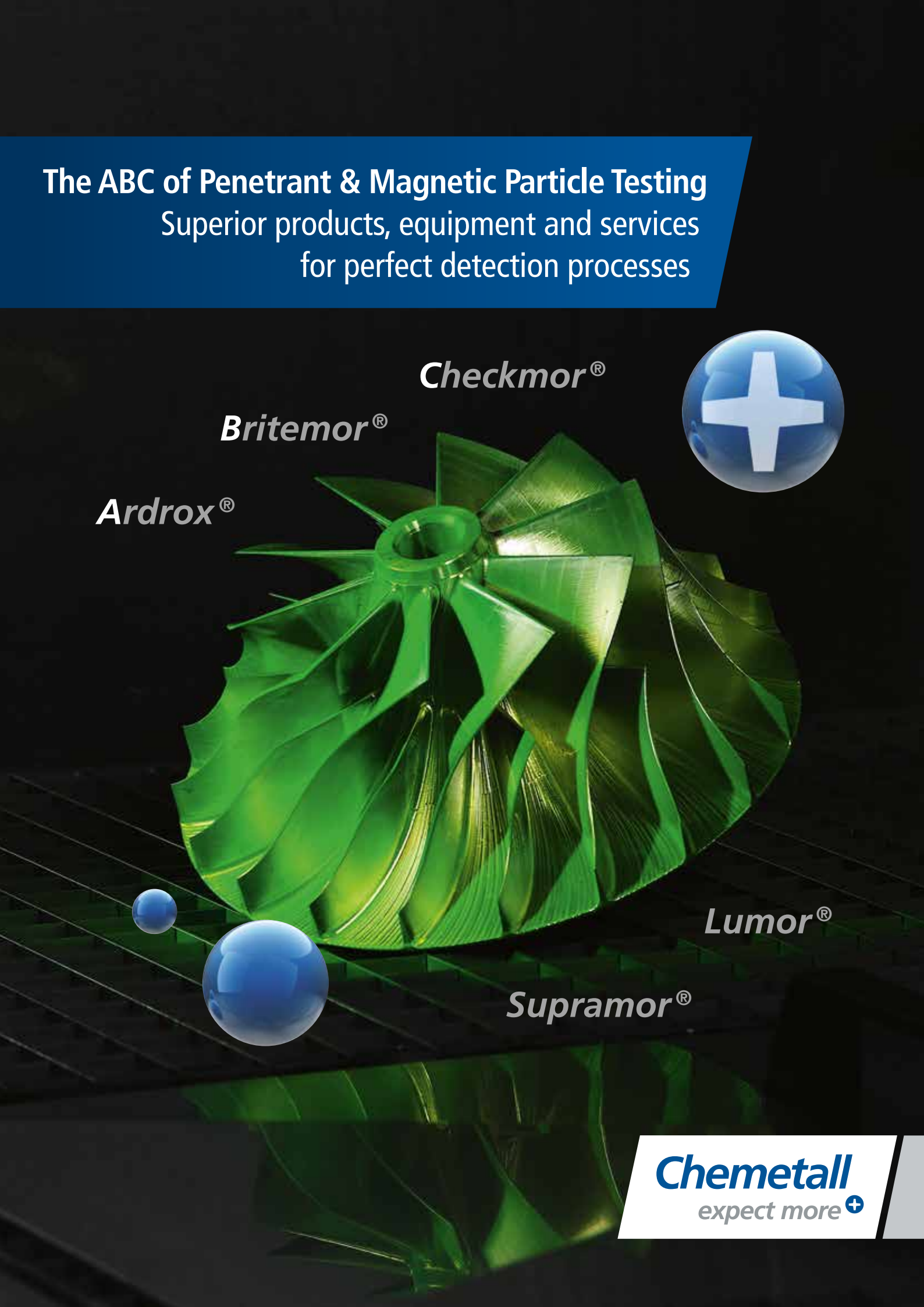
The ABC of Penetrant & Magnetic Particle Testing

Superior products, equipment and services
for perfect detection processes



Chemetall
expect more

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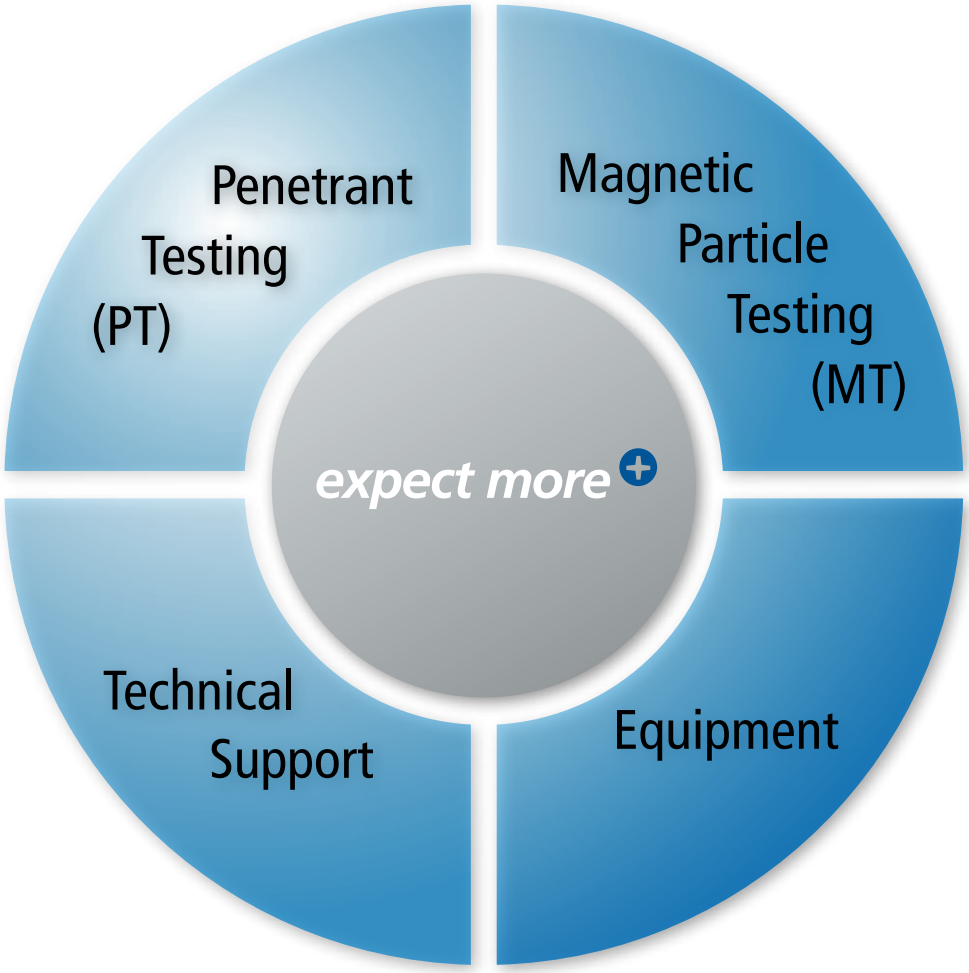
Your Global Partner for Penetrant and Magnetic Particle Testing



About Chemetall

Chemetall Company Headquarters: Frankfurt am Main, Germany

As one of the leading global players, Chemetall focuses on surface treatment technologies in all their facets. Quality products and services are the prerequisite of our business success. However, at Chemetall, we know that it takes more than that to be a preferred global supplier.

The chemical treatment of metal surfaces is Chemetall's core competence. We base the focus of our worldwide activities on the development and implementation of customized technologies and system solutions for surface treatment. The portfolio comprises technologies for cleaning, corrosion protection, sealing, and Non-Destructive Testing, as well as to improve paint adhesion and facilitate the forming and treatment of metals. Globally established technologies, i.e. **Oxsilan®**, **Gardobond®** and **Ardrox®**, are used in the most diverse market sectors from automotive to aerospace, from the appliance to architectural and construction industries. Over the past decades, Chemetall has been playing a leading role in shaping metal treatment.

In focus: value added for customers

Good products and quality services are the prerequisites for a successful business. However, at Chemetall we believe that true success is based on a close and partnership-based global cooperation with our customers. We offer value-added technologies to enhance processes, combined with an excellent, globally organized technical service.

Largest surface teatment facility in the world (Jackson, MI, USA)

Globally active, locally based

The global business activities of Chemetall are based on tradition and experience dating all the way back to the 19th century. Nowadays, Chemetall is one of the leading global players in surface treatment with its headquarters in Frankfurt am Main, Germany. With more than 2,100 employees, over 40 subsidiaries worldwide and 22 production sites, Chemetall is a financially strong and fast growing company with a long-term orientation, and we continue to aim high: We intend to strengthen our quality and innovation leadership even further. With sales and service teams, laboratories and warehouses at locations all around the world, we are operating in close proximity to our customers.

Sustainably successful

Responsible practices and sustainable development are key principles of Chemetall. Our first priority is to consistently implement environmental protection and work safety guidelines and to continuously improve the safety of our worldwide production sites. Chemetall acts responsibly with a view to society and the environment and puts them on an equal footing with its financial targets.

Quality

We write Quality with a capital letter – as documented by numerous QM certifications (DIN EN 9001, DIN EN 9100, ISO/TS 16949 ...). Chemetall's proven, high-performance products for non-destructive testing have been specifically developed to meet the demanding requirements of national and international quality standards such as e.g. AMS2644. With our more than 60 years of experience in NDT, we can offer our customers a complete product portfolio with all essential approvals.

Benefit from Chemetall's long-standing global experience in your line of business and from our top-quality and eco-friendly technologies.

More to read on www.chemetall.com

More than 60 years of experience in Non-Destructive Testing

Surface treatment is Chemetall's focus. Therefore, non-destructive testing – in the sense of Penetrant Testing (PT) and Magnetic-Particle Inspection (MPI or MT) – comes naturally to us. We offer a strong portfolio of approved products for all industry segments which meet today's and tomorrow's market needs. An additional plus for our customers: selected equipment around your NDT processes, our broad range of services, and extensive expertise.

The term "non-destructive testing" describes a wide range of techniques used to analyze a material or component without actually damaging or even destroying it. Due to the different natures of these techniques, it is crucial to select the right method and technique for the specific application. Ongoing economic changes and resulting customer demands, the evolution of the legal framework and permanent modernization of industrial production and testing processes: all this leads to new NDT methods and applications being constantly developed.

Focus on perfect surfaces

The advanced products required for today's and tomorrow's applications are offered by Chemetall. Our customers process a large variety of substrates. They produce and treat metallic parts, they weld, they are active in numerous industry segments: from building, maintaining and repairing cars to airplanes, pipelines to power plants, windows to washing machines and tractors to harvesters. Chemetall as surface treatment expert can offer the full scope of products for our customers' surface processes, from metal working fluids, cleaners, conversion coatings, temporary protection, waste-water treatment, pickling products to paint strippers. Our NDT product range – chemistry, equipment, and services – forms a strategic element of this comprehensive portfolio.

Innovation as a tradition

Chemetall knows and has been solving the challenges in non-destructive material testing for more than 60 years. The first Ardrox® product was approved as early as in the year 1948. Many innovative products have followed since then: Chemetall was one of the first companies to introduce products free of the carcinogenic azo dyes.

Chemetall is also one of the pioneers in the use of NPE-free penetrants. The new-generation products (Ardrox® recommended for the aviation and Britemor®, Checkmor®, Lumor®, Supramor® preferred by the general industries) are low-odor and characterized by a high wetting ability, have excellent washability and background characteristics.

Recommended by leading companies

Chemetall has been well acquainted with the high standards in the aerospace field for many years. Apart from the non-destructive testing products, the range is completed by aircraft sealants, corrosion inhibiting compounds, cleaners and paint strippers.

The high quality of the available NDT products and services has also convinced the automotive industry, its component supplier market, general industry and all areas of the high-specification energy sector (from pipelines to nuclear power plants).
The multiple approvals gained from well-known companies are proof of this. The product portfolio is supported by three major pillars: approved products, selected equipment, expert service.

Much more than chemistry

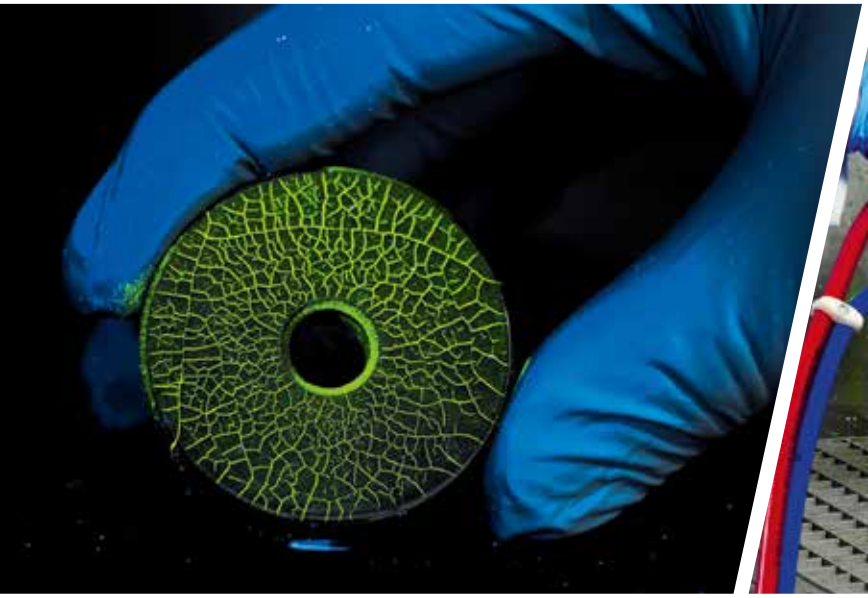
Technical support
Chemetall supports customers' processes continually and competently. Trained experts are globally available for your questions at all levels regarding your process.

Cooperate to innovate
Our knowledge and technical expertise is also requested elsewhere: Chemetall experts, for example, are active members of the various committees which take part in discussions to define standards, rules and norms concerning non-destructive material testing. Close cooperation with customers, universities, external research institutes, and associations forms an integral part of our research and development work. This enables us to work on tomorrow's challenges today and to offer our customers advanced technologies that fit future requirements, such as water-based products.

Chemetall's NDT products: top technology with green properties
More than 60 years of experience in non-destructive testing: our comprehensive product portfolio for PT and MT applications can boast all essential approvals. Bright and crisp indications as well as easy and quick removal of the products simplify the smooth and reliable running of your NDT processes. Low-odor products, new NPE-free developments, cost-effective rinse water treatment and an easy biological degradability (of our water-based and surfactant-based products) help you meet stringent environmental and health and safety standards.

Chemetall's PT product range
Chemetall's PT product range is represented by the well-known **Ardrox®**, **Britemor®** and **Checkmor®** brand names. The **Ardrox®** products hold all major approvals for the aerospace industry; whereas the **Britemor®** and **Checkmor®** products have been specifically developed for the automotive, automotive components, energy and general industries. We offer the following PT product groups:

- Colour-contrast penetrants
- Fluorescent/water-washable penetrants (oil-based, surfactant-based, water-based)
- Fluorescent/post-emulsifiable penetrants
- Penetrant removers
- Developers



Chemetall's MT product range

Chemetall's proven MT products are known by their successful Ardrox®, Lumor® and Supramor® brand names. Again, the Ardrox® line is especially recommended for the aerospace industry; whereas Lumor® and Supramor® focus on all other industry sectors. The following MT product groups are available:

- Black magnetic inks and white contrast paints
- Fluorescent magnetic inks
- Carrier oils
- Removers

Equipment

Our NDT portfolio is completed by selected equipment products around your non-destructive testing processes, such as e.g.

- Ultraviolet inspection lamps
- Stationary UV lamps
- UV and white light measuring equipment
- Permanent magnets and electromagnets
- Magnetic field indicators
- Field strength indicators
- UV light protective glasses
- Refractometers
- Certified test panels for plant and process testing

Our own experience over many years in connection with numerous proven partnerships, for example, with the manufacturers of PT-lines and MPI bench units, has created the best prerequisites for the development of holistic solutions.

New European regulations on chemicals
The impact of REACH and CLP

REACH is the European Community Regulation on chemicals and their safe use, which came into force on June 1, 2007. It applies directly and uniformly throughout the European Union and makes great demands on manufacturers, importers and users of chemicals. In order to meet the regulations of REACH and CLP, Chemetall has established a dedicated team.

To comply with the REACH initiative (**R**egistration, **E**valuation, **A**uthorization and Restriction of **Ch**emical Substances), we have established a central REACH group in Frankfurt/Germany. For Chemetall companies located outside the EU and exporting directly to the EU, Chemetall GmbH was appointed as the „Only Representative" to fulfill the REACH requirements. Therefore, customers of Chemetall are not importers under the regulation, but instead are regarded as downstream users.

To ensure continuity of delivery to our customers, we preregistered all relevant substances that require registration at the European Chemical Agency (ECHA). Building on these pre-registrations, we intend to register all relevant substances by 2018. As part of the registration process, the uses for chemical substances must be identified and detailed according to ECHA Guidance. We are working closely with our customers and associations to ensure that all uses for our chemistries are registered and detailed.

The goal of REACH is to ensure a higher level of protection of human health and the environment, and to establish an extensive risk assessment for the complete life-cycle of chemicals, involving the complete value chain. With REACH a uniform system is established providing information on registration of new notified substances and risk assessment for existing substances.

GHS – Globally Harmonized System

GHS provides a unified system to identify and to communicate hazards related to transporting and supplying chemicals across the world. The regulation describes criteria for the classification and labeling of substances and mixtures, its goals being the following:

- to ensure a higher level of protection of human health and the environment,
- to enhance free trade, competitiveness and innovation.

The more countries all over the world implement the GHS criteria in their legal system, the more valuable it becomes for all companies.

CLP – implementation throughout the EU

The CLP Regulation will ultimately replace the current rules on **C**lassification, **L**abeling and **P**ackaging of Substances (Directive 67/548/EEC) and Preparations (Directive 1999/45/EC) after the transitional periods given in the regulation, and Chemetall will meet the deadlines for classification and labeling described in it. Several substances have already been classified and labeled according to the CLP regulation by December 1, 2010. The transitional period for mixtures ends on June 1, 2015.

Chemetall's Product Safety group, which is supported by EHS responsible persons in every legal entity, is intensively working on implementing the requirements resulting from the REACH and CLP regulations.

Expect more working with a leading supplier of surface treatment technologies. Chemetall is familiar with the legal, quality and environmental requirements and globally coordinates all its activities. Working with Chemetall, you can rely on a reliable, strong and innovative partner for sustainable success.

- More to read in our GHS brochure or on www.chemetall.com

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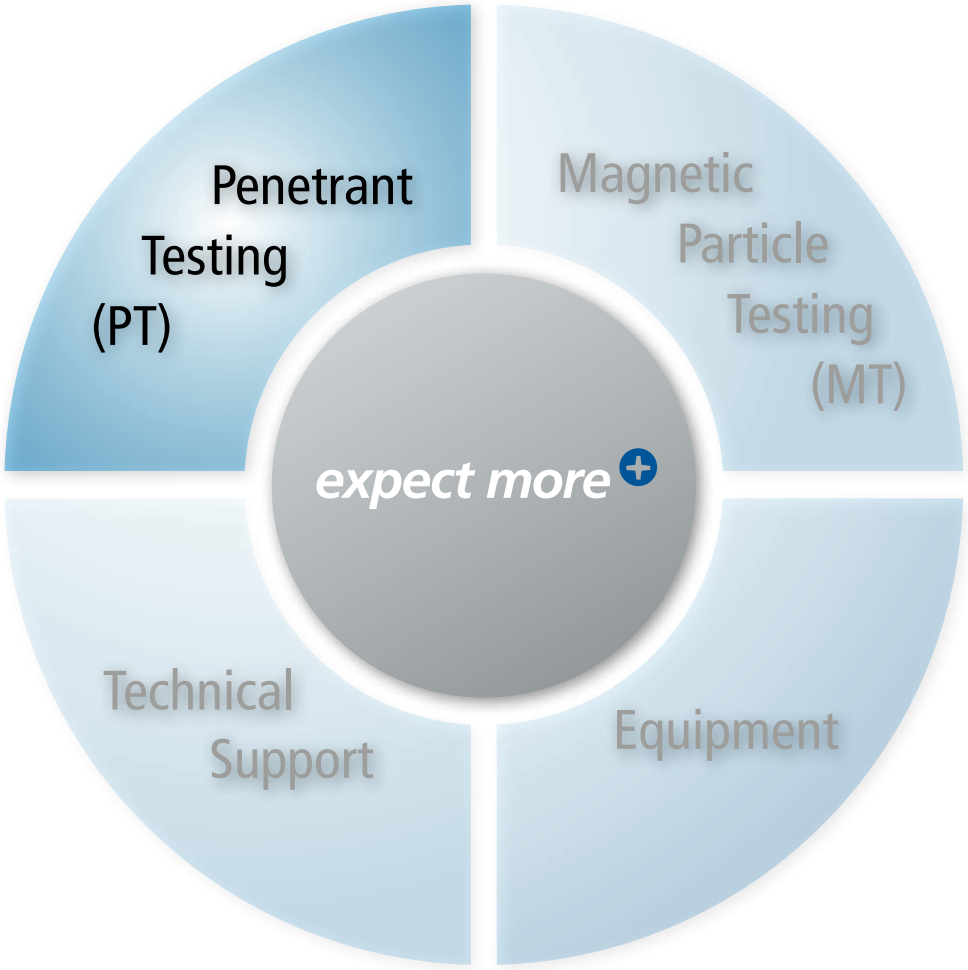
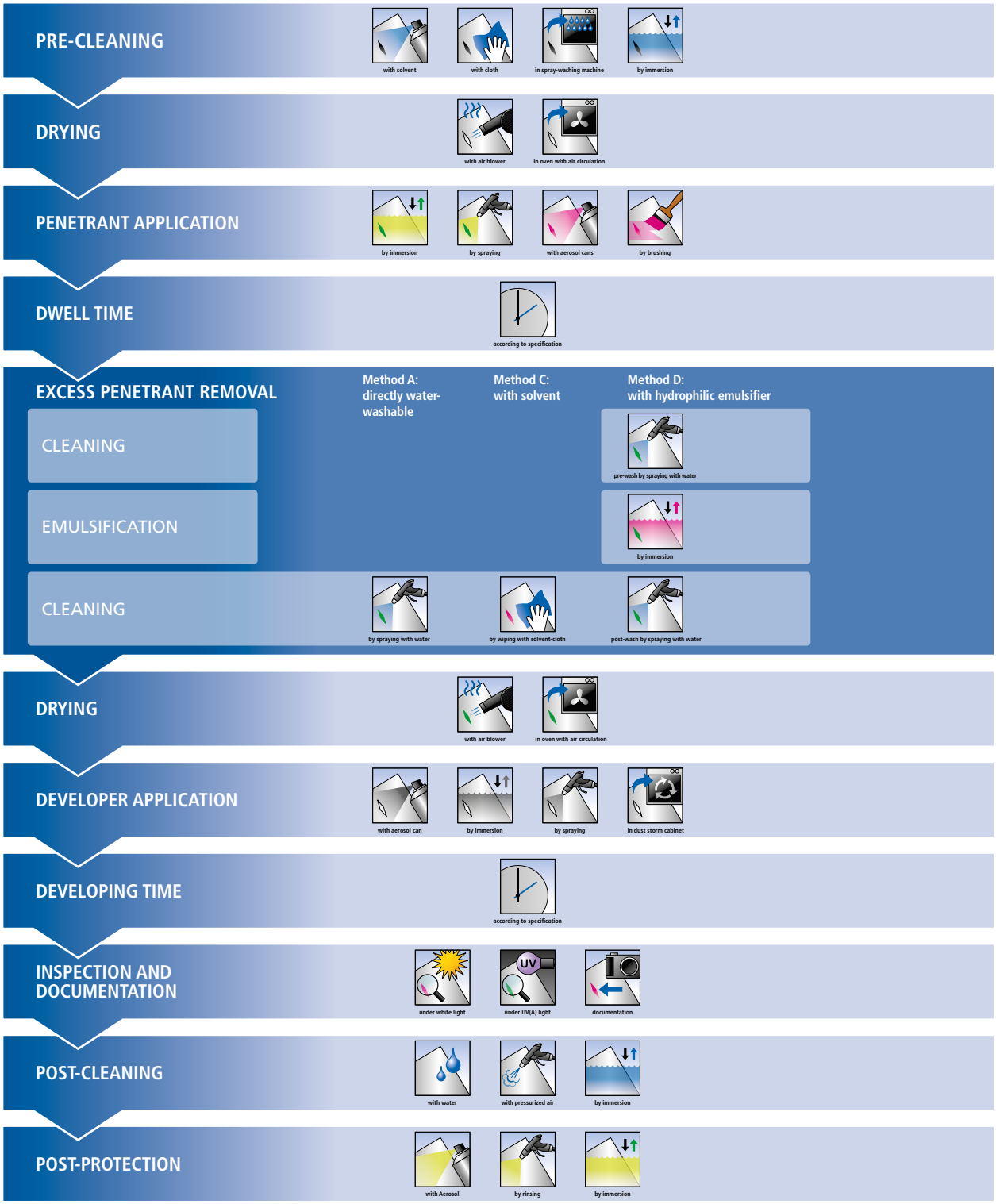
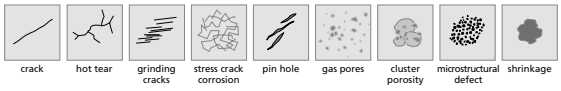


Penetrant Testing Process: White Light/UV(A)-Light



Please note the individual requirements and specifications for your respective application!



Ardrox® Britemor® Checkmor®

Ardrox®
Overview Penetrant Testing

1. Penetrant	2. Cleaner	3. Developer
APPLICATION: Red		
• Ardrox® 907 PB • Ardrox® 996 PB • Ardrox® 9VF2 (for red + fluorescent)	• Water* • Ardrox® 9PR5 • Ardrox® 9PR50 • Ardrox® 9PR88	• Ardrox® 9D1B • Ardrox® 9D4E • Ardrox® NQ1
APPLICATION: Fluorescent		
Water-washable		
• Ardrox® 9702 (AMS-Level 1) • Ardrox® 9703 (AMS-Level 2) • Ardrox® 9704 (AMS-Level 2) • Ardrox® 9705 (AMS-Level 3)	• Water • Ardrox® 9PR5 • Ardrox® 9PR50 • Ardrox® 9PR88	• Ardrox® 9D1B • Ardrox® 9D4A • Ardrox® 9D75L** • Ardrox® NQ1
Water-washable/surfactant-based		
• Ardrox® 970P24E (AMS-Level 2) • Ardrox® 970P25E (AMS-Level 3) • Ardrox® 970P26E (AMS-Level 4)	• Water • Ardrox® 9PR5 • Ardrox® 9PR50 • Ardrox® 9PR88	• Ardrox® 9D1B • Ardrox® 9D4A • Ardrox® 9D75L** • Ardrox® NQ1
Post-emulsifiable		
• Ardrox® 9812 (AMS-Level 2) • Ardrox® 9813 (AMS-Level 3) • Ardrox® 9814 (AMS-Level 4)	• Ardrox® 9881 in Water • Ardrox® 9PR5 • Ardrox® 9PR50 • Ardrox® 9PR88	• Ardrox® 9D1B • Ardrox® 9D4A • Ardrox® 9D75L • Ardrox® NQ1
Water-washable/water-based		
• Ardrox® 920A • Ardrox® 9721 • Ardrox® 9722	• Water	• Ardrox® 9D1B • Ardrox® 9D4A • Ardrox® 9D75L** • Ardrox® NQ1

Aerosol Bulk Bag

* not for Ardrox® 996 PB
** not for tests according to ASTM E 1417

Ardrox®

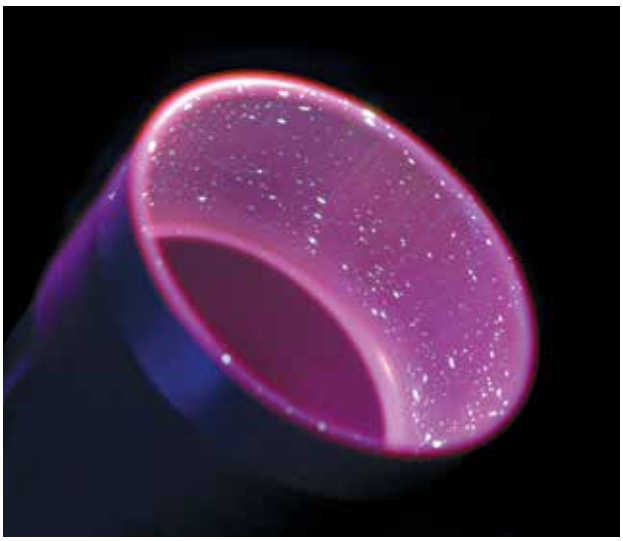
Fluorescent Water-Washable Penetrants (water-based)

Ardrox® 920A, Ardrox® 9721 and Ardrox® 9722 are water-based, water-washable fluorescent penetrants suitable for the detection of defects open to the surface.

These products give crisp indications with low levels of background. The new Ardrox® 970x series can be used for metals but also for porous ceramics during production and maintenance work.

Ardrox® 920A, Ardrox® 9721 and Ardrox® 9722 are equivalent to AMS 2644 to the following sensitivity levels:

Product	Sensitivity Level	Packaging
Ardrox® 920A	½	Bulk
Ardrox® 9721	1	Bulk
Ardrox® 9722	2	Bulk



Fluorescent Water-Washable Penetrants (surfactant-based)

Ardrox® 970P24E, Ardrox® 970P25E and Ardrox® 970P26E are biodegradable water-washable fluorescent penetrants offering a range of sensitivity levels.

The basis for this penetrant development is a mixture of biodegradable surfactants and fluorescent pigments without any mineral oils or hydrocarbons.

Because of these developments, penetrants of the Ardrox® 970P2x series have a minimal impact on the environment, have excellent wash characteristics, show low background and have a high flashpoint.

All products are approved to AMS 2644.

Product	Sensitivity Level	Packaging
Ardrox® 970P24E	2	Bulk
Ardrox® 970P25E	3	Bulk
Ardrox® 970P26E	4	Bulk

Fluorescent Water-Washable Penetrants (solvent-based)

Ardrox® 970x series represents Chemetall's new generation of state-of-the-art, water-washable fluorescent penetrants. Based on the latest surfactant technology (free of Nonylphenolethoxylate, short „NPE-free") all products have low-odor, low toxicity and have therefore a minimal impact on the environment.

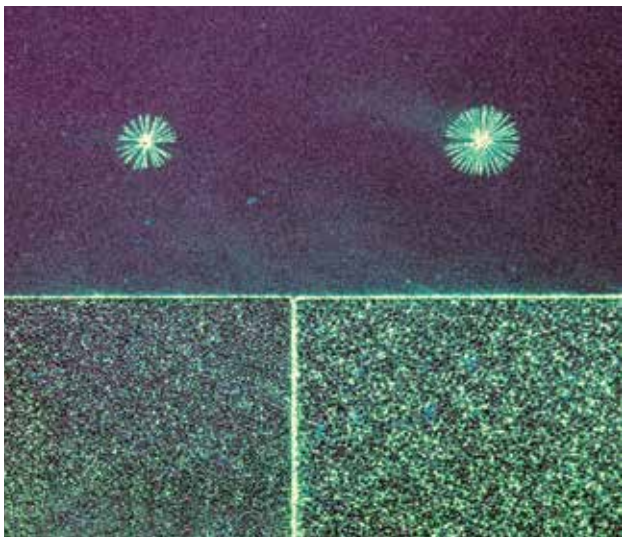
The new Ardrox® 970x series gives crisp indications with exceptionally low levels of background and have excellent heat and UV fade characteristics.

All products are fully approved according to AMS 2644.

Product	Sensitivity Level	Packaging
Ardrox® 9702	1	Bulk
Ardrox® 9703	2	Bulk / Aero
Ardrox® 9704	2	Bulk
Ardrox® 9705	3	Bulk

Ardrox®

Fluorescent Post-Emulsifiable Penetrants



Chemetall has developed a new range of Ardrox® high performance, post-emulsifiable, fluorescent penetrants that utilizes the latest surfactant technology (NPE-free).

The new Ardrox® 981x series of products have low-odor, low toxicity, high flash point, minimal environmental impact and show significant performance improvements compared to older generation products.

To complement this new range of penetrants, Ardrox® 9881, a new hydrophilic emulsifier with improved odor control and bath stability, has also been developed. All products are fully approved according to AMS 2644.

Product	Sensitivity Level	Packaging
Ardrox® 9812	2	Bulk
Ardrox® 9813	3	Bulk / Aero
Ardrox® 9814	4	Bulk / Aero
Ardrox® 9881	Hydrophilic Emulsifier	Bulk / Aero

Red Dye Penetrants

Ardrox® 907PB is a water-washable and solvent-removable red dye penetrant, Ardrox® 996PB is a solvent-removable red dye penetrant (please also refer to Ardrox® 9PRx series).

Ardrox® 9VF2 is a water-washable fluorescent colour contrast penetrant (dual purpose according to EN ISO 3452-2 TYPE III). The inspection can therefore be done under white light but improved indication of defects is possible by means of an ultraviolet light.

Ardrox® 9VF2 is a high sensitivity azo-dye free penetrant which does not contain any aromatic hydrocarbons.

Product	Description	Packaging
Ardrox® 907PB	Water-washable / Solvent-removable	Bulk / Aero
Ardrox® 996PB	Solvent-removable	Bulk / Aero
Ardrox® 9VF2	Water-washable	Bulk / Aero

Ardrox®

Developers

Ardrox® developers are based on very fine white powder with a defined particle size range and exhibit advanced absorption properties. They ensure superior white film background for better visibility of indications. All developers can be removed easily after inspection. Ardrox® developers hold major approvals such as AMS 2644, Pratt & Whitney, Safran Group or MTU.

Depending on the application several developer types are available, including non-aqueous wet developer, dry powder, water suspendable or water soluble products.

Product	Description	Packaging
Ardrox® 9D4A	Form a) Powder developer	Bulk
Ardrox® 9D75L*	Form b) Water soluble	Bulk
Ardrox® 9D75	Form b) Water soluble	Bulk
Ardrox® 9D1B	Form d) Solvent-based	Bulk / Aero
Ardrox® NQ1	Form d) Solvent-based	Bulk / Aero

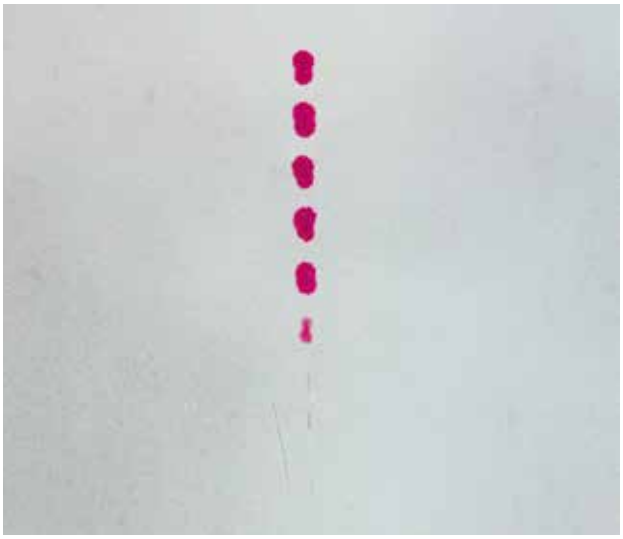
* not approved according to AMS 2644

Penetrant Removers

Ardrox® 9PRx products are colourless, highly volatile, solvent-based penetrant removers. They are fast drying and have a low sulphur and halogen content.

All products are mainly used for the removal of both visible red dye and fluorescent penetrants. They can also be used as a solvent precleaner prior to the penetrant application for the removal of oil and grease.

Please note the following Flash Point values:



Product	Flash Point	Packaging
Ardrox® 9PR5	- 4°C	Bulk / Aero
Ardrox® 9PR50	> 38°C	Bulk / Aero
Ardrox® 9PR88	10°C	Bulk / Aero

Britemor® and Checkmor®
Overview Penetrant Testing

1. Penetrant	2. Cleaner	3. Developer	Approvals	Conformances
APPLICATION: Visible				
Water-washable/solvent-removable				
Checkmor® 240	• Water • S76	• LD7	AMS 2644 (Methods A and C)	• EN ISO 3452-2 (sensitivity level 2) • ASME Boiler & Vessel Code
Checkmor® 300	• Water • S80 • S85	• LD9	–	• EN ISO 3452-2 • ASME Boiler & Vessel Code
APPLICATION: Fluorescent				
Water-washable				
Britemor® 445 (AMS Level 1)	• Water • S76	• LD7 • PD3	AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code
Britemor® 4455 (AMS Level 2)			AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code
Britemor® 446 (AMS Level 3)			AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code
Post-emulsifiable				
Britemor® 755 (AMS Level 2)	• H92 (conc. 20 %) • S76	• LD7 • PD3	AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code
Britemor® 760 (AMS Level 3)			AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code
Britemor® 768 (AMS Level 4)			AMS 2644	• EN ISO 3452-2 • ASME Boiler & Vessel Code

Aerosol Bulk Bag

Britemor® and Checkmor®

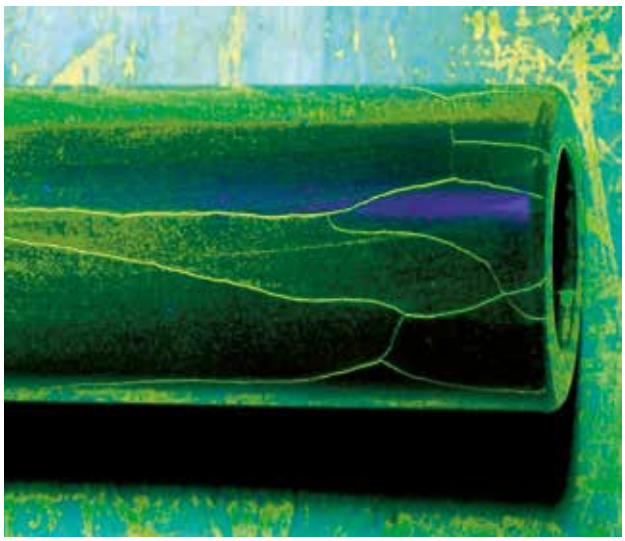
Fluorescent Water-Washable Penetrants (solvent-based)

Britemor® 445, Britemor® 4455 and Britemor® 446 are a range of fluorescent, water-washable penetrants which are suitable for the detection of defects open to the surface.

These products give crisp indications with low levels of background. They are typically used for the inspection of precision castings, forgings, machined parts and fabrications.

All products are approved to AMS 2644.

Product	Sensitivity Level	Packaging
Britemor® 445	1	Bulk
Britemor® 4455	2	Bulk / Aero
Britemor® 446	3	Bulk

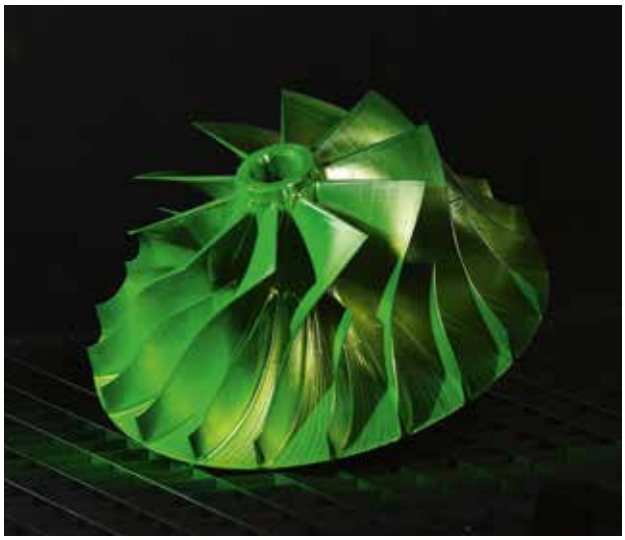


Fluorescent Post-emulsifiable Penetrants

The Britemor® 700 series is a new range of post-emulsifiable penetrants designed to meet the modern expectations of environmental and personal safety. Free from nonylphenol ethoxylates (NPE), the Britemor® 700 range avoids restrictions on transportation and makes an important contribution for protecting the environment.

In accordance with AMS 2644 there are three different sensitivity levels available to cover the requirements of different applications.

Product	Sensitivity Level	Packaging
Britemor® 755	2	Bulk
Britemor® 760	3	Bulk
Britemor® 768	4	Bulk
H92	Hydrophilic Emulsifier	Bulk



Checkmor®

Red Dye Penetrants

Checkmor® 240 is Chemetall's new water-washable and solvent removable red dye penetrant. This dark red penetrant is widely used in many industries for the detection of defects which are open to the surface of solid work-pieces.

Examples are: forged parts, welds, and casts.

Checkmor® 300 is a water-washable fluorescent colour contrast penetrant (dual purpose according to EN ISO 3452-2 TYPE III). The inspection can therefore be done under white light but improved indication of defects is possible by means of an ultraviolet light.

Checkmor® 300 is a high sensitivity azo-dye free penetrant which does not contain any aromatic hydrocarbons.

Product	Packaging
Checkmor® 240	Bulk / Aero
Checkmor® 300	Bulk / Aero

Penetrant Removers

S76 is a colourless solvent-based penetrant remover.

It is mainly used for the removal of both visible red dye and fluorescent penetrants. It can also be used as a solvent precleaner prior to the penetrant application for the removal of oil and grease.

S80 can also be used to remove White Contrast Paints.

Please note the following Flash Point values:

Product	Flash Point	Packaging
S76	-4°C	Bulk / Aero
S80	-11°C	Bulk / Aero
S85	+12°C	Bulk / Aero

Developers

There are two developer types available for use with Britemor® and Checkmor® penetrants:

PD3 (dry powder developer) is used in conjunction with Britemor® fluorescent penetrants.

LD7 (liquid developer) is a suspension of an inert fine white powder in a quick drying solvent predominantly used with the Checkmor Red dye range but may also be used with the Britemor Fluorescent range of penetrants.

LD9 provides a slightly thicker developer film and has been specifically developed for colour contrast paints.

Product	Description	Packaging
PD3	Form a) powder developer	Bulk
LD7	Form d) solvent-based	Bulk / Aero
LD9	Form d) solvent-based	Bulk / Aero

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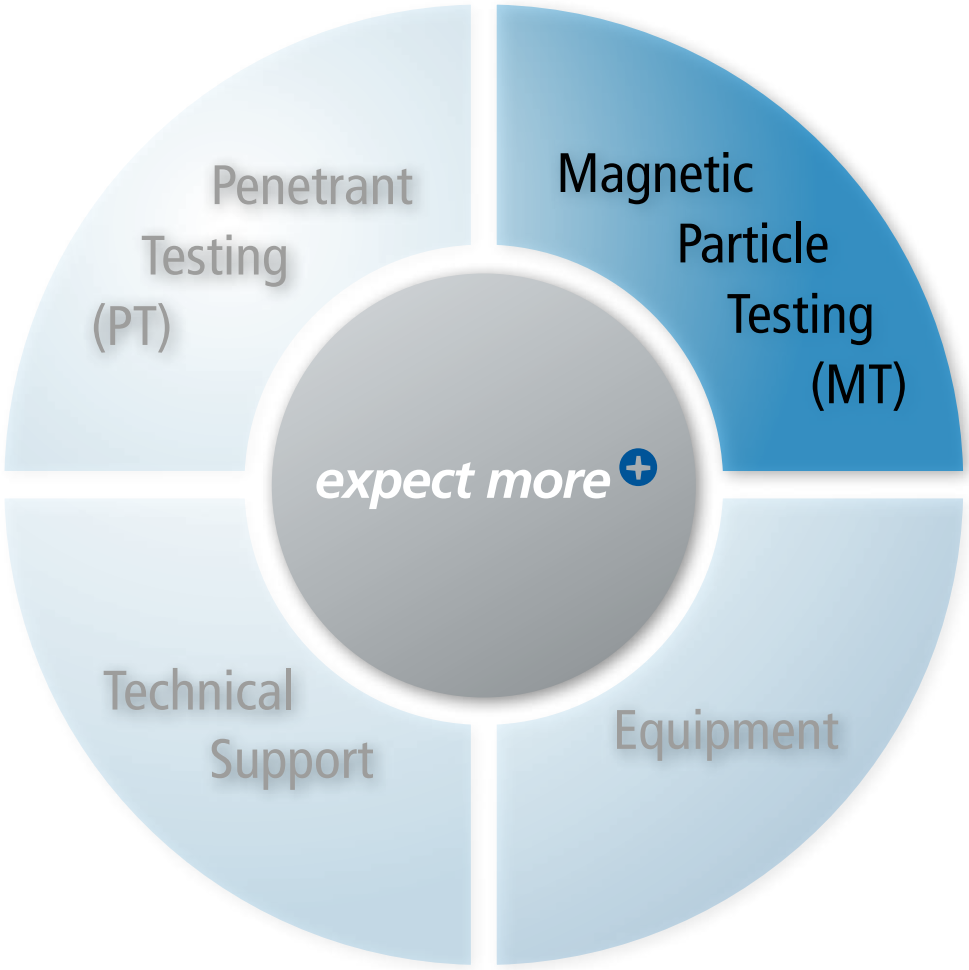


Ardrox®
Overview Magnetic Particle Testing

Product	Description	Appearance	Application	Packaging	Approvals	Conformances
APPLICATION: White Light						
Ardrox® 800/3	High-sensitivity inspection of ferro-metallic surfaces; inspection with and without white contrast-aid paint on blank metallic surfaces	Fluid	Ready-for-use (petroleum-based)		Rolls-Royce CSS231	EN ISO 9934-2
Ardrox® 8032	High-sensitivity detection of surface and near-surface defects in ferro-magnetic metals	Fluid	Ready-for-use (petroleum-based)			EN ISO 9934-2
Ardrox® 8901W	White contrast-aid paint: suspension of white pigments in a fast-drying solvent system; provides an excellent contrasting white background when dark steels are being tested and inspected in daylight (e.g. with Ardrox® 800/3)	Fluid	Ready-for-use		Rolls-Royce OMat264 V2500	BS 5044 EN ISO 9934-2
Ardrox® 8903W	White contrast-aid paint: suspension of white pigments in a fast-drying solvent system; provides an excellent contrasting white background when dark steels are being tested and inspected in daylight (e.g. with Ardrox® 8032)	Fluid	Ready-for-use		Rolls-Royce OMat264	EN ISO 9934-2
APPLICATION: Fluorescent						
Ardrox® 8505	Fluorescent magnetic ink consisting of an iron oxide powder of finest particle size; for high-sensitivity detection of surface and near-surface defects in ferro-magnetic materials	Brown powder	Disperse in carrier oil		Rolls-Royce CSS231	AMS 3044F EN ISO 9934-2
Ardrox® 8501	Suspension of a fluorescent iron oxide with the finest particle size in a high-flashpoint carrier oil with low aromatic contents; for high-sensitivity detection of surface and near-surface defects in ferro-magnetic materials	Fluid	Ready-for-use (petroleum-based)		Rolls-Royce CSS231	AMS 3045E AMS 3046F EN ISO 9934-2
Ardrox® 8544	Water-suspendible, high-sensitivity, fluorescent magnetic ink concentrate; inhibited against corrosion of ferrous metals	Fluid concentrate	After dilution (3 %)			EN ISO 9934-2
Carrier oil						
Ardrox® Base Oil HF	Carrier oil for magnetic particle inspection, both for fluorescent and visible MT applications	Fluid	Add magnetic particles			AMS 2641B (Type 1)

 Aerosol  Bulk

Ardrox®

Black Inks

Ardrox® black magnetic inks are designed for the high-sensitivity inspection of ferro-magnetic materials and ensure reliable indications of surface and near-surface sub-surface defects.

Ardrox® black magnetic inks consist of black iron oxide with a controlled particle size, in a high flash, low aromatic petroleum distillate. Solid content is between 1.2 and 2.4 ml/100 ml according to ASME Code V Article 7.

Ardrox® black inks are used in conjunction with the Ardrox range of white contrast paints.

Ardrox® black inks are available as ready-for-use fluids or aerosols.

Product		Packaging
Ardrox® 800/3	Recommended for Ardrox® 8901W	Bulk / Aero
Ardrox® 8032	Recommended for Ardrox® 8903W	Bulk / Aero

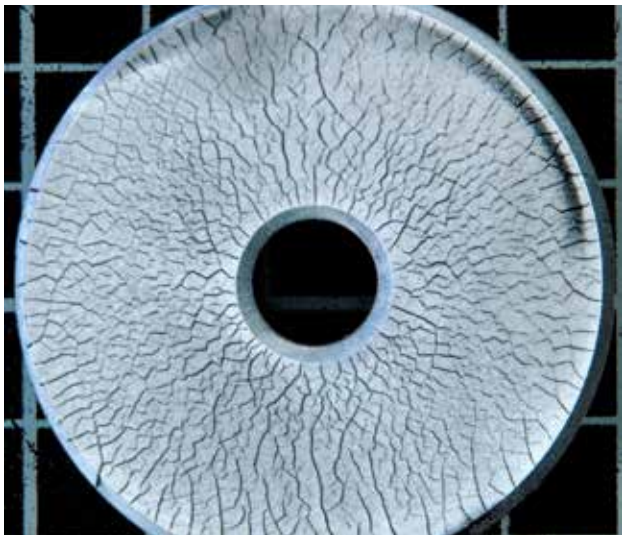
White Contrast Paints

Ardrox® contrast-aid paints are made of a suspension of white pigments in a fast-drying solvent carrier.

They provide an excellent contrasting white background when using the Ardrox range of Black Magnetic Inks (e.g. with Ardrox® 800/3 or Ardrox® 8032). A matt finish, free from reflections, assists the viewing of defects.

Ardrox® white contrast paints are available in bulk or aerosols.

Product	Description	Packaging
Ardrox® 8901W	Recommended for Ardrox® 800/3	Aero
Ardrox® 8903W	Recommended for Ardrox® 8032	Bulk / Aero



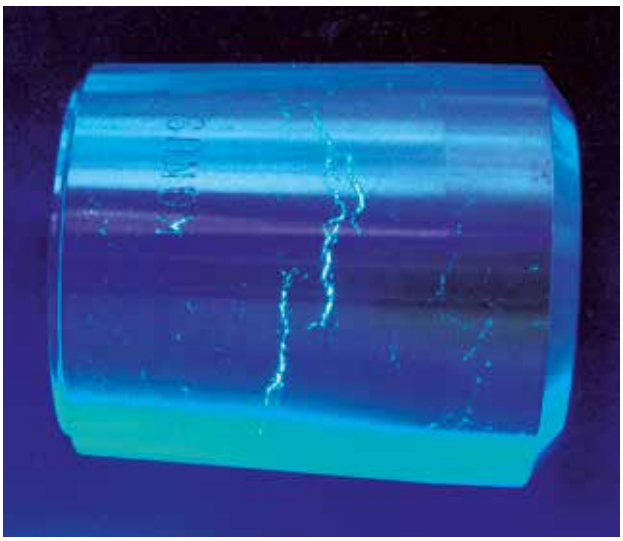
Ardrox®

Fluorescent Inks

Ardrox® fluorescent magnetic inks are used for the detection of surface and near-surface sub-surface defects in ferro-magnetic materials under UV(A) light.

Ardrox® fluorescent ink is available as powder (which can easily be dispersed in a carrier oil), ready-for-use fluid or as water-based fluid concentrate.

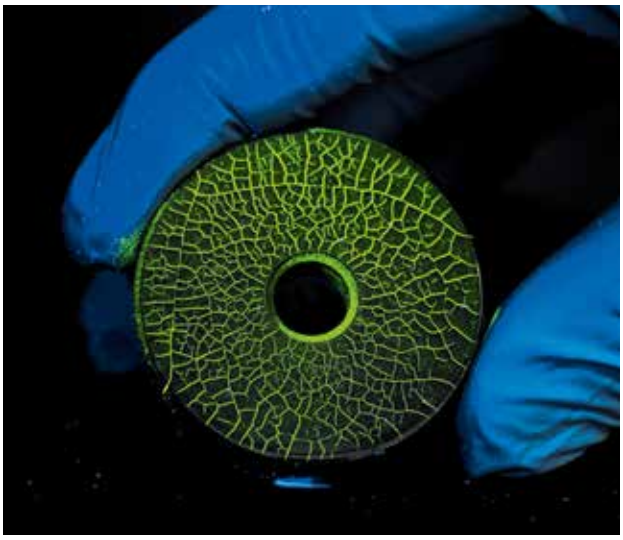
Product	Description	Packaging
Ardrox® 8506	Brown Powder / Disperse in carrier oil	Bulk / Aero
Ardrox® 8501	Ready-for use fluid	Bulk / Aero
Ardrox® 8544	Fluid concentrate	Bulk



Carrier Oil

Ardrox® Base Oil HF is the carrier fluid for magnetic particle inspection, both for visible and fluorescent MT applications.

Product	Flash Point	Packaging
Ardrox® Base Oil HF	approx. 105°C	Bulk



Supramor® and Lumor®
Overview Magnetic Particle Testing

Product	Description	Appearance	Application	Packaging	Conformances
APPLICATION: White Light					
Supramor® 4 Black	Very fine black magnetic particles in high-flash type 1 hydrocarbon carrier; good particle mobility, high magnetic response, low coercivity	Fluid	Ready-for-use (type 1 hydro-carbon carrier)		EN ISO 9934-2 ASME Boiler & Vessel Code AMS 3041E ASTM E 1444-05
WCP 712 White Contrast Paint	Provides a dense white background against which black or red indications of defects can be seen readily; ideal for use with oil-based or water-based magnetic inks	Fluid	Ready-for-use		EN ISO 9934-2 ASME Boiler & Vessel Code
APPLICATION: Fluorescent					
Lumor® J Powder	Fine fluorescent magnetic particles; will fluoresce brilliant yellow-green under ultraviolet radiation; high magnetic response, low coercivity	Dry powder	Mix with carrier fluid or pre-treated water		EN ISO 9934-2 ASME Boiler & Vessel Code AMS 3044F ASTM E 1444-05
Lumor® J (HF)	Fine fluorescent magnetic particles, dispersed in high-flash type 1 hydro-carbon carrier; will fluoresce brilliant yellow/green under ultraviolet radiation	Fluid	Ready-for-use (dispersion in type 1 hydro-carbon carrier fluid)	 *	EN ISO 9934-2 ASME Boiler & Vessel Code AMS 3045E AMS 3046F ASTM E 1444-05
Lumor® J (W) Powder	Dry blend of magnetic particles, wetting agents and corrosion inhibitors for dispersion in water; gives an aqueous fluorescent magnetic ink ideal for the inspection of ferromagnetic materials, structures and components	Dry powder concentrate	Disperse in water (typically 10 g/l)		EN ISO 9934-2 ASME Boiler & Vessel Code ASTM E 1444-05
Lumor® J40 (W)	Blend of magnetic particles, wetting agents and corrosion inhibitors for dispersion in water; settlement volume 0.2 – 0.4 %; provides a fluorescent magnetic ink ideal for the inspection of ferromagnetic materials, structures and components	Fluid concentrate	Mix with water (typical dilution rate 39 : 1)		EN ISO 9934-2 ASME Boiler & Vessel Code ASTM E 1444-05
Lumor® J50 (W)	Blend of magnetic particles, wetting agents and corrosion inhibitors for dispersion in water; settlement volume 0.3 – 0.5 %; provides a fluorescent magnetic ink ideal for the inspection of ferromagnetic materials, structures and components	Fluid concentrate	Mix with water (typical dilution rate 39 : 1)		EN ISO 9934-2
Carrier Fluid					
MPI Diluent HF	Type 1 hydrocarbon carrier for the dispersion of magnetic particle inks	Fluid	Add magnetic particles		AMS 2641B (Type 1) ASTM E 1444-05

 Aerosol  Bulk  Bag

* Note: The aerosol version is called Lumor® J Aerosol

Supramor® and Lumor®

Black Inks

Supramor® 4 Black is based on very fine black magnetic particles in a high-flash type 1, odorless hydrocarbon carrier.

The black particles have been selected for their high magnetic response, low coercivity and prolonged operational life.

Supramor® 4 Black is available as ready-for-use fluid or aerosol.

Product	Packaging
Supramor® 4 Black	Bulk / Aero

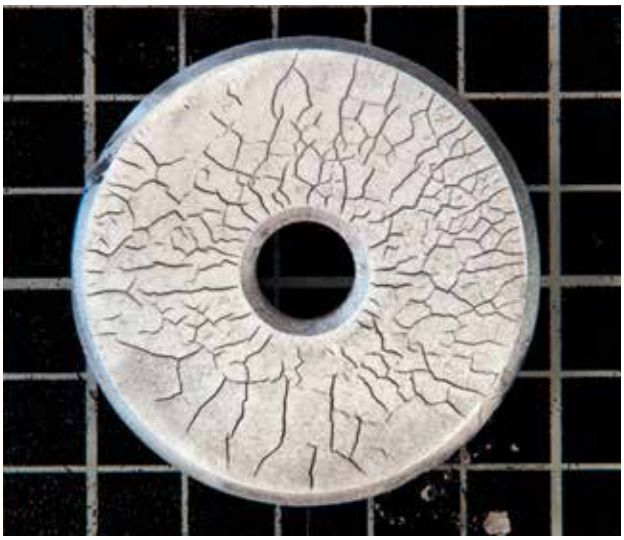
White Contrast Paints

WCP 712 contrast-aid paints are made of a suspension of white pigments in a fast-drying solvent carrier.

They provide an excellent contrasting white background when using the Supramor range of Black Magnetic Inks.
WCP 712 offers matt finish, free from reflections, and assists the viewing of defects.

WCP 712 white contrast paints are available in bulk or aerosols.

Product	Description	Packaging
WCP 712	Recommended for Supramor® 4 Black	Bulk / Aero
WCP 722	Recommended for Supramor® 4 Black / Strippable	Aero



Lumor®

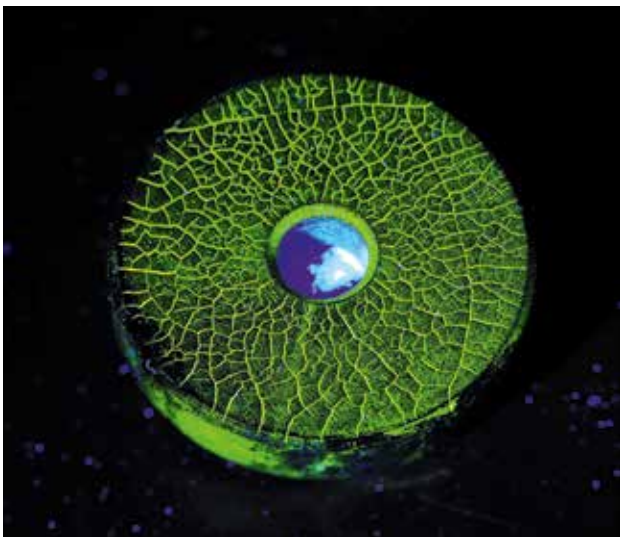
Fluorescent Inks

The Lumor® J series includes fluorescent magnetic inks, which will fluoresce brilliant yellow-green under UV(A) light.

Lumor® is ideal for the inspection of ferro-magnetic materials, structures and components.

Lumor® J is available as ready-for-use product or can be mixed with carrier fluid or water.

- Lumor® J Powder: Dry powder to be mixed with carrier fluid or water
- Lumor® J (HF): Ready-for-use fluid
- Lumor® J (W) Powder: Dry powder concentrate to be dispersed in water
- Lumor® J40 (W): Fluid concentrate to be mixed with water; settlement volume 0.2 – 0.4 %
- Lumor® J50 (W): Fluid concentrate to be mixed with water; settlement volume 0.3 – 0.5 %



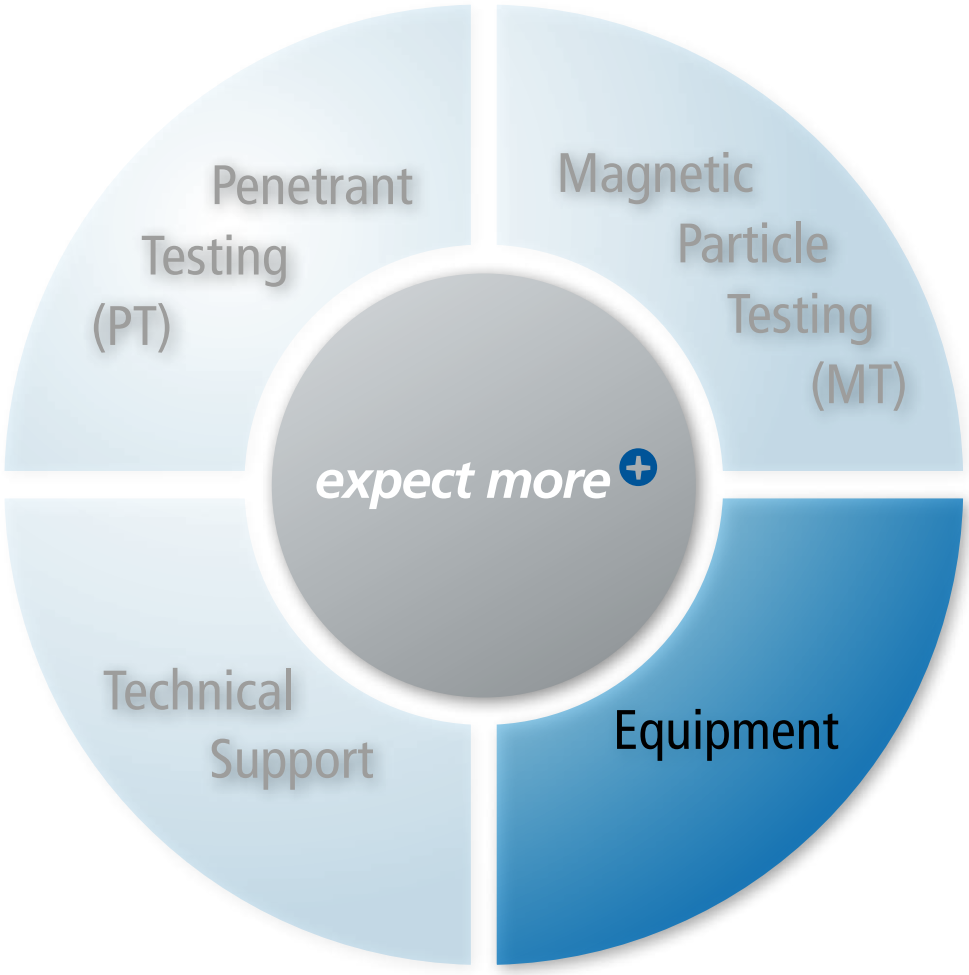
Product	Description	Packaging
Lumor® J Powder	Dry powder concentrate	Bulk
Lumor® J (HF)	Ready-for-use	Bulk / Aero
Lumor® J (W) Powder	Dry powder concentrate for water	Bulk
Lumor® J40 (W)	Water-based fluid concentrate	Bulk
Lumor® J50 (W)	Water-based fluid concentrate	Bulk

Carrier Fluids

MPI Diluent HF is the type 1 hydrocarbon carrier fluid for the dispersion of Lumor magnetic particle inks. HC-1 carrier Fluid is a water-based concentrate carrier. It has been optimized for Lumor J Powder.

Product	Flash Point	Packaging
MPI Diluent HF	approx. 105°C	Bulk
HC-1	n.a.	Bulk

Your Global Partner for Penetrant and Magnetic Particle Testing



UV Lamps

HIL 100

The CHEMETALL HIL 100 LED MAINS OPERATED UV LAMP is a compact and lightweight lamp that is ideal for fluorescent penetrant and magnetic particle inspection processes. The high intensity UV output is derived from high power LEDs to give virtually immediate full output of the UV light after switch on.

The lamp has a robust aluminium housing that has a replaceable front protection glass fitted with a rubber protection ring; it also has a pistol grip handle with a rubber coating for optimal handling.

The lamp is supplied complete with a plug mounted wall power supply and a 5-M power connection cable.

Product	Code
HIL 100 LED Mains Operated UV Lamp	270655000

HIL 200

The CHEMETALL HIL 200 LED BATTERY/MAINS OPERATED UV LAMP is a compact and lightweight lamp that is ideal for fluorescent penetrant and magnetic particle inspection processes. The high intensity UV output is derived from high power LEDs to give virtually immediate full output of the UV light after switch on.

The lamp has a robust aluminium housing that has a replaceable front protection glass fitted with a rubber protection ring; it also has a pistol like grip handle with a rubber coating for optimal handling. The lamp is either powered from a rechargeable battery or can be powered from the mains.

The lamp is supplied complete with a charger set for the Lithium-Ion battery and a plug mounted wall power supply and a 5-M power connection cable for mains power use.

Product	Code
HIL 200 LED Battery/Mains Operated UV Lamp	270656000

UV Accessories

Radiometer / Light Meter

The innovative UVe-LUX is a compact, lightweight and robust meter specifically designed for the non-destructive testing environment using a single sensor to measure UV and white light at the same time.

The Chemetall UVe-LUX meets the requirements for non-destructive testing process control for penetrant and magnetic particle inspections (ISO 3059).

Product	Code
Chemetall UVe-LUX Single Sensor UV/White light meter	270652000

UV Protective Goggles

The UV PROTECTIVE GOGGLES are designed to protect the user against most ultraviolet light sources.

The goggles provide maximum protection from exposure to extended or high intensity UV sources.

Product	Code
UVA goggles – UVA Absorbing	270524000

Permanent/Electromagnets

Mag 1 Permanent Yoke Magnet

The MAG 1 PERMANENT YOKE MAGNET is ideal for the effective magnetisation of components for crack detection, particularly where the use of electromagnetic yokes is impracticable or prohibited for safety reasons. The hinged arms and rotating pole pieces facilitate the local inspection of a diverse range of components such as critical welds in structures of fabrications, castings and automotive components.

The magnets used in the Mag 1 are manufactured from Neodymium Iron Boron, which has been specially selected for the Mag 1. This material offers the highest magnetic energy per unit volume commercially available.

Product	Code
Mag 1 Permanent Yoke Magnet	270561000

CEY Yoke Magnet MK2

The CEY ADJUSTABLE YOKE ELECTROMAGNET is commonly used for the magnetisation of ferromagnetic materials during magnetic particle inspection.

Operation of the yoke is carried out by placing of the poles on the test area, pressing the energising switch and applying Ferromor dry powder, Supramor visual or Lumor fluorescent particles to the test area whilst the component is being magnetised.

(Note application of magnetic particles should cease before power is switched off)

Product	Code
CEY Yoke Magnet MK2 – 240 V	270564000
CEY Yoke Magnet MK2 – 110 V	270565000
CEY Yoke Magnet MK2 – 48 V*	270568000

* Special order only

Permanent/Electromagnets

Test Weight

The TEST BLOCKS are used for the checking of the serviceability of both permanent magnet yokes and electromagnetic yokes.

Two weights that are complete with carrying handles are available, 4.5 kg for electromagnetic yokes and 18 kg for permanent magnet yokes. Both blocks come complete with test certificates traceable to national standards.

Product	Code
Test Weight – 18 kg	270597000
Test Weight – 4.5 kg	270600000

Induction Light for CEY Yoke Magnet

The INDUCTION LIGHT ATTACHMENT is designed to mount on the operating leg of the CEY electromagnetic yoke. The light is powered from the induced magnetic field from the yoke when it is in operation.

The light enables indications to be observed when the yoke is being used in areas that have reduced lighting conditions or where it is impractical to illuminate the area with additional lighting.

Product	Code
Induction Light for CEY Yoke Magnet	270525000

Magnetic Particle Test Equipment

Magnetic Flux Indicators Type I & II (Pk 5)

MAGNETIC FLUX INDICATOR STRIPS are widely used to indicate the presence of induced magnetic fields during the magnetic particle inspection method of ferromagnetic materials. Flux Indicators give evidence of an external field in the air above the magnetised surface and in some circumstances can be used to obtain a semi-qualitative estimate of the tangential field strength H.

Type I indicators are typically used for general engineering applications and type II are used for aerospace applications. Flux indicators have the advantage of being flexible enough so that they can be bent to fit the contours of a work piece, but robust enough to enable them to be used many times.

Product	Code
Magnetic Flux Indicators Type I (5pc.)	270500000
Magnetic Flux Indicators Type II (5pc.)	270501000

Berthold Pentrameter

When the pentrameter is placed on a magnetised test piece, magnetic lines pass through the sectioned iron cylinder. If magnetic powder or fluorescent magnetic solution is sprayed over the pentrameter, the cuts in the iron cylinder become visible. By turning the pentrameter around its axis, the maximum indication of the cut indicates precisely the magnetic field direction.

For determination of magnetising efficiency, and quality of the magnetic ink suspension, the outside ring of the pentrameter is turned slowly, increasing the distance of the thin brass plate from the test piece.

Product	Code
Berthold Pentrameter	270594000

Magnetic Particle Test Equipment

ASME Magnetic Field Indicator

The indicator comprises of 8-sections of mild steel brazed together; the separating lines between the sections forming artificial defects. When the indicator is placed on a magnetised component under inspection, the magnetic field passes through the indicator. The separating lines between the sections become visible when dry magnetic powder, fluorescent or coloured magnetic ink is applied over the surface of the indicator.

To determine the direction of the magnetic field it is only necessary to rotate the indicator slowly on its axis until one of the separating lines becomes clear.

Product	Code
ASME Magnetic Field Indicator	270502000

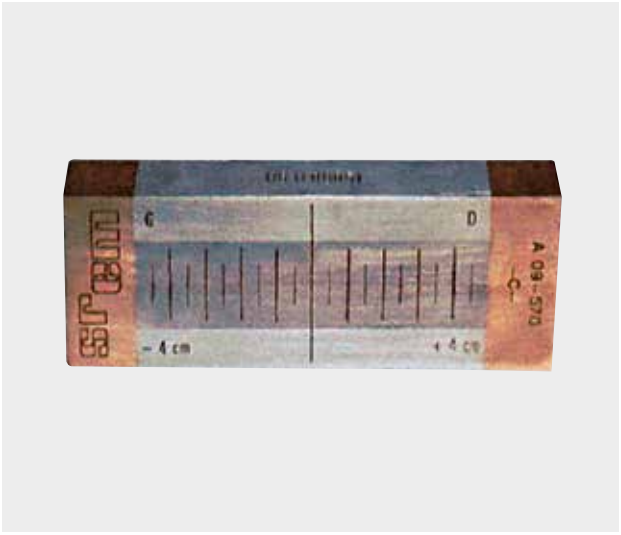
Temoin C Test Piece

Reference test block C is made of two rectified low carbon steel fit together with an air gap (0.015 mm).

On each side of these bars, there are two magnets which are assembled top to bottom so that each bar may have a North and a South poles to its ends.

The length of the indication spectrum, which can be read on the right side and the left side, indicates the quality of the magnetic ink, which is used.

Product	Code
Temoin C Test Piece	270602000



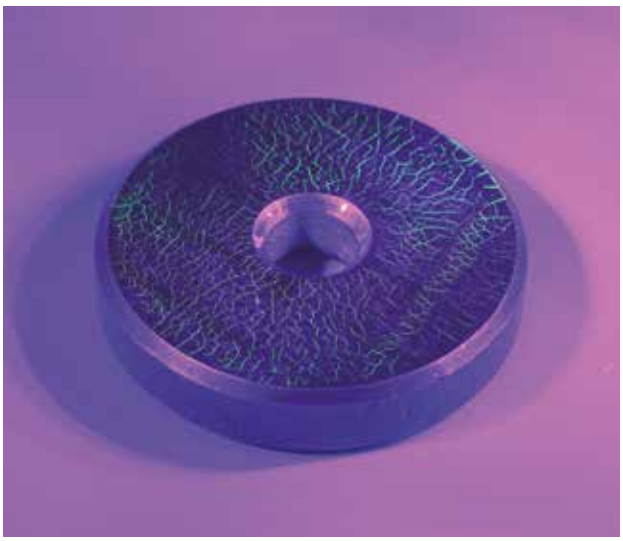
Magnetic Particle Test Equipment

MTU No 3 Magnetic Test Piece

The MTU 3 MAGNETIC INK MONITOR is a useful accessory for determination of the magnetic powder concentration in the test liquid.

The MTU test piece consists of a manganiferous steel, which is alloyed with vanadium. The cracks available in the test piece on both surfaces are manufactured by hardening and are in the size of 0.1 to 1 µm. Every test piece has a unique crack figure, it distinguishes itself by having net-shaped crack indications which were produced as naturally grown cracks.

The assessment as to whether the magnetic powder suspension is still usable for crack indication is carried out by means of the preparation of a reference image for comparison of the monitor when used with the test sample.



Product	Code
MTU No 3 Magnetic Test Piece	270545000

Magnetic Test Pieces

MAGNETIC TEST PIECES provide a quick means by which magnetic inspection processes can be checked for serviceability. They verify the elements of the process to ensure that they are functioning correctly. Regular use of the test pieces at the beginning and the end of the shift will help prove that a particular process is operating correctly and increase overall confidence in the system.

Product	Code
TP1A Bar & Wheel Test Piece K2810 (0-1000 AMPS)	270551000
TP2A Test Piece (RPS 700) (1000-3000 AMPS)	270548000
TP3A Test Piece (RPS 700) (3000-5000 AMPS)	270549000
TP4 Test Piece (RPS 700) (5 hole)	270550000
TP5 Magnetic Flow & Coil Test Piece	270626000

Magnetic Particle Test Equipment

Pear Shaped Centrifuge Tube ASTM 1444

MAGNETIC INK CENTRIFUGE (SETTLING) TUBES are used to measure the settlement volume and bath strength of magnetic inks. Magnetic inks, whether fluorescent or non-fluorescent, ready made or from concentrate shall consist of finely divided ferromagnetic particles and a suitable carrier liquid.

These magnetic ink tubes are an easy cost-effective way of ascertaining the working strengths of magnetic inks. The tubes can be used for sampling inks prior to use from the container, as well as in-service inks. Conform to the requirements of ASTM 1444.

Product	Code
Pear Shaped Centrifuge Tube ASTM 1444 Fluorescent ink	270653000
Pear Shaped Centrifuge Tube ASTM 1444 Visible ink	270654000
Stand for Centrifuge Tube	270601000

Magnetometers/Field Indicator

Model 25 (20+0-20) Calibrated Magnetometer

The CALIBRATED MAGNETIC FIELD INDICATOR is used to determine the presence of magnetism in ferrous materials when subjected to magnetic particle testing. The indicator can be used to ensure that components are appropriately magnetised and de-magnetised after undergoing magnetic particle inspection. An indication of polarity of the field can also be measured by the direction of the pointer deflection on the centre zero scale.

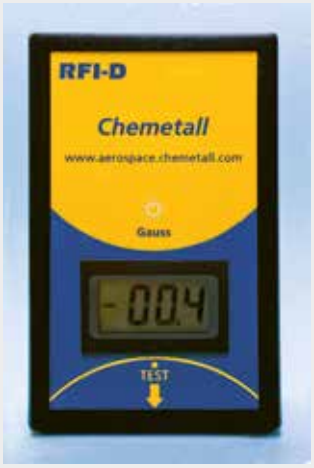
Product	Code
Model 25 (5+0-5) Calibrated Magnetometer	270628000
Model 25 (10+0-10) Calibrated Magnetometer	270554000

Chemetall RFI-D Digital Field Indicator

The RFI-D is a self contained magnetic residual field indicator incorporating an internal sensor providing a clear stable digital readout visible in UV and white light.

- Range Polarity dependant +/- 199.9 Gauss
- Resolution 0.1 Gauss

Product	Code
Chemetall RFI-D Digital Field Indicator	270660000



Penetrant Dye Test Equipment

Aluminium Thermal Quench Test Block

The PENETRANT CRACKED TEST PIECE provides a means by which penetrants may be checked for serviceability, comparison of contrast or to qualify its use outside the standard temperature range of 16 – 52 °C.

The Test Piece comprises of an aluminium block, which is divided by a machined groove to provide two side-by-side comparison test areas. Both the areas have identical fine cracks on them which when processed with penetrants can be compared.

Product	Code
Aluminium Thermal Quench Test Block	270544000

Pentrant Test block Type 2 EN ISO 3452-3

The EN ISO 3452-3:1998 TEST BLOCK TUPE 2 is used as a control test piece for both fluorescent and colour contrast process penetrant processes.

The test piece has 5 specific defects with diameters from 3 – 5.5 ± 10 %. Adjacent to the defects are four areas of different surface finish, ranging from 2.5 to 15 µm which are used to check the removability of the penetrant. The base material of the test piece is stainless steel, which is electroless nickel and hard chrome plated. Each test block is serialised and supplied with a test certificate.

Product	Code
Pentrant Test block Type 2 EN ISO 3452-3	270504000

Penetrant Dye Test Equipment

Refractometer 0 – 30 %

THE REFRACTOMETER is a hand held optical device for measuring the concentration of hydrophilic emulsifiers in water.

In operation a small sample of the solution is applied to the prism face of the instrument. Readings are then directly read from the borderline on the scale, by holding the instrument to the eye with it directed towards a suitable light source.

Product	Code
Refractometer 0 – 30 % (with Calibration Certificate)	270583000

Tricon Water Wash Gun (Ard 65/4)

The TRICON WASH GUN is a heavy-duty manual hand held spray wash gun for washing of components where an air assisted wash is not required.

The unit is a sturdily constructed low-pressure unit with a trigger lock to relieve hand pressure during long periods of spraying.

Product	Code
Tricon Water Wash Gun (Ard 65/4)	270556000

Penetrant Dye Test Equipment

SG E17 Air-Water Spray Gun

The SG E17 AIR-WATER SPRAY GUN is a useful addition to any manual rinsing facility, especially where the maximum effect is required from a minimal volume of water. It can be used for the removal of chemically loosened contaminants, e.g. paint, carbon or grease and is also ideal for removing dye penetrant materials when rinsing during flaw detection processes.

The SG E17 is a well-balanced gun with air and water control easily to hand (a small screw valve controls water flow and the air flow is controlled by the trigger). The SG E17 can be set to give moving spray for the removal of tenacious soils. The SG E17 requires only mains water and normal shop compressed air to be connected prior to use.

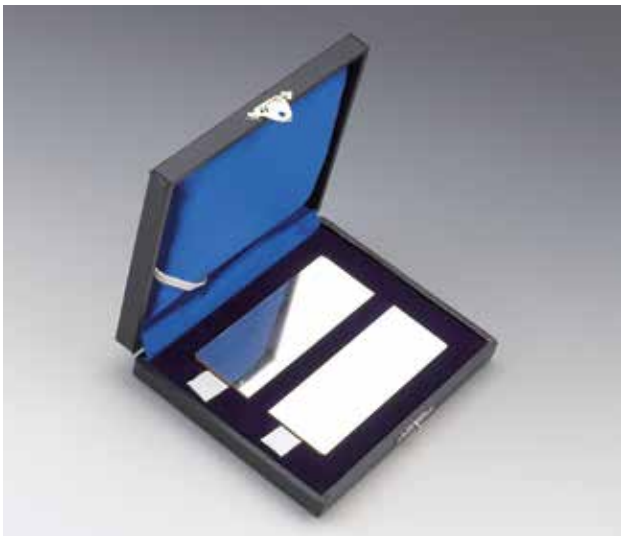
Product	Code
SG E17 Air-Water Spray Gun	270558000

Eishin Ni-Cr Test Piece (Pair)

The PENETRANT TEST PIECES are used to determine the sensitivity of penetrant systems. Each panel consists of a layer of Ni-Cr plated onto a brass base to produce a film thickness of 10, 20, 30 and 50 µm respectively. Transverse cracks are produced on each panel by stretching in the longitudinal direction.

The 10, 20 and 30µm panels are normally used with fluorescent penetrant and the 30 and 50µm with colour contrast penetrant.

Product	Code
Eishin 10 Micron Ni-Cr Test Piece (Pair)	270505000
Eishin 20 Micron Ni-Cr Test Piece (Pair)	270506000
Eishin 30 Micron Ni-Cr Test Piece (Pair)	270633000
Eishin 50 Micron Ni-Cr Test Piece (Pair)	270599000



Penetrant Dye Test Equipment

Remover Foam Generator

The Chemetall Foam Units are portable chemical generators designed to apply a large range of foaming chemicals to surfaces where the chemical is required to be in contact for a prolonged period of time.

Only requiring a compressed air supply to be fully operational, all units are self contained and totally mobile. Adjustment of the air control on the trolley enables the consistency of foam to be varied to suit the particular application.

Product	Code
Remover Foam Generator	270592000

Chemetall at a glance

Chemetall is a leading global surface treatment company, headquartered in Frankfurt, Germany. With our 2,100 employees, 40 subsidiaries and 22 production sites, we are a financially strong and fast growing company with a long-term orientation. Our aim is to further strengthen our quality and innovation leadership. With our own sales offices, production facilities, service teams, laboratories and warehouses at locations all around the world, we are operating in close proximity to our customers.

The chemical treatment of metal surfaces is our core competence: Our products are developed for cleaning, giving corrosion protection, sealing, improving paint adhesion, and facilitating the forming and treatment of metals. Our globally established technologies are used in the most diverse industry sectors and have played a leading role in shaping metal treatment.

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