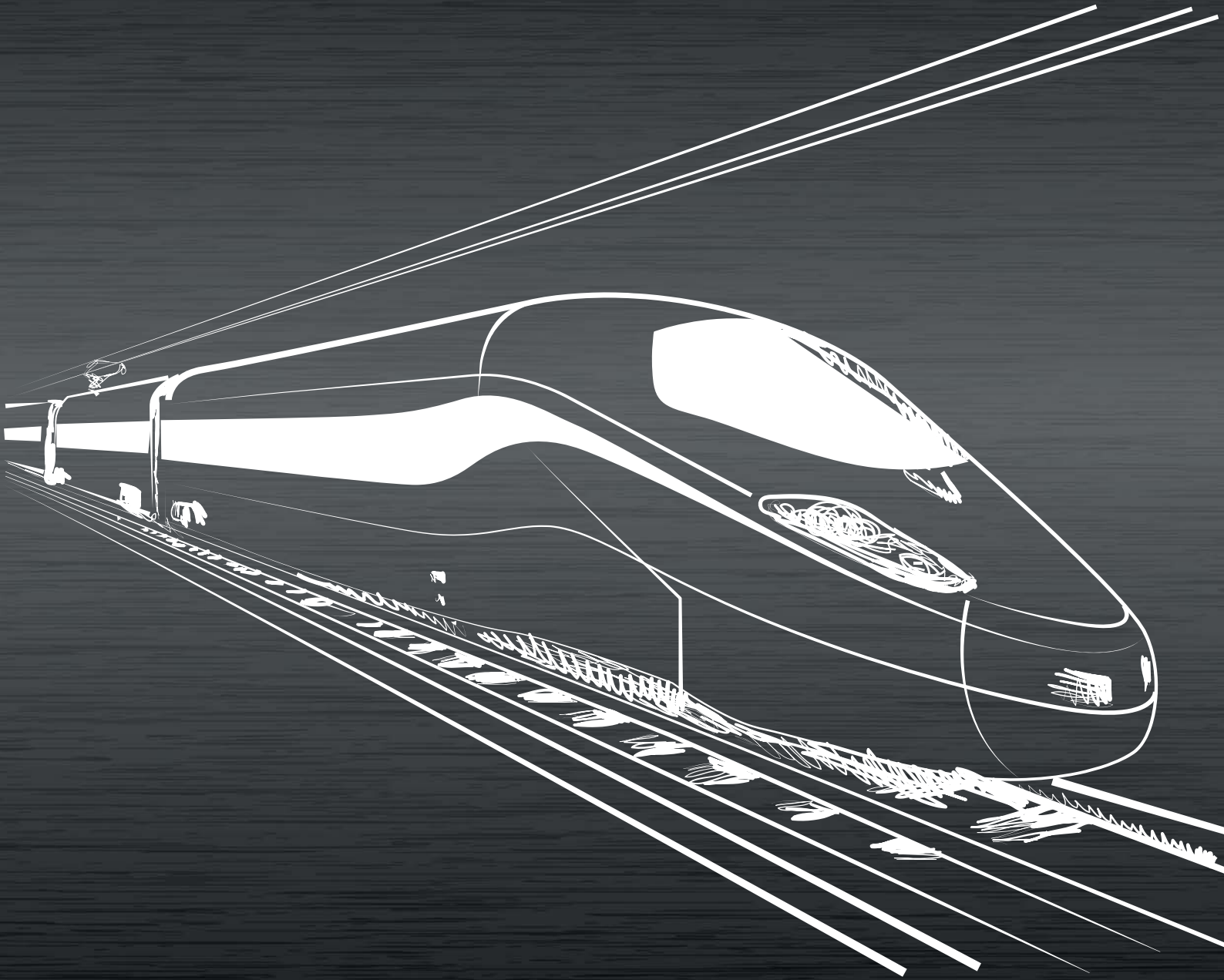


FANS FOR RAILWAY TECHNOLOGY



railway.rosenberg.fans

[®] **ECO FIT**
rosenberg **ETRI**
THE AIR MOVEMENT GROUP



Your powerful business partner ... in the matter of railway technology

Air is our element – moving it **intelligently and efficiently** is our passion. Since 1981 we have been developing and producing speed-controllable external rotor motors, fans and air handling units.

German Engineering skill is the basis of our development work and drives our innovation. As a worldwide company we are represented where our customers need us. With production sites and sales offices in more than 45 countries **we are present worldwide** – a strong and reliable partner always within reach of our customers.

Numerous manufactures and suppliers of the railway industry trust in our fans. Through permanent and logical development we achieve high quality improvements for our products. The continuous exchange of information between customers and factory engineers enables us to develop flexible and reliable system-solutions quickly.



Customer specific developments enable a smooth operation also at:

- Voltage peaks
- High shock stress
- Vibrations
- Varying weather conditions and thermal stresses

... and offer flexible solutions for:

- Optimal airflow
- Various operation voltages (at 50/60 Hz)
- Maximum efficiencies at variable speeds
- Minimum maintenance



Headquarters
Plant 2 in Künzelsau-Gaisbach (Germany)





Picture: © Liebherr

HVAC - Heating, Ventilation and Air Conditioning

HVAC units are necessary to guarantee proper air quality in both the driver's cabin and the passenger's compartment. Rosenberg fans help to provide the right air climate in trains and are used as condenser, evaporator, exhaust and supply fans.



Picture: © Voith Digital Solutions Austria GmbH & Co KG

Equipment (Rack) Cooling

Heat generated by various components like traction converters, auxiliary converters and battery chargers need to be cooled to ensure proper function of the train. Through removing the dissipated heat and simultaneously providing ambient air to the equipment it is possible to build more compact and powerful equipment. In order to cool power electronic stacks in an efficient and silent way, Rosenberg fans are perfectly suited.



Cabinet Cooling

Most of the functions which are not directly related to the driving process are controlled by electronics built in switch gear cabinets. To protect the electronics and the entire cabinet system from overheating, Rosenberg fans are used to cool down the cabinets.



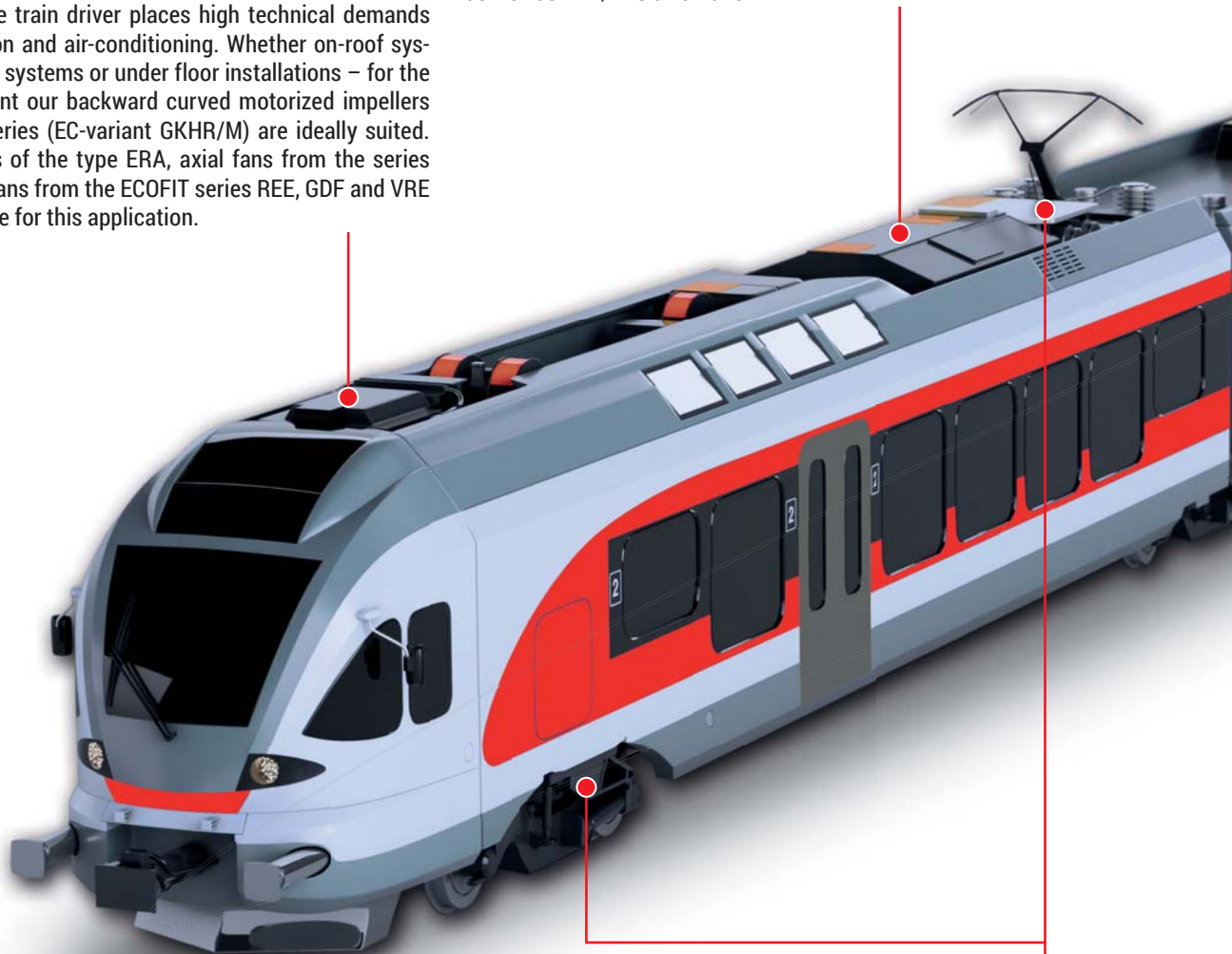
Air conditioning of the passenger cabin

Comfort for passengers is a top priority in railway technology. Fans of the Rosenberg group are the right choice for a pleasant climate in the cars. They reach the required operating point within integrated system solutions reliably at minimum space requirements. Such characteristics have for example our backward curved motorized impellers from the DKHR/M (EC-variant GKHR/M), centrifugal fans of the type DRA, centrifugal fans from the ECOFIT series GDF, as well as AKF/AKS axial fans.



Air conditioning of the driver's cab

The workplace of the train driver places high technical demands on heating, ventilation and air-conditioning. Whether on-roof systems, integrated roof systems or under floor installations – for the required air movement our backward curved motorized impellers from the DKHR/M series (EC-variant GKHR/M) are ideally suited. Also centrifugal fans of the type ERA, axial fans from the series AKF/AKS as well as fans from the ECOFIT series REE, GDF and VRE are eminently suitable for this application.



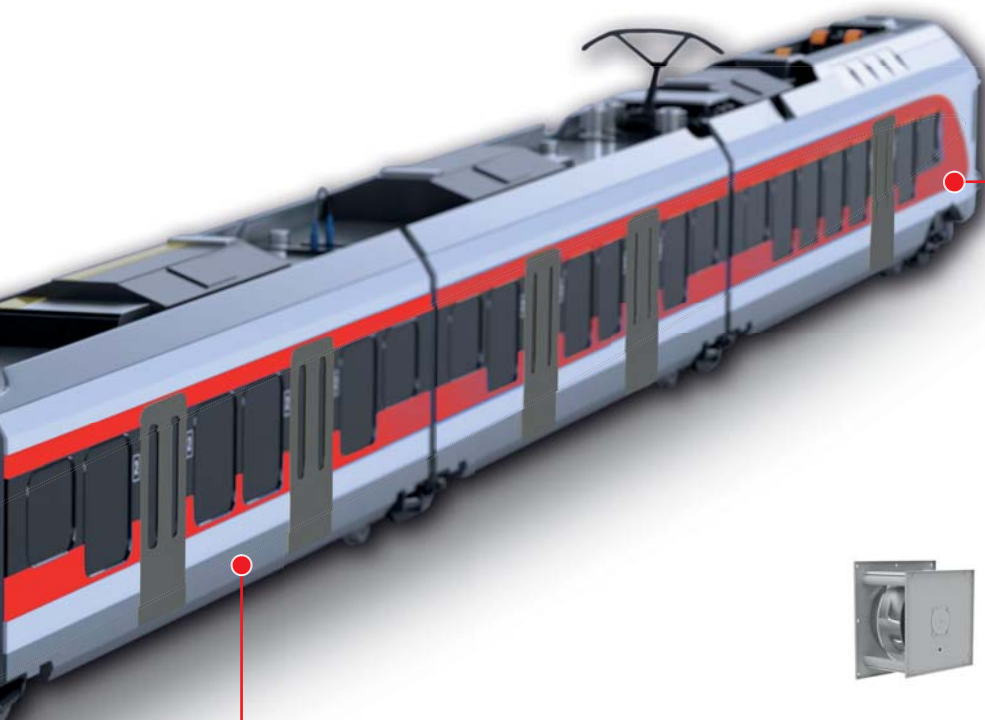
Cooling of components of the propulsion- and braking system

The traction system of a rail vehicle consists of different elements like tractions motors and traction inverters. To avoid harmful overheating the heat has to be dissipated. The same is true for components of the braking system of trains. Backward curved motorized impellers from the DKHR/M series (EC-variant GKHR/M), centrifugal fans of the type ERA/DRA, as well as centrifugal fans from the ECOFIT series GDF are best suitable for this field of application.

From lightrail to high-speed trains, when it comes to reliable fans for ventilation or cooling systems, the Rosenberg innovative products are represented worldwide in all areas of railway technology. For more than 30 years, our customers have relied on our industry-specific application solutions.

OUR RAILWAY PRODUCTS ARE CHARACTERISED BY THEIR:

- performance
- highest reliability
- low weight
- compact design
- long lifetime
- special corrosion protection
- plug-in solutions
- quiet operation



Switch gear cabinet ventilation / electronics cooling

The technical constructions of rail vehicles consist of many electronic components which are often housed in switch gear cabinets. Here too sufficient heat dissipation is required to protect the sensitive electronic components. Our backward curved motorized impellers from the DKHR/M series (EC variant GKHR/M), centrifugal fans of the type ERA or fans from the ECOFIT series REE, GDF and 200DW were especially designed for this application.



Cooling of components of the onboard power system

High precision power supply within the onboard power system of rail vehicles is state-of-the-art today. Comparable with the propulsion system of trains, here system components which have to be cooled are used as well. For these cooling applications, our backward curved motorized impellers from the DKHR/M series (EC variant GKHR/M), centrifugal fans of the type ERA/DRA, as well as fans from the ECOFIT series REE, GDF and 200DW are used.

Backward Curved Motorized Impellers ; Type: GKHM / GKHR

- Impeller with backward curved blades with EC motor
- Motorized-impeller individually (GKHR) or ready-to-install module (GKHM)
- Optimally suited for restricted installation spaces through space-saving design
- Airflow up to 6.750 m³/h (3.900 cfm)
- Total pressure increase up to 1.400 Pa (5.6" WG)
- For curves please see page 10/11

Fields of application: Air conditioning of the passenger or driver's cabin, switch gear cabinet ventilation, electronics cooling, equipment cooling



Backward Curved Motorized Impellers ; Type: DKHM / DKHR

- Impeller with backward curved blades with AC external rotor motors
- Motorized-impeller individually (DKHR) or as ready-to-install module (DKHM)
- Optimally suited for restricted installation spaces through space-saving design
- Airflow up to 12.000 m³/h (7.000 cfm)
- Total pressure increase up to 1.800 Pa (7.2" WG)
- For curves please see page 12/13

Fields of application: Air conditioning of the passenger or driver's cabin, switch gear cabinet ventilation, electronics cooling, equipment cooling



Centrifugal Fans ; Type: DRAD

- Double inlet centrifugal fan with forward curved blades
- Variable mounting positions possible
- Airflow up to 8.500 m³/h (5.000 cfm)
- Total pressure increase up to 1.200 Pa (4.8" WG)
- For curves please see page 16/17

Fields of application: Air conditioning of the passenger cabin, equipment cooling



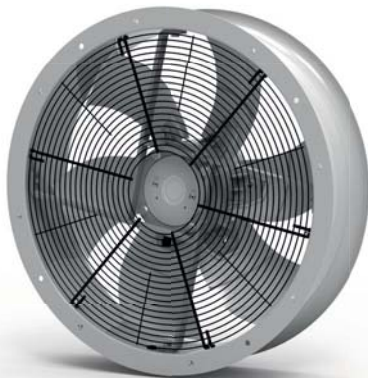


Centrifugal Fans ; Type: ERAD

- Single inlet centrifugal fan with forward curved blades
- Variable mounting positions possible
- Airflow up to 4.500 m³/h (2.650 cfm)
- Total pressure increase up to 1.400 Pa (5.6" WG)
- For curves please see page 16/17

Fields of application:

Air conditioning of the passenger or driver's cabin, electronics cooling, equipment cooling (braking system, motors)



Axial Fans ; Type: AKFD / AKSD / AKBD

- selectable blade-pitch to achieve the required operation point
- Optimally suited for restricted installation spaces through space-saving design
- Airflow up to 20.000 m³/h (11.700 cfm)
- Total pressure increase up to 350 Pa (1.4" WG)
- For curves please see page 14/15

Fields of application:

Air conditioning of the passenger or driver's cabin



Axial Fans (ECOFIT/ETRI) ; Type: 200DW

- Reliable operation even in high air humidity (up to IP55)
- Excellent isolation due to encapsulated stator and electronics with resin
- Extremely compact design (200 mm impeller diameter)
- Airflow up to 1.000 m³/h (580 cfm)
- Total pressure increase up to 950 Pa (3.8" WG)

Fields of application:

Electronics cooling

Backward Curved Motorized Impellers (ECOFIT) ; Type: REE

- Impeller with backward curved blades
- Optimally suited for restricted installation spaces through space-saving design
- Easy to mount / very easy to maintain
- Airflow up to 1.700 m³/h (1.000 cfm)
- Total pressure increase up to 775 Pa (3.1" WG)

Fields of application:

Air conditioning of the driver's cabin, electronics cooling



Axial Fans (ECOFIT) ; Type: VRE

- Optimally suited for restricted installation spaces through space-saving design
- Airflow up to 1.800 m³/h (1.000 cfm)
- Total pressure increase up to 260 Pa (1.0" WG)
- For curves please see page 14/15

Fields of application:

Air conditioning of the driver's cabin



Centrifugal Fans (ECOFIT) ; Type: GDF

- Double inlet centrifugal fan with forward curved blades
- Variable mounting positions possible
- Airflow up to 1.475 m³/h (870 cfm)
- Total pressure increase up to 650 Pa (2.6" WG)

Fields of application:

Air conditioning of the driver's cabin, electronics cooling, equipment cooling



OUR HIGH QUALITY PRODUCTS ARE ABLE TO COMPLY WITH THE FOLLOWING STANDARDS*

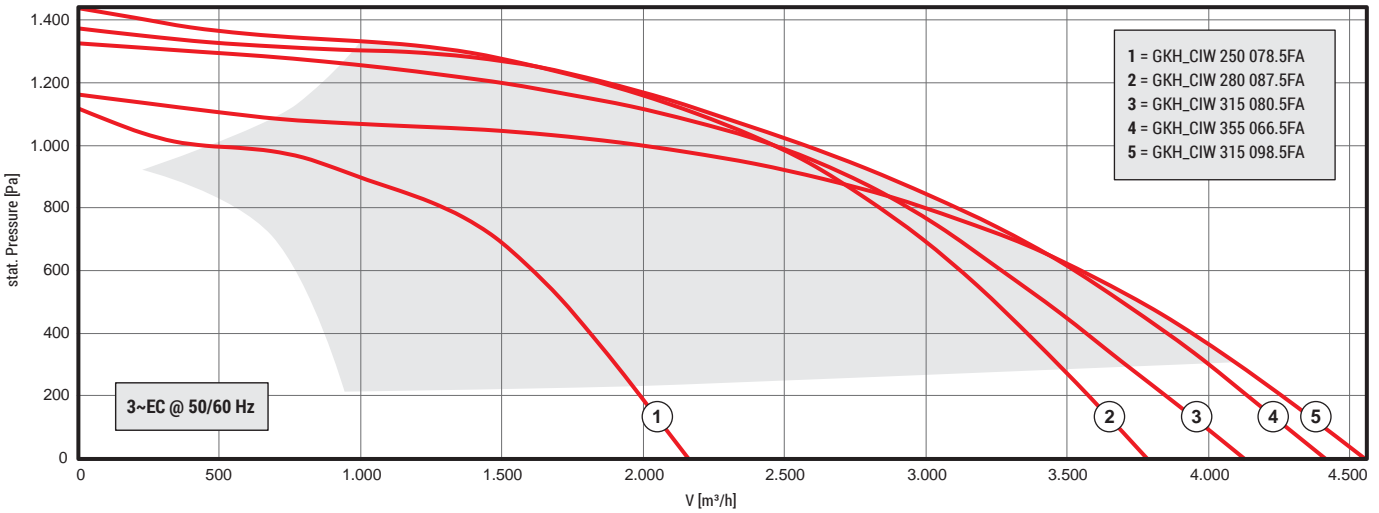
IN RAILWAY TECHNOLOGY

EN 60349-2	Rotating electrical machines for rail vehicles (AC fans)
EN 60349-4	Rotating electrical machines for rail vehicles (EC fans)
IEC 61373	Shock and vibration tests
EN 60034-1	Rotating electrical machines
EN 15085-1	Welding of railway vehicle components
EN 50124-1	Insulation Coordination
EN 60721-3-5	Classification of environmental conditions
EN 50155	Electronic equipment used on roll stock
EN 50121-3-2	Electromagnetic compatibility
EN 45545-2	Fire protection on railway vehicles
EN 50533	Three-phase train line voltage characteristics

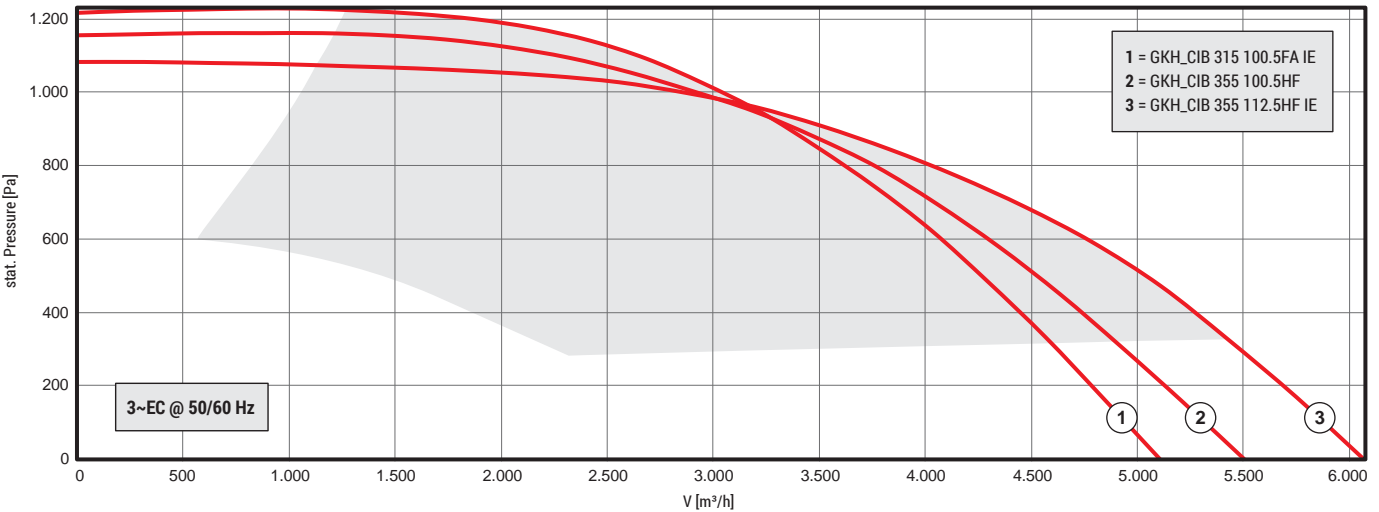
In cooperation with our customers, we work out the IDEAL SOLUTION for the respective requirements.



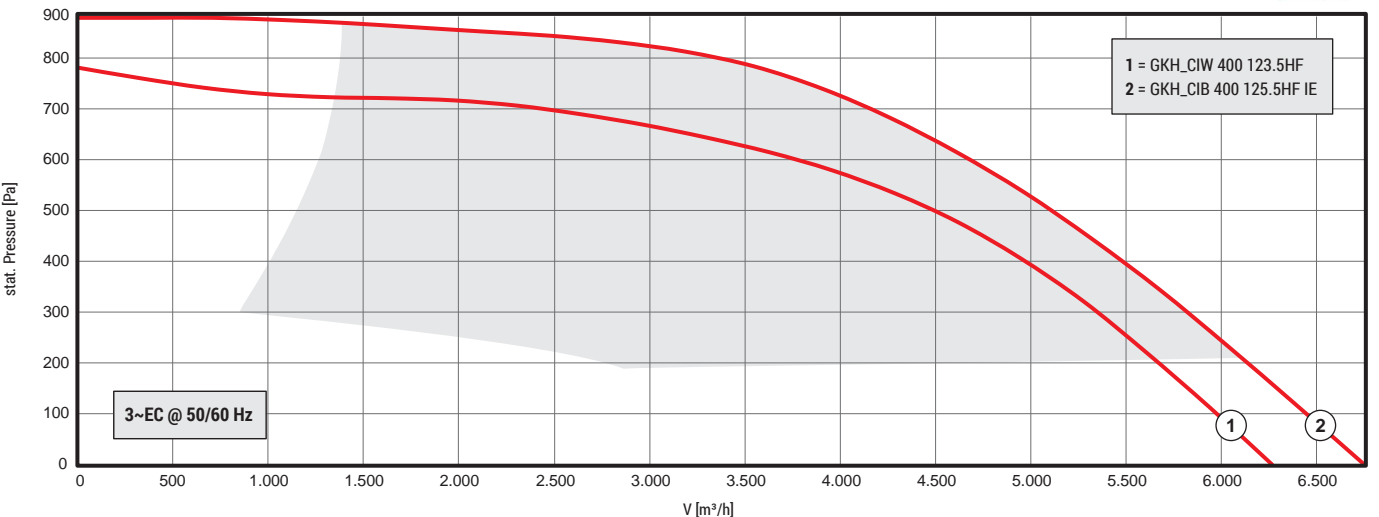
Backward Curved Motorized Impellers (Type: GKH_CIW)



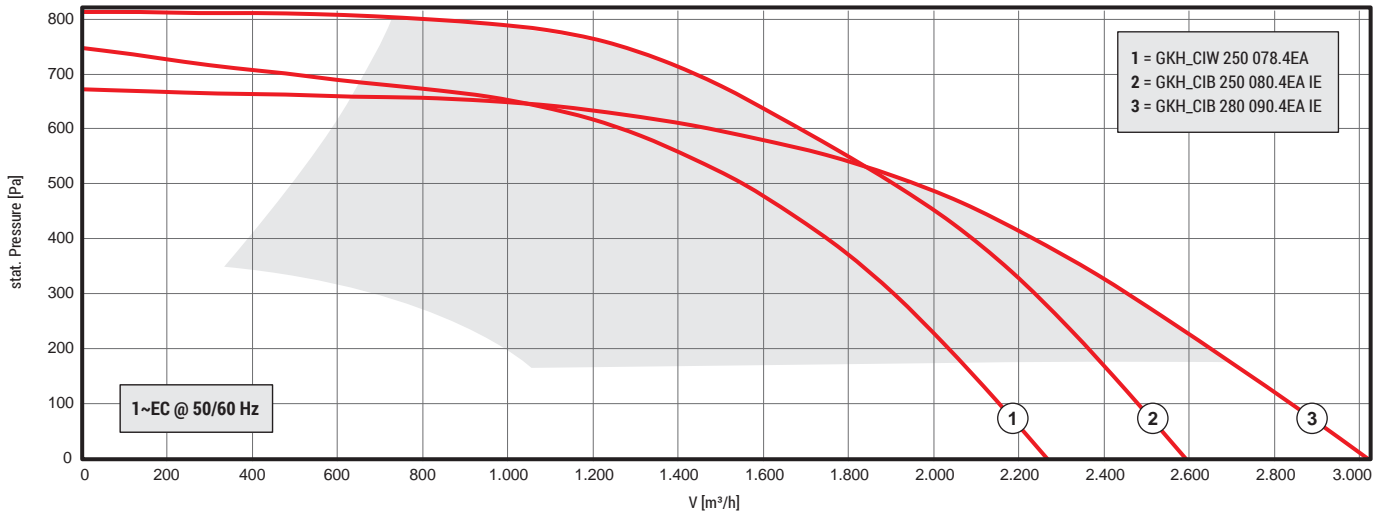
Backward Curved Motorized Impellers (Type: GKH_CIB)



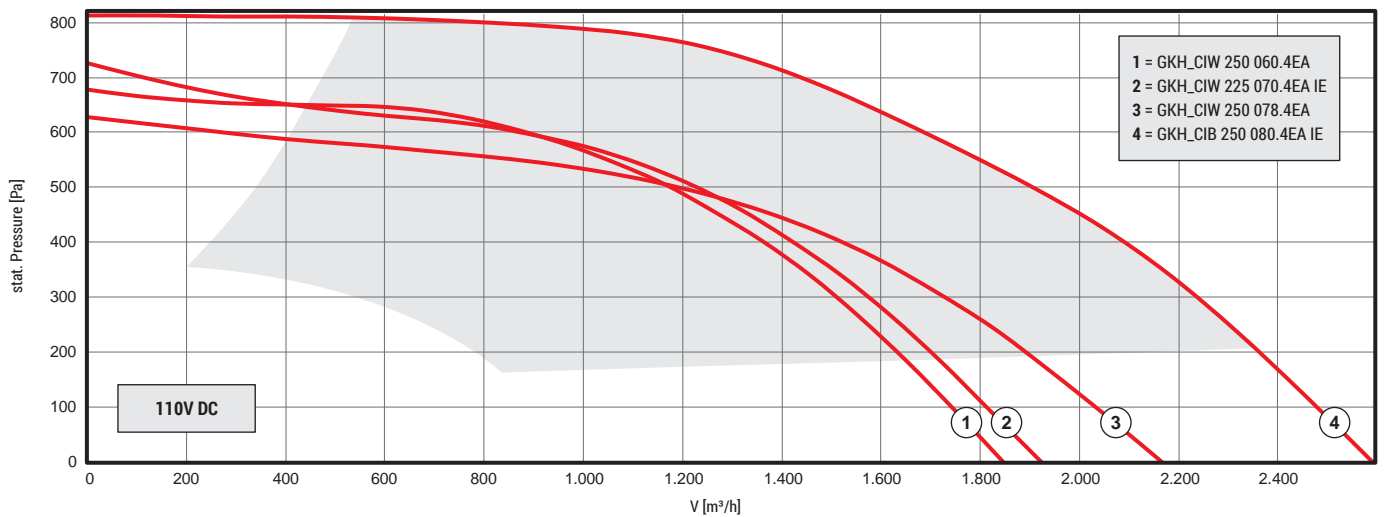
Backward Curved Motorized Impellers (Type: GKH_CIW ; GKH_CIB)



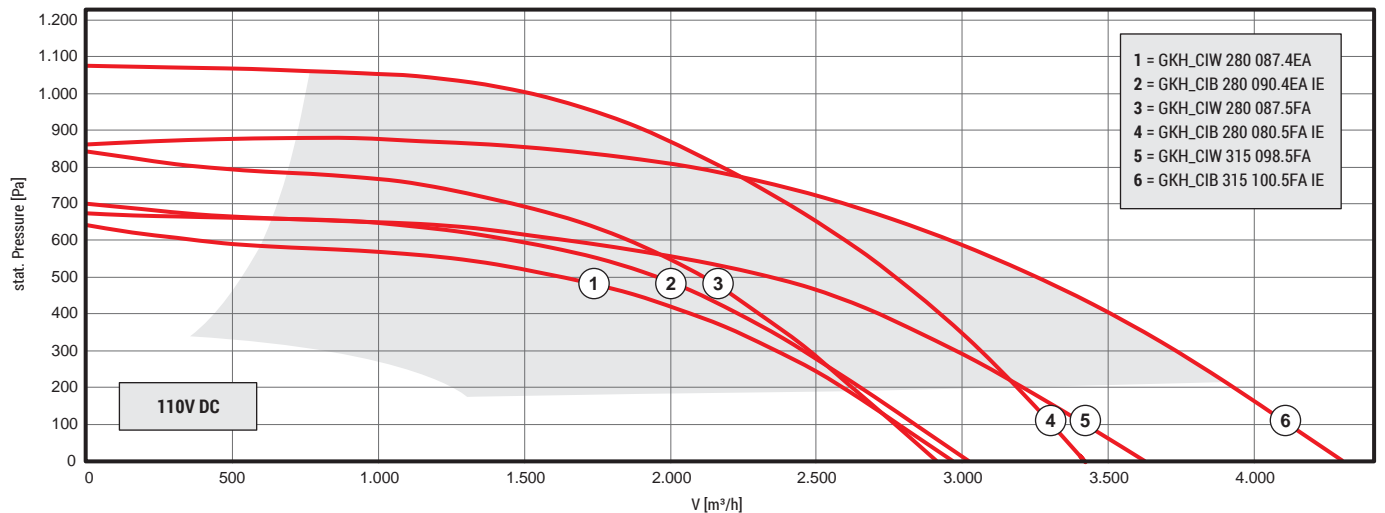
Backward Curved Motorized Impellers (Type: GKH_CIW ; GKH_CIB)



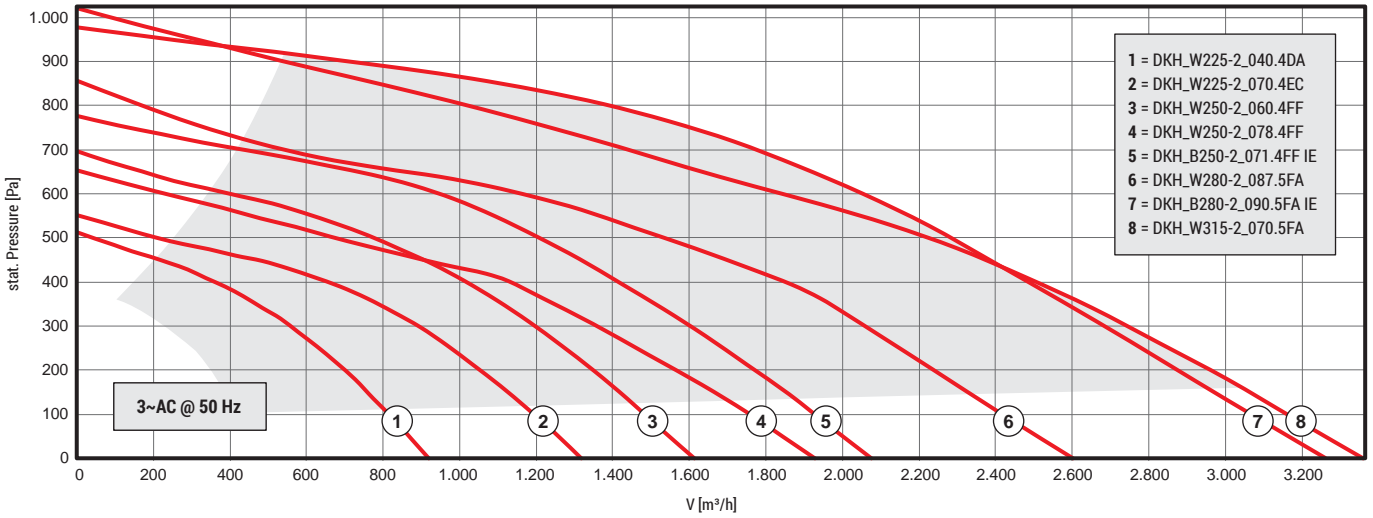
Backward Curved Motorized Impellers (Type: GKH_CIW ; GKH_CIB)



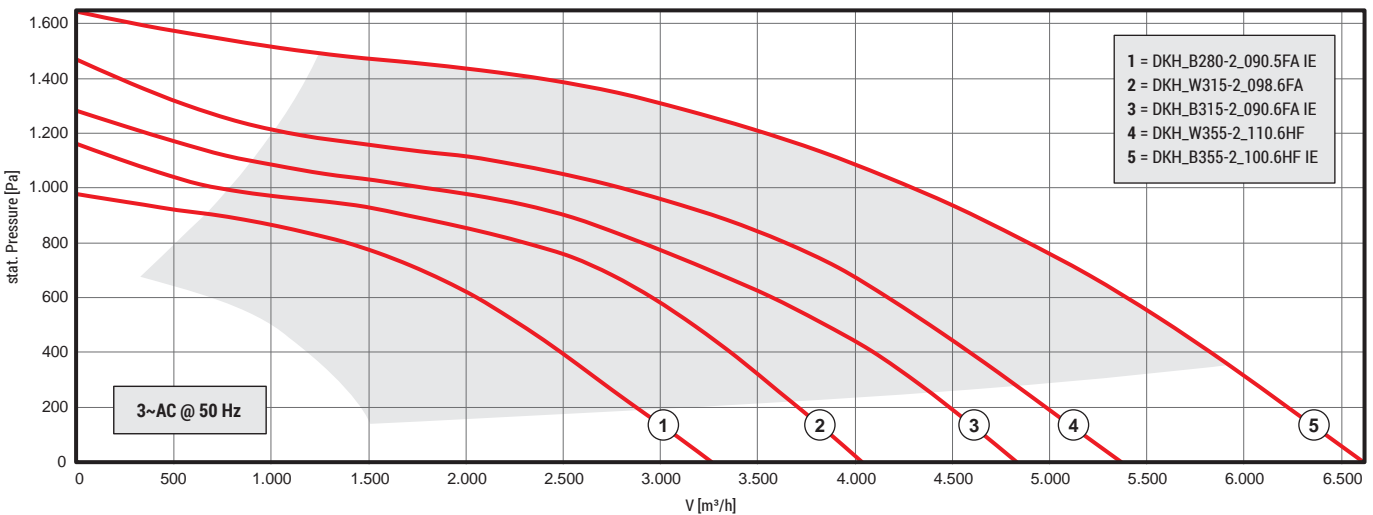
Backward Curved Motorized Impellers (Type: GKH_CIW ; GKH_CIB)



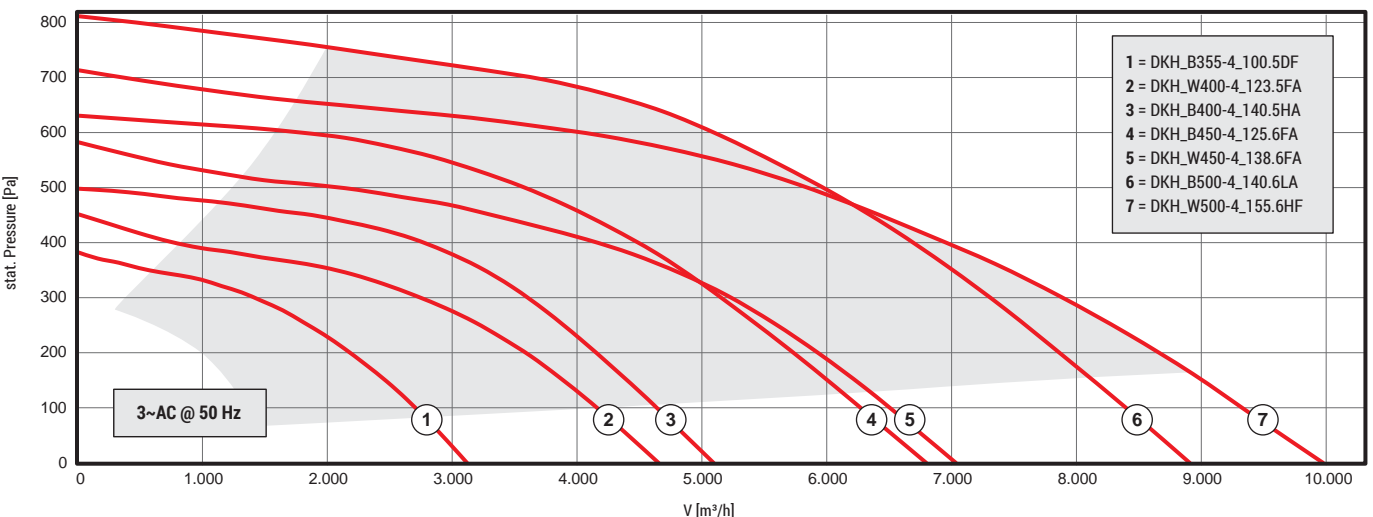
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



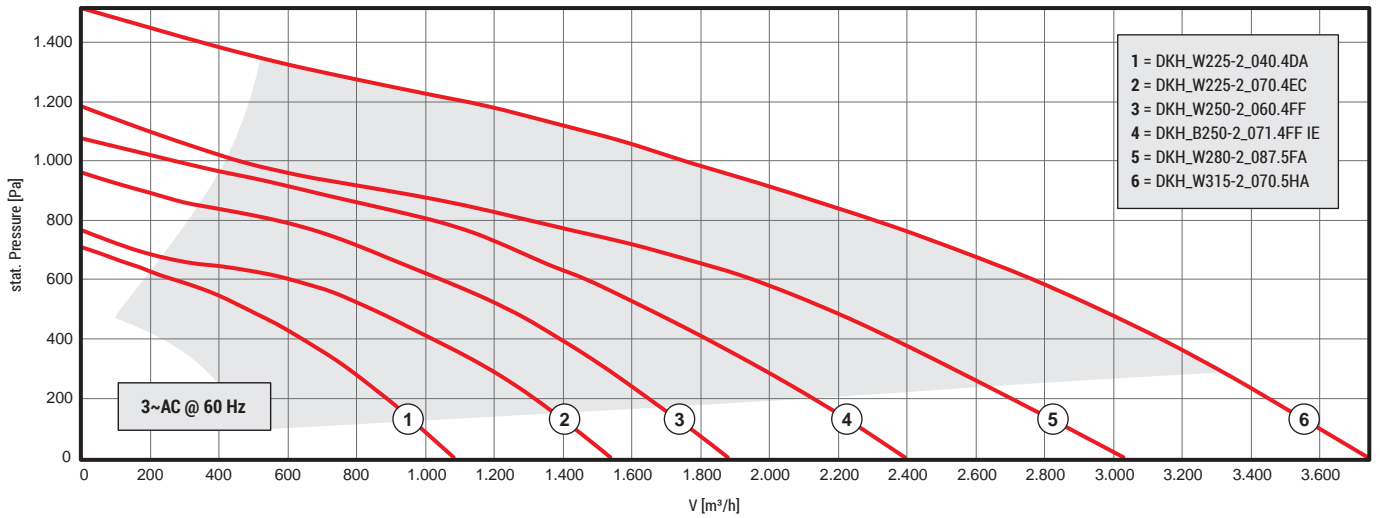
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



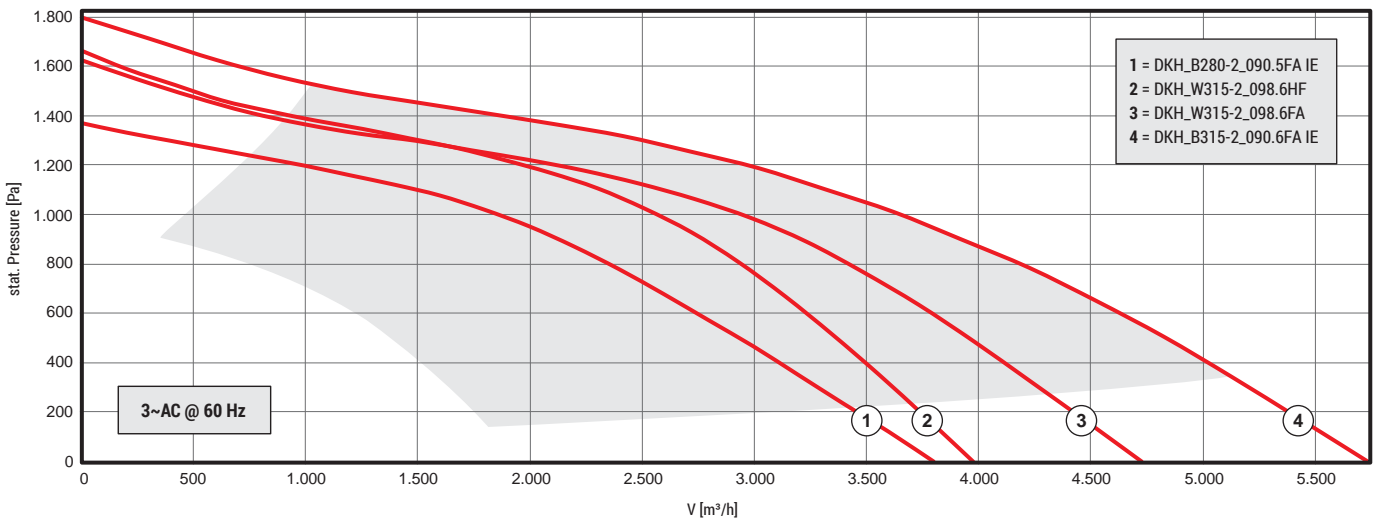
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



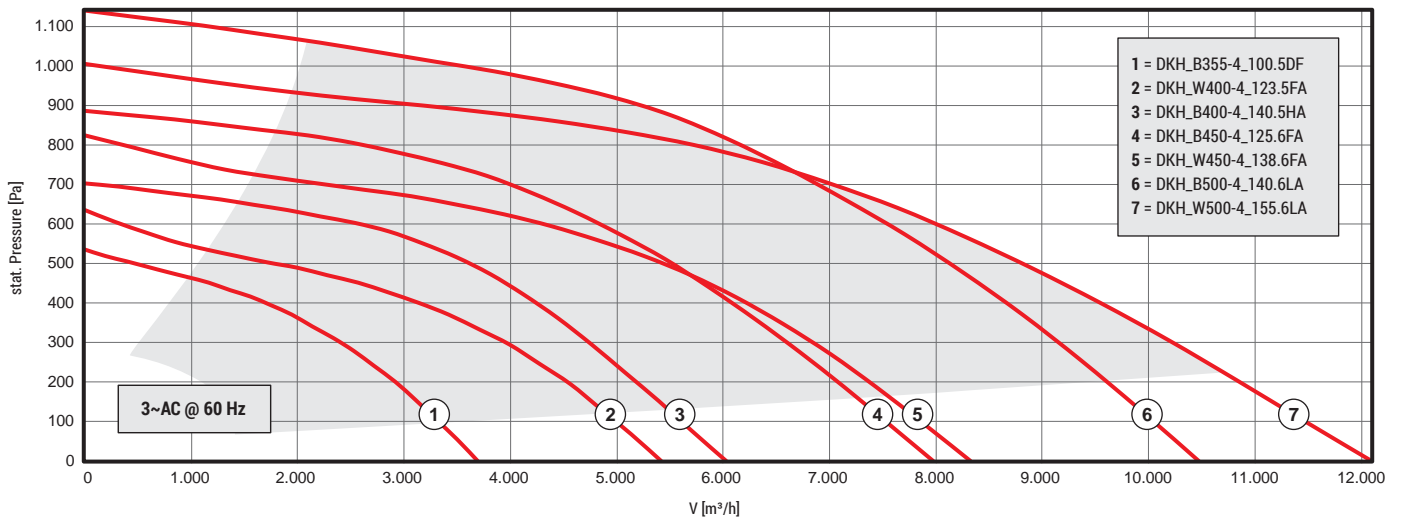
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



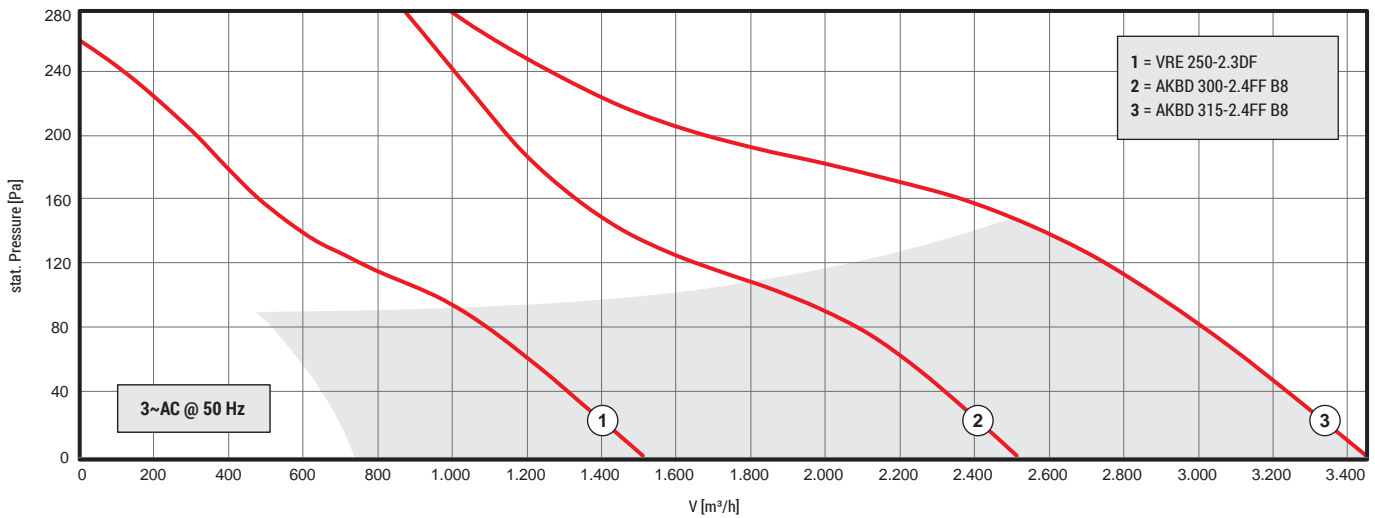
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



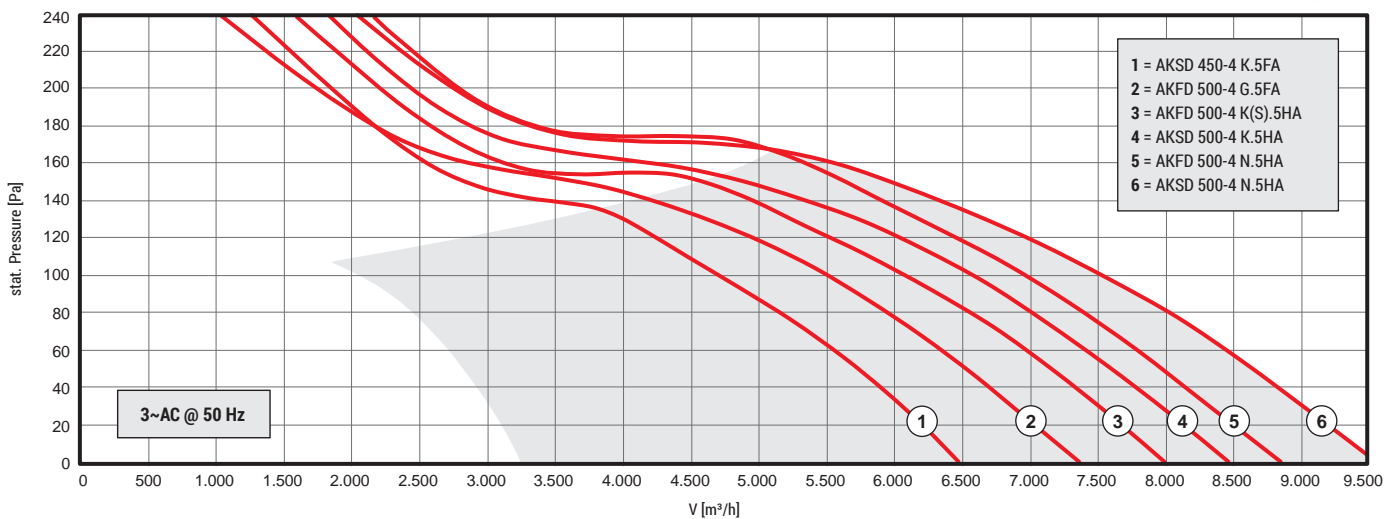
Backward Curved Motorized Impellers (Type: DKH_W ; DKH_B)



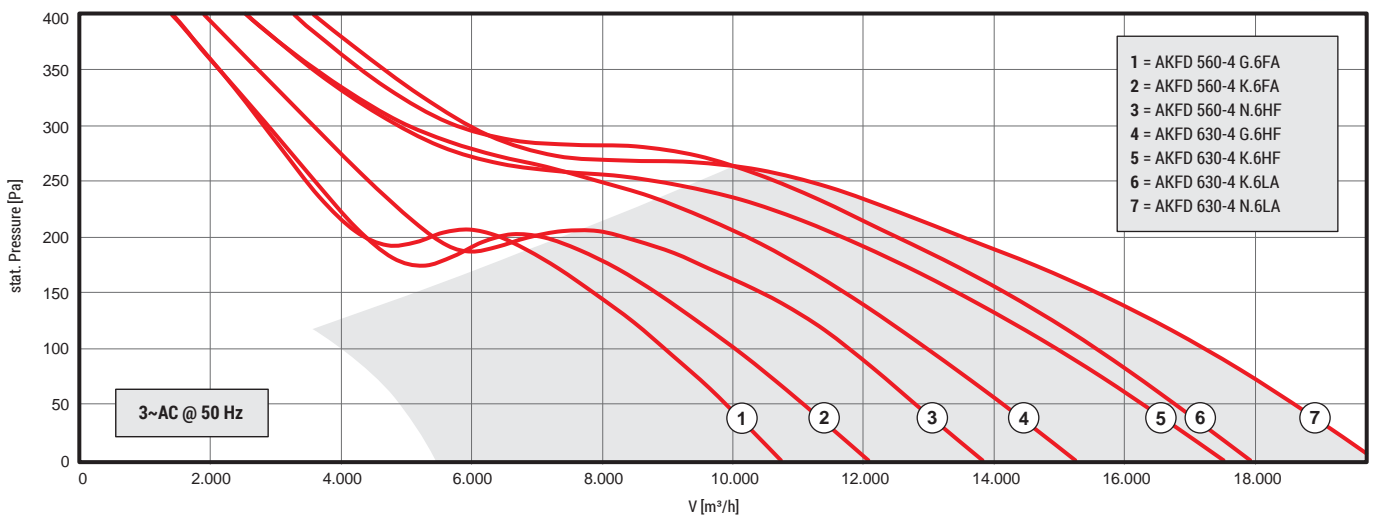
Axial Fans (Type: VRE ; AKBD)



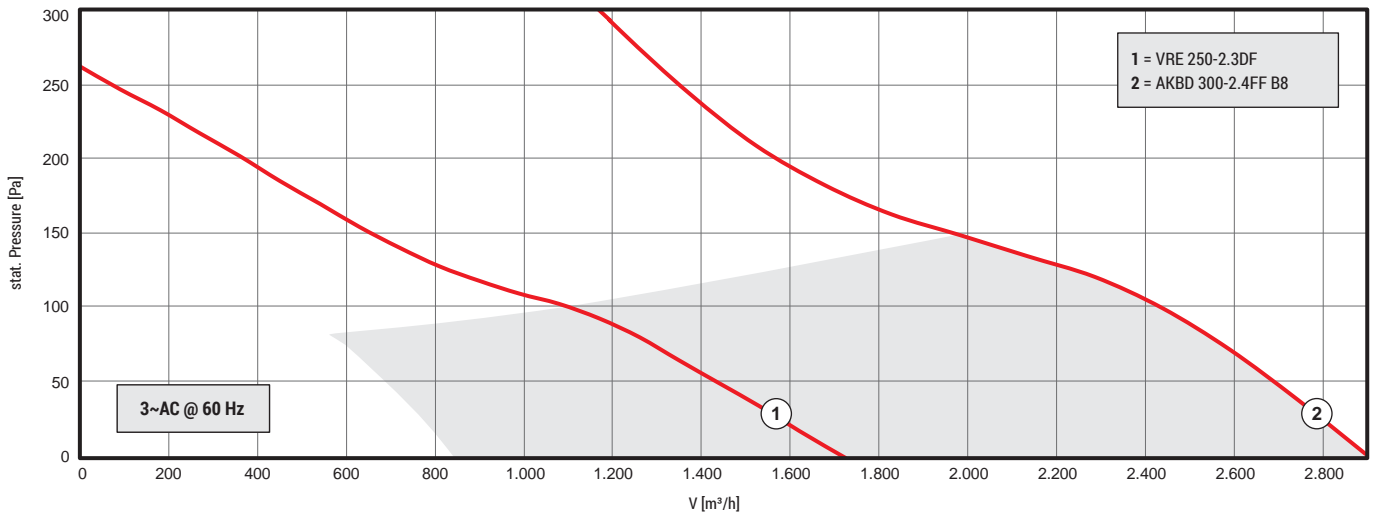
Axial Fans (Type: AKSD ; AKFD)



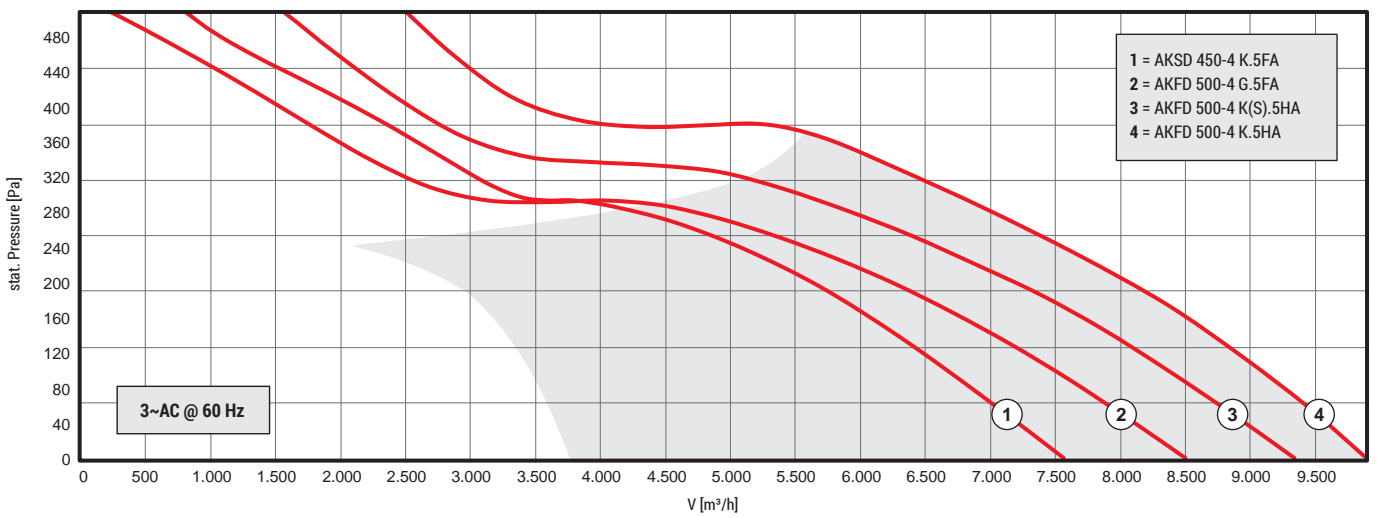
Axial Fans (Type: AKFD)



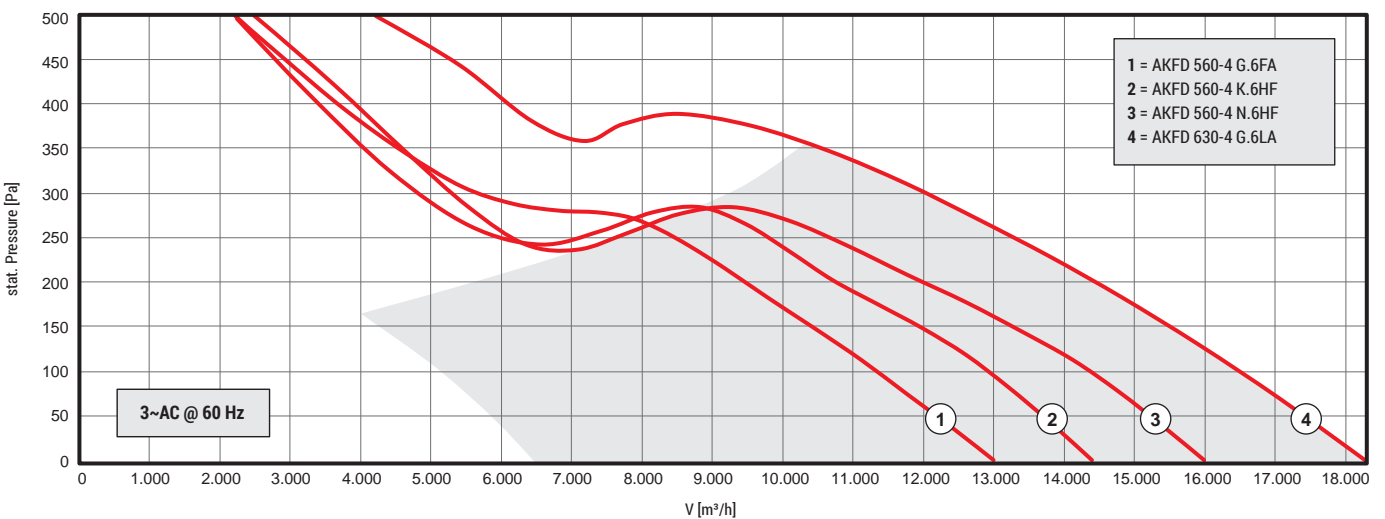
Axial Fans (Type: VRE ; AKBD)



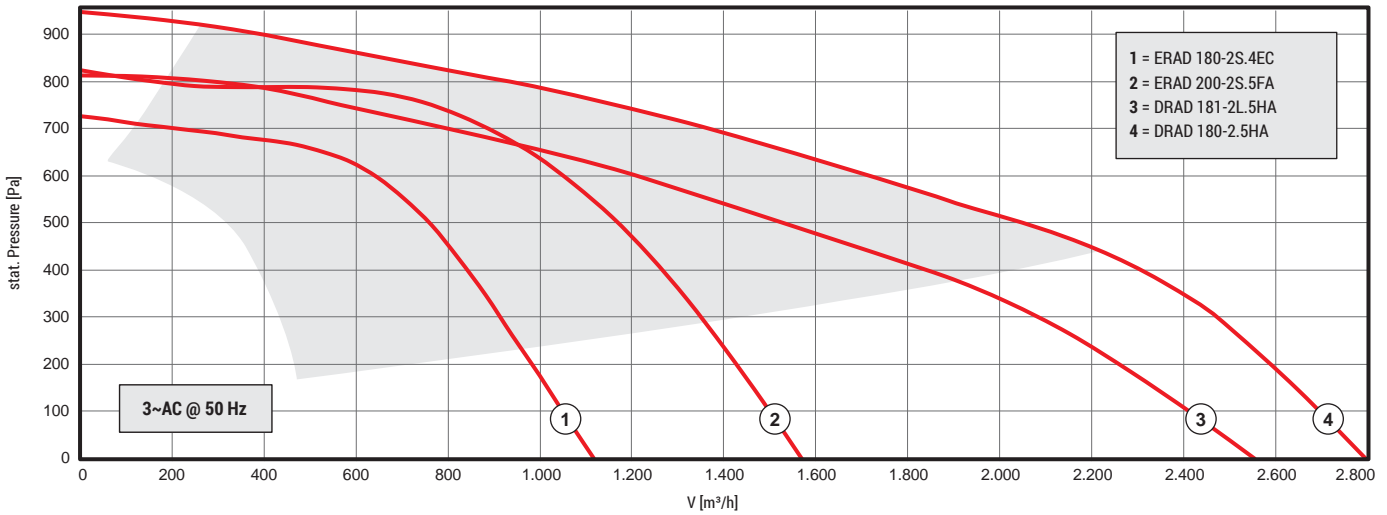
Axial Fans (Type: AKSD ; AKFD)



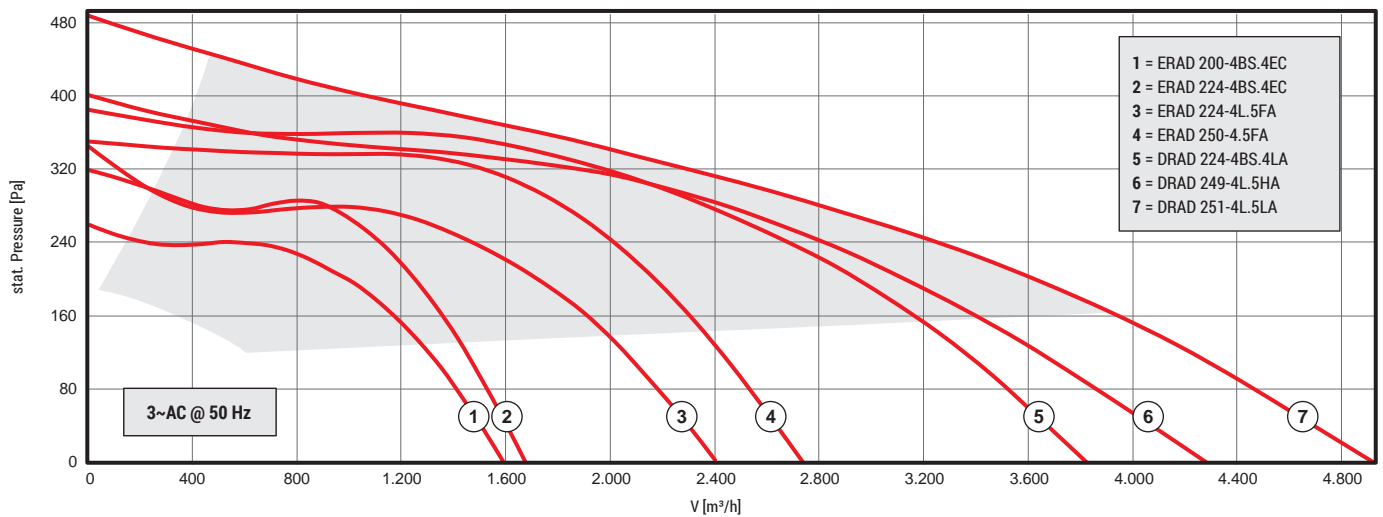
Axial Fans (Type: AKFD)



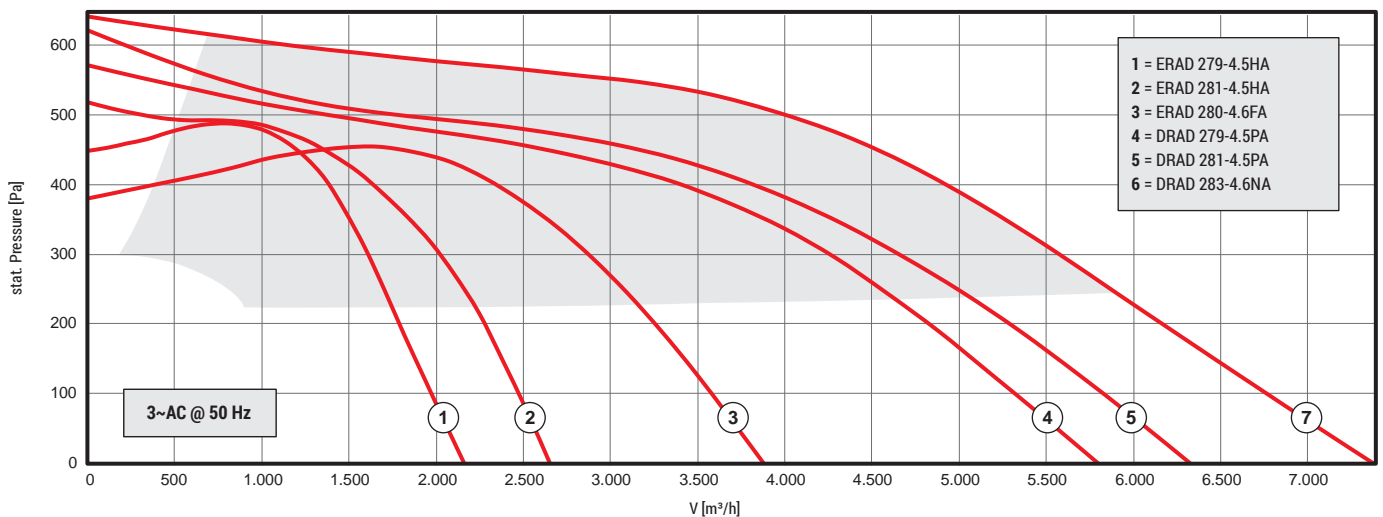
Centrifugal Fans (Type: ERAD ; DRAD)



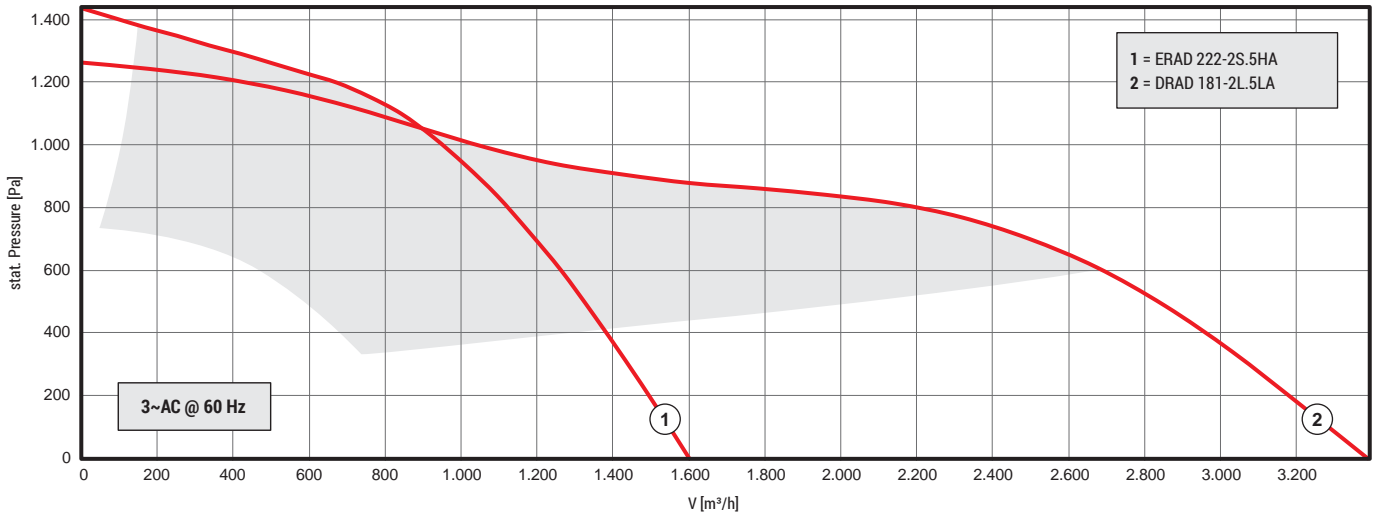
Centrifugal Fans (Type: ERAD ; DRAD)



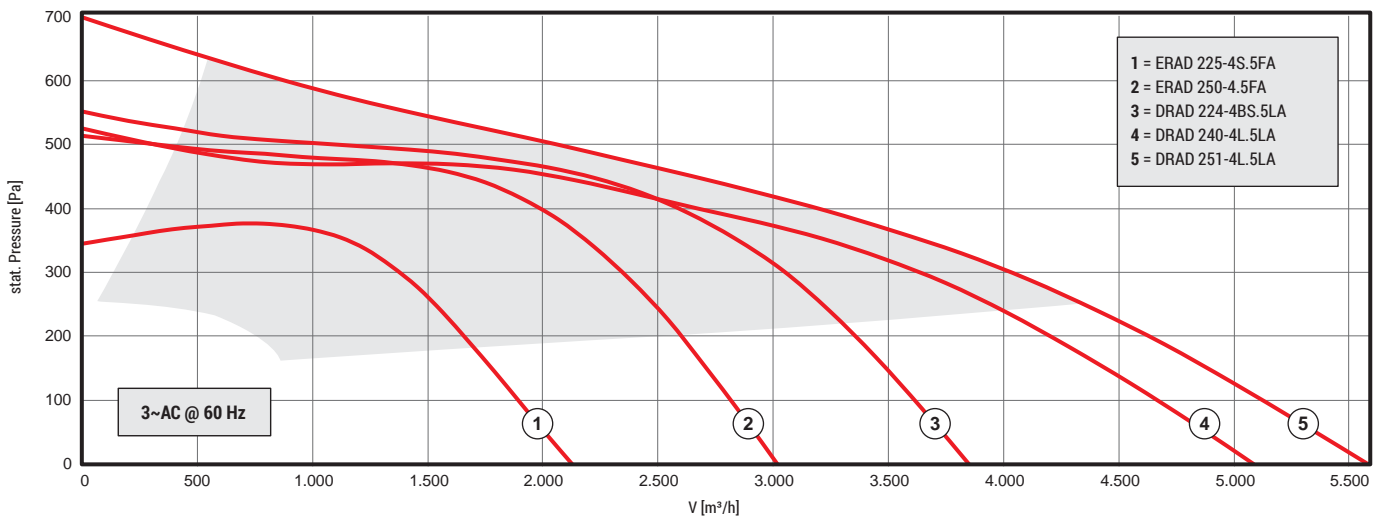
Centrifugal Fans (Type: ERAD ; DRAD)



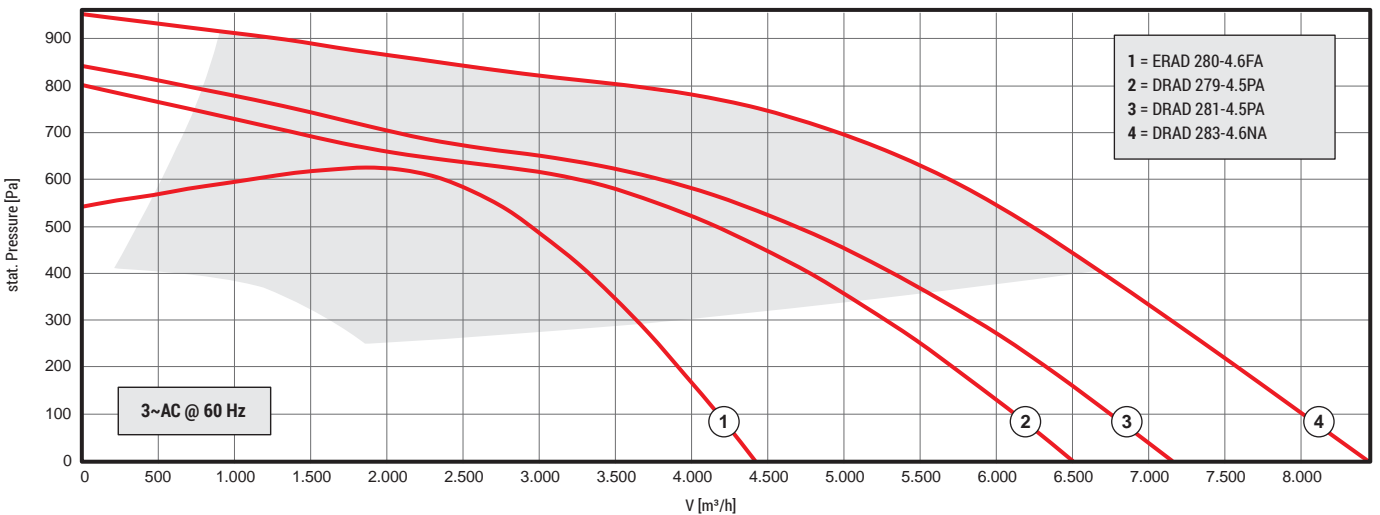
Centrifugal Fans (Type: ERAD ; DRAD)



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Centrifugal Fans (Type: ERAD ; DRAD)



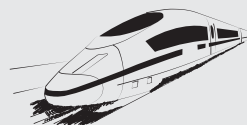
OUR RAILWAY FANS IN MOTION

GLOBAL OVERVIEW



HIGH-SPEED TRAINS / LONG DISTANCE TRAFFIC

Germany, Russia, India, China, Spain, Turkey, Israel,
Austria, Saudi Arabia, United Kingdom, South-Africa,
Korea, Italy, France



... and many more

REGIONAL TRAINS / CITY TRAINS / METROS / TRAMS

Germany, Russia, India, Belgium, Canada, China, Spain, USA,
Sweden, Denmark, Norway, Morocco, Egypt, Finland, Ireland,
Belarus, Kazakhstan, Taiwan, Australia, New Zealand, Singapore,
Philippines, Thailand, Korea, Katar, Dubai, South-Africa, Saudi Arabia



... and many more



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