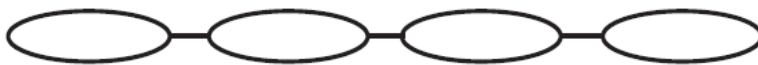


HDPE Annealing / Tempering

General

Annealing and Tempering are two expressions for the same meaning.

Tempering of plastics is a heating of the polymers to below their glass transition temperature to relieve the internal stresses introduced and 'frozen' into the products during its fabrication (moulding/extrusion) by the production speed and cooling process.



Stretched molecules after manufacturing



Molecules after annealing/tempering process

Results

Tempered products result in

- reduced shrinkage during further treatments like during machining, drilling, uneven thickness reduction, screw thread cutting, thermo-forming and fusion
- better dimensional stability
- better shape while cutting (less pipe end deformation)
- better relaxation after deforming (like during transports)
- lower expansion/shrinkage during ambient temperature changes

Process

Tempering process should be considered upon the kind of product size, wall thickness and production method. Thick walled extruded parts like pipes or sheets needed higher and longer annealing process than thin walled moulded parts.

Thick walled HDPE parts can be annealed by

1. Oil annealing in a bath heated to 120 °C and under controlled rate slowly to reduce to room temperature within several hours
2. Air annealing in an oven heated to 120°C and under controlled rate slowly to reduce to room temperature within several hours

Conclusion

Most standard applications of HDPE pipes, fittings and sheets do not require an additional tempering. However, for a lot of special applications tempering is a perfect solution to achieve better product results.