Sealing Solutions for Metal Processing Industries

MAX SPARE LIMITED

QUALITY. PRECISION. SPEED.

Scan the QR code or visit
our website to find out
more about our product range.
www.maxspare.com

Introduction

Max Spare is a leading seal manufacturer in India providing standard & customised sealing solutions to clients across industries. Having more than five decades of experience and expertise in serving the industrial clients, Max Spare with its wide range of seal profiles and elastomers is fully capable of serving in Metal processing industries.

Max spare is involved in all different stages of Metal processing.

- High Speed
- High Pressure
- High Temperature
- Operating Reliability
- Economy & Long Life
- Customised Solutions

Max Spare thus understand these needs which comes across during selecting appropriate seals & elastomers.

Thus offers Standard and Customised seals for Rotating & Reciprocating applications.

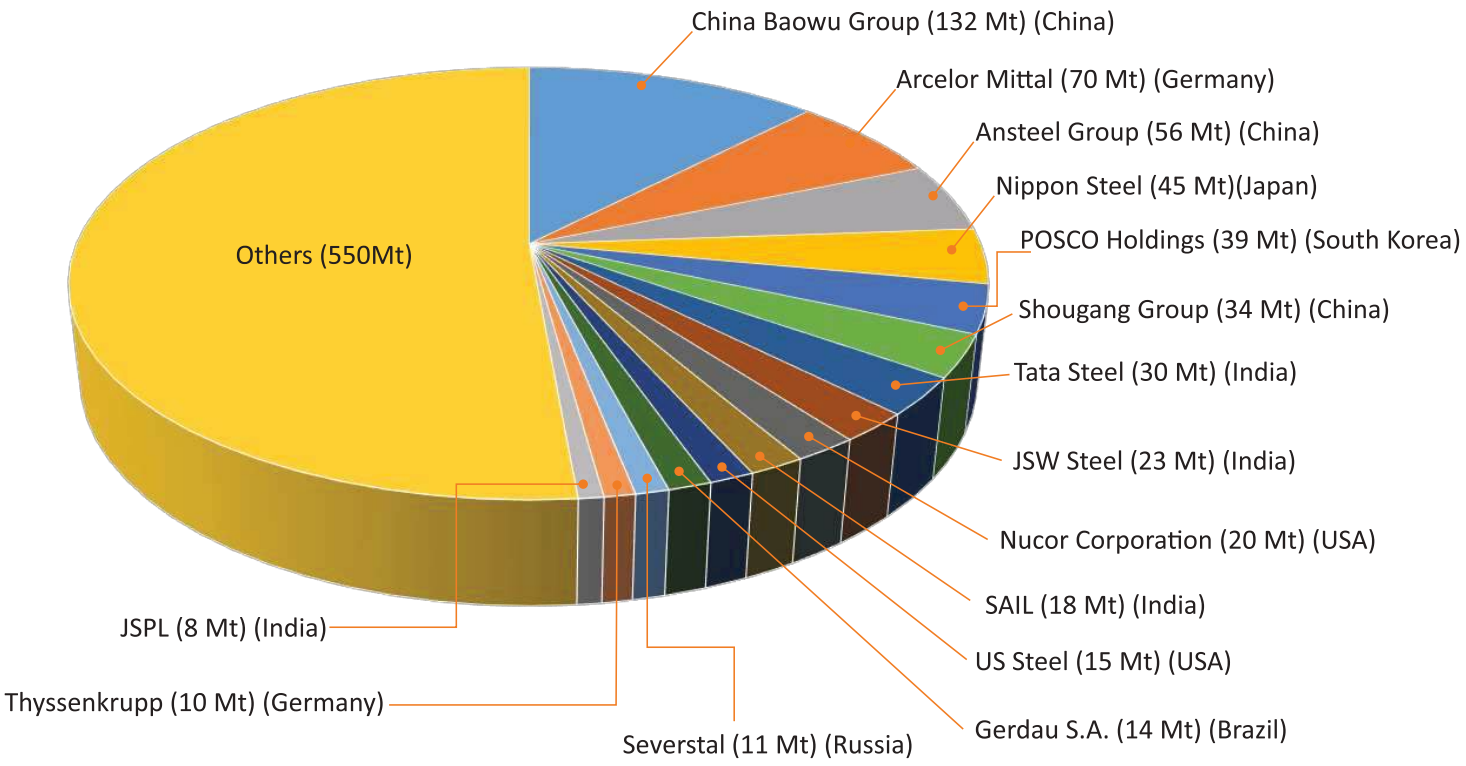
Max spare offers high pressure hydraulic seals upto 700 bar and rotary seal for high speed upto 30mtr/sec in rolling mill applications.

It is not only the seals design an issue, but the easy installation under challenging environment, Max Spare offers split seal solutions which reduces down time.

With the team of competence engineers, we are capable to offer sealing solutions without carrying out major modification in the existing setup. Our team is involved from start to the designing, installation and monitoring the performance of the sealing solutions.

A global presence enabels Max Spare to deliver sealing technology to places where it matters the most. From Asia to North America and Europe, we are just a phone call away from delivering the best sealing solutions.

Industry Overview



ABOVE IS AN OVERVIEW OF TOP STEEL-PRODUCING COMPANIES

Max spare involvement in iron & Steel making process

Material Handling Plant
Coke Oven
Blast Furnance
Steel Melting Shop
Continuous Casting
Hot & Cold Rolling Mill

Steel Product

- Hot rolled sheets
- Cold rolled sheets
- Flat products
- Galvanized sheets

Long Product

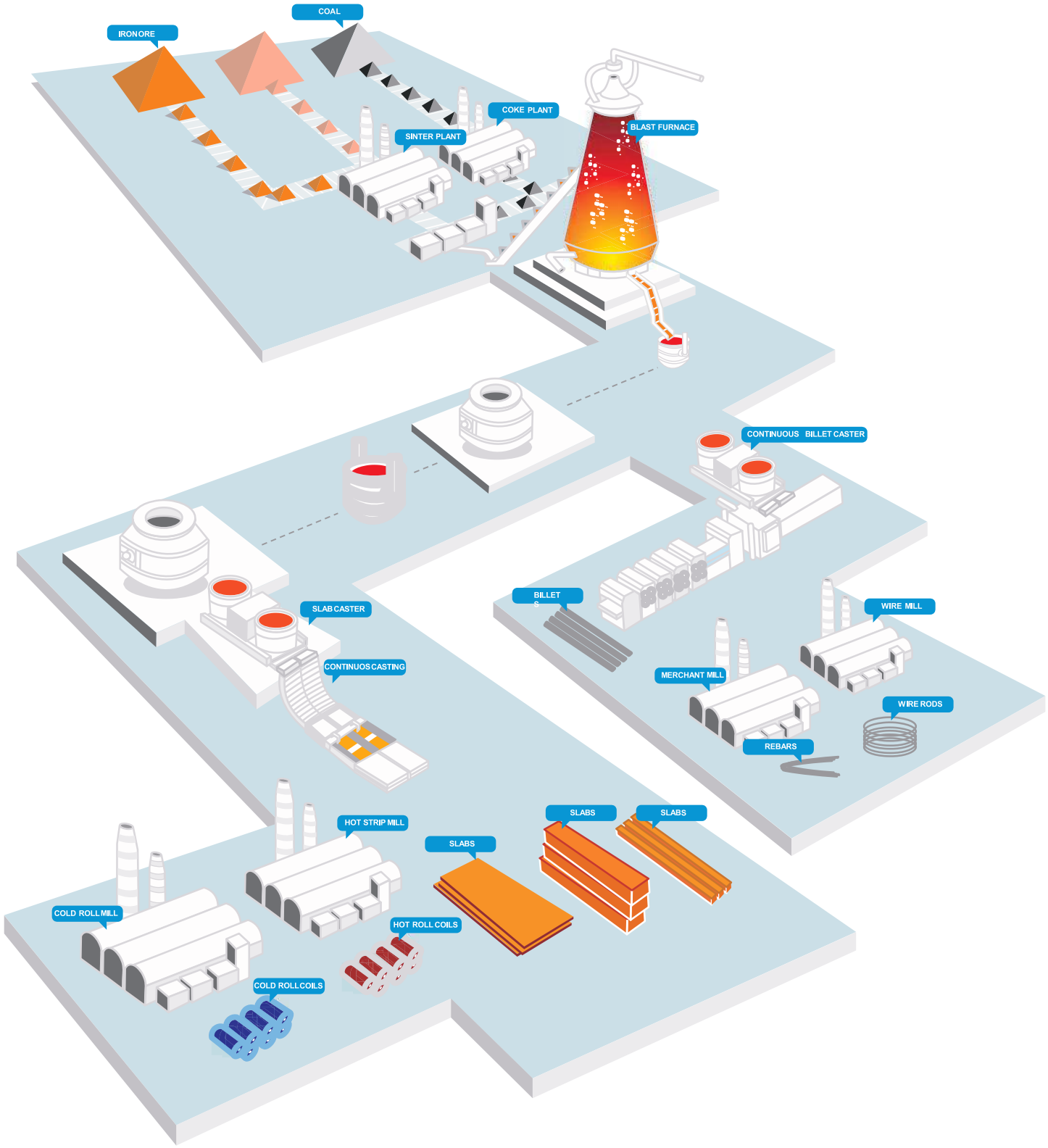
- Longrail products
- Rolled wires
- Seamless pipes

* Above data is estimated upto 2022

MAX SPARE

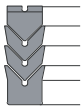
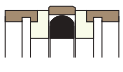
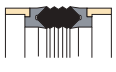
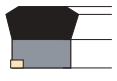
Steel Making Process

Max Spare are present at all different stages in steel industry across the globe. Start from iron ore processing till finished coils. Max Spare has been providing technically advanced seals solutions to meet the needs of applications in these industry. Max Spare involvement starts from been providing technically advanced seals solutions to meet the needs of applications in these industry. Max spare involvement starts from application study, designing, material compounding, manufacturing to installation and monitoring performance.

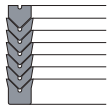
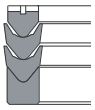
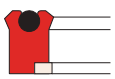
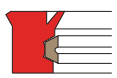


Max spare Product Line for Steel Industry -

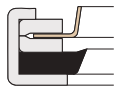
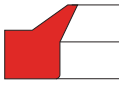
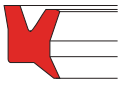
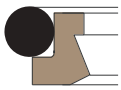
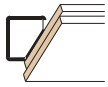
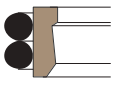
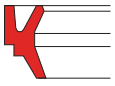
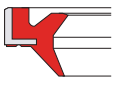
Piston Seals

									
P45	P52	P43	P46	P76	P69	P28	E31	P38	P29

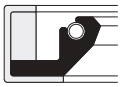
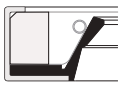
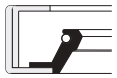
Rod Seals

									
S15	S16	E10	S60	S61	S19	S46	S28	S33	S38

Wiper Seals

									
W30	W10	W13	W38	W33	W14	W39	W12	W21	W16

Rotary Shaft Seals

									
R31	R32	R33	R35	R23	R26	R41	R07	R16	R34

R47	R58	R57	R44	R99	R56	R25	R45	R63	R62

V-Rings

V01	V09	V10	V02	V03	V04	V05	V06	V07	V08

Pneumatic Seals

P02	P12	P26	P14	P20	S03	S06	S05	W04	W07

Jet Express Seals

P28	P34	P15	P94	P08	S31	E23	P61	A02	S20


Blast
Furnace
Blast
Furnace

High Temperature Applications

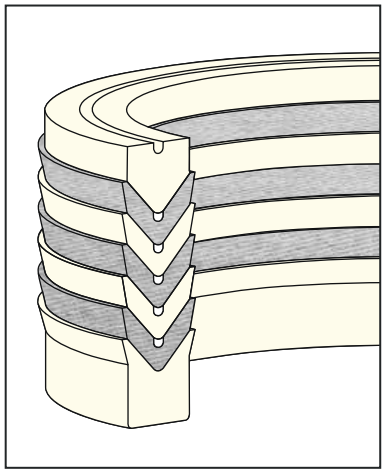
The hottest place in the steel making process is in the blast furnace where the seals are exposed to high temperature. Max spare had developed the seals for some of the critical equipments used in blast furnace in combination of elastomer and Teflon.

Tap Hole Drilling

The Tap Hole drilling used for tapping the furnace hearth for casting or draining iron and slag down is exposed to extremely high temperature. Thus, replacement of standard sealing system by a special designed seal kit made of teflon & elastomer achieved extension of life time of these aling working condition.

Mudgun Ramming Cylinder

With the combination of Teflon & High Temperature resistance material, seals are developed for robust and reliable working conditions for such high end applications.



V-Packing Set consists of two support rings and two centre rings inTeflon & 3 centre rings in FKM fabric.

Working Conditions	
Pressure	400 Bar
Temperature	-40°C to +250°C
Speed	1 mtr/sec


Coke
Oven
Coke
Oven

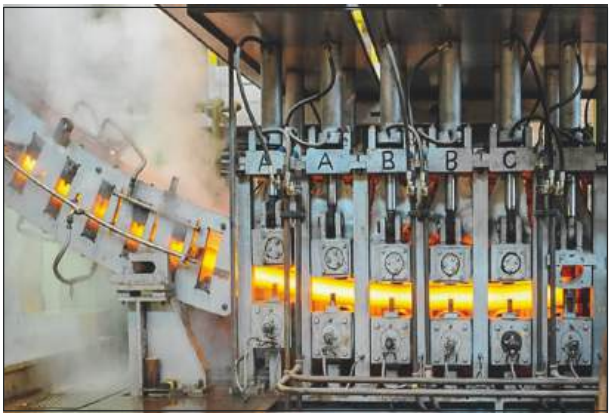
High Temperature Application

MAX SPARE

For one of the critical application in coke oven where the reliability is most concern, Max spare had developed sealing profile in combination of elastomer and Teflon which achieved a tremendous extension of the life time of the seal.

Converter

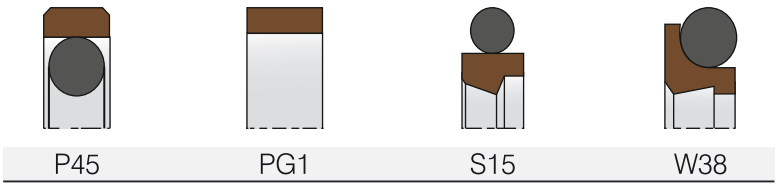
Dismantling equipment and replacing seals is time consuming and therefore expensive. Max spare offers Its split seal range for such applications which reduces down time and production loss.



Continuous Casting

Continuous Casting Plant is operating 7 days a week. Thus required reliability of seals. Shut down of this process leads to high production losses.

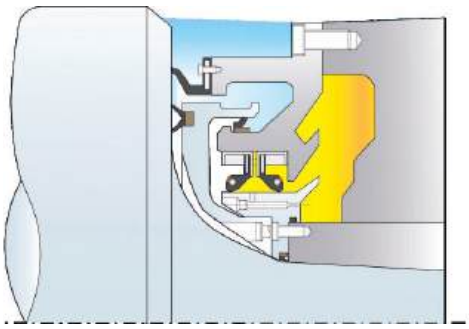
Max spare offers high end Rubber & Thermoplastic Material in combination of seal profile which gives optimum life of the seals in working condition.



Sealing system for Guide Segment Hydraulic Cylinders in CCP

Working Conditions	
Pressure	400 Bar
Temperature	40°C to +250°C
Speed	10 mtr/sec

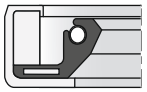
Rotary Seals for Backup Rolls Chocks



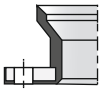
Working Parameters			
	NBR	HNBR	FKM
Temperature	-30°C to +100°C	-30°C to +140°C	-40°C to +220°C
Speed	20 m/s	25 m/s	30 m/s
Size Range	5" to 60"		

Some typical profiles :

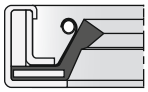
Some of the typical rotary seal profiles use in rolling mill applications. Our improved V-Ring design geometry gives maximum and effective water or coolant sealing efficiency compare to standard designs.



R23

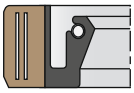


V09



R26

V04

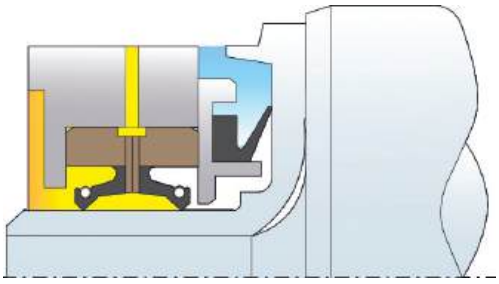


R47

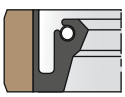
V01

Rotary Seals for Work Roll Chocks

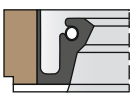
(Typical Arrangemet)



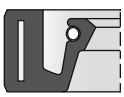
Working Parameters			
	NBR	HNBR	FKM
Temperature	-30°C to +100°C	-30° C to +140° C	-40°C to +220°C
Speed	10 m/s	15 m/s	20 m/s
Size Range	1" to 40"		



R35

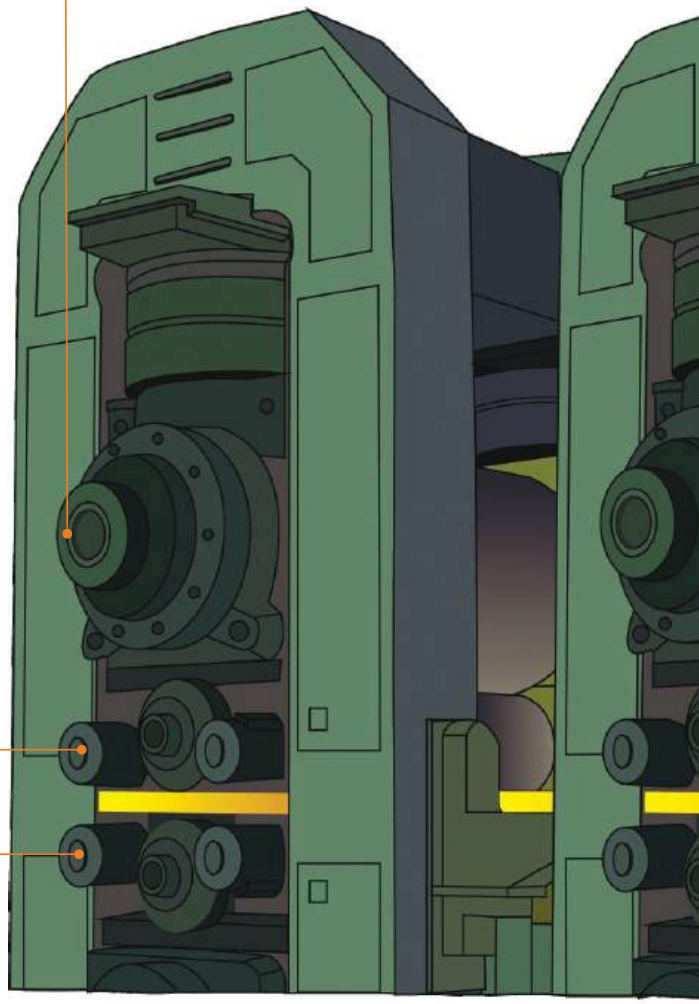


R36



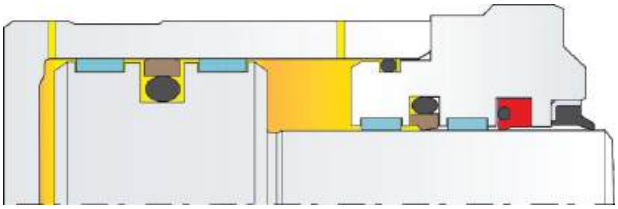
R07

Standard Water Guard V-Ring recommended.



Hot & Cold Rolling Mill

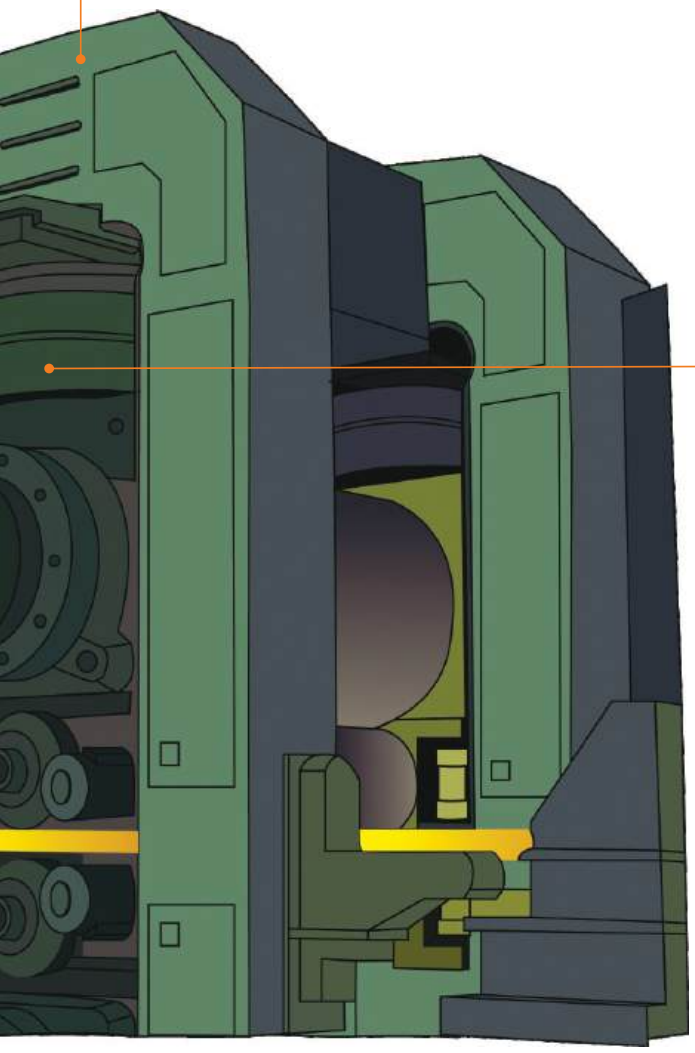
Seals for Balancing & Bending Cylinder
(Typical Seal Combination)



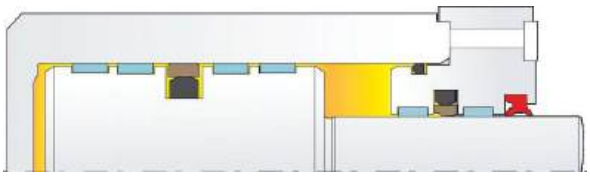
Working Parameters	
Pressure	Upto 300 Bar
Temperature	-30° C to +100° C (Viton matl. upto +220° C)
Speed	1 mtr/sec
Size Range	Upto 7"

P45 PG1 S15 E10 W14

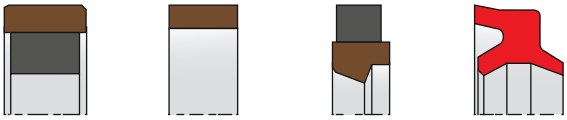
- Many special designed seal combinations are available.
- Customised development for improving work life without extra cost.



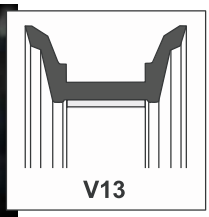
Hydraulic Seals for Automatic Gauge Control Cylinder

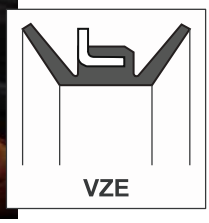


Working Parameters	
Pressure	Upto 500 Bar
Temperature	-30° C to +100° C (Viton matl. upto +220° C)
Speed	1 mtr/sec
Size Range	20" to 60"



P46 PG1 S16 W13





FRONT VALVE SEALS

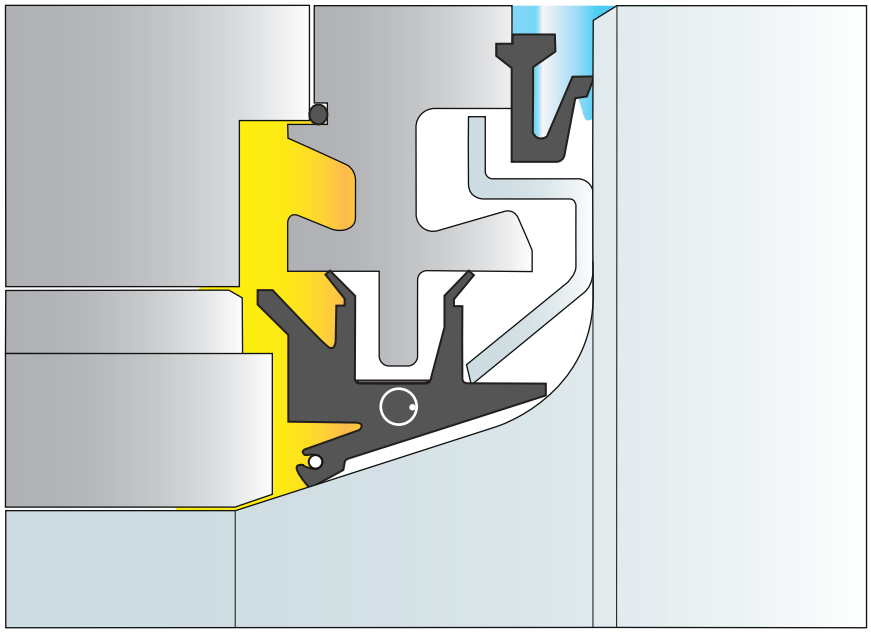
This seals are developed for module.
Specially design sealing element with steel band offers high wear resistance and excellent performance.

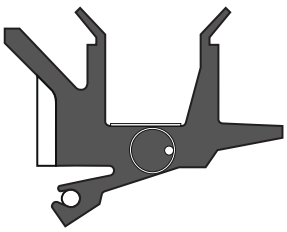
- Speed -2 mtr/sec
- Size Range -4", 6" & 8"

NECK SEALS

Max spare had developed Neck Seals for domestic and Global Steel lindustries. These neck seal series is available in both R80 & R81 style to meet customers requirement. With the special material compound and stringent manufacturing process these neck seal had proven good performances and optimum service life.

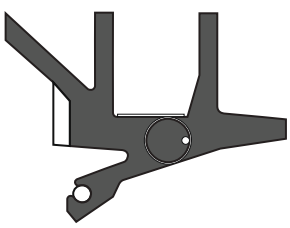
Every size of neck seal can be supplied along with its corresponding watergard seal or the single neck seal and water guard seal.





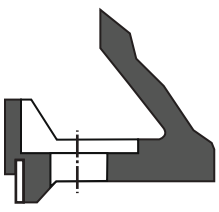
TYPE:- R81
DF Series

Developed Sizes -
12", 16", 21",
44", 46", 48", 50"



TYPE:- R80
X Series

Developed Sizes -
10", 14", 16", 18",
24", 48", 50", 54"

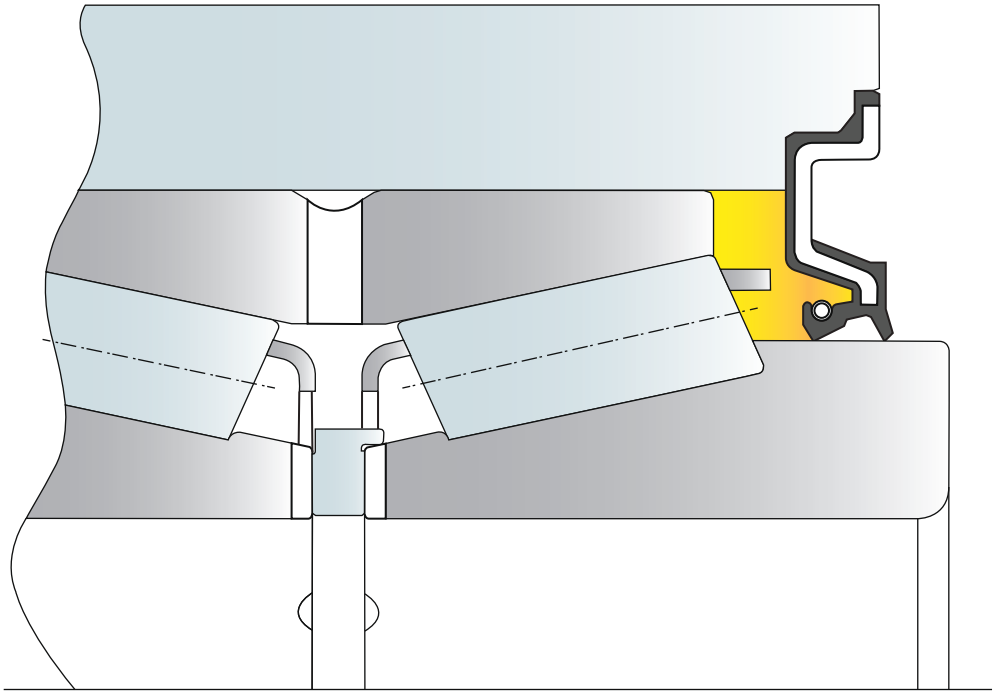


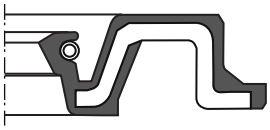
TYPE:- V11

Application Overview

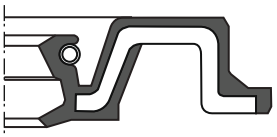
TAPER ROLLER BEARING SEALS

Max spare had developed inner & outer seals for Taper Roller Bearings used in work roll and intermediate roll chocks. R63 & R73 seals are constructed with a metal insert with rubber covered outer diameter. Spring loaded single and dual lip made out of FKM or HNBR elastomer.





TYPE:- R63



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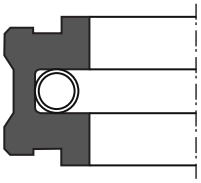
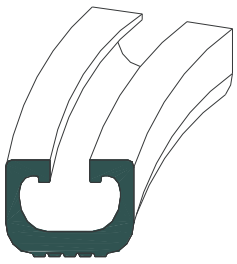
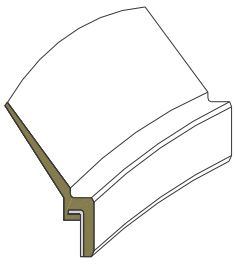
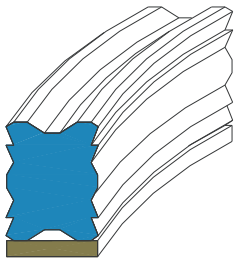
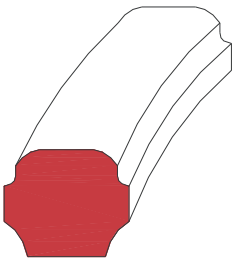
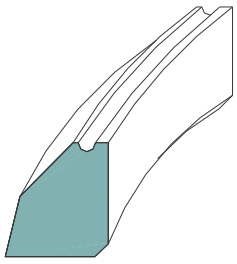


TYPE:- RB2

* Assembly shown is just for an example purpose, it may vary to the actual bearing assembly.

OTHER COMPLEX SEALS

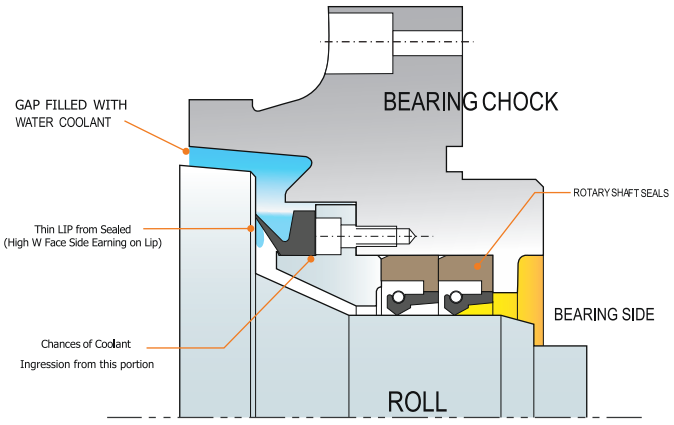
Max spare is involved in supplying specially developed seals in various applications in different stages of steel making process. Seals for valves, actuators, accumulators, rolling mills, furnace equipments are supplied in different elastomer materials. The size range of these seals are covered upto 3mtr. in diameter. You can place your trust on Max spare for these kinds of special requirements.

				
Location : Pellet Plant Description : Sealing ring for discharger air sealing of HBFS 120/10 Size : Ø1500.00mm	Location : Rolling Mill Description : Oil seal for model Y for R2 work roll chock assembly Size : Ø 900.00mm	Location : Coke Oven Description : Piston seal for stove accumulator Size : Ø 350.00mm	Location : Blast furnace Description : Seal for lower seal valve Size : Ø 1000.00mm	Location : Blast furnace Description : Bleeder Valve Seals Size : Ø 800.00 mm

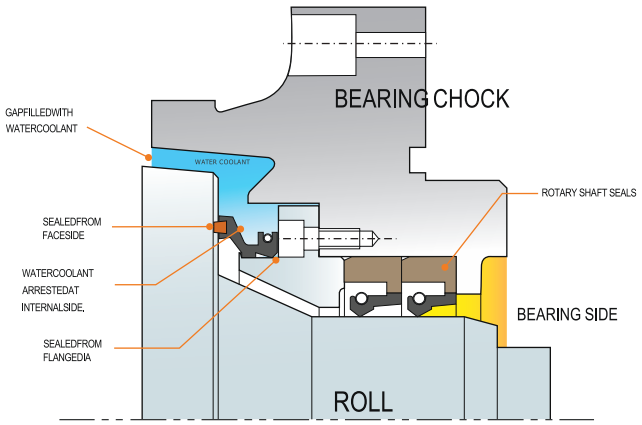
DEVELOPMENT OF TOPGUARD :-

Max spare is offering customised sealing solution in steel mill according to the requirement and encountering the problems by giving best sealing solution without doing major modification in existing assembly. Below shown design is one of an example of such development.

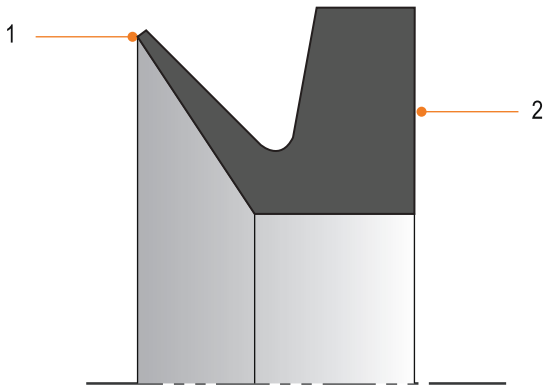
Old design



New design

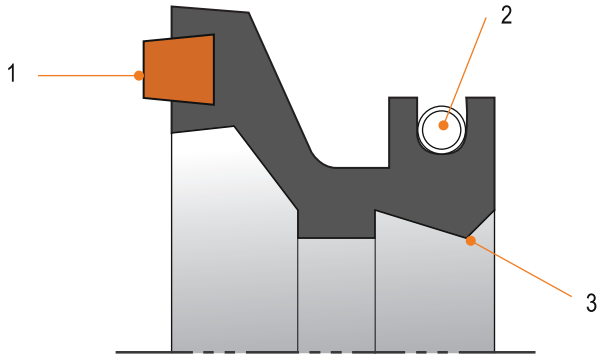


Old Design V-Ring Concept



1. ThinLipsurfaceincontact withrollface
2. Flat body contact with unevensurfaceofflange

New Design TOPGUARD Concept

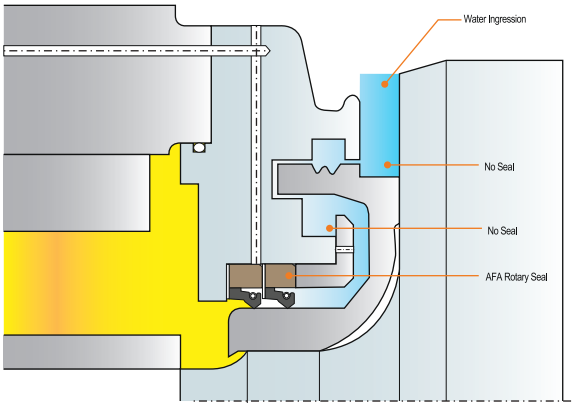


1. BronzefilledPTFEinsertLip forgoodwearresistance
2. SpringtoholdtheLiptighton flange
3. Sealing lip profile to seal coolantfromoppositeside

Success Stories

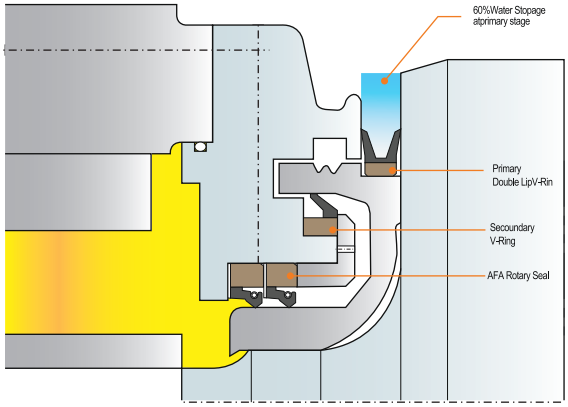
DEVELOPMENT OF SEALING SOLUTIONS FOR BACKUP ROLL:-

Old Sealing System



BACKUP ROLL CHOCK

New Mac spareSealingSystem



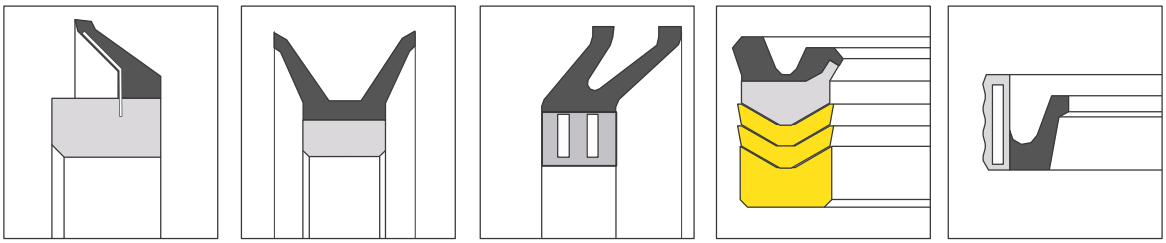
BACKUP ROLL CHOCK

Above is an example of development in one of the steel mill done by Max spare which had proven the performance and drastically reduced the ingression of coolant in to the bearing and had increased the life & performance of an expensive bearing.

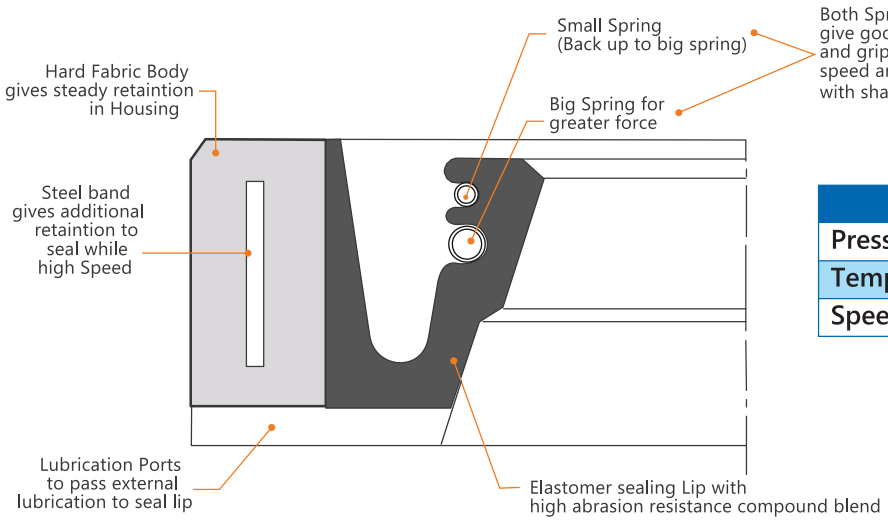
Development of Customized Profile:-

Highlights:-

Max spare has developed sealing solutions for Hydraulic and Rolling Mills for Steel Industry by offering customized sealing concepts to overcome the existing problems by developing new sealing profiles with suitable material according to the working parameters. The below given seals profiles are some of the examples developed.



Hard Fabric Body



Working Conditions	
Pressure	400 Bar
Temperature	-40°C to +250°C
Speed	15 mtr/sec

MAX SPARE

Sealing Solution for Aluminum Processing Line

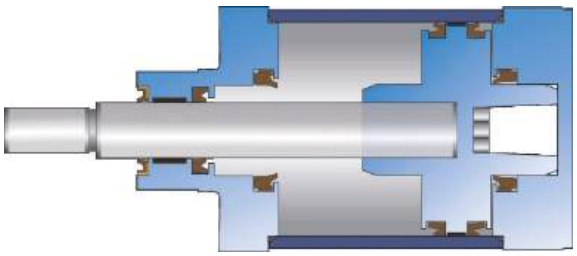
Aluminum processing areas :

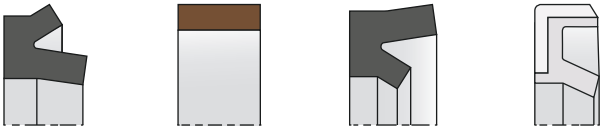
- Pot Shop
- Auto Shop
- Billet Casting
- Smelter
- Rolling Mill
- Cast House

POT Shop :

Crust Breaker Cylinder / Feeder Cylinder Seal Kit :

Crust Breaker Cylinder are use in harsh environment in an aluminum reduction in +150°C and intermittent temperature upto +200°C. We supply seals in FKM material having excellent wear resistant property inn high temperature. Also improved bearing rings on piston and rod for side load performance. All bearing materials are electrically non-conductive.





P13 PG1 S02 W29

PTM Crane

Other seal applications :

- Bath Grab Hydraulic Cylinder Seal Kit
- Hopper Gate Cylinder
- Anode Column Hydraulic & Rotary Seals
- Breaker lowering Hydraulic Cylinder
- Transfer & Intermidieate hopper cylinder
- Rodding bench bracket pneumatic cylinder

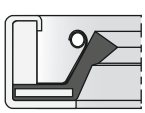
Sealing Solution for Aluminum Processing Line

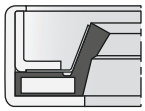
MAX SPARE

Rotary Seals for Aluminum Rolling Mills :

Many special Rotary Seals are also possible after analysis. We will offer you our best options.

Some common profiles


R26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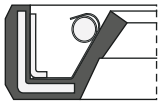
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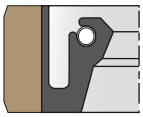
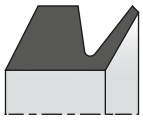
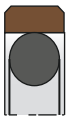

R35


V01


V02


V10

Hydraulic Cylinder Seals :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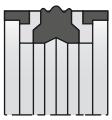
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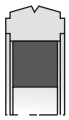
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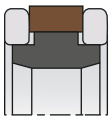
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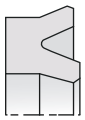
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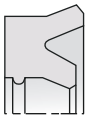
S37


S15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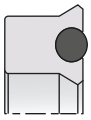
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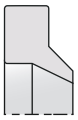
S59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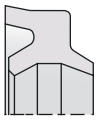
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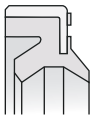
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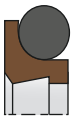
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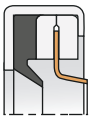
W38

MAX SPARE

Seal Material

Max Spare uses raw materials of global standards procured from well known global companies such as DuPont, Lanxess, Bayer, Japan Synthetic Rubber, Huntsman etc.

Our Global Suppliers -

Elastomers:

Materials (Commonly known as)	Material Description	Temp. Range	Hardness (Shore A)
NITRILE	Acrylonitrile Butadiene Rubber (NBR)	-30°C to + 100°C	40A to 95A
NITRILE	Low Temp. Resistance Acrylonitrile Butadiene Rubber	-50°C to + 100°C	65A to 85A
NITRILE	High Oil Resistance Acrylonitrile Butadiene Rubber	-30°C to + 120°C	65A to 85A
XNBR	Carboxilated Nitrile Rubber (XNBR)	-30°C to + 100°C	60A to 95A
HNBR	Hydrogenated Acrylonitrile Butadiene (HNBR)	-30°C to + 150°C	60A to 90A
VITON	Fluro Rubber (FKM)	-40°C to + 220°C	60A to 95A
FFKM	Perfluoro Elastomer (FFKM)	-10°C to + 300°C	70A to 75A
FEPM	AFLAS (FEPM)	-10°C to + 200°C	70A to 95A
SILICONE	Silicon Rubber (VMQ)	-70°C to + 200°C	40A to 95A
FVMQ	Fluorosilicone Rubber (FVMQ)	-70°C to + 220°C	70A to 85A
NEOPRENE	Chlorobutadiene Rubber (CR)	-20°C to + 100°C	40A to 95A
EPDM	Ethylene Propylene Diene Rubber (EPDM)	-40°C to + 120°C	40A to 95A
BUTYL	Butyl Rubber (IIR)	-40°C to + 120°C	40A to 90A
NR	Natural Rubber (NR)	-30°C to + 80°C	30A to 95A
SBR	Styrene Butadiene Rubber	-50°C to + 100°C	40A to 95A
ACM	Polyacrylic Rubber (ACM)	-10°C to + 170°C	60A to 85A

Fabrics:

Materials (Commonly known as)	Material Description
Cotton Fabric	Cotton Fabric
Aramide Fabric	Aramide Fabric
Kevlar Fabric	Kevlar Fabric
Nylon Fabric	Nylon Fabric

Note: Fabric listed can be impregnated with above elastomers as per application requirement.

Thermoplastics & Thermosets:

Materials (Commonly known as)	Material Description	Temp. Range	Hardness (Shore A)
PU	Oil Resistance Polyurethane	-30°C to + 100°C	70A to 67D
PU - X	High Oil Resistance Polyurethane	-40°C to + 150°C	92A
PU - W	High Heat + Hydrolysis Resistance	-40°C to + 130°C	92A
CPU - H	Hydrolysis Cast Polyurethane	-30°C to + 100°C	90A
CPU - O	High Oil Resistance Cast Polyurethane	-30°C to + 100°C	95A
PP	Polypropylene (PP)	95°C	M80
LLDPE	Linear Low-Density Polyethylene	97°C	M65
UHMWPE	Ultra-High-Molecular-Weight Polyethylene	-270°C to +80°C	62D to 65D
PPS	Polyphenylene Sulphide	200°C	M100
DELRIN	Polyacetal (POM)	-40°C to + 140°C	M84
G.F.PA66	Glass Filled Polyamide (Nylon)	-20°C to + 220°C	M95
PEEK	Polyether Ether Ketone	Up to + 315°C	M99
TEFLON	Polytetrafluoroethylene (PTFE)	-200°C to + 260°C	50D to 65D
HYT	Hytrel	-30°C to + 100°C	46D to 72D
PRW	Polyester Resin Fabric	-20°C to + 120°C	M95
BFT	Bronze Filled Teflon (40% & 60% Bronze Filled PTFE)	-200°C to + 260°C	71D to 73D
GFT	Glass Filled Teflon (15% & 25% Glass filled PTFE)	-200°C to + 260°C	66D to 68D
CFT	Carbon Filled Teflon (15% & 25% Carbon filled PTFE)	-200°C to + 260°C	71D to 73D
GRT	Graphite Filled Teflon (15% & 25% Graphite filled PTFE)	-200°C to + 260°C	62D to 65D
TPE	Polyester Elastomer	-50°C to + 100°C	55D to 63D
PF	Phenolic Resin Bonded Fabric	-20°C to + 120°C	M89

Storeage of Seals

Storage Conditions:

Most polymers, including vulcanized rubber and other elastomers, tend to change their properties during storage and may become unusable. This may be due to hardening, softening, cracking or other deterioration and may result from exposure to oxygen, ozone, light, heat and / or moisture.

The following recommendations indicate the most suitable storage conditions for elastomeric products, whether it is a single item or a composite product.

1. **Temperature -** Ideal storage temperature should be 25°C (77°F). Low temperatures are not permanently harmful provided the rubber items are handled carefully and not distorted. When taken from low temperatures items should be raised to approximately 30°C (86°F) before they are used.
2. **Humidity –** Relative humidity is of 40% to 70% in a draft-free atmosphere.
3. **Light –** The products should be protected from direct sunlight, ultraviolet and artificial light have a high UV content.
4. **Oxygen and Ozone -** Wrapping, storage in airtight containers or other suitable means should be used for vulcanised rubber items. Storage in containers that limit exposure to environmental conditions (e.g. sealed plastic bags) should be used for all materials.
5. **Radiation –** Products should be protected from all sources of ionizing radiation.
6. **Deformation –** The rubber items should be stored in a relaxed position, without tension or compression. Laying the product on a flat surface and preventing its suspension or crushing keeps it from deforming and minimizes deformation.
7. **Contact with liquid or semi-liquid materials –** Rubber should not come in to contact with liquid or semi-liquid materials or their vapours at any time during storage, unless these materials are an integral part of the product or the manufacture's packaging.
8. **Contact with Metals -** Metals such as manganese, iron and copper, or copper alloys can have a harmful effect on rubber. A layer of paper, polyethylene or cellophane will keep these separated.
9. **Contact with Non-Metals -** Contact with other rubbers should be avoided.
10. **Stock Rotation -** Elastomers should be stored for as short a period as possible, and practice the First In First Out (FIFO system) stock liquidation.
11. **Cleaning -** Organic solvents such as trichloroethylene, carbon tetrachloride and petroleum are the most harmful agents. Soap and water and methylated spirits are the least harmful, and all parts should be dried at room temperature before use.
12. **Shelf Life -** The table shows the storage life of seal components made from the more common materials under ideal conditions. Storing under less than ideal conditions will reduce the life of the component.

Careful inspection for the following should be made before installation after storage:

- Cracks or Surface crazing
- Permanent distortion
- Mechanical damage
- Surface softening or hardening

Rubber / Elastomer	Max Code	Primary storage period (Years)	Extension of storage period after visual re-inspection (Years)
Nitrile Butadiene Rubber (NBR)	NT	7	3
Ethylene Propylene (EPDM)	EP	10	5
Fluorocarbon (FKM)	VT	10	5
Vinyl-Methyl-Silicon (VMQ)	SL	10	5
Polyurethane (PU)	PU	5	2
Engineering Thermoplastics:			
Acetal (POM)	ACT	Unlimited	-
Polyamide (PA)	NY		
Polytetrafluoroethylene (PTFE)	PFT		

Guidelines of ISO 2230

FILMS & ANIMATIONS

For better understanding of product usage, seals installation method and sealing solutions for various applications. Maxspare had developed & uploaded videos which can properly show the function or characteristics of seals. These videos are available to view on Maxspare website or via youtube.

Scan the QR code to view films of seal installation method or on Maxspare website or via YouTube.

E-CATALOGS

Detail technical catalogs of Seals & V-Belts, Readily available products Stocklist, Product range, Chemical compatibility technical handbook are easily available on Maxspare website.

Scan the QR code or visit our website to download the copy of our Technical Catalogs.

ONLINE ENGG. TOOLS

- O-Ring Calculator
- Quad Ring Calculator
- Chemical Compatibility
- Equivalents
- Seal Information
- Tolerance
- Unit Converter
- V-Belt Tech

Scan the QR code or visit our website for our design support and engineering tools.

Services

EXPRESS FACILITY

- Seals in Non-standard sizes
- Delivery with in 4Hrs.
- Instant online booking on portal.

ONLINE SHOPPING

Trained workforce of more than 500 employees.
Back office comprising engineers, technicians and other support staff.
Well equipped to service its widening client base of more than 12,000+ customers worldwide.
Operations include customer support, procurement, Q.C, IT, Design etc.

WIDE NETWORK

- More than 50+ channel partners in all major cities of India.
- 40+ area representatives across India to give the best services to customers.
- Mutually enriching alliances with leading seal manufacturers and stockists across the globe.

SERVICE ADVANTAGES

- Over 70,000 sizes in stock.
- Standard Seal Profiles made in 1 Hour.
- Seals upto 3000 mm dia.
- Morethan 100,000 ready moulds.

- Arcelor Mittal (Germany)
- Thyssen Krupp Steel (Germany)
- Tata Steel
- JSW Steel
- Steel Authority of India (SAIL)
- AM/NS
- Vedanta Ltd
- Hindalco Ltd

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