

What you should consider to avoid major risks of tank failure in your factory?

Many companies in the process industries are inclined to consider or use poor design practices in the case of tanks and vessels selection - and some run on the 'edge of disaster' in tank applications - with often inadequate tanks or vessels. The notes which follow below are a summary of poor designs and practices observed by E4A Engineers that should be carefully assessed in future tank installations.

1. *Inadequate design.*

Comments: Our observations include tanks not built to SANS or other international standards; 'own' designs; low cost and high-risk designs. In recent years, we have seen designs in solvent coatings environments where the mandatory SANS 310 for hazardous chemicals is not complied with. This can lead to a high-risk exposure, such as a fire or an explosion.

2. *Wrong metallurgy or wrong materials selection.*

Comments: Our observations include tanks clearly made with inadequate or 'optimistic' assumptions of corrosive conditions, galvanic corrosion from mixed steel and galvanized fittings, and ignoring temperature effects on material corrosion (especially with plastic tanks).

3. *Too thin walls, base or wrong SG assumptions or no SG assessment. SG = Specific Gravity.*

Comments: Our observations include 'dairy grade' wall thicknesses in paint manufacturing services where SG regularly reaches 1.5 and higher; tank legs with thin material 'box legs' but used on high SG services.

4. *Inadequate or 'no vent' designs.*

Comments: We noted the reported catastrophic failure at Rossing from inadequate vent outlets and rapid tank loading. We have also observed vacuum collapse in smaller tank sizes.

5. *Inadequate support structures.*

Comments: Our observations include tanks clearly made with 'optimistic' assumptions of design that do not comply with the required standards such as API 650 referred to in SANS 310 (standard for solvent based paints); recent observations include very thin gussets on tank supports and no re-enforcing rings or inadequate spreader plates and leg gussets.

6. *Poor welding quality.*

Comments: Poor welding procedures are the main cause of weld failure – pitting and crevices lead to local stress concentrations; lack of inspection has been revealed where some welds are of very poor quality.

We provide several tank-design 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.