FINE FINISH ORGANICS PVT. LTD.
Excellence In Innovation

Fine Finish News Version 23

INSIDE

Editor's Note

We, at Fine Finish Team hope you had a great first month of the new financial year. As we welcome the new government, we hope it will infuse a new energy in the manufacturing sector. With newer companies investing in India, we are hoping it will boost the Indian economy to a great extent. We hope the new government encourages more manufacturing within the country.

As India was one of the key signatories of Paris Climate Agreement 2016, India needs to reduce emission levels by 25% by 2030. As the deadline grows closer, Government of India is looking to promote electric mobility as one of the key solutions to reduce carbon emission. As the production of electric vehicles will increase, we expect a quantum jump in growth of composite industry.

Wishing everyone a successful financial year!

- Dr. G. S. Prabhu

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Introduction

As the new financial year has begun with lot of hope, we as an organization strive to maintain the equilibrium in all our markets. As demonetization and GST impact have been negated almost completely, the new financial year has reignited the animal spirit of the economy. Manufacturing Industry has registered a phenomenal growth rate of 6.8 % in contrast to 2.8 % during the previous quarter. Global Economy is also stabilizing with sustainable global trade and financial conditions. GST is promising to deliver a very positive outlook and India is on the path of becoming single most competitive market.

Fine Finish Organics Pvt. Ltd. has recently commissioned a new plant at Mahad with an area of 7500 sq. m. This plant will create lot of opportunities for developing new markets and boosting innovation. Due to excellent connectivity with Pune and other cities of Maharashtra, accessibility and transportation facilities have got a big impetus. Irrespective of any dispensation, we hope that economy prospers for all stakeholders with minimal impact on environment.

- **Kishore Prabhu**

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NEW PRODUCTS

EPOFINE® 558/ FINEHARD® 5200- Epoxy System for High Performance Laminating System

Epofine® 558 is a medium viscosity laminating grade multifunctional epoxy resin and Finehard® 5200 is a formulated aromatic amine hardener. The laminating system has a low viscosity at 60^0C to 70^0C and has excellent chemical resistance and mechanical properties. Long pot life with Finehard® 5200 facilitates the production of very large industrial and aerospace parts.

This system is suitable for processing by Filament Winding, Wet Lay-up and Resin Transfer Molding. Almost all high-performance industrial composites requiring high mechanical strength at elevated temperatures can be made from this system. This combination gives excellent chemical resistance, particularly for highly alkaline conditions. This is an excellent matrix resin for composites which need to be used at temperatures of up to 250^0C.

This system has some advantages:

1) Simple Mixing Ratio.
2) Low viscosity of mix ensures proper wetting.
3) Excellent water resistance.
4) Very good chemical resistance and electrical insulation.
5) High glass transition temperature.

Chemical and mechanical tests are conducted in our accredited laboratories and this leads to better control on manufacturing activities. Laminates manufactured using this epoxy resin system have excellent flexural and inter laminar shear properties.

- **Kishore Prabhu**

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NEW TEST FACILITIES

FOURIER TRANSFORM INFRARED SPECTROMETER- FTIR

DSIR Recognized Research & Development Department of Fine Finish Organics Pvt Ltd has purchased a brand-new Fourier Transform Infrared Spectrophotometer. This is a type of infrared spectrophotometer that simultaneously collects high spectral resolution data over a wide range and is the preferred method of IR spectroscopy for laboratories. The definition of FTIR comes from the fact that a mathematical process known as Fourier Transform is used to convert raw data into a readable spectrum.

This spectrophotometer has full mid IR wave number range from 7800 cm^{-1} to 350 cm^{-1}. It has Michelson's interferometer in which a laser beam passes through a beam splitter. This splitter splits the original single beam into two beams. The beam splitter allows half of the light to pass through while the other half is reflected at 90^0 from the first. Each beam then travels down an arm of interferometer at the end of which it encounters a mirror. The mirror reflects the beam back towards the beam splitter where the two beams are merged back into single beam. In merging, the light waves from two beams recombine into one, interfering with each other in the process before travelling to a photodetector.

FTIR deals with infrared region of the electromagnetic spectrum and it works by measuring how much light is absorbed by the bonds of vibrating molecules to provide a molecular fingerprint. Principles of IR show that molecules vibrate, and bonds stretch and bend when they absorb infrared radiation. It works by passing a beam of IR light through a sample and for an IR detectable transition, the molecules of sample must undergo dipole moment change during vibration. When the frequency of IR is same as the vibrational frequency of bonds, absorption occurs, and the spectrum can be recorded.

With IR, different functional groups absorb heat at different frequencies. It is dependent upon their structure and a vibrational spectrum can be used to determine the functional groups present in a sample. When interpreting the data obtained by an IR spectrophotometer, results are compared to a frequency table to find out which functional groups are present.

FTIR has principally the following uses:

1) **Identification of Unknown compounds**
2) **Degree of cure of Epoxy Resins**
3) **Identification of Functional groups, rubbers, plastics etc.**
4) **Quantitative Information- On Inhibitors in Transformer oil**
5) **Kinetic information through the growth or decay of infrared absorptions**
6) **Forensic Studies**

- **Kishore Prabhu**

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TECHNICAL ARTICLE

Composites in Electric Vehicles

There is a need to make sustainable, autonomous means of transport for large- scale use. The automotive sector is accelerating the shift to electric and hybrid mobility, but also integrating alternative energy sources, like hydrogen. A parallel trend is about the evolution from connected cars towards more and more autonomous systems. In both cases, composites materials have a significant role to play thanks to their benefits. They enable not only light weight and a great design freedom, but also the integration of new functions, including connectivity, the housing & insulation of batteries in electric vehicles, the fuel storage for hydrogen- or CNG- powered vehicles. Increased use of composites could help the average new car achieve a 10% weight reduction by 2020.

India is one of the key signatories of Paris Climate agreement 2016 and plans to reduce emission levels by 25% by 2030. Therefore, Government of India is now looking forward to promoting electric mobility as one of the key solutions to reduce carbon emissions.

Most of the electric vehicles manufactured have carbon fiber composite bodies with aluminium frame. The ultimate goal is to reduce the weight of the vehicle to obtain maximum mileage on a single battery charge. Reducing vehicle weight is also critical to improving fuel economy, addressing range, performance, size, and cost challenges associated with fuel- cell and hybrid propulsion systems. Having a composite vehicle body provides superior crash protection, improved stiffness and favorable thermal and acoustic properties. For the vehicle's primary structure, advanced composite materials using primarily carbon fiber offer the greatest potential for mass reduction while also maintaining crashworthiness and unlocking new strategic benefits for the manufacturer such as component integration, modularity, lower capital and assembly costs, and potential to eliminate conventional painting and its corresponding environmental and capital cost. Composites are also used in manufacturing of roof, underbody, bonnet, transmission, seat pan, backrest shell etc.

While composite materials are used in electric vehicles, they constitute only approximately 7.5% of total vehicle mass and the applications are generally not for the primary vehicle structure. Although advanced composites represent the most logical replacement for steel in vehicle structures where significant weight reduction is desired, cost is a key challenge in all of the automotive design.

However, body of electric vehicles is not the only application for composites. Researchers are now working on carbon nanotube- enhanced carbon fiber material that has a potential to store and discharge electricity as a part of the car body.

- **Karishma Prabhu**

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PROBLEMS & REMEDIES

Coating Failures - Probable Causes & Solutions

Chemistry of Paints

Paint is a surface coating that is commonly used to protect, colour and provide texture to objects. Paints are a complex combination of binders, diluents, pigments, fillers, additives, etc. that must be mixed and applied to a prepared substrate and dried and cured correctly to perform to their maximum capability. The success or failure of any paint coating is dependent on the following factors:

1. Substrate conditions
2. Surface Preparation
3. Application
4. Drying & Curing times
5. Environmental conditions during application and service
6. Quality of the paint

Failures and defects can manifest themselves at various times in the life of a coating. Prior to the application, they can take the form of settlement and skinning, during the application as runs and sags, shortly after application as solvent popping and orange peel and during service as blistering and rust spotting. To determine the cause of failure, all possible contributory factors must be evaluated together with a detailed history from the time of application to the time the failure was first noted.

Coating Failures - Probable Causes & Solution

Some of the common coating failures are:

1. **Alligatoring (Crocodiling)**
    a. **Probable Causes:** Internal Stresses in the coating where the surface shrinks faster than the body of the paint film, excessive film thickness and limited paint flexibility, application of a top hard coat (e.g. enamel) over a softer undercoat (e.g. acrylic primer), application of top coat before the undercoat has dried
    b. **Solutions:** Use correct coating specifications & compatible materials. Avoid excessive film thickness, remove old paint completely by scraping, use a heat gun to speed up the process without igniting the paint.

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2. **Blushing (Blooming)**
    a. **Probable Causes:** Paint film exposed to condensation or moisture during curing especially at lower temperatures, incorrect solvent blend
    b. **Solutions:** Apply & cure coating systems under correct environmental conditions. Ask/ Follow manufacturer's recommendation for the correct blend of solvents, use correct ratio of amine hardeners in epoxy paints.

3. **Cratering**
    a. Probable Causes: Trapped air or solvent bubbles that have burst, leaving small craters as the coating dries, insufficient time to flow into a uniform film.
    b. Solutions: Improve spray technique, apply a mist coat, and avoid air entrapment during mixing. Add solvents/ diluents or thinner as per manufacturer's recommendations.

4. **Crowsfooting**
    a. Probable Causes: Rapid surface drying forms a skin that wrinkles as solvent evaporates slowly from the soft underlying paint
    b. Solutions: Apply a thinner coat of paint, check that application & drying conditions are correct for the paint system, add slower drying thinners.

5. **Orange Peeling**
    a. **Probable Causes:** Failure of the paint film to flow out caused by poor application techniques, incorrect solvent blend, or too- high thixotropy.
    b. **Solutions:** Use correct application techniques with suitable formulated products.

Surface defects like cracks, corrosion, remains of previous coats, condensation on the surface, leakages, rising dampness, mineral deposits, lack of cleanliness etc. should be addressed before starting any painting job. Since post painting remedial measures are always expensive, cumbersome and do not offer permanent solution, it is better to spend more amount of time on the preparation of coating surface. The most important point to be noted while painting is that, no paint film is stronger than the surface on which it is applied. No paint is good if it is not applied correctly.

- **Karishma Prabhu**

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PROFICIENCY TESTING

Fine Finish Proficiency Testing Provider (FFPTP) is accredited as per ISO 17043 by National Accreditation Board for Calibration & Testing Laboratories (NABL), Quality Control of India (QCI).

In Proficiency testing, PT items are sent to a number of participating laboratories by a PT provider accredited as per ISO/IEC 17043. After the testing is completed, the laboratory sends the results to their PT provider and the PT provider grades the test results using statistical calculations as per ISO/IEC 13528 and sends the laboratory their z - scores.

Proficiency testing determines the performance of individual laboratories for specific tests or measurements and is used to monitor laboratories' continuing performance. Routine reviews of PT reports by the laboratory staff and the laboratory director will alert them to areas of testing that are not performing as expected as well as indicate subtle shifts and trends that, over time, would affect their results.

Scheduled PT Programs

Sr. No.	PT PROGRAM	MONTH	TEST METHOD
1	DENSITY OF PLASTIC	MAY	ASTM D 792
2	HDT		ASTM D 648
3	FLEXURAL PROPERTIES		ASTM D 790
4	DENSITY OF RUBBER	JUNE	IS 3400 (Part 9)
5	pH OF LEATHER		ISO 4045
6	VISOCITY, NVC, DENSITY OF PAINT		IS 101(Part 1 & part 2)
7	ABRASION OF RUBBER		ISO 4946
8	ASH CONTENT OF RUBBER	JULY	ASTM D 297
9	COMPRESSION SET OF RUBBER		ASTM D35
10	MELT FLOW INDEX		ASTM D 1238

For more details please contact on +91 90292 90228 / +91 93727 05934 or email us on
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- **Prathamesh Phansekar**

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CERTIFIED REFERENCE MATERIALS

Fine Finish RMP Division is accredited as per requirements of ISO Guide 34:2009. CRM (Certified Reference Material) is a reference material which is homogeneous and stable with respect to one or more specified properties and is characterized by a metrologically valid procedure, accompanied by a certificate that states the value of the specified property, its associated uncertainty, and a statement of metrological traceability.

Certified Reference Materials (CRMs) are standards used to check the quality and metrological traceability of products, to validate analytical measurement methods, or for the calibration of instruments. A certified reference material is a particular form of measurement standard.

Reference materials are particularly important for analysis. Since most analytical instrumentation is comparative, it requires a sample of known composition (reference material) for accurate calibration. These reference materials are produced under stringent manufacturing procedures and differ from laboratory reagents in their certification and the traceability of the data provided.

Fine Finish Reference Material Producer Division has manufactured CRMs for Melt Flow Index, Density and Tensile Strength of Plastics. It has also produced CRM for Tensile Strength of Composites. CRMs for Ultimate Tensile Properties of Metals, Elemental Analysis of Metal & Tensile Strength of Rubber are also manufactured as per requirements of ASTM E 8, ASTM E 415 and ASTM D 412.

List of Available Certified Reference Materials

1. Melt Flow Index (PP Granules) (ASTM D 1238)
2. Tensile Strength of Composite (ASTM D 3039)
3. Density of Plastics (ASTM D 792)
4. Tensile Strength (Metals) (ASTM E 8)
5. Chemical Composition of Metals by Spectrometer (LAS) (ASTM E 415)
6. Tensile Strength of Rubber (ASTM D 412)
7. Coal – Proximate Analysis (IS 1350 Part -1)

- **Prathamesh Phansekar**

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TRAINING & CONSULTANCY

Fine Finish Training School is accredited by National Board For Quality Promotion (NBQP) for conducting training program as per requirements of ISO/IEC 17025. Training is also imparted for measurement uncertainty, method validation, mechanical testing of composites and wide range of technical topics.

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Forthcoming Training Programs

Sr. No.	Title	Date	Fees	
			Non-residential	Residential
1	Laboratory Management System and Internal Audit as per ISO/IEC 17025:2017	May 20 to 24, 2019	₹ 14,000/-	₹ 21,000/-
2	Mechanical Testing of Composites	May 27, 2019	₹ 8,000/-	₹ 10,000/-
3	Laboratory Management System and Internal Audit as per ISO/IEC 17025:2017	June 17 to 20, 2019	₹ 14,000/-	₹ 21,000/-
4	Rubber Testing & Result Interpretation	June 25 to 26, 2019	₹ 10,000/-	₹ 13,500/-
5	Uncertainty of Measurement	July 08 to 09, 2019	₹ 10,000/-	₹ 13,500/-
6	Laboratory Management System and Internal Audit as per ISO/IEC 17025:2017	July 22 to 25, 2019	₹ 14,000/-	₹ 21,000/-

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DSIR Recognized R&D Centre	Plot No.29, New Chemical Zone, M.I.D.C., Taloja - 410 208, Navi Mumbai, Maharashtra, India.	+91 22-27411329; +91 9029422224	karishma.prabhu@finefinish.net
Mechanical/ Chemical/ Thermal/ Electrical Testing	Plot No.29, New Chemical Zone, M.I.D.C., Taloja - 410 208, Navi Mumbai, Maharashtra, India.	+91 9029829777	vishakha.patil@finefinish.net; info@finefinish.net
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