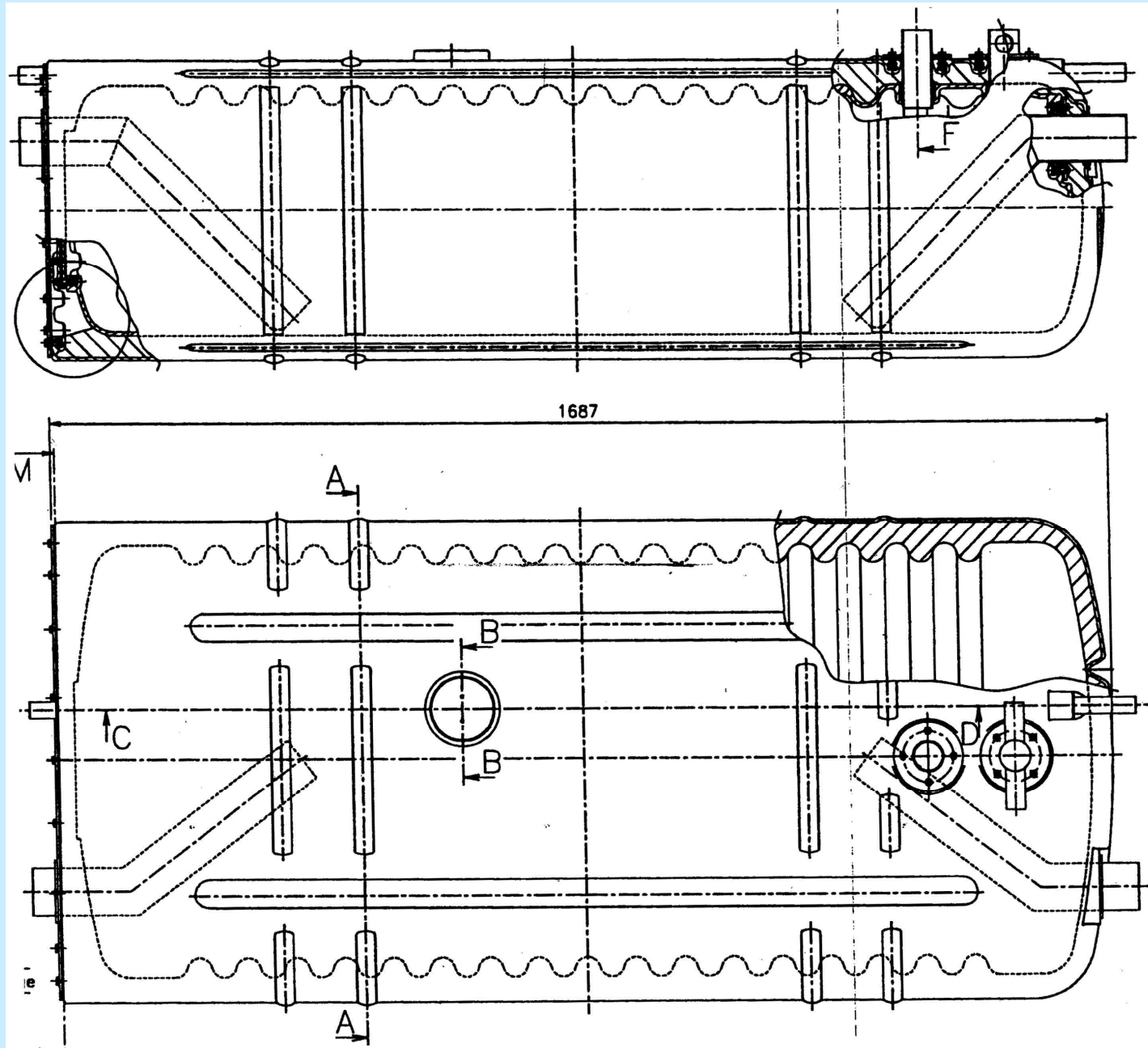


Waste water tank

- Replacement of a stainless steel tanks by HDPE tanks
- Almost one to one replacement
- Consult after the expert witness report of TNO
- Lawyer asked me to carry out experiments
- The proposed experiments were nonsense

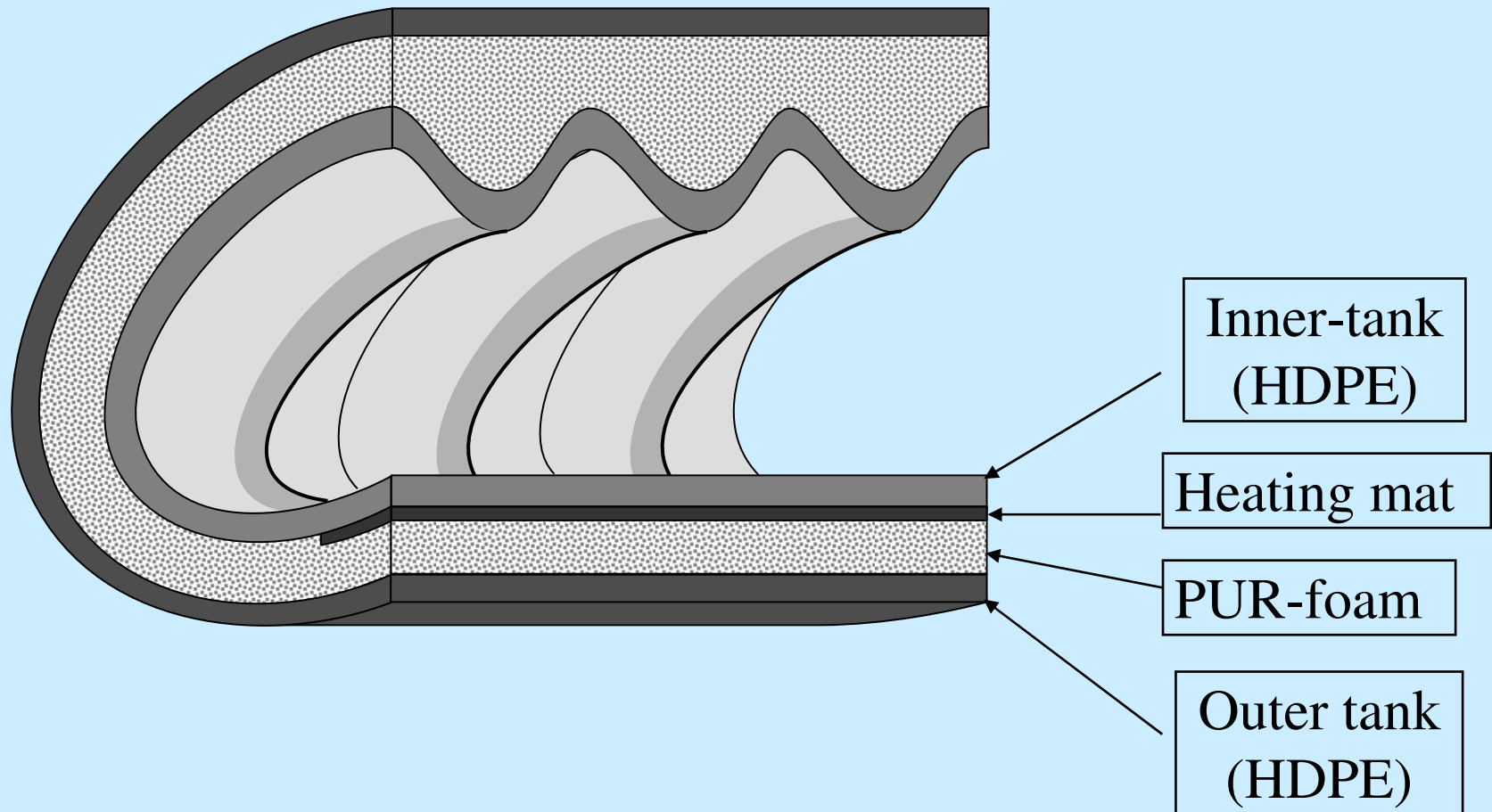
Waste water tank



Waste water tank



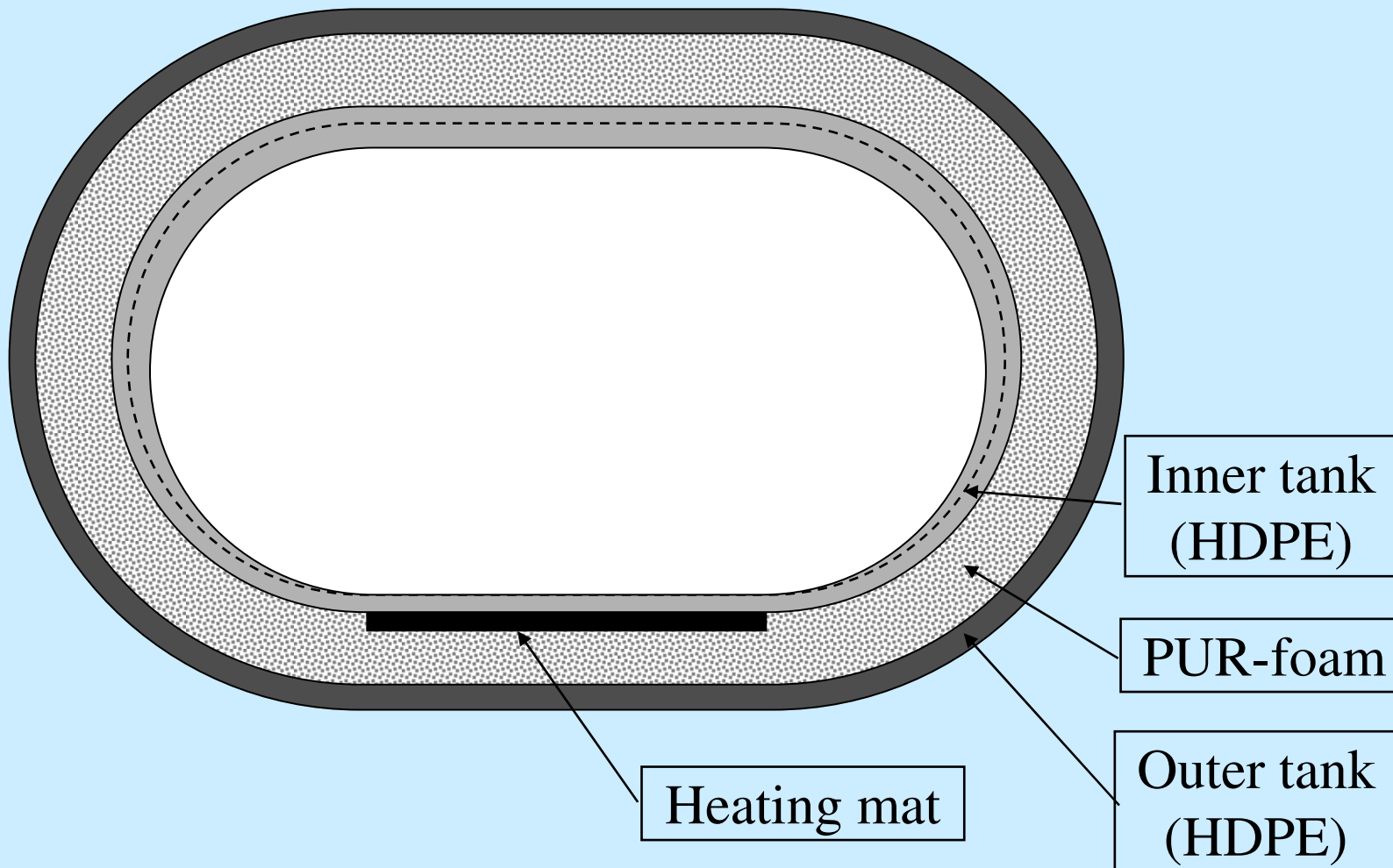
tank -1-set up



Cut out



Afvalwaternet – dwarsdoorsnede



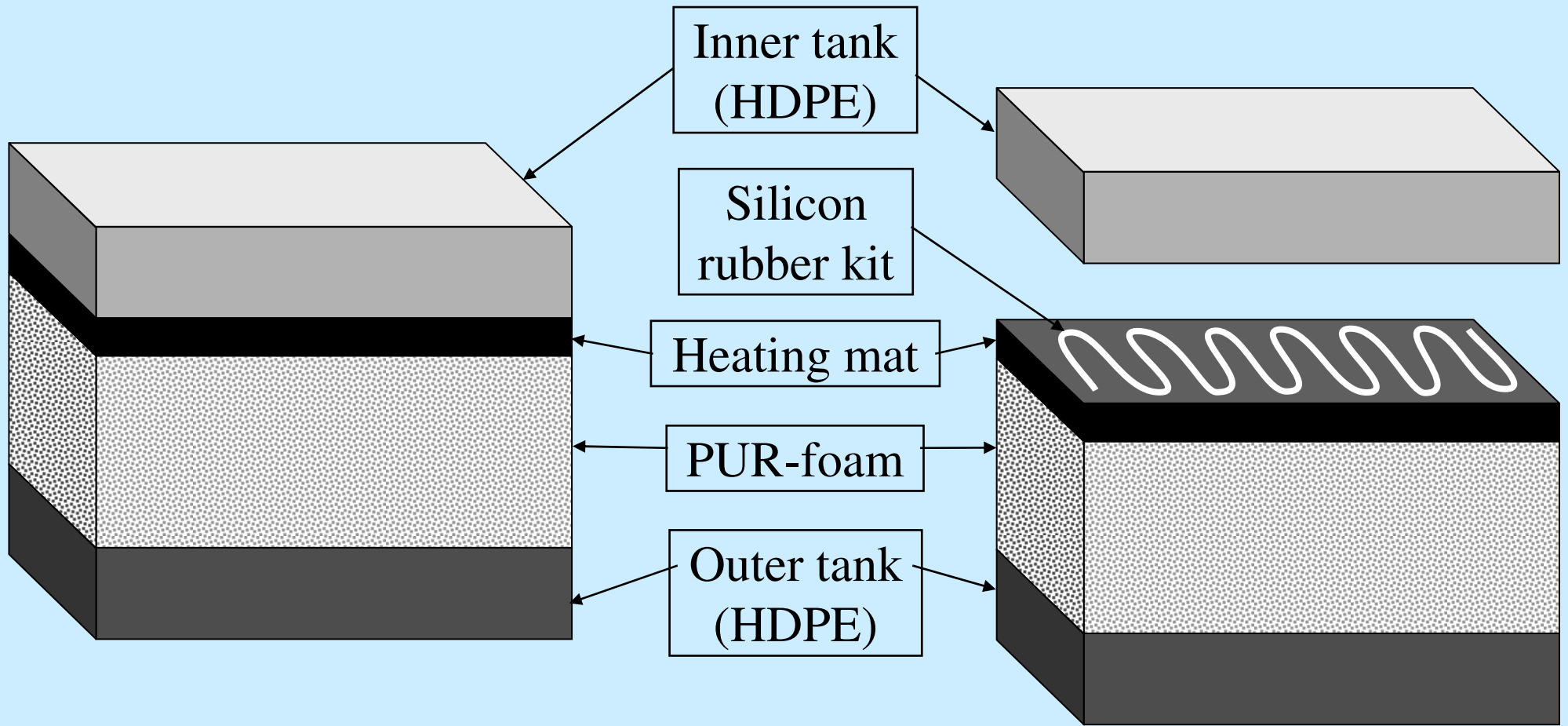
Bonding



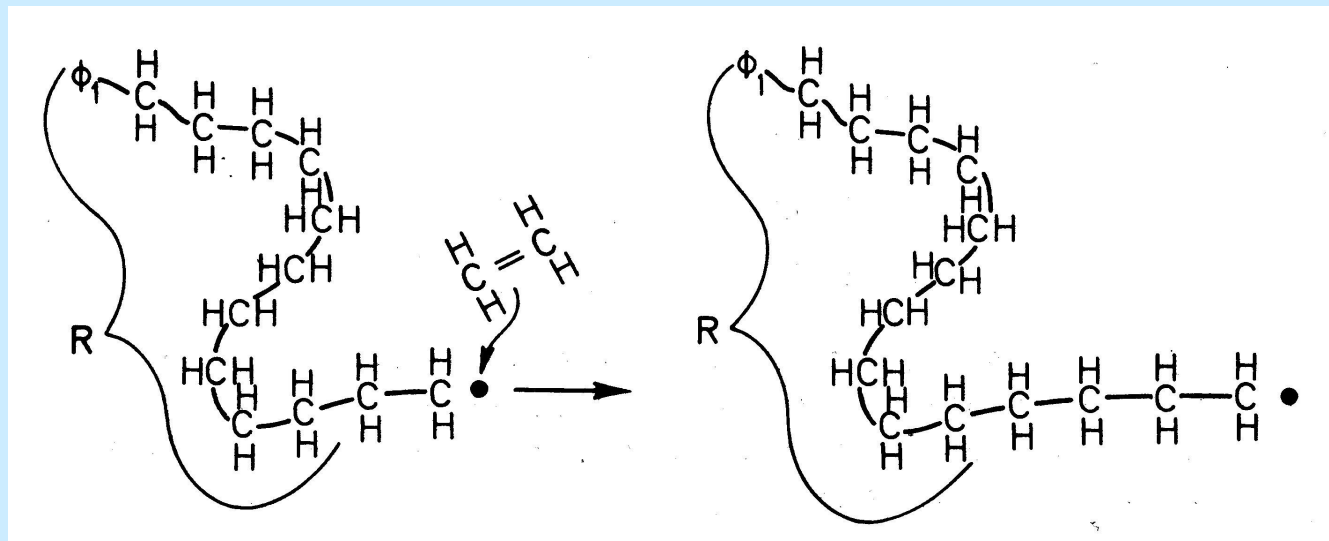
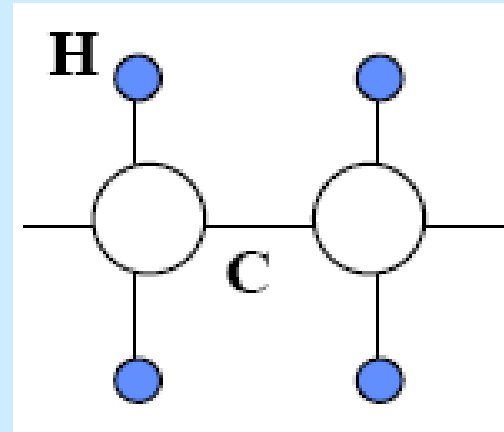
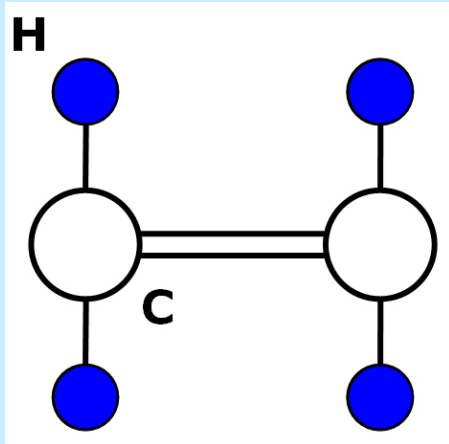
Bonding and debonding



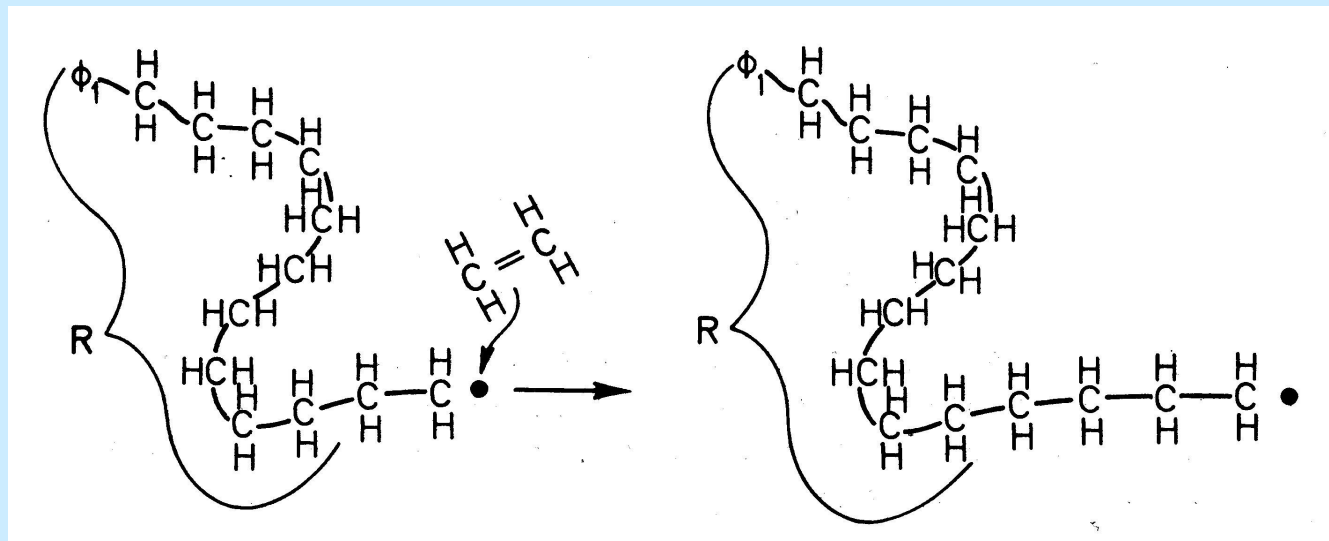
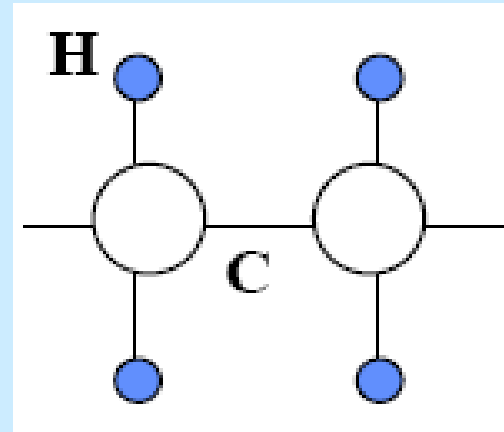
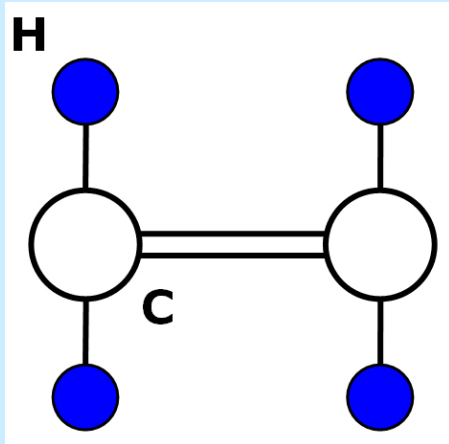
tank – 3 – bonding



Polymerisation



Polymerisation



Container for glue



Thermal resistance:

The thermal resistance for a stainless steel wall is:

$$R_{SS} = \frac{1}{\lambda_{SS}} \cdot \frac{t_{SS}}{A_{mat}} = \frac{1}{16.3 \text{ Watt/m}^\circ\text{C}} \cdot \frac{0.002 \text{ m}}{0.48 \text{ m}^2} = 0.00026 \text{ }^\circ\text{C/Watt}$$

The thermal resistance of a PE wall of 6 mm is:

$$R_{PE} = \frac{1}{k_{PE}} \cdot \frac{t_{PE}}{A_{mat}} = \frac{1}{0.34 \text{ Watt/m}^\circ\text{C}} \cdot \frac{0.006 \text{ m}}{0.48 \text{ m}^2} = 0.037 \text{ }^\circ\text{C/Watt}$$

Thermal resistance:

The thermal resistance ratio is:

$$V_R = \frac{R_{PE}}{R_{RVS}} = \frac{0.00307}{0.00026} = 142$$

$$\tau = R_{th} \cdot C_{th}$$

Conclusions:

- **Designing in plastics is very different from designing in metals.**
- **One to one relation is dangerous**
- **Do not only rely on injection moulders.**
- **Carry out design reviews and FMAE in all stages of design and production.**