

## NORHOF LN2 Dispensing System model #455

### Click-on Manual Controlled Liquid Nitrogen Dispensing system

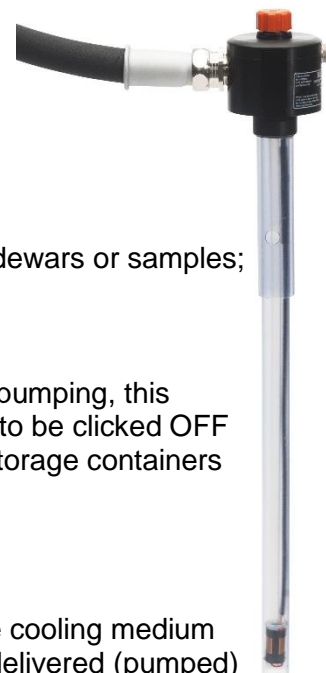
#### Are you still poring LN2 into small vessels by hand?

- 💧 Safe filling of small vessels;
- 💧 Hand controlled administration of smaller amounts of LN2, for filling; small dewars or samples;
- 💧 Low flow, starting by pressing on pump head;
- 💧 Pressure-less flowing LN2, without spilling, noise, vibrations etc.

Where the #405 pump is for small quantities of LN2, and needs to be pushed during pumping, this #455 model can be switched ON and pump for several minutes, but it needs manual to be clicked OFF to degas and stop pumping. This makes this model suitable for filling up a series of storage containers daily, still manual controlled.

### Norhof LN2 microdosing systems

Norhof manufactures LN2 microdosing systems. Liquid Nitrogen (LN2) is used as the cooling medium and is taken from a storage vessel (Dewar) with low pressure (max. 300 mBar) and delivered (pumped) through a fill line to the application in a micro dosing way.



The Norhof LN2 microdosing system is designed to overcome the drawbacks of LN2 under pressure in which a solenoid valve is used to switch the supply ON / OFF. You may compare the Norhof system with a water tap, but instead of giving water, it gently gives liquid nitrogen, with an adjustable flow, possible to regulate from some drops, up to 1 Liter/minute. Our pump can pump LN2 up to 5 meters above the pump itself

The reservoir Dewar can safely stand next to your working place.

When you need a small amount of LN2, the system is ready to supply by only pressing on the pump head.

By pressing on the pump head, the system starts building a small over pressure, forcing the liquid gently to rise into the fill line, and fall into your little Dewar, or other small LN2 container.

After your pressure on the pump head is released, the system shuts off automatically, and the flow stops.

#### Norhof 455 series pump, mounted on a 35 Liter Dewar

#### 455 series Technical Specifications

Static evaporation rate	< 0,5 liters per day	
Flow rate	Dripping up to 2 Liter/minute (not adjustable)	
Maximum working pressure	< 200 mBar	
Reaction time	10-40 seconds (depending on level in Dewar)	
Power connection	115V / 230V AC with supplied power supply or 12 Volt AC/DC	
Power consumption	average 10 Watts, during pumping 50 watts	
Storage container volume	35 Liter	50 Liter
Outside dimensions (diameter)	480	500 mm
Height dimensions	643	727 mm
Weight (empty, full)	13 / 41,5	17 / 57,5 kg
Options	Transport trolley 5 wheels (10 cm height) Stand for pump (when Dewar is refilled)	

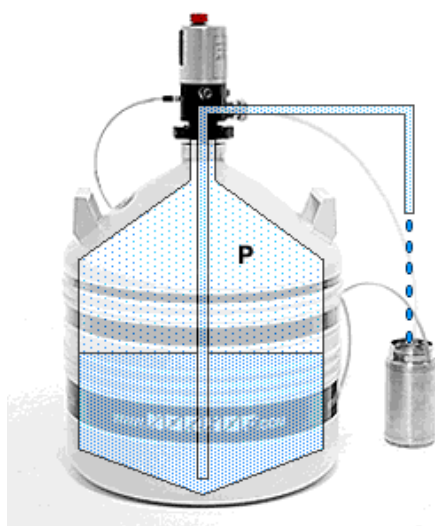
\* pump can be used on other type dewars as long as the Dewar has a NW50 flange

The majority of this system find use in the field of scientific instruments, physical laboratories, research centers etc. where small amounts of liquid nitrogen is needed every day for experiments, and where it is handy to have your supply next to your working place, instead of walking all the way to a fill station and handle big pressure tanks for filling just a tea cup of LN2.

## 455 series applications:

- ◆ hand-controlled filling of small dewars;
- ◆ hand-controlled cooling of small objects;
- ◆ hand-controlled freezing of small samples;
- ◆ hand-controlled filling of Dry Shippers;
- ◆ hand-controlled cooling of small chemical reactions.

\*For automatic administration we have the #900 series of microdosing pumps, see [www.norhof.com](http://www.norhof.com)



(#900 pump model shown on this picture)

## Working principle

The pressure above the liquid level inside the Dewar is built by heating a small amount of liquid in the bottom of the Dewar. With only up to 100 mBar of overpressure, the liquid will gently rise out of the rise pipe and fall into the fill hose. Because we evaporate some LN2 to build pressure, there is no adding of ice inside the Dewar, such as with manual systems which use air from the environment..

When LN2 is required, a small overpressure is generated by a small heater element in the LN2, and liquid flows out of the system like water from a tap, without spilling, noise, vibrations etc.

## 455 series advantages:

- ◆ **the system can deliver LN2 liquid just with a press on the pump head;**  
this means that the system is ready for use 24 hours a day
- ◆ **the system delivers LN2 without any pressure;**  
this means without noise, vibration, excessive waste, etc.
- ◆ **there is no external LN2 valve required;**  
that implies no unnecessary heat input which spoils a lot of LN2
- ◆ **there is no internal LN2 valve in the pump;**  
LN2 comes out of insulated tubing without making contact to warm metallic parts, so very fast
- ◆ **there is a very low thermal mass to cool down the pump;**  
LN2 comes out within 10 to 40 seconds, depending on the level in the Dewar.  
Filling efficiency is better than 90%, due to very less loss for cooling down pump parts.
- ◆ **there is a very low thermal connection to the ambient temperature;**  
This means that the system is extremely economic in stand-by.  
Typical usage less than 0,5 Liter / day
- ◆ **P.E.D. 99/36/EC (Pressure European Directive) for pressurized vessels does not apply for this system;**  
The maximum possible pressure is lower than 300mBar. Therefore this system is allowed to be used inside the lab, near your working place, without danger.