



Annealing routes that should not be conflated in pipe and tube metallurgy

Annealing Steel: Annealing Types, +I and Pipe & Tube Applications

Treatment	Purpose / concept	Pipe-and-tube note
Full Annealing	For suitable steels, develops a softer, closer-to-equilibrium structure through a controlled heating and cooling cycle	The exact cycle must come from material/process requirements; one universal pipe-and-tube temperature range is not valid.
Process / Recrystallization Annealing	Restores ductility and reduces cold-work effects in formed products	Closely tied to cold-work history and steel composition.
Isothermal Annealing	Uses a controlled isothermal stage to develop the intended transformation path	EN 10216-2 identifies +I for specific grades.
Solution Annealing	For austenitic stainless steels, dissolves soluble phases/precipitates and uses rapid cooling to retain the intended solution-treated condition	Not the same as +I; requirements come from the stainless product specification.

Source / basis: <https://niktrd.com/annealing>