Temperature and Climatic Chambers

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Drying Ovens

ED series: Drying ovens with natural convection

Reliable drying tasks, precise warm storage.

Features / Equipment:

- Electronically-controlled APT.line® preheating chamber technology with natural convection
- Temperature range from 5 °C above ambient temperature to 300 °C
- DS-controller with integrated timer 0 to 99 hours
- Digital temperature setting with degree accuracy
- One ramp function
- Adjustable safety device, Class 2 (DIN 12880), with visual temperature alarm
- Adjustable ventilation by means of rear exhaust duct Ø 50 mm with ventilation flap and front ventilation slide
- 2 chrome-plated shelves
- Units up to 115 liters are stackable
- Optional RS 422 interface for communication software APT-COM® DataControlSystem

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Drying Ovens

Technical data:

	ED 23	ED 53	ED 115	ED 240	ED 400	ED 720
Exterior dimensions						
Width (mm)	433	634	834	1034	1234	1234
Height (inclusive feet/castors) (mm)	492	617	702	822	1022	1528
Depth (mm)	516	575	645	745	765	865
plus door handle, I-panel and exhaust duct (mm)	105	105	105	105	105	105
Wall clearance rear (mm)	100	100	100	100	100	100
Wall clearance side (mm)	100	160	160	160	160	160
Exhaust duct outer- Ø (mm)	52	52	52	52	52	52
Steam space volume (l)	36	70	142	283	457	808
Interior dimensions						
Width (mm)	222	400	600	800	1000	1000
Height (mm)	330	400	480	600	800	1200
Depth (mm)	277	330	400	500	500	600
Interior volume (l)	20	53	115	240	400	720
Shelves, chrome-plated (number standard/max.)	2/3	2/5	2/6	2/7	2/10	2/16
Load per shelf (kg)	12	15	20	30	35	45
Permitted total load (kg)	25	40	50	70	90	120
Weight (empty) (kg)	22	42	57	86	125	174
Temperature data						
Temperature range from 5 °C above ambient up to °C	300	300	300	300	300	300
Temperature variation [1] at 70 °C (± K)	1,5	2	1,5	1,5	1,7	1,5
Temperature variation [1] at 150 °C (± K)	2,5	3,2	2,5	2,5	3	2,8
Temperature variation [1] at 300 °C (± K)	3,8	4,5	4,5	5,0	5,0	5,0
Temperature fluctuation (± K)	0,3	0,3	0,3	0,3	0,3	0,3
Heating-up time [2] to 70 °C (Min.)	13	14	15	40	49	56
Heating-up time [2] to 150 °C (Min.)	24	27	29	48	62	69
Heating-up time [2] to 250 °C (Min.)	35	61	66	61	74	80
Recov. time after door was open for 30 sec.[2] at 70°C (min.)	2,5	2	2	5	4	4
Recov. time after door was open for 30 sec.[2] at 150°C (min.)	5	6	9	13	20	14
Recov. time after door was open for 30 sec.[2] at 300°C (min.)	8	11	14	18	24	18
Air change at 150 °C (x/h)	13	19	10	10	10	9
Electrical data						
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	400	400
Nominal power (W)	800	1200	1600	2700	3400	5000
Energy consumption at 70 °C (W)	43	60	90	143	201	220
Energy consumption at 150 °C (W)	148	210	300	447	672	750
Energy consumption at 300 °C (W)	450	600	360	700	1000	1200
Number of doors	1	1	1	2	2	2

1) value without window 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating Ovens

FD series: Heating ovens with forced air convection

Heating-/Drying tasks with reduced processing times.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range from 5 °C above ambient temperature to 300 °C
- DS control with integrated timer 0 to 99 hrs
- Digital temperature setting with an accuracy of one degree
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust Ø 50 mm
- Units up to 115 liters are stackable
- 2 chrome-plated racks included

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Heating Ovens

Technical data:

	FD 23	FD 53	FD 115	FD 240
Exterior dimensions				
Width (mm)	433	634	834	1034
Height (inclusive feet/castors) (mm)	492	617	702	822
Depth (mm)	516	575	645	745
plus door handle, I-panel and exhaust duct (mm)	85	105	105	105
Wall clearance rear (mm)	100	100	100	100
Wall clearance side (mm)	100	160	160	160
Exhaust duct outer- Ø (mm)	52	52	52	52
Steam space volume (l)	36	77	158	308
Interior dimensions				
Width (mm)	222	400	600	800
Height (mm)	330	400	480	600
Depth (mm)	277	330	400	500
Interior volume (l)	20	53	115	240
Shelves, chrome-plated (number standard/max.)	2/3	2/5	2/6	2/7
Load per shelf (kg)	12	15	20	30
Permitted total load (kg)	25	40	50	70
Weight of the unit (empty) (kg)	33	44	62	96
Temperature data				
Temperature range, 5°C above ambient up to °C	300	300	300	300
Temperature variation [1] at 70 °C (± K)	0,8	0,8	0,8	0,8
Temperature variation [1] at 150 °C (± K)	2,2	2	1,8	2
Temperature variation [1] at 300 °C (± K)	4,3	3,7	3,9	4,3
Temperature fluctuation (± K)	0,3	0,3	0,3	0,3
Heating-up time [2] to 70 °C (Min.)	7	7	7	11
Heating-up time [2] to 150 °C (Min.)	22	24	28	24
Heating-up time [2] to 300 °C (Min.)	45	60	49	50
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min.)	2	2	2	2
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min.)	4	5	5	6
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min.)	9	9	12	13
Airchange at 150 °C (x/h)	64	64	32	20
Electrical data				
housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230
Nominal power (W)	800	1200	1600	2700
Energy consumption at 70 °C (W) at 70°C	145	172	230	370
Energy consumption at 150 °C (W) at 70°C	300	429	544	850
Energy consumption at 300 °C (W) at 70°C	720	951	1100	1400
Number of doors	1	1	1	2

1) value without window 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating Ovens

KARG Industrietechnik

FED series: Heating ovens with forced air convection and multifunctional control

Universal performance for high-precision thermal processing via expanded time functions, including standard APT-COM® DataControlSystem interface.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range from 5 °C above ambient temperature to 300 °C
- MS controller with several timer functions
- Controller timer functions: delayed ON, delayed OFF, temperature dependent delayed OFF
- Adjustable fan speed
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust 50 mm
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for use with APT-COM™ DataControlSystem communication software or switch over to printer output with RS 232 / RS 422 interface converter
- Units up to 115 liters are stackable
- 2 chrome-plated racks included

KARG Industrietechnik

Heating Ovens

Technical data:

	FED 53	FED 115	FED 240	FED 400	FED 720
Exterior dimensions					
Width (mm)	634	834	1034	1234	1234
Height (inclusive feet/castors) (mm)	617	702	822	1022	1528
Depth (mm)	575	645	745	765	865
plus door handle, I-panel and exhaust duct (mm)	105	105	105	105	105
Wall clearance rear (mm)	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160
Exhaust duct outer- Ø (mm)	52	52	52	52	52
Steam space volume (l)	77	158	308	498	869
Interior dimensions					
Width (mm)	400	600	800	1000	1000
Height (mm)	400	480	600	800	1200
Depth (mm)	330	400	500	500	600
Interior volume (l)	53	115	240	400	720
Shelves, chrome-plated (number standard/max.)	2/5	2/6	2/7	2/10	2/15
Load per shelf (kg)	15	20	30	35	45
Permitted total load (kg)	40	50	70	90	120
Weight (empty) (kg)	44	62	96	145	195
Temperature data					
Temperature range, 5°C above ambient up to °C	300	300	300	300	300
Temperature variation [1] at 70 °C (± K)	0,8	0,7	0,8	1	1
Temperature variation [1] at 150 °C (± K)	2	1,8	2	2,5	2
Temperature variation [1] at 300 °C (± K)	3,7	3,9	4,3	4,8	5,5
Temperature fluctuation (± K)	0,3	0,3	0,3	0,3	0,3
Heating-up time [2] to 70 °C (Min.)	6	7	12	18	25
Heating-up time [2] to 150 °C (Min.)	24	30	27	35	39
Heating-up time [2] to 250 °C (Min.)	45	49	50	60	65
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min.)	2	2	2	2	2
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min.)	5	8	10	17	20
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min.)	10	15	16	21	24
Air change at 150 °C (x/h)	43	32	20	18	12
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (± 10%) 50/60 Hz (V)	230	230	230	400	400
Nominal power (W)	1200	1600	2700	3400	5000
Energy consumption at 70 °C (W)	162	230	370	520	570
Energy consumption at 150 °C (W)	397	544	850	1200	1320
Energy consumption at 300 °C (W)	933	1100	1400	2340	2600
Number of doors	1	1	2	2	2

1) value without window 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating Ovens

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FP series:
High precision temperature test chamber for thermal cycling

FP series chambers are designed for the most demanding test applications and are particularly effective thanks to their extensive programming abilities. Forced convection provides extra efficiency and reliably facilitates increased drying performance as well as extra rapid heating-up, even with fully loaded chamber.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range from 5 °C above ambient temperature to 300 °C
- MP controller with 2 programs with 10 sections each, or alternatively 1 program with 20 sections
- The time of an individual program step can be set to max. 99.59 hours or 999.59 hours. This adjustment applies to all program sections
  - * Integrated weekly program timer with real-time function
  - * Adjustable ramp function via program editor
- Digital temperature setting with an accuracy of one degree
- Adjustable fan speed
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust 50 mm
- Elapsed time indicator
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for use with APT-COM™ DataControlSystem communication software or switch over to printer output with RS 232 / RS 422 interface converter
- Units up to 115 liters are stackable
- 2 chrome-plated racks included

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Heating Ovens

Technical data:

	FP 53	FP 115	FP 240	FP 400	FP 720
Exterior dimensions					
Width (mm)	634	834	1034	1234	1234
Height (inclusive feet/castors) (mm)	617	702	822	1022	1528
Depth (mm)	575	645	745	765	865
plus door handle, I-panel and exhaust duct (mm)	105	105	105	105	105
Wall clearance rear (mm)	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160
Exhaust duct outer- Ø (mm)	52	52	52	52	52
Steam space volume (l)	77	158	308	498	869
Interior dimensions					
Width (mm)	400	600	800	1000	1000
Height (mm)	400	480	600	800	1200
Depth (mm)	330	400	500	500	600
Interior volume (l)	53	115	240	400	720
Shelves, chrome-plated (number standard/max.)	2/5	2/6	2/7	2/10	2/15
Load per shelf (kg)	15	20	30	35	45
Permitted total load (kg)	40	50	70	90	120
Weight (empty) (kg)	45	62	98	145	184
Temperature data					
Temperature range, 5°C above ambient up to °C	300	300	300	300	300
Temperature variation [1] at 70 °C (± K)	0,8	0,7	0,8	1	1
Temperature variation [1] at 150 °C (± K)	2	1,8	2	2,5	2
Temperature variation [1] at 300 °C (± K)	3,7	3,9	4,3	4,8	5,5
Temperature fluctuation (± K)	0,3	0,3	0,3	0,3	0,3
Heating-up time [2] to 70 °C (Min.)	6	7	12	18	25
Heating-up time [2] to 150 °C (Min.)	24	30	27	35	39
Heating-up time [2] to 250 °C (Min.)	45	49	50	60	65
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min.)	2	2	2	2	2
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min.)	5	8	10	17	20
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min.)	10	15	16	21	24
Air change at 150 °C (x/h)	64	32	20	18	12
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (± 10%) 50/60 Hz (V)	230	230	230	400	400
Nominal power (W)	1200	1600	2700	3400	5000
Energy consumption at 70 °C (W)	145	230	370	520	570
Energy consumption at 150 °C (W)	300	544	850	1200	1320
Energy consumption at 300 °C (W)	720	1100	1400	2340	2600
Number of doors	1	1	2	2	2

1) value without window 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Safety Drying Ovens

FDL 115 series: Drying lacquer safely

The FDL series meets all requirements and standards for working with solvent-based materials pursuant to EN 1539. It is also fully compliant with ISO 3215. Symmetrical airflow with defined flow velocities provide reproducible results and exact definition of non-volatile components. In short: The perfect environment for painted surfaces, provided by a silicone and dust-free interior and a replaceable filter cartridge with significantly increased removal efficiency.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- All safety features met according to EN 1539
- Temperature range from 5 °C above ambient temperature to 300 °C
- MP controller with 2 programs with 10 sections each, or alternatively one program with 20 sections
- The time of an individual program step can be set to max. 99.59 hours or 999.59 hours. This adjustment applies to all program sections.
    - * Integrated weekly program timer with real-time function
    - * Adjustable ramp function via program editor
    - * Digital temperature setting with an accuracy of one degree
- Adjustable fan speed
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust 50 mm
- Elapsed time indicator
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for use with APT-COM™ DataControlSystem communication software or switch over to printer output with RS 232 / RS 422 interface converter
- Units up to 115 liters are stackable
- 2 chrome-plated racks included

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Safety Drying Ovens

Technical data:

	FDL115
Exterior dimensions	
Width (mm)	834
Height (inclusive feet/castors) (mm)	800
Depth (mm)	685
plus door handle (mm)	50
Wall clearance rear (mm)	100
Wall clearance side (mm)	100
Exhaust duct outer- Ø (mm)	100
Steam space volume (l)	156
Interior dimensions	
Width (mm)	600
Height (mm)	435
Depth (mm)	435
Interior volume (l)	115
Shelves, chrome-plated (number standard/max.)	2/5
Load per shelf (kg)	20
Permitted total load (kg)	50
Weight (empty) (kg)	90
Temperature data	
Temperature range, 5°C above ambient up to °C	300
Temperature variation at 70 °C (± K)	1,5
Temperature variation at 150 °C (± K)	2,5
Temperature variation at 300 °C (± K)	4
Temperature fluctuation (± K)	0,3
Heating-up time [2] at 70 °C (Min.)	7
Heating-up time [2] at 150 °C (Min.)	17
Heating-up time [2] at 300 °C (Min.)	44
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min)	1
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min)	3
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min)	6
Air change (approx. x/min.)	3
Air circulation (approx. x/min.)	40
Exhaust air volume flow (approx. L/Min., m³/h)	400 (24,0)
Air flow velocity (m/sec)	0,8-1,2
Highest permitted solvent quantity (g) [1] (at T-180°C, M-100g/mol, U-40g/m3, K=0,5)	6,65
Electrical data	
Housing protection acc. to EN 60529	IP 33
Nominal voltage (+10 %) 50/60 Hz (V)	230
Nominal power (W)	2900
Energy consumption at 150 °C (W)	1098

1) T = drying temperature, M = molecular mass, U = lower explosion limit, K = solvent vapor concentration as percentage of lower explosion limit 2)
2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating-/Ageing Ovens

KARG Industrietechnik

M series: Precise and programmable temperature tests

Chambers of this series are ideal for applications related to materials testing and aging tests up to 300 °C. An extra heavy-duty air turbine and the programmable exhaust ventilation flap provide rapid heating-up times and ensure that the required test temperature is maintained absolutely accurate, as never before, with minimal spatial fluctuations.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range from 5 °C above ambient temperature to 300 °C
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Adjustable ramp function via program editor
- Program-controlled ventilation flap
- High air-exchange rate through high-performance fan
- Adjustable fan speed
- Exhaust duct Ø 50 mm
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for communication software APT-COM™ DataControlSystem
- Units up to 115 liters are stackable
- 2 chrome-plated racks included

KARG Industrietechnik

Heating-/Ageing Ovens

Technical data:

	M 53	M 115	M 240	M 400	M 720
Exterior dimensions					
Width (mm)	634	834	1034	1234	1234
Height (inclusive feet/castors) (mm)	779	863	984	1184	1692
Depth (mm)	575	645	745	765	865
plus door handle and exhaust duct (mm)	150	150	150	150	150
Wall clearance rear (mm)	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160
Exhaust duct outer- Ø (mm)	52	52	52	52	52
Steam space volume (l)	77	158	308	498	869
Interior dimensions					
Width (mm)	400	600	800	1000	1000
Height (mm)	400	480	600	800	1200
Depth (mm)	330	400	500	500	600
Interior volume (l)	53	115	240	400	720
Shelves, chrome-plated (number standard/max.)	2/5	2/6	2/7	2/10	2/15
Load per shelf (kg)	15	20	30	35	45
Permitted total load (kg)	40	50	70	90	120
Weight (empty) (kg)	61	89	131	173	203
Temperature data					
Temperature range, 5°C above ambient up to °C	300	300	300	300	300
Temperature variation [1] at 70 °C (± K)	0,5	0,6	0,8	0,7	0,7
Temperature variation [1] at 150 °C (± K)	1,3	1,5	1,5	1,5	1,9
Temperature variation [1] at 300 °C (± K)	2,8	2,8	2,8	5	4,6
Temperature fluctuation (± K)	0,3	0,3	0,3	0,3	0,3
Heating-up time [2] to 70 °C (Min.)	5	5	6	6	7
Heating-up time [2] to 150 °C (Min.)	15	16	19	18	21
Heating-up time [2] to 250 °C (Min.)	35	36	42	44	51
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min.)	1	1	1	1	1
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min.)	3	3	3	3	3
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min.)	5	5	5	5	5
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (± 10 %) 50/60 Hz (V)	230	230	230	400	400
Nominal power (W)	1200	1600	2700	3400	5000
Energy consumption at 70 °C (W)	145	230	370	520	570
Energy consumption at 150 °C (W)	300	544	850	1200	1320
Energy consumption at 300 °C (W)	720	1100	1400	2340	2600
Number of doors	1	1	2	2	2

1) value without window 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating-/Ageing Ovens

KARG Industrietechnik

MDL series: High-efficiency, drying oven, incorporating high-precision temperature control and programming

The MDL series operates at temperatures up to 350 °C at a flow of 400 l/min, ideal conditions for high temperature testing, e.g. in coil coating applications. The preheating chamber with the special Airflow Design feature simulates evenly distributed baking processes on specimens within extremely short periods, and the program control system offers 25 different programs with a variety of options.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range from 5 °C above ambient temperature to 350 °C
- All safety features met according to EN 1539
- Heating output 9.0 kW
- Door gasket made of of high temperature resistant silicone
- Rear exhaust connector Ø 100 mm
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Replaceable fresh-air filter cartridge, class F6 (EU6-fine particle filter for particle sizes between 1 ... 10 µm)
- Independent adjustable temperature safety device class 2 (DIN 12880), with acoustic and visual temperature alarm
- Fresh-air monitoring with audible and visual alarm and automatic deactivation of heating
- RS 422 interface for communication software APT-COM™ DataControlSystem
- 2 chrome-plated racks included

KARG Industrietechnik

Heating-/Ageing Ovens

Technical data:

	MDL 115
Exterior dimensions	
Width (mm)	834
Height (inclusive feet/castors) (mm)	800
Depth (mm)	685
plus door handle (mm)	50
Wall clearance rear (mm)	100
Wall clearance side (mm)	100
Exhaust duct outer- Ø (mm)	100
Steam space volume (l)	156
Interior dimensions	
Width (mm)	600
Height (mm)	435
Depth (mm)	435
Interior volume (l)	115
Shelves, chrome-plated (number standard/max.)	2/5
Load per shelf (kg)	20
Permitted total load (kg)	50
Weight (empty) (kg)	90
Temperature data	
Temperature range, 5°C above ambient up to)°C)	350
Temperature variation at 70 °C (± K)	2
Temperature variation at 150 °C (± K)	3,4
Temperature variation at 300 °C (± K)	7
Temperature variation with door flap at 70 °C (± K)	2
Temperature variation with door flap at 150 °C (± K)	3
Temperature variation with door flap at 300 °C (± K)	8
Temperature fluctuation (± K)	0,5
Heating-up time [2] at 70 °C (Min.)	3,5
Heating-up time [2] at 150 °C (Min.)	6
Heating-up time [2] at 300 °C (Min.)	10
Recov. time after door was opened for 30 sec.[2] at 70 °C (Min)	0,5
Recov. time after door was opened for 30 sec.[2] at 150 °C (Min)	2
Recov. time after door was opened for 30 sec.[2] at 300 °C (Min.)	4
Recov. time after door was opened for 30 sec [2] with door flap at 70 °C (Min.)	0,5
Recov. time after door was opened for 30 sec [2] with door flap at 150 °C (Min.)	1
Recov. time after door was opened for 30 sec [2] with door flap at 300 °C (Min.)	2
Air change (approx. x/min.)	3
Air circulation (approx. x/min.)	40
Exhaust air volume flow (approx. L/Min. m³/h)	400 (24,0)
Air flow velocity (m/sec)	0,8-1,2
Highest permitted solvent quantity (g) [1] (at T-180°C, M-100g/mol, U-40g/m3, K=0,5)	6,65
Electrical data	
Housing protection acc. to EN 60529	IP 33
Nominal voltage (+10 %) 50/60 Hz (V)	(400 3/N)
Nominal power (W)	9000
Energy consumption at 150 °C (W)	1130

1) T = drying temperature, M = molecular mass, U = lower explosion limit, K = solvent vapor concentration as percentage of lower explosion limit 2)
2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 20 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating-/Cooling Chambers

KARG Industrietechnik

KB series:
Heating- / Cooling chambers with forced air convection

For demanding tasks and variable-temperature profiles in a wide range of temperatures.

Features / Equipment:

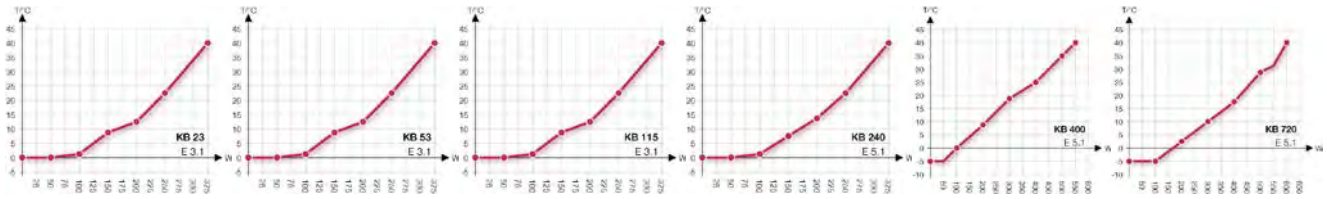
- Electronically controlled APT.line™ preheating chamber with DCT™ cooling system assuring temperature accuracy and reproducible results
- Temperature range -5 (0) °C to 100 °C
- MP controller with 2 programs with 10 sections each, alternatively switchable to 1 program with 20 sections
- Adjustable ramp function via program editor
  - * Integrated weekly program timer with real-time function
  - * Digital temperature setting with an accuracy of a tenth of a degree
  - * Adjustable fan speed
  - * Elapsed time indicator
- Independent temperature safety device class 3.1 (DIN 12880) with optical and audible temperature alarm
- Inner glass door
- RS 422 interface for use with APT-COM™ DataControlSystem communication software or switch over to printer output with RS 232 / RS 422 interface converter
- Adjustable intervals for printer
- Units up to 115 liters are stackable
- 2 shelves, stainless steel

Heating-/Cooling Chambers

Technical data:

	KB 23	KB 53	KB 115	KB 240	KB 400	KB 720
Exterior dimensions						
Width (mm)	433	634	834	925	925	1250
Height (inclusive feet/castors) (mm)	618	837	1022	1460	1945	1925
Depth (mm)	520	580	650	800	800	887
inkl. door handle, I-panel and exhaust duct (mm)	100	100	100	100	100	100
Wall clearance rear side (mm)	100	100	100	100	100	100
Wall clearance left and right side (mm)	100	100	100	100	100	100
Steam space volume (l)	36	77	158	348	564	918
Interior dimensions						
Width (mm)	222	400	600	650	650	970
Height (mm)	330	400	480	785	1270	1250
Depth (mm)	277	330	400	485	485	576
Interior volume (l)	20	53	115	247	400	698
Shelves (number standard/max.)	2/3	2/4	2/5	2/9	2/15	2/15
Load per shelf (kg)	10	15	20	30	30	45
Permitted total load (kg)	25	40	50	100	100	150
Weight (empty) (kg)	44	72	105	170	220	309
Temperature data						
Temperature range (°C) [1]	0-100	-5 - 100	-5 - 100	-5 - 100	-5 - 100	-5 - 100
Temperature variation max. (± K)				0,5	0,6	0,5
Temperature variation at 4 °C (± K)	0,7	0,6	0,4	0,2	0,4	0,2
Temperature variation at 25 °C (± K)	0,3	0,2	0,1	0,2	0,2	0,2
Temperature variation at 37 °C (± K)	0,3	0,3	0,2	0,2	0,3	0,2
Temperature fluctuation max. (± K)	0,2	0,1	0,1	0,1	0,1	0,1
Recov. time after door was open for 30 sec [2] at 4 °C (min)	5	4	5	16	14	12
Recov. time after door was open for 30 sec [2] at 37°C (min)	2	1	1	1	3	2
Electrical Data						
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	230	230
Nominal power (W)	340	460	460	1200	1400	2300
Energy consumption [3] at 37 °C (Wh/h)	60	215	115	260	420	510
Number of doors	1	1	1	1	1	2
Number of inner glass doors	1	1	1	1	1	2

Heat Compensation:



1) Lower values are valid up to an ambient temperature of max. 25 °C
2) to 98 % of the set value
3) These values can be used for dimensioning air condition systems

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating-/Cooling Chambers

KARG Industrietechnik

MK series:
The classic temperature test for natural simulation

This series covers the classic temperature range between -40 °C and 180 °C for heat and refrigeration tests – with the added benefit of the unique natural simulation, incorporating preheating chamber technology and the horizontal air flow design. These features mean that the MK series meets the highest precision and performance requirements, while offering an intelligent alternative to expensive individual solutions for stability or durability testing, along with comprehensive standard features.

Features / Equipment:

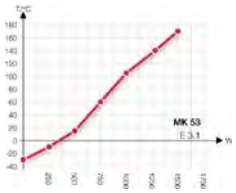
- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range of -40 °C to 180 °C (at an ambient temperature of 25 °C)
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Programmable condensation protection for test material
- Powerful adjustable fan
- Adjustable ramp function via program editor
- Access port(s)
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual and audible temperature alarm
- Heated viewing window with LED interior lighting
- Environmentally friendly refrigerant R 404a
- RS 422 interface for communication software APT-COM™ DataControlSystem
- 1 shelf, stainless steel

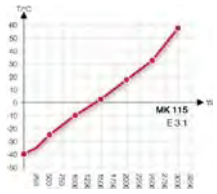
Heating-/Cooling Chambers

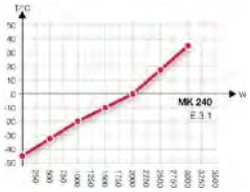
Technical data:

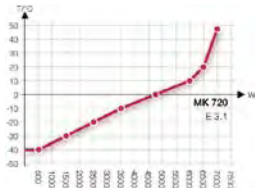
	MK 53	MK 115	MK 240	MK 720
Exterior dimensions				
Width (incl. access port with plug) (mm)	740	995	1130	1613
Height (incl. feet/castors) (mm)	1242	1718	1713	2005
Depth (incl. I-triangle and door handle) (mm)	794	855	946	1175
Wall clearance (mm)	160	160	160	300
Viewing window width (mm)	280	290	508	508
Viewing window height (mm)	280	220	300	300
Number of doors	1	1	1	1
Interior dimensions				
Width (mm)	402	600	735	1200
Height (mm)	402	480	700	1020
Depth (mm)	330	400	443	600
Interior volume (l)	53	115	228	734
Shelves (number standard/max.)	1/5	1/4	1/6	1/11
Load per shelf (kg)	15	30	30	40
Permitted total load (kg)	40	60	70	160
Weight (empty) (kg)	150	260	360	570
Temperature data				
Temperature range (°C)	-40 .. +180	-40 .. +180	-40 .. +180	-40 .. +180
Temperature variation (+/- K)	0,4 - 2,0	0,1 - 2,0	0,1 - 1,2	0,3 - 2,0
Temperature fluctuation (± K)	0,1 - 0,5	0,1 - 0,5	0,1 - 0,5	0,1 - 0,5
Rec.Time after 30 sec door open at -10 °C (Min.)	5	n. l.	8	n. l.
Rec.Time after 30 sec door open at 70 °C (Min.)	1	n. l.	2	n. l.
Rec.Time after 30 sec door open at 150 °C (Min.)	5	n. l.	7	n. l.
Heating up time from -40°C up to 180°C (Min)	47	45	50	58
Cooling down time from 180°C up to -40°C (Min)	93	90	110	75
Mean heating rate acc. to factory standard (K/min.)	4,6	5,5	5,0	4,0
Mean cooling rate acc. to factory standard (K/min.)	4,1	5,2	4,5	4,5
Heat compensation, max. (W)	500	2000	2000	6500
Electrical Data				
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20
Nominal voltage (+ 10%) 50/60 Hz (V)	230 (1N)	400 (3N)	400 (3N)	400 (3N)
Nominal power (W)	2600	3000	4200	7200
Energy consumption [1] at 20°C (W)	1020	600	1300	1900
Noise level (ca. dB(A))	59	62	62	65

Heat Compensation:

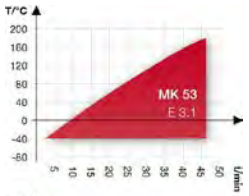


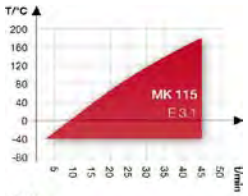


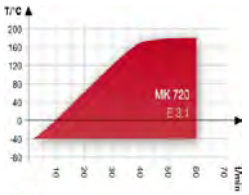


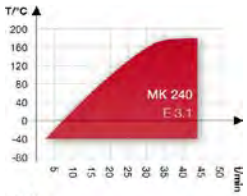


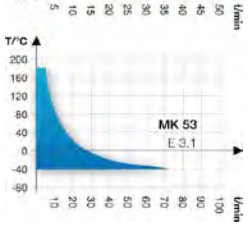
Heating up / Cooling down times:

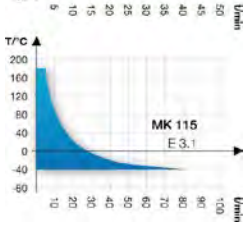


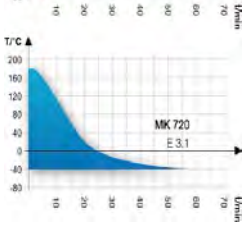


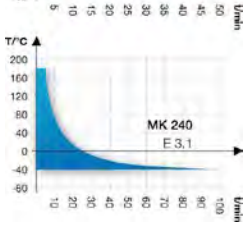












1) These values can be used for dimensioning air condition systems.

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Heating-/Cooling Chambers

KARG Industrietechnik

MKT series:
Precise simulation at extremely low temperatures

MKT series low-temperature test chambers meet all requirements for testing under extreme temperature conditions between -70 °C and 180°C. Outstanding cooling and heating performance permit rapid temperature changes at any time and an unparalleled ease of operation. The MKT series is equipped with automatic process control, color display, documentation software, and comprehensive standard features.

Features / Equipment:

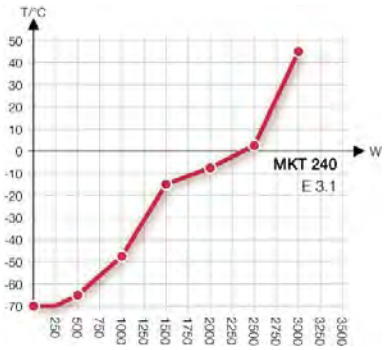
- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range -70 °C to 180 °C
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD color screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Heated viewing window with interior lighting
- Programmable condensation protection for test material
- 230 V power socket on the right-side operating panel
- Adjustable ramp function via program editor
- Access port Ø 50 mm, left side
- Independent adjustable temperature safety device Class 2 (DIN 12880)
- 4 potential-free relay outputs that can be activated via MCS controller
- Ethernet interface for communication software APT-COM™ DataControlSystem
- 1 rack, stainless steel
- 4 castors (with 2 brakes)

Heating-/Cooling Chambers

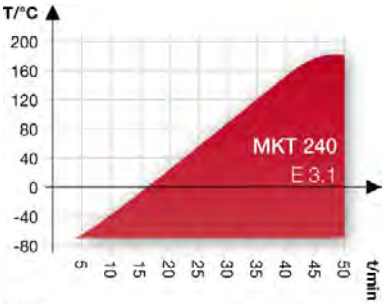
Technical data:

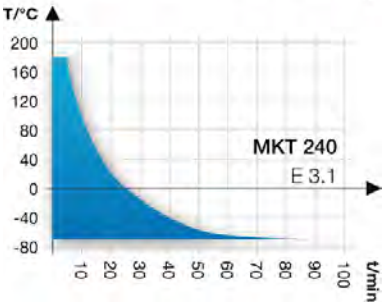
	MKT 240
Exterior dimensions	
Width (including access port 80 mm with plug) (mm)	1130
Height (incl. feet/castors) (mm)	1938
Depth, excl. 54 mm for door handle (mm)	946
Wall clearance (mm)	160
Viewing window width (mm)	508
Viewing window height (mm)	300
Number of doors	1
Interior dimensions	
Width (mm)	735
Height (mm)	500
Depth (mm)	443
Interior volume (l)	228
Shelves (number standard/max.)	1/6
Load per shelf (kg)	30
Permitted total load (kg)	70
Weight (empty) (kg)	380
Temperature data	
Temperature range (°C)	-70 ... +180
Temperature fluctuation (± K)	0,1 ... 0,4
Temperature variation (± K)	0,1 ... 1,0
Mean heating rate acc. to factory standard (K/min.)	5,4
Mean cooling rate acc. to factory standard (K/min.)	4,2
Heating up time from -70°C up to 180°C (Min)	50
Cooling down time from 180°C up to -70°C (Min)	95
Heating compensation, max. up to 25°C (W)	3000
Electrical Data	
Housing protection acc. to EN 60529	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	400 (3N)
Nominal power (W)	6500
Energy consumption [1)] at 20°C (W)	1400
Noise level (ca. dB(A))	64

Heat Compensation:



Heating up / Cooling down time:





1) These values can be used for dimensioning air condition systems.

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Constant Climatic Chambers

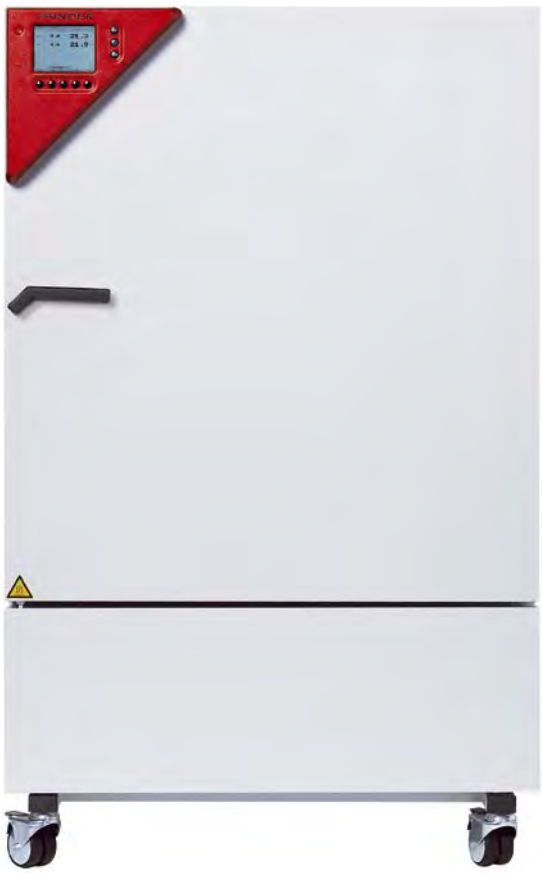
KARG Industrietechnik

KBF series:
Constant climatic chambers with forced air convection

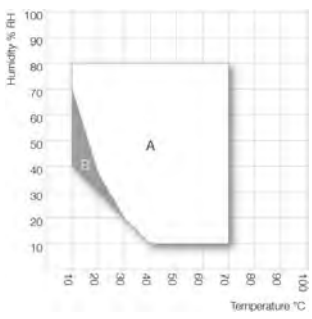
Test chambers for constant climate conditions. The series meets all prerequisites for short and long-term conditioning tests, from programming to documentation of your projects in compliance with standards.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber with cooling system assuring temperature accuracy and reproducible results
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor
- Suitable for stability tests according to ICH guideline Q1A (R2)
- Inner glass door with seal
- Independent temperature safety device class 3.1 (DIN 12880) with optical and audible temperature alarm
- Access port with silicone plug
- Complete safety connection kit for water supply and drainage, including water hose, (total length 6 m)
- Ethernet interface for communication software APT-COM™ DataControlSystem
- 2 shelves, stainless steel



Temperature-humidity chart



A: Standard Climate range
B: Discontinuous range

KBF 240 (open)

Constant Climatic Chambers

Technical data:

	KBF 115	KBF 240	KBF 720
Exterior dimensions			
Width (mm)	880	925	1249
Height (incl. feet/roller) (mm)	1048	1460	1924
Depth (plus door handle, I-panel, connection, 80 mm) (mm)	699	850	939
Wall clearance rear (mm)	100	100	100
Wall clearance side (mm)	100	100	160
Steam space volume (l)	155	348	918
Interior dimensions			
Width (mm)	600	650	970
Height (mm)	482	785	1250
Depth (mm)	351	485	576
Interior volume (l)	101	247	698
Shelves (number standard/max.)	2/5	2/9	2/15
Load per shelf (kg)	30	30	45
Permitted total load (kg)	100	100	150
Weight (empty) (kg)	129	184	309
Temperature / Climatic Data			
without humidity / without lighting (°C)	0-70,0	0-70,0	0-70,0
with humidity / without lighting (°C)	10-70	10-70	10-70
Temp. variation without humidity at 25°C (± K)	0,2	0,2	0,2
Temp. variation without humidity at 40 °C (± K)	0,2	0,3	0,2
Temp. fluctuation without humidity (+/- K)	0,2	0,1	0,1
Max. heat compensation up to 40°C (W)	200	300	600
Temp. variation with humidity at 25°C / 60% rH (± K)	0,2	0,3	0,2
Temp. variation with humidity at 40°C / 75% rH (± K)	0,2	0,3	0,2
Temp. fluctuation with humidity at 25°C / 60% rH (± K)	0,1	0,1	0,1
Temp. fluctuation with humidity at 40°C / 75% rH (± K)	0,1	0,1	0,1
Humidity range (% rH)	10-80	10-80	10-80
Humidity variation at 25°C / 60% rH (± % rH)	2	1,5	1,5
Humidity variation at 40°C / 75% rH (± % rH)	2	1,5	1,5
Recovery time after doors were open for 30 sec 25 °C / 60% rH (Min.)	15	4	2
Recovery time after doors were open for 30 sec 40°C / 75% rH (Min.)	8	5	6
Electrical Data			
Nominal voltage (±10 %) 50/60 Hz (V)	200 - 240	200 - 240	200 - 240
Nominal power (W)	2000	2100	3100
Energy consumption at 40 °C / 75% rH (W) [1]	470	650	620
Number of doors	1	1	2
Number of inner glass doors	1	1	2

Heat Compensation:

1) These values can be used for dimensioning air condition systems.

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Constant Climatic Chambers

KARG Industrietechnik

KMF series:
Constant climatic chambers for stress testing from -10 - 100°C

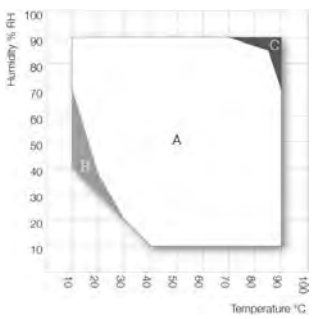
The KMF ensures absolutely constant test conditions throughout the testing area. Its advantage is the low space requirement and flexibility in terms of water supply. The wide temperature and humidity range make it ideally suited for stress testing series.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber with cooling system assuring temperature accuracy and reproducible results
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor
- Inner glass door
- Independent temperature safety device class 3.1 (DIN 12880) with optical and audible temperature alarm
- Access port with silicone plug
- Complete safety connection kit for water supply and drainage, including water hose, (total length 6 m)
- Ethernet interface for communication software APT-COM™ DataControlSystem
- 1 shelf, stainless steel

KMF 240 (open)

Temperature-humidity chart



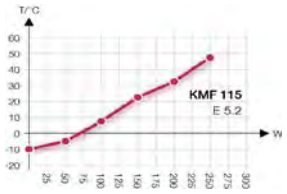
A: Standard Climate range
B: Discontinuous range
C: In this range, condensation in the inner chamber is possible

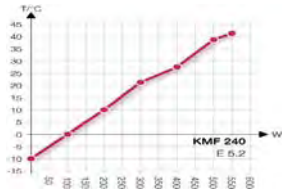
Constant Climatic Chambers

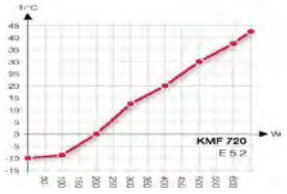
Technical data:

	KMF 115	KMF 240	KMF 720
Exterior dimensions			
Width (mm)	880	925	1250
Height (incl. feet/roller) (mm)	1048	1460	1925
Depth incl. door handle, I-panel, connection (mm)	699	850	939
Wall clearance rear (mm)	100	100	100
Wall clearance side (mm)	100	100	100
Steam space volume (l)	155	348	918
Interior dimensions			
Width (mm)	600	650	973
Height (mm)	483	785	1250
Depth (mm)	351	485	576
Interior volume (l)	102	247	700
Shelves (number standard/max.)	1/5	1/9	1/15
Load per shelf (kg)	30	30	45
Permitted total load (kg)	100	100	150
Weight (empty) (kg)	127	185	309
Temperature range			
without humidity / without lighting (°C)	-10 - 100	-10 - 100	-10 - 100
with humidity / without lighting (°C)	10 - 90	10 - 90	10 - 90
Mean warm-up rate acc. to IEC 60068-3-5 (K/min.)	1,3	1,1	1,0
Mean cooling rate acc. to IEC 60068-3-5 (K/min.)	0,5	0,6	0,4
Warm-up time from -10°C up to 100°C (Min.)	85	100	110
Cooling down time from 100°C up to -10°C (Min.)	240	285	350
Max. heat compensation up to 25°C (W)	150	350	400
Temp. variation with humidity (± K)	0,3 - 1,0	0,3 - 1,5	0,2 - 1,0
Temp. fluctuation with humidity (± K)	0,1 - 0,2	0,1 - 0,5	0,1 - 0,5
Humidity range (% rH)	10 - 90	10 - 90	10 - 90
Humidity fluctuation (± % rH)	2	2	2
Dew point temperature range (!C)	5 - 80	5 - 80	5 - 80
Max. heat compensation at 25°C / 90% rH (W)	30	100	≤ 2
Electrical Data			
Nominal voltage (±10 %) 50/60 Hz (V)	200 - 240	200 - 240	200 - 240
Nominal power (W)	2000	2100	3100
Energy consumption at 85 °C / 85% rH (kW) [1)]	0,57	0,5	1,05
Number of doors	1	1	2
Number of inner glass doors	1	1	2

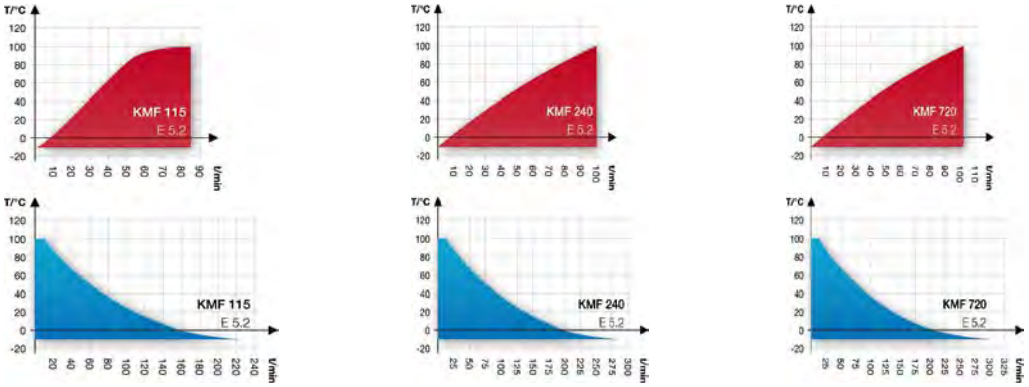
Heat Compensation:







Heating up / Cooling down times:



1) These values can be used for dimensioning air condition systems.

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Climatic Test Chambers

KARG Industrietechnik

MKF series:
For dynamic climatic tests according with current standards

MKF series test chambers are ideally suited for all tests in accordance with current temperature climatic test standards based on DIN and IEC standards.

Features / Equipment:

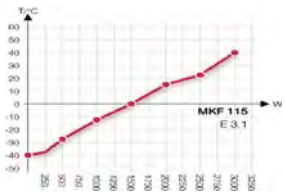
- Electronically controlled APT.line™ preheating chamber assuring temperature accuracy and reproducible results
- Temperature range -40 °C to 180 °C
- Humidity range 10% to 98% RH
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
  - * Easy-to-read menu guide
  - * Integrated electronic chart recorder
  - * Variety of options for the graphic display of process parameters
  - * Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor and vapor pressure humidification
- Integrated water storage tank
- Heated viewing window with interior lighting
- Programmable condensation protection for test material
- Adjustable ramp function via program editor
- 230 V power socket on the right-side operating panel
- Independent adjustable temperature safety device Class 2 (DIN 12880)
- 4 potential-free relay outputs that can be activated via MCS controller
- Ethernet interface for communication software APT-COM™ DataControlSystem
- Access port(s)
- 4 castors (2 with brakes)
- 1 shelf, stainless steel

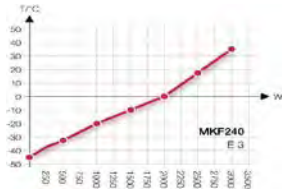
Climatic Test Chambers

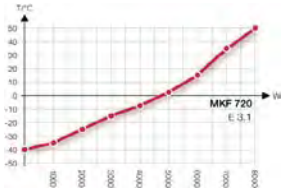
Technical data:

	MKF 115	MKF 240	MKF 720
Exterior dimensions			
Width (mm/inch) (including access with plug)	995	1130	1613
Height (incl. castors) (mm)	1718	1713	2005
Depth, excl. door handle (mm)	850	946	1173
Wall clearance (mm)	160	160	300
Viewing window width (mm)	290	508	508
Viewing window height (mm)	220	300	300
Number of doors	1	1	1
Interior dimensions			
Width (mm)	600	735	1200
Height (mm)	480	700	1020
Depth (mm)	400	443	600
Interior volume (l)	115	228	734
Shelves (number standard/max.)	1/4	1/6	1/11
Load per shelf (kg)	30	30	40
Permitted total load (kg)	60	70	160
Weight (empty) (kg)	280	360	590
Temperature data			
Temperature range (°C)	-40 - +180	-40 ... +180	-40 ... +180
Temperature fluctuation (± K)	0,1 - 1,0	0,1 ... 0,5	0,1 ... 0,5
Temperature variation (± K)	0,1 - 1,3	0,5 ... 2,0	0,1 ... 1,8
Mean warm-up rate acc. to IEC 60068-3-5 (K/min.)	5,5	5,0	4,8
Mean cooling rate acc. to IEC 60068-3-5 (K/min.)	4,5	5,0	4,8
Warm-up time from -40°C up to 180°C (Min.)	45	45	74
Cooling down time from 180°C up to -40°C (Min.)	120	98	118
Heating compensation, max. (kW)	2,5	2800	6500
Climatic data			
Temperature range (°C)	+10 - +95	+10 ... +95	+10 ... +95
Humidity range (% r.H.)	10 ... 98	10 ... 98	10 ... 98
Temperature fluctuation (± K)	0,1 - 1,3	-	-
Humidity fluctuation (± r.H.%)	≤ 2,5	0,5 ... 3,0	≤ 2,5
Dew point temperature range (°C)	+5 ... +94	+5 ... +94	+5 ... +94
Heating compensation to 25°C / 90% rH (kW)	0,4	0,3	1000
Electrical Data			
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	400 (3N)	400 (3N)	400 (3N)
Nominal power (kW)	4,2	5,1	11,0
Noise level (ca. dB(A))	62	62	65

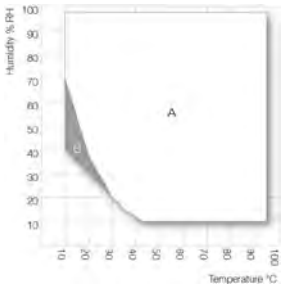
Heat Compensation:





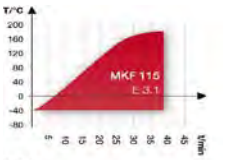


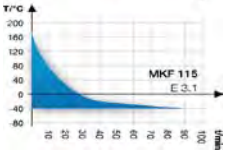
Temperature humidity chart:

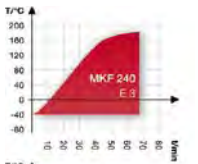


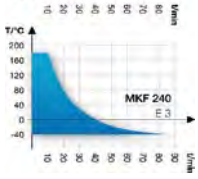
A: Standard Climate range
B: Discontinuous range

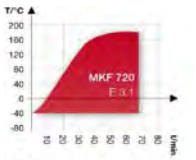
Auf- und Abkühlzeit:

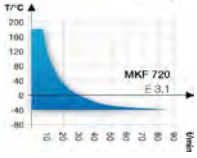












All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Deep Freezers

KARG Industrietechnik

TT and KBT series: Freezers for low temperature tests/storage

Deep Freezer TT and Mini Deep Freezer KBT are especially designed for decentralized freezing and for storage of materials directly at the working place. With quiet refrigeration system (comparable to home freezers, no noise pollution at the workplace), these types are optimized being placed directly in the laboratory.
The freezers are fitted with hermetically sealed, intrinsically safe, air-cooled refrigeration systems and are maintenance-free.

Deep freezer type TT

Mini Deep freezer type KBT

Features / Equipment:

- All TT models are equipped with a electronic controller with keyboard, integrated alarm (optical and acoustic, alarm output can be connected to an external alarm signal), temperature recorder output 10 mV/K, RS 485 output port
- All models are made of stainless steel
- All KBT models are fitted with a blue protective ring around the top and bottom to avoid risk of injury by corners and edges
- The fastener of the lid of all TT types are lockable

KARG Industrietechnik

Deep Freezers

Options:

- Ventilation for a better temperature accuracy available (only -50°C models)
- Roller frame with four rolls for TT models
- Stainless steel shelves TS 100 RS for all 55 liter models (9 single shelves for 9 standard cryoboxes 135 x 135 x 52 mm available)
- Temperature recorder for all TT models
- Access ports (different diameter) with silicon plug available

Technical data:

	KBT 02-51	KBT 04-51	KBT 08-51	TT 50-55	TT 80-55
Exterior dimensions					
Width (mm)	260	330	350	820	820
Height (inclusive feet/castors) (mm)	470	490	470	890	890
Depth (mm)	390	390	430	600	600
Wall clearance rear (mm)	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160
Interior dimensions					
Width (mm)	Ø 130	Ø 170	150	560	560
Height (mm)	170	185	200	270	270
Depth (mm)	-	-	300	360	360
Interior volume (l)	2	4	8	55	55
Weight (empty) (kg)	22	26	32	100	100
Temperature data					
Temperature range (°C	-30...-50	-30...-50	-30...-50	-10...-50	-50...-80
Control precision (± K)			1		
Ambient Temperature (°C)			+12 ... +30		
Electrical data					
Nominal voltage (± 10 %) 50 Hz (V)			230		
Power (A)	1,5	1,8	2,0	2,5	3,0

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Deep Freezers

KARG Industrietechnik

TS and TUS series: Upright and underbench freezers

Small Freezers TS and Underbench Freezers TUS are designed for decentralized freezing and for storage of materials directly at the workplace. With their compact, space saving construction and the quiet refrigeration system (comparable to home freezers, no noise pollution at the workplace) these types are optimized to being placed directly in the laboratory. The freezers are fitted with hermetically sealed, intrinsically safe, air-cooled refrigeration systems and are maintenance free.

Deep freezer type TS

Deep freezer type TUS

Features / Equipment:

- All TS/TUS models are equipped with a electronic controller with keyboard, integrated alarm (optical and acoustic, alarm output can be connected to an external alarm signal), temperature recorder output 10 mV/K, RS 485 output port
- All models are made of stainless steel
- All models with 100 liter volume
- The fastener of the door of all TS and TUS models are lockable

KARG Industrietechnik

Deep Freezers

Technical data:

	TS 50-100	TUS 50-100	TS 80-100	TUS 80-100
Exterior dimensions				
Width (mm)	680	930	680	930
Height (inclusive feet/castors) (mm)	1160	745	1160	745
Depth (mm)	730	630	730	630
Wall clearance rear (mm)	100	100	100	100
Wall clearance side (mm)	160	160	160	160
Interior dimensions				
Width (mm)	450	450	450	450
Height (mm)	500	500	500	500
Depth (mm)	450	4500	450	450
Interior volume (l)	100	100	100	100
Weight (empty) (kg)	105	105	120	120
Temperature data				
Temperature range (°C)	-10...-50	-10...-50	-50...-80	-50...-80
Control precision (± K)	1			
Ambient temperature (°C)	+12 ... +30			
Electrical data				
Nominal voltage (± 10 %) 50 Hz (V)	230			
Power (A)	3,0		6,5	

Options:

- Roller frame with four rolls for type TS
- Drawer shelves TS 100 RS for all 100 liter models (9 single shelves for 9 standard cryoboxes 135 x 135 x 52 mm available)
- Temperature recorder for all models
- Access ports (different diameter) with silicon plug available

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Cold Boxes

KARG Industrietechnik

B series: Cold boxes

The cold- and freezing box B 30-20 as well as the series B are desk-freezer units and can be placed directly at the workplace.

The type B 30-20 is stackable. Up to three units can be stacked on top of each other.
The version B 30-20 (-20°C/30 liters) is equipped with a thermo pane window in the door that enables the observation of frozen materials. All casing parts are made from stainless steel.
The cold box B 30 is fitted with a quiet, hermetically sealed cooling compressor. The intrinsically safe, aircooled refrigeration system is maintenance-free.

The cold boxes series B3 are small desktop devices for cooling and freezing and therefore suitable for the use in laboratories as well as in research and industry facilities. It is suitable for the use directly at the workplace, especially because of its compact and space saving design and a low noise cooling aggregate.

Features / Equipment:

Type B 30-20:

- The model B 30-20 is fitted with an electronic controller with PT 100 sensor and LED temperature display
- Stainless steel housing
- Blue protective ring around top and bottom to avoid risk of injury
- Large window in the door

B 35 series:

- All B 35 models are equipped with a electronic controller with keyboard, integrated alarm (optical and acoustic, alarm output can be connected to an external alarm signal), temperature recorder output 10 mV/K, RS 485 output port
- Stainless steel housing
- Foamed door with douple door sealing
- Vacuum insulation - better insulation, therefore less power consumption
- Ventilation grid on the left and right side - the box can be placed directly to a wall
- Lockable door

Cold boxe type B 30-20

Cold boxes series B 35

KARG Industrietechnik

Cold Boxes

Technical data:

	B 30-20	B 35-50	B 35-85
Exterior dimensions			
Width (mm)	470	580	580
Height (inclusive feet/castors) (mm)	400	540	540
Length (mm)	580	765	765
Interior dimensions			
Width (mm)	360	425	425
Height (mm)	230	280	280
Depth (mm)	350	300	300
Interior volume (l)	30	35	35
Weight (empty) (kg)	42	81	81
Temperature data			
Temperature range (°C)	+10...-20	-10...-50	-50...-85
Control precision (± K)		1	
Ambient temperature (°C)		+12 ... +30	
Electrical data			
Nominal voltage (± 10 %) 50 Hz (V)		230	
Power (A)	1,5	5,0	5,0

Options:

B 30-20:

- Drawer shelves B 30-RS

Serie B 35:

- Drawer shelves B 35-RS
- Temperature recorder

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Cold Bathes / Thermostats

KARG Industrietechnik

KB and KT series: Cold bathes / cooling thermostats

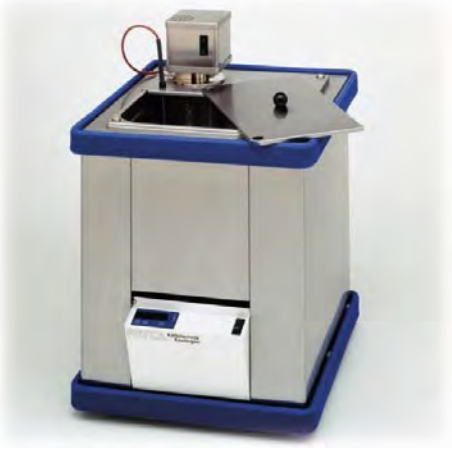
The cold bathes KB and cooling thermostats KT are suitable for the cooling and maintaining temperature of liquids.

The product series is available in two different versions:

- Cold bath KB:
For existing attachment thermostats
Bath size from 6 to 18 liters
Different temperature ranges
No control unit - cooling works non-stop

- Cooling thermostat KT:
With circulation pump or magnet stirrer
Bath size from 6 to 18 liters
Temperature control with LED display
Different temperature ranges

Cold bath type KB



Cooling thermostat type KT

Features / Equipment:

- No fixtures like radiator coils etc.
- No ECU above the bath exposed to vapours
- Exchangeable circulating pump mounted in the KT models
- Casing fitted with edge protection
- 4 attachment bolts with M8 inside thread in the corners of the bath to attach tripod bars
- Electrical temperature control with LED display and built-in PT100-Sensor
- Switches and control unit are fitted into a flap in the front, which can be opened for operation
- Housing is made of stainless steel sheet metal
- Bath reservoir is made of stainless steel 18/10
- Low-noise, fully hermetically closed and air-cooled compressor
- EP20 pump provides a maximum pressure of 0.15 bar and a circulation power of max. 5 l/min.

Cold Bathes / Thermostats

Technical data:

	KB 06-40	KB 8-40	KB 10-40	KB 12-20	KB 12-40	KB 18-40
Exterior dimensions						
Width (mm)	350	350	410	410	410	410
Height (inclusive feet/castors) (mm)	420	450	460	460	460	460
Length (mm)	430	430	450	450	450	450
Wall clearance rear (mm)	100	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160	160
Interior dimensions						
Width (mm)	150	150	240	240	240	300
Height (mm)	150	200	150	200	200	200
Length (mm)	300	300	300	300	300	327
Interior volume (l)	6	8	10	12	12	18
Weight (empty) (kg)	24	26	34	36	36	39
Temperature data						
Temperature range (°C)		+20...-40		+20...-20	+20...-40	
Control precision (± K)				0,5		
Ambient temperature (°C)				+12 ... +30		
Electrical data						
Nominal voltage (± 10 %) 50 Hz (V)				230		
Power (A)	2,0	2,5	2,8	3,0	3,2	3,6

	KT 06-22	KT 06-42	KT 06-43	KT 08-22	KT 08-42	KT 10-42	KT 10-43	KT 12-22	KT 12-42	KT 18-42
Exterior dimensions										
Width (mm)	350	350	350	350	350	410	410	410	410	410
Height (inclusive feet/castors) (mm)	420	420	420	450	450	460	460	460	460	460
Length (mm)	430	430	430	430	430	450	450	450	450	450
Wall clearance rear (mm)	100	100	100	100	100	100	100	100	100	100
Wall clearance side (mm)	160	160	160	160	160	160	160	160	160	160
Interior dimensions										
Width (mm)	150	150	150	150	150	240	240	240	240	300
Height (mm)	150	150	150	200	200	150	150	200	200	200
Length (mm)	300	300	300	300	300	300	300	300	300	327
Interior volume (l)	6	6	6	8	8	10	10	12	12	18
Weight (empty) (kg)	26	26	25	28	28	36	35	38	38	41
Temperature data										
Temperature range (°C)	+20...-20°C	+20...-40°C	+20...-40°C	+20...-20°C	+20...-40°C	+20...-40°C	+20...-40°C	+20...-20°C	+20...-40°C	+20...-40°C
Control precision (± K)					0,5					
Ambient temperature (°C)					+12 ... +30					
Electrical data										
Nominal voltage (± 10 %) 50 Hz (V)					230					
Power (A)	2,0	2,2	2,2	2,5	2,7	3,0	3,0	3,2	3,4	3,8

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. The temperature data is determined in accordance to factory standard following DIN 12880, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. All figures are typical average values for series devices. We reserve the right to alter technical specifications at any time.

Vacuum Drying Ovens

KARG Industrietechnik

VD series: Vacuum drying ovens

Safe and gentle drying under vacuum. The APT.line® vacuum drying ovens are simply without equal in terms of features. That makes them the professional, versatile choice for a multitude of tasks.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber with 2 expansion racks assuring temperature accuracy and reproducible results
- Temperature range from 15 °C above ambient temperature to 200 °C
- MP controller with 2 programs with 10 sections each or switchable to 1 program with 20 sections
- Integrated weekly program timer with real-time function
  - * Digital temperature setting with an accuracy of one degree
  - * Elapsed time indicator
- Precision-adjustable ventilation valve (for VD 23, the standard inert gas connection is also used as the ventilation valve)
- Precision-adjustable inert gas valve with Cross-Flow-Technology
- All electrical components are decoupled from the inner chamber
- Spring-mounted safety glass panel with shatter protection
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Measuring port DN 16 in rear panel
- Analog pressure gauge (displays pressure difference between the inner chamber and ambient pressure)
- Electro polished inner chamber, suction and ventilation tubes, pressure container, expansion racks, and ball valve are made of stainless steel
- Door gasket made of tempered silicone
- 2 x 24 V DC (max 0.4 A) switching outputs, switched via 2 control contacts in the program editor
- RS 422 interface for communication software APT-COM™ DataControlSystem
- 2 patented, flexible aluminum expansion racks
- Also available as complete system with module and vacuum pump

KARG Industrietechnik

Vacuum Drying Ovens

Technical data:

	VD 23	VD 53	VD 115
Exterior dimensions			
Width (mm)	515	634	740
Height (inclusive feet/castors) (mm)	655	775	900
Height option "vacuum module" (mm)	624	624	622
Total height with option „vacuum module" (mm)	1279	1400	1522
Depth (mm)	500	550	670
plus door handle, connection (mm)	100	100	100
Wall clearance, rear (mm)	100	100	100
Wall clearance, side (mm)	135	135	135
Interior dimensions			
Width (mm)	285	400	506
Height (mm)	285	400	506
Depth (mm)	285	330	450
Interior volume (l)	23	53	115
Expansion shelves (Aluminium) (number standard/max.)	2/4	2/5	2/6
Distance between the shelves (width x depth) (mm)	53	62	68
Usable space per shelf (width x depth) (mm)	234x280	349x320	455x440
Load per shelf (kg)	20	20	20
Permitted total load (kg)	35	45	65
Weight of the empty unit (kg)	63	95	153
Temperature data			
Temperature range from 15°C above ambient to °C	200	200	200
Temperature variation [1] at 100 °C (± K)	1,5	2	3,5
Temperature variation [1] at 200 °C (± K)	3	4,5	9
Temperature fluctuation [1] (± K)	0,1	0,1	0,1
Heating up time [1; 2] to 100 °C (Min.)	50	80	80
Heating up time [1; 2] to 200 °C (Min.)	100	130	190
Vacuum connection with small flange (DN mm)	16	16	16
Measuring access port with small flange (DN mm)	16	16	16
Inert gas connection with flow limiter (RP")	3/8	3/8	3/8
Permitted end vacuum (mbar)	0,01	0,01	0,01
Leak rate (max.bar 1/h)	0,01	0,01	0,01
Electrical data			
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage (+10 %) 50/60 Hz (V)	230	230	230
Nominal power (W)	800	1200	1700
Energy consumption at 100 °C (W)	105	150	250
Energy consumption at 200 °C (W)	280	445	785

1) value with aluminium racks 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. These average values have been determined according to the BINDER factory standard, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. Differing ambient temperatures and production-related device-specific variances can lead to varying technical data.

Vacuum Drying Ovens

KARG Industrietechnik

VDL series: Vacuum drying ovens with special safety concept

Safe drying in presence of combustable solvents. The extended safety package makes it extremely safe to dry substances with combustible solvent components. The VDL series carries the TÜV/GS mark as standard; the inner chamber is designed in compliance with the ATEX Directive for Zone 2. Optionally, the ovens can be upgraded in accordance with the European Directive 94/9/EC (ATEX Directive) for installation in a Zone 2 explosion hazard area. Inert gas can also be used for flushing the electrical installation space.

Features / Equipment:

- Electronically controlled APT.line™ preheating chamber with 2 expansion racks assuring temperature accuracy and reproducible results
- Temperature range from 15 °C above ambient temperature to 200 °C
- MP controller with 2 programs with 10 sections each or switchable to 1 program with 20 sections
- Integrated weekly program timer with real-time function
    * Digital temperature setting with an accuracy of one degree
    * Elapsed time indicator
- Spring-mounted safety glass panel with shatter protection
- Precision-adjustable ventilation valve
- Precision-adjustable inert gas valve with Cross-Flow-Technology
- Safety concept:
    * Pressure control device for heating activated < 125 mbar
    * Over pressure capsuled instrument panel with compressed air connection and maintenance unit
    * Flame protection gasket
- Analog pressure gauge (displays pressure difference between the inner chamber and ambient pressure)
- Electro-polished inner chamber, suction and ventilation tubes, pressure container, expansion racks, and ball valve are made of stainless steel
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Measuring port DN 16 in rear panel
- Printer and communication interface RS 422 for APT-COM™ DataControlSystem communication software
- 2 patented, flexible aluminum expansion racks
- All electrical components are decoupled from the inner chamber

KARG Industrietechnik

Vacuum Drying Ovens

Technical data:

	VDL 23	VDL 53	VDL 115
Exterior dimensions			
Width (mm)	515	634	740
Height (inclusive feet/castors) (mm)	655	775	900
Height option "vacuum module" (mm)	624	624	622
Total height with option „vacuum module" (mm)	1279	1400	1522
Depth (mm)	500	550	670
plus door handle, connection (mm)	100	100	100
Wall clearance, rear (mm)	100	100	100
Wall clearance, side (mm)	135	135	135
Interior dimensions			
Width (mm)	285	400	506
Height (mm)	285	400	506
Depth (mm)	285	330	450
Interior volume (l)	23	53	115
Expansion shelves (Aluminium) (number standard/max.)	2/4	2/5	2/6
Distance between the shelves (width x depth) (mm)	53	62	68
Usable space per shelf (width x depth) (mm)	234x280	349x320	455x440
Load per shelf (kg)	20	20	20
Permitted total load (kg)	35	45	65
Weight of the empty unit (kg)	63	95	153
Temperature data			
Temperature range from 15°C above ambient to °C	200	200	200
Temperature variation [1] at 100 °C (± K)	1,5	2	3,5
Temperature variation [1] at 200 °C (± K)	3	4,5	9
Temperature fluctuation [1] (± K)	0,1	0,1	0,1
Heating up time [1; 2] to 100 °C (Min.)	50	80	155
Heating up time [1; 2] to 200 °C (Min.)	100	130	200
Vacuum connection with small flange (DN mm)	16	16	16
Measuring access port with small flange (DN mm)	16	16	16
Inert gas connection with flow limiter (RP")	3/8	3/8	3/8
Permitted end vacuum (mbar)	0,01	0,01	0,01
Leak rate (max.bar 1/h)	0,01	0,01	0,01
Pressure air connection for pressure-encapsulation (Ø mm)	8	8	8
Electrical data			
housing protection acc. to EN 60529	IP 54	IP 54	IP 54
Nominal voltage (+10 %) 50/60 Hz (V)	230	230	230
Nominal power (W)	800	1200	1900
Energy consumption at 100 °C (W)	105	150	250
Energy consumption at 200 °C (W)	280	445	785

1) value with aluminium racks 2) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. These average values have been determined according to the BINDER factory standard, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. Differing ambient temperatures and production-related device-specific variances can lead to varying technical data.

Vacuum Pumps

KARG Industrietechnik

N 860.3 series: Self drying vacuum pump

The chemically-resistant series ND 860.3 FT.40.18 diaphragm pump is a twin-head unit with an integrated self-drying system. There is a wide range of applications for this pump in laboratories, especially whenever clean vacuum is required and moist gases must be pumped down.
Examples include vacuum-drying of vacuum drying chambers (for drying or heat-treating substances and components) or steam sterilizers for sterilizing instruments, vessels, filters and textiles. Due to its high resistance to aggressive media, this pump can be used universally. The heart of these very compact pumps are structured diaphragms (PTFE-coated). These patented diaphragms were stress-optimized using the Finite Elements method. As a result, we were able to make the pumps smaller while increasing the service life of the diaphragm. The self-drying system allows condensed liquid to be blown out of the pump heads at high speed during evacuation. The vacuum in the recipient remains constant. The drying cycle can be adjusted to the requirements of the individual process using three variables. After drying, the pump reaches a better vacuum and is able to evacuate significantly faster compared with pumps without a drying system.

Features / Equipment:

- Pure transfer and evacuation
- Highly compatible with vapors and condensation
- Chemically-resistant
- Therefore suitable for highly aggressive or corrosive gases and vapours
- Maintenance-free
- Environmentally friendly
- Gastight, leakage rate approx. 6 x 10-3 mbar x l/s,- not tested in serial production

Technical data:

	N 860.3
Characteristics	
Delivery (L/min.)	60
Ultimate vacuum (mbar abs.)	4
Operating pressure (bar g)	1
Connectors for tube (mm)	ID 12
Permissible gas and ambient temperature	+5...+40
Electrical data	
Mains (V/Hz)	230/50
Motor protection	IP 54
Power P (W)	220
Overall dimensions, L x H x W (mm)	331 x 278,5 x 291
Net weight approx. (kg)	14,8

With thermal switch and power fuse
Motors with other voltages and frequencies on request

KARG Industrietechnik

Vacuum Pumps

MZ_C_ex series: Vacuum pump with ATEX admission

Diaphragm pumps offer low ultimate vacuum down to 12 mbar (two-stage pumps), 3 mbar (three-stage pumps) or 2 mbar (four-stage pumps). Optimized kinetics for minimum work and wear of the diaphragm result in high reliability, low scuffing, long life and low noise level of the diaphragm. Only selected resistant materials such as FPM (e.g. Viton® fluoroelastomers) and aluminium or PTFE compounds - depending on the version - are used for the gas and vapour contacted parts.
Chemistry version „C“: All gas and vapour contacted parts are made using only the most appropriate chemically resistant fluorinated plastics, e.g. PTFE/ETFE cylinder head and perfluorelastomer valves (e.g. Kalrez ® perfluoroelastomers parts).

Viton®, Kalrez® are trademarks or registered trademarks of DuPont Dow Elastomers

ATEX-Conformity: Scoop-area: II 2G IIC T3 X / Outer area*: II 2G IIB T4 X (Motor: II 2G EEx d IIB T4)
* with intergas overlay of the curbol area. Without inertgas overlay: II 3G IIB T4 X

Features / Equipment:

- Pressure capsuled motor with integrated over-temperature and over-current protection for direct 230 V / 50 Hz single phase connection
- Membrane heads made of antistatic, reinforced flour polymer
- Connection parts made with metallic inserts
- Gas ballast with inert gas supply
- Over pressure valves internal and at the outlet
- Safe membrane technology with inert gas flushing

Technical data:

	MZ 2C Ex	MZ 4C Ex	MZ 10C Ex
Characteristics			
Stages	2	3	4
Volume flow rate (m^3/h) at 230V/50 Hz	1,9	3,7	8,1
Ultimate vacuum (mbar abs.)	12	3	2
Connection for vacuum (suction/pressure)	DN 16 / DN 16	DN 25 / DN 16	DN / 25 / DN 16
Electrical data			
Mains (V/Hz)	230/50	230/50	230/50
Power P (W)	150	250	2 x 250
Overall dimensions, L x W x H (mm)	335 x 287 x 253	440 x 260 x 300	560 x 430 x 410
Net weight approx. (kg)	21,6	29,3	63,2

Motors with other voltages and frequencies on request

Vacuum Pumps

KARG Industrietechnik

VP series: Chemistry vacuum pumping unit

The generate totally oil free vacuum with manual vacuum control and efficient exhaust vapour emission condensor. Solvent recovery is the ruling factor for the choice of vacuum systems in chemistry. The variable and flexible chemistry vacuum system offers a practical solution as regards in technology, economy, pollution control and performance for many applications in chemistry laboratories. The pumping unit components are made of chemically resistant materials. The laboratory pumping unit VP3, designed specially for chemistry laboratories, generate totally oil free vacuum, maintain predetermined vacuum and control exhaust vapour emission. Solvent recovery is the ruling factor for the choice of vacuum systems in chemistry.

Features / Equipment:

- Oil free vacuum
- Low maintenance
- Chemically resistant materials
- High performance at low vacuum
- Solvent recovery next to 100%
- Vacuum gauge
- Flow/vacuum control valve

VP1 and VP2

VP3

Technical data:

	VP1	VP2	VP3
Characteristics			
Volume flow rate (m^3/h) at 230V/50 Hz	1,9	3,0	3,8
Ultimate vacuum (mbar) without gas bal.	9	2	2
Connection inlet	hose nozzle NW10/6	hose nozzle NW10/6	hose nozzle NW10/6
Connection outlet	hose nozzle NW10	hose nozzle NW10	hose nozzle NW10
Electrical data			
Mains (V/Hz)	230/50	230/50	230/50
Overall dimensions, L x W x H (mm)	325 x 260 x 475	320 x 260 x 500	406 x 275 x 535
Net weight approx. (kg)	12,1	17,7	26,8

Motors with other voltages and frequencies on request

KARG Industrietechnik

Debinding Ovens

MDL with CPCU: High-efficiency debinding oven, incorporating an efficient catalytic post combustion unit

The technology of the powder injection moulding (Powder Injection Moulding - PIM) finds ever more largely becoming acceptance with the production of precise and complex construction units one. In the following ranges increasingly PIM-parts are used:

- Ceramic(s) and porcellain industry
- Textile mechanical engineering
- Watch-and-clock-making industry
- Eyeglass industry
- Tool industry

Basis materials for the injection moulding of metal and ceramic(s) powders are sinterable powders which a suitable grain size possess, in addition belong among other things: Carbides, silicate -, oxide and nitride ceramic(s) products. During the production of PIM-parts the process does not end after the injection moulding, but further processing steps follow like the debinding process (remove the plastic from the "green") as well as the sintering of the "brown". The MDL with CPCU (catalytic post combustion unit) operates at temperatures up to 350 °C at a flow of 400 l/min, ideal conditions for debinding processes. The oven with catalytic post combustion unit was developed for catalytical debinding of ceramic and/or metallic injection molding parts (PIM/MIM) *).

Features / Equipment:

- Temperature range of 5 °C (9 °F) above ambient temperature up to 350 °C
- MCS controller with 25 storable programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD screen
- Easy-to-read menu guide
- Integrated electronic chart recorder
- Variety of options for the graphic display of process parameter
- Real-time clock
- Heat output: 9.0 kW
- Silicone door gasket, resistant to high operating temp.
- Adjustable ramp function via program editor
- Replaceable fresh-air filter cartridge, Class F6 (EU6 fine-particle filter for particle sizes between 1 µm and 10 µm)
- Independent adjustable temperature safety device, Class 2 (DIN 12880) with optical and acoustic alarm
- Fresh-air monitoring with acoustic alarm and automatic shut-off of heating
- RS 422 interface for communication software APT-COM® DataControlSystem
- 2 chrome-plated shelves

*) it cannot be used for debinding processes according to the BASF method

Debinding Ovens

KARG Industrietechnik

Technical data:

	MDL 115 with CPCU
Exterior dimensions	
Width (mm)	834
Height (inclusive feet/castors/CPCU) (mm)	1700
Depth (mm)	685
plus door handle (mm)	50
Wall clearance rear (mm)	100
Wall clearance side (mm)	100
Exhaust duct outer- Ø (mm) connected with the CPCU	100
Steam space volume (l)	156
Interior dimensions	
Width (mm)	602
Height (mm)	435
Depth (mm)	435
Interior volume (l)	115
Shelves, chrome-plated (number standard/max.)	2/5
Load per shelf (kg)	20
Permitted total load (kg)	50
Weight (empty) (kg)	180
Temperature data	
Temperature range MDL, from 5°C above ambient to (°C)	350
Operating temperature CPCU (°C)	500
Temperature variation MDL at 70 °C (± K)	2
Temperature variation MDL at 150 °C (± K)	3,4
Temperature variation MDL at 300 °C (± K)	7
Temperature fluctuation MDL (± K)	0,5
Heating-up time MDL [1]) at 70 °C (Min.)	3,5
Heating-up time MDL [1]) at 150 °C (Min.)	6
Heating-up time MDL [1]) at 300 °C (Min.)	10
Recov. time after door was opened for 30 sec.[1]) at 70 °C (Min)	0,5
Recov. time after door was opened for 30 sec.[1]) at 150 °C (Min)	2
Recov. time after door was opened for 30 sec.[1]) at 300 °C (Min.)	4
Air change (approx. x/min.)	3
Air circulation (approx. x/min.)	40
Exhaust air volume flow (approx. L/Min. m³/h)	400 (24,0)
Air flow velocity (m/sec)	0,8-1,2
Electrical data MDL	
Housing protection acc. to EN 50529	IP 33
Nominal voltage (+10 %) 50/60 Hz (V)	(400 3/N)
Nominal power (W)	9000
Energy consumption at 150 °C (W)	1130
Electrical data CPCU	
Nominal voltage (+10 %) 50 Hz (V)	240
Nominal power (W)	3000

1) to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a line voltage fluctuation of ±10%. These average values have been determined according to factory standard, respecting the recommended wall clearances of 10% of the height, width and depth of the inner chamber. Differing ambient temperatures and production-related device-specific variances can lead to varying technical data.

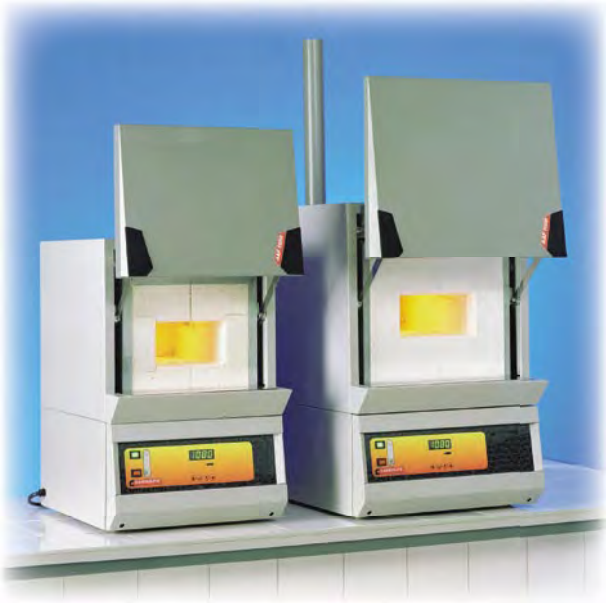
KARG Industrietechnik

Muffle Furnaces

AAF series: High-efficiency ashing and burning off furnaces

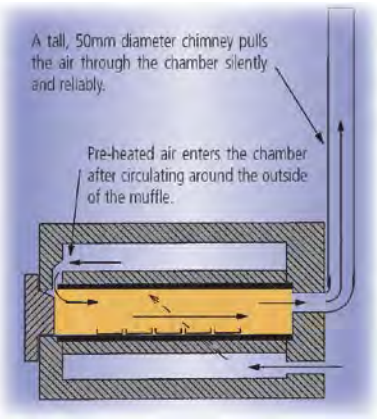
A furnance designed for ashing and burning with protected elements and preheated air giving a high level of uniformity.

These models are heated by wire heating elements protected from chemical and mechanical damage by a high quality, hard wearing alumina based liner. The graded winding and powerful double sided heating elements compensate for the heat loss, as well as preheating the air prior to it entering the chamber. Temperature uniformity within the chamber is therefore excellent, despite the higher airflow through the chamber. The AAF 11/3 and AAF 11/7 have a large floor area which allows many samples to be accommodated and because of the low chamber height the airflow is held close over the samples to promote burning. High airflow of between 4-5 changes per minute is ensured by use of an air inlet and a tall chimney, however it is not too high to disturb the samples in the crucibles, or chill them, as the incoming air is preheated.
The AAF range is ideal for ashing materials such as food, plastics, coal and other hydrocarbons. The AAF 11/7 furnance complies with the following industry standards BS 1016 part 4, ISO 344 and 1171, ASTM D 2361, D 2795 and D 3174.
The AAF 11/18 has high grade heating wire mounted behind silicon carbide tiles to protect against carbon or corrosive atmospheres. A two tier shelf is supplied as standard, which doubles the furnace capacity.



Features / Equipment:

- Maximum operating temperature 1100°C
- Chamber capacities of 3, 7 or 18 liters
- Robust muffle design of 3 & 7 liters models and silicon carbide tiles of 18 liters model offer strong resistance to carbon build up and chemical attack
- Constant airflow of 4-5 volume changes per minute ensures rapid combustion
- Pre-heated airflow to maintain excellent temperature uniformity
- 3 & 7 liters models supplied with inconel tray & handle for easy loading/unloading
- Tall chimney for fume exhaust by convection
- Vertical counter-balanced door keeps hot door insulation away from operator
- Positive break door safety switch isolates chamber from power supply, when the door is opened
- Double skinned construction allows convection air flow to cool the outer case, to conform to EN61010 safety standard
- Choice of PID controller or programmers Pictured left are 3 & 7 liters models



Muffle Furnaces

KARG Industrietechnik

Technical data:

	AAF 11/3	AAF 11/7	AAF 11/18
Exterior dimensions			
Width (mm)	290	430	505
Height (inclusive feet/castors) (mm)	480	650	705
Depth (mm)	340	740	675
Height to top of chimney (mm)	780	1060	1015
Interior dimensions			
Width (mm)	150	170	19
Height (mm)	85	90	235
Depth (mm)	250	455	400
Interior volume (l)	3	7	18
Weight (empty) (kg)	22	63	70
Temperature data			
Max. Temperature (°C)	1100	1100	1100
Continuous temperature (°C)	1000	1000	1000
Heat up time (min.)	140	155	70
Electrical data			
Nominal voltage (+10 %) 50 Hz (V)	230	400 (3N)	400 (3N)
Holding power (W)	1270	2300	3500
Max. Power (W)	2100	4000	3500

1) Holding power is measured at 1000°C below max. temperature, based on 240V supply, with an empty chamber.
2) Uniformity graphs are available on request, for most models.
3) All external dimensions are taken with the door closed and include a chimney.
4) Heat up time is measured at 1000°C below max. temperature with an empty chamber.
5)* Sample rack and tray system consists of hearth tray, two-tier rack, two sample trays and loading handle.

KARG Industrietechnik

Muffle Furnaces

Phoenix series: Microwave ashing and burning off furnaces

The new PhoenixT line of microwave-powered muffle furnaces offers unmatched versatility and speed in a rugged, easy-to-use system.

The Phoenix Muffle Furnaces enable companies in many diverse industries to improve their process control, allowing them to make rapid adjustments to reduce „out-of-specification“ product. These systems can perform many high temperature applications up to 97% faster than traditional muffle furnaces.
The Phoenix is available with your choice of either a High Temperature or High Capacity furnace. The High Temperature furnaces reach 1,200 °C and can process up to eight 25-ml crucibles. For laboratories needing greater throughput, the High Capacity furnaces reach 900°C and hold up to fifteen 25-ml crucibles. Any crucible that can be used in a conventional muffle furnace (including platinum) can also be used in the Phoenix Ashing Systems.

The Phoenix Systems are rugged, easy-to-use and engineered to be dependable. Temperature verification and temperature calibration for ISO and GLP practices are quickly and easily performed with optional accessories including NIST traceable dual thermocouples and calibration source instruments.

Phoenix satisfies the equipment requirements for „electrically heated“ furnaces in the following methods:

- ASTM, USP (281 - ROI & 733-LOI), AOAC, FDA, ISO & DIN

Phoenix also meets the requirements for applications listing a "microwave-heated" furnace

- ASTM D5630-94, ASTM D1506-94b

Features / Equipment:

- Programmable temperature control
- Auto-Start/Auto-Shutdown software
- Built-in exhaust system
- Entry and storage of up to 20 methods
- Built-in calibration software
- Over-temperature and thermocouple failure safeguards
- Built-in system diagnostics
- Use any type of crucible normally used in a conventional muffle furnace, incl. platinum!

Options:

Quartz Fiber Crucibles
These unique quartz fiber crucibles dramatically reduce ashing times and cool in seconds. The quartz fiber material allows oxygen to circulate around the sample speeding combustion.

Muffle Furnaces

KARG Industrietechnik

Options:

Self-Sealing Quartz Crucibles
For oxygen-free ashing, self-sealing quartz crucibles are available. These crucibles can be used for Carbon Black determination in polyethylene and polypropylene and eliminate the need for slow, fragile tube furnaces.

Workstation
The Phoenix Workstation option transforms your microwave muffle furnace into a complete center for accurate ashing and data compilation. The system utilizes the furnace's built-in serial and parallel ports to connect to a balance for weighing and a printer for complete documentation of the ashing process to assist you in complying with ISO and other QC requirements.

	Typical ashing times		
Materials being ashed	**Conventional (Minutes)**	**MicroWaves (Minutes)**	**Time savings (%)**
Butyl Rubber	90	20	78%
Carbon Black	960	90	91%
Graphite Powder	240	35	85%
Kaolin	120	30	75%
Polyester (filled)	480	15	97%
Polyethylene (unfilled)	30	5	83%
Polyethylene (% carbon black)	30	7	77%
Polypropylene	30	5	83%
TiO2	60	10	83%

Technical data:

	Phoenix
Exterior dimensions	
Width (mm)	462
Height (mm)	498
Depth (mm)	654
Interior dimensions	
Width (mm)	210
Height (mm)	76
Depth (mm)	116
Interior volume (l)	1,8
Weight (empty) (kg)	44,2
Temperature data	
Max. Temperature (°C)	1200
Electrical data	
Nominal voltage (+10 %) 50 Hz (V)	220-240
Power (W)	975 +/- 50
Magnetron frequency (MHz)	2450

Further informations about standards:

www.iso.ch
www.din.de
www.astm.org
www.jsa.or.jp
www.webstore.jsa
www.boutique.afnor.fr
www.bsi-global.com
www.cenorm.be

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- Plastic industry
- Automotive industry
- Laboratories / Universities / Technical high schools
- Electronic industry
- Rubber industry

Due to continuous development policy, changes may be introduced without any notice!

KARG Industrietechnik

Competence in material testing

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