

High-performance centrifugal fans

Measuring device for determining air volume

The differential pressure compares the static pressure in front of the inlet ring with the static pressure in the inlet ring of the narrowest point. The differential pressure between the static pressures is related to the air volume via the energy conservation rate as follows:

$$q_V = k \cdot \sqrt{\Delta p_w}$$

where k takes into account the specific ring characteristics.

If the fan is operating at a temperature other than 20°C, the following equation can be used to determine the volumetric flow:

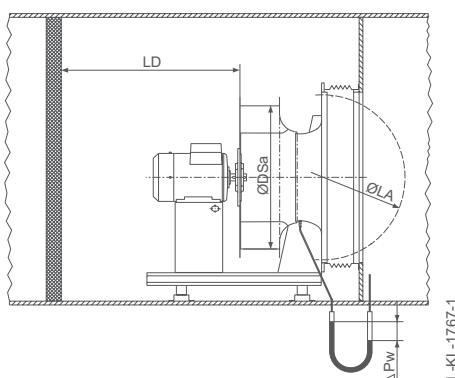
$$q_V = \sqrt{\frac{\rho_{20}}{\rho_{\text{Betr}}}} \cdot k_{20} \cdot \sqrt{\Delta p_w}$$

ρ_{op} = air density at operating temperature

Nozzle coefficients

Type	k-factor*
RH22C	47
RH25C	60
RH28C	75
RH31C	95
RH35C	121
RH40C	154
RH45C	197
RH50C	252
RH56C	308
RH63C	381
RH71C	490
RH80C	620
RH90C	789
RH10C	999
RH11C	1233

* $\rho = 1,20 \text{ kg/m}^3$



Example:

Example: If an active pressure of 700 Pa is measured for the frame size ER63C, the air flow rate can be calculated

$$q_V = k \cdot \sqrt{\Delta p_w} = 381 \cdot \sqrt{700} = 10080 \text{ m}^3/\text{h}$$

The corresponding active pressure / air flow rate curves can be downloaded from our website under the product information section in the download area.

High-performance centrifugal impeller RH..Cpro / RH..C

Technical description



Description RH..Cpro - ZAmid Technology

- Energy optimised for operation without spiral housing through special three-dimensional blade geometry made of specifically ZAmid technology
- 7 rear-curved blades
- Impeller with backward curved, diffusers for high efficiency and favourable acoustic behaviour
- With embossed rotary direction arrow
- Best impeller efficiency, resulting in conditional reduction of the absorbed power
- Rating plate with specification of the hub size, permissible max speed and balance quality
- With hub half-wedge balancing according to DIN ISO 8821, balance quality G2.5/6.3 according to ISO G 2.5/6.3 according to ISO 1940-1
- Balancing weights made of steel / corrosion resistant material
- Put the impeller through a performance test before installing. A „balance test“ in the installed state is required; possible rebalancing.
- The impellers are designed for continuous duty S1
- Fitting position horizontal and vertical

ZAmid technology

- Reduced weight through ZAmid technology
- Colour RAL 5002
- Reduced noise behaviour
- Same mechanical properties as steel
- From one cast, without welds
- Suitable for high circumferential speed
- Impeller corrosion-free
- Can be used from -20 °C to +80 °C
- Suitable for use in cleanrooms
- 100% recyclable



Description RH..C- steel

- Energy optimised for operation without spiral housing through special blade design with rotating vaneless diffuser for high efficiency and favourable noise behaviour
- 7 rear-curved blades
- Welded sheet-steel blade design
- Surface protection through powder coating in or liquid painted - RAL 5002
- Enhanced corrosion protection on request
- Rating plate with specification of the hub size, perm. max speed and balance quality
- With glued rotary direction arrow
- Standard design to 80 °C
- With hub half-wedge balancing according to DIN ISO 8821, balance quality G 2.5/6.3 according to ISO 1940-1
- Balance weights steel / corrosion resistant material
- Put the impeller through a performance test after installation. A „balance test“ in the installed state is required; possible rebalancing required.
- The impellers are designed for continuous duty S1
- Fitting position horizontal and vertical

High-performance centrifugal impeller RH..Cpro / RH..C

Technical description

Series RH..Cpro

Type	Number of pole	Start-up time [s]
ER/RH25C.CR	2	04
ER/RH28C.CR	2	06
ER/RH31C.CR	2	07
ER/RH35C.CR	2 4	07 04
ER/RH40C.CR	2 4	06 05
ER/RH45C.CR	2 4	05 08
ER/RH50C.CR	4	12
ER/RH56C.CR	4 6	13 08
ER/RH63C.CR	4 6	15 16

Series RH..C

Type	Number of pole	Start-up time [s]
ER/RH22C.1R	2	03
ER/RH25C.1R	2	04
ER/RH28C.1R	2	06
ER/RH31C.1R	2	07
ER/RH35C.1R	2 4	07 02
ER/RH40C.1R	2 4	06 05
ER/RH45C.1R	2 4	05 08
ER/RH50C.1R	4	12
ER/RH56C.1R	4 6	13 08
ER/RH63C.1R	4 6	15 16
ER/RH71C.1R	4 6	13 18
ER/RH80C.1R	4 6	13 21
ER/RH90C.1R	4 6 8	11 19 25
ER/RH10C.1R	6 8	18 27
ER/RH11C.4R	6 8	21 24
ER/RH11C.1R	6 8	21 24

Forces and stress during operation

The rotating impeller is stressed through centrifugal and compressive forces in addition to the normal residual imbalance. Residual imbalance denotes the initial imbalance and its amplification during installation (seating related imbalance) and the conditions that change during the course of operation (deformation due to the setting of material through influences of temperature/ stress).

The residual imbalance increases during operation due to sedimentary deposition as well as through the wear and tear of the impeller. Due to the changing residual imbalance during operation, a systematic verification and, if applicable, a rebalancing of the wheel is required (see assembly instructions L-BAL-018).

Additional impeller stress occurs (Wöhler diagram) through start-up / stop procedures, as well as through control operations (acceleration / deceleration phases). Superimposed stress caused by system vibrations and impacts as well as the dynamic oscillations from the system that affect the fan impeller also lead to an increase in impeller stress. „Superimposed characteristic frequencies” from other system parts (e.g., pipelines, frame structure, etc.) and rotational vibration caused by the drive (frequency inverter, operation) are additional sources of stress. Likewise, additional stress can appear due to temperature effects, fluids, and corrosion / wear (during operation and during standstill).

All of the above-mentioned additional forces are principally of a transient and dynamic nature and cannot be exactly recorded or calculated. A significant indication of the presence of additional stress is an increase in the frequency of vibration (see assembly instructions L-BAL-018). It is important to ensure that the additional stress is kept as low as possible by responding appropriately.

For the starting times for the impellers please see the tables to the left.

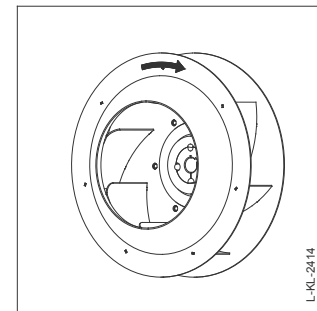
Stresses due to start / stop procedures connected with dynamic control in impellers generally lead to fatigue fractures in the shroud and the blade's trailing edge (the crack expands from the weld seam obliquely toward the middle of the blade). If such a use is planned, this is to be stated during the enquiry.

High-performance centrifugal impeller RH..Cpro / RH..C

Technical description

Direction of rotation

Clockwise rotation when looking at the inlet of the impeller. In the opposite direction, i.e. impellers with forward curved blades, there is the danger that the motor will overload. It is therefore absolutely necessary to check the direction of rotation before putting the fan into operation.



Series RH..Cpro

Type	Max. speed min ⁻¹	Clamping bush hub	Moment of inertia with clamping bush hub kgm ²	Impeller with clamping bush hub	Fixed hub	Moment of inertia with fixed hub kgm ²	Impeller with fixed hub
RH25C.CR	5350	SM12-1	0.018	3	NA02	0.015	2
RH28C.CR	4775	SM12-2	0.030	4	NA04	0.023	2
RH31C.CR	4245	SM12-2	0.044	4	NA04	0.038	3
RH35C.CR	3765	SM12-2	0.074	5	NA04	0.068	4
RH40C.CR	3340	SM12-2	0.124	6	NA04	0.118	5
RH40C.CR	3340	SM20	0.140	8			
RH45C.CR	2970	SM20	0.213	9			
RH50C.CR	2675	SM20	0.352	11			
RH56C.CR	2310	SM20	0.610	14			
RH63C.CR	2060	SM25	1.084	21			

Series RH..C

Type	Max. speed min ⁻¹	Clamping bush hub	Moment of inertia with clamping bush hub kgm ²	Impeller with clamping bush hub	Fixed hub	Moment of inertia with fixed hub kgm ²	Impeller with fixed hub
RH22C.1R	5940	SM12-1	0.018	3	NA02	0.015	2
RH25C.1R	5350	SM12-1	0.026	3	NA02	0.024	3
RH28C.1R	4775	SM12-2	0.042	4	NA04	0.036	3
RH31C.1R	4245	SM12-2	0.073	6	NA04	0.066	4
RH35C.1R	3765	SM12-2	0.113	7	NA04	0.107	5
RH40C.1R	3340	SM12-2	0.211	9	NA04	0.205	8
RH40C.1R	3340	SM20	0.224	11	NS06	0.223	11
RH45C.1R	2970	SM20	0.350	13	NS06	0.346	13
RH50C.1R	2675	SM20	0.667	18	NS06	0.664	18
RH56C.1R	2310	SM20	1.062	22	NS06	1.059	23
RH63C.1R	2060	SM25	2.157	36	NS07	2.158	38
RH71C.1R	1840	SM25	3.430	44	NS07	3.431	46
RH80C.1R	1620	SM25	6.996	68	NS07	7.000	69
RH90C.1R	1475	SM30	11.415	91	NS08	11.417	93
RH10C.1R	1280	SM30	22.039	133	NS08	22.043	138
RH11C.4R	1030	SM30	39.889	190	NS08	39.893	191
RH11C.1R	1190	SM30	50.483	240	NS08*	50.487	244
RH11C.1R	1320	SM35	50.547	245			

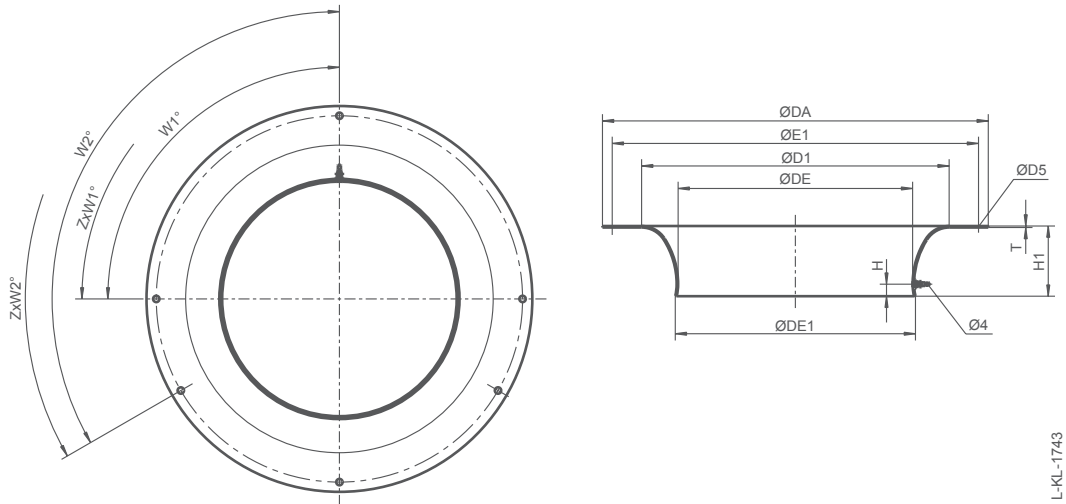
* max. shaft diameter 65

Inlet ring for RH..Cpro / RH..C

Technical description

Inlet ring

- Made of galvanised sheet steel
- With measuring device for volume flow measurement
- Fastening pitch diameter in conformity with DIN EN 12 220



Inlet ring																	
Type	Article no. a	b	DA	DE	DE1	D1	D5	E1	H	H1	T	W1° (1)	ZxW1° (1)	W2° (2)	ZxW2° (2)	Inlet guard (3)	Nozzle
RH22C	00401503	00401736	253	135	140	179	8.5	233	12	42	1.5	60°	6x60°	-	-	00409757	1
RH25C	00401504	00401737	277	153	158	202	8.5	257	12	47	1.5	60°	6x60°	-	-	00409758	1
RH28C	00401505	00401738	303	171	176	225	8.5	283	12	52	1.5	60°	6x60°	-	-	00409759	1
RH31C	00401506	00401739	343	193	198	253	8.5	317	12	59	1.5	90°	4x90°	120°	3x120°	00409760	1
RH35C	00401296	00401740	378	218	223	286	8.5	352	12	66	1.5	90°	4x90°	120°	3x120°	00409761	1
RH40C	00401297	00401741	418	246	252	322	8.5	392	13	74	2.0	90°	4x90°	120°	3x120°	00409762	2
RH45C	00401298	00401742	464	278	285	364	8.5	438	14	83	2.0	90°	4x90°	120°	3x120°	00409763	3
RH50C	00401299	00401743	514	312	320	410	8.5	488	16	94	2.0	90°	4x90°	120°	3x120°	00409764	3
RH56C	00401300	00401744	564	347	355	455	8.5	538	18	104	2.0	90°	4x90°	120°	3x120°	00409765	4
RH63C	00401301	00401745	634	389	397	510	10.5	600	20	117	2.0	60°	6x60°	90°	4x90°	00409766	5
RH71C	00401302	00401746	704	437	447	574	10.5	670	23	131	2.0	60°	6x60°	90°	4x90°	00409767	6
RH80C	00401303	00401747	784	493	504	646	10.5	750	25	148	2.5	60°	6x60°	90°	4x90°	00409768	9
RH90C	00401304	00401748	874	555	567	728	10.5	840	29	167	2.5	45°	8x45°	-	-	00409769	11
RH10C	00401305	00401749	974	625	637	819	10.5	940	32	187	2.5	45°	8x45°	-	-	00409770	14
RH11C	00401306	00401750	1075	694	707	910	10.5	1041	36	208	2.5	22.5°	16x22.5°	-	-	00409771	17

a) With measuring device, made of galvanised sheet steel

b) With measuring device, plastic coated

(1) Fixation inlet jet

(2) Mounting inlet guard

(3) Part no. inlet guard for RH..C, GR..C

➤ Measuring device for determining air volume

➤ Inlet guard for Ex-design

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High-performance centrifugal impeller RH..Cpro with clamping bush hub



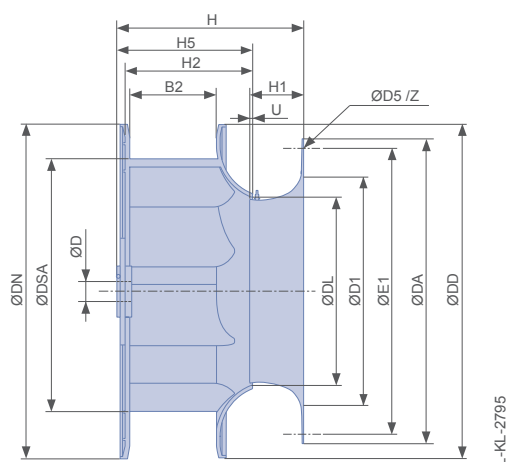
Description

Scope of delivery: Bolted hub each including clamping bush hub
Bore diameter: Specification corresponding to motor classification

Surface protection hub:

SM12 - SM20: Phosphate coating

SM25: Phosphate coated and painted RAL 7011



Impeller RH..Cpro with clamping bush hub																	
Type	Article no.	Dimensions															
		D	B2	DA	DD	DL	DN	DSA	D1	D5	E1	H	H1	H2	H5	U	Z
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
RH25C.CR/SM12-1	113908VAR	19-24	76	277	290	164	290	257	202	8.5	257	174	47	114	129	2.5	6x60°
RH28C.CR/SM12-2	113909VAR	19-28	85	303	322	182	322	286	225	8.5	283	191	52	126	142	3.0	6x60°
RH31C.CR/SM12-2	113910VAR	19-28	95	343	360	204	360	320	253	8.5	317	211	59	140	156	3.0	4x90°
RH35C.CR/SM12-2	113911VAR	19-28	106	378	406	230	406	360	286	8.5	352	234	66	156	172	3.5	4x90°
RH40C.CR/SM12-2	113912VAR	19-28	118	418	457	258	457	406	322	8.5	392	261	74	176	191	4.0	4x90°
RH40C.CR/SM20	113913VAR	38	118	418	457	258	457	406	322	8.5	392	263	74	176	193	4.0	4x90°
RH45C.CR/SM20	113914VAR	19-38	133	464	515	291	515	457	364	8.5	438	293	83	197	214	4.5	4x90°
RH50C.CR/SM20	113915VAR	24-42	150	514	579	328	579	514	410	8.5	488	327	94	221	239	5.0	4x90°
RH56C.CR/SM20	113916VAR	28-42	167	564	644	363	644	572	455	8.5	538	363	104	247	265	6.0	4x90°
RH63C.CR/SM25	113917VAR	28-42	187	634	721	407	721	640	510	10.5	600	410	117	275	300	6.5	6x60°

High-performance centrifugal impeller RH..Cpro

with fixed hub



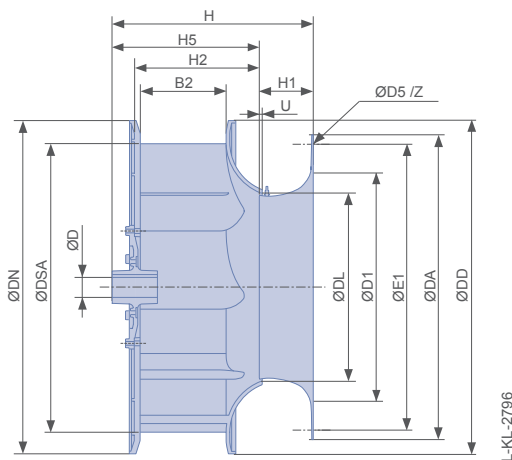
Description

Scope of delivery: Bolted hub with internal diameter

Bore diameter: Specification corresponding to motor classification

Surface protection hub:

NA02 - NA04 (aluminium): bare



Impeller RH..Cpro with fixed hub

Type	Article no.	Dimensions															
		D	B2	DA	DD	DL	DN	DSA	D1	D5	E1	H	H1	H2	H5	U	Z
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
RH25C.CR/NA02	113918VAR	19-24	76	277	290	164	290	257	202	8.5	257	189	47	114	144	2.5	6x60°
RH28C.CR/NA04	113919VAR	19-28	85	303	322	182	322	286	225	8.5	283	206	52	126	157	3.0	6x60°
RH31C.CR/NA04	113920VAR	19-28	95	343	360	204	360	320	253	8.5	317	226	59	140	171	3.0	4x90°
RH35C.CR/NA04	113921VAR	19-28	106	378	406	230	406	360	286	8.5	352	249	66	156	187	3.5	4x90°
RH40C.CR/NA04	113922VAR	19-28	118	418	457	258	457	406	322	8.5	392	276	74	176	206	4.0	4x90°

High-performance centrifugal impeller RH..C

with clamping bush hub



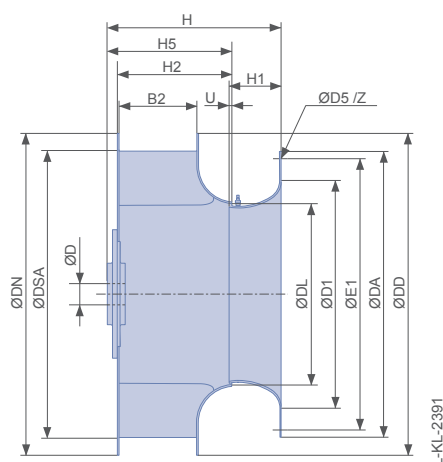
Description

Scope of delivery: Bolted hub each including clamping bush hub
Bore diameter: Specification corresponding to motor classification

Surface protection hub:

SM12 - SM20: Phosphate coating

SM25 - SM35: Phosphate coated and painted RAL 7011



Impeller RH..C with clamping bush hub																	
Type	Article no.	Dimensions															
		D	B2	DA	DD	DL	DN	DSA	D1	D5	E1	H	H1	H2	H5	U	Z
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
RH22C.1R/SM12-1	112261VAR	14-19	62	253	257	145	257	229	179	8.5	233	147	42	92	107	2.0	6x60°
RH25C.1R/SM12-1	112262VAR	19-24	70	277	290	163	290	258	202	8.5	257	163	47	103	119	2.5	6x60°
RH28C.1R/SM12-2	112263VAR	19-28	78	303	322	181	322	286	225	8.5	283	179	52	115	130	3.0	6x60°
RH31C.1R/SM12-2	112264VAR	19-28	87	343	360	203	360	320	253	8.5	317	199	59	128	144	3.0	4x90°
RH35C.1R/SM12-2	112265VAR	19-28	98	378	406	228	406	361	286	8.5	352	222	66	144	160	3.5	4x90°
RH40C.1R/SM12-2	112266VAR	19-28	111	418	457	257	457	406	322	8.5	392	248	74	163	178	4.0	4x90°
RH40C.1R/SM20	112275VAR	38	111	418	457	257	457	406	322	8.5	392	250	74	163	180	4.0	4x90°
RH45C.1R/SM20	112267VAR	19-38	125	464	515	290	515	458	364	8.5	438	279	83	183	200	4.5	4x90°
RH50C.1R/SM20	112268VAR	24-42	140	514	579	326	579	515	410	8.5	488	312	94	206	224	5.0	4x90°
RH56C.1R/SM20	112269VAR	28-42	156	564	644	363	644	572	455	8.5	538	344	104	229	246	6.0	4x90°
RH63C.1R/SM25	112270VAR	28-42	174	634	721	406	721	641	510	10.5	600	391	117	256	281	6.5	6x60°
RH71C.1R/SM25	112271VAR	28-48	196	704	811	457	811	721	573	10.5	670	437	131	288	313	7.0	6x60°
RH80C.1R/SM25	112272VAR	38-48	221	784	914	515	914	813	646	10.5	750	490	148	325	350	8.0	6x60°
RH90C.1R/SM30	112273VAR	38-55	249	874	1030	580	1030	916	728	10.5	840	552	167	366	394	9.0	8x45°
RH10C.1R/SM30	112274VAR	42-65	280	974	1159	653	1159	1030	819	10.5	940	617	187	412	440	10.0	8x45°
RH11C.4R/SM30	114157VAR	55-60	315	1075	1287	725	1287	1145	910	10.5	1041	688	208	463	491	11.0	16x22.5°
RH11C.1R/SM30	112469VAR	55-75	390	1075	1287	725	1287	1145	910	10.5	1041	765	208	540	568	11.0	16x22.5°
RH11C.1R/SM35	113583VAR	80	390	1075	1287	725	1287	1145	910	10.5	1041	769	208	540	572	11.0	16x22.5°

High-performance centrifugal impeller RH..C

with fixed hub



Description

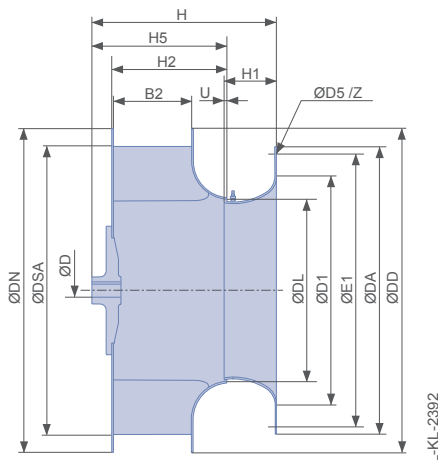
Scope of delivery: Bolted hub with internal diameter

Bore diameter: Specification corresponding to motor classification

Surface protection hub:

NA02 - NA04 (aluminium): bare

NS06 - NS08 (grey cast): oiled



Impeller RH..C with fixed hub

Type	Article no.	Dimensions															
		D	B2	DA	DD	DL	DN	DSA	D1	D5	E1	H	H1	H2	H5	U	Z
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
RH22C.1R/NA02	112276VAR	14	62	253	257	145	257	229	179	8.5	233	152	42	92	112	2.0	6x60°
RH22C.1R/NA02	112276VAR	19	62	253	257	145	257	229	179	8.5	233	162	42	92	122	2.0	6x60°
RH25C.1R/NA02	112277VAR	19-24	70	277	290	163	290	258	202	8.5	257	178	47	103	134	2.5	6x60°
RH28C.1R/NA04	112278VAR	19-28	78	303	322	181	322	286	225	8.5	283	194	52	115	145	3.0	6x60°
RH31C.1R/NA04	112279VAR	19-28	87	343	360	203	360	320	253	8.5	317	214	59	128	159	3.0	4x90°
RH35C.1R/NA04	112280VAR	19-28	98	378	406	228	406	361	286	8.5	352	237	66	144	175	3.5	4x90°
RH40C.1R/NA04	112281VAR	19-28	111	418	457	257	457	406	322	8.5	392	263	74	163	193	4.0	4x90°
RH40C.1R/NS06	112290VAR	38	111	418	457	257	457	406	322	8.5	392	268	74	163	198	4.0	4x90°
RH45C.1R/NS06	112282VAR	19	125	464	515	290	515	458	364	8.5	438	287	83	183	208	4.5	4x90°
RH45C.1R/NS06	112282VAR	24-38	125	464	515	290	515	458	364	8.5	438	297	83	183	218	4.5	4x90°
RH50C.1R/NS06	112283VAR	24-42	140	514	579	326	579	515	410	8.5	488	330	94	206	242	5.0	4x90°
RH56C.1R/NS06	112284VAR	28-42	156	564	644	363	644	572	455	8.5	538	362	104	229	264	6.0	4x90°
RH63C.1R/NS07	112285VAR	28-42	174	634	721	406	721	641	510	10.5	600	402	117	256	292	6.5	6x60°
RH71C.1R/NS07	112286VAR	28-48	196	704	811	457	811	721	573	10.5	670	448	131	288	324	7.0	6x60°
RH80C.1R/NS07	112287VAR	38-48	221	784	914	515	914	813	646	10.5	750	500	148	325	361	8.0	6x60°
RH90C.1R/NS08	112288VAR	38-55	249	874	1030	580	1030	916	728	10.5	840	559	167	366	401	9.0	8x45°
RH10C.1R/NS08	112289VAR	42-65	280	974	1159	653	1159	1030	819	10.5	940	624	187	412	447	10.0	8x45°
RH11C.4R/NS08	114158VAR	55-60	315	1075	1287	725	1287	1145	910	10.5	1041	705	208	463	508	11.0	16x22.5°
RH11C.1R/NS08	112470VAR	55-65	390	1075	1287	725	1287	1145	910	10.5	1041	782	208	540	585	11.0	16x22.5°