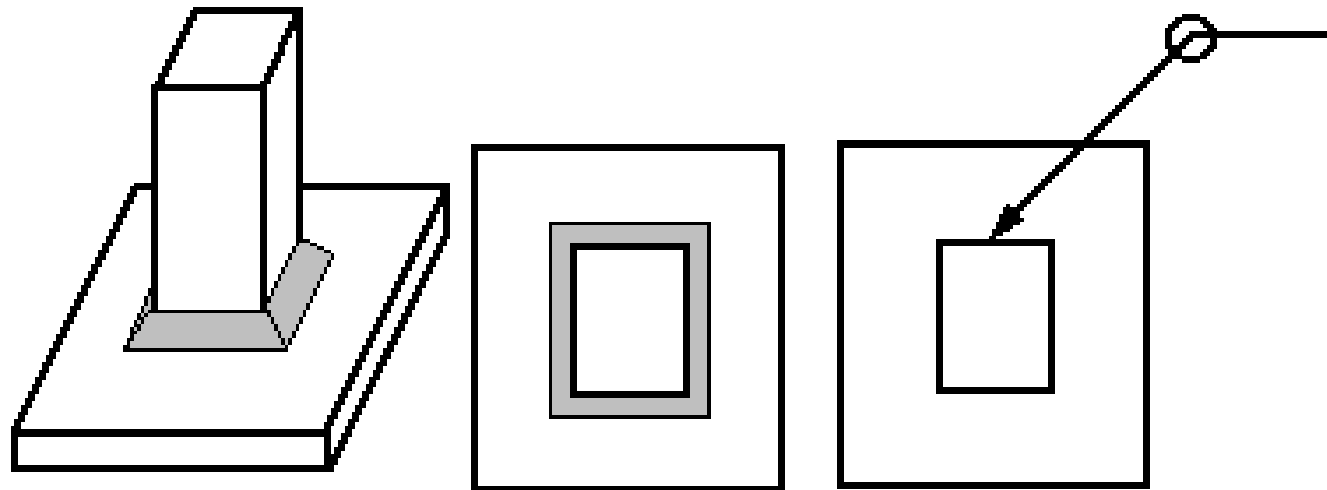
As built

# Weld All Around & Field Weld:

- ▶ There are two other elements that may be seen on the reference line that provide information about the weld. One is a circle around the place where the leader line connects to the reference line and indicates the weld is “all around”. This means the weld extends all the way around the joint the arrow is pointing at.

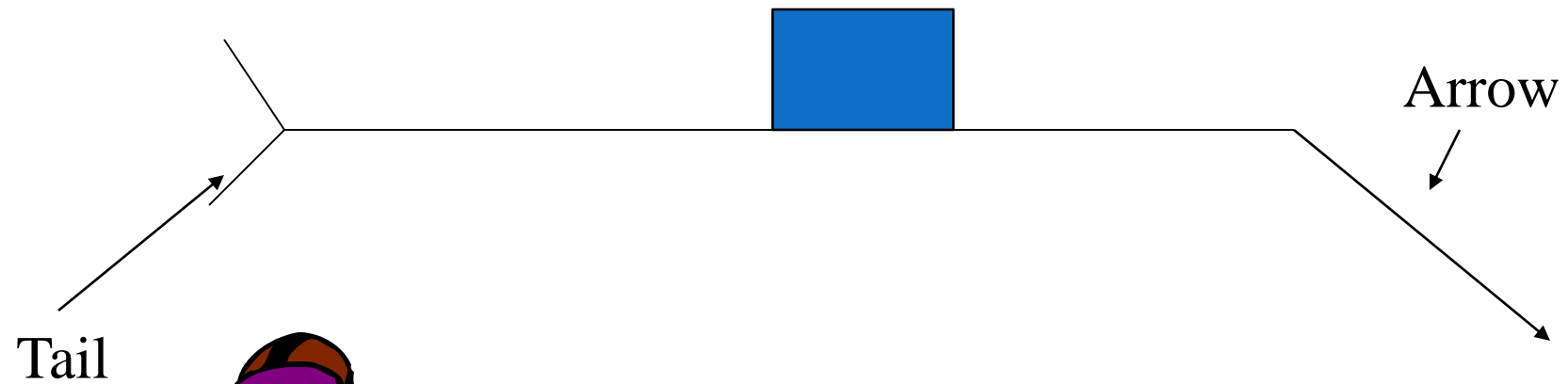


- ▶ The all around element is only used when it is possible to weld all the way around a single surface (see below).



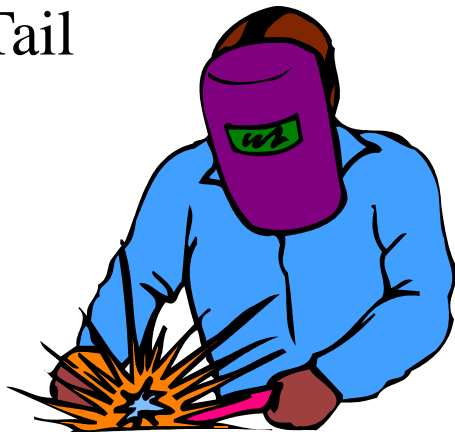


# Plug or Slot Symbol

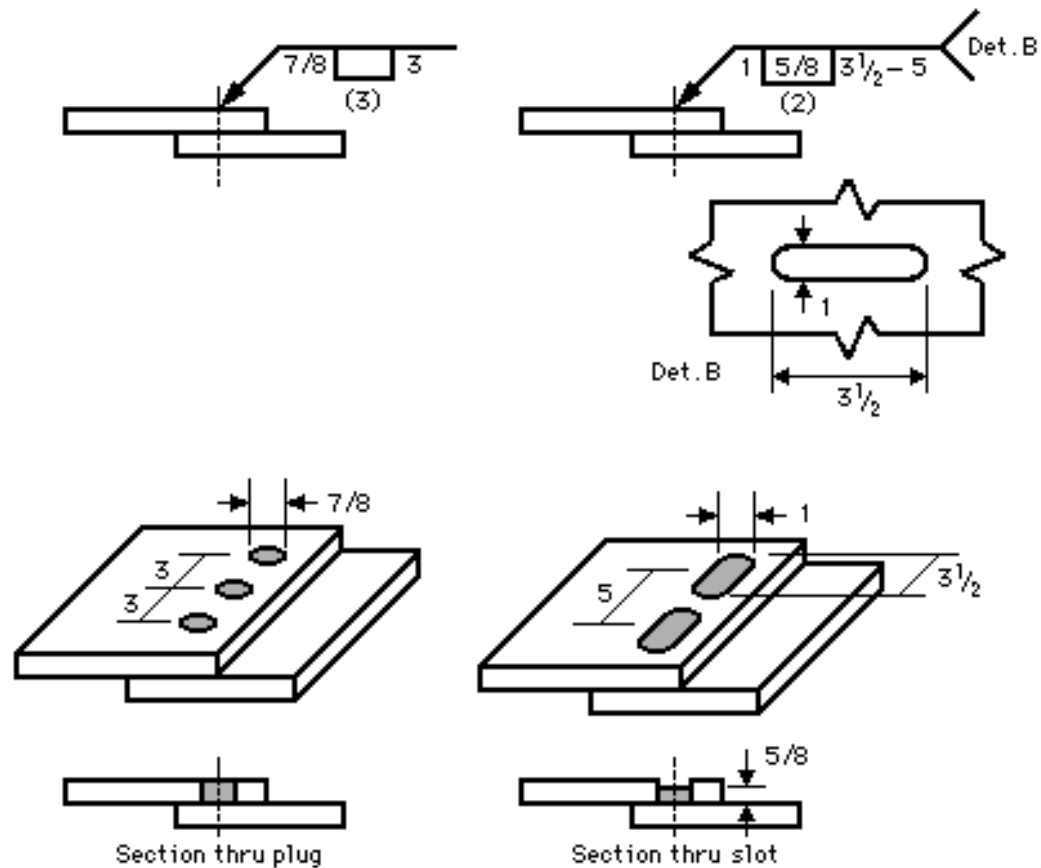


Tail

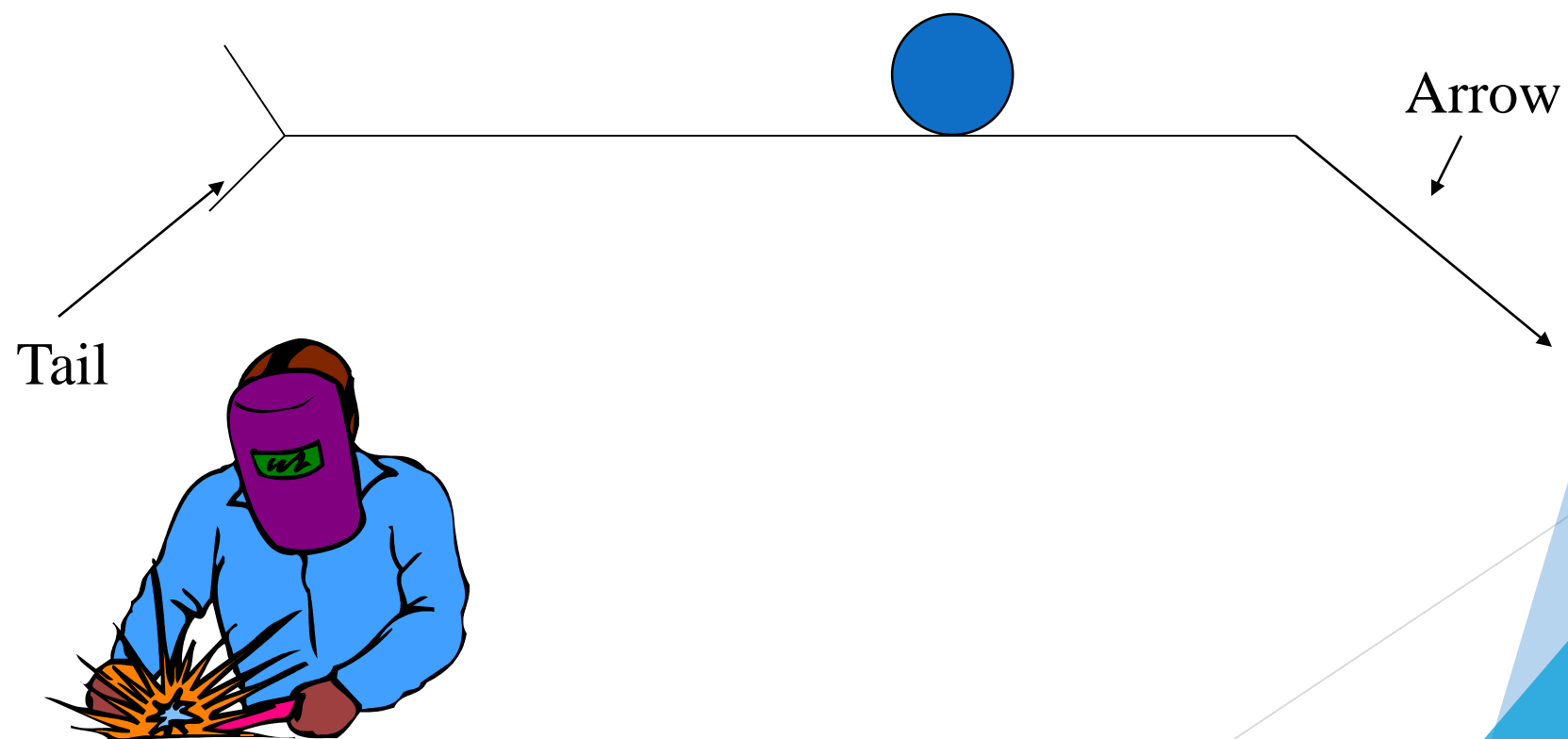
Arrow



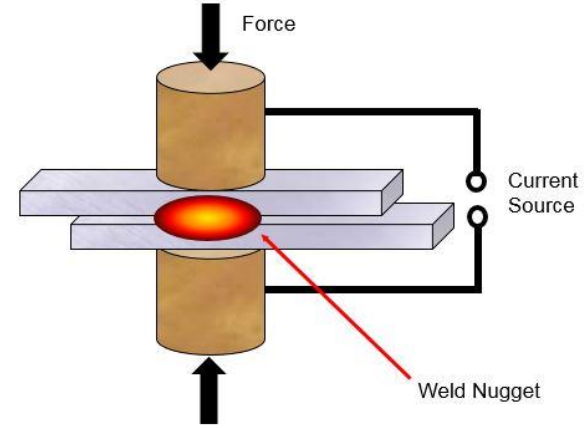
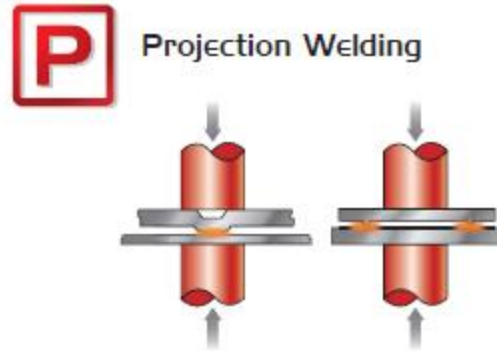
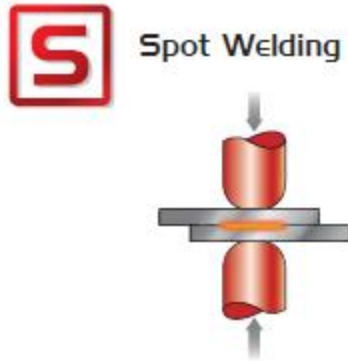
# Plug or Slot Weld



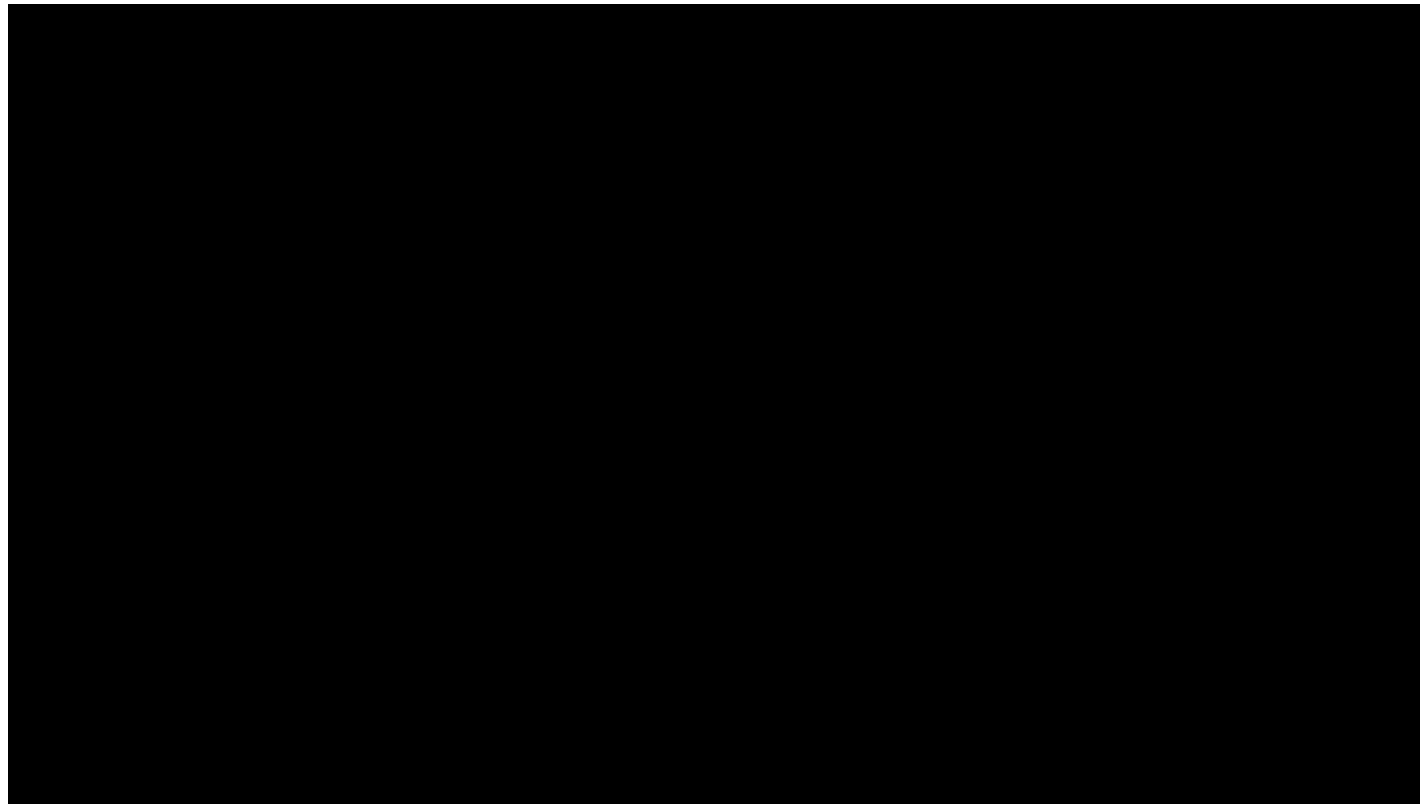
# Spot or Projection



# Spot or Projection



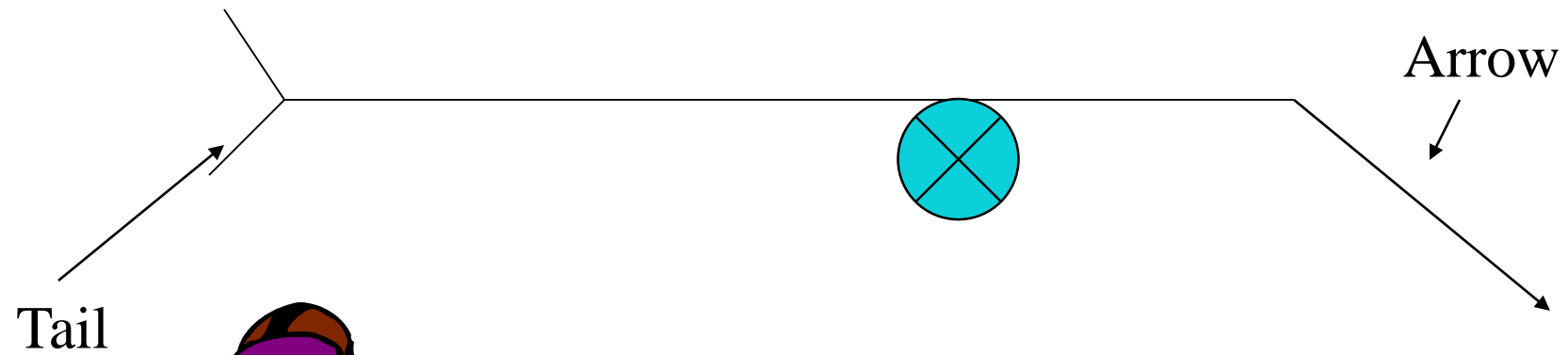
# Spot or Projection



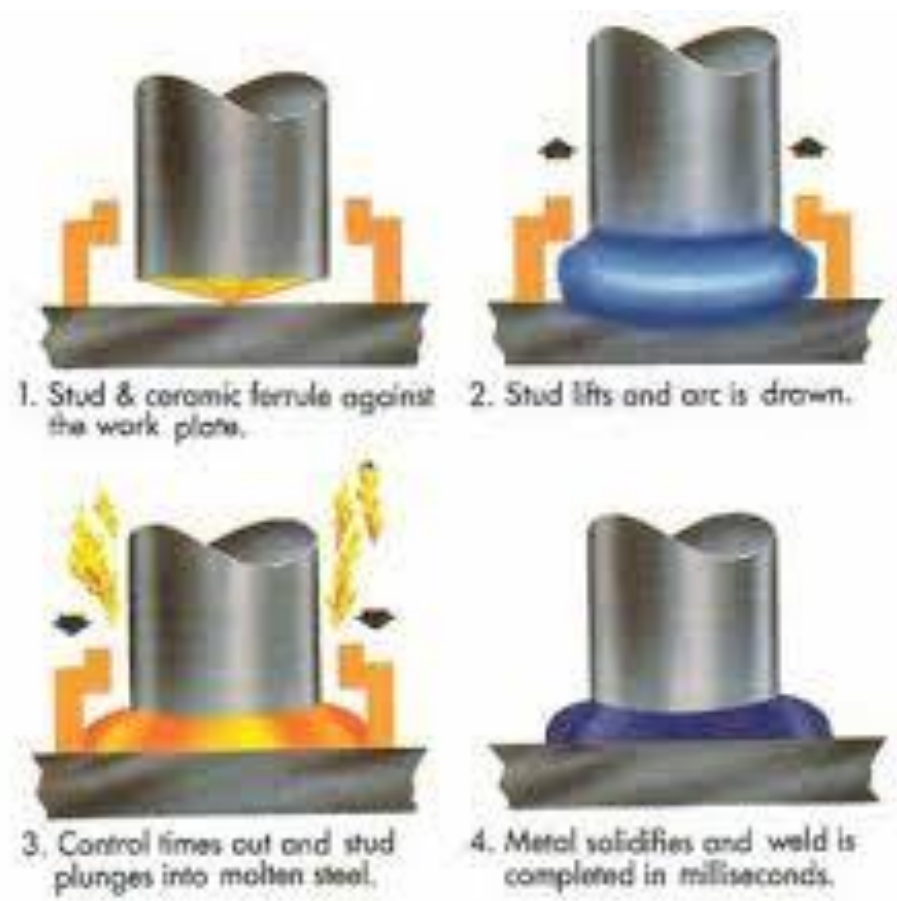
<https://www.youtube.com/watch?v=2TIp93pHyek>



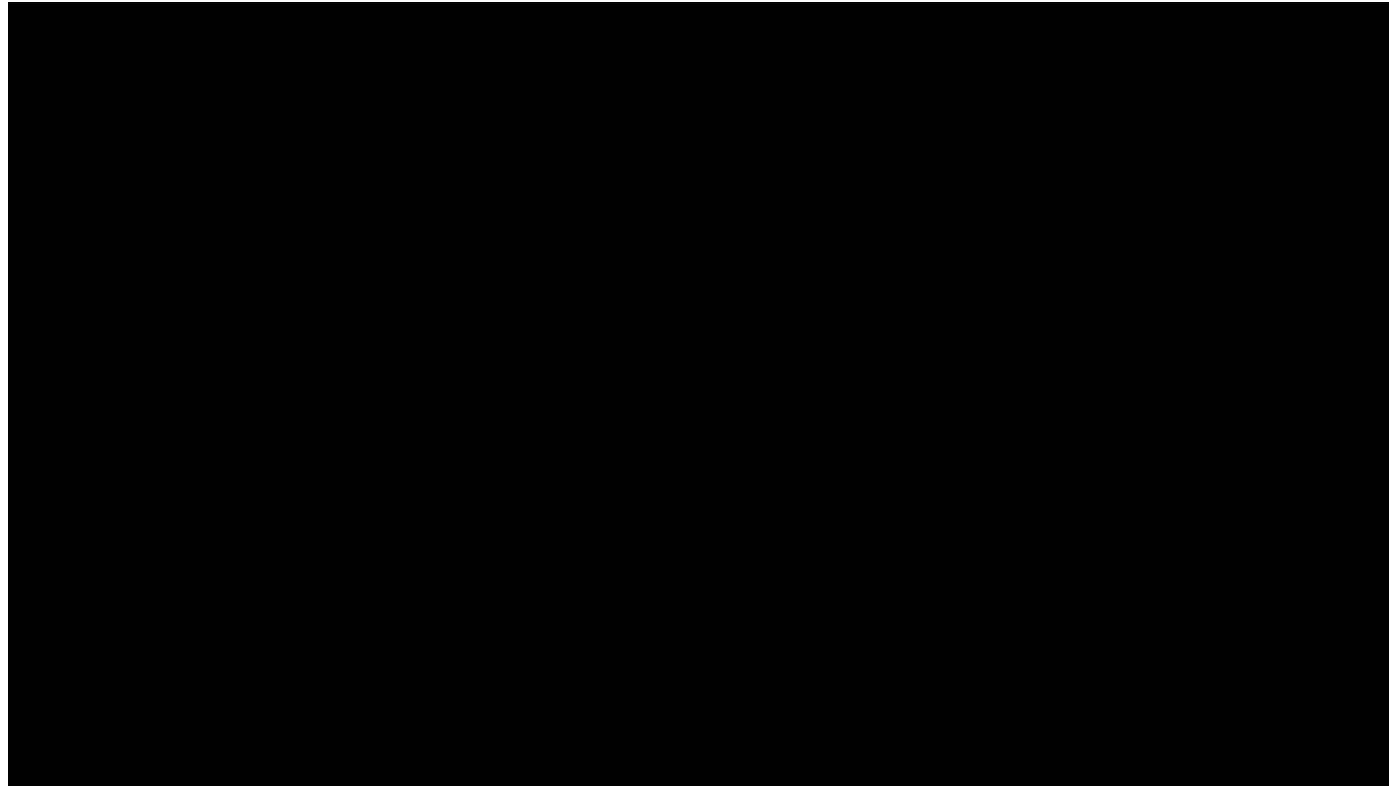
# Stud



# Stud Weld



# Stud Weld

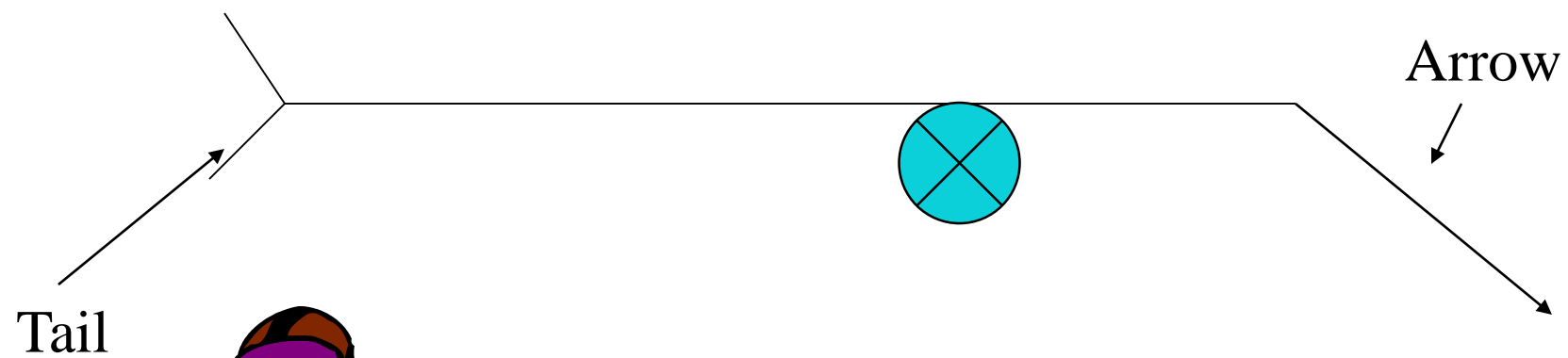


<https://www.youtube.com/watch?v=Ljz6twH-Pc4>

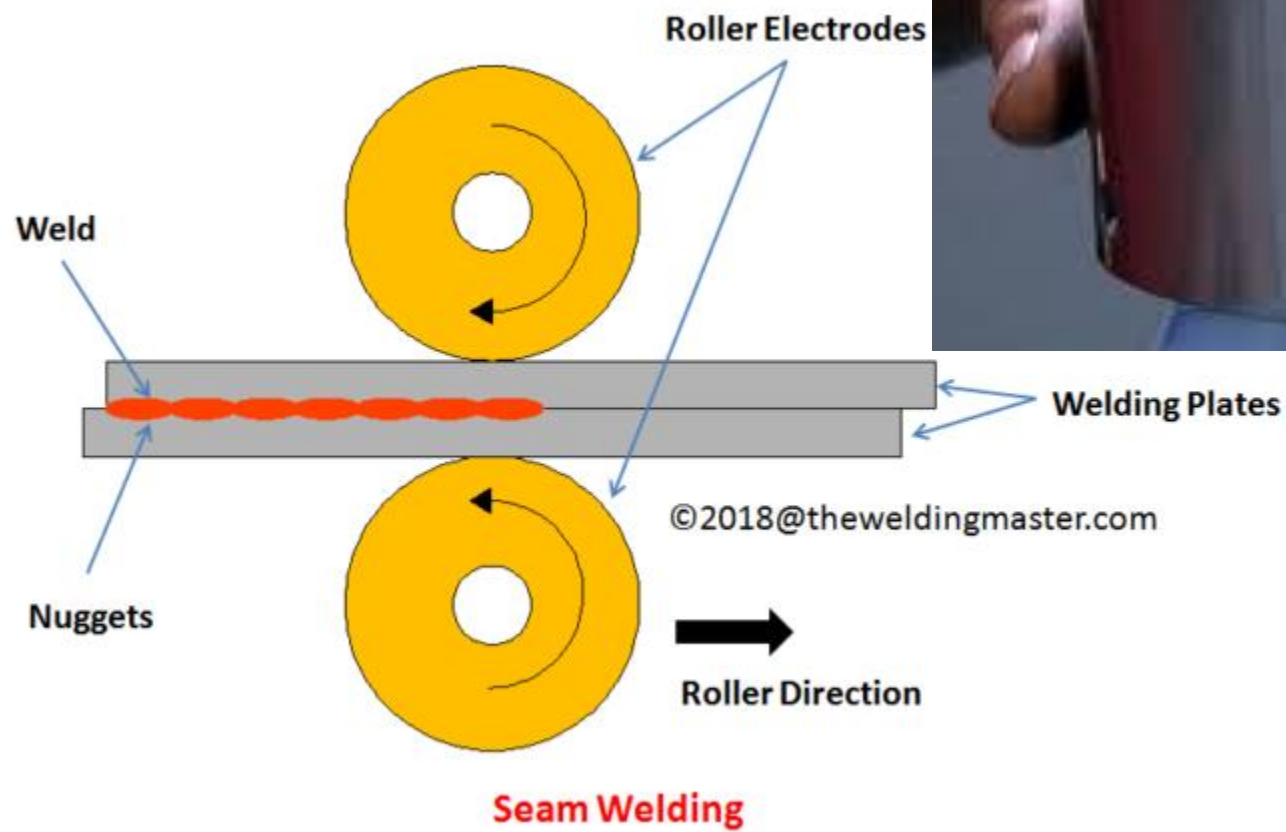




# Seam



# m Weld

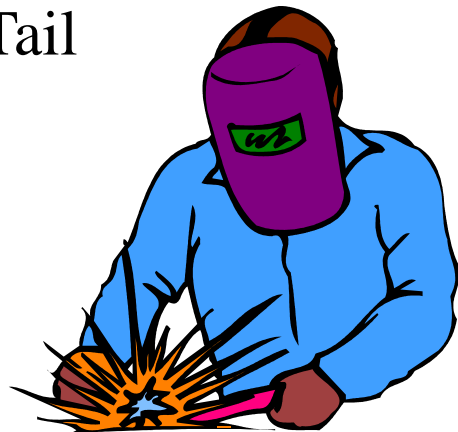
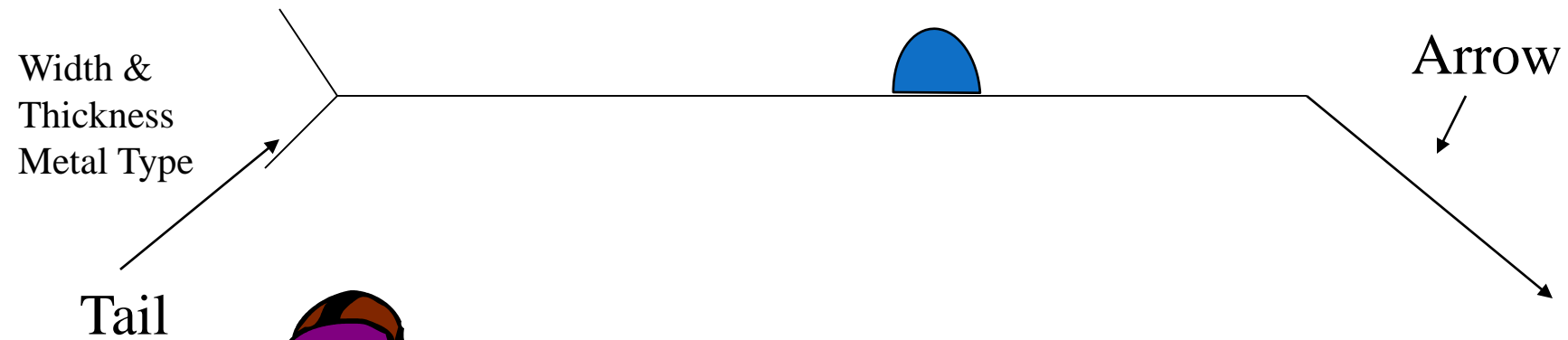


# Seam Weld



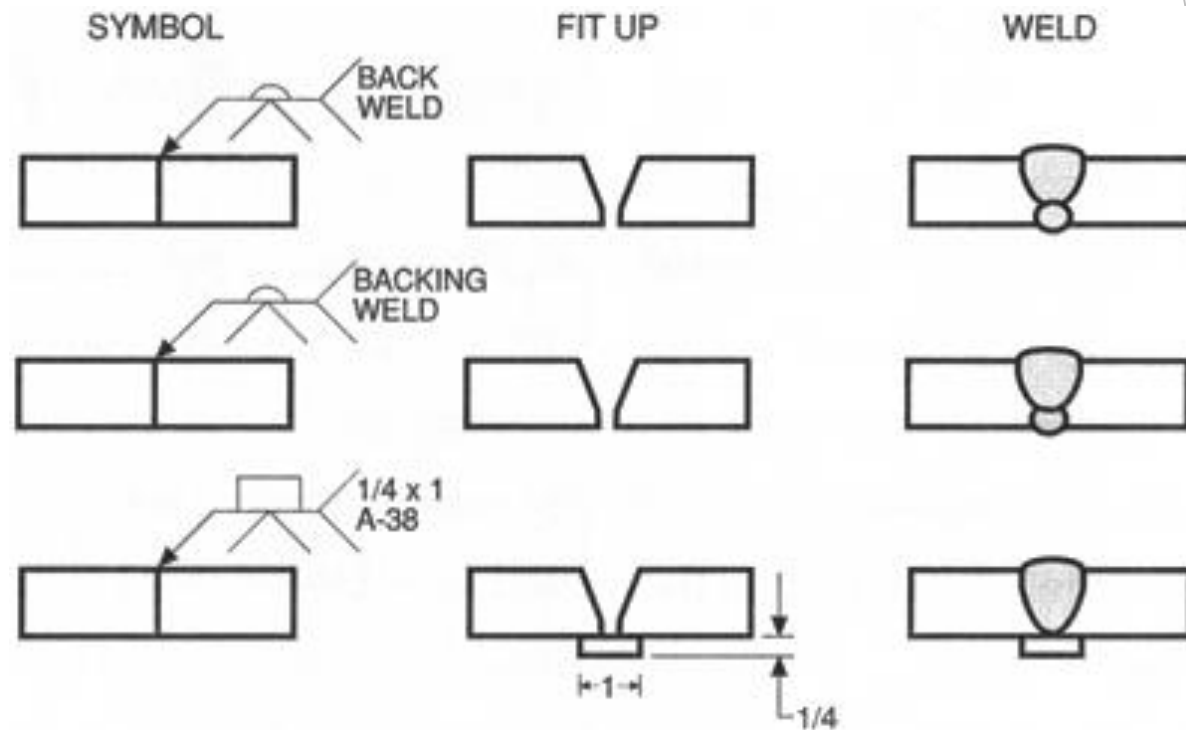
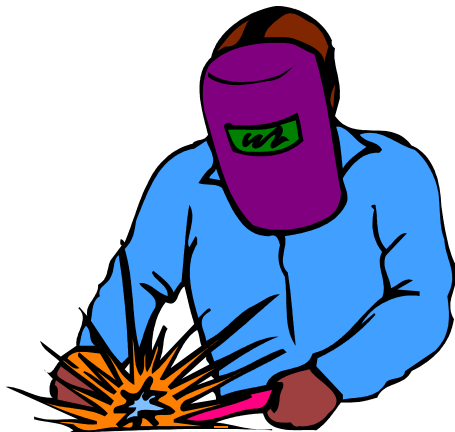
<https://www.youtube.com/watch?v=xZ5SMBoIh4s>

# Back or Backing

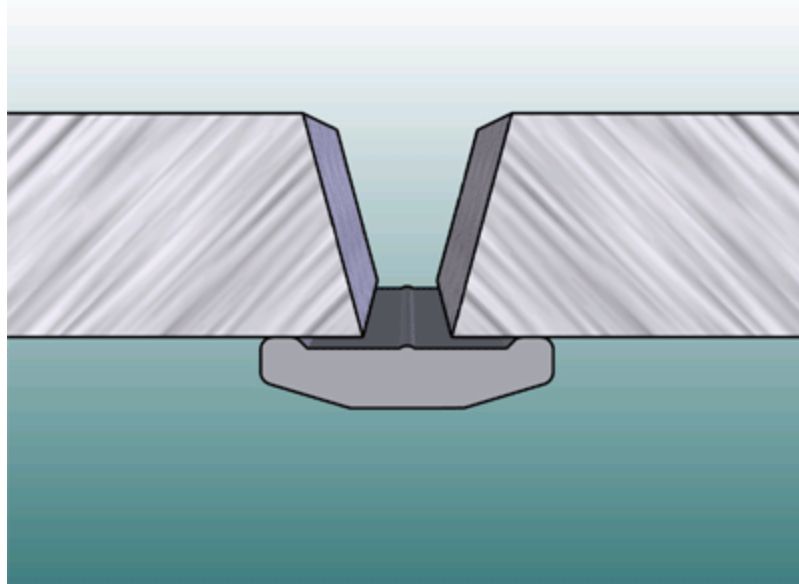


Always on opposite  
side of weld!!!

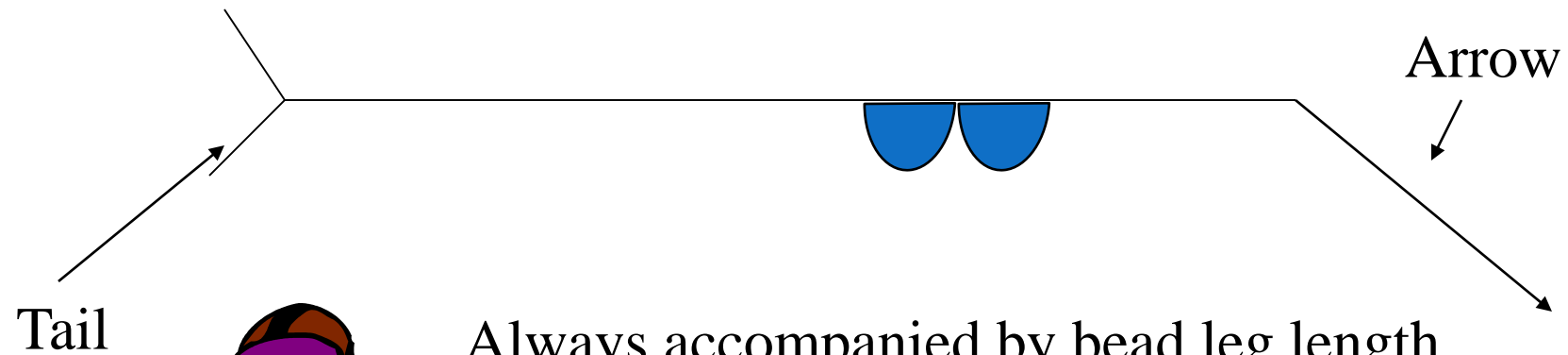
# Back or Backing



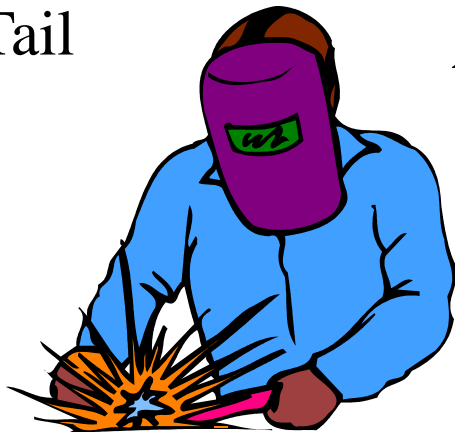
# Back or Backing



# Surfacing



Always accompanied by bead leg length  
Always on arrow side!!

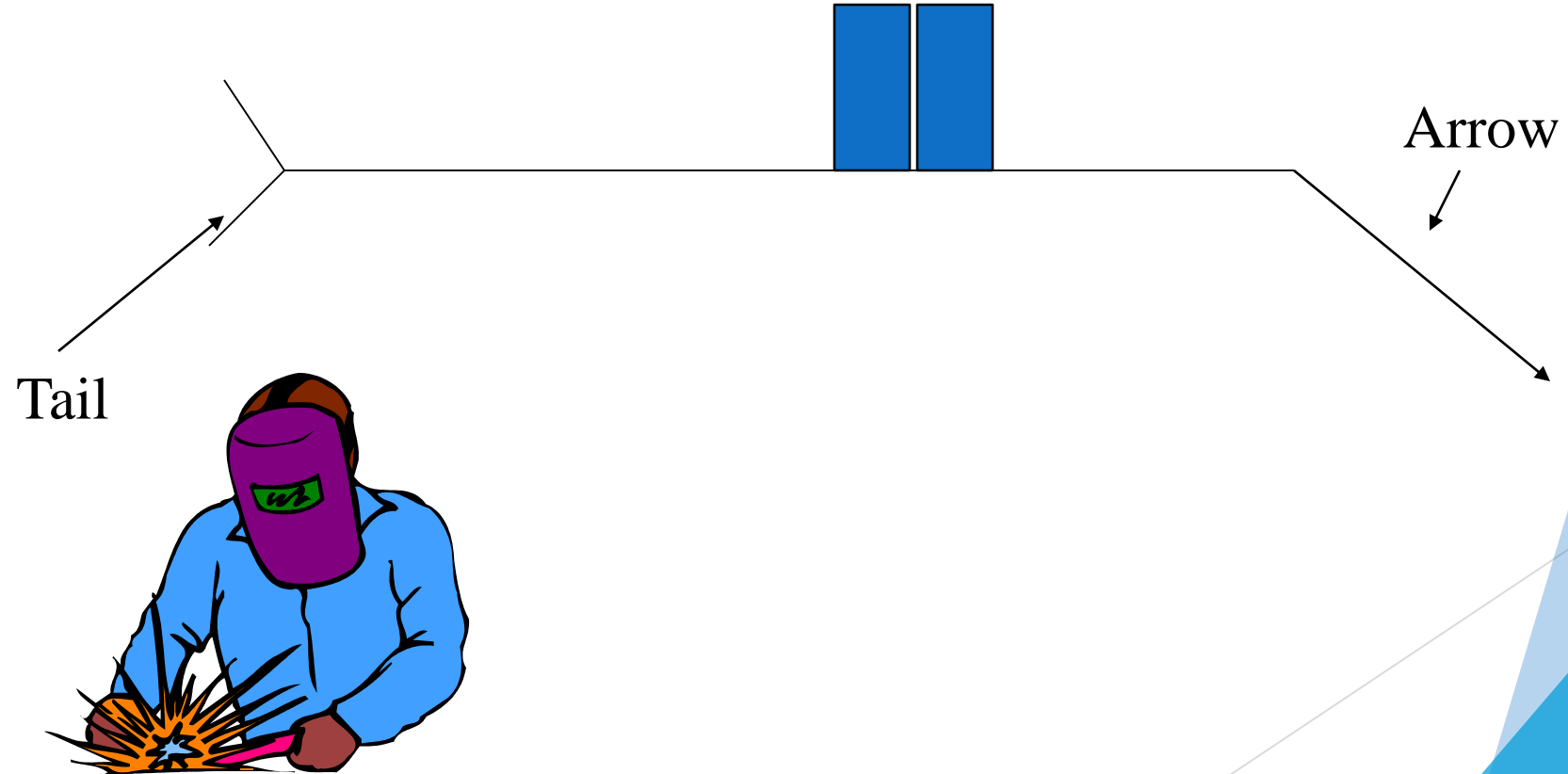


# Surfacing

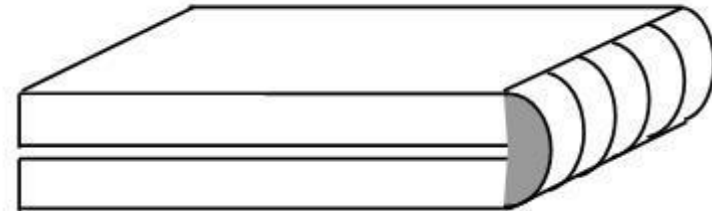
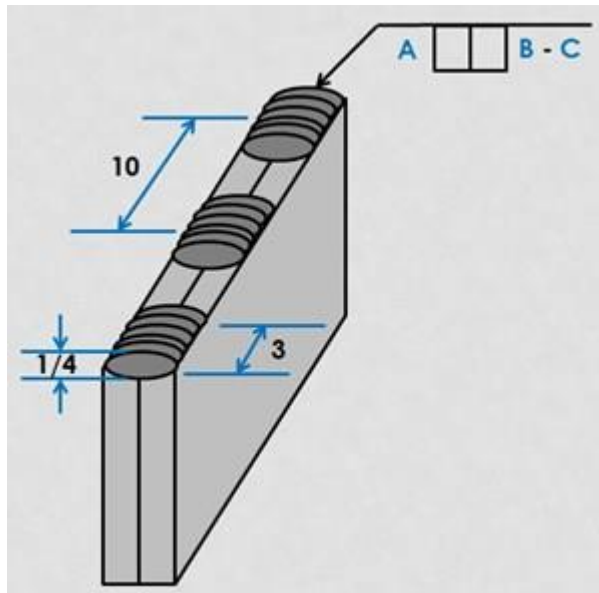




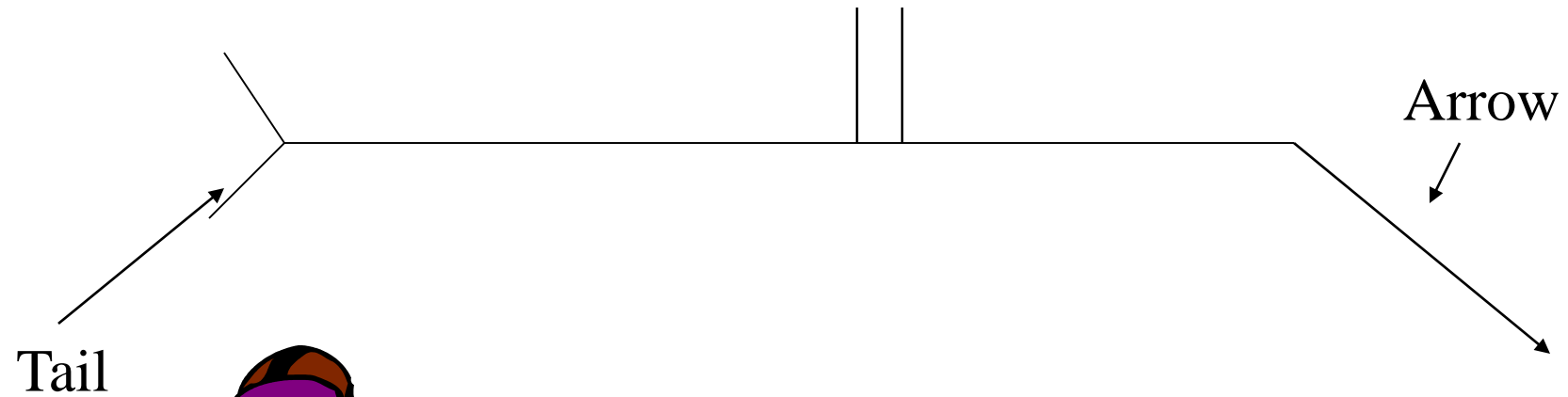
# Edge Welds



# Edge Welds

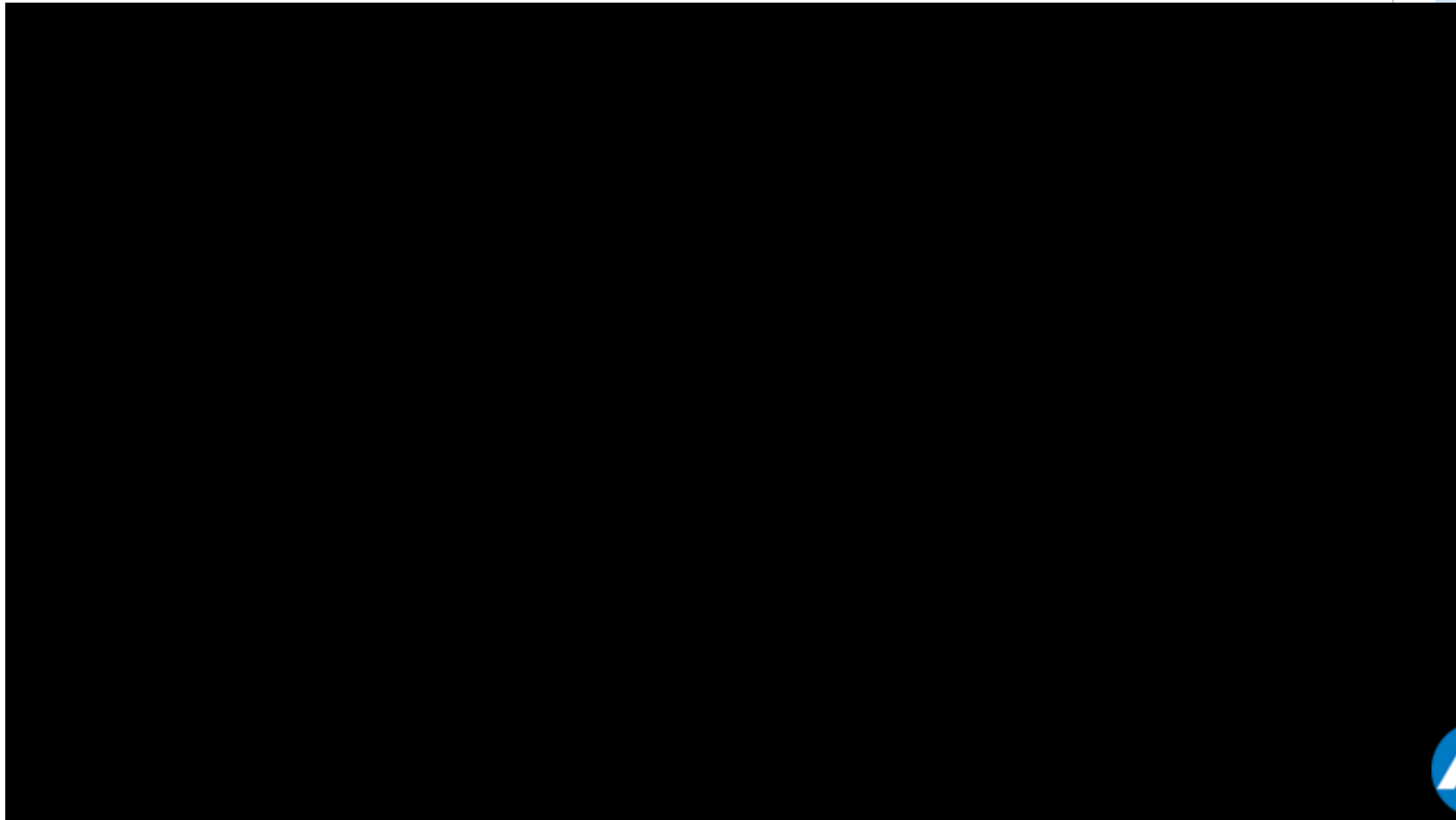
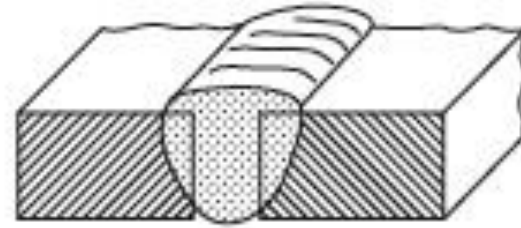


# Square Weld



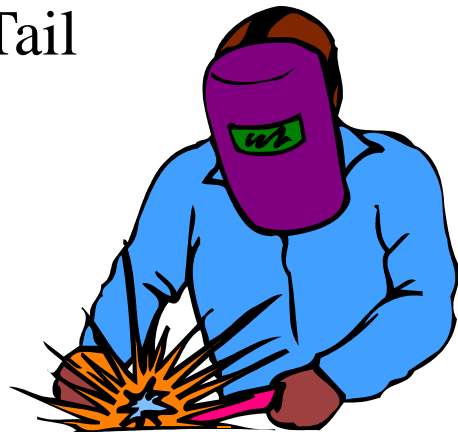
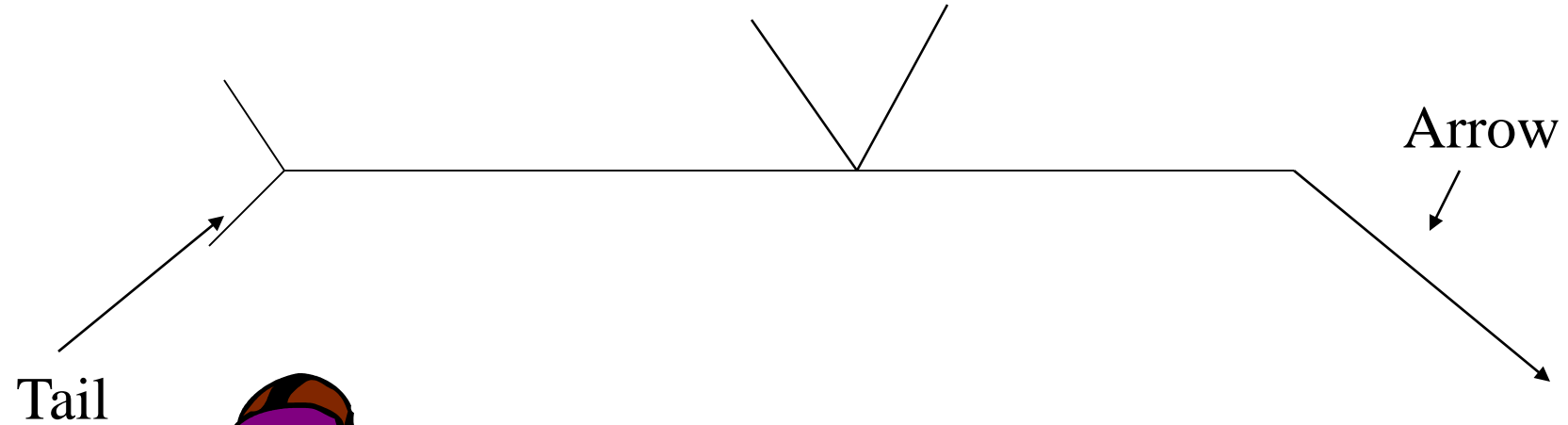
# Square Weld

Square butt/groove  
weld

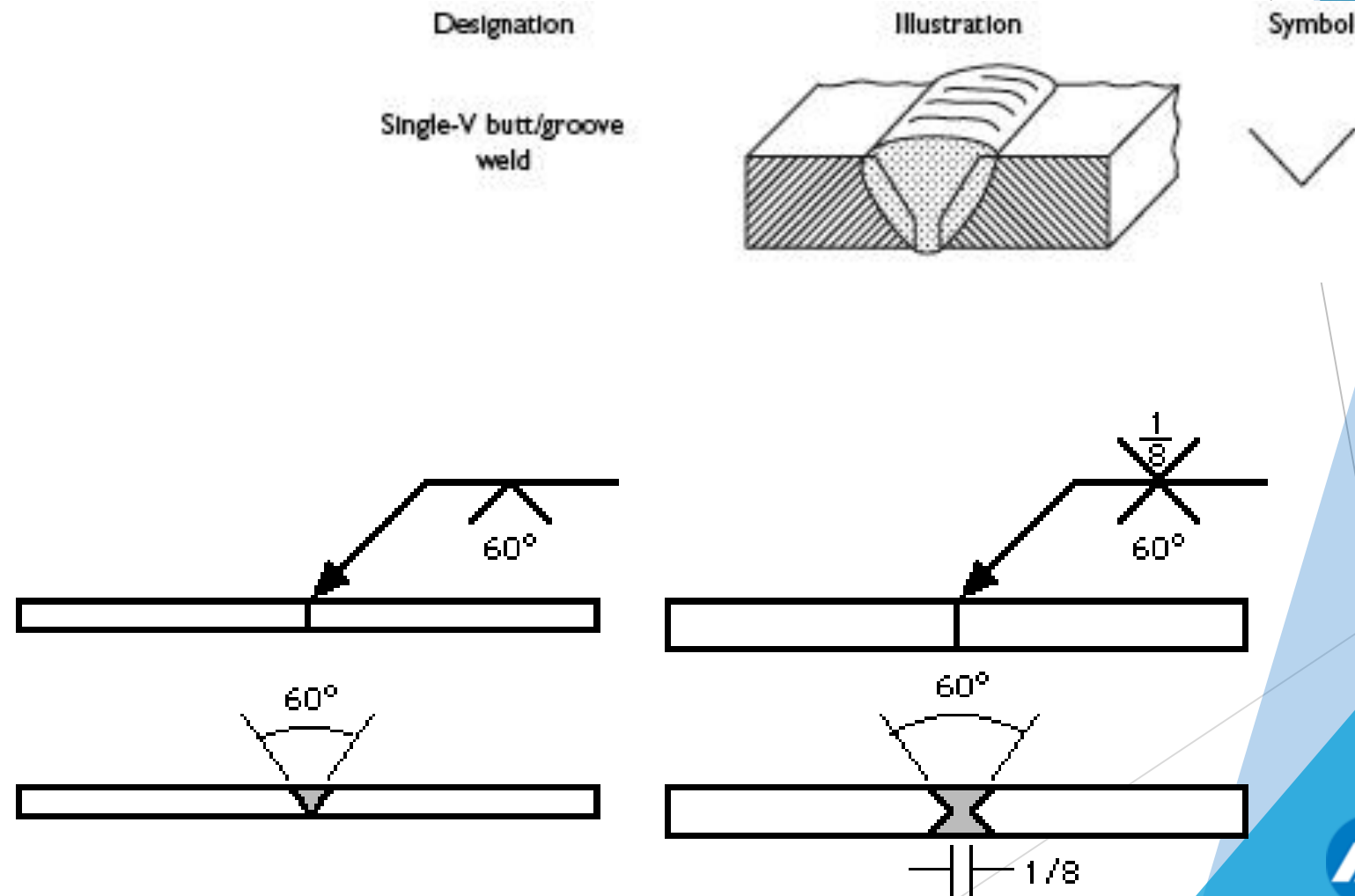


<https://www.youtube.com/watch?v=YmkWzShQuLU>

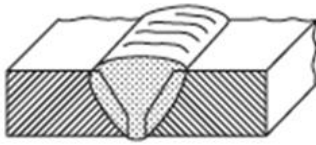

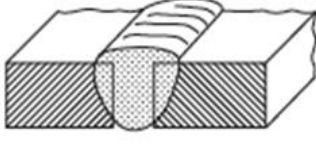

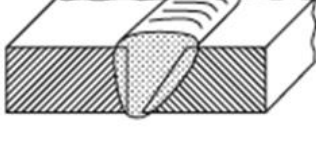

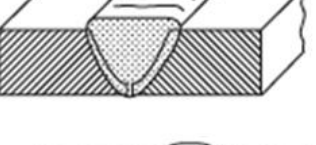

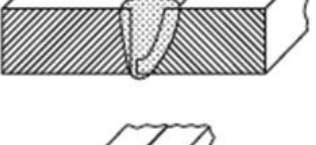








# V Weld



# V Weld



# Grove Welds

Designation	Illustration	Symbol
Single-V butt/groove weld		
Square butt/groove weld		
Single bevel butt/groove weld		
Single-U butt/groove weld		
Single-J butt/groove weld		
Butt weld between plates with raised edges (ISO) Edge weld on a flanged groove joint (AWS)		 
Single-V butt weld with broad root face		
Single bevel butt weld with broad root face		

# Field Weld Symbol

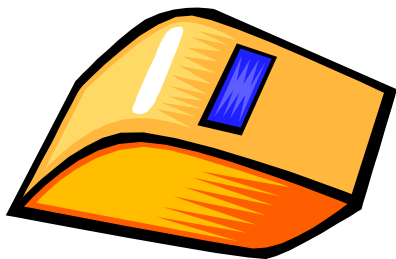


A flag at the tangent of the reference line and arrow means Field Weld.

What does a Field Weld mean?

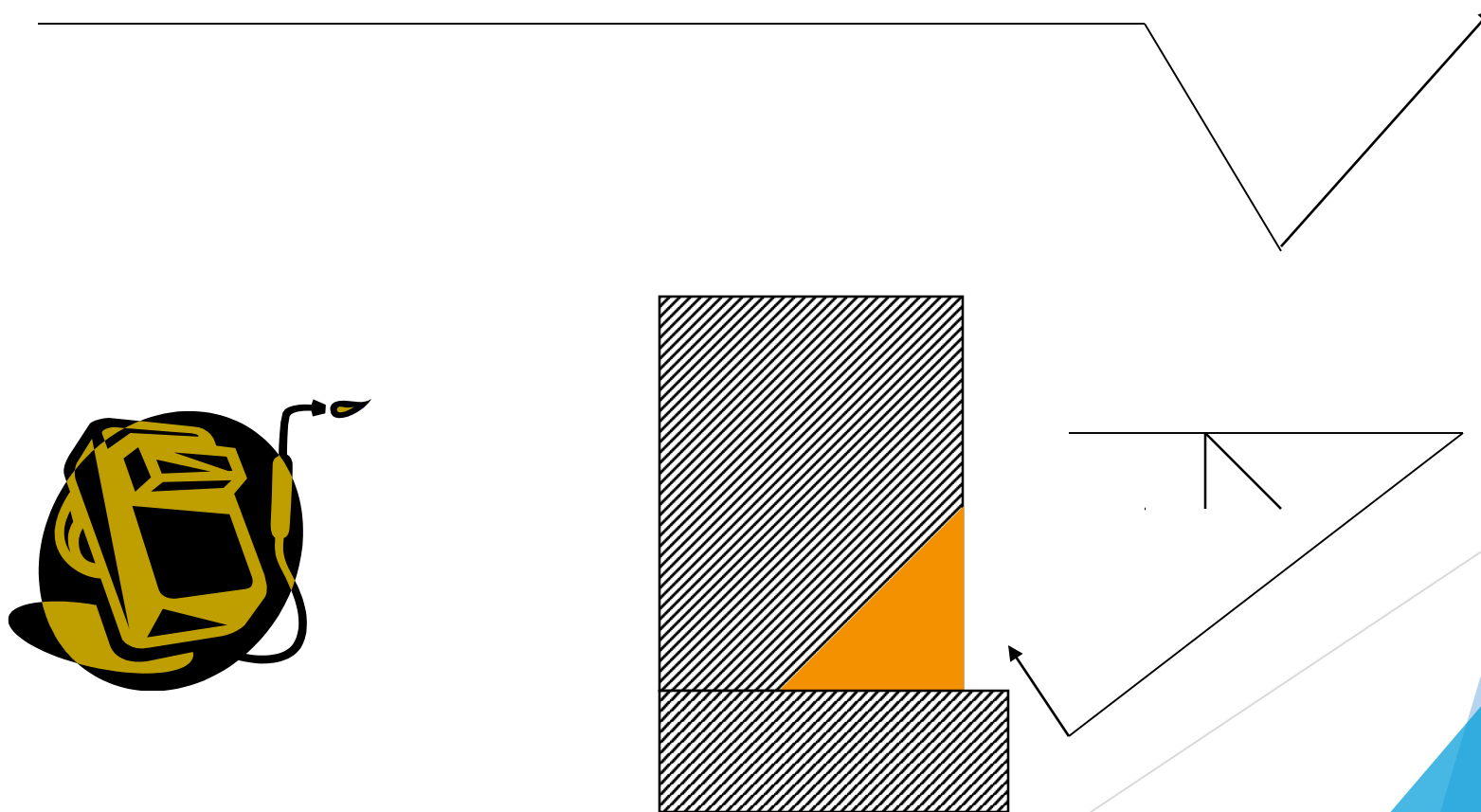
It means that you will be conducting the weld at the location of the structure.

What considerations now need to be made?





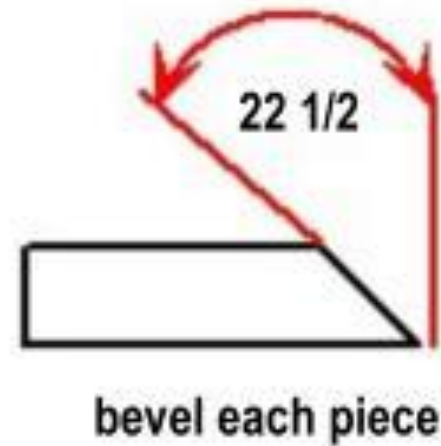
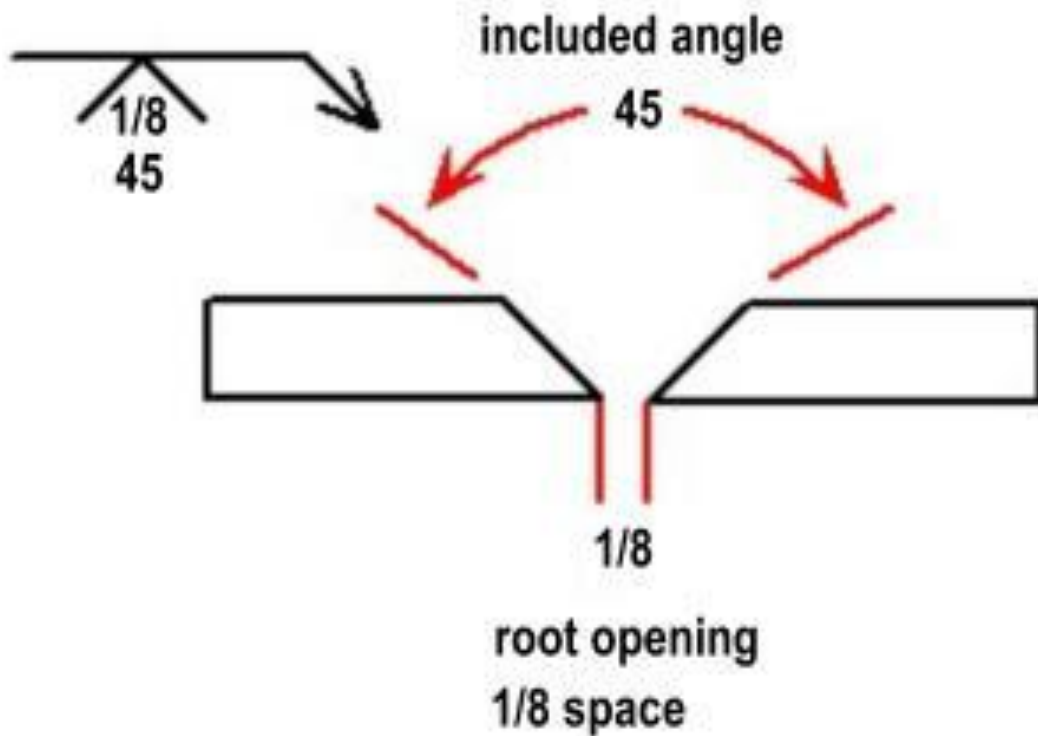
Break in arrow means arrow side must be side that beveling or other preparation required.



# The Length & Pitch of Intermittent Welds:

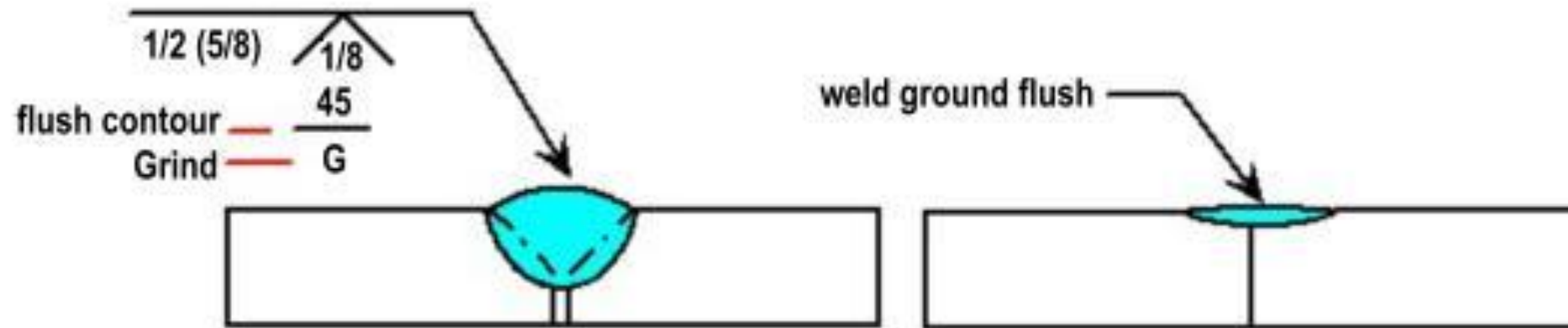
- ▶ An intermittent weld is one that is not continuous across the joint, but rather is a given length of weld separated by a given space between them. This method of welding may be used to control heat distortion or where the joint strength requirements allow. Intermittent welding can save time and money if a long weld is not necessary.
- ▶ Used more frequently than the length alone, the length and pitch (length first, spacing second) are two numbers located at the right of the fillet weld symbol.
- ▶ The length appears first as before followed by a hyphen then the pitch is shown.
- ▶ The pitch refers to a dimension from the center of one weld to the center of the next weld.

# Groove Opening & Angle

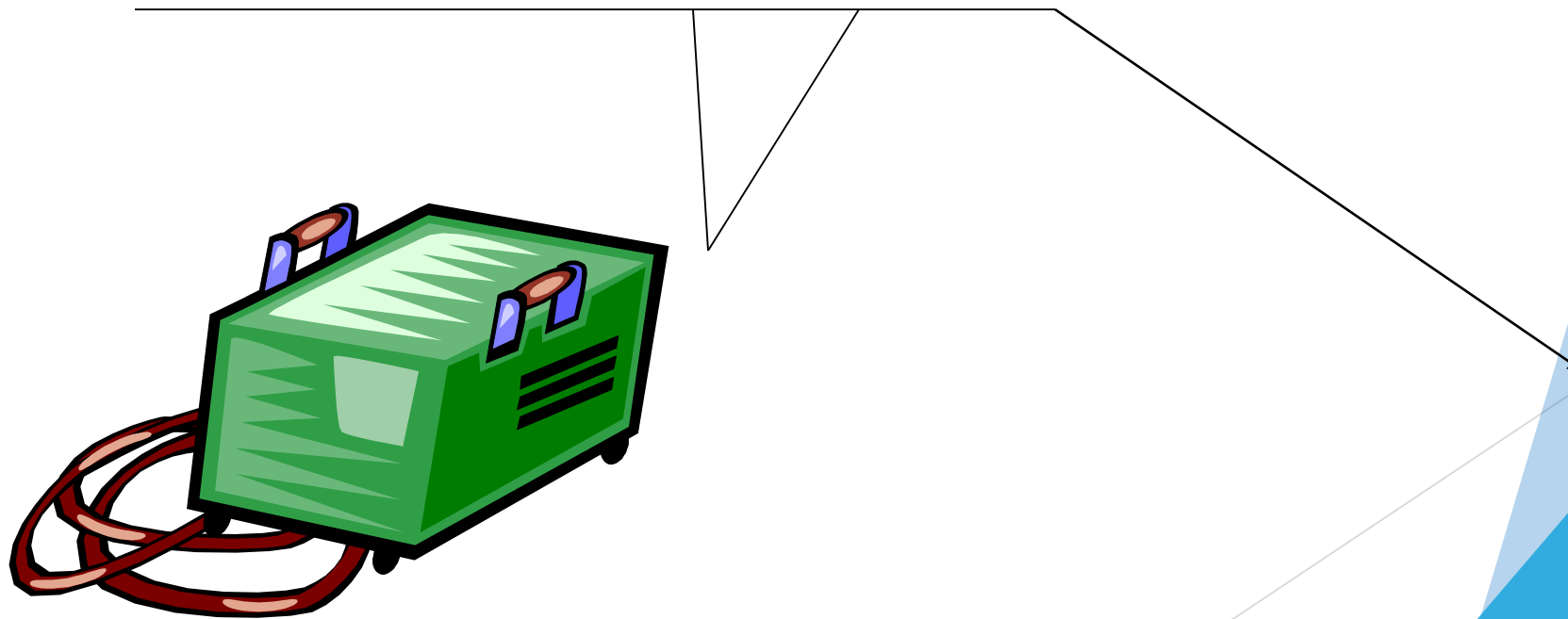


# Contour & Finishing

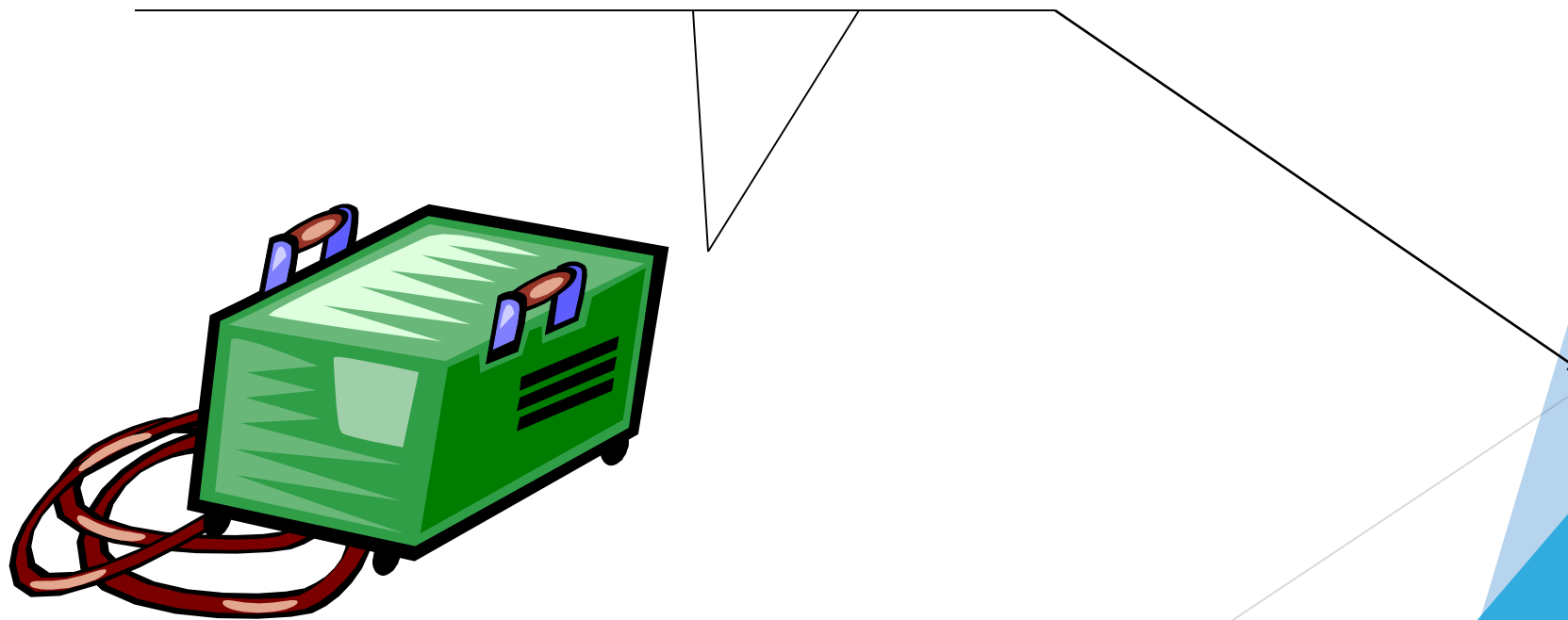
- ▶ The same contour symbols that apply to fillet welds may be used with groove welding and are placed above the weld symbol.



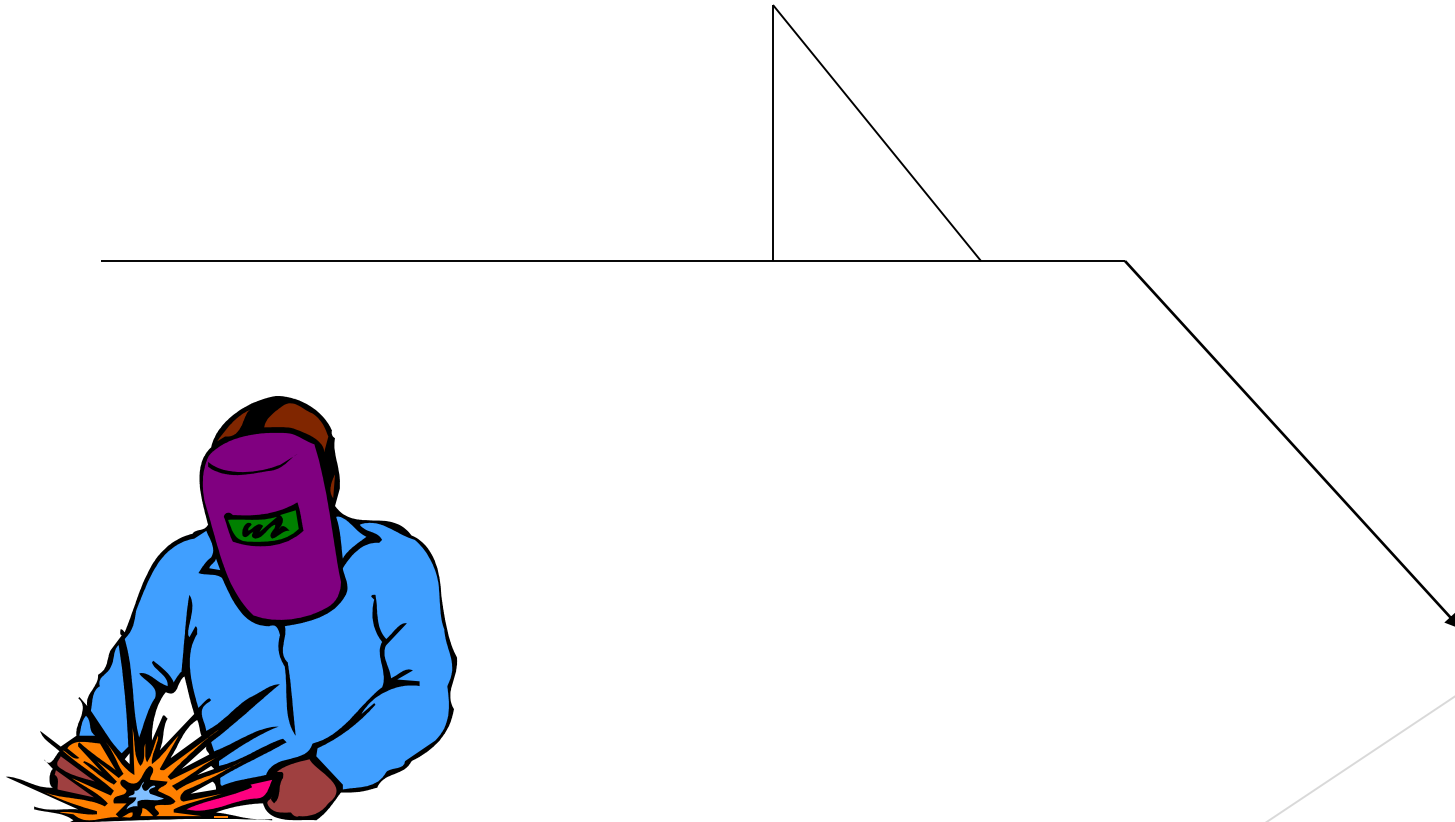
Practice... What welds are the following?



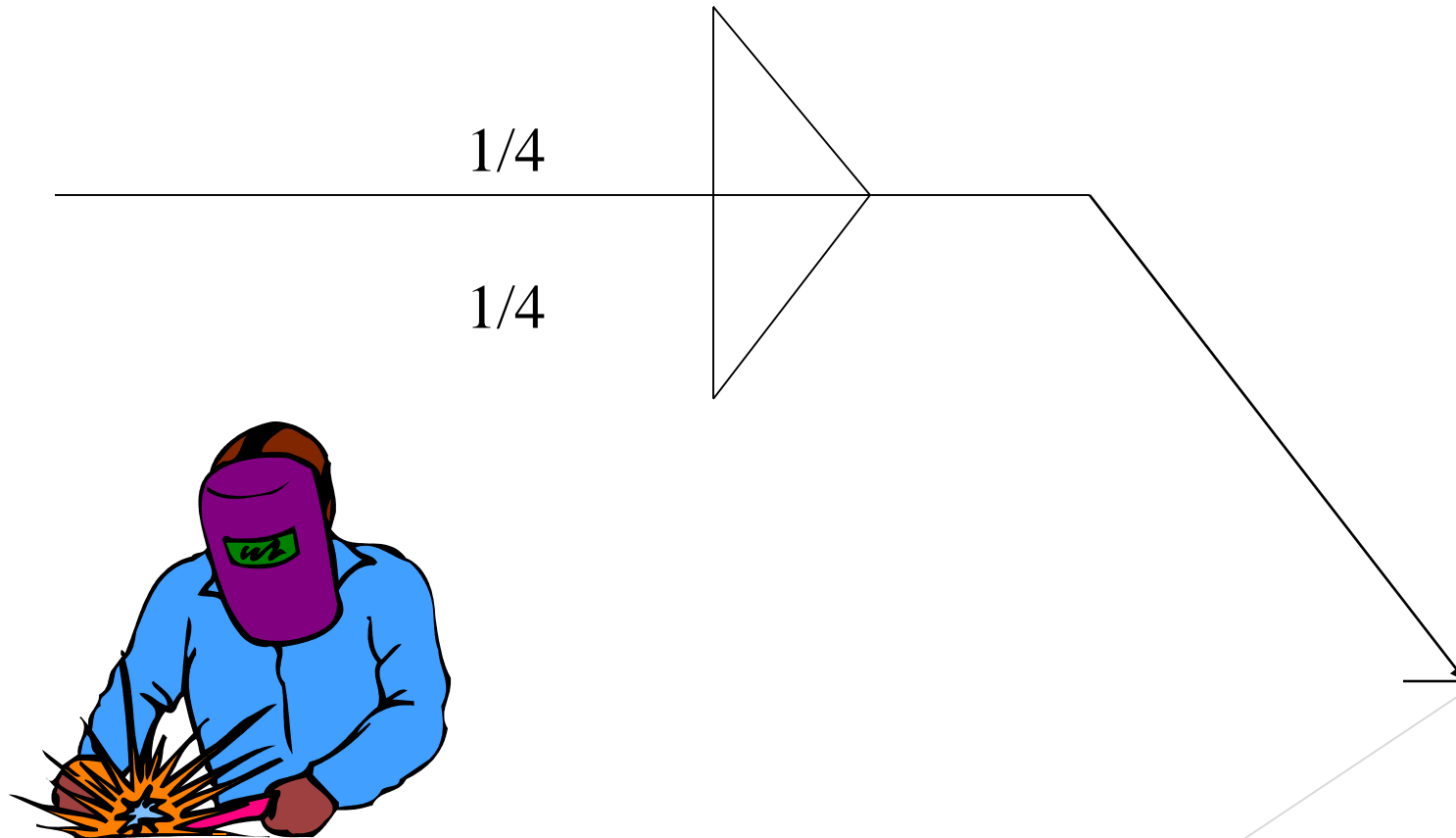
# Fillet Weld (Arrow Side Only)



# Fillet Weld (Other Side)



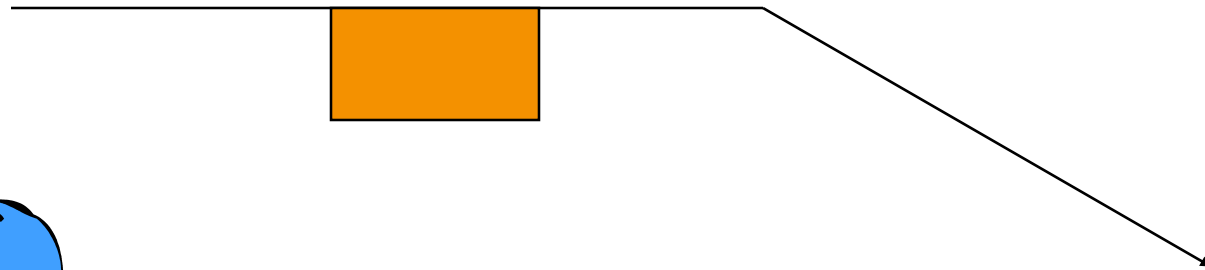
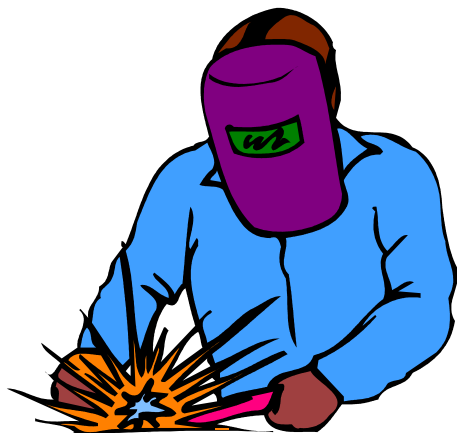
# Size of Fillet Weld Noted





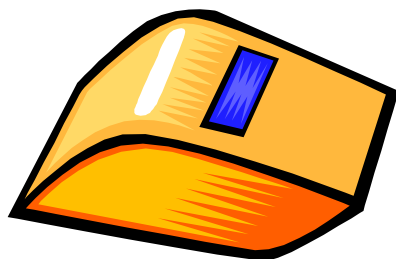
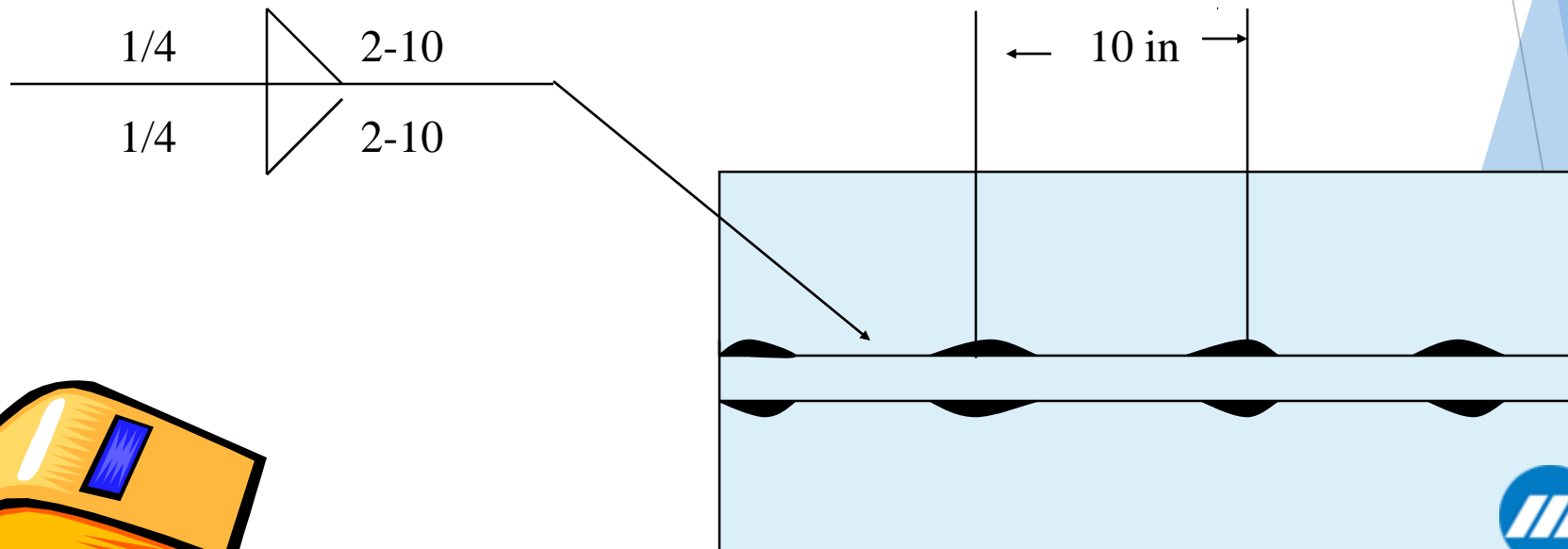
# Plug or Slot Weld Symbol

Arrow Side



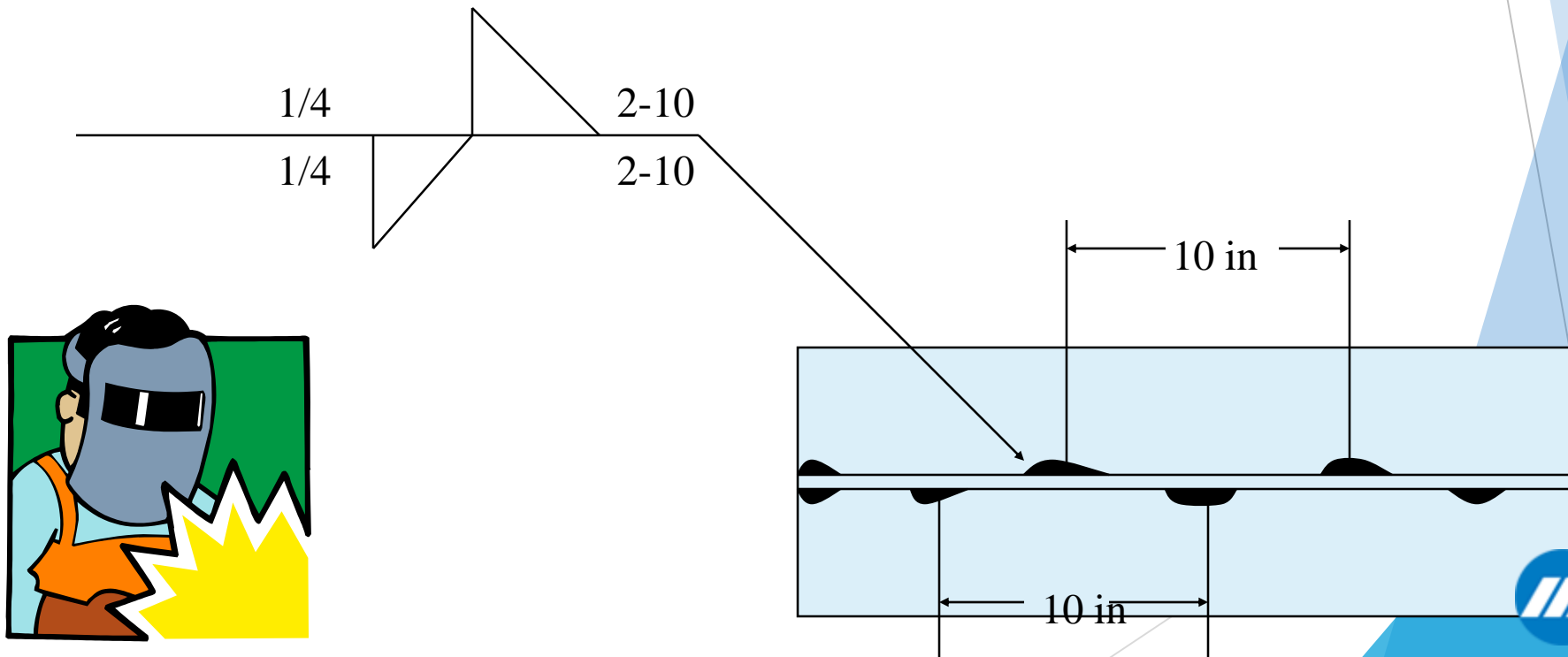
# Chain Intermittent Fillet Weld

Weld both sides each end and 10 inches center to center in between



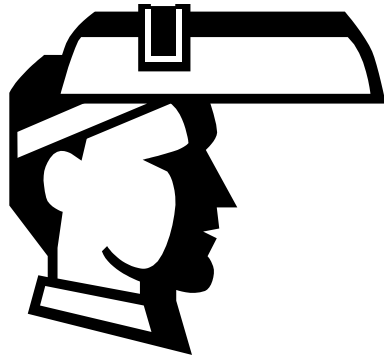
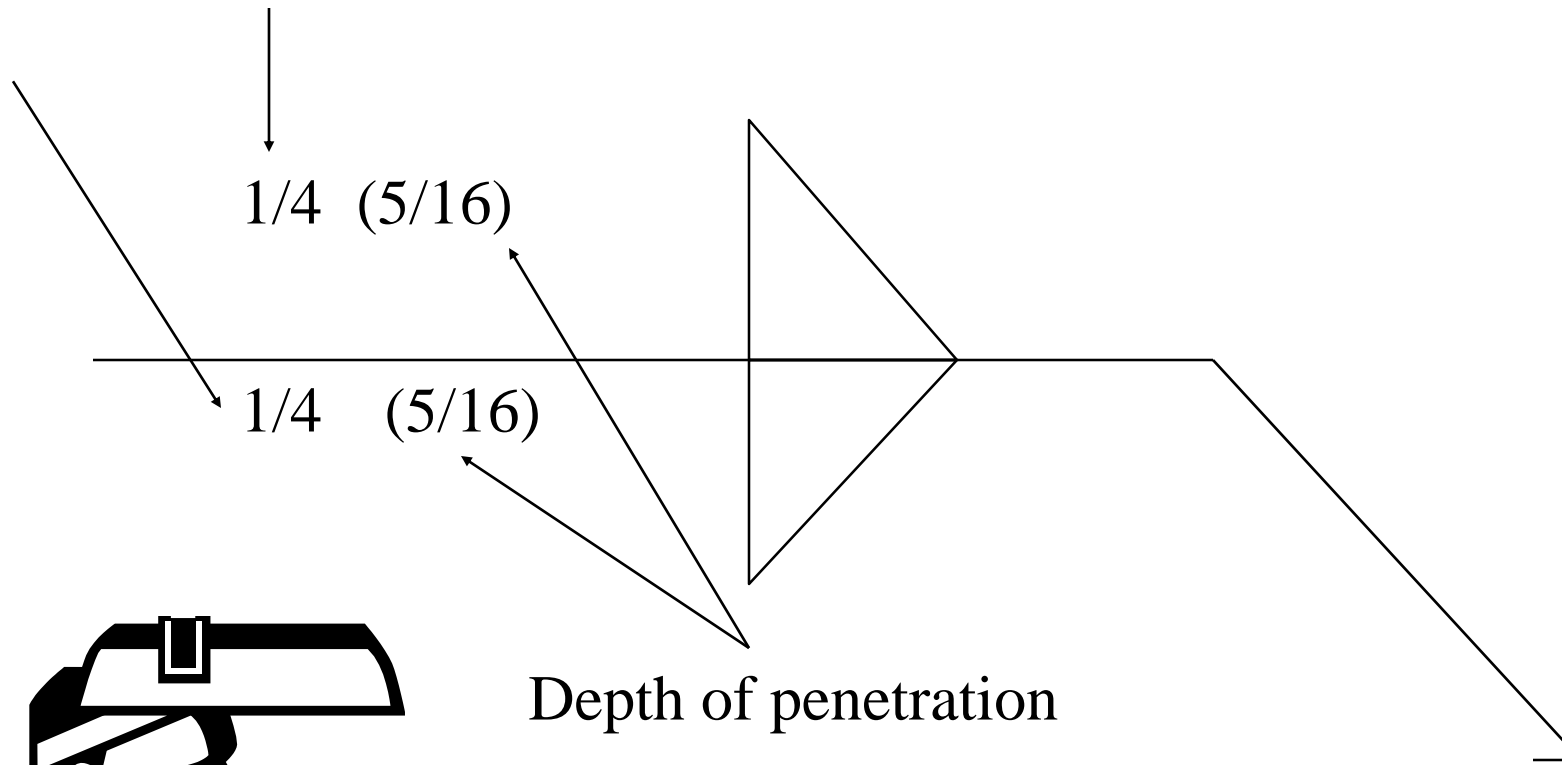
# Staggered Intermittent Fillet Weld

Weld ends than 10 inch centers staggered each side



# Example of Double Bevel Groove weld

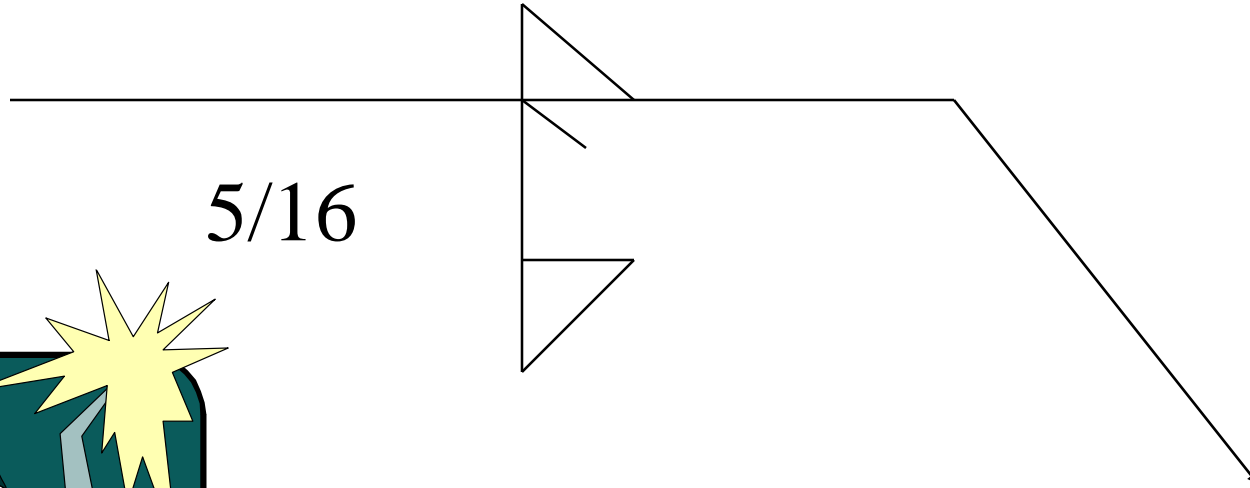
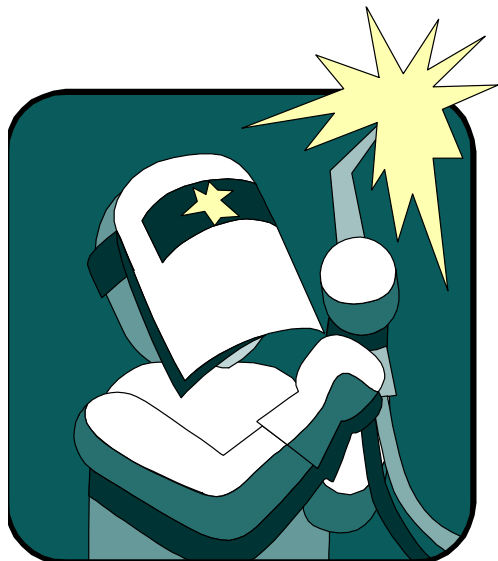
Size/ Length of leg



# What does this symbol Represent?

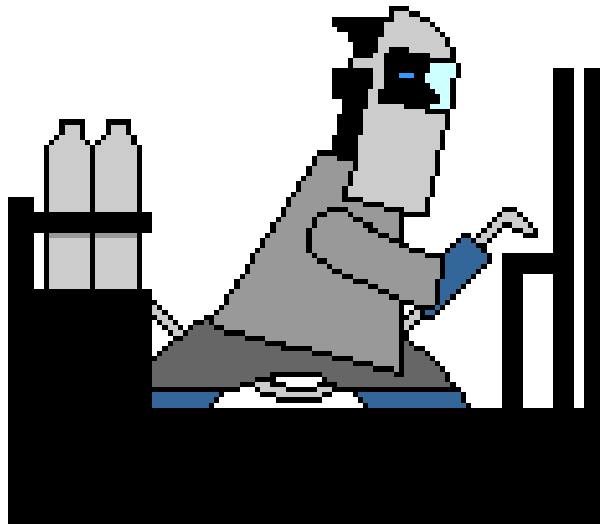
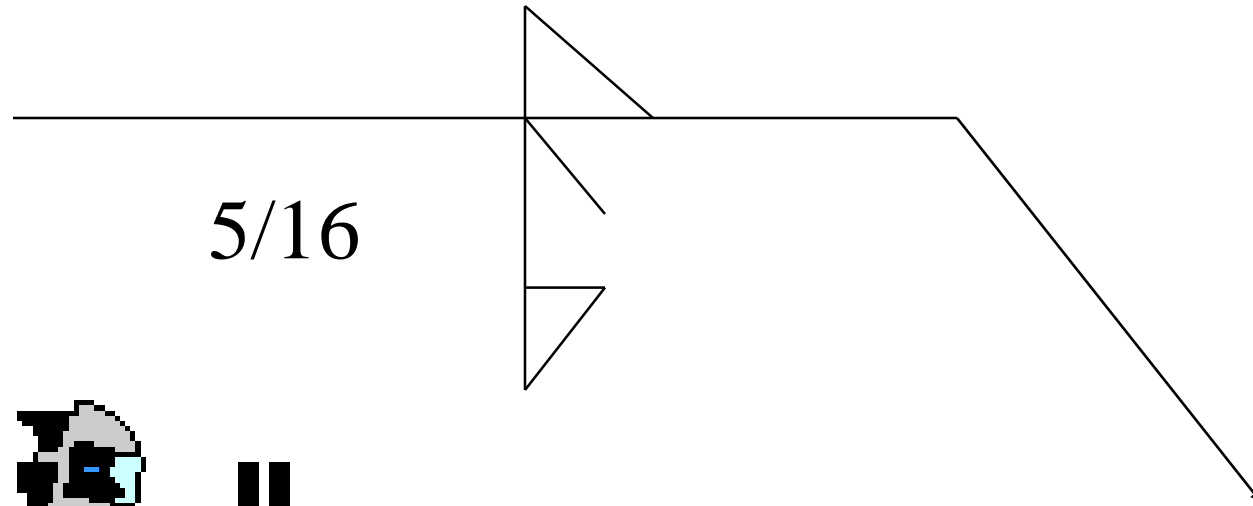
5/16

5/16



# Single-Bevel-Groove and Double Fillet Weld Symbol

5/16



# Single-Bevel-Groove and Double Fillet weld Symbols

