

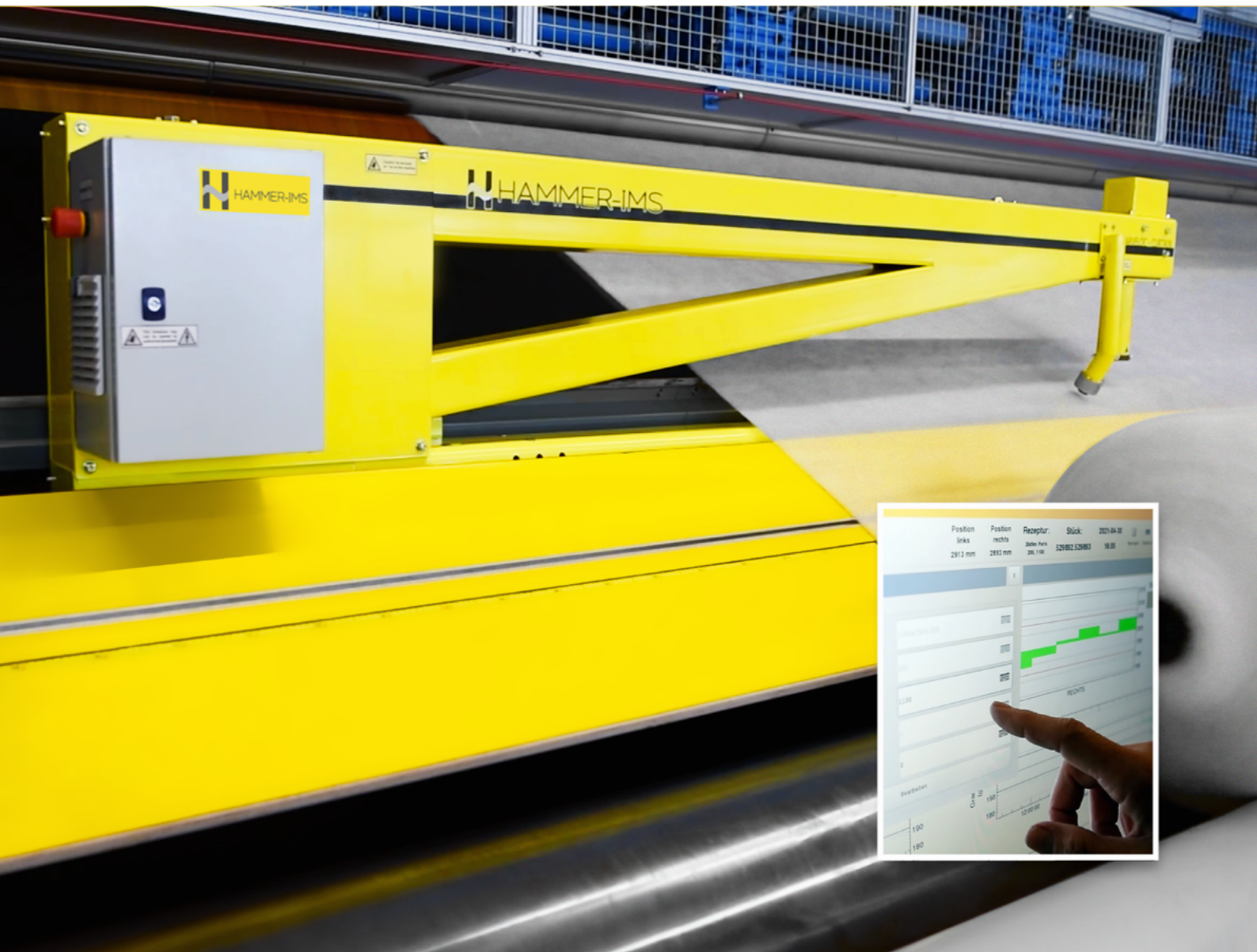


HAMMER-IMS



Product Overview

One-stop shop for quality and process control



Product overview

At Hammer-IMS we provide solutions to minimize material scrap, maximize product quality, reduce energy consumption, and achieve less labor-intensive operations. Our Marveloc-CURTAIN, Marveloc-CHARIOT and Marveloc-CIRCLE measuring systems are utilized for thickness and weight measurement, containing either fixed or moving sensor(s). Our Edge-Vision-4.0-CURTAIN machine-vision systems are used for the automated inspection and analysis of products in real-time during production.

The three pillars of innovation

Hammer-IMS innovates in three domains: mechanics, sustainable sensor/vision technology and software technology. We call these our three pillars of innovation, as together, they form a strong bond and a solid structure for the solutions that we offer. Our team of engineers and technicians have the expertise to create a solution tailored to your specific needs, perfectly aligning with your quality demands.

Our range of solutions come in different variants, depending on the dimensions of your manufactured product and its final purpose. Most of our solutions are implemented as in-line systems at different stages of the production line. Other common applications include the integration of our systems for purposes of research and development in laboratories.

MECHANICAL PLATFORM



Our strong, sturdy and compact mechanical frames are engineered to fit your production line needs and serves as a platform to fit our range of sensor technologies for either fixed-head, scanning-frame or scanning-head applications. For scanning-head applications, we provide both linear and circular scanning solutions.

SUSTAINABLE SENSOR/VISION TECHNOLOGY



Our sustainable approach in the field of sensors for thickness and basis weight (grammage) measurements, industrial cameras for machine-vision applications, and third-party sensor integrations can be fitted to your manufacturing process with ease.

CONTROL SOFTWARE



Our Connectivity 3.0 control software is programmed to give you a seamless and intuitive view on the status of your product by showing the measurement, detection and monitoring output and implementing process control functions.

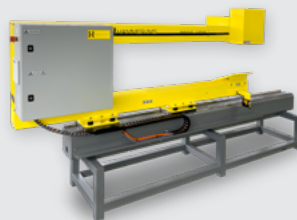
In-line solutions

Our quality control systems are developed to operate 24/7 as part of your industrial production line. These are used primarily for measurement, detection and monitoring purposes. Optionally, these systems can be equipped by automatic process controllers, directly interfacing with the production equipment.

Marveloc-CURTAIN systems consist of a scanning frame that accommodates single or multi-sensor configurations for thickness and basis-weight (grammage) measurements. Edge-Vision-4.0-CURTAIN systems consist of a stationary frame that accommodates our in-line machine-vision technology for anomaly detection. Marveloc-CHARIOT systems consist of a single thickness measuring sensor



Marveloc-CURTAIN O-frame
Robust system for wide production lines (> 2 m.) (>6.5 ft.)



Marveloc-CURTAIN C-frame
Sensors on arm lengths ($\leq 2\text{ m.}$) ($\leq 6.5\text{ ft.}$)



Marveloc-CURTAIN C-frame Slim
Compact frame technology for space-constrained cases. Sensors on arm lengths ($\leq 1\text{ m.}$) ($\leq 3.3\text{ ft.}$)

OEM solutions

In essence, all Hammer-IMS quality control systems can be ordered for integration into third-party machinery as part of an OEM project. Key in this regard is our programming API, which enables a third-party's central computer system to control both third-party machinery and our Hammer-IMS system, displaying Hammer-IMS data and status on a single HMI. We offer this API through a number of industry-standard fieldbus protocols.

In an OEM application, the power and emergency stop buttons or switches should fit any relevant OEM customer policies and international safety standards. We work alongside you to ensure you have the application up and running in a timely manner.

No need for a full-fledged M-Ray measuring system for your OEM project? We can offer a basic standard M-Ray OEM Module.



Image of an M-Ray OEM Module.

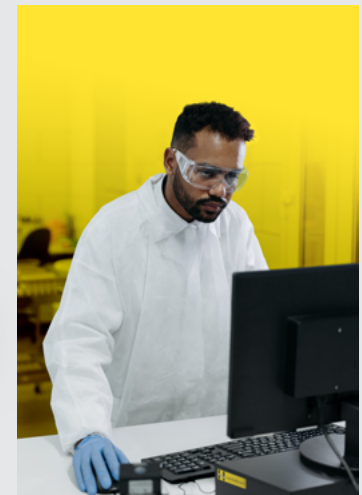


Lab solutions

Laboratory applications of our Marveloc-CURTAIN measuring systems can give you more thorough insights into material properties and geometries. This is particularly useful when developing new materials or production techniques. A desktop version of the Marveloc-CURTAIN system is also available. For certain system configurations we offer to equip the system with a small scanner or compact samples feeder system. In addition, we offer our Edge-Vision-4.0-CURTAIN systems for offline inspection, e.g. for measurements of the Uniformity Index of non-woven products. We also offer a Marveloc-CURTAIN-2D scanner system for 100% inspection and measurement of basis-weights.



Scan to watch video of 2D scanner

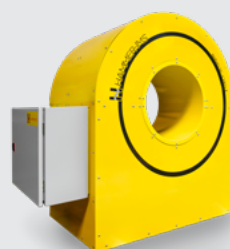


unit that moves within a fixed mechanical frame. Marveloc-CIRCLE systems contain a single thickness measuring sensor unit that moves along a circular bearing. The Marveloc-CIRCLE is typically applied for pipe-thickness measurement. You can learn more about these technologies further in the brochure.

Regardless of the intended use, our quality control systems are heavy-duty and equipped with our Connectivity 3.0 software for easy operation supported by intuitive visuals. Additionally (on request), all of our installations can be connected to any preferred process management software for centralized data processing and storage.



Marveloc-CHARIOT
Compact and affordable single head system



Marveloc-CIRCLE



Edge-Vision-4.0-CURTAIN
Machine-Vision for anomaly detection



Marveloc is the brand name for our range of sensors that enable thickness and basis weight (grammage) control. Renowned for its high operational robustness and sustainability, Marveloc supports single and multi-sensor applications, allowing us to offer maximum material coverage.

M-Ray: electromagnetic millimeter wave technology

For thickness and basis weight (grammage) measurements

The concept of our M-Ray technology for thickness or basis-weight (grammage) measurements is straightforward: A sensor at the top transmits an electromagnetic millimeter wave that passes through the material being measured, then reverses direction when hitting the reflector underneath, passing through the material once again, and finally being captured by the sensor. Our M-Ray based measurement systems track the time required by the wave to pass through the material. This time measurement enables us to deduct information about the physical state of the material.

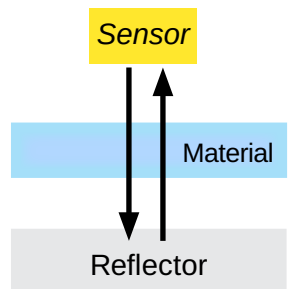
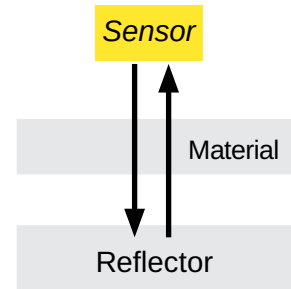
Typical applications for the reflection-based M-Ray technology include thickness measurement of thicker plastic films and sheets (opaque and non-opaque, starting from 50 micrometers or 50 grams per square meter) (from 1.96 mils or 0.164 ounces per square foot) as well as density measurements of foams. Furthermore, the technology perfectly matches applications for basis-weight control for coated textiles, dry-laid non-wovens, mineral wools, glass wools, wall coverings, bitumen, and many more.

For moisture measurements and water-based coatings

The concept of our M-Ray technology for the quantification of moisture and water-based coatings consists of a sensor at the top, transmitting an electromagnetic millimeter wave that passes through the material being measured. Below the material, a receiver captures the waves, and performs an analysis of the signal's power. The lower the power reported by the bottom receiver, the higher the moisture content or yield of the applied water-based coating.



Compatible with: CURTAIN



C-Ray: capacitive sensor technology

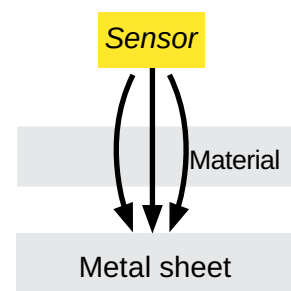
For thickness measurement of thin-film plastic films

Our C-Ray technology combines robust capacitive thickness measurement technology with integrated variable-standoff compensation such that it can be applied as a moving-head solution for thickness measurement. Capacitive technology provides the best precision for thin film thickness measurement, but comes typically at a small stand-off distance (about 4 millimeters maximum) (about 157 mils maximum) to the metal roller to which the film is being pressed during production.

Typical applications for C-Ray based in-line quality control are for materials ranging in thickness from 20 micrometers to 4 millimeters (from 0.78 mils to 157 mils) including thinner sheets (opaque and non-opaque), films and foams, offering the highest measurement precision. Minimal effort integration of the C-Ray technology into our Marveloc-CHARIOT quality control systems, makes this solution extremely valuable for thickness measurement in thin-film plastics extrusion lines with tight integration constraints.



Compatible with: CHARIOT



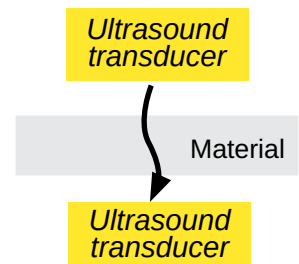
U-Ray: ultrasound sensor technology

For battery film (coating)

The U-Ray ultrasound sensors of Hammer-IMS are optimized for quality control of thinner materials and are able to penetrate metal materials or materials with high electrical conductivity such as carbon fibers or carbon sheets. The ultrasound U-Ray sensor was developed by upgrading analogue ultrasound sensing with digital signal processing techniques (DSP) to enable ultrasound wave phase and/or power detection. U-Ray sensors are ideal for solutions such as battery film applications, in which layer coated thickness needs to be measured on a metal substrate.



Compatible with: CURTAIN



L-Ray: laser sensor technology

For true-thickness quality control of thin materials

Our L-Ray technology offers true-thickness measurements for both opaque and transparent or translucent materials. L-Ray technology offers the smallest-achievable measuring spot. Depending on the application we choose either for laser based L-Ray technology or confocal-based L-Ray technology.

Laser-based L-Ray technology

The Laser-based L-Ray technology applies one or more laser triangulation sensors. In a differential-lasers setup, the L-Ray sensor technology applies two opposing laser sensors to measure the thickness of sheets, films and foams in a differential way (one laser on top, the other underneath). In a single-sided laser setup, only a single L-Ray sensor is applied when the customer's material is able to be guided over an additional roll as part of the Hammer-IMS measuring system, as is the case for a Marveloc-CHARIOT solution. In either case, the choice of the specific L-Ray sensor is tailored to the customer's application: long range versus high precision, or optimized for rough or shiny surfaces, etc.

The L-Ray based Marveloc-CHARIOT measures the thickness of a range of flooring and construction materials up to 25 mm thick (up to 1 inch) (carpet tiles, PVC based LVT, heterogeneous vinyl, EPS and XPS foams, etc.). The L-Ray based Marveloc-CURTAIN is a good alternative for thicker and rigid materials, or highly-fluttering production lines.

Apart from applications of thickness measurement, our L-Ray technology is suitable for accurate material width detection with precision levels down to 0.1 mm for a 600 mm web width (3.937 mils for a 23.62 inch).

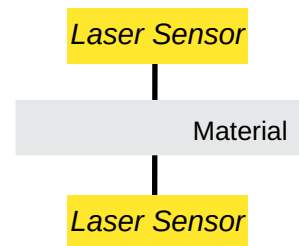
Confocal-based L-Ray technology

For thickness measurements for the markets of battery films and steel products, a laser-based L-Ray solution won't be the best technological fit. For these glossy and shiny products a, the scattering phenomenon, on which the laser-based L-Ray concept relies, is too insignificant to provide good measurement output. Therefore, Hammer-IMS proposes the confocal-based L-Ray technology, which has a better match with these materials. Two confocal sensors are required to come to a true thickness measurement: one above the material, the other one below the material. Measurement spots of the confocal-based L-Ray technology are comparable to the ones realized by our laser-based L-Ray technology. A second use case for confocal-based L-Ray technology is thickness measurement of thin transparent films starting from 100 micrometers (3.937 mils), going up to several millimeters thick. For transparent films, a single confocal sensor mounted on top of the material will be sufficient.

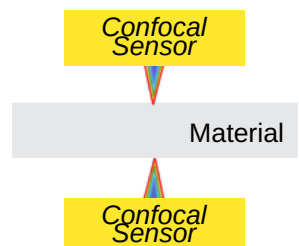
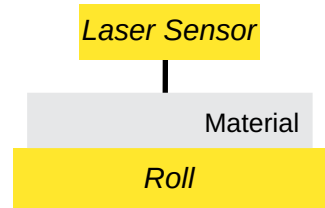


Compatible with: CURTAIN (differential lasers setup, differential confocal setup),
CHARIOT (single-ended sided laser setup, single-sided confocal setup)

Differential lasers



Single-ended laser



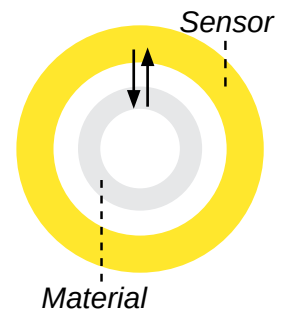
M2-Ray: radar-based sensor technology

For thickness measurement of multi-layers and extruded pipes and profiles

We have recently introduced our M2-Ray technology. The physical principle is comparable to the one of the M-Ray technology. Yet, with M2-Rays we are able to measure multilayers and extruded pipes and profiles. The M2-Ray technology can be mounted in a linear scanner or a circular scanner. The latter is particularly useful for pipe thickness measurement.



Compatible with: CHARIOT, CIRCLE



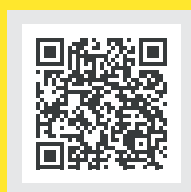
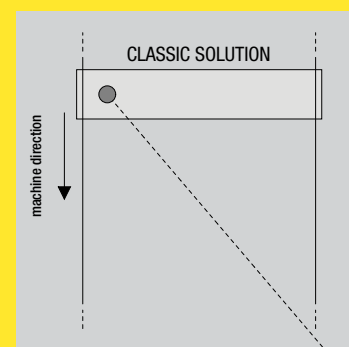
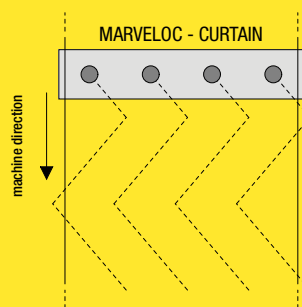
Sustainable and non-radioactive Marveloc technology

It is no coincidence that we named our Marveloc sensors M-Ray, C-Ray, U-Ray, L-Ray and M2-Ray. This clearly differentiates our sensor technologies from X-Ray, a typically harmful and expensive technology. The Marveloc sensor family is an innovative alternative to radioactive and nuclear measurement technologies. M-Ray and M2-Ray (electromagnetic waves), C-Ray (local capacitive coupling), U-Ray (inaudible ultrasound waves) and L-Ray (industrial laser or confocal light beam) are all technologies that are safe for humans. All of our sensor technologies support fast and accurate measurements.

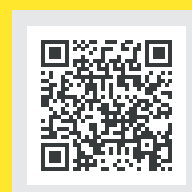
Our measuring systems outperform radioactive and nuclear technologies in terms of total cost-of-ownership (TCO): the use of our technology does not require (in most cases) specific operating licenses, special safety prescriptions, disposal management, a radiation protection officer, etc.

Multi-sensor measurement for near-100% material coverage

We are proud to have introduced our first solution based on multiple sensors back in 2016. Today we offer quality control system configurations containing multiple sensors, developed to simultaneously measure materials in transversal direction to capture complete and reliable information about their weight, thickness or anomaly level. The use of multiple sensors provides near-100% material coverage. This compares favorably against the use of single-sensor systems.



Scan to watch
Heimbach installation
video



Scan to watch
ThermHex installation
video

Edge-Vision-4.0



SUSTAINABLE VISION
TECHNOLOGY

Connected high-resolution optical inspection

Our Edge-Vision-4.0 product family adds an extra eye to your product or process. We offer integrations of our Edge-Vision-4.0 technology mainly in CURTAIN frames, giving rise to Edge-Vision-4.0-CURTAIN systems. Edge-Vision-4.0 stands for optical ways to capture and analyze high-resolution images of your product or process. This is mainly done by means of machine-vision technology but can also be achieved by line laser technology or specialized color sensors. Our thickness measurement and basis-weight measuring solutions can be combined with our machine-vision solutions, realizing a smart fully-integrated quality solution in the same Connectivity 3.0 software environment.

Identify anomalies in continuous processes

Continuous process anomaly detection is relevant for industries of plastic films, textiles, non-wovens, battery films, insulation, and many more. Our Edge-Vision-4.0 technology has been developed to deal with two main tasks:

1- Detection and classification applications

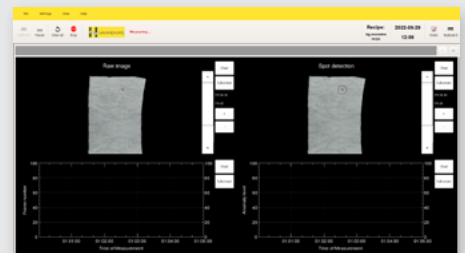
- Black spot detection in extruded films and sheets.
- Detection of length-direction stripes resulting from die contamination in extruded sheets.
- Detection of foreign objects in non-woven materials, e.g. lost needles.
- Detection and classification of holes, stains, stitching errors and printing anomalies in textile applications.
- Detection of fractures and defects in battery film coating applications.

We apply both advanced signal processing techniques and the newest AI-techniques for detection and classification (read more about our AI technology further down). Acceptance or rejection of the product (or product part), means we will mark the product, activate an actuator, or provide visual feedback to the operator.

2- Continuous monitoring applications

- Tracking dimensions of batch-processes, e.g. panels and boards.
- Quantifying color variations in non-woven materials resulting from limited bale opener or mixing randomness, and real-time calculation of the industry standard Uniformity Index.
- Detecting and quantifying color variations in textile coatings or plastics extrusion. For this we use third-party color sensors.
- 100% basis-weight control. By combining M-Ray technology with Edge-Vision-4.0, we achieve high-resolution calibrated basis-weight measurements. This is especially useful for the non-woven industry.
- Tracking material edges.

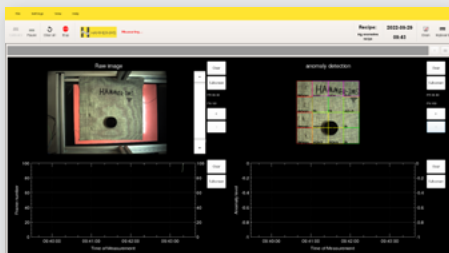
We mainly focus on roll-to-roll processes, or processes converting raw materials into flat products or rolls, which predominantly means non-wovens, textile coating applications, battery film, plastics film/sheet and foam extrusion. For batch-processes, the tracking of board and panel dimensions represents an important application for Edge-Vision-4.0.



Edge-Vision-4.0



SUSTAINABLE VISION
TECHNOLOGY



Our newest AI-techniques for detection and classification

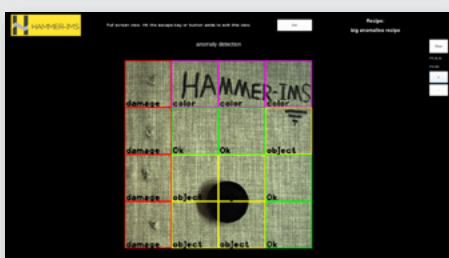
As AI is increasingly on the rise, we are developing an AI-enabled feature, which distinguishes defects and classifies them into multiple defect categories. Based on a dataset of images, pre-classified by the customer, we use artificial intelligence to execute a learning process offline and build a powerful neural network for use during in-line quality control. When inspecting textile, plastic, or battery film in-line, the newly developed software continuously traces product defects and foreign items on the product. This feature is an integral element of our latest generation of Edge-Vision-4.0-CURTAIN products from Hammer-IMS.



Our machine-vision technology can be tuned towards your specific product and application, covering specific categories as desired. The camera-based AI solution excels in delivering sufficiently reliable inspection results to provide maximum viability for the quality control industry. Furthermore, the system offers fast, effective and robust AI performance. Re-training neural networks online is a capability we envision to realize in the future.

Made to withstand the test of time

We continuously enhance our systems to maximize longevity. Our Edge-Vision-4.0 technology is mounted inside stationary steel CURTAIN constructions. We enclose our system to avoid dust and other particles on the lenses and interior components, and thus minimize maintenance and down-time. Our systems are robust, reliable and easily maintainable, just like our Marveloc quality control systems renowned for accuracy and reliability.



Scan to watch
machine-vision
video



Scan to watch
software for
machine-vision

Mechanical platforms

Our products consist of three variants: CURTAIN , CHARIOT and CIRCLE. Depending on the specific needs for your production or application, you might want to consider one, two or multiple variants.

CURTAIN MECHANICAL PLATFORM

Products equipped with a CURTAIN mechanical platform have sensors directly attached to the fixed or traveling mechanical frame. These systems are typically used for multi-sensor applications dealing with wider or thicker products.

Scratch-free products, even for thick materials

Your products deserve the best quality. When selecting the CURTAIN platform equipped with M-Ray or M2-Ray sensor technology, our unrivaled high measurement stand-off can be implemented. A high stand-off distance between sensor heads and your production batch avoids contact damage and scratches on your products. Thanks to the high stand-off distance, our sensors are not at risk of overheating due to significantly-hot production processes like for the businesses of plastics extrusion or hot coating processes. In addition, when using an M-Ray or M2-Ray based CURTAIN system there are no active sensor components underneath the material, this means that no expensive parts can get irreversibly damaged by dripping material such as coating, bitumen or melted plastics.

Typically, high stand-off distances translate into a measurement gap of 30 up to 60 centimeters (11.8 up to 23.6 inches). Obtaining a comparable high stand-off distance with other conventional X-Ray based systems calls for the use of radioactive sources above 5kV (very high energy consumption). Such huge gaps allow you to run a production line with a broad range of thicknesses, and this eliminates the need for Hammer-IMS measuring systems to be removed from the production line by an operator while the material is being passed through the production machine.

Robust and rigid mechanics increase machine performance

Hammer-IMS mounts its Marveloc sensors or Edge-Vision-4.0 machine-vision on the rigid CURTAIN frame construction. This stiffness ensures improved measurement consistency and reduces mechanical wear on critical technology components. Food or medical grade production facilities can particularly benefit from the rigid design without moving parts or re-lubrication in the upper part of the Marveloc-CURTAIN. This avoids any potential contamination to your sensitive products. Hammer-IMS has experience with lubricant-free bearings which is beneficial for highly demanding industries.



Edge-Vision-4.0-CURTAIN



Marveloc-CURTAIN O-frame Robust system for wide production lines (> 2 m.) (>6.5 ft.)

CURTAIN



MECHANICAL
PLATFORM



Scan to watch
Vetex installation video



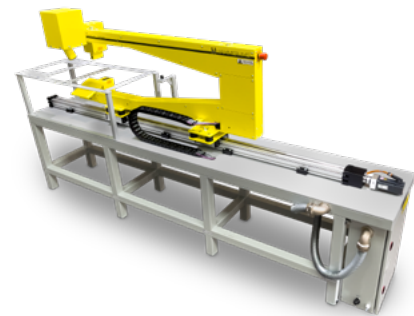
Scan to watch
Grandeco installation video

Versatility and high compatibility

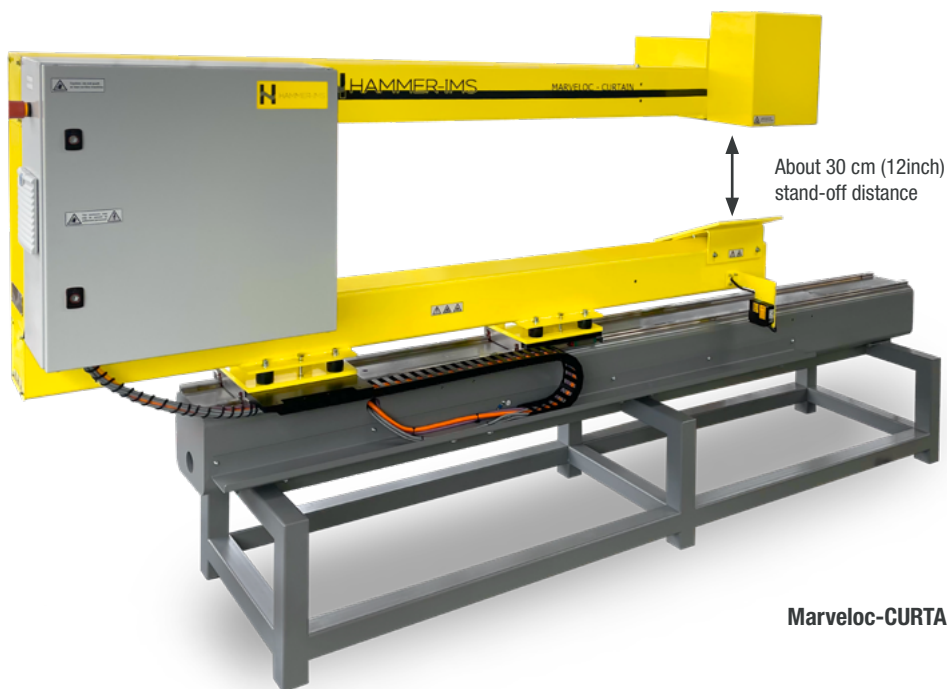
When selecting the CURTAIN platform equipped with L-Ray technology for thickness measurement, stand-off distances can still be considerably high. The specific requirement for precision in the L-Ray system will dictate whether the stand-off distance results in a slight gap of a few millimeters (or mils)(applicable to our most precise thickness measurement L-Ray systems) or a larger gap of up to 20 centimeters (up to 7.9 inches) for less demanding applications.

It's worth mentioning that our U-Ray technology is also compatible with the CURTAIN technology, adding another dimension to its capabilities. Additionally, we offer combinations such as M-Ray/L-Ray, M2-Ray/L-Ray or U-Ray/L-Ray, allowing for both thickness and basis-weight measurements within the same CURTAIN setup (see product list, page 18). Furthermore, the integration of both Marveloc and Edge-Vision-4.0 into a single CURTAIN installation is a feasible and synergistic option, effectively merging our measurement and machine-vision functions.

The adaptable nature of the CURTAIN platform extends to the integration of third-party sensor technologies, including moisture sensors and color sensors, thus broadening its potential applications.



Marveloc-CURTAIN C-frame Slim
Compact frame technology for space-constrained cases.



Marveloc-CURTAIN C-frame

CHARIOT



MECHANICAL
PLATFORM



Scan to watch
CHARIOT platform

The CHARIOT mechanical platform is perfectly suited for both new production lines or space-limited retrofits for true-thickness measurement. By moving a single measuring head across the entire product width instead of the complete frame, the CHARIOT is cost and space efficient.

Ideal for in-line thickness measurement

Our compact system efficiently measures thicknesses with high-precision mode (material thickness up to 25 mm)(up to 0.9 inch) or extended-range mode (material thickness above 25 mm)(above 0.9 inch).

The CHARIOT platform is equipped with our Marveloc sensor technology, more specifically with our C-Ray, L-Ray or M2-Ray sensors (M-Ray is not supported). The C-Ray based CHARIOT machine measures the thickness of thin materials such as plastic films whereas the L-Ray or M2-Ray machine version measures thicker insulation sheets, extruded sheets and foams. CHARIOT's minimal-effort sensor integration and the moving sensor unit within the fixed machine frame, prove extremely valuable for in-line thickness measurement that is cost and space efficient.

Single traveling sensor unit

A small footprint and high mechanical rigidity characterize the CHARIOT, regardless of the product width. This means that it can be flexibly integrated into any new or existing production line. The compact CHARIOT can accurately and affordably measure a multitude of materials: from thin films to thick multi-layered PVC LVT sheets, synthetic foams, and many more.

Sensor extensions

The flexibility, versatility and small footprint make the affordable CHARIOT a unique solution. Our system offers features that further optimize measurement performance. For instance, the system integrates a steel roller to ensure a more steady and flat passage of the material through the machine. The scanning sensor unit travels the entire width of the passing material. The spacious sensor unit allows for integrating different sensor types. One example is the optional Optics Extension for in-line color measurement.



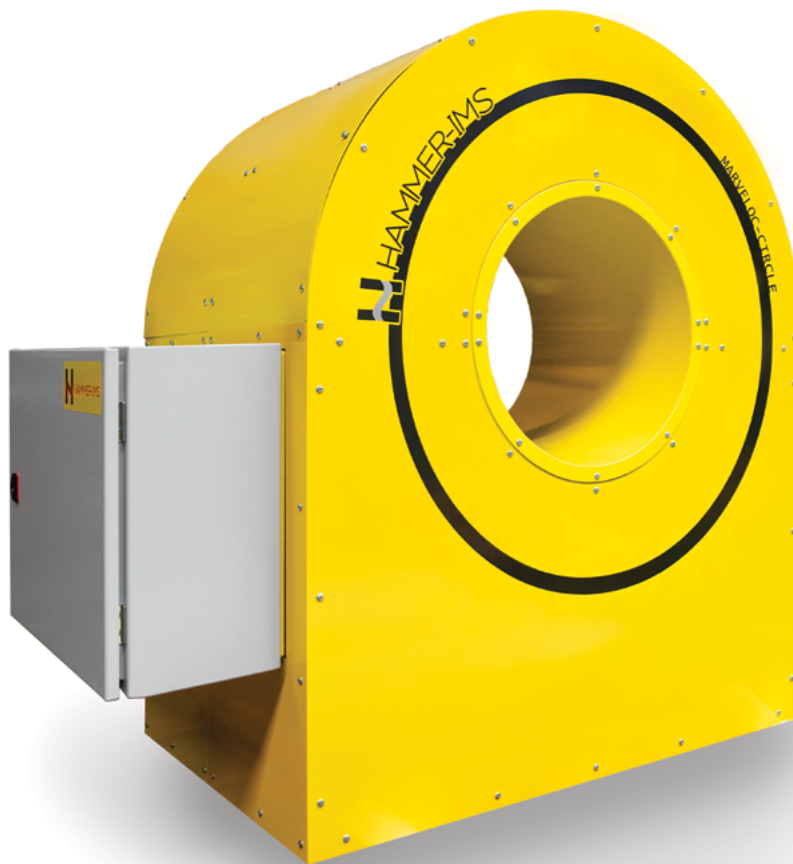
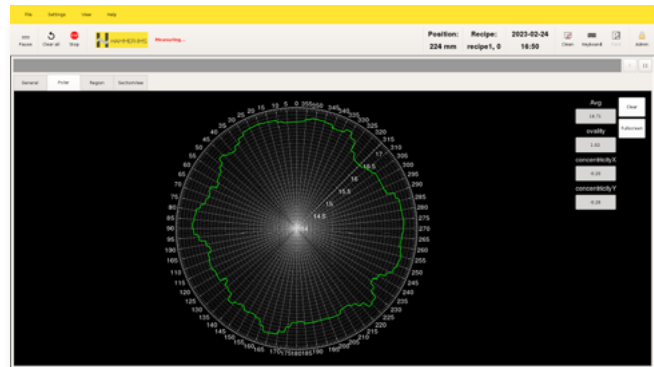


The CIRCLE mechanical platform is engineered specifically for 360-degree circular plots for pipe extrusion production lines.

Contactless, non-destructive 360-degree measurements

The CIRCLE is our unique platform that allows for 360 degree measurements. The platform enables non-destructive, no-contact measurements in piping production facilities. To achieve this, the CIRCLE platform has a rotating mechanism that runs along the entire circumference of the material that runs through the center.

The CIRCLE platform can be paired with M2-Rays that we are able to perform thickness, ovality and coaxiality measurements for multilayers and extruded pipes and profiles. Additionally, the CIRCLE can be paired with L-Ray technology to measure material diameter and circumference.



Connectivity 3.0 software



CONTROL
SOFTWARE

Connectivity 3.0 is the beating heart of any of our products. The software controls the interaction with both Edge-Vision-4.0 and Marveloc-based systems. Our software is easy and intuitive to use, contains various industry-specific visualizations, and comes pre-installed on a rugged industrial PC with a touch panel (or alternatively on a desktop PC) offering a widescreen experience. Connectivity 3.0 also supports closed-loop feedback control, which drives automatic production adjustment to maintain high production quality and minimize material scrap.

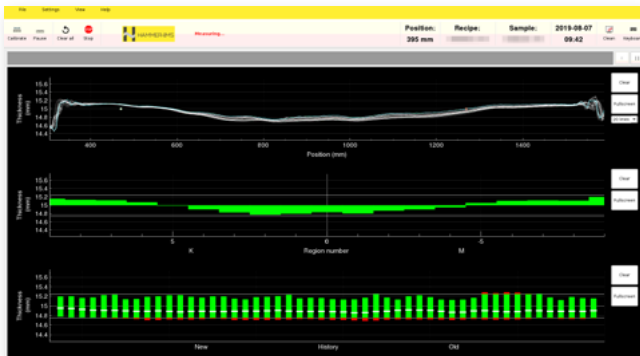
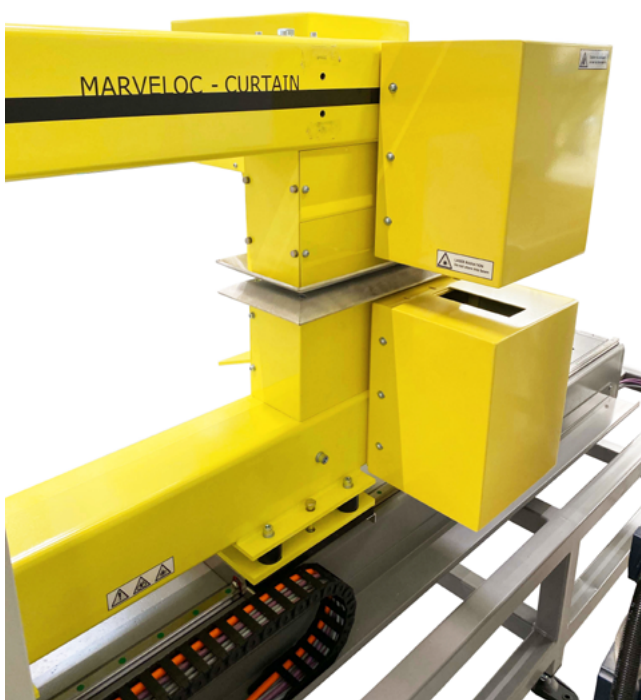


Image shows Connectivity 3.0 intuitive interface displaying different measurements in real time.

Sensor fusion: combining multiple sensor/vision technologies

Connectivity 3.0 software controls your specific Hammer-IMS solution, regardless of whether your system is equipped with our Edge-Vision-4.0 machine-vision technology, Marveloc-sensors, third party sensors or combinations thereof. A great example of our sensor fusion is the displayed Marveloc-CURTAIN system shown below, equipped with M-Ray for basis-weight measurement, microwave for moisture measurement (third-party sensor) and L-Ray for thickness measurement. Other sensor integration examples are:

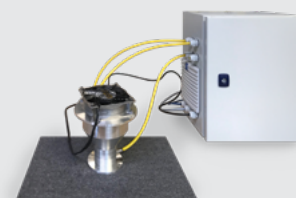
- ABB microwave moisture sensor
- Various Sick and KEYENCE sensors
- Premosys color sensors



Software integration with complementary (third-party) sensors

AEROBILITY air permeability sensor

The AEROBILITY sensor is available to help customers in the non-woven industry measure air permeability. This is typically of interest in the field of non-woven filtration media, such as HEPA filters or mouth masks. Contact Hammer-IMS for more information on this OEM sensor.



Other sensors and add-ons

In this brochure we show some of the available add-ons for your Hammer-IMS product. A more exhaustive list of sensor and software add-ons is available to fit your specific needs. Contact our sales team to discuss your case and customize your Connectivity 3.0 software package.



Scan to watch
Connectivity 3.0
software

Add-on: Runtime marker lines

This software add-on gives the possibility to insert marker lines in graphs at runtime. When adding a marker, a mirrored version can automatically be added symmetrically around the center of the production line, for symmetry reasons, if this is required. There is also the possibility to have markers being positioned at fixed, non movable positions.

Add-on: Closed-loop feedback control

Adjusting extrusion dies, coating calendering and coating knives in closed loop

Measuring is key for the control of consistent material thickness or basis weight (grammage). Ideally, a closed-loop feedback system provides the information to adjust the production process. As an option, Hammer-IMS can provide measurement data directly to automatic process controllers, or even implement the controller. Think about controlling the die in a plastic sheet extrusion line or controlling the calendering or coating knife stage for coated textiles. Such closed-loop feedback solutions respond quickly and operate automatically to systematically keep thickness or basis weight (grammage) within specifications.



Add-on: Industrial HMI unit

An industry-grade touch-screen HMI unit, which is connected to the main HMI unit by means of an Ethernet network is typically added to your Hammer-IMS system to be controlled through the Connectivity 3.0 software, regardless whether you are using a single or multi sensor setup.



Industrial HMI unit



Standard HMI unit

Add-on: Real-time industrial bus technology

We support real-time industrial bus technology to enable integrations based on Modbus TCP/IP, OPC UA, EtherNet/IP or PROFINET for links with existing industrial infrastructure. In this way, the data and statistic information provided by our measuring systems can be used in real-time by existing equipment to optimize the production process.

Additionally, you can request your API with Modbus TCP/IP, OPC UA, EtherNet/IP or PROFINET to even control your system remotely.

Add-on: Line speed/position integration

Additional functionality for your Connectivity 3.0 software package can be added to be able to read line position or line speed of your production. A speed measuring wheel hardware add-on may be required.



Add-on: Stack light logic

The functionality and programming behind the way colors are used in a stack light is always customer specific. Hammer-IMS offers seamless integration between software and hardware to control stack lights according to your needs.

Add-on: Data logging and analytics (offline quality logging)

The quality department can obtain measurement data from our systems. Our rugged industrial computer platform has IO ports which can be configured for easy backup of your measurement data. This is practical for quality engineers to analyze measurement data in Microsoft Excel and other software, and draw conclusions about measurement data trends related to production quality and performance. Integrations with commercial database systems such as Microsoft SQL Server or data transfer over FTP or SFTP can also be enabled to customers and eliminate manual USB data transfers.

Data monitoring and analysis on plant level allows product quality to be safeguarded more effectively and efficiently. Furthermore, this cloud-based approach enables us to flexibly intervene from a distance. Remote diagnostics, predictive maintenance and firmware upgrades minimize response times, machine downtime and service costs.



Add-on: Batch job functionality

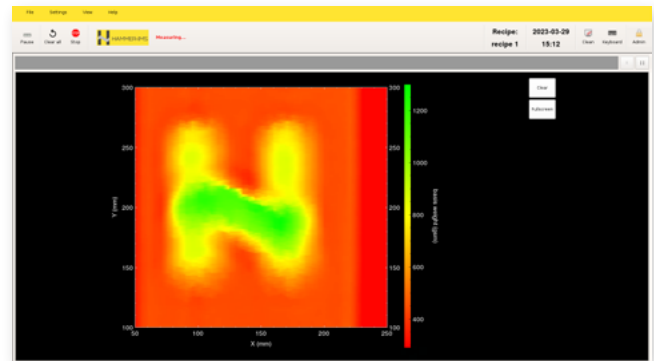
You can add the possibility to label production batches by entering a specific batch name, and even combine it with automatic screenshot integration to keep track of relevant metrics.

Add-on: time/zone conversion

Hammer-IMS sensor technologies and Connectivity 3.0 software are able to be adapted to different languages and measure values according to specific regions, such as imperial measurement units.

Add-on: Heat map

Plotting the measured data of either thickness, basis-weight (grammage) or density on a 2D color map makes your Hammer-IMS solution capable of visualizing even the most subtle differences in material properties.



Add-on: Single-click recipe selection

Using our solutions is simple, clear and intuitive. We offer a single-click configuration of our Connectivity software according to the recipe that is currently being processed/produced by your production machines. This straightforward approach avoids wasting valuable time by eliminating the repetitive task of manually entering entire production configurations for similar measurement jobs. It also prevents that human mistakes or improper configurations could inadvertently result in quality issues of your products. We are happy to assist you in converting existing recipe data file formats (xlsx, csv, etc.) and upload it to your Hammer-IMS product to enable quick startup.

Recipe name	Nominal basis-weight (gsm)	Sample name	Material width (mm)	Gain	Offset (gsm)	Display deviation (%)	Locked
1 RECIPE 1	200	SAMPLE 3	2000	1	0	10	NO
2 RECIPE 2	300	SAMPLE 1	2000	1	0	10	YES
3 RECIPE 3	400	SAMPLE 1	2700	1	0	10	NO
4 RECIPE 4	500	SAMPLE 2	2800	1	0	10	YES
5 RECIPE 5	600	SAMPLE 2	2900	1	0	10	NO
6 RECIPE 6	700	SAMPLE 2	3000	1	0	10	YES

Hardware add-ons for our scanner products

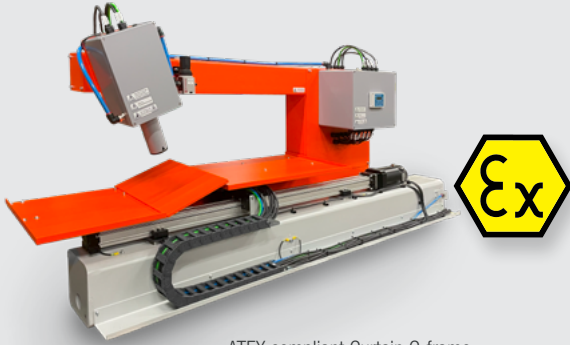
Add-on: ATEX

Designed for use in potentially explosive environments (ATEX)

As an option, Hammer-IMS offers measuring solutions ready for use in potentially explosive (EX) environments (ATEX directive). When designing measuring quality control systems for this purpose, our engineers take into account the following range of aspects:

- Using anti-static materials at friction-critical machine parts
- Applying qualitative grounding wiring to all machine parts
- Carefully checking temperatures of critical machine parts
- Introducing overpressure security mechanisms

Our M-Ray technology's wireless output power is perfectly compatible with EX-environments.



ATEX compliant Curtain C-frame

Add-on: Transportability

Flexibly moving the system across R&D and production

In most cases, the measuring systems of Hammer-IMS serve a specific purpose at a fixed location. However, as an option, the machine can be adapted so that it can be readily moved using support structures underneath. This way our measuring systems can be used for R&D tasks or offline material validation work.



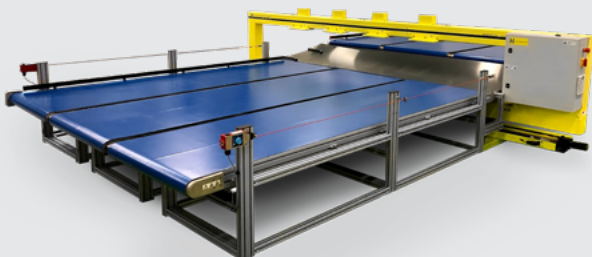
Marveloc-Curtain C-frame Slim

A transportable measuring system can deliver more value in inline settings since it can be applied to multiple production lines.

Add-on: Feeder/conveyor

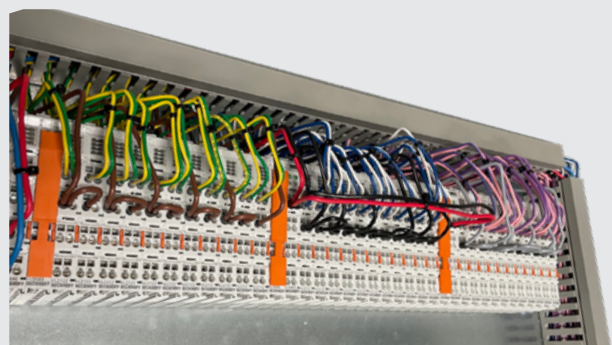
Supporting R&D and offline material validation

An optional feeder unit can be delivered with any of our CURTAIN or CHARIOT systems. Typically, a feeder transports sample materials through the measuring machine for R&D purposes or offline material validation. The feeders allow material samples to be fully covered and analyzed in great detail to maintain high product quality. The compact and lightweight feeder units can be operated through the Hammer-IMS Connectivity software that controls the measuring system at the same time.



Add-on: Die Automation System

We are able to use measurement data to directly control the thermo bolts of an extrusion die. Such a closed-loop feedback solution responds quickly and operates automatically to continuously keep thickness within specifications. At Hammer-IMS we provide both the hardware and the software required for this. By offering the combination of both the measuring system and the control system, Hammer-IMS is able to deliver a refined and integrated system.



OEM products



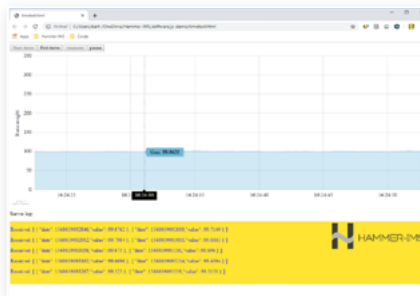
Scan to watch
our CHARIOT model

M-Ray OEM module

Hammer-IMS also offers a standard OEM module to machine builders and sensor integrators. The M-Ray OEM product is perfectly suited for such parties, as it is easy to integrate by themselves. Furthermore, the standard OEM module is for everyone: scientific researchers or enthusiasts who are passionate about non-nuclear measuring innovations. The module is sold 'as is' and can be accessed through our API software. The API also supports multi-sensor use of the OEM module, so you can use several OEM-modules in a single application. The OEM module comes with the embedded software and API description including demo material source code to execute your integration project at any preferred pace. Hammer-IMS can provide some assistance related to wireless regulatory and application development, where needed. In principle, this approach enables you to make your own flavor of a Marveloc-CURTAIN scanner system.



M-Ray OEM module.



M-Ray OEM module web interface.



An integration based on our M-Ray OEM module.

Custom M-Ray measurement module

Our Hammer-IMS engineers can develop and deliver custom M-Ray measurement modules and provide integration services. These custom measurement modules enable machine builders or sensor integrators to make their own integrations with thickness or basis-weight measurement capabilities delivered by Hammer-IMS. You typically select this approach when you have stringent geometrical constraints or particular non-standard integration needs. As an example, the picture below shows such an integration.



Custom M-Ray measurement module
developed for a machine builder.

OEM measuring machines

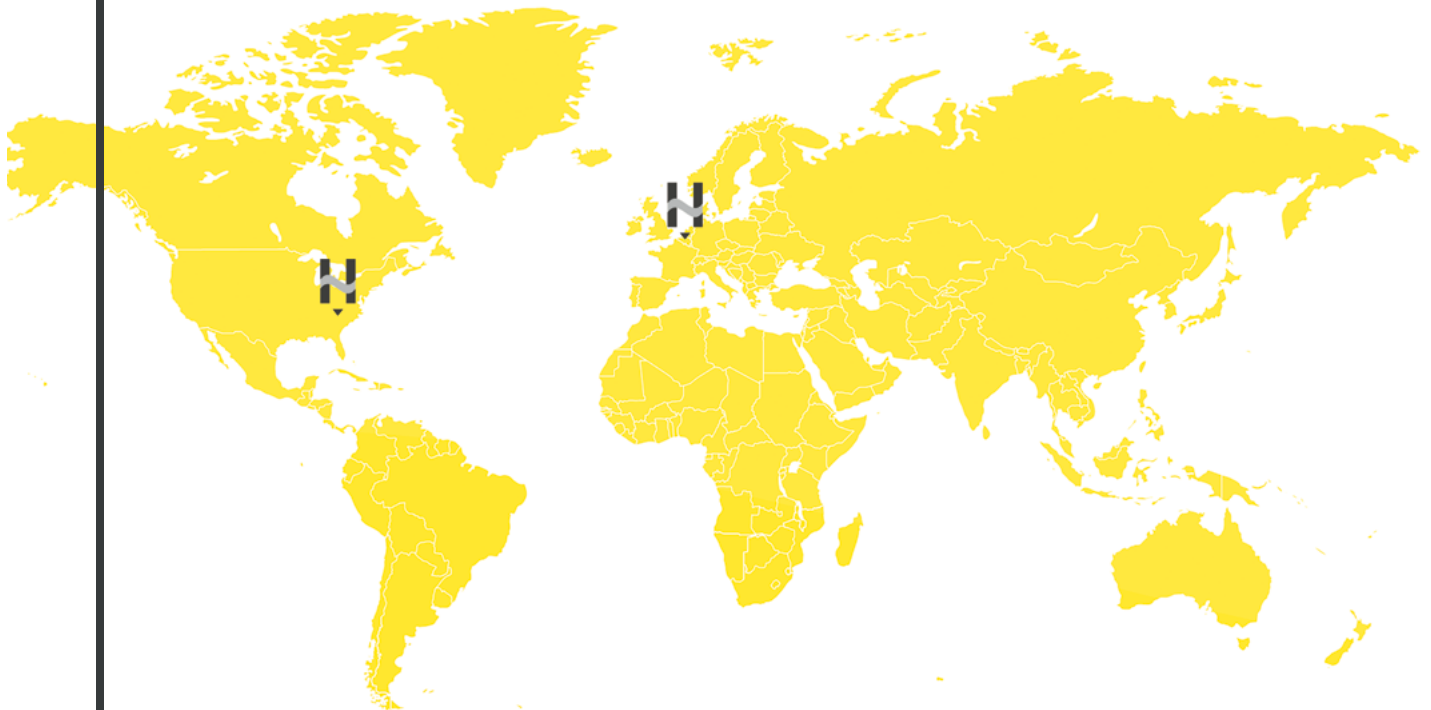
Apart from custom OEM-modules and our M-Ray OEM Module, we offer our thickness and basis-weight quality control systems of the type Marveloc-CURTAIN and Marveloc-CHARIOT to builders of production lines in the fields of technical textiles, non-wovens and plastics extrusion. As an OEM-provider we are open to discuss the level of integration between our quality control systems and your production line technology. For example, when feedback is requested: would you like us to provide the motor drivers for the blade control or the power electronics to heat the thermobolts? Furthermore, to what level of extent emergency stop integration should be performed for your case? Do you require a panel PC or only a bus interface, such as PROFINET?

Product list

The table below provides a useful overview of the Hammer-IMS products. Use the names of your products of choice when contacting us to discuss your specific process and quality control application. Add-ons and third-party sensor integrations are not listed here. Get in touch with our sales representatives to consult our extensive add-ons brochure.

Product name	Product group	Product description	Combinations
Marveloc-CURTAIN-O featuring M-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials. Closed frame.	
Marveloc-CURTAIN-O featuring M-Rays	Industrial basis-weight quality control systems	Machine for basis-weight measurement of flat materials. Closed frame.	+ L-Ray for thickness measurements.
Marveloc-CURTAIN-C featuring M-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials. Open frame.	
Marveloc-CURTAIN-C featuring M-Rays	Industrial basis-weight quality control systems	Machine for basis-weight measurement of flat materials. Open frame.	+ L-Ray for thickness measurements.
Marveloc-CURTAIN-C Slim featuring M-Rays	Industrial basis-weight quality control systems	Compact machine for basis-weight measurement of flat materials. Open frame.	
Marveloc-CURTAIN-C Slim featuring M-Rays	Industrial thickness quality control systems	Compact machine for thickness measurement of flat materials. Open frame.	
Marveloc-CURTAIN-O featuring U-Rays	Industrial basis-weight quality control systems	Machine for basis-weight measurement of flat materials. Closed frame.	+ L-Ray for thickness measurements.
Marveloc-CURTAIN-C featuring U-Rays	Industrial basis-weight quality control systems	Machine for basis-weight measurement of flat materials. Open frame.	+ L-Ray for thickness measurements.
Marveloc-CURTAIN-C Slim featuring U-Rays	Industrial basis-weight quality control systems	Compact machine for basis-weight measurement of flat materials. Open frame.	+ L-Ray for thickness measurements.
Marveloc-CURTAIN-O featuring L-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials. Closed frame.	
Marveloc-CURTAIN-C featuring L-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials. Open frame.	
Marveloc-CURTAIN-C Slim featuring L-Rays	Industrial thickness quality control systems	Compact machine for thickness measurement of flat materials. Open frame.	
Edge-Vision-4.0-CURTAIN-O	Machine-vision systems	Machine-vision solution for detection and classification of anomalies or continuous monitoring. Closed frame.	
Edge-Vision-4.0-CURTAIN-C	Machine-vision systems	Machine-vision solution for detection and classification of anomalies or continuous monitoring. Open frame.	
M-Ray OEM Module featuring M-Rays	Basis-weight sensors	For OEM projects on basis-weight measuring by machine builders and sensor integrators.	
M-Ray OEM Module featuring M-Rays	Thickness sensors	For OEM projects on thickness measuring by machine builders and sensor integrators.	
Marveloc-CHARIOT-Capacitive featuring C-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials.	
Marveloc-CHARIOT-Laser featuring L-Rays	Industrial thickness quality control systems	Machine for thickness measurement of flat materials.	
Connectivity 3.0	Control software	Industrial software to connect to PLCs and various information sources.	
Lab devices featuring Miscellaneous technologies	Lab systems	Lab devices, custom or off-the-shelf.	
Marveloc-CIRCLE featuring Next-generation M2-Rays	Industrial material quality control systems	Thickness measurement and quality control for non-corrugated synthetic pipes.	
Marveloc-CIRCLE featuring L-Rays	Industrial thickness quality control systems	Dimensional measurement and quality control for non-corrugated synthetic pipes and profiles.	

A global partner for your industry. Hammer-IMS establishes presence in America.

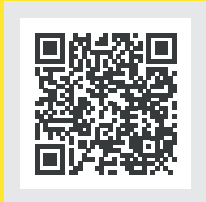


Hammer-IMS has become a supplier of contactless measurement systems used in production lines across international borders. As of Q3 2023, Hammer-IMS has made a strategic move to establish operations in Spartanburg County, South Carolina. This enables our customers and partners to have a supplier that is always within reach. Furthermore, this strategic expansion will allow Hammer-IMS to reach new markets.

As we embark on this strategic phase, our focus remains on pushing the boundaries of sustainable sensors for measurement and machine-vision technology. Our Spartanburg operations serve as a step for innovation, propelling industries toward enhanced efficiency, minimized waste, and unparalleled product quality.

Serving across markets

Contact us to discuss your specific application

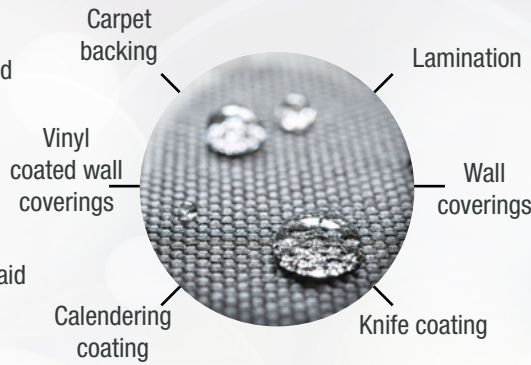


Curious to see Hammer-IMS products in action?

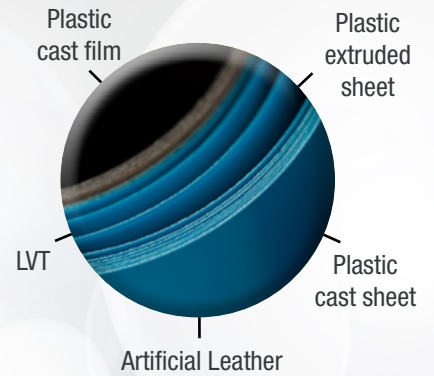
Non-wovens



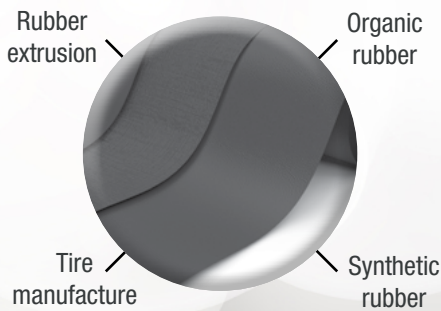
Textiles



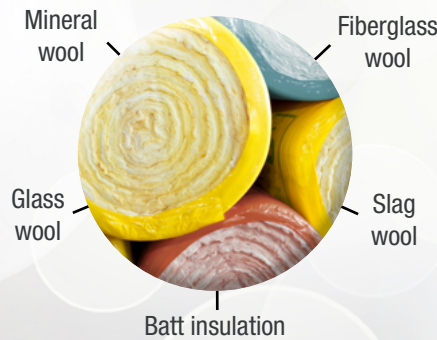
Plastics



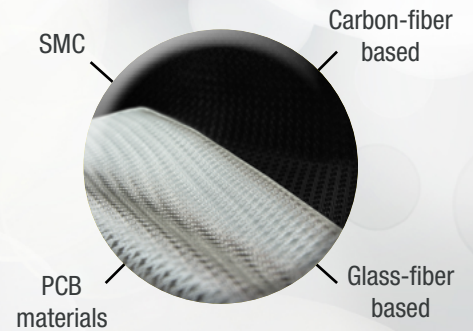
Rubber



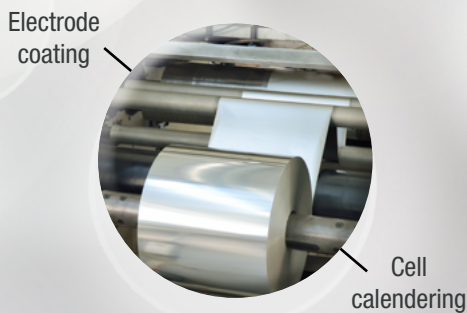
Insulation wool



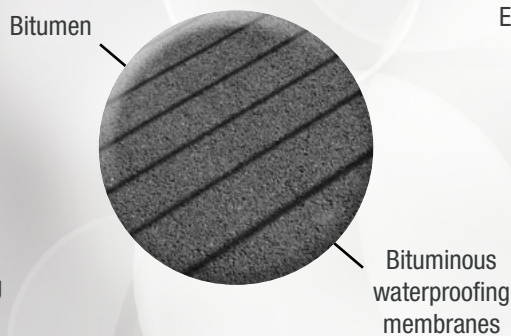
Composites



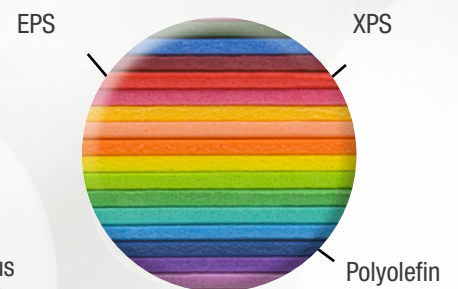
Battery film & steel sheet



Bitumen



Synthetic foam



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The data as listed in this brochure is non-binding. Contact us to obtain a dedicated technical datasheet, a feasibility analysis for your industrial case, or to get in touch with our preferred integrators and resellers.

Our general terms and conditions apply.

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