

# LÖDIGE COATING SYSTEMS



**ALWAYS THE RIGHT MIX**

# COATING APPLICATIONS



**The following products can be processed with a suitable coating drum design:**

- Tablets of all shapes
- Mini-tablets
- Sugar coated tablets
- Capsules
- Pellets



# LÖDIGE COATERS – SUCCESSFUL SINCE 1980



## LÖDIGE Coaters provide many advantages:

- Film and sugar coating with a very gentle product movement
- High variability of working volume (15 - 100 %) without having to change the coating drum
- Optimal air routing
- Explosion proof design on request
- Individual, customized systems



Coating technology has developed rapidly. More and more rapid processes in combination with low spraying losses, easier handling and residue-free cleaning are required in fully automatic systems.

The LÖDIGE Coater series comply exactly with these requirements by providing two series for different needs: The **LC series** are true high-end machines with a wide range of equipment options. Each coater is tailored to the exact requirements of the customer.

The **LC light series**, on the other hand, offer an attractively priced alternative to custom-made machines thanks to their standardised design.



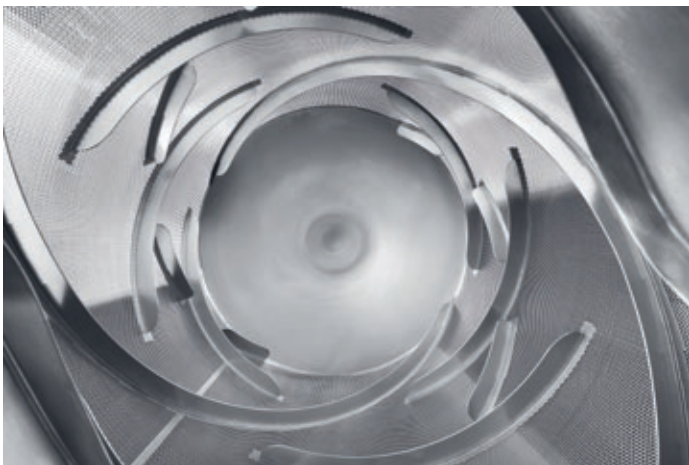
Aqueous and organic coating of tablets, capsules and mini-tablets



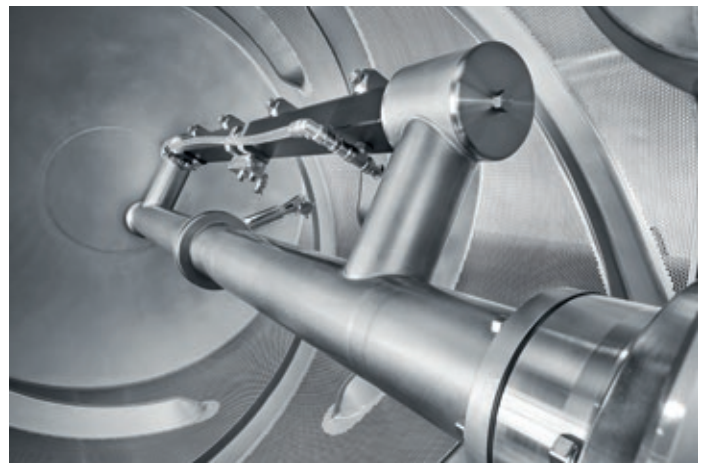
Sugar coating of tablet cores

# THE LÖDIGE COATER LC

Due to maximised air volume and nozzle quantity and exceptionally effective product mixing, the LÖDIGE Coater LC permits extremely fast coating processes while maintaining excellent tablet quality and ideal coating homogeneity.



Mixing elements for film coating



Mixing elements for sugar coating

## MIXING ELEMENTS

Based on decades of experience LÖDIGE has developed extremely effective mixing elements for the LÖDIGE Coater LC series.

The mixing elements have a reduced height and are easy to clean. They permit a high filling level variability of approx. 15 - 100 % of the working volume without coating drum replacement while simultaneously ensuring a very gentle product movement. On request, the LC series is available with mixing elements suitable for both film and sugar coating processes.

During backward running, special discharge elements discharge all tablets completely and quickly through the appropriate opening. Additional discharge aids are not required.

## DRUM GEOMETRY

The coating drum's length/diameter ratio of 1:1 permits:

- a compact design,
- a large spray area and therefore a high number of nozzles,
- quick mixing of the tablets, both horizontally and vertically,
- thorough, quick cleaning with cleaning nozzles.

The drum perforation is available in different sizes to suit the product.

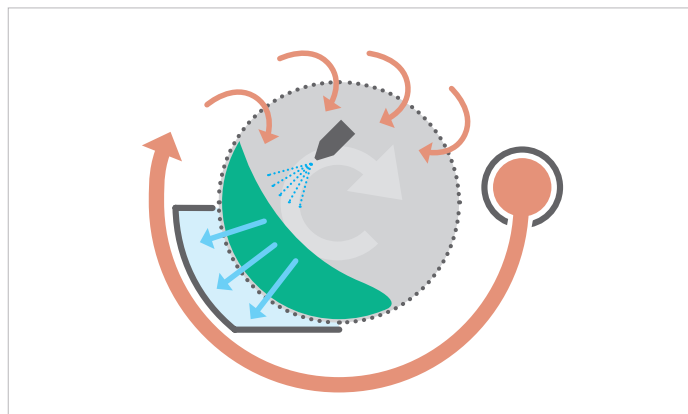
# THE LÖDIGE COATER LC



## AIR ROUTING

The supply air is routed through an air distributor pipe. This ensures a mostly turbulence-free flow of large drying air volumes into the coating drum at low input speeds. The supply air is evenly distributed across the entire drum length.

The result is a very high drying efficiency. Spray losses are minimised, reducing the need for cleaning. This allows for larger production campaigns.



Coater air flow

## NOZZLE ARM

The LÖDIGE nozzle arm is adjustable on two pivot axes (optionally motor-driven in the LC series). The clearance between the nozzles and the tablet bed is reproducible from the outside and easy to adjust without having to interrupt the process. As an alternative, LÖDIGE offers for the LC series a fully automatic spray arm which not only adjusts the clearance between the nozzles and the tablet bed, but also the spray angle to the tablet bed. With this mechanism, nozzles can be adjusted in an extremely wide range to make full use of the filling level variability of 15 - 100 %. This permits production of various batch sizes without having to change the drum.

The product temperature can be measured by a non-contact infrared sensor.

Each coater is equipped with the ideal number of nozzles to create the perfect spray pattern. Coating solution is evenly applied to the entire spray area.

Depending on the pump version, fluids can be transported to the nozzles through one common line or through one line per nozzle in the case of the LC series.

In the LC light series, a distributor line in the nozzle arm acts as the supply line.

Circulation of the coating solution through a return line with a valve is also possible, if requested.



Nozzle arm with sensors to measure the clearance and angle to the tablet bed

# THE LÖDIGE COATER LC



Coater filling by means of lifting column

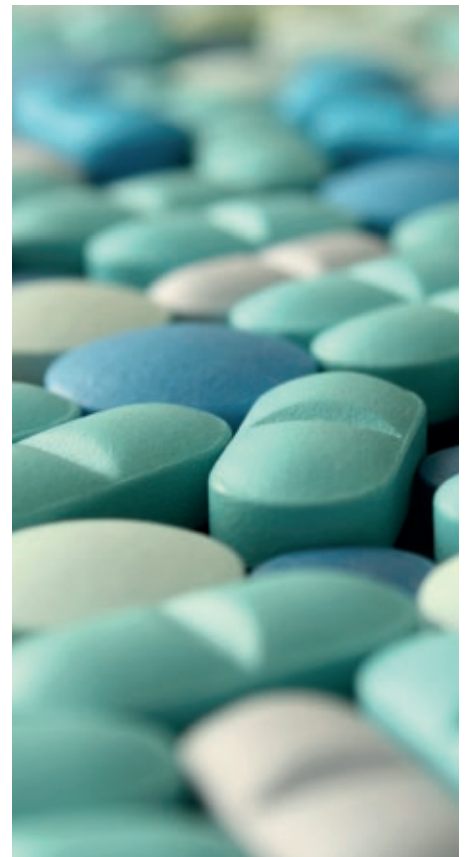


Coater discharge through the outlet at the front of the coater

## HANDLING SYSTEM

Usually the LÖDIGE Coater is fed through the window of the front door manually or using containers and lifting equipment. LC light series coaters are filled with the nozzle arm extended and swivelled to the side.

The product is discharged into a tablet container through the outlet at the coater front while the drum runs backwards.





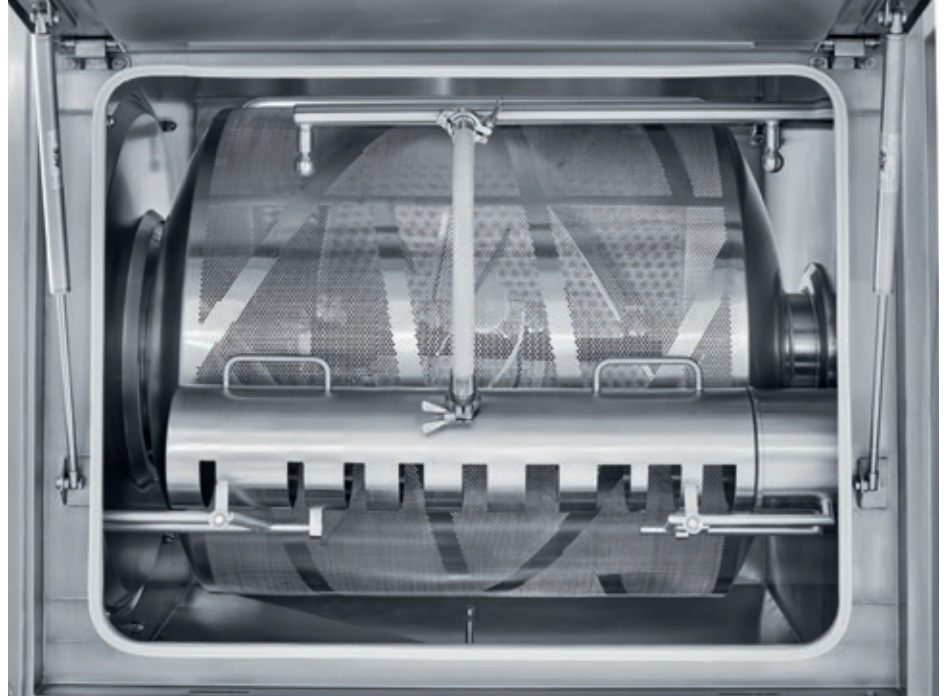


## CLEANING WIP/CIP

The cleaning system consists of jet cleaners and spate cleaners. This allows effective cleaning of all coater parts in contact with the product from the inlet air flap to the exhaust air flap.

Detergent dosing stations, a booster pump, a flow heater and buffer tanks as well as additional components can be provided in the LC series if required\*.

\* no included in the LC light series



Inside view of a LC 70: the large inspection door enables good accessibility to the coater inside.



To speed up cleaning of the drum perforation, an ultrasound generator can be integrated in the cleaning system of the LC series\*.

# CONTROL SYSTEM

All LÖDIGE controls are designed to be compliant with GAMP 5 and FDA 21 CFR Part 11, meaning they guarantee user management with different access authorisations and audit trail functionality.

The HMI (Human Machine Interface) permits intuitive operation and gives the operator an overview of the system status at all times.

## PLC/PC-BASED CONTROL SYSTEM FOR THE LC SERIES

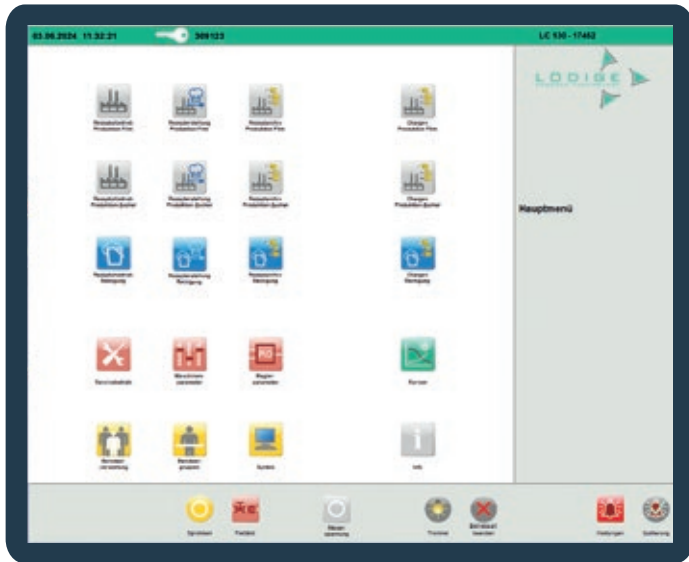
The PLC/PC-based control system permits fully automatic operation for production and cleaning of the Coating System.

A safe data exchange with superordinated or parallel systems is possible through interfaces designed for this purpose if required.

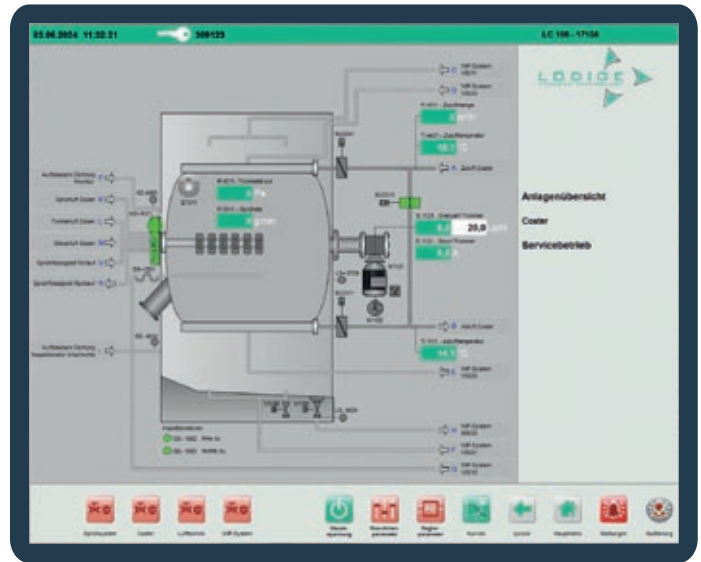
Various production steps can be freely combined in the recipe management to form a recipe. This ensures a correct process at all times.

## PLC-/TP-COMFORT CONTROLS FOR THE LC LIGHT SERIES

This control system enables a fully automatic production mode. A simple manual cleaning mode is used for cleaning this series.



Main menu of the control system with intuitive operation



Clear schematic representation of the system with operating options





# A COMPARISON OF THE EQUIPMENT OPTIONS FOR THE LC AND LC LIGHT SERIES

	LC serie	LC light series
Fully automatic cleaning	✓	
CIP	✓	
WIP	✓	✓
Sugar coating	✓	
Fully automatic production	✓	✓
Recipe management, production	✓	✓
Recipe management, cleaning	✓	
Fully insulated coater	✓	✓
Fully welded housing	✓	
Different drum perforations	✓	
Individual supply for nozzles	✓	
Manifold supply for nozzles	✓	✓
Fully automatic nozzle arm with clearance and angle measurement	✓	
Product temperature sensor	✓	✓
Clearance measurement nozzle - bed	✓	
Spray angle measurement nozzle - bed	✓	
Flow measurement, spray air and forming air	✓	
Spray rate determination using scale	✓	
Spray rate determination using mass flow meter	✓	✓

# COMPONENTS OF THE LÖDIGE SYSTEMS

The coaters in the LC series can be tailored according to customer requirements. The containment and ATEX 2014/34/EU requirements are naturally taken into account in the design.

Special designs, e.g. nitrogen circuit systems are available.\*

The coater systems generally consist of the pictured components.



Technical area of a coating system with nitrogen circuit and solvent condensation

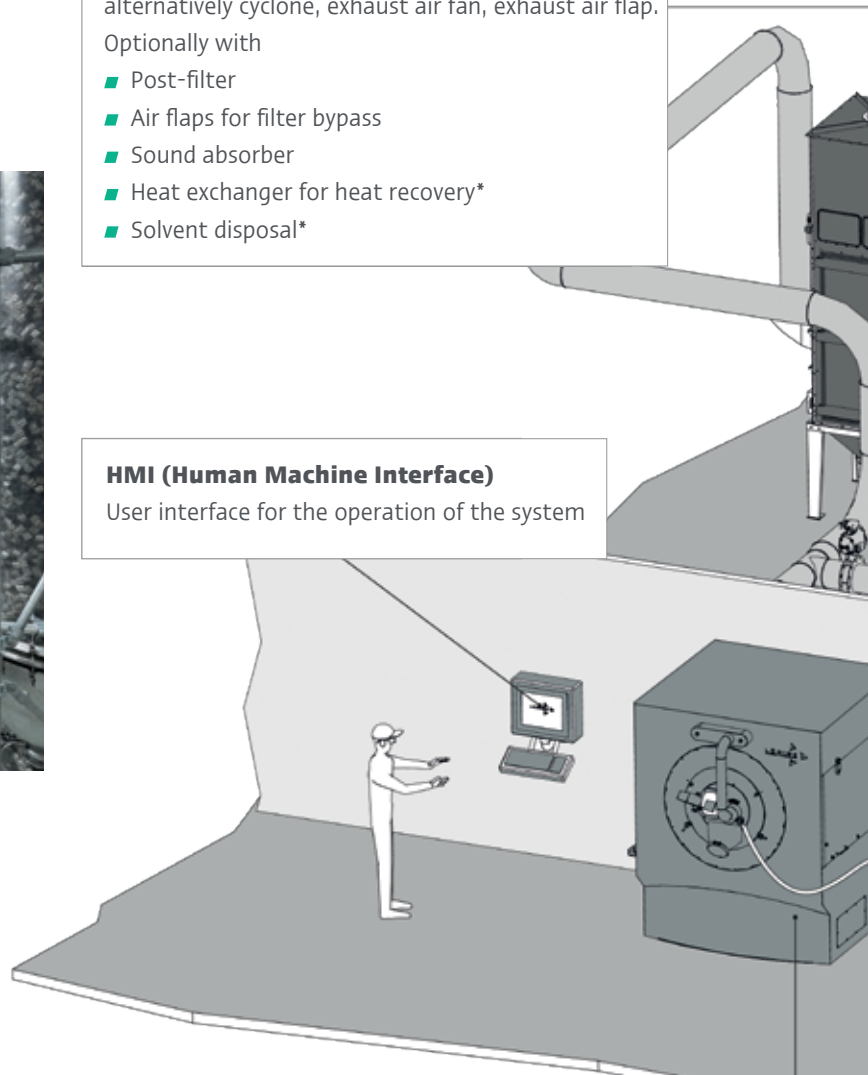
**Exhaust air** system with an exhaust air filter or alternatively cyclone, exhaust air fan, exhaust air flap.

Optionally with

- Post-filter
- Air flaps for filter bypass
- Sound absorber
- Heat exchanger for heat recovery\*
- Solvent disposal\*

**HMI (Human Machine Interface)**

User interface for the operation of the system



**LÖDIGE Coater**



### Control system

with power part with PLC and PC, pneumatic part and measuring technology (see page 8)

**Inlet air unit** with preliminary filter, air heater, fine filter, air flaps for the Coater bypass.

Optionally with

- Anti-freeze heat exchanger
- Air dehumidifier
- Molecular sieve for air drying\*
- Humidification\*
- Heat exchanger for heat recovery\*
- Face and bypass flaps for hot air/cold air mixing

### Cleaning system

Optionally with

- Detergent dosing\*
- Booster pump\*
- Flow heater for the cleaning media\*
- Ultrasound generator for improved perforation cleaning\*

**Dosing unit** with hose pump (for individual supply using multi-head hose pump\*), tank and spray rate detection/control using a scale or mass flow meter

\* not included in the LC light series



# LC SERIES – FOR CUSTOMER SPECIFIC COATING PROCESSES

The coaters of the LC series are characterised by their high efficiency and short process times. These customised machines have an optimised drum design with a maximised number of nozzles and an increased tablet bed surface to permit high spray rates. Moreover, a new air flow design allows large drying air volumes to enter the drum evenly and largely without turbulence. This prevents undesired spray drying and associated spray loss, thereby minimising soiling of the drum and nozzle arm.

In addition, LC series coaters have an optimised nozzle arm containing integrated air lines, fluid supply and return lines as well as the distribution to all nozzles. Fully welded mixing elements with a minimum height permit high variability in the coater filling level without modification or drum replacement.

The coaters are suitable for film and sugar coating without extensive conversion work.

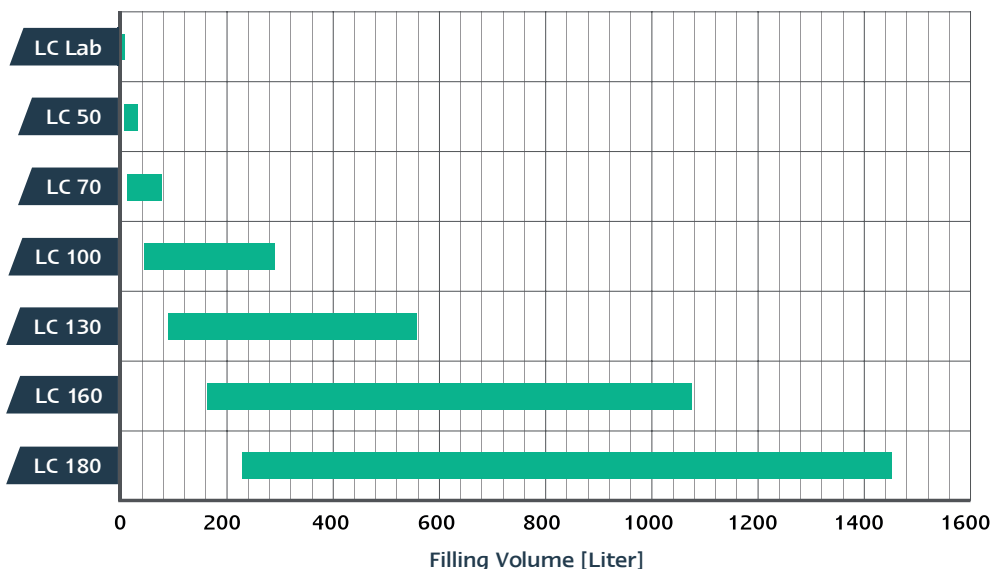
LÖDIGE offers complete customisation with a wide range of options to adapt the coaters to the customer's specific requirements:

- Customised design of supply and exhaust air systems
- Intuitive state-of-the-art control system compliant with FDA 21 CFR Part 11
- WIP systems with various options for fully automatic cleaning, WIP and CIP both possible!
- Nozzle arm with fully automatic measurement and control of the nozzle spacing and spray angle
- Product temperature measurement
- Design of the coater and peripherals for use of solvent
- Systems for automatic coater feeding and discharge
- Containment option for level OEB5

## Specification LC series

	LC 70	LC 100	LC 130	LC 160	LC 180
Number of spray nozzles (film coating)	4	6	8	10	12
Number of spray nozzles (sugar coating)	2	3	4	5	6
Exhaust air/supply air fan capacity	2000 m <sup>3</sup> /h	4500 m <sup>3</sup> /h	6900 m <sup>3</sup> /h	9000 m <sup>3</sup> /h	12200 m <sup>3</sup> /h

## The LC series



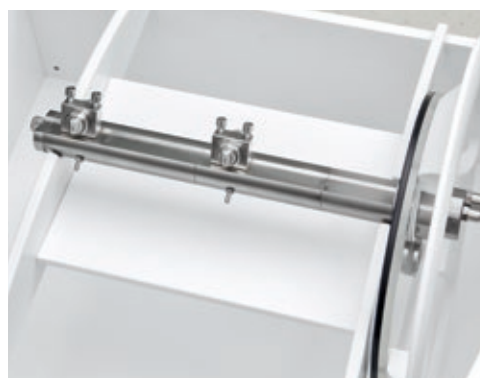
Intuitive control system for easy operation of the system



LC Lab



The focus here is on particularly easy handling



Dividable nozzle arm

The LC Lab combines modern design with high functionality.

The drum provides working volumes of:

- complete drum 1.15 – 6 l
- divided drum 0.6 – 3.85 l

The use of either 2 or 1 spray nozzle creates ideal coating conditions comparable to those in the production coater.

The LC Lab has been designed and developed for simple, reliable upscaling to the complete LÖDIGE Coater LC production series. Factorised parameters determined in lab tests can be used to define the process time in the production system.

The LC Lab control system offers full operating options, just like a production machine.

An ATEX compliant version of the LC Lab for solvent based coating processes can be provided.

## MODULES

- Liquid supply station consisting of:
  - Integrated hose pump
  - Spray rate detection using a scale
- The inlet air unit contains:
  - Pre-filter
  - Heating register for hot water heating
  - Fine filter of class H13
- The exhaust air unit contains:
  - The exhaust air fan
  - Filter of class H13 or higher



# LC LIGHT SERIES – ATTRACTIVE STANDARD COATER

LÖDIGE has developed the standardised LC light series as a priced alternative to the customised coaters of the LC series. Without the cost and effort of designing, engineering and programming tailor-made special machines, these coaters offer cost advantages and shorter delivery times. LC light series machines are specially designed for producing price-sensitive products in the OTC and food supplement sector.

They feature film coating that meets the state of the art of our German production facilities and are suitable for all standard film coating processes (water-based or organic). Moreover, a limited number of customisation options is available for these coaters, for instance to permit use with solvents.

LC light series coaters have all the main advantages of the LC series:

- High performance through innovative air flow and high spray rates
- Optimised drum geometry and mixing elements
- High-quality nozzles and an innovative nozzle arm concept – for the LC light series, this concept is implemented as a swivelling nozzle arm for quicker filling and discharge.

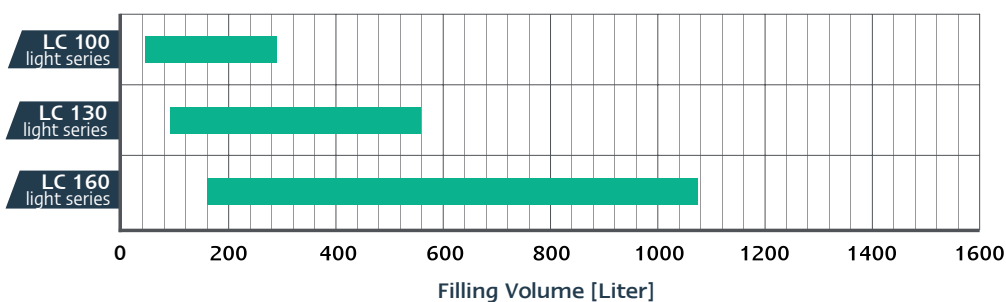


Coater LC 130 light series

## Specification LC light series

	LC 100 light series	LC 130 light series	LC 160 light series
Number of spray nozzles (film coating)	4	6	8
Exhaust air/supply air fan capacity	2000 m <sup>3</sup> /h	4500 m <sup>3</sup> /h	6900 m <sup>3</sup> /h

## The LC light series





# THE LÖDIGE PHARMACEUTICAL TEST CENTRE



A modern Pharmaceutical Test Centre permits trials in batch and continuous pharmaceutical mixers, granulators and fluid bed processors as well as coaters on laboratory and pilot scale.

## LABORATORY AND TEST CENTRES

The LÖDIGE Test Centres of more than 700 sqm provide trial capacity for more than 30 machines including a laboratory for physical analysis. A separate test centre is dedicated to pharma trials in compliance with GMP conditions. The pilot machines are designed for a reliable scale-up to production equipment.

## AFTER SALES

The role of our qualified After Sales Service is to ensure the high quality of the supplied machines by providing maintenance worldwide at regular intervals.

Our Service Team will react quickly to help you solve any problems that may occur.



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LÖDIGE offers high-quality partial systems and service for process engineering applications in various industries in the fields of mixing, granulation, coating, drying, reaction and related processes. Our motivated employees and their expertise in processes, development and production are the key to our success and the success of our partners all over the world. Focusing on core industries and proximity to our customers through local presence is a crucial component of the positive development of our company.

LÖDIGE was founded in 1938 and is a family-run company in the third generation. With the invention of the Ploughshare® Mixer, LÖDIGE provided the industry with a mixing system that can handle a wide range of process applications. This machine is the basis for many innovations in the area of mixing and processing technology.

Industrial mixing and processing technology has been significantly influenced by LÖDIGE and will continue to be so in the future. A large number of patents and more than 35,000 machines and systems demonstrate our experience with customer-oriented system solutions. LÖDIGE operates with more than 500 employees worldwide and supports its customers with a network of subsidiaries, technical offices and agencies.



**ALWAYS THE RIGHT MIX**