CERTIFICADO ◆ 인증서 ◆ CERTIFICATO ◆ 認証書 ◆ CERTIFICATE ◆ 认证证书 ◆ ZERTIFIKAT

This is to certify that

Rosenberg Ventilatoren GmbH

74653 Künzelsau

following the successful evaluation of the

selection software

„RoVent 10.x.x.x“

and

„Blackbox 10.4.x.x“

the software has been verified as suitable for the selection and rating of the following impellers of the series

„LRHF-A…“ size 710 to 1000
„LRHF-B…“ size 250 to 710
„LRHF-I…“ size 355 to 630

and fans of the series

„GKHR…“ / „GKHM…“ / „GKHS…“ / „GKHB…“ size 250 to 710
„GKHD…“ size 355 to 560

in accordance with the RLT Guideline Certification, 2017-11 edition and **subject to Annexes 1 to .4**

The right is also granted to mark these products with the TÜV SÜD certification mark shown below.

This certificate is valid through 2029-12-31.

Certificate registration no.: 12/14/102 (Revision 05)

Certification Body for Products
Refrigeration and Air-Conditioning
Munich, 2026-10-08

PIN: d3ws

This certificate is valid only in conjunction with the following annex, consisting of 4 pages.

TÜV SÜD Industrie Service GmbH, Westendstraße 199, D-80686 München
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List of certified types of the “LRHF…” impeller series and their calculation accuracy by size

Size	LRHF-A…	LRHF-B…	LRHF-I…
	Calculation accuracy B 1		Calculation accuracy B 0
	Impeller without motor	Impeller without motor	Impeller without motor
250	-	✓	-
280	-	✓	-
315	-	✓	-
355	-	✓	✓
400	-	✓	✓
450	-	✓	✓
500	-	✓	✓
560	-	✓	✓
630	-	✓	✓
710	✓	✓	-
800	✓	-	-
900	✓	-	-
1000	✓	-	-

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List of certified types of the "GKH…" fan series and their calculation accuracy by size

Size	Version [1]	GKHR… / GKHM… GKHS… / GKHB… (CIB/CEB/CIG/CEG/CIE/CII/CEI)		GKHD… (CII)	
		Calculation accuracy B 0			
		EC motor size	Nominal power [kW]	EC motor size	Nominal power [kW]
250	CIB	GD 84-40	0,5 - 1,2	-	-
280	CIB, CIE	GD 84-40	0,5 - 1,2	-	-
		GD 84-55	0,5 - 1,2	-	-
		GD 112-50	1,1 - 2,1	-	-
315	CIB, CIE	GD 84-55	0,5 - 1,1	-	-
		GD 112-50	1,1 - 2,5	-	-
		GD 150-55	3,7	-	-
355	CIB, CIE, CIG, CII	GD 112-50	1,2 - 2,4	GD 112-75	2,4
		GD 112-75	2,5	GD 150-55	4,3
		GD 150-55	4,4	-	-
400	CIB, CIE, CIG, CII	GD 112-50	1,15 - 1,55	GD 112-75	2,18
		GD 112-75	2,5	GD 150-55	4,32
		GD 150-55	4,5	-	-
450	CIB, CEB, CIE, CIG, CEG, CII, CEI	GD 112-50	1,15	-	-
		GD 112-75	2,2	GD 112-75	1,8
		GD 150-55	4,3	GD 150-55	4,1
		GD 150-85	4,5 - 6,7	GD 150-85	6,4
		GD 150-120	6,3	-	-
500	CIB, CEB, CIE, CIG, CEG, CII, CEI	GD 112-75	1,1 - 1,55	-	-
		GD 150-55	3,6	GD 150-55	3,8
		GD 150-85	4,5	GD 150-85	4,4
		GD 150-120	7,0	GD 150-120	7,2
560	CIB, CEB, CIE, CIG, CEG, CII, CEI	GD 150-55	4,3	GD 150-55	2,8
		GD 150-85	4,5 - 5,4	GD 150-85	4,2
		GD 150-120	7,0	GD 150-120	6,2
630	CIB, CEB, CIG, CEG, CII, CEI	GD 150-85	3,55	-	-
		GD 150-120	4,4 - 5,1	-	-
		GD 220-100	6,6	-	-
710	CIB, CEB	GD 220-100	6,6	-	-
		GD 270-120	6,8	-	-

Legend:

[1] Type code for versions CIB, CEB, CIG, CEG, CIE, CII and CEI:
(Note: An underscore denotes a variable position within the type code)

[2] CI_ Internal electronics; CE_: External power electronics
__B: Aluminium impeller with diffuser; __G: Coated steel impeller; __E: Plastic impeller;
__I: Aluminium impeller with profiled impeller blades

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Note regarding Annexes 1 and 2:
The specified calculation accuracy applies only within the manufacturer's recommended operating range of 20% to 97% of the maximum volume flow rate of the respective impeller or fan. Outside the recommended operating range, the calculation accuracy may be lower.

The specified calculation accuracy has been verified exclusively for the impellers shown in Annex 1 and the fans (impeller-motor combinations) shown in Annex 2 and applies only to these versions.

Performance data verified for certification

LRHF… / GKH…			
Terminology in accordance with DIN EN ISO 5801:2018-04	**Symbol**	**Terminology used in „RoVent“**	**Symbol**
Volume flow rate of the fan	q_v	**Airflow of the fan**	q_v
Fan static pressure	p_{fs}	**Static fan pressure**	p_{fs}
Rotational frequency of the impeller	n	**Impeller speed**	n
Mechanical power supplied to the fan shaft	P_a	**Fan shaft power1** [1)]	P_a
Drive control electrical input power	P_{ed}	**Drive control electric input power** [2)]	P_{ed}
Fan shaft efficiency	η_a	-	-
-	-	**Static efficiency for impeller** [1)]	$\eta_{na,fs}$
Overall efficiency for a fan with variable speed drive	η_{ed}	-	-
-	-	**Static efficiency for a fan with variable speed drive** [2)]	$\eta_{ed,fs}$

Legend:
[1)] Certified value for impellers of the LRHF… series
[2)] Certified value for fans of the GKH… series

Limit deviations for determining the calculation accuracy classes

Operating value	Limit deviation and class deviation		
	B 0	**B 1**	**B 2**
Volume flow	± 1 %	± 2,5 %	± 5 %
Pressure rise	± 1 %	± 2,5 %	± 5 %
Drive power	+ 2 %	+ 3 %	+ 8 %
Efficiency	- 1 %	- 2 %	- 5 %

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With reference to the RLT GUIDELINE Certification, 2017-11 edition, the correction values listed below shall be incorporated into the RLT selection program for the impellers and fans shown in Annexes 1 and 2.

Correction values for installation losses
for impellers of the LRHF… series and fans of the GKH… series:

As part of the certification of the selection software, the installation losses applied were reviewed for compliance with the requirements of the RLT GUIDELINE Certification, 2017-11 edition.

When the correction values stored in the selection software are used, **no** additional correction values for installation losses need to be considered in the RLT selection program.

If the correction values for installation losses from the selection software are not used, the installation losses specified in the RLT GUIDELINE Certification, 2017-11 edition, shall be applied.

Correction factor for the control device (f_R)
for impellers of the LRHF… series and fans of the GKH… series:

The performance measurements carried out on fans of the GKH… series as part of the certification of the selection software include the efficiency losses of the control device. Accordingly, for fans of the GKH… series, a correction factor for the control device of $\mathbf{f_R = 1{,}00}$ may be applied**.**

For impellers of the LRHF… series, a correction factor for the control device of $\mathbf{f_R = 0{,}97}$ shall be applied.

Correction factor for the rated motor efficiency (f_M)
for impellers of the LRHF… series and fans of the GKH… series:

The performance measurements carried out on fans of the GKH… series as part of the certification of the selection software were performed on complete impeller-motor assemblies. Accordingly, for fans of the GKH… series, a correction factor for the rated motor efficiency of $\mathbf{f_M = 1{,}00}$ may be applied.

For impellers of the LRHF… series, a correction factor for the rated motor efficiency of $\mathbf{f_M = 0{,}98}$ shall be applied.

Correction factor for motor part-load operation (f_{TL})
for impellers of the LRHF… series and fans of the GKH… series:

The performance measurements carried out on fans of the GKH… series as part of the certification of the selection software were performed at rated load and at part load. Accordingly, for fans of the GKH… series, a correction factor for part-load operation of $\mathbf{f_{TL} = 1{,}00}$ may be applied.

For impellers of the LRHF… series, the correction factors for motor part-load operation specified in the RLT GUIDELINE Certification, 2017-11 edition, and shown below shall be applied.

Part-load efficiency of induction machines:
The efficiency in part load area has to be calculated with the following correction factor:
In the complete range with $f_{TL} = -0{,}00004 \times (LR)^2 + 0{,}008 \times (LR) + 0{,}6$

Part-load efficiency of synchronous machines:
The efficiency in part load area has to be calculated with the following correction factors:
In the load range < 50%: $f_{TL} = 0{,}056 \times \ln(LR) + 0{,}78$
In the load range ≥ 50%: $f_{TL} = 1{,}00$

where:
(LR) load range [%]

Correction factor for the accuracy class (f_G)
for fans of the GKH… series:

Based on the delivery class specified by the manufacturer, a correction factor for the accuracy class of $\mathbf{f_G = 1{,}00}$ may be applied when using fans of the GKH… series.