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Working with Hazardous Substances: Guidelines and Regulations for the work with Chemicals/Gasses/radioactive Isotopes in Ny-Ålesund

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1. Introduction

This document is for all users of the Kings Bay Laboratories, who use hazardous substances in their research projects. In addition, this document addresses all researchers ordering hazardous substances for their stay in Ny-Ålesund.

In the following document we write primarily about chemicals, but if not otherwise mentioned all which applies to chemicals also applies to gasses and radioactive isotopes. For radioactive isotopes there is another document, the Isotope Lab user guide, which illuminates the specifics regarding the use of radioactive substances in Ny-Ålesund.

Please read the text carefully and make sure that you understand everything before you begin your work. Do not hesitate to ask if you have any questions or suggestions regarding our routines and safety protocols.

2. Where can I work with Chemicals?


You can work in those rooms/laboratories, which allow you to handle your chemicals in a safe manner. Generally said, nearly all chemicals need to be handled in a fume hood, which is not available in each laboratory.

3. Which Chemicals can I use?

To find out, which chemicals you can use in Ny-Ålesund, you should contact Kings Bay as early as possible and submit a list of all chemicals you want to use, those which are stored already in Ny-Ålesund as well those you want to order.

The reason why additional rules apply in Ny-Ålesund is because of its location, making it difficult to come in time to a hospital and because of its little size, which make it difficult to cater to all needs, e.g. concerning special storage conditions, as a temperate chemical cabinet.

In the following cases you are not allowed to use a chemical in Ny-Ålesund:

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- The Kings Bay nurse or the avdelingsingeniør decide they cannot provide for the first help, based on the Norwegian Safety Data Sheet (SDS) and the risk assessment provided by the researchers. The result can be, that:
 - Chemical can be only used under certain conditions (e.g. researcher paying for special medication needed in case of first help),
 - Chemical can be used only during normal working hours,
 - Chemical can't be used,
- The chemicals is on the non-wanted list, which may be decided by NYSMAC in the future,
- The chemical is too hazardeuous for the environment in Ny-Ålesund¹,
- There are no adequate storage facilities²,
- There is no possibility to react in case of a fire.

In addition their might be national and international rules forbidding the use of a chemical:

- The chemical is forbidden to use by Norwegian Law. And you do not have an exception granted by the Norwegian Government, (1)
- There is a possibility to use substitute. (2)

(1) Norwegian: For some substances Norway has laws in addition to International or EU laws. For more information use these websites: [Kjemikalier - Miljødirektoratet \(miljodirektoratet.no\)](http://Kjemikalier - Miljødirektoratet (miljodirektoratet.no)) and [Kjemikaliesøk - Miljødirektoratet \(miljodirektoratet.no\)](http://Kjemikaliesøk - Miljødirektoratet (miljodirektoratet.no)) from the Norwegian Environment Agency. That information only exist in the Norwegian version of the website, so Non-Norwegian-Speakers need to contact the agency directly.

One commonly used substance which falls under that category is Mercury (II) Chloride. Kings Bay can assist you writing the application.


(2) Substitution: In Norway you are obliged to follow to principle of substituion, that means to use the least dangerous substance you can use for your experiment. The responsibility to check and find substitutes lays with the User.

In case your request to use a chemical has been denied because of local rules, you can apply to Kings Bay for an exception. The exception might include e.g. the researcher having to pay for the additional measures. Additional measures would be e.g. special first help medication.

In case your request to use a chemical has been denied because of (1), you have to apply to the Norwegian Environment agency for an exception.

¹ This basically means, that future research should not be hindered by contamination.

² Currently it is not possible in Ny-Ålesund to provide special storage, as e.g. storage under argon gas or in vacuum.

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Special Case – “REGULATION (EU) 2019/1148 (...) on the marketing and use of explosives precursors, amending Regulation (EC) No 1907/2006 and repealing Regulation (EU) No 98/2013”

For some chemicals, you will be asked to submit additional documents. Depending on the supplier this will be directly after the order and/or when you get the chemical from the storage after your arrival of Ny-Ålesund. This is more of a formality, where you need to confirm, that you will use the chemical for research purposes. The following substances are on the list with the limit value:

RESTRICTED EXPLOSIVES PRECURSORS³

- Nitric Acid 3 % w/w
- Hydrogen Peroxide 12 % w/w
- Sulphuric Acid 15 % w/w
- Nitromethane 16 % w/w
- Ammonium Nitrate⁴ 16 % w/w of nitrogen in relation to ammonium nitrate
- Potassium Chlorate 40 % w/w
- Potassium Perchlorate 40 % w/w
- Sodium Chlorate 40 % w/w
- Sodium Perchlorate 40 % w/w


REPORTABLE EXPLOSIVES PRECURSORS⁵

- Hexamine
- Acetone
- Potassium Nitrate
- Sodium Nitrate
- Calcium Nitrate
- Calcium Ammonium Nitrate
- Magnesium Powders
- Magnesium nitrate hexahydrate
- Aluminum powders

³ List of substances which are not to be made available to, or introduced, possessed or used by, members of the general public, whether on their own or in mixtures or substances that include those substances, unless the concentration is equal to or lower than the limit values set out in column 2, and for which suspicious transactions and significant disappearances and thefts are to be reported within 24 hours.

⁴ 16 % w/w of nitrogen in relation to ammonium nitrate corresponds to 45,7 % ammonium nitrate, discarding impurities

⁵ Suspicious transactions and significant disappearances and thefts are to be reported within 24 hours.

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4. FAQ - Ordering Chemicals

Can I bring my own chemicals/gas/isotopes?

No, bringing your own chemicals is not allowed. All chemicals/gas/isotopes must be ordered over Kings Bay. In case you need an exception from this rule, please contact Kings Bay.

Which chemicals/gas/isotopes can I order?

We usually order chemicals from VWR.no, as they have the best delivery times. In case no suitable chemical is available from VWR.no, we order from other suppliers.

If you cannot find suitable products from VWR, please find a supplier that provides a suitable product and use their catalog number so Kings Bay AS (if possible) can order from this supplier or find the same/similar product elsewhere. We also have good experiences ordering from MERCK and Roth.

Gas orders are done over Linde.no. Here you find an overview over which gases they have:
<https://www.linde-gas.no/shop/>

Concerning Isotopes, we do not have a fixed supplier.

Are there restrictions to which chemicals/gas/isotopes I can use/order?

Yes. See section 3

How early do I need to order?

All chemical orders need to be placed well in advance of planned use. It is possible to begin the order process without having a RiS booking.


Kings Bay cannot guarantee that chemicals will arrive on time and is not held responsible for items lost or delayed during shipment.

While most chemicals can be sent by plane, flight companies have the right to refuse to transport any chemical, which quite often happens on the way up to Svalbard. Therefore, a lot of Chemicals can be only sent up to Svalbard by boat.

Here you can find the Sailing Plan of MS Norbjørn, the freight boat which supplies Ny-Ålesund: [Svalbard https://www.bring.no/tjenester/pakker-og-gods/svalbard-bring.no](https://www.bring.no/tjenester/pakker-og-gods/svalbard-bring.no) . Recommendation would be to have two boats + 4 weeks between your order and arrival, if possible. (Often, we have shorter delivery times, but we would still recommend ordering as early as possible, to make sure, your chemicals arrive.)

Gases: As usually all gas is available either in Tromsø or Oslo, so usually it is enough for you to contact us 4 weeks before arrival of the MS Norbjørn. For larger orders and special orders, we recommend contacting us as soon as you know, what you want to order. In case we must order gas from Longyearbyen you have to expect additional freight costs for the handling in Longyearbyen.

Isotopes: As early as possible.

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How do I order?

In case you want to order Chemicals/Gas/Isotope earlier than your RiS booking is finished, you can contact Kings Bay directly via laboratories@kingsbay.no. In all cases, we want you to update the RiS Booking later, so it shows all items ordered for the project.

What information do you need from us to order a chemical?

- Chemical Name + Percentage
- Grade (e.g. molecular biology grade) if applicable
- Quantity of one bottle and total quantity
- If you have a preferred product: Product Number plus supplier

Example: Ethanol $\geq 96\%$ (v/v) Reag. Ph. Eur., Supelco®, 3 x 2,5 l, 1.59010 Merck

What information do you need from us to order gases?

- Type of gas
- Type of connection (e.g. click-on or industrial)
- Type of regulator needed (in case you do not bring your own regulator)
- Amount, e.g. 4 x 5 l
- Type of bottle (in case you have preferences)

Examples: Balloon Helium 200 bar, 4 x 50 l OR Propane, Household, Steel, 11 kg

What is a typical availability of chemicals from the supplier?

This largely depends on the chemical and on the overall demand at the time of order. A good example is Ethanol 96%. Usually it is not a problem to order and is in-stock by the suppliers, but in 2020 in the first month of the Corona pandemic, it suddenly could have a lead time of several months.

Will I be able to follow up my order in RiS?


No, this is not possible. You will be contacted by email to discuss what to order and get a confirmation, when we order. In case there are problems with the shipment you will be informed.

How much will I need to pay?

Chemicals: Prices for chemicals changes all the time, therefore it is impossible to answer that question before the actual order. Therefore, we contact you to confirm the order, when we have the final price. In case you want to order us directly without checking the final amount, please tell us.

Gas: Here the prices are fixed. As we often have special offers, they often differ from the prices you will see on linde.no. In general specialty gases will be more expensive. The price of gases constitutes of:

- Price for the gas
- Price for the bottle or daily rent for the bottle
- Freight Costs

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{This is status March 2022. The price model might change in the future.}

Why vary freight costs so much?

The freight costs can vary greatly and depend on the quantity of the order. Freight cost can e.g. consist if you order just one chemical: minimum order charge + dangerous goods freight + freight + additional freight charges + insurance.

If you order early, we will try to bundle orders from different researchers to one, so that the overall freight costs go down.

I did not use the chemicals/gas/isotopes at the end, do I still have to pay?

Yes, you must pay for all your orders.

What about hazardous waste?

Hazardous waste/Dangerous Goods is handled by Kings Bay. It is only possible to send chemical waste via boat. The waste handling is explained in the Guidelines for Waste Management.

5. What else do I have to do before arrival?

Risk Assessment and Standard Operating Procedures

Before you want to start working in the Kings Bay Laboratories or want to get chemicals from the Storage at Kings Bay, you need to provide us with a risk assessment and Standard Operating Procedures.


Safety Data Sheets and Personal Protective Equipment:

- You have to read all Safety Data Sheets, which apply to your work. You have to understand the content and have to take the appropriate safety measures. In case you have problems to get the Safety Data Sheets for the ordered products, you can contact laboratories@kingsbay.no for help.
- Prepare all the Personal Protective Equipment for shipment up to Ny-Ålesund.

6. Laboratory Routines and Safety during your stay

You must know the safety procedures and how to work appropriately in a laboratory to protect yourself and others from dangerous situations. Please remind each other to be safe and “stop the work” if you are uncertain.

For more information about laboratory safety and routines read “General Introduction to your stay and safety rules in the Kings Bay Laboratories” and use the Laboratory Introduction when you come, to discuss any open questions and find out over the specifics of the Kings Bay Laboratories, e.g. specific fume hoods for specific chemicals, availability of chemical spill trays or waste containers for contaminated pipette tips etc.. Of course you can also contact the Kings Bay Engineer before arrival to find out more about e.g. Marine Lab lab areas or fume hoods.

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Some hints, how to work safely in a fume hood:

When working in a fume hood, it is essential, that the fume hood is on. In older fume hoods, it is very helpful to mount a post-it on the lower lip of the front slide in order to see, whether there is air flow.

You should never put your head in the fume hood and never work with the fume hood opened more than the maximum working height, which is at 30 cm. Ideally you place your experiment in the middle of the fume hood and only move your body slowly, to minimize turbulences, which may minimize the effect.

Close the fume hood in between work.

If you keep a lot of bottles in the fume hood or huge apparatuses this can cause turbulences, which might hinder the airflow to fulfill his protective function.

Do not use the fume hood for storage.

Storage of Chemicals in the Laboratory


- Store the minimum stock levels of hazardous materials that is reasonable for the level of usage in the lab.
- Chemicals which you cannot store safely (check SDS!) in your assigned laboratory room have to be stored before and after work in the General Storage or another suitable place.
- You should not store Chemicals at a height exceeding the shoulder height of the smallest person working in the lab.
- When you leave the laboratory after work, store the chemicals in the ventilated and closable cabinet next to the fume hood.
- A fume hood is not a storage cabinet.
- Only the engineer (or a person authorized by her/him) can enter the chemical storage to collect and deliver the chemicals needed for your work.

Storage of Chemicals in the General Chemical Storage

- In case you plan to use a chemical in the year after, you can store it in the chemical storage for a year (or another time frame you agree on with the engineer). In case the chemical is not planned to use after the period, Kings Bay will contact you to arrange disposal of the chemical.
- Currently there is no fee for storage of chemicals in the central storage, but this might change in the future.

Other Laboratory Routines

- All ongoing projects (even if very temporary) must be labelled; all glassware, samples, and equipment that are being used need to be labelled with date, contents, and a name.
- All chemicals stored in the Chemical Storage of the Marine Laboratory: The researcher get a paper copy of the Safety Data Sheet in Norwegian and English for the chemicals stored and/or provided by Kings Bay. Alternatively, they can get pdf sent via email. For chemicals stored at the host institution, the host institution is responsible for giving out the Safety Data Sheets.
- Never use hazardous substances in the Tox-Free Laboratory.

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7. What to do with chemicals at your departure?

- Chemical Waste: Make an appointment with the engineer to look over your chemical waste and follow the guidelines for waste management.⁶
- Storage: You can store chemicals in the Marine Lab Storage until you come the next time or for a colleague of you. In case there is no further usage for the chemical, you have to dispose it as chemical waste.
- Do not leave any chemicals in the laboratory.


8. Attachments

Short Introduction to Safety Data Sheets (SDS)

These sheets provide information on e.g. safe handling of chemicals, personal protective equipment, which actions to take in case of accident, and disposal. **Make sure any SDS for a substance - you plan to work with - has been read and understood by you before you start to work. If you have any questions or concerns, ask!** The up-to-date version of the SDS sheet in Norwegian is the legally binding version for Svalbard. In addition, there should be a version in English (European Union). In a SDS sheet you find the safety information the producer is obliged to tell the consumer. Here is a short overview over the different sections:

- Section 1: Identification of the Substance/mixture and of the company/undertaking
- Section 2: Hazards identification
- Section 3: Composition/information on ingredients
- Section 4: First aid measures
- Section 5: Firefighting measures
- Section 6: Accidental release measures
 - Here is explained, what to do in case of a spill.
- Section 7: Handling and storage
 - Here is explained how you have to store the chemical.
- Section 8: Exposure controls/personal protection
 - Here you find which personal protective equipment you have to use.
- Section 9: Physical and chemical properties
- Section 10: Stability and Reactivity
- Section 11: Toxicological Information
- Section 12: Ecological information
- Section 13: Disposal considerations
- Section 14: Transport information
- Section 15: Regulatory information
- Section 16: Other information

⁶ See also Guidelines for Management of Waste and Hazardous Waste in Ny-Ålesund

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Timeline what to before your arrival

1. As soon as possible / 3 months before arrival: Sent an email to laboratories@kingsbay.no with your chemical order and the list of all chemicals you want to use
2. Before arrival: Sent Personal Protective Equipment to Ny-Ålesund
3. As soon as possible / latest day of arrival: Submit risk assessment and Standard Operating Procedures