IMFORMATION
AUGUST 2023

IMPORTANT!

Don’t miss the next Course Enrolment Date of:-

8th September 2023

www.materials-finishing.org

IMF DIARY

AGM

AGM – 29th November – Windmill Village Hotel Coventry 11 am - 3 pm invitations to be sent out shortly

DISTANCE LEARNING START DATES

Apply by 28th August for start date 8th September 2023.

Please note that all course fees must be paid in full before any course materials can be released.

Please contact Karen Yates by email

karen@materialsfinishing.org

You can find details of courses and qualifications on our website- https://materials-finishing.org/

UPCOMING WEBINARS/SEMINARS

Below are the dates of new webinars which are designed to help with the first 7 units of the Foundation Course, although attendance is **not compulsory**.

The webinars will be held in the evening (19-00) to avoid any disturbances with work commitments and will last 30 – 45minutes.

All webinars will be through the "Clickmeeting" platform and invites will be sent to students to register for the webinar if they wish. Any student or member may attend any of the webinars.

Foundation Course Unit 5 05/09/23

Foundation Course Unit 6 19/09/23

Foundation Course Unit 7 03/10/23

It is suggested that all students attend Unit 1 as this will also provide information on how to go about completing the course .

SECRETARY GENERAL'S COLUMN

Once again, I'm writing this under pressure from Helen and Barry so that this edition of IMFormation can be "put to bed"! Life is so hectic at the moment, but one shouldn't really complain as it means that business is booming, and it keeps one from getting bored!

Watching the current political and financial position the UK is in, its worrying to note how slow inflation is falling, certainly compared to the US and other major countries. This is having an effect on business, with instability within raw material supplies throughout the supply chain, and unfortunately I don't see any real improvements. We can only hope that business recovers and we return to a period of solid growth.

As its still the silly season, with many people holidaying, there is little movement in legislative matters, particularly REACH. The dossiers for re-authorisation of chromium trioxide after September 2024 have been submitted to both ECHA, for Europe, and the HSE for UK, and are out for public consultation. Its not certain if or when a decision on re-authorisation will be made so we can only hope for a positive outcome before September next year.

One item the painters amongst our members need to be aware of is the requirement for staff and operatives to be trained in the safe handing of products containing diisocyanates. There is a separate article about this in this edition of IMFormation. By the time you read this the deadline will probably have passed, but please review your companies position and check out the noted website. I have taken the training course which is fairly straightforward via a power-point style presentation that lasts about 40 minutes followed by a 10-question multiple choice test.

I can't help but be concerned about the extremes in weather we have been seeing this summer. After the extra hot June, here in the UK we're back to more typical weather of rain and lower temperatures, but the Mediterranean and southern Europe seeing excessively high temperature. The number of wildfires across Greece, Spain and now Portugal are frightening, and must have a negative effect on the eco-systems. I do believe we need to move forward quickly with our goal of net-zero carbon emissions, but we will need far better infrastructure to achieve this than we seem capable of achieving right now. Worrying times!

I understand there is much of interest in this edition of IMFormation, so do enjoy reading it. Remember, this is a vehicle to tell fellow members about your and your companies special news so contact Helen at New Exeter House with your stories.

Enjoy the rest of your summer!

imf Institute of Materials Finishing

July 2023

Training for the Safe Use of Diisocyanates

You will already be aware that under both EU and UK REACH regulations, REACH Restriction 2020/1149/EU, that for continued use of coatings containing Diisocyanates, all personnel handling these products must complete a training course. The deadline for completing the course is Thursday 24th August 2023.

There is a range of courses available, depending on the end use of the coating containing the diisocyanate. For spray application in a controlled spray cabin, training course T019 would look to be the correct choice.

Please refer to the following link to access the courses: www.safeusediisocyanates.eu . The courses are charged at €5.00 plus an administration fee of €10.00, giving a total cost of €15.00 per trainee. The course can be taken individually or can be arranged as a group session.

The courses are managed by "ISOPA" (European Diisocayanate and Polyol Producers Association: www.isopa.org) and ALIPA (European Aliphatic Isocysanate Producers Association: www.alipa.org).

The courses are taken over the internet and typically take about 40 minutes. There is a 10-question multiple choice test (quiz) at the end of the course, with a pass rate requirement of 80%.

It is the employer's responsibility to ensure their workers complete the training, and that this is recorded within their training records. The training record will last for 5 years before re-training will be required.

If you have any queries please view either web sites noted above.

EXAMINATION RESULTS

Congratulations to all our students who passed exams taken in June 2023!

Foundation Certificate – Distance Learning - 9 passes, 7 Merits and 8 Distinctions

Technician Modules – Distance Learning and Tutored – 7 Merits and 3 Distinctions

Advanced Technician Certificate Awarded - 4

Our next start date for all Distance learning courses is **8th September 2023**

For further details and costs please contact Karen Yates - karen@materialsfinishing.org

Or telephone 0121 622 7387

THE INSTITUTE OF MATERIALS FINISHING

INTERNATIONALLY RECOGNISED QUALIFICATIONS

We are a leading provider of technical training and skills development for employers and individuals. IMF courses lead to recognised qualifications and cover a wide range of materials finishing and surface engineering applications. IMF tutored courses, distance learning and corporate training underpin business performance and enable profitability.

Foundation Module Basic Surface Finishing

Develops fundamental understanding from 29 Units of which a student studies 15, including 7 mandatory units. One of three core technology blocks are chosen, either **Electroplating** (8, 9, 10 & 18); **Organic Coating** (19, 20, 21, & 23); or **Aerospace Finishing** (19, 21, 24 & 25), each comprising 5 units plus 3 optional units relevant to the student or their employer – all units are listed below.

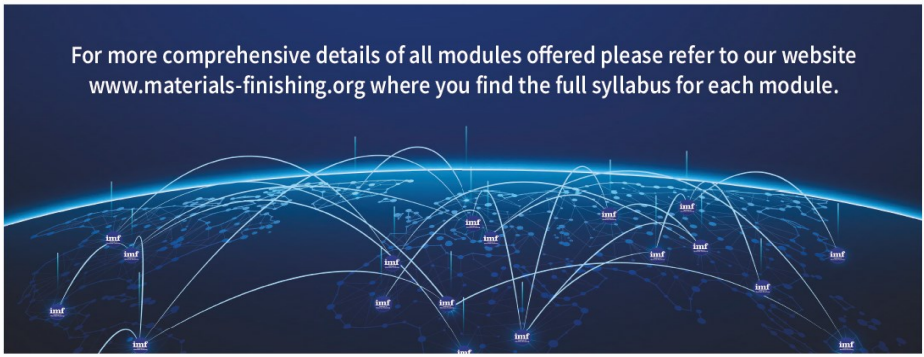
Two pieces of marked coursework are required and on passing an examination a student is awarded the **Foundation Certificate.**

Unit 1 *	Surface Finishing
Unit 2 *	Corrosion
Unit 3 *	The Environment & Surface Finishing
Unit 4 *	Health and Safety
Unit 5 *	Cleaning and Pre-treatment
Unit 6 *	Sacrificial Coatings
Unit 7 *	Services
Unit 8	Surface Improvement
Unit 9	Principles & use of Electroplating (Double unit)
Unit 10	Plant and Equipment
Unit 11	Copper, Silver and Gold Plating
Unit 12	Nickel Plating
Unit 13	Chromium Plating
Unit 14	Zinc & Cadmium Plating & Passivation
Unit 15	Electroless Plating
Unit 16	Alloy Plating & Composites
Unit 17	Printed Circuit Board Processes
Unit 18	Electroplating - Care & Maintenance of Solutions & Product Quality
Unit 19	Conventional Paint Processes (Double unit)
Unit 20	Electrophoretic Paint Processes
Unit 21	Paint Application Methods
Unit 22	Coating Powders & Application
Unit 23	Testing Paint & Powder & Coatings
Unit 24	Chemical Conversion Coatings and Sol Gel Coatings
Unit 25	Anodising of Aluminium & Alloys
Unit 26	Vacuum Coating Processes
Unit 27	Duplex Coatings of Galvanising plus Paint
Unit 28	Electroforming
Unit 29	Nanotechnology

* Mandatory units

On achievement of the **Foundation Certificate** candidates may wish to progress to the **Technician level modules**, please see over the page for details.

EDUCATION AND TRAINING (ii)



Technician Modules

Develops in-depth knowledge for key finishing technologies and their application and best practice methods.

Principles of Electroplating	Broad introduction to electroplating technology
Electroplating Practice	Industrial application of major metals and supporting pre-treatments for electroplating and electroless deposition
Paints, Lacquers & Varnishes**	Application methods, equipment, curing, drying and testing of solvent and water based industrial finishing processes
Powder Coating	Application methods, testing, environmental, health & safety topics
Environment, Health & Safety	Legislation information on environmental, health & safety topics
Materials Science	Manufacture, properties and examination of materials which require various forms of coating or treatment to meet service life needs
Automotive Surface Finishing**	Applications specific to the automotive industry
Electroforming	How electroforming can be used to manufacture components and tooling

On successful completion of four marked assignments and passing an examination, a student is awarded a **Technician Module** certificate.

Passing two Technician modules leads to the award of **Technician Certificate**.

Passing four Technician modules leads to the award of **Advanced Technician Certificate**.

** These modules together cannot rate towards the award of a Technician Certificate

mks | Atotech

Leading surface-finishing solutions

Sustainable cleaning solutions for improved profitability and reduced CO_2 footprint

Surface preparation, in the context of paint applications, can be defined as the removal of contaminants from a substrate surface before subsequent coating steps. It includes the removal of organic and inorganic soils coming from forming applications or those created during welding and joining. Cleaning and degreasing are required to achieve the highest finished part quality and first pass yield during production. Poor removal of soils from the fabrication process can lead to a variety of quality issues. The main concerns for final part quality relate to paint adhesion, corrosion resistance or fluid resistance. Improper bonding of the paint to the base material compromises quality leading to premature part failure. With a lower first pass yield, rework costs will increase, and profitability will decrease. Additionally, a higher defect rate, requiring rework, can generate inefficiencies or bottlenecks that slow production throughput.

Operating temperature – a critical issue for the cleaning process

Traditionally cleaning is performed using alkaline-based chemistry. We consider critical parameters when operating a cleaner – temperature, time, concentration, and agitation/ impingement. Each of them plays an important role in the efficiency of the cleaning application, but the temperature may have the largest impact. Increasing the temperature of a cleaner also increases the required heating energy. Not only does using more heating energy increase a manufacturer's costs, but it also increases the associated carbon footprint. Recent advancements in cleaning chemistries deliver many benefits to manufacturers compared to conventional processes, most notably the ability to operate at lower temperatures. It directly supports a reduction in energy demand and lowers carbon emissions as well.

The extended life cycle for wastewater treatment reduction

In addition to lower temperatures, next-generation cleaning technologies can operate for a longer period of time. By extending cleaner solution life, manufacturers can increase their productivity, reduce waste and wastewater treatment burden, and even reduce chemical consumption.

imf Institute of Materials Finishing

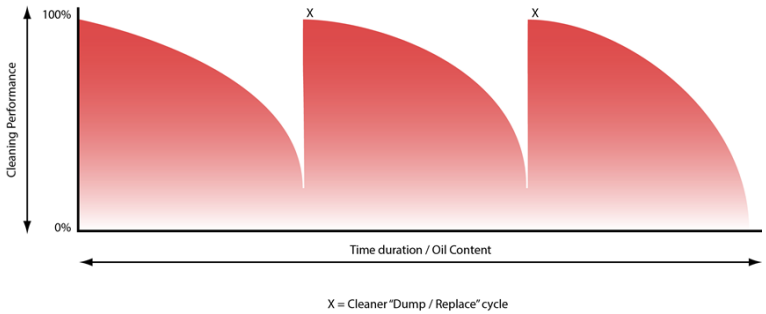


Figure 1: Life cycle of a conventional cleaner

In Figure 1, the typical life cycle of a conventional alkaline cleaner can be seen. As the cleaner is continuously used in production, the amount of oil in the solution rises while the cleaning efficiency gradually decreases. To limit defects, the cleaner solution must be discarded and made new at regular intervals.

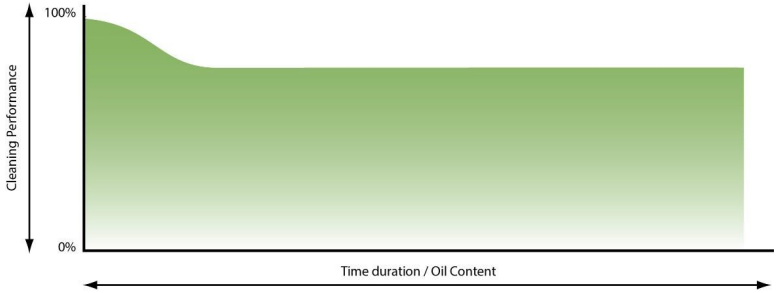


Figure 2: Life cycle of a next-generation cleaner

When using more recently developed cleaners, the life cycle will more closely mirror that shown in Figure 2, where there is a slight drop in cleaning efficiency at the beginning of its use before stabilizing, creating a much more consistent and reliable performance over time for the manufacturer.

Quantifying cleaning quality and performance

A critical question often asked about low-temperature cleaning is whether performance and quality can be replicated. As mentioned earlier, operating temperature is elementary for

high-quality cleaning. However, the savings potentially realized with low-temperature cleaning from reduced energy costs cannot offset lower production yield. To eliminate this risk, various tools can be utilized to quantify cleaning. Simple methods like water break and white tissue offer a visual representation but are limited in their true ability to quantify cleaning. The implementation of a more sophisticated method like surface tension fluids can provide an exact quantification of surface cleanliness.

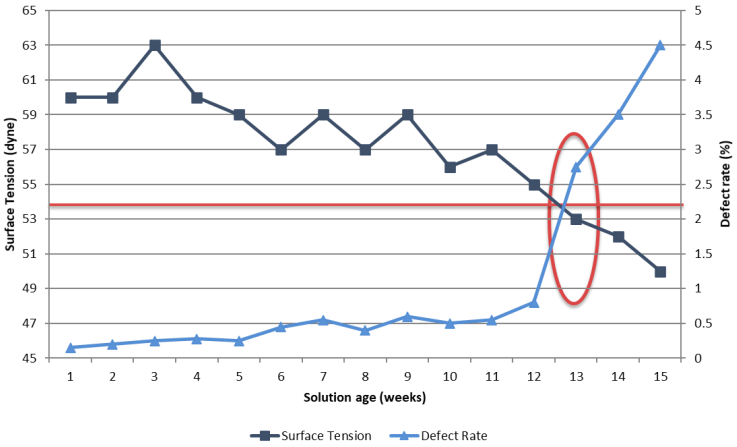


Figure 3: Measurement of surface tension (primary y-axis) and defect rate (secondary y-axis) versus solution age; as surface tension decreases, the defect rate gradually increases; this applicator established a discard schedule once the cleaner was only achieving 55 dyne/cm to limit costly defects

Figure 3 demonstrates how surface tension fluid tests are utilized in production for monitoring surface cleanliness against defect rate. This was after implementing low-temperature cleaning. By integrating this cleaning quantification tool, a cleaner life cycle can be established. This helps to ensure that defect rates are maintained within a reasonable, low level and so they do not increase beyond a certain threshold due to insufficient cleaning.

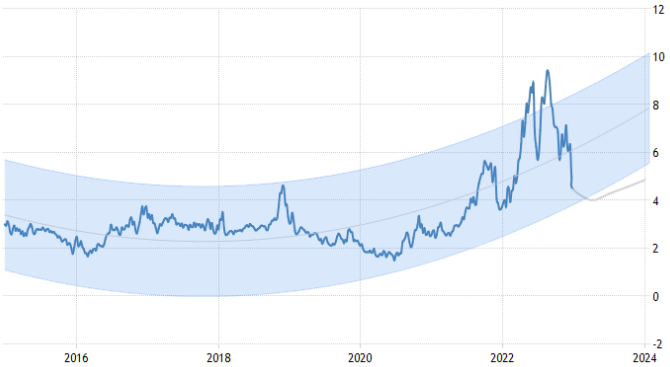


Figure 4: Natural gas prices worldwide from 2015 – 2022 / *Source: https://tradingeconomics.com/commodity/natural-gas*

Energy saving and reducing carbon footprint – a problem solved using low-temperature cleaners

In recent years, energy prices have seen a considerable increase, creating a substantial impact on production costs (see Figure 4). Due to these increases, manufacturers may be driven to raise prices to their end customers to maintain profitability, especially without the appropriate countermeasures to offset higher costs.

To illustrate the economic benefits of innovative new cleaning processes, we consider a spray washing system utilized for cleaning in a pre-paint application. In a conventional process, the cleaner would have to operate at 55 °C to achieve the needed cleaning performance. For a next-generation cleaner process, the operating temperature can be reduced, in this case, to 35 °C. Reducing the operating temperature by 20 °C leads to considerable cost savings. In addition, the CO_2 emissions are also greatly reduced. Figure 5 summarizes these benefits from a theoretical customer application. Reducing the carbon footprint by 124 tons of CO_2 is equivalent to eliminating 27 internal combustion engine vehicles from use (Source: https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle).

Figure 5: Summary of savings capable with low-temperature cleaner. Assumptions in these calculations include (1) 5,000 l tank volume (2) natural gas boiler system energy source (3) 500,000 m²/month production

Process	Energy cost	Spent chemical sent to WWT	WWT cost	CO_2 emission (from pre-treatment)
Conventional de-greaser (1) (2) (3)	57,800 USD	50,000 l	13,250 USD	212 t
Next-generation cleaning process (1) (2) (3)	23,900 USD	15,000 l	3,975 USD	88 t
Savings/ reductions	33,900 USD **59%**	35,000 l **70%**	9,275 USD **70%**	124 t **58%**

Considering the contribution of sustainable cleaning to reducing carbon emissions, there are various benefits achieved from both, the low temperature, and long-life capabilities. The low-temperature operation directly reduces energy consumption and in turn carbon emissions. The contribution of long-life operation is not as obvious since most of those benefits are realized outside of the pretreatment line. By extending cleaner life the chemical consumption can be reduced by requiring less make-up chemistry, and the subsequent dumping and wastewater treatment, as displayed in Figure 5 for “Spent chemical sent to WWT”. The requirement for less make-up chemistry also means there is less freight and production requirement for that chemistry as well, reducing secondary energy requirements.

The perception that a sustainable alternative for a conventional process or system is less economical, no matter the application or industry, is often difficult to overcome. Typically, a new technology comes with a higher price and the challenge of quantifying how that equates to a lower overall running cost. With advancements in cleaning technologies, the two major benefits observed are lower operating temperatures and longer solution life. Their influence on improved economics and lower carbon emissions shows just how much of an impact the implementation of next-generation cleaning processes can be as the surface finishing industry continues seeking paths to a carbon-neutral future and improving its impact on future generations of the world.

ATOTECH (vi)

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About Atotech

Atotech, a brand within the Materials Solutions Division of MKS Instruments, develops leading process and manufacturing technologies for advanced surface modification, electroless and electrolytic plating, and surface finishing. Applying a comprehensive systems-and-solutions approach, Atotech's portfolio includes chemistry, equipment, software, and services for innovative and high-technology applications. These solutions are used in a wide variety of end-markets, including datacenter, consumer electronics and communications infrastructure, as well as in numerous industrial and consumer applications such as automotive, heavy machinery, and household appliances.

With its well-established innovative strength and industry-leading global TechCenter network, MKS delivers pioneering solutions through its Atotech brand – combined with unparalleled on-site support for customers worldwide. For more information about Atotech, please visit us at atotech.com.

Are You A 3m® User? Start To Find A Suitable Alternative Now

You may have heard the latest information from 3M® that they will exit from PFAS manufacturing in the near future. If you are a current 3M® PFAS product user you will need to start to find alternative chemistries. Find out what steps you have to take below.

What is the update from 3M®?

3M® have announced that they will stop manufacturing the Novec HFE materials by the end of 2025. Please go to our website to see a copy of the notice. They also have stated in a letter sent to all their customers that they cannot guarantee supply and that current users should be looking at alternatives as quickly as possible.

Are you a current 3M® user? If yes what does the update from 3M® mean for you?

While there are no immediate issues with supply it would be prudent to consider your options before the supply of the 3M® materials becomes an issue. Frasers can help with direct drop in alternatives to the Novec materials as well as alternative technologies such as water wash and solvent recovery systems etc.

What alternatives are available for me to switch to?

There are a few direct drop in alternatives available, but it should be noted that many of these contain HFE materials manufactured by 3M®. These can sometimes be hidden away and not openly declared so it is important to know what is in any alternative you are considering and the source of these materials. Frasers can assist with evaluating your current application and offer free advice on legal compliance and safe, available alternatives such as the Chemours Opteon™ speciality fluids which are direct drop in alternatives.

What to be aware of before you switch?

Suitability of equipment, material compatibility, product performance and legal compliance are just some of the key areas to look at here. At Frasers we can run application trials with suitable alternatives and advise on alternative chemistries and or equipment if relevant.

When do I need to make the switch?

You can either be proactive and line up suitable alternatives in advance or wait until supply ends or is interrupted. The choice is yours but, but supply will stop and switching systems can sometime take time, so allow time for this. If you are not wanting to make any immediate changes that will be ok, but we would definitely suggest putting this into your diary for January 2024.

What shall I do now?

We are currently offering free 3M® switch reviews for any customers who are wanting some advice on when they should make their switch and how the process would work for them, as remember every application is different. Contact us today to get this in your diary to avoid any disruption to not only your cleaning supplies/procedure but more importantly your production line.

For more information, please contact us:
Tel: 01506 443058 | E-mail: sales@frasertech.co.uk | www.frasertech.co.uk