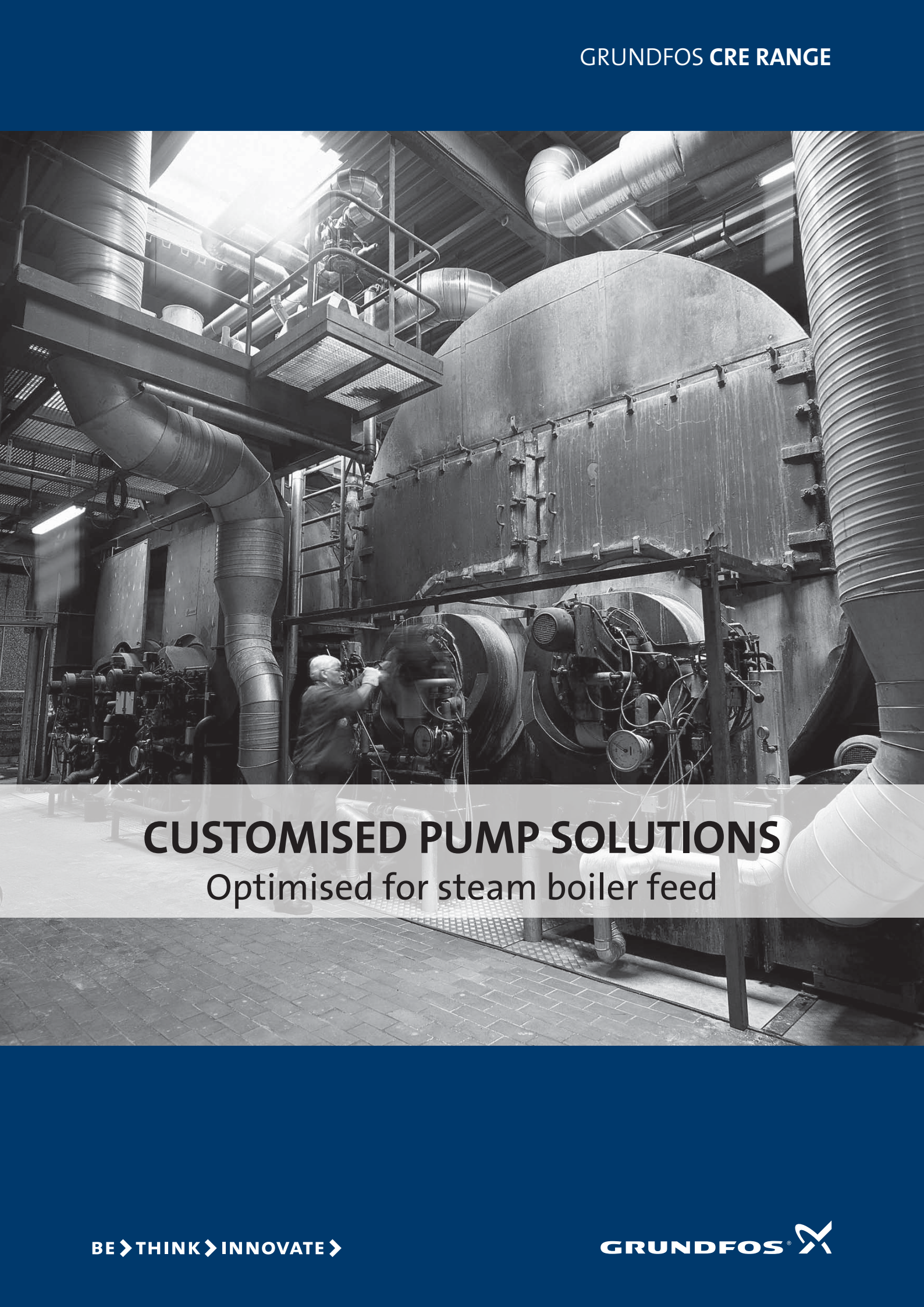




CUSTOMISED PUMP SOLUTIONS

Optimised for steam boiler feed

Get upgraded. Twice.

A double upgrade for your boiler feed pumps

Your first upgrade: The new CRE with three-phase motors

You already know the electronically controlled CRE pump range and how it combines reliability and efficiency thanks to the integrated frequency converter in its MGE motor.

You may also already know that the new generation of CRE pumps with three-phase, dual-voltage MGE motors from Grundfos has hit the market.

You have heard how they are
even more efficient
even more robust
have a very wide power supply range
incorporate a duty/standby function
and seriously improve stock management.

You may even have heard that they are matched to different pump applications with a range of different functional modules. But there's even more in store for you.

Your second upgrade: Software to optimise boiler feed pumping

The new MGE motors are good news for everyone. You, however, are a special case. You already know the benefits of using CRE pumps to feed boilers:

- Steady steam production
- Fast responses to changes in steam consumption
- Stable water levels
- Energy savings

Now you get even more. The Grundfos experts have found ways to use sophisticated software to further customise the CRE range to specific situations. And boiler feed pumps have received special attention.

More wants more ...

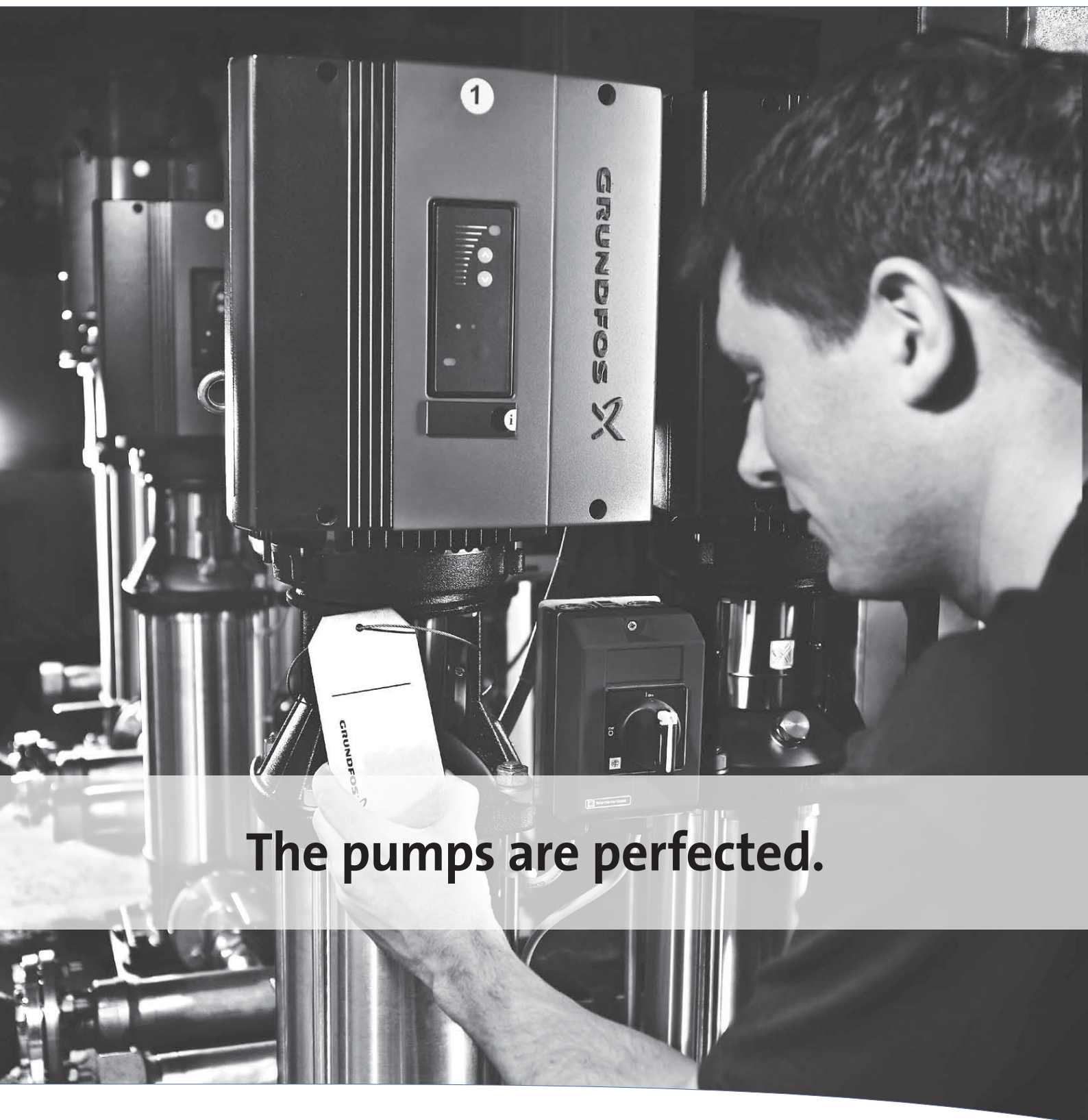
Boiler feed specialists can derive great benefits from the full range of Grundfos products for boiler/steam applications. Highlights include the Grundfos Alldos dosing pumps that enable e.g. efficient oxygen binding. The full water treatment portfolio for measurement and control is also worthy of note.





Designed to solve challenges

Challenge	Solution	See page
Unstable water levels	Continuous feeding ensures means continuous operation	5 & 8
Erractic load characteristics	Stretched pump curves ensure smooth load characteristics	5, 8-9 & 11
High temperatures	Superior temperature tolerance for both motor and pump. Automated derating optional.	5
Cavitation	Low-NPSH technology adjusts pump performance to suit loads	7
Limited space	Over-synchronous operation gets the same performance out of smaller pumps	6
Insufficient control	Embed the functionalities and get the data readouts you want	9
BUS communication	Full access to BUS communication for constant information and control	5



The pumps are perfected.

The customisation options of the CR range goes even further than a choice of materials, connection options, and details. The CRE range of speed-controlled pumps can now be optimised with special software, too..

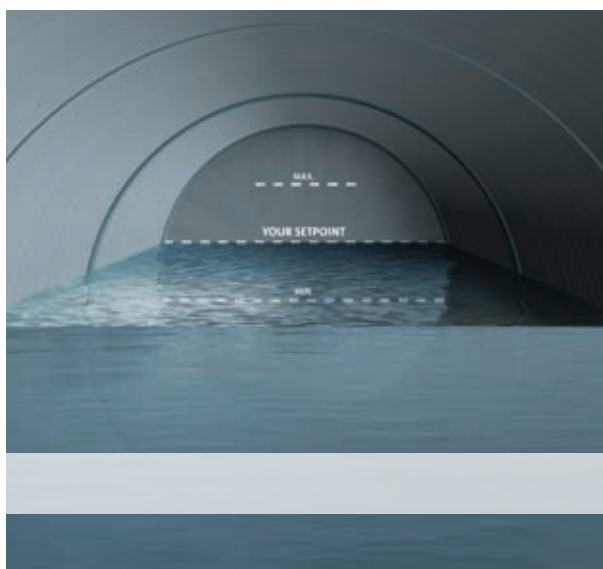
Now go for complete control.

Sophisticated code optimises your pumps

After decades of development work, the mechanics of your Grundfos pumps and motors are virtually as good as they can get. So our design team went on to harness the power of computers.

Always adapting, always efficient

Inside the customised CRE pumps, digital wonders work tirelessly to analyse input and make small adjustments all the time, helping you create a system that works better. It's that simple on the outside. But rather complex on the inside. See below for more – and turn to “The Science Bits” for details.



Smooth water levels with smooth control

Our Grundfos experts have combined sensors and software in ways that let you maintain constant feeding at smoother rates than ever. The water level remains stable. The feeding is continuous. And operation is smooth and unbroken. To see how we do this, turn to “The Science Bits” on p. 8.



We make no compromises. But we still save you money.

A Grundfos CRE pump not only saves money on day-to-day operation. Getting the right, customised E-pump solution also lets you save on the initial investment.

By integrating the motor, pump, and frequency converter, Grundfos CRE pumps eliminate the need to combine separate valves and bypass systems – which are often expensive and very demanding in terms of servicing – with external controllers and standard pumps.

Instead, you get a solution that's more compact, easier to install, and perfectly integrated. In a new, upgraded version that withstands higher temperatures and has even greater scope for customisation. You get Grundfos quality, but you actually pay less.

Connect and control with BUS communication

A Grundfos CRE solution lets you stay informed and keep full control of your process. You can get connected via GeniBUS, Profibus, MODbus, LON Works and much more. The Grundfos PC tool also gives access to highly detailed fine-tuning, moving in behind the scenes to control every last detail.

Optimising boiler feed pumps with software

We stretch the pump curves for you

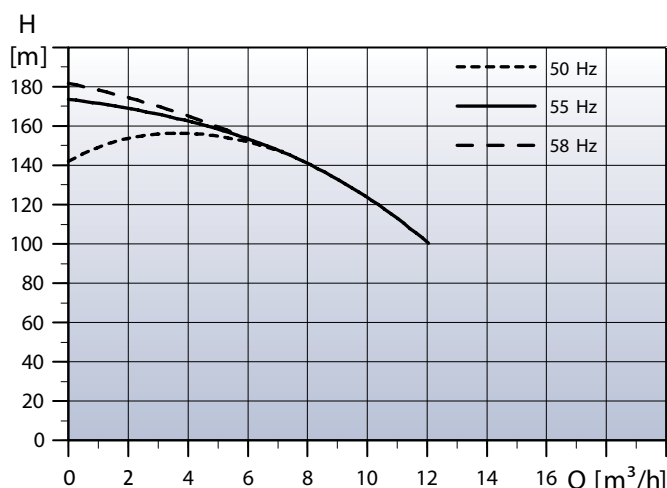
By getting software tailor-made for you, you can make your pumps operate outside their set pump curves. You get efficiency so high it almost goes against the laws of nature. Basically, the rules don't apply to you anymore. To see how we can stretch pump curves to suit you, turn to "The Science Bits" on p. 8-9.

So how do we get the pump to choose the right point? With computer power. By fiddling with the electronics, our experts persuade the pump to decrease its rpm as the flow demand increases. In effect, the pump mimics a weaker motor when you need it to – but keeps its strength for when you don't.

This over-synchronous operation gives the pump curve the right inclination – you get a flat curve for good efficiency. The customised code creates a smooth curve where there's only one right setpoint, so there's no risk of excessive water intake.

From the outside, the pump now has very different characteristics. And is much more efficient. All this by just pulling back a little – otherwise we'd have to use poorer pumps! A great example of how you can sometimes achieve the best results by pulling your punches. For more details, see "The Science Bits" on p. 11.

Flattening the pump curve makes the pump much more efficient for your purpose.

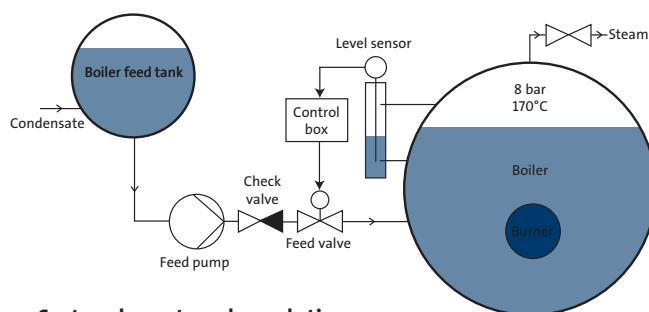


Upgrade your customers

Your customised boiler feed pump software gives you many direct benefits. But of course an optimised system also brings advantages that you can pass on to your clients. Here's a list of things you can pass on to your customers when you take the Grundfos CRE upgrade.

- Eff1 motors save energy, generate less heat, may prompt government subsidies and can promote a greener image
- Stable water levels mean stable operation
- No downtime thanks to cutting-edge supervision and protection
- Due to the low net positive suction head (NPSH) we have very efficient cavitation preventing, which is ideal in all situations where you deal with high temperatures and difficult inlet conditions. Low-NPSH pumps also allow for more compact systems by reducing excess pressure itself, thereby eliminating the need for additional tanks.
- Superior reliability through high quality, tolerance of high ambient temperatures, etc.

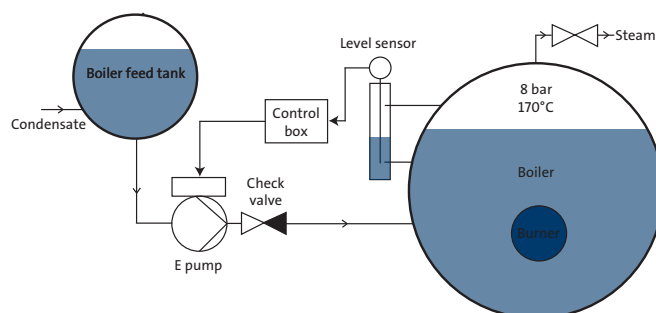
Of course, you can also pass on the opportunity to have a customised solution to your clients. If they have special requirements or challenges, talk to us. Maybe we can change things with just a few lines of code.



System layout - valve solution

Traditional solution for controlling the boiler feed pump - one of the two above solutions:

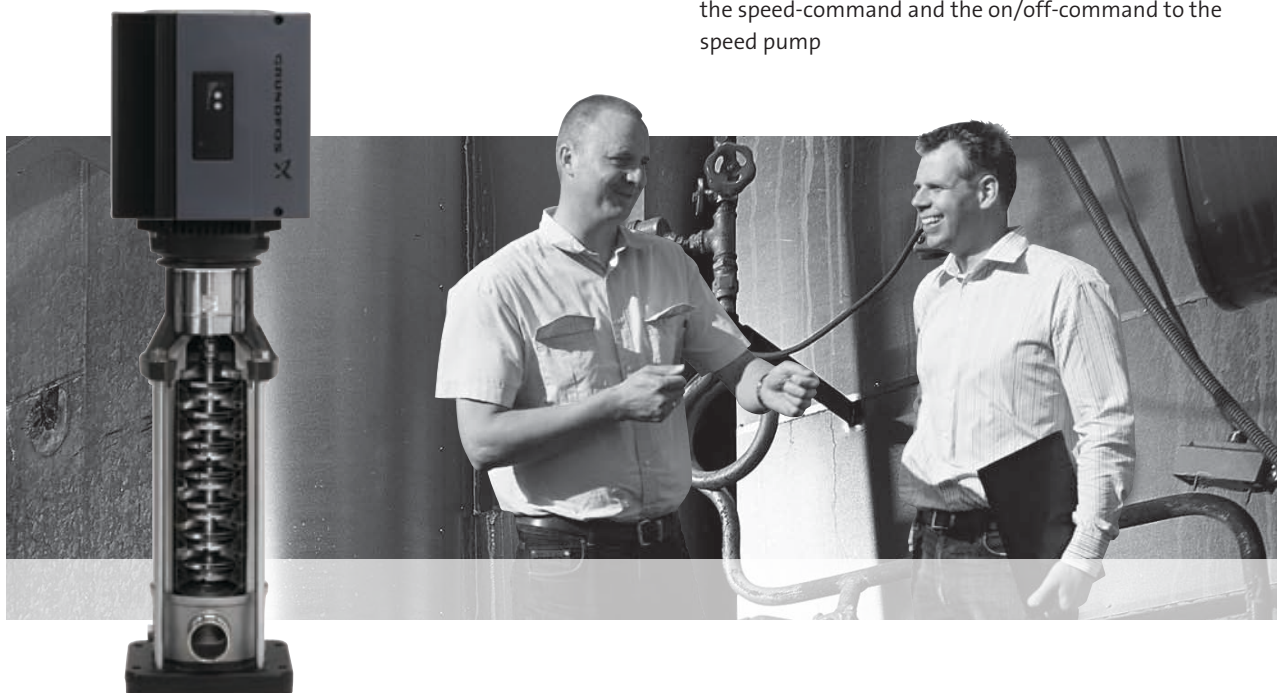
1. On/off pump controlled according to a start-level and a stop-level
2. Constant level control by means of a motorised feed valve, as shown above

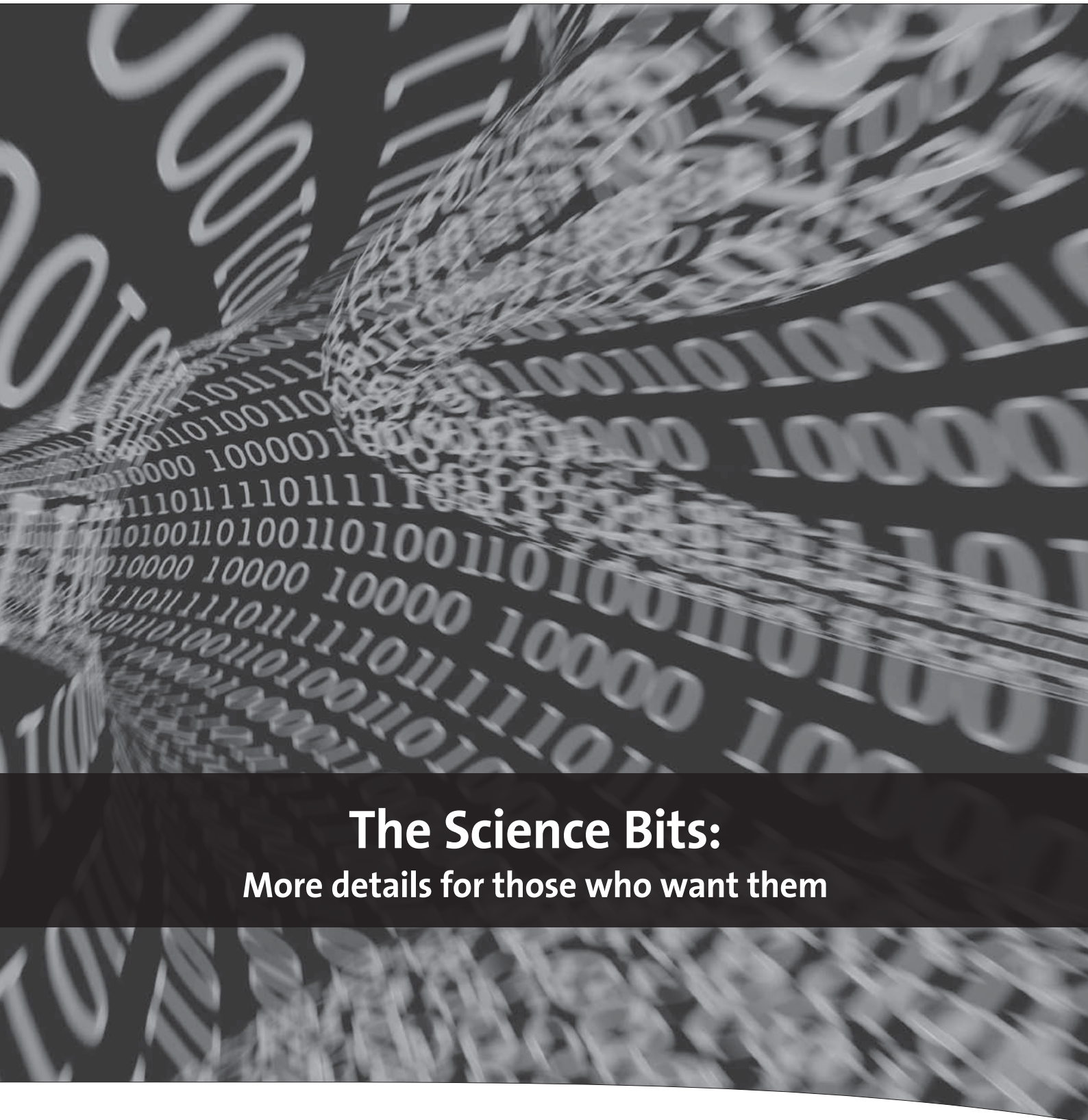


System layout - E-pump solution

Benefits:

1. The E-pump solution makes it unnecessary to have the expensive motorised feed valve, which cause pressure loss
2. The level sensor is connected to a control box which gives the speed-command and the on/off-command to the speed pump





The Science Bits: **More details for those who want them**

Your upgrades explained

The “Science Bit” is exactly what it says: It is where those with a keen interest in technical matters can check out how your dedicated system upgrade was created.

Creative software. Made for you.

The latest advances in software allow us to create completely customised solutions with very compact object code. Basically, that means our designers are free to think creatively about how your systems can be improved. And because it's all done with software, they can target your challenges very, very specifically, making the hardware do exactly what is best for you. Nothing else.

Essentially, we change the hardware without touching it. You won't see any difference. Your installations remain the same. But it feels like you have a different, more powerful and more accurate pump installed.

Customised software **optimises** your system

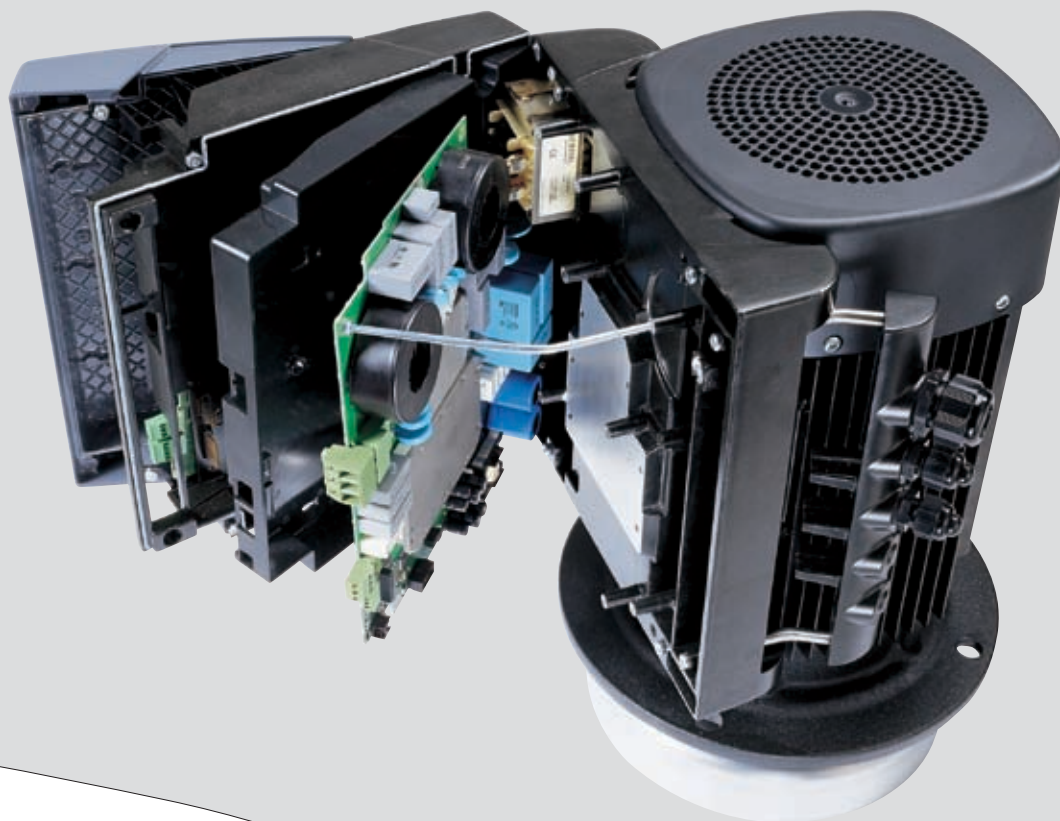
You can have code made just for you. That means we check out your system and find out exactly what the pumps need to do to – for example to keep the flow of feed water continuous and the water level even. Then we set them up to respond to sensor inputs by increasing or decreasing their speed.

You're welcome!

Customised software does more than optimise efficiency. It also essentially puts down the welcome mat and say “Come on in!” You get the functionalities you want embedded into the motor. And access to the data you want. Some customers prefer to let the MGE handle the operation loop, while others go for other control options. You can get it all from us.

Be your own expert with the Grundfos PC tool !

For those who want to carry out their own adjustments, the Grundfos PC tool gives you full access to optimising your software.





The Science Bits:

Push and pull the pump curve with software

We keep your **water levels level**. At all times

In any boiler tank application, a key objective is to maintain a constant water level in the tank, creating a stable surface to ensure stable steam generation. Using a motorised feed valve will enable you to maintain constant feeding.

Such equipment needs to be very accurate. Regulation must be carried out within a seriously narrow window; you need fast, yet smooth responses to changes in operating conditions. That presents special challenges. And is often costly.

Sensors and software meet specific demands

Grundfos has met those challenges with a combination of sensors and customised software. For example, we might use a level sensor to monitor water levels instead of pressure – our experts know that it's impossible to get an accurate “spot” reading of pressure. Combined with software to make the pumps take appropriate countermeasures, such an installation can seriously reduce costs.

One client, for example, now has a system that knows exactly which pump speed to use when the water reaches a level just one cm above or below the set-point. All thanks to a lot of expertise, an ingenious use of sensors, and a little bit of code.

The rules don't apply to you anymore

Go beyond the set pump curves with Grundfos software

Compensating for labile pump curves

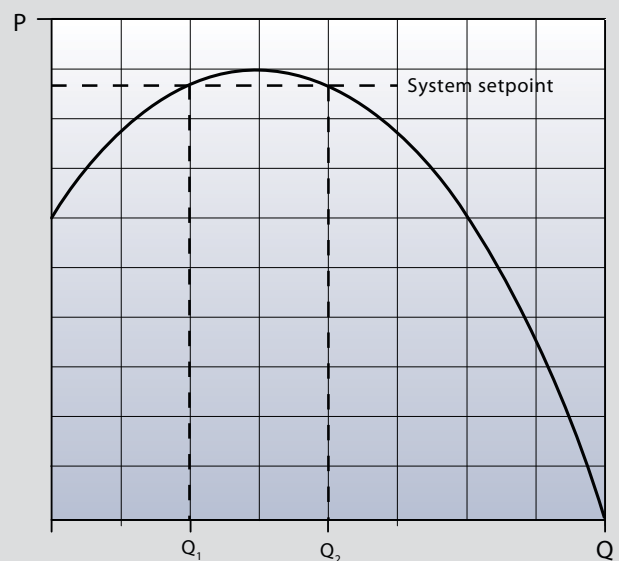
A very important benefit of the Grundfos software is its ability to compensate for labile pump curves. Effectively, it lets you go beyond the “official” pump curves to combine high pressure with high efficiency.



One of the unique features of boiler feed systems is that you get very little pipe loss, but in return you are going up against a high counter-pressure. Normally, you would strive to reach a position on the right-hand side of the pump curve. But in boiler feed applications, you want high pressure – i.e. to be near the vertical axis. That presents certain challenges.

Two matching setpoints? Not good.

These days, a desire to make standard pumps as efficient as possible in standard applications means that they have labile pump curves: the pressure falls as the curve approaches the vertical axis. That's why you get two points that would match the pressure setpoint. Getting the wrong one would mean taking in too much water.



The CR range from Grundfos

Grundfos was the first company ever to develop a multistage in-line pump. The present-day CR pump series is the most extensive in-line pump programme on the market and remains second to none. With many innovative features unique to Grundfos, CR pumps provide superior reliability and the lowest possible cost of ownership to customers worldwide.

Customisation made easy

In order to meet all customer requirements with complete precision, Grundfos has developed a unique mix-and-match approach to customised pumps. The elements of the CR range can be combined any which way to create the solution that is exactly right for you.

Grundfos: a pump for every purpose

Impressive as the CR range is, Grundfos offers much more. A complete range of pump solutions means that all applications – industrial and domestic – can benefit from the Grundfos touch.

Customers can always rely on our complete dedication to quality and service.