

## Price list NorFab

The vision of NorFab is to be a robust and competent backbone consortia supporting and enabling research and innovation within micro-and nanotechnology (MNT) in Norway. NorFab will be an enabling resource for both academic and industrial R&D.

The members of the NorFab consortium are NTNU NanoLab, UiO MiNaLab, SINTEF MiNaLab and MSTLab at HiVe. More information about the national infrastructure NorFab can be found at [www.norfab.no](http://www.norfab.no).

This document introduces the common price system for NorFab. In general, the three university/university college cleanrooms\* are hands-on and open-access, meaning that the users will carry out the research themselves after an initial training process. However, for some instruments an operator is required.

SINTEF MiNaLab has an-ISO certified semi-production line with strong requirements regarding access and cleanliness. Therefore, the infrastructure requires an operator for all processing carried out in the lab and the prices follow a different system than for the university NorFab nodes.

The presented prices are based on the intention to share the costs of the infrastructure among users. Prices for academic activities are subsidised through basic funding from the universities. Prices for industrial activities are based on a full-cost approach; no cross-subsidies between the user groups are given.

### User categories

NorFab distinguishes between academic, start-up and industry activities that use the infrastructure. The corresponding users are defined as follows.

*Academic users* are defined as:

- Bachelor, Master and PhD students.
- Post docs/researchers
- Fully internally-financed research within non-profit research institutes.
- Public funded and co-funded projects (i.e. NFR, EU).

*Users from start-up companies* are defined as:

- Companies following the EU definition for micro enterprises. The reduced fee is paid for the first 24 months after start-up.
- Research projects financed by start-up companies

*Industrial users* are defined as:

- Any other company/users
- Research projects fully financed by industry

Academic activities are considered as knowledge building with a pronounced aim to contribute to the general scientific knowledge base. There is therefore a strong ambition that processes developed during the course of academic activities will be documented and to a large extent made available to NorFab.

\* hereafter called "university cleanrooms"

---

**Postadresse**

Realfagbygget  
7491 Trondheim

E-post: [hanna.gautun@nt.ntnu.no](mailto:hanna.gautun@nt.ntnu.no)

**Telefon**

+ 47 73 59 45 44

**Telefaks**

+ 47 73 59 14 10

## Prices

NorFab's price structure is based on the costs for use of the infrastructure and is divided into four parts:

- Instrument costs, paid per booked hour for more expensive instruments with running costs >100 NOK/hour
- Operator costs, paid per hour of use of personnel for operating machines
- Task costs, for a fully performed task within the infrastructure (only applicable for SINTEF)
- Costs for basic infrastructure, paid per working hour in the cleanroom; includes standard chemicals and small instruments (only applicable for NTNU NanoLab)

Table 1: Price list of NorFab (in NOK)

|   | Academia | Start-up | Industry |
|---|----------|----------|----------|
| <i>Instrument prices (a list of available equipment and pricing is given in appendix 1)</i> |          |          |          |
| Instrument type A (/h)  | 100      | 125      | 150      |
| Instrument type B (/h)  | 300      | 375      | 450      |
| Instrument type C (/h)  | 500      | 625      | 750      |
| Instrument type D (/h)  | 800      | 1000     | 1200     |
| Instrument type E (/h)  | 1000     | 1250     | 1500     |
| Instrument type F (/h)  | 1250     | 1580     | 1900     |
| Basic Infrastructure*<br>additional fee /h<br>(only NTNU NanoLab)                           | 250      | 300      | 350      |

\* Fee for using the basic infrastructure (including standard chemicals and small instruments – see instrument list in appendix 1) is charged per working hour in the cleanroom. Fees for use of instruments type A-F are charged in addition.

Table 2: Flat rate prices of NorFab (in NOK)

|  | Academia   | Start-up             | Industry            |
|--|--|----------------------|---------------------|
| <i>Flat rate (only available at university cleanrooms)</i>                     |  |                      |                     |
| Flat rate / full infrastructure (free use of the entire NorFab infrastructure) | 15% of the research project funding*;<br>PhD students/post docs:<br>125.000/year | 40.000 /month/person | 50.000/month/person |
| Flat rate / basic infrastructure (only NTNU NanoLab)                           | 25.000/semester/project  | 6000/month/person    | 7.500/month/person  |
| Training costs   | 0  | 0                    | 0                   |

\*The total funding of the project is reduced by the amount for consumables and running costs for equipment used in laboratories outside NorFab.

**NorFab****General rules for flat rates**

Flat rates are based on average cost estimations and the purpose of flat rate is to facilitate project planning. The following rules apply:

- PhD students are charged for a maximum of 3 years
- Instrument booking rules apply
- No operator service included

**Other conditions**

The following conditions apply:

- Users of the institute sector are charged after the following rules:
  - all public funded and co-funded projects (ie NFR, EU)                      academia
  - projects fully financed by industry    industry/start-up
  - internal projects\*    academia

\*Requires project and budget description accepted by the institute management and access to cleanroom process descriptions.
- Training costs (to become a user) are currently covered by NorFab, for any user involved in a proposed activity in NorFab.
- To enable easy calculation of prices for long-term use of the infrastructure, NorFab also offers flat rates, with full use of the university cleanrooms within the infrastructures on a monthly, semester, or year.
- Furthermore, NorFab offers both opportunities and space for own instruments and more permanent set-ups. To utilise this and evaluate possibilities please contact NorFab for further discussions.
- The prices listed in Appendix 1 may vary for users originating from NorFab infrastructures due to local subsidies given by NorFab partners to their employees. For information regarding local subsidises, contact your local laboratory.

**Tasks performed by operator**

The following operator prices are charges in addition to the fees given above:

*NFR/EU projects*

|              |   |
|--------------|---|
| SINTEF*      | based on SINTEF hourly rates depending on operator qualification and project type |
| Universities | 750                      NOK/h  |

*Start-up/Industry projects*

|              |   |
|--------------|---|
| SINTEF*      | based on SINTEF hourly rates depending on operator qualification and project type |
| Universities | 1100                      NOK/h   |

The university infrastructures have limited capacity for operator services. SINTEF offers operator services at NTNU NanoLab. Here SINTEF operator prices apply, based on SINTEF hourly rates.

All prices are given exclusive VAT.

**The price system including the prices given in this document will be enforced from 01.07.2012 and subjected to annual revision.**

**Appendix 1****Price matrix**

For readability the price matrix is repeated here:

|   | Academia | Start up | Industry |
|---|----------|----------|----------|
| A | 100      | 125      | 150      |
| B | 300      | 375      | 450      |
| C | 500      | 625      | 750      |
| D | 800      | 1000     | 1200     |
| E | 1000     | 1250     | 1500     |
| F | 1250     | 1580     | 1900     |

Price per hour in NOK excl. VAT

For NTNU NanoLab an hourly fee is charged per working hour in the cleanroom:

|                     | Academia | Start up | Industry |
|---------------------|----------|----------|----------|
| all cleanroom areas | 250      | 300      | 350      |

Price per hour in NOK excl. VAT

**List of instruments**

| Tool Nr.  | Tool name                             | Model                         | Category             | Price group |
|-----------|---------------------------------------|-------------------------------|----------------------|-------------|
| <b>NL</b> | <b>NTNU NanoLab</b>                   |                               |                      |             |
| NL0001    | STM, Nanosurf (4 pcs)                 | easyScan2                     | Characterization     | A           |
| NL0003    | AFM, Nanosurf                         | easyScan2                     | Characterization     | A           |
| NL0096    | Nanosight                             | LM10                          | Characterization     | A           |
| NL0101    | Particle size analyser                | Beckman coulter N5            | Characterization     | A           |
| NL1410    | AFM, Veeco                            | diMultimodeV                  | Characterization     | A           |
| NL2331    | Wire bonder                           | Leica/tpt S6                  | Packaging            | A           |
| NL3010    | Dicing Saw                            | Disco DAD- 2H/6               | Other                | A           |
| NL3021    | Scriber                               | Dynatex DXIII                 | Other                | A           |
| NL0004    | AFM, Nanosurf Flex                    | easyScan2                     | Characterization     | A           |
| NL0120    | Rapid Thermal Processing (RTP) oven   | Jipelec Jetfirst 200mm        | Thermal Processes    | B           |
| NL1461    | Sputter coater and Thermal Evaporator | Cressington 308R              | Deposition           | B           |
| NL5010    | Student photolithography              | Karl Suss MJB3 + Wet stations | Lithography          | B           |
| NL1101    | Photolithography                      | Karl Suss MA56 + Wet stations | Lithography          | C           |
| NL1105    | Nanoimprinter                         | EVG620                        | Lithography          | C           |
| NL1207    | Reactive Ion Etch (RIE)               | Oxford Instruments            | Etching, dry and wet | C           |
| NL1512    | S(T)EM                                | Hitachi S-5500                | Characterization     | C           |
| NL1103    | Electron Beam Lithography             | Hitachi 4300SE Raith stage    | Lithography          | D           |
| NL1205    | E-beam evaporator                     | Pfeiffer Vacuum Classic 500   | Deposition           | D           |

## NorFab

|        |                              |   |                      |       |
|--------|------------------------------|---|----------------------|-------|
| NL1225 | PECVD                        | Oxford Instruments, PlasmaLab System 100-PECVD  | Deposition           | D     |
| NL1230 | Inductive Coupled Plasma RIE | Oxford Instruments, PlasmaLab System 100-ICP180 | Etching, dry and wet | D     |
| NL1405 | Focussed Ion Beam (FIB)      | FEI   | Characterization     | E     |
| NL0010 | SECM                         | Princeton Applied Research 370                  | Characterization     | incl. |
| NL0020 | Drying Oven                  | Termaks TS 8056                                 | Thermal Processes    | incl. |
| NL0021 | Drying Oven                  | Termaks TS 8056                                 | Thermal Processes    | incl. |
| NL0022 | Drying Oven                  | Termaks TS 8056                                 | Thermal Processes    | incl. |
| NL0023 | Binder vacuum Oven           | Binder VD23                                     | Thermal Processes    | incl. |
| NL0024 | Binder vacuum Oven           | Binder VD23                                     | Thermal Processes    | incl. |
| NL0030 | Heidolph Rotary Evaporator   | Laborota 4000/ G4 bath                          | Other                | incl. |
| NL0031 | Heidolph Rotary Evaporator   | Laborota 4000/ G4 bath                          | Other                | incl. |
| NL0040 | Glove Box Ar                 | MBraun Unilab MB-20-G                           | Other                | incl. |
| NL0041 | Glove Box N2                 | MBraun Unilab MB-20-G                           | Other                | incl. |
| NL0050 | Centrifuge (Table top)       | Heraeus Labofuge 400R                           | Other                | incl. |
| NL0051 | Ultracentrifuge              | Thermo Electron Corporation, WX Ultra 100       | Other                | incl. |
| NL0070 | Microwave Oven               | Anton Paar Multiwave 3000                       | Thermal Processes    | incl. |
| NL0098 | Syringe pump                 | KDScientific KDS-200-CE                         | Other                | incl. |
| NL0110 | WTW pH-meter                 | inoLab pH 730                                   | Other                | incl. |
| NL0130 | Ultrasound desintegrator     | 450 CE Digital                                  | Other                | incl. |
| NL0150 | Autoclaves                   | Parr 4560 Mini Bench Top Reactor                | Thermal Processes    | incl. |
| NL0160 | Dip Coater                   | Nima Technology Dip Coater DC Mono 75           | Deposition           | incl. |
| NL0163 | Spin coater (not litho)      | WS-400B-6NPP-LITE/ AS                           | Deposition           | incl. |
| NL0230 | Calcination (gold) furnace   | Thermcraft                                      | Thermal Processes    | incl. |
| NL1120 | Yellow light microscope 2    | Nikon LV150 eclipse                             | Characterization     | incl. |
| NL1130 | DIC microscope 2             | Zeiss AxoScope A1                               | Characterization     | incl. |
| NL1131 | Stereomicroscope 4           | Nikon SMZ460/C-PS                               | Characterization     | incl. |
| NL1435 | DIC microscope 1             | Zeiss AxoScope A1                               | Characterization     | incl. |
| NL1436 | Stereomicroscope 2           | Nikon SMZ800/C-PS                               | Characterization     | incl. |
| NL1450 | Plasma cleaner               | Diener Electronics, Femto                       | Etching, dry and wet | incl. |
| NL1470 | UV/Ozone cleaner             | novascan PSDPro-UVT6                            | Other                | incl. |
| NL1500 | Reflectometer 1              | Filmetrics F20                                  | Characterization     | incl. |
| NL1501 | Reflectometer 2              | Filmetrics F20                                  | Characterization     | incl. |
| NL1510 | Carbon coater                | Cressington 208 Carbon                          | Deposition           | incl. |
| NL1720 | Profilometer                 | Veeco Dektak 150                                | Characterization     | incl. |
| NL1735 | Stereomicroscope 3           | Nikon SMZ460/C-PS                               | Characterization     | incl. |
| NL1920 | Fluorescence microscope      | Zeiss AxoScope A1                               | Characterization     | incl. |
| NL1922 | SEM (Table top)              | Hitachi TM3000                                  | Characterization     | incl. |

## NorFab

|            |                                       |   |                      |       |
|------------|---------------------------------------|---|----------------------|-------|
| NL2008     | PDMS/silanes area                     | Fume hood, spinner, oven                    | Other                | incl. |
| NL2314     | Curing Oven for PDMS                  | Termaks TS 8024                             | Thermal Processes    | incl. |
| NL2315     | Safety bench                          | Kojair Biowizard silver                     | Other                | incl. |
| NL2326     | Syringe pump                          | Chemyx Fusion 400                           | Other                | incl. |
| NL2327     | Syringe pump                          | Chemyx Nexus 3000                           | Other                | incl. |
| NL2330     | Stereomicroscope 1                    | Nikon SMZ460/C-PS                           | Characterization     | incl. |
| NL3012     | Surface Plasmon Resonance             | Reichert Life Sciences SR 7000 DC           | Other                | incl. |
| NL5012     | Oven for lithography                  | Memmert U26                                 | Thermal Processes    | incl. |
| NL5013     | Yellow light microscope 1             | Nikon LV150 eclipse                         | Characterization     | incl. |
| NL5014     | Oven for lithography                  | Memmert U26                                 | Thermal Processes    | incl. |
| NL1460     | Sputter coater for SEM Sample Prep.   | Cressington 208HR                           | Deposition           | incl. |
| <b>UIO</b> | <b>UiO MinaLab</b>                    |   |                      |       |
| UIO001     | Warm cabinet                          |   | Thermal Processes    | A     |
| UIO002     | 4-point probe                         | Jandel KM3-AR                               | Characterization     | A     |
| UIO003     | Ellipsometer                          | Rudolf Research / AutoEL                    | Characterization     | A     |
| UIO004     | Stylus profilometer                   | Veeco Dektak 8                              | Characterization     | B     |
| UIO005     | CV/IV characterization; probe station | Agilent 4284A, Keithley 617, Keithley 2440  | Characterization     | A     |
| UIO006     | Solar simulator                       | Newport 91160 Full Spectrum Solar Simulator | Characterization     | B     |
| UIO007     | Wet etch                              | Manual wet station                          | Etching, dry and wet | B     |
| UIO008     | Spectrophotometer                     | Shimadzu SolidSpe-3700 DUV                  | Characterization     | C     |
| UIO009     | Hall/TDH                              | LakeShore EM4 HGA                           | Characterization     | C     |
| UIO011     | FTIR                                  | Bruker IFS 125HR                            | Characterization     | C     |
| UIO012     | Photolithography                      | Karl Suss MH56 + wet etch + spinner         | Lithography          | C     |
| UIO013     | Photolithography                      | Karl Suss MJB55 + wet etch + spinner        | Lithography          | C     |
| UIO014     | High temp tube furnace                | Gero 1 75242                                | Thermal Processes    | B     |
| UIO015     | High temp tube furnace                | Gero 2                                      | Thermal Processes    | B     |
| UIO016     | Tube furnace                          | Lindberg 59544                              | Thermal Processes    | B     |
| UIO017     | Thermal evaporation                   | Balzers BAE 250                             | Deposition           | B     |
| UIO018     | E-beam evaporation                    | BioRad                                      | Deposition           | C     |
| UIO019     | XRD                                   | Bruker AXS D8 Discover                      | Characterization     | D     |
| UIO020     | Tube furnaces                         | 4-stack ThermCo                             | Thermal Processes    | B     |
| UIO021     | Tube furnaces                         | GSL1100X                                    | Thermal Processes    | B     |
| UIO022     | Rapid Thermal Processing              | AnnealSys AS-Micro                          | Thermal Processes    | C     |
| UIO023     | Rapid Thermal Processing              | AnnealSys AS-One                            | Thermal Processes    | C     |
| UIO024     | Magnetron sputtering                  | CVC type AST-601, DC system                 | Deposition           | C     |
| UIO025     | Magnetron sputtering                  | Semicore TriAxis                            | Deposition           | C     |
| UIO026     | E-beam evaporation                    | Leybold L 560 K                             | Deposition           | D     |

## NorFab

|            |   |  |                      |       |
|------------|---|--|----------------------|-------|
| UIO027     | PECVD                                       | Advanced Vacuum Vision 310 MK II               | Deposition           | D     |
| UIO028     | RIE   | Advanced Vacuum Vision 320 MK II               | Etching, dry and wet | C     |
| UIO029     | Doping – Ion Implantation                   | NEC Tandem accelerator                         | Other                | D*    |
| UIO030     | ALD   | Beneq TFS 200- 148                             | Deposition           | E*    |
| UIO031     | MOCVD                                       | Titan (EMF) reactor                            | Deposition           | E*    |
| UIO032     | Optical Microscope                          | Olympus BX 41 M                                | Other                | incl. |
| UIO033     | RBS   |  | Characterization     | D*    |
| <b>MST</b> | <b>MSTLab HiVE</b>                          |  |                      |       |
| MST101     | Thermal cycling                             | Weiss- Weiss Technik 64                        | Characterization     | A     |
| MST102     | Interferometer                              | Veeco - Wyko NT9100                            | Characterization     | A     |
| MST103     | IR camera                                   | PL-B741E 1.3MP monochrome camera               | Characterization     | incl. |
| MST104     | Microscopes                                 | Leica - DM 4000M<br>Carl Zeiss Jena Neophot 32 | Characterization     | incl. |
| MST106     | Probe station                               | PWS - Probe II                                 | Characterization     | A     |
| MST107     | Profilometer                                | Veeco- Dektak 150 Stylus ProfilerScan          | Characterization     | B     |
| MST109     | Shear tester                                | F&K- Delvotec 5600                             | Characterization     | A     |
| MST201     | Tube furnace (Oxidation) Oven               | HarmbridgeHitech Furnace                       | Thermal Processes    | A     |
| MST301     | Student photolithography                    | Karl Suss: MA56                                | Lithography          | B     |
| MST302     | Photolithography                            | EVG -AL6 / 620                                 | Lithography          | C     |
| MST303     | Plasma cleaner                              | March Plasmod                                  | Lithography          | incl. |
| MST305     | UV Cleaner                                  | UVOCS (Ultra-Violet Ozone Cleaning System)     | Lithography          | incl. |
| MST401     | Au sputter                                  | Fison Instruments Polaron SC500                | Deposition           | incl. |
| MST402     | Electroplating (wafer and pieces)           | Heimerle + Meule - PGG 20                      | Deposition           | C     |
| MST403     | Thermal evaporator                          | MiniLab T25M                                   | Deposition           | C     |
| MST501     | RIE   | PlasmaTherm - SLR series                       | Etching, dry and wet | B     |
| MST502     | Wet Etching                                 | General wet-benches                            | Etching, dry and wet | B     |
| MST602     | Wafer bonding (Anodic, Fusion and Metallic) | EVG 501 Wafer bonder<br>EVG 620 Bond aligner   | Wafer bonding        | B     |
| MST701     | Die attach                                  | Laurier Incorporated                           | Packaging            | A     |
| MST702     | Flip-chip bonder                            | MAT- MAT 6400                                  | Packaging            | B     |
| MST703     | Dicing SI-wafer                             | Disco- DAD-2H/6T                               | Packaging            | A     |
| MST703     | Dicing ceramik ++                           | Disco- DAD-2H/6T                               | Packaging            | B     |
| MST704     | Wirebonder                                  | F&K- Delvotec 5610                             | Packaging            | A     |

\*operator required

**SINTEF MiNaLab**

The price list applies only to single processes at SINTEF MiNaLab and cannot be used to price projects including integrated processes. The indicated prices are exclusive operator cost. Activities at SINTEF MiNaLab will be performed by SINTEFs operators. For any binding quotation please contact SINTEF MiNaLab at norfab-minalab@sintef.no as most of the indicated prices are volume sensitive and as some processes might require pre- and/or post processes. Please observe that most of the equipment includes automatic or semi-automatic wafer handling, and as such yields a more industry-compatible process and capacity.

The price groups used at SINTEF MiNaLab refer to the prices listed in the "industry" column of the price matrix and will be used independently of user types and project types. User types and projects will, however, be reflected in the operators hourly rates.

**Price list for process steps at SINTEF MiNaLab**

|        | Process step                           | Equipment type                    | Price group |
|--------|--|-----------------------------------|-------------|
| SI 001 | <b>Lithography</b>                     |                                   | <b>E</b>    |
|        | Priming, coating, aligning, baking     |                                   |             |
|        | Primer                                 | YES                               |             |
|        | Resist Coater                          | Suss ACS 200                      |             |
|        | Resist Coater                          | ATMsse Maximus 804                |             |
|        | Mask Aligner (two)                     | Suss MA 150e                      |             |
|        | Baking Chamber                         | Different brands                  |             |
| SI 002 | <b>ICP-equipment</b>                   |                                   | <b>F</b>    |
|        | RIE, PECVD                             |                                   |             |
|        | Reactive Ion Etch                      | Alcatel AMS 200 SE I-speeder      |             |
|        | Reactive Ion Etch, non-silicon etching | Alcatel AMS 200 SE I-speeder      |             |
|        | Reactive Ion Etch, electrostatic chuck | Alcatel AMS 200 SE I-Productivity |             |
|        | PECVD deposition                       | Alcatel AMS 200 PECVD             |             |
| SI 003 | <b>Wafer bonding line</b>              |                                   | <b>B</b>    |
|        | wafer stack aligning, bonding          |                                   |             |
|        | Bond Aligner                           | Suss Microsystems MA6/BA6         |             |
|        | Wafer Bonder                           | Suss Microsystems SB6e            |             |
| SI 004 | <b>Thin Film (ex. material costs)</b>  |                                   | <b>C</b>    |
|        | Al. + noble metals sputtering          |                                   |             |
|        | <u>Sputter for Al, Ti, TiN and W</u>   | MRC 643                           |             |
|        | Sputter for Au, NiCr, TiW and Al       | MRC 603                           |             |
| SI 005 | <b>Surface Characterization</b>        |                                   | <b>B</b>    |
|        | SEM, Zygo, EDX                         |                                   |             |
|        | SEM, Scanning Electron Microscope      | FEI Quanta FEG 600 with EDAX      |             |



## NorFab

|        |   |                                |                       |
|--------|---|--------------------------------|-----------------------|
|        | Interferometer (white light)                  | Zygo NewView 6300              |                       |
|        | Energy Dispersive X-ray analysis (EDX)        | EDAX                           |                       |
| SI 006 | <b>Electrical Characterisation</b>            |                                | <b>C</b>              |
|        | Automatic probing                             |                                |                       |
|        | Automatic probing station (two)               | ACCURETECH TSK A-PM-90A        |                       |
| SI 007 | <b>Wet processing</b>                         |                                | <b>B</b>              |
|        | Wet chemistry                                 |                                |                       |
|        | Manual etching of Si, SiO <sub>2</sub> and Al | Stangl wet benches             |                       |
|        | Manual RCA cleaning                           | Stangl wet benches             |                       |
| SI 008 | <b>Gold process line</b>                      |                                | <b>D</b>              |
|        | priming, coating, aligning, baking            |                                |                       |
|        | Primer  | YES                            |                       |
|        | Resist Coater                                 | Suss Gyrset RC8                |                       |
|        | Mask Aligner                                  | Suss MA 150 KWS                |                       |
|        | Baking Chamber                                | Different brands               |                       |
| SI 009 | <b>TMAH, KOH (etching), RCA cleaning</b>      |                                | <b>C</b>              |
|        | Manual wet benches for etch and clean         | Stangl wet benches             |                       |
| SI 010 | <b>Packaging</b>                              |                                | <b>B</b>              |
|        | Wafer dicing                                  | Disco DAD 321 wafer saw        |                       |
|        | Post dicing cleaning                          | Disco DSC 141 spin rinse dryer |                       |
|        | Wire bonding                                  | Kulicke & Soffa 4522           |                       |
| SI 011 | <b>RTP</b>                                    | Annealsys AS-Master 2000 RTP   | <b>B</b>              |
| SI 012 | <b>Thermal processes</b>                      |                                |                       |
| SI 013 | Standard diffusion tubes                      |                                | <b>A</b>              |
| SI 014 | Boron and phosphorous deposition tubes        |                                | <b>B</b>              |
| SI 015 | SiC high temperature tube                     |                                | <b>B</b>              |
| SI 016 | Poly-Si and Silicon nitride LPCVD tubes       |                                | <b>4615 kr /time*</b> |

\*Price exclusive VAT