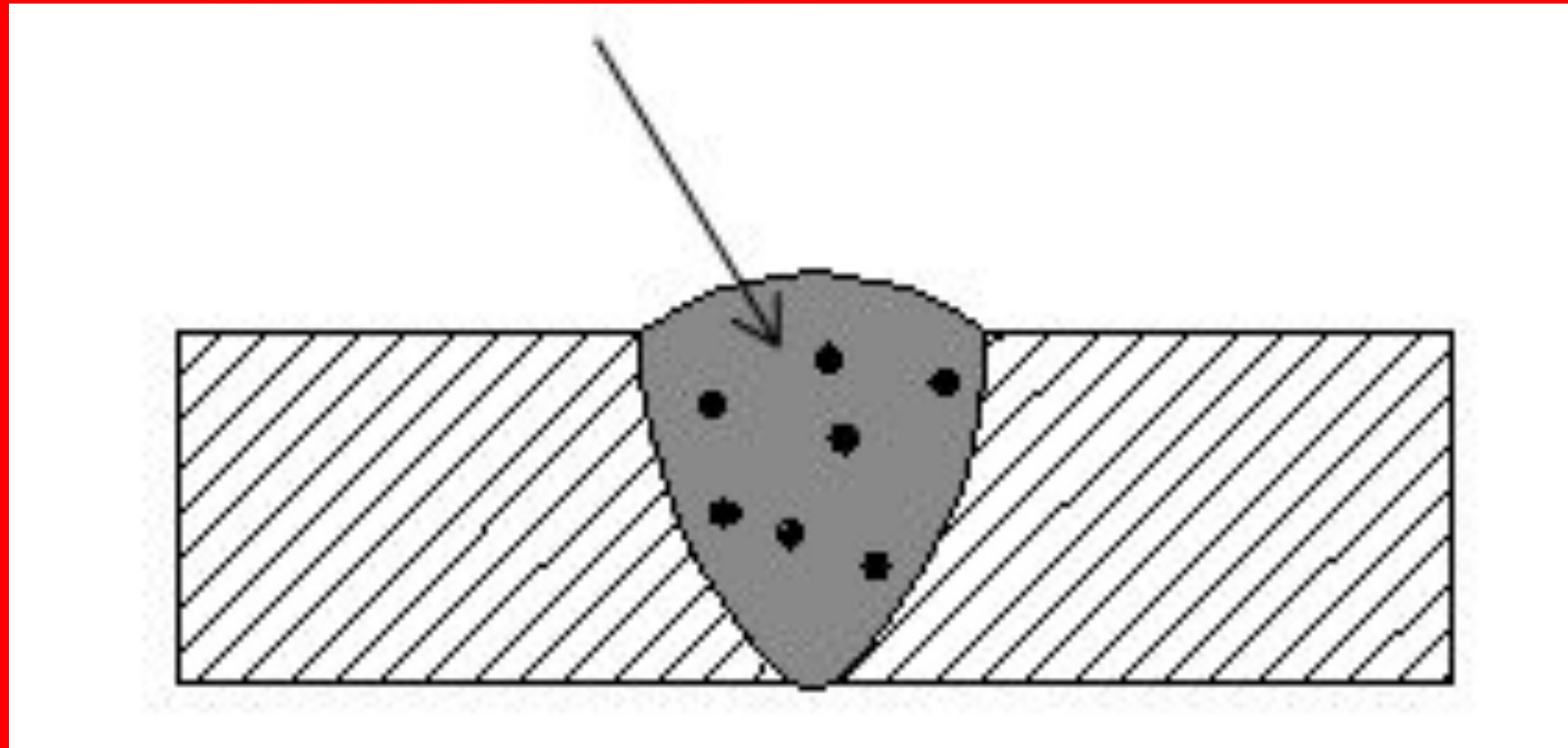
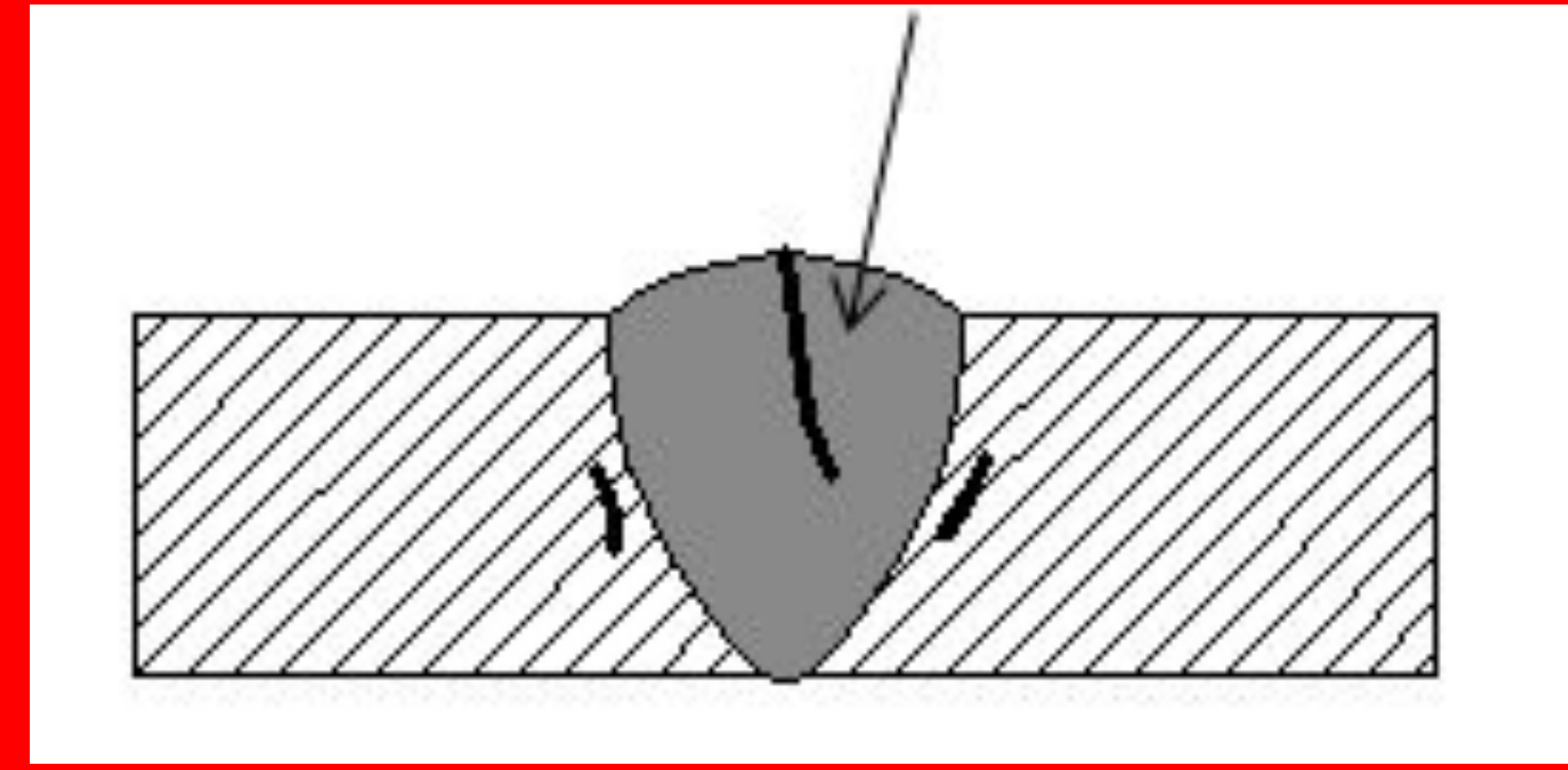


# Types of Welding Defects and Causes

## Cracking

Cracking can be caused by many different problems from rapid cooling to contamination. But in almost all cases, the reason cracking occurs is because the internal stresses exceed either the weld, the base metal or both. After welding, both the base metal and the weld begin shrinking as they cool.

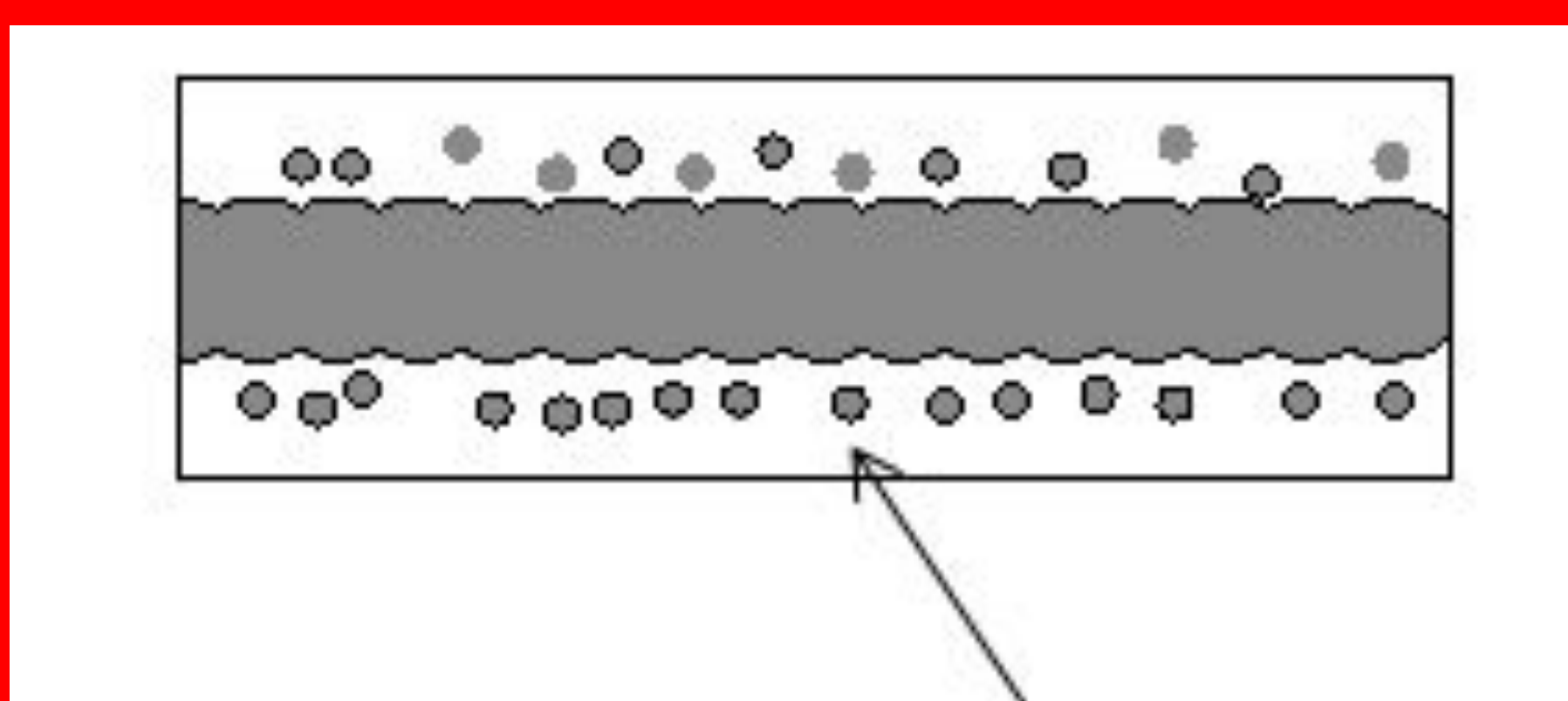
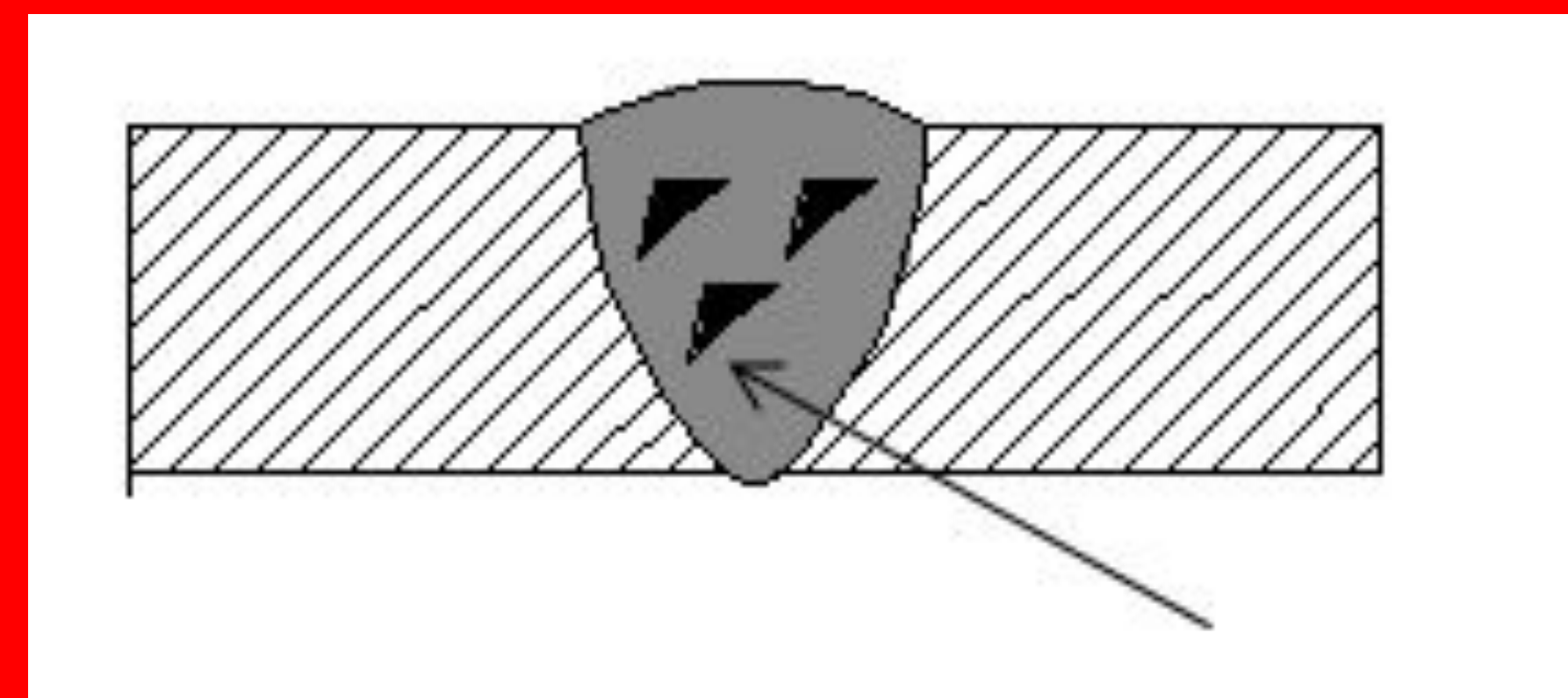


## Porosity

Porosity is caused by the absorption of nitrogen, oxygen and hydrogen in the molten weld pool which is then released on solidification to become trapped in the weld metal. Nitrogen and oxygen absorption in the weld pool usually originates from poor gas shielding. This happens most often when low hydrogen electrodes like 7018 gets wet/damp. To prevent this from happening keep all low hydrogen electrodes in the manufacturers sealed container or in a heated oven.

## Slag Inclusion

Slag inclusions are non metallic particles trapped in the weld metal or at the weld interface. Slag inclusions result from faulty welding technique, improper access to the joint, or both. Sharp notches in joint boundaries or between weld passes promote slag entrapment. Slag inclusion are mainly caused by improper cleaning when using SMAW.

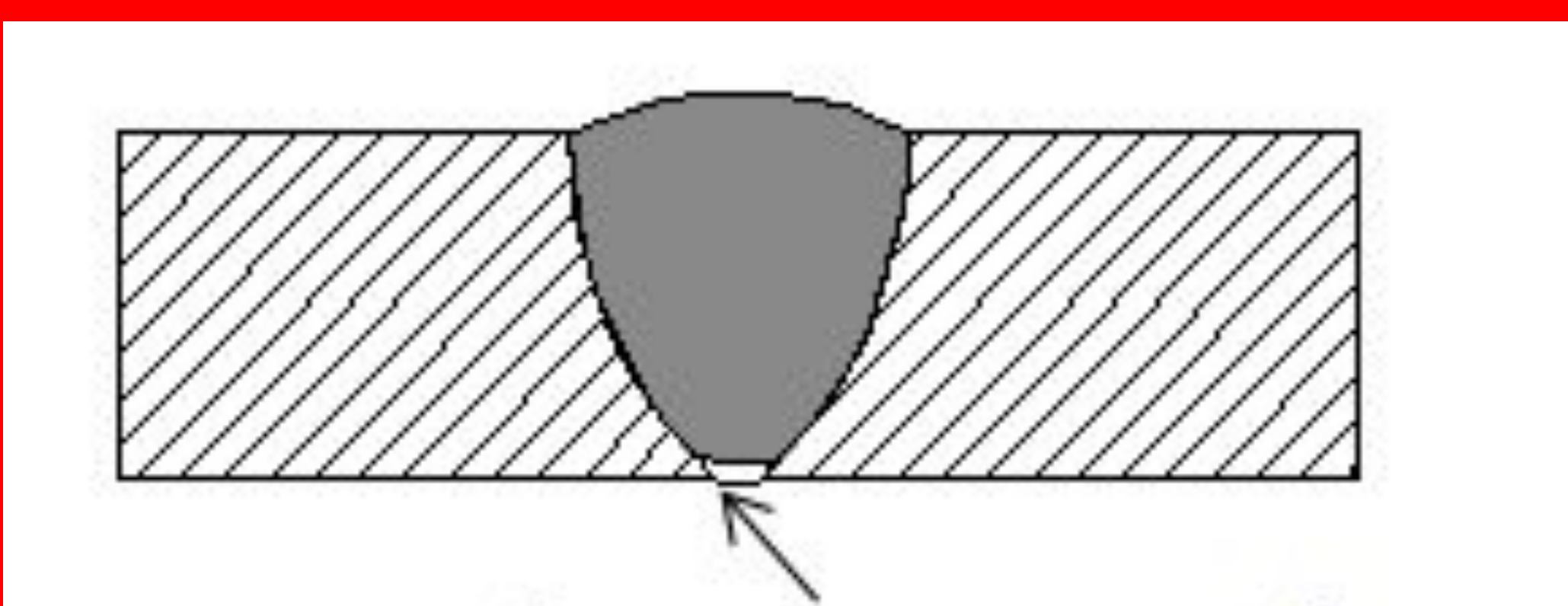
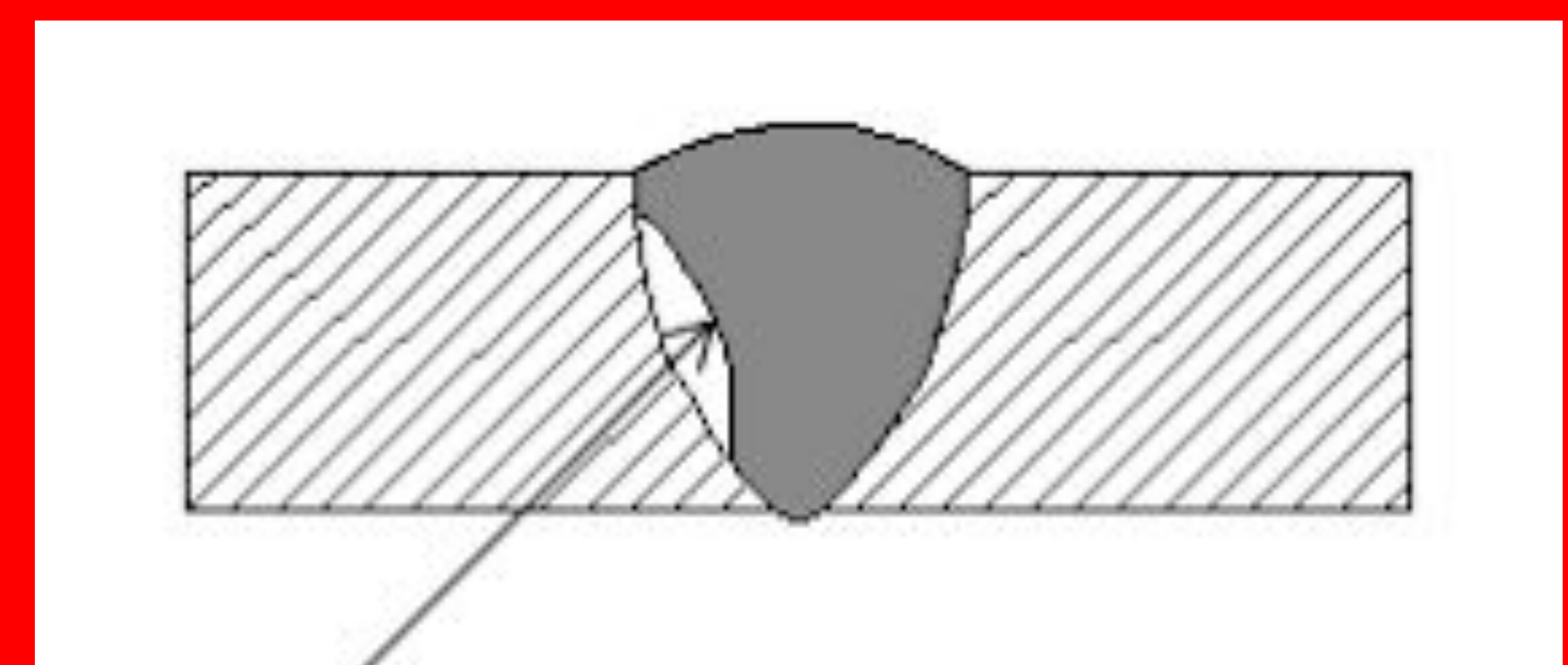


## Spatter

Causes of weld spatter can be worsened further by factors including poor quality welding wire, overly long or short arcs, incorrect mixtures of gas, poor welding surface conditions, incorrect welding torch angle, improper wire feed speed, grounding location, loss of shielding gas or wind, and moisture in the atmosphere.

## Incomplete Fusion

Common causes of incomplete fusion include incorrect angle and/or positioning of the welding gun, incorrect weaving technique when filling a joint, travel speed too slow or too fast, inaccurate settings such as amperage too low, or contamination and/or insufficient cleaning of the base metal.



## Incomplete Penetration

Some common causes of incomplete joint penetration are related to groove weld design or set up not suitable for the welding conditions. These problems develop in situations where the root face dimensions are too large, the root opening is too small, or the included angle of a v-groove weld is too narrow.