Induction brazing is a fast and appropriate method for industrial joining of complex geometries and metal combinations. In all types of brazing processes it is important to heat the joint interface of the two materials to the same, high temperature. If one of the specimens is warmer than the other, or if the hottest area is located outside the joint interface, a number of defects may appear: the braze metal may flow away from the joint, the flux may burn off, poor binding of the braze metal may appear or the braze metal may be overheated. Joint geometry as well as electro-magnetic properties of the workpiece materials has large influence on the heating time and temperature distribution in induction heating. In order to ensure high and uniform temperature distribution near the interface of a joint between dissimilar materials the precise coil geometry and position is of great importance. The present paper presents a combined numerical and experimental method for fast determination of appropriate coil geometry and position in induction brazing tube-to-plate joints of different ratios between tube and plate thickness and different combinations of the materials stainless steel, brass and copper. The method has proven to give successful results in brazing tube-plate joints of copper-brass, copper-stainless steel, stainless steel-brass, and stainless steel-stainless steel.