

# ***Laboratory Ovens***



Standard-heating-cabinets are continuously developed to the latest demands and recommendations of the VDE and the German organization of standardization. The temperature accuracies are better than DIN 50011 resp. DIN 58945. The **inside** of all cabinets are made of stainless steel, **material No. 1.4301 (304)** (on O20 Inox also the outsides). All cabinets may be **stacked-up** and built into laboratory furniture. Heating by sealed tubular heating elements with low surface-load and unlimited duration. Our especially effective motor driven **horizontal air-circulation** improves essentially the **temperature distribution** and **rapid heat transfer**, it circulates **uniformly** around each individual tray and prevents the creation of dead angles. Outside stoved enamel finish in cream-white colour RAL 9001, instrument panel azure-blue RAL 5009.

### Technical Data: **Standard Laboratory Ovens**

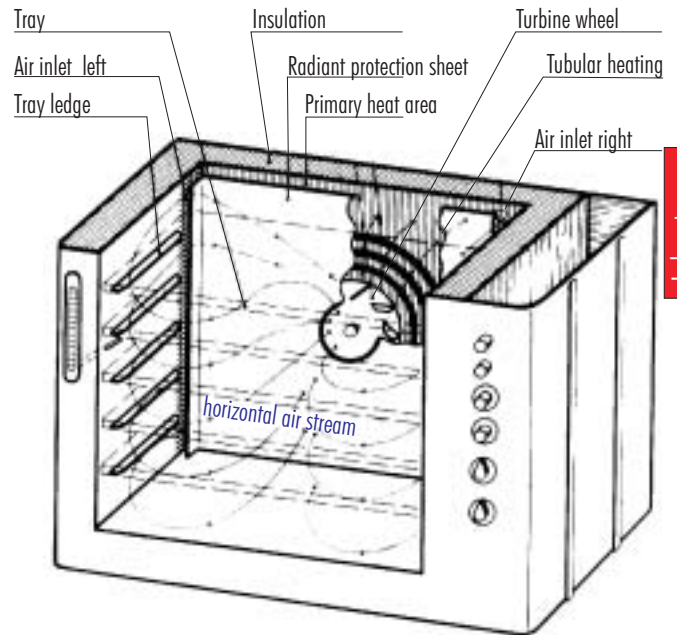
Type/Size	020	038	048	080/100 90 mm deeper
<b>Volume</b> (Litre)	20	38	48	80 / 100
<b>H</b> interior (mm)	225 / 240 with air circ.	305 / 330 with air circ.	400 / 420 with air circ.	410 / 450 with air circ.
<b>W</b> interior (mm)	355 / 335 with air circ.	415 / 415 with air circ.	420 / 420 with air circ.	540 / 540 with air circ.
<b>D</b> interior (mm)	205 / 205 with air circ.	270 / 270 with air circ.	300 / 300 with air circ.	370 / 350 with air circ.
<b>H</b> exterior (mm)	455 / 455 with air circ.	480 / 480 with air circ.	570 / 570 with air circ.	600 / 600 with air circ.
<b>W</b> exterior (mm)	470 / 470 with air circ.	650 / 660 with air circ.	670 / 670 with air circ.	790 / 790 with air circ.
<b>D</b> exterior (mm)	290 / 340 with air circ.	390 / 430 with air circ.	440 / 460 with air circ.	510 / 530 with air circ.
<b>Control</b>	electronic temperature controller			
<b>Temp. Range</b>				
A = Drying/Sterilize	50 - 250°C	Stage I = 40 - 110°C Stage II = 110 - 250°C	Stage I = 40 - 110°C Stage II = 110 - 250°C	Stage I = 40 - 110°C Stage II = 110 - 250°C
B = Incubation	5 - 80°C	5 - 80°C	Stage I = 5 - 50°C Stage II = 50 - 80°C	Stage I = 5 - 50°C Stage II = 50 - 80°C
<b>Accuracy</b>				
A = Drying/Sterilize	+/- 2°C	+/- 1,5°C / 1°C air circ.	+/- 1,5°C / 1°C air circ.	+/- 1,5°C / 1°C air circ.
B = Incubation	+/- 0,3°C (range 30-50°C)	+/- 0,3°C (range 30-50°C)	+/- 0,3°C (range 30-50°C)	+/- 0,3°C (range 30-50°C)
<b>Capacity</b> (Watt)				
A = Drying/Sterilize	400	Stage I = 150 Stage II = 600	Stage I = 200 Stage II = 800	Stage I = 400 Stage II = 1600
B = Incubation	100	150	Stage I = 150 Stage II = 600	Stage I = 400 Stage II = 1600
<b>Standard Accessories</b>	internal direct heaters by sealed tubular heating elements made of stainless steel 1 nickel-plated grate-shelf 2-pole switch 3 pairs of shelf runners	1 two-step switch 1 vent valve 1 nickel-plated grate-shelf as incubator alternatively supplied with heavy acrylicglass-door 15 mm	1 two-step switch 1 vent valve 1 nickel-plated grate-shelf	1 two-step switch 1 vent valve 1 nickel-plated grate-shelf
<b>Weight</b> (kg)	17	33	38	49
<b>Heat-up time</b>	all ovens without air-circulation 35 to 40 min. up to 180°C / containing motor driven air-circulation 25 - 30 min. up to 180°C			
<b>Air Circ.</b> (m <sup>3</sup> /min.)	1,2	1,4	1,5	1,8


**Typ 900V**

Heating capacity is divided into 2 circuits, **coarse- and fine circuit**. Each circuit will be controlled separately by an electronic ON-OFF temperature controller which gives **extremely slight control fluctuations**. Shortly before reaching the nominal temperature, the preheating circuit is automatically cut off and only the fine circuit steers sensitively for the nominal temperature. The heating circuit of the fine regulator can be reduced by a step-switch. Step 1 for low temp. up to 80°C, step 2 for temp. 80°C to 250°C. In the design without electronic control the coarse and fine circuit is regulated each by a Robert-Shaw-Thermostat. The fine regulator will be adjusted to the nominal temperature value, the rough regulator 10°C lower. The heating up in any case takes place by coarse and fine circuit, that means with full capacity. By this principle **extremely good temperature accuracies** can be obtained while having **short heating-up times** resp. a quick temp. rise after new fills. Air circulation system also lock up on reverse side. The air circulates **uniformly** and horizontally each tray, the air flow pattern eliminates the so-called dead zones. The air circulation can be throttled on request. The fresh air first will be guided over the heating elements, heated up and mixed with hot air before entering into the working space. Heating is effected **without radiation by convection**.

### Technical Data: **Precision-V** Laboratory Ovens

Type/Size	080V/100V 90 mm deeper	200V	400V	600V/720V 200 mm higher
<b>Volume</b> (Litre)	80/100	200	400	600/720
<b>H</b> interior (mm)	450	660	650	1000
<b>W</b> interior (mm)	540	695	950	950
<b>D</b> interior (mm)	350	440	665	665
<b>H</b> exterior (mm)	600	860	870	1220
<b>W</b> exterior (mm)	790	970	1220	1220
<b>D</b> exterior (mm)	530	670	1040	1040
<b>Control</b>	fully automatic by means of electronic temp. controller			
<b>Temp. Ranges</b>	electronic: from 5°C above ambient temperature up to 250°C (higher temp. on request)			
<b>Accuracy</b>	30 - 80°C +/- 0,2°C / 80 - 250°C +/- 0,5°C over full range +/- 1,0 - 1,5°C		30 - 80°C +/- 0,4°C / 80 - 250°C +/- 0,8°C over full range +/- 1,5 - 2,0°C	
<b>Temperature-Distribution</b>	at 110°C +/- 0,8°C guaranteed in the working space according to DIN50011		at 160°C +/- 1,5°C guaranteed in the working space according to DIN50011	
<b>Capacity</b> (Watt)	1600 (230V)	2520 (230V)	4500 (400V)	6000 (400V)
<b>Standard Accessoires</b>	horizontal motorized air circulation (throttled on request). selective lower temperature ranges / selective higher fresh and exhaust air quantity			
	Electr. temp. controller / safety temp. limiter acc. to DIN 12880 1 step switch; 1 control thermometer 2 signal lamps 1 ventilation valve for air inlet and air outlet adjustable 2 m connection cable with plug 1 split-pole motor; 1 illuminated main switch 2 nickel-plated grate-shelves		stationary installation 1 special-threephase A.C. motor with winding protection by built-in thermocontacts 3 contactors 2 switches "ON" illuminated "OFF" unilluminated 2 shelves of stainless steel, 1.4301 (304) perforated	
<b>Weight</b> (kg)	49	81	150	200
<b>Heat-up time</b>	all cabinets within 15 - 20 min. at 180°C			
<b>Air Circ.</b> (m³/min.)	1,8	3,7	9,5	11,5
<b>Fresh air</b> (l/min.)	75	240	1050	1200



The illustration figures the system of air circulation and air heating within the primary heat area. Generally all our ovens are provided by this principle of air circulation.

The turbine wheel is sucking the interior air through a slot within the radiation protection sheet into the primary heat area. There it will be passed over the tubular heating elements (Baker-tubes) and then guided through the air inlet slots on both side walls into the oven space - for a horizontal air stream. By this all inserted trays including contents will be **streamed equal, unconcerned if the oven is completely charged or only partly and even unsymmetrical**. This arrangement ensures a **heat transfer only by convection** and also **prevents local radiation over temperatures** within the hole oven. In this way an **exceptional uniform temperature distribution** is forming within the oven processing space (this is especially important in cases when - e.g. for paints samples - test conditions and test results have to be **reproducible at pleasure** and on every position within the oven processing space). By this principle of air circulation the interior oven air will be heated **instantly and on direct way**. For this the **heat guiding ways are very short** and the required **heat capacity** of the tubular heating elements (8,5 mm Ø) are **very low**, so that the **pre-heating time incl. required time for equalization of temperature is extremely low**.

On laboratory ovens designed without motor driven air circulation the inside walls must first be heated, at that the influence of longer heat conduction ways and the higher heating capacity of the cabinet walls will naturally result in a delayed heating time.

The unimpeded horizontally air stream above and below the interior trays causes additionally a **faster heat transfer to the contents**, so that on the one hand the charging capacity has hardly any affect on heating up time and on the other hand in case of changing a tray or even a complete charge the set point temperature will be reached again within a minimum of time.

The **air discharge** (fresh air / exhaust) is optional possible to be dosed by means of an air damper on top of the oven. The fresh air enters through the reverse side of the oven and is passed over the heating elements within the pre-heat section; heated there and mixed with hot air before guided into the working space, so that even with **maximum fresh air addition** an **uniform temperature distribution** within the working space is not impaired and **no cold air pockets and filaments** of flow can arise.

**Possible variants (on request!):**

special sizes - gastight - heat media: steam/hot water - laquering furnaces (VBG24) - sterilizers - clean-room designs - cooling equipment

Make use of our experiences - ask for technical advise!