WAVE

Technical Description

Wave FD440

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WAVE FD440

Table 1: **Performance Table – Summary**

# Notation	Description	Performance
1	**Vacuum chamber**	
1.1	Maximum extraction capacity	**60kg**
1.2	Drawer loading volume	**192 L**
1.3	Chamber diameter	**600 mm**
	Material of chamber	**Extruded aluminium 7mm**
2	**Shelves**	
2.1	Number of shelves	**4-12**
2.2	Tray dimension (2 trays in each drawer)	**600 mm x 400 mm**
2.3	Total usable tray area (basic version with 8 shelves)	**3.85m²**
2.4	Distance between shelves (basic version with 8 shelves)	**48 mm**
3	**Vacuum system**	
3.1	Vacuum pump type	**Two-stage rotary-vane or scroll pump (new or refurbished)**
3.2	Pump down time to 0.1 mbar	**20 minutes**
3.3	Maximum system vacuum	**50 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	**-40°C**
4.3	Shelf cool down time (+20 to -30°C)	**20 min (unloaded)**
4.4	Heating capacity	**Up to 400 Watt/tray**
4.5	Defrost mechanism	**electrical**
4.6	Defrost time	**20 – 60 min**
5	**Refrigeration system**	
5.1	Number of compressors	**2**
5.2	Compressor Type	**Piston Type**

5.3	Maximum cooling capacity	**-40°C**
5.4	Compressor energy consumption	**3 kW**
6	**Size of freezedryer**	**89 cm x 140 cm x 130 cm**
7	**Weight of freezedryer**	**430 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	**9 kW**
2	**Water**	**Only needed for cleaning trays, shelves etc**
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	**FD440**
1.2	Control	**Siemens Simatic PLC + touchscreen**
1.3	Dimensions of unit (as well refer to drawing) (L x W x H)	**89 cm x 140 cm x 130 cm**
1.4	Floor space with maintenance area	**Extra 1 m at each side**
1.5	Weight (approx..)	**430 kg**
1.6	Noise	**Sound pressure level less than 65 db (A) measured from a distance of 1 meter from the machine**
2	**Chamber**	
2.1	Chamber form	**Tube**
2.2	Internal finish	**Hard anodized 25u**
2.3	Outside finish	**Hard anodized 25u**

2.4	Material	**Extruded aluminium 7mm**
2.5	Vacuum nanomenter for chamber vacuum measurement	**Pirani vacuum sensor**
3	**Door**	
3.1	Material	**40 mm acrylic**
3.2	Door closing mechanism	**Mechanical**
3.3	Chamber door open direction	**Hinge on left side**
3.4	Open angle	**170°**
3.5	Gasket	**Silicone rubber**
3.6	Locking arrangement	**Manual door lock**
4	**Shelves**	
4.1	Temperature range	**-40 to +80°C**
4.2	Temperature sensors	**PT100 “A”**
4.3	Number of shelves	**4-12**
4.4	Total usable area (4-12 trays)	**1,9m² - 5.76m²**
4.5	Tray dimension (2 trays in each drawer)	**600 mm x 400 mm x 20 mm**
4.6	Spacing 6 shelves	**64 mm**
4.7	Spacing 8 shelves	**48 mm**
4.8	Spacing 12 shelves	**32 mm**
4.9	Material	**Anodized aluminium or stainless steel**
4.10	Shelf cooling down time (+20 to -30°C)	**20 min (empty)**
4.11	Shelf heating time (-30 - +20°C)	**3 min (empty)**
4.12	Shelf temperature precision	**+/- 1°C**
5	**Refrigeration System**	
5.1	Compressor	**Embraco**
5.2	Compressor current load	**3 kW**
5.3	Refrigerant depending on local regulations	**R449A or R404A**
5.4	Defrost/De-icing	**50 min (ice can be removed before that)**
6	**Heating System**	
6.1	Heating method	**Heating mat**
6.2	Heating capacity	**Up to 400 Watt/tray**

6.3	Maximum heating mat temperature	**+80°C**
7	**Vacuum System**	**<30 min**
7.1	Vacuum pump	**Two-stage rotary-vane or scroll pump (new or refurbished)**
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**
7.5	Final vacuum	**<0.07 mbar**
7.6	Time to build up final vacuum	**<30 min**
7.7	Leakage rate of system	**10^-4 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	**Vacuum System**		
1.1		Vacuum pump oil	**4 L**
2	**Electrical System**		
2.1		Relays	**2**
3	**Valves**		
3.1		Vacuum valve for pump	**1**
3.2		KF25 clamp	**2**
3.3		KF25 seal	**2**
4	**Control**		
4.1		CAT6 Ethernet cable	**1**
5	**Tool**		
5.1		Phase screwdriver	**1**
6	**Extras**		
6.1		Thermo gloves	**1**
6.2		USB Stick	**2**