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nitro

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BASIC GUIDE TO COOKING WITH LIQUID NITROGEN

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Submerge foods in order to freeze them and then effortlessly break them into pieces without losing a drop of their juice, color or flavor, frozen foams, oils and high-fat sauces trickled in the nitrogen to obtain fun finishes, submerge foods and obtain vast temperature contrasts between the interior and exterior (-70 °C to 20 °C), achieve incredible finishes and fillings using the chilled sauce-covering garnish technique, submerge spurts of liquid to make brittle spaghetti, pulverize liquids with the help of aerosols, use molds to create shapes or containers, as an instantaneous refrigerant to chill a metallic grill (Teppan Nitro) to -60 °C and cook thin layers of fruit with below-zero temperatures, chocolate creations and, needless to say, inconceivable ice creams in seconds with a really smooth consistency.

The cocktail world can also afford one or two impressive techniques, as liquid nitrogen allows all kinds of alcohol to be frozen. This paves the way for new possibilities that were unthinkable until now, such as serving alcoholic drinks with different textures, etc.

It is chefs such as Heston Blumenthal, Ferran and Albert Adrià, Dani García and Kristof Coppens, to name but a few, who have openly de-

veloped a specific cooking technique and have made a triumphant entrance into the world of modern cuisine in just a few years.

Further on, we will expand upon each of these techniques one by one. However, before we continue, let's get acquainted with everything related to handling liquid nitrogen, such as the different types of containers, its main requirements for use, safety, work equipment and accessories as well as familiarize ourselves thoroughly with its characteristics.

TYPE AND SIZE OF N2 STORAGE CONTAINERS

For these impressive preparations, a special container with the sufficient amount of liquid nitrogen is necessary at the establishment itself. These special storage containers (*Dewar*) are essential both for its transport and its maintenance, given that nitrogen must be stored at a very low temperature to prevent evaporation. These containers cannot be airtight; they need a relief valve to turn into gas again and thereby prevent the vessels from exploding. Remember that liquid nitrogen can increase its volume almost 700 times.

There are several types of storage containers, those with a tap or those with a pressure regulator. The latter are generally used to store a large amount of liquid inside at a higher pressure. This pressure is also necessary later on to decant the nitrogen into smaller containers.

If you occasionally wish to carry out some kind of preparation, we recommend that you at least have a 15- to 30-liter capacity container for refilling and immediate consumption. Generally speaking, they are containers with a narrow tap, greater in height than width.





On the other hand, if you are going to undertake preparations on a daily basis, we recommend you have a larger pressurized container to hold a large amount and refill smaller containers, so that you can make use of them at each service or work station with great ease. Thereby you can avail of liquid nitrogen at all times and foresee and schedule refills more conveniently. The size of your main container should be proportional to your daily consumption and the service rotation of the supplier in your area. To decant the liquid nitrogen with the utmost safety, we recommend you use the gloves your supplier will provide together with the purchase or rental of the cylinders.

A closed container should be stored in the coolest possible place with good ventilation, far from a source of heat, without moving or shaking it. You should avoid opening and closing the tap unnecessarily. Following these instructions will ensure the nitrogen is conserved from its refill until its use with the minimum loss.

As a matter of fact, *Dewar* vessels or containers are two vessels manufactured in aluminum, one inside the other. Between the two is a layer of insulating fiber and a vacuum seal to prevent condensation, thermal shock or the transmission or exchange of temperature. If we detect that loss through evaporation is higher than the usual or stipulated loss by the manufacturer, the container may have lost its vacuum tightness.

CONSUMPTION RATIO

Its consumption and performance will largely depend on a wide range of factors: frequency of use, the various temperature and moisture differences in the preparation context, the technique employed, the containers or the large diversity of utensils used. Other factors are related to the logistics themselves such as where the refill is located, etc. The wide range of determining factors that are difficult to measure can make it virtually impossible to ascertain the exact consump-

tion for each preparation; even with a great deal of experience, it is difficult to calculate. Perhaps liquid nitrogen should be considered as a consumable energy product such as electricity or water rather than as an ingredient.

The following table can give you an idea of its approximate conservation time when kept in the optimal conditions and without opening or closing the container.

Container size	Static time
5 liters	4-5 weeks
10 liters	6-8 weeks
20 liters	8-12 weeks

NITROGEN REFILL

There are different companies that take care of nitrogen production and distribution. Remember that liquid nitrogen is used for a great deal of applications including industrial, medical, cleaning, air-conditioning, veterinary, food conservation, etc., so there is an extensive network of distribution and storage facilities.

To find out which distributor can supply this service and which type of service is available, we recommend getting in contact with us via our website or contact email, giving us your contact details, location and refill preferences. We will put you in contact with the supplier in your area right away.

The refill can generally be carried out at your restaurant establishment. In other cases, the cylinder is collected, refilled and subsequently delivered. Alternatively, you can go in person to get the refill by transporting the cylinder in your vehicle, although this is ill-advised. If it is necessary, ensure that the vehicle is well ventilated and the cylinder is well secured.

BASIC SAFETY PRECAUTIONS AND RULES

Another point of note is that the gloves are to avoid possible splashes and not to submerge your hands in the nitrogen. Safety comes first, so when handling liquid nitrogen we should bear in mind that the eyes are extremely sensitive and **must be protected with a mask or special goggles because even a small splash could cause irreparable damage. In addition, exposure to the vapor given off by this element is not at all advisable.** We believe the best protection is a face shield because that way the entire face is covered. **In the event of a splash to the eyes, rinse with water at room temperature for fifteen minutes and seek medical assistance.**

Prolonged contact with liquids, vapors or gases at very low temperatures can cause small and sometimes indiscernible skin lesions, which are similar to heat burns whose depth will depend on the temperature of the substance and length of time the substance is in contact with the skin.

The worst burn involves adherence when the handler has moist hands or skin. Therefore, working with wet garments is to be avoided. One first aid measure would be to submerge the burned part of the body in a water bath at 40 °C, but not more than 42 °C.

A vessel or container should never be sealed airtight because the enormous pressure it could reach might cause the container to explode or cause serious harm to people in the surrounding area.

Work should be carried out in well-ventilated areas because the continuous evaporation of the nitrogen can displace part of the oxygen in the air we breathe. Should this lack of oxygen be repeated or prolonged we could suffer from dizzy spells or fainting. High concentrations of nitrogen can even cause asphyxiation. To prevent any of the above effects, we recommend handling containers in cool well-ventilated rooms. In the event of a major spill, we should avoid breathing to prevent possible intoxication, ensure adequate ventilation, try to block or halt the leak and ventilate the area until the gas has fully disappeared.

You can request additional safety information from your liquid nitrogen supplier or regular supplier. Every supplier generally has specifically published manuals that address handling and safety.

Though we wish to point out that lack of experience can make us more cautious and heedful of possible accidents, we repeatedly advise you never to let your guard down even with the most routine jobs or because of your long-standing experience. It is when you start to perceive everything as safe and nothing happens when an error can occur and cause an accident. So be careful!



TRANSFERRING FROM STORAGE VESSEL TO WORK CONTAINER

When we transfer the substance we should do so with the utmost caution. Given that it is one of the incidences when more accidents can occur, you have to be well-protected with the appropriate clothing, gloves, face shield and footwear covering the whole of the foot.

It will largely depend on the type of container you have: if it is a large drum you can always tip it with some assistance, given that it is difficult to effectively control spills due to its volume. Again, remember that it is necessary to transfer the substance in well-ventilated areas because it is during this operation that the largest spillages usually occur. Appropriate clothing, gloves, face shield and covered footwear are required in this case also.

If it involves transferring the substance from a large drum with a pressure valve, you should just open the valve slowly once its end is well secured into the recipient container. This is the most convenient, safest and most crucial procedure when working with large-capacity drums.

NITROGEN STABILIZER

Liquid nitrogen sends out plumes of large white clouds as it expands, which bubbles and hisses as if we were boiling water on a hot stove.

This hissing and constant puffing subsides as the container creates a thermal effect and the temperature contrast between the materials and the nitrogen grows narrower. The better the container's thermal properties, the sooner the nitrogen will stabilize and the less will be consumed.

You will see that the cloud is increasingly thinner and generally re-

mains above the vessel or container and that its hissing is very mild. This is the best time to begin submersion or pulverization work. Generally speaking, when the container is first filled, the initial evaporation will cause greater consumption.

We advise you refill a second time once it has stabilized.

WORK RECEPTACLES AND THE MOST SUITABLE MATERIALS

Once the nitrogen is inside the receptacle or thermos flask we should move to the work station, trying to do so with the usual precautions or as if we were carrying a container of boiling oil.

The receptacle should have good stability and not be likely to tip over as well as the best thermal insulation possible, thus the nitrogen will stabilize much sooner and its consumption will be much lower. Therefore, the bubbling will come to an end much sooner, allowing the most delicate tasks to be completed with greater precision. Many chefs use stainless saucepans, trays, bowls and pots as containers, which can considerably increase consumption through evaporation. We recommend the use of thermal containers made with insulating materials or double-chambered receptacles.

There are various suitable receptacles for containing and working with liquid nitrogen or CO2 on the market. *Dewar* vessels, made of double-walled borosilicate glass type 3.3, commonly known as Pyrex®, are characterized by the fact that between their double-walled glass is a sealed vacuum chamber allowing for greater stability and loss of coldness. The delicate vessel is placed on top of a stainless ring, making it ideal for working on in front of customers. Attention should be given to its handling and its cost makes it a little exclusive. This laboratory vessel has one major drawback: its high price. This limits the number of vessels you can have when working.

NITROGEN CONTAINERS

120/005 Capacity: 5 liters	120/006 Capacity: 10 liters	
120/007 Capacity: 20 liters	120/008 Capacity: 30 liters	120/009 Capacity: 50 liters

The cook series is designed for the user who has small capacity needs, but requires long-term storage and low liquid nitrogen consumption in a convenient lightweight package. These units efficiently maintain varying quantities of materials at liquid nitrogen temperatures for 11 to 32 weeks under normal field working conditions. Lightweight aluminium construction makes them efficient, durable, and convenient for reliable cryogenic storage.

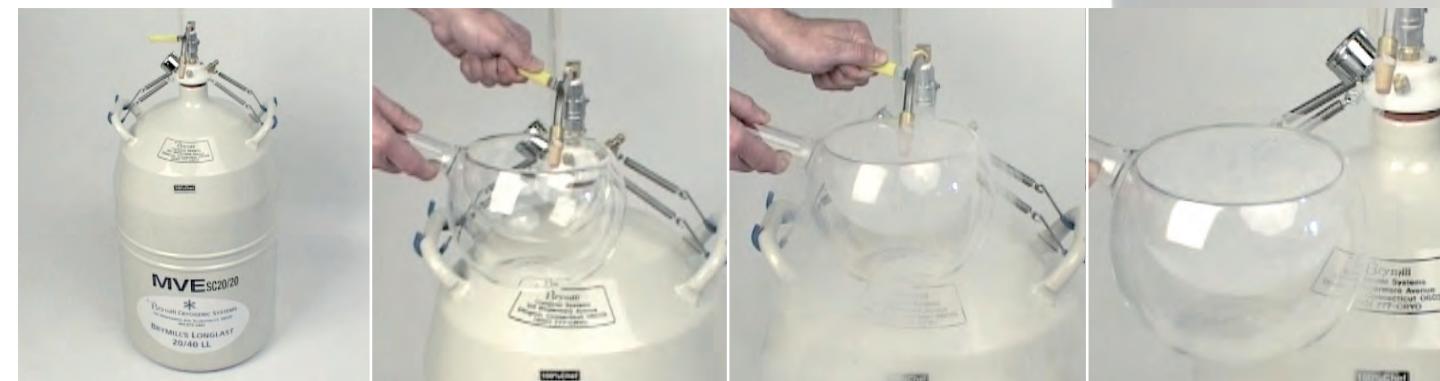
TRANSFERRING VESSELS Y TRANSPORT TROLLEYS

120/0010
Available only for 30 and 50 litre containers.

TRANSPORT WHEELS

120/0011

Disponible
contenedores
de 20 y 30 litros,
tipo termo.
Larga duración del
nitrógeno...
hasta 6 meses.
Consultar.



CRYO SPRAY

120/0013 300 ml spray
120/0014 500 ml spray

As if it were a blowtorch, this ingenious tool from the dermatology field allows us to pulverize and instantaneously inject cold air in the form of -196°C gas into a product's core, freezing any surface and immediately achieving a crunchy effect on the surface, or a cold centre like ice cream.

Turn your foams into hard rocks that are creamy on the inside.

- Freezing of drinks on the surface.
- Ingenious hollow and refillable chocolate truffles.
- Liquid liqueur ice-cubes.
- Cold sphere shapes...

Perfect control of the cold. Now everything is possible!

