

Eczacıbaşı - Lincoln Electric

Kobatek® **ABRAMAX®**



*Hardfacing
Wear
Plates*

BTGO

مركز البراغي والعدد
BOLTS & TOOLS CENTER **BTGO**

Kobatek®
PROTECTIVE MAINTENANCE TECHNOLOGY

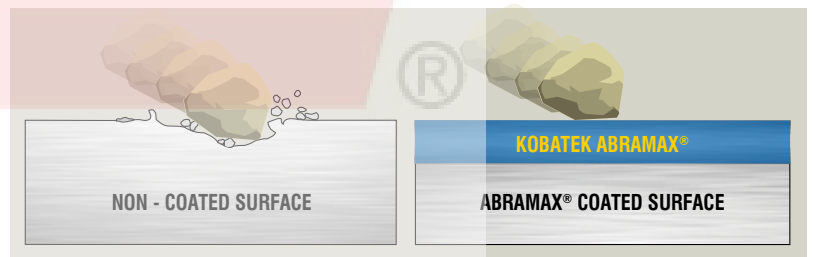
Kobatek® ABRAMAX® Wear Plates



“Wear Plates” is the general name given to a low carbon steel which coated on the surface with high abrasive wear resistant metallic materials. **Kobatek® ABRAMAX®** wear plates are especially developed for applications where high abrasion and low or moderate impact resistance required.

As a result of our experience and knowledge about Repair and Maintenance welding, Kaynak Tekniği Sanayi ve Ticaret A.Ş. offer to the users **Kobatek® ABRAMAX®** wear plates which are classified in 4 groups;

- ABRAMAX® STANDARD**
- ABRAMAX® PLUS**
- ABRAMAX® FLEX**
- ABRAMAX® PRESTIGE**



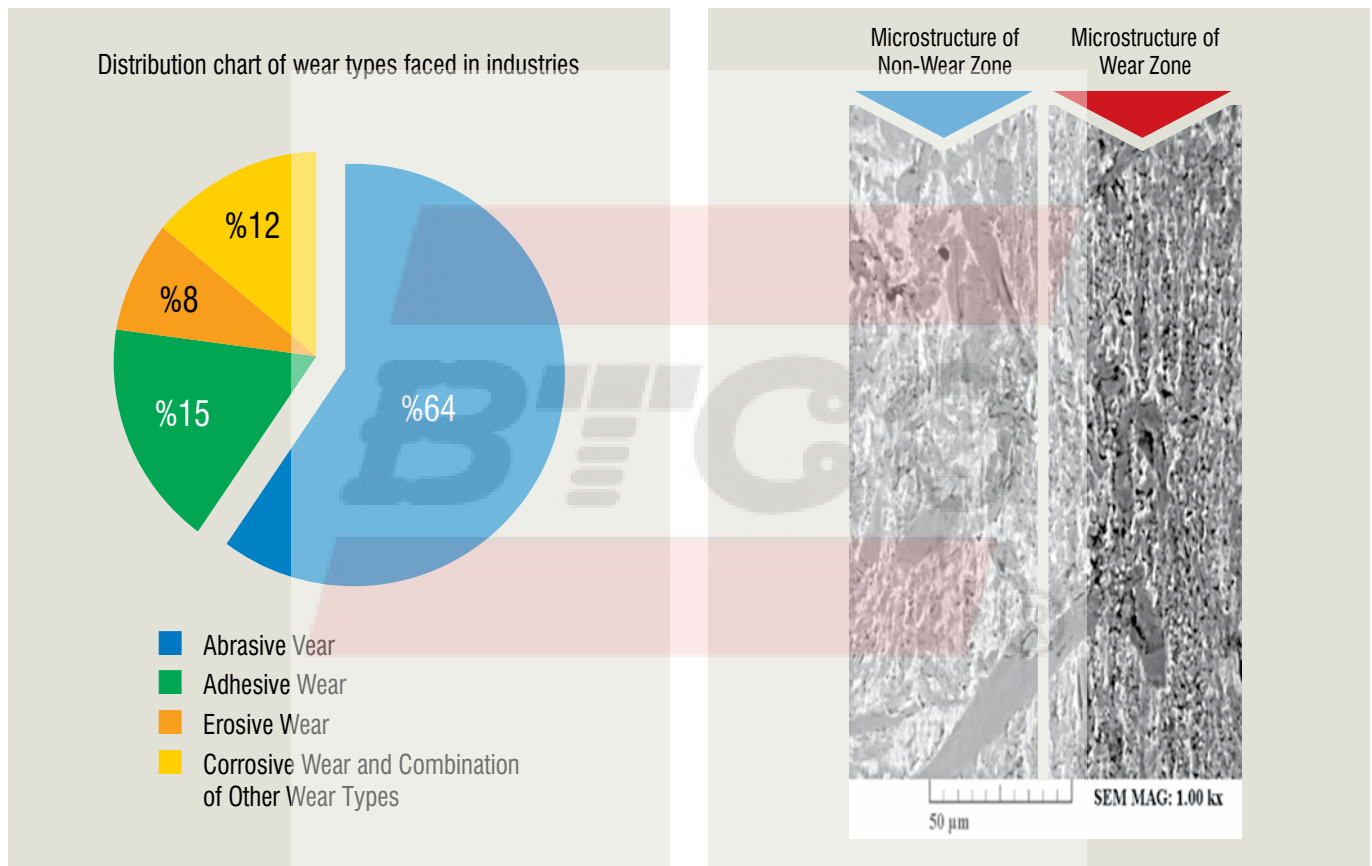
<p>CEMENT INDUSTRY</p> <ul style="list-style-type: none"> • Fans & Fan Casing • Fans & Fan Casing • Cyclones & Seperators • Clinker Transportation Pipe Lines • Mixer Linings • Mill Linings • Baffle Plates • De-dusting Plants 	<p>MINING INDUSTRY</p> <ul style="list-style-type: none"> • Buckets • Chutes • Front-End Loaders • Crusher Linings • Conveyor Systems • Channels • Slides 	<p>STEEL INDUSTRY</p> <ul style="list-style-type: none"> • Chutes • Channels • Blast Furnace Gas Systems • Bunkers • Broach Rams • Sintering Systems
<p>POWER STATIONS</p> <ul style="list-style-type: none"> • Coal Bunkers • Fans • Pipelines • Mill Linings • Slag Removal Systems • Transfer Chutes • Chain Conveyors 	<p>PULP AND PAPER</p> <ul style="list-style-type: none"> • Fans • Transportation Channels • Pipelines • Cyclones • Barking Drums • Mixing Equipment 	<p>MIXER-USING INDUSTRIES</p> <ul style="list-style-type: none"> • Foundries • Concrete Block Industry • Ready-Mixed Concrete • Asphalt Industry • Recycling Industry

Kobatek® **ABRAMAX**® Wear Plates

The definition of abrasive wear is, the type of wear occurs due to the hard particles flow along a solid surface. Abrasion is the most common form of wear. It is caused by non-metallic materials such as sand, oxides or small sized particles moving over a metal part. The worn surface can be recognized by its polished appearance or very fine scratches in the flow direction of particles. Hardness, shape, size and velocity of abrasive particle, service temperature, applied force and type of abraded material determines the severity and intensity of abrasive wear. The effect of abrasive wear may be seen most particularly in the cement, mining, mineral processing

and earthmoving industries and also in the environment with sand, rock, minerals etc., **Kobatek® ABRAMAX®** wear plates especially designed against abrasive wear. Service life of critical components such as chute liners, front-end bucket loader liners, excavators, trucks and separator blades, will be much longer with **Kobatek® ABRAMAX®** wear plate.

Microstructure comparison of deformed region according to ASTM G65 abrasion test and undeformed regions is shown in the below picture. As it is seen, hexagonal shaped chromium carbide structures act as barrier and prevent the wear.



Products	Hard Materials (1)	Alloying Elements (1)	Wear Resistance (2)	Hardness Single Layer (3)	Hardness Second Layer (3)	Impact Resistance (4)	Service Temperature Max.°C (4)	Corrosion Resistance (4)
STANDARD	Chromium Carbide	—	++++	55-60	57-62	Moderate	350-400	Good
PLUS	Chromium Carbide	Mo, B	+++++	55-60	57-62	Moderate	500-550	Good
FLEX	Chromium Carbide	B, Mn	+++	50-55	52-57	Good	350-400	Good
PRESTIGE	Niobium Carbide + Chromium Carbide	Nb, B, Mo	+++++	60-65	62-67	Moderate	550-600	Excellent

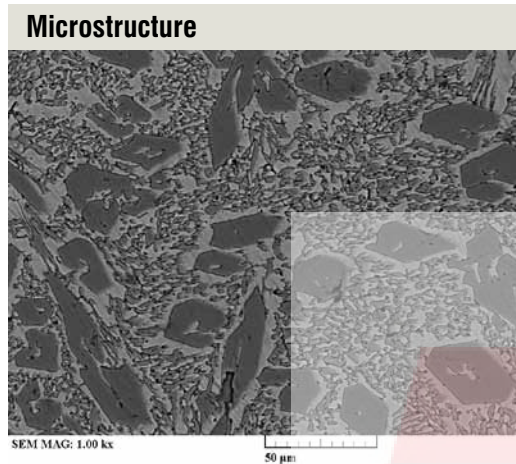
- 1) Chemical composition, hardness and microstructure properties of **ABRAMAX® Standard, Plus and Flex** wear plates are associated with Fe14 from EN 14700 standard (Classification of welding electrodes for hard-surfacing), while **ABRAMAX® Prestige** is associated with Fe15.
- 2) Abrasion Resistance Tests are made by our expert engineers in accredited laboratories of Sakarya University in accordance with ASTM G65 procedure-A standard.
- 3) Hardness Measurements are made in our Quality Laboratories according to EN ISO 6508-1 (HRC: Rockwell-C Hardness Test Standard)
- 4) The specified values refer to standard applications; in case of special conditions it must be agreed with technical department of Askaynak.

Kobatek® **ABRAMAX®** Wear Plates

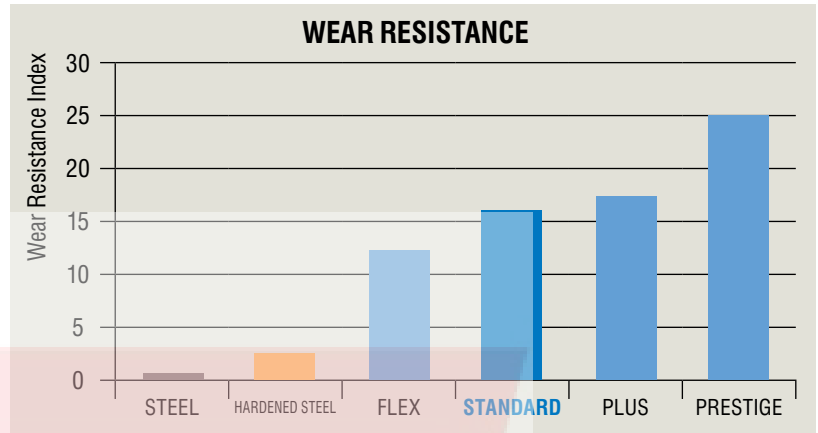
ABRAMAX® STANDARD

Standard wear plate with chromium carbide structure which provides high abrasive wear resistance and moderate impact resistance. The resistance to abrasion and erosion is obtained by the high chromium carbide concentration, grain size of the carbides and in addition to that toughness and hardness of the matrix.

Hardness : 55-60 HRC (1 pass)
Hardness : 57-62 HRC (2 pass)
Working Temperature : 350-400°C



Primary chromium carbides can be seen clearly in every region of the hardfacing structure of **ABRAMAX® STANDARD** wear plate.

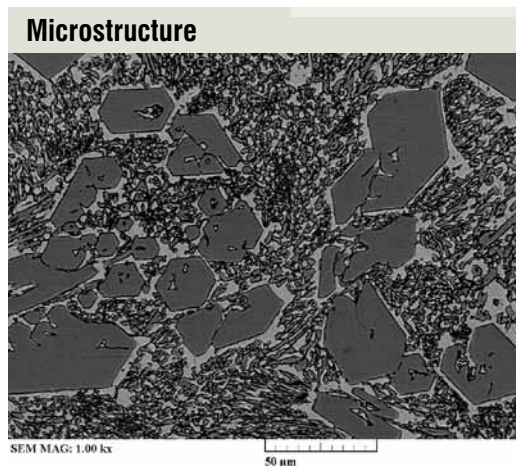


Product	C	Si	Mn	Cr	Fe
STANDARD	3,5 - 4,5	1,0	0,5	25 - 30	Rest

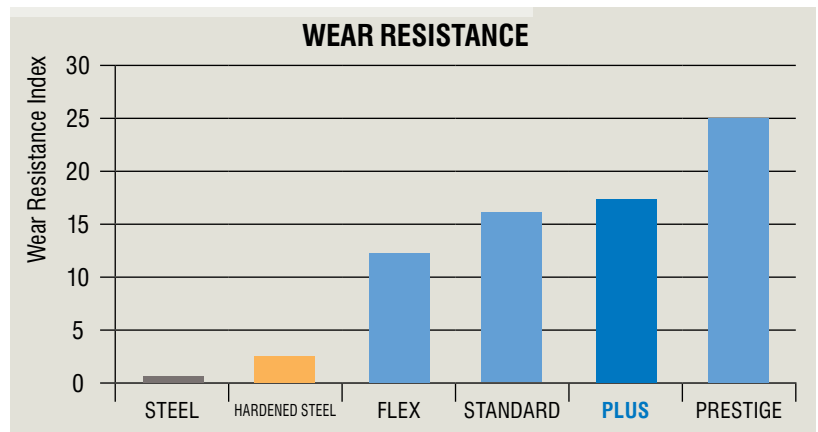
ABRAMAX® PLUS

Abramax Plus wear plate alloyed with Molybdenum (Mo) provides high resistance to severe abrasion and moderate impact. The addition of Molybdenum (Mo) increases the matrix strength of chromium carbide structure. Especially advised for the working environments where high temperature and severe abrasion occur. **ABRAMAX® PLUS** wear plate increases the lifetime and decreases the operating costs.

Hardness : 55-60 HRC (1 pass)
Hardness : 57-62 HRC (2 pass)
Working Temperature : 500-550°C



Higher chromium carbide density in all regions and more resistant matrix can be seen from the analysis of the microstructure obtained by **ABRAMAX® PLUS** wear plate.



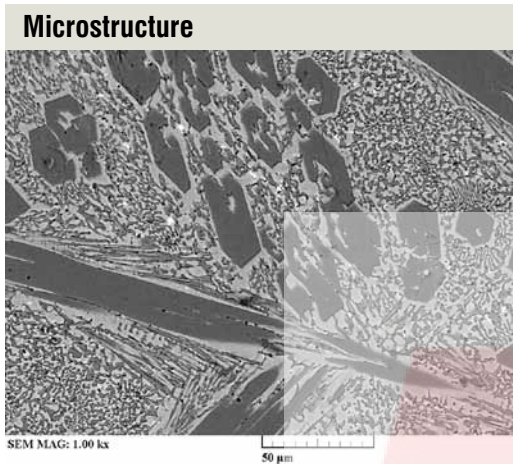
Product	C	Si	Mn	Cr	Mo	Fe	B
PLUS	3,5 - 4,5	0,8	0,5	27 - 32	1,0	Rest	< 0,4

Kobatek® **ABRAMAX®** Wear Plates

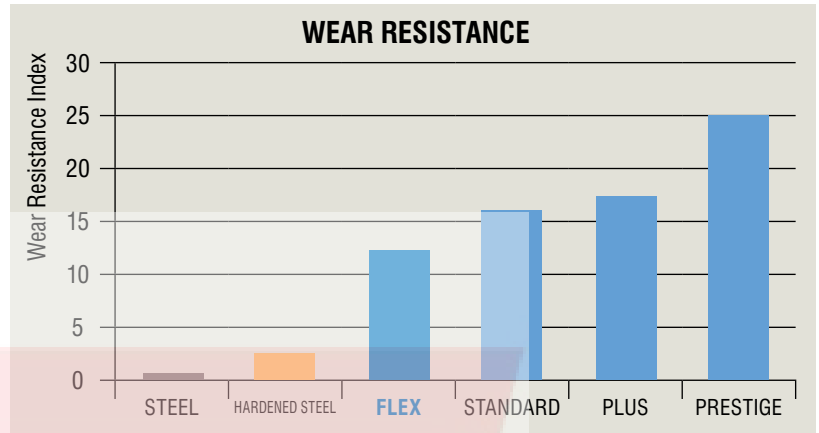
ABRAMAX® FLEX

Together with the abrasive wear resistance **ABRAMAX® FLEX** wear plate is especially suitable for forming and bending applications down to minimum 150 mm diameter. Highly advised for pipes, pipe elbows and fan blades where severe impact and moderate wear resistance are needed.

Hardness : 50-55 HRC (1 pass)
Hardness : 52-57 HRC (2 pass)
Working Temperature : 350-400°C



Microstructure of **ABRAMAX® FLEX** wear plate is suitable for special application which required bending operation.

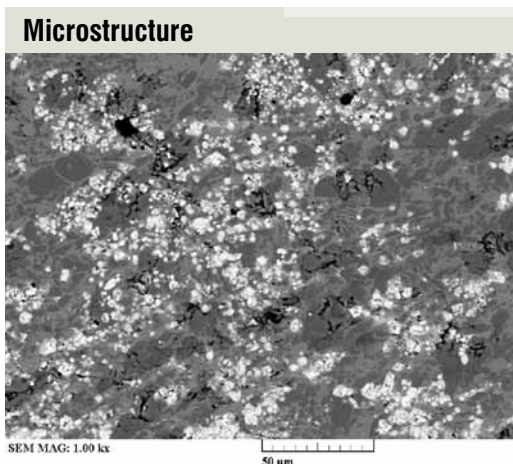


Product	C	Si	Mn	Cr	B	Fe
FLEX	3,5 - 4,5	1,2	1,2 - 2,4	24 - 28	< 0,4	Rest

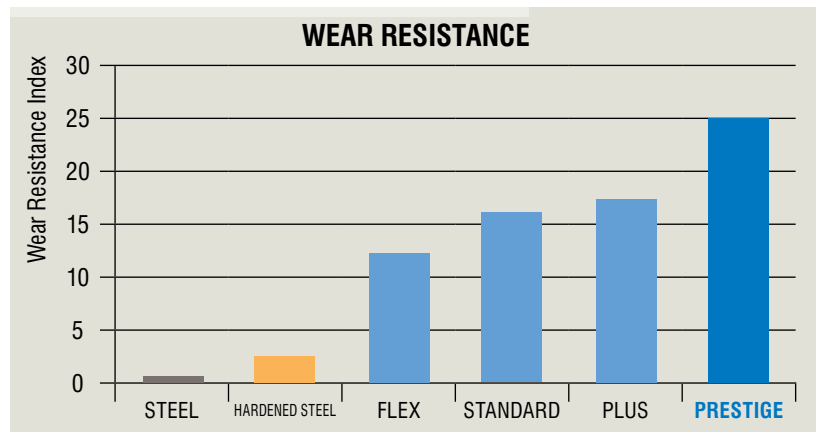
ABRAMAX® PRESTIGE

ABRAMAX® PRESTIGE wear plate has complex carbides to provide the highest abrasion resistance. Most qualified solution which can be used safely where severe abrasion and erosion occurs. It is suitable for working temperatures up to 600°C due to the high carbide concentration occurred by Niobium Carbide (NbC) and Molybdenum (Mo).

Hardness : 60-65 HRC (1 pass)
Hardness : 62-67 HRC (2 pass)
Working Temperature : 550-600°C

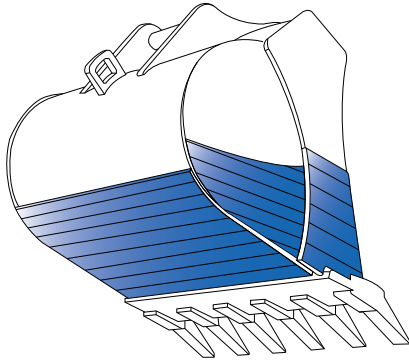


ABRAMAX® PRESTIGE wear plate contains highest primary carbide concentration, in all regions of the microstructure. Complex carbides increase the abrasive wear resistance dramatically by the existence of Niobium Carbides.

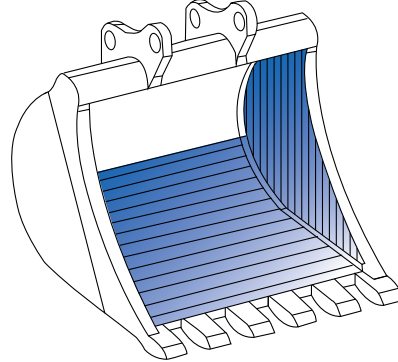


Product	C	Si	Mn	Cr	Mo	Nb	B	Fe
PRESTIGE	4,0 - 5,0	0,8	0,5	25 - 30	1,2	1 - 2	< 0,6	Rest

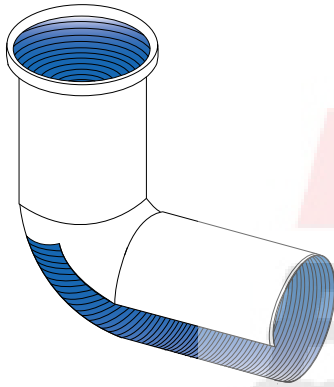
Kobatek® **ABRAMAX**® Application Areas



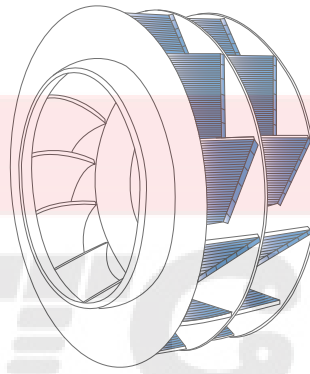
BUCKET



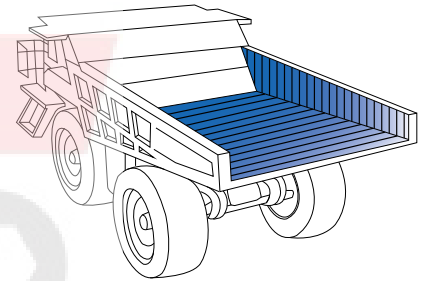
DRAGLINE BUCKET



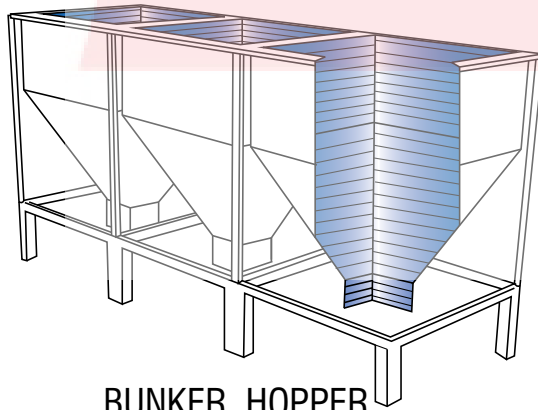
PIPE



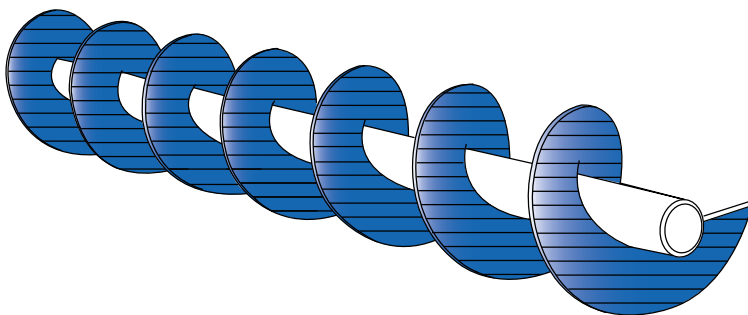
FAN BLADE



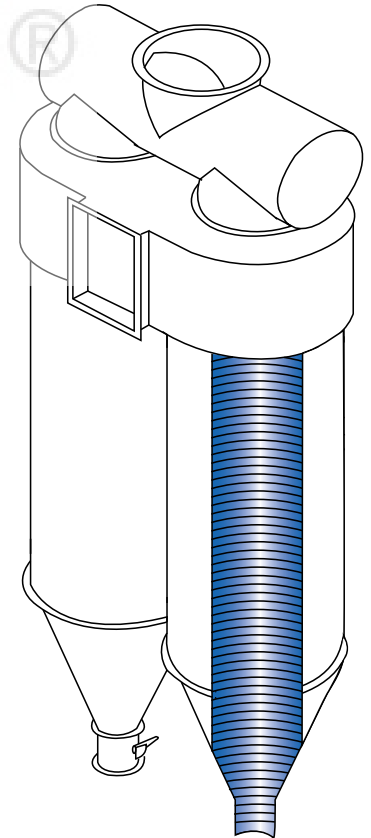
TRUCK



BUNKER, HOPPER



SCREW CONVEYOR



CYCLONE

Nominal Plate Dimensions - Joining Technics



MAIN PLATE	HARDFACING LAYER	TOTAL THICKNESS
5 mm	3 mm	8 mm
6 mm	4 mm	10 mm
8 mm	4 mm	12 mm
8 mm	6 mm	14 mm
10 mm	5 mm	15 mm
10 mm	6 mm	16 mm
20 mm	10 mm	30 mm

Custom design sizes can be made.

Different thicknesses can be produced.



MACHINING, CUTTING and WELDING of Kobatek® ABRAMAX® WEAR-RESISTANT PLATES:

Chemical analysis, microstructure and hardness of Kobatek® ABRAMAX® wear plates limit the usage of conventional machining methods.

Plate edges and corners can be machined by grinding, however it can not be cutted by oxy-fuel cutting technic because of high chromium content. Generally, the most preferred cutting method is plasma arc cutting technic. By applying plasma arc cutting, perfect results can be obtained due to quality and cleaning.

The wear-resistant hardfacing layer can also be removed **locally** by using air carbon arc technic.

Kobatek® ABRAMAX® wear plates can be welded to each other by Kobatek 352 covered electrodes. During this operation, the welded joint must be located on mild steel base metal surface. On the welded joint, the hardfacing application should be applied by Kobatek 578 covered electrode



Welded joint realised by Kobatek® 352 and hardfacing application by Kobatek® 578 stick electrodes



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