Safety Documentation

Please select the forms you require by selecting the check boxes below.
You can select more than one.

☑ **Method Statement** ☑ **Risk Assessment** ☑ **Chemicals COSHH**

Once you have made your selections, scroll down and complete the forms.

Buttons: [+] will add a row to a list [X] will delete a row from a list

You may save this file to a local drive at any time.
When you have finished, save the file to a local drive and email it to your supervisor for authorisation.

Supervisors - There is a sign-off section at the end of the document set that must be completed.

Staff may "self authorise", (as a supervisor), but the forms must still be submitted to the DSO for approval.

IMPORTANT:

YOU ***MUST NOT*** START ANY PRACTICAL WORK UNTIL THESE FORMS HAVE BEEN RETURNED TO YOU WITH **BOTH** YOUR SUPERVISOR's AND DSO's APPROVAL SIGNATURES ATTACHED.

Please complete these fields

School or Service	Wolfson School of Mechanical, Electrical and Manufacturing Engineering
Department	Wolfson School of Mechanical, Electrical and Manufacturing Engineering
Originator name	Nicholas Jan Spoor
email address	n.spoor-19@student.lboro.ac.uk
Location	Center for Biological Engineering, Room H27
Project / Activity / Task	Development of a non-invasive glucose monitoring device using microwave signals
Supervisor Name	Prof Sotiris Korossis

Version : 2.32

Loughborough University
Wolfson School of Mechanical, Electrical and Manufac

Safety Method Statement

Reference: SAF/MEME/7560

Location: Center for Biological Engineering, Room H27

Originator: Nicholas Jan Spoor

Project / Activity / Task: Development of a non-invasive glucose monitoring device using microwave signals

What equipment will be used in this activity?	+
Vector Network Analyzer	x
Antennas	x
Forceps	x
Chemgene wipes	x
Wires	x
Disposable scalpel	x
Disposable single use scalpels	x
Scissors	x
Cuvette	x
Porcine skin	x
Porcine artery	x
Porcine heart	x
Beaker	x
Test tube	x
Laboratory stand	x

What training must be completed to do this activity?	+
Sharps use	x
Biological spill response	x
Decontamination and disposal of biological waste	x
Hand tools use	x
Fundamentals of VNA	x

What chemicals are being used? (These must be included in the COSHH Form)	+
1% Virkon	x
70% IMS	x
Chemgene	x
Glucose solution	x

Spill and accident procedures.	+
Container with 1% Virkon solution	x

Procedure in the event of an emergency. (How to leave the process in a safe condition in such an event) +

Safety Method Statement (Continued)

Dispose scalpels in the sharps bin. Put porcine tissue in a container. Dispose contaminated gloves into correct waste stream. Leave a note with name of the operator and state mentioning not to move anything from the are.	x
If fire alarm sounds continuously evacuate the building. Only return to lab when informed that it is safe to do so	x

References.	+
CBE code of practice, SOP003, SOP037, SOP038	x

Detailed sequential description of the process

Process step	Precautionary measures and comments	+
Wear PPE mentioned above.	Check if PPE is damaged and replace if it is compromised.	x
Pour 1% Virkon into a container.	Pour solutions with care avoiding spillages. If there is a spillage follow SOP038.	x
Prepare dissection tray.	Place absorbent paper towel underneath the tray.	x
Retrieve powder glucose and deionized water.	Use trolley if deionized water is too heavy to carry.	x
Using a scale weigh out the desired mass (g) of glucose in a beaker.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Add 80ml of deionized water and stir until the glucose is completely dissolved.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Adjust volume to desired concentration using deionized water and mix again.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Repeat steps 4-7 to increase or decrease solution concentration for each experiment.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Pour glucose solution into cuvette/test tube.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Remove samples from container, which they have been stored in, using forceps.	Take care in avoiding spillages. If there is a spillage follow SOP038.	x
Place tissue on dissection tray.	Be careful not to drop the tissue. In case of an accident disinfect the area.	x
Cut the porcine tissue using scissors or scalpel depending on user's preference to desired dimensions.	Do not cross hands to avoid cutting or puncturing yourself. Use disposable single use scalpels and open sheath from the side of the handle. If disposable single use scalpels are not available, place the scalpel on the handle maintaining the scalpel in the protective sheath. In any case, wear cut-resistant glove level 5 on hand that does not hold the scalpel.	x
Prepare the cuvette/test tube for tissue to be wrapped around or seal one end of an aorta segment and fill it up with glucose solution or fill left ventricle of heart with glucose solution.	Be careful not to drop the tissue. In case of an accident disinfect the area.	x
Secure tissue sample on cuvette/test tube using zip tie/rubber band or tie/seal top end of aortic segment or secure heart in applied position using laboratory stand.	Be careful not to drop the tissue. In case of an accident disinfect the area.	x
Secure antennas on the outside of the porcine tissue and begin testing using signals generated by the VNA.	Be careful to not damage the VNA or other electronic equipment. Keep VNA dry and at least 1m away from the tissue.	x
After testing is complete, remove the tissue samples from the cuvette/test tube or empty glucose solution from the aorta/heart and remove heart from laboratory stand.	Be careful not to drop the tissue. In case of an accident disinfect the area.	x
Immerse used porcine tissue in 1% Virkon solution over night.	According to CBE code of practice and SOP003.	x
Repeat steps 3-17.	According to CBE code of practice and SOP003.	x

Safety Method Statement (Continued)

Process step	Precautionary measures and comments	+
At the end of the procedure discard the scalpels in the sharps bin and pour glucose solution down the drain.	Put the disposable single use scalpel in the sharps bin placing the blade part in first. Otherwise, use scalpel blade remover to remove blade from handle and dispose it in sharps bin.	x
If there are no more samples to use. Disinfect the beaker, cuvette/ test tube, scissors and dissection tray. Briefly disinfect using 1% Virkon then wash with water and follow up by using Chemgene wipes and finally 70% IMS.	According to CBE code of practice and SOP003.	x
Put all contaminated gloves in yellow stream bag for disposal.	According to CBE code of practice and SOP003.	x
The next day dispose tissue left in 1% Virkon into 2 yellow bags and zip tie shut. Pour the Virkon down the sink with plenty of water.	According to CBE code of practice and SOP003.	x
		x
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		x
		x
		x
		x
		x

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Risk Assessment

Reference: SAF/MEME/7560

Location: Center for Biological Engineering, Room H27

Originator: Nicholas Jan Spoor

Project / Activity / Task: Development of a non-invasive glucose monitoring device using microwave signals

Is this process risk assessment for a : ☑ Laboratory / Workshop ○ General use

Category 1: Machinery & work equipment:				
Design and Construction	Mechanical hazards	Electrical hazards	Radiation hazards	+
		Electrical test lables current	Microwave signals within 100MHz-3GHz	x

Category 2: Workplace	+
Confined work area (striking objects)	x
Falling/moving objects/materials	x
Slips/Trips/Falls on the level	x
Category 3: Hazardous and/or Harmful substances	+
Irritant substances	x
Category 4: Work activity	+
Use of hand tools	x
Category 5: Work organisation	+
N/A	x

Explain the risks associated with these hazards

People / Groups at risk: Operator only — x

Enter risk details here:-	Impact	Probability	Risk Score
Cut wounds that can lead to infection and nerve damage	Very Harmful	Likely	Unacceptable
What are the control measures?	Lowers Impact	Lowers Probability	+
Use of cut-resistant gloves level 5	Significantly	Significantly	x

Residual Risk: Low

People / Groups at risk: Operator only — x

Enter risk details here:-	Impact	Probability	Risk Score
Aerosols from disinfectants.	Harmful	Likely	High
What are the control measures?	Lowers Impact	Lowers Probability	+
Wear nitrile gloves, lab coat, goggles	Significantly	Significantly	x

Process Risk Assessment Form (Continued)

			Residual Risk	
			Low	
People / Groups at risk	Operator only			x
Enter risk details here:-		Impact	Probability	Risk Score
Electrical shock.		Very Harmful	Unlikely	High
What are the control measures?		Lowers Impact	Lowers Probability	+
Keep main electrical equipment at least 1m away form test fluids.		Significantly	Significantly	x
			Residual Risk	
			Low	
+ Add another Risk				

Who may be at risk as a result of this activity?

Personnel Group	Maximum (Task setup/ Re-configuration)	High (Performing the task)	Medium (Observing the task)	Low (Present, but not involved)	Lone Working (Out of hours)	No Exposure Permitted	Total
Academic Staff	0	0	0	0	0	0	0
Technical Staff	0	0	0	0	0	0	0
Research Staff (PDRA)	0	0	0	0	0	0	0
Research Students (PhD)	0	0	0	0	0	0	0
Students (Undergraduate / MSc)	0	0	0	0	0	0	0
Visitors	0	0	0	0	0	0	0
Others - Over-type as needed	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

With these controls in place, the risk is:

The activity is LOW RISK - and is effectively controlled

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COSHH Form

Reference: SAF/MEME/1859, 1863

Location: Center for Biological Engineering, Room H27

Originator: Nicholas Jan Spoor

Project / Activity / Task: Development of a non-invasive glucose monitoring device using microwave signals

CHEMICAL NAME

Glucose (C6H12O6)

CAS No. 50-99-7

W.E.L. (Itel / stel)

Amount used		Period of use (hrs)	The process is:	Physical State		Exposure Potential	Hazard Rating	OVERALL RISK:
18	g	48	Closed	Non-Volatile Liquid	☐ Eyes ☐ Skin ☐ Inhaled ☑ Ingested	Low	Low	Low

Hazard Statement and Description	Precaution Statement and Description
H303 May be harmful if swallowed	P280 Wear protective gloves/protective clothing/eye protection/face protection.

How will the precautions listed above be implemented?

Wear PPE: Nitrile gloves, lab coat and eye protection.

Special Storage and Containment Measures	Disposal Method
No specific storage requirements as solution will be dissolved when required.	Aqueous waste - Check with Technician or Supervisor

How will spillages be dealt with?

Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.
Click here to see spill procedures

Absorbent cloth / tissue

CHEMICAL NAME

Virkon

CAS No.

W.E.L. (Itel / stel)


Amount used		Period of use (hrs)	The process is:	Physical State		Exposure Potential	Hazard Rating	OVERALL RISK:
5	g		Open	Dusty Solid	☑ Eyes ☑ Skin ☐ Inhaled ☐ Ingested	Low	High	Medium

Hazard Statement and Description	Precaution Statement and Description
H315 Causes skin irritation.	P280 Wear protective gloves/protective clothing/eye protection/face protection.
H318 Causes serious eye damage.	P280 Wear protective gloves/protective clothing/eye protection/face protection.
H412 Harmful to aquatic life with long lasting effects.	P501 Dispose of contents/container to ...

How will the precautions listed above be implemented?

Wear PPE- nitrile gloves, lab coat and goggles.

Special Storage and Containment Measures	Disposal Method
Corrosive cabinet	Aqueous waste - Check with Technician or Supervisor

How will spillages be dealt with?

Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.
Click here to see spill procedures

Absorbent cloth / tissue

COSHH Form (Continued)

CHEMICAL NAME

Chemgene

CAS No.

W.E.L. (Itel / stel)

Hazard Rating: High

Amount used		Period of use (hrs)	The process is:	Physical State		Exposure Potential
5	g		Semi Closed	Non-Volatile Liquid	☑ Eyes ☑ Skin ☐ Inhaled ☐ Ingested	Low

OVERALL RISK: **Low**

Hazard Statement and Description	Precaution Statement and Description
H314 Causes severe skin burns and eye damage.	P280 Wear protective gloves/protective clothing/eye protection/face protection.
H412 Harmful to aquatic life with long lasting effects.	P273 Avoid release to the environment.

How will the precautions listed above be implemented?

Wear PPE- nitrile gloves, lab coat and goggles.

Special Storage and Containment Measures	Disposal Method
tightly closed container in a cool, well ventilated area	Check with Technician / Supervisor (Orange bin)
How will spillages be dealt with?	*Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.* *Click here to see spill procedures*

CHEMICAL NAME

IMS 70%

CAS No.

W.E.L. (Itel / stel)



Hazard Rating: High

Amount used		Period of use (hrs)	The process is:	Physical State		Exposure Potential
5	g	1	Open	Non-Volatile Liquid	☐ Eyes ☑ Skin ☑ Inhaled ☑ Ingested	Low

OVERALL RISK: **Medium**

Hazard Statement and Description	Precaution Statement and Description
H224 Extremely flammable liquid and vapour.	P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
H225 Highly flammable liquid and vapour.	P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhal	P280 Wear protective gloves/protective clothing/eye protection/face protection.
H370 Causes damage to organs.	P280 Wear protective gloves/protective clothing/eye protection/face protection.

How will the precautions listed above be implemented?

Wear all required PPE including nitrile gloves and ensure everyone in the lab is aware of no flames

Special Storage and Containment Measures	Disposal Method
Store in flammables cupboard	Aqueous waste - Check with Technician or Supervisor
How will spillages be dealt with?	*Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.* *Click here to see spill procedures*
Absorbent cloth / tissue	

+ Add another chemical

Statement of work (Process to be undertaken)

The tissues will not be contaminated with bacteria and can be used for further testing.

Show image

COSHH Form (Continued)

Personal protection requirements not covered in the precaution statements above.

Appropriate clothing (long legged trousers) and closed shoes must be worn.

Sources of information and references

MSDS

Reference to **existing approved** Risk Assessment

Virkon CBE/COSHH/39
IMS CBE/COSHH/36
Chemgene CBE/COSHH/242
SAF/MEME/7554 &7556&7544

With the current controls, the risk of using these chemicals is: Medium

Supervisor to check that the process involving the safe use of these chemicals has been satisfactorily evaluated

Supervisor and Departmental Safety Office (DSO) Sign-off.

Supervisors

Please check the documents above and if you want to approve them:

1) Electronically sign this document
2) Save it to a local drive (You will be prompted to do this)
3) eMail the signed document to the DSO.

DSO

Please review the documents above and if you want to approve them:

1) Enter the reference numbers as appropriate
2) Electronically sign this document
3) Save it to a local drive (You will be prompted to do this)
3) eMail the signed document to the originator

IF YOU DO NOT WANT TO AUTHORISE THE FORMS,

Please do not sign the form, but click the "Not Approved" check-box and return it to the originator by email stating why and what you expect them to do to put it right in the comments box below.

Not Approved ☐

Supervisors Signature: Professor Sotiris Korossis — Digitally signed by Professor Sotiris Korossis Date: 2023.02.21 12:37:44 Z

Form Reference Numbers

Risk Assessment	Method Statement	COSHH Assessment
SAF/MEME/7560	SAF/MEME/7560	SAF/MEME/1859, 1863

DSO Signature: Keven G Smith — Digitally signed by Keven G Smith Date: 2023.03.14 11:16:34 Z

This document set must be reviewed and re-approved at the following times:

1) After the first occurrence of the activity described above (Review only)
2) After any change to the procedure or reagents used
3) After any incident resulting from this activity
4) At least annually from the date of approval

Next Review: 14 Mar 2024

Review comments