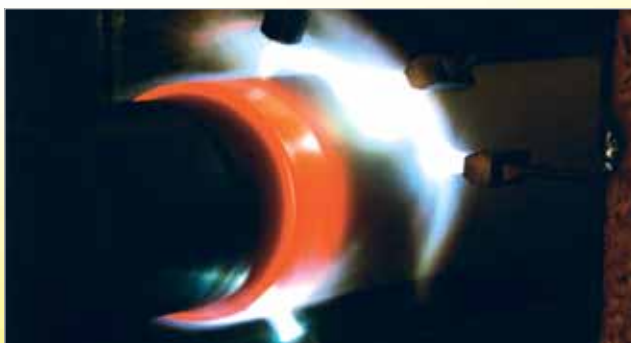


Metal Wear Protection KALMETALL ...

**Preferred Choice for Heavy Sliding and Impact Wear**



Kalenborn offer a comprehensive range of metallic wear protection which includes:

■ **KALMETALL-W  
hard overlay welding**

Composed of alloys characterized by very high chromium and carbon content on a tough substrate made of structural steel or special steel

■ **KALMETALL-C  
hard casting**

Chromium hard casting or manganese hard casting with high resistance to sliding and/or impact wear

■ **KALMETALL-HM  
hard metal**

Sintered tungsten carbide tiles with a good hardness/toughness ratio soldered on a tough substrate

■ **KALMETALL-S  
hard material spray**

Hard to very hard sprayed-on plasma layers of nickel-chromium alloys enabling optional addition of tungsten carbide which are sintered on tough substrate

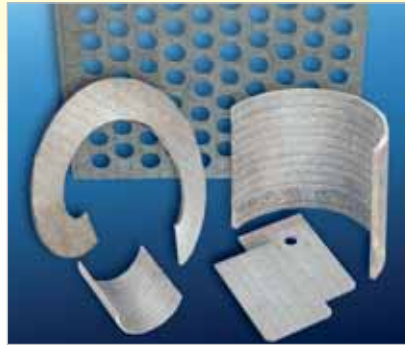
■ **KALMETALL-HB  
hard steel**

Hardened wear resistant steels subjected to a special thermo-mechanical treatment

The use of material combinations is of special importance to plant operators. It is true, in particular, for combinations of metal and ceramic wear protection.

# Full Range of KALMETALL Metal Wear Protection

## KALMETALL-W Hard Overlay Welding



*Very good wear protection  
on large surfaces*

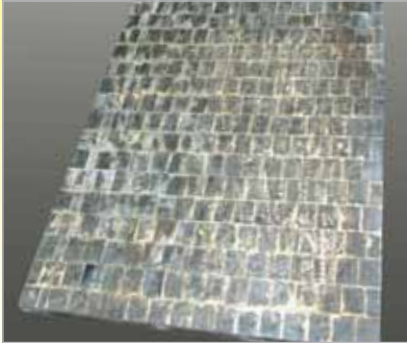
## KALMETALL-C Hard Casting



*Very good wear protection for  
series-produced items or for  
complex geometries*

<b>Design</b>	<p>Hard overlay welding made up of alloys with very high chromium and carbon content on tough substrate of structural steel or corrosion and/or heat resistant steel</p> <p>Cuts and tailor-made shaping of the flat sheets are just as feasible as the lining of individual components</p>	<p>Chromium hard casting or manganese hard casting</p> <p>The various shapes and geometries are cast in individual moulds</p>
<b>Alloy of wear protective layer</b>	Basic iron alloys of very high chromium and carbon content enabling further wear inhibiting alloys to be added	Basic iron alloys of very high chromium, manganese and carbon content enabling further wear-inhibiting alloys to be added
<b>Hardness</b>	700 to 820 HV	580 to 700 HV
<b>Wear resistance</b>	Very good	Good to very good
<b>Impact strength</b>	Good to very good	Good
<b>Maximum temperature</b>	Up to 750 °C / 1,382 °F	Up to 350 °C / 662 °F
<b>Thermal shock resistance</b>	Good	Medium
<b>Maximum dimensions</b>	<p>Sheets up to 1,900 x 3,900 mm</p> <p>Hard overlay welding from 3 to 18 mm</p> <p>Substrate from 5 mm upward</p>	<p>Wall thickness from 15 mm upward</p> <p>Total weight ranging from 2 kg to 8,000 kg</p>
<b>Typical applications</b>	Lining of mixers, bunkers, chutes, pipes, screens, hoppers, etc.	Mixer linings, mixing tools, hammers, grinding rollers and grinding plates
<b>Advantages</b>	<p>Well suited for special solutions</p> <p>Wear protection on large surfaces</p> <p>May be used as structural material</p>	<p>Well suited for series-produced items</p> <p>Wear protection for complex geometries</p> <p>Very good wear protection reserve</p>

**KALMETALL-HM  
Hard Metal**



**Extreme wear protection**

**KALMETALL-S  
Hard Material Spraying**



**Wear protection exactly matched to specific surface**

**KALMETALL-HB  
Hard Steel**



**Cost-effective wear protection on large surfaces**

<p>Sintered tungsten carbide shapes with a good hardness/toughness ratio which are soldered on a tough substrate</p> <p>Complex surfaces and sizes can be lined</p>	<p>Hard to very hard sprayed-on plasma layers of nickel-chromium-boron alloys with optional addition of tungsten carbide which are sintered on a tough substrate</p> <p>Practically no restrictions as to surface, shape and size</p>	<p>Hardened wear resistant steels with a special thermo-mechanical treatment</p> <p>Cuts and tailor-made shapes of the flat sheets are feasible</p>
<p>Sintered parts made of tungsten carbide and cobalt/nickel</p>	<p>Nickel-chromium-boron alloys with individually adjustable portions of tungsten carbides from 0% to 50%</p>	<p>Close grained treated steel of approx. 0.2% carbon and approx. 1% chromium</p>
<p>1,600 HV</p>	<p>Up to 680 HV for the basic substrate 1,600 HV for die embedded hard phase</p>	<p>400 to 500 HB 420 to 530 HV</p>
<p>Very good</p>	<p>Very good</p>	<p>Good</p>
<p>Very good</p>	<p>Good</p>	<p>Very good</p>
<p>Up to 350 °C / 662 °F</p>	<p>Up to 500 °C / 932 °F</p>	<p>Up to 250 °C / 482 °F</p>
<p>Good</p>	<p>Good</p>	<p>Good</p>
<p>Dimensions 20 x 20 mm Thickness ranging from 2 to 5 mm</p>	<p>—</p>	<p>Sheets from 1,000 x 1,350 Thickness from 4 to 130 mm</p>
<p>Mixing tools, scrapers, fan blades, housing linings</p>	<p>Screens, protective sleeves, cyclones, tools, knives</p>	<p>Screens, mixer linings, fan blades, housings, chutes</p>
<p>Well suited for special solutions in case of extreme wear stress</p>	<p>Even existing parts can be protected against wear Wear protection exactly matched to specific surface is feasible</p>	<p>Cost-effective solution for moderate wear Wear protection for large surfaces Can be used as structural material</p>

# KALMETALL Highlighted by Beneficial Properties: The Optimal Solution even for Complicated Wear Problems

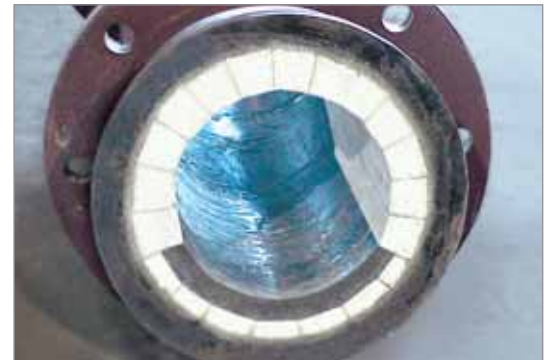
## Preferred use of metallic wear resistant materials

Use	Examples	KALMETALL
High temperatures	Clinker chutes, clinker coolers, Sinter crushers, sinter coolers	W C, W
Intense temperature changes	Coke benches (skirting boards)	W, S, C, HB
Heavy impact stress	Impact zones in bunkers Belt transfer points Mill lining Crusher linings	W C, W, HB C, W, HB C, W, HB
Strong dynamic forces acting on the components	Fan blades Separator blades	W, HM W, HM, HB
Self-supporting structures	Screens	C, W, S, HB
Attachment problems	Flights of screw conveyors	C, W, HB, HM

## KALMETALL well suited for material combinations



*Use in a shredder system for plastic waste:  
KALMETALL-C and KALCRET*



*Impact protection in the extrados:  
KALMETALL-HM combined with KALOCER  
high alumina ceramics as pipe brick material*

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**The Wear Protection People**