

## Metal quenching

The polymer quench bath is affected by concentration and molecular weight. This is a suggested starting point for developing an aqueous-polymer metal quench bath. Typically, a formulator sells the quenchant in a concentrated form which the customer then dilutes to achieve the ratios listed below.

### End User Concentrations

**Aquazol** – 0.5% - 5% depending upon desired cooling curves. Most typically 2% - 3%.

**Antifoamers** - 8% - 12% triethyl amine, benzotriazole, tolytriazol, ethanol amine, or silicon defoamers.

**Corrosion protectors** - keep pH between 7 – 10. Sodium nitrite or potassium nitrite are common corrosion protectors

**Antibiological protectors** – this is not typically a problem with Aquazol based quench baths. Gluteraldehyd based biocide at 100 ppm as needed.

- Aquazol 500 at 2% by Weight in Aqueous Solution
  - No vapor phase
  - Rate of cooling in boiling phase from 162 C/s to 133 C/s
  - Rate of cooling in convection phase (400°C) from 33 C/s to 25 C/s
- Aquazol 200 at 2% by Weight in Aqueous Solution
  - No vapor phase
  - 186 C/s to 156 C/s Rate of cooling in boiling phase from
  - Rate of cooling in convection phase (400°C) from 105 C/s to 113 C/s
- Aquazol 50 at 2% by Weight in Aqueous Solution
  - No vapor phase
  - Rate of cooling in boiling phase from 199 C/s to 176 C/s
  - Rate of cooling in convection phase (400°C) from 125 C/s to 120 C/s

### Benefits

**Aquazol** – Low polymer to water ratio gives tunable quenching properties

**Aquazol** – High thermal stability for consistent cooling curves

**Aquazol** – Low drag-out after cooling for economical quenchant bath