Risk Assessment | Actions | Blog

NOTIFICATION FORM:
RISK ASSESSMENT FOR ACTIVITIES
WITH MACHINES, APPARATUSES AND TEST-SETUPS (MAT)

Complete this form electronically, in consultation with your promotor and HSE contact [1]

1. IDENTIFICATION OF THE ACTORS

1.1 Requestor

Requestor: Gert Steurs;

Tel: 003216328432

Email: gert.steurs@kuleuven.be

Division:

Stockroom code[2]:

1.2 Actors of the workflow

HSE-contact: Risk Assessments;

Promotor: Wim De Borggraeve;

1.3 Participants

Persons who be conducting the experiment (only applicable in case of a *new* risk assessment):

u-/s-nummer/…:	Staff group:
KU Leuven (Association) staff with NMR clearance and access to the low-field spectrometer	KU Leuven
KU Leuven (Association) students with NMR clearance and access to the low-field spectrometer	Student KU

add new participant

2. IDENTIFICATION OF THE EXPERIMENT

2.1 Title (name) (max.40 characters):

Low-field (benchtop) NMR spectrometer

Version No. of this risk assessment (in case of modification/expansion):

3

Scope of the risk assessment (definition):

Day to day use and maintenance of the spectrometer

☐ Use ☐ Maintenance ☐ Setup/Configuration

Additional info:

Apart from fixing computer errors, removing blocked samples (maintenance) and determination of the specs, technical interventions will be done by the vendor.

2.2 This risk assessment concerns:

- ◉ a new MAT,
- ○ an existing MAT without previously submitted notification,
- ○ a modification/expansion of an existing MAT with previously submitted notification,

  This modification/expansion concerns
  (please indicate below and describe further down in this form):
  - ☐ locations where the MAT is installed
  - ☐ agents
  - ☐ modification or remodeling of MAT
  - ☐ other

  File number or reference number of previously submitted notification (if known):
- ○ termination of the experiment / dismantling or MAT with file number:

2.3 Activities for the HSE file:

(in consultation with your HSE network coordinator and Promotor/Executive [3])

- ◉ Existing activity: Enter the number of the activity, as shown in KU Loket:

  Chem - MDS _ NMR (638)

  add item
- ○ New activity for the HSE file: Enter a name for the activity (max. 40 characters):

  Item invoegen

2.4 Dates

Desired startup date: 2/05/2022 (DD/MM/YYY)

Sheduled end date: (DD/MM/YYY)

3. IDENTIFICATION OF MAT

Name:	Magritek Spinsolve 80 Carbon	Total nominal power:	3 kW
Serial Number:	SPA3537	Water content:	liter
Building:	Leuven Chem&Tech	Own construction:	☐
Room:	01.164 (mobile device on movable cart)	Second hand:	☐
Year Of Construction:	2022	Foreign supplier:	☑
		The MAT could be sold later on:	☐

There is a CE-mark on the MAT or on the individual parts (not applicable (N/A) if the year of construction is before 1995).

○ N/A ◉ Yes ○ No (comment):

In case of assembly-setup, please describe the parts

system equipped with a standard uninterruptable power supply delivered by the vendor of the setup

4. DESCRIPTION OF THE ACTIVITIES WITH MAT AND RISK ASSESSMENT

4.1 Describe the purpose of this MAT and the preconditions (detailed description):

Record NMR spectra at low field (1.9 T magnet, 80 MHz 1H basic frequency) using a benchtop NMR spectrometer

4.2 Describe all necessary manual operations:

nr.	description	equipment	location	
1	STANDARD USE IN AUTOMATION: Insert sample into the autosampler and program the experiment in the computer	Sample, Spinsolve NMR spectrometer, computer	building room cont. lvl unit [5]	Leuven Chem&Tech - C 01.164 (varying) own unit
2	STANDARD USE WITH FLOW SETUP: Prepare spectrometer for flow experiments, setup peristaltic pump and connect to reaction vessel, program the experiment in the computer	Sample, Spinsolve NMR spectrometer, computer, peristaltic pump, reaction vessel	building room cont. lvl unit [5]	Leuven Chem&Tech - C 01.164 (varying) own unit
3	MANUAL MEASUREMENTS WITHOUT AUTOMATION: Insert sample into the autosampler or directly into the bore of the magnet, program measurements in the Spinsolve software or Spinsolve Expert software	Sample, Spinsolve NMR spectrometer, computer	building room cont. lvl unit [5]	Leuven Chem&Tech - C 01.164 (varying) own unit
4	MAINTENANCE: Recalibrating shims, determination of specs, software or firmware updtaes, ...	Standard samples, Spinsolve NMR spectrometer, computer	building room cont. lvl unit [5]	Leuven Chem&Tech - C 01.164 (varying) own unit

4.3 Frequency of execution of the experiment

- ◉ Daily
- ○ Weekly
- ○ Monthly
- ○ Less than monthly

4.4 Use this space to include any additional information essential to perform the risk assessment (e.g. photo's, descriptions, schematic of the reaction) or to refer to any annexes:

Description	attachment
The 5 Gauss line (even the 2 Gauss line) of the setup resides within the footprint of the spectrometer. The spectrometer is designed for use inside the lab at or near the bench. There is one moving part in the autosampler that should not be blocked during operation. However the system monitors the status of this part to avoid issues. As the 2 Gauss line is within the footprint of the machine, no additional safety guidelines regarding the static magnetic field need to be considered. Care must be taken, however, for fluctuating magnetic fields from the gradients and radio-frequency pulses.	Click here to attach a file

add item

4.5 Risks associated with the experiment

General risks

	yes	no	n/a
There is a risk of damage to hearing, e. g. because of noise levels exceeding 85dB.	○	◉	○
There is a risk of being cut, crushed, clamped, perforated, grasped, of damage to the eye/other, from e. g. • sharp edges or corners • unshielded moving parts/engine mechanisms • shields that are easily bypassed (without tools/safety contact) • emissions of dust, vapor or liquids • falling/flinging parts. • parts that can break or shatter	○	◉	○
There is a risk of falling or tripping e. g. • limited space to move	○	◉	○

• insufficient lighting around (and possibly within) the apparatus. • loose wires • altitude (relevant height as of 50 cm)	
There is a risk of electrocution (direct or indirect) e.g. • electrical parts exposed to touch • insufficient or lack of grounding (or no double insulation). • damaged or incorrectly connected electrical wires	○ ◉ ○
There is a risk of getting burns e. g. • hot or extremely cold surfaces exposed to touch • working with open flames	○ ◉ ○
The MAT can tip over or fall over because of unstable positioning.	○ ◉ ○
There is a risk of fire.	○ ◉ ○
There is a risk of explosion, chemical or physical (a.o. because of pressure, dust, gas, liquids ...).	○ ◉ ○
Other:	
	○ ◉ ○
If "Yes", please describe the precautionary measures that need to be put in place:	

Operating conditions

	ok	nok	n/a
The MAT can be quickly and safely switched off in all circumstances. (If this is not possible using the standard controls, an emergency stop is recommended).	◉	○	○
When the emergency stop (if present) is activated, the MAT is put into safety condition.	○	○	◉
Only an intentional action can activate the MAT.	◉	○	○
The MAT cannot restart automatically after a power cut, or this poses no risk.	◉	○	○
The operating mechanisms are outside the danger zone.	○	○	◉
The stop-command has a higher priority than the start-command.	◉	○	○
The MAT can easily be disconnected from the electric circuitry.	◉	○	○
The user manual is present on site and contains:			
- Instructions for use (start, stop, signalization ...)	◉	○	○
- Instructions for maintenance (maintenance program, tests ...)	◉	○	○
- Instructions for (dis)assembly and commissioning	○	○	◉
Other:			
	○	○	◉
If “NOk”, please describe the safety measures that need to be put in place:			

Specific risks

Description	Condition for notification (indicate where condition is met)
☐ Use of gases (which + pressure):	☐ As of class E4+, acute dangerous
☐ Use of cryogenic gases (which + amount):	☐ In case there is a risk for O2-depletion (<19%O2 in air)
☐ Use of powders (which)	☐ As of class E4+, acute dangerous ☐ Pyrophoric
☑ Use of chemicals	☑ As of class E4+, acute dangerous

Name of product	CAS	Class	Amount, concentration	Most significant risk (flammable, toxic, …)
NMR solvents		Selecteren...	0.5 mL	specific risks per solvent, however closed systems used and samples prepared in the fume hood
Analyte		Selecteren...		specific risks per analyte. These risks should be taken up in a separate RA.

add item

☐ Use of biological agents (which):	☐ Only in case of no previous notification ...
☐ Only in case of no previous notification.	☐ Only in case of no previous notification.
☐ Use of ionizing radiation (which):	☐ Risk of exposure
☐ Use of material-processing machines (workspace machines ...)	☐ Always
☑ Magnetic fields: Maximum field strength 19000 Gauss ☑ Static magnetic field. ☐ Variable magnetic field: frequency: Hz	☐ As of static field of 5 Gauss outside the setup.
☐ Use of lasers: - laser class: - wavelength: nm	Risk of exposure to: ☐ Laser class 3 and 4 with open beam (including during alignment). ☐ Reflections from laser class 4 beam
☐ Use of increased/reduced pressure with risk of ☐ emission of toxic/flammable/hot/... gases or substances. ☐ rupture of the vessel (without pressure relief).	☐ Risk of emission and/or rupture.

☐ Use of high voltage (as of 1000V): - max. tension = V - max. output current = mA	☐ Contacts are not shielded and Imax≥10mA. ☐ Unshielded capacitive power.
☐ Use of nano materials: ☐ in solid matrix. ☐ in solution. ☐ in open air. specify the parent material:	☐ Risk of exposure.
☐ Other (falling from height ...):	

Which specific risks are present?:

Which specific measures have been taken to deal with these risks?:

The samples are submitted in closed NMR tubes and small amounts of solvents are used (500 microliter per experiment). Outside of the spectrometer casing, there is no stray field higher than 2 gauss.

Interaction with surroundings

Are there any other activities present in the same location? (f. ex. office or lab)

◉ Yes
○ No

If “Yes”, please describe the activities:

synthesis activities

Which are the measures put in place to minimize any interaction with other activities?

The spectrometer is designed to be operated in a synthesis lab and to even monitor reactions

Organizational measures:

	yes	no	n/a
Maintenance, repairs and periodic cleaning are executed according to the specifications. In these cases, the MAT is first rendered inoperative.	○	○	◉
A technical construction file is available which contains at least the construction data, the user manual, the necessary maintenance and an the necessary check-ups of the MAT (applicable for self-constructed MAT with risks).	○	○	◉
If periodical maintenance or check-ups are necessary for a good and safe use, a log should be present.	○	○	◉
The main instructions (if applicable) are stored and available with the MAT.	◉	○	○
The MAT is not used outside its normal intended purpose (described in section 1).	○	◉	○
Every operator of the MAT has sufficient knowledge (through training, experience, user manual ...)			
on operating the apparatus (start-stop-emergency stop),	○	○	◉
on the intended purpose of the MAT,	◉	○	○
to recognize a dangerous or abnormal situation.	◉	○	○
Every operator has knowledge of the emergency procedures and is aware of what to do in case of a failure or incident.	◉	○	○
In case of isolated employment (i.e. remote location or space with very little staff or passers-by) with a risk that in case of a grave incident, one is NOT able to autonomously raise the alarm, at least one of the following measures is put in place (indicate which):	○	○	◉
☐ Another person is in the vicinity and is aware of the activity.			
☐ An automatic dead-man switch is present (to be requested at the Central Dispatch).			
Which residual risks (e.g. warm surfaces, electrical risk, moving parts ...) and attention points (goggles, hearing protection, gloves ...) are signalized through pictograms?			
Is this sufficient?	○	○	◉
A responsible person has been indicated for the MAT (only applicable for high-risk MAT).	◉	○	○
Other	○	○	◉
If "No", please describe the precautionary measures that need to be put in place:			

5. PROTECTIVE EQUIPMENT

Protective equipment

	normal use	maintenance	setup/config
5.1 Collective protective Equipment			
Closed System (specify type)	☐	☐	☐
Fume Cabinet (extraction hood)	☐	☐	☐
Local Ventilation	☑	☑	☑
General Ventilation	☑	☑	☑

Safety Screen	☐	☐	☐
Spillage Collectors underneath the setup	☐	☐	☐
Gas Detection (type)			
Portable	☐	☐	☐
In the room/lab	☐	☐	☐
Fire Detection (general)	☑	☑	☑
Other:	☑	☑	☑

Samples should be prepared in a fumehood and NMR tubes should be properly closed before placing them in the autosampler.

5.2 Personal Protective Equipment

General Protection			
Labcoat/Workwear	☑	☑	☑
Safety Shoes	☐	☐	☐
Disposable Overshoes	☐	☐	☐
Disposable Hygienic Hairnet	☐	☐	☐
Disposable Overalls	☐	☐	☐
Disposable Lab Coat	☐	☐	☐
Other:	☑	☑	☑

Use of PPE is determined by the lab environment and not by the MAT.

Facial Protection			
Safety Glasses	☑	☑	☑
Safety Visor	☐	☐	☐
Face Shield	☐	☐	☐
Other:	☑	☑	☑

Use of PPE is determined by the lab environment and not by the MAT

Respiratory Protection			
Disposable Dust Mask P1	☐	☐	☐
Disposable Dust Mask P3	☐	☐	☐
Dispoasable hygienic mask/surgical mask	☐	☐	☐
Half face mask with following cartridges:	☐	☐	☐
Full face mask with following cartridges:	☐	☐	☐
Other:	☐	☐	☐

Gloves			
Disposable Nitril EN 374	☑	☑	☑
Disposable Vinyl EN 374	☐	☐	☐
Nitril EN 374	☐	☐	☐
Cryogenic Gloves	☐	☐	☐
Other:	☐	☐	☐

Use of PPE is determined by the lab environment and not by the MAT

Hearing protection			
Disposable Earplugs	☐	☐	☐
Hearing Bracket	☐	☐	☐
Earmuffs	☐	☐	☐
Custom made otoplast	☐	☐	☐
Other:	☐	☐	☐

5.4 Work practices

- ☑ Apply the Code of Good Laboratory Practice
- ☑ Provide internal training and guidance
- ☑ Organize selective collection of waste
- ☑ Other:

Users need to get an official training by the MAT's manager to use the setup.

6. WASTE MANAGEMENT - MAT

6.1 Which waste fractions do you expect and how will these be disposed of?

Description

Description
Solvents and analytes will be disposed in the appropriate waste vessels, as taken up in the corresponding RA.

add item

7. PARTICULAR MEASURES

7.1 In case of failure and reactivation of utilities (incl. deviation from the specifications)

Utilities	Consequence(s) in case of failure/malfunction	Is this an HSE issue, yes/no?	If yes, please describe the measures
Electricity	MAT will be shutdown and will need to be restarted (and calibrated)	☐	
Ventilation	none, all samples are in closed tubes	☐	
Gas-supply		☐	
(Cooling) water		☐	
Compressed air		☐	
Inert atmosphere		☐	
Vacuum		☐	
		☐	

7.2 Can the experiment take place when the setup is left unattended (= continuous experiments)?

- ○ Not applicable: the setup will never be left unattended
- ◉ Yes. Apply the procedure "Continuous activities - unattended"
- ○ No, additional measures are required.

Describe the additional measures:

In addition, apply the procedure "Continuous activities - unattended".

7.3 Is working outside normal working hours permitted?

- ○ No
- ◉ Yes

Describe which additional measures have been put in place (e.g. ventilation, second person present, dead-man switch ...):

Samples can be added to the experiment queue during the regular working hours, measurements can run overnight without user intervention.

7.4 Describe your procedure for rapid shutdown,
or the measures to be taken in case of evacuation of the premises:

no special procedures needed

8. CONCLUSION / COMMENTS / QUESTIONS

Use this space to note down any additional comments or questions you may have:

FILL IN THIS CHECKLIST.

In case one or more of the following criteria apply, the HSE network coordinator will present this risk assessment to the HSE Department by starting a **type 3** advice workflow.

- ☐ A "Yes" from section 4.4 is not followed up with an adequate preventative measure or the specified measures are inadequate to sufficiently reduce/eliminate the risk.
- ☑ In section 4.4, "specific risks", a check is marked for one or more of the conditions for notification.
- ☐ A failure of utilities has HSE-relevant consequences.
- ☐ Despite the implementation of the safety measures as described, there is still a realistic risk at physical injury (short- and/or long-term).
- ☐ The MAT is self-made and poses risks when used.
- ☐ The unit would like to request additional advice from the HSE Department. (Specify your request above)

Additional information may be requested if necessary.

9. ADVICE BY HSE-DEPARTMENT

This space is reserved for the HSE-Department

HSE-reference:

[1] You can find the members of your local HSE network through KU Loket > HSE & Spaces > My HSE > My HSE network

[2] If you don't know the stockroom code, please consult your HSE contact

[3] This is the hierarchical responsible according to the official organisational chart.

[4] Number of agent as indicated in section 3.1.

[5] If manipulations are conducted within a room allocated to another unit, then a copy of this risk assessment must be sent to the concerned manager (in cc.).

[6] Number of sub-experiment as indicated in section 4.2.

[7] For guidelines on how to acquire Personal protective equipment (PPE), please consult your HSE contacts or visit the HSE Department website.

end of document