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RECLAMATION WELDING HANDBOOK

WELDING CONSUMABLES & CUTTING EQUIPMENT

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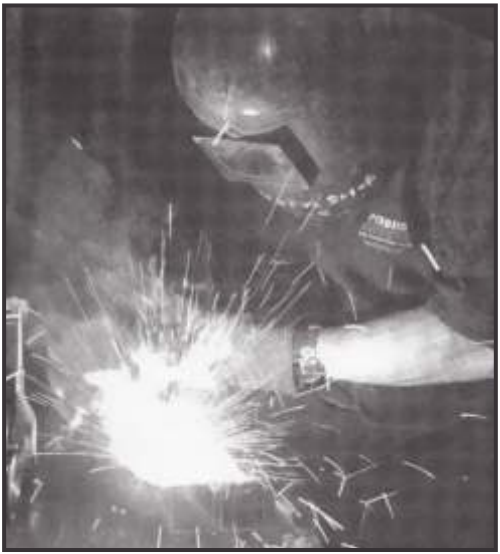

RECLAMATION WELDING HAND BOOK

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OUR PROFILE

D&H Secheron has been a successful player in the field of Welding Consumables for four decades now and today, the name is held synonymous with high quality welding consumables, as well as dedicated customer service. Our comprehensive product range is well complimented by our interactive customer education programs, which have two-pronged benefits - enabling proper selection of consumables & the correct usage of them thus sharpening our own insight of our customer's requirements. This is in turn helps to fuel our research activities to improve further.....

D&H Sécheron has played a vital role in the field of Maintenance Welding: Repair & Reclamation of components to enhance their service life. In fact our LoTherme range of products, are dedicated to maintenance needs of a broad spectrum of industries that regularly need consumables like SMAW Electrodes, Open Arc FCW and Composite Wear Resistant Plates tocombat wear, in all forms, and prolong life.

LoTherme consumables are now used by a number of industries like the Cement, Thermal Power, Mining, Steel, Sugar, Railways, Transportation and General Engineering Industries. Several consumables have formed an ideal solution for the reclamation of the Components. This booklet highlights the various aspects of maintenance welding, the characteristics and applications of consumables from our LoTherme range.

'Apart from this, there are a number of custom-built consumables for specific applications, like the Wear Resistant Plates. If required we would be pleased to furnish you details of the same too. We hope that this booklet will be of use to all the Maintenance Welding Personnel in the various industries in enabling them to select the right consumables. Any queries regarding selection of consumables, its application etc for the LoTherme Range of products can besought from us.

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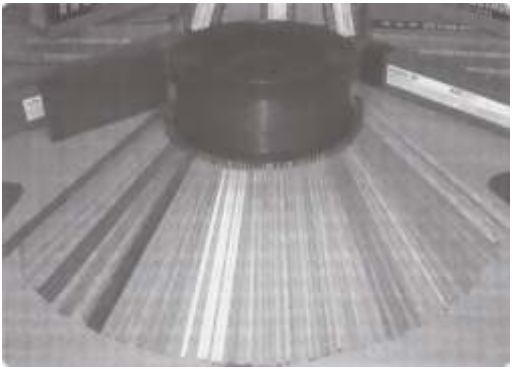

Low Heat Input SMAW Welding Electrodes

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LoTherme Electrodes in Tamper-Proof Packs

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RECLAMATION WELDING

Effective maintenance and repair are essential for efficient running of industries. Welding, as a tool of maintenance and repair, plays a vitally important role in the functioning of all major industries. In general it may be said that practically any metal part which has broken or worn-out in service can be reclaimed by welding. In fact, one of the first uses of welding was to repair broken machinery and parts. What started out, as a process for making an emergency repair until a replacement could be obtained, has today become an economic necessity to conserve expensive materials and to reduce inventories.

The need for maintenance welding arises mainly because of :

a) Wear and
b) Failure

Wear is caused by mechanical means like friction, abrasion and impact in case of, relative movement between the parts in contact with each other. Wear is also caused by corosive action of the medium being handled by the particular equipment. It is observed that the magnitude of wear, may it be due to mechanical or chemical reasons, is greater at higher temperatures. Complete failure of the equipment is the next stage if wear exceeds permissible levels. Failure can also take place due to defective material or accidental overloads.

In addition to the application of welding process to salvage broken parts, resurfacing by welding has become an economical solution to various problems. A majority of maintenance welding is carried out by the shielded manual metal arc process.

To obtain longer service life in many cases, it is even economical to surface new parts before putting them to use.

This handbook is designed to guide you in the selection of suitable electrodes for shielded manual arc welding for various maintenance applications.

SPECIAL FEATURES OF RECLAMATION WELDING

In reclamation welding, the wield metal is deposited on the worn-out components or is used to join fractured component. Therefore, it is essential that the weld metal possesses the properties, which will meet the service requirements of the components and enhance its service life. Most of the times the component calls for welding only in certain ares and therefore in relamation welding it is essential to see that the component does not lose its original properties in the areas where welding has not been done. These special features associated with reclamation welding impose restrictions on selection of welding consumables and also call for reduction of heart input during welding.

LoTherme low heat input welding

LoTherme electrodes are specially designed for low heat input welding. These electrodes are the result of extensive development, testing and analysis in our well-equipped modern laboratories.

The advantages of welding, particularly for maintenance and repair applications, with low heat input LoTherme electrodes needs no emphasis. It is well known that the composition and metallurgical state of the bese material affects the properties of the deposited weld metal since the first layer will always be diluted with base material.

The carbon content and other alloying elements can have a pronounced effect on the first layer of weld deposit. There is also a risk of damage of the desirable structure in the heat-affected zone of the base material. It is in this context that the introduction of LoTherme low heat input electrodes can be fully appreciated.

You derice the following benefits when you use LoTherme electrodes:

- Reduced pick-up of carbon and other detrimental elements from the base material,
- Minimal effect on the surface of the base material adjacent to the fusion zone, known as heat-affected zone,
- Reduced propensity for grain coarsening in weld metal and HAZ, thereby resulting in better toughness of weld and HAZ,
- Reduced width of the HAZ,
- Reduction in the cracking tendency of the highly brittle materials due to reduced 'thermal shock,
- Less distortion of the weldment,
- Lower consumption of electrodes, especially in hardfacing applications due to lower dilution with the parent material.

Through developments in the design of flux coating, it has been ensured that each LoTherme electrode performs at low welding currents, low arc voltage and short arc length. These factors are strictly controlled to ensure that you get the maximum advantage of low heat input welding with LoTherme electrode.

SELECTION OF ELECTRODE FOR RECLAMATION WELDING

Selection of electrode in maintenance welding is a very important step for achieving the desired results. The two major factors, which basically control the selection of electrodes, are:

1) Types of base material.

2) Service condition.

Though there are other factors, which can influence the choice on welding electrodes, the above two factors primarily decide the welding electrodes.

TYPES OF MATERIAL

The different types of base materials that are normally encountered in any industry are:

1) Carbon and low alloy steels

2) Stainless Steels

3) Austenitic Mn steels and

4) Cast iron.

The salient features of welding these materials are listed in appropriate sections in this handbook together with the electrodes that are suitable for these materials. These guidelines should help the maintenance welding personnel to select the electrode for their applications.

WELDING TECHNIQUE

The welding technique for each type of LoTherme electrode is

highlighted in the individual product literature. It is, however, necessary to observe certain general procedures and precautions in order to obtain best results.

Electrodes should be kept dry. Moisture pick-up affects the performance of the electrodes as also the soundness of the weld deposits. It is advisable to dry the electrodes before use as suggested in the individual product literature.

- Clean the weld groove and the adjacent area thoroughly free of rust, scale, paint, oil, grease or any other surface contamination. For removal of paint, oil or grease from the surface, it is advisable to use acetone or any other solvent.

- Use lowest possible current and short arc. As far as do not weave the electrode. Use stringer bead technique. If weaving becomes necessary due to position of welding, the width of weaving should not exceed two to three times the core wire diameter of the electrode.

- While welding on austenitic manganese steel, cast irons and thin sheets especially stainless steel, the length of each weld bead should be limited and the welds staggered over the surface to be welded. In case of austenitic manganese steel and cast irons, short and staggered weld beads help avoid cracks whereas in case of thin sheets, this technique helps control distortion. Please refer to individual LoTherme product literature for further details on control of heat input.

- while welding hard and brittle materials, especially cast irons, it is necessary to peen the weld beads. Peening helps

in reduction of residual stresses by 'stretching' the weld metal. Peening should be done immediately after the weld metal has solidified and before slag is removed.

- Appropriate pre-heat and pre-weld heat treatment may have to be adopted depending upon the physical as well as the metallurgical conditions from which the parts may have to be reclaimed. Please consult our Engineer for further details.

Packing and storage of electrodes

All LoTherme electrodes are supplied is moisture-proof and shock-proof high density polythene containers. For further protection, the electrodes are first packed in moisture-proof, low-density polythene bags.

LoTheme electrodes are supplied in 1 kg. and 2 kg. packing. Small quantities in each packet will help you control your inventory costs as well as avoid wastage of electodes.

Rectangular containers facilitate storing. No special storage conditions are necessary for LoTheme electrodes. The storage area, however, should not be exposed to moisture conditions.

Each LoTherme electrode is printed along the length near the holder-end with the brand name for easy and positive identification.

Save Time and Money with LoTherme

Due to its economic advantages, welding naturally plays a very important role in maintenance work, particularly for emergency repairs or building-up worn out parts. There is no need to treat such work as a temporary job to keep the plant going till a replacement part is procured. LoTherme-low heat input electrodes are specially designed to ensure that the parts reclaimed by welding, in many cases, perform better than the original.

Each LoTherme electrode is developed after a thorough study of the application requirements.

Save time and money by adopting LoTherme electrodes and technique.

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Electrodes for Carbon & Low Alloy Steels

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CARBON AND LOW ALLOY STEELS

The carbon steels are the most common materials used for various applications. The percentage of carbon is a major creterion in deciding its properties and also its weldability. Increasing amounts of carbon results in loss of ductility of the material and renders the material difficult to weld. Therefore, the percentage of carbon will have to be determined before deciding on the welding techniques and consumables. The susceptibility of the material to form hard structures like martensite increases with the higher percentage of carbon, additional precautions like pre-heat, post-heat may be required to achieve the desired properties.

The alloy steels in addition to carbon have additions of alloying elements like Mn, Ni, Cr, Mo, V, etc., which increase the susceptibility of the material to form hard structures like martensite. These low alloy steels also, therefore, require special consideration while designing the welding procedures. In general, these low alloy steels are welded with a suitable pre-heat depending on the composition of the base material and the section thickness involved.

Our LoTherme electrodes in the 200 and 300 series are suitable for this group of materials; the 200 series suitable for sheet metal welding and the 300 series suitable for carbon and low alloy steels. Apart from joining applications LoTherme-352 is also suitable for buffer layers on a variety of carbon and low alloy steels and cast iron. These buffer layers are:

a) Useful for providing a ductile layer over the hard material before hardfacing.

b) For sealing off the impurity elements particularly in cast steel.

Depending on the composition of the material, suitable pre-heat for the base material will have to be selected.

LoTherme - 200

A special low heat input electrode for welding mild steel.

Characteristics :

LoTherme-200 is a specially formulated low heat input electrode for welding mild steel sheets, structural, etc. It can be used on AC/DC (±) and can be operated with ease in all welding positions including vertical down. The beads are finely rippled and arc is smooth.

Applications :

LoTherme-200 is ideally suited for sheet metal welding, structural welding using low heat input welding technique. Ideal for welding mild steels in maintenance work.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	47 kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Technique :

* Clean the weld area free of all contaminants.
* Use low current, short arc technique.

Current Conditions : AC/DC (±)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-190	120-160	80-120	50-75

LoTherme - 210

Exclusive electrode for low heat input welding of mild steel with minimal distortion.

Characteristics :

LoTherme-210 flux formation is so chosen that the electrode produces excellent weld finish at extremely low current. It can be used on AC/DC (±) in all conventional positions.

Finally rippled weld beads, soft and steady arc which is easy to strike and re-strike and self-detachable slag are a few among many pleasant features associated with LoTherme-210.

Applications :

LoTherme-210 has been specially designed for welding sheet metal with low heat input technique in order to prevent distortion. However, it can also be used for welding mild steel of higher thickness.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	48 kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Technique :

Keep the electrode dry. Clean the weld area free of any surface contamination. Use low current and short arc technique. While welding sheet metal, it will be of greater advantage if the job can be placed in an inclined position and welded downhill. This will also help in increasing welding output.

Current Conditions : AC/DC (±)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-200	110-160	80-120	50-80

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LoTherme - 210 R

A medium coated electrode for low heat input welding of mild steel with minimal distortion.

Characteristics :

LoTherme-210R produces excellent weld finish at extremely low currrent. It can be used in all conventional positions. Finely rippled weld beads, soft and steady arc, radiographic quality weld and self-detachable slag are a few among many pleasant features associated with LoTherme-210R.

Applications :

LoTherme-210R has been designed for welding sheet metal in low heat input technique. It can also be used for welding mild steel of higher thickness depending on the applications. This electrode can be used for fabrication and repairing of Buckles, Gear cases, Protector tubs, Door patches, Side panels, End wall patches etc. of rolling stocks and locomotives.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	48 kgf/mm^2
ELONGATION (L=4d)	:	27 %

Welding Technique :

Keep the electrode dry. Clean the weld area free of any surface contamination. Use low current and short arc technique. While welding sheet metal, it will be of greater advantage if the job can be placed in an inclined position and welded down-hill. This will also help in increasing welding output.

Current Conditions : AC/DC (±)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-160	90-120	50-80

LoTherme - 351

Low heat input basic coated type high-yield hydrogen controlled electrode.

Characteristics :

- Low heat input, low hydrogen type electrode.
- Steady, smooth arc, which is easy to strike and re-strike.
- Extremely low spatter, excellent slag detachability and finely rippled weld beads.
- Radiographic quality welds having excellent cracking resistance.
- Weld metal of excellent toughness to withstand heavy dynamic loading and impact.

Applications :

LoTherme 351 is ideally suited for welding carbon steels used in the construction of machinery and equipment subjected to heavy dynamic load, impact and severe service conditions. Some of the typical applications include: Heavy structures subjected to dynamic loading and impact, Highly restrained joints, Rail coaches, Wagons, Ships, Girders for columns, bridges, Blast furnace shells, Rotary kiln shells, building machinery, Earth moving machinery, Boilers, Pressure vessels.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	53 kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Technique :

Redry the electrodes at 250°C for one hour before use. Clean the weld area completely free of oil, grease, paint, rust or any other foreign matter. For welding heavy sections in cast steel, preheating of the part may prove beneficial. Use short arc.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-220	130-160	90-120	60-90

LoTherme - 352

Hydrogen controlled electrode for mild, medium carbon, high strength steels, cast steels, "problem steels", and for cushion layer under hard deposits.

Characteristics :

LoTherme-352 is a hydrogen controlled AC/DC (±) electrode, operates equally well in all conventional positions. High quality, high strength, crack-free RADIOGRAPHIC welds are the special features of LoTherme-350. Welds display good ductility and impact resistance at ambient and sub-zero temperatures.

Applications :

LoTherme-352 is ideally suited for welding mild, medium carbon, high tensile steels, difficult steels, steels high in sulphur and phosphorus, heavy structures, plant and equipment subjected to dynamic loading and impact. It is equally good for depositing buffer layer before hard surfacing.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	56 kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Technique :

For best results, dry the electrode at 250°C for two hours before use. Clean the weld area completely free of oil, grease, paint, rust or any other foreign matter. For welding heavy sections in cast steel, pre-heating of the part may prove beneficial. Use short arc.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-210	140-170	110-140	60-90

LoTherme - 352 R

A low heat input electrodes for mild, medium carbon steels, cast steels and for buffer layers.

Characteristics :

LoTherme-352R is a low heat input AC/DC electrode, operates equally well in all conventional positions. High quality, high strength, crack free radiographic welds are the special features of LoTherme-352R. Welds display excellent ductility and toughness.

Applications :

LoTherme-352 is suitable for repair of bogies, both cast and fabricated. Also suitable for welding mild, medium carbon steels, difficult steels, steels heavy structures, repair of Co-Co bogies, plant and equipment subject to dynamic loading and impact. It is also suitable for depositing buffer layers before hard surfacing.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	57 kgf/mm^2
ELONGATION (L=4d)	:	26 %

Welding Technique :

Redry the electrodes at 250°C for one hour before use. Clean the weld area completely free of oil, grease, paint, rust or any other foreign matter. For welding heavy sections in cast steel, preheating of the part may prove beneficial. Use short arc.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-210	140-170	100-130	60-90

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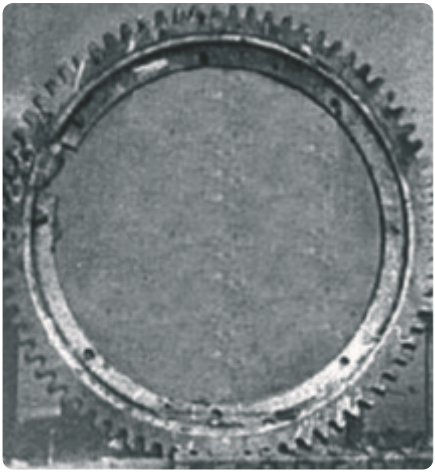

Welding Cast Steel Gear Using LoTherme-352 & LoTherme-601

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LoTherme - 353

A low heat input electrode for welding carbon steel.

Characteristics :

LoTherme-352R is a AC/DC(±) electrode operating in all conventional positions depositing a high strength weld metal. The deposits are of radiographic quality and display excellent ductility and toughness.

Applications :

LoTherme-353 is ideally suited for welding mild, medium carbon steels of medium tensile strength. Ideal electrode having excellent operational characteristics for welding carbon steels where a high joint strength is required. The electrode has a high metal recovery and is ideal for achieving faster welding speed and welding output.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	54 kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Technique :

Redry the electrodes at 250°C for one hour before use. Clean the weld area free of contaminants. Use low current and short arc technique.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-200	120-160	90-120	60-90

LoTherme - 355

An extra low hydrogen low heat input electrode depositing a low steel weld metal. Extra high strength facilitates welding of critical jobs.

Characteristics :

LoTherme-355 is an extra low hydrogen low heat input electrode depositing a low alloy steel, high strength weld metal ideal for maintenance and repair welding of Cr- Ni -Mo high strength low alloy steels, case hardened steels, heat-treated steels, etc. The extra low hydrogen helps in preventing cold cracks.

Applications :

Ideal for maintenance and repair welding of high strength steels, case hardened steels, heat-treated steels, etc. Typical applications include welding of rolls, shafts, gear wheels, etc.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	78 kgf/mm^2
ELONGATION (L=4d)	:	20 %

Welding Technique :

Redry the electrodes at 350°C for 2 hours. Clean the weld area free of all contaminants. In case of the case hardened materials, the case depth should be removed before welding. Depending on the base material, a suitable procedure should be evolved for reclamation.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-170	110-140	80-120	50-70

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LoTherme - 357

Low heat input electrode for withstanding moderate thermal shocks, on carbon steel applications only.

Characteristics :

LoTherme-355, is a special type electrode, operates equally well in all conventional positions. Smooth and soft arc, which is easy to strike and restrike. Finely rippled smooth weld beads. Crack free RADIOGRAPHIC welds are the special features of LoTherme-357.

Applications :

LoTherme-357 is a versatile low heat input electrode. Ideally suited for welding 0.5Cr-0.5Mo, 1Cr-0.5Mo and 1.25 Cr-0.5Mo steels. The weld deposit gives good tensile strength.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	60 kgf/mm^2
ELONGATION (L=4d)	:	25 %

Welding Technique :

For best results dry the electrodes at 250°C for 2 hours before use. Clean the weld area completely free of oil, grease, paints, rust or any other foreign matter. For welding heavy sections in cast steel and low alloy steel, preheating of the part may prove beneficial. Use short arc and stringer beads.

Current Conditions : DC (+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-200	140-170	90-120	60-80

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Electrodes for Stainless Steels Alloys

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STAINLESS STEELS

Stainless steels are normally alloyed with considerable amounts of alloying elements like Cr, Ni. The most commonly used austenitic stainless steels contain 18Cr-8 Ni, 25Cr-12 Ni, 25Cr-20 Ni and several modified versions are also available to suit the service conditions.

The 400 series of LoTherme electrodes represent the electrodes depositing stainless steels weld metal. This range consists of electrodes, which are suited not only for welding similar steels but also for dissimilar steels.

Electrodes like LoTherme-452, LoTherme-453 and LoTherme-455 are suited for welding stainless steels of similar composition, Electrodes like LoTherme-456, LoTherme-457, LoTherme-458, LoTherme-464, LoTherme-467 and LoTherme-468 are suited not only for welding stainless steels but also are suited for welding a number of dissimilar steels combinations. The various steels that can be welded with these electrodes are indicated in the individual technical data of each electrode.

LoTherme - 430

Low heat input electrode for welding of AISI 430 and equivalent 17% chromium steels. Martensitic Stainless Steel Deposits withstand Cavitation Erosion.

Characteristics :

LoTherme-430 is a low heat input electrode depositing a weld metal containing 17% chromium. The weld deposit displays good resistance to Cavitation Erosion.

Applications :

LoTherme-430 is ideally suited for Welding of stainless steel AISI 430 and equivalent 17% chromium steels. For overlay on carbon steel, low alloy steels, and chromium steels.

It is appropriate electrode, where the service conditions require good resistance to corrosion, cavitation and heat up to 550°C. Typical applications include surfacing of valves, impellers, hydro-turbine pelton wheel, and valve seats.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	54 kgf/mm^2
ELONGATION (L=4d)	:	22 %
HARDNESS AS DEPOSITED	:	250 - 300 BHN

Welding Technique :

Keeping the electrodes dry. For best results, redry the electrodes at 250-300°C for one hour before use. Clean the weld are thoroughly free of any foreign matter. Use low current, short arc and stringer beads.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	100-130	80-110	70-90

LoTherme - 444 L

Martensitic Stainless Steel Electrode with High Strength for increased resistance to cavitation erosion.

Characteristics :

LoTherme-444L especially designed for the fabrication and repair welding of hydro turbine components made of soft martensitic SS 13% Cr-4%Ni alloyed steels and cast steel. Suitable for reclamations of ASTM CA6NM casting, Continuous Casting Rolls, etc.

Applications :

LoTherme-444L is well suited welding electrode for joining and building up on corrosion resistant martensitic Cr - Ni steels and the corresponding cast steels. The welding deposit has an increased resistance against cavitations and erosion also at working temperatures up to 350°C.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	79 kgf/mm^2
ELONGATION (L=4d)	:	17 %
Hardness As Welded	:	330 - 400 BHN
CVN IMPACT STRENGTH (@RT)	:	60 Joules

Welding Technique :

Weld the electrode slightly inclined with a short arc. Re-drying 2-3 hours at 250-300°C. For wall thickness more than 10mm, preheating base metal to 150°C is recommended.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-150	80-110	60-90

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LoTherme - 444 H

A unique electrode for surfacing of valves & valve seats, steel plant hot metal rolls.

Characteristics :

- Unique deposit high temperature metal to metal wear on steel plant rolls.
- A special purpose electrode for hard-facing of valves & rollers.
- Excellent operating characteristics.
- Weld metal having excellent crack resistance.
- Weld metal possesses excellent resistance to corrosion, erosion, pitting, & abrasion.

Applications :

LoTherme-444H is ideally suited for surfacing components subjected to high temperature metal to metal wear, corrosion, erosion combined with abrasion. Typical applications include rebuilding of runners, hardfacing of valves & valve seats, pulp & paper machinery, continuous casting rolls & rolls subjected to high temp in steel Rolling mills.

WELD METAL HARDNESS : 400 - 500 BHN As Welded.

WELDING TECHNIQUE :

Keep the electrodes dry. In case of moisture pick up, they should be re-dried at 200-250°C for one hour. Clean the weld area throughly free of any foreign matter.

Use low current, short arc and stringer beads.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	120-150	80-110	60-80

LoTherme - 451

Stabilized low carbon electrode for Cr Ni Mo Steel

Characteristics :

LoTherme-451 produces deposits of extra low carbon with balanced Cr - Ni ratio and controlled ferrite. Furthermore, stabilisation with Niobium ensures excellent resistance to corrosion. The presence of molybdenum improves the corrosion resistance in reducing media. Easy arc striking and re-striking, excellent weld finish and good slag detachability are some of the many pleasant features associated.

Applications :

LoTherme-451 is well suited for welding AISI 316, 316L, 316Ti, 317, 318, 318Ti, and other molybdenum bearing stainless steels, which find extensive applications in paper, fertilizer, oil refining and chemical industries. The extra low carbon coupled with columbium in the weld deposit ensures excellent resistance to carbide precipitation and the resultant intergranular corrosion.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	61 kgf/mm^2
ELONGATION (L=4d)	:	35 %

Welding Technique :

For best results, dry the electrodes at about 250°C for one hour before use. Clean Weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-150	80-110	60-90

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LoTherme - 452

Low heat input AC/DC, all position, extra low carbon electrode for Food & Pharma Grade Stainless Steel.

Characteristics :

LoTherme-452 produces weld deposits of extra low carbon with balanced Cr-Ni ratio and controlled ferrite of outstanding resistance to hazards of cracking, weld decay, corrosion and pitting.

Excellent weld finish, easy striking and restriking, stable arc and good slag detachability are a few among many pleasant features associated with LoTherme-452.

Applications :

LoTherme-452 is ideally suited for welding AISI stainless steels types 201, 301, 302, 304, 304L, 308, 308L and their equivalents. The extra low carbon in the weld deposit ensures freedom from carbide precipitation and resultant intergranular corrosion.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	53 kgf/mm^2
ELONGATION (L=4d)	:	35 %

Welding Technique :

For best results, dry the electrodes at about 250°C for one hour before use. Clean Weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	90-130	70-90	50-70

LoTherme - 453

Low heat input AC/DC, ALL POSITION Cr-Ni-Nb stabilized electrode with Nb.

Characteristics :

LoTherme-453 produces Nb stabilized weld deposits with balance Cr-Ni ratio and controlled ferrite for excellent resistance to corrosion.

The electrode is characterized by soft and stable arc, which is easy to strike and re-strike, finely rippled weld beads of radiographic quality and easily detachable slag.

Applications :

LoTherme-453 is ideally suited for low heat input welding on AISI 301, 302, 304, 304L, 308, 308L, 321 and 347 stainless steel which are used in oil refining, chemical, paper pigments and paints, brewery, dairy and food processing industries. The welds have excellent resistance to carbide precipitation and the resultant inter-granular corrosion.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	54 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

For best results, dry the electrodes at about 250°C for one hour before use. Clean Weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	90-130	70-90	50-70

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LoTherme - 455

Low heat input AC/DC, all position extra low carbon Cr-Ni electrode with Molybdenum.

Characteristics :

LoTherme-455 produces deposits of extra low carbon with balanced Cr-Ni ratio and controlled ferrite. Furthermore, stabilization with columbium ensures excellent resistance to corrosion. The presence of molybdenum improves the corrosion resistance in reducing media.

Easy arc striking and re-striking, excellent weld finish and good slag detachability are some of the many pleasant features associated with LoTherme-455.

Applications :

LoTherme-455 is well suited for welding AISI 316, 316L, 316Ti, 317, 318, 318Ti, and other molybdenum bearing stainless steels, which find extensive applications in paper, fertilizer, oil refining and chemical industries.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	54 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

For best results, dry the electrodes at about 250°C for one hour before use. Clean Weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	90-130	70-90	50-70

LoTherme - 456

Low heat input AC/DC, all position versatile stainless steel electrode for high corrosion resistant applications.

Characteristics :

LoTherme-456 is characterized by excellent operational features on DC as well as AC power sources, a quit, soft and stable arc, which is easy to strike and restrike, good slag detachability and evenly rippled beads. The weld metal is strong, tough and ductile.

Applications :

LoTherme-456 is ideally suited for joining stainless steels to carbon steels, low alloy steels, cast steels and austenitic manganese steels for overlay welds. Typical applications include valve seats, pump impeller, shafts, etc. for chemical dairy, brewery and food industries. Deposits withstand acid corrosion & suitable for welding AISI 316L type stainless steel.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	57 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

For best results, dry the electrodes at about 250°C for one hour before use. Clean Weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	100-130	80-100	60-90

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LoTherme - 457

Special electrode for low heat input welding and surfacing of austenitic manganese steels and steels of widely varying composition for progressive work hardening.

Characteristics :

LoTherme-457 produces weld deposits, which display excellent resistance to impact in combination with corrosion. The special features include, soft and stable arc, which is easy to strike and re-strike, well rippled smooth weld beads and good slag detachability.

Applications :

The balanced chemistry of LoTherme-457 results in high quality welds on a wide range of similar and dissimilar steels, such as joining of austenitic manganese steels to themselves, and to Carbon Steels. Other applications include welding of heat treatable alloy steels for fabrication welding, maintenance and reclamation of worn-out parts, both for buffer layer and hardfacing in mining, cement, steel, power plant, earth moving machinery, etc.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	62 kgf/mm^2
ELONGATION (L=4d)	:	35 %
HARDNESS As Welded	:	200 BHN

Work hardens (under impact) to 450 - 550 BHN

Welding Technique :

Keeping the electrodes dry. In case of moisture pick up, redry at 250°C for minimum one hour. Clean the weld area thoroughly free of any foreign matter. Use low current, short arc and stringer beads.

Current Conditions : DC (+)/AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	120-160	80-100	55-80

Also available as LoTherme 457 HD for high deposition rate.

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Complete Welding Support

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Welding heavy joints in Mn Steels : Recommended Electrode LoTherme-457

Welding Mn Steels buckets using LoTherme-457

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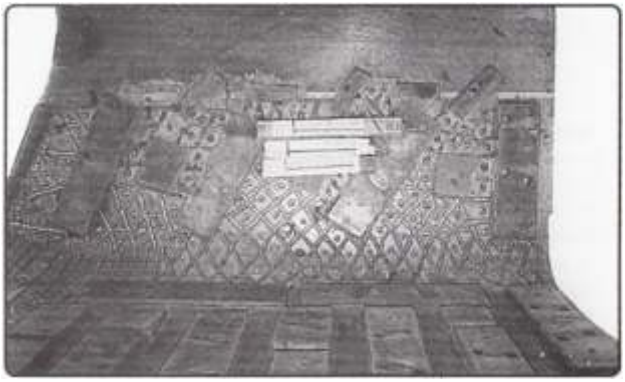
Complete Welding Support

LoTherme



Joining of Mild Steel with Austenitic Manganese Steel with our LoTherme-457

LoTherme - 457 IVR

Specially developed low heat electrode for resurfacing rail points and crossings.

Characteristics :

LoTherme-457 IVR has been formulated to produce extra tough and crack resistant weld metal. The weld metal exhibits excellent resistance to rolling and sliding friction, and impact. The weld metal work hardens under impact.

The electrode possesses pleasing operating characteristics and produces smooth, well-rippled weld beads.

Applications :

LoTherme-457 IVR has been specially developed for resisting rolling and sliding friction, and impact service conditions as encountered by rail points and crossings. It is ideally suited for resurfacing rail points and crossings, worn-out rails, etc. in order to enhance the service life. LoTherme -457 IVRis recommended for both buffer and surface layers.

Typical Mechanical Properties Of All Weld Metal :

HARDNESS As Welded	:	220 BHN
Work hardens (under impact)	:	450-550 BHN

Welding Technique :

Keep the electrodes dry. In case of moisture pick-up, they should be re-dried at 250°C for minimum one hour. Clean the area thoroughly of all contaminants. Use low current, short arc and stringer beads.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-170	90-120	60-90

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LoTherme - 458

A versatile electrode for low heat input welding of Stainless steels to carbon Steels and for overlays.

Characteristics :

LoTherme-458 produces welds of RADIOGRAPHIC quality and for joining SS to Steels, resistance to corrosion. Evenly rippled, extremely smooth weld beads. Softand stable arc, which is easy to strike and re-strike. Good slag detachability.

Applications :

LoTherme-458 is ideally suited for :

(1) Welding stainless steel AISI 309 and similar compositions in wrought or cast form ;

(2) Joining 18/8 stainless steel to mild steel ;

(3) Welding the clad side of 18/8 stainless steel ;

(4) Applying sheet linings of 12% Cr or 17% Cr steel to mild steel Shells ;

(5) Overlays on carbon steels and low alloy steels for superior corrosion resistance.

Typical applications include chemicals pumps and a number of other machinery and equipment.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	57 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

Keep the electrode dry. Redry moist electrodes at 250°C for one hour. Use low current, short arc length and stringer beads.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	90-130	70-100	50-70

LoTherme - 464

Low heat input, special purpose stainless steel electrode for welding stainless steels and steels to resist scaling upto 1100°C.

Characteristics :

LoTherme-464 is characterized by a stable arc, which is easy to strike and re-strike. Easily removable slag, smooth finely rippled welds of RADIOGRAPHIC quality. The weld metal is fully austenitic in structure and possesses high strength, high ductility, good toughness and creep strength. Resistance to scaling is retained up to 1100°C.

Applications :

LoTherme-464 is ideally suited for welding of stainless steel AISI 310 to itself and to other steels, straight chromium stainless steels, dissimilar steels, including steels of relatively high harden ability, clad steels, carbon-molybdenum and chromium-molybdenum piping. Some of the typical applications include welding of heat kiln anchors, exchanges, heat-treating pots and boxes, furnace parts, etc.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	56 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

Dry the electrode at 250°C for one hour before use. Keep the interpass temperature as low as possible by using current and low heat input. Use short arc and stringer beads.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	90-130	70-100	50-70

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LoTherme - 467

A heat resistant stainless steel electrode with molybdenum for low heat input welding and overlays, on most types of stainless carbon steel. Deposit resists high temperature & corrosion.

Characteristics :

LoTherme-467 is characterized by quiet and stable arc, which is easy to strike and restrike, finely rippled, smooth weld beads and good slag detachability.

Applications :

LoTherme-467 is a 'universal' electrode suited for welding all grades of steels where high strength and corrosion resistance in combination with heat resistance are important factors. For welding of straight chromium stainless steel such as AISI 410, and 430 LoTherme-467 is the appropriate electrode.

Typical applications of LoTherme-467 include salvaging pumps, valves and shafts operating at high temperature. Also suitable for hot dies and overlays on cast iron.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	68 kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

For best results dry the electrodes at about 250°C for one hour before use. Clean weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) /AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	110-130	80-100	60-80

LoTherme - 468

A universal low heat input high strength, high alloy electrode for crack-free welds and overlays on steels of widely varying compositions. Unique Dissimilar Steel joining alloy.

Characteristics :

LoTherme-468 filler wire and flux material are so chosen that it is highly favourable for producing welds which have complete freedom from hazards of cracking on a wide variety of similar and dissimilar steels. It operates equally well on AC as well as on DC(+) in all conventional welding positions. Extremely low spatter. Easily detachable slag. Very smooth weld finish, which takes high polish, hence suitable for frictional wear resistance.

Applications :

LoTherme-468 is ideally suited for high strength, crack-free welds and overlays subject to services under wear, friction, impact, heat & corrosion on carbon, low alloy, molybdenum-vanadium spring, tool and die, stainless and dissimilar steels. Typical applications include dies, tools, leaf and coil springs and similar parts and surfacing hot dies, gear teeth, forged shafts, earth moving equipment and machine parts.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	85 kgf/mm^2
ELONGATION (L=4d)	:	21 %

Welding Technique :

Dry the electrode at about 125°C for one hour before use. Clean the weld area free from oil, grease, dirt or any other surface contamination. Hold a short arc. Do not weave the electrode. Weld with stringer beads. Intermittent welds may be necessary for welding high alloy and hardenable steels. Peening will relieve internal stresses. For certain high alloy tool steels preheating is recommended.

Current Conditions : DC(+) / AC

Size (mm) 5x350 Dia x Length	4x350	3.15x350	2.5x350	
Current Range (Amps)	140-170	100-130	75-95	60-80

LoTherme - 468 (SPL)

A special purpose electrode for low heat input welding of austenitic manganese steel.

Characteristics :

LoTherme-468 (SPL) produces a weld deposit having excellent crack resistance on a variety of steels particularly austenitic Mn steels. The metal exhibits a pleasing operating characteristics with good slag detachability.

Applications :

LoTherme-468 (SPL) is ideally suited for welding of austenitic manganese steel components to themselves and to mild steel. It is also suited for buffer layers on these steels as well as carbon steels. Ideal for joining of manganese steel liners and other austenitic manganese steel components with steel casting to IS:1030 Gr. 230-450W /280-520W or to IS:2062.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	220 BHN
Work hardens under impact upto	:	450-550 BHN

Welding Technique :

Ensure the electrodes are dry and in case of moisture pick up, redry the electrodes at 250°C for one hour. Ensure cleanliness of the weld area and use short arc, lowest current possible and stringer beads.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-170	90-120	70-100	60-90

LoTherme - 468 XCEL

Characteristics :

LoTherme-468 XCEL producing welds which have complete freedom cracking on a wide variety of similar and dissimilar teels including hardened steels. It operates in all conventional welding positions. It has extremely low spatter and easy slag detach ability with spray metal transfer.

Applications :

LoTherme-468 XCEL is ideally suited for high strength, crack-free welds and overlays subject to services under wear, friction, impact, heat and corrosion on mild carbon, low alloy, molybdenum-vanadium spring, tool and die, stainless and dissimilar steels. Typical applications include welding welding on dies, tools, leaf and coil springs and similar parts and surfacing hot dies, gear teeth, forget shafts, earth moving equipment and machine parts. It is suitable for rebuilding in construction and mining industries.

Tensile Strength : 85 kgf/mm^2

Welding Technique :

Keep the electrode dry, in case of moisture pick up, they should be re-dried at 200-250°C for one hour. Clean the weld area thoroughly free of any foreign matter. Use low current, short arc and stringer beads. Peen to relieve stresses.

Current Conditions : AC / DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	125-145	95-115	75-95	55-75

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LOTHERME

Pressure Vessel

Vertical Roll mill (VRM)

LoTherme - 469

A low heat input electrode for crack free, high strength welds on all steels.

Characteristics :

LoTherme-469 is an ideal low heat input electrode for high strength welds on steels. Pleasing operating characteristics, smooth weld beads, high strength crack resistant weld metal are features associated with this electrode.

Applications :

Ideally recommended for high strength joints in steels, dissimilar joints in carbon, low alloy steels, dissimilar joints in carbon steels to stainless steels, etc., Typical applications include gears, dies, shafts, earth moving machinery, general machine parts, etc.

Typical Ultimate Tensile Strength Of Weld Metal :

80 Kgf/mm^2

Welding Technique :

The electrodes should be dry. Redry the moist electrodes at 250°C for one hour. Use short arc and stringer beads. Use Pre-heating wherever necessary.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	90-110	70-90	50-70

LoTherme - 470

A versatile low heat input electrode for crack free welds on a variety of steels especially for joining SS to CS.

Characteristics :

LoTherme -470 is a low heat input electrode ideally suited for producing crack free welds on a variety of steels. It operates equally well on AC as well as DC (+) in all conventional positions. Smooth weld beads, extremely low spatter are some of the features associated with this electrode.

Applications :

Ideal for repair and maintenance welding on a variety of steels; dissimilar joints between carbon, low alloy steels to other steels, stainless steels, etc., surfacing applications; ideal for buffer layers before hardfacing. Ideal for joining and building up of a number of components in earthmoving and mining, thermal power, cement, sugar, general engineering industries.

Typical Ultimate Tensile Strength Of Weld Metal :

65 Kgf/mm^2

Welding Technique :

The electrodes should be dry. Redry if necessary at 250°C for one hour. Clean the weld area of all contaminants. Use short arc stringer beads. Use preheat wherever necessary.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	125-145	95-115	75-95	55-75

Also available as LoTherme 470 M for higher critical joining applications in mining Industry.

LoTherme - 483

Low heat input electrode depositing low carbon high Cr - high Ni - Mo -Cu weld metal.

Characteristics :

LoTherme-483 is a special DC (+) electrode producing a low carbon Cr-Ni-Mo-Cu weld metal which resists Sulfuric acid, Phosphoric acid corrosion environment. It is characterized by quite and stable arc, which is easy to strike and restrike, finely rippled smooth weld beads and good slag detachability.

Applications:

LoTherme-483 is ideally suited for welding similar composition materials to itself and to other grades of stainless steels.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	54 Kgf/mm^2
ELONGATION (L=4d)	:	34 %

Welding Instructions:

Welding zone must be clean and free from residues, such as grease, paint or metal dust. Use stringer beads, short arc and smallest possible size, which helps in reducing the heat input. The electrodes should be kept dry. Redry the electrodes at 200-250°C for one hour before use.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	100-140	80-100	50-70

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LoTherme - 485

Low-carbon, fully austenitic electrode, High Cr-Ni-Mo-C alloy having high corrosion resistance.

Characteristics :

LoTherme-485 distinguishes itself particularly by resistance to tension cracks and pitting in media containing chloride. This alloy has remarkably high corrosion resistance against phosphoric acid and exhibits very low excavation rates in sulphuric media. The electrode can be welded in all positions, except vertical down. The seam has a finely rippled, smooth and regular structure.

Applications :

LoTherme-485 electrode for joining and surfacing of base materials of the same and of similar nature.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	54 Kgf/mm^2
ELONGATION (L=4d)	:	31 %

Welding Instructions :

Welding zone must be clean and free from residues, such as grease, paint or metal dust. Use stringer beads, short arc and smallest possible size, which helps in reducing the heat input. The electrodes should be kept dry. In case of moisture pick-up re-dry the electrodes at 250°C for one hour.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

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Complete Welding Support

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Electrodes for Nickel & Nickel Alloys

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LoTherme - 510 N

A high Nickel-Cr-Mn-Nb Alloy for extreme thermal shocks resistance, high temperature and cryogenic applications exhibiting sustained creep properties for multiple number of years.

Characteristics :

LoTherme-510 N producing high quality Nickel alloy deposits. It operates in all conventional positions. Excellent weld finish, steady arc, and good slag remove-ability.

Applications :

LoTherme-510 N is a universal, all positional electrode, designed for joining and surfacing of Nickel & Nickel Alloys, inconel alloys, Nickel-Cr-Fe based materials, 9% Ni Steels for cryogenic applications for very high-temperature applications and applications of extreme thermal cycles, possessing much higher UTS and Elongation compared to many other products. It is recommended for welding different steels, such as austenitic to ferrite steels, as well as for cladding on unalloyed and low-alloyed steels. Typical applications include cement kiln rings, blast furnace components, reformer tubes, chemical containers & liquid gas installations.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	65 Kgf/mm^2
ELONGATION (L=4d)	:	38 %
CVN IMPACT STRENGTH (@RT)	:	90 Joules
-------"----- (at Minus 196°C)	:	60 Joules
HARDNESS	:	180 BHN

Welding Technique :

Ensure that the electrodes are dried at 250°C for 2 hours before use. Clean the weld area free of rust, oil, grease, paint, or any other surface contamination. To ensure minimal heat input, use short arc and stringer bead technique.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-140	80-100	50-70

LoTherme - 511 N

Low heat input electrode for welding Ni-Cr-Fe alloys and dissimilar steels experiencing high temperature.

Characteristics :

LoTherme-511 N is operates in all conventional positions. The weld deposit is hot cracking resistant and does not tend to embrittlement. The weld metal working significantly after more than 10,000 hours at temperature up to 850°C. Has exceptional impact properties, with excellent lateral exoansion.

Applications :

LoTherme-511 N is used for joining or cladding heat resistant Ni Cr Fe alloys, Inconel Alloyes heat, resistant austenitic steels, heat resistant austenitic ferrite materials, Ni-Cr-Fe materials, joining of dissimilar steels, nickel based alloyes.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	61 Kgf/mm^2
ELONGATION (L=4d)	:	36 %
CVN IMPACT STRENGTH (@RT)	:	90 Joules
-------"----- (at Minus 196°C)	:	60 Joules
HARDNESS	:	190 BHN

Welding Technique :

Dry the electrodes 250°C for 2 hours before use. Clean the weld area free of rust, oil, grease, paint, or any other surface contamination. To ensure minimal heat input, use short arc and stringer bead technique.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-140	70-100	50-70

LoTherme - 512

Low heat input electrode for high strength and corrosion resistant welds on Monel and other Ni-Cu alloys.

Characteristics :

LoTherme -512 is a hydrogen controlled, low heat input welding electrode. Good weld finish with good slag detachability. Versatile in applications for maintenance welding.

Applications :

LoTherme-512 electrode core wire and flux formulation are so balanced as to make it a versatile electrode for welding of monel to monel, to other Ni-Cu alloys, Ni-Cu alloys to themselves, Ni-Cu Alloys to steels, the clad side of Ni-Cu clad steel and for surfacing steel parts for service against corrosion by sea water, chlorinated solvents, sulphuric acid and alkalis. Ideal for power plants, chemical, food, dairy and oil refining industries.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	57 Kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Technique :

The electrode should be stored dry. In case of moisture pick-up, redry them to 250°C for one hour before use. Clean the weld area free of surface contamination of any form. Use short arc and weld with stringer beads. Wherever possible weld in flat position.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350	2x300
Current Range (Amps)	140-170	105-135	70-100	50-70	35-50

LoTherme - 513

Low heat input electrode depositing practically pure nickel for wrought and cast Nickel and Ni Alloys

Characteristics :

LoTherme-513 is a special purpose electrode, versatile in applications in the field of fabrication and maintenance welding of machinery and equipment. It is meant for use with DC reverse polarity in all conventional positions. Finely rippled even weld beads. Stable arc, which is also easy to strike and restrike. Good slag detachability.

Applications :

LoTherme-513 is so designed as to deposit practically pure nickel. It is highly useful for welding nickel in wrought and cast forms, pure nickel to themselves and for joining nickel to steels, for surfacing carbon and low-alloy steels. It is an ideal electrode for building up worn out or missing sections, repairing defects and cladding mild steel for chemical, food, dairy and oil refining industries. It is also ideal for overlays on parts used for caustic soda service.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	43 Kgf/mm^2
ELONGATION (L=4d)	:	22 %

Welding Technique :

Dry the electrode at 250°C for one hour before use. Clean the weld area free of any surface contamination. Use DC reverse polarity, short arc, stringer beads. Control the heat input to as low a level as possible by allowing the weld to cool before depositing subsequent passes. Wherever possible, weld in flat position.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	110-140	80-110	55-75

LoTherme - 514

Outstanding electrode for welding Ni-Cr-Mo-W-Co alloys and for surfacing application with strength and heat & oxidation resistance up to 1000°C.

Characteristics :

LoTherme-514, a non-synthetic electrode is specially developed to produce high nickel deposit containing carefully controlled quantities of Chromium, Molybdenum, Tungsten and Cobalt. Progressively work hardens.

The welds are Characterised By :

1. Suitable for welding | Clading on Nickel alloys like Hast Alloy, Inconels, to themselves & with any other steels.
2. Excellent heat resistance, strength and toughness upto about 1000°C.
3. High resistance to corrosion by most types of acids or their Combinations.
4. Good thermal shock resistance.
5. Good machinability. Progressively work hardens to 400 BHN to retain hardness even at elevated temperatures.

Applications :

LoTherme-514 is ideally suited for welding Ni-Cr-Mo alloys to themselves, to other metals and for surfacing steel with Ni-Cr-Mo deposit. Applications in this category include valves, pumps, etc. LoTherme-514 is thus highly suited for hot working tools, e.g. shear blades, forging dies, punches, hot trimming dies, heating elements, etc. Ideally suited to extreme chloride environment.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH : 70 Kgf/mm^2

ELONGATION (L=4d) : 28 %

WORK HARDENS UNDER IMPACT TO 400 BHN

Welding Technique :

Dry the electrode at 250°C for one hour before use. Use low current, short arc and stringer beads. Wherever possible weld in flat position.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-150	80-100	70-90

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LoTherme - 515 N

Extreme Corrosion resistance electrode with high Nickel content.

Characteristics :

LoTherme-515 N electrode is weld-able in all positions, except vertical down. Stable arc, good slag remove-ability. The seam is finely rippled and notch-free. It gives a fully austenitic weld metal without hot cracks, not prone to embrittlement either at high or low temperatures.

Applications :

LoTherme-515 N is recommended for cold-tough steels up to 9% Ni and working temperatures down to minus 196°C, particularly where the welded joint has to undergo hot deformation or stress relieving. Cold tough austenitic Cr - Ni steels can also be welded with LoTherme-515 N. This electrode is also suitable for joining different materials, such as austenitic to ferritic stainless steel, steels to Nickel alloys and steels to Copper alloys.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	63 Kgf/mm^2
ELONGATION (L=4d)	:	35 %
CVN IMPACT STRENGTH (@RT)	:	85 Joules
-------"----- (at Minus 196°C)	:	55 Joules

Welding Instructions :

Ensure that the electrodes are dry. In case of moisture pick-up, dry the electrodes at 250°C for 2 hours before use. Clean the weld area free of rust, oil, grease, paint, or any other surface contamination. To ensure minimal heat input, use short arc and stringer bead technique.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

LoTherme - 516 N

Extreme Scale resistant electrode with High Ni-Cr Alloy with High No content for high temperature applications.

Characteristics :

LoTherme-516 N has excellent welding properties, a regular and finely rippled bead appearance due to spray arc. Very easy slag removal. The weld deposit is highly corrosion resistant, scale resistant and work hardening. Machinable with cutting tools. Resistance to hot cracking for service temperature up to 1100°C.

Applications :

LoTherme-516 N electrode for cladding & joining and surfacing high-temperature Ni-Cr-Mo alloys. Special applications are in oxidizing media at high temperatures, especially for the construction of gas turbines, combustion chambers and ethylene production plants, journals, trimming dies, etc.

Typical Mechanical Properties Of All Weld Metal :

ULTIMATE TENSILE STRENGTH	:	72 Kgf/mm^2
ELONGATION (L=4d)	:	32 %
CVN IMPACT STRENGTH (@RT)	:	90 Joules

Welding Instructions :

Ensure that the electrodes are dry. In case of moisture pick-up, dry the electrodes at 250°C for 2 hours before use. Clean the weld area free of rust, oil, grease, paint, or any other surface contamination. To ensure minimal heat input, use short arc and stringer bead technique.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

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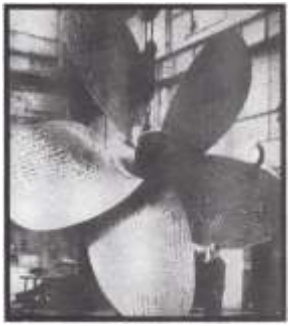
Electrodes for Copper & Copper Alloys



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LoTherme - 532

Basic coated Tin-bronze electrodes with 6% tin.

Characteristics :

LoTherme-532 is distinguished by good welding properties. With steady arc and low spatter losses it gives dense, pore-less seams. The slag is easily removed.

Applications:

LoTherme-532 for joining copper and copper alloys, phosphorus and tin-bronzes as well as copper-clad plates in mechanical and plant engineering and ship building. For surfacing on copper and copper alloys, phosphor and tin-bronzes.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	32 Kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Instructions:

Seam preparation with large V angle (80-90°). Electrode guided vertical, arc 3-4 mm. Only work-pieces more than 5 mm need preheating up to 100 - 250°C. Bronze castings must be cooled slowly. Electrodes that have got damp must be dried 2 to 3 hours at 150°C.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	130-160	100-130	80-100	60-90

LoTherme - 533

Tin-bronze electrodes with 6% tin for welding with AC machines.

Characteristics :

LoTherme-533 is distinguished by good welding properties. With steady arc and low spatter losses it gives dense, pore-less seams. The slag is easily removed.

Applications:

LoTherme-533 for joining copper and copper alloys, phosphorus and tin-bronzes as well as copper-clad plates in mechanical and plant engineering and ship building. For surfacing on copper and copper alloys, phosphor and tin-bronzes.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	32 Kgf/mm^2
ELONGATION (L=4d)	:	30 %

Welding Instructions:

Seam preparation with large V angle (80-90°). Electrode guided vertical, arc 3-4 mm. Only work-pieces more than 5 mm need preheating up to 100 - 250°C. Bronze castings must be cooled slowly. Electrodes that have got damp must be dried 2 to 3 hours at 150°C.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

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LoTherme - 534

Aluminium Bronze electrode for sea water corrosion resistance.

Characteristics :

LoTherme-534 possesses outstanding welding properties and can be used in all positions, except vertical down. The weld metal displays high mechanical properties and is tough, pore-less and not prone to cracking.

Applications:

LoTherme-534 is used for joining and surfacing on aluminium-bronzes (up to 10% Al), copper and copper alloys as well as surfacing on steel, cast steel and cast iron. It is also suitable for welding pipe cavities in new aluminium-bronze castings. Its corrosion resistance allows it to be used on marine propellers, acid pumps and fittings.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	46 Kgf/mm^2
ELONGATION (L=4d)	:	20 %

Welding Instructions:

Clean the weld zone thoroughly. Wall thickness in excess of 5 mm must be grooved out with a 90°V. Bigger work-pieces are preheated to about 150-250°C. To avoid overheating, guide the electrode vertically at high welding speed. Use only dry electrodes. Electrodes that have got damp must be dried 2 to 3 hours at 250°C.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-160	80-110	70-90

LoTherme - 535

Complex aluminium-bronze electrode with high mechanical properties and sea water resistant

Characteristics :

LoTherme-535 possesses outstanding welding properties and can be used in all positions, except vertical down. The weld metal displays high mechanical properties and is tough, pore-less and not prone to cracking. It work hardens to give excellent resilience to wear.

Applications:

LoTherme-535 is used for joining and surfacing on complex aluminium-bronzes, especially those with high Mn, as well as steel and grey cast iron. It is also eminently suited for shipbuilding (marine propellers, pumps and fittings) and in the chemical industry (valves, pumps) where chemical attach is accompanied by erosion. Its favorable coefficient of friction makes it ideal for surfacing on shafts, sliding surfaces, bearings, punches and dies of all kinds.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	66 Kgf/mm^2
ELONGATION (L=4d)	:	25 %

Welding Instructions:

Clean the weld zone thoroughly. Wall thickness in excess of 5 mm must be grooved out with a 90°V. Bigger work-pieces are preheated to about 200-250°C. To avoid overheating, guide the electrode vertically at high welding speed. Use only dry electrodes. Electrodes that have got damp must be dried 2 to 3 hours at 250°C.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-190	120-160	80-120	60-90

LoTherme - 536

A specially formulated low-heat input 70/30 alloy for Cupro-Nickel welding.

Characteristics :

LoTherme-536 is a copper - nickel electrode, for joining and surfacing of wrought and cast alloys of similar composition as well as 80/20 and 90/10 alloys. It operates in all conventional positions.

Applications:

LoTherme-536 is used in offshore applications because of its good resistance to the corrosion in seawater. It is also suitable for ship-building, chemical process equipments, oil refineries, food industries, etc.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	40 Kgf/mm^2
ELONGATION (L=4d)	:	28 %

Welding Instructions:

Clean the weld zone thoroughly. Wall thickness in excess of 5 mm must be grooved out with a 90°V. Bigger work-pieces are preheated to about 200-250°C. To avoid overheating, guide the electrode vertically at high welding speed. Use only dry electrodes. Electrodes that have got damp must be dried 2 to 3 hours at 250°C.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	130-160	100-130	80-100	60-90

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Electrodes for Hard-Surfacing, Wear-Facing or Overlay Applications

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HARDFACING OF MATERIALS

The components in service are subjected to different types of wear namely friction, abrasion, impact, etc., which cause the material wear and render them unsuitable for service. The components are normally hardfaced by depositing a suitable weld metal, which will resist the type of wear encountered in service. It is needless to emphasize here that depending on the type of wear, the weld metal will have to be selected. Let us consider the hardfacing of various materials to resist different types of wear.

The frictional wear which is encountered in rollers, drives, bearings, gears, etc., is due to the movement of the metallic surface over the other. The resistance to this type of wear can be achieved by hardfacing the component with a weld metal with **LoTherme-601**. This weld metal will be an air hardening type and the hardness will be in the range of 250 to 350 VPN. This weld metal will have considerable toughness also and resist impact forces, which occur in service. The use of **LoTherme-603** can be made for applications, which involve abrasion & heavy impact. To resist heavy abrasion, the chromium carbide type weld metals are preferred. **LoTherme-604, LoTherme-611** are ideal weld metals suited for resisting heavy abrasion. The weld metals of **LoTherme-605** and **LoTherme-613** are suited for resisting heavy abrasion in combination with high temperature. The typical service conditions in which these weld metals are suitable are indicated in the individual literature.

In hardfacing, it is necessary to understand the phenomena that occur during welding known as dilution.

DILUTION

Dilution is defined as the percentage of base material in the weld metal. When a weld metal is deposited on the base material, it mingles with the base material and the resultant weld metal is of an

intermediate composition. In all maintenance welding applications the dilution effect should be taken into consideration.

Normally in manual metal arc welding this dilution can be expected to be around 30 % which means, the deposited weld metal will have 70 % of weld metal and 30 % of base material.

FOR EXAMPLE IF WE CONSIDER THE FOLLOWING :

Base material : A1 + B1 + C1 + etc.

Weld metal : A2 + B2 + C2+ etc.

Where A, B, C are different elements

Resultant deposited weld metal :

For A : (0.7A2 + 0.3A1)

B : (0.7B2 + 0.3B1) and so on.

The practical consequence of this dilution effect can be observed as follows :

1) When a hardfacing deposit is made on mild steel, the first layer may get diluted with the base material and there fore may not give the required hardness in the first layer.

2) When depositing a hardfacing deposit (which is normally air hardening and has higher hardenability) on a high carbon material, the weld metal can pick up carbon from the base material, and on solidification the weld metal may crack because of the formation of brittle structures. In such cases, it is preferred to have a ductile weld metal deposition, which can, even with the carbon pickup from the base material, retain sufficient ductility to produce crack free weld metal. These are known as buffer layer or cushioning layers.

Hardfacing of austenitic manganese steel is one of the commonly practised maintenance welding jobs in industries like, cement plants, thermal power plants, mining and earthmoving industries.

HARDFACING OF AUSTENITIC MANGANESE STEELS

These steels also known as ' Hadfield steels' find wide range of applications in cement units. These steels contain about 11-14 % Mn and because of the presence of this element, these steels are rendered austenitic in structure at room temperature. These steels have the property of work hardening and therefore are used for services where impact loads are involved. Some of the components of austenitic manganese steels are crusher jaws, crusher rolls, crusher hammers, etc.

When these austenitic manganese steels are heated, because of the precipitation of carbides on the grain boundaries, the steel gets embrittled. Therefore, it is essential that during welding, the heat input is restricted to the minimum. In general, it is not recommended to heat this material to above 310°C (and during welding the interpass temperature should never be more then 100°C). It is advisable to keep a portion of the casting immersed in water during welding so that the heat is dissipated fast and precipitation of brittle phases is avoided.

Since these types of steels will not be subjected to any further heat treatment after welding, care should be exercised to see that the properties of the base material are not hampered because of welding.

Reclamation of austenitic manganese steel component calls for detailed welding procedures and use of appropriate welding electrodes so that best service life can be obtained. Normally, the build-up can be done using LoTherme-607. However, on work hardened surfaces it is preferable to have a single layer deposition of LoTherme-610. After sufficient build-up using LoTherme-607 the top two layers should be made with LoTherme-603/604/605 depending on the type of wear to which this component will be subjected to in service.

The deposition of the air hardening deposit will help in reducing the initial wear of the components. By the time air hardened layers wear out, the austenitic manganese steel deposit below, would have work hardened and resist wear subsequently.

As detailed earlier, while hardfacing austenitic manganese steels, care should be taken to restrict the heat input to a minimum and overheating of the casting should be avoided by using:

1) The minimum possible current and the lowest possible size of the electrode.

2) Keeping the component immersed in water and maintaining a low interpass temperature in such a way that the component is warm to touch.

3) Using small stringer beads and adopting intermittent and sequential welding techniques.

Apart from this, a number of hardfacing applications are encountered in various industries. By analyzing the service and the hardness requirements of the actual job, one can select the appropriate electrode.

LoTherme - 600

Co-Cr-W-alloy of Cobalt Grade 1 for surfacing to resist high temperature wear.

Characteristics :

LoTherme-600 welds well in the horizontal position. Soft arc, smooth seam surface. It still retains great hardness at high temperatures, even at red heat, and recovers its original hardness after cooling.

Applications:

LoTherme-600 is the hardest of the cobalt-containing alloys and is used mainly for severe friction wear, erosion and corrosion. It is very resistant to sliding stressing metal-to-metal, and is therefore recommended for pump bushes, screw conveyors, wear rings, guide rails, cutters, rolls.

Typical Mechanical Properties Of All Weld Metal:

AT ROOM TEMPERATURE	:	45-55 HRC
AT 600°C	:	43-48 HRC

Welding Instructions:

Re-dry the electrodes at 250°C for one hour before use. Clean the weld zone of rust, scale and grease. Bigger work pieces are preheated to about 300°C. Keep the amperage as low as possible, so as to fuse the parent metal as little as possible. Guide the electrode vertically, keeping the arc short. Weave only slightly. Cool slowly in an oven or under asbestos. Machinable only by grinding.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-190	120-160	80-120	60-90

Available in Filler Rod form also.

LoTherme - 601

Low heat input touch-weld electrode for machinable overlays on all ferrous metals Deposit in flame hardenable.

Characteristics :

LoTherme-601 is characterized by a soft and stable arc, which is easy to strike and restrike, smooth, crack free welds, good slag detachability.

The deposited weld metal has a high degree of toughness, excellent resistance to rolling and sliding friction and heavy impact loads.

Applications:

LoTherme-601 is a versatile electrode for hardfacing, overlay and inlay applications on all ferrous metals, components, machine parts requiring moderate hardness in combination with good machinability, such as tractor sprockets, gears, shafts, axles, pinion teeth, concrete and pan mixer blades, ropeway and tram car rails, and wheels, points and crossing, crane wheels, ropeway trolley wheels.

Weld Metal Hardness : 240 - 300 BHN

Welding Technique :

Clean the weld area. Use low current and a short arc length. Avoid weaving of the electrode. While surfacing on medium and high carbon steels, use LoTherme-352 for buffer layers in order to avoid chances of cracking. For surfacing on heavy sections and materials high in carbon, pre-heating of the part may be necessary.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-250	130-160	95-120	60-90

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Grear Teeth built up with LoTherme-601

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LoTherme - 602

Low heat input, touch-weld, low manganese electrode for moderately hard deposit to resist impact & frictional wear. It is a flame hardenable alloy.

Characteristics :

LoTherme-602 is characterised by a stable arc, which is easy to strike and restrike, good slag detachability and weld beads of fine appearance. It operates equally well on AC as well as DC in all conventional positions.

Applications:

LoTherme-602 is ideally suited for a number of applications, which demand good abrasion resistance, combined with fairly high degree of toughness. It can be used on mild steel, carbon steel, low alloy steels, etc., where hardness of 250-300 BHN is required. Some of the typical applications include gears, shafts, crane wheels, brake shoes, forging dies, drive sprockets, conveyor parts, cold punching dies, rail ends, log wheels, ploughshares, wobblers, etc.

Weld Metal Hardness : 280 - 380 BHN

Welding Technique :

The electrode should be stored dry. In case of moisture pick-up, ready at 150°C for one hour before use. Use low current and short arc. Avoid excessive weaving. For base materials with carbon content of 0.3% and above, use buffer layers with LoTherme-352 before surfacing.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-190	130-160	95-120	55-75

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LoTherme - 602 B

A basic electrode, with high recovery, for moderately hard deposit, especially on high tensile ferrous metals, that are heat treatable, well suited for difficult to weld steels in forging industries.

Characteristics :

LoTherme-602 B is characterised by a stable arc, good slag detachability and weld beads of fine appearance. It operates well on conventional positions.

Applications:

LoTherme-602 B is a highly crack resistant, even in multiple layer deposit, ideally suited for a number of applications, which demand good impact resistance, combined with high degree of toughness. It can be used on mild steel, carbon steel, low alloy steels, etc. where an as-welded hardness of 33-40 HRC is required. Some of the typical application include gears, shafts, crane wheels, brake shoes, forging dies, drive sprockets, conveyor parts, cold punching dies, rails ends, log wheels, ploughshares, wobblers, etc.

Weld Metal Hardness : 320 - 380 BHN (As Welded)

Welding Technique :

The electrode should be stored dry. Re-dry at 250°C for 1 hour before use. Use low current and short arc. Avoid excessive weaving. For base materials with carbon content of 0.30% and above, use buffer layers with LoTherme-352 before surfacing. When welding hardenable steels of large thickness, adequate care for preheating, slow cooling after welding & PWHT are recommended for best result.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-210	140-170	90-130	N.A.

LoTherme - 603

Low heat input, based coated versatile electrode for hard surfacing of widely varying machine parts and components.

Characteristics :

LoTherme-603 a hard surfacing electrode, operates well in all conventional positions. The deposited weld metal has exceptional abrasion and wear resistance in combination with resistance to heavy impact. Evenly rippled, porosity free weld deposits permit heavy build-up without danger of cracking. In most cases LoTherme-603 can be used direct on the job without the necessity of depositing buffer layers.

Applications:

LoTherme-603 core wire and flux formulation are so chosen as to make the electrode versatile in terms of surfacing applications on a large variety of machine parts, equipment, etc. Typical applications include surfacing chipper knives, conveyor bucket lips, shear blades, shovels dredger and elevator bucket lips rock crushers, rock drills, tractor grousers and paddlers. In crushing applications, LoTherme-603 is recommended as the final layer on 14 % manganese weld deposit to reduce the initial wear.

Weld Metal Hardness **:** 52 - 62 RC

Welding Technique **:**

Ensure that the electrodes are perfectly dry before use. In case of moisture pick-up, redry the electrodes at 200°C for one hour before use. Clean the weld area free of any surface contamination. Use AC or DC(+). Hold a short arc length and weld with stringer beads.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350
Current Range (Amps)	170-210	140-170	100-130

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LoTherme

Hammer welding using LoTherme-607 & LoTherme-603

LoTherme - 603 R

Rutile-coated, touch-welding, H/F electrode for wear resistant surfacing on wide range of machine components.

Characteristics :

LoTherme-603 R has excellent welding properties, a homogeneous, finely rippled bead appearance due to the spray arc and very easy slag removal. This electrode is weldable with very low amperage settings (advantage for edge buildup).

Applications:

LoTherme-603 R is used for wear resistant buildups for abrasion and impact applications. Typical applications include surfacing chipper knives, conveyor bucket lips, shovels dredger and elevator bucket lips, rock crushers, rock drills, tractor grousers and paddlers.

Weld Metal Hardness **:** 55 - 60 HRC

Welding Instructions **:**

Preheat high-alloy tool steels to 400-450°C and maintain this temperature during the whole welding process. Hold electrode vertically with a short arc and lowest possible amperage setting. Machining only by grinding. Re-dry electrodes that have got damp for 1 hour at 100°C.

Current Conditions : AC / DC (±)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	110-150	80-110	60-90

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LoTherme - 604

Unique graphite based low heat electrode for hard facing overlays on machine parts and components subject to high abrasion and moderate impact.

Characteristics :

LoTherme-604 yields hard and tough deposits, which have excellent resistance to abrasion in combination with friction, moderate impact.

Applications:

LoTherme-604 is ideally suited for surfacing machine parts subject to high stress grinding abrasion as also grouping abrasion on carbon steels, manganese steels, malleable iron and air hardenable alloy steels. Typical applications for abrasion resistance include excavator teeth, ploughshares, cultivators, impellers, excavator buckets, bucket teeth, cams, fan blades, exhaust blades, scraper bars, dredger buckets and oil expeller worms. LoTherme-604 is also well suited for coal crushing applications such as mill hammers, pulverizers and cement grinder rings.

Weld Metal Hardness : 56 - 62 HRC

Welding Technique :

Redry the electrodes at 200°C for one hour before use. Clean the weld area. Use short arc and avoid weaving of the electrode. While surfacing medium and high carbon steels use LoTherme-352 for buffer layers to avoid chances of cracking. Do not use more than two layers of LoTherme-604 at a time. For a heavy build-up, deposit a cushion layer of LoTherme-352 or LoTherme 607 followed by two layers of LoTherme-604.

Current Conditions : AC / DC (+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	165-190	120-160	90-120	70-90

LoTherme

Dozer Blade hardfacing with LoTherme-604

LoTherme - 605

AC/DC Low heat input versatile electrode for depositing Chromium Carbide alloy to resist High Abrasion and impact along with mild corrosion.

Characteristics :

LoTherme-605 is a hard surfacing electrode, operates well in all conventional positions. The deposited weld metal has exceptional abrasion wear resistance in combination with resistance to impact & mild corrosion. Evenly rippled, porosity free weld deposits permit heavy build-up without danger of cracking. In most cases LoTherme-605 can be used direct on the job without the necessity of depositing buffer layers.

Applications:

LoTherme-605 core wire and flux formulation are so chosen as to make the electrode versatile in terms of surfacing applications on a large variety of machine parts, equipment, etc. Typical applications include surfaciing Sugar Mill cane cutting knives, shredder & fibrizer hammers, anvil, chipper knives, conveyor bucket lips, shear blades, shovels dredger and elevator bucket lips rock crushers, rock drills, tractor grousers and paddlers. In crushing applications, LoTherme-605 is recommended as the final layer on 14% manganese weld deposit to reduce the initial wear.

Weld Metal Hardness : 55 - 60 HRC

Welding Technique :

Ensure that the electrodes are perfectly dry before use. In case of moisture pick-up, redry the electrodes at 200°C for one hour before use. Clean the weld area free of any surface contamination. Use AC or DC(+). Hold a short arc length and weld with stringer beads.

Current Conditions : DC (±) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350
Current Range (Amps)	150-180	120-160	95-120

LoTherme - 606

Co-Cr-W-alloy of Cobalt Grade 6 hard-facing to resisting impact and wear.

Characteristics :

LoTherme-606 welds well in the horizontal position. Soft arc, smooth seam surface. High resistance to impact, corrosion and hardness at elevated temperature under alternating temperatures stressing.

Applications:

LoTherme-606 is used primarily on work-pieces exposed to high alternating temperatures and corrosion. Specific applications: valves and valve seats, sealing surfaces, hot shear blades, hot pressing tools, forging de-burrers, wire mill rolls and beaters for coke combustion.

Typical Mechanical Properties Of All Weld Metal:

AT ROOM TEMPERATURE	:	32-40 HRC
AT 600°C	:	30-35 HRC

Welding Instructions:

Clean the weld zone of rust, scale and grease. Bigger work pieces are preheated to about 300°C. Keep the amperage as low as possible, so as to fuse the parent metal as little as possible. Guide the electrode vertically, keeping the arc short. Weave only slightly. Cool slowly in an oven or under asbestos. Machinable with tungsten carbide tools.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

Filler Wire also Available.

LoTherme - 607

Versatile low heat input welding and surfacing electrode producing a weld metal highly resistant to cracking, heavy impact, metal-to metal wear and deformation, with rapid work hardening.

Characteristics :

LoTherme-607 is characterised by excellent performance in all conventional positions, soft and stable arc which is easy to strike and restrike, good slag detachability and well rippled, uniform weld beads.

The electrode produces a unique weld metal chemistry and set of physical and mechanical properties which are highly favorable for obtaining crack free weld deposits having outstanding resistance to heavy impact, metal-to-metal wear and plastic deformation.

Applications:

LoTherme-607 is ideally suited for use on austenitic manganese steels. Typical applications include surfacing and building up of broken or worn out 14% manganese steel parts such as jaw and roll crushers, crusher hammers, excavator bucket teeth and lips, dredger buckets, dipper teeth, rail road trucks, frogs and switches and similar machine parts and components subject to heavy impact and high stresses.

Weld Metal Hardness:

160-200 BHN (As welded)

43-53 HRC (Work hardens under impact rapidly)

Welding Technique :

Dry electrodes at 250°C for one hour. Clean the weld area. Use low current, short arc, short and stringer beads. For joining or resurfacing of austenitic manganese steel, ensure that the inter-pass temperature dose not exceed 100°C, by keeping the object submerged partially in a tank full of running water.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-190	110-150	80-120	50-80

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Complete Welding Support

LoTherme

Hardfacing Mn steel tooth points with LoTherme-607 & LoTherme-604

Reclamation of Mn steel tooth points with LoTherme-607 & LoTherme-604

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LoTherme - 608

Versatile low heat input electrode for hard-facing and overlay applications on high speed steels and tool steels.

Characteristics :

LoTherme-608 is a versatile electrode for surfacing, inlay, overlay and hardfacing of a variety of machine tools and components for prolonged service life. The weld deposits are highly resistant to wear and retain hardness and toughness up to 600°C. This special feature enables the weld metal to retain its cutting edge and hardness even at elevated temperatures. Use of LoTherme-457 may be necessary as buffer layer on tool steels.

Applications:

LoTherme-608 has been specially designed for surfacing cutting tools, dies, punches, bamboo chipper knives, paper cutting knives, shearing blades, boring tools, and large number of other machine tools requiring high speed steel type deposit of appropriate hardness.

Weld Metal Hardness : 56 - 60 HRC

Welding Technique :

Keep the electrodes dry. In case of moisture pick-up, redry at 250°C for one hour before use. Clean the weld area free of any surface-contamination.

Pre- heating of hardenable steels, complicated parts and heavy sections at 200-300°C may be necessary depending upon the size and type of the job.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	140-170	90-120	60-90

LoTherme - 609

A special formulated low hydrogen electrodes for hot shear blades.

Characteristics :

LoTherme-609 is a low heat input electrode depositing a C-W-Co-Cr-V alloy. The electrode has excellent operating characteristics and operates smoothly without posing any difficulty for the welders. The weld metal possesses good toughness and resistance to shock loads. The weld metal retains hardness even at elevated temperatures of 600°C and possesses good resistance to oxidation.

Applications:

LoTherme-609 is ideally suited for reclaiming hot shear blades and components of similar type where retention of elevated temperature hardness is important.

WELD METAL HARDNESS : 55 - 60 RC

Welding Technique :

For best results dry the electrodes at 250°C for one hour before use. Clean the weld area completely free of oil, grease, paints, rust of any other foreign matter. Use short arc and stringer bead technique.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-160	90-120	60-90

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LoTherme - 610

An outstanding, low heat input electrode for hard-facing and applying buffer and cushion layers on a wide variety of austenitic manganese steel components, with progressive work hardening.

Characteristics :

LoTherme-610 yields a weld metal, which has high toughness and abrasion resistance in combination with excellent resistance to deformation and cracking. Ideally suited for depositing buffer layers on hard austenitic manganese steel surface.

Applications:

LoTherme-610 is ideally suited for hardfacing, overlay, buffer, and cushion layer applications on a variety of components on mild steel, carbon steel, low alloy steel and austenitic manganese steel. Typical applications include surfacing mining machinery, dredging equipment, excavator parts, mill hammers, cement mill air rings, crusher hammers, roll crusher, muller tyres, shovel tracks, coal mining cutters, tractor grousers, dipper teeth, sand pump impellers, value seats, etc.

Weld Metal Hardness : 280-380 BHN (As welded)

Work hardens under impact to : 480-550 BHN

Welding Technique :

For best results, dry electrodes at 250°C for one hour before use. Clean weld surface thoroughly free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-190	110-150	80-100	50-70

LoTherme

Buffer layers on work hardened Manganese steels :
Recommended electrode LoTherme-610

LoTherme - 611

Low heat input, versatile, hard-facing electrode having excellent resistance to abrasion accompanied by mild impact.

Characteristics :

LoTherme-611 is a versatile low heat input electrode producing a weld metal having exceptional resistance to heavy abrasion in combination with high compressive load and moderate impact even at temperatures up to 500°C. Soft and stable arc, which is easy to strike and restrike, easily detachable slag and smooth, regular weld bead are some of the pleasant features associated with the electrode.

Applications:

LoTherme-611 is ideally suited for hardfacing parts and components subject to heavy abrasion, erosion, metal-to-metal wear and moderately heavy impact. Typical applications include air rings, conveyor screws, dredger buckets, shovels, impellers, mill hammers, mixer blades, muller ploughs, dipper teeth, I.D. fans, etc. in steel mills, construction and earth moving machinery, power plants and cement industry.

Weld Metal Hardness : 55 - 58 HRC

Welding Technique :

Ready electrode at 250°C for one hour before use. Clean weld surface free of all surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-190	130-160	90-120	60-80

LoTherme - 612

Co-Cr-W-alloy of Cobalt Grade 12 hard-facing resisting heat, corrosion and wear.

Characteristics :

LoTherme-612 welds well in the horizontal position. Soft arc, smooth seam surface. Very high resistance to combined abrasion and impact stressing under high temperatures. Corrosion- resistant.

Applications:

LoTherme-612 is given preference where corrosion, abrasion and impact stressing are imposed simultaneously. Typical specific applications are cutters and tools for processing plastics, wood and paper, as well as highly stressed sealing and sliding surfaces.

Typical Mechanical Properties Of All Weld Metal:

AT ROOM TEMPERATURE	:	37-45 HRC
AT 600°C	:	35-40 HRC

Welding Technique:

Clean the weld zone of rust, scale and grease. Bigger work pieces are preheated to about 250°C. Keep the amperage as low as possible, so as to fuse the parent metal as little as possible. Guide the electrode vertically, keeping the arc short. Weave only slightly. Cool slowly in an oven or under asbestos. Machinable by grinding.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

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LoTherme - 613

An outstanding low heat input, hard-facing electrode having excellent resistance to abrasion, metal-to-metal wear at ambient as well as at high temperatures and good corrosion resistance.

Characteristics :

LoTherme-613 yields weld deposits, which have excellent resistance to abrasion and metal-to-metal wear in combination with good resistance to corrosion. The weld deposits possess hardness of 48-56 RC. Hardness is retained up to 550°C. A soft and stable arc, which is easy to strike and restrike, good slag detachability and smooth weld profile are some of the many pleasing features associated with LoTherme-613.

Applications:

Where conditions are highly abrasive and also corrosive e.g. flue gases, slurries, etc., LoTherme-613 is the most appropriate electrode.

The capacity to retain hardness at high temperatures, and excellent resistance to abrasion make LoTherme-613 ideally suited for surfacing blast furnace bells and hoppers, conveyor screws, coke, chutes, steel mill grinders, pump impellers, valves, etc.

Weld Metal Hardness : 48 - 55 RC

Welding Technique :

For best result, bake the electrodes at 200°C for one hour before use. Clean weld surface thoroughly free of all surface contamination. Use short arc and stringer bead technique.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350
Current Range (Amps)	180-220	140-170	100-130

LoTherme - 615

An electrode for resisting extreme abrasion, erosion & metal to metal wear severe impact.

Characteristics :

LoTherme-615 is a specially designed complex Titanium Carbide alloy, in martensitic matrix, designed to resist extreme abrasion, erosion, metal to metal wear and high impact loads while handling minerals. A crack free multilayer deposit is obtained.

Applications:

LoTherme-615 is specially designed for heavy compressive loads and severe impact experienced especially in roller press, scraper blades, coal crusher rolls, pulverize rolls, blow bars, impact arm, shovel buckets, clinker breaker hammers, etc.

Weld Metal Hardness : 51-58 HRC (As Welded on Multilayer)

Welding Technique :

For best result, dry the electrodes at about 250°C for 1 hour before use. Remove all the damaged and fatiqued metal and clean weld area. Use short arc and stringer bead technique. For high carbon steels use preheat up to 300°C.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-220	120-160	100-140	70-90

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LoTherme - 616

Electrode for resisting high abrasion wear with moderate impact at 450°C.

Characteristics :

LoTherme-616 is a high Niobium-Chromium Carbide alloy specially designed to resist high stress grinding abrasion wear with moderate impact, even at elevated temperature of 450°C. The deposit will exhibit surface relief checks.

Applications:

It is suitable for welding of conveyor screws, VRM tyres, Coke chutes, coal mill exhaust fan blades, table liners, screens, oils expeller screws, etc.

WELD METAL HARDNESS : 56 - 62 HRC

Welding Technique :

Remove all the damaged and fatiqued metal and clean weld area. Use short arc and stringer bead technique. For High Carbon Steels use preheat up to 300°C. For austenitic manganese steels do not allow the temperature of parts to exceed 150°C and use LoTherme-457 as cushioning layers. Slow cool after welding.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-220	130-160	110-140	70-90

LoTherme - 617

Low heat input, hardfacing electrode having excellent resistance to high stress abrasion, severe erosion at moderate temperature.

Characteristics :

- A versatile electrode producing a weld metal having exceptional resistance to wear from combined abrasion, erosion and moderate impact.
- Soft and stable arc which is easy to strike and restrike.
- Electrode deposits high rate of weld metal with little slag.
- Thick single pass deposits give high yield.

Applications:

LoTherme-617 is ideally suited for hardfacing machine parts and components subject to combination of heavy abrasion, erosion, and moderate impact. Typical applications include surfacing carbon steels, austenitic manganese steels like drag line bucket walls, scraper blades, crushing blades, crushing hammers, conveyor chains, etc.

Weld Metal Hardness : 57-62 HRC

Welding Technique :

Remove all damaged and fatigued metal before deposition. Use short arc and stringer bead technique. One pass overlay is normally recommended. If more build-up is required, use cushion layer of LoTherme-602 for steels, LoTherme-457 for 14% manganese steels.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	150-180	120-150	80-110	70-90

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LoTherme - 618

Low heat input hardfacing electrode having outstanding abrasion, erosion resistance at high temperatures.

Characteristics :

- Specially formulated to retain abrasion, erosion resistance up to 650°C.
- Excellent resistance to wear due to high temperature Abrasion & Erosion.
- Soft and stable arc which is easy to strike and re-strike.
- Easy handling with rapid deposition rate.
- Thick single pass deposits give extra high yield.

Applications:

LoTherme-618 is a specially designed for hard-facing carbon steel and austenitic manganese steels for applications encountering abrasion and erosion at elevated temperatures. The typical applications include clinker conveyor chains, sinter handling equipment, coke pusher shoes, augers, slurry pumps, billet conveyor guide, hot slag conveyors, etc.

Weld Metal Hardness : 57-63 RC

Welding Technique :

Remove all damaged and fatigued metal and clean weld area. Use short arc and stringer bead technique. For high carbon steels, hardfacing use preheat upto 275°C. For austenitic manganese steels do not allow temperature of parts to rise more then 150°C and use LoTherme-457 as a cushion layer. Slow cool after welding. Pre-dry electrodes to 200°C before use.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	180-220	140-160	120-140	70-90

LoTherme - 618 S

"Spray" electrode for roughening the cast-iron cane crushing rolls in the SUGAR industry. Equally efficient in both Wet & Dry arcing.

Characteristics :

LoTherme-618 S has an aggressive "spray" type arc with excellent penetration to allow application while the mill is in operation. By attaching the earth clamp to the gearbox housing, arcing in the bearing area is avoided. It has been developed to resist the extreme load produced during crushing. The deposit is highly abrasion-resistant and also corrosion-resistant.

Applications:

The application of LoTherme-618 S electrode on sugar mill rollers improves the grip on the cane, increases the quantity of sugar care crushed and, consequently, results in a higher sugar recovery.

Weld Metal Hardness on the Carbide :

ON CARBON STEEL	:	55 - 60 HRC
ON CAST IRON	:	58 - 62 HRC

Welding Instructions :

Hold electrode vertical to work piece. Keep stable arc on moving roll for full spraying effect.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	170-200	140-170	100-140	70-100

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LoTherme - 619

Low heat input hard-facing electrode for reconditioning of worn-out MM steel and Gr. 90A points and crossings for use in high traffic density routes.

Characteristics :

LoTherme-619 has been formulated to produce strong, tough, easy work hardening and highly abrasion resistible austenitic 15Cr-15Mn-2Ni weld metal. The electrode possesses pleasing operating characteristics and produces smooth, well-rippled weld beads, with easy slag detachability.

Applications:

LoTherme-619 is ideally suited for welding high manganese steel such as rail crossings, Bulletproof steel plates, Crushing blades, Crushing hammers etc.

Weld metal Hardness	:	240-250 BHN (As welded)
After work hardening	:	400-470 BHN

Welding Instructions :

Keep the electrode dry. In case of moisture pick up, they should be rebaked at 250°C for min. one hour. Clean the weld area thoroughly free of any foreign matter, Use low current, short arc and stringer beads,

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	140-180	100-140	70-90

LoTherme - 621

Specially designed Electrodes produces cobalt base grade 21 weld metal with Mo for Impact, Pressure & Abrasion at elevated temperature.

Characteristics :

LoTherme-621 has excellent welding properties and a homogeneous, finely rippled bead due to spray arc. Very easyslag removal.

Applications:

LoTherme-621 is used for crack resistant hardfacing on parts subject to a combination of impact, pressure, abrasion, corrosion and high temperatures up to 900oC, such as running and sealing faces on gas, water, steam and acid fittings and pumps, valve seats and cones for combustion engines, working parts in gas and power plants, hot working tools with changing thermal load. Excellent gliding characteristics, good polishability and toughness, highly work hardening nonmagnetic, machinable with cutting tools.

Weld Metal Hardness :

AT ROOM TEMPERATURE	:	25-32 RC
AT 600°C	:	220-280 BHN
WORK HARDENS	:	UP TO 45 HRC

Welding Instructions :

Ensure that the electrodes are dry. In case of moisture pick-up, dry the electrodes at 300°C for 2 hours before use. Clean weld area and preheat the base material. Hold electrode vertically and with a short arc and lowest possible amperage. Ensure slow cooling.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

LoTherme - 624BE

Low heat input, low hydrogen electrode having excellent resistance to abrasion at elevated temperature.

Characteristics :

- Low heat input, low hydrogen, Ni-Mo alloy based electrodes.
- Electrode producing a weld metal having exceptional resistance to wear to combat abrasion, impact, and retain hardness at elevated temperatures.
- Soft and stable arc, which is easy to strike and re-strike.

Applications:

LoTherme-624 BE is ideally suited for hardfacing machine parts and components subject to combination of heavy abrasion, metal-to-metal wear, moderate impact and hardness at elevated temperatures. Typical applications include surfacing such as hot shears, blast furnace bells, tong teeth, hoppers, valve seats, guide plates, etc.

Weld Metal Hardness :

As Deposited	:	50 - 53 RC
At 550°C	:	40 - 43 RC

Welding Technique :

Remove all damaged and fatiqued metal before deposition. Use short arc and stringer bead technique. Keep the electrodes dry. In case of moisture pick-up, redry at 250°C for an hour before use.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	190-220	160-185	120-150	80-100

LoTherme - 625

Low heat input hard-facing electrode for reconditioning of worn-out MM steel and Gr. 90A points and crossings for use in high traffic density 35 GMT.

Characteristics :

LoTherme-625 is characterized by producing easy work hardening and highly wear resistible austenitic 17%Cr-15%Mn- 3% Ni weld metal. The electrode possesses pleasing operating characteristics and produces smooth, well-rippled weld beads.

Applications:

LoTherme-625 is ideally suited for welding high manganese steel such as rail crossings and points, jaw and roll crushers, crusher hammers, crushing blades, etc.

Weld Metal Hardness	:	200-300 BHN (As welded)
After work hardening	:	400-470 BHN

Welding Technique :

Keep the electrode dry. In case of moisture pick up, they should be rebaked at 250°C for one hour. Clean the weld area thoroughly free of any foreign matter, Use low current, short arc and stringer beads,

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	200-250	160-190	130-160	100-130

LoTherme - 627

A special low heat input hardfacing electrode.

Characteristics :

LoTherme-627 is a specially formulated low heat input hard-facing electrode for the reclamation of rolls, crane wheels, etc. The electrode has pleasing operating characteristics. The weld metal has excellent resistance to heat and rolling friction and resistance to wear at elevated temperatures. The weld deposit is machinable for smooth finish.

Applications:

The weld metal is ideally suited for the reclamation of steel mill rolls and other similar applications involving roll friction and elevated temperature wear.

Weld Metal Hardness : 280 - 380 BHN

Welding Technique :

Keep the electrode dry. In case of moisture pick-up, redry at 150°C for an hour before use. Clean the weld area free of any surface contamination. Use short arc and stringer bead technique.

Current Conditions : AC / DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-160	90-120	60-90

LoTherme - 628

Low heat input electrodes depositing air hardening weld metal for hardfacing.

Characteristics :

LoTherme-628 is a low heat input electrode specially designed for hardfacing and build-up of worn out machine parts and components. Welds are highly resistance to abrasive wear and possesses moderate toughness. It can be used in all conventional positions. Soft and stable arc, which is easy to strike and restrike, well rippled smooth weld beads and good slag detachability are the special operating characteristics.

Applications:

LoTherme-628 has versatility of applications in areas of building-up worn out parts and hard-facing. It can be use directly on the job without the necessity of putting a buffer layer. Some of the typical applications including surfing / rebuilding of shafts, chain sheaves, dies, shares, sprockets, rail ends & crossings, pulleys, idler wheels.

Weld Metal Hardness : 290-390 BHN

Welding Technique :

Keep the electrodes dry. For best results, redry the electrodes at 250°C for one hour before use. Clean the weld area thoroughly free of any foreign matter. Use low current, short arc and stringer beads.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	180-220	130-160	80-110	70-90

LoTherme - 629

Low heat input electrodes for versatile hard-facing applications.

Characteristics :

LoTherme-629 is a low heat input electrode specially designed for hardfacing and build-up of worn out machine parts and components. Welds are abtasive wear resistance and possesses moderate toughness. It can be used in all conventional positions. Soft and stable arc, which is easy to strike and restrike, well rippled smooth weld beads and good slag detachability are the special operating characteristics.

Applications:

LoTherme-629 is versatility of applications in areas of building-up worn out parts and hardfacing. It can be use directly on the job without the necessity of putting a buffer layer. Some of the typical applications include surfacing / rebuilding of shafts, chain sheaves, dies, shares, sprockets, rail ends & crossings, pulleys, idler wheels.

Weld Metal Hardness : 290-390 BHN

Welding Technique :

Keep the electrodes dry. For best results, redry the electrodes at 250°C for one hour before use. Clean the weld area thoroughly free of any foreign matter. Use low current, short arc and stringer beads.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	180-220	130-160	80-110	70-90

LoTherme - 630

Electrode is especially meant for cavitation wear, corrosion & high temperature impact.

Characteristics :

- It gives soft and smooth arc, which is easy to strike and re-strike.
- Detachability of slag is very easy.
- Smooth, regular and finely rippled beads.
- Weld metal has good erosion and corrosion resistance.

Applications:

LoTherme-630 is a highly corrosion resistant, especially against cavitation, erosion, compression and impact, experienced on water-turbines & pump constructions. It is ideal for surfacing on 13 Cr-4Ni stainless steel for service life improvement. As a result of work - hardening under impact to around 50 HRC, it exhibits extreme wear resistance in its application areas like high temperature impact resistance on steel plant rolls. Especially applicable for the surface of Turn Over Cooling Bed Rakes. Weld-metal is resistant to scaling up to 900°C Machinable with tungsten carbide tip tool.

Hardness Weld Metal :	As Welded	:	240 BHN
	Work Hardened upto	:	50 HRC

Precautions :

- The electrode should be dry. In case of moisture pick up Re-Dry the electrode at 250°C for two hours.
- Use short arc.
- Preheating or PWHT not warranted in case of normal carbon steels or stainless steel base material.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-220	120-150	80-110	70-90

LoTherme - 650 P

High Heat & Tempering Resistant Alloy for Surfacing of Mandrels, Hot Pierciing Plugs.

Characteristics :

LoTherme-650P has excellent welding properties, a homogeneous, finely rippled seam and a self-lifting slag.

Applications:

LoTherme-650P is suited for heat resistant buildups on hot working steels particularly exposed to metallic gliding wear and elevated shock stress, such as die cast molds for brass, aluminum and magnesium, hot piercing plugs, hot pressed mandrills, trimming tools, hot shear blades, extruding tools, forging dies and hot flow pressing tools for steel. Due to the excellent metalto-metal gliding properties, also suitable for buildups on guiding and gliding surfaces. Tempering resistant up to 650°C, scale resisting up to 900°C.

Weld Metal Hardness :

AS WELDED	:	47 - 52 RC
ANNEALED AT 850 - 900°C	:	35 RC
HARDENED AT 1100 - 1150°C	:	48 - 52 RC
TEMPERED AT 700°C	:	40 RC

Welding Instructions :

Clean welding area to metallic bright. Preheating temperature depends on the welding application (150-240°C). On low-alloy steels at least 3-4 layers should be applied. For best results, re-dry the electrodes at 250°C for one hour before use.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

LoTherme - 660 G2

Electrode for high temperature resistant surfacing of hot work steels exposed to compression and friction especially in a re-rolling mill.

Characteristics :

LoTherme-660 G2 electrode welds well in the horizontal and slightly rising positions. The weld pool is easy to control and the slag is easily removed.

Applications:

On the strength of its great hardness, toughness and high-temperature resistance, LoTherme-660 G2 is employed for surfacing on machine components and tools exposed to friction and compression with moderate impact loads and operating temperatures up 500°C. These include dead centers, tons, slide - and guide ways, hot and cold cut-off attachments, valves, slides, hot shear blades, extrusion press pistons, dies, strippers, deburrers, sheet punching tools. It is also used to good advantage for the economic manufacture of cold and hot working tools.

Weld Metal Hardness : 50 - 57 RC

Welding Instructions :

Preheat the work piece to 250-300°C. Guide the electrode as vertically as possible, with medium-long arc. Let the work piece cool slowly under asbestos. Finish by grinding. For best results, re-dry the electrodes at 250°C for one hour before use.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	80-120	60-90

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LoTherme - 660 G3

Electrode for high temperature resistant surfacing on hot work steels exposed to impact, compression and friction, especially in a re-rolling mill.

Characteristics :

LoTherme-660 G3 electrode welds well in the horizontal and slightly rising positions. The weld pool is easy to control and the slag is easily removed.

Applications:

On account of its high tensile strength, toughness and high-temperature resistance, LoTherme-660 G3 is employed for surfacing on machine components and tools exposed to impact, compression and friction at operating temperatures up to 550°C, such as cutting edges for cold and hot shear blades, guillotine shears, dies, swages, hammers etc. It is also used to good advantage for the economic manufacture of cold and hot working tools.

Weld Metal Hardness : 46 - 52 RC

Welding Instructions :

Preheat the work piece to 250-300°C. Guide the electrode as vertically as possible, with medium-long arc. Let the work piece cool slowly under asbestos. Finish by grinding. For best results, re-dry the electrodes at 250°C for one hour before use.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	120-160	90-120	60-90

LoTherme - 660 G4

Electrode for high temperature resistant surfacing exposed to compression and friction, especially in a re-rolling mill.

Characteristics :

LoTherme-660 G4 electrode welds well in the horizontal and slightly rising positions. The weld pool is easy to control and the slag is easily removed.

Applications:

On the strength of its toughness and high-temperature resistance, LoTherme-660 G4 is employed for surfacing on machine components exposed to impact, compression and friction at operating temperatures up to 550°C. Accordingly LoTherme-660 G4 is particularly suited for building-up dies. It can also be used to good effect for surfacing rollers, drive cloverleaves, hot shear blades, etc. It is also employed for the economic manufacture of these work pieces.

Weld Metal Hardness : 37 - 45 RC

Welding Instructions :

Preheat the work piece to 250-300°C. Guide the electrode as vertically as possible, with medium-long arc. Let the work piece cool slowly under asbestos. Subsequent machining with tungsten carbide or grinding. For best results, re-dry the electrodes at 250°C for one hour before use.

Current Conditions : DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-170	90-120	60-90

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LoTherme - 684

Low heat input electrodes for high stress grinding abrasion and hard deposit on ferrous metals.

Characteristics :

LoTherme-684 is a low heat input complex carbide electrode, which is easy to strike and restrike having very high abrasion resistance & good slag detachability. Weld beads are of fine appearance. It operates in all conventional positions. The weld metal is designed to give excellent resistance to high stress grinding abrasion, galling and scratching abrasion.

Applications:

It can be used on variety of steels and cast iron. Ideally suited for parts subject to abrasion, impact and compressive load, for sand pump, mining & cement industry, bucket lips, pug mill screw, power-station coal nozzles and coal burners.

Weld Metal Hardness : 57 - 62 RC

Welding Instructions :

- Keep the electrode dry. In case of moisture pick, redry at 150°C for one hour before use.
- Use low current and short arc.
- For base materials with carbon content of 0.3% and above, use buffer layers with LoTherme-352 / 607 before surfacing.

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350
Current Range (Amps)	150-180	120-150	95-120

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LOTHERME

Electrodes for Cast Iron Alloys

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CAST IRONS

Next to carbon steels the cast irons form an important group of materials. Cast irons are iron carbon alloys, which have carbon more then 1.7%. The effect of higher carbon was detailed earlier. The cast irons are highly brittle and their ductility is very less. However, because of their shock resistance, heat resistance and corrosion resistance in certain media, they are used for many applications.

Cast irons have poor weldability . This is due to :

1) The formation of high carbon martensite in the HAZ during welding which embrittles the material and causes cracking.

2) Ductility of the material is so less that it is not able to withstand the shrinkage stresses that occur during welding because of which cracks appear.

However, many of the cast irons can be welded taking due precautions like pre-heating, post heating, slow cooling, etc.

For welding of cast irons, LoTherme range offers :

LoTherme-701	:	Non- machinable deposit.
LoTherme-702	:	Monel type, machinable weld metal.
LoTherme-703	:	Fe-Ni type, machinable type.
LoTherme-704 & LoTherme-705	:	Ni type, machinable weld metal

Apart from the selection of electrode the most important aspect in producing sound welds in cast irons is the welding procedure that is to be adopted. The various steps in welding cast irons are given below :

1. Grind the area to be welded so that the casting skin is removed.
2. Clean the area free of all contaminants.
3. If a crack has to be repaired, drill crack arrestor holes at the end of the cracks
4. Deposit welds in small lengths of 25-30 mm at a time.
5. Peen the welds.
6. After welding allow the casting to cool slowly by covering with suitable insulating material.

LoTherme - 701

Unique formulation gives Spray transfer to seal the porosities on Cast Iron. Non-machinable deposits.

Characteristics :

The special flux formulation of LoTherme-701 electrode produces a quick freezing deposit. Spray transfer to seal porosities on Cast Iron, preventing oil coming out during welding. It is ideally suited for buttering layer before joining oil-soaked Cast Iron.

Applications:

LoTherme-701 is highly suited repair & maintenance for welding of cast iron, cast steel machine parts, equipments, etc. For repair of defective castings in steel foundry. Where repair welding of rusty, dirty or greasy castings are involved, LoTherme-701 is the appropriate electrode.

Welding Technique :

Dry the electrode at 150°C for one hour before use. Use low current, short weld runs followed by peening.

Current Conditions : AC / DC(-)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	160-200	130-160	80-120	55-85

LoTherme - 702

A low heat input, Ni-Cu alloy (monel) type electrode for machinable welding of cast iron.

Characteristics :

LoTherme-702 is a nickel-copper alloy electrode for low heat input welding of cast iron without preheating. The welds are sound, strong and easily machinable. The electrode displays a soft and steady arc, which is easy to strike and restrike and ability to operate on low currents.

Applications:

LoTherme-702 is suited for joining of broken cast iron parts, repairing defects in cast iron foundry and repairs of fractured iron parts in all welding positions. Typical applications include **rebuilding of worn out surface, gear teeth, pump impellers, etc.**

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	34 Kgf/mm^2
HARDNESS	:	160 BHN

Welding Technique :

Dry the electrode at 150°C for one hour before use. Clean the base material thoroughly free of any surface contamination. Use short weld runs followed by peening. In case of repair welding on castings, remove entire defective portion to sound metal prior to welding.

Current Conditions : AC / DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	100-130	80-100	50-70

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LoTherme - 703

Low heat input electrode for high-strength machinable deposit. Highly suitable for crack-free joining of Cast Iron to Steel.

Characteristics :

LoTherme-703 produces high strength, machinable welds and overlays on grey and alloy cast irons. Deposits are even crack-free on joints of Cast Iron to Steels. A stable arc and evenly rippled, smooth beads are some of the many pleasant features of the electrode.

Applications:

LoTherme-703 is used for :

1. Welding grey cast iron, malleable iron and S.G. iron ;
2. Welding cast iron to steel and to nickel alloys and ;
3. Repair welds and rectification of defects in castings.

Typical applications include engine heads, pump castings, impellers, rope drums, ingot moulds and a variety of cast iron machine parts. Due to the high strength and ductility, LoTherme-703 is ideal for welding heavy and highly stressed cast iron sections.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	43 Kgf/mm^2
HARDNESS	:	190 BHN

Welding Technique :

For joining bevel the edges to 75-90° in single or double 'Vee' groove according to thickness of the parts. For repair of cracks, drill holes at the two ends of the crack to arrest its further propagation. Remove entire cracked material to sound metal by chipping, gouging or machining.

Clean the weld area free of grease, oil, paints, etc. prior to welding. Weld short beads not exceeding 50 mm at a time. Each bead should be peened when still hot. For large and heavy sections pre heating of the job may be necessary. After the welding is completed, the castings should be covered completely with a layer of asbestos or dry lime until it attains room temperature.

Current Conditions : AC / DC(-)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	130-170	100-130	85-120	50-70

LoTherme

Cast iron gear repaired with LoTherme-703

LoTherme - 704

A low heat input, high nickel electrode for better machinability deposit on cast iron.

Characteristics :

LoTherme-704 is a low heat input electrode, which deposits a very high nickel alloy. The arc is stable even at low current ranges, and this minimises dilution of weld metal with harmful elements present in the parent metal. Slag coverage is complete and slag detachability is excellent. The deposit bonds soundly with the parent metal and the beads are smooth and dense. The welds are machinable.

Applications:

LoTherme-704 is ideally suited for sound, crack-free welds on grey cast iron, S.G. iron, malleable iron and for joining cast irons to steels and to nickel-copper alloys. It is equally good for corrosion resistant overlays, filling and building up of worn out parts and joining broken sections. Typical applications are repair welding on machine bases, motor blocks, heavy castings, valve bodies, sprockets, pumps castings and gears.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	35 Kgf/mm^2
HARDNESS	:	140 BHN

Welding Technique :

Redry the electrode at 150°C for one hour before use. Clean weld area free from any surface contamination. Bevel broken parts or cracks to 70-80° Vee. Use a short arc and as low a current as possible. Deposit short weld beads not exceeding 25 mm. Peen the weld to relive internal stresses and allow the work-piece to cool slowly to room temperature. Pre-heating of the part is generally not necessary.

Current Conditions : AC / DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	125-165	95-125	65-95	45-65

LoTherme - 704 N

Universally applicable electrode with a specially designed bimetallic core mise having high penetration even on oil soaked C.I.

Characteristics :

The electrodes have a stable arc and produce a flat seam. Particularly for fillet welds an optimal seam structure is achieved. Due to the bimetallic core wire, the current carrying capacity and the deposition rate are excellent. The weld deposit is highly crack resistant and easily machinable.

Applications:

LoTherme-704N is suitable for joining and surfacing of grey cast iron, nodular cast iron (spheroidal cast iron) and malleable cast iron as well as for joining these materials each other or with steel and cast steel.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	40 Kgf/mm^2
HARDNESS	:	200 BHN

WELDING INSTRUCTIONS :

LoTherme-704N is preferably welded on DC (-) or on AC. When welding on DC (-) a deep penetration is reached in fillet welds. Position welding are easier with AC. Prior to welding, remove the casting skin. Hold electrode vertically and with short arc. When welding crack susceptible cast iron grades, the deposit may be peened.

Current Conditions : DC(-) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	140-170	110-130	90-110	65-80

LoTherme - 705

Low heat input electrode producing outstanding quality machinable welds on cast iron.

Characteristics :

LoTherme-705 flux formulation is so chosen that the electrode produce extremely soft arc which is essential for low heat input and avoiding dilution of weld metal with harmful elements present in the parent metal. The electrode produces crack free machinable welds.

Applications:

LoTherme-705 is ideally suited for sound, crack free welds on grey cast iron, spheroidal iron, malleable cast iron to themselves, to each other, to steel, or to monel or copper alloys. Equally good for cladding, filling, surfacing and building up of worn-out parts or broken sections. Repair welding of valve bodies, sprockets, engine blocks, pump casings, gears, machine base and defective castings are some of the various applications of LoTherme-705.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	35 Kgf/mm^2
HARDNESS	:	150 BHN

Welding Technique :

Dry the electrode at 150°C for one hour before use. Clean weld area free of all surface contamination. Bevel broken parts or crack areas to about 70° Vee. For cold welding, use as low a current as possible and deposit short weld beads not exceeding 50 mm. Peen the welds. Pre-heating of the part is not necessary.

Current Conditions : AC / DC(+)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	125-165	95-125	65-105	45-65

LoTherme - 707

Highly Machinable Nodular Deposit Provides Crack Free Weld Metal on Cast Iron and Carbon Steel.

Characteristics :

LoTherme-707 is all position electrode designed for repair welds as well as for joining components of various types of cast irons, including grey and nodular cast irons and for welding them to steel and some ferrous and non-ferrous materials.

Applications:

LoTherme-707 is the right electrode for repair welds as well as for joining components and parts made out of various of various types of cast irons, rectification of defective casting in cast iron foundry, anguine heads, pump casings, housings, impellers rope drums, ingot moulds and a variety of cast iron machine parts and equipments.

Tensile Strength : 40 Kgf/mm^2

Current Conditions : DC(+) / AC

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	130-130	100-130	85-120	50-70

Precautions :

Keep the electrode dry. In case of moisture pick up, they should be re-dried at 200-250°C for one hour. Clean weld area thoroughly free of any foreign matter. Use low current, short arc, skip weld sequence and stringer beads. Peen to relieve stresses. Allow to cool slowly.

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Electrodes for Cuting, Gouging, Piercing & Chamfering

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LoTherme - 801

For cutting and piercing all ferrous and non-ferrous metals and alloys without the need for any auxiliary equipment.

Characteristics :

LoTherme-801 is designed to produce fairly smooth cuts and pierce metals in all positions. The special coating withstands high current without overheating. A forceful arc renders it possible to cut all metals and alloys without the necessity of supplementary gas, compressed air or oxygen or special torches.

Applications:

LoTherme-801 is meant for cutting and piercing carbon steels, low alloy steels, stainless steels, cast irons, nickel and nickel alloys, copper, brass, bronze, aluminium and other metals and alloys. Although the cut will not be as smooth as that produced by gas cutting of carbon steel, the application of LoTherme-801 extends to various ferrous and non-ferrous metals which cannot be cut by conventional gas cutting process. The electrode is also suitable for cutting and piercing out of position jobs, rivets, risers, etc., where gas cutting is not convenient.

Welding Technique :

Mark the area to be cut or pierced with chalk. Hold the electrode at an angle of 45° to the job and use a sawing motion to cut. Manoeuvre LoTherme-801 continuously in sawing motion, pressing it against the surface of the metal. The high arc-force produced by the electrode and the manual pressure ensures and rapid cutting.

For piercing, position the electrode perpendicular to the part. Strike the arc and apply push in and pull out motion till the part is pierced.

Current Conditions : AC / DC(-)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	280-320	200-240	150-180	120-150

LoTherme - 802

AC/DC electrode for chamfering and grooving of various metals with electric arc. without any auxiliary equipment.

Characteristics :

LoTherme-802 is designed to produce smooth grooves in all positions. The special coating of the electrode withstands high current without overheating. The forceful arc renders it possible to chamfer and gouge various metals without the need for supplementary gas, air, oxygen or special torches. The force of the arc blows away undesired materials from its path leaving a clean groove for subsequent operations such as welding, surfacing, re-building, etc. Delayed arcing facilities accurate positioning of electrode.

Applications:

LoTherme-802 is meant for chamfering and gouging carbon steels, low alloy steels, stainless steel, cast irons, nickel alloys, etc., to bevel out cracks, remove defective weld metal and unwanted metal in castings. The special advantage of LoTherme-802 is the accessibility in locations where it is inconvenient to work with metal cutting tools or even gas cutting torch. LoTherme-802 comes in handy wherever repair or maintenance welding is envisaged such as in foundries, steel plants and fabrication industries.

Welding Technique :

Mark the area to be gouged with Chalk. Hold the electrode pointing towards the path of gouging at an angle not exceeding 25° to the job. Push the electrode along the line, maintaining contact with the base metal all the while. The strong arc-force produced by LoTherme-802 and the pushing action will blow the molten metal ahead and away from the groove. Avoid reverse motion.

Current Conditions : AC / DC(-)

Size (mm) Dia x Length	5x350	4x350	3.15x350	2.5x350
Current Range (Amps)	300-360	230-280	150-200	125-175

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LOTHERME

Tubular Electrodes

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LoTherme - T 901

Tubular electrode deposits excellent abrasion resistant weld metal.

Characteristics :

LoTherme-T 901 tubular electrode deposits excellent abrasion resistant weld metal. With steady arc and low spatter losses it gives dense and poreless seams. It works very well with low currents, very less dilution, higher deposition rate and higher hardness can be achieved on single layer also.

Applications:

Weld metal of LoTherme-T 901 is excellent abrasion resistant under moderate impact on carbon steels, low alloy and other steels. It is ideally suited for wear resistance overlays on austenitic manganese steels. Typical applications include bucket lips & teeth, crusher teeth, coal crusher jaws, coal crusher hammers, quarry screen plates, blow bars, clinker-grinder buttons, gyratory cones, toggle plates, etc.

All Weld Metal Hardness :

58 - 61 RC (on two layer deposit)

Welding Technique:

Clean the weld area free of any surface contaminations by grinding and wire brushing. Austenitic manganese steels should not be preheated.

Current Conditions : DC(±) / AC (70V)

Size (mm) Dia x Length	10.0x450	8.0x450	6.3x450
Current Range (Amps)	140-190	125-175	85-125
Weight / Carton (kgs)	5	5	5

Identification Mark: Name Printed

LoTherme - T 904

Tubular electrode deposited weld metal for severe abrasion and erosion at elevated temperature.

Characteristics :

LoTherme-T 904 tubular electrode deposits complex carbides of Cr, Mo, Nb, W & V weld metal for severe abrasion resistance and erosion resistance at elevated temperatures up to 800°C. With steady arc and low spatter losses it gives dense and pores -less seams. It works very well with low currents, very less dilution, higher deposition rate and higher hardness can be achieved on single layer also.

Applications:

Weld metal of LoTherme-T 904 provides severe abrasion resistance and erosion resistance at elevated temperatures up to 800°C on carbon steels, low alloy and other steels. Typical applications include sinter breakers, sinter fans, clinker parts, blast furnace bells, hoppers, cement kiln parts, coal burner nozzles, etc.

All Weld Metal Hardness :

63 - 65 RC

Welding Technique:

Clean the weld area free of any surface contaminations by grinding and wire brushing.

Current Conditions : DC(±) / AC (70V)

Size (mm) Dia x Length	10.0x450	8.0x450	6.3x450
Current Range (Amps)	140-190	125-175	85-125
Weight / Carton (kgs)	5	5	5

Identification Mark: Name Printed

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LoTherme - T 905

Tubular electrode deposited tungsten carbide alloy with excellent abrasion resistance.

Characteristics :

LoTherme-T 905 tubular electrode deposits tungsten carbide alloy weld metal. It gives maximum resistance to severe wear under low impact. With a steady arc and low spatter losses it gives dense and pores-less seams. It works very well with low currents, very less dilution, higher deposition rate and higher hardness can be achieved on single layer also.

Applications:

Weld metal of LoTherme-T 905 provides maximum abrasion resistance among all hardfacing alloys on carbon steels, low alloy and other steels. Typical applications include pan scrapers, concrete mixers, oil drill collars, induced draft fans, forced draft fans, primary air fans, coal crusher plates, muller blades, conveyor screws, etc.

All Weld Metal Hardness :

Two Layers: 65 - 70 RC

Welding Technique:

Clean the weld area free of any surface contaminations by grinding and wire brushing. Austenitic manganese steels should not be preheated.

Current Conditions : DC(±) / AC (70V)

Size (mm) Dia x Length	10.0x450	8.0x450	6.3x450
Current Range (Amps)	140-190	130-180	85-140
Weight / Carton (kgs)	5	5	5

Identification Mark: Name Printed

LoTherme - T 909

Tubular electrode deposited weld metal of complex carbide alloy with excellent abrasion resistance.

Characteristics :

LoTherme-T 909 tubular electrode deposits weld metal of complex carbide alloy of chromium, molybdenum and vanadium. It gives maximum resistance to course and fine grinding abrasion under moderate to heavy impact. With a steady arc and low spatter losses it gives dense and pores-less seams. It also gives high-temp wear-resistance up to 500°C. It works very well with low currents, very less dilution, higher deposition rate and higher hardness can be achieved on single layer also.

Applications:

Weld metal of LoTherme-T 909 provides severe abrasion on carbon steels, low alloy and other steels under moderate to heavy impact. Deposits polish on service. Typical applications include hammers, power shovels, conveyor screw fights, drag-chain buckets, rolling mill guides, ripper teeth, crushing equipments, bunker funnel, clinker hammers, hot air fans, mill plow blades, agricultural appliances, etc.

All Weld Metal Hardness :

58 to 63 RC

Welding Technique:

Clean the weld area free of any surface contaminations by grinding and wire brushing. Austenitic manganese steels should not be preheated.

Current Conditions : DC(±) / AC (70V)

Size (mm) Dia x Length	10.0x450	8.0x450	6.3x450
Current Range (Amps)	140-190	130-180	90-140

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LOTHERME

Flux Cored Wires

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LoTherme OA - 352

An OA wire for Heavy Structural Fabrication

Characteristics :

LoTherme OA-352 wire is designed for single and multiple pass flat & horizontal position welding for low & medium carbon steels where high impact properties are not required. It has high deposition rate, low penetration and especially suitable for poor joint fit up.

Applications:

LoTherme OA-352 is suitable for construction of farm machinery, automobiles, field erection of structures, fabrication of frames, heavy equipment repair, etc.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	:	530 Mpa
ELONGATION (L=4d)	:	22 %

Current Conditions : DC(+)

Diameter (mm)	1.6	2.4	2.8
Current Range (Amps)	140-190	130-180	90-140
Voltage (V)	26-28	26-28	26-28
Stick Out (mm)	30-40	30-40	30-40

Standard Wire Diameter (mm): 1.6, 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 410S

A Martensitic Stainless Steel OA wire against Metal to Metal Wear

Characteristics :

LoTherme OA-410S deposits martensitic stainless steel weld metal for abrasion resistant hard facing. The deposited weld metal is tough, good resistant to metal-to-metal wear and heat resistant to approximately 450°C.

Applications:

LoTherme OA-410S is suitable for reclamation of impellers pump casing, casting rolls, steam & gas turbine components.

Weld Metal Hardness: 30 - 35 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 430S

A Ferritic Stainless Steel OA wire for Surfacing & Buffer Layer

Characteristics :

LoTherme OA-430S deposits ferritic stainless steel weld metal. The weld metal displays good resistance to corrosion and heat. Used commonly as a buffer layer on low alloy steel jobs prior to high alloy hard surfacing applications. The buffer layer takes care of dilution and prevents formation of hard & crack-sensitive martensite microstructure during hard surfacing.

Applications:

LoTherme OA-430S is suitable for reclamation of steam & gas turbine components, valve & valve seats and used as buffer layer during re-building of continuous casting rolls.

Weld Metal Hardness: 30 - 35 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 444 L

A Martensitic Stainless Steel OA wire for CC Roll Rebuilding

Characteristics :

LoTherme OA-444L deposits a martensitic weld metal with 13%Cr - 4%Ni - 0.5%Mo. It has excellent resistance to cracking and good resistance to corrosion, erosion, abrasion and pitting. It has good resistance to metal-to-metal wear & galling and also heat resistant up to 950°C.

Applications:

Ideally suited for welding of similar composition alloyed steels and cast steels. Typical applications include repair welding of hydro turbine components, continuous casting rolls, surfacing of high-pressure valves, turbine blades, valve seats, repair of runners, pulp and paper plant equipment, etc.

Weld Metal Hardness: 40 - 45 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 457 S

An 18-8-5 Stainless Steel OA wire for Joining & Surfacing

Characteristics :

LoTherme OA-457S wire deposits 18Cr - 8Ni - 5Mn type work hardening, radiographic quality weld metal, suitable for welding manganese steel to carbon steel and for build up applications involving severe impact and compressive loads. It is used for welding 13% Mn steel, high carbon steels and other steels which are difficult to weld with unalloyed or low alloyed electrodes.

Applications:

LoTherme OA-457S wire is suitable for welding of railway points & crossings, armour plate, dredging equipments, hammers, jaw & cone crusher, roll crushers, roll crusher, various steel mill applications like; coupling boxes, hook liners, ladle repairs, joining of wear plates, etc. This wire is also used as buffer layer before hand surfacing.

Typical Mechanical Properties Of All Weld Metal:

ULTIMATE TENSILE STRENGTH	: 620 N/mm^2
ELONGATION (L=4d)	: 30 %
HARDNESS: AS WELDED	: 180-200 BHN
WORK HARDENED	: UP TO 400 BHN

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 468 S

A Stainless Steel OA wire for Joining Steels of Unknown composition.

Characteristics :

LoTherme OA-468S deposits a duplex type weld metal suitable for both single & multi-layer welding applications. The wire burns with a stable & smooth arc and results in good slag detachability. The deposited weld metal is of radiographic quality and extremely resistant to cracks & fissures.

Applications:

LoTherme OA-468S wire is suitable for welding of armoured vehicles and various dissimilar steels like; high carbon steels, manganese steels, cast steels, spring steels, etc. The wire is especially suitable for welding of steels of unknown chemical compositions and is recommended for laying buffer layer before hard surfacing.

Weld Metal Hardness:

ULTIMATE TENSILE STRENGTH	: 820 N/mm^2
ELONGATION (L=4d)	: 18 %
CVN IMPACT STRENGTH AT ROOM TEMPERATURE	: 50 Joules

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

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LoTherme OA - 602

An OA wire for Low Hardness Surfacing & Buffer layer

Characteristics :

LoTherme OA-602 deposits low alloy air-hardening type weld metal having moderate resistance to abrasion and very good resistance to impact & compression. The wire is suitable for rebuilding of carbon & low alloy steel components where resistance to compressive loading is of prime importance. It is also used as a buffer layer prior to hard surfacing.

Applications:

LoTherme OA-602 wire is suitable for trawler tractor links, crane wheels, shafts, drive sprockets, C.S. rollers, etc. Buffer layer on continuous casting rolls and mine car wheels.

Weld Metal Hardness: 34 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 603

A Chromium Carbide OA wire against Abrasion & Impact.

Characteristics :

LoTherme OA-603 deposits high Carbon-high Chromium alloy martensitic weld metal having a good combination of abrasion resistance and toughness. The welds bead results stress relief check. Weld metal is machinable by grinding only.

Applications:

LoTherme OA-603 is suitable for re-building and reclamation of cast iron rolls, sugar mill rolls, crusher cylinders, oil expeller screws, coal burner nozzle, nozzle tip, worm screws, shovel bucket teeth & lips, etc.

Weld Metal Hardness: 52 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 607

An Work-hardening type 12% Mn Steel OA wire of Excellent Impact resistance.

Characteristics :

LoTherme OA-607 is austenitic alloy designed for building up on Hadfield Manganese steel. Exhibits excellent impact resistance making it ideally suitable for Mn steel earthmoving equipments joining hard facing.

Applications:

Cement: crusher hammers, coal crusher rollers, impacters, blow bars, hoppers and chutes.

Mining: buckets, cutting edge, dredging equipment, shovel bucket & lips and hoppers hard facing by checkered pattern.

Weld Metal Hardness:

HARDNESS: AS WELDED	: 160 200 BHN
WORK HARDENED	: UP TO 46 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 610

A Stainless Steel base Work-hardening type OA wire

Characteristics :

LoTherme OA-610 is an open arc self shielded flux cored wire giving a 16% Cr-4% Mn deposit. The weld metal has excellent abrasion resistance property combine to good resistance to cracking, corrosion, erosion and metal-to-metal wear.

Applications:

LoTherme OA-610 wire is especially designed for the hard-surfacing, overly and buffer layer applications of various components & parts made of carbon steel, low alloy steel and austenitic manganese steel. Applications include, surfacing of mining & excavation components, cement mill parts, steel plant rolls & roll crushers, etc.

Weld Metal Hardness:

HARDNESS: AS WELDED	: 220-250 BHN
WORK HARDENED	: 450-500 BHN

Current Conditions : DCEP/DCRP/DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging may be available on request.

LoTherme OA - 611

An enriched Chromium Carbide OA wire against Abrasion, Erosion & Impact resistance.

Characteristics :

LoTherme OA-611 deposits chromium carbides having excellent abrasion resistance property even for elevated temperature applications. The weld metal has good corrosion & erosion resistance in mineral-water mixer. Weld reveals stress relief cracks during cooling of the bead. Weld metal is machinable by grinding only.

Applications:

LoTherme OA-611 is suitable for welding of dredge pump impellers, ore crushers, clinker grinder rollers, screw conveyors, shovel bucket teeth, dredge cutters, ore chutes, etc.

Weld Metal Hardness: 60 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 612

A Niobium-Chromium-Boron Carbide OA wire for Elevated temperature Wear & Abrasion.

Characteristics :

LoTherme OA-612 is high Chromium - Niobium alloy designed to resist high stress grinding abrasion wear with moderate impact at service temperature of 450°C. The deposit will exhibit surface relief checks.

Applications:

LoTherme OA-612 is suitable for welding of coke chutes, coal mill exhaust fan blades, conveyor screws, pulverizing rolls, VRM tyres & table liners, screen in the coal industry, oil expeller screws, etc.

Weld Metal Hardness: 62 RC

Current Conditions : DC(+)

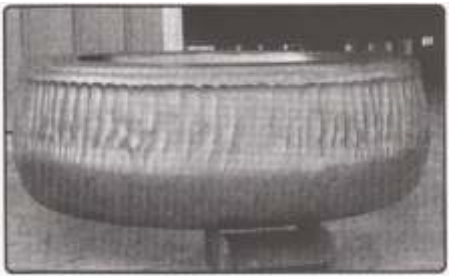
Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.



Type Service Welding - Before

Type Service Welding - After

LoTherme OA - 617

A Tungsten-Vanadium Complex Carbide OA wire for Severe abrasion at High Temperature.

Characteristics :

LoTherme OA-617 is complex Chromium Niobium - Molybdenum alloy with addition of Tungsten and Vanadium designed to resist high stress grinding abrasion and severe erosion at service temperature up to 600°C. The deposits will exhibit surface relief cracks, metallic appearance and does not require any post weld cleaning.

Applications:

LoTherme OA-617 is suitable for welding of chutes in blast furnace bells & screens, burden area & throat armour plates of blast furnace, sinter plant parts, sugarcane industries, boiler fan blades, etc.

Weld Metal Hardness: 62 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 622

A 40-45 HRC Air-hardening type Hard-surfacing OA wire

Characteristics :

LoTherme OA-622 deposits low alloy air-hardening type weld metal having moderate resistance to abrasion and very good resistance to impact & compression. The weld metal is machinable. The wire is suitable for re-building and overlay applications except 14% Manganese steel components.

Applications:

LoTherme OA-622 is suitable for re-building and reclamation of crawler tractor rollers, drive sprockets, links, pins, shovel rollers, crane wheels, etc.

Weld Metal Hardness: 40 - 45 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 625

A 13Cr-13Mn OA wire for Excellent Impact & Corrosion resistance.

Characteristics :

LoTherme OA-625 deposits high chromium (~14%) high manganese (~13%) austenitic weld metal suitable for heavy impact loading. Weld metal work hardens after cold work and has excellent abrasion resistance. Weld metal is machinable by grinding.

Applications:

LoTherme OA-625 is suitable for re-building and reclamation of manganese steel (~14%) components, railway points & crossings, gyratory & jaw crushers, shaft drive ends, dredge pump cutters, etc.

Weld Metal Hardness:

HARDNESS: AS WELDED	: 24 RC
WORK HARDENED	: UP TO 50 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme OA - 633

An 54-56 HRC Air-hardening Crack-free OA wire.

Characteristics :

LoTherme OA-633 deposits air-hardening, crack-free martensite weld metal resistant to moderate abrasion, heavy impact and high compressive load applications. Weld metal is machinable by grinding only.

Applications:

LoTherme OA-633 is suitable for re-building and reclamation of rock drills, agricultural equipments, burden area of blast furnace bells & hoppers, shear blades, etc.

Weld Metal Hardness: 54 RC

Current Conditions : DC(+)

Diameter (mm)	2.4	2.8
Current Range (Amps)	200-300	250-350
Voltage (V)	26-28	26-28
Stick Out (mm)	30-40	30-40

Standard Wire Diameter (mm): 2.4 and 2.8

Packing:

Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme GS - 602

A Gas-shielded wire for Low Hardness Surfacing & Buffer layer

Characteristics :

LoTherme GS-602 is a gas-shielded wire designed for air hardening type hard surfacing deposit with machinable characteristics. The wire has very good welder's appeal and easy slag detachability. The deposit is low alloy steel martensitic weld metal having good toughness and resistance to impact loading.

Applications:

LoTherme GS-602 wire is suitable for weld-surfacing & reclamation of track rollers & links, shafts, pulleys, idle rollers, conveyor parts, etc.

Weld Metal Hardness: 32 - 36 RC

Recommended Shielding Gas :

- Argon-CO_2, gas mixture
- CO_2 gas

Current Conditions : DC(+)

Diameter (mm)	1.2	1.6
Current Range (Amps)	160-240	180-270
Voltage (V)	26-30	26-30
Stick Out (mm)	25-35	25-35

Standard Wire Diameter (mm): 1.2 and 1.6

Packing:

Supplied in layer wound 15 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme GS - 355

A Gas-shielded wire for High Tensile Steel welding

Characteristics :

LoTherme GS-355 is a gas shielded flux cored wire designed for welding of high tensile strength steel, quenched & tempered steels, surfacing & repair of low alloy steel, case hardened steel, etc. The weld deposit contains very low diffusible hydrogen and good resistant to cracks & fissures. The wire produces an easy to remove thin frible slag and results smooth & uniform radiographic quality bead.

Applications:

LoTherme GS-355 designed for single and multi-pass welding of high tensile steels: HY-80, Sumiten-610, B/C grades of SA-543, steels conforming to SA-612 grade, A/B/C grades of SA-738, etc. The wire is also suitable for welding and surfacing of rolls, shafts, gear wheels, etc. Recommended with both CO_2 and Ar-CO_2 gas mixture.

Weld Metal Tensile Strength:

In as-weld condition : 785 MPa	19%

Current Conditions : DC(+)

Diameter (mm)	1.2	1.6
Current Range (Amps)	160-240	180-270
Voltage (V)	26-30	26-30
Stick Out (mm)	25-35	25-35

Standard Wire Diameter (mm): 1.2mm and 1.6mm

Packing:

Supplied in layer wound 15 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

LoTherme GS - 633

A Gas-shielded wire to deposit Air-hardening, Crack-free 52-56 HRC weld metal.

Characteristics :

LoTherme GS-633 is a medium alloy gas shielded wire designed for air hardening type hard surfacing deposit. The weld is non-machinable and finished by grinding only. The wire has good welder's appeal & easy slag detachability. It deposits a crack-free, martensitic weld metal suitable for heavy impact and moderate abrasion resistant applications.

Applications:

LoTherme GS-633 wire is suitable for weld-surfacing & reclamation of agricultural equipments, excavator components, conveyor buckets & screws, drill bits, scraper blades, conveyor parts, dredge rollers, concrete mixer blades, etc.

Weld Metal Hardness: 52 - 56 RC

Recommended Shielding Gas :

- Argon-CO_2, gas mixture
- CO_2 gas

Current Conditions : DC(+)

Diameter (mm)	1.2	1.6
Current Range (Amps)	160-240	180-270
Voltage (V)	26-30	26-30
Stick Out (mm)	25-35	25-35

Standard Wire Diameter (mm): 1.2 and 1.6

Packing: Supplied in layer wound 12.5 kgs plastic spool. Each spool is sealed in a polythene bag and then packed in a shrink-wrapped corrugated box.

Note : Any other type of packaging, or other than standard wire sizes, may be available on request.

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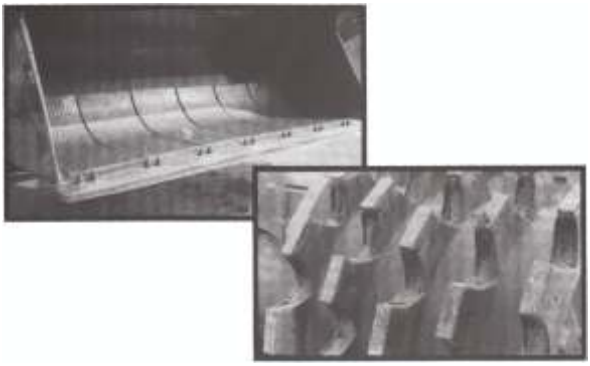

Composite Wear Plates

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LoTherme WP - 608

Wear Plate for resistance to metal wear, Heavy compressive loads, Impact with mild abrasion.

Characteristics And Applications :

These are nearly crack free Wear plates. Very smooth in deposit suitable for metal to metal wear and abrasion. Suitable for use as liners where nearly crack free surface required. General liners used for resists above wear.

The Technical Details are as Under :

ALLOY BASIS : C, Cr, W, V, Mo.

HARDNESS : 54 - 58 RC

Standard Available Sizes :

Thickness Ranges (mm) : 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements

Plate Sizes : 3000 x 1000, 2000 x 1000 mm

: (2200 x 2200 - available on request)

Mounting : Drilling, Nut Bolt, Plug Weld, Bendign Possible upto 150°R

Identification Mark :

Name printed on the plates & punched on the base plates.

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LoTherme WP - 611

Wear Plate for moderate abrasion and moderate impact & sliding wear

Characteristics And Applications :

These have been developed to provide superlative Wear resistance on ferrous parts subject to high abrasion or erosion. Application includes Blow Bars, Screens, Grizzly Bars.

The Technical Details are as Under :

ALLOY BASIS : C, Cr, Mn, Si, B

HARDNESS : 56 - 60 RC

Matrix - Austenitic & Martensitic

The Salient Features :

1. It is chromium carbide wear plate, which has an even concentration of borides, which adds to life.
2. It is manufactured by **CNC controlled processes** that ensures dilution of only 5% on base plate thereby ensuring high concentration of carbides and better wear resistance.
3. Minimal dilution with base material due to rapid cooling of the alloyed smelting bath.

Standard Available Sizes :

THICKNESS RANGES : 5+3, 6+3, 6+4, 6+6, 8+3, 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements

Plate Sizes : 2200 x 1000 mm
: (2200 x 2200 - available on request)

Identification Mark :

Name printed on the plates & punched on the base plates.

LoTherme WP - 612

For abrasion and low angle impact erosion up to 650°C.

Characteristics And Applications :

These have been developed to provide superlative Wear resistance on ferrous parts subject to high abrasion or erosion. Application includes medium temp. liners, used in core sector industries.

The Technical Details are as Under :

ALLOY BASIS : C, Cr, Mn, Si, B, W

HARDNESS : 59 - 64 RC

WEAR RESISTANCE COMPARED TO **MILD STEEL FOR HARD LAYER** IS 1: 32 TIMES UNDER TEST CONDITIONS AS PER ASTM - G - 65 / 1994

The Salient Features :

1. It is chromium carbide cladding having a high concentration of primary carbides and borides, which adds to life.
2. It is manufactured by **CNC controlled processes** that ensures high concentration of carbides and better wear resistance.

Standard Available Sizes :

THICKNESS RANGES : 4+2, 5+3, 6+3, 6+4, 6+6, 8+3, 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements

Plate Sizes : 3000 x 1000, 2200 x 1000 mm

: (2200 x 2200 - available on request)

Identification Mark :

Name printed on the plates & punched on the base plates.

LoTherme WP - 615

For severe abrasion resistance and high not hardness up to 800°C

Characteristics And Applications :

These have been developed to provide superlative Wear resistance on ferrous parts subject to abrasion resistance and erosion. Application includes. Sinter crushers liners, BLT Chute, Burners etc.

The Technical Details are as Under :

ALLOY BASIS	:	C, Mn, Si, Cr, Mo, W, Nb, V
HARDNESS	:	63 - 67 RC
PRIMARY CARBIDES	:	60 - 65 %
SECONDARY CARBIDES	:	20 - 30 %

WEAR RESISTANCE COMPARED TO **MILD STEEL FOR HARD LAYER** IS 1: 50 TIMES UNDER TEST CONDITIONS AS PER ASTM - G - 65 / 1994

The Salient Features :

1. This wear plate constitutes of Complex chromium carbide high concentration of secondary carbides.
2. These are manufactured by **CNC controlled processes** that ensures.
3. Minimal dilution with base material.

Standard Available Sizes :

THICKNESS RANGES : 4+2, 5+3, 6+3, 6+4, 6+6, 8+3, 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements

PLATE SIZES : 2200 x 1000 mm

: (2200 x 2200 - available on request)

Identification Mark :

Name printed on the plates & punched on the base plates.

LoTherme WP - 617

Wear plate for abrasion / erosion under moderate / heavy impact loads

Characteristics And Applications :

These have been developed to provide superlative Wear resistance on ferrous parts subject to abrasion resistance and erosion. Application includes Coal, Steel, Cement mill liners. These plates can withstand temperatures of up to 650°C.

The Technical Details are as Under :

ALLOY BASIS : C, Cr, Mn, Si, V, Mo, W

HARDNESS : 58 - 63 RC

Primary Carbides : 40 - 45 %

Secondary Carbides : 10 - 15 %, Boride : 5 - 10 %

The Salient Features :

1. It is Complex chromium carbide with dense carbide concentration, which adds to life.
2. It is manufactured by **CNC controlled processes** that ensures high concentration of carbides and better wear resistance.

Standard Available Sizes :

THICKNESS RANGES : 5+3, 6+3, 6+4, 6+6, 8+3, 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements

PLATE SIZES : 3000 x 1000, 2200 x 1000 mm

: (2200 x 2200 - available on request for thickness above 16 mm)

Identification Mark :

Name printed on the plates & punched on the base plates.

LoTherme WP - 625

Wear plate for severe impact under heavy load

Characteristics And Applications :

These have been developed to provide superlative Wearresistance on ferrous parts subject to high abrasion or erosion. Application includes Mill guards, Chutes, Scrappers, Clinker components, Mixer liners.

The Technical Details are as Under :

ALLOY BASIS	:	C, Mn, Si, Cr, Nb Ti
HARDNESS	:	As deposited 25 - 30 RC Work hardened 48 - 52 RC
TEMPERATURE RESISTANCE	:	200°C
APPLICATION	:	ON HIGH IMPACT AREAS

The Salient Features :

1) The construction is with Niobium and Titanium carbides in austenitic grain boundaries. It is therefore suitable for high impact and will also take abrasion due to these carbides.
2) The austenite changes to martensite on impact and therefore the wear resistance improves with impact. The hardness goes up from **25 RC** to about **50 RC** on Impact.

Standard Available Sizes :

THICKNESS RANGES	:	4+2, 5+3, 6+3, 6+4, 6+6, 8+3, 8+4, 8+5, 8+6, 8+7, 8+8, 10+3, 10+4, 10+5,..... in mm As per requirements
PLATE SIZES	:	3000 x 1000, 2200 x 1000 mm
	:	(2200 x 2200 - available on request for thickness above 16 mm)

Identification Mark :

Name printed on the plates & punched on the base plates.

Wear Plate Application

D&H LoTherme Range of WEAR PLATES is high Chromium Carbide containing ferrous alloys deposited by a CNC controlled process on a high-grade mild steel plate. The relatively rapid cooling rate obtained with this process produces a very fine structure consisting of Chromium Carbide having an acicular morphology in the matrix, which is tough, and of medium hardness. Various grades are made with differing proportions of high carbides in the tough matrix to suit individual applications. The overlaid deposit is fully fused to the ductile backing plate, thereby, preventing failure due to fracture or de- lamination.

The application procedure is what makes our plate unique. The process has the advantage of making perfect fusion of the alloyed layer with the host material. At the same time, the effect of dilution is reduced as much of the heat generated is used in the melting of the powder. The final result is that the deposited metal is not contaminated by the inferior metal of the host material, such as happens with other known processes. This also means that the base material retains its mechanical strength, thereby allowing it to be used as a structural element.

Fusion takes place under a thick flux cover, thereby virtually eliminating oxide formation and gas pick-up, resulting in an inclusion free deposit. It also produces a relatively smooth weld bead, creating a flat surface across (he plate. The result is extremely low coefficients of friction when compared to all other brands of wear plate.

The actual composition of D&H range of products can be adjusted much more freely than is possible with processes dependent on commercially available welding rods, wire, etc. This enables us to produce a range of compositions to suit specific applications. Various reputed wear plates manufacturers have compiled the following list of applications from the list of various successful applications of wear plates throughout.

Power Stations

Ventilators, Pipe lines linings, Vibratory feeders, Bunkers, Cyclone blades and housing, Screw conveyers Impellers, Bowl mill liner plates.

Earth Moving

Excavator shovels, Bunker chutes, Loader screw, Conveyers, Bucket Scrapers, Bulldozer blades, Compact rollers

Mining

Dump truck body trays, Ore cars, Dipper shovel lining, Apron feeders, Mine and quarry skips, Deck and skirting plates, Bulldozer mould boards, Ore scrapers, Grizzly bars and side plates, Slurry pipes, Dragline buckets and chains.

Steel Industry

Bunker liners, Pallet chute liners, Reclaim buckets, Hot discharge chutes, Vibratory feeders, Down comer pipes, Traveling hearth, Control gates, Chain guides, Rolling mill guides, Burden inner plates.

Cement Industry

Clinker chutes, Cyclones, Ventilators, Chutes, Separators, Coal mill body, Clinker crusher body, Limestone crusher liners, Impeller blades Hopper Liners, Chute Liners, Skip Car Liners, Apron Feeder Liners, Fan Blade Liners, Dragline Bucket Liners Grizzly Bars, Impact Crusher Plates & Bars, Screen Deck High Wear Zones Run out Plates, Bucket Bottoms & Heel Plates, Bucket wheel Ring Chutes and Deflector Plates, Conveyor Components, Cyclone Components, Centrifuge Components, Vibrating Feeder Components Mullcr Components Shot and Sand Blast Equipment

Note : We can supply Welding Consumables with specific compositions or properties or features, other than the ones mentioned in this book, if required, after clue confirmation from our Technical Service / Commercial Dept. These custom products may meet your specific requirements. The data regarding the Packing Standards, or any other matter, may be sought from our Commercial Dept., if not already given here. All data on our products contained here in are based upon careful investigation and intensive research. However we do not assume any liability for their accuracy. We do recommend the user to test, at his lab, with regard to their specific application and required compositions or properties. As an on going process, we periodically upgrade our products and features, with a view to improve our quality and services. Please do call us in case of any queries, and we shall be ever so glad to reply.

DISSIMILAR METAL WELDING CONSUMABLES CHART

	Cast iron	Nodular iron	Steels Cast steel non-alloyed	Steels Cast steel low and medium alloyed	Steels Cast steel high alloyed
Brown	534 535	535	535	535	515 N 534 535
German silver	702 535	703 535	535 512	535 512	512 535
Brass	534 535	535 534	535 534	535 534	535 534
Copper	705 535	535 703	535 515	515 N 534 535	515 N 534 535
Nickel Nickel alloys	705 704 N 703	703 704 N	513 515 512	513 512 515 N	513 512 515
Steel Cast steel high alloyed	705 704 N 703	703 704 N	457, 468 464	457, 468 464	457, 468 464, 457 S 515
Steel Cast steel low and medium alloyed	705 704 N 703	704 N 703	457, 468 464	457 S, 457 464	
Steel Cast steel non-alloyed	704 N 703	704 N 703	210, 352 464		
Nodular iron	704 N 703	704 N 703			
Cast iron	704 N 703				

DISSIMILAR METAL WELDING CONSUMABLES CHART

Nickel Nickel alloys	Copper	Brass	German silver	Bronzes
512, 513 535	512, 513 535	512, 513 535	535, 534	535, 534
512, 513 535, 515 N	535	512, 535 534	535	
535, 534	535, 534	535, 534		
512, 513 535, 515 N	534			
512, 513 535, 515 N				

APPLICATION GUIDE

SUGAR PLANTS

Wear & tear due to Abrasion, Impact, Corrosion and Friction has been a constant problem for the Maintenance Engineer in the Sugar Industry. To achieve high performance, high productivity, low operation cost without disturbing the production operation is task at hand. This can only be achieved t Reclamation & Repair to prolong life. It will also minimize inventory and dow time considerably.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
1	Cane Grabs	C. Steel	Wear	603 R
2	Cane Leveler Arms	C.Steel	Wear	603 R
3	Cane Loading Spikes	C.Steel	Wear	603 R
4	Cane Cutting Knives	C.Steel	Wear	611
5	Fibrizer	C.Steel	Wear	602 / 605
6	Trash Beam	Cast Iron	Crack	701 / 702
7	Trash Plate	C. Steel	Teeth Wear	605
8	Scraper Plate	C. Steel	Teeth Wear	605
9	Crusher Roller	Steel/CI	Wear / Slip	618
10	Roller Pinion	C. Steel	Wear	352 / 602
11	Tail Bar	L.A. Steel	Wear	457 S
12	Square Coupling	Steel/CI	Wear	602 /701+703
13	Juice Ring	Steel	Wear	660 G2 / 603 R
14	Striking Bar of Anvil	Steel	Wear	457 S + 660 G2
15	Juice Pump	Cast Iron	Wear	703
16	Magma Pump	Bronze	Wear	534 / 532 / 533
17	SS Condenser	SS 316	Wear/Fab	451
18	Centrifuge Shaft	Alloy Steel	Wear	468
19	Sprocket	Steel	Wear	603
20	Pump Shaft Keys	Steel	Wear	468
21	Brake Drum	Cast Iron	Wear	703
22	Unknown Material	Steel	Wear/Crack	468
23	Turbine Casing	Steel	Crack	468

APPLICATION GUIDE
STEEL INDUSTRY

Today, Steel Plants are working at maximum utilization hence, several parts are constantly subjected to continuous wear and fear at rapidly changing temperatures. Metal to Metal wear & tear, Corrosion, Abrasion etc. has been be a regular problem at every service workshop the Steel Industry. Lotherme's recommendation will enormously bring down the need to REPLACE. Reclination and repair is the only profitable solution.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Gear	Cast Steel	Abrasion/ friction	602
02	Pinion of Sinter M/c	Forged Steel	Abrasion/ friction	352 / 602
03	Hammer Mill Rotor	Forged Steel	Abrasion	352 / 602
04	Cooler Fan Blade	Cast Steel	Abrasion/ friction	352 / 602
05	Blower Fan Blade & Hub (Impeller)	Special Alloy	Abrasion/ friction	352 / 602
06	Rail	Mn. Steel	Abrasion/ impact	352 / 602
07	Support Rolls	Cast Steel	Friction	703
08	Friction Wheel	Forged Steel	Abrasion/ friction	352

COKE OVEN

10	Air Compressor Body	Cast Iron	Accident	701 / 703
11	Motor Base Plate	Cast Iron	Accident	701 / 703
12	Pump Body	Cast Iron	Accident	701 / 703
13	Chute	Stainless Steel	Abrasion	468 / 457
14	Flange	Stainless Steel	Abrasion	468 / 457
15	Shaft	Stainless Steel	Abrasion	468 / 457
16	Gears	Cast Steel	Friction	352 / 602
17	Dog Clutch	Cast Steel	Friction	602
18	Gear Box	Cast Iron	Accident	701 / 703
19	Conveyor Drums	Cast Steel	Friction	602

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
20	Crusher Jaws Hammer	Mn. Steel	Impact/ abrasion	625
21	Pulleys	Cast Iron	Friction	701 / 705
22	Buckets	Mn. Steel	Impact/ abrasion	625
23	Gear Wheel	Cast Iron	Friction	352 / 468
24	Motor Casings	Cast Iron	Accident	701 / 705
25	Transmission Gear	Cast Iron	Friction	457
26	Bush Bars	Copper/	Friction	533 / 532
27	Lifting Blocks	Cast Iron	Accident	701 / 705
28	Chains	Cast Steel	Friction	468 / 457
29	Leader Tips	Alloy Steel	Friction	602
30	Chassis	Cast Steel	Crack	468
31	Hydraulic Units	Brass/bronze	Friction	532
32	Washery Main Pump	Cast Iron	Accident	701 / 457
33	Coke Crushing Hammer	Steel	Impact	625 / 603
34	Pinion For Pusher Rack	Mn. Steel	Abrasion/ Impact	457 S
35	Coupling Flanger	Cast Steel	Friction	352
36	Rambeans of Support	Cast Steel	Vibration	352
37	Cooling Members	Copper	Joining	533 / 532
38	Sinter Breaker	Cast Steel	Abrasion/ Impact	625 / 603
39	Hammers	Cast Steel	Abrasion/ Impact	625 / 603
40	Pallets	Cast Steel	Abrasion	352 / 468
41	Pallets	Cast Steel	Abrasion	705 / 703
42	Shafts	Stainless Steel	Joining/ Surfacing	468
43	Crusher Jaws	Mn. Steel	Abrasion/ Impact	625 / 603

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S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
44	Valves	Cast Iron	Abrasion/ surfacing	701 / 703
45	Throat Armour Plates	Cast Steel	Abrasion/ erosion	605 / 617

STEEL MELTING SHOP

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
47	Furnace Doors	Cast Steel	Joining	510 N
48	Pump Shafts	En Steel	Joining/ surfacing	468
49	Pulley	Cast Iron	Broken/ buildup	703 / 705
50	Kiln Shell	Cast Steel	Joining	352
51	Ladle Trunion	Cast Steel	Abrasion	352 / 602
52	Crane Rails	Cast Steel	Abrasion	352 / 625
53	Rollers	Cast Iron	Broken/ joining	701 / 703
54	Valves	Stainless Steel	Steel Erosion	612
55	Oxygen Lancer	Copper	Erosion	532

FOUNDRY

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
56	Crane Bearing Pedestral	Cast Steel	Friction	352
57	Sand Pump	Cast Iron	Abrasion	701 / 705
58	Impeller Casing	Cast Iron	Abrasion	705
59	Mix Muller Plough	Mn. Steel	Abrasion	625
60	Impeller Backplate	Cast Iron	Friction	705
61	Valve Spindle Of Max M	Brass	Friction	533 / 532
62	Elevator Shaft	Steel	Friction	468
63	Feed Screw	Cast Steel	Abrasion	611
64	Vibartor Table	Cast Iron	Crack	701 / 703
65	Moulding Box	Cast Iron	Crack	701 / 703

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
66	Feeder Head	Steel	Abrasion	611
67	Rollers	Steel	Friction	468
68	Mould Drill	H.S.S	Friction	608
69	Mould Knife	H.S.S	Friction	608
70	Fan Blade	Steel	Abrasion	611
71	Heat Treatment Grill	Stainless steel	Heat	457 + 464
72	Heating Elements	Nichrome	Heat	510 N
73	Machine Base	Cast Iron	-	701 / 703
74	Machine Housing Engine Blocks	Cast Iron	-	701 / 703
75	Sand Discharge Chute	Mild steel	Abrasion	611
76	Pump Shaft	Steel	Friction	468
77	Mns.Liner Mould	Mn.Steel	Impact/ abrasion	607
78	Scrap Blades	Mn.Steel	Abrasion	607 + 611
79	Scrap Blades	Mn.Steel	Abrasion	611
80	Tackle Ingot Mould	Cast Iron	Cavition/ heat	701 / 705

MILL

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
81	Idlers	Cast Iron	Friction	705
82	Idlers	Steel	Friction	468
83	Rollers	Cast Iron	Friction	701 / 705
84	Rollers	Steel	Friction	468
85	Housing	Cast Iron	Crack/joining	701 / 703
86	Housing	Cast Iron	Crack/joining	701 / 703
87	Crane Rails	Mn.Steel	Fiction/abrasion	625 / 602
88	Crane Wheels	Forged steel	Fiction/abrasion	602
89	Impellers	Bronze Cast Iron	Abrasion Abrasion	532 / 533 701
90	Main Stand Bores	Cast steel	Friction	352
91	Flying Shear Housing	Cast steel	Friction	352
92	Hot Shear Blade	HCHC	Impact/friction	600

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
93	Hot Working	HCHC	Friction	63 G3
94	Wire Cutters	HSS	Friction	608 N

REFRACTORIES

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
95	Supporting Rolls Of Rotary Kiln	Low alloy steel	Abrasion/ friction	352 + 602
96	Impact Crusher	Low alloy steel	Friction/ impact	608 + 603
97	Rotters	Mn.Steel	Abrasion	608 + 603
98	Crown Gears	Cast Steel	Friction	602

ELECTRICAL

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
99	Fan Cover Of Motors	Cast Iron	Friction/ accident	701 / 703
100	Motor Foundation	Cast Iron	Accident	701 / 703
101	Armature Shaft	Steel	Friction	468
102	Bearing Seating	Cast Steel	Friction	602
103	Housing	Cast Iron	Friction	703
104	Copper Bushes	Copper	Friction	532 / 533

CENTRAL REPAIR SHOP

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
105	Machine Beds Housing	Cast Iron	Joining	701 / 705
106	Crane Wheels	Cast Steel	Abrasion	352
107	Hosing	Cast Steel	Abrasion	352
108	Wheel Punch	Cast Steel	Abrasion	603
109	Shear Blades	Alloy Steel	Impact/heat	464 + 606
110	Punch & Die For Sleeper	Alloy Steel	Impact/heat	464 + 606
111	Hammer Pallets	Mn. Steel	Impact	625
112	Weaying Plates	Carbon Steel	Abrasion	352 + 602
113	Spindle	Carbon Steel	Friction	352

APPLICATION GUIDE

TRANSPORT SECTOR

In a fast changing world, trasoportator in growing leaps and bounds, continuos and extended houses of running causes wear and tear an several components. These need not to replaced by expensive spares. Instead repair and rebnilc worn out ports to prolong life. Lotherme will help you find sohitirns to save considerably.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Clutch housing	Cast Iron	Cracked Im-pact/Friction	703
03	Clutch withdrawal face	Cast Iron	Impact/Friction	703
05	Clutch release finger	Cast Iron	Broken/Impact	602
06	Clutch Yoke	Cast Iron	Friction	602
07	Rear Flange	Cast Iron	Friction	352
08	Interlock Shifter Shaft	Forged Steel	Friction/Impact	468

ENGINE

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
09	Cylinder Block	Cast Iron	Impact/Cracked	703 N
10	Cylinder Head	Cast Iron	Impact/Cracked	703 N
14	Pulley	Cast Iron	V-Belt Area	602 B
15	Flywheel ring gear	Alloy Steel	Chipped	468 N
18	Patching in cylinder block	Cast Iron	Cracked/Heat	703

GEAR BOX

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
20	Gear Box Housing	Cast Iron	Impact/ Cracked	703
21	Gear Box Housing	Cast Iron	Bearing area/ Friction	705
22	Gear Shifting Fork	Steel	Impact	611

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
23	Gear	Steel	Pitting on teeth/ Corrosion	468
24	Gear	Steel	Impact/ Chipped or Broken	468
25	Gear Shifting Shaft	Steel	Friction/ Chipped/ teeth	468

PROPELLER SHAFT

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
28	Flange	Steel	Friction/ Impact/ Elongated hole	352
29	Propeller Shaft (rear)	Alloy Steel	Bearing seal / friction	468

DIFFERENTIAL

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
30	Thrust area	Steel	Impact	468
31	Bearing area	Steel	Heat	468
32	Housing	Cast Iron	Cracked/Heat	701 + 703
33	Housing	Cast Iron	Cracked/Heat	468
34	Hypoid gear	Steel	Impact/ Chipped off	468
35	Crown Wheel	Steel	Impacted/ Chiffed/teeth	468
36	Crown Wheel	Brass	Chipped/ teeth/friction	532
38	Rear axle housing	Alloy Steel	Damaged threads	468
39	Leaf Spring	Spring Steel	Impact/Broken	468
40	Slack adjuster	Cast Iron	Heat	703

AXLE & WHEEL

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
42	Wheel rim	Steel	Impact/Heat	352
43	Stub Axle	Steel	Friction/Damaged threads	468
44	Wheel hub	Steel	Friction/ bearing area	468
45	Rear Axle Tube	Steel	Corrosion/ pitting on teeth	468
46	Rear Axle Shaft holes get elongated	Steel	Friction/Impact	468
47	Rear Hub	Cast Iron	Heat/Cracked	705
48	Front Beam	Cast Iron	Impact/Cracked /Vibration	602

BRAKES

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
49	Stack Adjuster	Steel	Impact/Cracked	468
50	Stack Adjuster	Cast Iron	Heat/Cracked	703
52	Compressor Housing	Cast Iron	Heat/Impact /Cracked	703

CHASIS

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
54	Chassis	Steel	Impact/Cracked	468
55	Shovel/Bracket	Mild Steel	Impact	352
56	Leaf Spring	Spring Steel	Impact/Broken	468

APPLICATION GUIDE
CEMENT PLANTS

The cement Industry has been one of core industries contributing to industrial growth. Our & decades of association with the Cement Industry has given in depth knowledge of the need to save down time and minimize inventory. This is a key factor in this highly competition market. Our solutions will minimize effect of wear & Tear are Abrasion, Impact & Hand.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Hammer (New)	Mn.Steel	Impact/Abrasion	607 / 603
02	Hammer (Old)	Mn.Steel	Impact/Abrasion	457 + 607 + 603
03	Jaw-Crusher plate & Eccentric Shaft	Alloy Steel	Friction	352 + 602 + 607
04	Shovel Bucket & Lip	Mn.Steel	Abrasion/Impact	468 / 607
05	Toggle Bearing Plate	Mn.Steel	Abrasion	625
06	Idler, Guides & track Rollers	Carbon Steel	Impact/Friction	352
07	Spockets	Alloy Steel	Friction/Impact	352 + 603
08	Hammer Arms & Shafts	Alloy Steel	Impact	468
09	Track Link & Shoes	Mn.Steel	Impact/Abrasion	607
10	Diaphragm	Mn.Steel	Impact	625
11	Scooping-Liner Plates	M.S./Mn. Steel	Abrasion	468
12	Cylinder Mill-Teeth & Crusher Bar	Austenitic/ Mn Steel	Impact / Abrasion	468
13	F.K. Pump Shaft-Bearing	Carbon Steel	Friction	468
14	F.K. Pump Screw (Flight & Delivery End)	Carbon Steel or Mild Steel	Abrasion/Heat/ Corrosion	906
15	Mill Gear Drive Pinion	Cast Steel	Friction	352

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
16	Mill Head/Journal	Cast Steel	Impact	352
17	Kiln Tyre	Cast Steel	Friction	352 + 602
18				
19	Girth-gear teeth (Broken Tooth) Girth Gear Teeth	Cast Steel Cast Steel	Fatigue Friction	352 + 457 352 + 457
20	Girth Gear drive pinion	Cast Steel	Fatigue / Friction	352 + 618
21	Burner Nozzle	Stainless Steel	Heat / Abrasion1	464 + 618 464 + T904
22	Clinker Inlet	Alloy Steel	Heat / Abrasion	464 + T904
23	Cooler-Plates	Alloy Steel	Heat / Abrasion	464 + T904
24	Lifting arm & Roller	Mild Steel	Friction	352
25	Loco/Crane wheels	Cast Steel	Friction	352
26	Elevator Rim/Drum	Mild Steel	Abrasion	352
27	Inlet Neck/Body	Cast Iron	Heat / Abrasion	703
29	Cylinder Block/Head	Cast Iron	Impact	705
30	Crane Crab	Mild Steel	Abrasion	611
31 32	Drag-Chain Sprockets Slurry-Pump Shaft	Carbon Steel Carbon Steel	Friction Corrosion / Friction	457 468
33	I.D. Fan Blades	Mild Steel	Abrasion	T901
34	Coal Pipe Bends	Cast Steel	Abrasion	603
35 36	Pump Housing Kiln-Support Roller	Cast Iron Cast Iron	Impact Fatigue / Friction	705 352 + 602

APPLICATION GUIDE

POWER SECTOR

In any growing economy the power sector is quite often not able to meet the demand and hence these is on immense pressers on the pace of power generation. This leads to constant breakdowns, wear and tear of critical components. Factors of wear involved are several like, Abrasion, Impact, Erosion, Corrosion, Cavitation etc. Replacement of worn out components is an expensive proposition. Lotherme R&D offers a series of solution to combat wear & tear with minimal cost.

COAL HANDLING PLANT

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Coal mill verticle shaft	A. Steel	Wear	468
03	Roller yoke	C. Steel	Wear	603
04	Coal bend	CI	Wear	701
05	Coal orifice	CI	Wear	701
06	Boiler feed pump	A.Steel	Wear	468
07	Coal burner nozzel	S.G.Iron	Wear	603
08	Nozzel tip	SS 310	Wear	464 + t904
E09	I D Fan shaft	A. Steel	Wear	468

APPLICATIONS IN POWER INDUSTRY

01	Points & Crossing	Mn.Steel	Wear	457IVR
02	Wagon tippler gear	C. Steel/Ci	Wear	352 + 611
03	Slurry gear/pinion	C. Steel	Wear	602
04	Reclaimer wheel	C. Steel	Wear	352 + 611
05	Dozer cutting edge	Mn. Steel	Wear	607 + 611
06	Dozer arms	C. Steel	Wear	607
07	Dozer H Frame	H.T. Steel	Crack	352
08	Track Pads	Mn. Steel	Wear	625
09	Track links	Mn. Steel	Wear	625
10	Idler	Mn. Steel	Wear	625
11	Rollers	Mn. Steel	Wear	607
12	Ring & Tooth hammers	Mn. Steel	Wear	607 + 611

ASH HANDLING PLANT

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
13	Clinkar grinder liners	Mn.Steel	Wear	611
14	Universal slide valve	SS 304	Wear	452
15	CW Pump impeller	SS 410 / Bronze	Wear	410S
16	Wear plates of pump	SS 410	Wear	410S

APPLICATION GUIDE

EARTH MOVING & MINING INDUSTRIES

Our continuous research and interaction into the aspects of wear and tear in the Mining and Earth Moving Industry has given us immense experience to combat wear. In fact we do not recommend you wait for a break down or components to wear out before suggesting solutions. We advice the OEM to initiate the action. Even before the new equipments and components are put to use we recommend you to PROTECT. Protect with the right kind of alloy for Hardfacing / Rebuilding to resist the wear, most effectively.

COAL HANDLING PLANT

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Bucket tooth	Mn. Steel	Abrasion / Impact	607 E
02	Bucket Lip	Mn. Steel	Abrasion / Impact	607 E
03	Track Shoes	Mn. Steel	Friction / Abrasion	625 N
04	Sprocket	Steel	Friction / Abrasion	602 B
05	Rack Pinion	Steel	Friction	352 E
06	Rack Teeth	Steel	Friction	625 N
07	Bucket Body	Mn. Steel	Abrasion / Impact	625 N
08	Latch Bar	Mn. Steel	Friction / Abrasion	625 N
09	Latch Keeper	Mn. Steel	Friction / Abrasion	625 N
10	Slides	Steel	Friction	625 N
11	Intermediate Hoist Shaft	Steel	Friction	468 N
12	Boom Stick	Steel	Friction	468 N
13	Swing Drum	Steel	Cracks	352 E
14	Take up Axel Shaft	Steel	Friction	352 E
15	Shaft for Rack pinion	Steel	Friction	468 N
17	Bevel gear	Steel	Friction	468 N
18	Idlers	Steel	Friction	352

DRILL MASTER

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
19	Chassis	Steel	Cracks	352 / 457
20	Main Base frame	Steel	Cracks	352 / 457
21	Support Lever	Steel	Cracks	468
22	Spool Valve handler	Steel	Cracks	352
23	DRP-2 Rotary Head Floating Spindles	Steel	Friction	468
24	Spindle Complete	Steel	Friction	468
25	Hoisting winch motor	Steel	Cracks	352
26	Break lever	Steel	Cracks	352
27	Tower Cylinder Bushing Bracket	Steel	Cracks	352
28	Dust Collector Blower	Cast Iron	Abrasion / Cracks	703
29	Rod Changer Assembly	Steel	Cracks	468
30	Drill Rod Support plate guides	Steel	Friction	352
31	Tower Support Bracket	Steel	Cracks	352

HAULPAK DUMPER

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
32	Pivot pin	Alloy Steel	Friction	468
33	Suspension Eye	Alloy Steel	Cracks	457 + 468
34	Pivot Pinion Carier	Alloy Steel	Friction	468

COAL DRILL

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
35	Track Frame	Steel	Cracks	457
36	Chassis	Steel	Cracks	457
37	Tower	Steel	Cracks	468
38	Tower Bracket D 14 HAMMER	Steel	Cracks	352
39	Chuck D 14 HAMMER	Steel	Friction / Abrasion	352
40	Back Head	Steel	Friction	352
41	Clevies (Dump Shaft)	Steel	Cracks	468

DOZERS

42	Carrier Rollers	Steel	Friction / Abrasion	602
43	Idlers	Steel	Friction / Abrasion	602
44	Sprocket	Steel	Friction / Abrasion	602
45	"C" Frame	Steel	Friction / Abrasion	
46	Track Roller	Steel	Friction	602
47	"C" Frame Bracket	Steel	Cracks	352 / 457
48	Base Arms	Steel	Abrasion / Cracks	352
49	Blade Assembly	Mn. Steel	Impact / Abrasion	625
50	Gear Shifting Lever	Steel	Friction	468
51	Track Farm	Steel	Crack	352
52	Idler Shaft	Steel	Friction / Abrasion	352
53	Track Frame Lever	Steel	Crack	468

BOTTOM DUMPER

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
54	Goose Neck	Steel	Crack	352
55	Goose neckside Corner Box	Steel	Crack	468
56	Door Opening Cylinder	Steel	Crack	468
57	Exhaust Main Delivery Pipe	Cast Iron	Crack	703
58	Water Pump Bracket	Steel	Crack	352
E89	Chassis	Steel	Crack	352

LOADERS

60	Bucket Body	Steel	Abrasion	603
61	Bucket Bracket	Steel	Shock Load Cracks	352
62	Cutting Edges	Mn. Steel	Impact / Abrasion	625 / 611
63	Brake Head Cover	Mild Steel	Crack	352
64	Bucket Tooth	Mn.Steel	Abrasion / Impact	625
65	Hoist arms	Steel	Crack	352

MOTOR GIRDER

66	Blade Lifting Arm	Steel	Crack	352
67	Brake Drum	Cast Iron	Friction	703
68	Lifting housing Mounting Bracket	Steel	Crack	352

CRANES

75	Axle housing	Steel	Friction	352
76	Hydraulic Pipe	Steel	Leakage	352
77	Rooms	Steel	Crack	468
78	Body	Steel	Crack	468

APPLICATION GUIDE

OIL & PETROCHEMICAL SECTOR

With a high gap in the demand supply of Petroleum Products, the need for continuous expansion coupled with exploration, both inland and off-shore, has lead to a strain on the drilling equipments and related components. Sea-water Corrosion, Soil Erosion, Heat, etc. has a detrimental factor on all these equipments. Our R&D have proven solutions to your problems.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Boring bits	Steel	Abrasion	611
02	Reformer tubes	HK 30/HK 40	Corrosion	467
03	Furnace Components	Nickel Alloys	Heat / Corrosion	510 N
04	Conveyor Screws	Alloy Steel	Heat / Abrasion /Corrosion	606
05	Chemical Apparatus	Nickel	Corrossion / Heat	513
06	Valve seat	Stainless	Heat /	
		Steel	Impact	606

APPLICATION GUIDE
MARINE SECTOR

Sea-Water Corrosion, Constant, Variations in temperatures, Metal Fatigue, Metal to Metal wear, has lead to several breakdowns and repairs of Sea-faring vessels. Our latest technology offer solutions to minimize wear and down time for the maintenance in the repair docks.

S. No.	Components	Base Metals	Wear Factors	Recommended Electrodes
01	Pump Impellers	Steel/Bronze	Corrosion/ Abrasion	533 N
02	Heat Exchange tubes	Nickel Alloys	Corrosion	512 N
03	Water pump housing	Cast Iron	Erosion/ Corrosion	705 N
04	Condensor pipes	Cu Nickel Alloys	Corrosion	512 N
05	Engine Blocks	Cast Iron	Impact	703 N
06	Valve seat	Stainless Steel	Heat/Impact	906

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APPLICATION GUIDE
RAILWAY SECTOR

With a high gap in the demand supply of Petroleum Products, the need for continuous expansion coupled with exploration, both inland and off-shore, has lead to a strain on the drilling equipments and related components. Sea-water Corrosion, Soil Erosion, Heat, etc. has a detrimental factor on all these equipments. Our R&D have proven solutions to your problems.

S. No.	Components	Base Metals	Recommended Electrodes
01	Roof Truss/Under Frames	Alloy Steel/ Carbon Steel	352
02	Crank Case	Carbon Steel	352
03	Brake Equipment/levers/rods	Carbon Steel	352
05	Exhaust Muffers & Mainfolds	Alloy Steel	464 + 511 N
06	Rail Ends, Crossings	Austenitic Manganese Steels	468
07	Diesel Valve	High Temperature Steel	606
08	Cylinder Head	Cast Iron	703
09	Journal Box	Manganese Steel	468
10	Bearing Ends	Copper Alloy	533 / 532
11	Loco Wheels	Steel	468
12	Crane Case	Cast Iron	705
13	Machine Housings	Cast Iron	701 / 705

HARDNESS CONVERSION TABLE (APPROX.)

ROCKWELL HARDNESS		VICKERS HARDNESS		BRINELL HARDNESS		ROCKWELL HARDNESS		VICKERS HARDNESS		BRINELL HARDNESS	
C-150 Kg. Load, Diamond	B-100 Kg. Load, 1/16" Ball	Diamond Pyramid	Tungsten Carbide Ball	Steel Ball	Tensile Strength, 1000 Psi	C-150 Kg. Load, Diamond	B-100 Kg. Load, 1/16" Ball	Diamond Pyramid	Tungsten Carbide Ball	Steel Ball	Tensile Strength, 1000 Psi
67	-	918	820	-	-	20	98.9	240	231	225	107
66	-	884	796	-	-	19	98.1	235	226	220	106
65	-	852	774	-	-	18	97.5	231	222	215	103
64	-	822	753	-	-	17	96.9	227	218	210	102
63	-	793	732	-	-	16	96.2	223	214	206	100
62	-	765	711	-	-	15	95.5	219	210	201	99
61	-	740	693	-	-	14	94.9	215	206	197	97
60	-	717	675	-	-	13	94.1	211	202	193	95
59	-	694	657	-	-	12	93.4	207	199	190	93
58	-	672	639	-	-	11	92.6	203	195	186	91
57	-	650	621	-	-	10	91.8	199	191	183	90
56	-	630	604	-	-	9	91.2	196	187	180	89
55	-	611	588	-	-	8	90.3	192	184	177	88
54	-	592	571	-	-	7	89.7	189	180	174	87
53	-	573	554	-	283	6	89.0	186	177	171	85
52	-	556	538	-	273	5	88.3	183	174	168	84
51	-	539	523	500	264	4	87.5	179	171	165	83

50	-	523	508	488	256	3	87.0	177	169	162	82
49	-	508	494	476	246	2	86.0	173	165	160	81
48	-	493	479	464	237	1	85.5	171	163	158	80
47	-	479	465	453	231	0	84.5	167	159	154	78
46	-	465	452	442	221	-	83.2	162	153	150	76
45	-	452	440	430	215	-	82.0	157	148	145	74
44	-	440	427	419	208	-	80.5	153	144	140	72
43	-	428	415	408	201	-	79.0	149	140	136	70
42	-	417	405	398	194	-	77.5	143	134	131	68
41	-	406	394	387	188	-	76.0	139	130	127	66
40	-	396	385	377	181	-	74.0	135	126	122	64
39	-	386	375	367	176	-	72.0	129	120	117	62
38	-	376	365	357	170	-	70.0	125	116	113	60
37	-	367	356	347	165	-	68.0	120	111	108	58
36	-	357	346	337	160	-	66.0	116	107	104	56
35	-	348	337	327	155	-	64.0	112	104	100	54
34	-	339	329	318	149	-	61.0	108	100	96	52
33	-	330	319	309	147	-	58.0	104	95	92	50
32	-	321	310	301	142	-	55.0	99	91	87	48
31	-	312	302	294	139	-	51.0	95	86	83	46
30	-	304	293	286	136	-	47.0	91	83	79	44
29	-	296	286	279	132	-	44.0	88	80	76	42
28	-	288	278	272	129	-	39.0	84	76	72	40
27	-	281	271	265	126	-	35.0	80	72	68	38
26	-	274	264	259	123	-	30.0	76	67	64	36
25	-	267	258	253	120	-	24.0	72	64	60	34
24	-	261	252	247	118	-	20.0	69	61	57	32
23	-	255	246	241	115	-	11.0	65	57	53	30
22	100.2	250	241	235	112	-	0.0	62	54	50	28
21	99.5	245	236	230	110						

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EN SERIES - BRITISH STANDARD SCHEDULE 970-1955

En No.	Type of steel and example of application	Chemical Composition - Percent C	Mn	Si	Cr	Ni	Mo
1A	Free cutting machinig steel for low duty bolts, nuts, studs, etc.	0.07-0.15	0.80-1.20	0.10 Max.	-	-	-
8	40 Carbon steel (as rolled or normalised). For bolts and machine rods and crankshfts and part requiring strength and wear resistance (without grain size control).	0.35-0.45	0.60-1.00	0.05-0.35	-	-	-
9	55 Carbon steel (normalised or hardened and tempered or cold drawn). Suitable for cylinders, gears, mahince tools, rifle barrels and breech machanisms.	0.50-0.60	0.50-0.80	0.05-0.35	-	-	-
15	Carbon - Manganese steel (higher tensile)	0.30-0.40	1.30-1.70	0.10-0.35	-	-	-
16	Manganese-Molybdenum steel. Suitable for tensile ranges of 45/75 tons / sq.in. according to the ruling section.	0.30-0.40	1.30-1.80	0.10-0.35	-	-	-

18	1 percent Chromium steel, Suitable for tensile ranges of 45/65 tons/sq.in. according to the ruling section.	0.35-0.45	0.60-0.95	0.10-0.35	0.85-1.15	-	-
19	1 percent Chromium Molybdenum steel. Suitable for tensile ranges of 45/80 tons / sq.in. according to the ruling section of the part.	0.35-0.45	0.50-0.80	0.10-0.35	0.90-1.50	-	0.20-0.40
24	1.5 percent Nickel - Chromium - Molybdenum steel. Suitable for tensile ranges of 50/100 tons / sq.in. according to the ruling section of the part.	0.35-0.45	0.45-0.70	0.10-0.35	0.90-1.40	1.30-1.80	0.20 0.35
31	1 percent Carbon-Chromium steel. For parts of maximum hardness such as ball races.	0.90-1.20	0.30-0.75	0.10 0.35	1.00 1.60	-	-
36A	3 pecent Nickel-Chromium case hardening steel	0.15 max.	0.30-0.60	0.10-0.35	0.60-1.10	3.00-3.75	-
36B	As above	0.12-0.18	0.30-0.60	0.10-0.35	0.60-1.10	3.00-3.75	-

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En No.	Type of steel and example of application	Chemical Composition - Percent C	Mn	Si	Cr	Ni	Mo
36C	3 percent Nickel - Chromium - Molybdenum case hardening steel.	0.12-0.18	0.30-0.60	0.10-0.35	0.60-1.10	3.00-3.75	0.10-0.25
40A	3 percent Chromium - Molybdenum nitriding steel. Suitable for tensile strengths of 45/70 tons/sq.in. Cylinder linings, crank-shafts and airscrews shafts.	0.10-0.20	0.40-0.65	0.10-0.35	2.90-3.50	0.40 Max.	0.40-0.70
40B	3 percent Chromium - Molybdenum nitriding steel. Uses as for En 40A	0.20-0.30	0.40-0.65	0.10-0.35	2.90-3.50	0.40 Max.	0.40 0.70
40C	3 percent Chromium - Molybdenum - Vandium nitriding steel. Uses as for En 10A	0.30-0.50	0.40-0.80	0.10-0.35	2.50-3.50	0.40 max.	0.70 1.20
41A	1.5 percent Chromium - Alumininum - Molybdenum nitriding steel	0.25-0.35	0.65 max.	0.10-0.45	1.40-1.80	0.40 max.	0.10-0.25
41B	1.5 percent Chromium - Alumininum - Molybdenum nitriding steel	0.35-0.45	0.65 max.	0.10-0.45	1.40-1.80	0.40 max.	0.10-0.25

45	Silicon - Manganese spring steel for oil hardening and tempering	0.55-0.60	0.70-1.00	0.15-2.00	--	--	--
47	1 percent Chromium - Vanadium spring steel for oil hardening and tempering.	0.45-0.55	0.50-0.80	0.50 max.	0.80-1.20	--	--
48	1 percent Chromium spring steel for oil hardening and tempering.	0.45-0.55	0.50-0.80	0.10-0.50	1.00-1.40	--	--
52	Silicon - Chromium value steel for forgings and drop forgings, bars for machining, bright bars.	0.40-0.50	0.30-0.60	3.00-3.75	7.50-9.50	0.50 max.	--
351	3/4 percent Nickel - Chromium case hardening steel.	0.20 max.	0.60-1.00	0.35 max.	0.40-0.80	0.60-1.00	0.10 max.
352	1 percent Nickel - Chromium case hardening steel.	0.20 max.	0.50-1.00	0.35 max.	0.60-1.00	0.85-1.25	0.10 max.
353	1.25 percent Nickel - Chromium case hardening steel.	0.20 max.	0.50-1.00	0.35 max.	0.75-1.25	1.00-1.50	0.08-0.25
354	1.75 percent Nickel - Chromium - Molybdenum case hardening steel.	0.20 max.	0.50-1.00	0.35 max.	0.75-1.25	1.50-2.00	0.10-0.20

Estd. 1966
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Complete Welding Support

WELDING & CUTTING EQUIPMENT

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SALIENT FEATURES

- Heavy duty, rugged welding transformers
- Reliable, high performance welder
- 400/500/630 amps at 35% duty cycle
- Choice of copper or aluminium windings
- Forced air cooled
- Ideal for all type of electrodes

TECHNICAL SPECIFICATIONS

DETAILS	SUPRA TFR 400	SUPRA TFR 500	SUPRA TFR 630
Supply Voltage	400 – 440 Volts	400 – 440 Volts	400 – 440 Volts
Phase	2 Lines of 3 phase supply	2 Lines of 3 phase supply	2 Lines of 3 phase supply
Frequency	50Hz	50Hz	50Hz
Rated Input Power	32 KVA	38 KVA	53 KVA
Rated Output Current	400 Amps	500 Amps	630 Amps
Open Circuit Voltage	76 Volts	76 Volts	76 Volts
Duty Cycle	35 %	35%	35%
Output Current Range	80 ~ 400 Amps	100 ~ 500 Amps	150 ~ 630 Amps
Cooling	Forced air	Forced air	Forced air
Weight (approx.)	110 Kgs	135 Kgs	142 Kgs
Dim. (lxwxh) Approx.	550x300x450 mm	550x300x450 mm	630x440x690 mm

SUPRA MMA 400(D)/600(D) trasducting controlled MMA welding rectifier is built using advanced, solid State technology, designed to meet stringent demands of high quality radiographic welding. It ship-bulding, power plants, petroleum, steel plants, structural fabrications, pressure vessels and others.

SALIENT FEATURES

- Transductor contolled DC arc welding rectifier
- Heavy duty, rugged for site construction work
- Reliable, High performance welder
- OCV-80 Volts, for better arc initiation
- Forced air cooled
- Ideal for all type of electrodes
- Wheel mounted, easy to manoeuver

TECHNICAL SPECIFICATIONS

DETAILS	MMA 400 D (A & C)	MMA 600 D (A & C)
Supply voltage	415, +/- 10%	415, +/- 10%
Phase	3 Phase	3 Phase
Frequency	50 Hz.	50 Hz.
Maximum input power	30 KVA	45 KVA
Rated input current	42 Amps	64 Amps
Rated welding current (A)	400 Amps	600 Amps
Welding current range	30 - 400	50 - 600
Duty cycle	60%	60%
Open circuit voltage	80 Volts	80 Volts
Insulation class	H	H
Protection class	IP 23	IP 23
Cooling	Forced Air	Forced Air
Weight (approx)	260 Kgs.	375 Kgs.
Dimension (L x W x H) (approx)	610 x 585 x 738mm	610 x 647 x 813mm

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Supra MMA 400 (T) / 630 (T) fully thyristorised MMA welding rectifier is built using advanced, solid state technology, designed to meet the most stringent demands of high quality radiographic welding. Ideal for fabrication industries including Nuclear Power Plants, Chemical Process Plants, Defence, Steel Plants, Thermal Power Plants, Mining, Structural Fabrications and others.

SALIENT FEATURES

- Thyristor Controlled three phase Rectifier, Wheel Mounted, Fan Cooled, Flexible for use with a wide range of electrodes- Rutile, Basic, Cellulosic etc.,for welding all kinds of materials like M.S, S.S, Non-ferrous and other alloys
- Hot Start facility for easy arc striking
- Immune to voltage fluctuations, with built-in overload and thermal cut out protections
- Since the output waveform is more constant, it has a better welding characteristic

TECHNICAL SPECIFICATIONS

DETAILS	SUPRA MMA 400 (T)	SUPRA MMA 630 (T)
Supply Voltage	415 Volts, +/- 10 %	415 Volts, +/- 10 %
Phase	3 Phase	3 Phase
Frequency	50 Hz	50 Hz
Maximum Input Power	24 KVA	45 KVA
Rated Input Current	34 Amps	67 Amps
Rated Welding Current (A)	400 Amps	630 Amps
Rated Welding Voltage	36 Volts	44 Volts
Welding Current Range	40 - 400 Amps	80 - 630 Amps
Duty Cycle	60 %	60 %
Open Circuit Voltage	78 Volts	78 Volts
Insulation Class	F	F
Cooling	Forced Air	Forced Air
Net Weight	160 Kg	224 Kg
Dimensions (L x W x H) (approx.)	770 x 460 x 830 mm	970 x 670 x 830 mm

SUPRA Inverter arc welding machines are suitable for DC stick welding with various types of welding electrodes. It is suitable for almost all industries, such as ship-building, pressure vessels, steel, petroleum and power plants. SUPRA Inverter machines are also suitable for carbon arc gouging.

SALIENT FEATURES

- High efficiency, lower no load loss
- Light, compact and easy to move
- Withstands wide range of voltage fluctuations
- Provided with arc force current adjusting function
- Provided with pre-setting welding current function
- Dynamic characteristics, stable arc, good bead shape, less spatter
- Easy to operate, provided with pre-retain interface of remote control
- Provided with under voltage and overheat protection functions

TECHNICAL SPECIFICATIONS

DETAILS	INVERTER 200	INVERTER 400	INVERTER 500	INVERTER 630
Supply voltage	230+/- 15%	415+/- 10%	415+/- 10%	415+/- 10%
Phase	1 Phase	3 Phase	3 Phase	3 Phase
Frequency	50 Hz.	50 Hz.	50 Hz.	50 Hz.
Input power @ 100%	7 KVA	16 KVA	22 KVA	32 KVA
Open circuit voltage	78 Amps	78 Amps	78 Amps	78 Amps
Rated welding current	200 Amps	400 Amps	500 Amps	630 Amps
Rated welding voltage	28	36	40	44
Duty cycle	60%	60%	60%	60%
Current range	20-200 Amps	20-400 Amps	20-500 Amps	20-630 Amps
Insulation class	F	F	F	F
Cooling	Forced air	Forced air	Forced air	Forced air
Weight (approx.)	8 Kgs	38Kgs	42Kgs	43Kgs
Dim. (LxWxH) (approx.)	390x300x155mm	640x320x550mm	640x320x590mm	640x320x590mm

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ULTRA MMA 240

Ultra MMA 240 is highly reliable, IGBT inverter controlled, light weight welding machines for MMA welding applications. These machines allow precise and stable regulation of current and compen-sates for variations in input supply.

SALIENT FEATURES

- Hot start to improve arc striking
- Arc force control to improve arc stability
- Rugged and powerful
- Ideal for cellulosic electrodes and low hydrogen electrodes
- Extremely high level of welding performance
- Very light and handy

ULTRA TIG 240

Ultra TIG 240 is a compact IGBT inverter controlled welding machine. Ideal for TIG welding with non-contact HF striking and with direct current electrode. The auto regulation system allows simple use and fast adaptability of the appliance to the different welding conditions even in the most demanding applications.

SALIENT FEATURES

- Ambient operating temperature from-10°C to + 50°C
- Very high level welding performance
- Can be used for TIG and MMAW process
- Rugged, powerful, very high and handy
- Ideal for TIG welding with HF inbuilt
- Optional pulsar attachment

TECHNICAL SPECIFICATIONS

DETAILS	ULTRA MMA 240	ULTRA TIG 240
Supply voltage	415 +/- 10%	415 +/- 10%
Phase	3	3
Frequency	50 Hz.	50 Hz.
Input Power	10 KVA	10 KVA
Current / Duty Cycle	240@45 A%	240@45 A%
Current / Duty Cycle	160@100 A%	160@100 A%
Current Range	5 - 240 A	5 - 240 A
Open Circuit Voltage	105 V	105 V
Insulation Class	H	H
Protection Class	IP23	IP23
Hot Start Control	Available	Available
TIG arc ignition	Lift arc	HF
Pulser attachment	-	Optional
Weight (approx.)	15	17
Dimension (LxWxH) (approx.)	150 x 300 x 360 mm	150 x 300 x 360 mm

SUPRA TIG 300 (I) / 400 (I) is a new generation inverter based pulsed TIG machine is very handy and compact for easy operation. Even at very low current values, the arc is well controlled and stable thus enabling excellent weld quality. The adjustable current up-slope and down-slope are distinct features of this machine.

SALIENT FEATURES

- The machine is designed for high duty cycles
- Pulse welding function suitable for thin welding
- Time controlled spot welding
- Dual operation modes, i.e. 4T / 2T
- The machine can be used for MMAW and TIG processes
- The special design of the machine helps in making it quake-proof, moisture-proof and dust-proof
- The high frequency arc strike, helps in achieving sound, radiographic quality welds

TECHNICAL SPECIFICATIONS

DETAILS	SUPRA TIG 300 (I)	SUPRA TIG 400 (I)
Input power supply	415+/-10%, 50Hz	415+/-10%, 50Hz
Input power	11 KVA	15 KVA
Open circuit voltage	70-80 Hz.	70-80 Hz.
Rated welding current	300 Amps	400 Amps
Duty cycle	60%	60%
Current range	10 - 300 Amps	10 - 400 Amps
Upslopetime	0.4 - 2.5 Sec.	0.4 - 2.5 Sec.
Pulse frequency	0.3 - 115 Hz.	0.3 - 115 Hz.
Downslope time	1 - 13 Sec.	1 - 13 Sec.
Pre flow	4 - 6 Sec.	4 - 6 Sec
Post flow	8 - 10 Sec.	8 - 10 Sec
Insulation class	F	F
Weight (approx.)	44 Kgs.	46 Kgs.
Dimension (LXWXH) (approx.)	623 x 309 x 545 mm	623 x 310 x 545 mm

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SUPRA MIG 400(T) / 500(T) / 630(T) are designed for the most demanding welding applications. The cooling fan and rational wind tunnel design improves the performance.

This machine can be used to weld a variety of materials like Carbon Steels, Stainless Steels, Aluminium etc.

SALIENT FEATURES

- SUPRA MIG 400(T) / 500(T) / 630(T) are the most powerful thyristorised MIG/ MAG welding machines
- Wheel mounted
- Separate Wire Feeder
- Complete with MIG/MAG Torch & Welding accessories
- Suitable for Flux-cored arc welding (FCAW)
- Protection for Voltage fluctuations, Short Circuit, Single Phasing, Thermal Overload

TECHNICAL SPECIFICATIONS

DETAILS	MIG 400 (T)	MIG 500 (T)	MIG 630 (T)
Supply Voltage/Phase	415 Volt, +/- 10 %, 3	415 Volt, +/- 10 %, 3	415 Volt, +/- 10 %, 3
Frequency	50 Hz./ 60 Hz	50Hz / 60 Hz	50Hz / 60 Hz
Rated Input Power	20 KVA	28 KVA	44 KVA
Rated Input Current	27 Amps.	38 Amps.	61 Amps.
Rated Welding Current	350 Amps.	500 Amps.	630 Amps.
Output Voltage Range	17-32 Volts	17-39 Volts	19-44 Volts
Duty Cycle	60 %	60 %	60 %
Current Range	60-400 Amps	100-500 Amps	100-630 Amps
Insulation Class	F	F	F
Static-Output Char.	Constant Voltage	Constant Voltage	Constant Voltage
Cooling	Forced Air	Forced Air	Forced Air
Drive System	Four roll	Four roll	Four roll
2T & 4T systems	Available	Available	Available
Wire size	0.8-1.2 mm (solid)	1.0-1.6 mm (soild)	1.0 -1.6 mm (solid),
			1.2 -2.0 mm (flux cored)
MIG torch	3 / Euro	3 / Euro	3 / Euro
Weight, (approx.)	128 kgs.	154 kgs.	290 Kgs.
Dimen. (LxWxH) (approx.)	410 X 695 X 680 mm	456 X 800 X 635 mm	885 x 620 x 760 mm

SUPRA Inverter arc welding machines are suitable for DC stick welding with various types of welding electrodes. It is suitable for almost all industries, such as ship-building, pressure vessels, steel, petroleum and power plants. SUPRA Inverter machines are also suitable for carbon arc gouging.

SALIENT FEATURES

- Highly Reliable, Rugged, Heavy duty System
- IGBT based inverter power source
- 250/350/500/630 Amps. at 100% Duty Cycle
- Compact & Energy Efficient
- 2-Roll, 4-Roll, Quick Release Wire Drive Mechanism
- MULTI - PROCESS Power Source suitable for GMAW, MMAW, GTAW

DETAILS	INV MIG 250	INV MIG 400	INV MIG 500	INV MIG 630
Supply Voltage	415 Volt, +/-10%	415 Volt, +/-10%	415 Volt, +/-10%	415 Volt, +/-10%
Phase	3	3	3	3
Frequency	50 Hz./ 60 Hz	50 Hz./ 60 Hz	50 Hz./ 60 Hz	50 Hz./ 60 Hz
Rated Input Power	8 KVA	14 KVA	23 KVA	30 KVA
Rated Welding Current	250 Amps.	350 Amps.	500 Amps.	630 Amps.
Output Voltage Range (GMAW)	16 - 26.5 Volts	16 - 31.5 Volts	15.5 - 39 Volts	16 - 44 Volts
Duty Cycle	100 %	100 %	100 %	100 %
Output Current Range	50 - 250 Amps	50 - 400 Amps	50 - 500 Amps	50 - 630 Amps
Insulation Class	F	F	F	F
Output Characteristic	CC / CV	CC / CV	CC / CV	CC / CV
Cooling	Forced Air	Forced Air	Forced Air	Forced Air
2T & 4T systems	Available	Available	Available	Available
Wire size (Solid/FCAW)	0.8-1.2	0.8-1.2	1.0-1.6	1.0-1.6
Drive System	2 Roll	4 Roll	4 Roll	4 Roll
MIG torch	3 / Euro	3 / Euro	3 / Euro	3 / Euro
Weight, (approx.)	34 kgs.	39 kgs.	45 kgs.	54 kgs.
Dimen.(LxWxH)approx.	530x320x470mm	570x290x530mm	640x290x530mm	690x320x570mm

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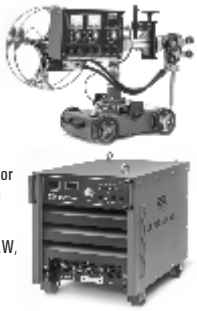
This Welding Power Source is a multi-function power source with constant-voltage and constant current characteristics. In addition to submerged welding, it can also be used as a welding power source for stick welding, carbon arc air gouging, electro-slag welding and high diameter wire GMAW/FCAW.

SALIENT FEATURES



- Due to digital display, the operator finds it easy to view current a voltage.
- An auto power-off switch gets activated, when the machine is no in use for more than 30 minutes, thus in turn saving power cost.
- The machine can run on two-speed mode - variable and constant.
- PWM is used for adjusting the speed (wire feed and welding tractor travel), so that the speed is not affected by the input voltage and environmental temperature.
- The power source can be used for multiple functions: SAW, MMAW, Carbon arc gouging, GMAW, FCAW and Electro-slag welding.
- Very reliable weld quality.

TECHNICAL SPECIFICATIONS

WELDING HEAD

DETAILS	SUPRA SAW 1000
Input supply voltage	3 Phase, 415+/- 10 %, 50Hz
Rated welding voltage	44 VDC
Rated welding current	1000 ADC
Voltage adjusting range	
Constant - current	28 - 44 V
Constant - voltage	24 - 44 V
Current adjusting range	200-1000 ADC
Open circuit voltage SMAW	75 OCV
Rated duty cycle	100 %
Rated input capability	66 KVA
Rated input current	101 AMPS
Efficiency	83 %
Weight (approx)	370 Kgs.
Dim. (L x W x H) (approx.) mm	950x650x810

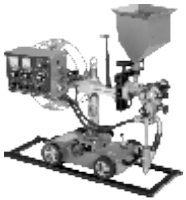
TROLLEY

DETAILS	VALUE
Input supply voltage	110V
Suitable diameter of wire	2, 3, 4, 5, 6 mm
Wire-feed speed	20-450 cm/ min
Feeding wire method	constant or alternate wire-feed
Welding speed	15-117 cm/ min
welding current	1000 A
welding voltage	44 V
Vertical adjustable range (The tractor's head)	96 mm
Horizontal adjustable range of (the tractor's head)	±30 mm
Up-down adjustable range of (the tractor's column)	70mm
Capacity of flux hopper	10 Kg.
Left-right rotation angle (the tractor's head)	30°
Sloped angle (the tractor's head)	30°
Horizontal rotation angle (the head round the column)	±90°
Outer dimensions (L x W x H)	103x400x730 mm
Welding tractor weight (without flux and wire)	67kg

SUPRA INV SAW 1000 is an inverter based multi function power source. In addition to submerged arc welding, it can be used as a welding power source for stick welding, TIG welding, GMAW/FCAW and carbon arc air gouging.

SALIENT FEATURES

- Smooth & stable arc
- Small, Light Weight easy to handle
- Immune to input voltage fluctuations
- Built-in Overheating, under /over voltage protection indicators
- Simultaneous drive of front and rear wheels, smooth motion
- Double drive wire feeding with straightening mechanism
- Suitable for dia 2.0 to 6.0 mm welding wire
- Rotatable and height adjustable cross beam



TECHNICAL SPECIFICATIONS

WELDING POWER SOURCE

DETAILS	SUPRA INV SAW 1000
Input Power Supply VAC	415
Phase Nos	3
Frequency	50 / 60
Rated Input current	73A
Input power @ 100% duty cycle	53 KVA
No Load Voltage (OCV) max.	90 VDC
Output welding current range	100-1000 A
Welding current at 100% duty cycle	1000 A
Welding current at 60% duty cycle	1000 A
Protection class	F
Insulation class	IP 21S
Cooling Type	Forced Air
Weight (approx.)	125 Kgs.
Dimension (L x W x H) (approx.)	780 X 390 X 800 mm

WIRE FEDER

DETAILS	VALUE
The rated supply voltage	110V
Suitable diameter of wire	2, 3, 4, 5, 6 mm
Wire-feed speed	0-450 cm/ min
Feeding wire method	constant or alternate wire-feed
Welding speed	15-117 cm/ min
The rated welding current	1000 A
The rated welding voltage	44 V
The rated welding duty cycle Arc Welding Rectifier	See the technical parameters
Vertical adjustable range (The tractor's head)	96 mm

SUPRA PLASMA is inverter based air plasma cutting machine with PWM technology. It is portable, light weight energy efficient suitable for cutting carbon steel, stainless steel, alloy steel , copper and other non ferrous metals.

SALIENT FEATURES

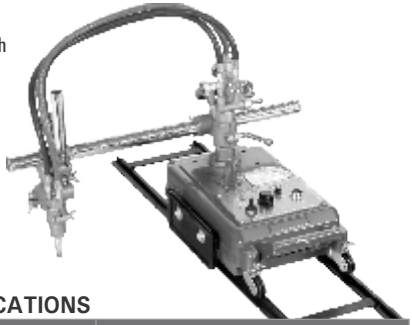
- Inverter based Plasma Cutting Machine with PWM technology
- Reliable, high performance
- Duty cycle 60 %
- Forced Air Cooled
- Ideal for all type of cutting
- Lifting handle / wheel mounted, Easy to maneuver
- Heavy duty, rugged

TECHNICAL SPECIFICATIONS

DETAILS	SUPRA PLASMA 101	SUPRA PLASMA 201
Input Supply	415 Volt, +/- 10 %,	415 Volt, +/- 10 %,
Phase	3	3
Frequency	50 Hz./ 60 Hz	50Hz / 60 Hz
Input Power	14 KVA	49 KVA
Switching Device	IGBT	IGBT
No load Voltage	270 Amps.	210 Amps.
Current Range	20 - 100 A	40 - 200 A
Duty Cycle	60 %	60 %
Cutting thickness	25 mm	43 mm
Rough cutting thickness	28 mm	60 mm
Air pressure	0.3 - 0.5 Mpa	0.4 - 0.5 Mpa
Cooling	Air	Air
Protection	IP 21	IP 21
Weight, (approx.)	32 Kgs.	60 Kgs.
Dimen. (LxWxH) (approx.)	500 x 300 x 450 mm	700 x 420 x 900 mm

SALIENT FEATURES

- Circle cutting : Can be cut with circle cutting attachment
- User friendly, requires minimum operator training
- Straight cut : 1.8 meter rail can be multiply
- Easy to handle: Heavy Duty, Light Weight
- Bevel cutting arrangement
- Light weight and flexible torch



TECHNICAL SPECIFICATIONS

DETAILS	SUPRA CUT OF - A / L
Input power supply	230 Hz
Phase	1
Cutting capacity (max.)	100 mm
Straight cut (track Length)	1.8 & multiple mtr
Circle cutting dia	200 - 2000 mm
Bevel cutting angle	45°
Cutting speed	50 - 750 mm/min
Horizontal Adjustment of torch	550 mm
Vertical adjustment of torch	150 mm
Nozzle type	NM
Dimension (L x W x H)	470 x 230 x 240 mm
Weight of machine	18 Kgs.
Weight of track	5 Kgs.

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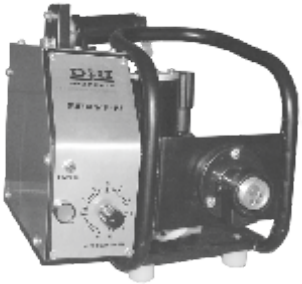
SALIENT FEATURES

- Gas solenoid provided for GMAW applications
- Heavy duty, rugged wire feeder
- Four roll quick released mechanism
- Euro type torch end connection
- Operate on 230 volts 50 Hz
- PMDC drive motor



TECHNICAL SPECIFICATIONS

DETAILS	SUPRA W/F-H1 WIRE FEEDER
Input Supply	415 Volt
Phase	1
Frequency	50 Hz.
Torch end connection	Euro type
Drive and mechanism	4 roll quick release
Drive motor	PMDC, 24/5
2T / 4T	Available
Suitable for wire sizes	2.4 - 3.0 (FCAW)
Gas solenoid	Available
Weight, (approx.)	12 Kgs.
Dimen. (LxWxH) (approx.)	610 x 305 x 360 mm

SALIENT FEATURES

- IGBT based MULTI Function power source
- Suitable for MMAW/GTAW(AC/DC) & Plasma Cutting
- Light Weight Suitable for Maintenance work
- Adjusting AC Balance
- High Frequency inbuilt For TIG welding

TECHNICAL SPECIFICATIONS

DETAILS	MULTIARC 200
Maximum Input Power	4.5 KVA
Welding Current Range	20-200 AMPS
Duty Cycle	60%

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NOTE

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