

INS-FD-400 SIP/CIP Pharmaceutical Freeze Dryer



Parameters	Specifications
Model	INS-FD-400 SIP/CIP Pharmaceutical Vacuum Freeze Dryer
Application	Pharmaceutical, biotech, and sterile production freeze-drying with full SIP & CIP compliance
Drying Chamber (Inner)	AISI 316L Stainless Steel, rectangular shape, surface finish $Ra \leq 0.4 \mu m$
Shelf / Plate Area	$\geq 5.4 m^2$ effective drying area
Shelf Temperature Range	$-50^{\circ}C$ to $+80^{\circ}C$ (minimum coil temperature $\leq -70^{\circ}C$)
Temperature Uniformity & Heating	$\pm 1^{\circ}C$ shelf uniformity, heating rate $\geq 1^{\circ}C/min$, silicone oil heat transfer
Condenser Capacity	100 kg ice per batch, AISI 316L stainless steel
Vacuum Performance	Ultimate vacuum $\leq 2.6 Pa$; atmospheric to 10 Pa in ≤ 30 minutes
Refrigeration System	BITZER (Germany) compressors $\times 2$, refrigerant R404A
Cooling Performance	Plate cooling to $-40^{\circ}C \leq 60 min$; condenser to $-40^{\circ}C \leq 30 min$
Mushroom Valve	DN300 mm hydraulic mushroom valve, AISI 316L, leak-proof with feedback control
Control System	Mitsubishi PLC, touchscreen HMI + industrial PC, auto/manual modes, 10-year data storage
Overall Dimensions & Compliance (Outer)	Approx. $4500 \times 1500 \times 3500 mm$ (L \times W \times H); 33.5 kW; ~ 6 tons; GMP / cGMP, FDA & EU compliant