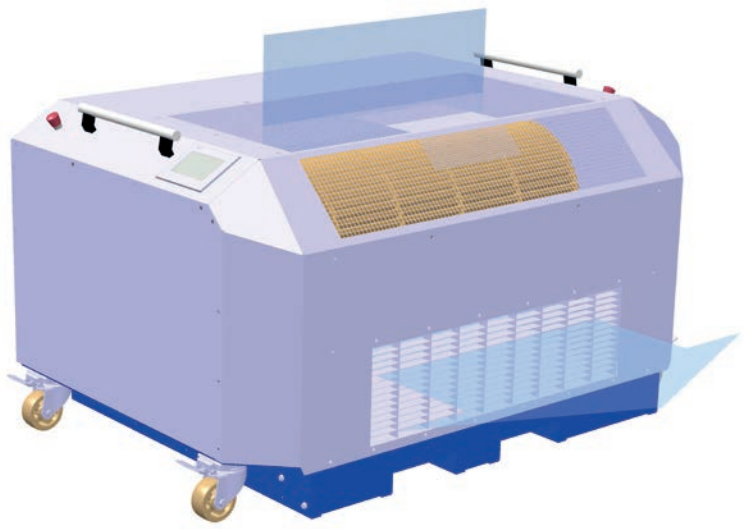
AIR TECH SYSTEMS

Technical Documentation

LTG Fans

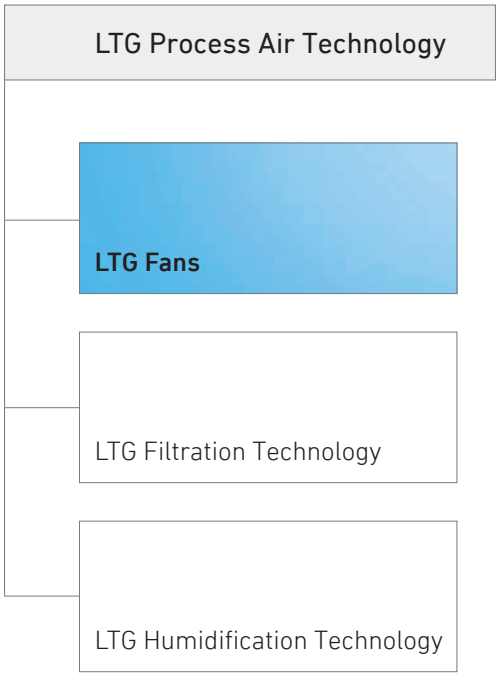
Fahrtwind-Simulators*

Type Series VQF



* Fahrtwind = wind generated by a moving vehicle

www.LTG.net



Comment

The dimensions in this technical leaflet are indicated in mm.

The sizes indicated in this leaflet are subject to the general tolerances according to DIN ISO 2768-cL.

The technical documents include technical leaflets, operating and maintenance instructions, technical data sheets, the order documents and the rating plate.

Special designs on request.

Product Overview VQF

Type	Average blow-out speed at nominal revolutions [km/h]	Blow-out cross section H x W [mm]	Blow-out height above the bottom [mm]	Conveyed-volume flow at nominal speed [m³/h]	Ambient temperature [°C]	Motor output [kW]	Weight kg	mobile	Require-ments met	Page
VQF 200/1000	70	1000 x 121	200 - 1500	9000	+10 to +40	2.5	200	yes		19
VQF 500/800	100	584 x 800	240 - 600	47 000	+4 to +40	66	580	no		21
	120	630 x 630	105	48 000	-40 to +40	55	530	yes		23
	160	300 x 800	200	40 000	-30 to +40	45	500	yes		25
VQF 500/1250	135	294 x 1030	200 - 500	40 880	-10 to +40	22	830	yes	WLTP, CFR	13
	135	294 x 1030	200 - 500	40 880	-30 to +40	30	880	yes	WLTP, CFR	13
	135	294 x 1030	200 - 500	40 880	-40 to +60	30	880	yes	WLTP, CFR	13
	135	356 x 1118	200 - 500	51 300	-10 to +40	52	1000	yes	WLTP CFR, EPA	15
	160	294 x 1030	200 - 500	48 000	-10 bis +40 -30 bis +40 -40 bis +60	54	1000	yes	WLTP, CFR, RDE	14
VQF 630/1250 with nozzle	150	630 x 630	85	60 000	-10 to +40	110	1960	no	WMTC	27
VQF 630/1400	150	382 x 1000	200 - 500	57 300	+10 to +40	55	2400	no		29
VQF 800/1250 with 3 nozzles	100	914 x1070	50 - 350	98 000	-30 to +50	110	2900	yes	SC03	31
	135	300 x 1000	200 - 500	40 800					WLTP	31
	160	600 x 1000	50 - 350	98 000					RDE	31
VQF 800/1400	90	488 x 1400	455 - 655	62 500	-25 to +40	30	2250	no		33
VQF 1000/1600	140	800 x 1200	45	135 000	-40 to +50	160	4000	no		35
VQF 1000/2000	140	850 x 1600	45 - 495	199 000	-35 to +55	250	5500	no		38
	150	800 x 1500	100 - 450	180 000	-35 to +50	200	5000	no		38
	160	800 x 1400	50 - 350	179 000	+10 to +35	200	5800	no	WLTP	38
	200 with nozzle	460 x 1600	45 - 495	199 000	-35 to +55	250	5500	no		38

Used by leading companies

Application example: Porsche, type VQF 500/1000

Application example: Daimler, type VQF 500/1000

Used by leading companies

Application example: Tesla, type VQF 500/1400

Application example: Audi, type VQF 500/1000

Used by leading companies

Application example: Ford, type VQF 1000/2000

Application example: Ford, type VQF 500/1400

Used by leading companies

Application example:

Volkswagen,
type VQF 500/1000

Application example:

Volvo, type VQF 500/1000

Application example:

Alpina, type VQF 500/800

Used by leading companies

Application example:

BMW, type VQF 500/1000

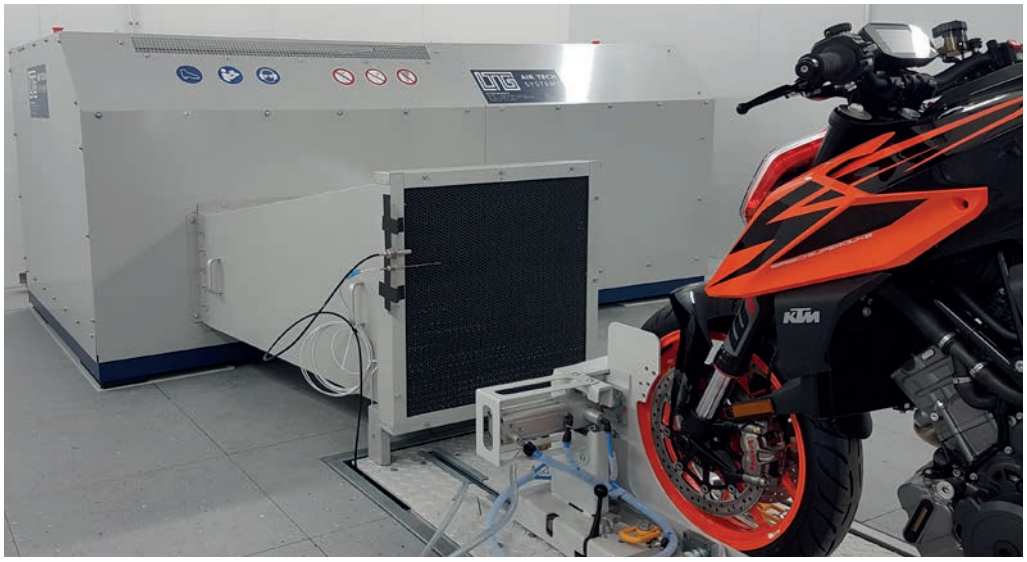
Application example:

Jeep, type VQF 500/1250

Application example:

Citroen,
type VQF 630/1400

Used by leading companies



Application example:
KTM, type VQF 630/1250

Other Fahrtwind-Simulators are successfully used by:

- ABB France
- Angelantoni
- Apicom
- Argonne National Lab
- AVL
- Ceprocs
- Continental
- Daimler
- Danae
- Denso
- Eberspächer
- Ferrari
- Fiat Chrysler Automobiles
- Ford UK
- GM
- Harley Davidson
- Hochschule Ulm
- Horiba
- IAV - Ingenieurgesellschaft Auto und Verkehr
- Johnson Controls
- Kristl, Seibt & Co
- KTM
- Lingemann
- Logitrade
- MAGNA Steyr
- MBtech
- Mitsubishi
- Nedcar
- Nissan
- Opel
- Porsche
- PSA Peugeot Citroën
- Renault
- SAAB
- Sagatron
- SEAT
- Siemens VDO
- Suzuki
- TCA
- Toyota Group
- TU Cottbus
- TÜV Nord
- TÜV Süd
- Umicore
- VW Südafrika
- Weiss Umwelttechnik
- 3R Co., Ltd.

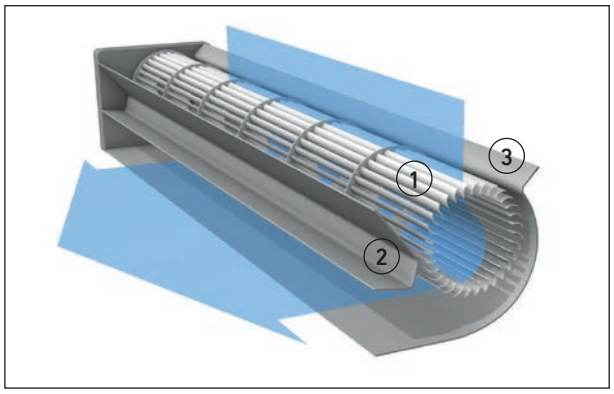
Use

The compact LTG Fahrtwind-Simulators were specifically developed for use on chassis dynamometers, but may be used universally for other cooling and flow simulations as well.

Areas of use include the automotive industry or test labs in machine and plant construction.

The LTG equipment is characterised, e.g., by use of cross-flow fans. Their special flow principle offers decisive advantages:

- Even laminar air flow across the entire outlet width of the fan
- Space-saving through 90° deflection of the air flow



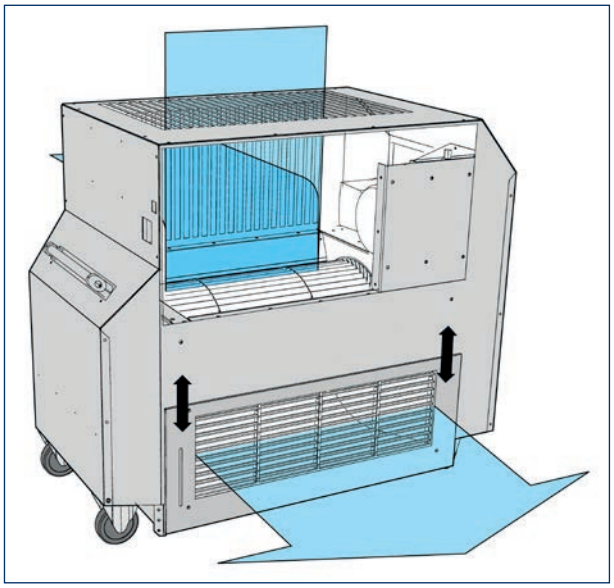
① *Impeller*
② *Vortex generator*
③ *Fan guide plate*

Full load operation

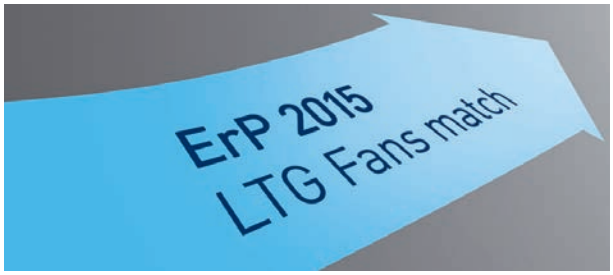
Function

The cross-flow fan of the air stream simulator takes in air from the environment through the guard.

The desired fan speed is set using speed control and is either performed on an operating panel or via an external power input synchronously to the driving speed.



Flow principle Fahrtwind-Simulator

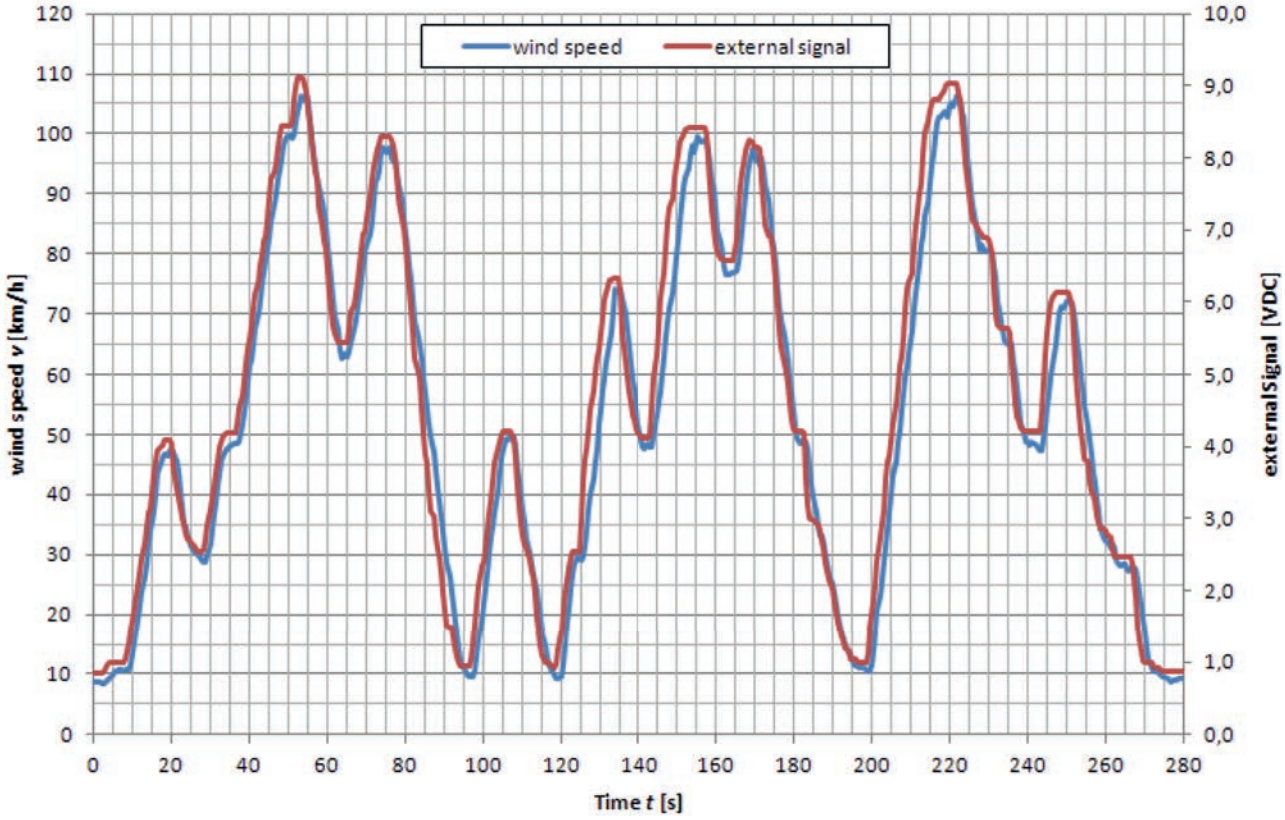


LTG Aktiengesellschaft offers different designs for different inspection requirements and test situations. Customer-specific designs on request. The Fahrtwind-Simulators of type series VQF can be used to perform tests with the following running cycles depending on design:

- WLTP – regulation (EU) 2017/1151
- WMTC – regulation (EU) 2017/1151
- CFR – directive CFR § 1066.105 (c) (1) (i to iv) / (c) (2)
- RDE – regulation (EU) 2016/427
- EU – directive 70/220/EWG – 2007
- EU – rule 83 of the UNECE; chapter 6
- EU – rule 83 of the UNECE; annex 3
- EU – MVEG-A
- EU – NEDC (New European Driving Cycle)
- EU – ECE/UDC (Urban Driving Cycle)
- EU – EUDC (Extra Urban Driving Cycle)
- USA – Urban Dynamometer Driving Schedule (UDDS)
- USA – US06
- USA – SC03
- USA – Refuelling emission test
- USA – Hot soak test
- USA – Diurnal emission test
- USA – Running loss testing
- USA – FTP75
- Japan – 10 Mode Cycle
- Japan – 10-15 Mode Cycle
- Japan – JC08 Cycle

Other driving cycles on request.

Time to reaction of the LTG Fahrtwind-Simulators



The above illustration shows based on an example driving cycle how fast the LTG Fahrtwind-Simulators will follow the specified speed (does not apply to all designs).

Due to the standby speed, the target signal of 0 V leads to a minimal airflow of about 2-7 km/h, depending on type.

LTG Fahrtwind-Simulator type VQF 500/1250
for vehicle chassis dynamometers

Mobile, height adjustment 200 to 500 mm

Specification

- Meets the global requirements of the WLTP cycle according to VO (EU) 2017/1151, and according to the test cycles based on CFR § 1066.105 (c) (1) (i to iv) / (c) (2), i. e. FTP, HFET, US06 & LA-92
- For simulations up to 135 km/h or 160 km/h with realistic and reproducible measuring results
- Diverse adjustments possible (mobile and electrically height-adjustable for different vehicle types
- Compact and ergonomic build
- All elements integrated in one housing
- Control of the airstream unit via integrated operating panel or present interface with the dynamometer
- Different drive versions and other system solutions available
- Smooth adjustment of the speed by frequency converter via external target value input (0 - 10 V or 4 - 20 mA)
- For mains voltages 400 V/50 Hz and 380 - 480 V/60 Hz

Use

The compact LTG Fahrtwind-Simulators were specifically developed for use on chassis dynamometers, but may be used universally for other cooling and flow simulations as well.

Areas of use include the automotive industry or test labs in machine and plant construction.

The LTG equipment is characterised, e.g., by use of cross-flow fans. Their special flow principle offers decisive advantages:

- Even airflow across the entire blow-out width of the fan, also vertical across the entire defined height
- Space-saving through 90 ° deflection of the air flow

Design

The air stream simulator is delivered completely assembled and ready to be plugged in.

It comprises a cross-flow fan of type VQN 500/1250 with belt drive, motor, frequency converter and mobile housing with latchable rolls.

The blow-out height is electrically adjustable.

Operation

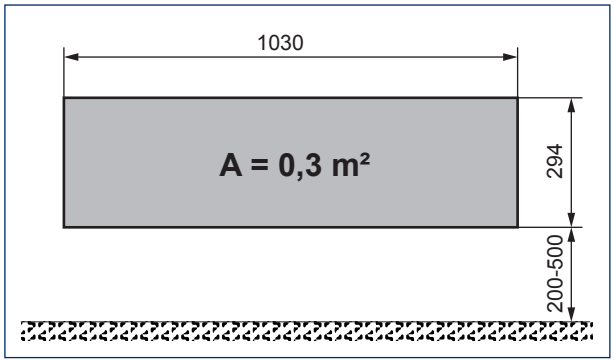
The ergonomic operation takes place via a coloured operating panel. All functions such as fan control, height adjustment and maintenance/fault messages are displayed. An external signal (0 - 10 V or 4 - 20 mA) can control the blow-out speed and synchronise it with the speed of the dynamometer roll. The operating panel is equipped with an additional memory in order to store, e.g., specified blow-out heights for various vehicle types. Operation takes place at the housing (at multi-temperature design externally on the control cabinet) according to the current safety provisions. Optionally a second screen display is available at the front of the device.

Operation via operating panel

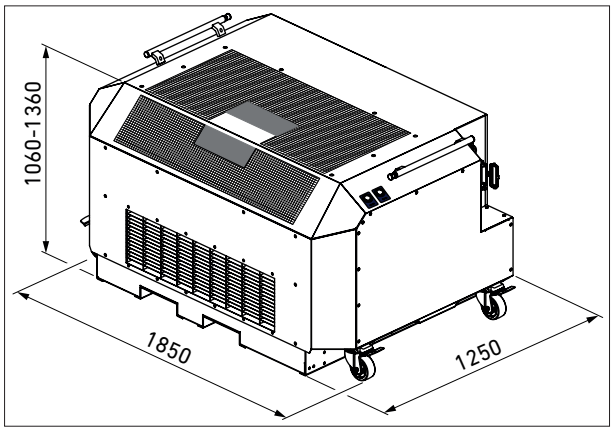
Operating panel, intake on top *Blow-out side* *Connection of power supply*

LTG Fahrtwind-Simulator type VQF 500/1250
for vehicle chassis dynamometers, up to 135 km/h

Blow-out area



Dimensions



Technical Data

Standard type

Average outlet speed at nominal speed	135 km/h
Displaced volume flow at nominal speed	40 880 m^3/h
Ambient temperature (without moisture and condensate formation)	-10 to +40 °C
Motor output	22 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 830 kg

Low temperature type

Average outlet speed at nominal speed	135 km/h
Displaced volume flow at nominal speed	40 880 m^3/h
Ambient temperature (without moisture and condensate formation)	-30 to +40 °C
Motor output	30 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 880 kg

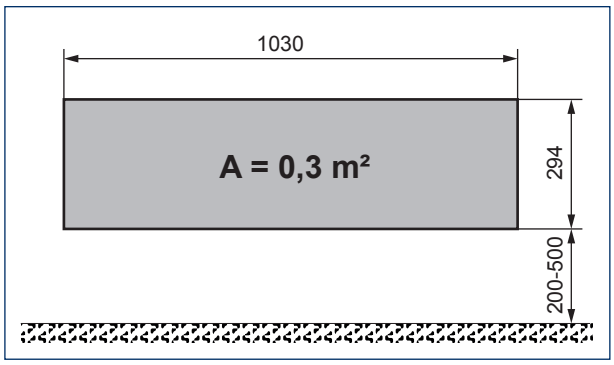
Multi temperature type *

Average outlet speed at nominal speed	135 km/h
Displaced volume flow at nominal speed	40 880 m^3/h
Ambient temperature (without moisture and condensate formation)	-40 to +60 °C
Motor output	30 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 880 kg

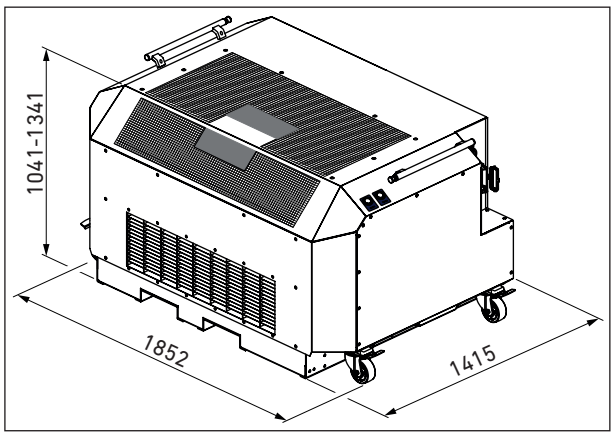
* For realisation of cooling and flow simulations with increased requirements to the ambient temperature. Control in separate control cabinet 800 x 300 x 1200 mm (W x D x H), external operating panel

LTG Fahrtwind-Simulator type VQF 500/1250
for vehicle chassis dynamometers, up to 160 km/h

Blow-out area



Dimensions



Technical Data

Standard type

Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	48 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-10 to +40 °C
Motor output	54 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 1000 kg

Low temperature type

Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	48 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-30 to +40 °C
Motor output	54 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 1000 kg

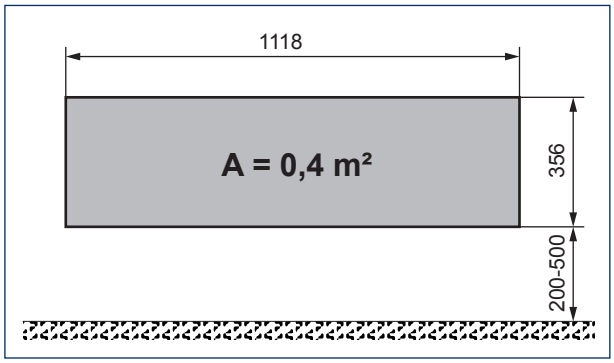
Multi temperature type *

Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	48 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-40 to +60 °C
Motor output	54 kW
Blow-out cross section	294 x 1030 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 1000 kg

* For realisation of cooling and flow simulations with increased requirements to the ambient temperature. Control in separate control cabinet 800 x 300 x 1200 mm (W x D x H), external operating panel

LTG Fahrtwind-Simulator type VQF 500/1250
for vehicle chassis dynamometers, ccording to EPA requirements

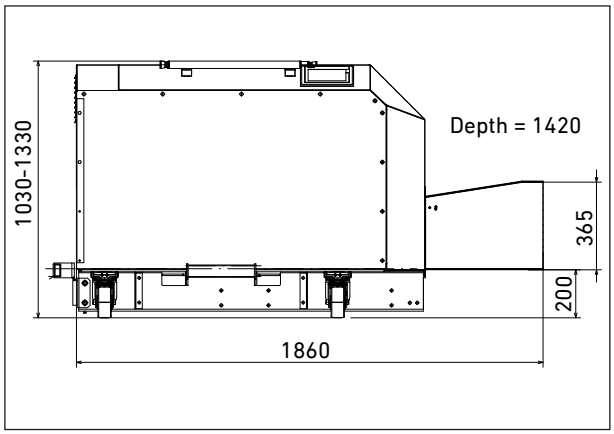
Blow-out area



Technical Data

Standard type	
Average outlet speed at nominal speed	135 km/h
Displaced volume flow at nominal speed	51 300 m^3/h
Ambient temperature (without moisture and condensate formation)	-10 to +40 °C
Motor output	52 kW
Blow-out cross section	356 x 1118 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 1000 kg

Dimensions



LTG Fahrtwind-Simulator type VQF 500/1250, accessories

Drive

COMFORT DRIVE
Double-wheel drive

- Battery-powered
- Intuitive handling
- Ergonomic movement
- Integrated safety switch
- Modular system
- Highly manoeuvrable

EASY DRIVE
Electric tractor

- Can be used flexibly for multiple devices
- Compact, autonomous transport aid
- Simple and safe coupling system
- Retrofitting possible

SUPER DRIVE
All-wheel drive

- Handling without compromises
- Precise positioning in any direction, incl. turn
- Patented drive kinematics
- Technology: four 24V engines
- Battery operation
- Retrofitting possible

Automation

Distance measurement vehicle-nozzle by ultrasound sensor

Feedback via interface: (0 - 10 V)

- Speed
- Device height
- Distance from the vehicle

Electromagnetic compatibility

Certification to EMC-ILA®

EMV-ILA® certified

EMC integration guideline for achieving electromagnetic compatibility in electrical of the automotive industry.

(EMV-ILA® is a registered trademark of Steinbeis GmbH & Co. KG für Technologietransfer, D-70174 Stuttgart, Germany, www.emv-ila.de)

Base frame
300 mm additional height

- For high vehicles, such as SUV and off-road vehicles
- Height adjustment of basic unit is preserved (500 to 800 mm above the bottom)

Integrated Sensors
Humidity and Temperature

- Positioned in the fan's suction or blow-out area
- Meets the normative erquirements
- Analogue output or via digital unit interface (optional)

Digital Interface
Non-dissipative Communication

- Digital interface via Ethernet to integrate the Fahrtwind-Simulator into the dynamometer
- Optimal for long cables due to non-dissipative transmission, compared to analogue signals
- Profinet Communication

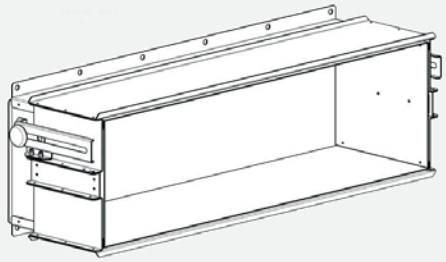
Rolls and brakes

- Standard: 4 x Caster with brake
- Option 1: - Caster with brake and with latch, 90° each, suitable in combination with drive "Easy Drive"
- Option 2: - Safety-targeted monitoring of the brake, fan only ready with the brake activated, suitable for standard caster with brake
- Additional option: Surrounding bumper protection

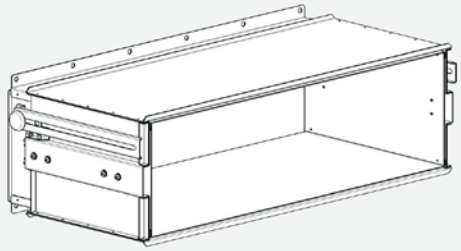
LTG Fahrtwind-Simulator type VQF 500/1250, accessories

Attachment nozzles

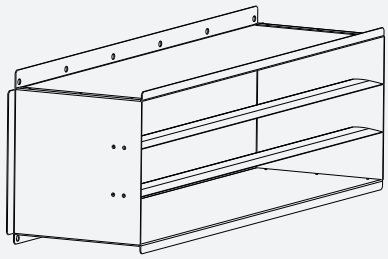
Variable nozzle L=300...500 mm



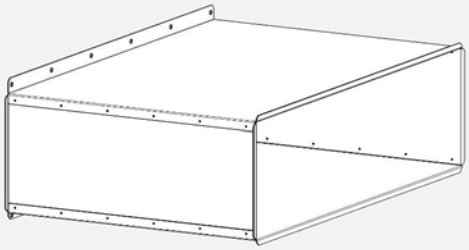
Variable nozzle L=500...900 mm



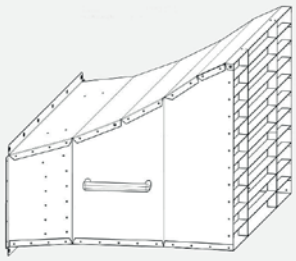
Nozzle L=300 mm



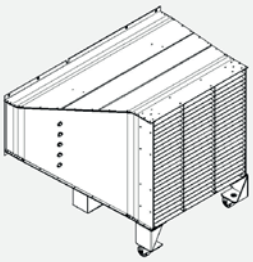
Nozzle L=700 mm



Nozzle with cross-section 800 x 600 mm



Nozzle with cross-section 630 x 630 mm



Miscellaneous

- Further accessories on request
- Customer-specific, individual solutions on request

LTG Fahrtwind-Simulator type VQF 200/1000
for labs, dynamometers and workshops

Ambient temperature + 10 °C to + 40 °C, movable

Use

Type VQF 200/1000 was developed for labs, dynamometers and workshops in order to meet different requirements in the area of cooling or conditioning.

Mobile and space-saving use for targeted blowing against objects from below or above.

Fahrtwind-Simulator type VQF 200/1000

Design

The air stream simulator is delivered completely assembled.

The ergonomic setup comprises a mobile frame with cross-flow fan type TM 200/1000 and a control panel in which the entire control is installed. Various types and sizes on request.

Application example: Porsche, type VQF 200/1000

LTG Fahrtwind-Simulator type VQF 200/1000
for labs, dynamometers and workshops

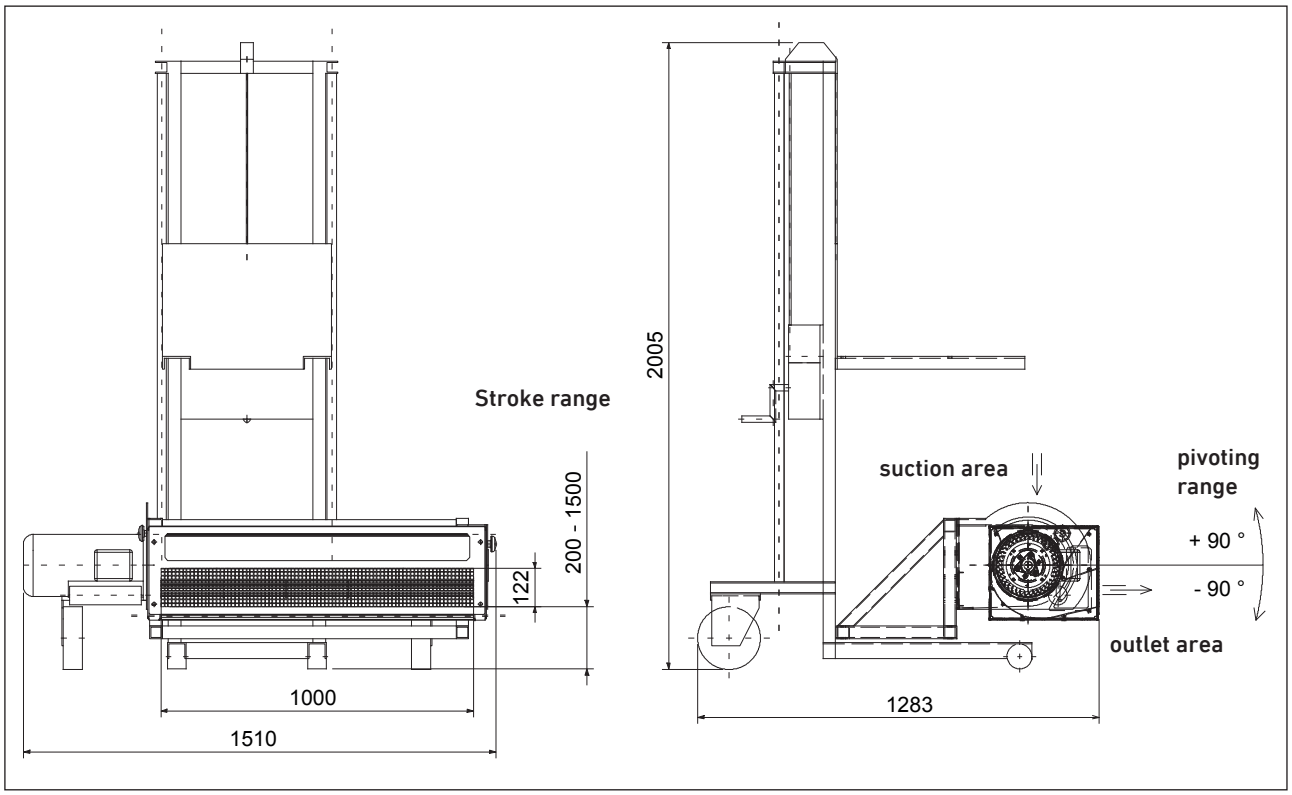
Specification

- Design ready to be plugged in
- Mobile use by movable frame
- Ideal for blowing on vehicles from below or above
- Ideal for all engine arrangements: Front, rear, midengine
- Can be used for many different vehicle types
- Space-saving, simple handling
- Smoothly height-adjustable by 1300 mm
- High-performance cross-flow fan, swivelling by 180°

Technical Data

Average outlet speed at nominal speed	70 km/h Hz
Displaced volume flow at nominal speed	9000 m^3/h
Ambient temperature (without moisture and condensate formation)	+10 to +40 °C
Motor output	approx. 2.5 kW
Blow-out cross section	1000 x 121 mm
Blow-out height above the bottom	200 - 1500 mm

Dimensions



LTG Fahrtwind-Simulator type VQF 500/800
for vehicle chassis dynamometers

Ambient temperature +4 °C to +40 °C, height adjustment 240 to 600 mm

Use

Type VQF 500/800 was developed for vehicle chassis dynamometers where there is little space in front of the vehicle.

It can be adjusted in height for optimal adjustment to many different vehicle types.

Fahrtwind-Simulator type VQF 500/800 for vehicle chassis dynamometers, blow-out side

Design

The air stream simulator is delivered completely assembled. Transport and delivery takes place with an industrial truck.

It consists of a belt-driven VQN 500/800 cross-flow fan with motor, a vibration-dampened setup and wiring, and is installed on a height-adjustable frame with lifting columns. The control takes place via a control cabinet with frequency converter.

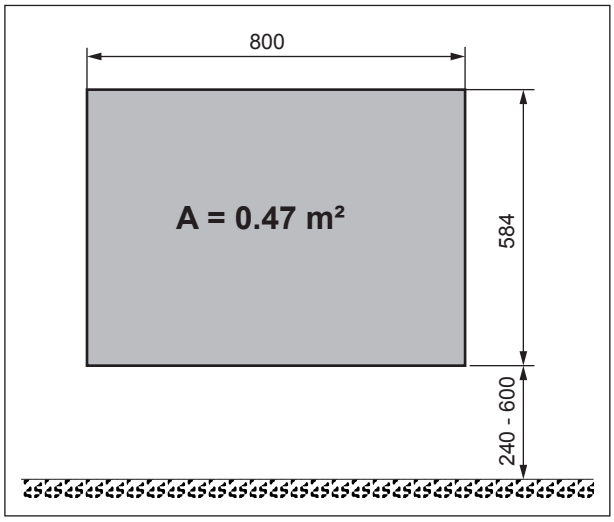
The blow-out height is electrically adjustable.

LTG Fahrtwind-Simulator type VQF 500/800
for vehicle chassis dynamometers

Specification

- Compact build
- Complete design ready for operation incl. control cabinet with control and frequency converter
- Smoothly electrically height-adjustable by 360 mm
- Vibration-dampened setup
- Transport and setup with industrial truck
- Electrical connection to the device either on the left or right

Blow-out area



Technical Data

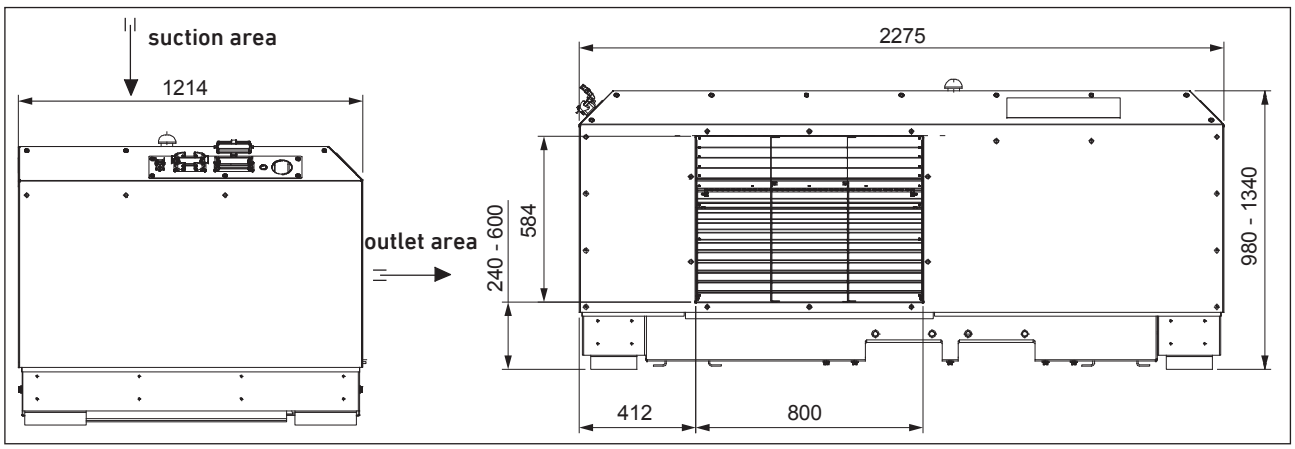
Average outlet speed at nominal speed	100 km/h
Displaced volume flow at nominal speed	47 000 m³/h
Ambient temperature (without moisture and condensate formation)	+4 to +40 °C
Motor output	66 kW
Blow-out cross section	584 x 800 mm
Blow-out height above the bottom	240 to 600 mm
Weight	Approx. 580 kg

Operation

The ergonomic operation takes place via a coloured touch panel. All functions such as fan control, height adjustment and maintenance/fault messages are displayed. An external signal (0 - 10 V) can control the blow-out speed and synchronise it, e.g., with the speed of the dynamometer roll. The touch screen is available with an additional memory in order to store, e.g., specified blow-out heights for various vehicle types. Operation takes place at the side of the device, according to the current safety provisions. Optionally a second screen display is available at the front of the device.

Operation via operating panel

Dimensions



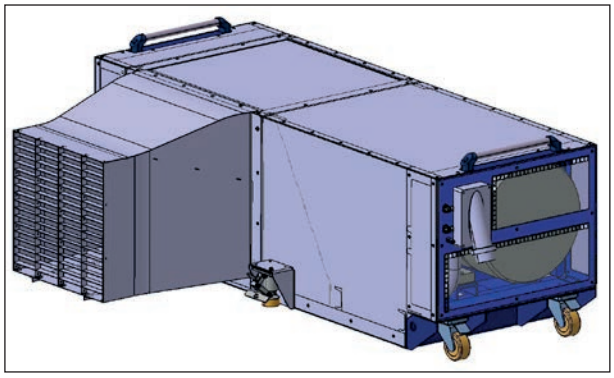
LTG Fahrtwind-Simulator type VQF 500/800
for motorcycle chassis dynamometers

Ambient temperature -40 °C to +40 °C, movable

Use

This design of type VQF 500/800 was developed for motorcycle chassis dynamometers on which exhaust measurements at speeds up to 120 km/h are performed.

For accuracy of the measuring results, it is essential that the relevant components, such as exhaust system and engine cooling, are targeted by an even flow. The Fahrtwind-Simulator is equipped with a square blow-out nozzle for this.



Fahrtwind-Simulator type VQF 500/800 for motorcycle chassis dynamometers, blow-out side with nozzle and protective grille

Fahrtwind-Simulator type VQF 500/800 for motorcycle chassis dynamometers, drive side with electrical connections

Design

The Fahrtwind-Simulator is delivered completely installed – except for the blow-out nozzle. Before commissioning, the blow-out nozzle must be attached to the housing of the Fahrtwind-Simulator.

It comprises a direct-driven cross-flow fan of type VQN 500/800 with shaft coupling, with motor and housing installed on a mobile frame with casters, the blow-out nozzle with attachment parts, intake and blow-out protection grid and electrical connections.

Fahrtwind-Simulator type VQF 500/800 for motorcycle chassis dynamometers, drive side/rear

LTG Fahrtwind-Simulator type VQF 500/800
for motorcycle chassis dynamometers

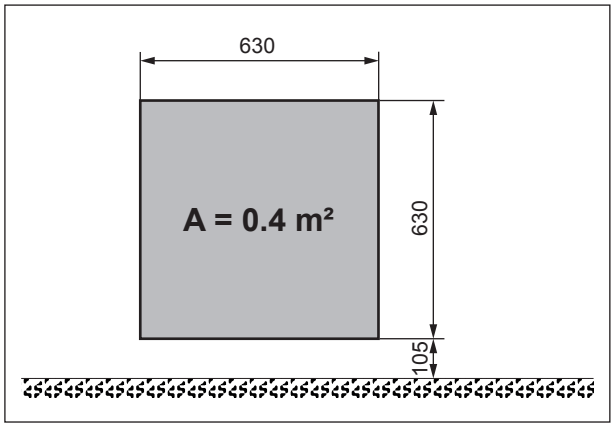
Specification

- Use in climate chambers of -40 to +40 °C (not thawing)
- Compact build
- Design ready to be plugged in
- Control outside of the dynamometer
- Blow-out nozzle can be removed for transport
- Stoppers/casters for transport

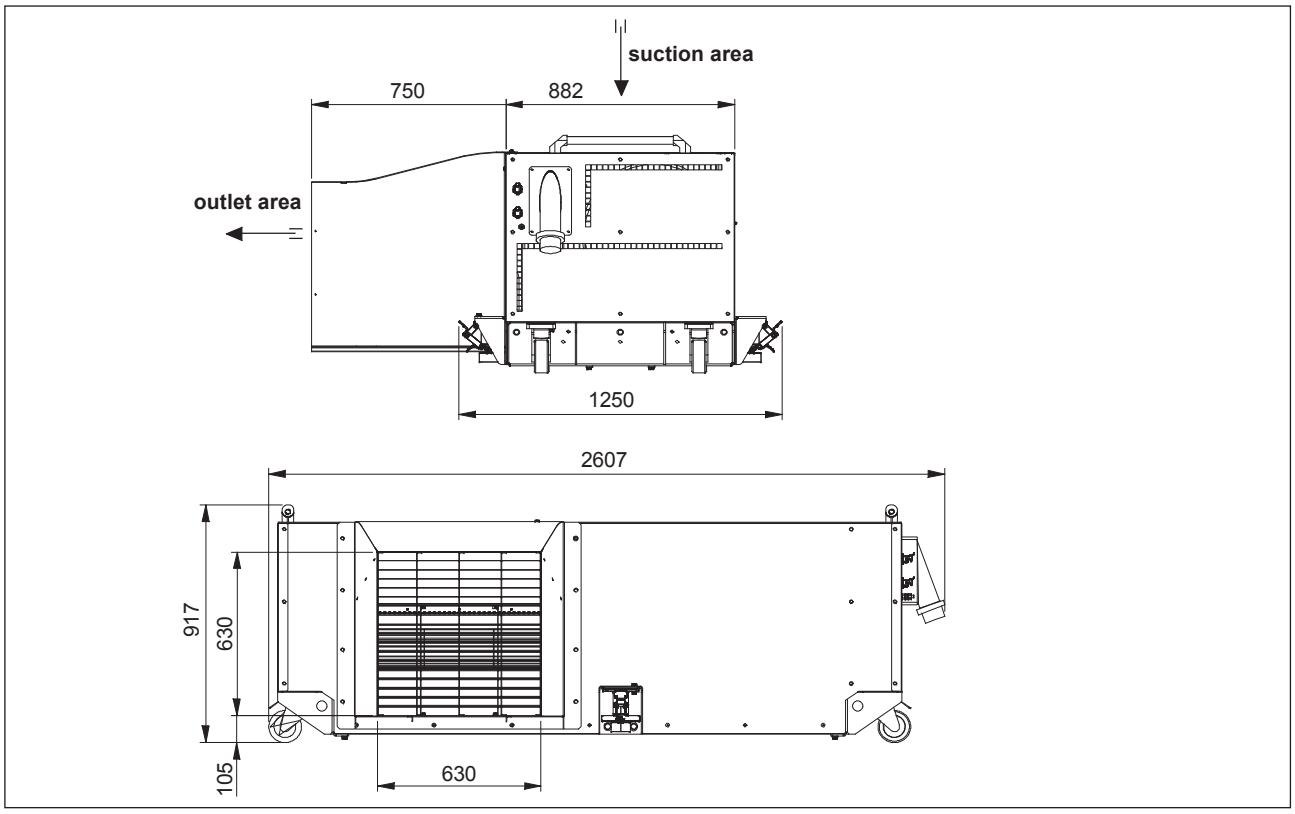
Technical Data

Average outlet speed at nominal speed	120 km/h
Displaced volume flow at nominal speed	48 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-40 to +40 °C
Motor output	55 kW
Blow-out cross section	630 x 630 mm
Blow-out height above the bottom	Approx. 105 mm
Weight	Approx. 530 kg

Blow-out area



Dimensions



LTG Fahrtwind-Simulator type VQF 500/800
for vehicle chassis dynamometers

Ambient temperature -30 °C to +40 °C, movable

Use

Type VQF 500/800 was developed for vehicle chassis dynamometers on which exhaust measurements at speeds up to 160 km/h are performed.

For accuracy of the measuring results, it is essential that the relevant components, such as catalytic converter and oil tray, are targeted by an even flow.

Fahrtwind-Simulator type VQF 500/800 for vehicle chassis dynamometers, blow-out side with protective grille

Fahrtwind-Simulator type VQF 500/800

Design

The air stream simulator is delivered completely assembled.

It comprises a direct-driven cross-flow fan of type VQN 500/800 with shaft coupling, with motor and housing installed on a mobile frame with casters, intake and blow-out protection grid and electrical connections.

Fahrtwind-Simulator type VQF 500/800 for vehicle chassis dynamometers, drive side/rear

Fahrtwind-Simulator type VQF 500/800 for vehicle chassis dynamometers, drive side with electrical connections

LTG Fahrtwind-Simulator type VQF 500/800
for vehicle chassis dynamometers

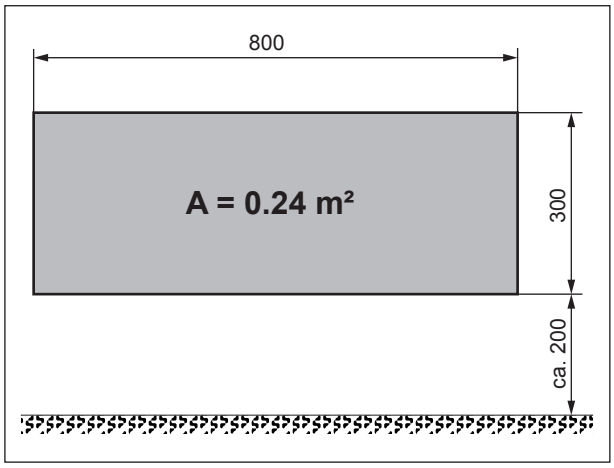
Specification

- Use in climate chambers of -30 to +40 °C (not thawing)
- Compact build
- Design ready to be plugged in
- Control outside of the dynamometer
- Stoppers/casters for transport

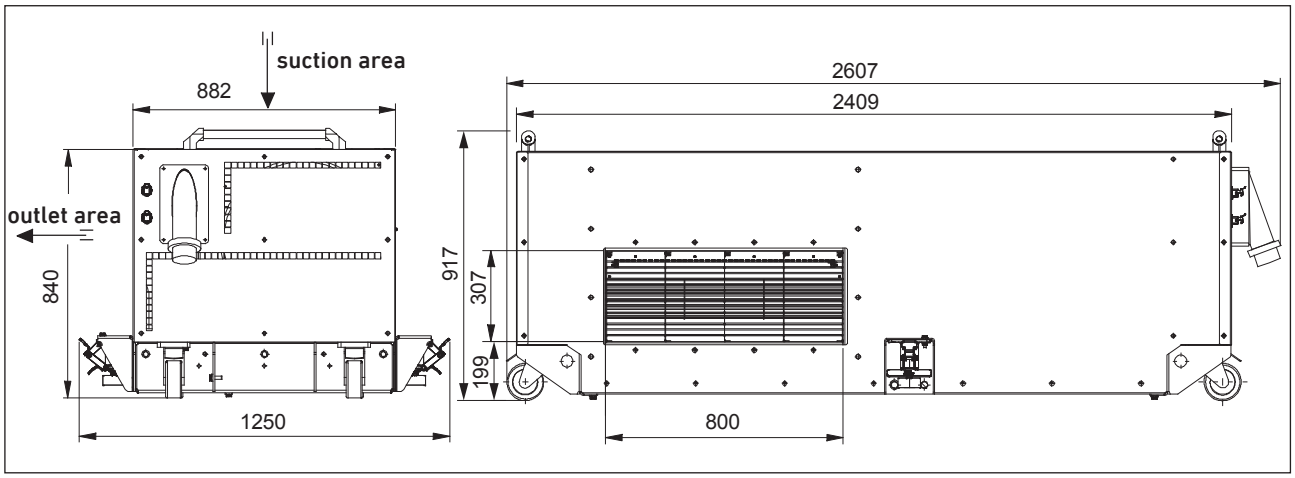
Technical Data

Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	40 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-30 to +40 °C
Motor output	45 kW
Blow-out cross section	300 x 800 mm
Blow-out height above the bottom	Approx. 200 mm
Weight	Approx. 500 kg

Blow-out area



Dimensions



LTG Fahrtwind-Simulator type VQF 630/1250
for motorcycle chassis dynamometers

Ambient temperature +10 °C to +40 °C

Use

Type VQF 630/1250 for motorcycle chassis dynamometers was developed for airstream simulation at high speeds and short acceleration times.

This makes the system optimal for performance and exhaust measurements on motorcycle chassis dynamometers.

The entire front of the motorcycle must be subject to an even flow in order to receive reliable measuring results and to protect the engine and exhaust system from overheating.

Design

The Fahrtwind-Simulator consists of a type VQN 630/1250 cross-flow fan with a belt drive, motor and an fixed attachment nozzle.

The control is located in the separate control cabinet

Incl. frequency converter and an external operating panel.

Fahrtwind-Simulator type VQF 630/1250

Application example: KTM, type VQF 630/1250

LTG Fahrtwind-Simulator type VQF 630/1250
for motorcycle chassis dynamometers

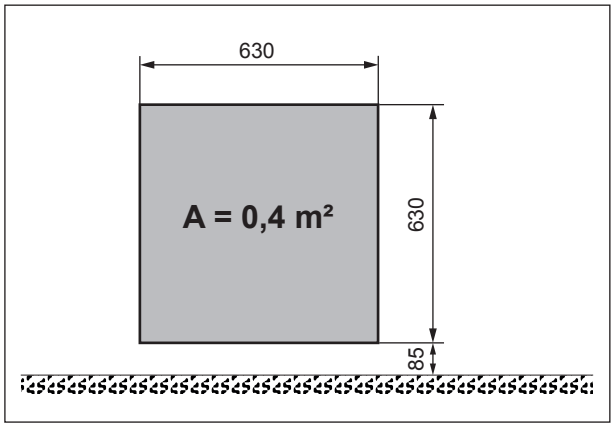
Specification

- High performance density
- Large simulation range up to 150 km/h (93 mph)
- High acceleration 0 - 60 km/h in 3 s,
  0 - 100 km/h in 10 s
- Even air flow across the entire blow-out surface
- Smooth adjustment of the speed by frequency converter via analogue input 0 - 10 V

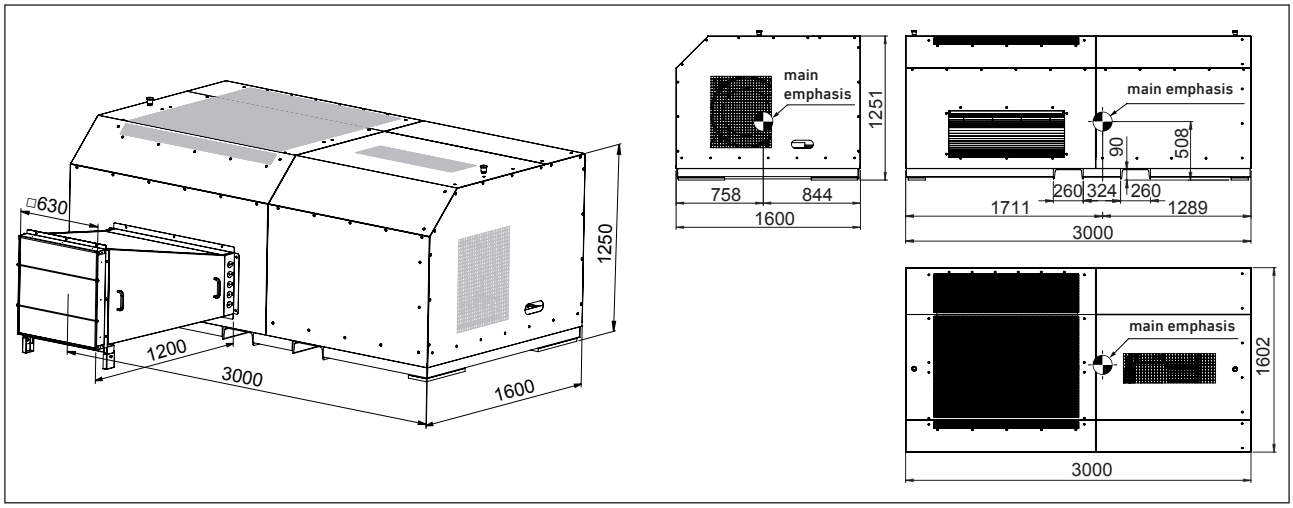
Technical Data

Average outlet speed at nominal speed	150 km/h
Displaced volume flow at nominal speed	60 000 m^3/h
Ambient temperature (without moisture and condensate formation)	+10 to +40 °C
Motor output	110 kW
Blow-out cross section	630 x 630 mm
Blow-out height above the bottom	Approx. 85 mm
Weight	Approx. 1960 kg

Blow-out area



Dimensions



LTG Fahrtwind-Simulator type VQF 630/1400
for vehicle chassis dynamometers

Ambient temperature +10 °C to +40 °C, height adjustment 200 to 500 mm

Use

The type VQF 630/1400 Fahrtwind-Simulator was developed for airstream simulation in vehicle and chassis dynamometers, where a blow-.out speed of up to 150 km/h is required.

An electrically height-adjustable blow-out nozzle covers applications from passenger cars to transporters.

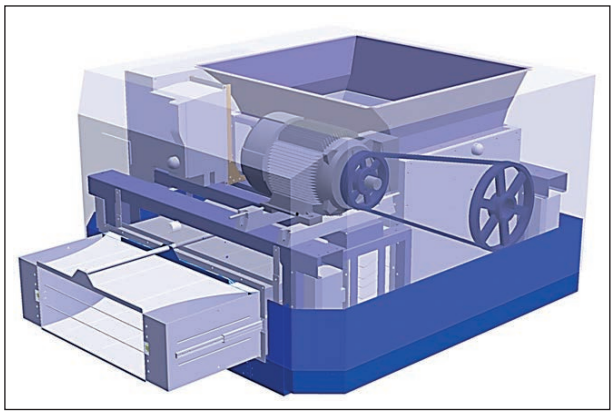
A separate additional nozzle also covers special applications.

Design

The Fahrtwind-Simulator is transported by an industrial truck and delivered completely installed.

It consists of a type VQN 630/1400 cross-flow fan with belt drive and a motor with frequency converter, vibration-dampened setup and contains the entire electrical equipment and wiring.

The Fahrtwind-Simulator is installed on a height-adjustable frame with lifting columns.



Fahrtwind-Simulator type VQF 630/1400

Fahrtwind-Simulator type VQF 630/1400, blow-out side.

Fahrtwind-Simulator type VQF 630/1400, blow-out and operation side

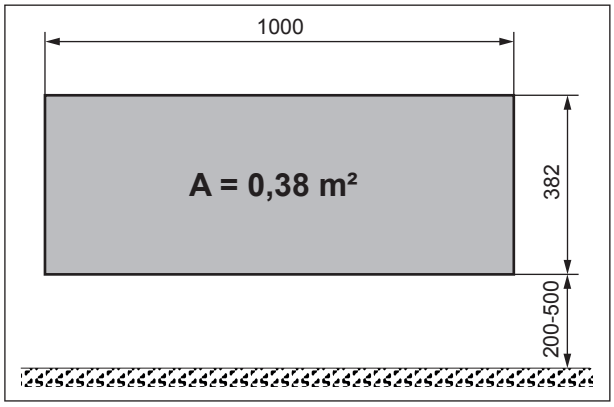
Fahrtwind-Simulator type VQF 630/1400, height-adjusted, extensible blow-out nozzle

LTG Fahrtwind-Simulator type VQF 630/1400
for vehicle chassis dynamometers

Specification

- High performance density
- Large simulation range up to 150 km/h (100 mph)
- High acceleration 0 - 60 km/h in 3 s,
  0 - 100 km/h in 10 s
- Even air flow across the entire blow-out surface
- Smooth adjustment of the speed by frequency converter via analogue input 0 - 10 V

Blow-out area



Technical Data

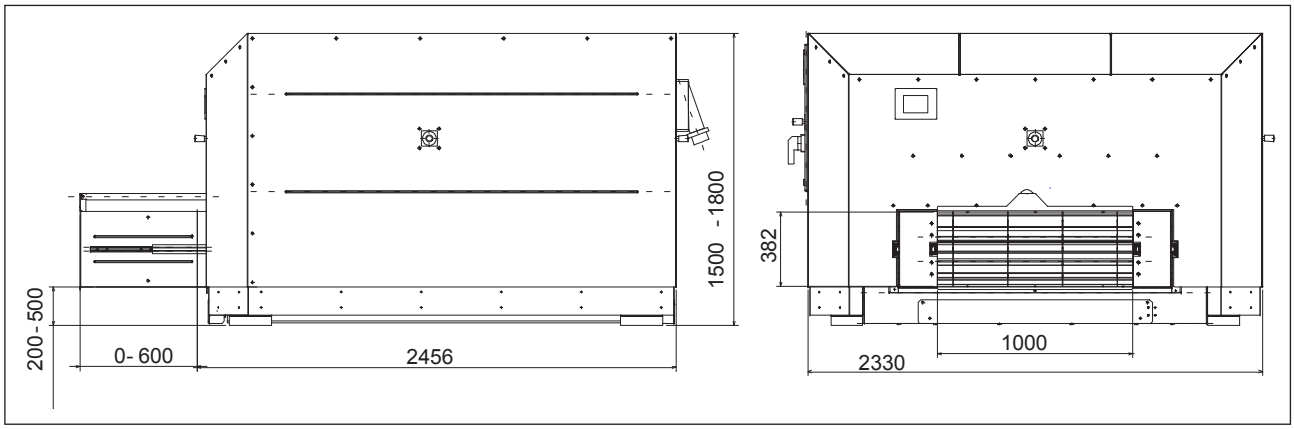
Average outlet speed at nominal speed	150 km/h
Displaced volume flow at nominal speed	57 300 m³/h
Ambient temperature (without moisture and condensate formation)	+10 to +40 °C
Motor output	55 kW
Blow-out cross section	382 x 1000 mm
Blow-out height above the bottom	200 - 500 mm
Weight	Approx. 2400 kg

Operation

The ergonomic operation takes place via a coloured operating panel. All functions such as fan control, height adjustment and maintenance/fault messages are displayed. An external signal (0 - 10 V or 4 - 20 mA) can control the blow-out speed and synchronise it with the speed of the dynamometer roll. The operating panel is equipped with an additional memory in order to store, e.g., specified blow-out heights for various vehicle types. Operation takes place at the side of the device, according to the current safety provisions. Optionally a second screen display is available at the front of the device.

Operation via operating panel

Dimensions



LTG Fahrtwind-Simulator type VQF 800/1250
for vehicle chassis dynamometers

Ambient temperature -30 °C to +50 °C, electrically movable

Specification

- Meets the global requirements of the WLTP cycle and RDE according to VO (EU) 2017/1151 (also WMTC) and SC03-test according to SFTP (Supplemental Federal Test Procedure)
- Compact build
- High performance density
- Large simulation range up to approx. 100/135/160 km/h
- Even air flow also vertically across the entire defined height
- All electronics with controls and frequency converter in separate cabinet outside the test cell
- Smooth adjustment of the speed by frequency converter via analogue input 0 - 10 V
- Smoothly electrically height-adjustable
- Independently electrically movable in the longitudinal direction
- Completely covered

Use

The type VQF 800/1250 has been designed for airflow simulation in climatic/emission tests under SC03 conditions with customer specific nozzle.

The entire front, including underbody, of the vehicle or unit must be targeted by the airstream for reliable measuring results and to protect the exhaust system from overheating.

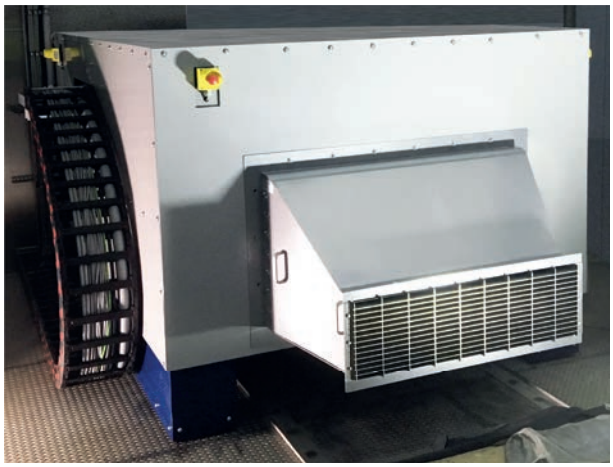
Additionally, the entire unit can be electrically height-adjusted and moved independently for optimal adjustment to many different vehicle types.

Design

The air stream simulator is delivered completely assembled. It consists of a type VQN 800/1250 cross-flow fan with belt drive and a motor with frequency converter, as well as an operating panel for control and inspection of all functions.

The blow-out height is electrically adjustable.

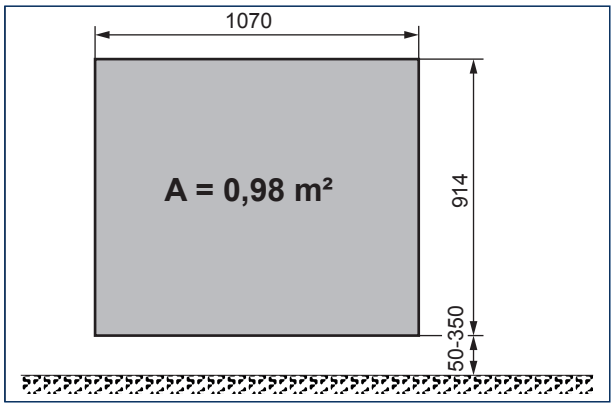
The entire device is electrically movable with powered rolls.

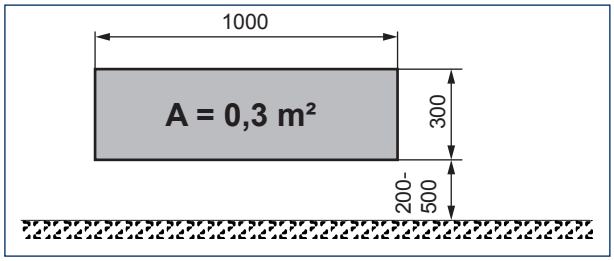


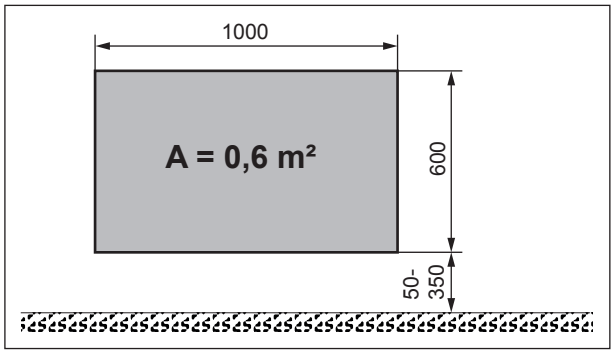
Fahrtwind-Simulator type VQF 800/1250, with height-adjustable, extensible blow-out nozzle

LTG Fahrtwind-Simulator type VQF 800/1250
for vehicle chassis dynamometers

Blow-out area







Technical Data

Basic unit

Ambient temperature (without moisture and condensate formation)	-30 to +50 °C
Motor output	110 kW
Weight	Approx. 2900 kg

Operation with customer specific SC03-nozzle

Average outlet speed at nominal speed	100 km/h
Displaced volume flow at nominal speed	98 000 m^3/h
Blow-out cross section	914 x 1070 mm
Blow-out height above the bottom	50 - 350 mm

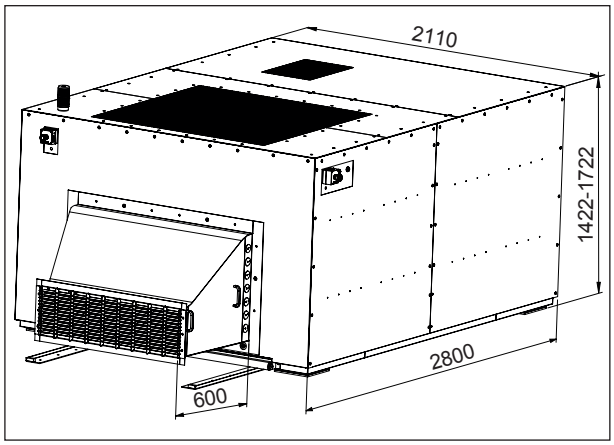
Operation with WLTP-nozzle

Average outlet speed at nominal speed	135 km/h
Displaced volume flow at nominal speed	40 800 m^3/h
Blow-out cross section	300 x 1000 mm
Blow-out height above the bottom	200 - 500 mm

Operation with RDE-nozzle

Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	98 000 m^3/h
Blow-out cross section	600 x 1000 mm
Blow-out height above the bottom	50 - 350 mm

Dimensions



LTG Fahrtwind-Simulator type VQF 800/1400

for environment simulation, complete in stainless steel

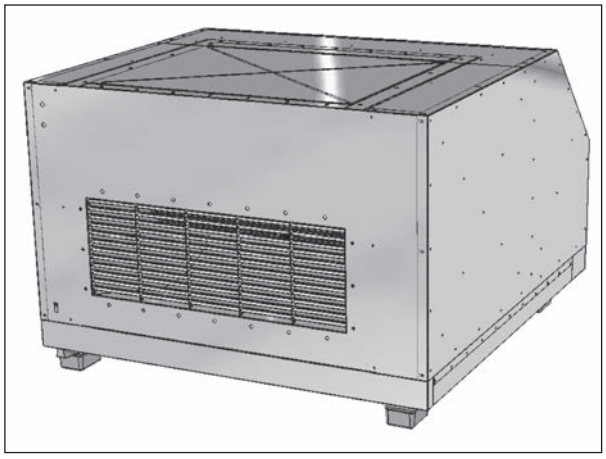
Ambient temperature -25 °C to +40 °C, height adjustment 455 to 655 mm

Use

Type VQF 800/1400 was developed for airstream simulation with salt spray.

With its stainless steel build, the system is optimal for performance and exhaust measurements on vehicle chassis dynamometers on which corrosion tests are performed.

The entire front of the vehicle must be subject to an even flow in order to receive reliable measuring results and to protect the engine and exhaust system from overheating.



Fahrtwind-Simulator type VQF 800/1400

Design

The air stream simulator is delivered completely assembled.

The Fahrtwind-Simulator is made of stainless steel; corrosion-sensitive parts are separately enclosed in stainless steel housings.

It consists of a type VQN 800/1400 cross-flow fan with belt drive and motor.

The blow-out height is electrically adjustable.

The Fahrtwind-Simulator is designed so that attachments on the intake side (e.g. heat exchanger) can be installed directly on the unit.

LTG Fahrtwind-Simulator type VQF 800/1400
for environment simulation, complete in stainless steel

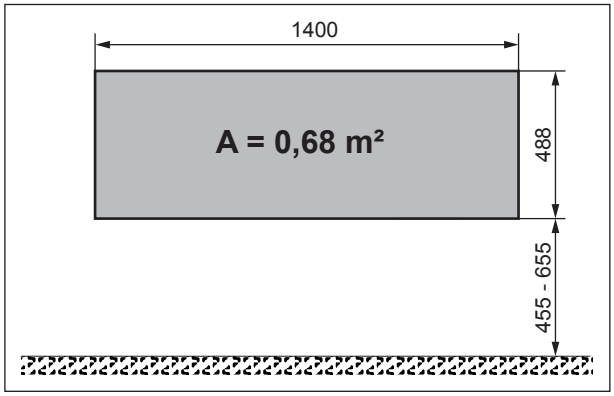
Specification

- Corrosion-resistant housing of stainless steel
- Compact build
- High performance density
- Large simulation range up to 90 km/h
- Even air flow across the entire blow-out surface
- All elements integrated in one housing
- Smooth adjustment of the speed by frequency converter via analogue input 0 - 10 V.
- Smoothly electrically height-adjustable by 200 mm

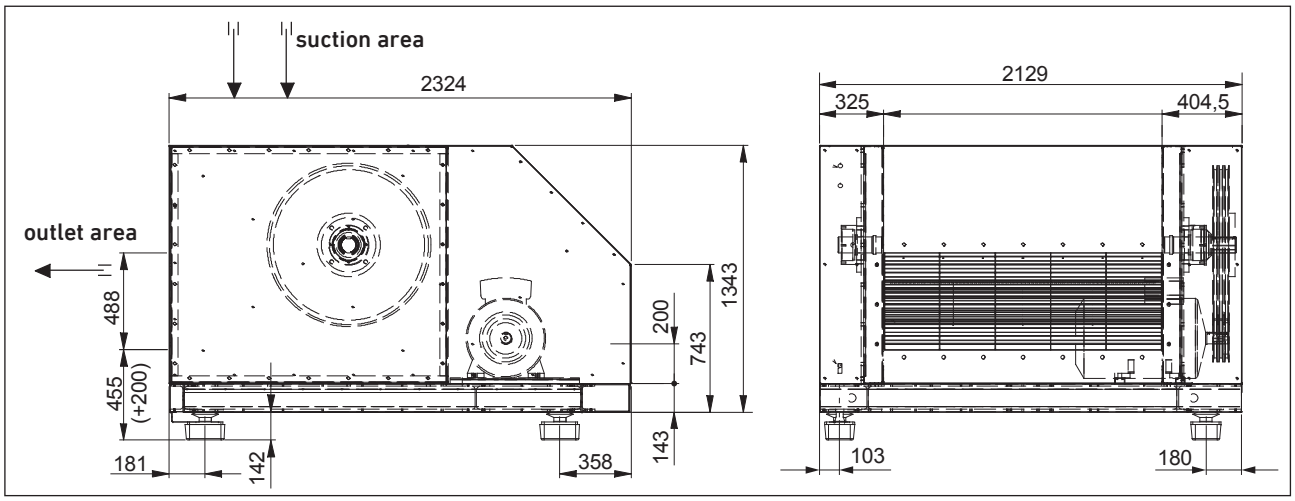
Technical Data

Average outlet speed at nominal speed	90 km/h
Displaced volume flow at nominal speed	62 500 m^3/h
Ambient temperature (without moisture and condensate formation)	-25 to +40 °C
Motor output	30 kW
Blow-out cross section	488 x 1400 mm
Blow-out height above the bottom	455 - 655 mm
Weight	Approx. 2250 kg

Blow-out area



Dimensions



LTG Fahrtwind-Simulator type VQF 1000/1600
for vehicle chassis dynamometers

Ambient temperature -40 °C to +50 °C, movable nozzle

Use

Type VQF 1000/1600 was developed for vehicle chassis dynamometers on which exhaust measurements at speeds up to 140 km/h are performed with small trucks.

For accuracy of the measuring results, it is essential that the relevant components, such as catalytic converter and oil tray, are targeted by an even flow.

Transport into the dynamometer and positioning takes place by forklift or on rails. For this, the Fahrtwind-Simulator has a removable undercarriage and a lifting device.

Fahrtwind-Simulator type VQF 1000/1600, blow-out side

Fahrtwind-Simulator type VQF 1000/1600, blow-out side

Design

The Fahrtwind-Simulator is delivered completely installed – except for the blow-out nozzle, the undercarriage parts and lifting device.

It comprises a type VQN 1000/1600 cross-flow fan with belt drive, motor and housing on a welded basic frame, and a terminal box ready for connection with all electrical connections.

Fahrtwind-Simulator type VQF 1000/1600, blow-out side

LTG Fahrtwind-Simulator type VQF 1000/1600
for vehicle chassis dynamometers

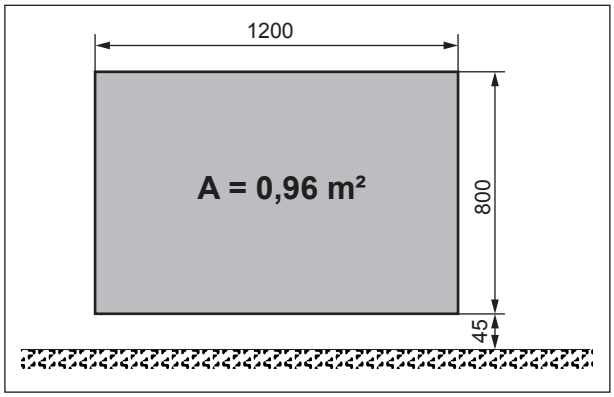
Specification

- Blow-out speed up to 140 km/h
- Use in climate chambers of -40 to +50 °C (not thawing)
- Design ready to be plugged in
- Control outside of the dynamometer
- Blow-out nozzle length-adjustable
- Undercarriage and lifting device for transport
- Inductive speed sensor optional

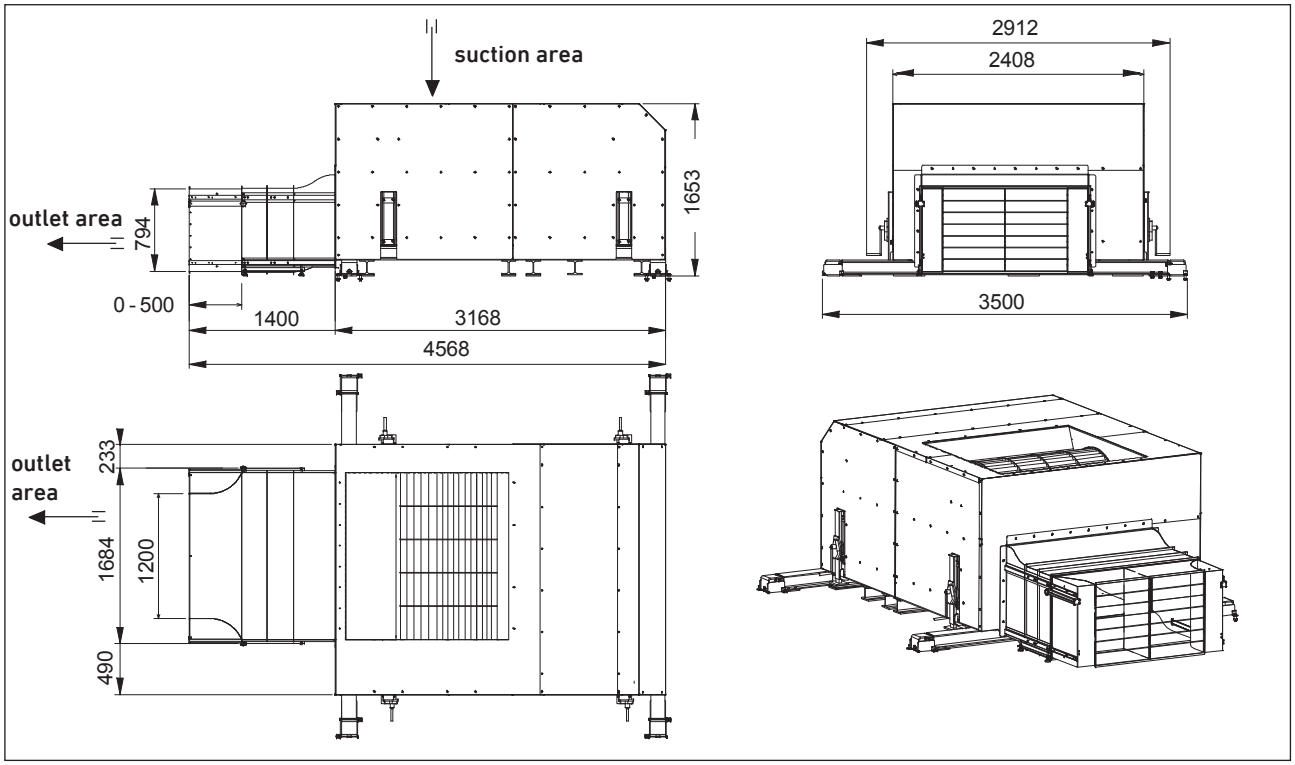
Technical Data

Average outlet speed at nominal speed	140 km/h
Displaced volume flow at nominal speed	135 000 m^3/h
Ambient temperature (without moisture and condensate formation)	-40 to +50 °C
Motor output	160 kW
Blow-out cross section	800 x 1200 mm
Blow-out height above the bottom	45 mm
Weight	Approx. 4000 kg

Blow-out area



Dimensions



LTG Fahrtwind-Simulator type VQF 1000/2000
for vehicle chassis dynamometers

Ambient temperature -35 °C to +55 °C, height adjustment 45 to 495 mm, movable nozzle

Use

Type VQF 1000/2000 covers a particularly broad requirements range. It has been developed for application in vehicle chassis dynamometers with extreme climate conditions. Therefore, the VQF 1000/2000 can be operated in temperatures between -35 and +55 °C.

The integrated electronic height adjustment (incl. storage) with a stroke of up to 450 mm permits tests with nearly any vehicle type. The blow-out nozzle, which can be extended smoothly by 1200 mm, in combination with the large blow-out area, contributes to this as well.

The attachment nozzle, which can be installed optionally, permits simulation of airstream speeds of up to 200 km/h (without attachment nozzle up to 140 km/h).

Transport into the dynamometer and positioning there takes place by forklift and on rails. The VQF 1000/2000 has a transport substructure for this that can be removed after commissioning of the lifting cylinders.

Design

The air stream simulator is delivered completely assembled.

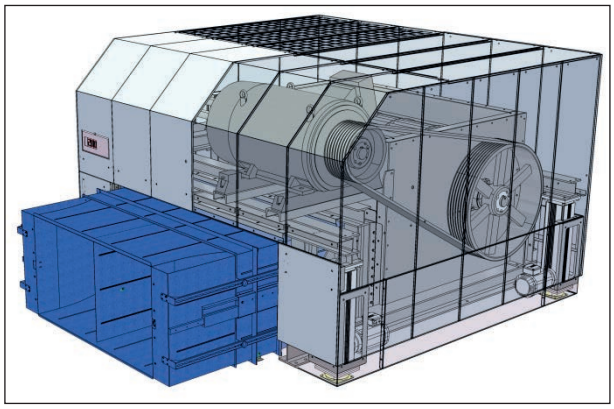
It consists of a type VQN 1000/2000 cross-flow fan that is powered by a motor via a belt drive. All components are installed on a welded base frame and are enclosed by a housing on all sides.

The blow-out height is electrically adjustable.

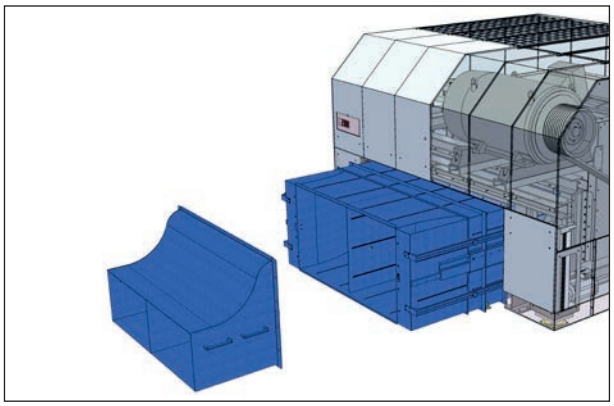
There is a separate terminal box for connection of the control and motor cable each.

The current blow-out speed of the Fahrtwind-Simulator may be read from the front display panel at any time.

There are 3 emergency off buttons located around the device to ensure safe operation.



Fahrtwind-Simulator type VQF 1000/2000, blow-out side with smoothly extensible blow-out nozzle



Fahrtwind-Simulator type VQF 1000/2000, optimal attachment nozzle for increasing the blow-out speed

Fahrtwind-Simulator type VQF 1000/2000

Fahrtwind-Simulator type VQF 1000/2000

LTG Fahrtwind-Simulator type VQF 1000/2000
for vehicle chassis dynamometers

Specification

- Meets the global requirements of the WLTP cycle according to VO (EU) 2017/1151
- Contact sensor for automatic recognition of the attachment nozzle
- Use in climate chambers of -35 to +55 °C (not thawing)
- Control outside of the dynamometer
- Blow-out nozzle mechanically adjustable by 1200 mm
- Smoothly electrically height-adjustable by 450 mm
- Speed sensor
- Temperature sensor
- Display at the front

Design

The air stream simulator is delivered completely assembled and ready to be plugged in.

It comprises a cross-flow fan of type VQN 1000/2000 with belt drive, motor, frequency converter and mobile housing with latchable rolls.

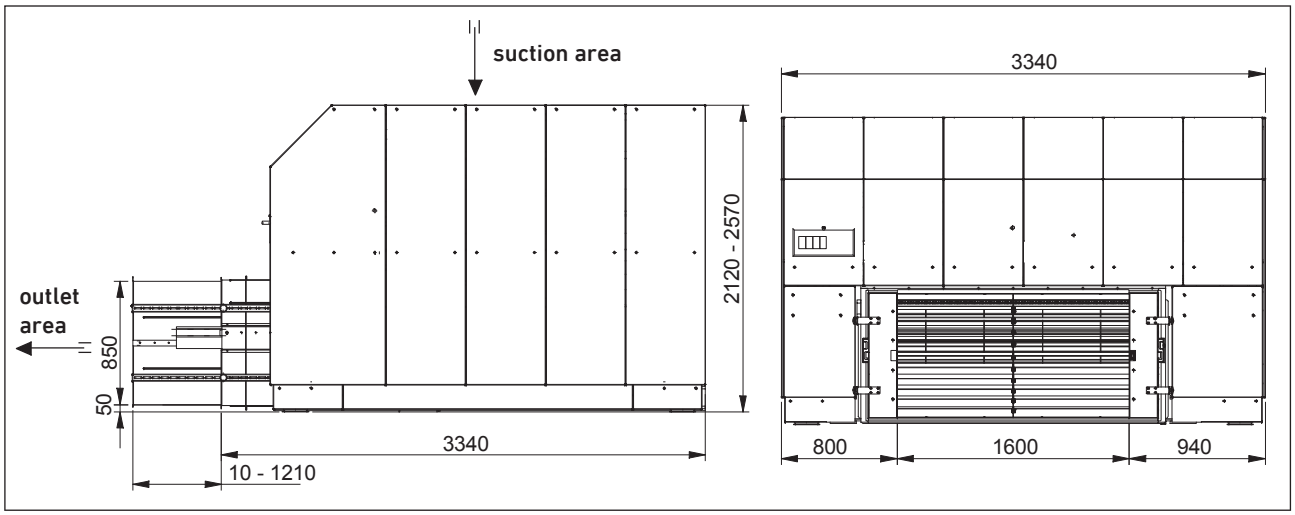
The blow-out height is electrically adjustable.

Operation

The ergonomic operation takes place via a coloured operating panel. All functions such as fan control, height adjustment and maintenance/fault messages are displayed. An external signal (0 - 10 V or 4 - 20 mA) can control the blow-out speed and synchronise it with the speed of the dynamometer roll. The operating panel is equipped with an additional memory in order to store, e.g., specified blow-out heights for various vehicle types. Operation takes place at the side of the device, according to the current safety provisions. Optionally a second screen display is available at the front of the device.

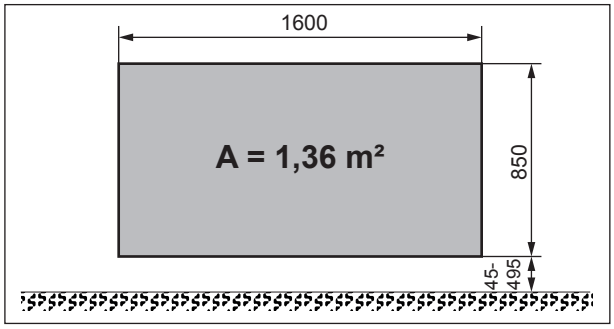
Operation via operating panel

Dimensions



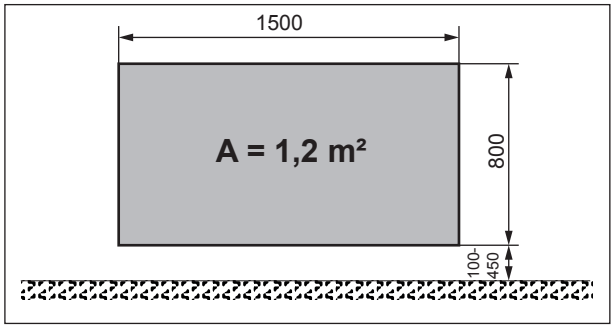
LTG Fahrtwind-Simulator type VQF 1000/2000
for vehicle chassis dynamometers

Blow-out area

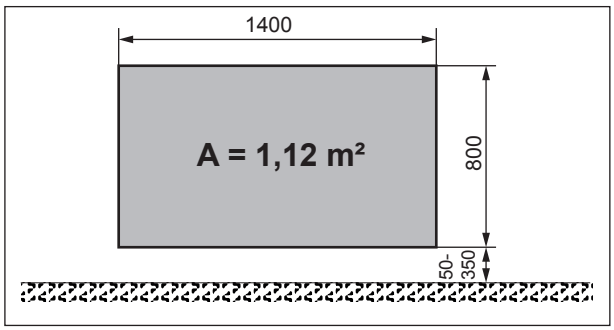


Technical Data

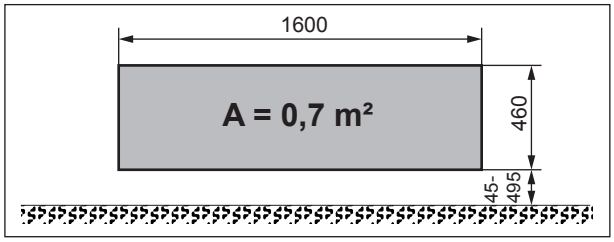
Average outlet speed at nominal speed	140 km/h/
Displaced volume flow at nominal speed	199 000 m³/h
Ambient temperature (without moisture and condensate formation)	-35 to +55 °C
Motor output	250 kW
Blow-out cross section	850 x 1600 mm
Blow-out height above the bottom	45 - 495 mm
Weight	Approx. 5500 kg



Average outlet speed at nominal speed	150 km/h
Displaced volume flow at nominal speed	180 000 m³/h
Ambient temperature (without moisture and condensate formation)	-35 to +50 °C
Motor output	200 kW
Blow-out cross section	800 x 1500 mm
Blow-out height above the bottom	100 - 450 mm
Weight	Approx. 5000 kg



Average outlet speed at nominal speed	160 km/h
Displaced volume flow at nominal speed	179 000 m³/h
Ambient temperature (without moisture and condensate formation)	+10 to +35 °C
Motor output	200 kW
Blow-out cross section	800 x 1400 mm
Blow-out height above the bottom	50 - 350 mm
Weight	Approx. 5800 kg



Average outlet speed at nominal speed	200 km/h with nozzle
Displaced volume flow at nominal speed	199 000 m³/h
Ambient temperature (without moisture and condensate formation)	-35 to +55 °C
Motor output	250 kW
Blow-out cross section	460 x 1600 with nozzle
Blow-out height above the bottom	45 - 495 mm
Weight	Approx. 5500 kg

Accessories

High-performance anemometer VQ_VA/40/D 85

Use

High-precision measurement of the air speed is needed for speed-dependent wind simulation.

Such measurements can be performed with a certified and calibrated impeller wheel anemometer. The large impeller wheel gives the anemometer available from LTG an optimal integration surface for improved evaluation of the measured data.

Technical Data

Possible measuring range	0.3 - 40 m/s
Temperature range	-10 to +80 °C
Head size	Ø 85 x 80 mm
Total length	225 mm
Output signal	0 - 2 V
Measuring accuracy	± 1.5 % v. M.

Incl. digital display instrument MiniAir2

- Automatic sensor and area recognition
- Floor and temperature measurements
- Moisture and speed
- Medium, minimum and maximum values at the push of a button
- Freely selectable measuring time (2 s - 2 h)
- Measuring-time storage for repetition measurements
- Logger output 0 - 1 V and output for Mini2Logger
- Battery and mains operation

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