The Inherently Safer Design is a concept known since 1870. However, there is a general resistance to adopt a systematically apply its principles because they are subjective. For instance: "Reduce the inventory of a hazardous chemical substance." But, how much should the inventory be reduced? "Simplify your process." How to know if the process is simple enough?

Things cannot be classified strictly as "safe" or "unsafe". Something can be perceived as "not very safe" or "highly unsafe". One of the greatest challenges is to answer quantitatively the question "How safe is a chemical plant?" In order to quantify the safety level we need to capture all the possible options between the extremes of safe/unsafe. If we think in terms of traditional mathematics (Boolean logic), an element can only be inside or outside of a set. In other words, the element cannot only be safe or unsafe. What happens with the "not very safe" element?

The approach proposed here is based on fuzzy set theory. Here we will show how to use fuzzy logic to answer these questions. We will show how to develop the required membership functions and how to apply the methodology to calculate the index for a simple processing unit.