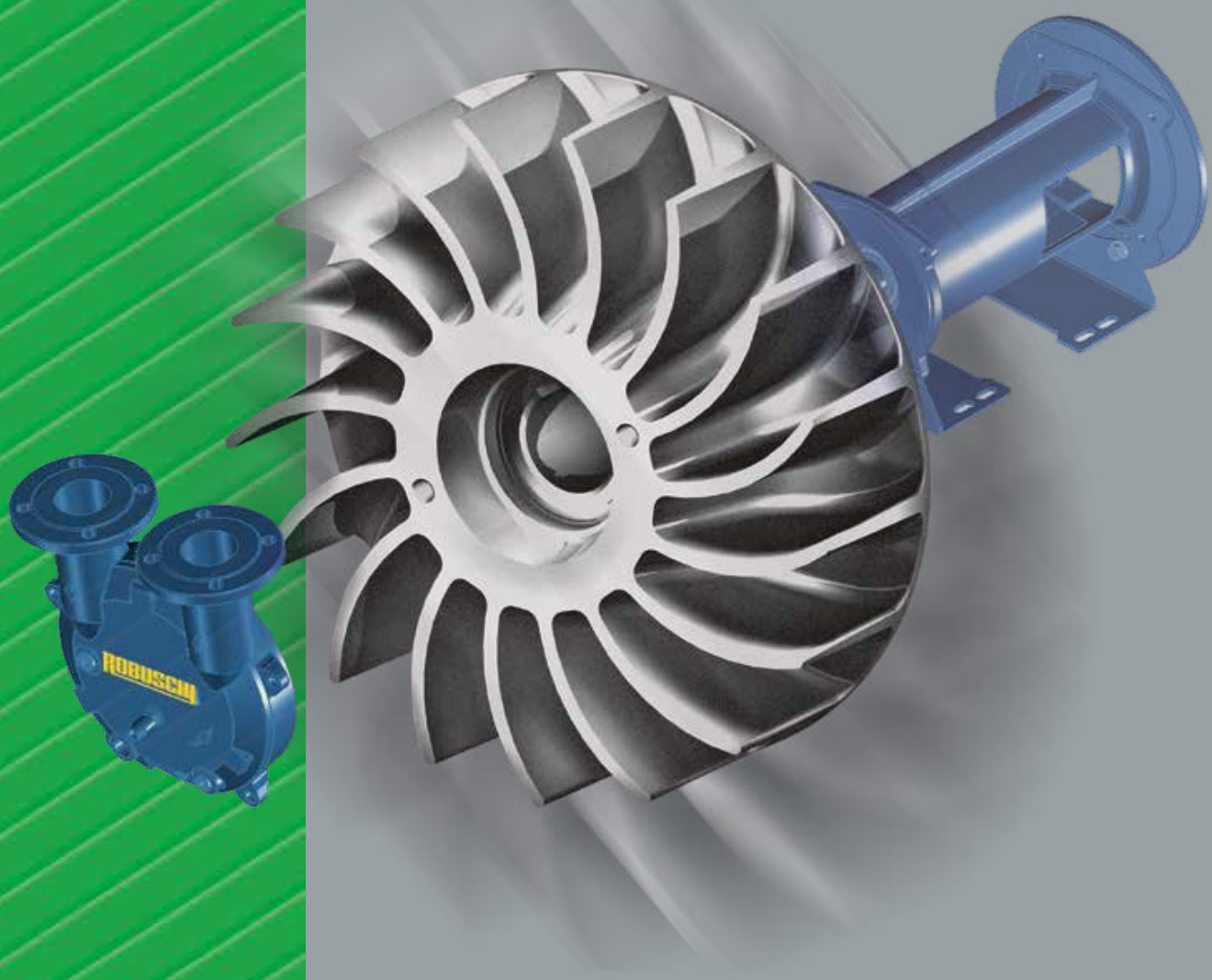
Liquid ring vacuum pumps



ROBUSCH®

by Gardner Denver

R V S

S E R I E S

RVS

Liquid ring vacuum pumps

The RVS series includes liquid ring pumps with innovative characteristics, which is able to suck in gas and vapours, without contamination from lubricants; also in the presence of dragged fluid and with nearly isothermal gas compression.
Thanks to its construction features, the liquid ring vacuum pumps are remarkable for low water consumption, low noise and vibrations, reliable service and minimum maintenance. The variety of construction materials allows a wide field of applications.
In addition to this, they can also be used as a compressor within the limits shown in the use and maintenance manual.

			RVS 3	RVS 7	RVS 14	RVS 16	RVS 17	RVS 21	RVS 23	RVS 25	RVS 30	RVS 40	RVS 60
Pump rotation speed	50Hz 60 Hz	rpm	2850 3420	1450 1750							970 1170		740 888
Motor power (1)	50Hz 60 Hz	kW	1,5 2,2	3 4	4 5,5	5,5 7,5	7,5 11	11 15	15 18,5	22 30	30 37	45 55	90 127
Min suction pressure		mbar	33										
Max discharge overpressure	/M /SG	mbar	100 –	100 200			– 200		200		300		
Max temperature of gas		°C	100										
Max temperature of service liquid		°C	70										
Max viscosity of service liquid		mm²/s	8						20				
Contents of liquid in the pump up to shaft level		l	0,25	1,1	1,5	2,3	3	4	6	8	15	24	95
Inertia moment of rotation parts		kg m²	0,004	0,05	0,06	0,11	0,15	0,23	0,33	0,51	2,16	3,33	8,5
Noise level at 80 mbar (2)		dB(A) ±3	72						74	76	78	79	82

(1) Bigger motor sizes can be installed under request (until size 21 only for the /SG pump).
(2) Discharge noise excluded.


RVS 3/M


RVS 21/SG


RVS 25/CT


RVS 40/CT


RVS 60/CT

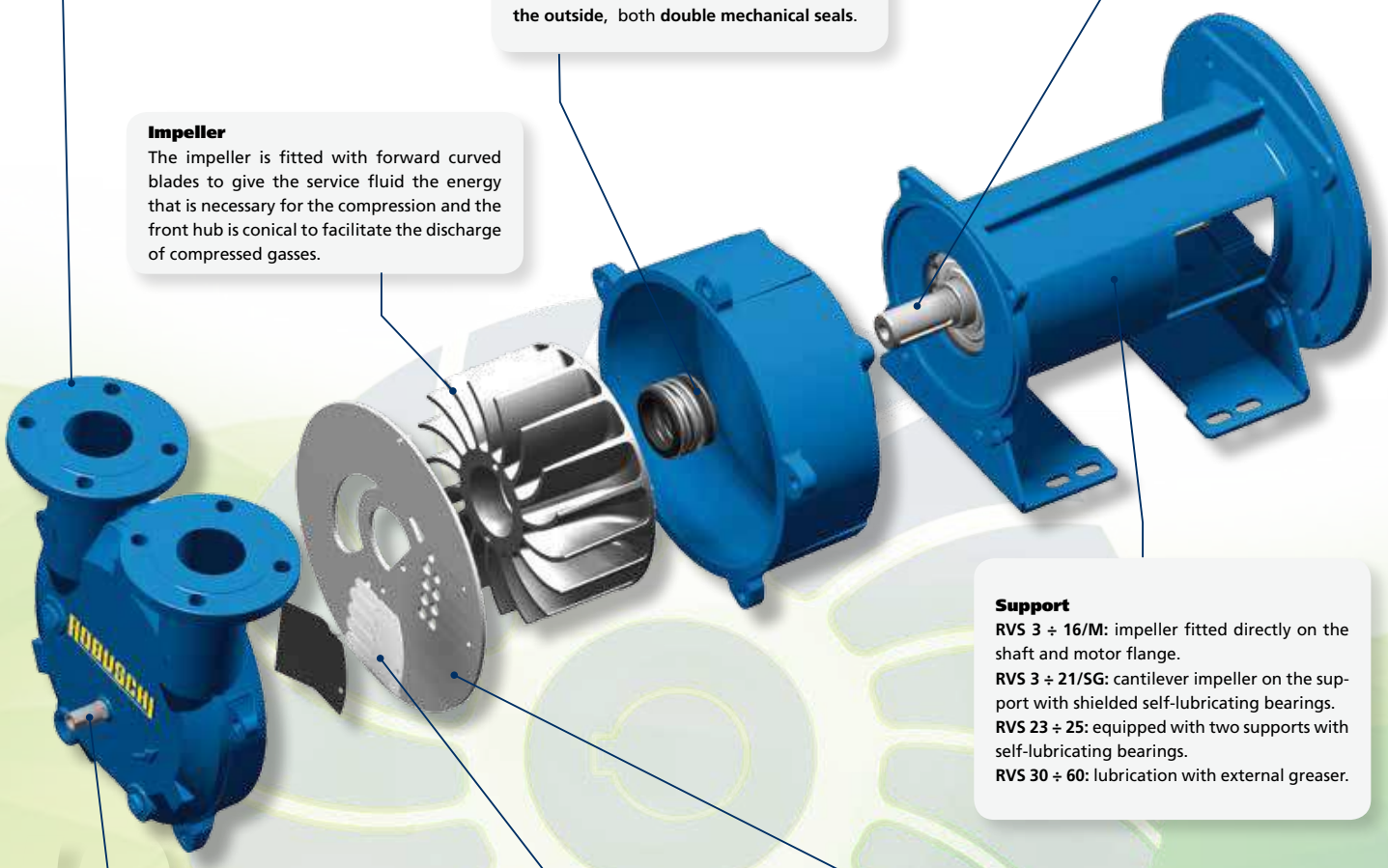
Liquid ring vacuum pumps

Casing
Reduced consumptions, thanks to the efficient layout of the internal intake and delivery gas baffles.

Shaft
The heavy-duty shaft is protected from the contact with the service fluid and conveyed gas, except for the RVS sizes 23 and 25, because the are made of stainless material (see the page Material execution)

Shaft seal
The **RVS 3-25** includes **single mechanical seals flushed from the service fluid**. The sizes **RVS 30-60** can be installed both packing **seals flushed from the service fluid or from the outside**, both **double mechanical seals**.

Impeller
The impeller is fitted with forward curved blades to give the service fluid the energy that is necessary for the compression and the front hub is conical to facilitate the discharge of compressed gasses.



Support
RVS 3 ÷ 16/M: impeller fitted directly on the shaft and motor flange.
RVS 3 ÷ 21/SG: cantilever impeller on the support with shielded self-lubricating bearings.
RVS 23 ÷ 25: equipped with two supports with self-lubricating bearings.
RVS 30 ÷ 60: lubrication with external greaser.

VGI
Anti-cavitation valve

Automatic valve
The automatic valve makes it possible to adopt the compression ratio of the pump at the installation conditions, with less energetic consumption.

Plate
A greater volumetric efficiency is possible thanks to the stainless steel laser-cut patented distribution plate and to the good layout of the intake and discharge lights.

CRVS - LRVS

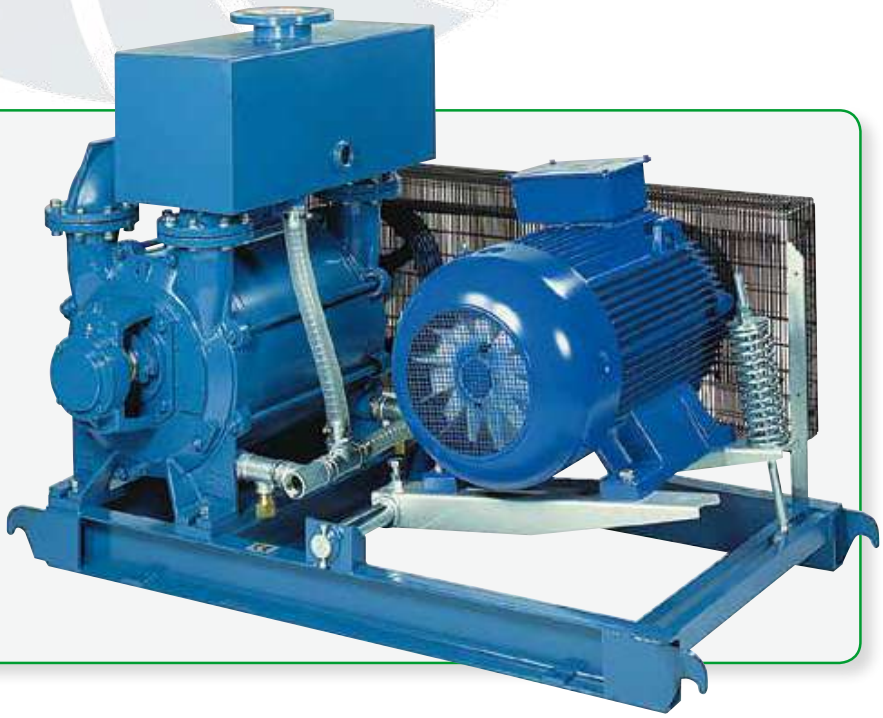
Electropump Units

CRVS

The vacuum compact systems **CRVS** are equipped with a pump that is already coupled with the electric motor with elastic direct coupling. This ensures a perfect alignment, optimal and long-lasting operation. The **CRVS** base was specifically designed to guarantee high stiffness and low vibrations.

LRVS

The vacuum compact systems **LRVS** feature belt and pulley drive, a motor oscillating suspension patented system, which makes it possible to reduce the load on the motor bearings and pump, by keeping constant over time the belts tension. This makes it possible to easily adapt the drive to various motors sizes without modifying the unit's dimensions. The V-Belt coupling makes it possible to select the vacuum pump at the optimal speed, ensuring thus, the correct capacity that is necessary to the system, without waste of energy, with capacities of up to 4200 m^3/h.



Thanks to the **recovery manifold** both the **CRVS** and **LRVS** units can be supplied with partial recirculation, achieving thus a substantial saving of service water (for further details, please see the corresponding page: Accessories).

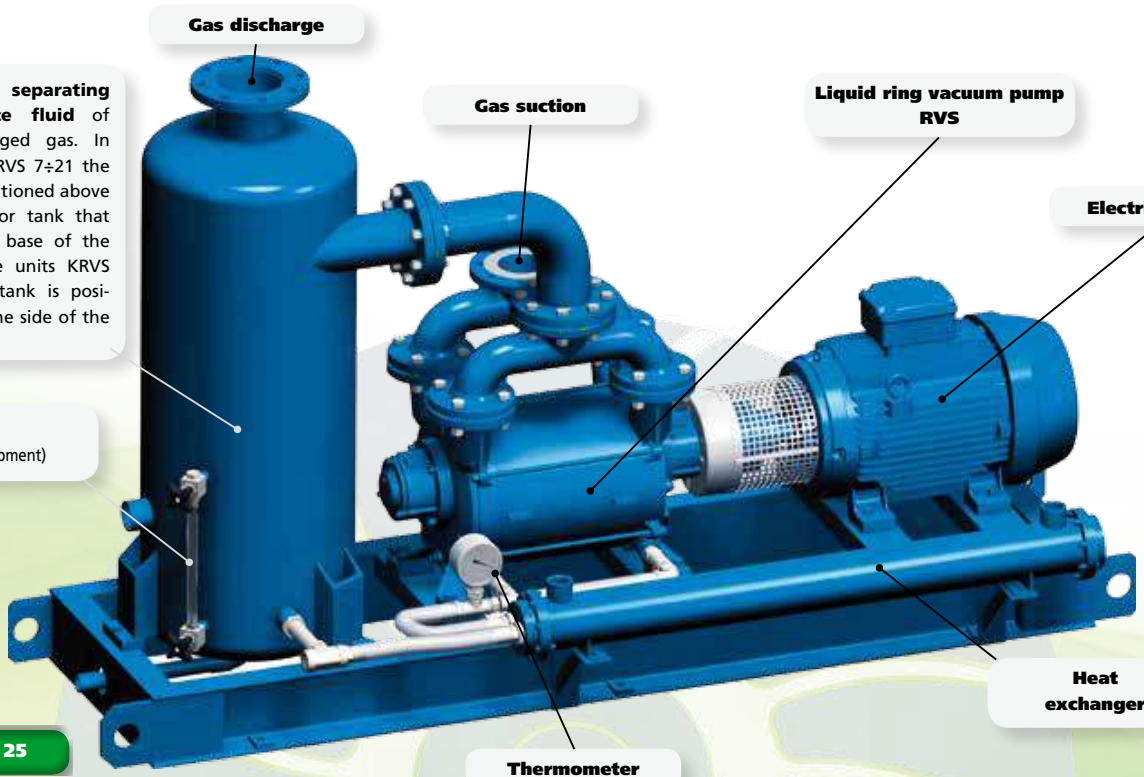
KRVS

Vacuum units

The **KRVS** are units developed for the vacuum generation in the most varied sectors, such as the chemical, petrol-chemical, pharmaceutical, textiles sectors…..and many more….
They consist of **liquid ring vacuum pumps** of the **RVS** series **with separation tank for the partial recirculation of the service fluid and corresponding connection pipes (/P); in the version with total recirculation (/T)** the unit is fitted with a **heat exchanger.**
The separator tank also silences the noise at the pump discharge.

The partial recirculation units (/P) are the Robuschi answer for the recovering of most part of the service liquid, which is used to supply the pump. However, it is necessary to provide a minimum supply of fluid in order to prevent overheating of the liquid ring, which would penalise the pump efficiency. Depending on the vacuum degree that you wish to achieve, it is possible to recover up to 70% (for details, please see corresponding table).

The vacuum units KRVS with total recirculation (/T) are especially recommended in case of polluting gasses and /or liquids, with consequent disposal issues. In these cases, it is indeed necessary to supply the pump in closed circuit and cool the fluid by means of the heat exchanger, which prevents the contact between the cooling fluid and the fluid itself. The service fluid temperature can be adjusted by acting on the capacity of the cooling fluid.



KRVS 25

Such characteristics ensure low noise and vibrations and extremely simplicity of installation, start-up, adjustment and maintenance.

KRVS 21

code description

VACUUM PUMP

RVS 16 / SG - 09

SIZE

3÷60

VERSION

M CLOSE COUPLED 3÷16
SG SUPPORT 7÷21
CT MANIFOLDS 23÷60
CR SEPARATOR 23÷60
C REINFORCED BEARINGS 23÷40

EXECUTION

02 09 24 06

ELECTROPUMP UNIT

L RVS 30 / CT - 06

SERIES

C COUPLING
L V-BELT SELF TENSIONING BELTS

PUMP SIZE

23÷60

PUMP VERSION

CT MANIFOLDS 23÷60
CR SEPARATOR 23÷60
C REINFORCED BEARINGS 23÷40

PUMP EXECUTION

09 24 06

VACUUM UNIT

KRVS 14 / SG / T - 06

SIZE

7÷60

PUMP VERSION

M CLOSE COUPLED 7 16
SG SUPPORT 7÷21
CT MANIFOLDS 23÷60
C REINFORCED BEARINGS 23÷40

UNIT VERSION

P PARTIAL RECIRCULATION
T TOTAL RECIRCULATION

PUMP EXECUTION

09 24 06

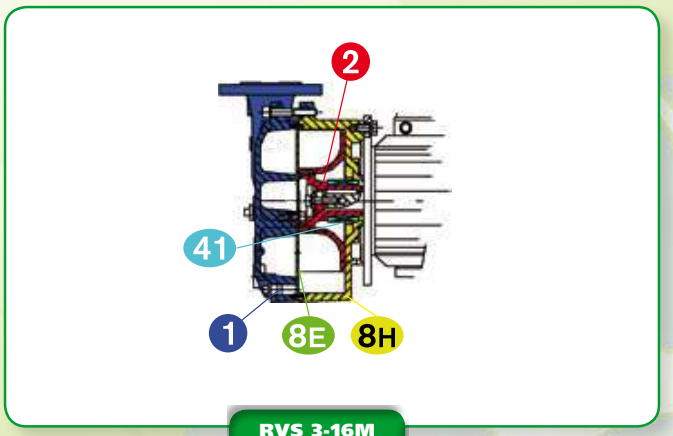
Available upon request, ***RVS ATEX:***

-RVS/M only ATEX 3

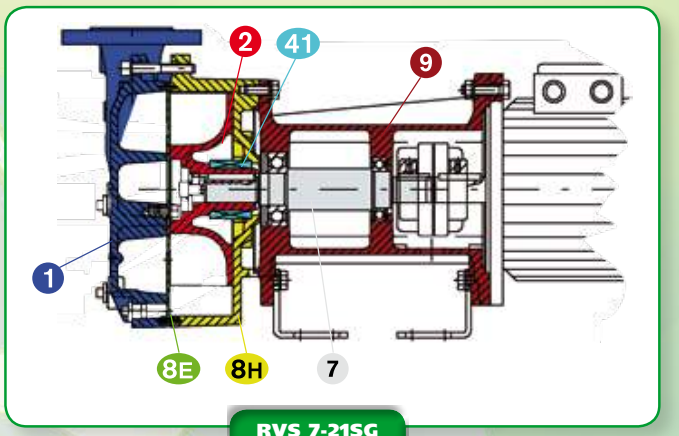
-All other RVS versions, both ATEX 3 and ATEX 2.

RVS

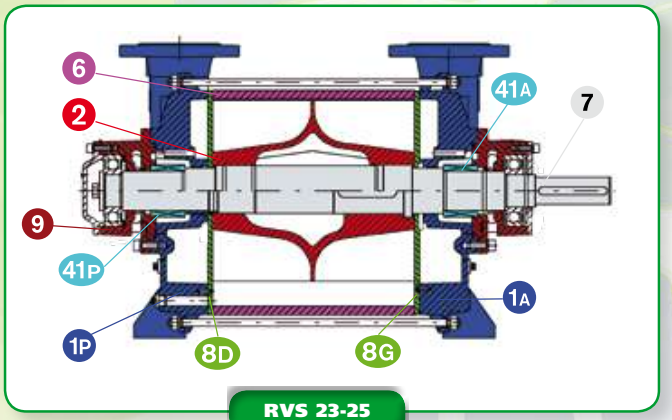
RVS - materials



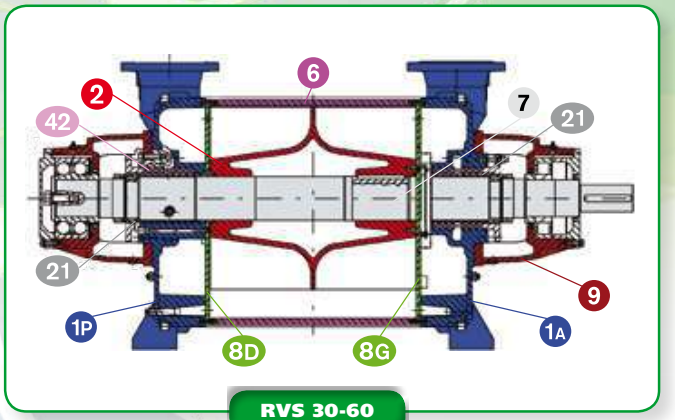
RVS 3-16M



RVS 7-21SG



RVS 23-25

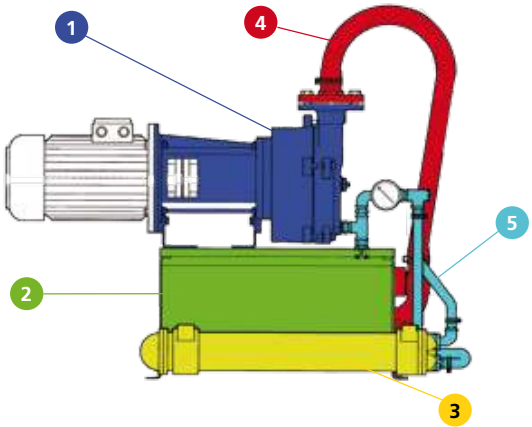


RVS 30-60

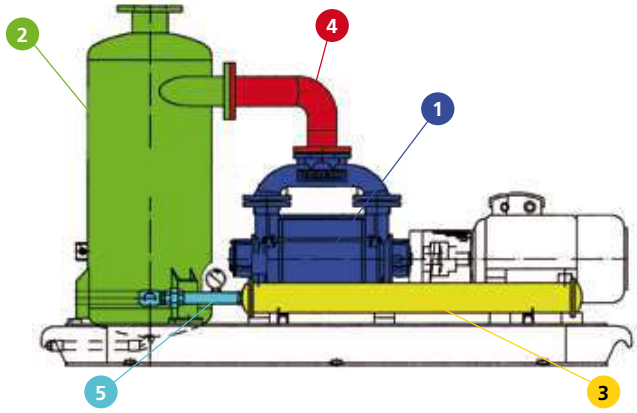
POS.	COMPONENT		NORMS	MATERIAL DESIGN			
				02(1)	09(2)	24(2)	06(2)
1 - 1A/P	Body	RVS 3-25	UNI-EN	GJL250 - UNI EN 1561			GX6CrNiMo2011 - UNI EN 10213-4
			ASTM	A48 No. 35 A			A351 CF8M
		RVS 30-60	UNI-EN	GJL250 - UNI EN 1561			GX6CrNiMo2011 - UNI EN 10213-4
			ASTM	A48 No. 30 A			A351 CF8M
2	Impeller		UNI-EN	BRONZE - G-CuSn5Zn5Pb5 UNI EN 1982	CAST IRON - GJS400-15 UNI EN 1563	STAINLESS STEEL - GX6CrNiMo2011 UNI EN 10213-4	
			ASTM	BRONZE	CAST IRON A536-84 GR 60-40-18	STAINLESS STEEL A351 CF8M	
6	Casing		UNI-EN	–	CARBON STEEL - Fe510 UNI EN 10297-1		STAINLESS STEEL - X5CrNiMo1712 UNI EN 10088-3
			ASTM	–	CARBON STEEL A 501		STAINLESS STEEL A276 316
7	Shaft	RVS 7÷21	UNI-EN	–	CARBON STEEL - C40 -- UNI EN 10083-1		
			ASTM	–	CARBON STEEL A576 GR 1040		
		RVS 23-25	UNI-EN	–	STAINLESS STEEL - X30Cr13 UNI EN 10088-3		STAINLESS STEEL - X5CrNiMo1712 UNI EN 10088-3
			ASTM	–	STAINLESS STEEL - A276 420		STAINLESS STEEL - A276 316
		RVS 30-40-60	UNI-EN	–	CARBON STEEL - C40 -- UNI EN 10083-1		
			ASTM	–	CARBON STEEL - A576 GR 1040		
8E/G/D	Port Plate		UNI-EN	X2CrNiMo1712 -- UNI EN 10088-3			
			ASTM	A276 316L			
8H	Plate with casing		UNI-EN	CAST IRON - GJL250 - UNI EN 1561			STAINLESS STEEL - GX6CrNiMo2011 UNI EN 10213-4
			ASTM	CAST IRON - A48 No. 35 A			STAINLESS STEEL
9	Support	RVS 7÷21 - 30÷60	UNI-EN	CAST IRON - GJL200 - UNI EN 1561			
			ASTM	CAST IRON - A48 No. 30A			
		RVS 23-25	UNI-EN	CAST IRON - GJL250 - UNI EN 1561			
			ASTM	CAST IRON - A48 No. 35A			
21	Shaft sleeve		UNI-EN	–	STAINLESS STEEL - X30Cr13 UNI EN 10088-3		STAINLESS STEEL - X5CrNiMo1712 UNI EN 10088-3
			ASTM	–	STAINLESS STEEL - A276 420		STAINLESS STEEL - A276 316
41-41A/P	Mechanical seal		UNI	CARBON-GRAPHITE / SIC / VITON / STAINLESS STEEL X6CrNiMoTi1713 / X6CrNiMoTi1713			
			EN	BQ1VGG - EN 12756			
42	Soft packing seal			–	ARAMIDIC FIBRE 40% PTFE		
—	Valve			PTFE			
—	O-rings			–	VITON (fluorinated rubber)		
—	Seals			ANAEROBIC SEALING			

(1) Only for size 3 - (2) Except for size 3

KRVS - materials



KRVS 7÷21



KRVS 23÷60

POS.	COMPONENT	MATERIAL DESIGN	
1	PUMP	09 - 24	06
2	SEPARATOR	Fe360 UNI EN 10028-1	X5CrNiMo1712 UNI EN 10088-3
3	EXCHANGER (KRVS/T only) Heads Blanket Plates Pipes	GJL250 UNI EN 1561 C40 UNI EN 10083-1 X5CrNiMo1712 UNI EN 10088-3 X5CrNiMo1712 UNI EN 10088-3	GX6CrNiMo2011 UNI EN 10213-4 X5CrNiMo1712 UNI EN 10088-3
	PIPES		
4	Gas - Water RVS 7 ÷ 21	PVC	
	Gas - Water RVS 23 ÷ 60	Fe360 UNI EN 10028-1	X5CrNiMo1712 UNI EN 10088-3
5	Water	PVC	

selection software

Robuschi has created a specific selection program to determine the **operating parameters** of the liquid ring vacuum pumps, depending on the **system conditions, such as the pressure and the inlet temperature, the capacity, the sucked gas humidity and the liquid ring's temperature**.
The selection program provides a detailed data sheet of the machine, fitted with the **selection of the electric motor and completed with the operating charts**.
The program is available through Robuschi sales network and on the internet site *www.robuschi.com* in the download area.