

Weld characteristics welding defects

Next class: Causes (relation with heat transfer and fluid flow),
and remedies

Cooling of fusion weld

Three important effects intimately connected with the cooling of a fusion weld:

- Contraction
- Thermal Stress
- Metallurgical phase transformation

All these effects significantly control the quality of the weld.

Thermal stresses or thermally induced stresses arise from a material or mechanical structure being acted upon by a temperature gradient or a temperature change (and not simply temperature). There are three principal examples: (1) stresses induced by a volumetric change, either expansion or shrinkage, associated with some change of phase in the material of construction; (2) stresses induced by a difference in coefficient of thermal expansion (3) stresses induced by a temperature gradient resulting in differential rates of expansion (on heating) or contraction (on cooling) within the volume of the material or within the structure.