

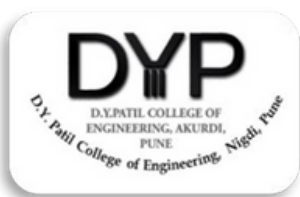


## NEWSLETTER

### ISSUE NO. 46, Sept 2024

ASM International, formerly known as the American Society of Materials, is a global professional organization dedicated to advancing materials science and engineering. It provides essential resources such as technical publications, training, and certifications, helping professionals stay at the forefront of innovation in industries like aerospace, automotive, and biomedical engineering. ASM also plays a key role in setting industry standards for material properties, processing, and safety. Through conferences, workshops, and a vast digital library, it fosters collaboration and knowledge sharing, driving research and development in sustainable and high-performance materials.

### ACADEMIC PARTNERS



### ASM CHAPTER OFFICE BEARERS



Rahul Gupta  
**Chairman**



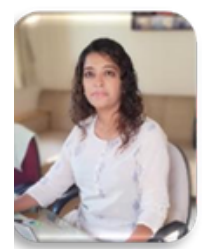
Ruta Barve  
**Secretary**



D.G.Chivate  
**Vice Chairman**



Hemant Zaveri  
**Treasurer**



Kruttika Apshankar-Kher  
**Chairperson -Newsletter**

### EDITORIAL



Hemant K Zaverit



EDITORIAL

Dear Friends, Patrons and Wellwishers.

Greetings for the upcoming festive season.

It is my pleasure to present you the 5th/6th/7th edition of the Newsletter for the current calendar year.



Using this platform, I would like to request you all to participate in the upcoming event, M & MT 2024, in December 2024, as sponsors, delegates, stall booking, etc. and make it a grand success.

This edition of the newsletter contains an extremely well written article on "THE IMPORTANCE OF METROLOGY IN PRODUCT QUALITY", very graciously contributed by Shri Nitin Kshirsagar.

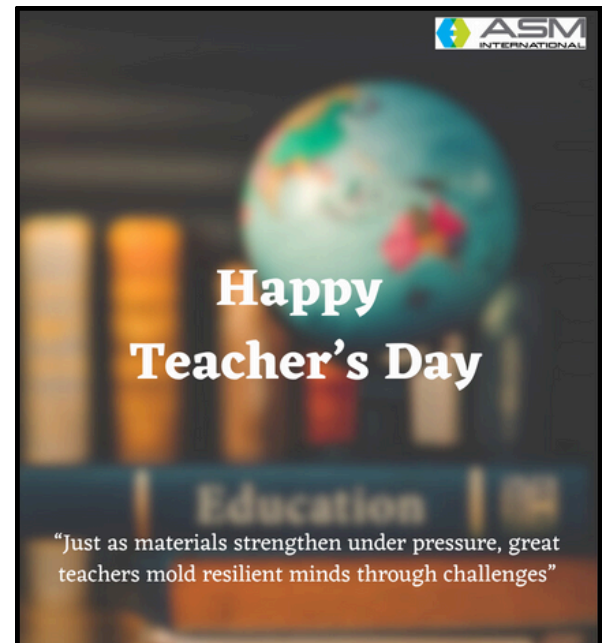
I would like to thank Dr. Krutika Khuir for taking this initiative for grooming a very young and enthusiastic team of students of Cummins College of Engineering for Women, Pune ably led by Aditi Kulkarni, to put together this edition of the newsletter.

I sincerely request the readers of this newsletter to share their feedbacks. This will help to hone the editorial skills of this young team and encourage them to scale newer heights.

Thanking You for your time to read the newsletter.

Signing off for this edition, till we touch base next time.

Hemant K Zaverit





# UPCOMING ANNOUNCEMENTS



## M&MT 2024

Materials & Manufacturing Technology

Sponsors



Robig India Pvt. Ltd., Mumbai



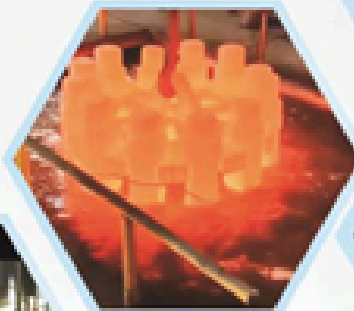
Adison Thin Film Systems Pvt. Ltd., Pune



Jyoti Heat Treatment Pvt. Ltd., Pune



ibg, Germany



Conceptual Sponsor



**ASM International Pune Chapter**  
is organising a two days International Conference & Exhibition on  
**Materials & Manufacturing Technology 2024**  
with a focus on Heat Treatment & Surface Modification

**Dates**  
4 - 5 December 2024

**Venue** | Hotel Pride, Ganeshkhind Road,  
Shivajinagar, Pune-411004.

For the conference M & MT 2024 Email : [mmt24.asmpune@gmail.com](mailto:mmt24.asmpune@gmail.com)



## UPCOMING ANNOUNCEMENTS

### M&MT 24 conference papers

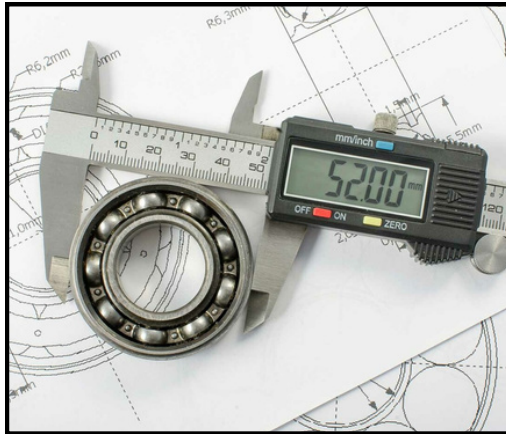
1. Plasma Nitriding and Plasma assisted CVD by **Thomas Muller**
  2. Surface engineered self lubricating coatings for demanding applications by **Bojan Podgirnik**
  3. Residual stresses in case hardened materials by **Dr OP Mohanty**
  4. Cryogenic treatment of die steels by **Dr RKP Singh**
  5. Distortion control in case hardened gears by Low pressure carburising by **Anand Andhale**
  6. Atmosphere Furnace Technology by **Ipsen**
  7. HVOF and advanced thermal spray technology by **Dr Karandikar**
  8. Nitriding of H13 fuel injector nozzles by **Cummins India**
  9. Use of Artificial intelligence and Machine Learning in Material science by **Dr Satyam Sahay**
  10. Oxidation coatings life extension in gas turbine blades by **Dr Dheepa Srinivasan**
  11. Metallographic techniques for heat treated structures by **Mr Y S Gowaikar**
  12. Techno commercial aspects of case hardened gears by **Mr B R Galgali and Dr P M Kulkarni**
  13. Diamond like coatings by **Dr Atul Kulkarni**
  14. Design of fixtures for Heat Treatment and induction coils By **Mr Udayan Pathak**
  15. Cold Spray technology by **Dr Harpreet Singh**
  16. CQI 9 by **Mr Deepak Kulkarni**
  17. Coatings for corrosion resistance by **Mr Rajan Ambat**
  18. Plasma processing of metals **Dr Nirav Jamnapara**
- Keynote talks by **Dr Shrikant Joshi and Dr S Sudarshan**

#### Call for Speakers:

M&MT Conference (December)  
The Materials & Manufacturing Technologies (M&MT) Conference organizing committee is pleased to invite professionals, researchers, and experts in the materials science and manufacturing industry to participate as speakers for our upcoming conference in December. This is a great opportunity to share your expertise, engage with a diverse audience, and contribute to discussions that will shape the future of materials and manufacturing technologies.

#### Call for volunteers:

We are thrilled to announce an opportunity for students to be a part of the Materials & Manufacturing Technologies (M&MT) Conference this December as volunteers! We are looking for enthusiastic, motivated, and dedicated students who are passionate about materials science and manufacturing technologies to help us make this conference a success. Volunteering at this prestigious event is a great way to gain hands-on experience, network with professionals in the field, and contribute to a high-impact event. Don't miss this opportunity to be part of an exciting event and build your professional network!



# TECHNICAL ARTICLE

## IMPORTANCE OF METROLOGY IN PRODUCT QUALITY



**Shri Nitin Kshirsagar,**  
Director (Quality Assurance) at  
WIKA Instruments India Pvt.  
Ltd,Pune.

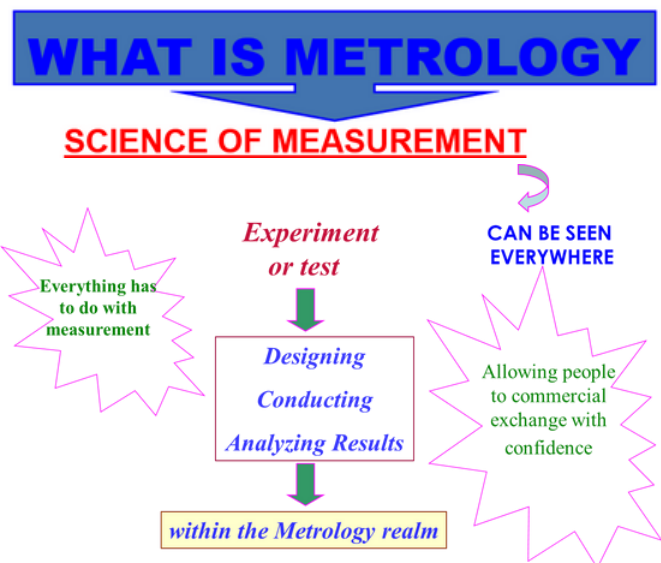
### INTRODUCTION:

To ensure desired product quality of any component, item or finished product- it is important that its required quality characteristics should be achieved. To verify characteristics (also called specifications in technical terms) measurement plays important role. Measurement involves use of suitable measuring equipment/instruments/gauges. Therefore, it is of vital importance that the used equipment/instruments/gauges :

- Are of required range, accuracy of the characteristic to be measured.
- Often we have experience that the measuring equipment/instruments/gauges used are not as per required specifications in terms of tolerance given/range given which may invalidate the measurement results.
- These measuring equipment/instruments/gauges should be calibrated to ensure that they are within their given specifications (accuracy) and will give proper results of measurement and the measurements should be traceable to international system of units SI.
- Proper and acceptable measurements will be only ensured by using appropriate, accurate, calibrated and traceable measuring instruments which will ultimately ensure desired PRODUCT QUALITY.

Once calibration/testing activity is involved- METROLOGY comes into picture. So let us discuss about what METROLOGY is and its importance.

### DEFINITION OF METROLOGY:



### Metrology Covers Three Main Tasks:

- The definition of internationally accepted units of measurement.
- The realization of units of measurement by scientific method.
- Establishment of traceability chain in documenting the accuracy of a measurement.



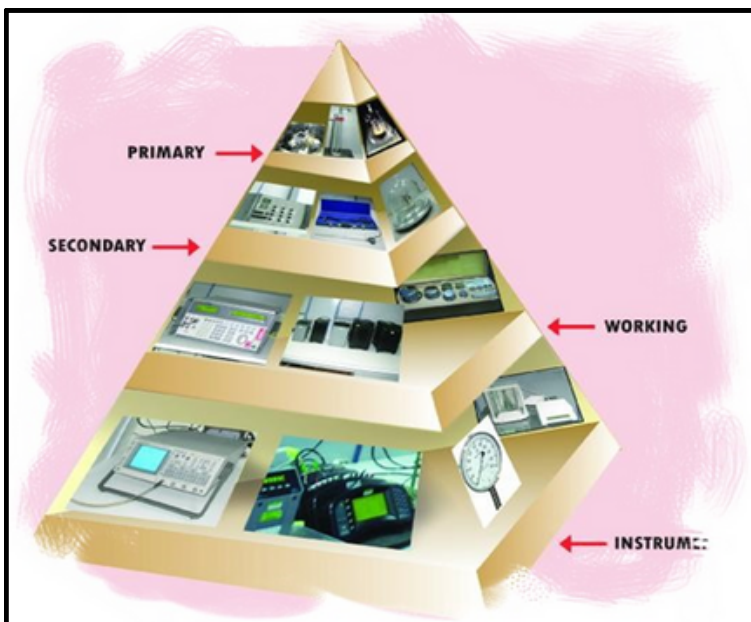
## Categories of Metrology

- Scientific Metrology – Development, maintenance and improvement of measurement standards.
- Industrial Metrology – To ensure the adequate functioning of measurement instruments used in industry, production & testing laboratories.
- Legal Metrology e.g. Weights & Measures – Accuracy of measurement - where these have influence on the transparency of economic transactions, health & safety.

## International System of measurement units - SI system

SI Units are published in the SI Brochure by BIPM-Paris-Int. Bureau of Weights and Measures- who is apex body maintaining world's primary measurement standards. The SI system of units is as follows:

So we get a hierarchy of measurements as follows:



## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K
Electric Current	ampere	A
Luminous Intensity	candela	cd
Amount of Substance	mole	mol

## Hierarchy of Measurements

Any measurement done by using required equipment which is calibrated will have its calibration report which contains its own measurement result which is realized by using a higher accuracy reference measuring instruments.

## SI Units contd.....

Quantity	Unit	Symbol
Pressure	N/m <sup>2</sup>	Pascal (Pa)
Force	N-m	Newton (N)
Acceleration	m/sec <sup>2</sup>	g
Velocity	m/sec	v
Voltage	Amp. x res.	V

Such many other derived units can be realized which are combination of base SI units:

## IMPORTANCE OF METROLOGY IN PRODUCT QUALITY

International standards (Primary) (maintained by BIPM)

National Metrology Institutes-get recognized by BIPM  
Part of SI system  
(For India –National Physical Laboratory)

National community that is using measurements



## Issues faced before evolution of system for calibration management:

Up to first two levels i.e. BIPM & NMIs- system is clear...

- BIPM maintains all the primary standards in the form of direct or derived ARTEFACTS. Also called as World's reference standards.
- All the NMIs get clone reference standards based on comparison with BIPM standards.
- NMIs have to undergo INTER-COMPARISONS as per defined program by BIPM and prove their continuous compliance with specifications.
- PEER Review system- i.e. one NMI will review system of other NMI is also in place as per defined program by BIPM.

Up to NMI level link is clear- however the problems started at lower end hierarchy of the used standards in the industry:

- Measurements done by one entity are not acceptable to the other e.g. on grounds of non-conformities in FORM-FIT-FUNCTIONS which created clashes between suppliers/customers
- There were no clear ground rules about correct selection of measurement standard for given measurement and its allowed tolerances
- Service providers for calibration/testing of measurement equipment were not into the picture for accountability of given results as they were out of the link mentioned above.
- No clear ground rules of re-calibration/retesting/verification/validation of measurement equipment.
- Given Results for calibration/testing were based on TOLERANCE values only. No further information is given.
- Validity of given results were in question
- Awareness was poor

- Example : Component Dimension -  
CD measurement: 25 mm $\pm$  0.2 ... specification  
Supplier measurement: 24.9 mm (used equipment- Vernier)  
User of component measurement: 24.7 mm (used equipment micrometre component rejected)

Here the dispute is there, and to validate whose measurement correct is in question. Unless backed up by proper calibration with traceability and allowed tolerance of used measurement equipment this will remain in question.

## Evolution of system for calibration management of measuring equipment

Concept introduced by ISO Quality Management System:

- It was ISO 9000 –Quality System Standards- brought the requirements of TRACEABILITY, RE-CALIBRATION, VERIFICATION, VALIDATION of measuring equipment used in industry and how this can affect product quality.
- Complementary standards like ISO 10012 are also published for explanation of the requirements
- At this point of time Industry got a wake-up call on the whole subject.
- However the service providers for calibration/testing any kind of requirements/conformity assessment
- However the service providers for calibration/testing any kind of requirements/conformity assessment process were not there and merely calibration reports based on some traceability and tolerance declaration were accepted.

## ISO Standards evolution for calibration management system

- ISO has come out with requirements in the form of ISO/IEC Guide 25 in 1990 which has given requirements for laboratories carrying out Calibration/Testing.
- However these requirements were more of technical nature and no system requirements like ISO 9001 were included.



## ISO Standards evolution for calibration management system

- ISO has come out with requirements in the form of ISO/IEC Guide 25 in 1990 which has given requirements for laboratories carrying out Calibration/Testing.
- However these requirements were more of technical nature and no system requirements like ISO 9001 were included.
- NMLs of various countries started program of recognizing the laboratories based on this e.g. NPL India started a program called NCTCF.
- However these types of programs were voluntary in nature.
- ISO/IEC Guide 25 modified in 1996
- ISO has revised ISO/IEC Guide 25 further in 1999 and came out with a standard ISO/IEC 17025: 1999 which is aligned with ISO 9001 in terms of Management Requirements and further clear Technical Requirements applicable for calibration/testing
- ISO has revised ISO/IEC Guide 25 further in 1999 and came out with a standard ISO/IEC 17025: 1999 which is aligned with ISO 9001 in terms of Management Requirements and further clear Technical Requirements applicable for calibration/testing
- Also scope for Accreditation Bodies recognition according ISO 17011 is enhanced to include ISO/IEC 17025
- On the national levels this subject was taken up and all the countries started their accreditation bodies for laboratories with clear aim to harmonize the system
- ISO/IEC 17025 brought important requirements e.g. New definitions of CALIBRATION, TRACEABILITY, DECISION RULES, MEASUREMENT UNCERTAINTY

## Definitions used in calibration management system as per ISO/IEC 17000 and ISO/IEC 17025

**Calibration:** Operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties, and in a second step, uses this information to establish a relation for obtaining a measurement result from an indication

**Measurement Uncertainty:** Parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used

It arises due to the imperfections in the measurement system

**Metrological Traceability:** property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty

That is - HOW TO ENSURE THAT TWO MEASUREMENTS OF THE SAME QUANTITIES ARE COMPATIBLE

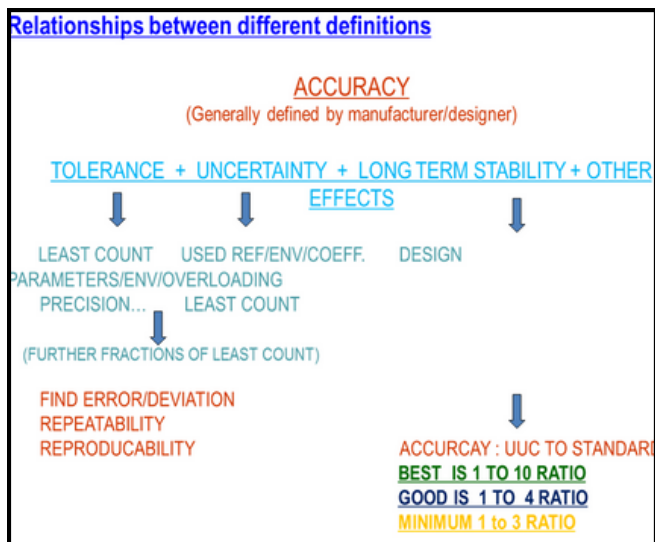
### ISO/IEC 17025 clearly brought requirements of Accreditation to overcome:

- Only calibration with some traceability is not sufficient to know the status of measuring instrument whether it is fit for use -as only ERROR is considered
- Used standard's suitability and traceability through unbroken chain is not visible in such calibrations Results may not be comparable
- Calibration process needs validation with competence of personnel & Measurement Capability (CMC) needs to be defined which

will explain what type of devices can be calibrated what is the best measurement possibility???

- Calibration affects the Product Quality e.g. interchangeability of parts must be guaranteed with consistency.





### Accreditation of Calibration Laboratories

To meet and maintain the calibration capability, traceability-calibration service providers i.e. calibration laboratories need accreditation as per ISO/IEC 17025.

Following are some important points by which the metrological requirements can be fulfilled by accreditation

- Assurance of accurate of measurements
- Ability to trace measurements to International standards
- Ensure measurements of products – fit for use-interchangeability-consistency of required quality.
- International acceptance of test/calibration reports
- Consumer protection (legal metrology)meeting the requirements of ISO 9001 and 17025

In India Accreditation for Calibration lab is provided by:

### National Accreditation Board for Testing and Calibration Laboratories

NABL House

Plot- 45, Sector 44,

Gurgaon – 122002, Haryana

Near HUDA City Centre Metro Station, Behind Fortis Hospital

Tel. no.: 91-124-4679700 (30 lines)

Fax: 91-124-4679799

Website: [www.nabl-india.org](http://www.nabl-india.org)

This body is functional under QUALITY COUNCIL OF INDIA

### Summary of the subject:

- To ensure PRODUCT QUALITY it is important that the measurement system used for measurement of product specifications-consisting of measuring equipment/instruments/gauges-should be appropriate and capable as per requirements of the specifications.
- All measurement system consisting of measuring equipment/instruments/gauges should have proper Metrological Traceability with Measurement Uncertainty in its calibration results.
- To establish that the calibration results are authentic and meet all the requirements of Metrological requirements, the calibration service providers i.e. calibration laboratories should have Accreditation as per ISO/IEC 17025 standard from an appropriate accreditation body.
- Such accreditation will give confidence for the calibration results of measurement system consisting of measuring equipment/instruments/gauges.
- If there are any disputes, issues- can be resolved with comparison of two calibration equipment results.
- Most important benefit is- such accreditation will bring Customer and Suppliers on one agreed platform and will help to achieve PRODUCT QUALITY which is the ultimate goal for all.



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Model - Autopol

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- Pneumatic or electrical operation
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Model - Autopol Dual

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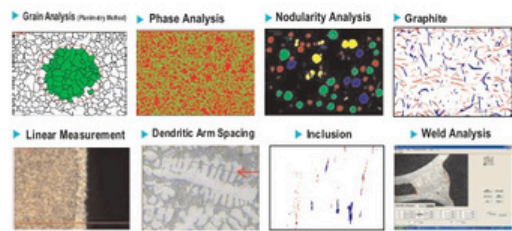


### Inverted Microscope

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Consumables : +91 98220 06106  
Email : sales@metatechind.com, meta@metatechind.com



# REPORT ON ASM MATERIAL ADVANTAGE CHAPTER ANNUAL MEETING 2024

## Event Details:

Date: 21st August 2024

Time: 6:00 PM to 7:00 PM

Venue: Conference Hall 1, Poona Club Ltd.,  
6 Bund Garden Road, Camp, Pune,  
Maharashtra, 411001

## Agenda Overview:

### 1. Welcome address

Presented by: Mr. Rahul Gupta, Chairman,  
ASM Pune Chapter

2. Summary: The meeting commenced with a  
welcome address by Mr. Rahul Gupta, setting  
the tone for the proceedings and  
acknowledging the members present.



### 3. Balance Sheet Presentation and Approval

Presented by: Mr. Rahul Gupta and Mr. Hemant Zaveri.

Summary: Mr. Rahul Gupta and Mr. Hemant Zaveri  
presented the chapter's financial statements  
including the balance sheet. The chapter's financial  
health was reviewed and the  
members approved the balance sheet.



### 4. Declaration of Chapter Awards

Presentations: All the chapters presented their ASM  
club chapter activities and prizes  
received for the academic year. MKSSS's Cummins  
College of Engineering for Women, PVG College of  
Engineering, Govt. Polytechnic, KLS Gogte Institute of  
Technology, Belagavi presented the activities for the  
academic year.

Summary: The chapter awards were announced,  
recognizing individuals and teams for their  
contributions to the chapter's success. The awards  
celebrated excellence in various areas, including  
research, service, and leadership.



### 2. Secretary Report

Presented by: Mr. D. G. Chivate, Vice-Chairman,  
ASM Pune Chapter

Summary: Mr. D.G. Chivate and Mrs. Ruta Barve  
delivered the

Secretary's Report,  
outlining the chapter's  
activities, achievements  
and challenges over the  
past year.

The report emphasized  
the key events,  
membership growth,  
and collaborative  
efforts with other student  
chapters and institutions.





### 5. Appointment of CA for FY 2023-24 and Approval for Remuneration

Presented by: Mr. Rahul Gupta

Summary: The appointment of the Chartered Accountant for the fiscal year 2023-24 was discussed. Mr. Rahul Gupta proposed the approval of the CA's remuneration, which was accepted by the members.

### 6. Technical talk

A Technical talk was presented by Prof. Mahesh Kori, KLS Gogte Institute of Technology, Belagavi, Karnataka on Application of Composite materials.



### 7. Any Other Point with the Permission of the Chairman

Felicitation: Mr. Bhimsen Galagali, former chairman, of ASM Pune Chapter, was felicitated by Shri. R. D. Kulkarni for his remarkable contribution to ASM Pune chapter.

Review of Conference: Mr. Bhimsen Galagali reviewed and presented the status of conference arrangements and the number of papers received from various organizations.

Felicitations of Industrial performers: Many industrialists were honoured for their contributions to the ASM chapter in various capacities

Summary: An open forum was held where members could raise any additional points for discussion with the permission of the Chairman. Various topics were discussed, including future initiatives and member engagement strategies.

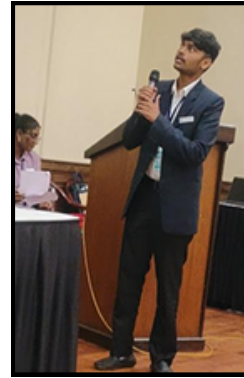


### FELICITATION OF INDUSTRIALISTS





**GLIMPSES OF ANNUAL MEET**



**8. VOTE OF THANKS**

- Presented by: Mr. Dattatray Chivate
- Summary: The meeting concluded with a vote of thanks by Mr. Dattatray Chivate, who expressed gratitude to all members for their participation and contributions to the chapter's activities.
- Conclusion: The ASM Material Advantage Chapter's annual meeting successfully reviewed the past year's achievements, discussed the financial standing, and set the stage for the upcoming year with renewed commitment and strategic planning. The meeting fostered a sense of community and collaboration among the members.



**Next Steps:** The chapter will continue to build on the discussions and decisions made during the meeting, with a focus on implementing the proposed initiatives and maintaining financial discipline.

This report summarizes the key points discussed during the ASM Material Advantage Chapter's Annual Meeting held on 21st August 2024 in Pune. The meeting was well-attended, and all agenda items were addressed effectively.



## **MKSSS's Cummins College of Engineering for Women, Pune Joins ASM International as a Student Chapter**



### **A New Era of Materials Science Education**

MKSSS's Cummins College of Engineering is thrilled to announce its affiliation with ASM International as a student chapter. This partnership will provide students with unparalleled opportunities for growth, learning, and professional development in the field of materials science and engineering.

ASM International is a global leader in materials science, offering a wide range of resources, educational programs, and networking opportunities for professionals and students alike. As a member of the ASM student chapter, Cummins College students will have access to:

- Cutting-edge research papers and publications
- Industry-leading conferences and workshops
- Mentorship and networking opportunities with industry experts
- Exclusive discounts on ASM membership and certifications

### **Benefits for Cummins College Students**

By joining ASM International, Cummins College students can expect to:

- Gain exposure to the latest advancements in materials science
- Enhance their technical skills through hands-on projects and competitions
- Build a strong professional network within the materials science community
- Explore career opportunities in various industries

Cummins College joining ASM boosts its global reach, especially in India, and promotes diversity by empowering women in materials science. The college brings fresh research, new talent, and fosters collaboration through events, making ASM's community stronger.

### **Looking Ahead**

This partnership marks a significant milestone for Cummins College, positioning the institution as a leader in materials science education and research. The ASM student chapter will provide a platform for students to explore their passions, develop their skills, and contribute to the advancement of materials science.

Thank you for your support and encouragement as we embark on this new journey.

I would like to extend my sincere appreciation to the students of our team who contributed to this newsletter. The students who contributed are Aditi Kulkarni, Sanjeevani Naik, Vishwa Patil, Krishna Manke, Sakshi Zimur, Avidnya Nalawade, Aditi Gudale, Ishani Bore, Isha Gattawar. Their collective efforts have ensured the successful completion of this publication.

Prof. Poonam Bhore  
Faculty Advisor,  
ASM International Student Chapter,  
MKSSS's Cummins College of Engineering for  
Women,Pune



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METAL ANALYSIS



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**Tubes**



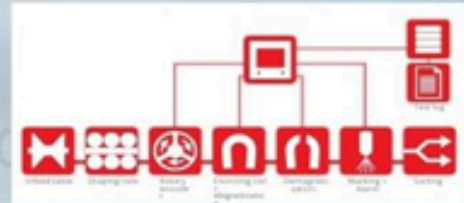
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**Wires**

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