

Color Measurement and System Control

**New Dimensions In Color**  
The future of measurement technology





## Taking the Mystery Out of Special Effect Paints

Responding to the needs of automakers and their suppliers, X-Rite Inc. is introducing a revolutionary technology that integrates and measures aspects of special effect paints similar to the way the human eye perceives color and appearance, taking into account not only the color, but also the surface and subsurface qualities of the coatings.

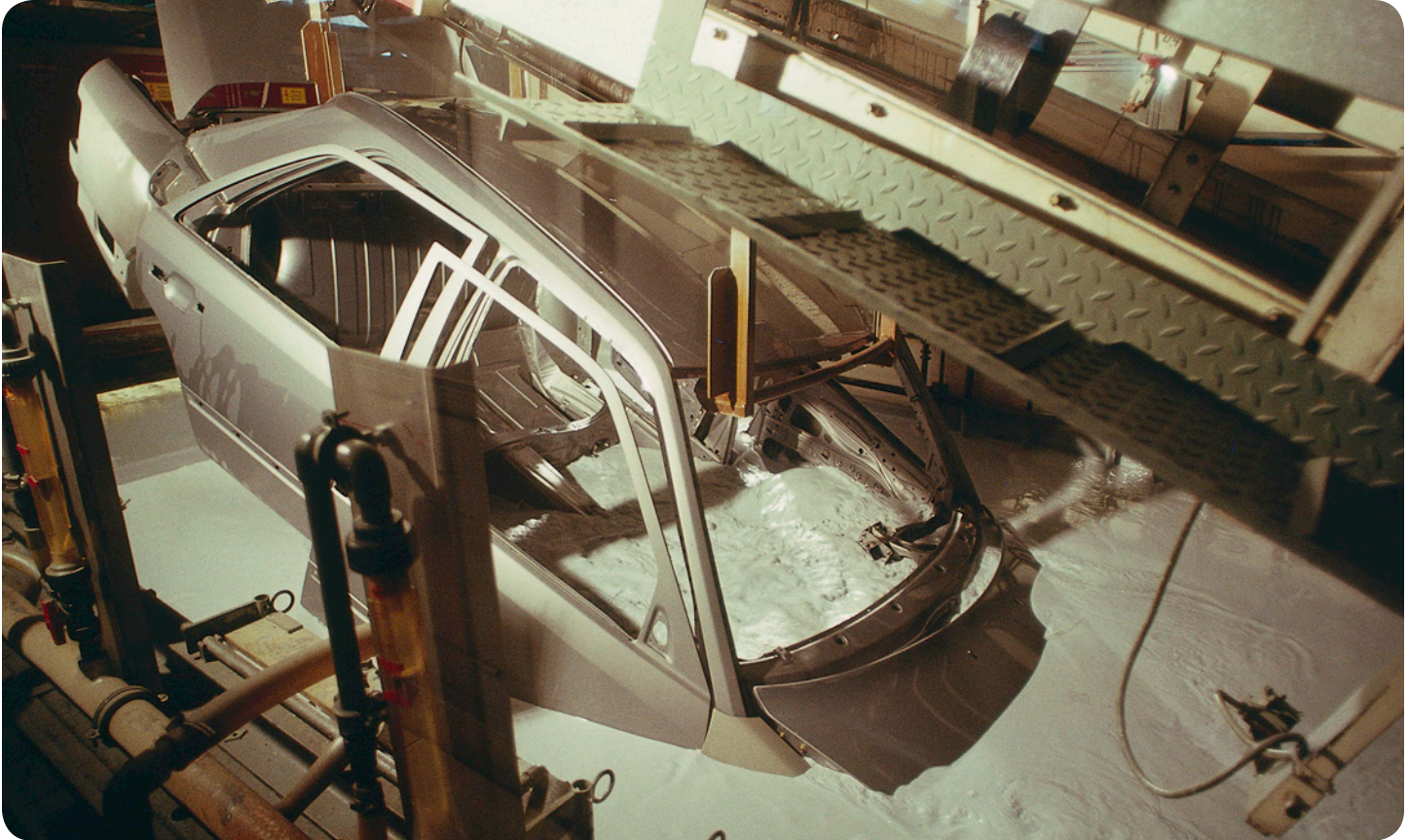
The technology — xDNA (X-Rite Dynamic Numerical Analysis) — is a powerful tool for anyone who needs to understand the impact of formula or process conditions on the overall color and appearance of special effect paints, while also providing a technique that connects color from design to final product manufacturing digitally,

With xDNA, companies all along the supply chain can now share a reliable method for measuring the color and appearance of effect paints that contain metallic, pearlescent, or special effect interference pigments.

The introduction of xDNA provides a technology leap for businesses that have struggled to precisely manage special effect paints that couldn't be done, except with expensive analytical laboratory instruments and technologies. The potential results of applying xDNA are powerful: improved uptime on a painting or assembly line, reduced scrap rates and quick root cause analysis when problems are discovered.

*Modern color pigments produce different appearances under different lighting and viewing angles. Descriptive terms, such as coarseness and sparkling, provide an empirical method of review but modern color complexity demands a more precise means of measurement.*





## The Power Of X: Getting Beneath the Surface

Every color has its own unique identity. xDNA integrates new X-Rite quality control software with advanced instrumentation that employs additional out-of-plane reflectance to develop a three-dimensional plot uniquely representative of a particular special effect paint — in essence, that paint's color genome. Using xDNA, output referencing and comparing color genomes can be easily communicated and understood.

The result: One simple number capturing a three-dimensional color plot that can serve as a communication tool for everyone in a supply chain.

Among the key elements of the xDNA system are:

- Precise measurement through use of a 10-angle spectrophotometer that can make relative comparisons of the critical aspects of special effect paints, such as relative flake size, orientation, and particle distribution
- Identification of each special effect paint with a digital plot that can be used to communicate along the supply chain, eliminate confusion and expedite process documentation
- Sensitive detection of color and appearance differences caused by paint process changes that speeds analysis of problems in a fraction of the time of prior methods
- Robust, ergonomically designed instruments that ease handling and are designed for optimal sample presentation during measurement
- Easy-to-read indicators on the instrument that show operators when they have appropriately positioned on parts for accurate, repeatable measurements, even on slightly curved surfaces
- Use of patented JOB routine that simplifies sample collection processes into a consistent procedure for consistent measurement of each part on each shift
- Powerful data analysis features that can be used to set process tolerances and provide response actions to measurement results to manage the painting process

# A Solution For Every Link In the Supply Chain

Up to now, companies forming the supply chain needed to expend excessive and unnecessary time and resources trying to determine whose data is more reliable during the program approvals, regular monitoring of the process and troubleshooting problems that may occur on the factory floor.

The crux of the problem was that no one's data and the interpretation of that data was good enough to explain what human observers perceived. The best instruments could only measure color along a two-dimensional plane, so they may detect some differences in a special effect paint as an attribute of color, but remain blind to essential surface and subsurface characteristics of the coatings.

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## A Solution for Designers

**Freedom**  
**Flexibility**  
**Inspiration**

As drivers of new color combinations, designers need the freedom to experiment. xDNA opens up the full spectrum of color options. The technology allows designers to feed rendering programs with consistent color information to view and analyze color ideas and appearance effects under various conditions, as well as quickly evaluate existing colors in the data file.

xDNA now gives designers a way to precisely define the data readings that a specific paint formulation and process should yield to achieve the exact color and appearance of a special effect paint. In one recent case study, xDNA provided the third dimension to the digital profiles of two different paints that human observers could readily tell were different — but that instruments had difficulty defining. X-Rite's new MA98 instrument now can measure the major characteristics of a special effects paint, and xDNA can pinpoint the location of that paint in three-dimensional space. With xDNA, everyone will be able to measure if the products being manufactured on the factory floor is following the designer's original intent



## A Solution for Paint Companies

**Accuracy**  
**Consistency**  
**Detail**  
**Economy**

Using xDNA, paint manufacturers can achieve significant competitive advantages because the system helps everyone in the supply chain agree on one standard — and gives everyone a way to accurately measure to that standard. During product launch, paint companies can provide hard, accurate data to customers at all tiers of the supply chain that is essential for speedy and successful approvals of sample warrants and PPAP/APQP analysis.

xDNA provides reliable data on paint specifications, tolerances, and process controls that promotes effective troubleshooting and eliminates finger pointing if problems arise on the factory floor.

Paint companies can send virtual standards and tolerances along with the physical master panels — so manufacturers know how close they are to the designer's original standard.

With xDNA technology, the MA 98 instrument measures color in three planes, literally capturing a whole new dimension in the color and appearance of special effect paints. With the MA 98 as its eyes, xDNA software serves as the brain of the system to analyze this complex set of data points and interpret the information give a single simple answer to human observers.

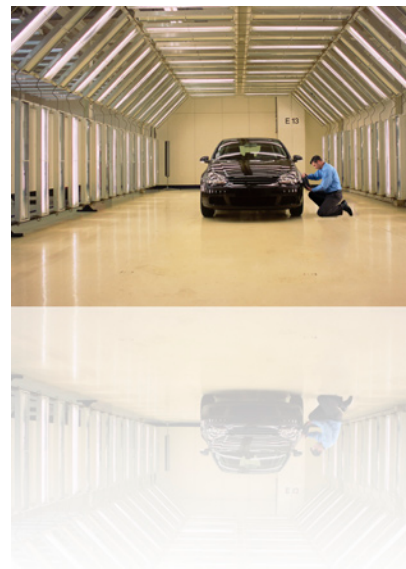
X-Rite believes that to be useful, data needs to be easily understandable and accessible. To ensure access by anyone in the supply chain, xDNA supports a variety of database formats that can be used by process engineers, quality control personnel and others. The result is an unbroken line from initial color development to quality control.

## A Solution for Manufacturers

**Time**  
**Control**  
**Repeatability**  
**Traceability**

Automakers and their suppliers can improve uptime on their production lines and reduce the amount of product rework using the system. The xDNA system detects when a process is drifting out of control faster and more accurately than any other system on the market. The xDNA system also speeds troubleshooting to keep the line running. Process engineers and production personnel can use xDNA to determine corrective actions quickly.

Process engineers can correlate xDNA measurements to other variables such as the microclimate of plant temperature, humidity, or barometric pressure to process problems, creating a standardized cause-effect troubleshooting guide. For instance, engineers can design and implement new processes more confidently because they can perform Design of Experiments on flow, atomization, and film build and measure outcomes accurately using xDNA.



## A Solution for Quality Assurance/Quality Control

**Uniformity**  
**Simplicity**  
**Precision**

With xDNA, QA personnel have an electronic master plot unique to that standard or sample that becomes the standard for everyone along the supply chain and a way to measure to that standard. Every aspect of quality assurance work — from approving standardized instructions for measurement to assisting with root-cause analysis when a process goes out of control — is assisted by the hard, factual data provided by xDNA. For instance, QA personnel can save significant blocks of time in submitting Initial Sample Warrants and conditional warrants for processes because xDNA provides the hard, factual data to build strong documentation.

QA personnel also can maintain and retrieve data files quickly and easily with xDNA, using the XColor QC software exports data to SPC programs to set and monitor process tolerances.

## Practical Software and Instrumentation

Anyone who is responsible for color data collection and analysis will find it easy to use xDNA, thanks to its use in the X-Color QC flexible, proprietary software program. Users with little training or experience can quickly understand and work with the software in its intuitive workflow. In addition, a QC system can be structured to accommodate specific product and operator requirements:

- Compare data, view information, and make relationships with data in any manner or form needed
- Customize menu and toolbar commands into logical blocks and arrangements for your specific operation
- Sequence modeling of jobs and procedures to provide step-by-step direction and automate routine processes to reduce errors
- Use simple programming procedure to create standards and samples
- Supports of a variety of database formats for customers who operate at different physical locations

The software package also ensures agreement between instruments, resulting in repeatable readings regardless of operators or conditions. This includes integrating historical data from earlier X-Rite instruments into a common database for long-term review and analysis.

New, robust instrument designs balance workplace and measurement demands. Rugged construction and modular illumination components provide for long-lasting performance in production environments. Instrument styling and reduced weight boost ergonomic integrity and permit extended use with less discomfort.

The major significance, however, is in how the new instruments perform. They are built specifically for use with xDNA technology in the measurement of complex colors. Their shape and styling make them easy to use and align — even with complex geometries. They are also easy to maintain.

As color technology evolves, the possibilities seem limitless. Realize all possibilities with xDNA, the color measurement and analysis that gets beneath the surface.



*xDNA is part of X-Color QC, a quality control package that organizes and manages color data for all types of surfaces in a single, flexible platform.*



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## Comprehensive Laboratory Service

For evaluating color performance and measurement standards, X-Rite maintains fully accredited laboratories throughout the world. Each is accredited in accordance with the recognized International Standard ISO / IEC 17025 and also meets additional program requirements in the field of calibration.

## The Color of Success

The global market continues to present challenges and opportunities. Color QC plays an increasingly significant role in product development and buyer preference. X-Rite offers you the expertise and technology to make the most of your color opportunities. On time. Every time.

For more information, visit [xrite.com](http://xrite.com)

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