VAUTID®

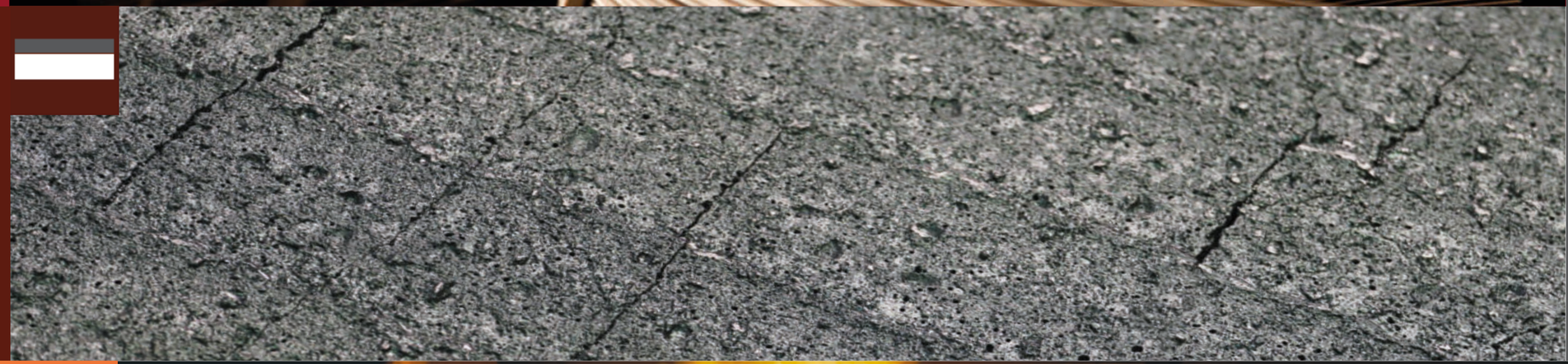
Pioneering Wear Protection

VAUTID ASW hardfacing welding consumables

VAUTID hardfacing welding consumables can be used in a great variety of applications. They offer a solution to different problems protecting high-wear components in plant and machinery.

VAUTID VVP composite wear plates

Extended service lifetimes on high-wear surfaces become a reality with VAUTID composite wear plates which are an efficient, use-anywhere solution.



VAUTID GUSS cast products

VAUTID has extensive experience as a supply chain partner for high wear-resistance cast components, which are manufactured to customer specifications.

INNOVATION FROM THE INVENTOR: FOR PROFITABLE OPERATION AND LONG SERVICE LIFE

“ With our innovative spirit and over 70 years of experience in wear protection, we develop leading system solutions in casting and welding technologies worldwide.”

VAUTID wear plate production.

■ The driving force behind the evolution of wear protection technology was Dr. Hans Wahl, who in 1934 made ground-breaking discoveries regarding wear resistance while developing a coal dust engine. With this knowledge, he founded VAUTID Verschleißtechnik in 1945. Over the course of the next 30 years, the company developed from a modest engineering firm into a consulting and manufacturing company – the world's leading system specialist in wear protection through casting and welding technology.

■ Today, the international VAUTID Group employs around 350 staff members in 10 offices, research laboratories, production sites, and a dense distribution network spanning all continents. The group of companies is growing once again. VAUTID provides industry-specific wear protection solutions from a single source – from consulting to design, simulation, research and development, all the way through to the finished product.

A PIONEER IN WEAR PROTECTION SINCE 1945

Only machines and industrial systems that operate efficiently can generate profits. Continuous, low-maintenance operations and a long service life ensure sustainable business success. The road to prosperity is made possible through innovative VAUTID wear protection in casting and welding technology.

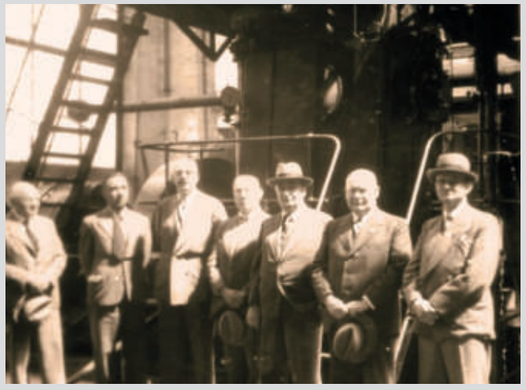
VAUTID for manufacturers and end users. VAUTID system solutions are designed for original industrial plant equipment and process engineering machinery as well as the subsequent protection and regeneration of elements exposed to wear. VAUTID plans, develops and manufactures comprehensive wear protection solutions. Custom-tailored VAUTID concepts are perfectly aligned in terms of technology and economy and ensure reliable, profitable production.

VAUTID continues to set the standard: V100 has been the #1 product in the industry in metal-based wear protection for over 65 years.

Consistent performance and return on investment with VAUTID

VAUTID consulting and design. Our goal is to develop the best solutions for reducing wear in original equipment operation and maintenance of systems and machines. To achieve this goal, VAUTID engineers analyze your requirements, prepare a fail-safe diagnosis and design a custom solution for protecting wear-exposed parts. The right VAUTID materials are selected to ensure optimum protection against wear, corrosion or heat. VAUTID uses its expertise to cut wear costs and maximize the service life of the equipment.

The founder and pioneer of metal-based wear protection was Dr. Hans Wahl



VAUTID grew out of research. With the development of the coal dust engine, Dr. Wahl also helped further the concept of wear protection

VAUTID wear research laboratory with oven for heat treatment examinations.

GROUND-BREAKING IDEAS AND SUPERIOR TECHNOLOGIES

VAUTID products for manufacturers and end users.

Optimal wear protection for mechanical processes such as crushing, mixing, conveying, extraction, storage, agglomeration, and separation in a wide variety of industries:

- mining
- metallurgy
- concrete and cement
- asphalt
- brick manufacturing
- construction
- coal-fired power plants
- waste incineration
- quarries, building materials, sand, gravel, crushed stone
- recycling
- steel and iron
- pharmaceuticals and chemicals

With its international focus on all major markets, innovative spirit and "Made in Germany" attention to detail, VAUTID guarantees each customer top-of-the-line system solutions and materials that are not just ahead of their time but that ensure perfect quality on the spot.

VAUTID research and development. To ensure maximum wear protection, VAUTID focuses all of its strengths on developing leading, innovative, metallurgic and constructive solutions to wear problems. In the VAUTID wear laboratory, a wide variety of structural tests, strength tests, and analyses (such as FEM) are conducted. By using 3D-CAD designs, model building, and simulated solidification, VAUTID innovations are prepared for market faster and more reliably. By cooperating with universities and institutions and participating in government-backed research projects, VAUTID can incorporate cutting-edge knowledge to ensure a long service life and profitable operation.

VAUTID training sessions, seminars, conferences, and scientific lectures are a perfect complement to the VAUTID catalog of innovative products and solutions. Customers benefit from the latest wear expertise, which they can implement right away into their daily routines.

Proven a million times over and continuously developed

VAUTID production. As a specialist in comprehensive wear protection, VAUTID produces all of its materials in accordance with high VAUTID quality standards in its own production facilities. Here, special raw materials, careful attention to detail, and cutting-edge process engineering are combined with the expertise and commitment of our staff to produce VAUTID premium products. With the ongoing expansion of further production sites, VAUTID will be able to deliver even more highly customized solutions faster than ever before.

VAUTID quality assurance

VAUTID has been ISO 9002 certified since 1993 and ISO 9001 certified since 1996. All VAUTID deposition welding materials, composite wear plates, and casting products are developed, tested and produced in accordance with these strict quality requirements. This guarantees a consistently high standard for all VAUTID premium products.

VAUTID wear research laboratory: Quality control

Tailor-made VAUTID wear solutions: Cutterhead of a tunnel boring machine.
Courtesy of Herrenknecht AG, Schwanau-Allmannsweier

VAUTID deposition welding materials

The unique VAUTID product portfolio ranges from wear-proof deposition welding materials to composite wear plates to casting products – all offering first-rate protection for wear-susceptible parts in continuous abrasive operations.

VAUTID deposition welding materials can be applied universally and in a short amount of time. They provide long-lasting, cost-efficient protection for high wear-and-tear parts.

Advantages. VAUTID deposition welding materials can be applied quickly and are an especially efficient solution to a variety of wear problems on site. In order to meet every requirement in every field of application perfectly, VAUTID deposition welding materials are available in a variety of material types, alloys and qualities, including hardfacing welding materials, rust-free auxiliary welding materials, auxiliary repair welding materials and special materials. These materials are available as stick electrodes or tubular wire

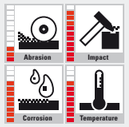
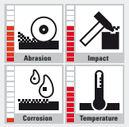
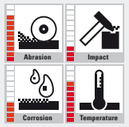
VAUTID deposition welding materials offer cost-efficient, lasting protection

Fields of application. Typical applications for VAUTID deposition welding materials include coating of mixing tools, hardfacing of excavator teeth, powder deposition welding of fan blades, hardfacing of bucket chain excavators and sinter crushers.

Manual hardfacing using VAUTID stick electrodes

VAUTID tubular wire

VAUTID hardfacing welding programme on iron base

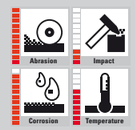
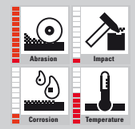
Forms of stress	Applications	VAUTID Type	Form	Alloy type	Hardness Vickers HV 30	Hardness Rockwell HRC
	buffer layers, rails, parts for chemical industry, joint welding	VAUTID 18/8/6	stick electrode tubular wire	X15CrNiMn1886	200 400*	40*
	buffer layers, rails, parts for chemical industry, for materials difficult to weld	VAUTID 30/9 (29/9)	stick electrode tubular wire	X10CrNi309	210	
	build-up and buffer layers, idlers	VAUTID 30	stick electrode tubular wire	low alloyed Fe, Cr, Si, Mn	300	30
	crushing heads, hammers for crushers, crushing jaws	VAUTID 50 (beta)	stick electrode tubular wire	high alloyed Fe, Cr, C, Mn	220 520*	10 50*
	crushing heads, hammers for crushers, crushing jaws	VAUTID 60 (gamma)	tubular wire	high alloyed Fe, Cr, C, Mn	220 450*	10 45*
	crushing jaws, dredger teeth	VAUTID 40 (alpha)	stick electrode tubular wire	high alloyed Fe, Cr, C, Mo	600	54
	sealing surfaces, impact bars, hammers for crushers	VAUTID 70 (delta)	stick electrode tubular wire	high alloyed Fe, Cr, C, Ti	650	57
	cone crushers, pick hammers, dredger teeth	VAUTID 80	tubular wire	high alloyed Fe, Cr, C, Mo	600	54
	top layer for hammers, excavator teeth, mixing blades	VAUTID 143	stick electrode tubular wire	high alloyed Fe, Cr, C, Nb	800	63
	screws, scrapers, mixer blades, chainwheels, top layer for teeth tips, crusher jaws	VAUTID 100	stick electrode tubular wire	high alloyed Fe, Cr, C	750	62
	screws, dredging bucket front edges, sieves, stirrer blades, top layer for teeth tips and crushing rolls	VAUTID 100 Mo	tubular wire	high alloyed Fe, Cr, C, Mo	750	62
	conveyor screws, bucket teeth, crusher jaws, grinding rollers	VAUTID 105	tubular wire	high alloyed Fe, Cr, B	800	63
	hammers for crushers, punching tools, shearing blades, drill heads	VAUTID 110	stick electrode	high alloyed Fe, Cr, C, Mo, V	690	59
	screws, gravel pumps,-bunbury mixers	VAUTID 150	stick electrode tubular wire	high alloyed Fe, Cr, C, B	880	66

VAUTID hardfacing welding programme on iron base

Forms of stress	Applications	VAUTID Type	Form	Alloy type	Hardness Vickers HV 30	Hardness Rockwell HRC
	sinter bars, coke pushers	VAUTID 100 T	stick electrode tubular wire	high alloyed Fe, Cr, C	750	62
	sinter crushers and bars	VAUTID 145	stick electrode tubular wire	high alloyed Fe, Cr, C, Mo, Nb, W, V	850	65
	furnace top bell facing, hot dust ducts, screens, sinter crushers, mixer components	VAUTID 146 Mining (VAUTID 176)	tubular wire	high alloyed Fe, Cr, C, V, Nb, B	850	65
	furnace top bell facing, hot dust ducts, screens, sinter crushers	VAUTID 147	stick electrode tubular wire	high alloyed Fe, Cr, C, Si, B	850	65
	mixer components for parts attacked by corrosion	VAUTID 100 C (VAUTID 100 K)	stick electrode tubular wire	high alloyed Fe, Cr, C, Ni, Mo	450	45

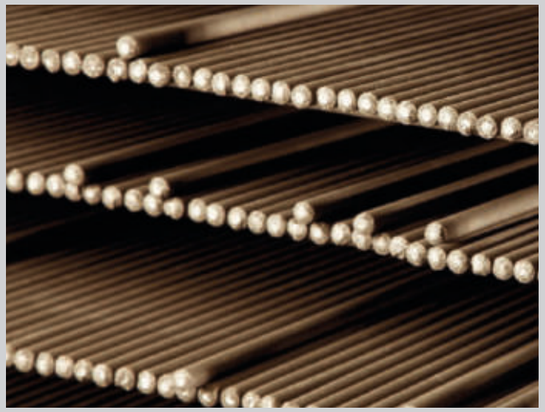
*cold hardened *cold hardened

VAUTID hardfacing programme on tungsten carbide base

Forms of stress	Applications	VAUTID Type	Form	Alloy type	Hardness Vickers HV 30
	scrapers, edges of augers, hammers, drill bits, cutting tools, impact bars	VAUTID Ultra 303 (Ultra III)	coated wire	W2C in nickel matrix	matrix: 500 HV W2C-grain: 2000 HV
	scrapers, edges of augers, hammers, drill bits, cutting tools, impact bars	VAUTID Ultra 305 (Ultra V)	tubular wire	W2C in nickel matrix	matrix: 600 HV W2C-grain: 2000 HV
	edges of augers, rock drills, mixer blades	VAUTID Ultra 301 (Ultra I)	filled rod	W2C in iron matrix	matrix: 600 HV W2C-grain: 2000 HV
	scrapers, plough shares, grinding segments	VAUTID V Ultra 302 (Ultra II)	stick electrode	W2C in iron matrix	matrix: 850 HV W2C-grain: 2000 HV
	scrapers, plough shares, grinding segments	VAUTID V Ultra 304 (Ultra IV)	tubular wire	W2C in iron matrix	matrix: 850 HV W2C-grain: 2000 HV

VAUTID®

Repair and Buffer	Impact	Impact and Abrasion	Abrasion	Temperature and Abrasion	Corrosion and Abrasion	Extremely high Abrasion
VAUTID 18/8/6	VAUTID 50	VAUTID 40	VAUTID 100	VAUTID 100 T	VAUTID 100 C	VAUTID Ultra 301
VAUTID 30/9	VAUTID 60	VAUTID 70	VAUTID 100 Mo	VAUTID 145	VAUTID Ultra 303	VAUTID Ultra 302
VAUTID 30		VAUTID 80	VAUTID 105	VAUTID 146 Mining	VAUTID Ultra 305	VAUTID Ultra 303
		VAUTID 143	VAUTID 110	VAUTID 147		VAUTID Ultra 304
			VAUTID 150			VAUTID Ultra 305



VAUTID hardfacing material as stick electrodes

VAUTID hardfacing material as tubular wire

VAUTID tubular wire production

VAUTID tubular wire (barrels)

VAUTID wear solutions. Formed wear plates in powder chime

VAUTID composite wear plates

VAUTID products employ efficient technologies to help extend the service life of system and machine parts subject to heavy loads. Universal composite wear plates provide robust wear protection and ensure low wear costs over the long term.

With its extensive product portfolio designed for a wide variety of individual wear issues, VAUTID is the world's leading specialist in comprehensive wear protection.

Advantages. VAUTID composite wear plates are wear-proof and long-lasting. The hard-surface layer can be made to suit the specific application. The plates are also easily installed through back-side welding or bolting. Composite plates are available in a variety of dimensions and qualities. Plates can be cut to size to conform to drawings and heated or cooled to attain the desired shape – for extremely cost-effective and fast wear solutions in a wide variety of applications and industries.

VAUTID composite wear plates can be individually installed and are extremely long-lasting

Fields of application. VAUTID composite wear plates are used where wear protection is desired as a self-supporting structure on large surface areas with no supporting substructure. They guarantee maximum operational reliability, even under high mechanical load. Sample applications include strainers, hopper linings, vibration conveyors, fan impellers, casings, mixers, cyclone separators, and sifters.

Production of VAUTID wear plates

VAUTID wear plate

VAUTID wear plates – available forms and shapes

1. Standard sheets and thicknesses (mm)

Coated surface

2.400 x 1.150	2.900 x 1.400
from 3+3	from 5+3
to 25+5/20+10	to 25+5/20+10

Base materials

- Steels (e.g. 1.0038, 1.0570)
- Fine grain steels (e.g. 1.89…)
- Hot steels (e.g. 1.7335…)
- Heat resistant steels (e.g. 1.4878…)
- Corrosion resistant steels (e.g. 1.4301…)

2. Special sizes

Up to largest sizes of 1.900 x 3.900 mm from 6+4 to 25+5/ 20+10 mm

3. Plates cut to size

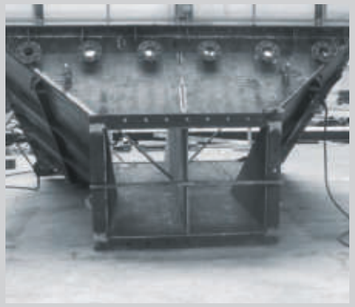
from 50 x 50 mm	
square boring from	4 x 4 mm
circular boring from	Ø 3 mm
tear shape boring from	Ø 3 mm
slots from	1.5 mm

4. Formed plates

Simple cold forming is possible only with VAUTID wear plates because of their low dilution between weld deposit and base material. The smallest cold-rolled diameter is 400 mm.

5. Installation-ready fabrications

- Pipes from 400 mm Ø
- Screens with different perforations
- Chutes
- Cyclones
- Elbows
- Troughs
- Distribution chutes
- Ventilators etc.



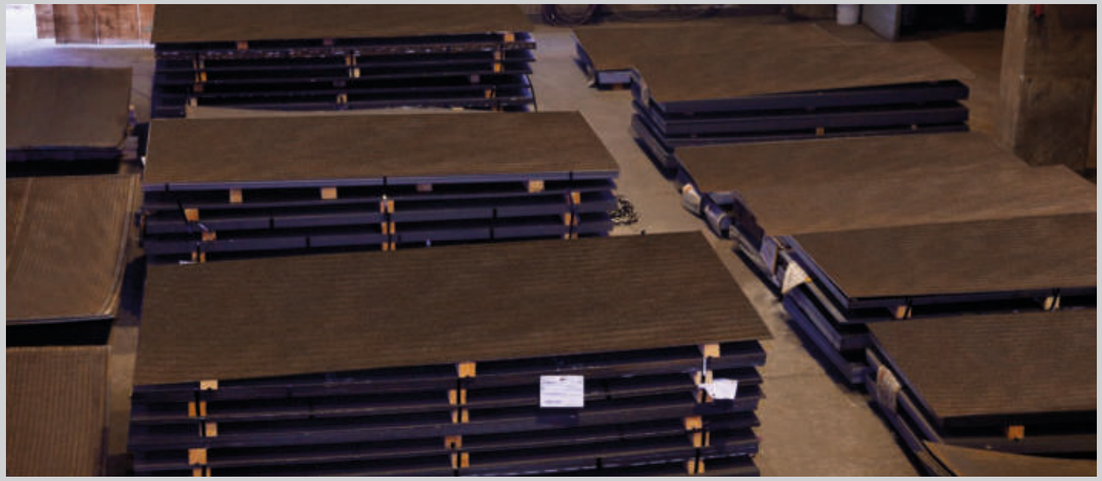
VAUTID wear plates

Qualities of VAUTID wear plates

Weld deposit analyses

VAUTID wear plates are produced in the following qualities Hardness according to DIN 32525-4

Qualities	Hard materials	Binderphase	Binderalloys	Hardness in Vickers	Applications
VAUTID 100	Chromium Carbides	Fe/Austenite	Mn	pure weld deposit ca. 700 HV 10	linings of ventilators, separators, cyclones, linings of mills in the cement and coal industry, screens in the iron and steel industry
VAUTID 100T	Chromium Carbides	Fe/Austenite	Ni, Mn	pure weld deposit ca. 700 HV 10	linings of fans for operating temperatures up to 550 °C, screens in the iron and steel industry for operating temperatures up to 550 °C
VAUTID 130	Chromium + Boron carbides	Fe/Austenite	B, Mn	pure weld deposit ca. 750 HV 10	security and safe plates
VAUTID 143	Chromium + Niobium carbides	Fe/Austenite	Mn	pure weld deposit ca. 750 HV 10	chutes for open pit mining equipment, conveyor chutes, ventilators
VAUTID 145	Chromium Nb, W, V carbides	Fe/Austenite	B,Mn	pure weld deposit ca. 820 HV 10	hot gas ventilators, hot screens for temperatures up to 750 °C, hot dust pipes and bell linings
VAUTID 146-Mining	Chromium Nb, V, V-carbides	Fe-base Austenite	B	pure weld deposit ca. 940 HV 10	chutes, sieves, fans, fan housings, grids, discharge, tables, bell linings, separators, converters, etc.
VAUTID 147	Chromium carbides	Fe/Austenite	B, Mn	pure weld deposit ca. 900 HV 10	hot gas ventilators, hot screens for temperatures up to 800 °C, hot dust pipes and bell linings
VAUTID 150	Chromium + Chromium carbides	Fe/Austenite	B, Mn	pure weld deposit ca. 750 HV 10	pipework in the cement industry, dust and ash pipes with very smooth surface



VAUTID wear plates

VAUTID wear solutions for mining: Bucket-wheel excavator for lignite.
Courtesy of ThyssenKrupp AG, Essen

UNIQUE PRODUCT PALETTE IN QUALITY AND VARIETY

"70 years of progress and the strictest requirements flow into each and every VAUTID product.

VAUTID wear solutions for mills in the cement plant:
Courtesy of Loesche GmbH, Düsseldorf

VAUTID Cast products

VAUTID offers a custom-tailored and cost-efficient solution for every requirement. Cast products are manufactured in accordance with customer needs using a wide variety of materials and casting methods. Optimized geometry combined with additional wear protection is a valuable asset in many applications.

Highly wear-resistant VAUTID components offer the most advanced wear protection for both original and replacement equipment from an innovation leader.

Advantages. VAUTID cast components represent the most cost-efficient method of wear prevention for mass production. Cast products can range in weight from 2 to 30,000 kg depending on the field of application and the type of material. Applications include sand casting, ceramic or Croning molds or lost foam casting. Models, computer simulations and extensive analyses ensure the optimal quality of each component. VAUTID cast products can also be machined directly in the plant to the desired level of precision.

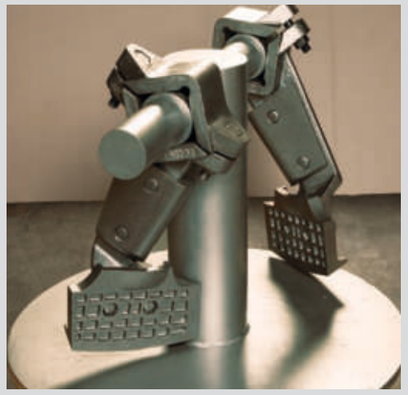
VAUTID casting provides cost-efficient wear protection for series parts

Fields of application. VAUTID hard casting offers highly streamlined production and high-quality wear protection through strict VAUTID quality controls and is ideal for use in a wide variety of industries that contain mechanical processes like crushing, mixing, conveyance, storage, agglomeration, and separation.

VAUTID foundries

VAUTID is an experienced partner in component manufacturing for high carbon and stainless steel casting. VAUTID cast products are manufactured and processed in accordance with customer specifications.

VAUTID casting process



VAUTID wear resisting casting for the concrete industry

Moulding lines

moulding line	600 x 700 mm	green sand
moulding line	1.100 x 1.200 mm	furan resin sand
moulding line	2.000 x 3.000 mm	furan resin sand
moulding line	2.000 x 4.000 mm	furan resin sand
jolt sqeeze pinlift moulding	1.100 x 1.200 mm	green-/furan resin sand
hand moulding	max. 4.000 x 5.000 mm	furan resin sand
lost foam	2.000 x 2.000 mm	sand

Melting furnaces

500 – 10.000 kg	capacity
300 – 3.500 kg/h	melt capacity

Lot sizes

1 to 150.000/a

Materials

1. Non-alloyed cast steel for general applications (DIN EN 10293)
2. Low-alloyed cast steel for general applications (DIN EN 10293)
3. Heat resistant cast steel for pressure vessels (DIN EN 10213)
4. Tough and hard cast steel
5. Austenitic manganese steel
6. Heat-resistant cast iron (DIN EN 10295)
7. Stainless cast steel (SEW 410, DIN EN 10213)
8. Chilled iron (DIN EN 12513)
9. VAUTID Chilled iron
10. Ceramic composite casting

Casting weights

2 – 30.000 kg

- Own heat treatment at all locations
- Own lab for melting analysis and material tests at all locations
- VAUTID wear-test lab

Moulding process

Individual and mass production of castings with the following moulding processes

- Green sand
- CO_2 sand
- Furan sand
- Lost Foam
- Hotbox (croning)
- Lost-wax process

Pattern shop

Manufacture of patterns in own pattern shop out of

- Metal
- Wood
- Plastics
- Polystyrol

Quality control

Testing possibilities

- Verify of dimensional accuracy
- Chemical Analysis
- Hardness (HB, HRC, HV)
- Microstructure
- Tensile strength
- Elongation
- Impact bending strength
- Magnetic powder testing method
- Ultrasonic testing
- Wear tests
- Calcination test
- Destroying test

CAD

Continual use of CAD supported development and production possibilities for the pattern shop

- Design: 2D/3D-CATIA V 5, Solidworks
- Moulding fill simulation: Flow cast
- Solidification simulation: Solid cast
- Rapid Prototyping: Selective laser sintering (SLS)

Bi-metal hammer

Grate bars in waste incineration

Crawler elements on excavator for open pit mining

Glass recycling; impact crusher for crushing of ceramics

VAUTID Material program, Cast products

Material Program		Mechanical Properties [a]						Condition of delivery	Weldability	Applications	Forms of stress
Cur No.	VAUTID Materials	Tensile strength N/mm²	Yield strength N/mm² min.	Enlongation after fracture (Lo=5d) min.	Hardness acc. HB (HRC)	KV ISO-V Trial J min.	Temperature °C				
1. VAUTID Non-alloyed cast steel for general applications (DIN EN 10293)											
1	VAUTID GE200 – 1.0420	300 – 530	200	25	130 – 140	27	RT	N	good	for mechanical engineering and steel structural work	
2	VAUTID GE240 – 1.0446	450 – 600	240	22	140 – 170	27	RT	N	good	for mechanical engineering and steel structural work	
3	VAUTID GE300 – 1.0558	520 – 670	300	18	150 – 190	31	RT	N	good	for mechanical engineering	
2. VAUTID Low-alloyed cast steel for general applications (DIN EN 10293)											
1	VAUTID G17Mn5 – 1.1131	450 – 600	240	24	130 – 190	27 / 70	– 40 / RT	QT	good	for pressure vessel	
2	VAUTID G28Mn6 – 1.1165	520 – 870	260 – 550	10 – 18	150 – 190	27 – 35	RT	N, QT1, QT2	good	for mechanical and plant engineering	
3	VAUTID G26CrMo4 – 1.7221	550 – 850	300 – 550	10 – 16	160 – 250	18 – 40	RT	QT1, QT2	preheating + after heat treatment	for mechanical and plant engineering	
4	VAUTID G34CrMo 4 – 1.7230	620 – 980	330 – 650	10 – 12	180 – 250	16 – 35	RT	QT1, QT2	preheating + after heat treatment	for mechanical and plant engineering	
5	VAUTID G42CrMo4 – 1.7231	650 – 1.000	350 – 700	10 – 12	190 – 290	16 – 31	RT	QT1, QT2	preheating + after heat treatment	for mechanical and plant engineering	
3. VAUTID Heat resistant cast steel for pressure vessel (DIN EN 10213)											
1	VAUTID GP240 GH – 1.0619	420 – 600	240	22	120 – 190	27 – 40	RT	N, QT	good	for pressure vessel	
2	VAUTID G17CrMo5-5 – 1.7357	490 – 690	315	20	140 – 200	27	RT	QT	preheating + after heat treatment	for turbins, pressure vessel, steam boiler	
3	VAUTID GXCrNi 13-4 – 1.4317	760 – 960	550	15	220 – 280	27	RT	QT	preheating + after heat treatment	for pressure vessel	
4. VAUTID Tough and hard cast steel											
1	VAUTID GS55NiCrMoV7 – 1.2714	–	–	–	min. 42 HRC	–	–	QT	limited	for hammer in the size reduction technics	
2	VAUTID GX37CrMoV5-1 – 1.2343	–	–	–	min. 48 HRC	–	–	QT	limited	for hammer in the size reduction technics	
5. VAUTID Austenitic manganese steel											from to
1	VAUTID M12 – 1.3403	–	–	–	–	–	–	AT	good	for crusher jaw, crushing cone	
2	VAUTID M18-3	–	–	–	–	–	–	AT	good	for crusher jaw, crushing cone	
3	VAUTID M20-3	–	–	–	–	–	–	AT	good	for crusher jaw, crushing cone	
6. VAUTID Heat resistant cast iron (DIN EN 10295)											from to
1	VAUTID H – 1.4729	–	–	–	max. 300	–	–	Wb4 / 800 – 850	preheating + stress relieve heat treatment	for industrial furnace engineering up to 850 °C on air	
2	VAUTID H – 1.4743	–	–	–	d	–	–	G	preheating + stress relieve heat treatment	for industrial furnace engineering up to 900 °C on air	
3	VAUTID H – 1.4776	–	–	–	d	–	–	G	preheating + coolant in furnace	for industrial furnace engineering up to 1.150 °C on air	
4	VAUTID H – 1.4777	–	–	–	d	–	–	G	preheating + coolant in furnace	for stirring teeth up to 1.100 °C on air	
5	VAUTID H – 1.4823	min. 550	min. 250	3	d	–	–	G	good	for industrial furnace engineering up to 1.100 °C on air	
6	VAUTID H – 1.4825	min. 450	min. 230	15	–	–	–	G	good	for industrial furnace engineering up to 900 °C on air	
7	VAUTID H – 1.4826	min. 450	min. 230	8	–	–	–	G	good	for industrial furnace engineering up to 950 °C on air	
8	VAUTID H – 1.4837	min. 450	min. 220	6	–	–	–	G	good	for industrial furnace engineering up to 1.150 °C on air	
8	VAUTID H – 1.4848	min. 450	min. 220	8	–	–	–	G	good	for industrial furnace engineering, petroleum and natural gas plants up to 1.100 °C on air	
7. VAUTID Stainless cast steel (SEW 410, DIN EN 10213)											
1	VAUTID K – 1.4086	–	–	–	260 – 330	–	–	G	preheating + coolant in furnace	for food technique, chemical industry	
2	VAUTID K – 1.4308	440 – 640	200	30	–	60	RT	AT	good	for accessories, mechanical engineering	
3	VAUTID K – 1.4312	–	–	–	–	–	–	AT	good	for pump construction	
4	VAUTID K – 1.4313	540 – 800	355 – 500	16 – 18	–	40 – 45	RT	AT	good	for pressure vessel	
5	VAUTID K – 1.4404	490 – 690	190	40	–	–	RT	AT	good	for pressure vessel	
6	VAUTID K – 1.4464	–	–	–	230 – 300	–	–	G	preheating + heat treatment	for chemical industry, flue gas desulfurization	
7	VAUTID K – 1.4517	650 – 850	480	22	–	50	RT	AT	good	for pressure vessel, chemical industry	
8	VAUTID K – 1.4529	440 – 460	180	20	–	60	RT	AT	good	for pressure vessel	
9	VAUTID K – 1.4552	440 – 460	200	25	–	40	RT	AT	good	for pressure vessel, chemical industry	
10	VAUTID K – 1.4581	440 – 660	210	25	–	40	RT	AT	good	for pressure vessel, chemical industry	

[a] Mechanical properties are reference values; exact values according to the condition of delivery and thickness can be taken from the appropriate standard.

d = Castings can be delivered also in an annealed condition: In this case a maximum value of the hardness can be arranged.

RT = room temperature, N = normalising, G = as cast, QT, QT1, QT2 = quenched and tempered, AT = solution annealing

VAUTID Material program, Cast products

Material Program		Mechanical Properties [b]						Condition of delivery	Weldability	Applications	Forms of stress
No.	VAUTID Materials	Tensile strength N/mm²	Crushing strength N/mm²	E-Modul [kN/mm²]	Hardness (HRC)	Fracture toughness Kic [kN/mm²]	Machinability				
7. VAUTID Materials for recycling industry											
1	VAUTID R1	–	–	–	min. 52	–	–	QT	limited	for impact crusher	
2	VAUTID R2	–	–	–	min. 55	–	–	QT	limited	for impact crusher	
3	VAUTID R3	–	–	–	min.55	–	–	QT	limited	for impact crusher, rotary crusher	
4	VAUTID R4	–	–	–	min. 42	–	–	QT	limited	scrap metal crusher and shredders	
9. VAUTID Chilled iron (DIN EN 12513)											from / to
1	GJN-HV520 – 0.9620 +similar Ni-Hard 1)	–	–	–	approx. 52	–	–	G	not allowed	abrasion stressed castings	
2	GJN-HV600(XCr18) – 0.9645 (similar Ni-Hard 4)	–	–	–	approx. 55	–	–	G/hardened	not allowed	abrasion and impact stressed castings	
10. VAUTID chilled iron (own developments)											
1	VAUTID W3	450 – 800	620 – 750	165 – 180	approx. 58	–	no	G	not allowed	for linings, mixer tools	
3	VAUTID W4	450 – 800	620 – 750	165 – 180	approx. 52	–	no	G	not allowed	for linings, mixer tools	
5	VAUTID W7	600 – 1.000	2.800 – 3.200	158 – 190	approx. 59	25 – 31	yes	hardened	not allowed	for pump elements, hammer	
6	VAUTID W72	600 – 1.000	2.800 – 3200	158 – 190	approx. 59	25 – 31	yes	hardened	not allowed	for pump elements, hammer	
7	VAUTID W72H	600 – 1.000	2.800 – 3.200	158 – 190	approx. 59	25 – 31	yes	hardened	not allowed	for impact bars, hammer	
8	VAUTID W73	600 – 1.000	2.800 – 3.200	158 – 190	approx. 59	25 – 31	no	hardened	not allowed	for impact bars, hammer	
12	VAUTID W78A	600 – 1.000	2.800 – 3.200	158 – 190	approx. 62	–	no	hardened	not allowed	for impact bars, linings	
16	VAUTID W100	450 – 800	1.800 – 2.800	150 – 170	approx. 59	25 – 31	no	G	not allowed	for brick industry	

further material developments according to customer requirements b) Mechanical Properties are refence values depending of geometry and cross section of components

G = as cast

Applications Cast Products

Crushing

Sinter breaker star steel industry

Hammer for rock crushing

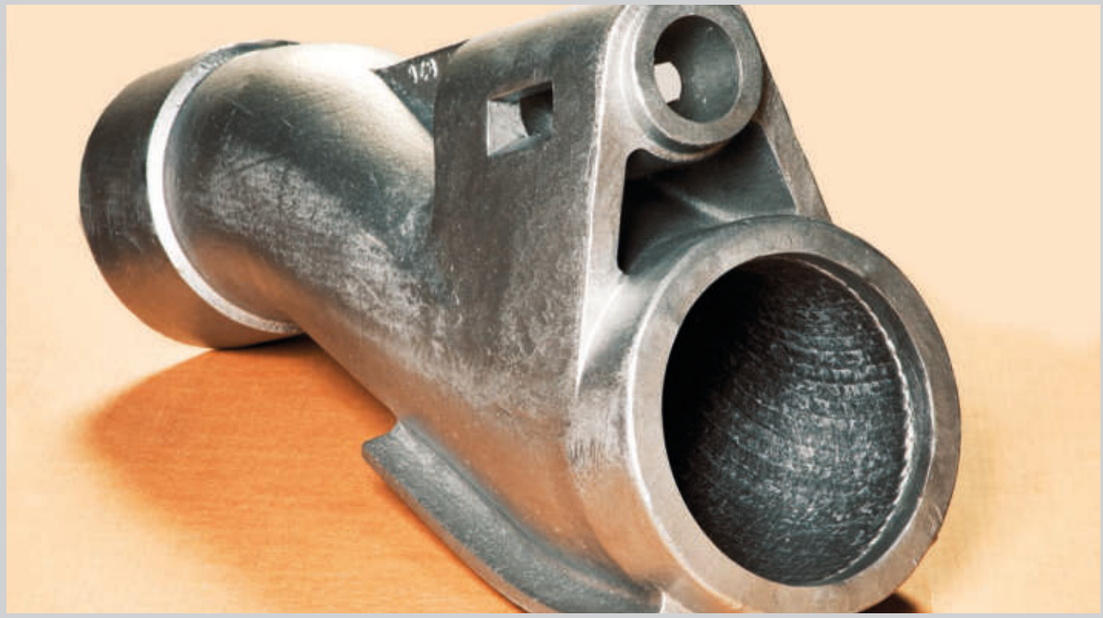
Impact bars for crushers

Mixing

Mixer blade for planet mixer

Mixing tools for double-shaft mixer

Conveying



VAUTID S-tube

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