

FIGURE 1 Schematic evolution of the freeze-drying process. Temperatures (*upper curve*) and water content (*lower curve*) versus time are indicated. *Abbreviations:* T_{cs} , maximum temperature of complete solidification; T_{im} , minimum temperature of incipient melting; T'_{im} , absolute limit for fast process; T_d , maximum allowed temperature for the dry product; RMF, final requested residual moisture.

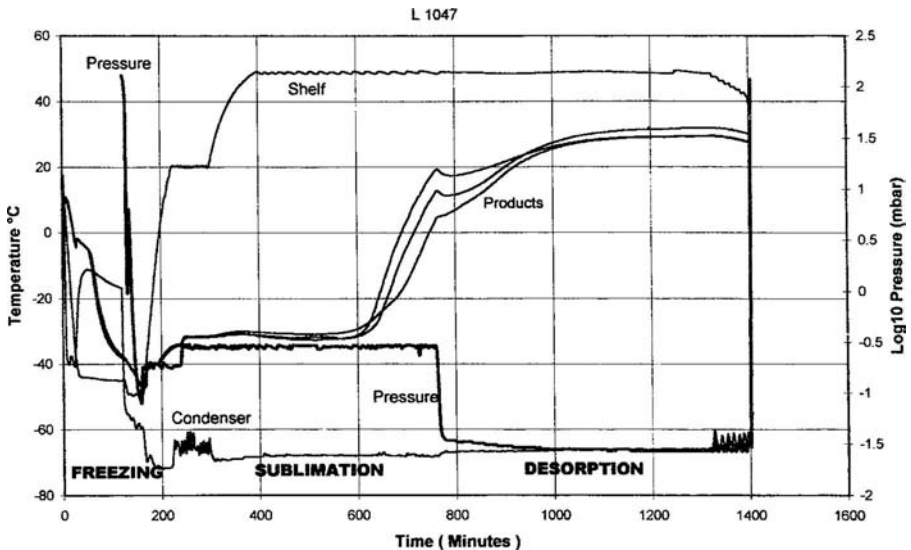


FIGURE 2 A typical freeze-drying cycle. Note that the pressure is raised to 0.3 mbar to increase the heat transfer during sublimation and then lowered to 0.02 mbar for desorption.