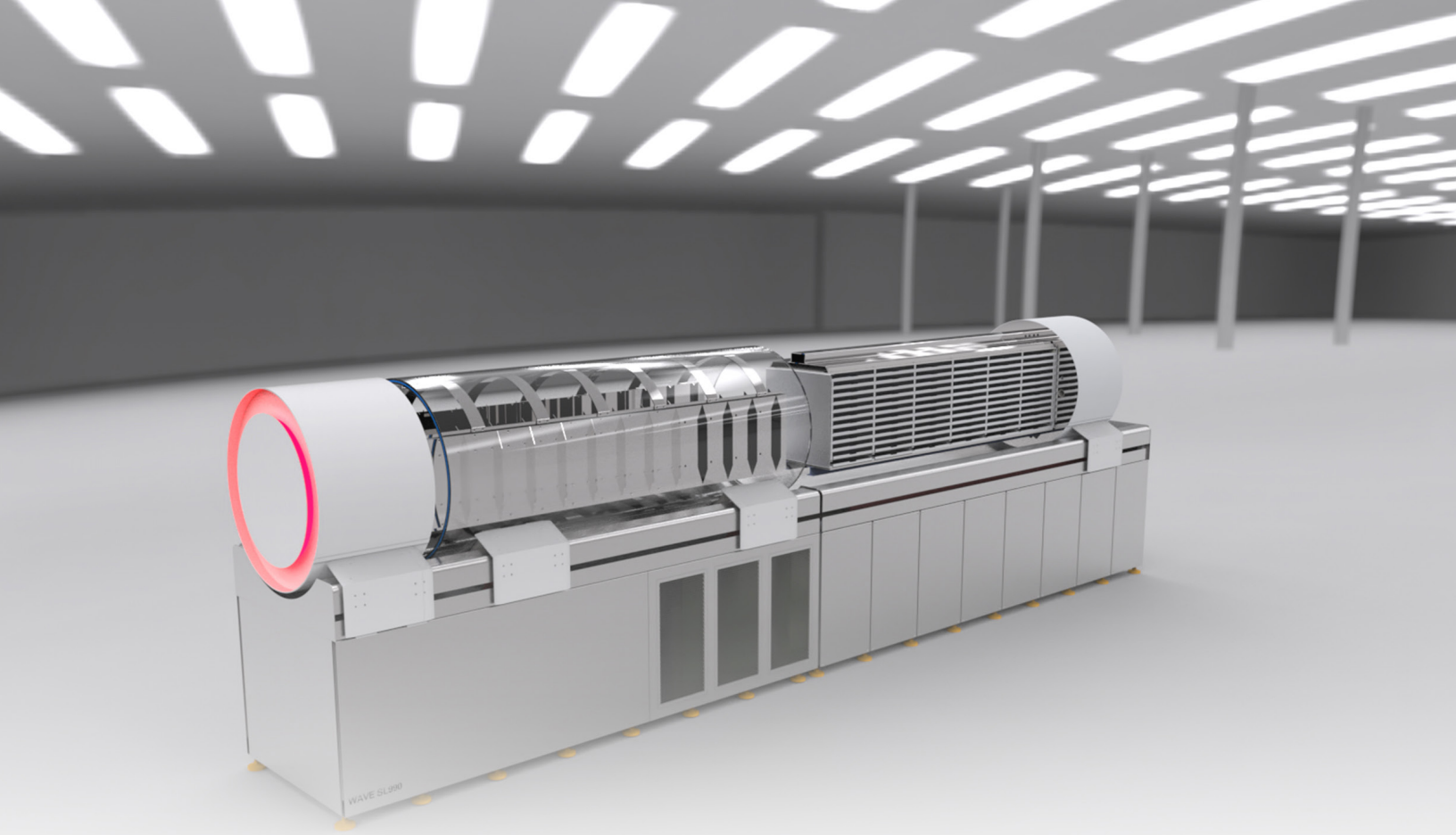

WAVE

Technical Description

Wave SL990

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WAVE SL990

Table 1: **Performance Table – Summary**

# Notation	Description	Performance
1	**Vacuum chamber**	
1.1	Maximum extraction capacity	**250kg**
1.2	Drawer loading volume	**800 L**
1.3	Chamber diameter	**1030 mm**
	Material of chamber	**Acrylic glass**
2	**Shelves**	
2.1	Number of shelves	**72**
2.2	Tray dimension	**600 mm x 400 mm**
2.3	Totable usable tray area (basic version with 12 shelves)	**17,2m²**
2.4	Distance between shelves (basic version with 12 shelves)	**37mm**
3	**Vacuum system**	
3.1	Vacuum pump type	**Recommended: Edwards Drystar 80**
3.2	Pump down time to 0.1 mbar	**20 minutes**
3.3	Maximum system vacuum	**30 mTorr**
3.4	System leak rate	**10^-4 mTorr/sec**
4	**Heating system**	
4.1	Maximum shelf temperature	**+80°C**
4.2	Minimum shelf temperature	**-45°C**
4.3	Shelf cool down time (+20 to -30°C)	**20 min (unloaded)**
4.4	Heating capacity	**Up to 200 Watt/drawer**
4.5	Defrost mechanism	**Hog gas Bypass + electric**
4.6	Defrost time	**20 min**
5	**Refrigeration system**	
5.1	Number of compressors	**1**
5.2	Compressor Type	**Bitzer**

5.3	Maximum cooling capacity	**-45°C**
5.4	Compressor energy consumption	**11 kW**
	Shock froster	
	Shelves	**72**
	Size of trays	**600 mm x 400 mm**
	Temperature	**-45°C**
	Time to minimum temperature	**45 min**
6	**Shock froster**	**7500 mm x 1800 mm x 1100 mm**
7	**Weight of freezedryer**	**4800 kg**
8	**Control of freezedryer**	**Siemens simatic**

Table 2: **Utility Requirements**

# Notation	Description	Performance
1	**Electricity**	**400 V, 50Hz / 60Hz, 3 phases, Neutral, Ground - 5 wires**
1.1	Maximum electrical load	**25 kW**
2	**Water**	**Only needed for cleaning trays, shelves etc, depending on Pump cooling water can be needed**
3	**Internet connection**	**CAT6 Ethernet for software updates**
4	**Ambient temperature**	**< 23°C**

Table 3: **Detailed Technical Specifications**

# Notation	Description	Performance
1	**General Information**	
1.1	Model	**SL990**
1.2	Maximum ice capacity	**220 kg**
1.3	Control	**Siemens Simatic PLC + handheld touchscreen**
1.4	Dimensions of unit (as well refer to drawing) (L x W x H)	**7500 x 1800 x 1100 mm**

1.5	Floor space with maintenance area	**Extra 2 m at each side**
1.6	Weight (approx..)	**4800 kg**
1.7	Noise	**Sound pressure level less than 65 db (A) measured from a distance of 1 meter from the machine without pump**
2	**Chamber**	
2.1	Chamber form	**Tube**
2.2	Internal finish	**Hard anodized 25u**
2.3	Outside finish	**Hard anodized 25u**
2.4	Materia	**Acrylic glass 30mm**
2.5	Vacuum nanomenter for chamber vacuum measurement	**Pirani vacuum sensor & Thermocouple sensor**
3	**Door**	
3.1	Door	**Sliding mechanism /Wave patent**
3.2	Door Material	**Special steel**
3.3	Chamber door open direction	**Moving to the front**
3.4	Door closing mechanism	**Manual**
3.5	Gasket	**Silicone rubber**
3.6	Locking arrangement	**Manual door lock**
4	**Shelves**	
4.1	Temperature range	**-45 to +80°C**
4.2	Temperature sensors	**PT100 "A"**
4.3	Number of shelves	**72**
4.4	Total usable area (48 compartments)	**18 m²**
4.5	Tray dimension (half tray)	**600 mm x 400 mm x 20 mm**
	Spacing 6 shelves	**53 mm**
4.6	Spacing 8 shelves	**40 mm**
4.7	Spacing 12 shelves	**26 mm**
4.8	Material	**Anodized aluminium or stainless steel**
4.9	Shelf cooling down time (+20 to -30°C)	**20 min (empty)**
4.10	Shelf heating time (-30 - +20°C)	**3 min (empty)**
4.11	Shelf temperature precision	**+/- 1°C**
5	**Refrigeration System**	

5	**Refrigeration System**	
5.1	Compressor	**Bitzer**
5.1	Compressor current load	**11 kW**
5.2	Refrigerant depending on local regulations	**R449A or R404A**
5.3	Defrost/De-icing	**Hot Gas Bypass + electric**
5.4	Defrost time	**20 min**
	Reuse of defrost ice for next cycle energy saving	**40%**
6	**Heating System**	
6.1	Heating method	**Heating mat**
6.2	Heating capacity	**Up to 200 Watt/tray**
6.3	Maximum heating mat temperature	**+80°C**
7	**Vacuum System**	
7.1	Vacuum pump	**Recommended: Edwards Drystar 80**
7.2	Pump isolation valve on main vacuum pipeline	**Butterfly or ballvalve**
7.3	Anti-suck valve	**Inside vacuum pump**
7.4	Vacuum manometer for vacuum pipeline vacuum measurement	**Pirani sensor & Thermocouple sensor**
7.5	Final vacuum	**<0.05 mbar**
7.6	Time to build up final vacuum	**<20 min**
7.7	Leakage rate of system	**10^-3 mTorr/sec**
8	**Control system**	
8.1	PLC	**Siemens simatic**
8.2	Touchscreen	**Kinco**
8.3	Software	**Inherent software, automatic control as well as manual control of all control options possible. Control points are shown on screen, advanced statistics of drying cycle are shown and can be saved. Individual programmes can be created and saved.**
9	**Documentation**	
9.1		**Operation manual**
9.2		**Layout drawing**
9.3		**Electrical wiring drawing**
9.4		**Loose parts list**

Table 4: **Loose Parts List**

# Notation	System	Description	Quantity
1	**Electrical System**		
1.1			**4 L**
2	**Valves**	Relays	
2.1		Vacuum valve for pump	**2**
2.2		KF25	**5**
2.3		KF40	**5**
4	**Control**		
4.1		CAT6 Ethernet cable	**1**
5	**Tool**		
5.1		Phase screwdriver	**1**
6	**Extras**		
6.1		Thermo gloves	**2**
6.2		USB Stick	**2**