

ENGINEERING REVIEW



www.engmag.in

India's leading manufacturing industry magazine since 18 years



COGNITIVE LEADERSHIP IN MOTION CONTROL & AUTOMATION

AN INTERFACE WITH:
MR. RUPESH PAPARAJU
MANAGING DIRECTOR
BETTINELLI AUTOMATION COMPONENTS PVT. LTD.
PG. 16 - 19

+ IN FOCUS

Tiding over
the Covid-19 crisis
pg. 24





All-in-one Solution Brushless DC Motors with Built-in-Drive

- Built-in Drive
- Instantaneous Start and Stop
- Compact Size
- Built-in Torque limit
- Maintenance Free
- Flat Torque
- Longer Life Time



Suitable for Packaging Machines, Conveyors, Railways, Electrical Distribution & Medical Equipments

motors.crouzet.com



Micro / Limit Switches for General & Severe Environmental Applications

- Current Rating From 1mA to 21A/250VAC
- High DC Switches 5A / 250 VAC
- Wide Range of Connection types & Levers / Actuators
- Water Sealed (IP67) and Air Sealed (Hermetically Sealed)
- Very Low force Snap action Switches
- Customized Switches



Suitable for Valve For Industrial & Nuclear Energy, Electrical Distribution Equipment, Railway / Transportation

switches.crouzet.com



Go to Index



More information about InnoVista Sensors:

BNR Complex, Plot No.92/1A, 1st Floor, H P Avenue Road, Konappana Agrahara, Electronic City - Phase 1, Bangalore – 560100. India Tel: +91 - (80) 67624500 / 01
 Email: india@crouzet.com | www.crouzet.com



The New
K-LITE
Architectural Luminaires

Underwater Luminaires




Recessed Pool LED Luminaires



LED Spot Lights




LED Fountain Lights

In-Ground Luminaires



Symmetrical Reflector



32mm
Micro & Mini LED Luminaires



Symmetrical Lens



Symmetrical Reflector
Honeycomb louvre optional



Walkover Luminaires



Symmetrical



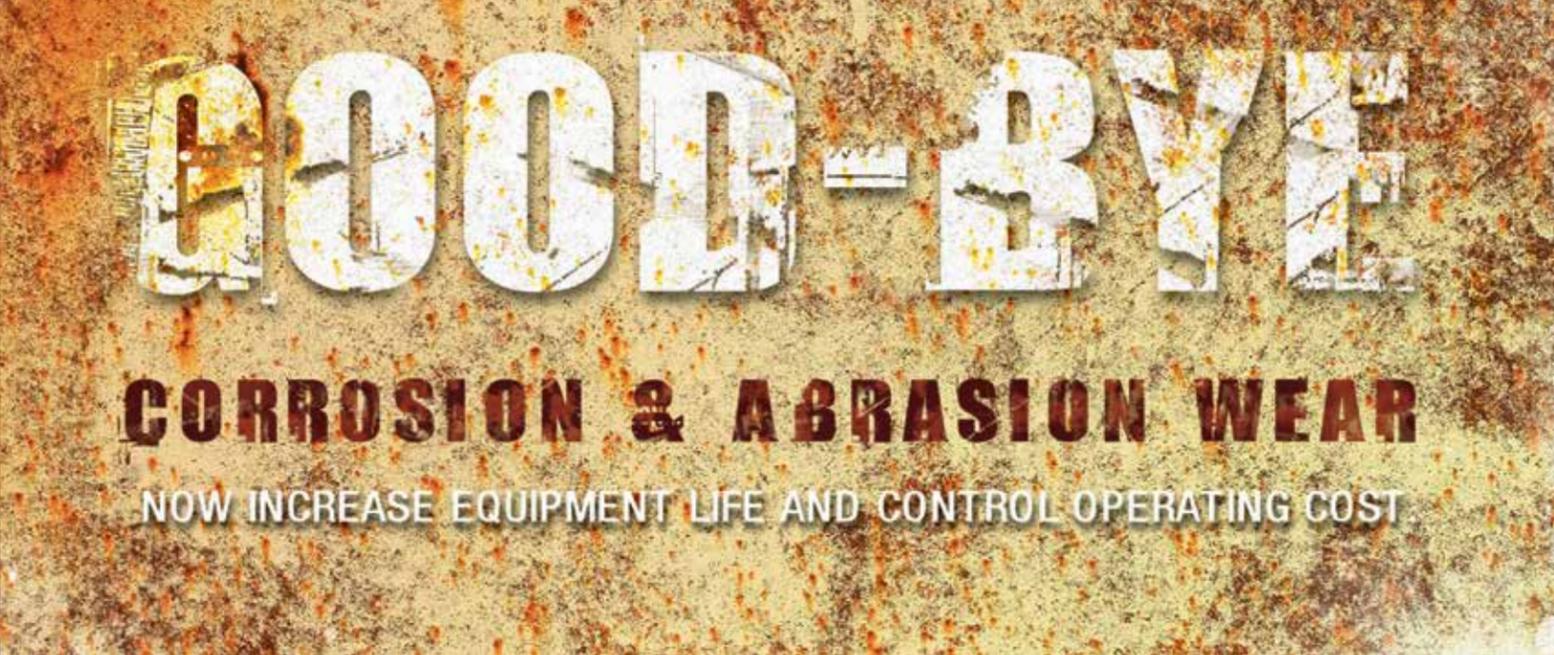
Asymmetrical



Asymmetrical



Symmetrical




ABRASION AND CORROSION RESISTANT CERAMIC COATINGS

CORROSION, ABRASION & CHEMICAL ATTACKS destroy crores of rupees worth equipment every year. Worldwide research shows that nearly 70%-80% equipment failures are purely due to their surface erosion. The need for effective preventive maintenance therefore is imperative.

The time has arrived for ceramics to finally take centre stage. Jyoti Ceramic Industries has specially developed ceramic filled polymer based coating compounds, "Aluma Coat®-BR" brushable / sprayable and "Aluma Coat®-TW" trowelable.

Aluma Coat® - TW
A trowelable, easy to apply protective coating, comprising of sintered sapphire-hard ceramic micro beads, doped in polymer resins designed to resist corrosion, abrasion and moderate surface impact. It gives a rough textured surface finish and can withstand maximum service temperature up to 150°C / 302°F.

Aluma Coat® - BR
A brushable / sprayable easy to apply coating designed to protect surfaces from severe turbulence, corrosion, erosion and chemical attacks. It gives a satin smooth, high-gloss surface finish and can withstand maximum service temperature up to 150°C / 302°F



Aluma Coat® - TW



Mineral Crusher
Coated with
Aluma Coat - TW



Inner Base of Dust
Collector Coated with
Aluma Coat - TW



Aluma Coat® - BR



Motor Shaft
Coated with
Aluma Coat - BR



Butterfly Valve
Coated with
Aluma Coat - BR

Contact us :
JYOTI CERAMIC INDUSTRIES PVT. LTD.



India (Head Office)
C-21, N.I.C.E, Satpur, Nashik - 422 007,
Maharashtra, India.
Tel.: +91 (0) 253 2350120 / 338 / 729, 2351251
Fax: +91 (0) 253 2350023
E-mail: info@jyoticeramic.com

Europe
Jyoti Ceramic GmbH
Frankenstr. 12, 90762 Fürth, Germany.
Tel.: +49 (0) 911 78 71 20 83 / 84 / 85
Fax: +49 (0) 911 78 71 20 82
E-mail : sales@jyoticeramic.com

U.S.A.
Techno Ceramic Inc.,
P.O. Box 333, New Hampton, NY 10958, USA.
Tel.: +1 (0) 845 547 2219 / 845 547 2220
Fax: +1 (0) 845 547 2221
Email : jcw@tci-jyoti.com



GOLDEN JUBILEE YEAR

Hilscher Communication Solutions



Automation and Visualization

- ✔ Lets you monitor and operate your machinery from anywhere
- ✔ HMI System over all common browsers

Analysis and Data Acquisition

- ✔ Graphical analysis of network timing parameters
- ✔ Passive recording with zero-delay

netX Chip Carriers

- ✔ For prototyping and SMD manufacturing
- ✔ Complete slave interface with smallest footprint (32 x 32 mm)

DIL-32 Communication IC

- ✔ Serial Modbus host interface for easy integration
- ✔ Direct I/O transfer via shift register

IIoT

- ✔ PROFINET/ Ethernet/IP connection to cloud and IIoT systems via Edge Gateways or
- ✔ Intelligent DIL-32 Communication IC with integrated OPC UA and MQTT functionality

Gateways

- ✔ 300 different combinations with main industrial protocols
- ✔ High performances and flexibility

PC Cards

- ✔ All form factors
- ✔ All drivers
- ✔ All protocols

IP 40 Exchange Modules

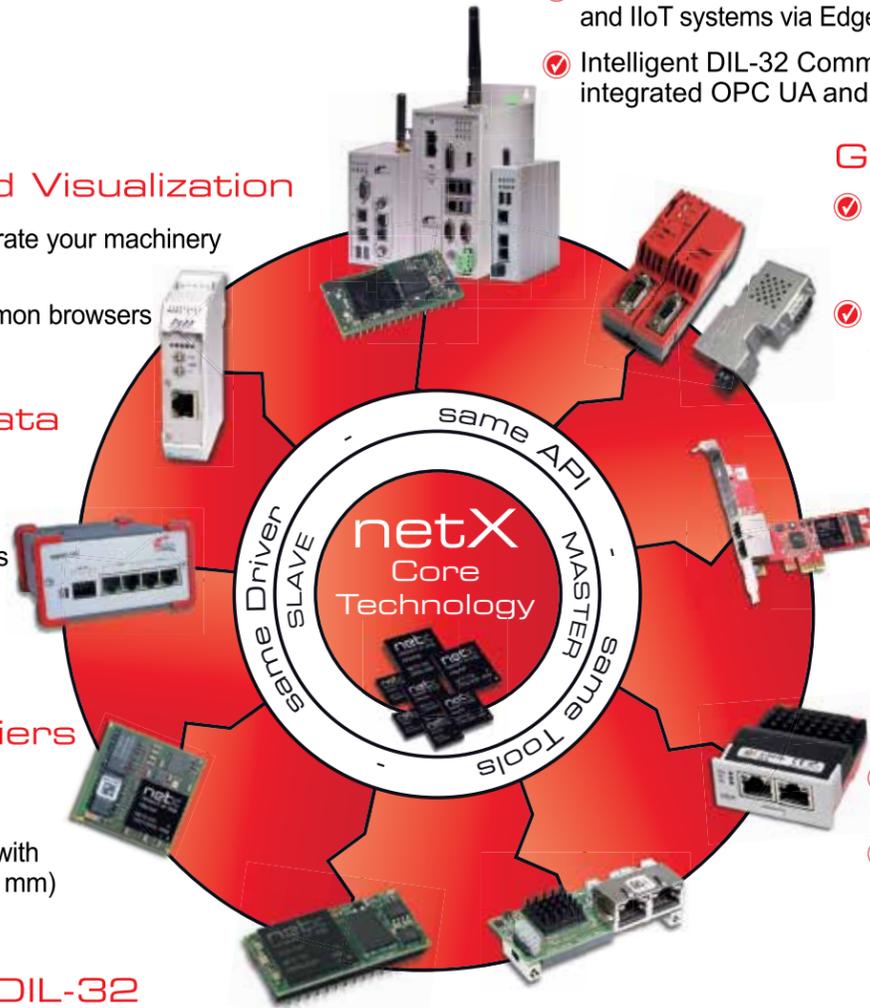
- ✔ PCIe, Dual-Port-Memory or SPI
- ✔ Quick & easy front loaded without tools

Go to Index



Communication Modules

- ✔ Dual-Port-Memory or SPI
- ✔ Once integrated all networks are useable



Hilscher India Pvt. Ltd.

Offices: Pune, Mumbai
 Phone: 8888 750 777
 E-Mail: usakle@hilscher.in
 Web: www.hilscher.com



www.netIoT.com



C.R.I. PUMPS
 Pumping trust. Worldwide.

One Stop Pumping Solutions...

PRESSURE Boosting Solutions



Applications:
 Pressure Boosting | Hotels | Apartments
 Commercial Buildings | Industries and Hospitals

FIRE FIGHTING Solutions



Applications:
 Airports and Ports | Fireworks Industries | Gas Plants
 Commercial Complexes | Petrochemical Industries

WASTE WATER Solutions



Applications:
 Pumping of Waste from houses | Hotels
 Commercial Buildings | Industrial Waste Water

HVAC Solutions



Applications:
 Water Supply | HVAC systems | Mines | Refiners
 Marine | Power Plant | Cooling Systems | Steel Plant

C.R.I. PUMPS PRIVATE LIMITED

Regd. Office: 7/46-1, Keeranatham Road, Saravanampatty, Coimbatore - 641 035. Tamilnadu, INDIA.
 Phone : +91-422-7117000 Fax : +91-422-7117005, E-mail : bcsmtk@cripumps.com • www.crigroups.com

Toll Free 1800 121 1243

CONTENTS

CONNECT WITH US

-  www.linkedin.com/company/engineering-review
-  www.facebook.com/engrreview
-  twitter.com/engrreview



16

COVER STORY

OUR PRESENCE IN INDIA HELPS US MATCH OUR WORLD-CLASS PRODUCTS WITH OUR EMINENT CUSTOMER SUPPORT

INDUSTRY FOCUS



Tiding over the Covid-19 crisis

COMPANY PROFILE



ABA Electricals for enduring solar energy solutions

20



GEISSEL – CABLE GLANDS AND MORE.....

22

TECH TRENDS



Integrated servo drives for automation outside of control cabinets

28

30
Sentinel 1 shock absorbers remotely optimize safety, equipment life & productivity

34
Leuze electronic India- The sensor people welcome you!

BUSINESS NEWS

10
Mr. Rashmi Ranjan Mohapatra of Kempfi India promoted with additional responsibilities

10
HARTING supplies cable assemblies for medical devices

12
ELGi Equipments' Heat Recovery System enables up to 96% wasted energy reuse

12
JAL contributes Rs 5 crore for COVID-19 relief efforts

14
FLIR Launches Smart Thermal Sensor Solution for Industrial Monitoring and Elevated Skin Temperature Screening

42
SPEEDY RAIL: A Successful Sinergy Creates A Show

46
Platinum cured Silicone tubing for biopharmaceutical Industry

48
Effect of Weld Metal Composition and Post Weld Heat Treatment on Mechanical, Corrosion & Microstructural Properties Of 308L, 309L Austenitic Stainless Steel Weldments

CASE STUDY

58
Machine tool manufacturer uses an igus guidance system for long unsupported lengths in its gantries

 **CLICK ON COMPANY NAME TO VIEW ADVERTISEMENT PAGE**

COMPANY NAME	PG. NO.
A	
ABA ELECTRICALS PVT. LTD.	37
AMI POLYMER PVT. LTD.	39
B	
BETTINELLI AUTOMATION COMPONENTS PVT. LTD.	29
BIRLA PRECISION TECHNOLOGIES LIMITED	35
C	
C.R.I. PUMPS PRIVATE LIMITED	3
D	
DOLD ELECTRIC INDIA PVT LTD	9
DOWEL ENGINEERING WORKS	63
H	
HILSCHER INDIA PVT. LTD.	2
HRS PROCESS SYSTEMS LTD.	33
I	
IGUS (INDIA) PVT. LTD.	41

COMPANY NAME	PG. NO.
INNOVISTA SENSORS INDIA PVT. LTD.	FRONT GATEFOLD
J	
JINDAL STEEL & POWER LTD.	21
JYOTI CERAMIC INDUSTRIES PVT. LTD.	1
JYOTI CNC AUTOMATION LTD.	INSIDE BACK COVER
K	
K.U. SODALAMUTHU AND CO. PVT. LTD.	27
K-LITE INDUSTRIES	INSIDE FRONT COVER
KUEBLER AUTOMATION INDIA PVT. LTD.	47
L	
LEE SPRING COMPANY INDIA PVT. LTD.	31
LEUZE ELECTRONIC PVT. LTD.	11
M	
MARVEL GLOVES INDUSTRIES	61
P	
POLYCAB INDIA LIMITED	6 - 7

COMPANY NAME	PG. NO.
POWER BUILD PRIVATE LIMITED	15
PRECISION MOTION INDUSTRIES, INC. (PMI)	55
PRIMA EQUIPMENT	53
R	
RENISHAW METROLOGY SYSTEMS LTD.	45
RMG POLYVINYL INDIA LTD.	59
ROLLON INDIA PVT. LTD. - INDIA	43
RR KABEL LIMITED	BACK PAGE
S	
SHAVO TECHNOLOGIES PVT. LTD.	49
SHIV-OM BRASS INDUSTRIES	51
SIGMATEK SYSTEMS INDIA PVT. LTD.	13
SMALLEY STEEL RING COMPANY	23
V	
VM TRADERS	57

The perfect connection for a world of possibilities

Polycab Cables

Besides powering India for over 50 years, Polycab cables and wires are being exported to over 40 countries. Polycab's multi-location, state-of-the-art manufacturing facilities ensure ready availability. Not just a wide range of cables and wires, Polycab boasts of rich gamut of electrical products and solutions to connect with global thought and endless possibilities.



Power & Control Cables: Low Voltage – up to 1.1 KV | Medium Voltage - 3.3 KV to 33 KV(UE) | Extra High Voltage – 66 KV to 220 KV | Instrumentation Cables: Individual & Overall Shielded | Railway Signalling Cables | Telecommunication: Optical Fiber Cables, Jelly Filled Telephone Cables | Solar AC/DC Cables | Specialty Cables: E-beam Irradiated Cables, Rubber Cables, Fire Survival Cables, Auto Cables, EV Cables, Cathodic Protection Cables, Marine Oil & Gas, Traffic Signaling, Aircraft, Submersible Cables | Other Cables: Overhead Conductors, Aerial Bunched Cables | Wires & LDC: Building Wires | Single/Multi Core Flexibles | Braided Cables | Welding Cables | Telephone Cables | Co-axial Cables | LAN Cables | Speaker Cables | CCTV Cables

Management System Certifications - BS OHSAS 18001: 2007, ISO 14001 : 2015, ISO 9001 : 2015 International Quality Standards Compliance - BASEC, UL, IEC etc. NABL Accredited Laboratory

POLY CAB INDIA LIMITED (formerly known as 'Polycab Wires Limited') Polycab House, 771, Mogul Lane, Mahim (W), Mumbai - 400 016, Maharashtra (India).

Ph.: +91-22-2432 7070/4, 6735 1400, Toll Free No. 1800 267 0008. www.polycab.com, Email: info@polycab.com.

[Go to Index](#)



Publisher : Shilpa Dongre
CEO : Shekhar Dongre
Editor : Rajeev Iyer
Assistant Editor : Shweta Nanda
CMO: Shirish Dongre

Marketing Team :

Ladoji Pendurkar, Amol Powle, Bhavin Shah,
Bharat Shah, K. Purohit, Vinod Surve, Hiren Shah

Online Marketing :

Kailash P.

Print & Online Division :

Arun P. Shinde, Nandan S. Moghe,
Ganesh B. Mahale, Dinesh S. Gawade

Circulation Executive :

Jyoti Fegade, Satish Kadam, Amol Ranshur

Legal Advisor :

Advocate Vijay S. Jadhav



Head Office : Divya Media Publications Pvt. Ltd.,
3rd Floor, Harmony Tower, N.S. Road, Thane-400 602.
Maharashtra. Tel: +91 22-25380574/75,
Telefax: +91-22-25418254
E-mail: shekhar@divyamediaonline.com
Website: www.engmag.in

Branch Offices (Zonal):

NORTH (Delhi & NCR regions) :
Sandesh Jain : 09810837877 / 09871602777

SOUTH (Chennai & Coimbatore) : Y. V. Raghu : 09566141224
Bangalore & Hyderabad - E Vikram : 09591488434
Vaman : 09686721340

EAST (Kolkata & Eastern Region) :
Amol Powle - 09820488541

WEST (Maharashtra & Gujarat) :
Pune - Kuldeep Kshirsagar : 09689403523
Nashik - Abhijit B. Joshi : 09890002333
Rajkot (Saurashtra) - Swapnil Bhatia : 09227909005

https://www.facebook.com/engreview
https://twitter.com/engreview
http://in.linkedin.com/pub/engineering-review/87/b31/97a

Printed & Published by Shilpa Dongre. Printed at The
Package Offset Printers, Maharshi Karve Marg, Ruby
Garage Compound, Mumbai-400002, published from
303, Harmony Tower, Netaji Subhash Road, Court Naka,
Kharkar Alley, Thane West, Thane-400602.
Editor: Rajiv Iyer

FOR ADVERTISING ENQUIRY CONTACT:
Email: shekhar@divyamediaonline.com

CEO CORNER



Staying afloat during the coronavirus crisis

Coronavirus pandemic has turned the world upside down. It has not only forced half of humanity indoors and rattled the global economy, but also changed the way business disasters were perceived. Till now, companies always planned for a disaster in a way that affected a certain region, such as earthquake, flood, etc. However, the impact of coronavirus is across the globe, forcing companies to re-look at their

Disaster Recovery plans.

The main concern for businesses now is providing employee protection, while maintaining business continuity and ensuring customer service. In our exclusive, 'Tiding over the Covid-19 crisis,' we bring you examples of companies that are staying positive and adopting several measures to ensure productivity. From adopting robust remote work practices, focusing on training to re-strategizing and planning, these companies are taking several steps to stay afloat amidst this crisis.

There is no doubt that challenging days lie ahead. Manufacturing, of course, remains the most severely impacted industry due to the global pandemic. Experts predict both demand behaviour, as well as the supply and capability of companies to deliver goods to the market to be disrupted.

However, one thing is for sure, companies need to plan, plan and plan for the post-Covid-19 workplace. Employee safety, business redundancy, liquidity all need to be re-considered and re-evaluated. Only companies that adapt to this paradigm shift will move ahead.



CEO

EDITORIAL BOARD



Mr. T. P. Singh
Director - S&M
Flir Systems India Pvt. Ltd.



Mr. Ashok Sheth
Chairman
Solitaire Machine Tools Ltd.



Mr. S. A. Mohan
Chief Executive Officer
Armes-Maini Storage
Systems Pvt. Ltd.



Mr. Sriram Ramakrishnan
Managing Director
Fuji Electric India Pvt. Ltd./
Fuji Electric Consul Neowatt
Pvt. Ltd.



Prof. R. Sreedaran
Faculty - Atharva College of
Engineering



Mr. P.K. Balasubramanian
President
VBS Corporate Support



Mr. Ravin Mehta
Managing Director
Neel Controls/Neel
Industrial Systems Pvt. Ltd.



Mr. C. S. Limaye
Director
Supertech Instrumentation
Services India Pvt. Ltd.

Contact :

For editorial contribution
E-mail: shweta@divyamediaonline.com

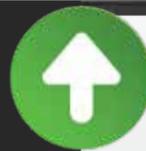
For accounts
E-mail: accounts@divyamediaonline.com

For advertising material
E-mail: advt@divyamediaonline.com

For online advertising
E-mail: shekhar@divyamediaonline.com

www.engmag.in

Go to Index



Solutions for electrical safety



Insulation monitor
LK 5896

Insulation monitor
RN 5897

Residual current monitor
RN 5884

Residual current
transformer ND 5015

Customer benefits

- Higher operational and plant safety
- Increased availability of the installation
- Preventive fire and system protection
- Suitable for mobile generators and DC charging stations
- Universal application in nonearthed and earthed AC, DC, AC/DC networks
- Increased rate of return on the installation due to reduced downtimes

Products and Solutions in the field of insulation and earth fault monitoring for power generation plants using renewable energy. Only by means of proper system solutions for the control and monitoring of power generation can competitive efficiency be achieved.



DOLD Electric India Pvt Ltd
B - 3 Vishranti Heritage, Gotri Road
390 021 Vadodara • India
Telephone +91 990 9001585
m.diwanji@dold.in

Mr. Rashmi Ranjan Mohapatra of Kemppe India promoted with additional responsibilities

Mr. Rashmi Ranjan Mohapatra, Managing Director of Kemppe India has been promoted as the **Managing Director of South East Asia region**. Along with the new role



he will continue to be the Managing Director of Kemppe India. Kemppe, headquartered in Lahti, Finland, is the pioneering company within the welding industry. The company believes that everything that can be connected will be connected. It develops solutions that make you win business. Its offerings include welding solutions – equipment, welding management software and expert services – for both demanding industrial applications and ready-to-weld needs. Kemppe customers operate in automotive, construction, oil and gas, shipbuilding, transportation and machine manufacturing industries. “In order to pioneer their value creation, we need to understand the individual motivations along the way,” says Mohapatra.



For more information
www.kemppe.com

HARTING supplies cable assemblies for medical devices

Against the backdrop of the coronavirus pandemic, the HARTING Technology Group has taken numerous measures to protect its employees on the one hand, while ensuring that customers continue to benefit from a reliable supply of HARTING products and solutions on the other.

“The protection of employees, but also maintaining the supply chain, is our top priority,” as Philip Harting, CEO of the HARTING Technology Group underscored. HARTING supplies renowned manufacturers of medical and respiratory equipment with customer-specific cable assemblies.

Working under high pressure, several German manufacturers are currently producing the devices on which patients and doctors are ur-



For years now, HARTING has been manufacturing connectivity system solutions for medical and respiratory equipment.

gently dependent in the coronavirus pandemic. HARTING has aligned its internal processes so as to supply these medical device manufacturers as quickly as possible. For years now, HARTING has been manufacturing complete connectivity system solutions

for these devices. The current high and short-term requirements and the maintenance of the associated supply chain present major challenges for all parts of the company. At HARTING, securing the supply of the required components takes priority over all

other activities.

All manufacturing, storage and delivery functions are secured by separation in space and time as well as a multitude of hygiene measures. A corona task force and a pandemic team coordinate all necessary measures.

“We are experiencing something that is absolutely unprecedented in this form. And we don’t know when the nightmare of the ‘Corona pandemic’ will end and what challenges still lie ahead. One thing is certain, we are doing everything we can to protect our employees and help our customers wherever possible,” Philip Harting went on to emphasize.



For more information
www.HARTING.com

Go to Index



Specialists for your application

More than 50 years of experience and our extensive application knowledge have made us specialists in our core industries.



Intralogistics



Packaging industry



Machine tools



Automotive industry



Laboratory automation

ELGi Equipments' Heat Recovery System enables up to 96% wasted energy reuse

Energy Savings. Reduced Carbon Emissions. A Greener Environment



Dr. Jairam Varadaraj,
Managing Director-
Elgi Equipments

Elgi Equipments (BSE: 522074 NSE: ELGIEQUIP), one of the world's leading air-compressor manufacturers, has witnessed wide adoption of the ELGi Heat Recovery System (HRS), a solution for utilizing waste heat energy from an air compressor. Approximately 96% of the heat generated dur-

ing the compression process, normally dispelled into the atmosphere, can now be recovered through the heat recovery system and then utilised to heat air (space) and water. This eliminates the need for additional equipment to heat air or water, thereby reducing CO2 emissions and energy consumption significantly.

The ELGi Heat Recovery System (HRS) is best suited for customers across process industries spanning paper, sugar, food and beverages, dairy, textiles etc, mainly companies who require compressed air and use hot water for their process requirements. The Heat Recovery System is a perfect solution for utilizing waste heat energy from the compressor and finds applicability across companies



committed to building energy efficiency in their compressed air system and paving the way for a clean environment.

One of our customers, a paper mill, experienced the benefits of the HRS system, within the first few hours of installation, by way of continuous warm water availability with no external heating. With the implementation of HR 110, the customer was able to recover a heat load of

~ 89.14 kWh / 0.077 MKcal through the continuous water supply of ~2000 lit/hr at a temperature of ~70°C throughout the year. This resulted in an annual energy savings of 800-900 tonnes of LP steam and a carbon emission reduction of ~170-190 tonnes of Co2 / Yr. With the ELGi's energy efficient compressor and heat recovery system, our client was able to achieve significant energy savings resulting in accomplishing the target stipulated by PAT Scheme I and winning the prestigious GREENCO award.



For more information
<http://www.elgi.com>

Go to Index



JAL contributes Rs 5 crore for COVID-19 relief efforts



Dr. Sitaram Jindal, Chairman, and Managing Director,
Jindal Aluminium Limited

Jindal Aluminium Limited (JAL) has contributed Rs 5 crore to PM's Citizen Assistance and Relief in Emergency Situation (PM CARES) Fund in order to help the government in the fight against coronavirus pandemic in India. Prime Minister Narendra Modi had earlier announced an emergency relief fund and invited contributions from the citizens as the country continues to battle COVID-19.

Dr. Sitaram Jindal, Chairman, and Managing Director, Jindal

Aluminium Limited said, "We are confident that India will conquer the COVID-19 crisis. In this exceptionally difficult period, we have made our humble support to the PM-CARES fund towards relief efforts. We at Jindal Aluminium Limited stand strong with the nation in this hour of crisis and will do everything within our capacity to win the battle against this deadly disease."

For more information
www.jindalaluminium.com

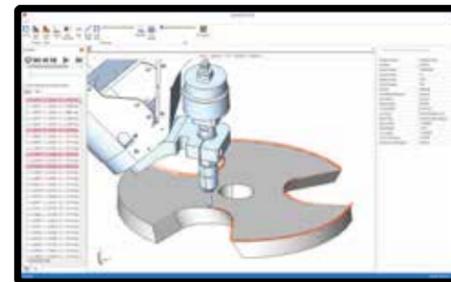


SigmaTEK Launches Version 20 of the SigmaNEST Product Portfolio

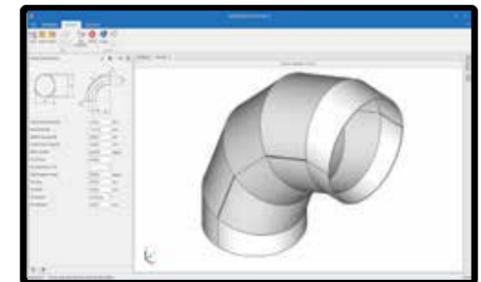
SigmaTEK Systems, a leader in developing CAD/CAM software solutions for the fabrication industry

We are pleased to announce the latest release of the flagship SigmaNEST product portfolio. Version 20 is a substantial release introducing many new features in all areas of the product with continued emphasis on user-experience, optimizing material utilization, and data management.

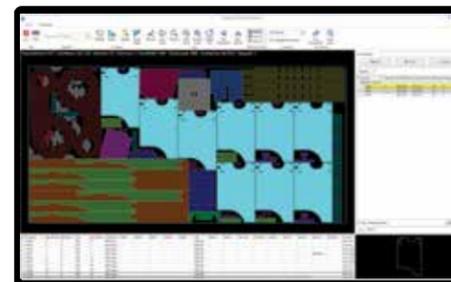
A new SigmaTEK Launcher provides a common, customizable desktop platform from which users can easily access core SigmaTEK products, and eco-system applications such as license manager, database utilities, and help resources. The Launcher also displays a live social media feed to ensure users are fully up-to-date with the latest product information, trade shows, and educational webinar schedules.



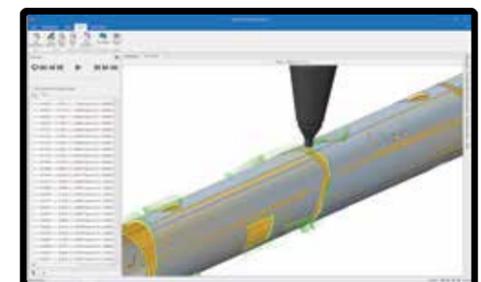
Version 20 delivers innovative bevel capabilities such as advanced toolpath generation, and rule-based corner transitioning



SigmaDEVELOP, a 3D system for standard ducting and HVAC geometry can convert multi-piece common line gores into a single no-kerf, common line part



Color Offload is a shopfloor tool that uses color-coding to track parts by next operation



Version 20 of SigmaTUBE includes support for new inventory profiles, and tab and notch enhancements

Contact

SigmaTEK Systems India Pvt. Ltd.
2nd Floor, Friends Park,
Lohia Jain Business Centre Senapati Bapat Road,
Near Chatushringi Temple PUNE - Maharashtra, 411016 India
Phone : +91 20-25636323/24/25
www.sigmanest.com

FLIR Launches Smart Thermal Sensor Solution for Industrial Monitoring and Elevated Skin Temperature Screening

FLIR Systems, Inc. (NASDAQ: FLIR) recently announced the FLIR A400/A700 Smart Thermal Sensor and Thermal Image Streaming fixed camera solutions for monitoring equipment, production lines, critical infrastructure, and screening for elevated skin temperatures. These highly configurable smart camera systems provide accurate, non-contact temperature monitoring across a wide range of disciplines: manufacturing process control, product development, emissions monitoring, waste management, facilities maintenance, and Environmental, Health, and Safety (EHS) improvements. The FLIR A400/A700 Thermal Smart Sensor solution initially will be prioritized for those responding to COVID-19. For all applications, the series offers multi-image streaming, edge computing, and Wi-Fi connectivity to help speed data flow and enable faster decisions, improving productivity and safety for professionals.



FLIR designed the A400/A700 cameras with two configurations to better meet application-specific needs. The Thermal Smart Sensor configuration, recommended for measuring elevated skin temperatures, incorporates advanced measurement tools and alarms with edge computing to enable faster critical decisions. The Image Streaming configuration provides multiple thermal streaming capabilities to help optimize process control, improve quality assurance, or identify potential failures that could shut down a production line.

Users design their systems by choosing either the Smart Sensor or Imaging Streaming

configurations, selecting either the A400 or A700 camera body based on the resolutions they need, and then adding lenses and a range of optional features to fit their application.

“For more than 40 years, FLIR thermal imaging has provided technologies for professionals to improve not only their capabilities, but also their safety on the job,” says Jim Cannon, President and CEO at FLIR. “As the world works together to face the global COVID-19 pandemic, given the need for this technology, FLIR will prioritize initial deliveries of this new A-series camera to professionals using it in elevated

skin temperature screening as an adjunct to other elevated body temperature screening tools to help to fight the spread of the virus.”

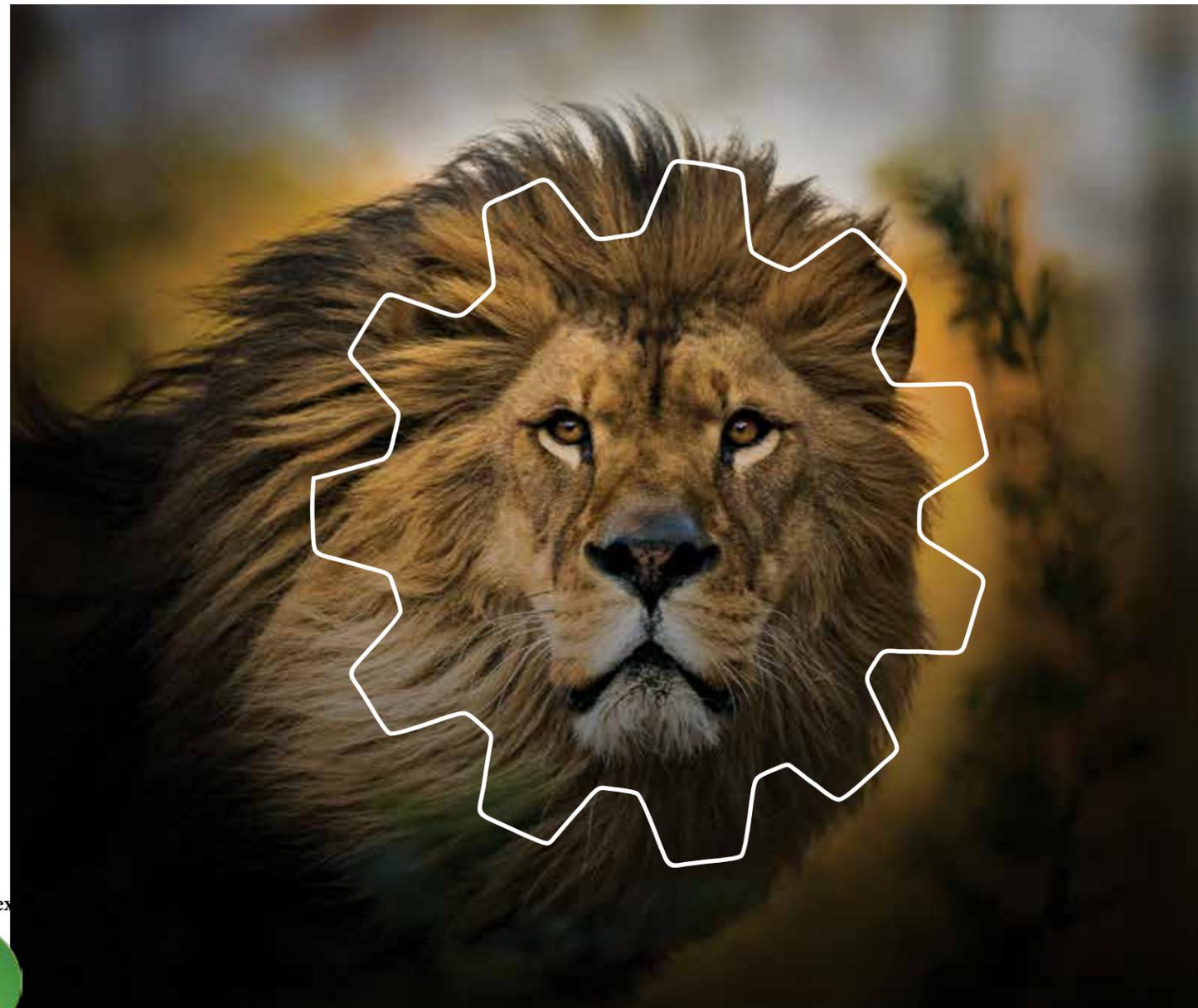
Also, FLIR currently is in beta testing for an automated elevated skin temperature screening software solution that is fully integrated with its United States Food and Drug Administration-certified thermal cameras. The solution is designed to rapidly increase the accuracy, ease-of-use, and speed of existing screening procedures. FLIR will share an announcement about its solution in Q2 2020.

FLIR A400/A700 Thermal Smart Sensor and Thermal Image Streaming cameras are available for purchase today globally from FLIR distributor partners.



For more information
www.flir.com/A400-A700-Series

Go to Index



POWER IS LEADERSHIP

The first choice in geared motors, across 20 countries.

POWER IS RADICON POWERBUILD

India's Leading Monthly Magazine on Manufacturing Industry



To advertise in ENGINEERING REVIEW call: +91 22 25380574 / 75 or email: shekhar@divyamediaonline.com

ENGINEERING REVIEW

India's Leading Industrial B2B Magazine

Professional magazine for people in profession of

- MACHINE TOOLS
- GEARS & MOTORS
- METAL INDUSTRY
- INDUSTRIAL CLEANING
- AUTOMATION
- ELECTRICAL & ELECTRONICS
- MATERIAL HANDLING
- CHEMICAL & PROCESS INDUSTRY
- POWER
- HYDRAULIC & PNEUMATICS
- PUMPS & VALVES
- INDUSTRIAL SAFETY

- Trusted name with a legacy of 47+ years
- Leaders in power transmission solutions
- World-class products
- Over 1.5 million units performing across India and the world



Series M
Helical Inline
Geared Motor



Series C
Heliworm
Geared Motor



Series F
Parallel Shaft
Geared Motor



Series K
Helibevel
Geared Motor



Series PL
Planetary
Geared Motor





Our presence in India helps us match our world-class products with our eminent customer support

Mr. Rupesh Paparaju, Managing Director, Bettinelli Automation Components, India



In the industrial world, Bettinelli is a well-known brand synonymous with quality, operational efficiency and productivity in automation and motion technology. The brand has a reputation for versatility, precision and reliability spanning close to seven decades. Bettinelli is a conglomerate headquartered in Italy. Its Indian arm, Bettinelli Automation Components Pvt. Ltd. has been serving the Indian industry for the past decade, providing world-class products and matching technical and service support. The company has built up an eminent team to speed up its response time and stay closer to its customers spread across the length and breadth of the country, says Managing Director Rupesh Paparaju in an interview with P.K. Balasubramanian. Excerpts:

“

Our design and manufacturing systems have given competitive and strategic advantages to numerous industries. For automation functions, customers prefer our products because of their technological edge and superlative performance.

”

Q. Bettinelli is a formidable name in motion control and automation. What's your standing?

Bettinelli S.p.A, established in 1953, specializes in the development of precision motion control components and systems. In 1996, a separate division named CDS Cam Driven Systems was formed to provide engineering solutions in automation and motion technology

Q. Could you describe the activities of your CDS Division?

CDS produces the widest range of mechanical Cam Driven Units, commonly known as rotary / indexing tables for precision motion control applications requiring rotary or linear transfer, positioning and handling. The product range includes cam indexing and servo-driven tables, ring positioning drives, intermittent and oscillating drives with parallel or right angle

configuration, rotary and linear part handlers, precision link transfer systems and epicycloidal servo reducers.

Q. We understand that Bettinelli's portfolio includes a wide product range.

Indeed, Bettinelli has a broad product spectrum covering IP parallel shaft indexers, IT roller dial indexing tables TR roller dial indexing tables, HP roller dial indexing tables, IG/IGA roller gear indexers, TL precision link conveyors, MHP /LHP part handlers, FT-HT open centering tables and packages of rotary indexing tables. Bettinelli also has a wide range of standard products. These are delivered in three weeks. When it comes to customized products, these are designed, manufactured and shipped in 6-8 weeks.

Q. Could you tell us something about your manufacturing facilities?

The manufacturing takes place centrally in Italy. The regimen starts with design & engineering, CNC induction hardening, CNC milling, grinding, quality check and then assembly, painting and shipment. In order to ensure quality, all components are machined internally, including the cam hardening by a proprietary CNC controlled induction hardening equipment. For better finish, the products are also subjected to chemical nickel plating, blasting and printing. The manufacturing process is constantly controlled to conform to international standards. Our quality systems are

Go to Index



Oscillator Indexers



Rotary Parts Handlers

ISO-9001-2008 certified.

Q. Your CDS Indexers seem to be quite popular in the automation industry. Could you elaborate?

Yes, over the years, Bettinelli Group and CDS Indexers have become synonymous with high quality automation products and technologies. Our design and manufacturing systems have afforded competitive and strategic advantages to numerous industries including pharmaceutical, automobile, manufacturing, electrical engineering including switchgear manufacture, packaging and a plethora of other sectors. And for automation functions, our solutions are invariably preferred by companies.

Q. When did you start the Indian operations?

Well, the Indian operations were started in 2010 with headquarters in Pune. Bettinelli Automation Compo-

nents Pvt. Ltd., India would soon be celebrating 10 years of our existence and service to Indian industry. We serve our customers by doing installation & commissioning and providing after-sales support. We also provide technical consultation and help the customers go in for the right equipment and systems to complement their manufacturing and enhance their productivity.

Q. Which are the proven and potential applications for cam driven systems?

In the pharmaceutical industry, cam driven systems are used for filling, blister pack, tablet making and packaging machines. In automobile industry, they are used in pallet transfer tables, assembly machines, painting applications and test rigs, etc. In machining industry, they are used with advantage in de-burring, lapping and pressing machines and in transfer

lines. In SPM & robotics they find applications in transfer lines, station loading, sequential operations and so on. In welding, these indexers are inevitable in positioners, synchronous welding, robotic welding and component transfer.

Packaging is yet another major application area. Cam systems are used in box filling machines wrapping machines, cartooning and capping machines,

Indexers are also used in casting, printing and cosmetics industries.

Q. When it comes to conveyors, your High Precision Link Conveyor is said to be a boon to the automation industry. Could you throw some light on this?

CDS Precision Link Conveyors TSL, TL and TXL provide the industry's highest accuracy and repeatability for automated assembly and manufacturing machinery platforms combined with the highest dynamic performance available on the market.

The precision link conveyor TL series has been designed to meet the requirements of high productivity and reliability of modern automation, combined with excellent precision and speed, with a high degree of versatility to offer customers the most suitable solution. They are used on machines that require stability, precision, high speeds and low maintenance. They are different in terms of body width, allowing great flexibility and a more accurate choice during the designing phase.

The need of the market and customer orientation, added to the desire of CDS to want to expand and improve its product range has brought new innovations to the TL series:

In TL 200, the depth of the body has been reduced, with the same stroke, with a consequent reduction



Rotary Indexing Tables

of the gearwheel diameter and a better ratio with the driver unit and a better positional accuracy. This makes the machine far more compact and it is a great advantage to the machine builder.

In the TL range, the plastic protections have been studied to be applied on pallets in order to guarantee an anti-intrusion covering for the components being processed.

These covers are printed in 3D.

Together with the plastic protections a new links chain has been developed.



The latter is equipped with special seals to reduce the accumulation of powders or abrasive material during the process and increase the protection of leads and bushes.

In a nutshell, following are the salient features of these conveyors:

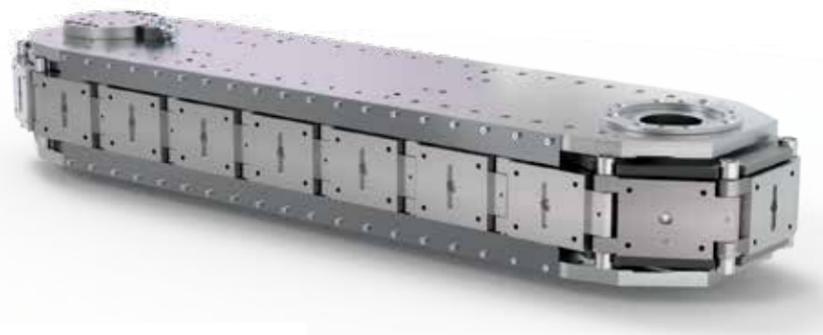
Versatile and compact modular-component design; Precision machined cast iron chemical-nickel plated links;

Precision chordal compensation cams; and cam driven for fixed indexing motion or servo driven for flexible positioning.

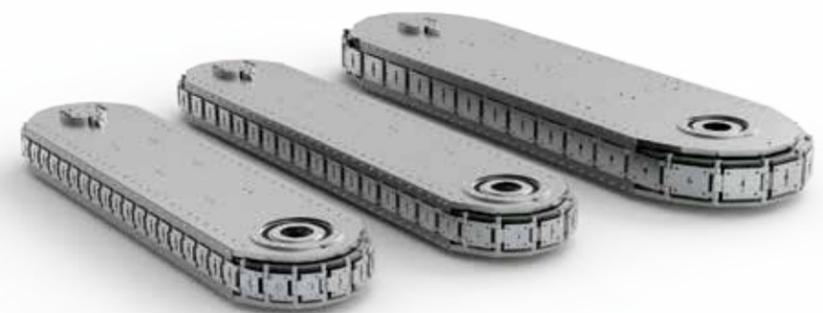
The competitive price and fast lead time together with CDS quality and reliability make this series very attractive for the market.

Q. What's your market mantra for gaining customer delight?

We are highly customer-centric. Our presence in India means quite something in fostering a symbiotic relationship with our customers. It helps us to match our world-class products with our eminent customer support. We have specially built up a team to improve our response time. CDS are high-tech products which lend themselves to enhance the operational efficiency and productivity at customer's end. We stay closer to the customer to understand his needs and offer customized solutions within the shortest possible time to ensure peak uptime of his equipment and operations.



Precision Link Conveyors



Go to Index



Robotic Solutions for Automation



ABA Electricals for enduring solar energy solutions



ABA Electricals Pvt. Ltd.
Engineers | Manufacturers | System Integrators

Binu P.B., Director,
ABA Electricals Pvt. Ltd.

products such as Solar Panels, Hybrid Solar PCUs, Batteries, Inverters, Solar Water Heaters, Sunverters, DC Pumps, Solar Lights and so on.

The company has an extensive dealer network in Tamil Nadu and Kerala to market and service ABA products and stay closer to the customers.

“The secret of a high yield, failsafe solar system is harnessing maximum energy when the sunlight is available”, says Binu P.B., Director, ABA. “This is possible with accurate calculations, proper engineering, correct use of equipment and devices and perfect installation. Once these aspects are taken care, a solar system will never fail. It will only add to your bottom-line for years”, he adds.

The company has an impressive list of clientele representing a cross-section of the user industry including domestic, hospitality and government sectors. ABA has executed a number of turnkey projects for Megamalai Wildlife Division of the Govt. of Tamil Nadu and Dairy Development Dept. of Kerala (Milma). It has the distinction of having built the first solar house in Kerala. The company has a glittering list of overseas clients as well.

For more information
ABA Electricals Private Ltd.,
E-mail: abaelectricalsco@gmail.com

www.engmag.in



Photo courtesy : Shinkansen 700T train
Taiwan High Speed Rail



MADE IN INDIA **LONG RAILS** MADE BY JSPL

JSPL Rails are equipped to facilitate rapid deployment of durable metal tracks for high speed and bullet trains

MADE IN INDIA **260 METER LONG RAILS** MADE BY JSPL



1 MTPA Rail Mill at Raigarh



MAKING IN INDIA



LONGEST OF DISTANCES ARE BRIDGED WITH JSPL RAILS

PRECISION | STRENGTH | DURABILITY | RELIABILITY

Corporate Office: Jindal Centre, 12, Bhikaiji Cama Place, New Delhi - 110 066, India
Call: +91 11 2618 8340 Fax: +91 11 2616 1271 (CIN L27105HR1979PLC009913)
www.jindalsteelpower.com | www.jindalpanther.com

[jsplcorporate](#) [Jindal Steel & Power Ltd.](#) [jsplcorporate](#) [jsplcorporate](#)

wege® "GEISSEL – CABLE GLANDS AND MORE....."



Geissel India, started in 1994, as a turned parts manufacturer, branched out into cable glands and electrical wiring accessories from 2009, to serve the vast and yet fully untapped Indian market. In just 8 years and over 100+ satisfied customers, it has earned a name for itself among the users of its products, some of them being large International Companies.

The sections of industry served by Geissel India are aerospace, automation & robotics, power, hydraulics, material handling, and pneumatics, to name just a few.

Able assisted by its R & D centre at its mother plant in Germany, Geissel is first in manufacturing the IP 68 Double Compression gland for armoured cables in India. Besides this, it has diverse products like standard IP 68 & 69, multisealing cable glands, plugs, reducers,

enlargements, lock nuts, conduits, etc., made in brass, polyamide & stainless steel S.S 303 (1.4305), S.S 316 Ti (1.4571), and all according to ROHS standards.

Geissel India is now compliant with the latest standards of ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007, thus totally committing itself to Quality Management Systems, Environment and Health & Safety.

From using recycled water, to harnessing its self-produced solar energy for 100% of its own consumption at its German plant, the Group is committed to protect natural resources and implementing sustainability for this generation and the ones to come.

*For more information:
Email: info@geissel-india.com*



EXTEND BEARING LIFE



SINGLE-TURN WAVE SPRINGS

REDUCE
Axial and radial play

MINIMIZE
Thermal misalignment and wear

ELIMINATE
Noise and vibration



Single-Turn Overlap-Type



Single-Turn Gap-Type

Free Samples on over 150 sizes in stock



Call +1.847.719.5900, or visit expert.smalley.com/ER/Bearing

TIDING OVER THE COVID-19 CRISIS



As Covid-19 rattles economies and disrupts businesses across industries, companies are learning to deal with the crisis and trying to figure out what will be the overall impact. Amid the fears of the global pandemic, the main concern for businesses now is ensuring employee protection, while maintaining business continuity and minimum impact to customer service. From focusing on upskilling to planning for changes post lockdown and re-strategizing in the wake of disruption caused by coronavirus, major companies are taking several key steps to fight the COVID-19 battle. We, at Engineering Review, spoke to some companies that are leading by example in terms of tiding over the crisis and finding a silver lining during these difficult times. Excerpts:

It's a Lock Opener, not a lockdown



Shreegopal Kabra, MD, RR KABEL

In line with the Government of India's lockdown initiative, we have, over the past few weeks highlighted the importance of staying home and practicing social distancing by using our social media handles to communicate this message to our global audiences. I have had the opportunity to hold positions of highest responsibility with various industry bodies like IEEMA and have major influences in many others.

Using this position, I have appealed to my industry colleagues to follow the RR Global model and ensure there is no disruption to our industry and to the greater economy. We believe every little

initiative helps in 'flattening the curve' and stopping the spread of this deadly disease at the same time sustaining livelihoods.

Staying Safe, Staying Connected

To ensure that work continues as efficiently as possible, the concept of 'work from home' has never played a more vital role. It is a relatively new idea for our industry but one that I think will catch on, considering the amount of time and finances it can save. Regardless, it does take some getting used to and to help our staff get used to it and stay connected and most importantly motivated,

happy & hopeful from a personal and professional standpoint, our HR team along with sales and area heads through regular interactions over the phone or through video conferencing ensure our team and their families are keeping safe.

We have developed an e-newsletter called 'Opportunities Unlimited' that is both interactive and informative and acts as fun read for the entire family. We have also ensured our health insurance covers all costs related to Covid 19.

Investing in Upskilling

On a professional front, we have developed tutorials and internal training programs conducted on a daily basis by the sales and area heads as well as the tech-

nical team. We decided to use this time to help brush up our team's product, brand and market knowledge as well as communication and marketing skills. This lockdown has provided us with the optimum opportunity to keep target-based training on the backburner and rather focus on interpersonal and relationship building, which we believe will only benefit our staff and the company in the long run.

The current scenario has created a change in culture, where I believe companies and individuals alike will invest in the future not just for monetary gains but for their health, their relationships and for the broader society. Over the years, we have all been in such a ruthless, frantic race to earn more materialis-

tic wealth that somewhere along the line we forgot the real meaning of life. That life goes far beyond money. That it is our relationship with ourselves, our family, our society and nature that is far more important.

Some may call this wishful thinking, but I do expect that there will be a big change in our collective thought process for the better. These are some values we impart to our staff during our training and through our conversations. In hindsight, the lockdown isn't really a 'lockdown' per se, I see it as a 'Lock Opener', it has helped us open our minds to a more caring, more beautiful world. May we continue to learn from it. ■

Committed to keeping customers connected

Amidst the Covid-19 epidemic on one side and providing connectivity to essential national services of India, we are in a responsible position to deliver our services and help our customers to succeed and make use of complete digital technology. Our proactive approach of remote access drills for operation network maintenance in past has helped us to manage work desk at home. With limited presence of our engineers in the Hub facility our battalion of Engineers are tirelessly managing response to all customer calls and monitoring the sites uptime by accessing the internal CRMs and network monitoring sites. Availability of domain Laptops with Support staff is helping in managing the workflows and approvals.

Representation to the local district government offices has helped and provided us the essential curfew passes for movement of limited number of Engineers in few areas. While maintenance mode is running well, the work has slowed down in new rollouts due to supply chain logistics, halt in production by backward integrated OEMs, service providers. It is remarkable that



Shivaji Chatterjee, Business Head, Enterprise Business, Hughes Communications India Ltd.

our employees and partners are fully cooperating towards the call of duty.

Working towards providing the best possible network experience

Across India and the world, the widespread panic of the Coronavirus outbreak has put millions under lockdown and forced Corporates to embrace remote work practices. There has been a sudden surge in network usage which is putting burden on Mobile Network Operators (MNO)

to augment capacity and provide relief from network congestion. Data demand has recorded a 10% surge as people are opting for remote workplaces. Being a Managed Service provider, we are in the business of connectivity ourselves. So, we are always prepared, up and running with 99.9% uptime— with our core network facing no network outages with multiple redundancies across geographies in place. This also helps in keeping customers who have had to WFH, free from worry about their business-critical applications.

On the field support, it's true that we are unable to work with the same efficiency as in normal conditions. Movement of our field teams is restricted, we are making up for this by online analytics and support, pinpointing the exact issues, but there are some delays.

We have to wait and see the total business impact in the coming quarters. The focus right now is to best use the network so as to provide the best possible network experience to our users to help them work with critical business applications. ■

Go to Index



COVID-19 may offer a mixed bag of positives and negatives



Shekhar Erande, Director, SigmaNEST

We have offered our employees complete freedom to work from home and take care of themselves. This way we are achieving complete social distancing. We have given required IT access

to our employees and scheduled flexible work time to ensure business and personal family both are addressed.

We are ensuring our customers are well informed about the situation and products. Further, we are providing online training and scheduling webinars for our customers to stay in touch. Our customers are taking advantage of lockdown to hone their skills by using our software.

Crisis teach us many things that we otherwise tend to overlook. There are many lessons we have learnt as humans from these difficult times, but few are vital to mention –

1. Change is constant
2. Work can be finished in 8 hrs per day

3. Live every day to your fullest capacity to enjoy.

As far as the impact from the pandemic is concerned, we expect it to be mixed positive and negative as we all can see there will be huge demand in all sectors due to change in economy, people are not going to stop living so we need to supply to fulfill all demands. Our sector is mainly affected as it depends on the steel so as per the steel demand our business will take same effect.

We are expecting government should make sure our customers are healthy from financial point of view by providing them required schemes so they can buy from us to run their business. ■

MNCs may consider relocating their plants to India



Dr. Jacob Chandapillai, Director, Fluid Control Research Institute

Ours being a service organization, and the services are mostly provided at our facility, the lockdown has severely affected the service and our ongoing projects. Business connectivity is

maintained through electronic media as usual. However, the quantum of communication has considerably reduced due to the lockdown. Our existing customers are always in touch for opinions and advice, which are provided as usual. This activity is expected to provide us continuity in business.

Expecting a boost in 'Make in India' campaign

The manufacturing industry may shift locations of its current production and our country is likely to be a preferred destination. We need to gear up ourselves in terms of infrastructure, transparency, fund availability and speedy bureaucratic clearances in order to make it happen. This may be a blessing in dis-

guise for our 'Make in India' campaign.

The Pandemic may result in a highly automated infrastructure, be it in production, construction, healthcare or government services. This will not only save energy and costs, but also improve quality. The resulting reduction in human interventions will help the businesses to carry on without interruptions should a crisis hit again.

Increased confidence in technology and technical performance will cause changes in customer behaviour, away from traditional methods. This force will adapt us to new trends, such as live streaming of calibration for witness and move towards a future that could be free from physical witnessing and inspection. ■

Indo-German trade in Engineering sector in 2019

Germany is the 7th largest foreign direct investor in India. There are more than 1,700 German companies active in India and over 600 Indo-German joint ventures in operation

Germany is India's largest trading partner in Europe. Bilateral trade increased to \$21.98 bn (2017-18), a growth of 17.15%. In 2017-18, India's exports were worth \$8.68 billion to Germany and imports were worth \$13.29 billion.

Germany is the 7th largest foreign direct investor in India. Germany's total FDI in India from April 2000 until June 2018 amounted to \$10.99 billion. There are more than 1,700 German companies active in India and over 600 Indo-German Joint Ventures in operation. German investments in India are mainly in the sectors of transportation, electrical equipment, metallurgical industries, services sector (particularly insurance), chemicals, construction activity, trading and automobiles.

In 2018, Indian imports from Germany experienced a good growth of 17% over the previous year and amounted to € 12.5 billion. From January to June 2019, Indian imports from Germany stood at Euro 5.8 billion, out of which machinery imports comprised 25.6 % and stood at Euro 1.5 billion. India ranks 15th globally, in the list of top 50 destinations for the German Mechanical Engineering exports. In 2019, the total import of machinery from Germany reached a volume of € 3.07 billion. This was a drop by 8.6% compared with the same period of time in the previous year.

Among the machinery sectors, major demand of German equipment was for Power Transmission (11.6%), Plastics and Rubber Machinery (6.9%), Machine Tools (6.9%), Valves & Fittings (5.3%) and Air Handling Technology (5.1%). There are other sectors like Construction Equipment & Building Material Machinery, fluid power equipments, Textile Machinery and food processing & packaging, which are growing steadily in India.

Out of the total export of German Mechanical Engineering to Asia of € 41 billion, India is the second largest sales market in Asia for the German engineering industry, with a share of 7.5%, after China (45.8%). In 2019, India imported machinery of the value € 24 bn globally. Germany is the 2nd most important

supplier to India globally, share of around 15%. Maharashtra, with around 44% share of German investments, remains to be the most attractive destination for German investments in India. In the last 4 to 5 years, Pune has become the hotbed for new German investments. Karnataka and Tamil Nadu are other important destinations. ■



Go to Index



Convert paper into profits
with our innovative solutions

Engineering successful relationships Since 1970

High Performance Machinery for producing
Paper Cones | Tubes | Cores | Composite Cans
| Square Drums | Fibre Drums
| Edge Protectors and Pulp Moulded Products
(Apple trays, Egg trays, Tableware etc)
which are easily recyclable and hence eco-friendly

Sodaltech Paper Conversion machinery are built to deliver dependable performance with their robust and functional construction, innovative design and above all highest quality components and workmanship, which form the basis of their enviable reputation in India and across the globe.

SODALTECH®
K.U. SODALAMUTHU AND CO. PVT. LTD.
428, Mettupalayam Road, Coimbatore - 641 043, India.
Ph : +91 422 4242100 / 2441223 • Fax : +91 422 2431279
e-mail : sales@sodaltech.net • www.sodaltech.net
+91-8754987519 | sodaltech.marketing | sodaltechcb

Integrated servo drives for automation outside of control cabinets

The new AMI812x series of integrated servo drives from Beckhoff expands the compact drive technology portfolio (up to 48 V DC) by extremely compact devices for distributed field installation. The integration of servomotor, output stage and fieldbus connection in a space-saving design makes the drives ideal for automation outside of control cabinets in the motion power range up to 400 W



The AMI812x in three overall lengths establishes a new series of integrated servo drives for automation outside of control cabinets.

As an EtherCAT slave, the AMI812x integrated servo drive can be placed directly on the machine without a control cabinet and without upstream I/O level, allowing for the implementation of highly compact machines without control cabinets. At market introduction, the AMI812x series includes three overall lengths in the F2 flange code with standstill torques from 0.5 to 1.1 Nm. The AMI812x is optionally available with a multi-turn absolute encoder without battery backup and with a

backlash-free holding brake. With an additional sealing ring, the servo drive achieves high IP 65 protection rating and is suitable for all installation positions. The STO safety function can be integrated as an option via the TwinSAFE Logic.

The fast control technology, based on vector current and PI speed control, supports highly dynamic positioning tasks. Numerous monitoring options, such as over and undervoltage, overcurrent or motor utilization via calculation of an I²T model, offer high operational reliability. The operating state

is indicated by integrated status LEDs.

Electronics and motor are supplied via the M12 power interface. The M8 bus interface for EtherCAT offers a second port for simple cascading in an EtherCAT daisy chain. In addition, the introduction of a motor version with EtherCAT P connection is planned. The I/O interface (M8) enables direct connection of two sensors or actuators in the

24 V DC signal range up to 0.5 A. The connection cables are available with straight and angled outlets. Very high torques can also be achieved with the matching planetary gear unit from the AG2250 series.



BECKHOFF

For more information
E-mail: info@beckhoff.co.in
Web: <https://www.beckhoff.co.in/AMI81xx/>

Go to Index





Your Specialists for Cam Motion Components and Systems

PACKAGING

- Box Filling Machines
- Wrapping Machines
- Crapping Machines
- Capping Machines

WELDING

- Welding Positioner
- Synchronous Welding
- Robotic Welding
- Component Transfer

CASTING

- Auto Casting
- Investment Casting
- Component Transfer
- Molding

PRINTING

- Glass Printing
- Label Printing
- Card Printing

PHARMA

- Filling Machines
- Blister Pack Machines
- Tableting Machines
- Packaging Machines

MACHINING INDUSTRY

- Deburring Machines
- Lapping Machines
- Pressing Machines
- Component Transfer

SPM & ROBOTICS

- Transfer Lines
- Station Loading
- Sequential Operation

COSMETICS

- Assembly Machines
- Filling Machines
- Carburing Machines

AUTOMOBILE

- Pallet Transfer Tables
- Assembly Machines
- Painting Applications
- Test Rigs

Advantage:

- No wear & tear
- Compact size
- Easy to install and operate
- Designed to work 24/7, 3 shifts a day
- High accuracy: ±20 Microns at cam follower PCD
- High speed: up to 800 cycles/minute
- Low operational vibrations
- Mounting position on all sides, including upside down
- 2D and 3D drawings available for all the products
- 3 years extended warranty upon application check
- Reduction motor driven or servo driven

FOR LIFE
ZERO BACKLASH
NO MAINTENANCE
LUBRICATED

All Parts Manufactured In-house and tested Cam Profile Induction Hardened with CNC Machine at 60 HRA
Carbon Case Hardened Cam Followers Modified Synchronous Motion for Smooth Acceleration

IP Series



IT/TP Series



TR/TRP Series



HP Series



IG Series



HL Series



TL Series



MHP Series
LHP Series

Over the years, Bettinelli Group and CDS Indexers have become synonymous with high quality automation products and technologies. Our design and manufacturing systems have furnished competitive and strategic advantages to numerous industries in Pharmaceutical, Automobile, Manufacturing, Packaging and other sectors. For automation functions, our solutions are invariably preferred by both, national and multi-national companies.



Bettinelli Automation Components Pvt. Ltd.
Office #3, First Floor, Destination Center, Magarpatta City,
Hadapsar, PUNE - 411013, India
T: +91 20 6723 6484 F: +91 20 6723 6485 E: info@bettinelli.in
www.cdsindexers.in www.bettinelli.in

High speed upto 800 cycles per minute

No wear & tear

Zero maintenance

3 years extended warranty

Unmatched accuracy

±20 microns at PCD

Easy to install

Zero backlash

Customizable

First delivery

Global support

Sentinel 1 shock absorbers remotely optimize safety, equipment life & productivity

ITT Enidine Technology advancements and the emergence of the industrial internet of things (IIoT) has led to what is referred to as Industry 4.0, or the fourth industrial revolution. Industry 4.0 combines automation with the IIoT to create smart factories, connected by the internet.

Automated factories and warehouses enable unattended operation of equipment and real-time communication of equipment status. These automation improvements, combined with the high operating speeds required to meet increasing productivity demands, have obvious advantages, but progress also comes with disadvantages. High operating speeds can also lead to an increase in noise, damage to machines, excessive vibration and accidents due to runaway equipment. If failsafe measures are not in place to detect these conditions and shut down equipment when they occur, costly accidents or personnel injuries may occur.

Controlling noise, vibration and shock due to an impact or repeated impacts is important to maximize equipment life, minimize damage and most importantly, provide a safe work environment. Products such as bumpers, springs, cylinder cushions and industrial shock absorbers are the main options design engineers employ to combat noise and vibration.

Employing industrial shock absorbers

The specific application dictates which product is optimal. Rubber bumpers and springs are inexpensive, but most of the energy at impact is stored, resulting in rebound and an undesirable recoil effect. Cylinder cushions operate over a limited operating range and provide

low energy absorption, which results in shock loading and vibration.

Industrial shock absorbers provide a controlled, predictable deceleration that converts kinetic energy to thermal energy. The shock absorber operates in the fully extended position under normal conditions. In hydraulic shock absorbers, the fluid is compressed on impact and forced through narrow orifices, which causes a rapid increase in fluid temperature that is dissipated through the cylinder body.

If it is important to limit recoil, shock and vibration, industrial shock absorbers are the clear product of choice. One such application is automated storage and retrieval systems, commonly found



Figure 1: Industrial shock absorber with Sentinel 1 monitoring system.

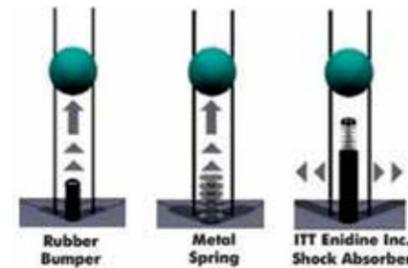


Figure 2: Dampening options. Source: ITT Enidine

in modern warehouses. Large fulfillment warehouses, such as those used by Walmart, Amazon and the food industry, feature unattended stacker cranes and other automated equipment. Stacker cranes operate along the aisles of warehouses between racks or shelves. They automatically transfer products to and from the storage racks and feature both linear and vertical travel mechanisms. They position, load and extract goods to a specified rack position.

Repeated soft-stop impacts are common in stacker crane operation. Industrial shock absorbers help minimize damage and dissipate the energy of the impact. While the shock absorbers can handle these soft stop impacts, repeated bumps will eventually affect the life of the unit, which will need to be refurbished or replaced.

Of greater concern are impacts due to runaway cranes or other emergency conditions, which can result in substantial damage and injury if personnel are working nearby. Shock absorbers intended for soft-stop operation absorb the impact in conditions where the velocity or impact is greater than normal. When this occurs, quickly shutting the crane down is imperative to prevent further damage or injury. In many existing warehouses, this is a manual process. Before the equipment can be shut

Continue on page no.32

Go to Index 9001:2015 ISO Registered



India's Premier Spring Manufacturer

- Compression Springs
- Extension Springs
- Flat Springs
- Torsion Springs
- Wire Forms
- Plastic Composite Springs
- Wave Springs
- Belleville Washers
- and many more!



Request a FREE Catalog

More than 380 pages of parts, pricing and specifications.

Call: +91 80 49376666 Visit: leespring.in
 Fax: +91 80 49376699 Email: india-sales@leespring.com



down, somebody must notice or be made aware of the accident.

Warehouse workers have one of the



most dangerous occupations with respect to on-the-job injuries, according to the U.S. Department of Labor. In addition to the obvious concern over personnel safety, there are financial costs to the company when accidents occur. According to the U.S. Department of Labor, each recordable injury costs an average of \$35,000. Preventing and limiting these accidents and costs is desirable for safety, efficiency and financial reasons.

Industrial shock absorbers for Industry 4.0

ITT Enidine Inc. has been providing noise, vibration and shock solutions for industrial, aerospace, defense, rail and transportation markets throughout the world since 1966. Research and development combined with new technologies and innovation led to the development of the Sentinel 1, ITT Enidine's first-generation, on-board monitoring system for industrial shock absorbers.

Sentinel 1 breaks new ground by integrating microelectronics into the ITT Enidine heavy-duty line of shock

absorbers to provide continuous monitoring and notification of impact activity in unattended applications. The Sentinel 1 does not require any wiring or batteries and uses energy-harvesting, wireless technology to generate energy upon impact to send a wireless signal up to 2,000 ft. As the energy is generated when needed, it does not need to be stored.

The Sentinel 1 can be integrated to a PLC or to similar plant safety controls. Depending on the application requirements, the signal can be used to either count soft-stop impacts or as a failsafe to shut down runaway equipment, preventing further damage and protecting people and goods.

Figure 6 shows a stacker crane application with multiple industrial shock absorbers. One Sentinel 1 shock absorber could be configured to count soft-stop impacts to inform maintenance personnel when the shock absorber needs replacement. A second shock absorber could notify a control system of a runaway condition. Emergency conditions such as this can shut down the crane and other systems.

Sentinel 1 can be purchased as part of a new shock absorber or retrofit to an existing Enidine heavy-duty series unit. Replacing or retrofitting an existing shock absorber with an ITT Enidine Sentinel 1 is a simpler and more cost-effective approach than attempting to design a custom solution.

Conclusion

The Sentinel 1 shock absorber from ITT Enidine is a ground-breaking product that combines advanced microelectronics and wireless technology to provide continuous monitoring for industrial applications such as warehouse automated storage and retrieval systems. The Sentinel 1 can be integrated into plant predictive maintenance programs to replace shock absorbers when they have reached their end of life. Alter-



Figure 5: Stacker crane application with multiple shock absorbers. Source: ITT Enidine

nately, they can be integrated with plant control systems to monitor for accidents, shutting down equipment to prevent further damage or injury.

About Shavo Technologies Pvt. Ltd.

Shavo is a leading diversified company specialized in highly engineered Advanced Control Technologies. Singularly focussed on technical expertise, quality and reliability, Shavo Technologies is your source for premier high-tech solutions in Gas Management, Shock and Vibration, Static & Dust controls, Lubrication and Air Moving Products. Shavo is a full service organization with design, assembly, sales support, service, installation, and commissioning functions.

Building on its heritage of innovation and high technology, Shavo has partnered with the world leader ITT Enidine to deliver enduring solutions to key industries in the area of Shock and Vibration solutions

Go to Index



For more information on ITT Enidine products, please contact Mr. Rushil Shah, Managing Director, Shavo Technologies Pvt. Ltd., on +91-7030938211, 7410004817. Email: corporate@shavogroup.com Web: www.shavogroup.com

INNOVATIVE.

EFFICIENT.

RELIABLE.

Customised heat exchange solutions for your various processes.

With a global footprint and application engineering, HRS has constantly delivered state-of-the-art heat transfer equipment for food, fruit, beverage, dairy, nutraceuticals, pharmaceutical, chemical, agrochemical, petrochemical, steel, fertilizer and other allied sectors. Our range of tubular, corrugated, plate type and scrapped surface heat exchangers cater to the demands in these sectors.



ECOFLUX* CTHE



Plate Heat Exchanger



Food System



Hot Water Systems

HRS, truly a One-Stop-Shop for all your heat exchanger requirement !

HRS Process Systems Ltd.

201/202 Karan Selene, 851, Bhandarkar Institute Road, Pune 411 004, Maharashtra - India
Ph. : +91-20-2566 3581/ 6604 7894 & 95 | Fax :+91-20-2566 3583
info@hrsasia.co.in | www.hrsasia.co.in



ASME 'U' Stamp Certified Company



Leuze electronic India- The sensor people welcome you!



Manish Kant Sahay- Managing Director
Leuze electronic Pvt Ltd-India



With the presence in Indian market from April 2008 through service provider, the company was finally founded in July 2012 considering the local need and excellent growth rate over the years.

For nearly 50 years, Leuze electronic has been developing, producing and marketing efficient sensor solutions for industrial automation around the world. We are specialists with solid application know-how and comprehensive industry knowledge. We always examine customer processes in their entirety so that we can develop efficient solutions.

As a subsidiary, we are part of the worldwide Leuze electronic family with over 1,200 employees. Our customers particularly appreciate the competent consultation and reliable customer service we offer all over the world. That's

why they call us the sensor people.

When the decision was made in the early 60s to found Leuze electronic that would develop sensors for the company's textile machines, we didn't expect that it would develop into the successful international company that it is today.

Today, it is a worldwide success story and stands for forward-thinking entrepreneurship as only few companies do. It's no accident that today Leuze electronic is considered a technology driver and is active in all growing markets with subsidiaries and a variety of distributors

all over the world.

Our goal: High quality standards for our products, reliability and sustainable orientation.

Satisfied customers are the basis of our success. Our core competencies are first-class sensor solutions, the high quality of which is ensured through tested and validated processes.

Our own demand for and our understanding of quality is continuously updated and is confirmed to have a high level of maturity by accredited certification bodies.

Continue on page no.36

Go to Index



NEW RANGE

**POWER
IN YOUR HAND**



Now With;

- ▶ Extra Life !
- ▶ Corrosion Resistance !
- ▶ Better Productivity !
- ▶ Superior Finish !
- ▶ Finest Quality Steel !

DIAMOND FILES	NEEDLE FILES
ENGINEERING FILES	AGRO FILES
SAW FILES	SPECIAL PURPOSE FILES



Sectors we serve:
RAILWAY, DEFENCE, POWER, AUTOMOBILE,
HEAVY ENGINEERING, FABRICATION



**BIRLA PRECISION TECHNOLOGIES LIMITED
INDIAN TOOL MANUFACTURERS (DIVISION)**

Registered Office: 23, Birla Mansion No. 2, 1st Floor, D. D. Sathe Marg, Prarthana Samaj, Mumbai - 400004, Maharashtra, India. Tel.: +91 - 22 - 23825060 | Email: itmth@indiantool.com



Branches

- | | | |
|--|---|-----------------------------------|
| Bangalore : (080) 22128347 | Delhi : (011) 43575500 / 23278531 / 23276809 | Pune : (020) 27614793 |
| Chennai : (044) 25342636 / 31076849 | Ludhiana : (0161) 2722535 | Mumbai : (022) 66168400 |
| Secunderabad : (040) 27713177 | Kolkata : (033) 22485191 | Ahmedabad : (079) 22123277 |
| Rudrapur : +91 9891123139 | Indore : +91 9993592691 | Kanpur : +91 9935112276 |

C&F Agent : Lucknow (0522) 2683392 / 2683393
For Export enquiries : (022) 66168400

CUSTOMER CARE
PH : (0253) 2352315 | EMAIL : customercare@indiantool.com

With curiosity and determination, we – the Sensor People from Leuze – have been innovators for technological milestones in industrial automation for more than 50 years. The success of our customers is what drives us.

What distinguishes us



Share experience

With a pioneering spirit, we have been setting new standards in technological development time and again for over 50 years, thus reinforcing the high level of trust our customers place in us.



Show determination

We are focused on the success of our customers in our target markets – we diligently work towards this end in order to meet these expectations.



Use passion

The best results are achieved through extensive communication with our customers and partners



Drive change

Our work is future-oriented, we continuously spark new ideas and thus actively contribute to progressing the industry.

Leuze

For more information
Web; www.leuze.com



ABA Electricals Pvt. Ltd.
Engineers | Manufacturers | System Integrators



CALL:
85920
34476

www.abaelectricals.in



THINK OF
Solar Power.

Think of ABA

Go to Index



Indeed, ABA Electricals is synonymous with Solar Energy and Energy Saving. For over a decade we have been helping the domestic and the industrial sectors to save energy through the use of Solar Power which is reliable and pollution-free. ABA Solar System makes use of German technology known for immaculate precision and utmost reliability. It reduces dependence on grid-power and helps the user slash utility bills substantially.

ABA Electricals are eminent engineers, established manufacturers and seasoned system integrators.

After ascertaining the exacting needs, we design a system and install it at the customer end without any hassle. We have a dedicated, trained workforce that

accomplishes projects to the entire satisfaction of our customer.

Besides custom-built systems, we also provide SOLAR PANELS, BATTERIES and INVERTERS off the shelf.

We have an impressive list of satisfied customers representing a cross-section of the user industry including domestic, hospitality and government sectors. No job is too small for us and no challenge is too big. Innovation is the secret of our reputation and success. Our latest milestone is a SOLAR HOUSE built in Kerala!

So, think of generating your own power in-house! Call ABA.

Dealer Enquiries Are Solicited



ABA Electricals Pvt. Ltd.
12/17, Kovai Garden, Kovaipudur,
Coimbatore 641 042, Tamil Nadu
P: 0 85920 34476
E: abaelectricalsco@gmail.com

Opt for Uninterrupted Power!
We can custom-build both Off-grid
& on-grid solar power plants.

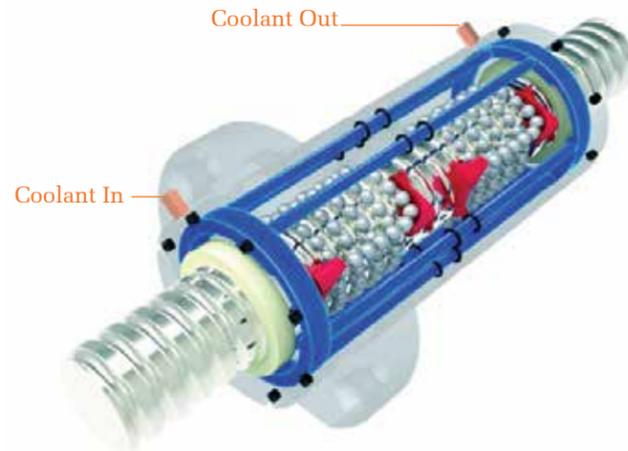
COOLING NUT SYSTEM-Direct Passing Type

Design Concept

The cool nut feature use forced cooling fluid to pass through the nut, which minimize heat generation and thermal expansion during ballscrew operation.

Features

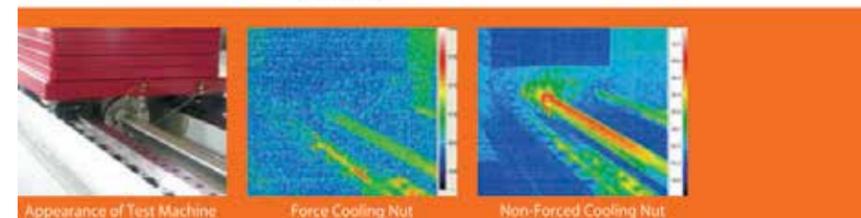
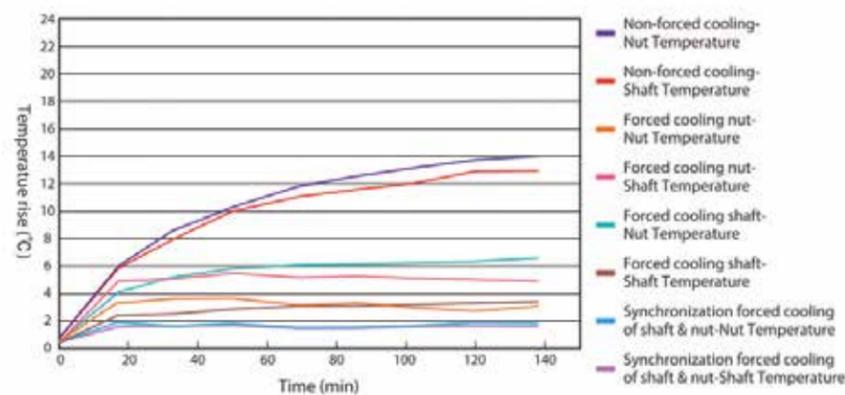
- Improve Positioning Accuracy and Stability
- Able to control the ball screw temperature, reducing thermal expansion. Hence it is a very helpful design to high precision machines tools.
- Shorten the Warm-Up Time
- Faster to stabilize the temperature, hence shorten the warm-up time for machine.
- Maintain the Performance of Lubricating Grease
- It is able to avoid high temperature which leads to lubricant grease quality deterioration.



Dynamic Exhibit Machine

Specification	R45-12T5-FDDA-1274-1569-0.018
Running length (mm)	690
Feed rate (m/min)	7.2
Mean rotation (rpm)	523.3
Acceleration (m/s ²)	5
Table weight (kgf)	200
Method for mounting	Fixed-Supported
Coolant	Mobil Velocite oil no.3 (ISO VG 2)
Coolant capacity (L/min)	3.1
Coolant temperature (°C)	Room temperature ±0.5°C

Measuring The Temperature Rise Curve



Go to Index



For more information

Headquarter **PRECISION MOTION INDUSTRIES, INC.**
E-mail: sales@pmi-amt.com.tw
Website: www.pmi-amt.com

Agent & Distributor in India **SUPERSLIDES & BALLSCREWS CO. INDIA PVT. LTD.**
E-mail: sales@superslides.in / info@superslides.in
Website: www.superslides.in



Specialized in
Platinum Cured Silicone Tubes,
Braided Hoses &
Inflatable Seals/Gaskets

Other Products

- FKM Cords & Tubes
- Silicone Antistatic Tube & Hoses
- Autoclave Gasket
- Triclover Gasket / Mesh Gasket
- Sifter Screen & Screen
- Metal Reinforced Extruded Profiles
- Corona Treater Sleeves
- Silicone / EPDM Sheet

CERTIFICATION

- FDA 21 CFR 177.2600
- USP Class VI
- ISO 10993
- German Bfr XV
- France Arrete Du 25
- TSE / BSE Free
- RoHS Certification
- Bisphenol A / Phthalate Free

Ami Polymer Pvt. Ltd.
"Sealing Expert in Silicone"
www.amipolymer.com | mktg@amipolymer.com

CORPORATE OFFICE
319, Mahesh Indl. Estate, Opp. Silver Park, Mira-Bhayander Rd.,
Mira Road (E), Mumbai-401104, Maharashtra. INDIA
MANUFACTURING PLANT
Plot No. 66-D/E, Govt. Industrial Estate, Near Beekaylon Factory, Masat,
Silvassa-396230, Dadra & Nagar Haveli. INDIA



Safe and fast DC Charging with insulation monitoring

DOLD has developed an intelligent solution for insulation monitoring especially for DC charging stations

The number of electric vehicles is constantly increasing and will grow even faster in the future. This will also help to expand the charging station infrastructure, as DC charging stations are the first choice when electric vehicles need to be charged in the shortest possible time. Electrical safety must be ensured during the charging process. For this

purpose, an unearthed DC power supply system (IT system) with insulation monitoring by an insulation monitoring device (IMD) is installed. The user must never be exposed to high voltages (up to 1000 V) at any time. DOLD has developed an intelligent solution for insulation monitoring especially for DC charging stations. The insulation monitor RN 5897/020

of the VARIMETER IMD family is used especially for DC charging stations according to the IEC/EN 61851-23 standard and monitors the charging process from the charging station into the vehicle. The device is characterised by the short response delay of $\leq 1s$, a nominal voltage up to DC 1000 V with an additional coupling device and the detection of asymmetrical as well as symmetrical insulation faults. The integrated voltage measurement ensures reliable determination of the insulation resistance in the IT system. The insulation monitor also has a self-test. This takes place automatically after power-on and after every full operating hour.

In addition to monitoring DC charging stations, the insulation monitor RN 5897/020 can also be used to monitor unearthed AC, DC, AC/DC system, UPS systems, networks with frequency converters or DC drives, battery networks and mobile power generators.



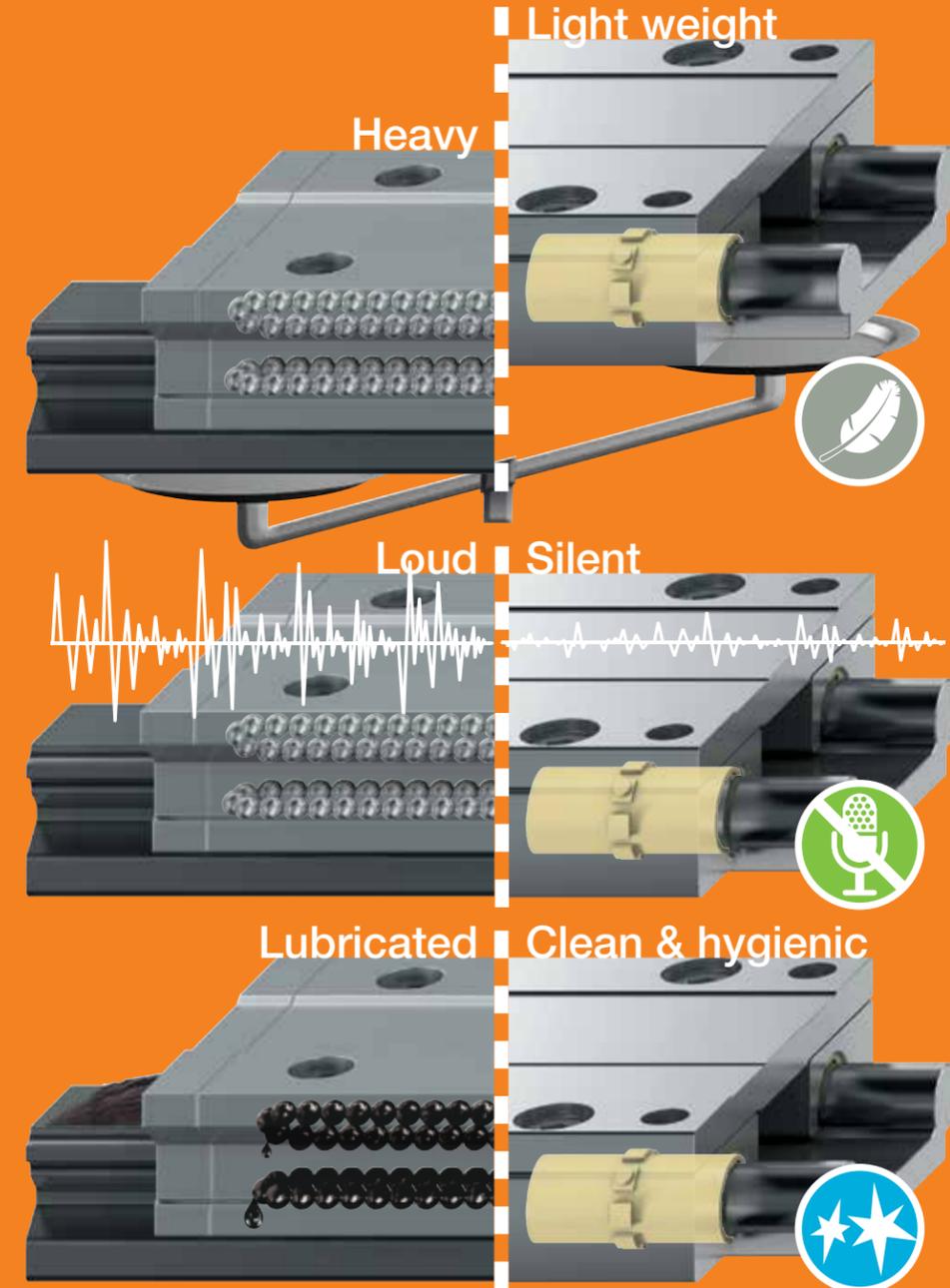
For more information
Web: www.dold.com

Go to Index



Change your bearing now!!!

... and save up to 40% cost with drylin® linear bearings



motion? plastics! Plastic instead of metal: Replace re-circulating ball guides and take advantage of the drylin® dry running technology. Calculate the exchange potential directly online and configure the drylin® linear bearings solution. Your application with drylin® can be reliably solved, please also check the factsheet: www.igus.in/change-linearbearing



igus® (India) Pvt. Ltd.
36/1, Sy. No. 17/3, Euro School Road,
Dodda Nekkundi Industrial Area - 2nd Stage
Mahadevapura Post Bangalore - 560048
Phone +91-80-45127800 Fax +91-80-45127802

igus.in
plastics for longer life®

SPEEDY RAIL: A Successful Sinergy Creates A Show



ROLLON
BY TIMKEN

How can you watch a football match without missing the details, while catching every emotion and moving quickly with the players, even if the weather gets worse and it starts to rain? It is possible. Imagine a camera mounted on self-supporting linear rails with potentially unlimited strokes, silent and able to work even in unfavorable environmental conditions. Now, this dream has become reality. This is what Rollon, a leading company in the linear motion sector, and Movikom, specialized in film shooting, have created together, putting technology at the service of the entertainment industry.

Movikom systems are currently used in cinematography, and the need for “special” filming began to emerge when a camera crew asked the company to create a remote control system mounted on a truck that would allow

them to shoot complicated stunts, like having the truck fall into a river, without engaging any stuntmen. That was the first time Movikom had to deal with camera platforms.

After the first project, they had more and more requests coming from both TV and film production companies. Therefore, they had to develop a specific product for this industry: the Robycam is a winches-based camera platform with advanced 3D motion control. Currently, this product, along with other solutions, is being used worldwide for shooting sport and cultural events.

A PERFECT FIT FOR SPEEDY RAIL

To build the new project, Movikom needed a long single rail, solid enough

to reliably carry a camera. This was also a safety requirement, since during filming the camera movement speed could be up to 10 m/s. The Robyrail system was intended for permanent installation in a stadium in the city of Minsk and it was necessary to be able to quickly mount the rails around the whole football field to obtain a discrete, non-invasive presence. Operation had to be silent, so as not to interfere with the audio, and sliding had to be optimal with any weather conditions. There was no time to deal with alignment problems or maintenance, and reliability had to be at maximum level and immediate.

Speedy Rail was chosen as the solution because it can satisfy the project's every requirement.

Movikom chose Rollon as partner because only few suppliers other than the Italian company could offer comparable linear rails.

For Robyrail, a single-track based camera movement system, designers

Continue on page no..44

www.engmag.in

ROLLON[®]
BY TIMKEN

Linear solutions global provider.



Go to Index



Linear Line

Actuator Line

Telescopic Line

Actuator System Line

ROLLON India Pvt. Ltd. - INDIA



1st floor Regus Gem Business Centre
26/1 Hosur road, Bommanahalli
Bangalore 560068, INDIA
www.rollonindia.in - info@rollonindia.in

Rollon is a global provider of linear motion solutions for several industrial sectors, such as: industrial machines, railway, automation, packaging and logistics, aerospace.





needed to make sure that the camera head remained as stable as possible as it moved. Good camera head on-the-track stability means smooth camera movement, which is crucial for a stable picture.

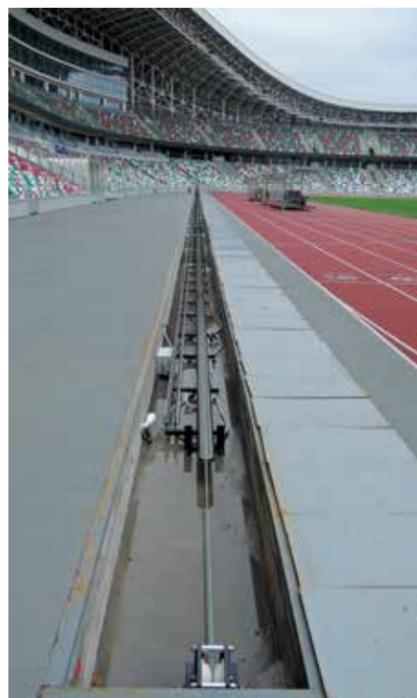
Since the RobyHead R3 camera head they were going to use had new drive motors, capable of moving the camera with very high velocity, a high-quality shooting would have been impossible without truly functional camera stabilization.

The Rollon Speedy Rail was part of what made such stabilization possible. Movikom appreciated the very long stroke of the Speedy Rail product and also the high quality of service Rollon specialists offered. The superior quality of the products did the rest.

TECHNICAL FEATURES:

Speedy Rail by Rollon is a self-sup-

porting linear rail with high durability over 80,000 km, easy to disassemble and reassemble thanks to the practical self-aligning junction kit. This offers the possibility to create potentially unlimited strokes on a modular basis, with changes and increases possible even



ROLLON: A CAPILLARY ORGANIZATION ON A GLOBAL SCALE

Rollon is close to its customers, both locally and internationally. Rollon's industrial and distribution organization has been developed to reach the customer on a global basis through a widespread network.

The Company can count on production sites, assembly logistics and a wide distribution network all over the world. The company is also present in India with its branch in Bangalore.

after years. It is uniquely quiet during sliding and able to work in total absence of maintenance, even outdoors and in critical environmental conditions. The self-supporting aluminum profiles that form the rails of Speedy Rail products are treated with a special hard anodizing treatment process, which gives them the same hardness of tempered steel, guaranteeing a very long product lifespan.

Steel rollers covered by a special plastic compound that allows a speed of over 15m/s with a particularly low noise level slide on the Speedy Rail linear rails. For this reason, this product can operate even in environments with a high level of impurities (glass and ceramic dust, sparks, wood, etc.) and in a wide temperature range, from -30°C to + 80°C.

*For more information:
ROLLON INDIA Pvt. Ltd.
1st floor, Regus Gem Business Centre
26/1 Hosur road, Bommanahalli
Bangalore 560068, INDIA
Tel: +91 80 67027066
Fax: +91 80 67027004
E-mail: info@rollonindia.in
Web: www.rollonindia.in*

Go to Index



Transform the performance of your current CMM



Renishaw's one stop retrofit service offers:

- direct hardware and software support from Renishaw
- unparalleled choice of 3 and 5-axis sensor systems
- Renishaw scales, readers, thermal compensation & reference sphere
- rapid exchange service on all system elements

More capability, more throughput, more confidence.

For further information please visit www.renishaw.com/cmmretrofit



Platinum cured Silicone tubing for biopharmaceutical Industry



Biopharmaceuticals are among the most sophisticated and elegant achievements of modern science. The huge, complex structures of these drugs do not just look extraordinary in the 3-D modeling systems used to design them; they also perform their jobs remarkably well, offering high efficacy and few side effects. There is much more to come: existing treatment archetypes are evolving and becoming more sophisticated all the time, and continuing research is yielding entirely new types of products.

Radically new concepts are making it to the market, such as the cell therapy Provenge, which is used to treat cancer, and, somewhat further out, gene therapies, which offer even more amazing promises of regenerative medicine or disease remission. Yet there are operational and technological challenges. Reproducing large molecules reliably at an industrial scale requires manufacturing capabilities of a previously unknown sophistication.

In Biopharmaceutical process, there are many single use products used to avoid contamination, ease of operation and increase in productivity. Silicone tubing plays a major role in BIOPHARMACEUTICAL PROCESS including Lab level, Pilot scale and production scale. Here, we will be looking into the Sili-

cone tubing applications in Biopharmaceutical Industries.

Silicone: The material of choice for purity

Silicones are one of the most extensively tested materials used in healthcare applications, dating back to the 1950s. The advantages of Pt-catalyzed silicone tubing include its inherent purity, flexibility and ease of sterilization. In addition, silicone materials are inert and biocompatible, with no adverse effects on human health. Resilience, as well as kink and pressure resistance, are also major benefits of silicone tubing and make it an excellent choice for pharma and biopharma processing. Categorized as thermoset materials, silicones are stable under a wide range of temperatures, from minus 80°C to at least 215°C. This class of silicones are not sensitizing, pyrogenic, genotoxic, cytotoxic or hemolytic, and they exceed USP [88] Class VI tests.

In a platinum-based silicone cure system, also called an addition system (because the key reaction-building polymer is an addition reaction), a hydride- and a vinyl- functional siloxane polymer react in the presence of a platinum complex catalyst, creating an ethyl bridge between the two. The reaction has no byproducts. Such silicone rubbers cure quickly. The Ami Polymer Pvt Ltd makes Imature™

brand Pharma Tubing products are made with a platinum-catalyzed process involving a two-part system consisting of a vinyl-functionalized siloxane polymer base, siloxane cross linker containing Si-H functionality, silica filler and the platinum catalyst (see Figure 1).

This process requires no processing aids, no organic plasticizers and no stabilizers. Only a low level of catalyst is used, and there is no formation of by-products. As no organic additives are introduced into the formulation and no byproduct is formed, the Extractables profile is predictable and consists primarily of low levels of low molecular weight oligomers originating from the silicone polymers.

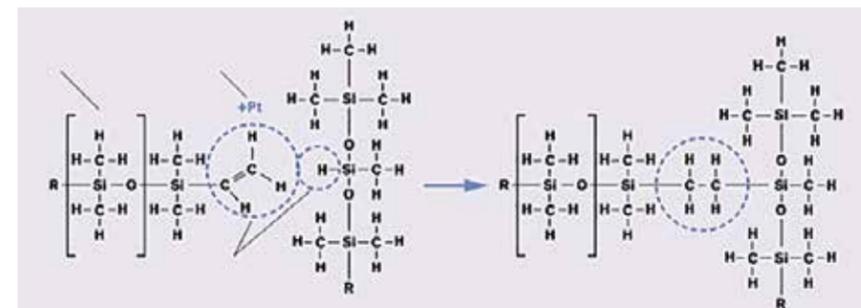
Benefits of Platinum cured Silicone Tubings over Peroxide cured silicones:

Properties	Peroxide Silicones	Platinum Silicones
Shelf life	Limited	3-5 years
Transparency over period of time	Turns yellowish	Remain transparent
Odor	Can be	Odor free
Extractable	Can be	Risk Free
Repeated sterilization	Yellowish	Retains transparency
Tear Resistance	Good	Excellent
Impurity detection systems	No device available. Over temp variation can leave impurities	No by product. No Impurity. No Risk.

Platinum cured silicone tubings are ideal choice in Biopharma industry for various applications in upstream and down-stream applications.

- Media fill and transfer
- Fill finish applications
- Peristaltic pump based drug transfer application
- Cell culture application
- Sampling of intermediates and final products

For more information
Web: www.amipolymer.com



240me

ONE DAY.
ONE MILLION VARIANTS.
YOUR ENCODER.

INDIVIDUAL SAME-DAY MANUFACTURING
FOR INCREMENTAL ENCODER FAMILY SENDIX 5000 / 5020.



PERFORMANCE UP
COST DOWN

Effect of Weld Metal Composition and Post Weld Heat Treatment on Mechanical, Corrosion & Microstructural Properties Of 308L, 309L Austenitic Stainless Steel Weldments

S.MOHAN, V.BALASUBRAMANIAN, NINAND THIGALE

Austenitic stainless steels (ASS) are widely used material in nuclear reactors and power plants because of their good ductility, excellent corrosion resistance and reasonable weld ability. But, to reduce the construction cost of vessels, stainless steel (SS) base metal is replaced by Carbon or low alloy steel and SS was cladded above the carbon steel for corrosion resistance. During cladding or welding, internal stresses are formed in the base metal. To remove those stresses, cladded base metal parts are post weld heat treated at 620°C & 690°C for 1hour. ASS weld metal contains some amount of ferrite to reduce the hot cracking. During Post weld heat treatment ferrite content in the weld metal is transformed into chromium rich secondary phases. These secondary phases make chromium depletion zones around them. The chromium depletion zones led to intergranular corrosion and affect the mechanical properties of the weld metal. The transformations of secondary phases depend on ferrite number of weld metal. Hence, the ferrite number was varied to achieve better mechanical property and corrosion resistance of weld metal. In this work, two different grades (AISI 308L, 309L) of austenitic stainless steel electrodes are manufactured to 6 different types to attain different ferrite number weld metal by changing chemical composition through flux. The properties of undiluted weld metal are evaluated before and after post weld heat treatment condition of 620°C & 690°C for

1hour. This thesis reports the effect of PWHT on impact toughness properties, lateral expansion, ferrite number, corrosion properties and micro structural properties of E308L, E309L weld metals with different ferrite numbers. From this investigation, it is found that mechanical properties of the high ferrite number weld metal drastically changed compared to low ferrite number weld metal.

KEYWORDS:

308L, 309L austenitic stainless steel, ferrite number, post weld heat treatment, impact toughness, micro structural properties

Introduction

Austenitic stainless steel is widely used among stainless steel group because of the properties of easily weldable and formable. They are most easily recognized as nonmagnetic. A literature survey indicates austenitic stainless steel used as electrodes for the welding of heavy structures in ship building, pressure vessels and heavy vehicles, in order to meet the requirement of good impact properties along with adequate strength [1]. Austenitic stainless steel had less than 0.15% carbon, 16 to 28% chromium and 9 to 30 % nickel. Chromium reacts with the atmosphere oxygen and form passive layer of chromium oxide. It prevents the further oxidation and nickel is enhancing the property of the toughness at cryogenic temperature. Austenitic stainless steels are indicated by 200 and 300 series.

Austenitic stainless steel weldments are solidified as austenite as their primary phase and small amount of ferrite [2],[3]. This ferrite was act as barrier to hot cracks, small fissures during solidification of weld zone. Fissures size and amount in the weldment is indirectly proportional to amount of ferrite present on the weldment [4]. The most widely used austenite steel electrode is the E308L, E309L also known as 18/9, 22/12 for its composition of 18% chromium, 9% nickel and 22% chromium, 12% nickel. By varying the chemical composition of the 308L, 309L weld metal within the range mentioned in the ASME SEC II, ferrite content is changed. Post weld heat treatment is the stress relieving process and during this process weldment and HAZ is heated near to critical temperature and kept for some time based on material thickness. Then cooled slowly to room temperature during post weld heat treatment strength of the material is increase [5].

The two major problems that arise during depositing of the austenitic stainless steel electrodes are hot cracking and sensitization. Low melting impurities such as sulphur (S), phosphorous (P) are reason for the hot cracking in austenitic stainless steel weld metal. Which tend to penetrate grain boundaries during welding and generating cracks and shrinkage stress during solidification of weldmetal. This problem can be controlled by adjusting the composition of the filler material to obtain a-ferrite in the aus-

Continue on page no..50

Go to Index




“ INDIA’S BIGGEST NAMES IN R & D, PETROCHEMICAL, PHARMACEUTICAL, AUTOMOTIVE, SEMI CONDUCTOR, PROCESS INSTRUMENTATION, CHEMICAL, AEROSPACE, DEFENSE, POWER, FOOD PROCESSING AND MANY OTHER INDUSTRIES TRUST US FOR VARIOUS ADVANCED ENGINEERING SOLUTIONS SINCE THE LAST 50 YEARS ”

GAST – Precision Air Moving Products | TESCO – Pressure Control Solutions & Gas Management | HORIBA – Mass Flow Controllers | HAM-LET – Instrumentation Fittings & Valves | ITT ENIDINE – Energy Absorption & Vibration Isolation | MEECH SHAVOTECH – Static Elimination Solutions & Surface Cleaning Technologies | CLASSIC FILTERS – High Pressure Filtrations | APPLIED ENERGY SYSTEMS - High Purity Gas Delivery Systems | ASGE – Advanced Specialty Gas Equipment | GFP – Gas Flow Products

Static Elimination Solutions & Surface Cleaning Technologies

Precision Air Moving Products

Energy Absorption & Vibration Isolation

Instrumentation Fittings & Valves

Pressure Control Solutions & Gas Management

High Pressure Filtrations

Gas Flow Products

Gas Delivery Systems

Mass Flow Controllers

SHAVOTECHNOLOGIESPVT.LTD.
29/2 Kharadi, Off Pune Nagar Road, Old Kharadi Mundhwa Road, Pune: 411 014
Tel. No.: +(91) (0) 7030938211, 7410004817, Fax No.: +(91) (080) 28395963 | Email: shavogroup@vsnl.com | Website : www.shavogroup.com

tenite matrix [3]. Heat input or cooling rate of the weld metal also have some influence on the ferrite formation, but chemical composition have more influence on changing ferrite level in weldment compared to heat input [6]. The ferrite provides ferrite-austenite grain boundaries, which are able to control the sulphur and phosphorous compounds and hot cracking.

If austenitic stainless steels will extensively heated or slowly cooled in the temperature range of 450°C to 850°C, chromium rich secondary phases like metal carbides, chi phase and sigma phase are precipitate along the grain boundaries of the ferrite in the weldment leading to chromium depletion in the vicinity of the grain boundaries, this phenomenon is called sensitization [7-13]. The chromium depletion vicinity area in the aged material is directly proportional to aged time and temperature [14]. These secondary phases were reduces the Corrosion and mechanical properties like toughness and ductility of the austenitic stainless steel weldment drastically [5], [15], [16]. Some chemical elements like molybdenum, silicon are promotes these secondary phase formation and copper will delays the secondary phase formation [17]. During aging, if ferrite grain boundary has low carbon content, chi and sigma phases will form. Otherwise metal carbides will form before chi and sigma phase formation. Chi phase will fully converted in to sigma phase by long time of aging [11]. This problem is controlled by adjusting the ferrite content and ferrite morphology in the austenite matrix weldment.

2. EXPERIMENTAL WORK
2.1 WELD ASSEMBLY

308L and 309L bare wire is used to produce electrodes in this project work. Chemical composition of the bare wire is showed in the table 2.1. These 2 wires are made in to 6 different austenitic

Table 2.1 Bare wire Chemical Composition

BARE WIRE	%C	%Cr	%Ni	%Mo	%Mn	%Si	%P	%S	%Cu	%Nb	%N
308L	0.022	19.75	9.20	0.176	1.51	0.42	0.028	0.01	0.102	0.02	0.064
309L	0.025	23.48	12.98	0.011	1.83	0.41	0.016	0.01	0.104	0.03	0.084

Table 2.2 308L & 309L electrode Chemical Composition

Heat No	%C	%Cr	%Ni	%Mo	%Mn	%Si	%P	%S	%Cu	%Nb	%N	WRC FN
1	0.036	19.5	9.6	0.103	0.910	0.45	0.034	0.01	0.074	0.038	0.086	4
2	0.037	19.98	9.54	0.065	0.89	0.43	0.039	0.01	0.046	0.038	0.082	7
3	0.032	20.69	9.31	0.235	0.94	0.42	0.033	0.01	0.17	0.040	0.080	11
4	0.030	22.59	13.06	0.304	1.47	0.7	0.027	0.02	0.166	0.047	0.104	6
5	0.037	23.56	12.82	0.302	1.5	0.77	0.017	0.014	0.103	0.042	0.110	9.5
6	0.038	24.47	12.8	0.302	1.58	0.77	0.024	0.024	0.106	0.046	0.106	13

stainless steel ferrite number weld metal by varying the chemical composition through flux. Chemical composition of the 6 different ferrite number weldmetal is shown in the table 2.2. Heat no 1-3 indicates 308L and heat no 4 – 6 indicates 309L weld metal chemical composition. C-Mn steel (IS 2062 grade B) is used as base material and 3.15 x 350 mm austenitic stainless steel electrode was used to make SMAW joints. The chemical composition of the base metal is shown in table 2.3. IS 2062 material is used as base metal for weld assembly, ferrite pad and IGC pad.

C-Mn steel, 15 mm thickness is used for fabrication of single 'V' but joint configuration as shown in Figure 2.1.

Welding parameters like root gap, Bevel angle, Interpass temperature, Back plate and Base plate dimensions are selected as per the ASME section II C – SFA 5.4. The base material IS 2062 used in the present investigation at the size of 300mm X 125mm X 15mm and Backing plate of size 370mm X 30mm X6.5mm. The initial joint configuration was obtained by securing the plates in position using tack welding. After tack welding 3mm butter layer is added to base metal to prevent the dilution of the base metal into weld metal. Interpass temperature was maintained

at maximum of 150°C. The process parameters used in the fabrication of joints are presented in Table 2.4. Then weld is made Plates are welded in flat (1G) position and DCEP polarity was used.

Table 2.3 Base material Chemical Composition

%C	%Mn	%S	%P	%Si
0.23	1.50	0.04	0.038	0.40

Table 2.4 welding parameters

Heat No	Current (A)	Voltage (V)	Average Travel speed (mm/s)	Average Heat Input (KJ/S) – MAX
1	107 – 110	20 – 22	2.17 – 2.35	1.12
2	107 – 110	20 – 22	2.17 – 2.35	1.12
3	107 – 110	20 – 22	2.17 – 2.35	1.12
4	107 – 110	20 – 22	2.17 – 2.35	1.12
5	107 – 110	20 – 22	2.17 – 2.35	1.12
6	107 – 110	20 – 22	2.17 – 2.35	1.12



Fig 2.1Weld assembly

The welded joints are sliced and machined to required dimensions for preparing impact and micro specimens under (American Society for Testing of

Continue on page no.52

Go to Index



ALWAYS AHEAD...

Manufacturer of Precision Turned Brass Components in India



PRODUCT RANGE

- Knurling Inserts | Turned Components
- Precision Miniature Parts
- Electrical Contacts
- Fasteners & Spacers | Sheet Metal Components
- Contact Pins & Sockets | Machined Screws
- Ceramic Terminal Block

FACTORY

Plot No. 3690 / 3691, G.I.D.C., Phase - III, Pramukh Swami Circle, Road No. 7, Dared, Jamnagar - 361 004. GUJARAT - INDIA
 Tel.: +91-288-2730 852 / 53 / 54 / 55 / 56, Fax: +91-288-2730 857
 Email: snehal@shivombrass.in | yash@shivombrass.co.in
 Website: www.shivombrass.co.in

Materials) ASTM guidelines.

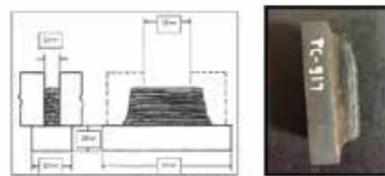


Fig 2.2 Ferrite pad

2.2 Ferrite pad

Ferrite pad is prepared as per the ASME sec II part C SFA-5.4/SFA-5.4M. The ferrite pad is built up between two copper bars laid parallel on the base plate by depositing single weld bead layer by layer. Schematic diagram of ferrite pad is and prepared ferrite pad is shown in fig 2.2.

Fig 2.3 Prepared IGC weld pad



2.3 IGC Pad

IGC pad was prepared by depositing the electrode on the base metal. The pad shall be welded in the flat position, using as short an arc length as practical. Multiple layers are used to obtain undiluted weld metal. Prepared IGC pad was shown in fig 2.3

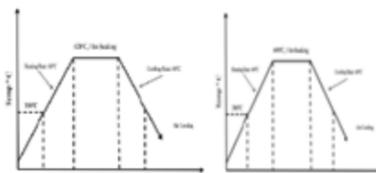


Fig 2.4 620°C & 690°C PWHT Cycle

2.4 Post weld heat treatment

After welding weld assembly, IGC specimen and ferrite pad from each heat are subjected to two post weld treatment temperature of 620°C and 690°C for one hour. Fig 2.4 showed the PWHT

cycle for weld metals.

2.5 Sample preparation

Test samples are prepared with dimensions and tested as per the ASTM E23 standard. From each assembly, impact samples are prepared with specified dimensions. The Charpy impact test was conducted at -20°C using a pendulum type impact testing machine.

The microstructure of weldments was analyzed using a light optical microscope. The specimens after polishing to mirror finish then etched with combination of distilled water – 70ml, HCL – 15ml and HNO3 – 5ml was specified in ASTM E407 is used to reveal the microstructure. IGC specimens are prepared with dimensions mentioned in the ASTM E262 standard and prepared. IGC specimens are shown in fig 2.5. Corrosion rate was measured by following formulae

$$\text{Corrosion rate (Millimeters per month)} = \frac{7305 \times W}{D \times A \times T}$$



Fig 2.5 IGC specimen

3. RESULTS

3.1 Ferrite number

Ferrite numbers of each heat weldments is measured by ferritescope before and after post weld heat treatment and listed in table 3.1. From the results we know that ferrite number of the weld is reduced after post weld heat treatment. Reduction percentage of ferrite number is increase with increasing post weld heat treatment temperature from 620 to 690 °C. It shows that secondary phase formation increased with post weld heat treatment temperature.

In 308L weld metal high amount of

ferrite was transformed into secondary phases in high ferrite weldment (FN 11) compared to low ferrite weldment (FN 4). But, During PWHT high percentage of ferrite in the low ferrite weldment (FN 4) will be transformed into 55% of secondary phases com-

Table 3.1 Ferrite number According to Ferritescope and WRC-1992(FN) Diagram

ELECTRODE TYPE	HEAT NO	FERRITE NUMBER FOR WRC1992 DIAGRAM	Ferritescope	
			As Weld condition	PWHT @ 620°C / 690°C
308L	1	4	7.7	4.5 / 3.4
	2	7	9.7	6.3 / 4.7
	3	11	12.8	8.8 / 6.8
309L	4	6	6.5	5.1 / 3.5
	5	9	9	6.8 / 2.9
	6	13	12.6	9.5 / 2.3

pared to high ferrite weldment (FN 11) transformed into only 45 % of secondary phases at post weld heat treatment temperature of 690 °C. In 309L material ferrite reduction rate was high in the high ferrite number weld metal due to high amount of chromium content.

3.2 Impact properties

The Charpy impact toughness value and lateral expansion are observed to all heat at as weld condition and post weld heat treated specimens at - 20°C and found that low ferrite number weld have high toughness compared to high ferrite weld. For each heat number, as welded joints have higher toughness when compared to post weld heat treated weld joints. Ferrite is brittle phase compared to austenite. So toughness was reduced while increasing ferrite content. When the weldment is subjected to post weld heat treatment chromium rich secondary phases like chromium carbide, chi phase and sigma phase are formed. It will reduce the ductility and toughness drastically.

Table 3.4 shows IGC practice E results. In 308L all ferrite number electrode at all weld conditions are passed without any fissures and cracks formation in IGC practice E. In 309L all ferrite

Continue on page no.54

Go to Index



An ISO 9001:2015, 14001:2015, 45001:2018 Company
PRIMA EQUIPMENT

Designer & Manufacturer: Pollution & Environment Monitoring Equipment



We are concerned about the most cherished dream in the world - LIFE



PRODUCT LINE

Continuous Emission Monitoring System Extractive, Hot Extractive, Hot-Wet Extraction, Dilution or In-situ measurement system with

- Electrochemical Gas Analyzer
- UV-DOAS Gas Analyzer
- Laser TDLAS Gas Analyzer
- NDIR Gas Analyzer
- Photo Ionization Gas Analyzer
- Flame Ionization Gas Analyzer

Dust Monitoring System

- Triboelectric / Laser Scattered

Toxic Gas Analyzer / Detector

Single Point Gas Detection

Multi Point Area Surveillance Gas Detection

Portable / Hand-Held Gas Detector

Oxygen & Trace Oxygen Gas Analyzer

Head Space Oxygen Analyzer

Flue Gas Analyzer

Ambient Air Quality Monitoring System

Low Volume Personal Air Sampler

APPLICATIONS

- Industrial Process Analysis
- Gas Emission Monitoring
- Dust Emission Monitoring
- Effluent Water Monitoring
- Safety & Occupation Health Monitoring
- Quality Control Monitoring
- Environmental Monitoring

ADVANTAGES

- In-house self-Designed & Manufactured
- Customized Design
- Manufactured as per International quality norms
- Application & Technical support
- Affordable CAPEX & Low OPEX & MATEX products
- Fast Response & Delivery
- Excellent After sales service
- Experienced and professionally expert team
- Proactive distribution network
- Ethical business policies
- Smooth communication



Contact us:

Registered Office Address:

21, 3rd Floor, Lohana Building, Raopura, VADODARA-390001, INDIA
Phone: #91 265 2416938, M. #91 98250 07609

Works & R&D:

Block No.128, Dabhasa-umraya Road, Opp. Cadila Healthcare Ltd, Village. Dabhasa, Ta. PADRA, Dist. VADODARA - 391 440, INDIA
Phone: #91 2662-244371/2/3, 75748 56749/50

Group Companies:

PRIMA HI TECH EQUIPMENT PRIVATE LIMITED

Manufacturer & Exporter:
Pollution & Environment Monitoring Equipment

PRIMA ENVIRONMENTAL MONITORING & ANALYTICAL LABORATORY

An Exclusive, Authentic & Trustworthy Analysis

Email: info@primaequipment.com Web: www.primaequipment.com

TOLL FREE: 1800 270 7609





Table 3.2 Impact toughness value at -20 °C

ELECTRODE TYPE	HEAT NO	FERRITE NUMBER	As weld condition (JOULE)	PWHT @ 620°C (JOULE)	PWHT @ 690°C (JOULE)
308L	1	4	80	68	60
	2	7	74	62	58
	3	11	68	60	56
309L	4	6	63	56	11
	5	9	55	47	08
	6	13	52	38	07

Table 3.3 Lateral expansion value at -20 °C

ELECTRODE TYPE	HEAT NO	FERRITE NUMBER	As weld condition (mm)	PWHT @ 620°C (mm)	PWHT @ 690°C (mm)
308L	1	4	1.35	1.19	1.07
	2	7	1.27	1.11	1.02
	3	11	1.14	1.05	0.94
309L	4	6	1.05	0.91	0.37
	5	9	0.91	0.70	0.33
	6	13	0.82	0.65	0.30

3.5 IGC practice E results

Table 3.4 IGC practice E results

MATERIAL TYPE	HEAT NO	FERRITE NUMBER	As weld condition	PWHT @ 620°C	PWHT @ 690°C
308L	1	4	PASS	PASS	PASS
	2	7	PASS	PASS	PASS
	3	11	PASS	PASS	PASS
309L	4	6	PASS	PASS	FAIL
	5	9	PASS	PASS	FAIL
	6	13	PASS	FAIL	FAIL

number electrode weld metal at as weld condition was passed. At post weld heat treated condition of 690°C for 1 hour all ferrite number welds are failed. Because formation of secondary phase was faster in 690°C PWHT temperature compared to 620°C PWHT temperature.

Table 3.5 shows IGC practice C results. High ferrite number welds have high corrosion resistance. Because high fer-

Table 3.5 IGC Practice C results

HEAT NO	FERRITE NUMBER	As weld condition (Mils per year)	PWHT @ 620°C (Mils per year)	PWHT @ 690°C (Mils per year)
1	4	29.765	25.76	28.59
2	7	29.74	29.74	29.85
3	11	27.39	28.85	28.49
4	6	18.882	22.98	17.93
5	9	17.60	19.67	20.31
6	13	17.41	19.85	16.17

rite welds have high chromium, Due to that passive layer strength is increased and corrosion rate is reduced. 309L weld metal have low corrosion rate

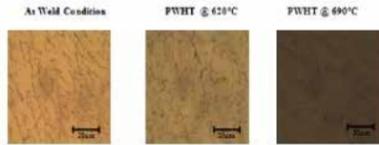


Fig 3.1 FN4 - FN4 weld metal microstructure with different PWHT temperature



Fig 3.2 FN7 - FN7 weld metal microstructure with different PWHT temperature



Fig 3.3 FN11 - FN11 weld metal microstructure with different PWHT temperature



Fig 3.4 FN6 - FN6 weld metal microstructure with different PWHT temperature



Fig 3.5 FN6 - FN6 weld metal microstructure with different PWHT temperature



Fig 3.6 FN13 - FN13 weld metal microstructure with different PWHT temperature

compared to 308L material. Because 309L materials have 22 - 25 % chromium and 308L material have 18 - 21 % chromium. Due to high chromium percentage corrosion rate is low in 309L material.

3.6 Microstructure

The microstructure of the joints was examined and optical micrographs taken at weld region are displayed in Figure.3.1, 3.2, 3.3, 3.4, 3.5 & 3.6 at 1000X magnification condition. In 308L weld metal Vermicular ferrite structure is observed in the low ferrite weldment FN 4 and FN 7 (fig 3.1 & 3.2). Lacy ferrite structure is observed in high ferrite weldment FN11 (fig 3.3). In 309L weld

metal vermicular ferrite is observed in the low ferrite weld metal FN 6 (fig 3.4), combination of vermicular and lacy ferrite was identified in the medium ferrite weld FN 9 (fig 3.5) and lacy structure was formed in high ferrite weld metal FN 13 (fig 3.6). These ferrite structures in the weldments are demised when weldments are subjected to post weld heat treatment.

The demised ferrite content in the weld metal was transformed in to chromium rich secondary phases like metal carbides (M23C6), Chi and sigma phase.

4. DISCUSSION

4.1 Effect of weld metal chemical composition and PWHT on ferrite number In 308L weld metal higher ferrite number is obtained in heat no 3 (table 2.2) and in 309L weld metal higher ferrite number is obtained in heat no 6 with changing the chemical composition of electrode as increasing chromium content and reduce the nickel content. Chromium is the strong ferrite stabilizer, so ferrite content in this weldment is increased. At heat no 1 and 4, low ferrite are obtained reducing the chromium content and increasing nickel content. Ferrite number of each weldment after post weld heat treatment was reduced when compared to as welded condition weldment. Because during post weld heat treatment ferrite content in the weldment is transformed in to secondary phases like metal carbides, chi phase and sigma phases [6-13]. These secondary phases all are non-magnetic. It cannot be measured by ferritoscope. So measured ferrite number value is reduced. Ferrite reduction rate was high in 309L high ferrite weld metal.

4.2 Effect of weld metal chemical composition and PWHT on impact properties

Percentage of ferrite phase in the aus-

Continue on page no.56



Cross Roller Bearing



Ballscrews
Linear Guideway
Actuator
Cross Roller Bearing



Cooling Nut System



Wide Rail Type



Full Roller Type



Actuator KM Series

Go to Index



Precision Ball Screw Spine



High Lead Series

Headquarter



PRECISION MOTION INDUSTRIES, INC.
No.71, Ln. 20, Dafu Rd., Shengang Dist.,
Taichung City 42946, Taiwan
TEL: +886-4-25282984
FAX: +886-4-25120834
E-mail: sales@pmi-amt.com.tw
Websit: www.pmi-amt.com

Agent & Distributor in India



SUPERSLIDES & BALLSCREWS CO. INDIA PVT. LTD.
SUPERSLIDES HOUSE, A-774 T.T.C Industrial Area, Off Thane-Belapur
Road, Next to SGS, Koparkhairne, Navi Mumbai-400 701 INDIA
TEL: 022-4935 555 (40 Lines) FAX: 022-4935 5556
E-mail: sales@superslides.in / info@superslides.in
Websit: www.superslides.in

tenitic stainless steel weld metal plays the important role in changing the toughness and lateral expansion in weld metal. Heat no 1 have high toughness and lateral expansion due to high amount of austenite in the weld metal compared to heat no 2 and 3 (table 3.2 and 3.3). During post weld heat treatment chromium rich secondary phases are precipitated at the ferrite grain boundary and grow towards the centre of ferrite grains [7-13]. These chromium rich phases are very hard and brittle [15, 16]. These phases are restricting the movement of the dislocations in the weld metal during elongation. So, it will reduce the ductility and toughness of the weld metal drastically. Heat no 4, 5, 6 have low impact toughness compared to heat no 1, 2, 3 weld metal. Because heat no 4, 5, 6 have high chromium content (22% -25%). This high chromium content accelerates the secondary phase formation and reduces the toughness drastically to brittle fracture at post weld heat treat condition.

4.3 Effect of weld metal chemical composition and PWHT on micro-structure

The weldment of ferrite number 4, 6 and 7 has vermicular ferrite morphology (figure 3.1, 3.2, 3.4) in as weld condition. Low ferrite content is the reason for the vermicular ferrite morphology [17]. Vermicular ferrite has fewer coherencies with the austenite [8]. Due to this high energy grain boundary is formed. When the weld metal is exposed to PWHT the ferrite is transformed into secondary phases and ferrite will demises. Ferrite number 11 weld metal has lacy ferrite morphology (figure 3.3). During PWHT it will transformed in to secondary phases. The demising rate of the ferrite is high at PWHT temperature 690°C when compared to 620°C. Because transformation rate of ferrite is higher at 720°C and 690°C is comparatively near to that

temperature [14]. Ferrite number 11 weld metal has lacy ferrite morphology. Lacy ferrite has high degree of grain boundary coherency with austenite [8]. Due to that it has less percentage of ferrite transformation tendency compared to vermicular ferrite structure. So, in the lacy ferrite structure (FN11) 45% of ferrite is transformed in to secondary phases at PWHT at 690°C. But in the vermicular ferrite (FN4) 55% of ferrite is transformed in to secondary phases at PWHT at 690°C. But in 309L weld metal ferrite demises rate is high in lacy ferrite structure (FN 13) compared to vermicular ferrite (FN 6). It clearly shows chromium content in the weld metal also play the major role in the demises of ferrite phase.

4.4 Effect of weld metal chemical composition and PWHT on corrosion properties

In 308l material, high ferrite number weld metal have high corrosion resistance due to high amount of chromium present in the weld metal. Chromium content in the weld metal was further strengthening the passive layer of the weld metal. Due to that corrosion resistance was increased. After post weld heat treatment corrosion rate was reduced in low ferrite weld metal due to stress relive and for high ferrite weld metal corrosion rate was increased due to chromium rich secondary phases formed. These chromium rich secondary phases formed chromium depletion zones. It leads to low resistance to corrosion.

In 309l material also same trend is followed in the as weld condition weld metal. But after post weld heat treatment corrosion resistance was increased. In 309L weld metal also chromium rich secondary phases formed. But due to high chromium content(22-25%) and diffusion rate of chromium in the weld metal, chromium depletion zones are not formed in the weld met-

al[14]. Due to that 309L have high corrosion resistance [19].

5. CONCLUSIONS

From this investigation, following conclusions are derived,

1. Ferrite number of weld material was reduced when the material was exposed to PWHT. Reduction percentage of ferrite was high at 690 °C compared to 620 °C. Ferrite was transformed into secondary phases like metal carbides, sigma phase and secondary austenite due to PWHT.
2. The impact toughness, lateral expansion of the weld metal was reduced when the ferrite content of the weld metal was increased. Because ferrite had higher amount of chromium and it reduced the ductility.
3. The impact toughness, lateral expansion of the weld metal was reduced when the weld metal exposed to PWHT due to secondary phases formation. 309L weld metal has low toughness and lateral expansion.
4. Microstructure was analyzed before and after PWHT. The weld metal of low ferrite number microstructure consisted of austenite and vermicular ferrite and high ferrite number have austenite and lacy ferrite morphology.
5. 309L weld metal has high corrosion resistance compared to 308L weld metal. After PWHT 309L corrosion resistance is further increased.

ACKNOWLEDGEMENTS

The authors are thankful to ADOR WELDING, PUNE for providing base material, electrodes and extending fabrication facility for joint fabrication providing testing facilities to carry out this investigation.



For more information
<https://www.adorwelding.com/>



Go to Index



112, Yusuf Meherali Road, Keshavji Jadhvaji Building, 1st Floor, Room No. 17-A, Mumbai - 400 003.
Tel.: 022 - 2341 4240 / 2411 6964, **Fax:** 022 - 2342 7021, **Mob:** 93222 27959, 98201 50116, 93200 63362
Email: vmaruti@vmtraders.net / vinodmaruti@vmtraders.net, **Web:** www.vmtraders.com

Machine tool manufacturer uses an igus guidance system for long unsupported lengths in its gantries

Large machining centre gantries are the speciality of machine tool builder Kao Ming in Taiwan. The long travel lengths of up to 13 metres provide challenging requirements for the supply of energy and media. By choosing guidelok supplied by motion plastics specialist igus, Kao Ming has improved machining results due to the low level of vibration caused by operation of the e-chains

Kao Ming is a pioneer in Asia in the development and manufacture of heavy-duty robotic milling machines. The KMC-G series is one of the Taiwanese company's largest gantry machining centres. The system is designed around a gantry i.e. the machining table with the workpiece remains stationary. With travel lengths of 13 metres, this design is especially useful for large-volume, heavy workpieces and is mainly used for workpiece machining in the aviation and machine tool industry. In the KMC-G series, Kao Ming uses the guidelok energy supply system for high unsupported lengths, in combination with an E4.80 energy chain.

Horizontal guidelok system guides upper run reliably and safely



The long travel length and large number of cables and hoses place tough requirements on the energy supply system. The pivoting roller holders of the guidelok system allow the e-chain to run freely while supporting the upper run. (Source: igus GmbH)



The gantry machining centre KMC-G is designed for workpieces from the aviation and machine tool industry. The x-axis of the travels over 13 metres. (Source: igus GmbH)

The gantry machining centre is equipped with a changing device for the machining spindle so that milling heads can be used at different angles. Due to the large number of spindles which have to be guided from the central control cabinet through the plant to the milling unit, there are a large number of cables and hoses for energy, media and data.

"For longer travels, no energy chain can be used without support. This is especially true when you consider the extra weight of the hoses and cables inside the chain," explains Kao Ming General Manager Tim Chang.

The guidelok system fulfils all these requirements. The supporting rollers guide the upper run of the E4.80. Each

roller can move out of the way when the chain radius moves past it. Moreover, the design allows the option to have two opposite chains move within the same trough system. Due to the design of the guidelok, the e-chain can move quickly and with little vibration. This has a positive effect on the machining result. At the same time, machine downtimes and maintenance intervals are reduced as swarf is unable to settle between the upper and lower run. The guidelok travel distance can even extend to 50 metres long.



For more information
Web: www.igus.in



SAFEVOLT®

Synthetic Mats for Electrical Purpose

HIGH VOLTAGE - INSULATING MAT

AS PER IS 15652 : 2006

Total Safety from Electrical Shocks

Use is mandatory as per Central Electrical Authority & Indian Electricity Rules.

Replace Outdated Rubber Mats

The "SAFEVOLT" Synthetic Mat - Confirming to IS: 15652 : 2006 has superseded the rubber mats with IS: 5424 (old Std.) As per Govt. Of India Gazetter notification No.: - S.O. 2086 dt. 17th July, 2007

- High Voltage insulating mats confirming to new specification IS:15652:2006 have excellent electrical insulation & mechanical strength.
- Pastable type, Permanently fixed, smooth Trolley movement, Moisture Proof, Fire Retardant, no adverse effect of Acids, Alkalies and Transformer Oil.
- Recommended for safety of workers involved Electricity Generation, Transmission, Distribution and working on upto AC 66 KV & DC 240 V installations in all kind of sub-stations operating HT, LT switch gears, control panels, transformer room, battery room, generator rooms and bus bar panels etc.
- CPRI tested and certified

Specified under CPWD General specification for Electrical works
Part-IV Sub-Stations 2007

RMG POLYVINYL INDIA LIMITED

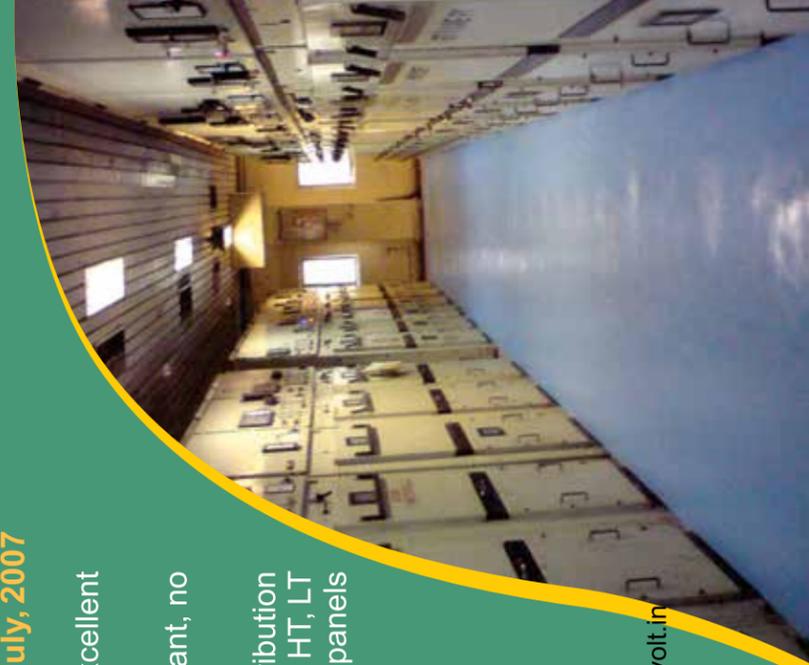
UG-SR-4, Ansal Plaza, Vaishali, Ghaziabad (U.P.) 201010, PH - 0120 - 4284802 - 06, Extn. 333
Mobile - +91 - 7838195579, Fax - +91 - 11 - 66173679, Email - dexam@rmgpoly.com, Website - www.safevolt.in

Dealers Enquiry Solicited

IS : 15652



CM/L : 3016636



Pioneer in intuitive programming

- Offer the easiest-to-use & most adaptable alternative Automation Solution for specialized & demanding needs
- An experienced technical team
- A pioneer in the simplification of programming



em4 - MORE THAN JUST A PLC

- All-in-one fully connected nano-PLC
- Remote management & maintenance on a PC & mobile devices
- Accurate & performant sensor measurement

Millenium 3 - Logic Controller

- Compact & expandable
- Easy to program
- Multiple configuration options.

Specialist in electromagnetic & electronic technology



- Specialist in time management with an extensive automation components offer that includes timers, monitoring relays
- In addition to high-performance products, advice and support, offers tailor-made solutions for any application

- Multi or mono function

MONITORING RELAYS:

- Close-up protection for total availability of equipment
- All anomalies are detected
- Optimise continuity of service.

TIMERS:

- Simple to use
- Multi voltage

For more information

InnoVista Sensors India Pvt Ltd

Div 1, BNR Complex, Plot No.92/1A, 1st Floor,
H P Avenue Road, Konappana Agrahara,
Electronic City -Phase 1, Bangalore - 560100, India
E-mail: india@innovistasensors.com
Web: www.innovistasensors.com

DYNASPEDE Product Line for Process Industries



Dynaspede has long established its name as solution engineers in the paper, film, foil, and converting industries. Dynaspede's market offerings include Pneumatic & Powder Brakes and Clutches with loadcells and tension indicators for printing, coating, laminating, slitting, sheeting, corrugating and other industries. The company also provides stock solutions for speed control of industrial machines and

processes. These include:

- Magnetic Particle Brakes & clutches
- Pneumatic Brakes & Clutches
- Electronic Control Panels
- Loadcells and Tachos
- Electronic Controllers

Dynaspede's solutions include analogue / digital AC/DC or eddy current drives, DC injection brakes, planetary gear units / gear boxes and electronics to match.

For more information

Dynaspede Integrated Systems Pvt. Ltd.

135-136A, Sipcot Industrial Complex
Hosur-635 126, Tamil Nadu

Phone: +91 7601800900 / 87540 46162

Email: usha@dynaspede.com / lalit@dynaspede.net

Website: www.dynaspede.com

Electronic position indicators: New wireless system

The new wireless spindle positioning system, designed for an efficient manual spindle positioning, consists of UC-RF control unit and, up to 36

electronic position indicators DD52R-E-RF (Elesa Patent).

Most often, machine set-up is performed manually by means of traditional me-

Are you looking for The better Ear Protection?

Go to Index



Your search is over



SILICON REUSABLE EARPLUG MC-2001C (WITH CORD)



DISPOSABLE PU FOAM EARPLUG MC-1003AC (WITH CORD)



ECONOMIC EARMUFF EM-5003



FOR MORE DETAILS / ENQUIRY PLEASE CONTACT
Marvel Gloves Industries

Manufacturers, Exporters & Importers of Gloves & PPEs

187/188, 2nd Floor, Ashoka Shopping Centre, G.T. Hospital Complex, L.T. Marg, Mumbai 400 001 INDIA
Tel.: +91 22 22659475 / 22659480 | Phone No: 9987402000 / 7400449905 / 9619453278 / 7400447711
Email: sales@marvelgloves.com | Website: www.marvelgloves.com



DEALERSHIP ENQUIRIES SOLICITED

Follow us on: marvelgloves



DD52R-E-RF Electronic position indicators, data transmission by radio frequency



chanical indicators coupled with handwheels or crank handles, following a specific list of set-up parameters.

The new electronic position indicators DD52R-E-RF are networked to UC-RF control unit via radio frequency (RF).

The PLC, connected to the UC-RF control unit, allows the remote monitoring of the indicators.

This system is particularly suitable for applications that require frequent format changes, facilitating the cor-



UC-RF Control unit for DD52R-E-RF PLC connection

rect adjustment of the target/current position of the machine parts, also representing a safety system. PLC can be programmed in order not to allow the machine to start the production cycle, thus avoiding production issues.

The installation of the system is quick and easy as it does not require any cable connections between the indicators and the control unit or the PLC.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

Thanks to the available functions and to the programmable parameters, one item only can be used for many applications including all shaft pitch variations, direction of rotation and unit of measure.

304 stainless steel boss with Ø 20 mm.
• Long battery life: over 3 years.

Product technical data sheets,

along with drawings and tables with codes and dimensions are available on our website

For more information :
Elesa and Ganter India Pvt. Ltd.
A-54, Sector-83, Noida-201305
+91-120-4726666 | info@elesaganter-india.com
www.elesa-ganter.in

Welding Fume Extractor, King Extractor-II-MU 3

Welding Fume Extractor, King Extractor-II-MU 3 is a mobile mechanical high efficiency self-cleaning filter designed for workplaces. The filter cleans air from different kinds of dry dust, welding aerosols & other dry contaminants from most industrial processes. The filter cartridge is cleaned automatically without interrupting the filtration process. The cleaning extends the cartridge service periods and minimizes maintenance.



workplaces unreachable to other ventilating equipment, &

• The filter requires connection to a general compressed air supply.

The Filter is designed for continuous indoor operation under the following climatic conditions:

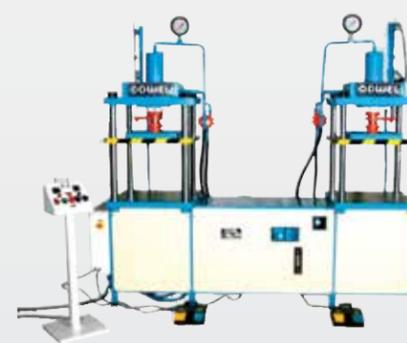
- Air temperature from +10 deg. C to +45 deg.C.
- Relative humidity : 80% at 25 deg. C
- The compact construction integrates the filter, extraction arm and fan
- The filter can be used at

For more information :
Ador Welding Ltd.
Akurdi, Chinchwad, Pune 411 019
Phone: 020-4070 6000 ,
Email: cmo@adorians.com, Web: www.adorwelding.com

Go to Index



perfect vision for quality



4-COLUMN HYD.PRESS
Capacity from 5 Tonnes to 200 Tonnes & More Tonnes



HORIZONTAL HYDRAULIC PRESS
Capacity From 15 Tonnes To 100 Tonnes & More Tonnes



"C" FRAME POWER OPERATED HYD. PRESS
Capacity From 5 Tonnes To 500 Tonnes & More Tonnes

DOWEL ENGINEERING WORKS

Office & Workshop : 12-Atika Industrial Area, Debar Road (South), Rajkot - 360 002. (Guj.) INDIA.
Telefax: + 91 - 281 - 2362465, E-mail dowel@dataone.in



MOBILE CYLINDER HYD. PRESS
Capacity From 40 Tonnes To 500 Tonnes & More Tonnes



CLOSE FRAME TYPE HYD. PRESS
Capacity From 5 Tonnes To 500 Tonnes & More Tonnes



PLC OP. HYDRAULIC PRESS
Capacity From 5 Tonnes To 500 Tonnes & More Tonnes

DOWEL MACHINERY PVT. LTD.

Admin.Office: 12-Atika Industrial Area, Debar Road (South), Rajkot - 360 002. (Guj.) INDIA.

Factory: Shri Satya Industrial Estate, Plot No. 15, Survey No. 239, Near Shreeji Nuts, Beside Weldor Eng. Pvt. Ltd., Veraval (Shapar) Tal.: Kotda Sangani. Dist. Rajkot
TeleFax : +91-2827-296113, Web Site : www.thedowel.com / E-mail : dowel@thedowel.com

ABA Sunverter Batteries

ABA Tubular Sunverter Batteries are specially designed for stationary backup and power storage applications.



us Ceramic Float Vent Plug with electrolyte level indication, Low topping up once in 4 to 5 months,

The Battery plate grids are made from selenium lead alloy which ensures corrosion resistance and hence longer life. Positive plates of tubular construction ensure high energy storage capacity, durability and reliability. Microporous ceramic vent plugs allows gas escape and retention of electrolyte inside, thus reducing top-up frequency.

and Extra-long life – 5 to 7 years. ABA Sunverter Batteries are ideal for applications in home inverters, UPS systems, solar and wind power applications, emergency lighting, alarm back-up systems, telecom and mobile base stations, railway lighting, and medical equipment.

ABA Electricals is synonymous with Solar Energy and Energy Saving. ABA Electricals are eminent engineers, established manufacturers and seasoned system integrators. Besides custom-built systems, the company provides Solar Panels, Batteries and Inverters off the shelf. ABA also custom-builds both off-grid and on-grid solar power plants.

Some of the unique features of ABA Sunverter Batteries include: Highly corrosion resistant low antimony selenium lead alloy for grids, Heat sealed with polypropylene containers, Through partition intercell welding for ruggedness and low internal resistance, PE bag separators for prevention of active material shedding, Microporo-

For more information
ABA Electricals Pvt. Ltd.
 12/17, Kovai Garden
 Kovaipudur -Coimbatore 641 042 Tamil Nadu
 Phone: 085920 34476
 Email: abaelectricalsco@gmail.com

Nitrile Fully Coating (Warrier)

15 gauge grey nylon and spandex liner, first nitrile smooth fully coating in Red, second sandy nitrile palm and thumb coating in Black.



Features & Benefits

- Unique double dipped provides superior grip under dry and wet condition.
- Ultra finest gauge nylon fiber provides outstanding comfort.

- Ergonomic designed offers great comfort and dexterous.
- Dexterity, oil resistance, antislip and comfortable
- First layer with 3/4 or fully coating are available

Application

- Light metal fabrication
- Assembling and finishing
- handling in Oily Surfaces
- General maintenance, Painting,
- Other automotive application, Mechanical Industries Parameters

For more information
Marvel Gloves Industries
 187/188, 2nd Floor, Ashoka Shopping Centre,
 G.T. Hospital Complex, L. T. Marg, Mumbai 400 001 INDIA
 Phone : +91 22 2262 6546 / 2262 6876
 Email : marvelgloves@gmail.com, www.marvelgloves.com

ITI-160(P) Portable Digital METAL Hardness Tester



Advantages

Largest screen 3 inch , showing all functions and parameters.it is the largest screen of leeb hardness tester, easy read and operate.

Main Application

- Die cavity of molds
- Bearings and other parts
- Failure analysis of pressure vessel, steam generator and other equipment
- Heavy work piece
- The installed machinery and permanently assembled parts
- Testing surface of a small hollow space
- Material identification in the warehouse of metallic materials
- Rapid testing in large range and multi-measuring areas for large-scale work piece

Technical Specifications

- Measuring range: HLD (170

- ~960) HLD
- Measuring direction: 360°
- Hardness Scale: HL, HB, HRB, HRC, HRA, HV, HS
- Display: 3 inch screen,
- Data memory: 600 groups max.(relative to impact times 32~1)
- Printing paper: width is (57.5±0.5)mm, diameter is 30mm
- Battery pack: 6V NI-MH
- Battery charger: 9V/500mA
- Continuous working period: about 150 hours (With backlight off, no printing)
- Communication interface: USB1.1
- Outline dimensions: 210mm × 85mm × 35mm (Instruments weight : 350 Gram)

India Tools & Instruments Co. – BOMBAY - INDIA
 Tel: 022-23428862 / 9819345050
 E-mail: ojus_itico@hotmail.com / web:www.indiatool.net



tachyon¹
 /tæki.on/ or tachyonic
 noun

is a hypothetical particle that always moves faster than light. Conceptualized by a team of scientists Which includes Indian scientists Mr. V.K. Deshpande and Mr. E.C.G Sudarshan in 1962.



Go to Index



TACHYON



Ta(e)ch nology is On



- Fast rapid of 60m/min in all 3 axis
- Fast acceleration upto 1.5 G
- High speed APC with pallet changing time of 3.5 sec *
- High speed ATC with tool to tool change time of 1 sec
- 5th axis tilting table on both pallets

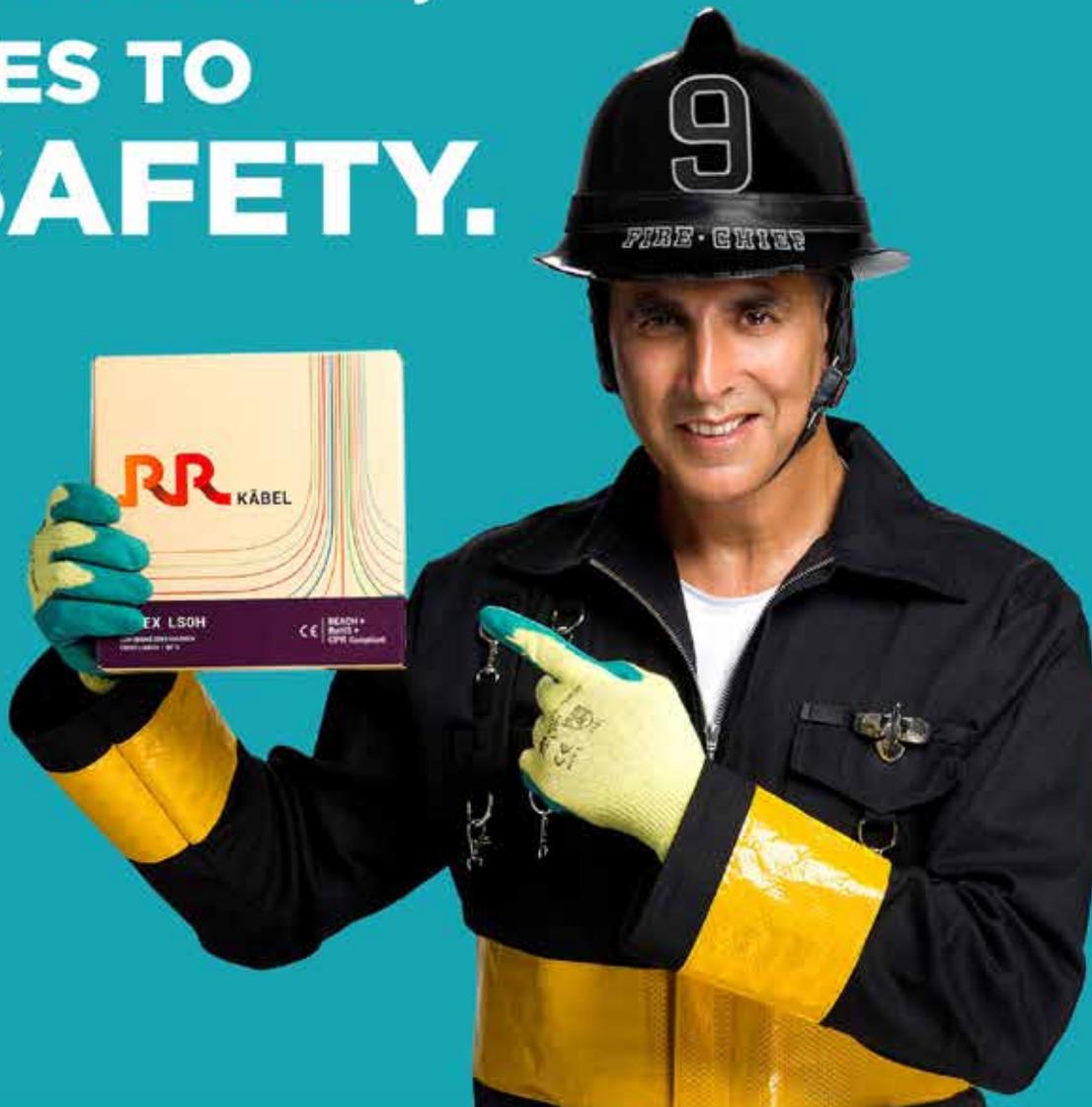
New Era Begins for the
High Speed Drill Tap Applications...!

JYOTI CNC AUTOMATION LTD.

G – 506, G.I.D.C. Lodhika, Village : Metoda, Dist : Rajkot – 360021, Gujarat (INDIA). T +91-2827-235100/235101, E info@jyoti.co.in, sales@jyoti.co.in

jyoti.co.in

SAY NO TO FIRE & SMOKE, YES TO SAFETY.



LSOH



PVC

AKALMAND BANO, SAHI CHUNO.

RR KÄBEL
WIRES & CABLES



REACH +
RoHS +
CPR Compliant



Email : rrkabel@rrglobal.com | Website: www.rrglobal.com | Follow us    



Go to Index