



# Shroff S.R. Rotary Institute of Chemical Technology



Principal Supporter & Sponsor-UPL Ltd. & Shroff family

Managed by Ankleshwar Rotary Education Society

Approved by AICTE, New Delhi, Govt. of Gujarat & Affiliated to GTU



ARES/SRICT/FIT/2/2016

Date: 23/12/2016

To,  
Mr. Thomas,  
CEO, General Electro-Engineers,  
Ankleshwar

Outward No.: 721  
Date: 23/12/2016  
S.R.I.C.T. Vataria.

**Subject:** Permission for Industry Training of Mr. Hiren Jariwala of Department of Electrical Engineering

Respected Sir,

We, Shroff S.R. Rotary Institute of Chemical Technology (SRICT), established in 2011, are an Engineering Institute approved by AICTE, New Delhi and Gujarat Technological University, Ahmadabad. At present, we are conducting following B.E Programs: Chemical Engineering, Mechanical Engineering, Electrical Engineering, Environmental Science & Technology, and Chemical Technology and M.E. in Chemical Engineering and Mechanical Engineering.

With an objective to enliven the academic teaching at the college and make learning of students more industry oriented, the SRICT management has decided to send its faculty members for industry training. Our motto is to make teachers correlate appropriately their experience in industry with the theoretical understanding of any subject. Teachers at SRICT in Science, Engineering and Technology subjects recognize the importance of having up-to-date experience of industry.

With your assured support, may I request you to please allow the following faculty member at your unit to avail himself/herself of the training?

We will certainly appreciate your feedback on this endeavor of ours. Please write to us on [anjali.bishnoi@sriect.in](mailto:anjali.bishnoi@sriect.in)

**Name of Faculty member:** Mr. Hiren Jariwala, Asst. Professor, DEE, SRICT

**Duration of Training:** 26/12/2016 to 31/12/2016 (06 Days)

Thanking you.

Yours Sincerely,

Dr. Shrikant J. Wagh  
Principal, SRICT



# General Electro-Engineers

**AUTHORISED REWINDERS / SERVICE CENTRE FOR :**



(An ISO 9001 - 2008 Certified Firm)

C-1B-1721, Post Box 217, Near Crystal Chowkdi,  
GIDC, Ankleshwar-393 002. Dist. Bharuch (Guj.)  
Ph. 02646-251 690, 224 190. Telefax : 252 690  
E-mail : geeank@yahoo.com

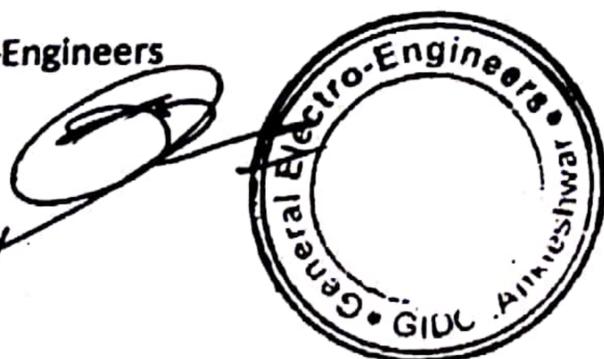
## CERTIFICATE

This is to certify that Mr. Hiren Jariwala form Shroff S.R. Rotary Institute of chemical technology, Ankleshwar has undergone training in the General Electro Engineers; Ankleshwar works for period of 06 days form 26<sup>th</sup> December to 31<sup>st</sup> December 2016 under my guidance, his performance has been satisfactory so as to fulfil all the requirements for successful completion of the training.

Date: 31/12/2016

For-General Electro-Engineers

Authorised Signatory



24<sup>th</sup> May '2017

Mr. Darshakkumar D Gadhesariya  
SRICT, Ankleshwar

Sub: Short Term Project

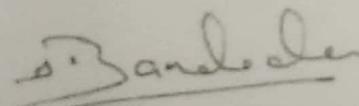
Dear Darshakkumar,

We are pleased to offer you a Short Term Project in UPL Ltd. beginning from 1<sup>st</sup> June, 2017 to 30<sup>th</sup> June, 2017 based at any of our manufacturing units in Gujarat.

In addition to the learning, this project is also meant for familiarisation with the corporate culture and norms and it is expected that you will abide by the rules & procedures of the company.

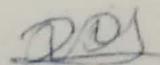
Please sign the duplicate copy of this letter & forward the same to us within a week's time as a token of your acceptance of the above mentioned terms & conditions of the Short Term Project.

Yours sincerely,  
For UPL Ltd.



Jeetendra Bandodkar  
Head - HR Ops & Special Projects

Received and confirmed



13



TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Drashti Ghodasara has satisfactorily undergone Summer Internship from 18<sup>th</sup> June, 2018 to 7<sup>th</sup> July, 2018 in various sections of our Organization for the partial fulfillment of Environmental Science and Technology.

This certificate is being issued to her to submit the same with the Shroff S.R. Rotary Institute of Chemical Technology, Vataria, to record the completion of her Summer Internship, which is a part of her curriculum.

For, Sanofi India Limited

A handwritten signature in black ink, appearing to be 'A. K. ...', positioned above the title 'Head- Human Resources'.

Head- Human Resources

7<sup>th</sup> July, 2018.



11

1<sup>st</sup> July, 2019

CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Mr. Abhirajsinh Gohil**, a final year student in Environmental Science & Technology from "*Shroff S.R. Rotary Institute of Chemical, Valia (Dist. Bharuch)*", has undergone a Summer In-Plant Industrial training at Birla Cellulosic, Kharach from 15<sup>th</sup> June, 2019 to 29<sup>th</sup> June, 2019.

During the project training period, his conduct was found satisfactory. He was found sincere, enthusiastic and dedicated towards the work assigned.

We wish him all the very best for his future endeavors.

For BIRLA CELLULOSIC

(A UNIT OF GRASIM INDUSTRIES LTD.)

**Samir Desai**  
General Manager – Human Resources



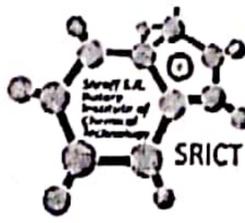
**Birla Cellulose**  
Fibres from nature

Grasim Industries Limited  
Unit - Birla Cellulosic

Works : Birladham, Kharach Kosamba R.S.  
Dist. Bharuch (Gujarat) - 394 120 INDIA  
CIN : L17124MP1947PLC000410

Telephone +91 2646 270001-005, 270301-305  
Fax +91 2646 270010, 270130  
Email bc-kharach.info@adityabirla.com

Liaison Office : 11th Floor - 1101 & 1102 OCEAN, Opposite Vadodara Central Mall, Vikram Sarabhai Marg, Vadiwadi, Vadodara - 390023, Gujarat - India  
Regd. Office : P.O. Birlagram, Nagda (MP) - 456 331. Phone : (07366) 246760-66, Fax : 255198, Website : www.grasim.com



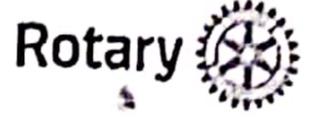
# Shroff S.R. Rotary Institute of Chemical Technology



Principal Supporter & Sponsor-UPL Ltd. & Shroff family

Managed by Ankleshwar Rotary Education Society

Approved by AICTE, New Delhi, Govt. of Gujarat & Affiliated to GTU



ARES/SRICT/FIT/24/2017

Date: 24/05/2017

To,  
The HR Department  
Heubach Colour Limited

Subject: Permission for Industry Training of Mr. Jignesh Joshi of Department of Electrical Engineering

Respected Sir/Madam,

We, Shroff S.R. Rotary Institute of Chemical Technology (SRICT), established in 2011, are an Engineering Institute approved by AICTE, New Delhi and Gujarat Technological University, Ahmadabad. At present, we are conducting following B.E Programs: Chemical Engineering, Mechanical Engineering, Electrical Engineering, Environmental Science & Technology, and Chemical Technology and M.E. in Chemical Engineering and Mechanical Engineering.

With an objective to enliven the academic teaching at the college and make learning of students more industry oriented, the SRICT management has decided to send its faculty members for industry training. Our motto is to make teachers correlate appropriately their experience in industry with the theoretical understanding of any subject. Teachers at SRICT in Science, Engineering and Technology subjects recognize the importance of having up-to-date experience of industry.

With your assured support, may I request you to please allow the following faculty member at your unit to avail himself/herself of the training?

We will certainly appreciate your feedback on this endeavor of ours. Please write to us on [anjali.bishnoi@sriect.in](mailto:anjali.bishnoi@sriect.in)

Name of Faculty Member : Mr. Jignesh Joshi

Duration of Training : 06-06-2017 to 12-06-2017

Thanking you.

Yours Sincerely,

Dr. Shrikant J. Wagh

Principal, SRICT.

**Mumbai Office :**  
Neelkanth Business Park, A-Wing,  
Office No. 302, Ramdev Nagar Road,  
Khalai Village, Vidhayavihar (W)  
Mumbai -400 086  
Tele: 91-22-25103629 / 65685999  
E mail : mumbai@heubach-india.com

**heubach**  
**COLOUR PVT. LTD.**

**Baroda Office :**  
"Land Mark", 2nd Floor,  
Gotri Road, Race Course Circle, Vadodara-390 007  
Tel. : (91 265) 2343310, 2314860, 2341651  
Fax : (91 265) 2354827  
E-mail : baroda@heubach-india.com

Date: 16/06/2017

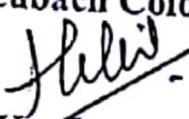
To Whomsoever It May Concern

This is to certify that Mr. Jignesh Joshi, Assistant Professor, Electrical Department from Shroff S,R, Rotary Institute of Chemical Technology, has successfully completed his short term Faculty Training at our organization from 06<sup>th</sup> June 2017 to 12<sup>th</sup> June 2017.

During the study he has undergone various aspects of function. We found his sincere, hardworking and bearing good moral character.

We wish you all success in your future endeavors.

For, Heubach Colour Pvt. Ltd.

  
Hetal Kumar Bakre  
Sr. Manager - HR & Admin



30<sup>th</sup> June 2015

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that Mr. Pathan Shaharyarkhan I (Enrollment No : 120990109018), student of Shroff S. R. Rotary Institute of Chemical Technology, Valia, had undergone summer training with us from 1<sup>st</sup> June 2015 till 30<sup>th</sup> June 2015.

During his training period he was deployed in Engineering (Electrical) function and his overall behavior was found to be satisfactory.

We take this opportunity to wish him all the best in his future endeavors.

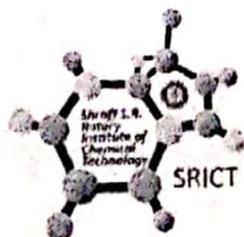
Thanking you,

Yours faithfully,

**For Abbott Healthcare Pvt.Ltd**

  
Ritesh Joshi  
Assistant Manager -HR





# Shroff S.R. Rotary Institute of Chemical Technology



Principal Supporter & Sponsor-UPL Ltd. & Shroff family

Managed by Ankleshwar Rotary Education Society

Approved by AICTE, New Delhi, Govt. of Gujarat & Affiliated to GTU



ARES/SRICT/FIT/13/2017

Date: 9/5/2017

To,  
Mr. R. D Singh  
L & T, Knowledge City,  
Vadodara.

**Subject:** Permission for Industry Training of Ms. Richa Dubey of Department of Electrical Engineering.

Respected Sir,

We, Shroff S.R. Rotary Institute of Chemical Technology (SRICT), established in 2011, are an Engineering Institute approved by AICTE, New Delhi and Gujarat Technological University, Ahmadabad. At present, we are conducting following B.E Programs: Chemical Engineering, Mechanical Engineering, Electrical Engineering, Environmental Science & Technology, and Chemical Technology and M.E. in Chemical Engineering and Mechanical Engineering.

With an objective to enliven the academic teaching at the college and make learning of students more industry oriented, the SRICT management has decided to send its faculty members for industry training. Our motto is to make teachers correlate appropriately their experience in industry with the theoretical understanding of any subject. Teachers at SRICT in Science, Engineering and Technology subjects recognize the importance of having up-to-date experience of industry.

With your assured support, may I request you to please allow the following faculty member at your unit to avail himself/herself of the training?

We will certainly appreciate your feedback on this endeavor of ours. Please write to us on [anjali.bishnoi@sriect.in](mailto:anjali.bishnoi@sriect.in)

**Name of Faculty member:** Ms. Richa Dubey  
**Duration of Training:** 24/5/2017 to 07/6/2017

Thanking you,  
Yours Sincerely,

Dr. Shrikant J. Wagh

Principal

SK: VSW: E&A: Industrial Training  
Kind Attn:  
Dr. Shrikant J. Wagh  
Principal,  
Shroff S.R. Rotary Institute of Chemical Technology,  
Block No. 402, At & Post: Vataria, Valia, Bharuch-393135.

May 13, 2017

Project Trainee

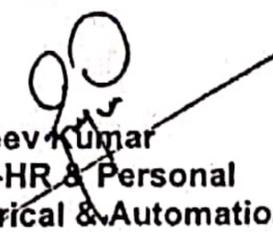
With reference to your request for Industrial Training of Ms. Richa Dubey, Department of Electrical Engineering. We are pleased to offer in plant training in our Company at E&A, Vadodara Plant on following terms and conditions:

Duration : 24.05.2017 to 07.06.2017  
Department : E&A – Manufacturing MCCB  
Report to : Adarsh Mundhra

1. The Student will have to make their own arrangements for **Travel and Accommodation** during the training period and will not be entitled to receive any travelling expenses.
2. The student will not be entitled to any kind of leave during traineeship with us. The working hours will be as per the working of the works where the Industrial Training takes place. Any company related information that will be made available while doing the project should be treated as strictly confidential. This information should not be published or disclosed in any public forum, without prior written permission. The student will be governed by the rules & regulation of the department assigned.
3. This letter of offer will stand withdrawn in case the student does not report for training on the specified date.
4. On the date of joining as Project Trainee please bring Medical Fitness Certificate, signed by any MBBS doctor.
5. Please note you will not be permitted to bring Mobile and Laptop inside premises of the Factory.
6. Please return the duplicate copy of this letter in token of your acceptance of the above along with one copy of the student's passport size photograph.

On the date of reporting for training, the student should report to Mr. Sanjeev Kumar at Larsen & Toubro Limited, E&A B/h Knowledge City, N.H 08, Village Ankhol, and Vadodara at 08.30 a.m.

Yours faithfully,  
For LARSEN & TOUBRO LIMITED

  
Sanjeev Kumar  
AGM-HR & Personal  
Electrical & Automation IC

Received and accepted

\_\_\_\_\_  
(Signature) (Date)  
Registered Office: L&T House, N. M. Marg, Ballard Estate, Mumbai - 400 001 . INDIA  
CIN : L99999MH1946PLC004768

A  
Brief Report  
on  
**“Issues of Under  
Voltage Release”**

By

Ms.RichaDubey  
Project Trainee ,  
L & T, Vadodara (Electrical &  
Automation)

## **ACKNOWLEDGEMENT**

It is always a pleasure to remind the fine people in the L&T, Vadodara (Electrical & Automation) for their sincere guidance I received to uphold my practical skills in Switchgear & Protection.

I would like to thank Mr. R.D Singh and Mr.Sanjeev Kumar for giving me the opportunity to undergo industrial training at L&T. They also gave me guidance and support.

I also want to express my deepest thanks to Mr.Adarsh Mundhra, Mr.Yuvraj Chudasama as industry training advisory for UVR that has helped me a lot in dealing with industrial work. They supported me by showing different methods of information collection about the UVR.

I would also like to thank Mr.Bhaumik Harde for his Lab support and Design part of UVR.

## INTRODUCTION

Being a Assistant Professor at Shroff S R Rotary Institute of Chemical Technology (SRICT ), Ankleshwar in Electrical Engineering Department. SRICT is established in 2011 is an Engineering Institute approved by AICTE, New Delhi and Gujarat Technological University, Ahmedabad.

At present, SRICT is conducting following B.E Programs: Chemical Engineering, Mechanical Engineering, Electrical Engineering, Environmental Science & Technology and Chemical Technology and M.E in Chemical Engineering and Mechanical Engineering.

With an Objective to enliven the academic teaching at the college and make learning of students more industry oriented, the SRICT management has decided to send its faculty members for industrial training . Our motto is to make teachers correlate appropriately their experience in industry with the theoretical understanding of any subject. Faculties at SRICT in Science, Engineering and Technology subjects recognize the importance of having up to date experience of industry.

I have joined L&T (Electrical & Automation) Vadodara as a Project Trainee under Mr. Adarsh Mundhra, from 24/05/2017 to 07/06/2017.

As a project trainee I was introduced the issues of under voltage relay (UVR) in which following problems were predominant:

- 1) Humming noise in the core (standalone)
- 2) Chattering
- 3) Low drop Off
- 4) Oil bubble in the Core assembly

## **OBSERVATIONS DURING TRAINING PERIOD**

As I visited assembly area of UVR, the assistants over their helped me a lot to understand the whole UVR assembly process.

As per my observations,

- The issue of humming noise is due FeNi Core, which on study found, saturates very fast.
- The second issue of Chattering, could be because of improper alignment of fixed core and moving core. The reason could be screw holding the fixed core does not give proper alignment to fixed core in the O Bracket. Also dust particles in the core assembly could also be one of the reason.
- For Low drop off, it means the actuator should unlatch with the core at 35% of the rated voltage that is part of under Voltage protection. One of the reason could be Core design. While testing UVR standalone , it does not comeup with low drop off while installing it in DN1 it shows low drop off issues. \
- Oil Bubble in the Core assembly after testing could because of over heating of coil material (insulation tape) which release small drop of oil.
- To check the current waveform of FeNi core, we tested UVR in developmental Lab and saw its current waveform in DSO, which was satisfactory.

## **CONCLUSION**

As per my observations, fundamental Core design of UVR should go under Revision. For humming noise B-H curve of the core material should be studied.

Over all in the span of two weeks, I learnt a lot and would like to work further in the future.

Thanks for the Support.



# Shroff S.R. Rotary Institute of Chemical Technology



Principal Supporter & Sponsor-UPL Ltd. & Shroff family

Managed by Ankleshwar Rotary Education Society

Approved by AICTE, New Delhi, Govt. of Gujarat & Affiliated to GTU



ARES/SRICT/FIT/7/2017

Date: 12/04/2017

To,  
The HR Manager,  
Essar, Hazira.

Outward No.: 225

Date: 12/04/17

S.R.I.C.T. Vataria.

**Subject:** Permission for Industry Training of Mr Sourav Choubey of Department of Electrical Engineering

Respected Sir/Madam,

We, Shroff S.R. Rotary Institute of Chemical Technology (SRICT), established in 2011, are an Engineering Institute approved by AICTE, New Delhi and Gujarat Technological University, Ahmadabad. At present, we are conducting following B.E Programs: Chemical Engineering, Mechanical Engineering, Electrical Engineering, Environmental Science & Technology, and Chemical Technology and M.E. in Chemical Engineering and Mechanical Engineering.

With an objective to enliven the academic teaching at the college and make learning of students more industry oriented, the SRICT management has decided to send its faculty members for industry training. Our motto is to make teachers correlate appropriately their experience in industry with the theoretical understanding of any subject. Teachers at SRICT in Science, Engineering and Technology subjects recognize the importance of having up-to-date experience of industry.

With your assured support, may I request you to please allow the following faculty member at your unit to avail himself of the training?

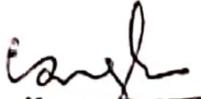
We will certainly appreciate your feedback on this endeavor of ours. Please write to us on [anjali.bishnoi@sriect.in](mailto:anjali.bishnoi@sriect.in)

**Name of Faculty member:** Mr. Sourav Choubey

**Duration of Training:** One Week

Thanking you.

Yours Sincerely,

  
Shrikant J. Wagh  
Principal



**Rockwell Structurals**  
27 Km Surat-Hazira Road,  
Hazira - 394270, Dist. : Surat (India)  
Tele. Off. : 0261-6681661  
Telefax. : 0261-6681666, 1636

May 20, 2017

**CERTIFICATE**

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that **Mr. Sourav Choubey**, faculty of Shroff S. R. Rotary of Chemical Technology, Bharuch, Gujarat have successfully completed his Industrial Training in our organization.

<b>Training on Power Generation &amp; Distribution</b>	
<b>Training Period</b>	<b>15.05.2017 - 20.05.2017</b>

It is further certified that during the training period, **Mr. Sourav Choubey** was punctual, disciplined and dedicated towards learning/ enhancing his knowledge on the above training.

We wish him all the success in his future endeavours.

For Rockwell Structurals

**Ravi Sarin**  
Chief Executive Officer

# A BRIEF REPORT ON

## ROCKWELL STRUCTURAL, ESSAR, HAZIRA PLANT VISIT

(15<sup>th</sup> May, 2017 to 20<sup>th</sup> May, 2017)

Submitted by

---

Mr. Sourav Choubey  
Assistant Professor  
Electrical Engineering  
Shroff S.R.Rotary Institute of Chemical Technology

## ACKNOWLEDGEMENT

The Training opportunity I had with Essar, Hazira was a great chance for learning and professional development. Therefore, I consider myself as a very lucky individual as I was provided with an opportunity to be a part of it. I am also grateful for having a chance to meet so many wonderful people and professionals who led me through this training period.

I am using this opportunity to express my deepest gratitude and special thanks to the Joint General Manager of Essar Heavy Engineering Service Mr. Lokesh Kumar who in spite of being extraordinarily busy with his duties, took time out to hear, guide and keep me on the correct path.

I express my deepest thanks to Mr. Ravi Sarin, CEO Essar Heavy Engineering Services, Hazira for taking part in useful decision & giving necessary advices and guidance and arranging all facilities to make life easier. I choose this moment to acknowledge his contribution gratefully.

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude to Mr. Nitesh Dayal , CEO Essar Transmission Ltd., Mr. Rathod, General Manager, Essar Transmission Ltd. for their careful and precious guidance which were extremely valuable for me.

I perceive as this opportunity as a big milestone in my professional development. I will strive to use gained skills and knowledge to the students.

Hope to continue cooperation with all of you in the future.

Sincerely,

Sourav Choubey

Place: Essar, Hazira.

Date: 20/5/2017

## ***INDEX***

Chapter No.	Topic	Page No.
1	Brief Introduction to Essar Plant, Hazira	4
2	Safety Measures	5
3	Products Fabrication	7
4	Essar Captive power Plant	8
5	GIS	12
6	Main Receiving Substation	15
7	Certificate	16

## CHAPTER -1

### Brief Introduction to Essar Plant, Hazira

Essar Global Fund Limited is an Indian conglomerate group based in Mumbai, India. The Fund is a global investor, controlling a number of world-class assets diversified across the core sectors of Energy, Metals & Mining, Infrastructure (comprising ports and EPC businesses) and Services (primarily comprising shipping and BPO businesses).

Essar began as a construction company in 1969 and diversified into manufacturing, services and retail. Essar is managed by Shashi Ruia – Chairman, and Ravi Ruia - Vice Chairman.

Today, the company has expanded its global footprint, focusing on markets in Asia, Africa, Europe and the Americas.

In the 1990s the group entered into steel making with its Hazira plant in Gujarat. Essar Steel is a global producer of steel with presence in Asia, Europe, Africa and North America. It has an annual capacity of 14 million tonnes. The product includes pipes, plates cold rolling, galvanizing and pre-coated segments.

It is India's largest exporter of flat steel with 10 million tons per annum (MTPA) of capacity in India and 4 million tons per annum (MTPA) in worldwide facility. Essar Steel is fully integrated from mining to retail and has specialised plants for value-added steel products like pipes and plates. On 11 June 2012, Essar Steel India commissioned a 19 MW heat recovery power plant at Hazira.

In 2016, Essar Steel became the first Indian company to manufacture bullet-proof steel.

Hazira, Gujarat, India: A 10-million tonne steel plant at Hazira, largest in Western India. The plant is supported by a captive port, power plant, lime plant and oxygen plant. Downstream facilities :

- Cold Rolling plant: 1.4 million tonnes
- Galvanizing plant: 0.5 million tonnes
- Annealing (CRA) plant: 0.66 million tonnes
- Extra-wide plate mill :1.5-million tonnes
- Pipe mill: 600,000 tonnes

Essar Hazira Power Plant is a gas-based thermal power plant located near at Hazira in Surat district in the Indian state of Gujarat. The power plant is operated by the Essar Energy. It has an installed capacity of 515 MW \* 2. The plant is functional since October 1997. Because of the price rise of natural gas this plant remains closed since 2015. Essar have a Multi fuel Power plant with a generation capacity of 300 MW.

## CHAPTER – 2

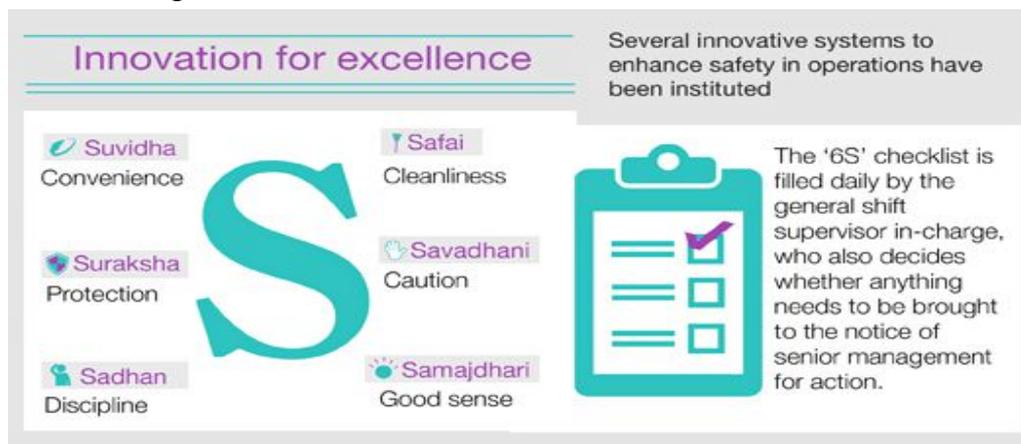
### Safety Measures

#### 2.1 General Safety

Safety is integral to all Essar operations and every Essar company prioritizes awareness-building, training programs and use of technology to enhance safety.

An enterprise information software system (prepared initially by Essar Shipping) has also been installed to monitor every logistics activity. This includes activities such as statutory inspections of equipment, audits, management reviews, etc. The HSE team and other relevant personnel receive an alert well in advance so that they can prepare before any activity falls due.

Another software-based system — based on recording biometric data — is the 'smart driver' monitoring system, which monitors the driver's health and safety records, including the training he has undergone.



An innovative 'PPE Passport System' was developed principally for the 1,500-plus contractual workforce. Under this, a 'Passport' and an 'Entitlement Chart' are created with a Unique Identification Number for each employee. All personal protective equipment (PPEs) is issued against this unique number, thus ensuring regular monitoring of whether the equipment is being used correctly or not.

Modules for training — arguably the single most important element in the company's safety management structure — have been designed on the basis of careful research. By using a 3x3 Risk Matrix, researchers identified six critical trades that have potential to cause serious injuries and property damage. The 600-plus associate employees working in these risky trades were

given classroom as well as practical training and assessed on the ground before being allowed to execute any job.

### **Awareness-building**

An anonymous Perception Survey was conducted among the contractual workers — who constitute 95 per cent of the total workforce — to arrive at the best methods of communication on safety practices and identify training requirements. Accordingly, safety awareness campaigns — such as 'Safety' weeks and months, 'Safety Friendship Day', 'Road Safety Week', among others — were designed to impact safety-related behavior both on-site and off-site. Conducted regularly, many of these are linked to an annual theme; for 2013, the theme is 'Accidents brings tears, Safety brings cheers'.



Safety officer provides training to 100s of people every day including new labors, trainees and other employer. The company's primary tool, the Essar Safety Anthem helps the worker to motivate to be safe.

## **2.2 Electrical Safety**

Electrical safety is the main concern of the each plant of Essar, Hazira. Accidents mainly occurs because of two conditions i) Unsafe Act ii) Unsafe Condition. For thing in view of electrical safety the following measures have been taken by the Essar.

For LT loads in Essar Heavy Engineering the following measures have been taken :

- Replaced All the MCB with RCD
- Tripping system installed at 30mA which is the minimum current to feel shock.
- All the RCD's are checked on every month.
- 24V AC hand lamps used

- Multi lock feeder used

## CHAPTER – 3

### **Products Fabrication in Rockwell Structural (EHES)**

Essar heavy engineering known as Rockwell structural have been doing the fabrication and testing of the machines and materials.

Products fabricated:

- Pressure Vessels, Reactor and Heat exchanger for fertilizer oil and gas
- Steel Power plant equipments
- Modular, Skids and Technological Structure

Software's used for designing of the machines:

- HTRI : Thermal design of heat exchanger
- PV Elite - Mechanical Design of PV & HE
- Codecal - Mechanical Design of PV & HE
- Microprotol - Mechanical Design of PV & HE
- Autocad 2010

They are supplying equipments to various companies worldwide. Companies are like Alstom , Reliance , L & T, NTPC ...etc.

Some of the Power Plant equipments which are fabricated and supplied are as follows:

- Stop Log Gate and Cross Screen
- Alstom upstream flange for main inlet valve steeves
- LP1 and LP2 turbine outer for L & T
- Kaplan turbine
- Boiler air pre heater

## CHAPTER – 4

### Essar Captive power Plant

Essar, Hazira is having total 4 captive power plant.

- 2 unit of 550 MW each run by Natural Gas
- 270 MW Multi fuel Power plant
- 19 MW water Gas plant
- 15 MW Combined cycle plant

Due to increase in the price of natural gas the 550 MW plant has been closed since 2015. Presently the plant is undergoing a modification for being the thermal power plant.

#### 270 MW multi fuel power plant :



The capacity of the plant is 270 MW which is having two unit of 135 MW each.

The fuels are:

Corax , Coal, Naphtha , Liquid fuel

- 270 MW multi-fuel plant now fully operational
- Plant is 100% captive to Essar Steel, which will now be able to reduce its power procurement cost

- Close to 80% of Essar Power's targeted 6,100 MW capacity now operational

Essar Power Hazira Ltd, a subsidiary of Essar Power Ltd, today announced the successful commissioning of the second unit of its 2x135 MW power project in Hazira. Completed in a record 53 days—from IBR Hydrottest to final synchronisation—it is among the swiftest commissioning for a unit of this size.



With this commissioning, the 270 MW multi-fuel power plant that is 100% captive to Essar Steel Hazira is now fully operational. The plant can run on multiple fuels, like coal (both domestic and imported) and corex gas, simultaneously. The commissioning will bring down the power procurement cost of Essar Steel and also assure unmatched reliability and flexibility in steelmaking operations.

Close to 80 % of Essar Power's targeted capacity of 6,100 MW, which comprises both captive and IPP assets, are now operational. Five of the plants in the company's portfolio were PAT positive in FY2015-16. .”

### **About Essar Power**

Essar Power Ltd is one of India's largest private sector power producers with over 20 years' operating track record. It owns power plants in India and Canada with a total generation capacity of 6,100 MW, of which 4,840 MW is operational. Of the total operational capacity, 3,240 MW is coal-based, while 1,600 MW is gas-based. The operating plants in India are located in Mahan, Chhatisgarh, and Hazira, Salaya and Vadinar, in Gujarat.



Fig: Different fuels feed in the plant.



## Electro static preceptor



Fig: Burner for all the fuels

They have separate burners for different fuels. Total 20 burners are available. Front Burner 4 \* 3 for coal and other fuel and other 4 \* 2 burners for Other fuels except coal.

## CHAPTER – 5

### Gas Insulated Substation

Gas used in Gas insulated substation is SF<sub>6</sub> Gas. Reason for being used SF<sub>6</sub> as insulation medium is that dielectric strength of SF<sub>6</sub> is more. The SF<sub>6</sub> in the equipment must be dry enough to avoid condensation of moisture as a liquid on the surfaces of the solid epoxy support insulators because liquid water on the surface can cause a dielectric breakdown. However, if the moisture condenses as ice, the breakdown voltage is not affected. So dew points in the gas in the equipment need to be below about –10°C. For additional margin, levels of less than 1000 ppmv of moisture are usually specified and easy to obtain with careful gas handling. Absorbants inside the GIS enclosure help keep the moisture level in the gas low, even though over time, moisture will evolve from the internal surfaces and out of the solid dielectric materials (IEEE Std. 1125-1993).

Small conducting particles of mm size significantly reduce the dielectric strength of SF<sub>6</sub> gas. This effect becomes greater as the pressure is raised past about 600 kPa absolute (*Cookson and Farish, 1973*). The particles are moved by the electric field, possibly to the higher field regions inside the equipment or deposited along the surface of the solid epoxy support insulators, leading to dielectric breakdown at operating voltage levels. Cleanliness in assembly is therefore very important for GIS.

#### GIS Substation Characteristics:

- High Operational safety
- High Reliability
- Long lifetime
- Maintenance free design



220 KV and 400 KV GIS substation is available in Essar, Hazira. Total 6 bay is there. 2 bay for Gen, 2 line bay , 1 bus coupler bay and 1 CT, PT bay.



Fig: Inside view of GIS.

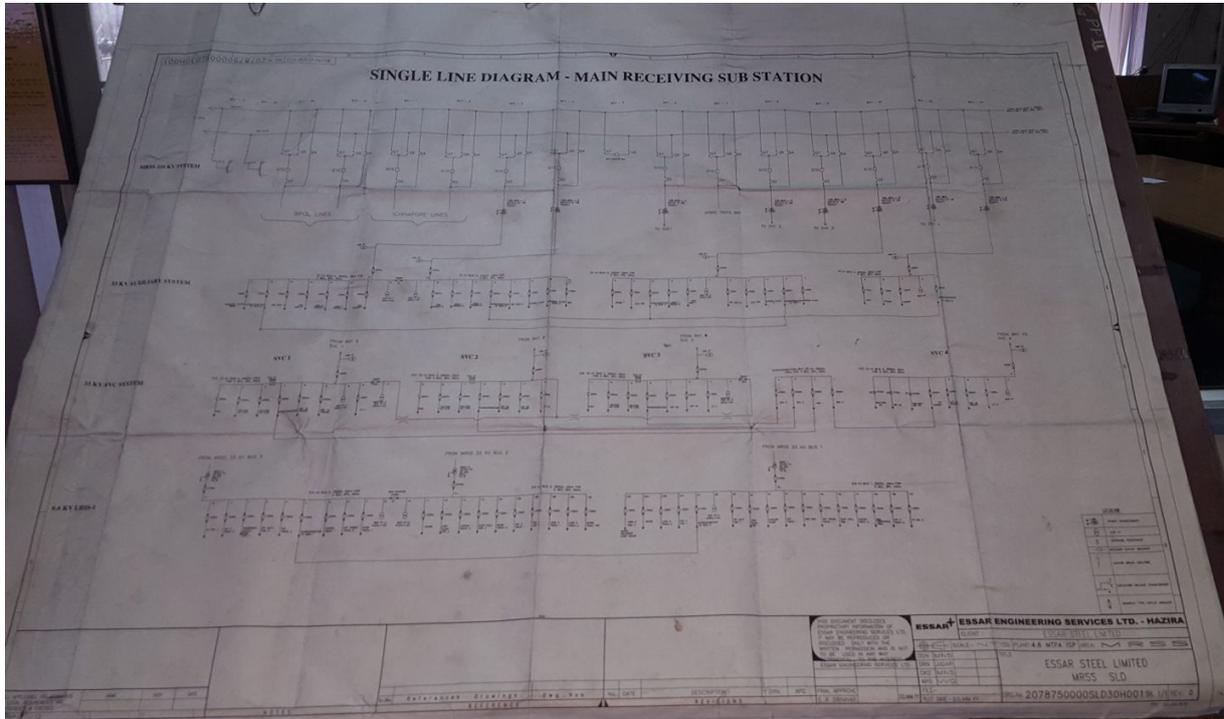


Fig: Synchronization between GIS and AIS

## CHAPTER – 6

### MRS

MRSS: Main receiving substation



MRSS is commissioned in the year of 1988. It uses TCR and SVC.



Substation View.



---

**Rockwell Structural**  
27 Km Surat-Hazira Road,  
Hazira - 394270, Dist. : Surat (India)  
Tele. Off. : 0261-6681661  
Telefax. : 0261-6681666, 1636

May 20, 2017

**CERTIFICATE**

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that **Mr. Sourav Choubey**, faculty of Shroff S. R. Rotary of Chemical Technology, Bharuch, Gujarat have successfully completed his Industrial Training in our organization.

Training on Power Generation & Distribution	
Training Period	15.05.2017 – 20.05.2017

It is further certified that during the training period, **Mr. Sourav Choubey** was punctual, disciplined and dedicated towards learning/ enhancing his knowledge on the above training.

We wish him all the success in his future endeavours.

For **Rockwell Structural**

**Ravi Sarin**  
Chief Executive Officer

# **TRAINING REPORT**

## **IN**

## **L&T**

## **HAZIRA,SURAT**

**SUBMITTED BY : ASHISH P YADAV**

**B.E III YEAR**

**ELECTRICAL ENGINEERING**

**SHROOF S.R ROTRY INSTITUTE OF**

**CHEMICAL TECHNOLOGY,VATRIA**

**DIST:BHRUCH**

## **CERTIFICATE**

This is to certify that **Mr. ASHISH P YADAV** Adm. No. **100048**

Studying in **B.E. Electrical Shroff S .R. Rotary Institute Of Chemical Tecnology** has completed his training in

**HEAVY FABRICATION SHOP-III, L & T HZW, SURAT.**

During 1<sup>st</sup> June to 3<sup>th</sup> july.

### **GUIDED BY**

Mr. Sachin Zala.

Mr.Chirag Tandel

Mr.Pranjal Parikh

### **CHECKED BY**

Mr. Mahesh Joshi

### **APPROVED BY**

Mrs. Alpa Gandhi

## ❖ PREFACE

If you know the laws of buoyancy it does not mean that you know how to swim. It is only jumping in the water that you get the feel of the depth. This is applicable to every aspect of life. Therefore practical training is most important to get familiar with weary waters of the industry and learn how to put theory in to the practices.

The industrial training helps engineer:

- ✚ To prove ability.
- ✚ To be particular in work.
- ✚ To know how communication useful in industrial environment.
- ✚ To be regular.
- ✚ To do planning.
- ✚ To take responsibility etc...

I have greatly privileged to have undergone training in **MAINTANANCE** at Larson & Toubro Hazira works, Surat.

This training report contain the extract of the things learnt during my training period.

## ❖ ACKNOWLEDGEMENT

Any endeavor can't lead to success unless and until a proper platform is provided for same. This reason I find myself very fortunate to have undergone my industrial training of **FOUR WEEK IN HEAVY FABRICATION SHOP** at **LARSON & TOUBRO PVT. LTD.** The persons of my department and all other department have extended a warm and helping hand. I am very fortunate to have had a chance to feel the gravity of what role mechanical engineering plays in the industry. It was a golden opportunity for me to get a chance to experience what it feels to be in a company where discipline, quality and hardwork are the motto.

First of all I would like to thank **Mr. SACHIN ZALA** for his valuable guidance and encouragement as a teacher through out my training period.

I would like to thank all the workmen and apprentices who gave me awareness of the various processes going on in the shop and helped me to take full advantages of this training.

**ASHISH P YADAV**

## ❖ COMAPANY HERITAGE

### **Larsen & Toubro Ltd. is a USD 12.8**

**billion** technology, engineering and construction group, with global operations. It is one of the largest and most respected companies in India's private sector. More than seven decades of a strong, customer-focused approach and the continuous quest for world-class quality have enabled it to attain and sustain leadership in all its major lines of business.

**It was ranked as 14th in 2011 by the Economic Times in their survey of the Top 500 Companies in India.** Another feather in its cap was added when L&T was ranked 47th in the world in the June 2009 issue of Forbes-Reputation Institute's **“World’s Most Reputable Companies”** survey. In this survey, L&T was the only engineering and construction company in the world to have made it to the top 200.

Having established its foothold in engineering and construction, electrical and electronics, industrial products and information technology, L&T forayed into the financial services space. Financial Services has been identified as a strategically important business for L&T Group. It has been L&T’s vision to become a holistic

player in this area of business. With an entire range of products and service offerings, L&T's 'Financial Services' initiative will cater to an entire spectrum of customers, and their various financial needs.

**Mr. Holck Henning Larson** received the **"PADMA BHUSAN AWARD"** from president of India **Mr. K.R.Narayan** at investiture ceremony held in New Delhi on **23<sup>rd</sup> March, 2002**.

## ❖ L & T HAZIRA WORKS PROFILE

L&T's Hazira campus is a multi-facility campus that covers a Modular Fabrication Facility (MFF), and Heavy Engineering & Shipbuilding, and Power equipment manufacturing facilities. This modern, coastal complex is situated on a 200 acre plot near Surat in Gujarat.

The factory buildings cover over 34,500 sq. m. and the complex has a load-out quay on the banks of the river Tapi close to the Arabian Sea.

Hazira campus is equipped to manufacture extra-large and very heavy equipment for power projects, chemical, refinery, petrochemical & fertilizer industries, which can be shipped out via waterways.

## DEPARTMENT AT HAZIRA WORKS

- ✚ Accounts
- ✚ Administration
- ✚ Civil Projects and Estate maintenance
- ✚ Computer System
- ✚ Industrial Relation and Welfare
- ✚ Logistics Cell
- ✚ Maintenance
- ✚ Manufacturing
- ✚ Marketing
- ✚ Material Planning and Inventory Control
- ✚ Medical Center
- ✚ Personnel & HR Department
- ✚ Plant Engineering Services
- ✚ Product Design & Execution
- ✚ Quality Control & Inspection
- ✚ Safety
- ✚ Security & Transport
- ✚ Training Center
- ✚ Welding & Production Engineering

## ❖ MANUFACTURING SHOPS AND YARDS AT HAZIRA WORKS

- ✚ Heavy Fabrication Shop-I
- ✚ Heavy Fabrication Shop-II
- ✚ Heavy Fabrication Shop-III
- ✚ Heavy Machine Shop
- ✚ Light Fabrication Shop
- ✚ Light Machine Shop
- ✚ Medium Fabrication Shop-I
- ✚ Medium Fabrication Shop-II
- ✚ Modular Fabrication Facilities-I
- ✚ Modular Fabrication Facilities-II
- ✚ Open Fabrication Yard
- ✚ Pre-Fabrication Yard
- ✚ Plate Preparation Shop
- ✚ Plate Storage Yard
- ✚ Shop Related Yard

# GRINDERS

## Types of grinders

1. Single phase grinders.
2. High frequency grinders.
3. Pneumatic grinders.

## What does high-frequency mean?

In electrical engineering, frequencies above 10 kHz are described as high-frequency. But for power tools this term is commonly used to describe all frequencies above the standard mains frequency of 50/60 Hz. Modern high-frequency power tools usually operate at a frequency of 300 Hz.

But why is the current from the socket at a higher frequency? One reason is the need for enhanced performance. By increasing the frequency, you can achieve a higher speed. The motor's output power increases as a direct proportion of increased frequency: at 300 Hz, performance is six times better because the frequency is six times greater than at 50 Hz. The frequency converters required for this, that bring the power up to the higher frequency, are connected to the national three-phase grid.

## There are also many benefits to using high-frequency power tools in an industrial setting:

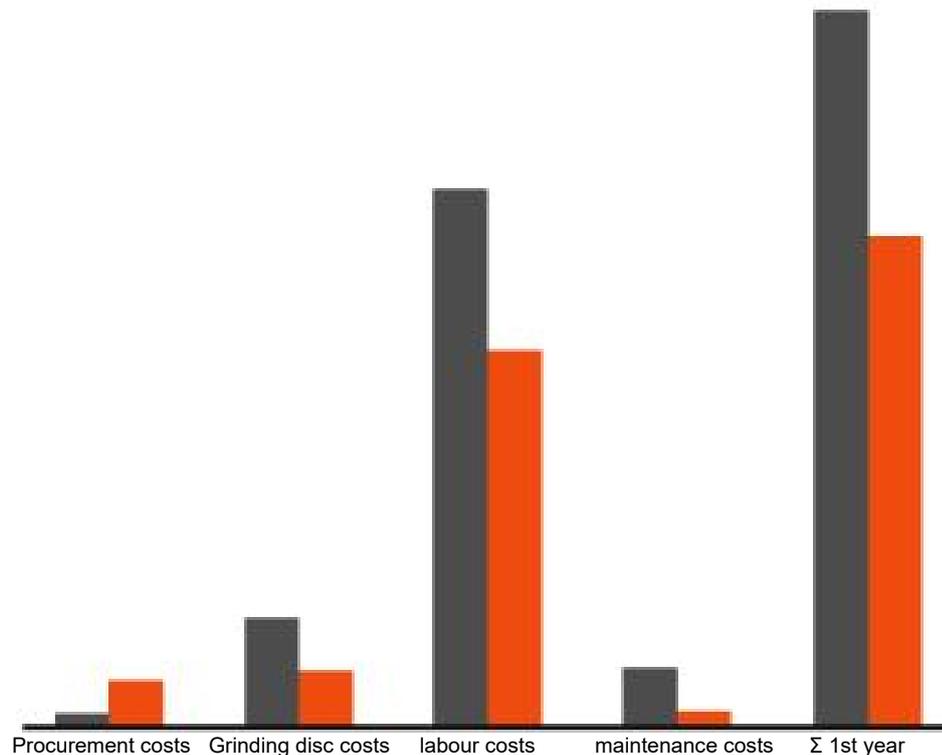
- There are also many benefits to using high-frequency power tools in an industrial setting. The productivity increase is extremely noticeable, thanks to the increased power, ideal speeds, constant speed stability even under load and the associated very high grinding performance.
- Tool wear is minimised.
- FEIN high-frequency power tools are also designed for maximum load capacity and with minimum maintenance in mind. This results in longer service lives, shorter downtimes and reduced maintenance and repairs.
- In industrial continuous use, for example in multi-shift operation, choosing FEIN high-frequency technology also delivers better cost-effectiveness.

## High frequency compared with standard frequency.

A higher frequency means a higher speed which increases the motor's output power. Increasing the frequency from 50 Hz to 300 Hz therefore increases power sixfold while retaining the same size and weight. The optimum power/weight ratio is reached at 300 Hz. Outstanding speed stability over the entire load range ensures optimum peripheral speeds which impacts positively on grinding performance, productivity and an appreciable reduction in grinding disc wear.

The induction motors of the high-frequency power tools with squirrel cage rotors

feature no wearing power-transmitting parts. They don't need powerful ventilation, just surface ventilation, which allows them to be fully encapsulated and gives the motors complete dust protection. High-frequency tools have simple structures, making them easy, fast and cheap to maintain. Stationary frequency converters require virtually no service – with the exception of ball bearing maintenance (roughly every 20,000 operating hours).



High frequency

Standard frequency

**The comparison was based on the following basic conditions:**

- 1 grinder workstation
- 250 working days per year, two-shift operation, 8-hour shifts
- 50% tool use, i.e. 8 hours a day or 2,000 hours a year
- 3 standard-frequency angle grinders (WSG 25-180) per year
- 1 high-frequency angle grinder (MSfo 869-1d) for 2 years + 1 converter (HFS 27-300) for > 5 years

## **Various grinders used in L&T company and their specification.**

### **1. High Frequency mini surface grinder.**

Specification:-  
Maximum RPM-900  
Voltage-200v  
Frequency-300hz  
Ampere-3.3A

### **2. High Frequency big surface grinder**

Specification:-  
Maximum RPM-5700  
Voltage-200v  
Frequency-300hz  
Ampere-10A

### **3.High Frequency big straight grinder**

Specification:-  
Maximum RPM-5800  
Voltage-200v  
Frequency-300hz  
Ampere-10A

### **4.High Frequency mini straight grinder**

Specification:-  
Maximum RPM-18000  
Voltage-200v  
Frequency-300hz  
Ampere-3.3A

### **5.High Frequency long neck mini straight grinder**

Specification:-  
Maximum RPM-18000  
Voltage-200v  
Frequency-300hz  
Ampere-3.3A

## 6.High Frequency long neck mini straight grinder

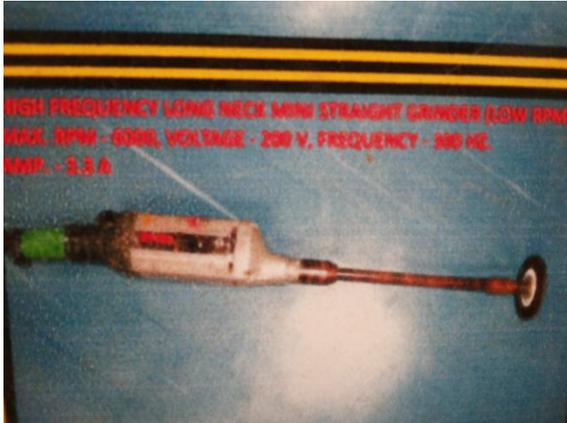
Specification:-

Maximum RPM-6000

Voltage-200v

Frequency-300hz

Ampere-3.3A

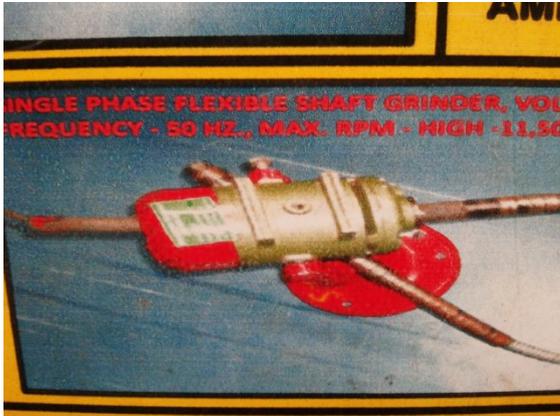


## 7.Single phase flexible shaft grinder

Specification:-

Maximum RPM-high=11500, low=1200

Voltage-230v



## Grinding wheel

### 1. Grinding wheel for mini surface grinder.

Specification:

Diameter- 125mm

Maximum speed-12200RPM

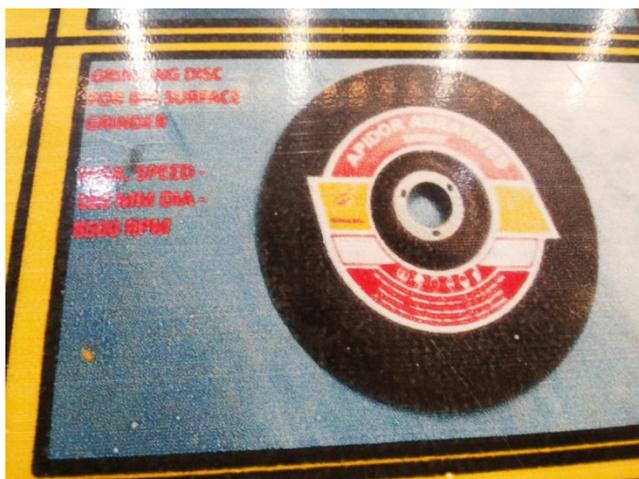


### 2. Grinding wheel for big surface grinder.

Specification:

Diameter- 180mm

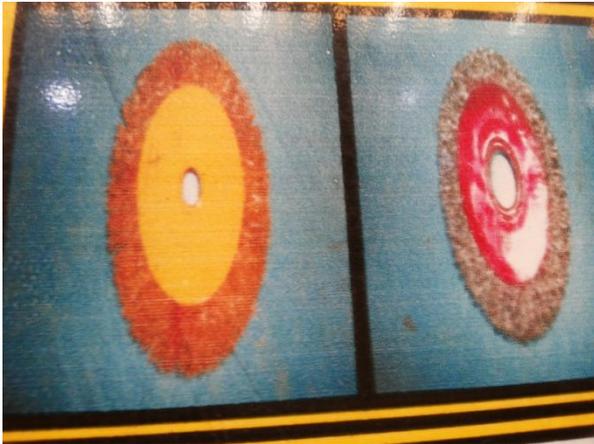
Maximum speed-8500RPM



### 3. Buffing wheel

Specification:

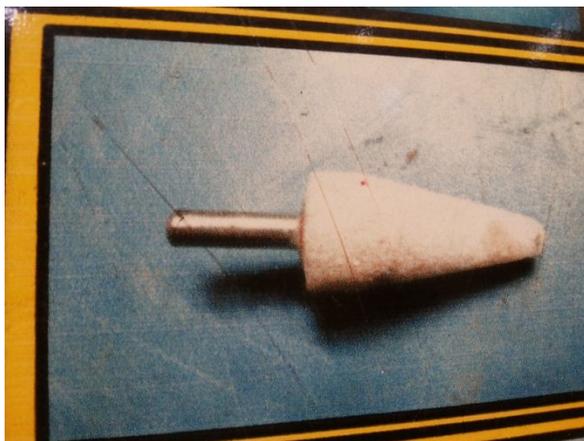
Diameter- 180mm,100mm



### 4. Mounted point grinding wheel.

Specification:

Diameter- 6mm



### **5. cutting wheel**

Specification:

Diameter-80\*6\*6mm

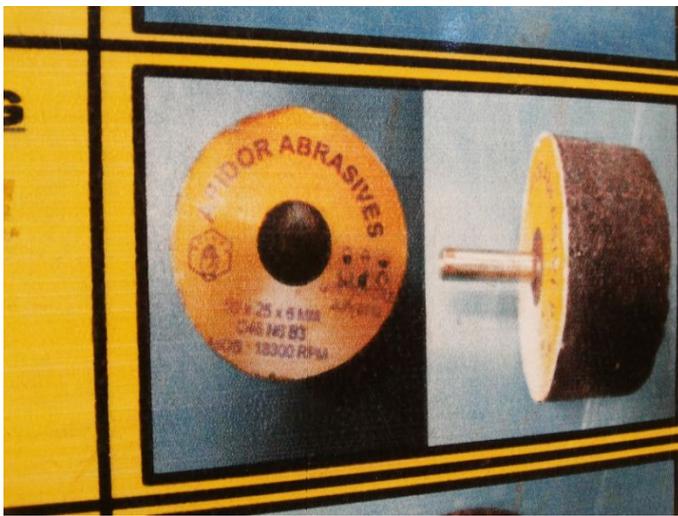
Maximum speed-19400RPM

### **6.Cup wheel**

Specification:

Diameter-50\*25\*6mm

Maximum speed-18300RPM



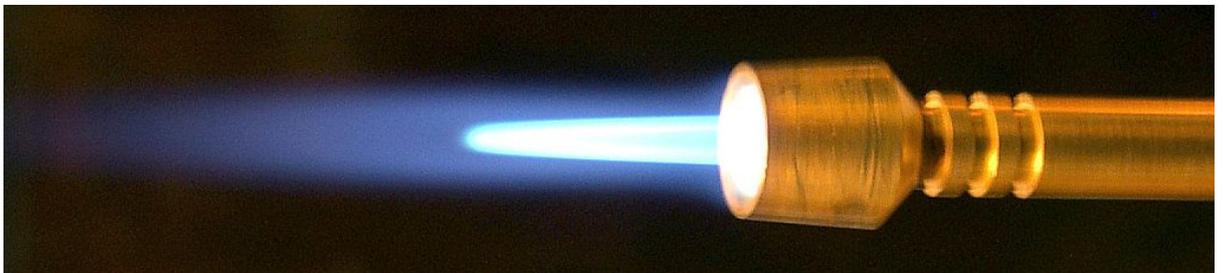
These are the various types of grinders and their wheels which are generally use for welding and cutting purpose.

## Torches

The torch is the part that the welder holds and manipulates to make the weld. It has a connection and valve for the fuel gas and a connection and valve for the oxygen, a handle for the welder to grasp, a mixing chamber (set at an angle) where the fuel gas and oxygen mix, with a tip where the flame forms.

1. gas cutting torches
2. FCAW torches
3. TIG welding torches

### 1. Gas cutting torches



For cutting, the setup is a little different. A cutting torch has a 60- or 90-degree angled head with orifices placed around a central jet. The outer jets are for preheat flames of oxygen and acetylene. The central jet carries only oxygen for cutting. The use of several preheating flames rather than a single flame makes it possible to change the direction of the cut as desired without changing the position of the nozzle or the angle which the torch makes with the direction of the cut, as well as giving a better preheat balance.<sup>[2]</sup> Manufacturers have developed custom tips for Mapp, propane, and polypropylene gases to optimize the flames from these alternate fuel gases.

The flame is not intended to melt the metal, but to bring it to its [ignition temperature](#).

The torch's trigger blows extra oxygen at higher pressures down the torch's third tube out of the central jet into the workpiece, causing the metal to burn and blowing the resulting molten oxide through to the other side. The ideal kerf is a narrow gap with a sharp edge on either side of the workpiece; overheating the workpiece and thus melting through it causes a rounded edge.



Cutting a rail just before renewing the rails and the ballast.

Cutting is initiated by heating the edge or leading face (as in cutting shapes such as round rod) of the steel to the ignition temperature (approximately bright cherry red heat) using the pre-heat jets only, then using the separate cutting oxygen valve to release the oxygen from the central jet.<sup>[2]</sup> The oxygen chemically combines with the iron in the ferrous material to oxidize the iron quickly into molten [iron oxide](#), producing the cut. Initiating a cut in the middle of a workpiece is known as piercing.

## The role of oxygen

Oxygen is not the fuel. It is what chemically combines with the fuel to produce the heat for welding. This is called 'oxidation', but the more specific and more commonly used term in this context is 'combustion'. In the case of hydrogen, the product of combustion is simply water. For the other hydrocarbon fuels, water and carbon dioxide are produced. The heat is released because the molecules of the products of combustion have a lower energy state than the molecules of the fuel and oxygen. In oxy-fuel cutting, oxidation of the metal being cut (typically iron) produces nearly all of the heat required to "burn" through the workpiece. Oxygen is usually produced elsewhere by distillation of liquified air and shipped to the welding site in high pressure vessels (commonly called "tanks" or "cylinders") at a pressure of about 21,000 kPa (3,000 lbf/in<sup>2</sup> = 200 atmospheres). It is also shipped as a liquid in Dewar type vessels (like a large Thermos jar) to places that use large amounts of oxygen. It is also possible to separate oxygen from air by passing the air, while under pressure, through a zeolite sieve which selectively absorbs the nitrogen and lets the oxygen (and argon) pass. This gives a purity of oxygen of about 93%. This works well for brazing, however higher purity oxygen is necessary to produce a clean, slag-free [kerf](#) when cutting

## **Fuel leakage**

Fuel gases that are denser than air (Propane, Propylene, MAPP, Butane, etc...), may collect in low areas if allowed to escape. To avoid an ignition hazard, special care should be taken when using these gases over areas such as basements, sinks, storm drains, etc. In addition, leaking fittings may catch fire during use and pose a risk to personnel as well as property.

---

## **Safety with cylinders**

When using fuel and oxygen tanks they should be fastened securely upright to a wall or a post or a portable cart. An oxygen tank is especially dangerous for the reason that the oxygen is at a pressure of 21 MPa (3000 lbf/in<sup>2</sup> = 200 atmospheres) when full, and if the tank falls over and its valve strikes something and is knocked off, the tank will effectively become an extremely deadly flying missile propelled by the compressed oxygen, capable of even breaking through a brick wall.<sup>[12]</sup> For this reason, never move an oxygen tank around without its valve cap screwed in place.

On an oxyacetylene torch system there will be three types of valves, the tank valve, the regulator valve, and the torch valve. There will be a set of these three valves for each gas. The gas in the tanks or cylinders is at high pressure. Oxygen cylinders are generally filled to approximately 2200 psi. The regulator converts the high pressure gas to a low pressure stream suitable for welding.

## Safety

Oxygas welding station (keep cylinders and hoses away from the flame)



Gas welding/cutting goggles and safety helmet

Oxyacetylene welding/cutting is not difficult, but there are a good number of subtle safety points that should be learned such as:

---

- More than 1/7 the capacity of the cylinder should not be used per hour. This causes the acetone inside the acetylene cylinder to come out of the cylinder and contaminate the hose and possibly the torch.
- Acetylene is dangerous above 1 atm (15 psi) pressure. It is unstable and explosively decomposes. hen welding will help to avoid large chemical exposure.
- Proper ventilation

## Regulator

The regulator is used to control pressure from the tanks to the required pressure in the hose. The flow rate is then adjusted by the operator using [needle valves](#) on the torch. Accurate flow control with a needle valve relies on a constant inlet pressure to it.

Most regulators have two stages: the first stage of the regulator is a fixed-pressure regulator whose function is to release the gas from the cylinder at a constant intermediate pressure, despite the pressure in the cylinder falling as the gas in the cylinder is used. This is similar to the [first stage of a scuba-diving regulator](#). The adjustable second stage of the regulator controls the pressure reduction from the intermediate pressure to the low outlet pressure. The regulator has two pressure gauges, one indicating cylinder pressure, the other indicating hose pressure. The adjustment knob of the regulator is sometimes roughly calibrated for pressure, but an accurate setting requires observation of the gauge.

Some simpler or cheaper oxygen-fuel regulators have only a single stage regulator, or only a single gauge. A single-stage regulator will tend to reduce its outlet pressure as the cylinder is emptied, requiring manual readjustment. For low-volume users, this is an acceptable simplification. Welding regulators, unlike simpler LPG heating regulators, retain their outlet (hose) pressure gauge and do not rely on the calibration of the adjustment knob. The cheaper single-stage regulators may sometimes omit the cylinder contents gauge, or replace the accurate dial gauge with a cheaper and less precise "rising button" gauge

# 1. TECHNICAL SPECIFICATIONS – IDEALARC DC – 1000

The IDEALARC DC-1000 is an SCR-controlled, three phase, welding and cutting power source. It uses a single range potentiometer to control.

## **Operation AND CONTROLS**

The IDEALARC DC-1000 comes with the following standard controls:

DOUBLE ON/OFF PUSH BUTTON (Main Power and 115V Auxiliary)

OUTPUT CONTROL POTENTIOMETER

OUTPUT CONTROL SWITCH (Remote or Machine Control)

WELDING MODE SWITCH

CONTROL CIRCUIT POLARITY SWITCH

POWER SOURCE PILOT LIGHT

DC AMMETER (OPTIONAL)

DC VOLTMETER (OPTIONAL)

## **DESIGN FEATURES AND ADVANTAGES**

- A control circuit designed to provide good starting for a large variety of processes and procedures.
- Output Control Potentiometer that provides easy single range continuous control.
- Output Control Switch that provides simple switching from local to remote control.
- Red neon pilot light to confirm that the Input Contactor is energized.
- Auxiliary power source to provide 115-volt AC power (1000 VA) to wire feeding equipment.
- Multi-functional terminal strip for easy connection of wire feeding control cables and switching between CV Innershield and CV Submerged Arc welding when using the Dual Process or Dual Procedure Kits.

- recessed output terminals to help prevent any person or object from accidentally coming into contact with the output current. These terminals are prominently labeled positive and negative for easy identification.
- Thermostatically protected power source.
- Electronic protection circuit to protect power source against overloads.
- Input line voltage compensation to provide an essentially constant output.
- SCR electronically controlled welder output provides extra long life, especially for highly repetitive welding applications.

## **CONTROLS AND SETTINGS**

1. ON/OFF PUSH BUTTON: This push button turns the machine ON or OFF

2. OUTPUT CONTROL POTENTIOMETER: This control provides tapered, continuous control of the machine output. The control can be rotated from minimum to maximum while machine is under load to adjust the machine output.

3. WELDING MODE SWITCH: This toggle switch is used to select the proper welder performance characteristics for the process being used. There are three modes: CV (Constant Voltage) Innershield®, CV (Constant Voltage) Submerged Arc, and VV (Variable Voltage) CC (Constant Current) Submerged Arc.

4. OUTPUT CONTROL SWITCH: This toggle switch is used to switch between "Output Control at DC-1000" for local control of machine output and "Output Control Remote" for remote control of machine output.

5. CONTROL CIRCUIT POLARITY SWITCH: This toggle switch is used to set power source voltage sensing polarity to match the polarity to which the electrode is connected to the machine. This provides the correct polarity at the terminal strip for correct operation of the automatic wire feeding equipment powered by the auxiliary power from the power source.

6. POWER SOURCE PILOT LIGHT: The red neon light glows when the power source input contactor is energized.

7. VOLTMETER: An optional voltmeter is available.

8. AMMETER: An optional ammeter is available.

- Standered voltage-230/460
- Input current at rated output-193/96.5

### **Rated Output**

Duty cycle	Amp	Volt at rated ampere
100%	1000	44
60%	1140	44
55%	1250	44

### **Output**

Mode	Current range	Maximum open circuit voltage	Auxillary power
Constant current	140 to 1250	75v DC	115vac 8 amp
Constant volage	140 to 1250	75v DC	115vac 8 amp
Constant voltage at 500 stud	140 to 625	75v DC	115vac 8 amp

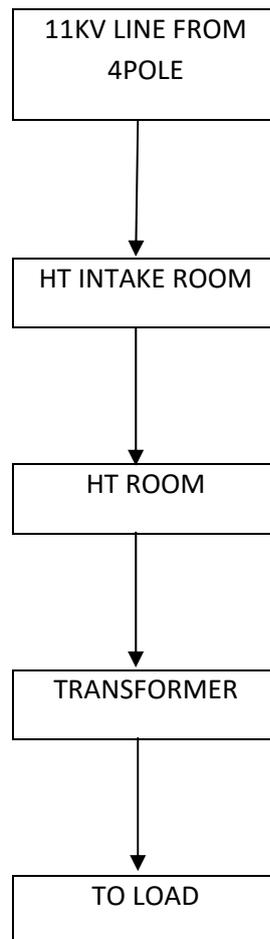
## **POWER DISTRIBUTION IN L&T**

---

### **INTRODUCTION:-**

In l&t power come from GEB at 11kv received and power is tranmitte to load through three stage HT intack,HT room,LT room.

### **BLOCK DIAGRAM:-**



## 1. Four Pole Structure

Incoming line 11kv come from GEB on 2 pole structure, there incoming current transformer for measuring current with two meter from GEB and L&T and another 2 pole L&T side.

## 2. HT Intake Room

In high tension intake room XLPE cables are coming from 4pole structure and send it to ht room. Device like CT,PT, relay, trivector meter, load manger, vacuum circuit breaker is there.

Vacuum circuit breaker implanted near ht intake room. it is the first protection device whenever fault occur arc is formed so metal vapour and ion electron form and high pressure vacuum cause these metal vapour to condensed on contact so dielectric strength recover fastly and arc is extinguished and breaker is tripped.

## 3. Circuit Breaker

Front panel of a 1250 a air circuit breaker manufactured by ABB. this low voltage power circuit breaker with drawn from its housing for servicing. trip characteristic are configurable via DIP switch on the front panel.

### Specification of V.C.B

- Type: VC32
- Voltage: 12kv
- Frequency: 50hz
- Short circuit time: 25 ka/3sec
- Making capacity: 62.5kv
- Breaking capacity: 25kv
- Rated current: 630A
- Power factor with voltage: 28kv rms
- Impulse withstand voltage: 75kv

Different type of relay are also placed in panel.this really are as follow.

1. Over current relay
2. Earth fault relay
3. Short circuit relay
4. Instantaneous continue fault relay
5. Auxiliary relay

The relay is one type of electronic protection device.the relay is imposed with main circuit breaker.when abnormality occur it sense and give signal to circuit breker to open and isolating the faulty quipment and ensure the safety to the system

### 3.HT room

In this room XPLE cable are coming from HT intake room and from it goes to the step down transformer .minimum oil circuit brekar

### Transformer specification

- Rating: 1250kva
- Primary current:65.7A
- Secondary current:1667.67A
- Voltage on load:HV-11kv, LV-433kv
- Impulse voltage: 5.35%
- Number of tapping:17

Here step down transforemer is used to convert 11kv to 433kv.on transformer buccolz relay,breatherand RTCC is used.

### 4.LT room

The power comes from HT room to LT room through cable from transformer.there are three transformer out of which one is spare,load is distributed according to rating of transformer,cable come from transformer are connected to the bus bar arrangement.there are three section.load is connected to the part of bus bar.from theses buses power is given to load by

cable. there is a panel in which bus is incoming and feeder is outgoing. there are capacitor bank at LT room to balance the power factor.

#### 5. control panel

In this there is different types of relay, electronic trivector meter, light indicator for on/off operation and ammeter on it.

##### ➤ Electronic trivector meter

Specification: 3 phase 4 wire.

$I_{max} : 10A$

Class : 0.5 second for active power

1.5s second for reactive power

Pulse rate : 10000 imp/kwh

Frequency : 50 hz

##### ➤ Relay

There is different type of relay tripping relay, auxiliary relay, neutral development relay, trip circuit supervision relay.

L&T CN-CS 800c is one type of relay. when line fault, short fault, ground fault occurs it is used to trip the device and save the equipment without damage.

#### 6. Bus coupler

All the transformer having spreaded load. so fault in any section not affected by two. but according to situation demand we can transfer the load between transformer with the help of bus coupler.