

General information

Risk Assessment (RA) of chemical processes must be prepared and approved before any practical work with chemicals in cleanrooms of Lund Nano Lab (LNL). It is recommended to start working with the RAs after the practical hands-on wet bench training course is completed (contact **Sara Ataran** to arrange a training). By knowing practical details of wet benches and fume hoods and methods of a safe work with chemicals, it would be easy to avoid typical mistakes working with the RAs in KLARA database.

KLARA is a database of all chemicals used at Lund University and has a built-in module for the assessments of chemical risks. Below is a step-by-step instruction how to do the Risk Assessments using the KLARA database.

The RA procedure requires two steps:

1. Study of Material Safety Data Sheet (MSDS) of the chemicals to be used
2. Evaluation of the risk of your chemical process (RA).

Please note that LUCAT ID is needed in order to login to KLARA and work with the risk assessments.

Step-by-step instruction

1. Login to [KLARA database of Lund University](#) using LUCAT ID.
2. Choose English or Swedish language in the upper right corner. English is recommended as there is a small bug in the software, which results that RA information shows differently in English and Swedish.
3. Logout and send e-mail to **Ivan Maximov** to activate your full access to KLARA.

Study of Material Safety Data Sheet (MSDS)

1. After confirmation of full access, login to [KLARA](#) again.
2. To study the MSDS of the chemicals, click on **Chemical products** in the upper left corner of the KLARA page.
3. In the **Search** window type KLARA-ID number of the most commonly used chemicals in LNL (see KLARA-ID code in the **Appendix 1**), e.g. 34878 for PMMA resists. One can also use a name or a chemical formula, e.g. Hydrochloric acid or HCl.
4. Choose the suitable search result by clicking on it. On the **Classification** page, one can find the most important safety data, by clicking on **SDS**; one can also download the pdf-version of the MSDS information, both in English and Swedish.
5. Study the MSDS carefully, paying attention to classification, hazard and precautionary statements according to Classification, Labelling and Packaging (CLP) regulations.
6. Make sure you understand the dangers of the substances

Note: access to MSDS (reading rights) is provided even without LUCAT ID, but login with full access is required to start working with RAs.

Work with Risk Assessments

1. Click on **Risk Assessments** in the upper menu. Choose **Risk assessment** in the upper left area.
2. Click to open **Avdelningar inom fysik tillhörande tekniska fakulteten**, then **Fasta Tillståndets Fysik**.
3. Scroll down the list on the left side. Under **Lund Nano Lab** you will find your folder in format **Surname Name**. If you do not see the folder with your name, contact Ivan Maximov or Sara Ataran and ask them to create it. The user folders are sorted in alphabetical order with folder ***Standard processes** placed on top.
4. To see how typical RA looks like, open the folder ***Standard processes** and click on one of the RAs, e.g. **Cleaning with acetone and IPA**. The risk assessment will be displayed on the right-hand side of the page. Scroll the page down to see the whole RA. Clicking on **?** symbol will display detailed help information. Follow those recommendations when working with your own RA.
5. To create a new RA, click on New risk assessment above the ***Standard processes**, give it a name, e.g. **Lift-off with acetone**. Use a concise and short name for clarity. In **Form** choose **Risk assessment** and in **Folder** pickup your own folder (you may need to scroll down until you find it). Press Save assessment.
6. During filling the RA, go through items 1 to 22: in case of questions, click on the **?** symbol for help.
7. Below is a brief explanation how to fill them.
 - **State the premises in which the activity is taking place.** Here you write the rooms which you will use in your experiments, e.g. Q161 (EBL-lab).
 - **Description of activity.** Give a step-by-step description of your experiment, stating the most essential experimental parameters, e.g. temperature, amount of chemicals, their handling, use of equipment (hot plate, ultrasonic bath etc.).
 - When filling **3. Products**, search the KLARA database for the required chemical (upper right corner – Search and add product). If you need to find e.g. 2-propanol, type IPA or propanol to find it. KLARA-ID codes in Appendix 1 can be used for frequently used chemicals. Mark: **Yes, the content level of air contaminants in inhaled air of the substance at described handling is acceptable according to the limit value in AFS 2015:7. Measurement is not considered needed.**
 - In **20. Final risk assessment of the method**, choose the suitable risk level. This is the most important part of the RA, it summarizes the degree of risk when using the chemicals – pay a special attention to it.

Chemical Risk Assessment in KLARA



- Write your name in **21. Participants in the assessment**.
 - Change the **Status** to **Finished** when everything is filled.
 - Date of re-assessment: put 2 (two) years from the current date.
 - Finally, in **Person signing**, write **Ivan Maximov**.
 - Click **Save** to secure changes.
8. When the RA is saved in the **finished** status, it will be evaluated by the responsible person (Ivan Maximov). Contact Ivan Maximov and ask him to evaluate the risk assessments.
 9. When the RA is approved, login to KLARA, open RA, click on **Show**, save the pdf-file and send it to Ivan Maximov. The RA must also be printed, signed and archived as a paper copy.
 10. Only after signing the RA paper copy one can do chemicals experiments.
 11. End

Contact information:

1. **Ivan Maximov**, responsible for risk assessments at LNL, tel. 046/222 31 85, e-mail: ivan.maximov@ftf.lth.se
2. **Sara Ataran**, responsible for registration of chemicals and hands-on training, tel. 046/222 7671, e-mail: sara.ataran@ftf.lth.se

Appendix 1. KLARA-ID codes of the most frequently used chemicals at LNL

prefix	Name	KLARA-id
	Acetone	9075
	Ammonium sulfide solution 20-25%	11159
	Adhesion Promoter AP3000	50704
	Ammonium acetate	9983
	Aluminum Etch	176291
	Adhesion Promoter AP3000	50704
	Ammonia solution 25% produkten Ej granskad	132338
	Ammoniumfluorid	1952
	Ammoniumfluorid solution, 40% in H2O	75725
	n-Amylacetat	9079
	Anisol	15480
	AZ nLOF 2070 Fotoresist	85253
	Buffered Oxide Etch 10:1	130515
	Butylacetat	9089
	Boron Dopant Coating BDC1-2500	176536
	Chromium etch	74503
	Citronsyra (Citric acid)	9922
	Cyclotene 3022-46 Advanced Electronics Resin	85363
	Cyclotene 3022-57 Advanced Electronics Resin	85364
	Cyklopentanon	10151
	Developer AR 600-546	138434
	Developer for Photoresist ma-D 525	138269
	Developer for photoresist ma-D 533 & ma-D 533 S	53396
	Developer for photoresist ma-D 330S & ma-D 335S	85187
	Developer for photoresist ma-D 532	34887
	Developer for Photoresist ma-D 531 - 534	176755
	E-Beam Resists AR-P 6200	163993
	EBR PG	50701
	ELEVATE GOLD 7990 RTU	176751
	ELEVATE GOLD 7990 ST2	176559
	Espacer 300Z	122621
	Etylacetat	9109
	E-Beam Resists AR-P 6200	163993
	EBR PG (MicroChem)	50701
	ECF 60 ready-to-use solution	176555
	EKC265	85294

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	ELEVATE GOLD 7990 ST2	176559
	ELEVATE GOLD 7990 RTU	176751
	24K Pure Gold Plating Solution	176289
	Phosphoric acid 85%	9145
	950 PMMA Series Resist in Anisole	34878
	Phosphorus Dopant Coating PDC5-2500	176761
	PMGI SF Series Resist	34873
	Orto-Phosphoric acid 85%	118734
	FOX(R)-12 Flowable Oxide	78452
	Galliumarsenid	12005
	Galliumfosid	50435
	Gold etchant, standard	74505
	1,1,1,3,3,3,-Hexametyldisilazan	10358
	Hexametyldisiloxan	9311
	Hexan	9116
	Hexylacetat	32298
	Hydrobromic acid >=48%	30987
	Hydrofluoric acid 1-7%	85223
	Hydrofluric acid 48 wt % in H2O	142463
	Isobutylmetylketon	9526
	Jod (Iodine)	9854
	LOR A Series Resists	122583
	LOR B Series Resists	122584
	Ma-D 330-337	85320
	Ma-N 2400 Negative Tone Photoresist Series	85251
	MCC Prime 80/20	76377
1-	Methyl-2-pyrrolidinone	11374
	Metanol	9121
	Microposit MF319 Developer	51074
	Microposit Remover 1165	160977
	Microposit S1805 G2 Positive Photoresist	138283
	Microposit S1813 G2 Positive Photoresist	51073
	Microposit S1818 G2 Positive Photoresist	85216
	MMA (8.5)MAA Copolymer Series Resists	50751
	Mr-I 9030 E Imprint Polymer	85373
	Mr-Rem 660 remover	62501
	ma-N 2400 Negative Tone Photoresist Series	85251
	MICROPOSIT S1805 POSITIVE PHOTORESIST	176760
	Microposit Remover 1165	160977
	Omnicoat	55405
	Poly(methyl methacrylate)	13190

Chemical Risk Assessment in KLARA



	2-Propanol	9129
	Remover AR 300-76	153595
	Remover AR 600-71	139349
	Remover for Photoresist mr-Rem 500	131209
	Remover PG	75256
	Salpetersyra 65% (Nitric Acid)	64
	Salpetersyra 69% (Nitric Acid)	143929
	Saltsyra 37% (Hydrochloric Acid)	163447
	SU-8 2000 Series Resists (gammal)	50692
	SU-8 2000 Thinner	79915
	SU-8 Developer	54771
	Svavel	9926
	Svavelsyra 95-97%	14758
	Simultaneously Thermal and UV	176747
	Tetrahydrofuran (volym)	9579
	Tetramethylammonium hydroxide solution (25 wt. % in H ₂ O)	9159
	Toluen	9133
	TriVal 24K Gold Strike Solution	176570
	Väterperoxid 8-35% (H ₂ O ₂)	65246
	XR-1541 E-Beam Resist in MIBK	82706
	O-Xylen	9513
	ZEP 520A	138210
	HF	77945
	TMAH	9159
	Az 726 MIF Developer	85171
	HCl - 37%	116254
	Mr-REM 700	168221
	AR-P 617.06	188778
	AR-N 7520 new	188779
	AR 300-76	188781