

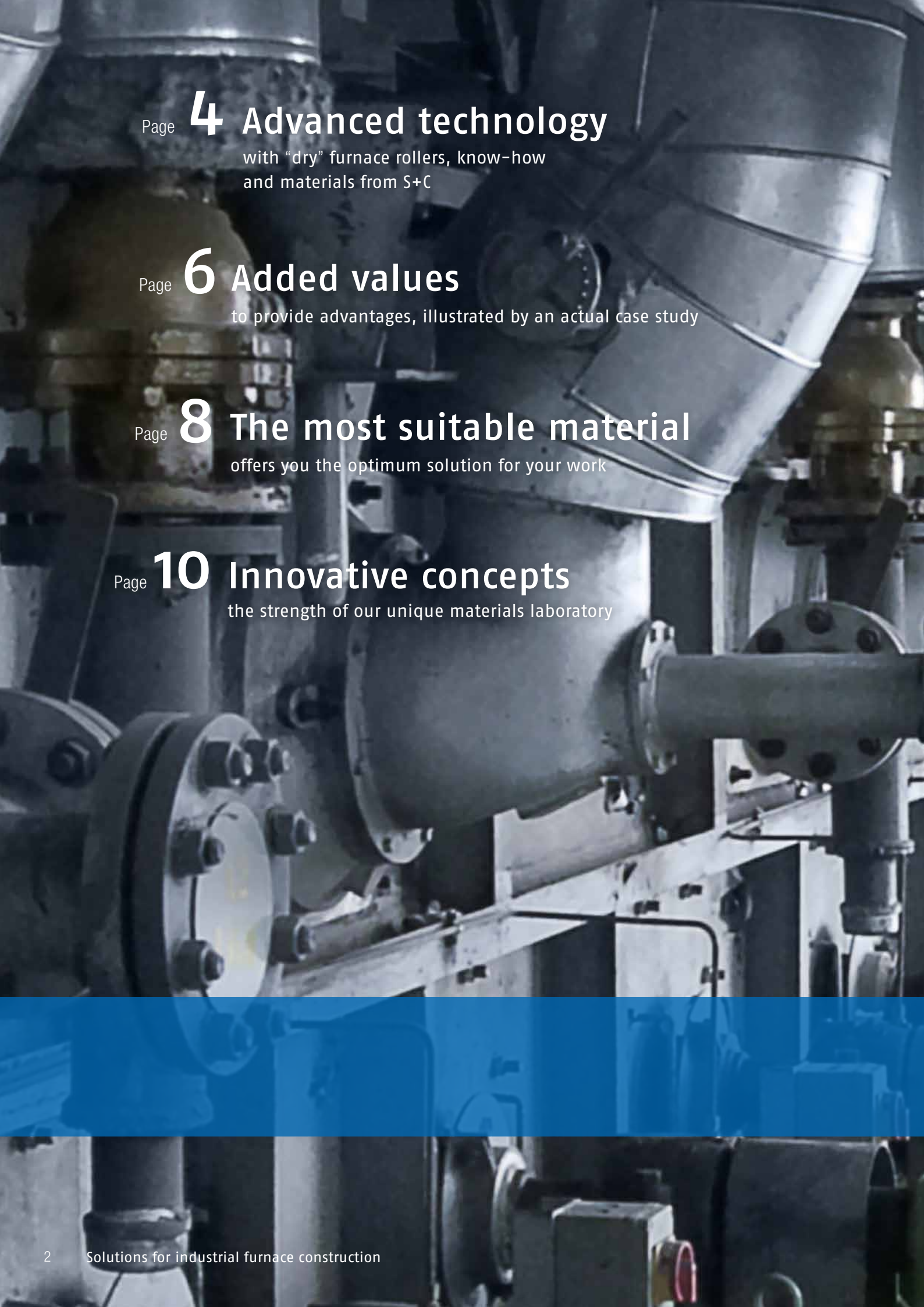


S/C

Superior when things get hot

Solutions for industrial
furnace construction

Schmidt + Clemens Group

The background of the entire page is a detailed, high-contrast photograph of industrial machinery, specifically large rollers and structural components of a furnace. The lighting is dramatic, with strong highlights and deep shadows, emphasizing the metallic textures and complex geometry of the equipment.

Page **4** **Advanced technology**
with “dry” furnace rollers, know-how
and materials from S+C

Page **6** **Added values**
to provide advantages, illustrated by an actual case study

Page **8** **The most suitable material**
offers you the optimum solution for your work

Page **10** **Innovative concepts**
the strength of our unique materials laboratory

Why Schmidt + Clemens?

Furnace rollers with built-in advantages

There are generally two types of furnace rollers: Firstly water-cooled rollers, the main advantage of which are their low procurement costs. The maximum working temperature of these rollers is 1,180 °C, and their service life is about two years.

The alternative are uncooled “dry” furnace rollers. Their procurement price is higher, but the maximum working

temperature is identical or higher. Their service life can be, depending on the furnace conditions, over twice to three times as long. This – in a direct comparison of the operating costs – is precisely where dry furnace rollers achieve a crucial economic advantage.



The advantages of dry furnace rollers compared with water-cooled furnace rollers:

- On average 90 % less heat loss
- Lower energy usage
- Lower maintenance costs
- No water storage / water supply systems required

S+C furnace rollers bring additional advantages: Our innovative material Centralloy® 60 HT R increases the maximum working temperature to 1,250 °C, and the service life is again extended. For other requirements and temperatures ≤ 1150 °C, our material selection on page 8 is available.

Advanced technology



Rotary kiln drums e.g. made from Centralloy® 60 HT R

For use in indirectly fired rotary kilns for the thermal treatment of pigments, metal powder and other bulk materials.

Characteristics:

- Material heat-resistant up to 1,250 °C
- Tube segments spun cast, flanges rolled or forged, machined and welded as per the drawing
- Diameter from 50 to 1,350 mm
- Length up to 20 metres
- Delivered ready to install
- Longer service life compared to standard materials

Pusher tubes made from heat-resistant stainless steel

For use in pusher type reduction furnaces, for example for making tungsten carbide powder.

Characteristics:

- Material heat-resistant up to 1,250 °C
- Horizontally spun cast, machined and welded as per the drawing
- Diameter from 100 to 250 mm
- Length up to 15 metres
- Suitable for a hydrogen atmosphere
- Static-cast reduction boats

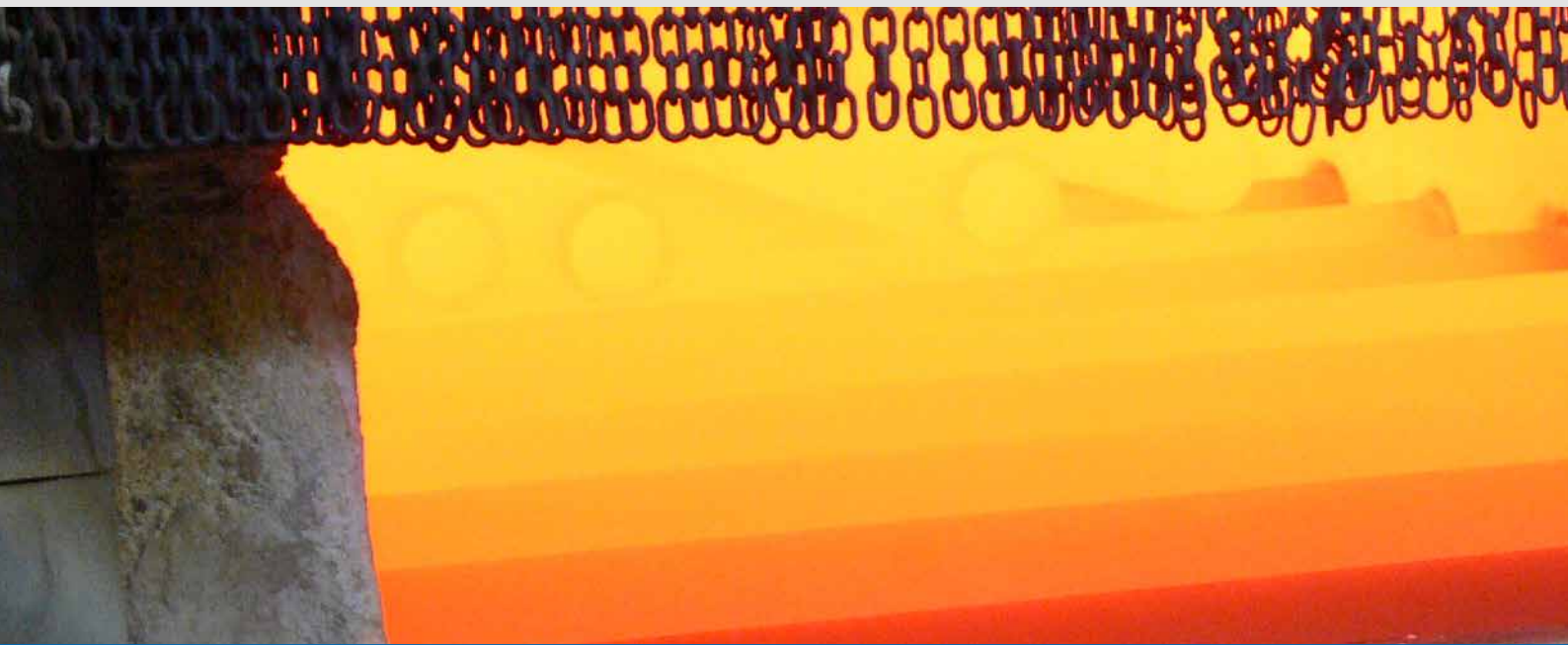


Case study: Conveyor Rollers in a heat equalization furnace

Following in-depth consultation by S+C, a customer who previously used water-cooled furnace rollers in their furnace changed over to “dry” furnace rollers made from Centralloy® 60 HT R.

The higher procurement costs compared with the usual water-cooled rollers were offset by lower operating costs and other advantages:

	Water-cooled, refractory cement	Water-cooled, fibre wool	Dry 360 mm	Dry 425 mm
Energy consumption (GJ/tonne)	0.7	0.6	0.45	0.45
Energy costs (million USD/year)	7.200	6.200	4.700	4.700



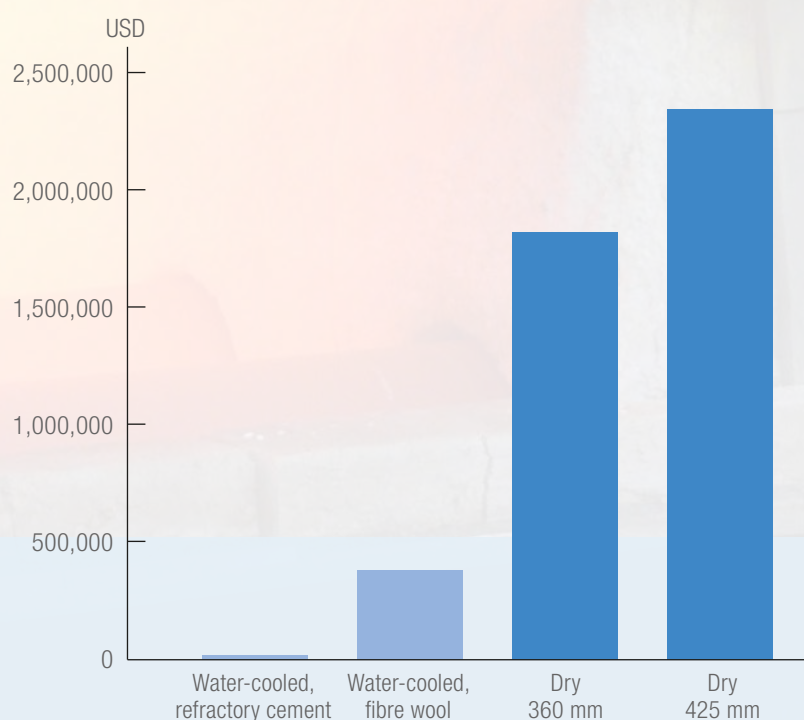
Added values

Changing over to dry furnace rollers made from Centralloy® 60 HT R (360 mm or 425 mm) reduced energy consumption and therefore energy costs by up to 35 % annually. Taking as a basis the entire plant of our customer (capacity 4 million tonnes/year) and taking into account the longer service lives of our rollers, (50 to 125 %), savings of between 1.8 and 2.5 million USD are achieved per year!

The lower energy input and the lower raw material requirement (for manufacturing the rollers) have another advantage: Both protect the environment, something that is of increasing importance to companies pursuing sustainability.

	Water-cooled, refractory cement	Water-cooled, fibre wool	Dry 360 mm	Dry 425 mm
Σ Costs/run time (USD)	17,000,000	19,000,000	20,000,000	27,000,000
Service life (years)	2	2	3	4.5
Ø Costs/year (USD)	8,500,000	7,900,000	6,670,000	6,000,000
Ø Savings/year (USD)	Reference	400,000	1,830,000	2,350,000

Savings/year (USD)



You have the requirements, we have the solution

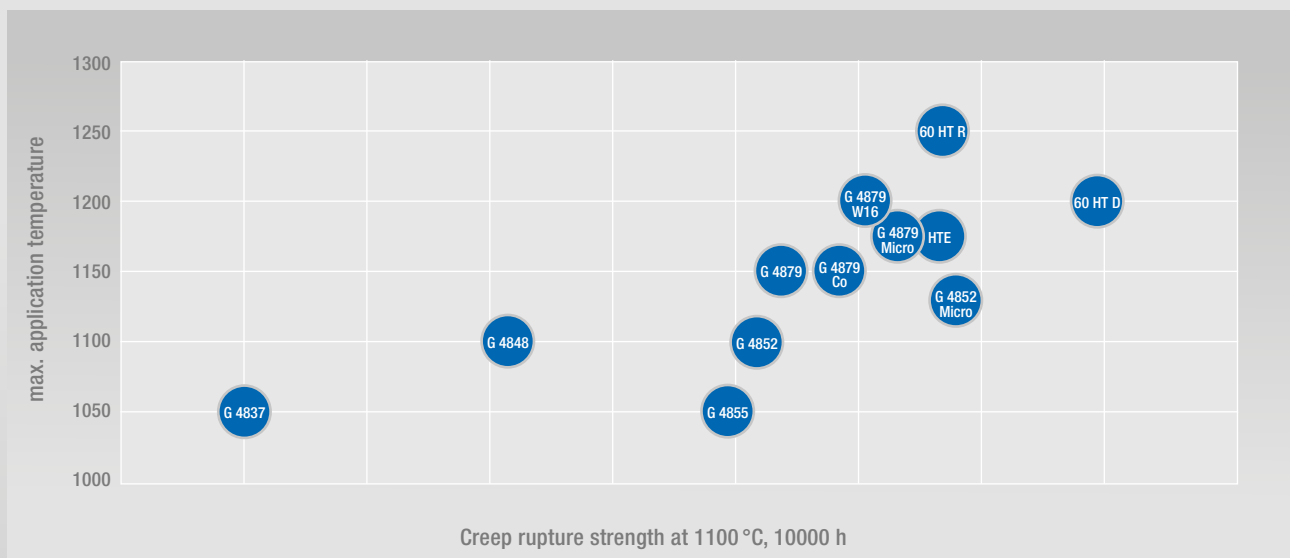
Our many years of experience in the field of industrial furnaces have seen us develop an extensive range of materials. This enables us to offer you at least one optimum solution for your actual plant and production situation.

At the same time we are working on expanding our range in a practical way. This is very often done through the close contact with our customers: When a challenge

emerges that cannot be optimally overcome using the existing material, we develop a new one.

This can result in a material that is like a fingerprint of a specific application. However, new findings and experiences are also incorporated into our “series production” and ensure that the S+C range of materials is not just extensive but also always up-to-date.

Comparison of common heat resistant alloys

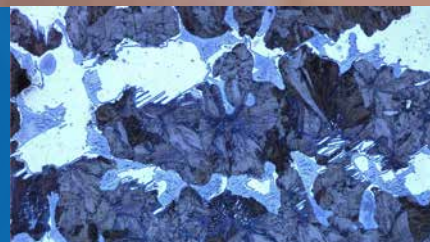


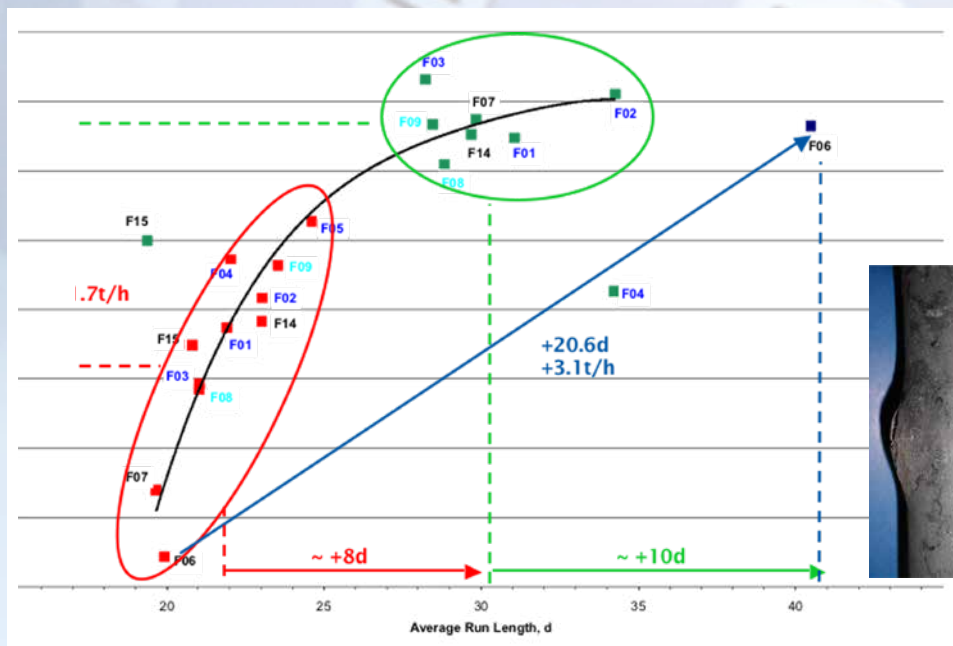
The most suitable material

The following table provides a general overview of materials that S+C offers in its standard range.
We would be happy to provide you with more detailed technical information – just call us or send us an e-mail.

Heat-resistant stainless steel centrifugal casting

Centralloy®/ Märker®	Material-No.	Abbreviation	Analysis / reference values in %							≈ ASTM	Maximum application- temperatur (air) in °C
			C	Cr	Ni	Si	Mn	W	Miscellaneous		
G 4823	1.4823	GX40CrNiSi27-4	0.40	27.00	4.00	2.50	1.50	-	-	HD	1100
G 4825	1.4825	GX25CrNiSi18-9	0.25	18.00	9.00	2.50	1.50	-	-	HF	900
G 4826	1.4826	GX40CrNiSi22-10	0.40	22.00	10.00	2.50	1.50	-	-	HF	950
G 4827	1.4827	GX8CrNiNb19-10	0.08	19.00	10.00	1.50	1.40	-	Nb	-	800
G 4828	1.4828	GX15CrNiSi20-12	0.15	20.00	12.00	2.00	1.30	-	-	-	1000
G 4837	1.4837	GX40CrNiSi25-12	0.40	25.00	12.00	2.50	1.50	-	-	HH	1050
G 4848	1.4848	GX40CrNiSi25-20	0.40	25.00	20.00	2.50	1.50	-	-	HK40	1100
G 4849	1.4849	GX40NiCrSiNb38-19	0.40	18.00	38.00	2.00	1.50	-	Nb 1.3	-	1020
G 4852	1.4852	GX40NiCrSiNb35-26	0.40	25.00	35.00	2.00	1.50	-	Nb 1.5	HP + Nb	1100
G 4852 Micro	1.4852 mod.	GX45NiCrSiNbTi35-25	0.45	25.00	35.00	1.50	1.00	-	Nb 1.5 / Ti	-	1130
G 4855	1.4855	GX35CrNiSiNb24-24	0.35	24.00	24.00	2.00	1.50	-	Nb 1.5	(In 519)	1050
G 4857	1.4857	GX40NiCrSi35-25	0.40	25.00	35.00	2.50	1.50	-	-	HP	1100
G 4859	1.4859	GX10NiCrNb32-20	0.10	20.00	32.00	1.50	1.50	-	Nb 1.0	CT 15 C	1050
G 4859 Micro	1.4859 mod.	GX10NiCrNbTi32-20	0.10	20.00	32.00	1.00	1.50	-	Nb 1.0 / Ti	-	1050
H 101	-	GX13NiCrNb37-25	0.13	25.00	37.00	1.30	1.50	-	Nb	-	1000
G 4868	1.4868	GX50CrNi30-30	0.50	30.00	30.00	2.50	1.50	-	-	-	1150
G 4879	2.4879	G-NiCr28W	0.45	28.00	48.00	1.50	1.50	5.00	-	-	1150
G 4879 Micro	2.4879 mod.	G-NiCrTi28W	0.50	28.00	48.00	1.00	0.75	5.00	Ti	-	1175
G 4879 Co	-	GX48NiCrWCo48-28-5-3	0.45	28.00	48.00	1.50	0.70	5.00	Co 3.0	-	1150
G 4879W16	-	Special alloy	0.20	32.00	50.00	0.30	0.30	16.00	Al	-	1200
ET 35 Co	-	G-NiCrCoW	0.50	28.50	35.00	1.50	1.50	6.00	Co 15.0	-	1175
ET 45 Micro	-	GX45NiCrSiNb4535	0.45	35.00	45.00	1.60	1.00	-	Nb 1.0 / + Add.	-	1150
G 4816	2.4816	G-NiCr15Fe	0.10	15.00	72.00	0.50	1.00	-	Nb / Al / Ti	-	1100
HTE	-	Special proprietary alloy	0.45	30.00	45.00	-	-	-	Nb / Al 4.0	-	1175
60 HT D	-	Special proprietary alloy	0.45	27.00	60.00	-	-	-	Nb / Al 3.0	-	1200
60 HT R	-	Special proprietary alloy	0.45	27.00	60.00	-	-	5.00	Nb / Al 4.0	-	1250





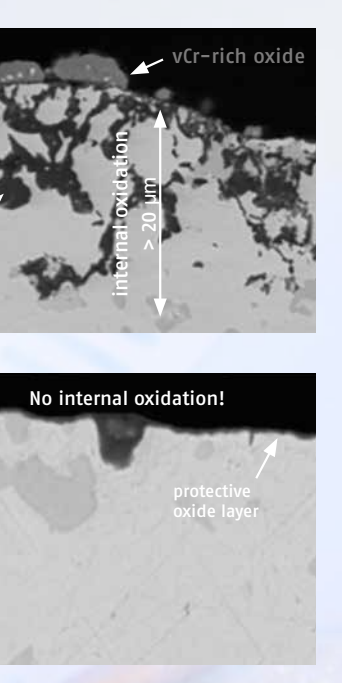
Innovative concepts

So that you “stay ahead”

Basically, our R+D department has just one task: Discovering added values to provide advantages for you in all aspects relating to materials, designs and applications.

These include metallurgical examinations of damaged components that uncovers much more than just the precise cause of the damage. You also receive detailed suggestions on how to avoid similar problems in future by using a different material or a modified design.

At the same time our materials laboratory – incidentally the industry’s largest and most modern – is a hotbed of material innovations. This gives you the assurance that everything will be in line with the state of the art at all times and enable you to follow new paths at an early stage.



Delivery program

- Furnace rolls
- Current rolls for electrolytic galvanizing
- Pusher tubes
- Radiant tubes
- Rotary kilns
- Retorts





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How can we assist you?

Schmidt + Clemens meets the multi-faceted challenges in industrial furnace construction. Put us to the test and experience how mutually satisfying, cost effective, and reliable collaboration with us can be. See for yourself our intelligent product alternatives.



We are ready

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