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Editor's Note

It is a pleasure to introduce the 20th edition of Fine Finish News. We are proud to bring to you our new products, new test facilities and capabilities, upcoming proficiency testing programs, technical training programs and technical news from around the world.

The most significant development in the government this year has been the early presentation of the Budget 2018-19 allowing for timely allocation of government funds. As it was the first budget post the GST rollout, the GST effect was clearly visible as the Government's focus in the Budget slowly shifted towards planned revenue expenditure rather than revenue collection.

The Ministry of Defence has been allocated USD 62 billion. This will give the much-needed boost to the defence manufacturing sector.

Government's landmark program of ZED for MSME's has been initiated through ZED certification. This Zero Effect Zero Defect project will lead to manufacturing of quality of products manufactured in India with Zero effect on the environment. Fine Finish is proud to be a part of the ZED program and will soon have implemented the ZED in all our manufacturing processes.

Wish you Happy Reading !!!!

- Dr G S Prabhu
Managing Director

Current Economic Scenario - Budget Highlights 2018

In comparison to recent years, Budget 2018-19 went past quietly as there are very few changes being made in the existing provisions and no key proposals have been introduced. The GST effect was clearly visible as the Government's focus in the Budget is slowly shifting towards planned revenue expenditure rather than revenue collection.

The Corporate Tax is more, or less left untouched, notable exceptions are being 1% increase in Education Cess (re-named Health & Education Cess) and 25% Tax Slab being extended to companies with a reported turnover of 250 Crore. This lower slab was introduced last year for companies with turnover of 50 Crore.

For agriculture sector, a big boost in the form of 100% tax exemption has been provided to the companies having turnover up to 100 Crore which are Farmer-producer or engaged in producing Farm related products. This is largely seen in the context of current Government's policy to increase Farm Income.

On the personal income tax front, this Budget is a mixed bag. Good for some and bad for some. Senior citizens are largest beneficiary as TDS exemption limit on their interest income and deduction limit for Mediclaim under section 80D has been hiked. For salaried class, a standard deduction has been re-introduced but swapped by taking back Transportation allowance and medical reimbursement thus making no effect on actual tax liability. The most unexpected announcement has been the proposal to Tax Long Term Capital Gain which was by far kept out of the Tax Net. This seems to be a last minute measure to bring additional revenue.

This time, the target fiscal deficit of 3.5% of GDP is high compared to last year which can be termed not good for Government's credibility and may have adverse effect on FDI among others.

- Arvind Tiwari

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New Products

Tooling Resin System - Epofine 8615/ Finehard 8615

For High performance, high temperature tooling resin system, Epofine 8615/ Finehard 8615 with a high glass transition temperature (Tg value >200°C) provides excellent long-term service in a high temperature curing cycle environments. Epofine 8615 is a low viscosity multifunctional epoxy resin and Finehard 8615 is a low viscosity poly functional amine-based hardener. Due to the low viscosity of the system, it has excellent wettability and easily wets all tooling fabrics made of glass, carbon and boron. It has negligible shrinkage when cured at the recommended cure schedule.



This resin system can be used to make molds for prepreg composite parts, high temperature cure epoxy parts, high temperature cure castings etc. It has excellent heat resistance making it suitable for long term service life. It can be used to produce parts multiple number of times due to its excellent chemical resistance, ability to withstand mechanical stress and continuous high temperature cycle.

Epofine 8615/ Finehard 8615 is recommended to be used with epoxy gel coats Epofine 410/ Finehard 2404 or Epofine 404/ Finehard 2404. If a master mold is unavailable, compatible epoxy tooling paste Fineset FE 427 (low density CNC machinable tooling paste) or Fineset FE 428 (high density CNC machinable tooling paste) can be used to create master.

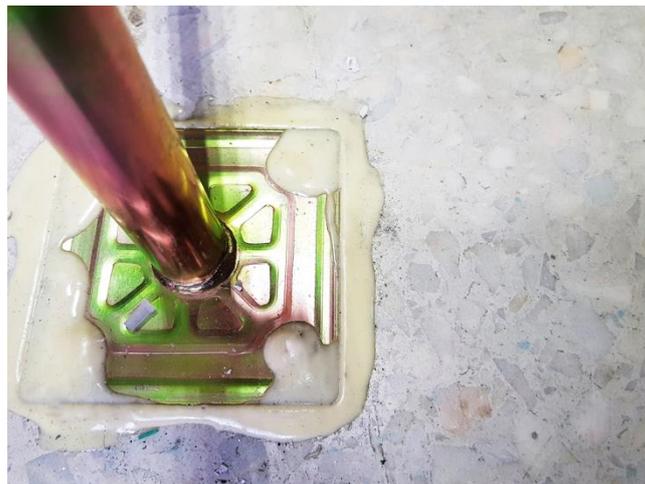
- Karishma Prabhu

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Construction Adhesive System: Epofine 27/ Finehard 28

Fine Finish has an extensive range of adhesives for applications in the construction industry. Developing an understanding of the critical factors in integrated manufacturing processes and adhesive selection when selecting a building component for factory production is very important.

Epofine 27/ Finehard 28 is a general-purpose adhesive system. It is a thixotropic paste that cures at room temperature. It has a very tolerant mixing ratio, excellent water and chemical resistance. It is an excellent adhesive for adhesion of concrete to steel, concrete to concrete, tile to concrete, granite to concrete etc. This system is easily applied, cost effective and proven in terms of long term durability.



The strength and durability of an adhesive joint, to a great extent, is decided by the pre-treatment of the substrate. Strongest joints are made by mechanically abrading or chemically etching. The mechanically abraded surfaces shall be further cleaned with a solvent. Minimum treatment that is required is cleaning by an oil-free solvent like trichloroethylene or environmentally friendly degreaser such as FINECLEAN – EC.

Fine Finish has many construction products in the portfolio including but not limited to bonding agents, anchoring grouts, impregnating resin system to make concrete structures impervious to moisture, coatings for potable water tanks, waterproofing materials for bathroom floors, acrylic finishing paints, top coat for protecting industrial structures, bridges and piping etc.

- Karishma Prabhu

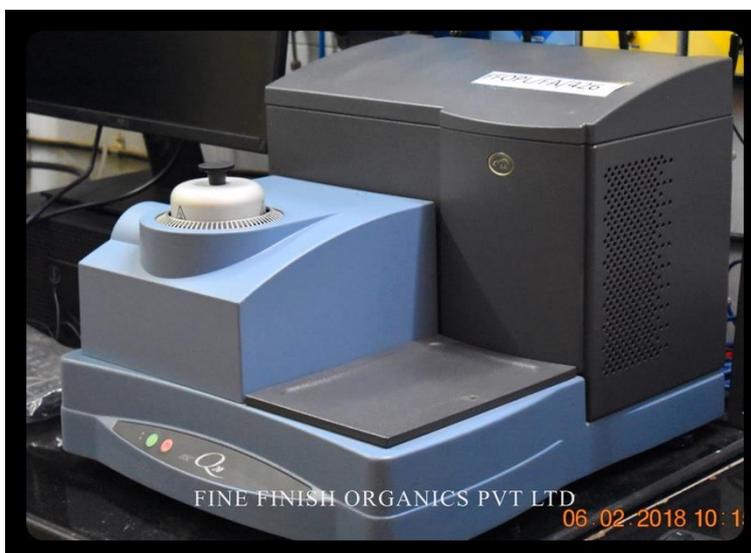
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New Test Facilities

Thermal Conductivity By Modulated Differential Scanning Calorimeter (MDSC)

Modulated DSC provides a unique method for determining the thermal conductivity of polymers, glasses, and ceramics. The test method followed is **ASTM E 1952**.

ASTM E1952 is the test method used to measure thermal conductivity in the range of 0.1 to 1.0 W/(K.m). Thermal diffusivity which is related to thermal conductivity through specific heat capacity & density, can also be calculated. Thermal conductivity and diffusivity can be determined at one or more temperatures over the range of **0 to 90°C**.



Test method **ASTM E 1952** is based upon the work of Marcus and Blaine in which the apparent heat capacity of two test specimens is measured. In the first experiment, a thin specimen is examined under experimental conditions that achieve temperature equilibrium throughout the sample. That is, the specimen thickness is less than the temperature penetration length. In the second experiment, a thick specimen is examined under conditions where the temperature sine wave is applied to one end and temperature equilibrium is NOT achieved throughout the sample. That is, the specimen thickness is greater than the temperature penetration length. The latter experiment produces thermal conductivity results that may be transformed into thermal diffusivity values through the use of specific heat capacity results (derived from the first experiment) and specimen density.

- Vishakha Patil

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Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

(ASTM D 1623)

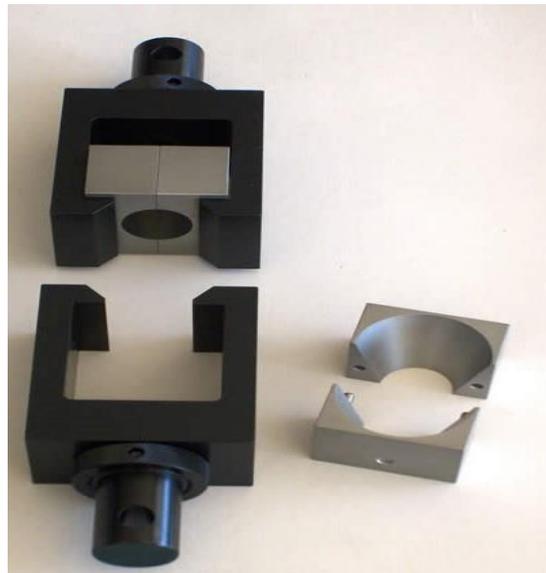
This test method covers the determination of the tensile and tensile adhesion properties of rigid cellular materials in the form of test specimens of standard shape under defined conditions of temperature, humidity, and testing machine speed.

Tensile properties shall be measured using any of three types of specimens:

Type A shall be the preferred specimen in those cases where enough sample material exists to form the necessary specimen.

Type B shall be the preferred specimen when only smaller specimens are available, as in sandwich panels.

Type C shall be the preferred specimen for the determination of tensile adhesive properties of a cellular plastic to a substrate as in a sandwich panel or the bonding strength of a cellular plastic to a single substrate.



(GRIP ASSEMBLY FOR PREFERRED TYPE A SPECIMEN)

Tensile Strength is calculated by dividing the breaking load in kilonewtons by the original minimum cross-sectional area of the specimen in square meters

- Vishakha Patil

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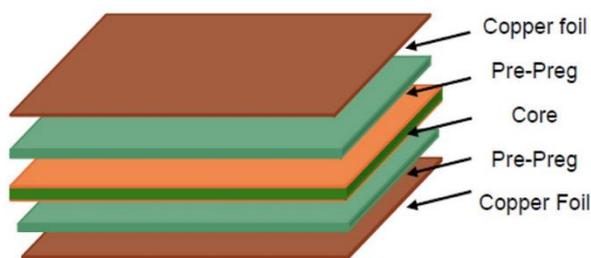
Technical Article

Printed Circuit Boards (PCBs) with FR4 Prepregs

Printed Circuit Boards are layered structures with multiple copper and insulating layers that mechanically support and electrically connect electrical/ electronic components using conductive tracks, pads etc. PCBs generally consist of four layers which are heat laminated together. The material used in PCB from top to bottom include silkscreen, soldermask, copper and substrate.



The substrate is made of fibre glass and epoxy prepreg. The most commonly used PCB material is the FR4 glass fibre epoxy laminate. FR4 is a NEMA grade designation for glass reinforced epoxy laminate material that complies with the standard UL94 V-0. The FR4 circuit boards are rigid and not made to flex. It is strong, crack resistant. It can resist temperatures up to 120°C. Temperatures over this limit will cause the board to melt, but the damage from the heat will remain in the heated area and the flame will not spread to the rest of the board.



Foil Structure

FR4 laminates owe their flame resistance to its bromine content, a non reactive halogen commonly used for its flame retardant properties. This gives FR4 materials an obvious advantage as a stock PCB material especially in prototyping where circuits are still in the initial testing stages and may be pushed to the extremes.

Circuit boards cores are pre-pressed layers according to the pattern: **copper foil – prepreg – copper foil**. The rigidity of the core gives foundation on which the PCB traces can be 'printed' onto. The FR4 core and laminates separate the copper layers creating an electrical isolation.

Fine Finish offers Epofine 8008 N80 that is suitable for making electrical grade printed circuit boards with a glass transition temperature (T_g) of 135- 140°C. The PCBs made from this resin will meet the requirements of

1. MIL- P- 13949, Type GF
2. NEMA FR4
3. IEC 249-2
4. UL 94 V-0

- Karishma Prabhu

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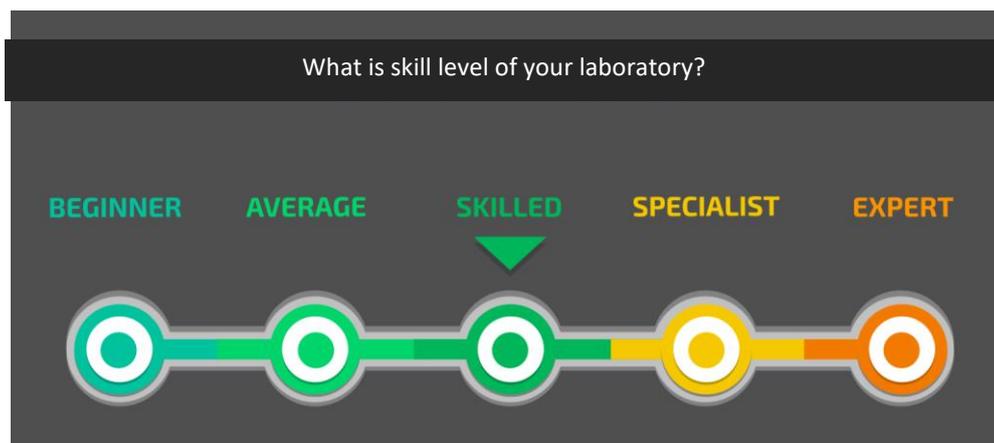
PROFICIENCY TESTING

What is Proficiency Testing?

In Proficiency testing, PT items are sent to a number of participating laboratory 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.

Why does my laboratory require Proficiency Testing?

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 patient results.



Scheduled PT Programs

1. Charpy Impact of Plastics:

Charpy Impact is a single point test that measures a materials resistance to **impact** from a swinging pendulum. **Charpy impact** is defined as the kinetic energy needed to initiate fracture and continue the fracture until the specimen is broken.

Impact testing reveals how “tough” a material is. Toughness can be defined as the ability of a material to absorb energy without breaking. High molecular weight favours high toughness. Crystallinity gives higher strength, yet lower toughness; unless the material can transfer the energy through its intermolecular structure. For example, nylon is crystalline and is tough due to the molecular strength of its backbone. Toughness is often considered to be the most critical mechanical property of thermoplastics because it relates to the service life of the part and influences product safety and liability.

This test simulates a high speed flexural test (three-point bend) of the material. Charpy impact is particularly valuable in measuring the effect of micro cracking, flow and weld lines on the parts toughness.

2. Overall Migration of Plastics:

The reason of determining overall migration is that the food contact material may bring about an unacceptable change in the composition of the food. The Overall Migration is the sum of all substances that can migrate from the food contact material to the food. The overall migration limit is a measure for the inertness of the material.

It includes overall migration of constituents of single or multi-layered heat-sealable films, single homogenous non-sealable films, finished containers and closures for sealing as lids, in the finished form, preformed or converted form.

3. Planned PT Programs

S.No.	PT Scheme No.	PT Item	Month / Year
1	FFOPL-PT-001 (xi)	Charpy Impact	Apr-18
2	FFOPL-PT-012 (i)	Oxidation induction time	May-18
3	FFOPL-PT-009 (i)	Shore D hardness	May-18
4	FFOPL-PT-008 (iii)	Shore A hardness	June-18
5	FFOPL-PT-001(xviii)	Ash content of plastic	June-18
6	FFOPL-PT-008(ix)	Carbon black percent	July-18
7	FFOPL-PT-020(viii)	Rockwell Hardness	July-18
8	FFOPL-PT-016 (i)	Migration Studies of Plastic	July-18

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- Prathamesh Phansekar

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Certified Reference Materials

We are proud to introduce our newest department- Certified Reference Materials. For those who are unaware of CRMs, in the modern world of measurements, all results should be traceable to national institutes of metrology. Use of CRMs is one of the processes of establishing measurement traceability. Production of CRMs are done by laborious process of establishing homogeneity, stability and determination of characterization values and its uncertainty value.



Fine Finish Reference Material Producer Division is accredited as per ISO Guide 34 by National Accreditation Board for Testing and Calibrating Laboratories. Each CRM produced by Fine Finish (RMP Division) will be accompanied by a certificate mentioning the properties and uncertainty of the CRM and can be used to validate your measurements methods.

Certified Reference Materials

1. **Rockwell Hardness:**

For Metallurgists, Hardness Testing is a collection of different methods for measuring a definite characteristic of metallic materials, namely:

- a) the resistance to penetration of a specific Indenter (defined by fixed form and properties),
- b) under the application of a certain static force
- c) for a definite time,
- d) using precise measuring procedures.

The **Rockwell scale** is a hardness scale based on indentation hardness of a material. The Rockwell test determines the hardness by measuring the depth of penetration of an indenter under a large load compared to the penetration made by a preload. There are different scales, denoted by a single letter, that use different loads or indenters. The result is a dimensionless number noted as HRA, HRB, HRC, etc., where the last letter is the respective Rockwell scale. When testing metals, indentation hardness correlates linearly with tensile strength. This important relation permits



economically important non-destructive testing of bulk metal deliveries with lightweight, even portable equipment, such as hand-held Rockwell hardness testers. Fine Finish CRM is intended for the calibration and verification of performance of the hardness equipment.

2. Tensile Testing of Plastics- ASTM D 638

A Universal Tensile Testing Machine (UTM) is needed to determine the Tensile Properties of plastics by ASTM D 638. This UTM needs to be validated to ensure the authenticity of the results. Fine Finish offers homogeneous and stable tensile specimens as CRMs.

3. Tensile Testing of Composites- ASTM D 3039

ASTM D 3039 is used for determining the tensile properties of polymer composite specimens including tensile strength, tensile modulus and Poisson's ratio. This standard is used to measure the force used to break the specimen and this data is often used to design parts and check the quality of the composites. Universal Tensile Testing Machine used in the tests should be validated using CRMs. Fine Finish RMP division has polymer composite CRMs that are homogeneous and have stable properties.

4. Melt Flow Index- ASTM D1238

Melt flow index (MFI) is the measure of the ease of flow of the melt a thermoplastic polymer. It is the measure of how many grams of polymer will flow through the die in 10 minutes. This test method is used by most people in the injection molding industry when choosing the right polymer. Fine Finish RMP Division has CRM for validating the MFI machine.

For more details please contact on +91 90292 90228 / +91 22 27412923 or mail us on proficiency.testing@finefinish.net/qm-pt.rmp@finefinish.net /kishore.prabhu@finefinish.net

- Karishma Prabhu

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Training & Consultancy

Training & Consultancy are vital components of Fine Finish Organics Pvt Ltd. Training is essence of any activity and is intricately linked to performance of organization. Fine Finish Training School imparts training in Laboratory Management System and Internal Audit as per requirements of ISO/IEC 17025:2005. As per requirements of the accreditation bodies across the world, laboratory standard has been revised according to ISO/IEC 17025:2017. Training Need Identification is an important aspect of any good laboratory or an organization.



Risk Assessment, mitigation, removal and acceptance are integral part of ISO/IEC 17025:2017 and it is essential that laboratory gets a grip on these activities for betterment of system. We at Fine Finish Training School strive to inculcate spirit of laboratory accreditation by ensuring that personnel working in laboratory irrespective of their position are trained in all relevant aspects of laboratory management system and internal audit. The whole gamut of accreditation is relevant for the personnel involved in laboratory management system and internal audit.

Fine Finish Organization is also involved in imparting training to various medical labs as per requirements of ISO 15189:2012. Medical labs are an integral component of all hospitals and it is essential that laboratory norms are well established for proper functioning of laboratory.

We also impart training in measurement uncertainty as this is an inseparable activity of testing. Measurement uncertainty needs to be estimated for all tests carried out by any laboratory and many terms related to measurement uncertainty like Gaussian distribution, rectangular distribution and triangular distribution are adequately covered. Labs involved in estimating measurement uncertainty need to have an idea about Type A uncertainty, Type B uncertainty and many related terminologies.

Method Validation is another important activity for all labs who are involved in tests using non-standard methods and laboratory developed methods. Method Validation is also required for labs who are involved in performing tests which deviate from standard methods. Many pharma and food labs are involved in performing many tests which are developed by lab. Validation using robust statistics is extremely important and use of linearity, specificity, robustness helps in mitigating failures arising due to use of non-standard methods.

Consultancy is another important aspect of our organization. We help the laboratories to get maximum benefit from the accreditation process by using various statistical tools available in various standards. We give consultancy in laboratory accreditation, proficiency testing, reference material production, measurement uncertainty, method validation for various labs involved in various scientific activities. We have imparted consultancy to government labs involved in animal fat testing, soil testing etc.

Upcoming Training Programs

S.No.	Title	Date	Fees	
			Non-residential	Residential
1	4 days training program on 'ISO/IEC 17025:2017'	15th to 18th May, 2018	₹. 14,000/-	₹. 21,000/-
2	4 days training program on 'ISO/IEC 17043:2010'	22nd to 25th May, 2018	₹. 14,000/-	₹. 21,000/-
3	2 days training program on 'Uncertainty Of Measurement'	28th to 29th May, 2018	₹. 10,000/-	₹. 13,500/-
4	4 days training program on 'ISO 15189:2012'	25th to 28th June, 2018	₹. 14,000/-	₹. 21,500/-

- Kishore Prabhu

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