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UNIVERSITY OF LISBON
INTERDISCIPLINARY STUDIES
ON SUSTAINABLE ENVIRONMENT AND SEAS

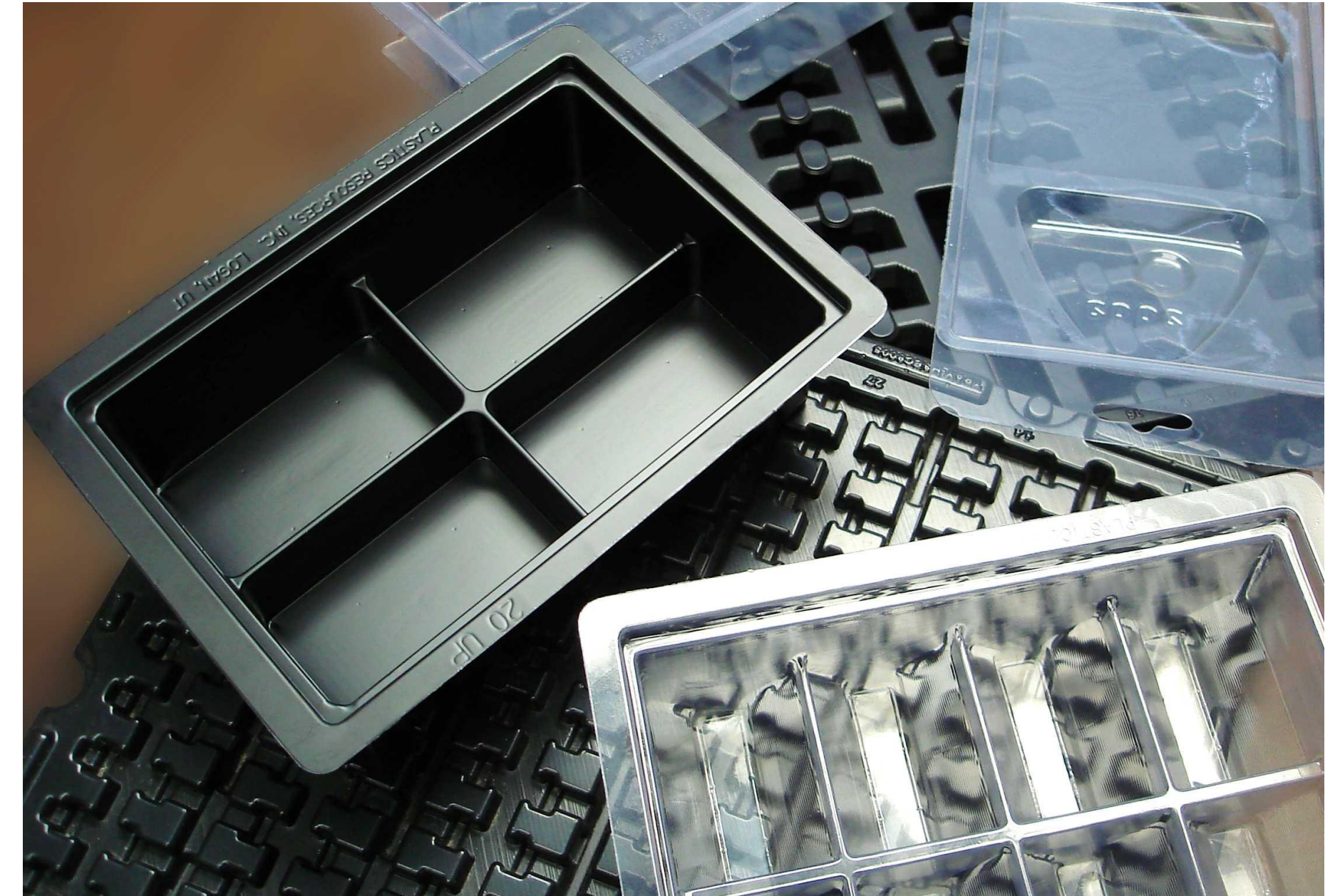


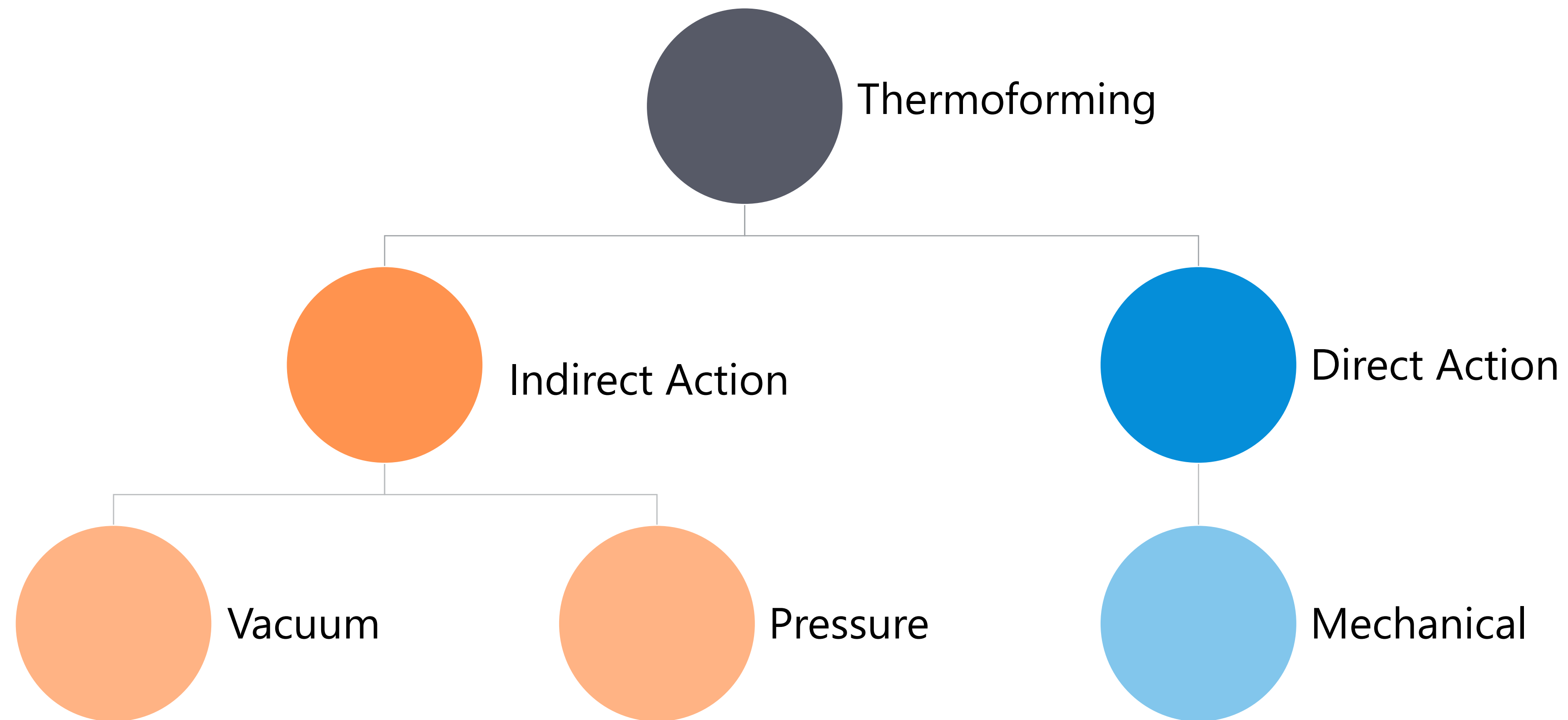
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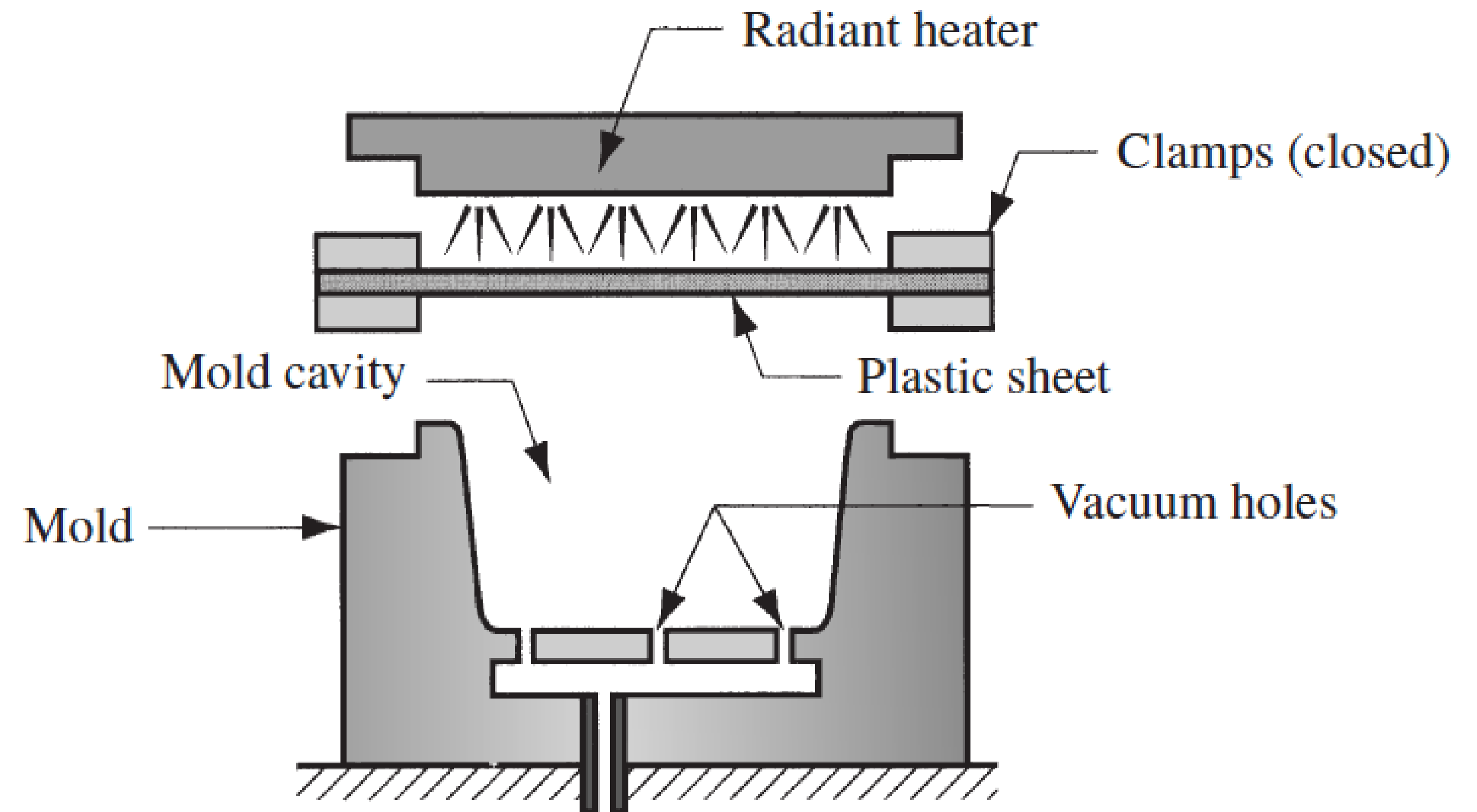
Thermoforming is a process in which a flat thermoplastic sheet is heated and deformed into a desired shape. The process is widely used to package consumer products and fabricate large items such as bathtubs, contoured skylights, and internal door liners for refrigerators.





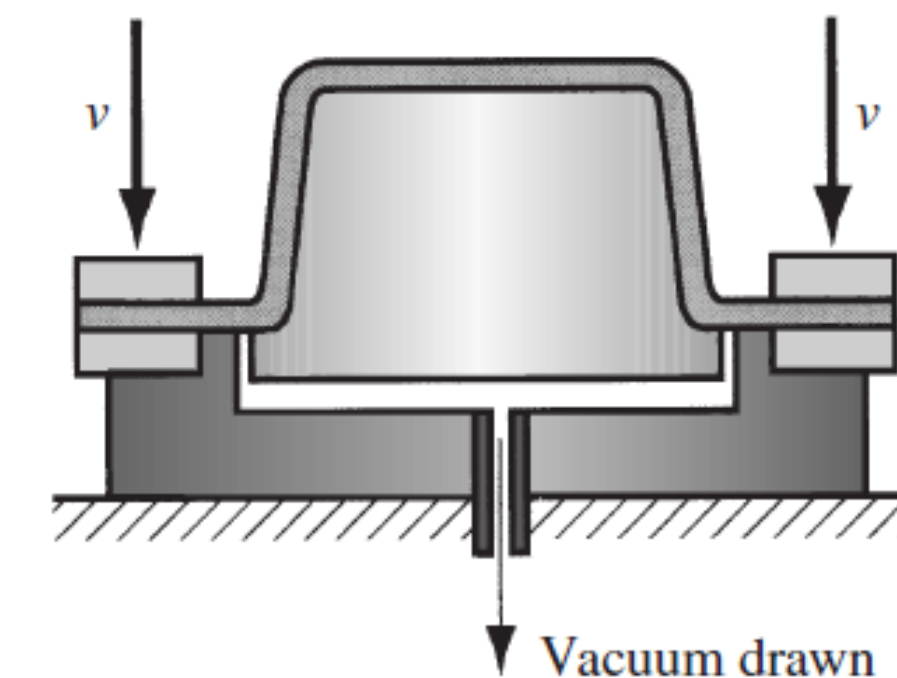
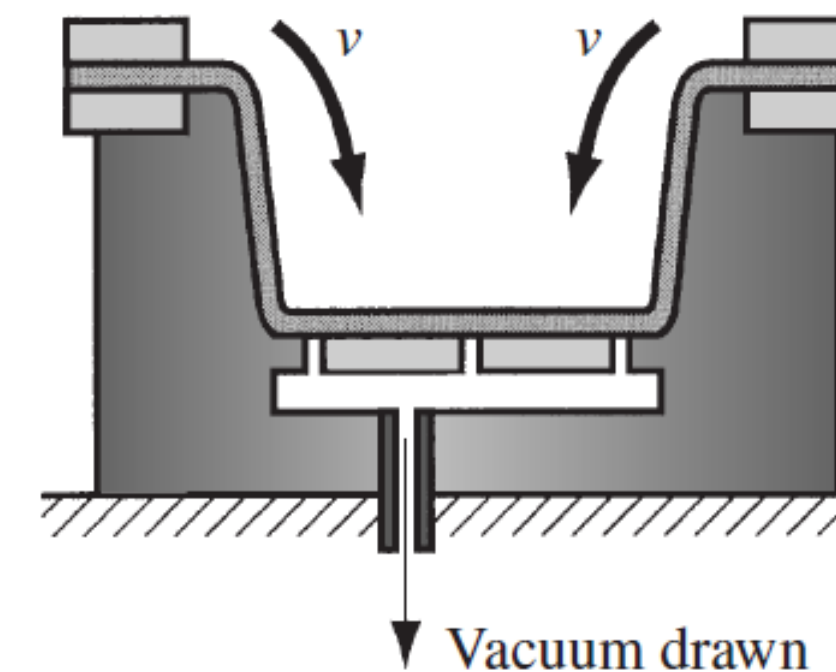
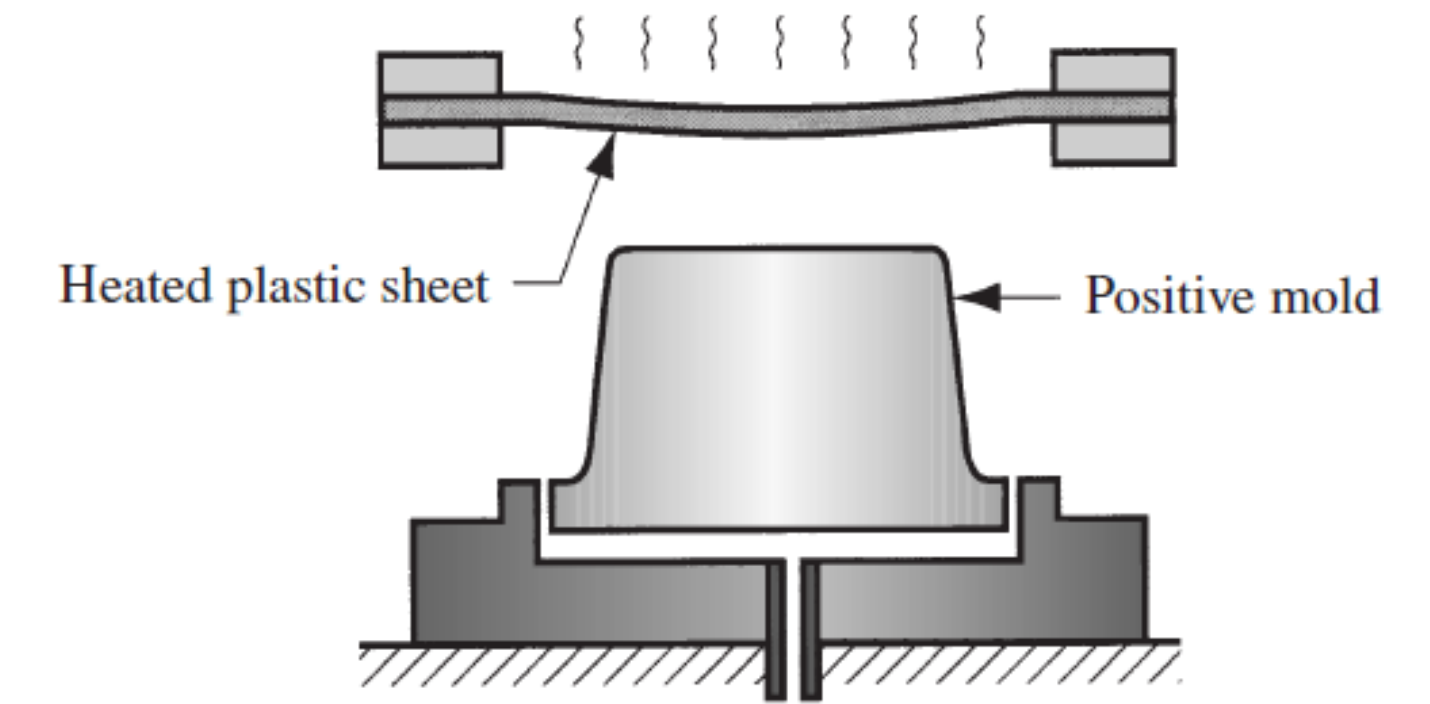
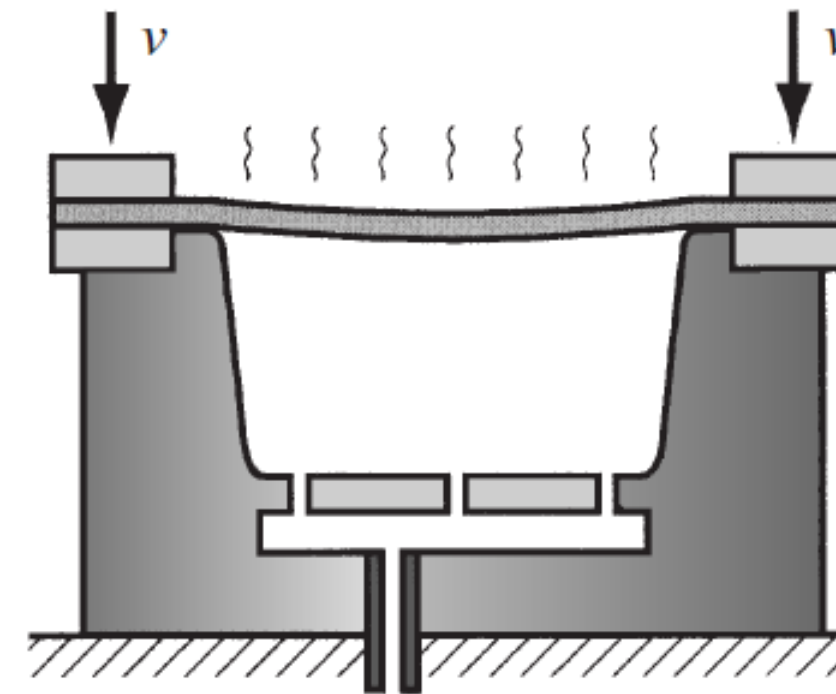
Indirect Action - Vacuum

1. Sheet cutting + clamping
2. Heating
3. Forming - vacuum
4. Cooling
5. Demoulding
6. Trimming



Indirect Action - Vacuum

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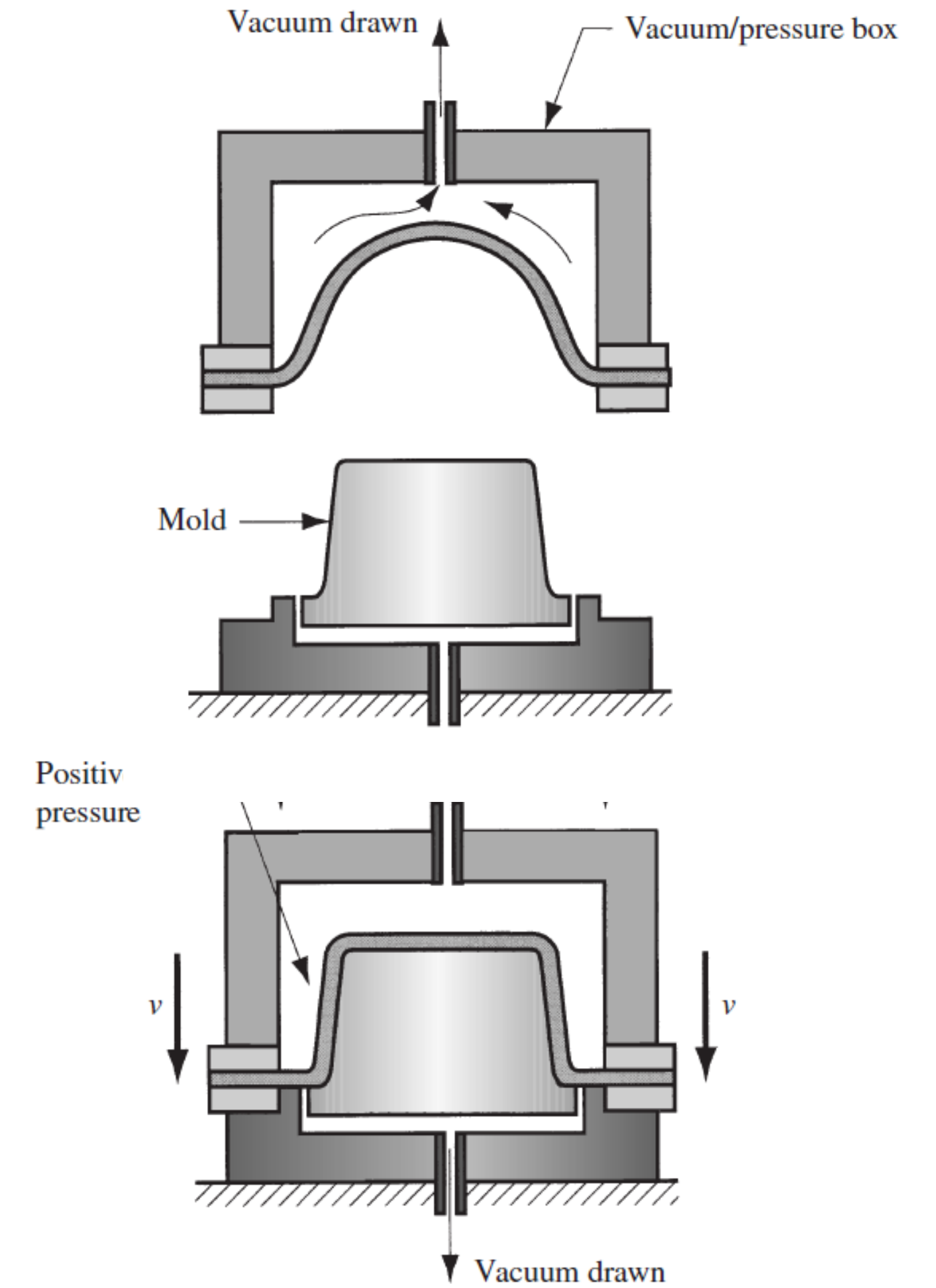
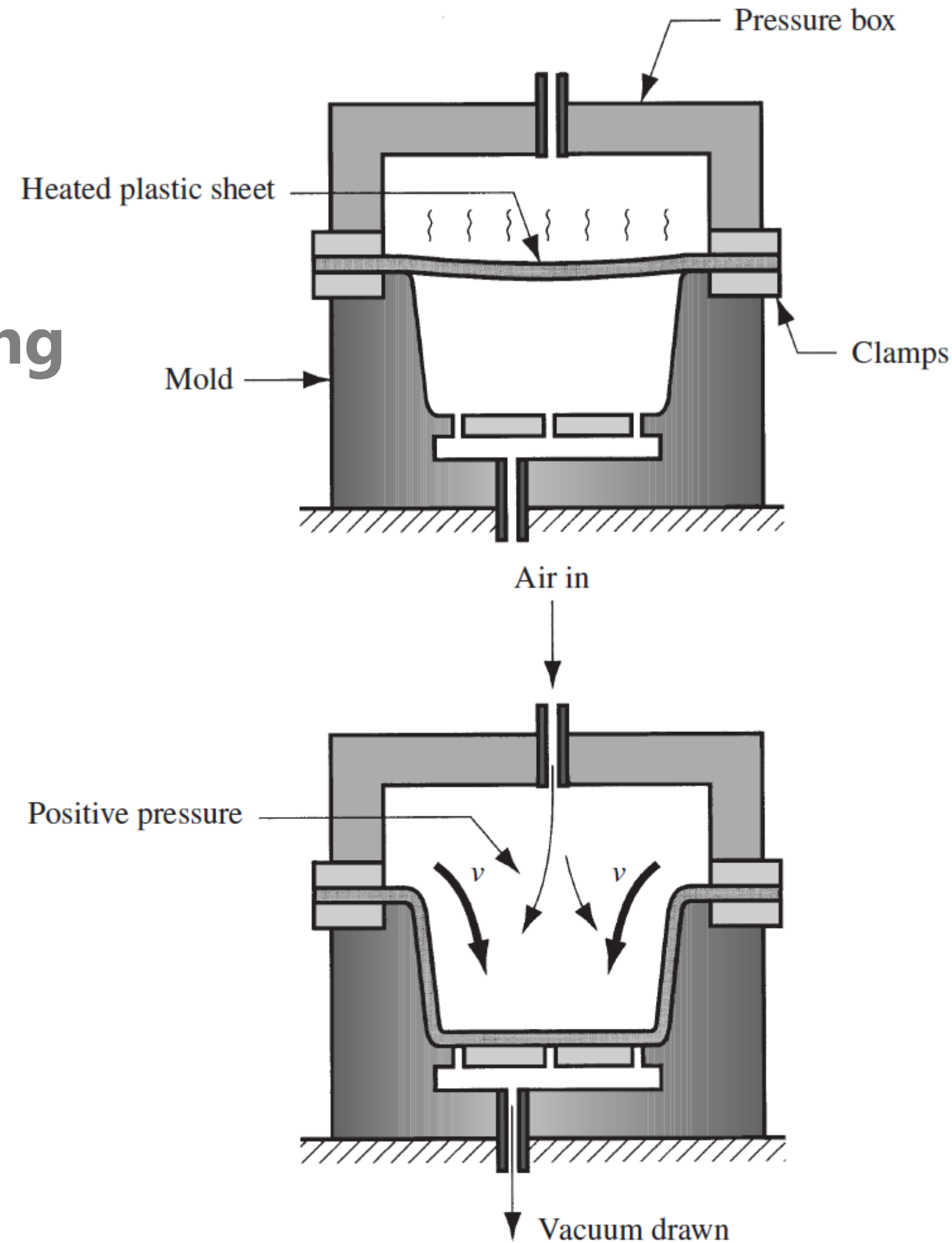






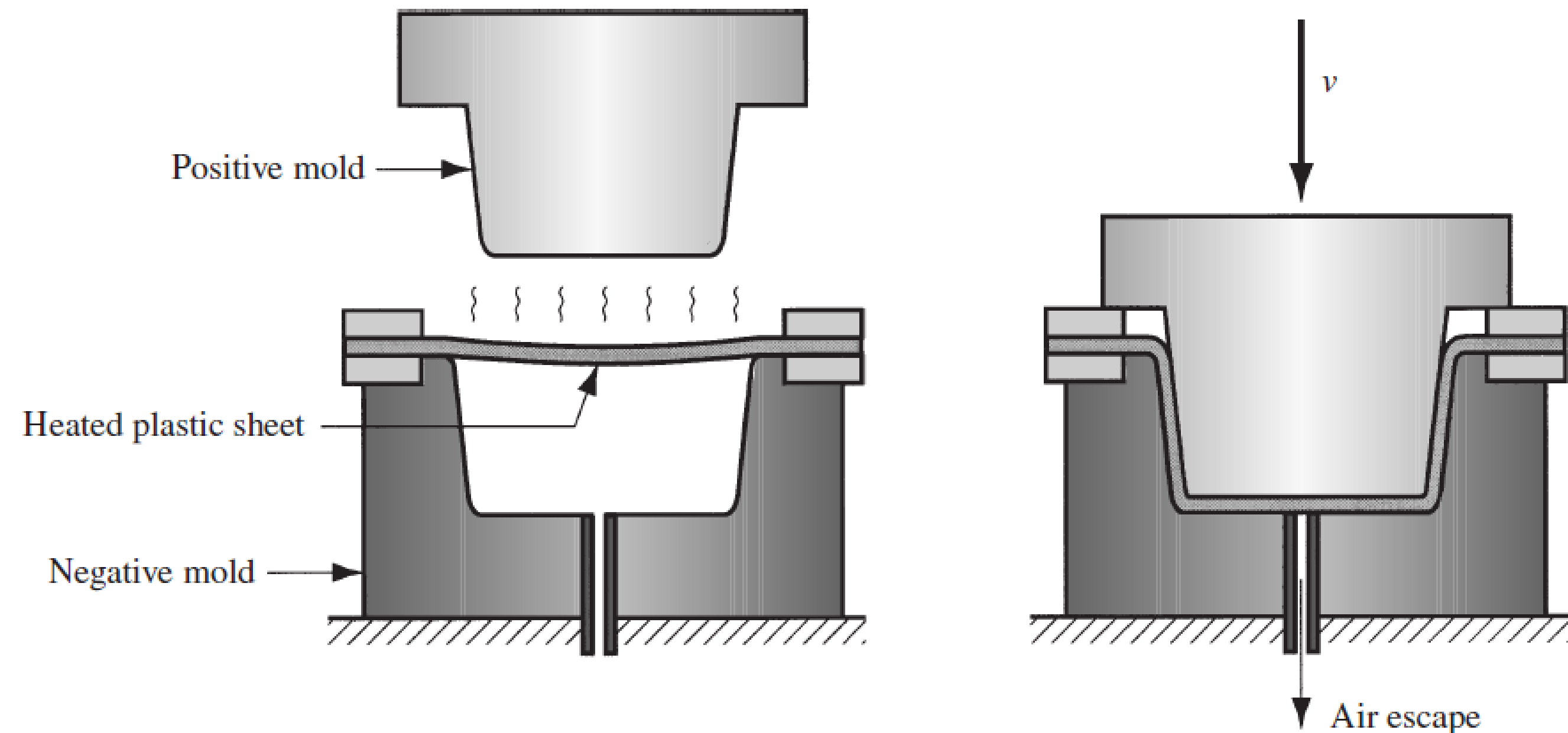
Indirect Action - Pressure

1. Sheet cutting + clamping
2. Heating
3. Vacuum + pressure
4. Cooling
5. Demoulding
6. Trimming



Direct Action - Mechanical

1. Sheet cutting + clamping
2. Heating
3. Forming
4. Cooling
5. Demoulding
6. Trimming

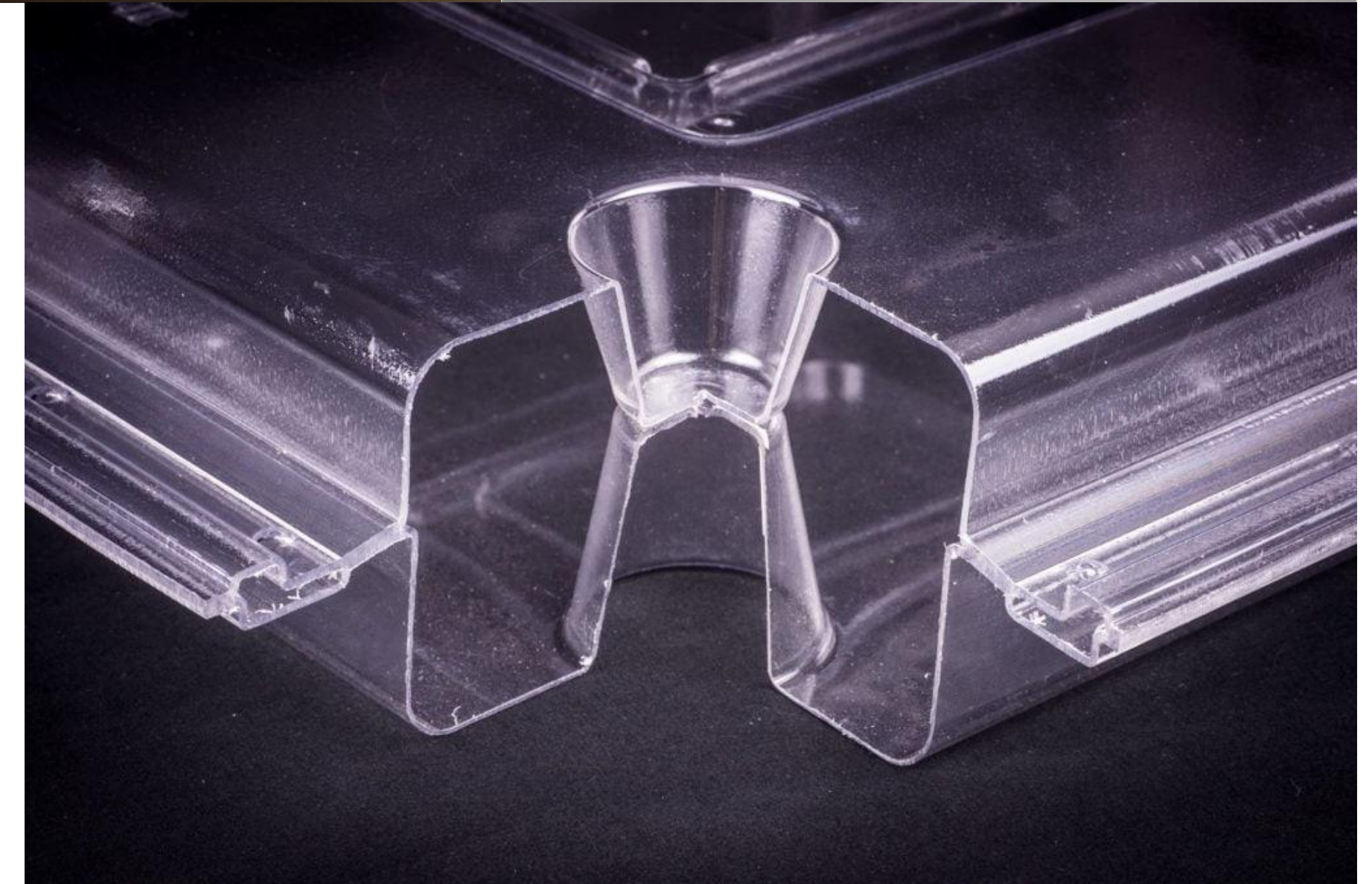
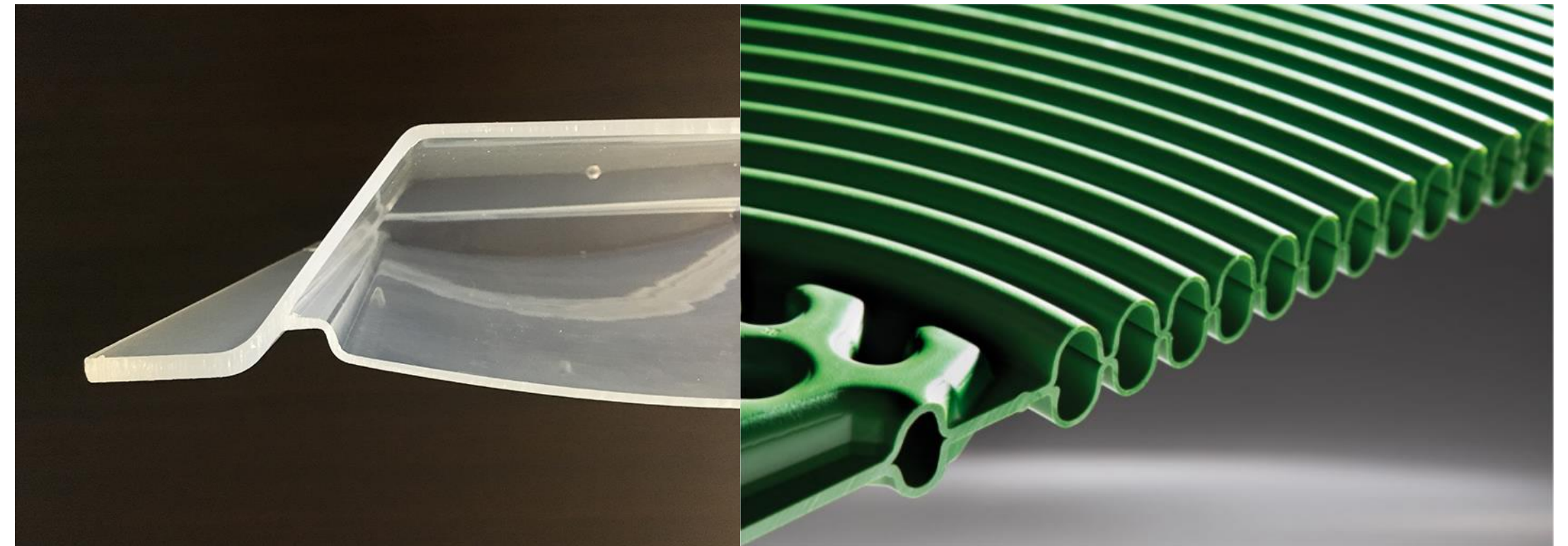
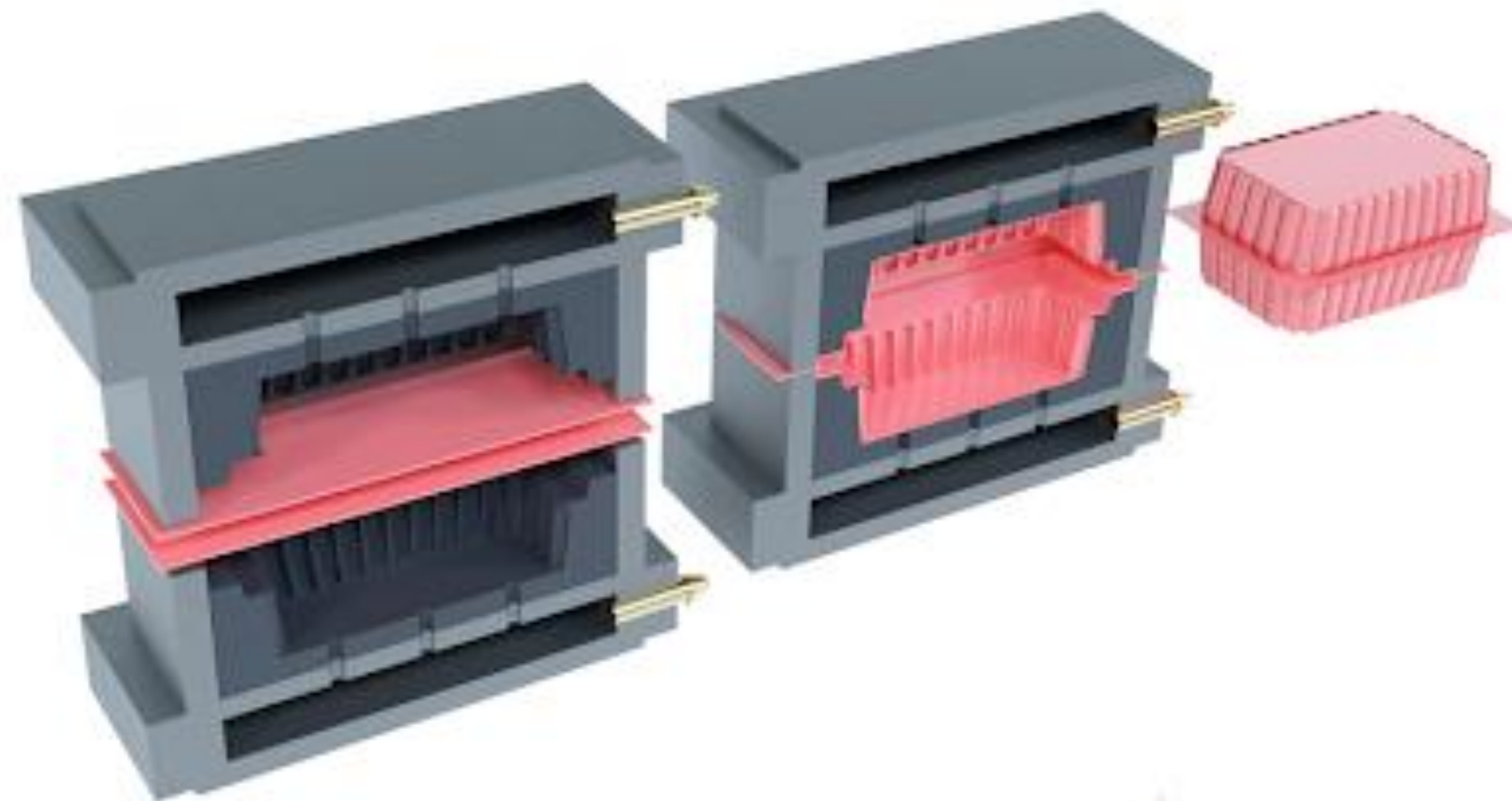




Property of Prothermoform.com



Twin Sheet variant



Advantages

- Extremely large parts can be produced
- Simple process
- Low cycle
- High quality parts
- Low tooling costs (injection moulding)

Disadvantages

- Restricted to thin-walled products and without undercuts
- Uneven thickness
- More costly than injection moulding
- Requires more material than other methods

An underwater scene with a sea turtle swimming towards the left. The water is filled with various types of plastic pollution, including bags, bottles, and debris. Several fish are visible swimming around the turtle and the trash. The overall color palette is blue and teal.

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