

Kobatek

**MAINTENANCE and REPAIR
WELDING CONSUMABLES**



 Eczacıbaşı

 LINCOLN®
ELECTRIC

"KOBATEK" helps you to cut spares and repair costs

Because wear exists wherever there is motion, nearly every industry encounters wear problems. Excessive wear causes billions of dollars to be lost annually through: unplanned downtime, repetitive replacement of costly parts, inordinate maintenance costs, lowered production efficiency and losses of sales due to poor product reliability.

Kobatek repair and maintenance welding electrodes have been instrumental in reducing losses and increasing cost savings for companies in a number of diverse industries and applications. Companies use Kobatek products to :

Reduce cost : Fewer man-hours for repair and maintenance jobs; minimized downtime and rejects; reduction in purchases of spare parts, energy and resources.

Prolong equipment time : Surfacing extends life 30-300 %, depending upon application, as compared to that of a non-surfaced part.

Reduce down-time : Save dismantling time and downtime due to replacement delays; minimizes re-fitting time, etc...

Reduce inventory of spare parts : There is no need to keep numerous spare parts when worn parts can be rebuilt.

There are basically two main areas where Kobatek electrodes are used :

1. The rebuilding of worn metal parts to their original dimensions. This is accomplished with build-up or with build-up and overlay welding.
2. The protection of new metal parts against the loss of metal. Hardsurfacing overlay is used on both new and/or original parts where the parts are most susceptible to wear. The higher alloy overlay offers much better resistance than that of the original base material. This usually increases the work life of the component up to two or more times that of a part which is not surfaced.

With over 20 years experience in the field of repair and maintenance welding, Kobatek can recommend and supply the most cost-effective solution to any repair-maintenance and welding problems. Kobatek offers you a complete range of welding electrodes for every repair and preventative maintenance need. Kobatek research teams are constantly seeking better methods of combating wear and welding problems; creating new products for new preventative maintenance and welding problems, and improving existing products for old problems. New products to match operating requirements in your plants can also be developed.

This part briefly outlines the Kobatek product line which includes electrodes for: surface preparation, cast irons, steels, stainless steels, hardfacing, copper and aluminium alloys.

Wear Factors

Wear is a general term used to describe a progressive deterioration of a surface with loss of shape, often accompanied by loss of weight due to the creation of debris. We have to understand the wear factors involved before making a hard surfacing product selection.

There are seven major types of wear which are caused by mechanical and chemical actions:

Mechanical causes of wear : Abrasion, impact, erosion, cavitation, friction

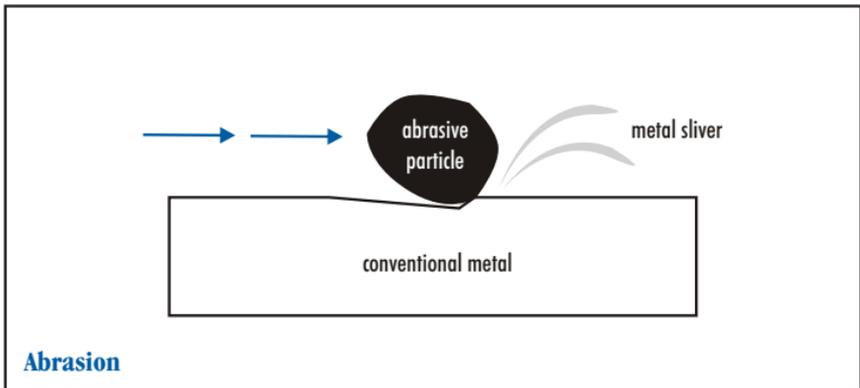
Chemical causes of wear : Corrosion and heat.

Abrasion :

Abrasion is the most common form of wear. It is caused by foreign materials (non-metallic materials such as sand, oxides or grit) moving over a metal part. The worn surface can be recognized by its polished appearance or by very fine scratches in the direction of particle movement.

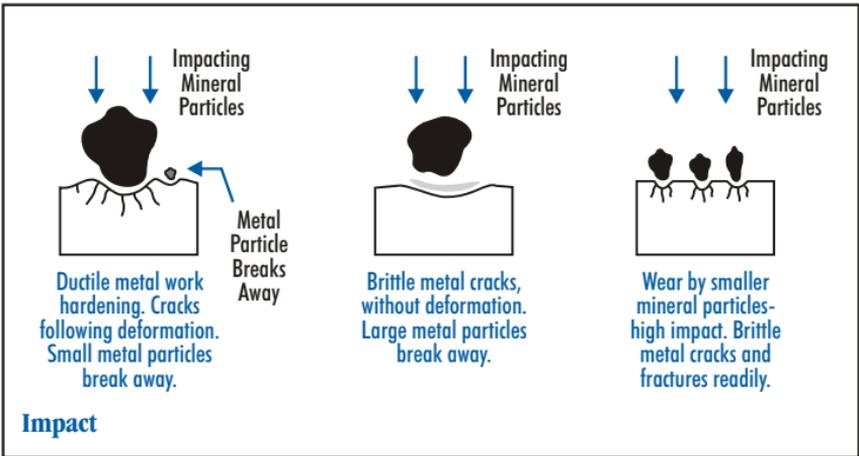
It can be broken down into three main categories :

1. Low-stress scratching abrasion : typical components subjected to this kind of abrasion include: agricultural implements, classifiers, screens, slurry pump nozzles, sand slingers and chutes, etc.
2. High-stress grinding abrasion : typical components subjected to this kind of abrasion include: augers, scraper blades, pulverizers, ball and rod mills, muller tires, brake drums, roll crushers, rollers sprockets and mixing paddles etc.
3. Gouging abrasion : typical components subjected to gouging abrasion include: dragline buckets, power shovel buckets, clam shell buckets, gyratory rock crushers, roll crushers and jaw crushers, etc.



Impact :

Wear by impact is the result of a succession of local shock loads on the material surface. When the stress exceeds the elastic limits of the metal, the metal deforms both beneath the point and laterally across the surface away from the impact point. Some of the effects of impact are: fatigue, cracking, flaking, compression and deformation. Typical components subjected to impact include: coupling boxes, crusher rolls, impact hammers, impactor bars, railroad frogs and crossings.

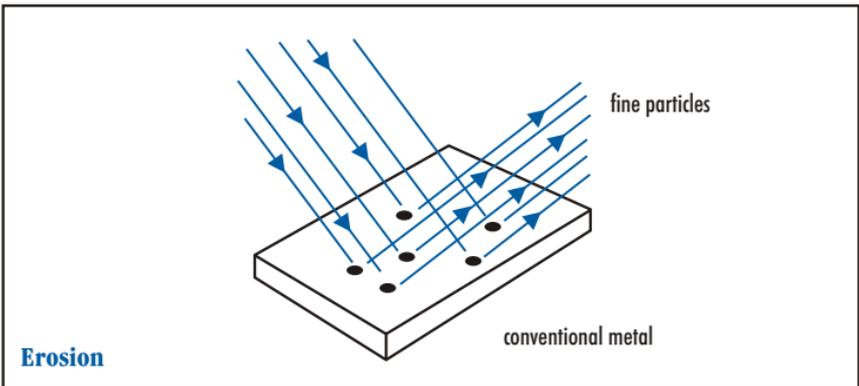


Erosion :

It occurs in liquid or gaseous media, when extraneous, fine and hard particles strike a surface at an angle of incidence. Erosion can be considered a combined form of impact and abrasion. Grit-blasting is a technological application of this phenomenon.

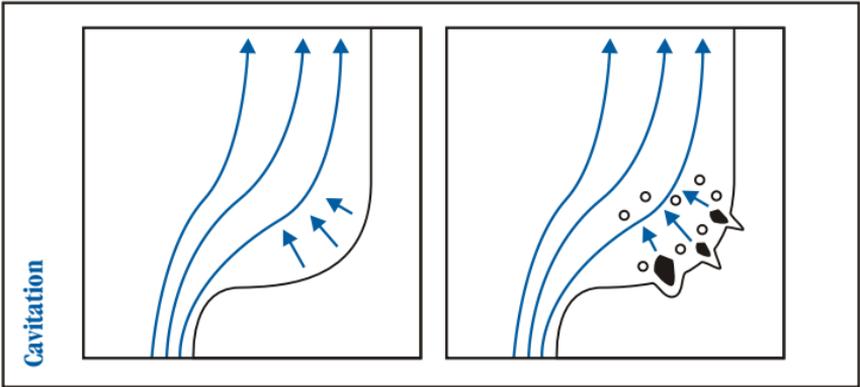
Erosion wear involves two typical mechanisms:

1. In cases of vertical impact we are dealing with local phenomena, which can lead to both elastic and plastic deformation, with grooves on the worn surface.
2. In cases of oblique or glancing impact by solid particles, the mechanism of surface damage involves the formation of chips.



Cavitation :

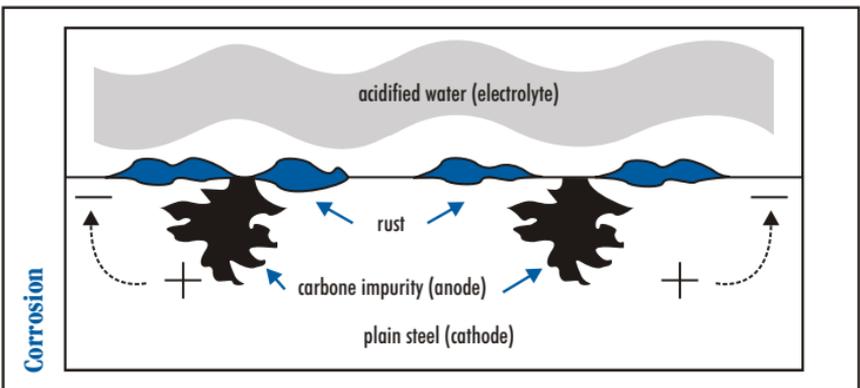
This wear results from the rapid formation and collapse of tiny gas bubbles in a liquid. This causes high speed localized pressure changes or explosions creating shock waves that impact on the base metal surface resulting in local deformation. The damage to the surface arises from a similar mechanism to that of erosion by impact deformation, except that in the case of cavitation the solid abrasive particles are replaced by microwaves that produce pitting fatigue, subsequent micro crevices (fissures) and the removal of metal.



Corrosion :

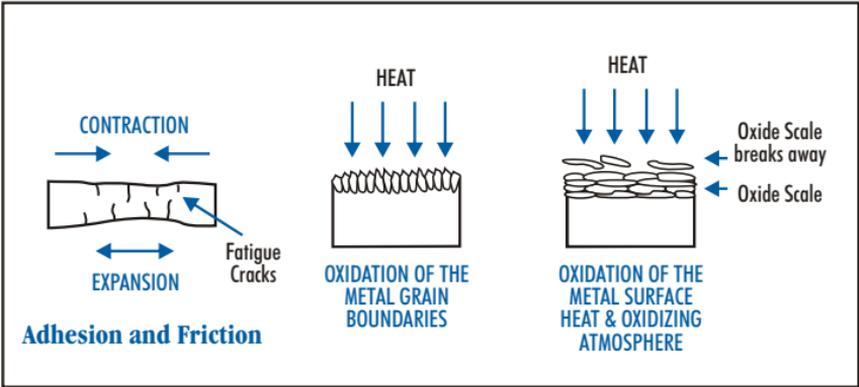
It is deterioration of a metal by a chemical or electrochemical reaction between the metal and the environment such as scaling and pitting caused by oxidation when a metal is heated, or by acids eroding the base metal. The most common type of corrosion is rust. Rust transforms the surface of a metal into oxide which eventually flakes off, thus reducing the original thickness of the metal.

In most cases, several different types of wear work together, with a combined destructive effect which is often greater than the sum of their individual effects. To propose an effective solution to complex combined wear problems, one approach is to analyze the exact manner in which the mechanisms are interacting. This brief description of the main types of wear shows that a detailed theoretical evaluation of any given wear problem is highly complex. But you can easily find a solution with the appropriate special KOBATEK alloys.



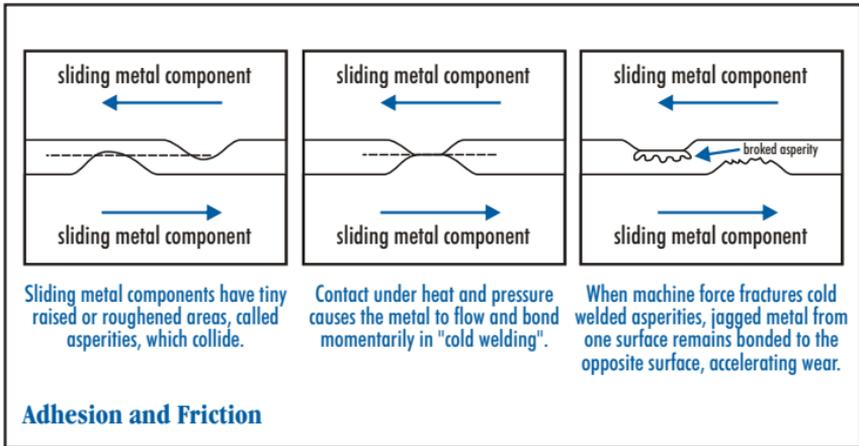
High Temperature :

Heat affects the metal's microstructure and generally reduces its durability. A major cause of metal failure from high temperature service is the thermal fatigue (fire cracking) that results from repetitive intense heating followed by cooling. The repeated expansion and contraction caused by this thermal cycling eventually exceeds the ability of the metal to recover and causes deep cracking. The most common form of wear caused by heat is probably oxidation. This takes place during the build-up of an oxide layer. Wear occurs when the layer is broken away by a cycle of expansion and contraction, and the whole oxidation operation is repeated. Typical components subjected to high temperature wear include: continuous caster rolls, steel mill work rolls, hot forging dies, tongs and sinter crushing equipment.



Adhesion and Friction (metal-to-metal) :

This wear results from the sliding or rolling contact of one metal surface against another. To the naked eye, metal surfaces may appear smooth and even highly polished, but under a microscope they show definite hills and valleys. As metal surfaces slide against each other, the high areas (hills) are broken and tiny fragments of metal are torn away. Typical components subjected to friction include: steel mill rolls, undercarriage components, shear blades, shafts, trunnions and non-lubricated bearing surfaces.

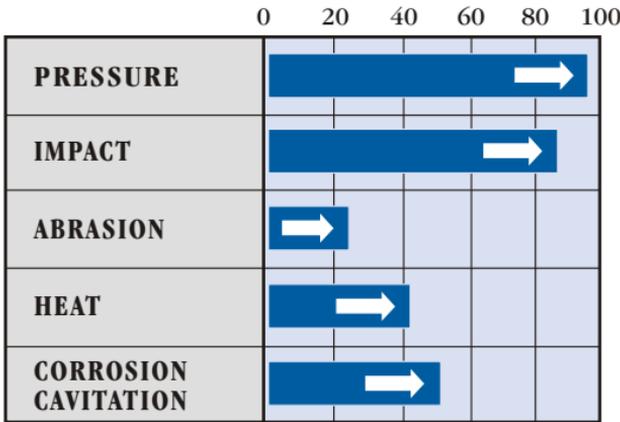


How can you select the most appropriate "KOBATEK" product ?

The graphic system is a simple method which helps to eliminate guesswork and chance in the selection of the proper welding alloy for repair or wear protection applications. Each product data page contains a table designation.

These tables summarize the principal characteristics and properties of the deposited alloys. You can analyze their environmental factors encountered causing wear or repair, and make a similar table and compare your application's factors with the product's factors.

- 0 - 20 : Inferior
- 21 - 40 : Fair
- 41 - 60 : Good
- 61 - 80 : Very good
- 81 - 100 : Excellent



Welding Methods

In addition to the properties of its chemical elements, the properties of the weld filler metal is based on the following factors :

- electrode diameter,
- arc length,
- preheating temperature,
- current and type of polarity.

The last factor leads to two welding methods :

METHOD - A

High Current Operation

It is suitable for large and thick sectioned components. It enables high speed welding. This method is particularly used for assembly and machine parts where pieces are removed from the surface and for multipass filler welding applications.

METHOD - B

Low Current Operation

It is used to eliminate the overheating of small and thin sectioned components. It also provides a protective layer in the weld metal due to the limited melting of the base metal. Minimum fluidity and liquidification is obtained on the base metal.

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Surface Preparation Electrode

Electrodes for Cast Irons

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Kobatek 111

Kobatek 111 is used for ferrous or non-ferrous metals where grooving is necessary without supplementary gases and special electrode holder. For preparing sections prior to welding, gouging out old or defective weld metal, removing flash and risers. All these operations can be carried out in all positions; except vertical upwards. A thick, specially developed exothermic coating produces a forceful gas jet which blows the molten metal away, to give a smooth, clean groove. A finishing operation is unnecessary.

RECOMMENDED PROCEDURE :

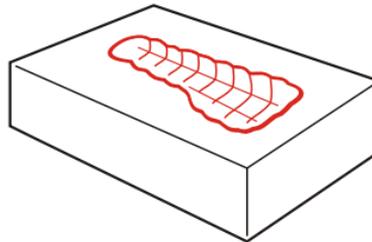
Strike the arc with the electrode normal to the workpiece and then immediately incline the electrode at an angle of 15-20° to the workpiece. Point the arc in the direction of travel, move the electrode forward to melt the metal and then pull it back to allow the gas jet to blow the molten metal away.

Approvals

GOST , SEPRO

Principal Applications

- Gouging, bevelling cast iron and other metals
- Removal of old welds and rivets
- Removal of weld defects
- Piercing holes
- Back-gouging root runs



Current Type : [DC (-) / AC]

Diameter	Welding Current (A)
3.25 mm	180 - 220
4.00 mm	200 - 275
5.00 mm	250 - 300

Kobatek 46

1

An AC/DC nickel electrode for welding of old, contaminated, oil-soaked gray and alloyed castings with a minimum preheat. The welding should proceed step by step so that the work-piece is not heated more than necessary. It has excellent application properties on welding in position. The deposit is always soft and machinable.

CRACK RESISTANCE				
BONDING				
MACHINABILITY				

Mechanical Properties, Typical

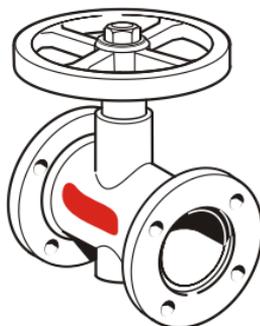
Tensile Strength [kg/mm²] : 26 - 30
 Elongation (L=5d) [%] : 8 - 10
 Hardness [HB] : 100 - 140

Approvals

GOST , SEPRO

Principal Applications

- Engine blocks
- Pump housings
- Cylinder heads and blocks
- Valves
- Gear and gear boxes
- Eccentric wheels
- Work-bench sledges
- Drums
- Reclamation of faulty castings
- Joining of castings in all-cast and composite fabrications



Current Type : [DC (-) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	70 - 90	50 - 60
3.25 mm	100 - 120	80 - 90

Kobatek 418

A pure nickel, non-conductive flux coating electrode for repair and maintenance welding of cast iron components. Kobatek 418 exhibits excellent arc characteristics by producing a drop arc transfer which assists in combating surface contamination such as when joining badly oiled cast iron parts. For all types of machinable repairs on old, contaminated, oil-soaked gray and alloyed castings. Sound, dense deposits are fully machinable. It can be used for thin, as well as thick sections.

CRACK RESISTANCE	██████████	██████████	██████████	██████████	██████████
BONDING	██████████	██████████	██████████	██████████	██████████
MACHINABILITY	██████████	██████████	██████████	██████████	██████████

1

Mechanical Properties, Typical

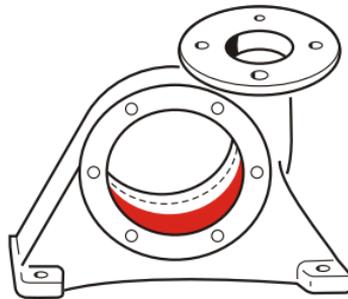
Tensile Strength [kg/mm²] : 26 - 30
 Elongation (L=5d) [%] : 8 - 10
 Hardness [HB] : 120 - 160

Approvals

GOST , SEPRO

Principal Applications

- Pump housings
- Pump rotors
- Compressors
- Valves
- Gear boxes
- Engine blocks
- Cylinder heads and blocks
- Pulleys
- Eccentric wheels



Current Type : [DC (-) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	70 - 90	50 - 60
3.25 mm	100 - 120	80 - 90
4.00 mm	130 - 150	100 - 120

Kobatek 458

1

Kobatek 458 has nickel-iron-copper alloyed deposit and it has been specially designed for welding of malleable cast iron and nodular or ductile spheroidal graphite iron where ease of welding, low heat input and high crack resistance are important. Therefore, it is very suitable for making thick joints and for filling up deep cavities.

CRACK RESISTANCE	████████████████████
BONDING	██████████████████
MACHINABILITY	██████████████████

It has high crack resistant deposits which are fully machinable. It can be used on both heavy and thin sections, especially for welding in position. The special arc characteristics also allow welding even on contaminated surfaces. It is also suitable for joining cast iron to steel. The deposit is the optimum colour match with the cast iron parts.

Mechanical Properties, Typical

Tensile Strength [kg/mm²] : 38 - 44
Elongation (L=5d) [%] : 15 - 20
Hardness [HB] : 140 - 180

Approvals

GOST , SEPRO

Principal Applications

- Repair of nodular and ductile iron castings and foundry defects
- Machine housings
- Pipes and flanges
- Pump impellers
- Pulleys
- Gears and gear boxes
- Turbine blades
- Engine blocks
- Transmission housings
- Joining of gray cast iron to steels and stainless steels
- Joining of steels to copper alloys

Current Type : [DC (-) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	80 - 90	60 - 70
3.25 mm	110 - 120	90 - 100
4.00 mm	140 - 150	120 - 130

Kobatek - 3xx

Electrodes for Steels

2

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Kobatek 326

Kobatek 326 has a very crack proof weld metal. It is suitable for the joining and welding of special steels used at both sub-zero and elevated temperatures, also recommended for 5-9 % nickel steels and nickel alloys such as Inconel 600, Incoloy 800, Nimonic 75, NiCr 80/20, NiCr 60/15, NiCr15Fe and dissimilar ferrous metal combinations, including stainless steel to steel.

MECHANICAL STRENGTH	[REDACTED]
CRACK RESISTANCE	[REDACTED]
HEAT RESISTANCE	[REDACTED]

Kobatek 326 provides the ultimate fatigue resistance for highly stressed constructions using thick sections. The weld metal has a good impact strength down to -196°C and a good tensile strength up to 1000°C. Also the corrosion and oxidation resistance are good.

Mechanical Properties, Typical

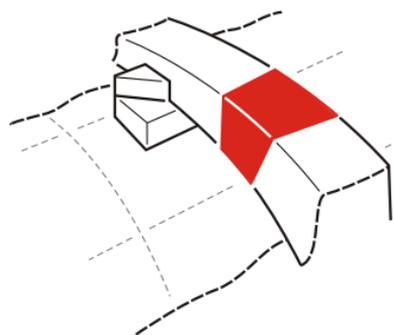
Tensile Strength [kg/mm²] : 66 - 71
 Elongation (L=5d) [%] : 40 - 44
 Hardness [HB] : 160 - 200

Approvals

GOST

Principal Applications

- Joining or repairing of heavily constrained massive sections
- Bearing rings of rotary kilns
- Walls of ball mills
- Ball mill driving gears, journals and collars
- Blast furnaces
- Flame hardening equipments
- Heat treating trays
- Pipe flanges
- Machine parts subject to thermal cycling and sub-zero temperatures such as cryogenic equipments
- Joining dissimilar combinations of steels



Current Type : [DC (+)]

Diameter	Welding Current (A)	
	A	B
2.50 mm	80 - 90	60 - 80
3.25 mm	100 - 110	70 - 100
4.00 mm	120 - 140	100 - 110

Kobatek 326 N

Kobatek 326 N has a very crack proof weld metal. It is suitable for the joining and welding of special steels used at both sub-zero and elevated temperatures, also recommended for 5-9 % nickel steels and nickel alloys such as Inconel 600, Incoloy 800, Nimonic 75, NiCr 80/20, NiCr 60/15, NiCr15Fe and dissimilar ferrous metal combinations, including stainless steel to steel.

MECHANICAL STRENGTH	
CRACK RESISTANCE	
WELDABILITY	

Kobatek 326 N provides the ultimate fatigue resistance for highly stressed constuctions using thick sections. The weld metal has a good impact strength down to -196°C and a good tensile strength up to 1000°C. Also the corrosion and oxidation resistance are good.

Mechanical Properties, Typical

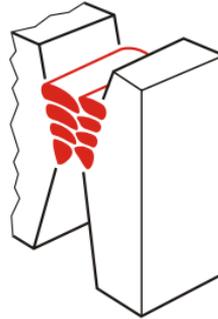
Tensile Strength	[kg/mm ²]	: 60 - 65
Yield Strength	[kg/mm ²]	: 38 - 42
Elongation (L=5d)	[%]	: 38 - 40
Hardness	[HB]	: 140 - 180

Approvals

GOST

Principal Applications

- Joining or repairing of heavily constrained massive sections
- Walls of ball mills
- Bearing rings of rotary kilns
- Boom welding of earth moving equipments
- Machine parts subject to thermal cycling and sub-zero temperatures such as cryogenic equipments
- Heat treating trays
- Ball mill driving gears, journals and collars
- Blast furnaces
- Flame hardening equipments
- Pipe flanges
- Joining dissimilar combination of steels



Current Type : [DC (+)]

Diameter	Welding Current (A)	
	A	B
3.25 mm	140 - 160	90 - 110
4.00 mm	160 - 200	120 - 150

Kobatek 345

A special electrode for welding steels having limited weldability, such as manganese steels, hardenable steels and others. It is an AC/DC electrode giving a non-magnetic and work hardenable stainless steel deposit containing Cr/Ni/Mn/Mo. The tough weld metal is able to absorb high welding stresses which is very important for achieving crack-free welds.

PRESSURE	████████████████████			
IMPACT	████████████████████			
ABRASION	████			
HEAT	████			
CORROSION CAVITATION	████████████			

2

Mechanical Properties, Typical

Tensile Strength [kg/mm²] : 58 - 64
 Elongation (L=5d) [%] : 38 - 42
 Hardness [HB] : 160 - 180 (as welded)
 400 - 420 (cold worked)

Approvals

GOST

Principal Applications

- Site machinery
- Drilling tools
- Rails, points
- Valve seats
- Earth moving equipments
- Stone working machines
- Coal machines
- Armoured cars
- Joining between X5 CrNiMo 18 10, X10 CrNiMoNb 18 10, HI-HIII, 17 Mn 4



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	85 - 110	65 - 90
3.25 mm	120 - 150	90 - 120
4.00 mm	150 - 180	110 - 140
5.00 mm	180 - 220	160 - 190

Kobatek 350

Kobatek 350 is a basic coated electrode used for welding martensitic and martensitic-ferritic type steels.

It exhibits high corrosion resistance to water, vapor and salt water. A preheating of 100-200°C should be applied for thick sectioned parts. Interpass temperature should be constant.

Weld beads are smooth and the slag is easy to remove.

MECHANICAL STRENGTH	████████████████████
IMPACT	██████████
PRESSURE	████████████████
HEAT	██████
CORROSION CAVITATION	████████████████████

Mechanical Properties, Typical

Tensile Strength	[kg/mm ²]	: 90 - 110
Yield Strength	[kg/mm ²]	: 70 - 80
Elongation (L=5d)	[%]	: 10 - 15
Hardness	[HRC]	: 38 - 40
Impact (ISO-V)	[Joule]	: + 20°C = 24 J

Approvals

GOST

Annealing temperature for stress relief is 550-600°C.

Principal Applications

It is particularly used for the protection of % 12-15 Cr, % 4 Ni containing steels against corrosion.

- Water turbines and compressors
- Pelton, Francis turbine rotors
- Kaplan turbine blades
- Valves used in gas, vapor and water pipelines operating under service temperatures up to 450°C
- Erosive and corrosive attacks caused by sea water
- Welding of X4 CrNi 13 4 and G-X5 CrNi 13 4 (1.4343) steels.



Current Type : [DC (+)]

Diameter	Welding Current (A)
3.25 mm	90 - 120
4.00 mm	120 - 170

Kobatek 352

Kobatek 352 has a manganese alloyed stainless steel deposit containing Cr/Ni/Mn/Mo which is a work hardening alloy. It is used for build-up applications and cushion layers prior to harder overlays, and for a wide range of steel, low alloy steel and 12-14 % austenitic manganese steel components subjected to severe impact combined with high pressure. Steel deposit will also resist a wide range of corrosive conditions and cavitation.

PRESSURE	████████████████████			
IMPACT	████████████████████			
ABRASION	████			
HEAT	████████			
CORROSION CAVITATION	████████			

2

Deposits exhibit a smooth even shaped bead, high metal recovery rates and ease of slag removal. The electrode can be deposited in contact with the workpiece.

Mechanical Properties, Typical

Tensile Strength [kg/mm²] : 64 - 66
 Elongation (L=5d) [%] : 40 - 44
 Hardness [HB] : 160 - 200 (as welded)
 400 - 440 (cold worked)

Approvals

GOST

Principal Applications

- Welding and repairing 12-14 % manganese steels
- Crusher jaws
- Tractor sprocket tooth
- Guides and rollers on tracked vehicles
- Armour plates
- Perforated plating on ore-sorters
- Gyratory crusher cones
- Conveyor rollers
- Crusher cylinder hooks
- Dozer cutting edges
- Bucket lips and sides
- Impactors, hammers
- Joining austenitic manganese steels to carbon steels
- Stainless cladding carbon steels and low alloy steels



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
3.25 mm	140 - 160	100 - 160
4.00 mm	210 - 240	140 - 190

Kobatek 381

Kobatek 381 deposits a Cr/Ni/Mo based stainless steel weld metal. It is designed for welding large, high strength steel components requiring fast multi-layer deposits with crack resistance. It is ideal for repairing difficult-to-weld steels and for putting down buffer layers before filling up with hardenable deposits. It can be used as a buffer layer on high manganese Hadfield steel and for surfacing where some resistance to impact and battering is required under corrosive conditions.

MECHANICAL STRENGTH	
CRACK RESISTANCE	
HEAT INPUT	

2

Mechanical Properties, Typical

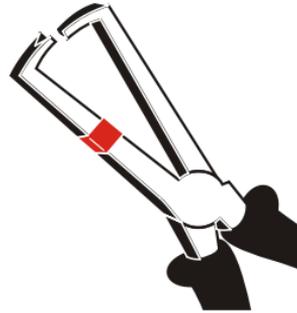
Tensile Strength	[kg/mm ²]	: 76 - 82
Yield Strength	[kg/mm ²]	: 58 - 62
Elongation (L=5d)	[%]	: 20 - 25
Hardness	[HB]	: 220 - 260

Approvals

GOST

Principal Applications

- Press cylinders in plastic and food industries
- Earth moving equipments
- Hydraulic cylinders
- Injection moulds
- Extrusion screws
- Turbine blades
- Valve seats for superheated steam
- Heat exchangers
- Coal washing screens
- Wear plates
- Bucket tooth
- Dies, gears, shafts, tools



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	90 - 120	70 - 80
3.25 mm	130 - 150	110 - 120
4.00 mm	180 - 210	120 - 160

Kobatek 382

It is extremely high strength and crack-resistant when joining steels of difficult weldability, such as hard manganese steels, tool steels, spring steels as well as dissimilar metal joints. A highly alloyed manual metal arc electrode with good deposition qualifies for the welding of air hardening steels, cementation steels, high carbon steels, vanadium-moly spring steels, stainless steels and any dissimilar combinations of these alloys.

MECHANICAL STRENGTH	
CRACK RESISTANCE	
HEAT INPUT	

Also ideal for the buffering of higher carbon and alloy steels prior to final hard overlays including 12-14 % austenitic manganese steels. It gives work-hardenable weld metal. The arc is stable and spatter-free.

2

Mechanical Properties, Typical

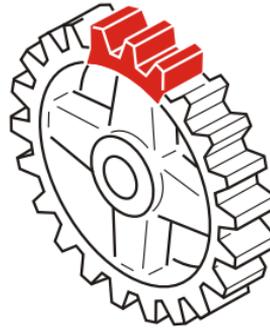
Tensile Strength	[kg/mm ²]	: 80 - 86
Yield Strength	[kg/mm ²]	: 64 - 66
Elongation (L= 5d)	[%]	: 20 - 25
Hardness	[HB]	: 220 - 260

Approvals

GOST

Principal Applications

- Cutting tools
- Gears, shafts and cams
- Forging dies
- Extrusion and hydraulic cylinders
- Vibration sieves
- Forming tools
- Earth moving parts
- Chassis frames
- Cushion pass for tool steels
- Joining stainless steels to carbon steels and low alloy steels
- Joining austenitic manganese steels to carbon steels and low alloy steels



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	60 - 80	40 - 50
3.25 mm	90 - 100	60 - 80
4.00 mm	125 - 150	90 - 120

Kobatek - 2xx 7xx

Electrodes for Non-Ferrous Metals

3

Product Name	Page
Kobatek 213	153
Kobatek 250	154
Kobatek 725	155

Kobatek 213

A metal arc electrode designed for the repair and fabrication of a wide range of wrought and cast aluminium alloys. Ideal for the build up of lost sections and casting defects, also for the repair of cracked parts. Kobatek 213 is intended for the welding of aluminium alloys containing up to 6 % silicon and for low magnesium containing alloys.

MECHANICAL STRENGTH					
INTENSITY OF HUMIDITY					
WELD METAL QUALITY					

Mechanical Properties, Typical

Tensile Strength	[kg/mm ²]	: 14 - 16
Yield Strength	[kg/mm ²]	: 8 - 10
Elongation (L=5d)	[%]	: 15 - 18
Hardness	[HB]	: 50 - 60

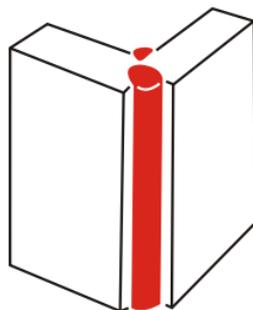
Approvals

GOST , SEPRO

3

Principal Applications

- Truck bodies and conveyers
- Rails
- Floor plates
- Engine blocks
- Machine casing
- Foundry defects
- Frames
- Rectification and fabrication of conveyers



Current Type : [DC (+)]

Diameter	Welding Current (A)
2.50 mm	60 - 90
3.25 mm	80 - 110
4.00 mm	100 - 140

Kobatek 250

An aluminium alloyed, basic electrode recommended for production and maintenance applications including the repair of cracks, casting defects and building up sections and broken parts, also suitable for overlaying applications. It is specially designed for welding of wrought and cast aluminium alloys, mainly of the half silumin and silumin type, containing up to 12 % silicon, like ; G- AlSi8Cu3 , G- AlSi10Mg , G- AlSi12 . It should not be used with aluminium magnesium alloys like : AlMg2 , AlMg3 , AlMg5 . In case of necessity, it can be applied with oxy-acetylene flame.

MECHANICAL STRENGTH					
INTENSITY OF HUMIDITY					
WELD METAL QUALITY					

3

Mechanical Properties, Typical

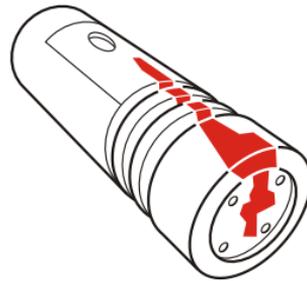
Tensile Strength [kg/mm^2] : 16 - 20
 Yield Strength [kg/mm^2] : 6 - 8
 Elongation (L=5d) [%] : 6 - 10
 Hardness [HB] : 50 - 70

Approvals

GOST , SEPRO

Principal Applications

- Engine blocks
- Truck bodies
- Housings, pumps, tanks
- Molds, pistons, fans, frames
- Casting defects
- Manufacture of petrol engines
- Window frames and stairs
- Gear boxes
- Engine pistons



Current Type : [DC (+)]

Diameter	Welding Current (A)
2.50 mm	60 - 90
3.25 mm	80 - 110
4.00 mm	100 - 140

Kobatek 725

Kobatek 725 is a tin-bronze electrode for coating and repairing parts made of copper, bronze, red brass and for joining of these to steels, cast iron, nickel and nickel alloys. Possible to work on very large bronze parts without preheating. Excellent resistance to metal-metal friction and good resistance to corrosion, particularly attack by acetone and dry ammoniac, industrial atmospheres and salty air, sea water and acids. It gives dense, porosity and spatter free, fully machinable deposits.

COMPATIBILITY					
MACHINABILITY					
CORROSION RESISTANCE					

Mechanical Properties, Typical

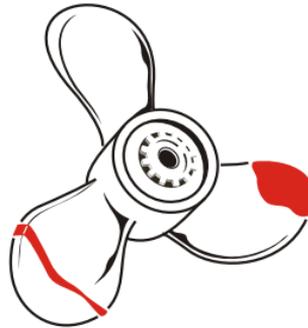
Tensile Strength [kg/mm²] : 30 - 36
 Elongation (L=5d) [%] : 15 - 25
 Hardness [HB] : 100 - 140

Approvals

GOST

Principal Applications

- Electrode holders
- Bearings
- Rotors
- Screws
- Valve seats
- Pump rotors
- Spindles
- Gears
- Spirals
- Pistons
- Repairing defective castings
- Turbine blades



Current Type : [DC (+)]

Diameter	Welding Current (A)	
	A	B
3.25 mm	110 - 130	80 - 100
4.00 mm	145 - 160	110 - 140

Kobatek - 5xx

Electrodes for Hardfacing Applications

Product Name	Page
Kobatek 512	159
Kobatek 520	160
Kobatek 543	161
Kobatek 550	162
Kobatek 562	163
Kobatek 578	164
Kobatek S-643	165

Kobatek 512

An AC/DC electrode which has high alloyed Cr/Mo/V weld metal. Deposits produce high resistance to pressure and abrasion and moderate impact resistance. It is used on steels, alloy steels and carbon manganese steel components. The weld metal is heat resistant up to about 550°C. The alloy combines with a special flux coating formulation to provide a high metal transfer across the arc.

PRESSURE	██████████			
IMPACT	██████████			
ABRASION	██████████			
HEAT	█			
CORROSION CAVITATION	█			

Mechanical Properties, Typical

Hardness [HRC] : 50 - 55

Approvals

GOST

4

Principal Applications

- Excavator buckets
- Dredge pump impellers
- Drill bits
- Crushers
- Breaker bars
- Gyrotory crusher cones
- Bulldozer buckets
- Chipper rotors
- Screw conveyers
- Cold pressing tools
- Shear blades
- Slideways and guide rails



Current Type : [DC (-) / AC]

Diameter	Welding Current (A)	
	A	B
3.25 mm	140 - 160	120 - 150
4.00 mm	220 - 230	170 - 190

Kobatek 520

A DC electrode specially designed for low-alloy steels with a tensile strength up to 900 N/mm² and the reclamation of the parts subjected to metal-to-metal friction under high pressure. The readily machinable deposit gives an alloy steel providing high mechanical properties and can be heat treated. It is also suitable for applications where resistance to deformation during service is required for maximum operational life.

PRESSURE	██████████	██████████	██████████
IMPACT	██████████	██████████	██████████
MECHANICAL STRENGTH	████████████████████	████████████████████	████████████████████
CRACK RESISTANCE	██████████████████	██████████████████	██████████████████
MACHINABILITY	██████████	██████████	██████████

Mechanical Properties, Typical

Approvals

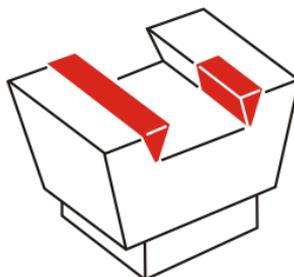
Tensile Strength [kg/mm²] : 92 - 96
 Yield Strength [kg/mm²] : 76 - 80
 Elongation (L=5d) [%] : 12 - 16
 Hardness [HB] : 300 - 360

GOST

4

Principal Applications

- Rollers
- Forging dies
- Forming dies
- Anvil dies
- Anvil guides of power hammer
- Hammers
- Table rollers
- Turbine blades
- Cushion layers before hardfacing



Current Type : [DC (+)]

Diameter	Welding Current (A)
3.25 mm	90 - 120
4.00 mm	110 - 150

Kobatek 543

A cobalt alloyed electrode for producing excellent wear resistance overlays on carbon and alloy steels. Excellent results can be obtained even when high temperature service conditions exist. It has been designed to withstand corrosion, oxidation and heat, and also has moderate resistance to pressure and abrasion.

PRESSURE	██████████	██████████	██████████	██████████
IMPACT	██████████	██████████	██████████	██████████
ABRASION	██████████	██████████	██████████	██████████
HEAT	██████████	██████████	██████████	██████████
CORROSION CAVITATION	██████████	██████████	██████████	██████████

Mechanical Properties, Typical

Approvals

	20 °C	600 °C	GOST
Hardness [HRC] :	40 - 44 HRC	30 - 32 HRC	

Principal Applications

- Hot shear blades
- Hot pressing tools
- Forging dies
- Steam and chemical valve seats
- Pump and bearing sleeves
- Handling equipments for hot steel
- Trimming dies and punches
- Stripper crane points
- Hot pressing dies
- Screw conveyors (for rubber)
- Valve steam tips
- Wear pads
- Drill collars
- Bearing sleeves
- Wire mill rolls
- Beaters for coke comminution



Current Type : [DC (+) / AC min. 70 V]

Diameter	Welding Current (A)	
	A	B
3.25 mm	100 - 120	80 - 110
4.00 mm	130 - 150	100 - 120

Kobatek 550

Kobatek 550 deposits a Cr/Mo alloyed, medium carbon, low-alloyed steel hard-surfacing weld metal, that is wear resistant under conditions of high pressure and impact combined with mild abrasion. It is particularly suited for surfacing cold cutting tools and for re-building manganese hard steel. The deposit is air-hardening, non-mechinable and can resist plastic deformation without cracking. It is suitable for protective overlays on steels including plain carbon steels, carbon manganese steels, low alloy steels and also for welding of cementation steels. Deposits are usually very smooth and may require little or no finishing operation.

PRESSURE	██████████			█
IMPACT	██████████			█
ABRASION	██████	█	█	█
HEAT	██	█	█	█
EROSION	████	█	█	█

Approvals

GOST

4

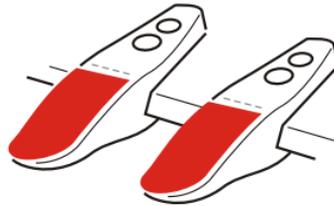
Mechanical Properties, Typical

Hardness [HRC] : 54 - 60

Heat Treatment : Annealing at 800°C : 30 HRC
 (except austenitic Hardening at 1030°C : 60 HRC
 manganese steels) Tempering at 500°C : 57 HRC

Principal Applications

- Earth moving equipments
- Dragline bucket tooth
- Farming machinery
- Forestry tools
- Bulldozer blades, scraper blades
- Bucket lips
- Excavator tooth, crusher jaws and hammers
- Concrete mixers
- Plough shaves, pulping knives
- Stamping dies
- Gravel pump housing
- Conveyors
- Tractor pads, links and rollers



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
2.50 mm	80 - 90	70 - 80
3.25 mm	110 - 130	80 - 120
4.00 mm	135 - 160	100 - 125

Kobatek 562

Kobatek 562 is a W, Co and Cr enriched electrode. It gives a speed steel type weld metal that has very good resistance to softening up to 500°C. It gives high hardness and high resistance to impact and pressure. Low preheating temperatures enable the welding of hard metals. A controlled increase of hardness of the deposit can be obtained by heat treatment after welding.

PRESSURE	██████████	██████████	██████████	██████████
FRICTION	██████████	██████████	██████████	██████████
MACHINABILITY	██████████	██████████	██████████	██████████

Mechanical Properties, Typical

Hardness [HRC] : 46 - 52 (as welded)
 52 - 54 (after heat-treatment)
 Working Temperature [°C] : max. 500

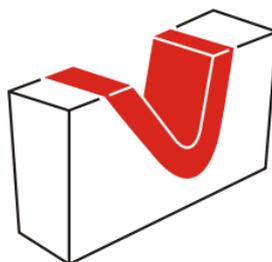
Approvals

GOST

Deposit can be heat treated by tempering for 1 hour at 550°C to obtain a deposit hardness of 52-54 RC.

Principal Applications

- Cold shear cutting edges and blades
- Profile and slab cutting edges used within the steel industry
- Hardfacing applications of injection molds
- Manufacturing of machining tools



Current Type : [DC (+) / AC]

Diameter	Welding Current (A)	
	A	B
3.25 mm	110 - 140	80 - 120

Kobatek 578

An AC/DC high chromium-carbide electrode. It has been designed to withstand high abrasive wear under pressure, combined with medium impacts which are specially caused by coarse sand and hard minerals. Also resistant to corrosion and oxidizing. For overlaying carbon steels, low alloy steels and 12-14 % austenitic manganese steels, it produces very thick deposits and so only one pass is usually required for most applications.

PRESSURE	██████████			
IMPACT	██████			
ABRASION	██████████████████			
HEAT	██████			
EROSION	██████████			

Deposits are smooth, of good shape and with little or no slag residues as the electrode is almost totally consumed in producing the weld bead. Deposits may check crack to relieve stresses but this will not adversely affect weld adhesion or wear characteristics.

4

Mechanical Properties, Typical

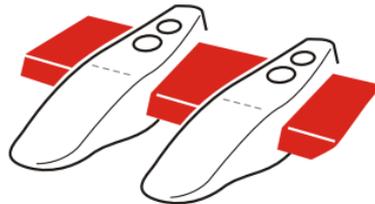
Hardness [HRC] : 60 - 63
(single pass)

Approvals

GOST

Principal Applications

- Dragline buckets
(lips, points, cutting edges, teeths)
- Scraper blades and mixers
- Conveyor chains
- Mixer blades
- Sludge pumps
- Hammers and crushers
- Crusher jaws
- Guide plates
- Dozer and bits
- Clinker chains
- Screw conveyors
- Crushing mills
- Edge runners and chutes
- Moulding screen segments
- Wearing strips



Current Type : [DC (-) / AC min. 60 V]

Diameter	Welding Current (A)	
	A	B
3.25 mm	150 - 170	100 - 120
4.00 mm	190 - 220	140 - 160

Kobatek S-643

Kobatek S-643 is a basic coated electrode that is highly resistant to abrasion wear caused by fine or coarse hard minerals in environments of low pressure and weak impact. It gives an austenitic weld metal with "Cr" and "Nb" carbides in its structure. It enables welding in vertical upwards position with a small diameter electrode.

PRESSURE	██████████			
IMPACT	████			
ABRASION	████████████████████			
HEAT	████			
CORROSION	████			

Mechanical Properties, Typical

Hardness [HRC] : 54 HRC (single pass)
 : 63 HRC (at 3 passes)
 Weld bead is free of slag.

Approvals

Principal Applications

Equipment used in mining and cement industry, press screws, extruder plates and heads in the ceramic industry, wear plates and dredger blades can be hardfaced with Kobatek S-643.

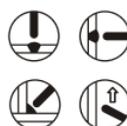
It should not be used for more than three passes. In applications requiring a thick deposit metal, Kobatek 352 or Kobatek 382 should be used for buffering of alloyed steels, whereas, AS B-248 should be preferred for buffering of unalloyed steels. It is crucial to have a buffer layer with Kobatek 352 for 12-14 % Mn containing steels before hardfacing applications.



Current Type : [DC (+) / AC min. 70 V]

Welding Positions

Diameter [mm]	Length [mm]	Current [A]	Weight (100 pcs) [g]
3.25	350	110 - 140	5750
4.00	350	140 - 180	8370



Main Applications Guide (by Industry) - 1

IRON and STEEL WORKS	
Applications	Recommended Alloys
Anvil guides of power hammers	520
Blast furnace pressure release valves	543
Casting drills	543
Chutes of ingot heating furnaces	543
Cold adjusting rollers (Montbard)	512
Cold cutting blades	512
Connection sleeves of rolling mills	382
Cooling water pump bodies	418
Drive sprockets	512
Driving gear wheels of polishing machines	418
Electric furnace electrode holders	725
Electrode holder slides	725
Forging dies	382 / 520 / 543
Forming dies	382 / 520
Foundry defects	458
Handling equipments for hot steels	543
Heat treating trays	326
Hot shear blades	352, 543
Housing of high pressure pumps	111, 382
Mill roll couplings	352
Neck rings of the forming rolls	543
Pinions of bearer reduction gears	326
Roller bed rolls	352
Rotary piercer wobblers	752
Shafts of winding coil on STRECKEL rolling	382
Shovel tooth	512
Sinter chutes	578
Stamping dies	550
Stripper crane points	543
Suction covers of water pumps	111, 418, 458
Wagon wheels	345 / 352
MECHANICAL WORK SHOPS	
Applications	Recommended Alloys
Bearing blocks of diesel engines	418
Cast iron engine blocks	46, 418
Cylinder blocks	250
Diesel cylinder liners	418
Extrusion screws	381, 512 / 578
Gear pinions	382
Brick press screws	345 / 578
Marine engine pistons	250 / 458
Pistons	418
Pump housings	111, 46, 418
Reduction shaft bearings	382
Valve seats	543

Main Applications Guide (by Industry) - 2

SUGAR MILL	
Applications	Recommended Alloys
"Rota" pump rotors	725
8 valve seat with two clappers	418
Bearings of pulp press shafts	418, 458
Beet pump housings	458
Cane pusher arms	550
Centrifuge drums	111, 382
Clamshell buckets	512
Cleaning wheels for sugar beets	418, 382
Geared pump rotors	418, 458
Mill cylinder bearing shells	725
Mixer vats	250
Pellet press rollers	578
Pump blades	725
Rollnecks of cane-mill cylinders	382
Shock bars of shredder (GRÜNDLER)	382, 578
Steam cotters	382
Steam engine pistons (CORLIS)	458
Sugar cane mill cog-wheels	382
Wear plates of sugar beet pumps	550
Pump impellers	458
EARTH MOVING and MINING	
Applications	Recommended Alloys
Arms of bulldozer blades	382
Articulation arms	382
Babbitless crusher housing	111, 418
Balance beam	381
Blades of loader buckets	381
Bulldozer buckets	382, 550, 512
Coal washing screens	381
Conveyor shutes	578
Crusher cones	578
Crusher jaws	512
Dampers exhaust pipe lines cracks	326
Dozer cutting edges	352
Dragline bucket tooth	352, 578
Drill bits	512
Drilling tools	345
Elevator and excavator buckets	578
Gears of an excavator	382
Grabs of a dredge	512
Guides and rollers on tracked vehicles	352
Gyratory crusher cones (Babbitless)	352, 512
Hydraulic pistons	382
Loader buckets	578
Motor blocks	418
Neck parts of caterpillar scrapers	111, 382
Oil pressure cylinders	382
Perforated plating on ore-sorters	352
Ripper tooth	326
Sprockets	352
Tension rollers	345
Track pads of dragline cranes	352
Trench excavator buckets	111,382,512

Main Applications Guide (by Industry) - 3

CEMENT WORKS	
Applications	Recommended Alloys
Ball-crusher gears	326
Breaker hammers	352, 578
Buckets of clinker elevators	578
Clinker crusher hammers	578
Crane wheels	345
Exhaust fan blades	578
Füller cooler plates	543
Feed cake screws	352, 578
Furnace drive roll bearings	111, 418, 458
Hazemag crusher buffers	352, 512
Rings of rotary ovens	326
Roller press chutes	578
Roller press cylinders	326, 352, 512
Rotor disks of crushers	578
Rotors	352, 578
Rotary oven cog wheels	111, 326
Segment of helical screws of fuller pumps	578
Tracks pads	352
Vibratory tables for filling cement into sacks	381
PAPER MILL	
Applications	Recommended Alloys
Chip mill chutes	578
Chipper bed knives	382, 578
Chipper log feeding spouts	578
Chipper rotors	382, 512
Conical refiner rotors and stators	543
Conveyor chain sprocket wheels	382, 550
Defiberiser screws	512
Disk refiner shafts	512
Endless screw pinions	418
Hydrapulper rotors	352
Kneaders tooth	550
Paste refiners	382, 543
Pulping knives	550
Pump housings	458