

VACUUM SHELF DRYERS DLDR/V DLDR/V-Ex



DE LAMA

more than fifty years of experience in sterilization and drying

DE LAMA's Quality Management System is certified:



ISO 9001: 2000 - Cert. n° 0351
ISO - UNI CEI EN 13485 - Cert. n° 1275

DE LAMA vacuum shelf dryers

DLDR/V and DLDR/V-Ex

DE LAMA vacuum shelf dryers, result of more than fifty years of experience, are designed to perform drying of products whose thermosensitive features do not allow high processing temperatures or require low temperatures.

Vacuum drying static process does not involve any mechanical stress for the product granular composition or sponginess and, therefore, the volume does not suffer any significant physical change.

These units are designed to dry a wide range of products requiring a low final humidity content within the pharmaceutical, chemical, cosmetics and food industries:

- moist powders
- granulated and crystalline materials
- medicinal plants extracts, antibiotics, enzymes
- colourings
- dense liquids
- chemical pulps
- food additives
- vegetable extracts



Vacuum dryer DLDR/V 10.10.10

Loading surface 7,7 m²

For applications using products containing a high percentage of alcohol, solvents or other volatile materials generating vapours classified as inflammable and potentially explosive, dryers DE LAMA DLDR/V-Ex are highly recommended.

Dryers high flexibility in design, lay-out configuration and chamber sizing enable DE LAMA to develop the best solution to meet any User's specific qualitative requirement.

Shelf dryers components are of the best quality and reliability, world-wide available for easy replacement and assure the equipment longest lifetime.

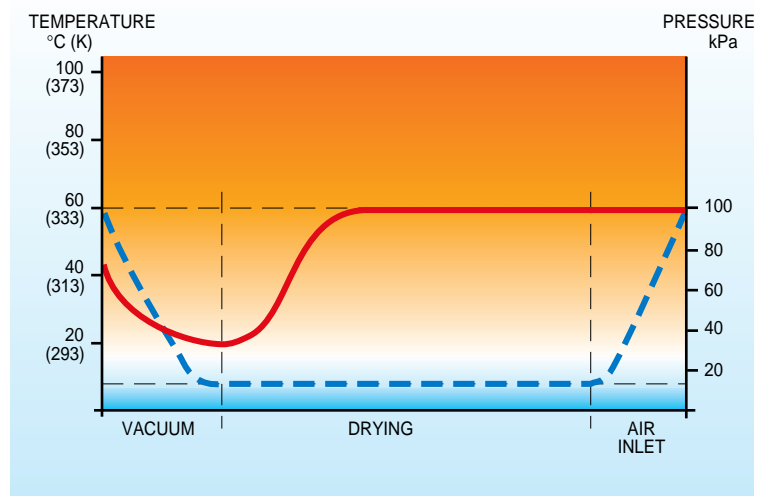
APPLICABLE REGULATIONS:

Vacuum dryers are designed, manufactured and tested according to **ISO 9001:2000** Quality Management System procedures, following **FDA** Guidelines and embody the **cGMP** requirements.

STANDARD OPERATING PARAMETERS

- Pressure: 0 abs. bar
- Temperature: from 20°C (239K) to 95°C (368K)

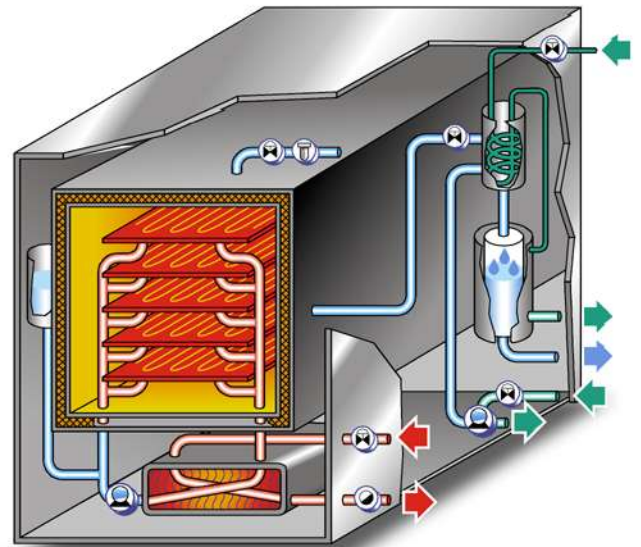
NOTE: Operating parameters can be modified according to Customer's requirements.



DESIGN

& CONSTRUCTION FEATURES

- chamber made of AISI 304 or AISI 316L stainless steel
- high vacuum seal execution
- high efficiency load support shelves stack in AISI 304 or AISI 316L stainless steel whose "sandwich" design allows the best performances, heat transfer and temperature uniformity
- chamber sloped floor, shelves and trays with rounded edges and smooth surfaces to allow easy cleaning and washdown, avoid the accumulation of residuals or any contamination
- liquid ring vacuum pump group
- piping system + centrifugal pump for thermal fluid circulation into the shelves
- thermal fluid heating through electrical resistances, steam powered exchanger or other fluid (e.g. hot water from factory utility line)
- stainless steel condenser with coil, cooled by chilled water, and recovery tank to avoid pollution
- vacuum breakage system
- high grade thermal insulation
- built-in or separate electrical cabinet



Vacuum dryer DLDR/V 8.8.8
Loading surface 3,7 m²



Shelves stack
extractable execution

Transducer for pressure control/regulation and thermoresistances Pt 100 Ohm class A EN 60751/ IEC 751 for temperature monitoring inside the chamber and the shelves.

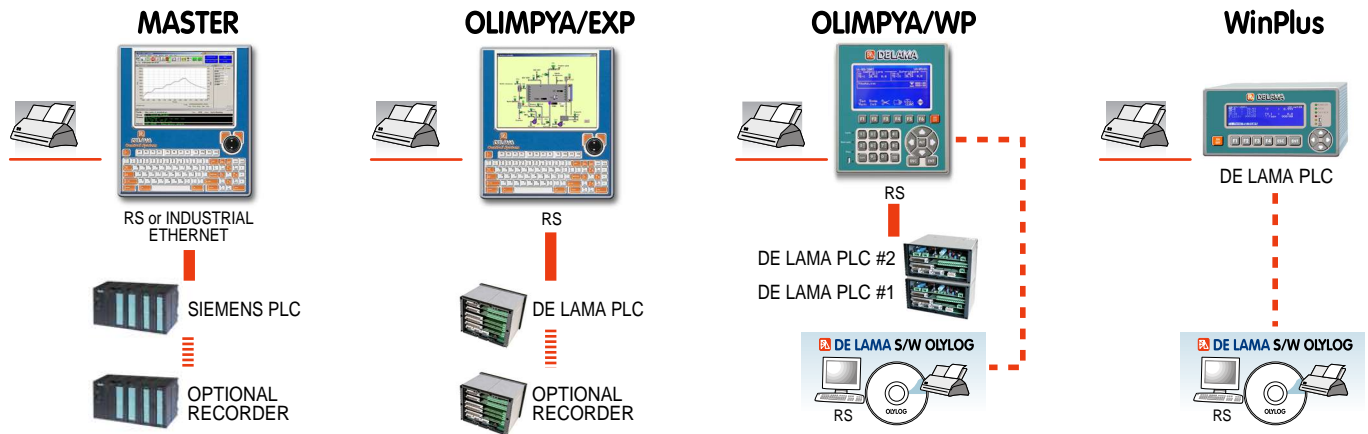
Clamp connections for validation activities.

Automatic door locking and a wide range of alarms/safety devices, conforming to European and International Rules, assure operator's protection and equipment well-proven operation.

PROCESS CONTROLLERS

DE LAMA offers several alternative series of control systems, described in a separate leaflet, to meet Customer's requirements and fit any application. DE LAMA controllers are compliant with current applicable Standard/Directives, cGAMP and FDA Guidelines:

| | |
|--------------------|---|
| MASTER | based on PC + PLC Siemens S7 controller |
| OLIMPYA/EXP | based on PC + MicroProcessor controller |
| OLIMPYA/WP | based on MultiProcessor integrated architecture |
| WinPlus | based on MicroProcessor integrated architecture |



DE LAMA explosion-proof vacuum dryers DLDR/V-Ex

Dryers DE LAMA DLDR/V-Ex incorporate design features, systems and means of protection, according to current ATEX Directive 94/9/EC or other applicable Standards, that allow operation within an internal potentially explosive atmosphere:

- instrumentation, motors, electricals and mechanical components in compliance with ATEX Directive 94/9/EC
- control system and electrical power board in a separate cabinet, out of dangerous area, located in a side protect-ed room not in a classified explosion zone

Explosion-proof execution ensures the highest safety level.

Dryers can be safely operated in conformity with established parameters.



Vacuum dryer DLDR/V-Ex 12.10.10

Loading surface 10 m²

OPTIONALS & ACCESSORIES

- heated jacket
- lighted viewing ports for interior inspection located on the door
- housing panels in satin finished AISI 304 stainless steel
- fluid cooling system
- automatic "CIP" and "SIP" systems to ensure total asepsis of the process
- special execution for operation at temperature higher than 100°C (373K) through diathermic oil
- stainless steel trays and containers to load product
- shelves stack extractable execution + transfer trolley

QUALITY CONTROL & VALIDATION

Equipment and process controllers are designed and manufactured to be easily validable in compliance with FDA quality standards for pharmaceutical processes. Careful tests, specific controls and high technical competence in pre-validation activities assure plants fully compliant with the strictest required standards.

TECHNICAL DOCUMENTATION & ACTIVITIES

Plants are always provided with a full dossier of documentation:

- installation and operation manuals
- P&I and technological diagrams
- dimensional drawings and lay-out
- materials and components data sheets
- materials and calibration certificates
- conformity certificates



Vacuum dryer DLDR/V 10.8.10
Loading surface 5,8 m²

DE LAMA supplies, on request:

- FAT and SAT check-lists/reports
- documentation to ensure faster and easier validation, customizable by the end-Users
- full documentation for FDA activity of validation
- manufacturer's data report
- trainings to Customer's production and maintenance team




Vacuum dryer DLDR/V-Ex 8.8.10
Loading surface 4,6 m²

TECHNICAL DATA

DE LAMA VACUUM DRYERS DLDR/V and DLDR/V-Ex

| MODEL | LOADING CAPACITY (*) | LOADING SURFACE | LOADING SHELVES | LOADING SHELVES DIMENSIONS | CHAMBER VOLUME | HEIGHT | WIDTH | DEPTH |
|-----------------|----------------------|-----------------|-----------------|----------------------------|----------------|--------|-------|-------|
| | kgs. | m ² | No. | mm | lts. | mm | mm | mm |
| DLDR/V 8.8.8 | 55 | 3,7 | 8 | 640x730 | 512 | 800 | 800 | 800 |
| DLDR/V 10.8.8 | 70 | 4,6 | 10 | 640x730 | 640 | 1000 | 800 | 800 |
| DLDR/V 10.8.10 | 90 | 5,8 | 10 | 640x930 | 800 | 1000 | 800 | 1000 |
| DLDR/V 10.10.10 | 120 | 7,7 | 10 | 840x930 | 1000 | 1000 | 1000 | 1000 |
| DLDR/V 12.10.10 | 150 | 10 | 13 | 840x930 | 1200 | 1200 | 1000 | 1000 |
| DLDR/V 12.12.10 | 190 | 12,5 | 13 | 1040x930 | 1440 | 1200 | 1200 | 1000 |
| DLDR/V 13.13.10 | 220 | 14,6 | 14 | 1140x930 | 1690 | 1300 | 1300 | 1000 |
| DLDR/V 13.13.13 | 300 | 20 | 14 | 1140x1230 | 2197 | 1300 | 1300 | 1300 |
| DLDR/V 13.13.15 | 350 | 23 | 14 | 1140x1430 | 2535 | 1300 | 1300 | 1500 |
| DLDR/V 13.13.20 | 460 | 31 | 14 | 1140x1930 | 3380 | 1300 | 1300 | 2000 |


(*) Calculated according to a product absolute weight of 0,6 kg/dm³ and a thickness inside trays of approx. 25 mm.

Models indicated in above table are only some of standard sizing for  DE LAMA DLDR/V and DLDR/V-Ex. Apart from the standard configurations indicated in the table, dryers can be proposed even with other dimensions, on request, according to Customer's production needs.



Vacuum dryer DLDR/V-Ex 8.12.12

Loading surface 8,8 m²

 DE LAMA advises that technical data and features indicated in this folder are subject to change, without notice, owing to the progressive development of the technology and the research in the field.

 **DE LAMA**
PHARMACEUTICAL EQUIPMENT

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