LM Dental Tracking System™

LM

feel the
difference

RFID INTELLIGENCE IN DENTAL CLINICS

TURNING DATA INTO EFFICIENCY, SAFETY AND SAVINGS

INTELLIGENCE IN THE DENTAL CLINIC

What if you could know the exact location and status of every dental instrument and material in your clinic?

LM has long been the pioneer in dental instrumentation and works actively together with dental clinics to ensure its product development remains at cutting edge. This co-operation reveiled a need for new intelligence to improve material and instrument flows and patient safety in the dental clinic, and started the development of a unique tracking system: LM Dental Tracking System™ (LM DTS™).

LM DTS™ is developed to tackle the everyday challenges related to material handling and traceability with increasing requirements for patient safety and infection control documentation emphasized.

LM DTS™ is the first commercially available system in dental industry to efficiently track and monitor dental instruments and materials from all different manufacturers using an advanced RFID technology. The system gives the visibility of instruments and materials from storage and maintenance to patient care.

The unique LM Dental Tracking System™ is created by combining scanning readers, proprietary server software and dental instruments and materials with built-in or retrotagged RFID chips. Automating traceability, logistics and infection control documentation allows staff to work more efficiently and focus on the patient.

In addition to enabling continuous improvements in daily operational level the scanned and documented data opens opportunities and benefits on long-term planning for cost efficiency and increased patient safety.

ⓘ Internet of Things goes dental

Internet of Things (IoT) is a giant network of connected things which are provided with unique identifiers and the ability to transfer data over a network. A thing can be a person with a heart monitor implant, a coffee machine or now a dental instrument or material with a RFID chip.

LM Dental Tracking System™ brings IoT into dentistry and enables the gathering and analyzing of Big Data from dental clinics for constant improvement of processes, work flows and cost efficiency.

An advanced RFID technology

Radio Frequency Identification (RFID) technology is widely used by major industries, for example air traffic for baggage tracking, sports for time/distance tracking and manufacturing and retail for shipments, inventory and preventing thefts.

LM Dental Tracking System™ uses UHF (Ultra High Frequency) RFID technology to efficiently track, monitor and control instruments and materials. An advanced RFID chip can be integrated in LM-ErgoSense hand instruments, extraction instruments and LM-Servo E series cassettes. The RFID chip can also be tagged to any material from different manufacturers enabling complete traceability of the materials by scanning them with the LM DTS™ Readers. Instruments, handpieces, filling materials, implants etc. are wirelessly read in just a few seconds.

What is RFID?

An RFID (Radio Frequency Identification) system consists of three components: a scanning antenna and transceiver (often combined into one reader, also known as an interrogator) and a transponder, the RFID tag. An RFID tag consists of a microchip, memory and antenna. The microship contains electronically-stored information which is activated with a reader.

Unlike a barcode, the tag does not need to be within the line of sight of the reader, so it may be embedded in the tracked object. WIth RFID many items can also be identified simultaneusly and from distance.
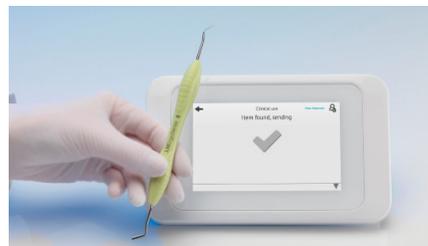
HOW TO BENEFIT FROM LM DTS™?

Are you doing fact based decisions on budgeting and purchasing? Are your processes and material flows optimized?

ASSET MANAGEMENT & CLINIC MANAGEMENT

Having the right instruments and materials in the right place at the right time is crucial at large hospitals as well as small clinics. Process optimization by having knowledge of the exact location and status of each instrument, handpiece and material allows for efficient daily clinic management and long term budgeting. Locating misplaced instruments or balancing uneven inventory levels between rooms or departments is easy with the cloud based LM DTS™. Personal accountability through RFID identification of instrumentation decreases loss of assets.

COST REDUCTION & PROCESS OPTIMIZATION

Costs related to logistics and material handling account for approx. 30% of the total operating expenses of health care providers. LM DTS™ provides the possibility to track and improve the flows of both single use materials and instrumentation throughout the clinic as well as the decontamination and sterilization room or Central Sterile Services Department (CSSD). Key performance indicators are defined e.g. based on the existing quality system or standard operating procedures. The big amount of data, that is made available by LM DTS™, makes it possible to allocate costs based on use, benchmark best practices, analyze and optimize process workflows and systematically strive for continuous improvement.

How are you improving the threshold for patient safety? Are you able to focus on the patient?

PATIENT SAFETY & INFECTION CONTROL DOCUMENTATION

LM DTS™ server knows the status of each article and allows the clinician to automatically check that expiry dates have not lapsed and that instruments have passed the proper reprocessing steps, inspections and validations. The database includes the records for the specified disinfection, maintenance and sterilization procedures and includes the detailed history of every instrument and material. Reducing risks through automatic checks and alerts adds an additional layer of safety without cumbersome manual work.

Are you able to document the instruments use of your students and validate the competences?

EDUCATION SUPPORT

Technology offers new possibilities to support learning and to validate competences in dental education. LM DTS™ can for example be setup to document the instruments and materials used in preclinical exercises for each student. Misunderstandings, for example regarding which instruments or materials to use in a certain phase of a restorative procedure, can be identified and rectified without delay. Documented proof of competence or learning of e.g. a specific procedure can be validated and documented. In the preclinical laboratory, reprocessing steps can be simulated or validated depending on the setup and equipment.

PATIENT SAFETY

COST REDUCTION

EDUCATION SUPPORT

ASSET MANAGEMENT

Knowing is efficiency, safety and savings

Automating traceability, logistics and infection control documentation allows staff to avoid time consuming manual controls and work more efficiently and focus on the patient. The different user groups, for example clinicians, students, clinic managers, operation managers and purchasers can all benefit from the data collected and analyzed by LM Dental Tracking System™.

CLINICIANS   Is the focus on the patients?

✓ Right instruments in the right place in the right time
Sterilized instruments
Safe materials
Focus on the patient session planning

HEADS OF CLINIC OPERATIONS   Are the decisions based on facts?

✓ Right resources in the right place in the right time
Efficient daily clinic management and long-term planning
Improved time management
Automated documentation
Use-based cost allocation

HEADS OF MAINTENANCE FUNCTIONS   Are the processes and material flows optimized?

✓ Material traceability
Avoiding time consuming maintenance controls
Improved material flows and decreased losses
Optimized instrument inventory and stock

PURCHASERS   Are the budgeting and purchasing made based on facts?

✓ Statistical reports to help the budgeting decisions
Avoiding hidden costs
Optimized purchasing process
Decrease stock

HOW MUCH WOULD YOU PROFIT?

CALCULATE at
www.dentaltracking.com
/benefits

University of Copenhagen: From intuition to fact based analysis and improvements

The School of Oral Health Care at the University of Copenhagen (UCPH) has used LM DTS™ together with the RFID tagged LM-ErgoSense instruments for a couple of years already. The system has helped the clinic to make continuous improvements in the daily operations and long-term planning for increased patient safety. With the system school's staff has greater control over the infection control status and stock levels of all instruments. "The LM DTS™ ensures that we always have full control over the hygiene status of our instruments. We can also precisely document which of them students have been using and on which patients, as well as when they have been sterilized", says Bo Danielsen, Head of the School of Oral Health Care at the UCPH at GS1 Healthcare Reference Book.

Text: Based on the article published by GS1 AISBL in the GS1 Healthcare Reference Book 2017/2018: ©GS1 AISBL.
Background image: Photo stock

In autumn 2010 Bo Danielsen, Head of the School of Oral Health at the UCPH was reviewing the school's budget for the following year and felt a bit uneasy. Danielssen wanted his staff to spend their time teaching students - on value-added activities rather than spending time in the sterilisation room and creating inventory reports and budget estimates.

The school didn't know exactly how much budget was needed for new hand instruments. In past years need was based on intuition. "I felt we needed information about the utilisation of instruments and their turnover to make fact-based decisions," explains Danielsen.

Danielsen also realised that misplaced instruments represented a wasteful, hidden cost. The staff and students had to go from one operating room to another to get an instrument while those were not in the right place, at the right time. In summary, the cost per patient and per student were inflated due to time wasted and inefficient processes.

"We didn't know exactly how big the impact of these inefficiences had on costs and how much we could benefit by optimizing the processes", says Danielsen. Year 2018 decision to take action was made.

From vision to reality

By collaborating LM-Dental Danielsen's vision was to come to reality. They equipped their instruments with tiny, autoclavable RFID tags and placed wireless LM DTS™ RFID readers at the point of delivery and additional readears for example in reprocessing and in storage rooms.

Today, thousands of instrument-specific events are logged each month. When

Danielssen now sits on computer, he logs into the cloud-based server that receives all the information from the readers scanning and collecting information across the clinic. "On my screen, I can see where each instrument is located and whether it is ready for clinical use. The complete history of the specific instrument is documented," says Danielsen.

Anyone from Danielsen's team can view data from the perspective of his/her role. For example when budgeting you are getting related statistical reports and person responsible for logistics can run inventory reports and monitor daily stock levels.

Another benefit is that teachers can ensure that students return all instruments given to them. Also the use of instruments by student in a clinical simulation can be tracked for timely feedback.

Infection control and patient safety are top priorities in Denmark. With the traceability system, a layer of automatic safety checks to avoid human error is added without any administrative burden on the maintenance and clinical staff.

"With the new traceability system, we have the needed data to improve our daily operations, support education, improve long-term planning and budgeting, and obtain big data that can be used for analysis and research purposes," concludes Danielsen.

Scan the QR code to read the full GS1 article.

"With the new traceability system, we have the needed data to improve our daily operations, support education, improve long term planning and budgeting, and obtain big data that can be used for analysis and research purposes."

Bo Danielsen,
Head of the School of Oral Health Care, University of Copenhagen

100 hours

SAVED PER YEAR for the sterilization of 250 000 instruments yearly by reducing the time needed for manual checking of instruments.
This is equivalent of

3
SAVED PERSON-WEEKS.

Several hours

SAVED PER WEEK by each staff member for there's no more misplaced instruments.

10%
REDUCTION OF INVENTORY COSTS with just-in-time processes for instrument maintenance.

About the School of Oral Health Care at the University of Copenhagen

The School of Oral Health Care at the University of Copenhagen (UCPH) is the largest school in Denmark, educating dental chairside assistants and dental hygienists. The school is co-located with the dental school in the Panum Institute, housing Denmark's largest clinic with 230 dental units. More than 400 people related to School of Oral Health Care attend the Panum Institute daily. Furthermore, between 100 and 300 patients are treated in the clinics every day. The School of Oral Health Care closely collaborates with other similar institutions in Denmark, as well as abroad.

https://skt.ku.dk

LM Dental Tracking System™

LM products with integrated RFID chip and other materials with RFID identification tags together with scanning readers and server software create a unique dental tracking system. The cutting edge system gives the visibility of hand instruments and materials from storage and maintenance to clinic and patient care. The scanned and documented information can be turned into efficiency, safety and savings.

RFID identification tags

The LM-ErgoSense hand instruments and other dental materials with identification tags can be scanned with LM DTS™ readers for realiable tracking through their entire life cycle - from storage and maintenance to clinical and patient care.

LM DTS™ readers

LM DTS™ Readers (either multi-read or single-read) can be placed in any environment. They notify users of errors, such as the use of unsterilized instruments or expired material.

LM DTS™ server software

LM DTS™ server is used to record, track and verify the cycles of activities done to tagged materials.

Analysis: The software provides easy analytical reports about the items and activity cycles registered in the system.

Action: The information in the reports can improve and ease asset management and documentation, and most importantly increase cost efficiency and patient safety.

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For more information about LM Dental Tracking System™ visit www.dentaltracking.com and scan the QR code for the video introduction

LM DTS™ readers for reliable tracking

LM Dental Tracking System™ RFID scanning readers give the visibility of instruments and materials from storage and maintenance through to clinic and patient care. When an instruments RFID tag is read, its status is automatically checked and user is alerted for errors, such as a use of unsterilized instruments or expired materials. With the system, a layer of automatic safety checks is added without any administrative burden on the maintenance or clinical staff.

The readers are available in two different models: Tray Reader with multi-read functionality and Unit Reader for single-read options. Both readers communicate over Ethernet or WiFi to LM DTS™ Server through encrypted HTTPS creating the system environment, as a cloud service or local server.

LM DTS™ Tray Reader

LM DTS™ Tray Reader is a cutting edge multi-read UHF (Ultra High Frequency) RFID read point solution that offers ease in deployment due to its small size. With the antenna, cables and reader enclosed in a single table top tray it can be placed in any environment with minimal effect on the surroundings.

The Tray Reader can be configured to be able to support single or multiple activities depending on the requirements and can be placed anywhere with minimal footprint. Instruments, handpieces, filling materials, implants etc from different manufacturers are wirelessly read in few seconds.

LM DTS™ Unit Reader

LM DTS™ Unit Reader is a cutting edge single UHF RFID read point solution that can be mounted anywhere in the clinical area due to its small size.

LM DTS™ RFID scanning cabinet

Newest innovation, LM DTS™ cabinet can be used for storing and scanning dental materials. Material packages are read and monitored when placing or withdrawings using UHF RFID technology like the other LM DTS™ scanning readers.

By placing RFID stickers on implant, filling material or other packages enables LM DTS™ to keep track of the inventory levels inside the cabinet, document usage by department or staffmember, and store serial or LOT numbers for reliable traceability.

Personal login with ID card

Easy to use user interface

Reliable RFID scanning
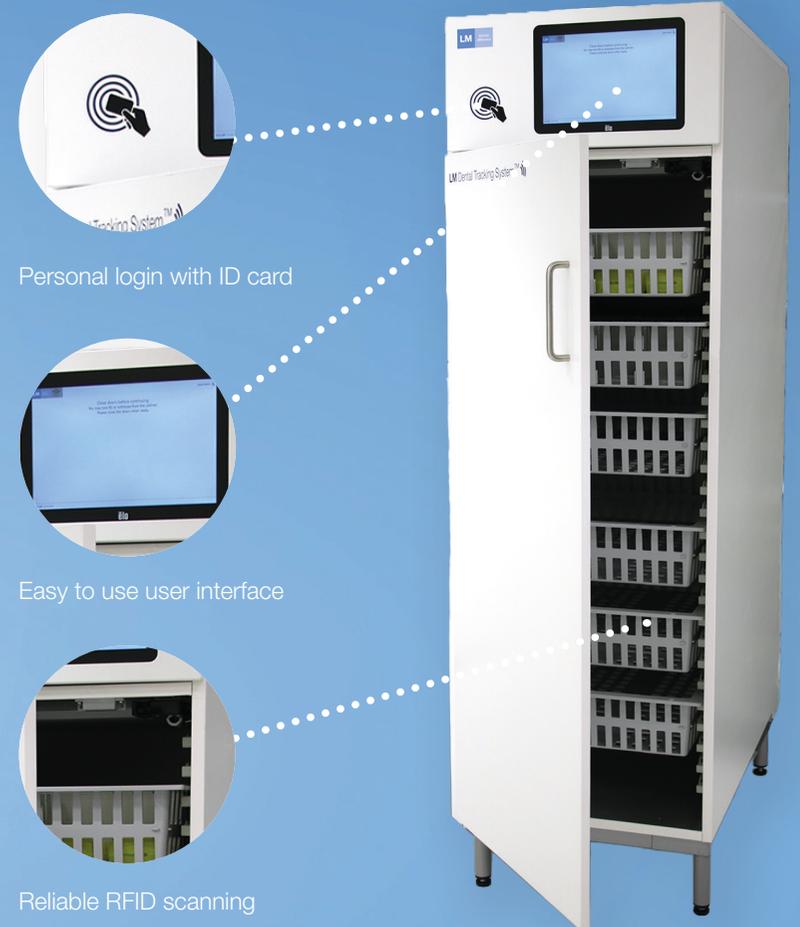
LM DTS™ server software: Easy reports and statistics to support fact based decisions

LM Dental Tracking System™ cloud server is a comprehensive database managing the material flows and activies for all items identified with RFID tag within dental clinics, CSSD's and laboratories. It's used to record, track and verify the activity cycles from storage to maintenance through clinic and patient care.

The software provides easy analytical reports about the items and activity cycles registered in the system. The information in the reports can improve and ease asset management and documentation, and most importantly increase cost efficiency and patient safety.

By logging in to the system, you can easily browse reports and view statistics to e.g.:

- Check the location and status of every instrument including its infection control history
- See the stock levels at different departments, dispensaries and rooms for anything from handpieces to gloves
- Check for expiring materials
- Infection control documentation for each instrument
- Benchmark the consumption of materials and logistic rotation of instruments
- Analyze processes and optimize for efficiency
- Locate missing items and control loss of assets
- Allocate cost by patient, clinician, room or department for accurate accounting and budgeting
- Review student work, verify competence and to provide timely guidance and feedback
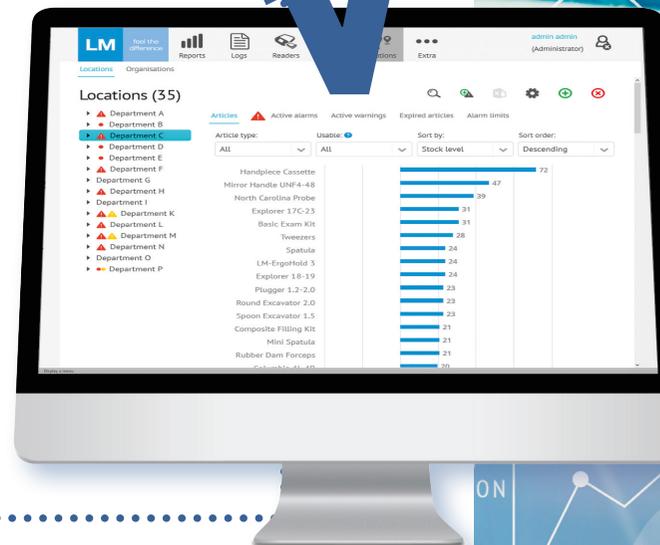
Customer specific **LM** DTS™ system solutions

The determination of the customer specific LM Dental Tracking System™ solution starts with core need identification: What is the current situation and what are the problem(s) and target(s) at the clinic? Based on this core need identification can the solution planning process start with three basic steps:

STEP 1. Find out how assets flow at the clinic

STEP 2. Identify critical steps of the flow

STEP 3. Decide what to track

The solution is combination of LM DTS™ software license and LM DTS™ readers. The cost for the system consists of setup fee, monthly fee for number of LM DTS™ readers online and for hardware cost (number of LM DTS™ Tray or Unit Readers).

LM DTS™ License

System setup fee

Monthly fee for readers online

Hardware cost
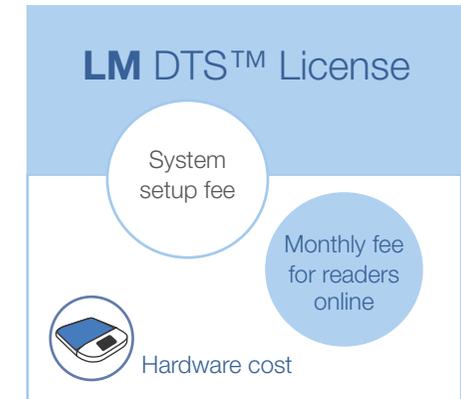
EXAMPLE for LM DTS™ CSSD License setup planned for Asset Management, Clinic Logistics Management or Infection control.
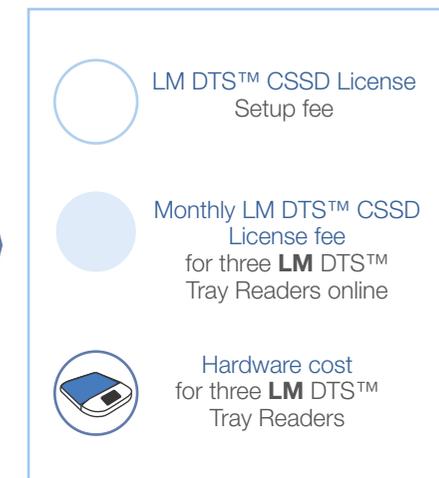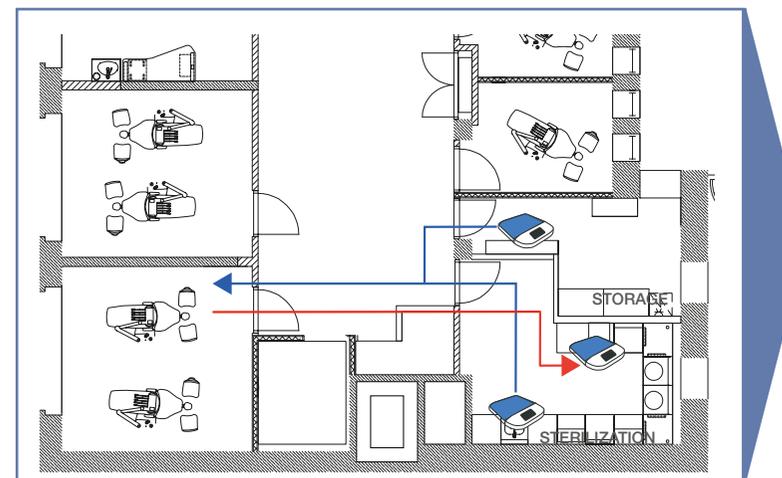
STORAGE

STERILIZATION

LM DTS™ CSSD License
Setup fee

Monthly LM DTS™ CSSD License fee
for three **LM** DTS™ Tray Readers online

Hardware cost
for three **LM** DTS™ Tray Readers

LM PRODUCTS WITH INTELLIGENCE INSIDE

LM-ErgoSense: Unique combination of ergonomics and new technology

Focus on ergonomics without losing sight of efficiency and technical development. The LM-ErgoSense hand instrument meets these targets and is truly a unique combination of ergonomic design and advanced technology. In designing LM-ErgoSense instrument LM developed an intelligent instrument offering unique opportunities to improve material handling and patient safety in the clinic as a part of LM Dental Tracking System™. All the LM-ErgoSense instruments are available with integrated RFID chip enabling a complete and reliable traceability by LM DTS™ scanning readers.

For more information about LM-ErgoSense instrument range visit www.lm-dental.com.

LM extraction instruments

All the LM extraction instruments - LM-LiftOut, LM-SlimLift, LM-TwistOut and LM-RootOut - are also available with integrated RFID chip for reliable tracking with LM DTS™ scanning readers.

For more information about LM extraction instruments visit www.lm-dental.com.

Scan the QR
for LM-ErgoSense
video introduction
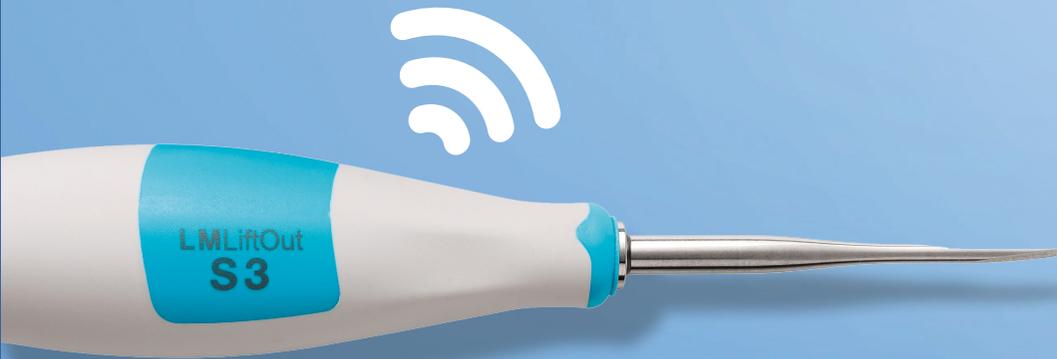
" All of our instruments have been tagged, which means we can keep track of them at all times – from their dispensation to utilisation, processing, sterilisation, and return to storage.
We can define which instruments different students are allowed to use. We can even follow when and for how long students work on different patients.
Through analysing statistics on their flow, we can implement a standard procedure for periodic control of instruments, e.g. sharpening of scalers."

Bo Danielsen,
Head of the School of Oral Health Care,
University of Copenhagen

LM-Servo E: Evolution series of hand instrument cassettes with RFID option

LM-Servo E cassette series provides a great combination of safety, hygiene and new technology. Easy to use, funtional design with safety shields prevents sharp prick injuries and protects the instrument tips.

The option to have LM-Servo E cassettes with built-in LM DTS™ RFID tagging makes E cassettes excellent tool for improving traceability by enabling easy handling and tracking of instruments as sets. In Servo E cassettes the instrument handles are clearly visible providing RFID tag readibility and identification of individual instruments, though the tips are securely covered with safety shields.

Cassettes are available for 5 and 8 instruments in four shield colors (blue, green, grey and yellow).

For more information about LM-Servo E cassette series visit www.lm-dental.com.

Compatibility across manufacturers

Anything at a dental clinic can be connected to LM Dental Tracking System™ with complete RFID tagging solutions. In addition to LM products with integrated RFID technology an advanced RFID chip can be tagged into materials from different manufacturers integrating all dental materials for tracking with LM DTS™ scanning readers.

LM DTS™ RFID tags: For knowing the status of all instruments and materials

Anything at a dental clinic can be connected to LM Dental Tracking System™. The LM DTS™ offers compatibility with instruments, handpieces and materials from different manufacturers. Any product with an RFID tag using UHF and EPC gen2v2 / RAIN is compatible with the system.

Frequency

LM DTS™ RFID tags are available for two different UHF frequency bands:

- 865.6-867.6MHz i.e. ETSI used in e.g. EU-countries and some countries in Europe, Asia, Africa and Oceania
- 902-928MHz i.e. FCC used in e.g. North America, Australia and some countries in South America, Asia, Africa, Oceania and Europe *)

*) The appropriate frequency band allocation need to be checked with local authorities and regulations.

RFID tagging principles

All the instruments in general are preferably RFID tagged using LM DTS™ RFID Flat or Round Surface Tags. If that is not possible, there's also other options available. Please see the table below for general tagging solutions and principles. For more information and guidance, please see more information at www.dentaltracking.com, or contact your LM representative for technical help.

WHAT ARE YOU TAGGING?	TAGGING SOLUTION	AUTOCLAVABLE (Yes/No)	NOTES
Instrument with flat surface tagging area	LM DTS™ RFID Flat Surface Tag	Yes	Instrument diameter min 15 mm or tagging area larger than 6x12 mm. Instrument length min 70 mm. If not possible to use the Flat Surface Tag, also LM DTS™ Heat Shrink Tag or LM DTS™ Sleeve Tag can be used.
Instrument with round surface tagging area	LM DTS™ RFID Round Surface Tag	Yes	Instrument diameter max 15 mm and length min 70 mm. If not possible to use the Round Surface Tag, also LM DTS™ Heat Shrink Tag or LM DTS™ Sleeve Tag can be used.
Plastic cassette	LM DTS™ RFID Sticker Tag 95x7 Clear/Black	Yes	
Metal cassette	LM DTS™ RFID Metal Cassette Tag	Yes	Also LM DTS™ Flat Surface Tag can be used.
Plastic and cardboard packages	LM DTS™ RFID Sticker Small/Large	No	No washing or sterilizing. For single-use only.
Metal and glass packages, and packaging containing liquids	LM DTS™ RFID Flag Sticker	No	No washing or sterilizing. For single-use only.

Interested to know more?

Please visit www.dentaltracking.com
or contact us by email
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LM-Instruments Oy

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