

Where should you start the tank selection process?

1. The process conditions and details of products to be reacted, or just mixed, are the starting point of any tank design. Typically, two or more raw materials, are involved in any mixing process. Each process has unique or somewhat unique requirements and characteristics.
2. Once the chemicals (i.e. raw materials) are identified and listed, the key properties should be listed, preferably in a spreadsheet. Chemicals in the rows and properties in the columns. The quantities of each chemical will vary, and the second column can usefully list the kilograms of each used in the recipe.
The columns must show specific gravity or bulk density, viscosity, temperature at start of process, and any other appropriate properties of importance. For example, the powder raw materials should show the prime particle sizes, if available.
If there is a temperature rise during the processing, or if the tank will be heated to better process more viscous products, these details should be shown in a column of the final maximum temperature expected.
3. With the chemicals identified and the properties defined, we can proceed to assess what tank materials can be considered. Chemical compatibility tables show the chemical concentrations (such as 10% or 50% in water or other carrier solvent and typically 2 to 4 different concentrations), temperature conditions and the various wall materials of tanks under consideration. While these corrosion charts enable a quick review of options, a second opinion is recommended, preferably from an experienced person, who is aware of special hazards and unique factors. This is an area of caution in design.
Often plastic tanks will be suitable for a particular chemical but will be rejected as a tank material option on the grounds of temperature conditions being too high for that plastic material. But be cautious even with various steel, or stainless-steel choices, as there may be some special conditions. Some are recorded on the internet and some not. Practise caution.
4. Review of the chemicals as possible hazardous products should be considered at this point, if not immediately obvious. Products such as solvents or solvent laden products such as paints are classified as hazardous products under South African National Standards and will thereby require special design considerations.
5. Review of pressure or vacuum conditions, or even likely but not expected such conditions, is also essential as these conditions make for very unique design parameters in such pressure vessels or tanks.
6. Hazardous products and pressure vessels require special design standards to be applied. Pressure and temperature charts will highlight various standards to be followed. We show the master chart in the 'Standards by Pressure-Temperature' charts, also on this site.
7. Armed with the chemicals details, the process conditions such as temperatures, SG and viscosity, the reviews of likely pressure or vacuum conditions and whether there are other hazardous conditions or products, it is now possible to consider the material choice for the tank. Plastics (fibreglass or roto moulded tanks) and metals can be considered.

8. At this stage we recommend a design review session with E4A and our partners, to also ensure that the proper style of mixer and mounting thereof, if a mixer is planned or in use. Equally we can advise on a tank only design and assist to optimise the final design parameters and indeed the detailed tank costs.

We provide several tank designs services for our valued clients. This list is not exhaustive and must be treated as guidelines only. There may be other important design and operational considerations that clients should consider.



These guidelines and notes are presented as general guides only and no warranty is implied or provided.