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THE CHOICE OF REFRIGERANT

The coefficient of performance of a **Carnot refrigerator** is independent of the refrigerant.

However, the irreversibilities inherent in the **vapour-compression cycle** cause the coefficient of performance of practical refrigerators to **depend some extent on the refrigerant**.

Toxicity, flammability, cost, corrosion properties, and vapour pressure in relation to temperature are of greater importance in the choice of refrigerant.

Air should not leak into the refrigeration system, The **vapour pressure** of the refrigerant at the **evaporator temperature should be greater** than atmospheric pressure.

The **vapour pressure** at the **condenser** temperature should not be unduly high, because of the initial cost and operating expense of high-pressure-equipment.

ABSORPTION REFRIGERATION
(ABSORPSİYON SOĞUTMASI)

Absorption refrigeration: the direct use of **heat** as the **energy source** for refrigeration (not from an electric motor).

1. The essential **difference** between a vapor-compression (**the work of compression is supplied by an electric motor, a heat engine**) and an absorption refrigerator is in the **different means employed for compression**.

2. The most commonly used absorption-refrigeration system operates with **water as the refrigerant** and a **lithium bromide solution as the absorbent**.

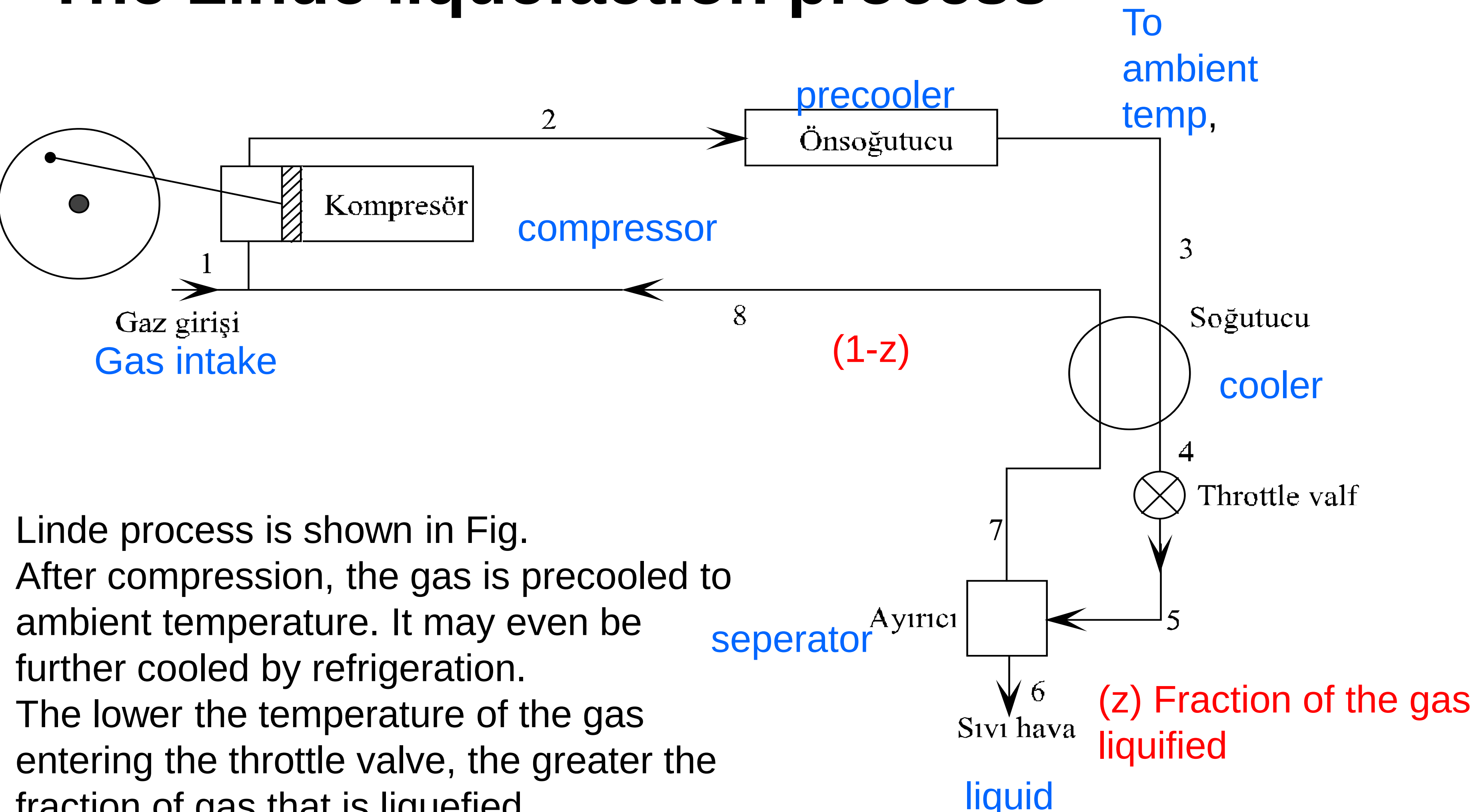
3. **Low-pressure steam** is the usual source of heat for the regenerator.

LIQUEFACTION PROCESSES
(SIVILAŞTIRMA PROSESLERİ)

Liquefied gases are in common use for a variety of purposes. For example,

- **liquid propane** in cylinders serves as a domestic fuel,
- **liquid oxygen** is carried in rockets,
- natural gas is liquefied for ocean transport,
- **liquid nitrogen** is used for low temperature refrigeration.

The Linde liquefaction process



Linde process is shown in Fig.
After compression, the gas is precooled to ambient temperature. It may even be further cooled by refrigeration.
The lower the temperature of the gas entering the throttle valve, the greater the fraction of gas that is liquefied.

Figure Linde liquefaction process

The Claude liquefaction process

The flow diagram for the Cloude process, shown by Fig , is the same as for the Linde process.

Replace the throttle valve by an expander

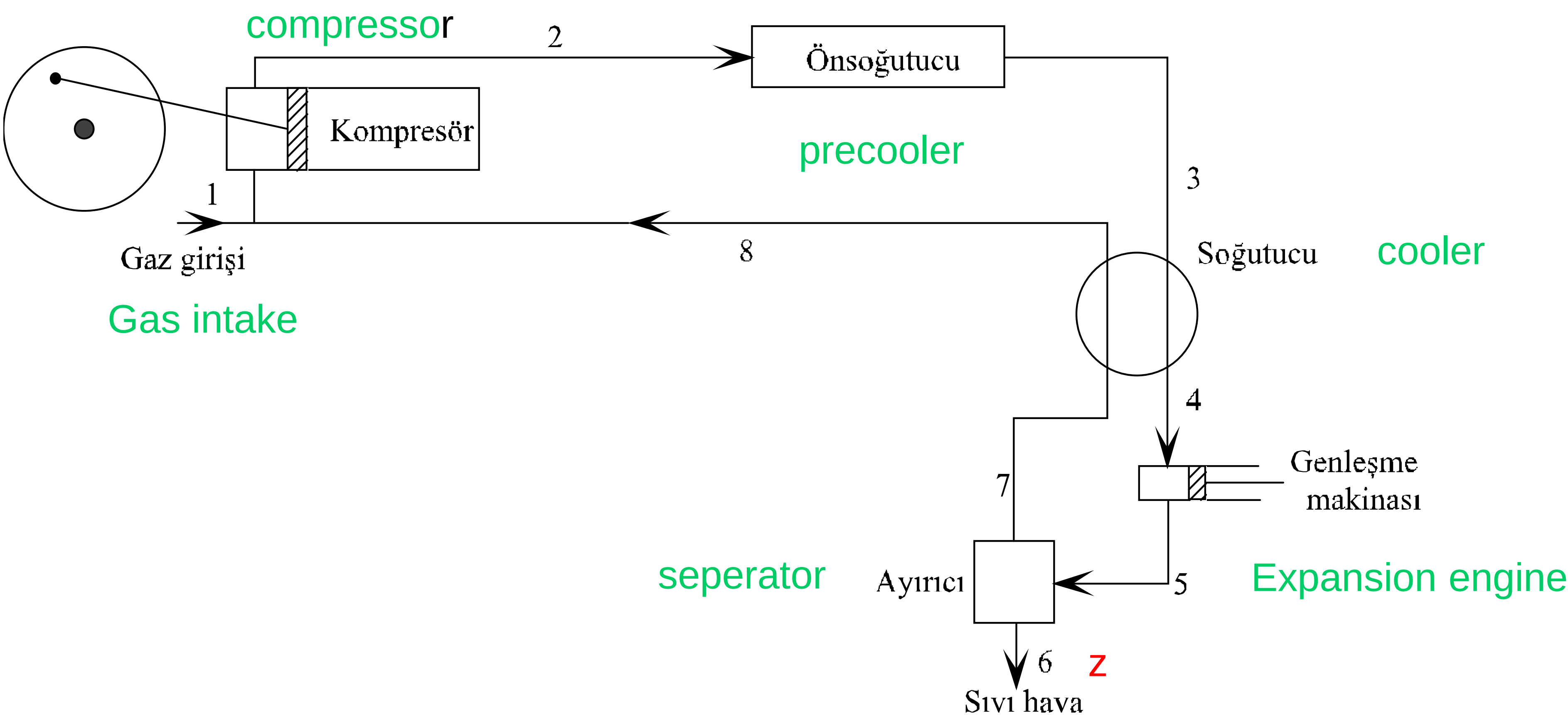


Figure Claude liquefaction process.

liquid

Equations suppose that no heat leaks into the apparatus from the surroundings. This can never be exactly true, and heat leakage may be significant when temperatures are very low, even with well-insulated equipment.

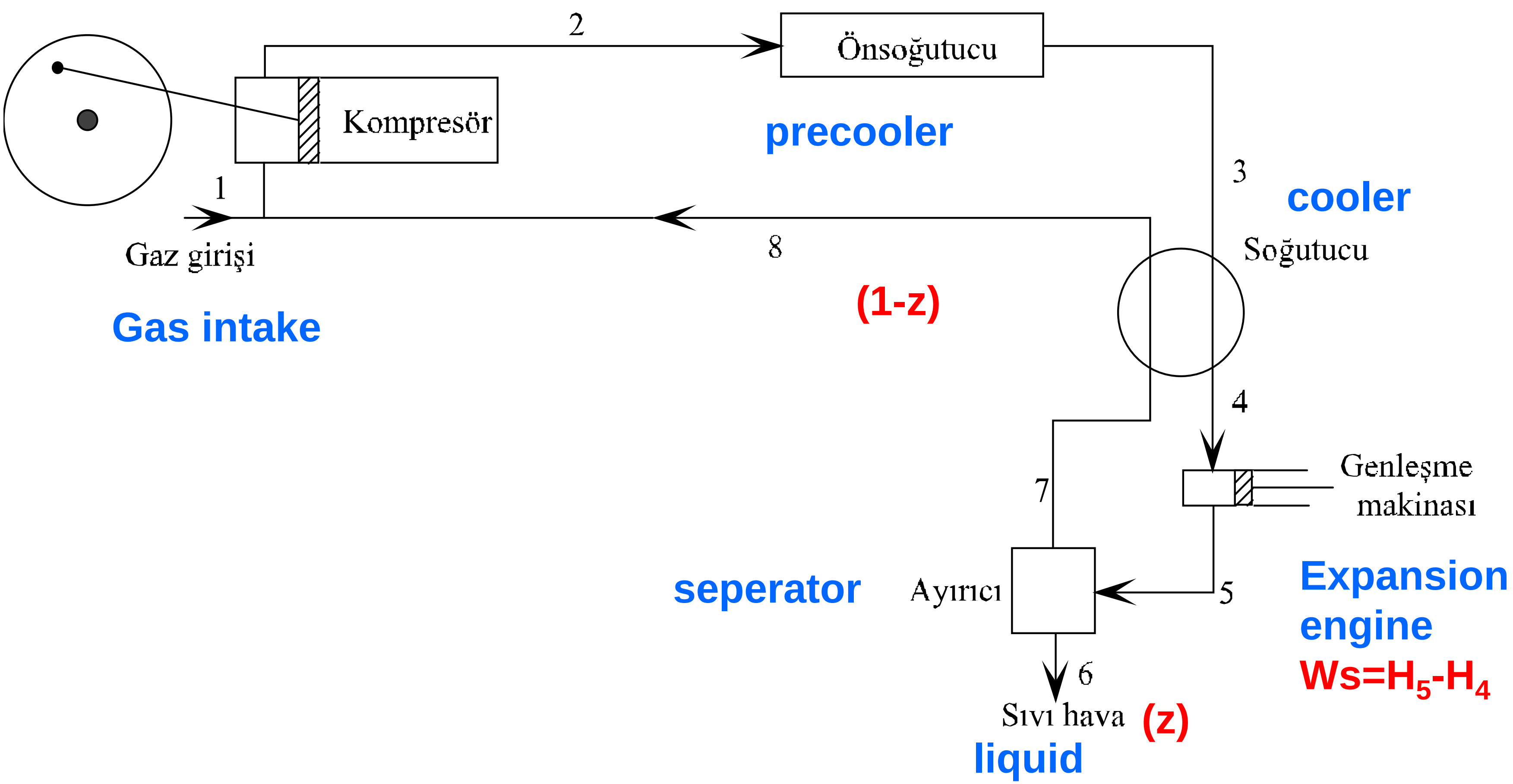


Figure Claude liquefaction process.