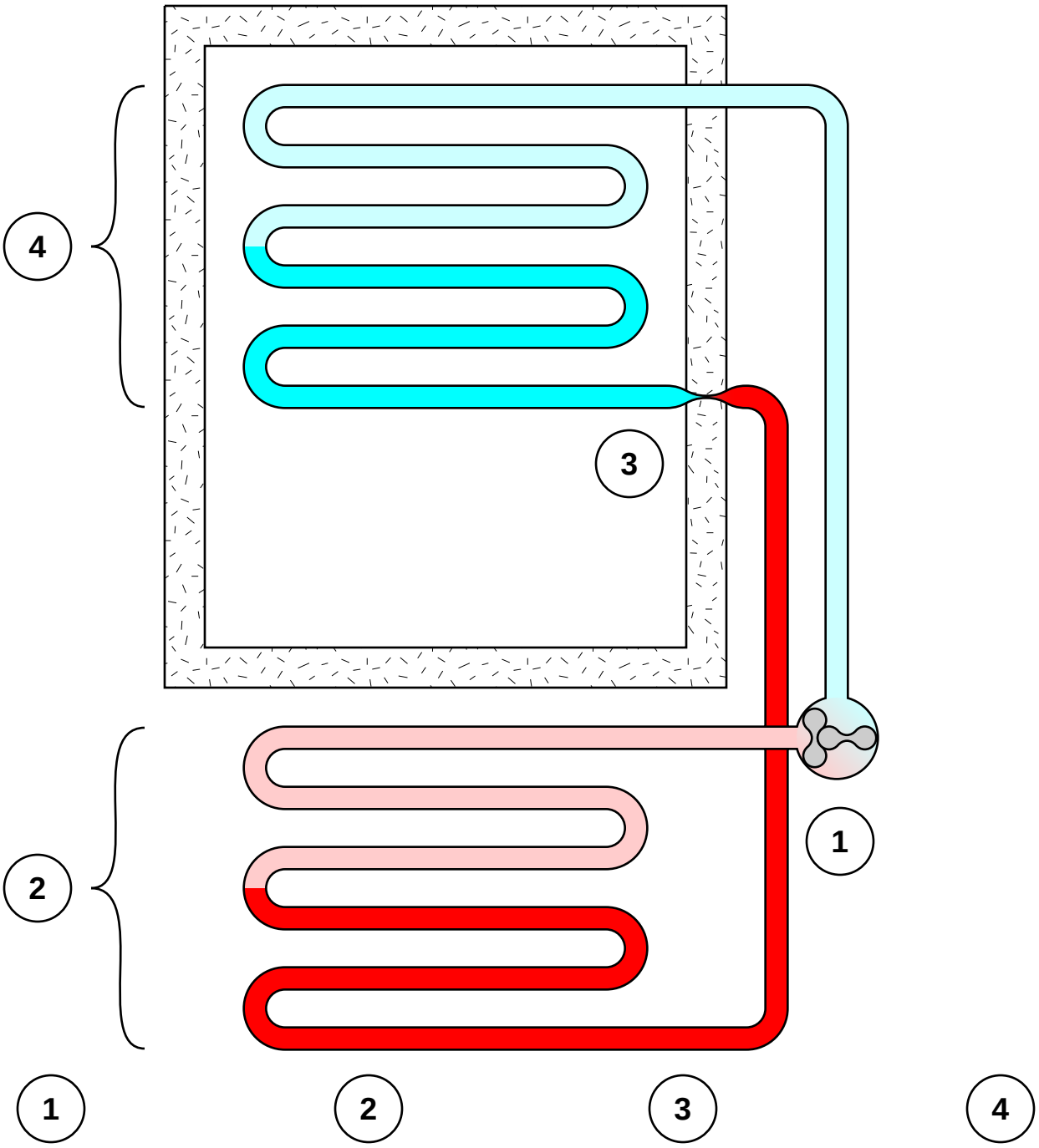
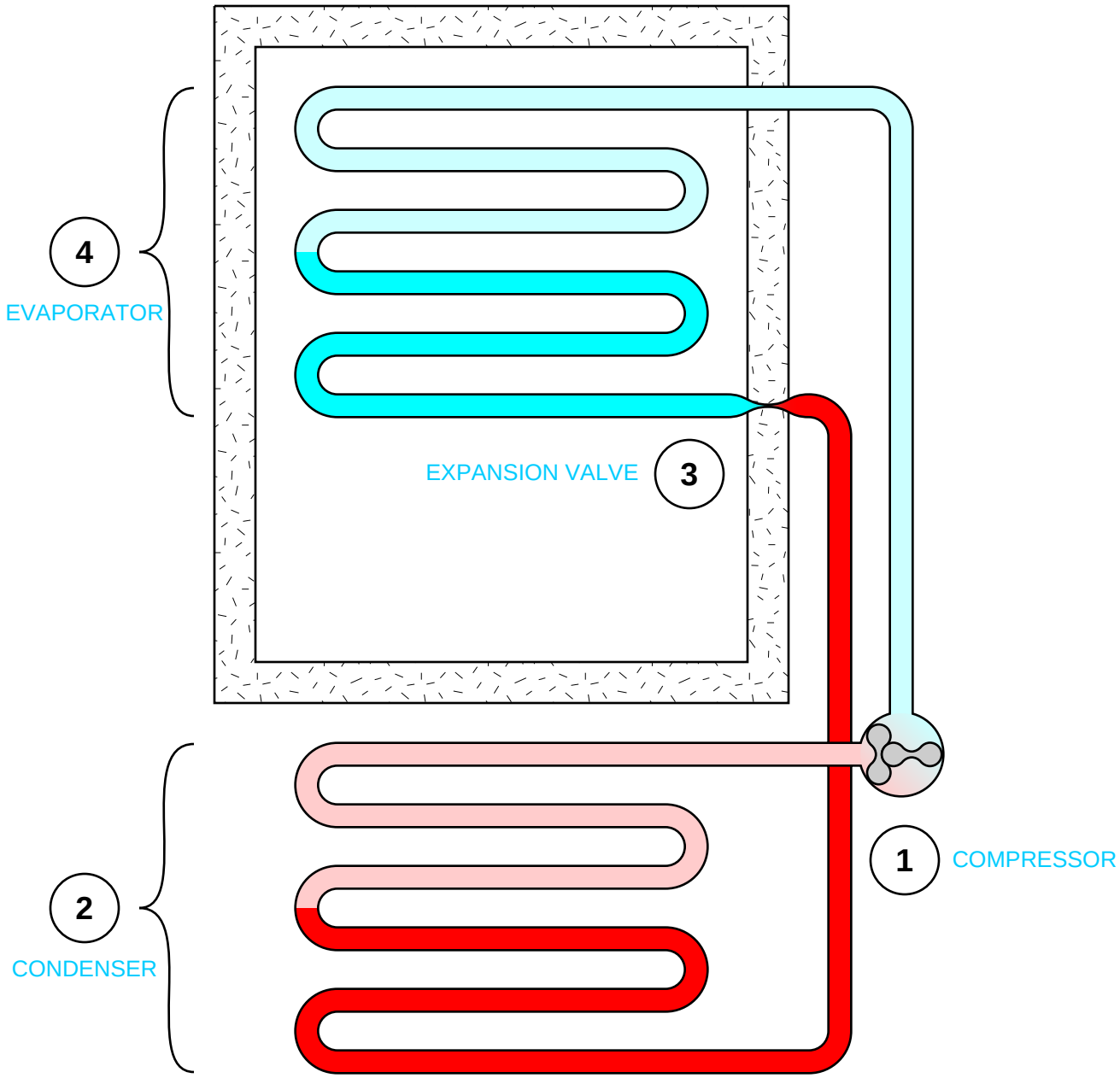
VAPOR–COMPRESSION REFRIGERATOR

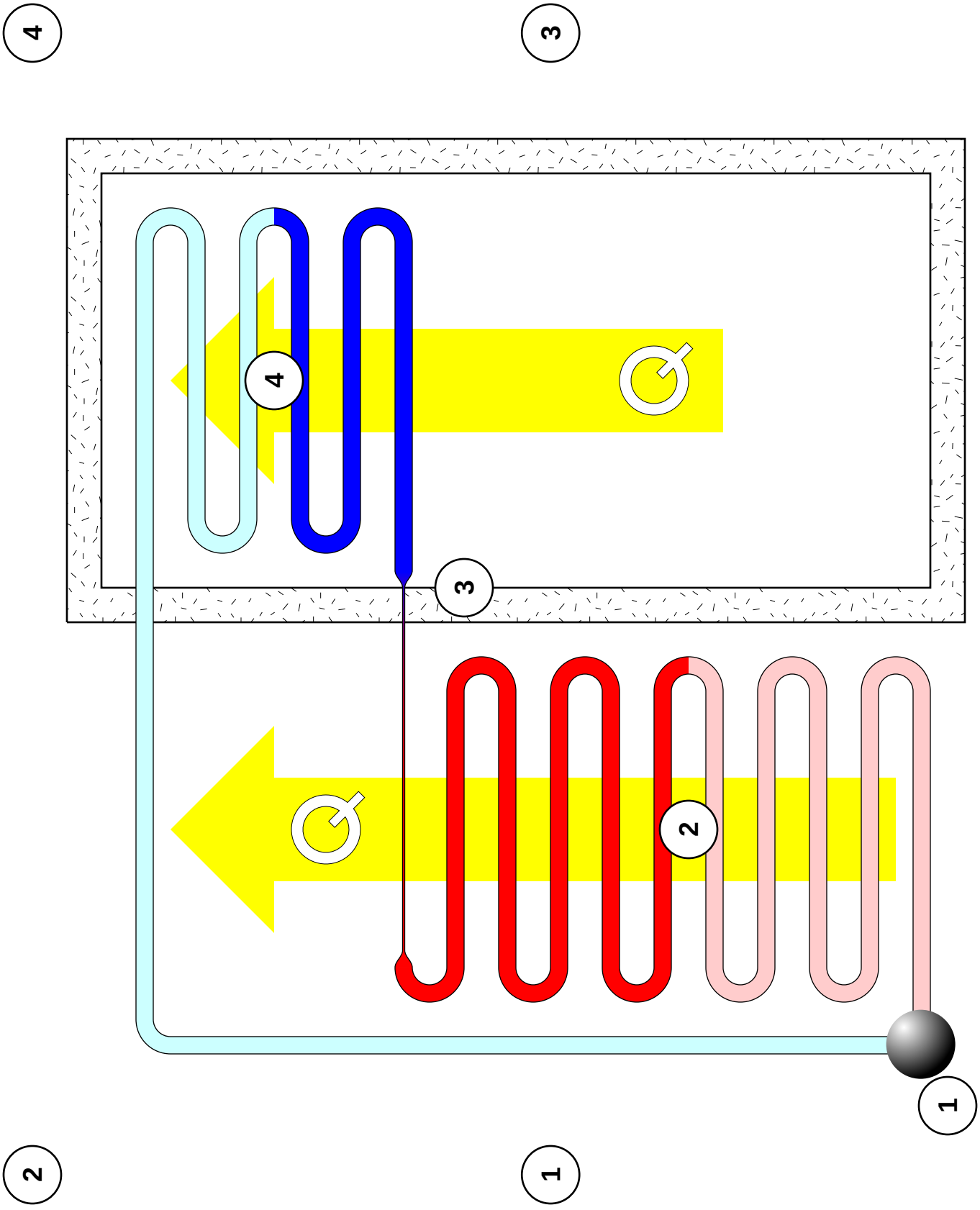


VAPOR–COMPRESSION REFRIGERATOR

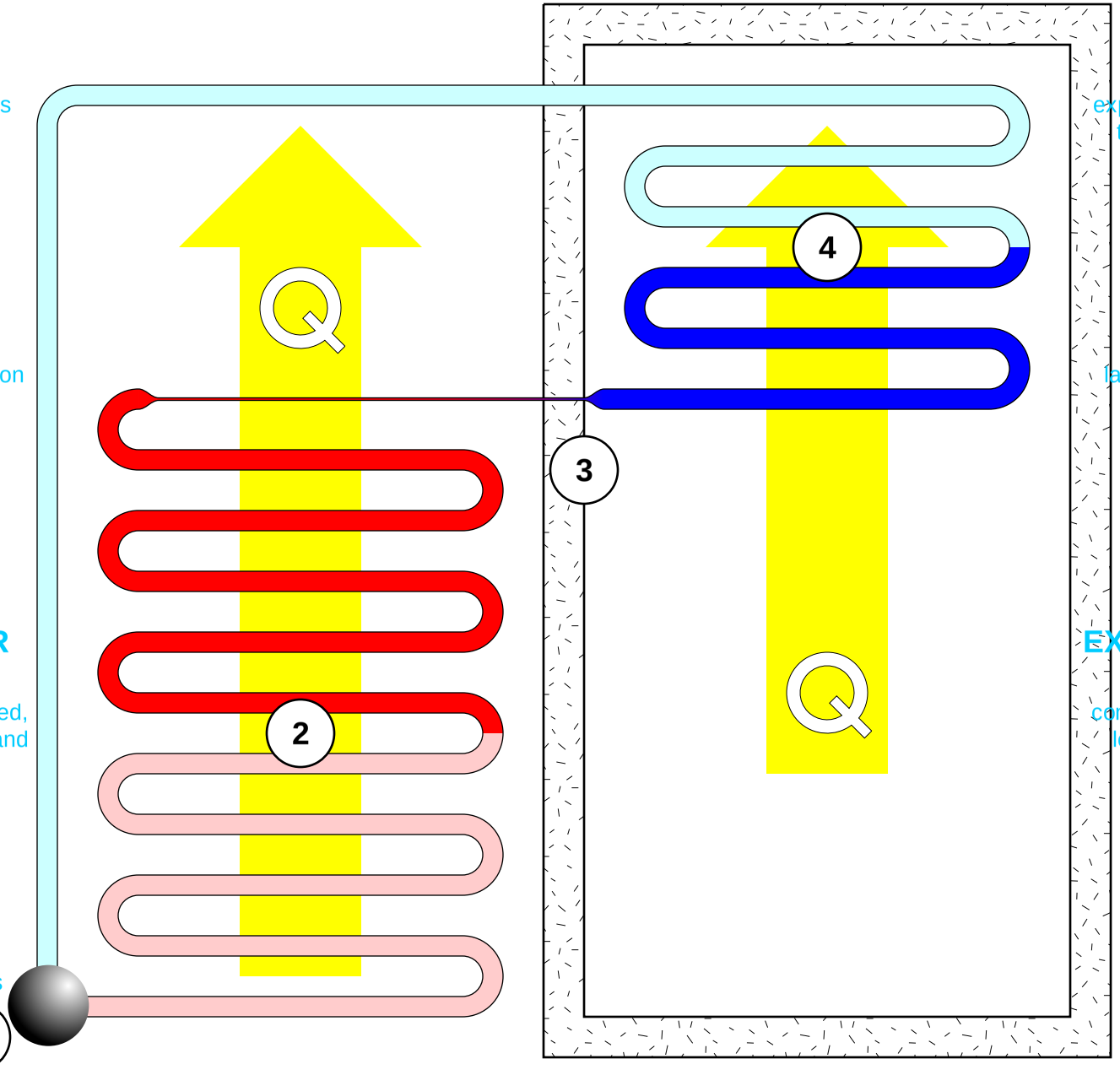


1	2	3	4
cold vapor from the evaporator is compressed, raisings it temperature and boiling point	hot vapor from the compressor condenses outside the cold box, releasing latent heat	hot liquid from the condensor is depressurized, lowering its temperature and boiling point	cold liquid from the expansion valve boils inside the cold box, absorbing latent heat
adiabatic compression	isothermal, isobaric condensation	adiabatic, isochoric expansion*	isothermal, isobaric boiling
T, b.p. ~ P	high temperature T (hot)	T, b.p. ~ P	low temperature T (cold)
work done on the gas W > 0	latent heat of vaporization Q (hot)	no work done W = 0	latent heat of vaporization Q (cold)

VAPOR–COMPRESSION REFRIGERATOR



VAPOR–COMPRESSION REFRIGERATOR



2

CONDENSER

hot vapor from the compressor condenses outside the cold box, releasing latent heat

isothermal, isobaric condensation

high temperature T (hot)

latent heat of vaporization Q (hot)

1

COMPRESSOR

cold vapor from the evaporator is compressed, raisings it temperature and boiling point

adiabatic compression

T, b.p. ~ P

work done on the gas W > 0

4

EVAPORATOR

cold liquid from the expansion valve boils inside the cold box, absorbing latent heat

isothermal, isobaric boiling

low temperature T (cold)

latent heat of vaporization Q (cold)

3

EXPANSION VALVE

hot liquid from the condensor is depressurized, lowering its temperature and boiling point

adiabatic, isochoric expansion*

T, b.p. ~ P

no work done W = 0