Mixing water — the foundations of an optimum performance

The quality of the water used has a significant impact on the functionality of coolant products during application. In emulsions, the water content is often over 90 percent, and in solutions it can exceed 95 percent. For this reason, there are specific minimum requirements that must be observed for mixing water components.

The pH value and the total hardness of the mixing water are of particular importance. A pH value of 7 is optimal, as the initial water will act neutrally at this value. pH values of up to around 9 are still permissible as long as there are no other reasons not to use the mixing water. However, initial water with a pH value of < 6 is unacceptable. Water with such a low pH could lower the pH value of the coolant emulsion even when freshly applied, and this can have far-reaching consequences — including reduced corrosion protection.

In addition to pH value, total hardness is an important factor for optimal mixing water. This is one of the most important technical application parameters. If the water is too hard, this may cause the hardness components it contains to react with anionic emulsifiers to form poorly soluble compounds — known as lime soaps. This can result in clogged filters and deposits on workpieces and tools.

Make sure that the mixing water has a low chloride content; a value that is too high will, first and foremost, have a negative effect on the corrosion protection behaviour of coolants that are mixed with water. In addition, the mixing water should not be polluted with microbes. In this case, the requirements for mixing water are the same as those for drinking water quality.
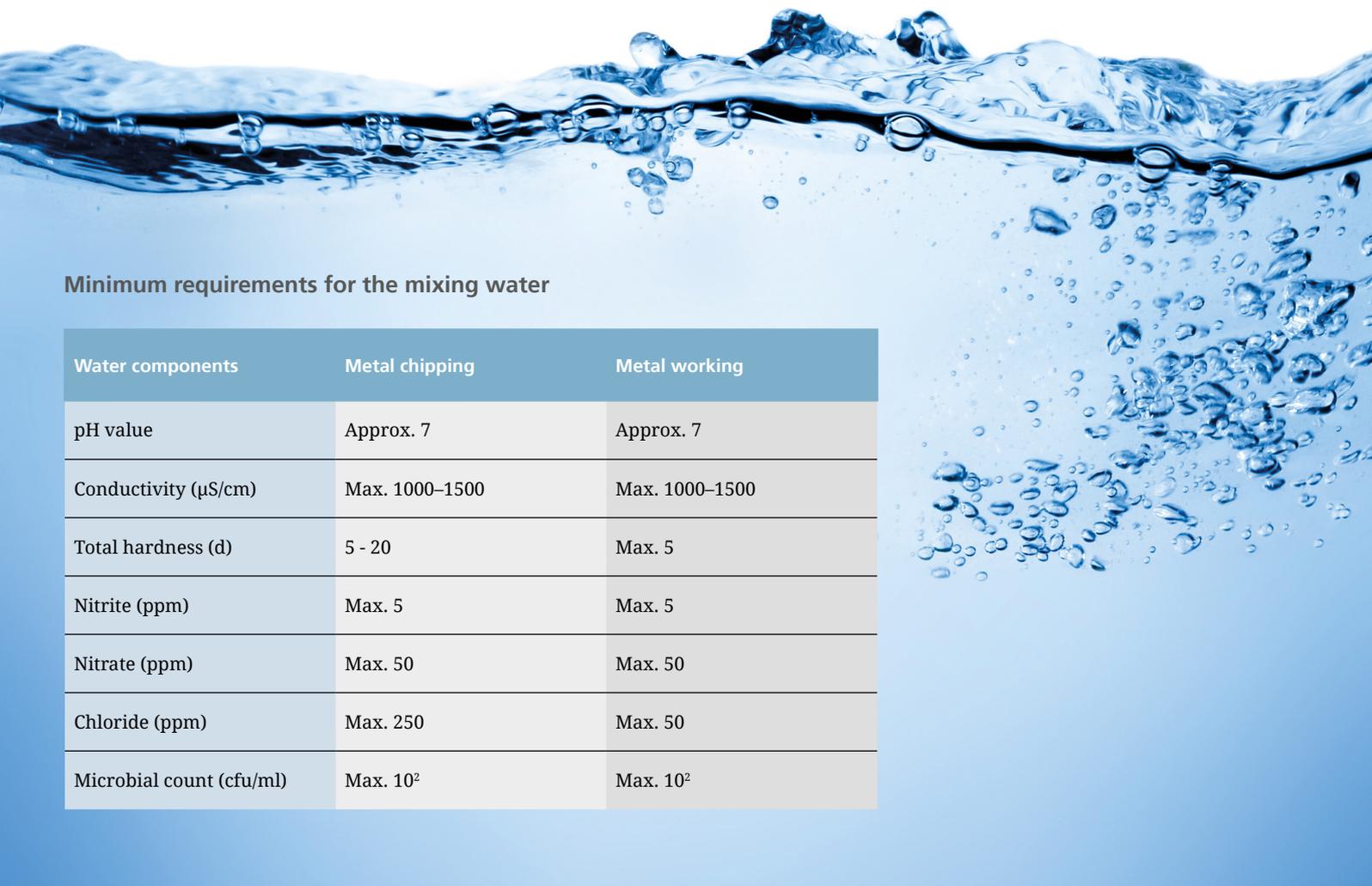
Minimum requirements for the mixing water

Water components	Metal chipping	Metal working
pH value	Approx. 7	Approx. 7
Conductivity (µS/cm)	Max. 1000–1500	Max. 1000–1500
Total hardness (d)	5 - 20	Max. 5
Nitrite (ppm)	Max. 5	Max. 5
Nitrate (ppm)	Max. 50	Max. 50
Chloride (ppm)	Max. 250	Max. 50
Microbial count (cfu/ml)	Max. 10^2	Max. 10^2