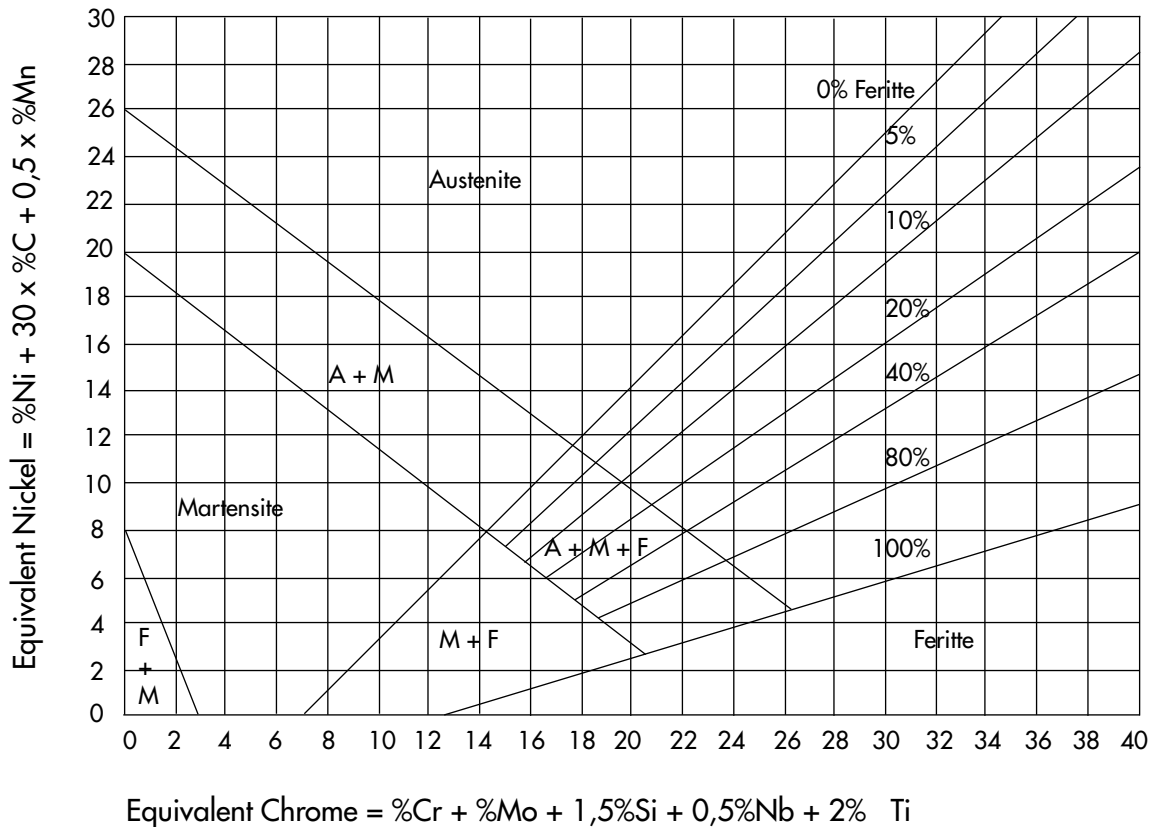


# Application of the Schaeffler diagram

Schaeffler-diagram



A Schaeffler diagram can be used to represent the effect of the proportion of two elements (and therefore the composition of the alloy) on the structure obtained after rapid cooling from 1050°C to room temperature. The figure shows that chromium is a ferrite stabilizer and nickel is an austenite stabiliser. This diagram shows the limits of the austenitic, ferritic and martensitic phases in relation to the chromium and nickel equivalent, calculated by using these expressions:

- Cr equivalent =  $(Cr) + 2(Si) + 1.5(Mo) + 5(V) + 5.5(Al) + 1.75(Nb) + 1.5(Ti) + 0.75(W)$
- Ni equivalent =  $(Ni) + (Co) + 0.5(Mn) + 0.3(Cu) + 25(N) + 30(C)$

with all concentrations being expressed in weight percentages.

The Schaeffler diagram is an important tool for predicting the constitution of austenitic Cr-Ni steel welds with carbon contents up to 0.12%. However, it does not allow determination of the composition and volume of the carbide phase. Furthermore, for a carbon content lower than 0.12%, the agreement of predictions with actual system is reduced due to consumption of carbon by the carbide formation process. This Schaeffler diagram is especially suited to weld metals in order to predict the structure.