



## Mask executive contract specification

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## GLOSSARY

- CdC : *Cahier des Charges* (Specifications)  
CEA : *Commissariat à l'Énergie Atomique et aux énergies alternatives* (French atomic energy and alternative energies commission)  
CEA Grenoble: *Commissariat à l'Énergie Atomique Centre de Grenoble* (French atomic energy commission, Grenoble site)  
CS : Correspondant Sécurité (protection des informations) (Safety contact (data protection))  
CSP : *Consommables Salles Propres* (Clean room consumables)  
CT : *Correspondant Technique du contrat* (Technical contact person for the contract)  
DPFT : *Département des Plates-Formes Technologiques* (Technologic Platforms department) – Department under the authority of *LETI* (Electronics and information technology laboratory)  
DCOS : *Département des Composants Silicium* (Silicon Components Department) – Department under the authority of *LETI* (Electronics and information technology laboratory)  
  
LETI : *Laboratoire d'Électronique et de Technologie de l'Information* (Electronics and information technology laboratory) – Institute under the authority of *DRT* (Technological research department)  
PQP : *Plan Qualité Particulier* (Particular quality Plan)  
RDO : *Réseau de Diffusion d'Ordres* (Emergency warning system)



This symbol affixed to the margin of the document means that particular attention shall be paid during proposal analysis and throughout the service for the concerned item(s).

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## 1 PURPOSE

The LETI /DCOS/SCCS/LMDE laboratory activities are aimed to all LETI's departments. The photomasks for all different technologies used in LETI 's clean rooms are designed in this unit. LMDE then entrusted the fabrication to an identified industrial.

The purpose of this contract is to set the conditions for the manufacture and supply of masks also referred to as "masks or reticules or Supply" that CEA wishes to entrust to a holder. This contract is an extend to contracts ACCORD-CADRE n°5200002676 and ACCORD-CADRE n°5200002677 that add two new lithography equipment's that will be installed in CEA cleanrooms during 2026.

## 2 OBLIGATION OF RESULTS

The services included in these Specifications shall be subject to an obligation of results incumbent upon the Contract Holder.



The Contract Holder's performance in terms of expected results shall be measured by implementing indicators intended to assess the proper performance of the services. However, the Contract Holder shall continuously search for an optimal activity management organisation in order to offer top-quality services.

## 3 APPLICABLE DOCUMENTS

The list of documents detailed in this chapter is not exhaustive. It is intended to identify the main documents applicable to the services described in these Specifications. CEA Grenoble shall modify this list as required, pursuant to safety rules, changes in the regulations and the Contract Holder's recommendations as part of the technological and regulatory watch.

### 3.1 Reference documents

The Prefectural Order for the centre, CEA safety circulars and instructions shall be applicable on the CEA Grenoble site, particularly the following texts:

- General purchasing conditions ;
- Purchase book;
- The public procurement code (specified by several decrees and notices listed in the preliminary annex to the public procurement code (decree of 22 March 2019)), transposition of European Directive 2014/24/EU of 26 February 2014.
- The "Rules applicable to external companies" (contractors and subcontractors) EQ/CS23-11 - appended to these Specifications (French version : EQ/ CS 23 10 « Règles applicables aux Entreprises Extérieures effectuant des travaux au CEA Grenoble ») ;
- CEA Grenoble internal regulations.

These documents can be consulted on site or transmitted upon request. The service Contract Holder shall inform CEA Grenoble of any regulatory changes occurring in the areas covered by these Specifications, and of contractual consequences, which may arise therefrom.

### 3.2 Quality documents

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*Quality documents shall be circulated to the Contract Holder when the contract is entered into, so that they are taken into account and implemented. CEA Grenoble may modify quality documents as required.*

Non-exhaustive list:

*(The quality department shall transmit these documents to service providers)*

- Quality specification for mask;
- SEMI standards;
- MRC\_LETI specifications

Reticle design guide of reference (may not be provided by quality department)

- RETICLE DESIGN MANUAL 6inch Reticles for TWINSCAN ATXT systems

## **4 WORKING TERMS AND CONDITIONS**

Operations on the CEA Grenoble site shall be carried out in compliance with specific provisions. In particular, the following requirements shall be taken into account:

### **4.1 Respective roles and parties**

#### **4.1.1 CEA Grenoble**

- The **DCOS** shall ensure technical follow-up of the services. The contact person appointed for said follow-up shall be appointed Technical Contact.
- The CEA Grenoble Purchasing Department shall ensure the commercial follow-up of the work performed by the Contract Holder
- The quality department shall ensure the quality follow-up of the services and the Contract Holders' documents. It shall follow up anomalies, audit planning and related improvement actions.

#### **4.1.2 Contract Holder**

The Contract Holder shall perform the work set out in these specifications.

### **4.2 Relationship with CEA Grenoble**

The Contract Holder shall appoint a main contact on the CEA Grenoble site, who shall directly report to the Technical Contacts on technical follow-up aspects.

The Contract Holder hereby undertakes to immediately inform the Technical Contacts of any anomaly, incident or accident of any kind whatsoever occurring during the services under its responsibility.

The Contract Holder may enter into contact with users in order to organise some of the services set out in these Specifications. The Contract Holder shall keep the Technical Contact informed of said contacts.

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### 4.3 Contract Holder organisation

The Contract Holder is responsible for the structure & the organisation set, their adaption to the workload, the logistic and the management, in order to ensure, in full and on time, all the missions describes in this specification form.

He must implement, in term of number & qualification, a team to fulfil all the mission describe in this document.



In its response, the Contract Holder will precise the mains interlocutor (qualification, experience, foration, etc..) he has identified to fulfil the services.

The supplier is free to add any additionnal information on its organisation and ressources establishment.

### 4.4 Construction of these Specifications

The Contract Holder is deemed knowledgeable of the CEA Grenoble site-working environment.

The Contract Holder is fully aware of the nature of the work to be performed, its importance and related restrictions of any kind whatsoever.

Thus, the Contract Holder has examined the premises and perfectly assessed all the constraints related to the performance of the scheduled work.

## 5 INFORMATION & ADVISE – OLBIGATION OF INFORMATION



The Contract Holder insure feedback, expertise, technological & regulatory watch to CEA.

Because of his competence & expertise, the holder must ensure the obligation of consulting to the CEA.

Any elements that does not allowed the Older to correctly perform the service describe in this speciation form, must be subject of an alert to the technical correspondents.

## 6 SUSTAINABLE DEVELOPMENT

### 6.1 CSR

With an amount of 2.7 billiards €, CEA purchase are an integral part of societal & environmental issue. The CEA take care of quality & diversity of relations with its suppliers. The responsible purchase policy is based on three priority commitments:

- Create and maintain trusted relationship with it suppliers;
- Take into account the responsible dimension of its purchase;
- Contribute to the development of small & medium enterprise and innovation

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The commitment to develop responsible purchasing of CEA cannot be done without taking in count suppliers. CEA therefore counts on your proposals in the framework of this call for tender to optimize environmental impact of your services and to develop a responsible social policy.

## 6.2 Sustainable development

As part of the “Sustainable Development” approach, CEA Grenoble is striving to improve its environmental performance and requires the cooperation of its suppliers in this respect.



In its proposal, the Contract Holder shall present its corporate strategy as regards sustainable development and its specific improvement proposals concerning the work that covered by these Specifications.

## 7 QUALITY

The Contract Holder shall implement a quality system with a level equivalent to Standard ISO 9001, version 2015, for all its activities. In addition, Supplier is recommended to maintain an environmental management system preferably certified ISO14001. If the provider is certified by a certification body, it will provide a copy of the certificate of accreditation.

Any significant and/or repeated deviations with respect to these Specifications shall be notified to the Contract Holder (in the form of a “Supplier service Follow-up” email or Improvement Sheet) for corrective action within a stipulated timeframe. In the event of deviations and failure to perform corrective actions, penalties shall be applied to the Contract Holder pursuant to the contract.

Work follow-up indicators are established in these Specifications. CEA Grenoble may request further information and the Contract Holder may add indicators in agreement with CEA, if they are relevant and suitable for proper performance of the work. These indicators shall be presented and checked during contract follow-up meetings.

CEA Grenoble reserves the right to check, at any time, the correct operation of the system, through quality audits, which may be carried out on the Contract Holder's premises and the CEA Grenoble site. A global audit can be organized, starting from the end of the first year of the contract.

The Contract Holder shall monitor the quality measures and in particular:

- take part in drawing up improvement sheets,
- analyse failures,
- handle anomalies,
- Follow up corrective actions.

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## 8 DEFINITION OF THE SUPPLY

The Standing Offer Agreement is a purchase order, which is related to the Supplies. The list of Supply is indicated on §8.5 Lots specification.

The CEA will order maskset to the Contract Holder. The Contract Holder must then produce the different mask(s) of this maskset according to the order form issue by CEA and deliver them in the requested period.

All Masks have to be conform to the document "Quality specification for mask".

### 8.1 Task

#### 8.1.1 Order

Under the framework contract, the CEA will send successive calls for deliveries (order forms in Excel format) to the Contract Holder as required, by email. These order forms will each bear an individual number as well as the reference for the call for deliveries.

The Contract Holder may not proceed with the delivery of the Supply until it has received an order form from the CEA, which specify the following information:

- The reference code for the Supply
- The quantity required
- The unit price for the Supply
- The reference code for the call for deliveries
- The nomination of equipment(s) is defined
- Design Database (gds, oas or MEBES format) via ftp on a secure server. All data send by CEA are confidential except explicit mention.

Starting grade H, in cases identified by CEA, other optional data or information can be send upon specific format agreed with the Contract Holder:

- Measurement location
- Illumination setup
- Blank information
- Pellicle information
- Process of record (POR)
- Mask box
- Etc...

The order form, the database and optional data transfer from CEA to the maskshop must provide all information necessary to maskshop to manufacture the mask.

If pellicle reference is not specified the supplier must put a pellicle compatible with equipment(s) specification. The equipment(s) is defined in the order form.

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### 8.1.2 Production

General case:

The Contract Holder should then produce the required mask(s). If POR is not specified, supplier must use a POR allowing to fulfil the specifications set by the requested grade. Grades are exhaustively described in the quality document "Quality specification for mask".

Particular case (Maskview):

When requested, the Contract Holder have to perform a XOR between the original database send by CEA and the fracked database. The supplier must then send the result of the XOR the CEA. This verification may help to detect problem before fabrication. It will never engage CEA responsibility in case of bad manufacturing.

Projects that may require Maskview are decided in consultation between CEA and the Contract Holder.

### 8.1.3 Delivery

Delivery costs are included in price.

The Contract Holder may not impose a minimum order, and undertakes to deliver the Supply at no extra cost, regardless of the quantity ordered and requested time.

The Supplies must be send in specific box described in the quality document "Quality specification for mask".

For each Supply, a certificate of conformity (CofC) report has to be send via ftp, upon agreed xml format between the Contract Holder and CEA.

Starting grade H, for cases identified by CEA, a report upon agreed format (xls, pdf, xml, csv ...) between the Contract Holder and CEA has to be send [mask.leti@cea.fr](mailto:mask.leti@cea.fr) . It will contain:

- CD measurements results
- Registration measurement results
- Inspection report
- AIMS analysis (if any)
- Transmission and phase measurement (if any)

During the expedition, the tracking number is also send to the same address.

### 8.1.4 Billing

A bill as to be send every month to the financial service of CEA. To validate the bill the contract holder should first send the bill on an .xlsx format to [mask.leti@cea.fr](mailto:mask.leti@cea.fr). It should contain all the mask order by CEA the past month to validate that there is no mismatch. After the validation the bill can be send to the financial service.

The .xlsx should contain at least the following six columns:

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Title	PO Number	Device	Layer	Amount	InvoiceNumber	InvoiceDate
Format	'texte'	'texte'	'texte'	'texte'	'numerical'	'texte'

## 8.2 Delivery time

The delivery time is the time between:

- The reception of the Standing Offer Agreement ( $T_0$ )
- The delivery date at CEA Grenoble of the supply ( $T_{\text{reception}}$ )

Therefore, it contains the production and the transport time.

### Standard delivery

The standard order will contain one mask order in priority 1 (P1) and one mask order in priority P2. The other masks of the maskset will be priority P3.

The delivery of the mask are staggered as follow:

- One mask of a maskset is P1. This mask have to be delivered at the standard time defined in the present document.
- The second mask is P2, have to be delivered either :
  - o Until grade I include, the day following the delivery of the first mask (P1) day for grade
  - o Starting grade J, at  $T_0$  + five days + the standard time defined.
- The rest of the mask (P3) are then delivered either :
  - o At the mean rate of three, every three days following the reception of the precedent mask. Until grade I (include)
  - o At the mean rate of one, every five days following the reception of the precedent mask. If it may become the time to deliver smaller than the standard time set, the standard time applies. Starting grade J

### Premium delivery

In special case, CEA may require express supply for one mask of a maskset: P0. P0 supply corresponding to:

- the standard time to deliver minus 2 days for mask (4", 5", 9") & reticule grade N00 to J Binary
- the standard time to deliver minus 5 days for mask (4", 5", 9") & reticule grade J eaPSM to N

None additional cost will be accepted for non-requested premium supply,

Non-worked days at CEA Grenoble (Saturday, Sunday & public holiday) are not taken in count in the time.

### Delivery forecast

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At the reception of the data, the prevision of expedition are send to [mask.leti@cea.fr](mailto:mask.leti@cea.fr), in the following 24 hours. If mask with priority P0, P1 & P2 cannot be guaranteed and in case of multi-awarded lots CEA can choose the other supplier qualified for the lot.

### **Order forecast**

CEA engage itself to deliver to the best of its abilities a forecast of its order each Friday for the following week.

## **8.3 Write time**

### **8.3.1 Advanced grades specificities**

Starting grade I, due to the high complexity to put in advance a cost for all mask, the Contract Holder shall send a specific quotation with following information:

1. A standard price
2. A standard writing time associated to this standard price
3. A price/min for any additional minute in case of exceeding the standard time

Then there is two possibilities:

1. CEA send the database to the supplier for writing time evaluation. In this case, the Contract Holder estimate the writing time and inform the CEA (The Mask Team) as soon as possible. If the Contract holder estimate a writing time that exceed the standard time defined, the unit price is applied with additional cost per minute of production. If the estimated time does not exceed the standard writing time for production, the standard unit price is applied. Then mask-team make the mask order. The real write time must not be 5% superior or minor to the writing time established with the writing time evaluation.
2. CEA do not request write evaluation, the invoice is adjust after the manufacturing of the mask regarding the real write time.

### **8.3.2 Prohibitive case of exceeding writing time**

For all grade CEA will inform the Contract Holder in case of any problem detected in advance that may happen during manufacturing of the mask. For example a very long fracturing time.

The supplier must then be careful during mask production.

If during the production the Contract Holder detect a prohibitive writing time (whether there was an alert or not), he must inform the CEA (Mask Team laboratory) to choose the right decision: stop the production or pursue. In order to pursue the fabrication, the Contract Holder shall send a specific quotation. On this basis, CEA shall draw up a purchase order. No regularisation will be make after production.

In some cases, CEA can require a write time evaluation. According to this evaluation, the Contract Holder can send a specific quotation if needed. On this basis, CEA shall draw up a purchase order.

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## 8.4 Required elements for response

CEA will provide a document to respond: an excel sheet that the Contract Holder can fulfil with its prices & POR reference.

This excel sheet ('Costing table.xlsx') will contain all lot and all grade, with an rough estimation of the quantity that may be order over a period of 1 years. It does not engage CEA responsibility to order this amount of mask.

In order to evaluate the technical quality of each supplier, CEA required some information. The format to respond to this is free.

- Global/general information about the Supplier
- Presentation of production(s) main site(s) and production backup site(s).
- Reference of the ISO quality certificates for each sites
- Process flow chart: A copy of Supplier process flow, process steps, starting from raw material store-in up to final material packing.
- A POR for each item, for each POR reference, we require to have a minimum information :
  - o Blank: type and precise reference.
  - o Resist
  - o Ref writing tool (brand, model, nominal address size)
  - o Positive process or Negative process
  - o Capabilities:
    - Min CD achievable : L/S, C/H/Dots, assist feature (if any), min corner to corner (if any)
    - CD control:
      - Max CD dev & Max CD range **OR** tightest 3sigma & Mean to target
      - Linearity curve
      - X/Y bias.
    - Registration : max error, 3sigma error (if any)
    - Def : min defect size by using DTDB inspection (if any)
  - o Pellicle: ref at least. Backup pellicle (if any)
  - o Back-up POR (if any)
- Staff :
  - o Number and names of technical contact
  - o Number and name(s) of commercial contact
- Tool set :
  - o Lithography tools and their main performances (min features, CD-Uniformity, CD linearity, Registration, etc...)
  - o Process tools (Dev & etch tools). Please precise wet/dry
  - o Metrology tools (CDSEM, registration, inspection, AIMS, phase)
  - o Repair tools
  - o Cleaning & pellicle

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The supplier has to propose at least one POR (Process of Record) in front of each item.  
The supplier can add other information that he may consider important.

A response may be not accepted if CEA judge that there are not enough information (POR missing, pellicle missing, etc...) to ensure the quality of the relation

All other case will make the object of a specific quotation.

## 8.5 Lots specification

The market is divided into 2 lots. The are specific to one equipment/size of mask.

Each lot will contain several "grades": it define the quality required of a mask. Please refer to the document: "QUALITY SPECIFICATIONS FOR MASKS" for all details.

In additional to the standard price to make a mask, we will require putting a cost on several other supply:

### Remanufacturing:

In case of wear out or break of a mask or reticule, it is requested to put a cost on option "remanufacturing".  
No new data has to be send for this purpose (option CLONE).

### Re-filming:

In some case, re-filming may be require. CEA will then send the mask to the supplier for a cleaning, re-filming and inspection.

### 8.5.1 Lot 1: ASML XT1060K

Product: 6" DUV 4X reticules for ASML XT1060K

Grade	Blank	Standard time (P1) in days
N00	BIN	4
2	BIN	4
1	BIN	4
A	BIN	4
B	BIN	4
D	BIN	4
E	BIN	4
F	BIN	4
G	BIN	4
H	BIN	6
I	BIN	6
I	eaPSM	8
J	BIN	8
J	eaPSM	10

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K	BIN	10
K	eaPSM	12

Re-filming with inspection: grade N00 to F, grade G to K

### 8.5.2 Lot 2: ASML XT400M

Product: 6" DUV 4X reticules for ASML XT400M

Grade	Blank	Standard time (P1) in days
N00	BIN	4
2	BIN	4
1	BIN	4
A	BIN	4
B	BIN	4
D	BIN	4
E	BIN	4
F	BIN	4
G	BIN	4
H	BIN	6
I	BIN	6

Re-filming with inspection: grade N00 to F, grade G to I

## 9 INSPECTION OF WORK

### 9.1 Inspection of work

The control of the service is based on objectives criteria define for each item.

Task	Indicator	Objective	Indicator calculation method
Time	Number of mask delivered in time	90% 100% accepted P0	% of mask delivered in requested delivery time
Quality	Number of non-conformity noted by CEA (mask usable or not usable)	0.2%	Number of non-conformity vs number of mask produce

Non-conformity can be:

- Defect criteria not met
- CD criteria not met
- Registration criteria not met
- Etc...

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## **9.2 Follow-up of work**

An meeting will be programmed to discuss technical and commercial points during the period of the contract:

- Synthesis and analysis of the activity over the year
- Contractual aspect
- Presentation by the supplier of its organisation to fulfil required tasks
- Analyse of the different indicators
- Focus on eventual dysfunction, non-conformity, anomalies...
- Discussion on future investment, future mask, etc...

A report will be redact by the Contract Holder and validated by CEA during the week following the meeting. It is then send to all stakeholder.

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