

How Magna Welding Alloys Benefits You

Magna Welding Alloys, a Division of ITW PP & F Korea Limited, has been pioneering the concept of "Total Maintenance Welding Solution" since 1968 for Cement Plants and other industries in order to achieve the following objectives:

- Reduce inventories
- Minimise labour cost
- Improve equipment availability
- Shorten shutdowns and quicken start-ups
- Stretch overhaul intervals

Research and Development:

Magna Technical Research team is dedicated to working in close partnership with its Distributors and Customers to provide a premium quality and comprehensive product range with complete technical back up service.

Network of Distributors:

The competitive advantage of Magna Welding Alloys lies in its ability to satisfy Customers' application needs and supply products quickly through its extensive network of Distributors around the world.

Environmental Policy:

Magna Welding Alloys envisions environmental protection as an integral part of its business activities. We have an environmental policy aiming to minimize impact on our customers, employees and the community. Objectives set within the policy are directed at conserving natural resources and reducing waste.

Internet and Intranet site:

Magna Welding Consultants and its Distributors at various cities utilize updated information system and internet technology to feedback to Customers' queries speedily.

Personal Service from our Technical Specialist:

Magna Welding Alloy's highly trained Distribution Representatives and Welding Consultants are available to provide a complete package (ask for details from your local representative) to determine your individual welding needs which includes the following:

Customer Support Service:

- Proactive investigation on problems and complaints
- Recommendations on base metal applications
- Complete solutions to technical enquiries

In-House Training Program:

- Trained Representatives can conduct seminars and presentations on a continuous basis, covering subjects such as cost savings, product applications and health and safety requirements.
- In-house training programs are customised on request

On Site Visits:

- Regular on sites visits conducted by Welding Consultants and Distribution Representatives
- Request of on-site visits by Welding Consultants are welcomed
- On-site demonstrations can be conducted by Distribution Representatives on request

Magna Welding Alloys uses high purity core wire generally having a much higher content of noble or semi-noble metals such as nickel, molybdenum, columbium, cobalt etc. than ordinary electrodes. Also our electrodes are coated with the state of the art - "Magna Flux Coating" technology specially formulated for maintenance welding.

Please check with your local Magna Welding Alloys Distributor for a comprehensive list of welding solutions that will exceed your expectations.

Specialist Welding Electrodes for Cement Plants

Magna 303 GOLD Ferrite Balanced Super-Strength Non-Cracking Alloy for All Steels

Magna 303 is a maintenance electrode that welds all steels including high alloy steels. It provides excellent heat and corrosion resistance. Magna 303 is excellent for welding and rebuilding of worn parts of Kiln Tyre, Hydraulic Cylinder Housing, Axles, Pressure Pipes, Roller Shaft / Frames, Buckets, Girth Gear, Pinions, Bull Gears and Swivel Rings.

Magna 400 Special Alloy for Crushing Equipment

Magna Crusher Rod 400 is a high chrome super metal formulated with rare earth compounds and special metals to provide an unprecedented shock absorbing quality. It is ideal for hardfacing Bucket Teeth, Hammer Crusher and Crusher Jaws.

Magna 401 Universal Hard Facing Electrode

Magna 401 does not crack even if applied in volume or welded rapidly without cushioning. Ideal for rebuilding on worn parts on Lifting Arms & Rollers, Mill Gear / Drive Pinions found in Crushers and Ball Mill. It provides supreme quality hardfacing for Bulldozers and Diaphragm of Cement Mill.

Magna 402 Impact-Resistant Alloy for Manganese Steel

Magna 402 is an electrode, which is austenitic in structure and non-cracking. It can withstand extreme shock, loading and impact. It is ideal for overlays and rebuilding of Hammers, Shovel Bucket & Lips, Toggle Bearing Plates, Hammer Arms & Shafts etc. in Crusher and Ball Mill.

Magna 403 Hard Facing Electrode for High Stress Abrasion

Magna 403 is designed to resist both extreme high stress and low stress abrasion. This electrode has a balanced arc transfer and a high deposition rate. It is easy to apply with no spatter or pin holes when rebuilding Crane Grabs, Coal Pipe Bends and I.D. Fans in the Cement Mill.

Magna 404 Hard Facing Electrode for Extreme Abrasion

Magna 404 contains hard tungsten cobalt carbides in a tough alloy steel matrix. This special formulation is designed to resist severe grinding abrasion and extreme wear. The electrode can be applied using either torch or arc welding equipment. Ideal for rebuilding Burners (inner & outer Stainless Steel pipes) located in Kilns.

Magna 405 Superior Build-up Electrode

Magna 405 is recommended for use in building up of worn parts for machining later. It is excellent for flame hardening or pack hardening.

Magna 770 High-Strength Non-Cracking Machinable Electrode for Cast Iron

Magna 770 is specially designed to weld all types of cast iron encountered in maintenance applications. It requires little or no preheating. It is ideal for repairing and rebuilding of Engine Housings, Water Pump Housings, Compressor Cylinder Block Housings, Couplings of Kiln and Gear Box Housings.

Magna 777 Generation II Machinable Electrode for Cast Iron

Superior design enables economical use on virtually all types of cast iron. High-tech "controlled blast" pulse action automatically burns off surface contaminants before weld metal transfer. This machinable electrode delivers superior weld and protection for Engine Housings of heavy vehicles at quarry, Bearing Housings in Cement Mill and Couplings in Raw Mill and Kiln.



About ITW

ITW (NYSE:ITW) is a Fortune 200 global multi-industrial manufacturing leader. The company's seven industry-leading segments leverage the unique ITW Business Model to drive solid growth with best-in-class margins and returns in markets where highly innovative, customer-focused solutions are required. ITW has nearly 50,000 dedicated colleagues in operations around the world who thrive in the company's unique decentralized and entrepreneurial culture. To learn more about the company and the ITW Business Model, visit www.itw.com.

To offer the best service to each market segment, ITW PP & F Korea Limited operates the following divisions that are branded uniquely for the most prominent recognition by users and customers:



OMEGA Ultimate Lubricants
Specializing in lubrication solutions - greases, oils and additives



MAGNA Welding Alloys
Specializing in gas and arc welding consumables for maintenance



CORIUM Industrial Chemicals
Specializing in industrial & commercial chemicals and adhesives



ZETALUBE Lubricants
A new lubricity dimension evolved from experience

WE SUPPLY SUPERIOR PRODUCTS THAT MAKE MAINTENANCE:

- FASTER
- SAFER
- MORE RELIABLE

Our products are engineered to:

- Lower costs
- Reduce downtime
- Cut wastage

At ITW PP & F Korea Limited we are fully committed to a proactive approach to safety, health, environment and product improvement. Our commitment is well reflected in:

- Our continuous Research and Developments
- Our on-going in-house Training and our in-house Training Facilities
- Our comprehensive range of Quality Products
- Our many long-term Repeat Customers.

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The information contained in this publication supersedes all relevant information previously released and is to the best of our knowledge and accurate at the time of issue on April, 2017.



Magna
Welding Alloys

Welding & Brazing Solutions for Maintenance Repairs in Cement Plants

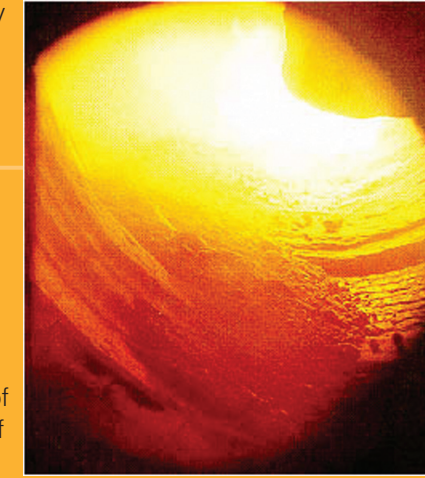


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Cement is second only to water as the most consumed substance on earth, with nearly three tons used annually for each person on the planet. Cement is the critical ingredient in concrete, therefore an indispensable part of meeting society's needs for housing and basic infrastructure such as bridges, roads, water treatment facilities, schools and hospitals.



And it is the hundreds of Cement Plants located all over the world that Magna Welding Alloys is committed to serve. With its use in construction of shelter and other assets of millions, cement is manufactured to strict standards. Based on the same philosophy, Magna Welding Alloys has been standing behind Cement Plants' most demanding maintenance needs with its proven solutions and cost-effectiveness over the years.

In the production of cement, there are many stages involving the crushing and grinding of raw materials like limestone and coal as well as semi-finished cement at the later stage of production. These harsh processes cause wear and tear to key components through impact, abrasion, corrosion and high temperatures induced on equipment such as the earthmoving equipment, crushers, roller presses, grinding tables, kiln trunnions, etc.



With spiralling costs of maintenance, labour and expensive new parts challenging Cement Plants today, scraping or replacing of parts is not a satisfactory answer. The alternative is to salvage expensive parts by a comprehensive wear management system. The most reliable way is to rebuild and reclaim equipment with maintenance welding solutions. Extending the life of equipment parts through the use of electrodes is the most preferred and economic method.

However, maintenance engineers understand the conditions for production welding are entirely different from conditions for maintenance welding. In production welding the base metal is known, welding environments are ideal and projects are repetitive. In maintenance welding the base metals are unknown, welding conditions are less than ideal and repairs often are carried out on rusty and dirty parts.

The challenge now is not to prove welding as the preferred solution, but to identify a truly preferred solutions provider.

Whether you are the Owner of a Cement Plant, the Plant Operation Manager, Maintenance Manager, or Maintenance Engineer, your day-to-day challenge is to maximize the return on every dollar you invest in your assets and maintenance jobs. You need a reliable and professional partner who can offer you a genuine wear management system. Magna Welding Alloys is your ultimate answer.

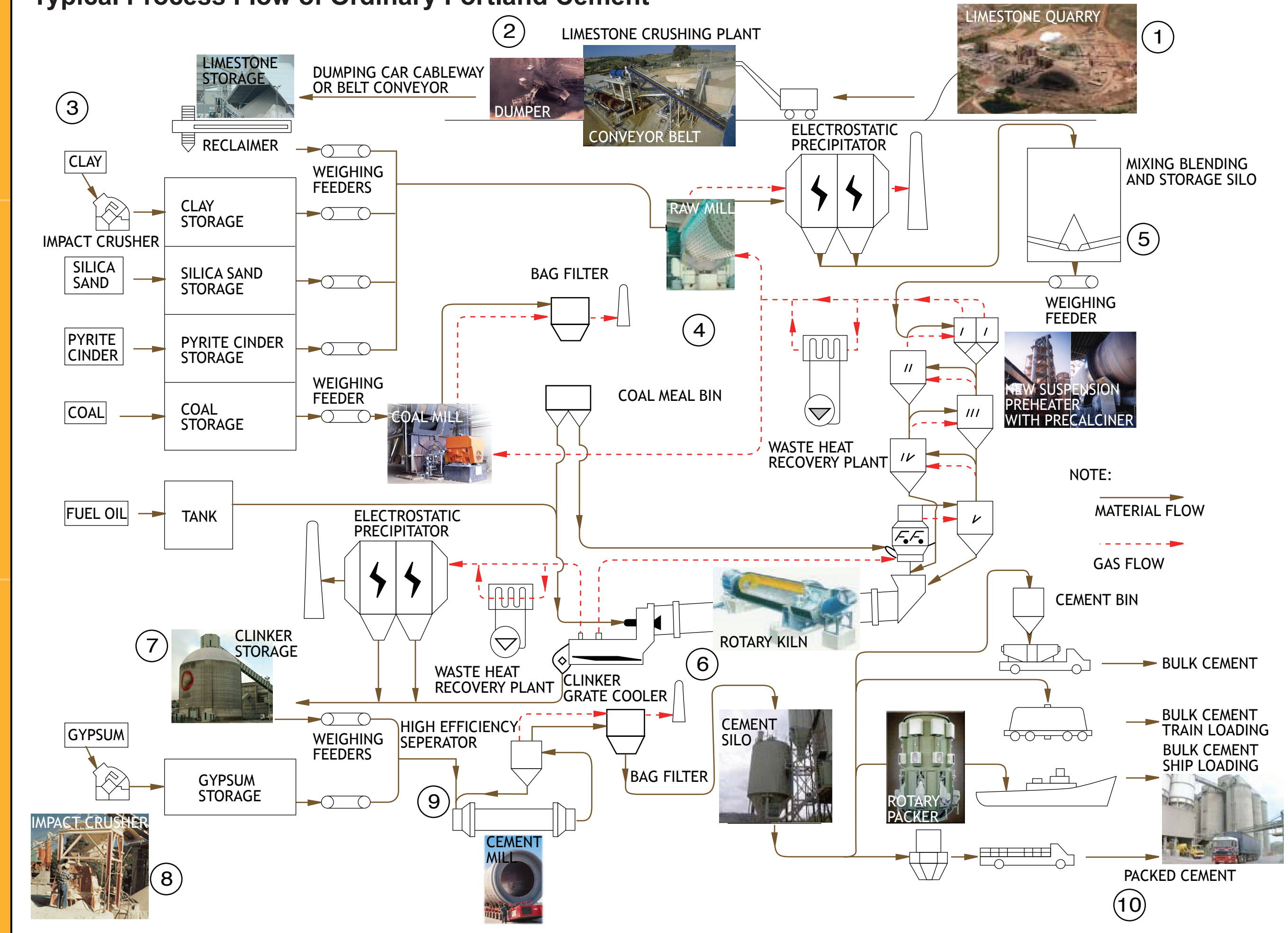
Magna Welding Alloys' Wear Management System offers Complete Solutions to the following Key Equipment and Machinery of Cement Plants

- | | | | |
|--|---|---|---|
| <p>1. Quarries</p> <ul style="list-style-type: none"> • Shovel loader • Bulldozer • Drilling equipment • Reclaimer • Tractor • Truck • Funnel • Dragline excavator • Conveyor belt • Scalper • Cone crusher • Hammer crusher • Bar crusher • Double roll crusher • Jaw crusher • Screening machine <p>2. Clay / stone transport</p> <ul style="list-style-type: none"> • Screw conveyor • Slurry pump • Conveyor belt | <p>3. Homogenization</p> <ul style="list-style-type: none"> • Reclaimer • Excavator • Traveling crane • Drag chain • Metering system <p>4. Raw mill</p> <ul style="list-style-type: none"> • Vertical mill • Ball mill • Tube mill • Roller mill • Roller press • Separator <p>5. Meal transport and homogenization</p> <ul style="list-style-type: none"> • Bucket elevator • Belt conveyor • Weighing Feeder • Fuller pump • Pipe-line | <p>6. Clinker fabrication</p> <ul style="list-style-type: none"> • Kiln • Dryer • Preheater • Grinder (coal) • Cooler • Planetary cooler • Ventilator • Dust extraction • Drag chain • Hammer crusher <p>7. Clinker storage</p> <ul style="list-style-type: none"> • Bag elevator • Bucket elevator • Belt conveyor • Traveling crane • Storage silo • Storage dome | <p>8. Additives</p> <ul style="list-style-type: none"> • Silo • Drying plant • Metering system • Drag chain • Weighing feeder <p>9. Cement fabrication</p> <ul style="list-style-type: none"> • Ball mill • Vertical mill • Separator • Ventilator • Pipeline • Cement silo • Pneumatic trough conveyor <p>10. Delivery</p> <ul style="list-style-type: none"> • Rotary Packer • Pump • Sacking • Filter |
|--|---|---|---|

* Please refer to Typical Process Flow of Ordinary Portland Cement on opposite page

Some Application Examples of Magna Welding Alloys					
Equipment	Particular Locations	Base Material	Common Problems	Magna Solutions (* = Overlay)	Why Magna is better?
(1) QUARRY					
	Bucket teeth	Manganese Steel	Severe Impact & Abrasion	• M402 • M400	• Withstands extreme shock and impact • Provides a high deposit rate with little or no spatter. • Outstanding resistance to sand and stone wear
	Engine Housings	Cast Iron	Cracks	• M770 / M777	• Specially designed for welding all types of cast irons
	Chassis Bucket Body	Manganese Steel	Cracks, Punctures	• M303 Gold	• Provides superior corrosion resistance and heat resistance
	Hydraulic Cylinder Housing	Alloy Steel	Cracks	• M303 Gold	• Ditto + Delivers high tensile strength, yield strength & holding power
	Chassis	Alloy Steel	Cracks	• M303 Gold	• Ditto + Excellent for all position welding
	Dozer Sprockets	Manganese Steel	Friction Impact Wear	• *M401	• *Engineered to resist heavy abrasion and wear
	Track Link & Pin Track Roller	Manganese Steel	Friction Impact	• M402 • *M401	• Withstands extreme shock and impact • *Crack-free deposit even with large volume application
	Front Blade	Mild Steel & Manganese Steel	Abrasion, Friction	• M402 • *M403	• Ideal for shock & impact resisting build-ups • *Hardfacing for high stress abrasion
	Engine Housings	Cast Iron	Cracks	• M770 / M777 • M100	• Offers machinable and non-cracking welds • Chamfers, grooves & gouges metals with no special skills required
	Hammer Crusher	Manganese Steel	Impact, Friction	• M402 • *M400	• Withstands extreme shock, loading and impact • *Specially engineered for crushers with ultra-resistance to impact and abrasion
	Crusher Jaws	Alloy Steel	Friction, Abrasion	• M402 / *M400	• Ditto + Can be applied using either stringer bead or weave techniques
	Toggle Plate	Austenitic Manganese Steel	Wear	• M402	• Withstands shock and impact
	Toggle Seal	Manganese Steel	Wear	• M402	• Works rapidly, hardens to great depth and resists excessive shock and impact
	Blow Bars	Manganese Steel	Impact, Abrasion	• *M400 • M402 / *M400	• *Outstanding resistance to stone and sand wear • Excellent for equipment build-ups and *overlays
(4) RAW MILL					
	Girth Gear	Alloy Steel	Wear	• M303 Gold	• High ease-of-application, welds all kinds of steels
	Girth Gear Drive Pinion	Alloy Steel	Wear	• M303 Gold	• Machinable weld deposit • Work hardens to high hardness
	Diaphragm	Manganese Steel	Impact & Abrasion	• M402 • *M401	• Withstands extreme shock & impact • *Resists heavy abrasion
	Couplings	Cast Iron	Cracks	• M770 / M777	• Welds most kinds of cast iron • Crack-free deposit
(6) CLINKER PRODUCTION					
	Kiln Tyre	Cast Steel	Wear	• M303 Gold	• Offers high versatility for repairing unknown or dissimilar steels • Highly ductile weld metal with very high UTS
	Roller Shaft Burner inner & Outer pipe	Carbon Steel / S.S. Steel	Wear / Abrasion	• M303 Gold • M303 Gold • *M404	• Weld deposits are machinable • Excellent resistance to corrosion • Highest resistance to abrasion
	Couplings	Cast Iron	Cracks	• M770 / M777	• Produces crack-free and machinable weld deposits
(9) CEMENT PRODUCTION					
	Main Bearing Housing	Cast Iron	Wear	• M770 / M777	• Gives perfect machinable welds on cast irons and no preheating is required
	Girth Gear Drive Pinion	Alloy Steel	Wear	• M303 Gold	• Gives super strength as well as high precision weld • Work hardens to high hardness
	Diaphragm	Manganese Steel	Impact & Abrasion	• M402 • *M401	• Produces perfect build-up and *hardfacing to ensure ultra protection
	Trunion and I.D. Fans	Cast Steel	Cracks	• M303 Gold	• Welds all kinds of steels • Highly ductile weld metal with exceptional tensile strength

Typical Process Flow of Ordinary Portland Cement



NOTE:
 → MATERIAL FLOW
 - - - GAS FLOW