

# The ErP Directive

## New values for fans

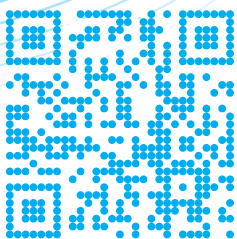
Issue 2 EN

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# ErP

2015



**NICOTRA** | **Gebhardt**  
fan|tastic solutions

# What is the ErP Directive?

“ErP” stands for “Energy related products”. The aim of ErP Directive 2009/125/EC is to lower the energy consumption of these products by means of environmentally friendly design („Eco design“). For this reason, applicable standards have been developed for each product group applicable throughout the EU. For fans with input power of between 125 W and 500 kW the Commission’s regulation 327/20011 applies. The construction of electric motors is regulated by means of Directive 640/2009.

## **How does the ErP Directive affect fans?**

The prescribed efficiency grades for fans are set out in two stages for the first time in 2013 and then raised again in 2015. Several models used to date do not meet the requirements and have therefore been revised or taken off the market.

## **How did this regulation come about?**

By signing the Kyoto Protocol the EU committed itself to lower its CO<sub>2</sub> emissions by 20 % by 2020. Energy-saving products make an important contribution to this. At the same time, the user benefits as greater energy efficiency not only results in lower emissions but also in lower operating costs.

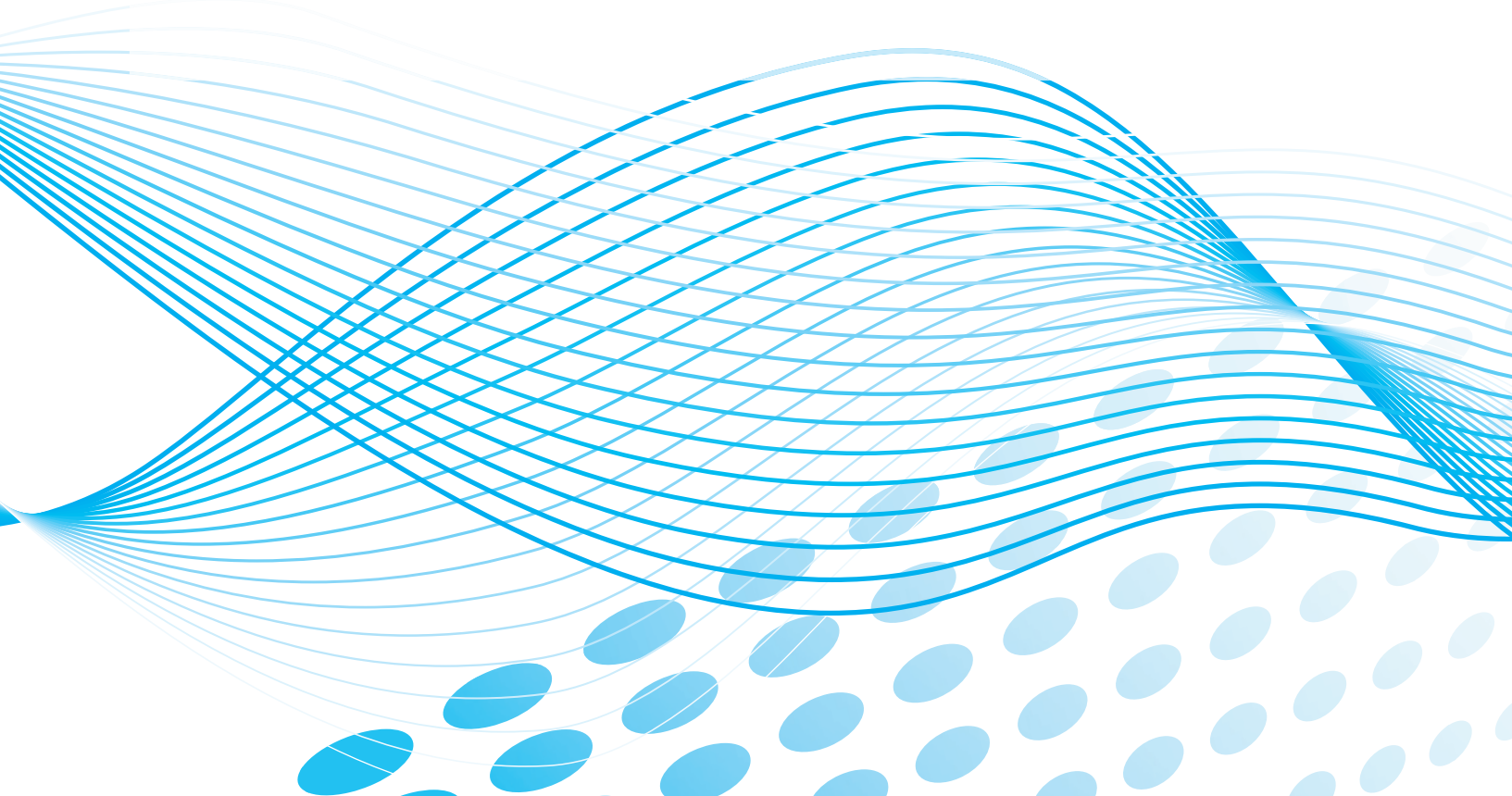
## **Who must act now?**

Everyone who brings fans into circulation in the EU must supply ErP compliant products. Available solutions which meet the requirements of the ErP Directive must be taken into consideration for each application. This must be implemented before this deadline.

## **Nicotra Gebhardt achieves top values**

With Nicotra Gebhardt fans you can be assured of achieving the required statutory efficiency grades at any time. Furthermore: The majority of our products already now exceed the threshold values valid from 2015. We can offer ErP compliant solutions for all our product categories.

Do you have any further questions? Our specialists are available to provide you with information at all times.



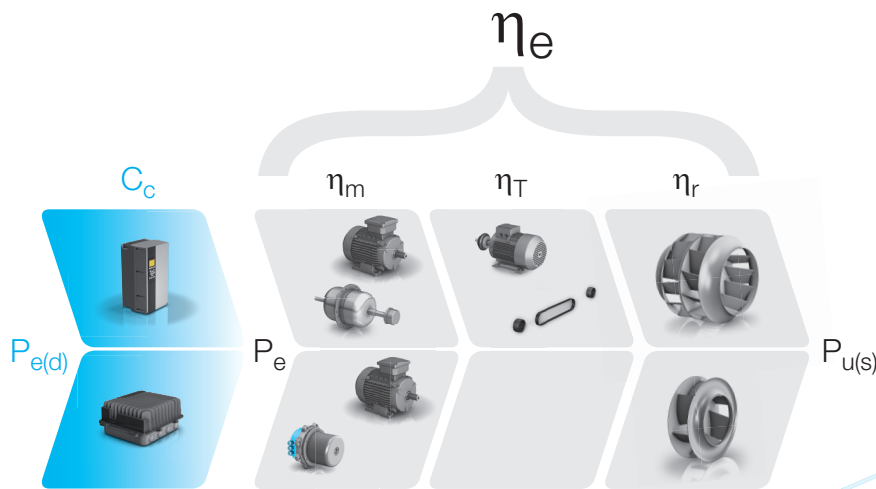
# The overall picture will decide

Depending on the model of the fan, the efficiency grade "N" set in accordance with the ErP Directive must be achieved from 2013 and 2015 respectively.

The efficiency grade designates a parameter in the calculation of the target energy efficiency of a fan depending on the electric input power when operating at the optimal energy efficiency point. The figure of parameter "N" corresponds to the target energy efficiency with a power of 10 kW.

Efficiency grade "N" to ErP-Directive

Year	Centrifugal fans with backward curved blades			Centrifugal fans with forward curved blades	
	without housing static	with housing static	total	with housing static	total
2013	58	58	61	37	42
2015	62	61	64	44	49



To make the selection easier for our customers, we offer complete systems as defined by the ErP Directive!

In order to compare the systems, the total efficiency  $\eta_e$  of the fan without speed regulation is considered.

$$\eta_e = \frac{P_{u(s)}}{P_e}$$

Total efficiency

Fan gas power when operating at the optimal energy efficiency point

Electric input power when operating at the optimal energy efficiency point

If the system has speed regulation, it will be taken into account with the "part load compensation factor"  $C_c$  (see below):

$$\eta_e = P_{u(s)} / P_{e(d)} \cdot C_c$$

$P_{e(d)}$  = Input power of speed regulator when operating at the optimal energy efficiency point

without speed regulation

$C_c$  = part load compensation factor

$$C_c = 1$$

with speed regulation  $\geq 5$  kW:

$$C_c = 1.04$$

with speed regulation  $< 5$  kW:

$$C_c = -0.03 \ln(P_{e(d)}) + 1.088$$

In order to take the speed regulation into account via the part load compensation factor  $C_c$ , the following mathematical losses arise in accordance with the formula prescribed by ErP for the following typical motor powers:

- 4.00 kW -  $C_c = 1.05$  (5 %)
- 2.20 kW -  $C_c = 1.06$  (6 %)
- 0.75 kW -  $C_c = 1.10$  (10 %)

# ErP compliant solutions for all product categories

If complete systems are not considered, but “bare-shaft” fans, total efficiency is calculated in accordance with the following formula:

$$\eta_e = \eta_r \cdot \eta_m \cdot \eta_T \cdot C_m \cdot C_c$$

$\eta_r$  = impeller efficiency  
 $\eta_m$  = motor efficiency  
 $\eta_T$  = efficiency of the drive configuration  
 $C_m$  = compensation factor to account for matching of components  
 $C_c$  = part load compensation factor

$C_m = 0.9$  Compensation factor to account for matching of components

## Complete systems by Nicotra Gebhardt

Nicotra Gebhardt can supply complete systems in all product categories which meet the ErP requirements. We offer highly efficient fan systems up to IE4

- ▶ with matching components and “high efficiency drives” – belt and direct drive
- ▶ with integrated or external control to regulate speed
- ▶ with IEC standard motors
- ▶ with permanent magnet motors
- ▶ with AC external rotor motors
- ▶ with EC-motors.

## Building blocks for best values

Thanks to the decades-long experience of Nicotra Gebhardt all the components of our fans contribute to their high performance.

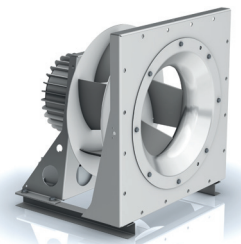
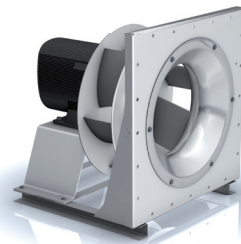
Impellers and blades are optimised for turbulence and therefore particularly efficient. An example: With the latest development, the RLM Evo impeller, the free-running centrifugal fans of Nicotra Gebhardt achieve system efficiency grades never reached before.

In addition, permanent magnet and EC-drives which Nicotra Gebhardt offers for its direct drive fans improve the system efficiency grades.

**The fan technology of Nicotra Gebhardt delivers highly efficient systems for all applications.**

## Centrifugal fans with backward curved blades without casing / Plug fans

### RLM<sup>EVO</sup> / RLM

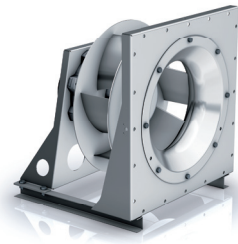
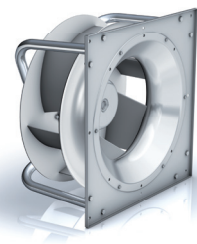


#### Direct driven centrifugal fan

- with IEC standard motor or permanent magnet motor
- with integrated or external control electronics

**Motor efficiency grades up to IE4**

### RLE<sup>EVO</sup> / RLE



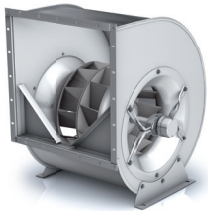
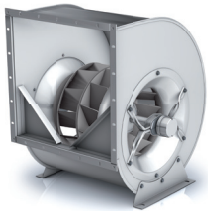
#### Direct driven centrifugal fan

- with AC or EC external rotor motor
- with integrated control electronics

**Motor efficiency grades up to IE4**

## Centrifugal fans with backward curved blades with casing

### RZA / RZP

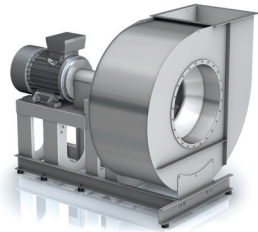
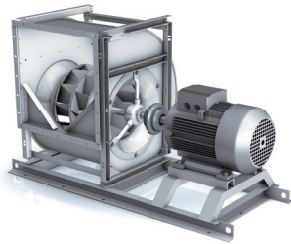


#### Direct driven centrifugal fan

- with AC or EC external rotor motor
- with external control electronics

Motor efficiency grades up to IE4

### RZM / P4K

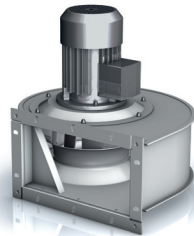
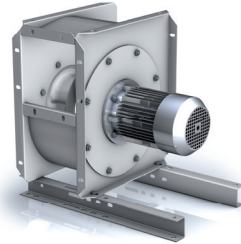


#### Direct driven centrifugal fan

- with coupling
- IEC standard motor or permanent magnet motor

Motor efficiency grades up to IE4

### P2M / REM / P4M

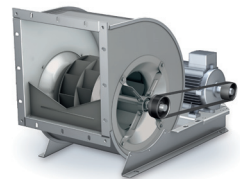
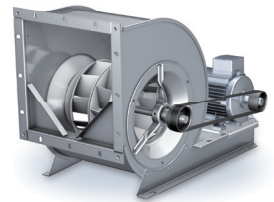


#### Direct driven centrifugal fan

- with IEC standard motor

Motor efficiency grades up to IE2

### RZR / RDH / RER / RSH



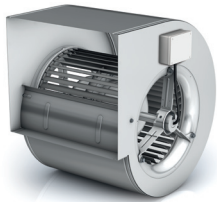
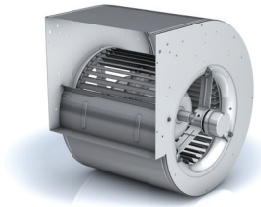
#### Belt-driven centrifugal fan

- with IEC standard motor or permanent magnet motor

Motor efficiency grades up to IE4

## Centrifugal fans with forward curved blades with casing

### DDM / DDMB

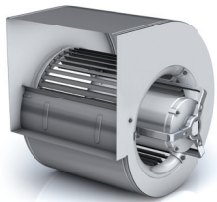
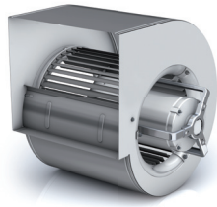


#### Direct driven centrifugal fan

- with AC or EC external rotor motor
- with external control electronics

Motor efficiency grades up to IE4

### DD / DDB

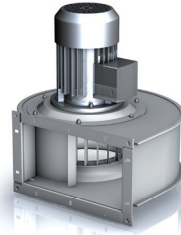


#### Direct driven centrifugal fan

- with AC internal rotor motor or brushless DC internal rotor motor
- with external control electronics

Motor efficiency grades up to IE4

### TEM

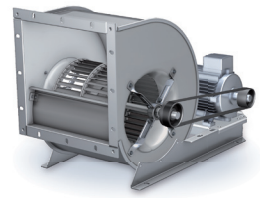


#### Direct driven centrifugal fan

- with IEC standard motor

Motor efficiency grades up to IE2

### ADH / AT / ASH



#### Belt-driven centrifugal fan

- with IEC standard motor

Motor efficiency grades up to IE2

# What you also need to know

## **01** Which fans are affected?

In general, all fans with input power of between 125 W and 500 kW which are brought into circulation in the EU must comply with the requirements. This applies to both fans as individual devices as well as those integrated into equipment and buildings.

## **02** Are there any exceptions?

Yes, for instance fans for operation in explosive areas or fans for liquid media with temperatures exceeding 100°C. Also, fans designed especially for operation in toxic, highly corrosive or flammable environments or in environments with abrasive materials and other special applications are excluded.

## **03** Must existing products and buildings be refitted?

No. The ErP Directive does not state that existing products and buildings must be refitted.

## **04** What must be done for servicing?

There is a transition period for fans which are integrated into other products or buildings before 2013 and must be replaced: The exact same replacement fans are still permitted between 2013 and 2015. They must however be labelled. As from 2015, ErP compliant fans will be compulsory even for servicing.

## **05** How can one identify ErP compliant fans?

The CE mark. As from 2013, it will only be given to fans which adhere to the prescribed limits and power values. Total efficiency will be seen as a figure on the nameplate.

## **06** Does the ErP Directive also apply outside the EU?

No, but it can be expected that outside of Europe similar guidelines will be decided on as well.

## **07** Will the new fans be more expensive?

Many Nicotra Gebhardt fans already comply with the requirements of the ErP Directive today. The selection of a higher quality drive system can affect the price of the fan. The investment costs are recovered very quickly due to the higher energy efficiency and the lower energy consumption.

