



European Organization for Nuclear Research
Organisation européenne pour la recherche nucléaire

Market Survey

Qualification Criteria

Planar Silicon Sensors for the ATLAS and CMS Outer Tracker Upgrades

MS-4086/EP

Abstract

In order to be considered as a potential bidder for the forthcoming Invitations to tender, the firm shall satisfy the specific criteria detailed below.

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1. GENERAL QUALIFICATION

The firm registering an interest shall be established within a CERN¹ Member State and, under certain conditions, from Associate Member States or Candidates for Accession or from the ATLAS² or CMS³ Member States.

Firms can be qualified for each and any combination of the three sensors defined in section 3.4 of the document “Technical Description”:

- A. **ATLAS strip sensors**
- B. **CMS strip sensors**
- C. **CMS macro-pixel sensors**

2. TYPE OF FIRMS

In order to qualify for the forthcoming invitations to tender the respondent shall be a single firm (hereafter referred to as “the firm”) whose competence and experience cover all the specified technical domains of this Market Survey (see in particular the document “Technical Description”) and meeting all the requirements below.

Subcontracting is permitted but will be limited to the supply of the substrate material. The full chain of process steps (from the formation of the implants to the passivation of the sensor) shall be performed by the firm. In the case of subcontracting, CERN shall be informed of all the proposed subcontractors. CERN reserves the right to refuse the participation of a subcontractor. CERN reserves the right to audit the proposed subcontractors.

¹ The CERN Member States are currently Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom. In addition, Cyprus, Pakistan, Serbia and Turkey are Associate Member States, and Romania is Candidate for Accession.

² List of ATLAS Member States: Argentina, Armenia, Australia, Austria, Azerbaijan Republic, Republic of Belarus, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, France, Georgia, Germany, Greece, Israel, Italy, Japan, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom, USA.

³ List of CMS Member States: Austria, Belgium, Brazil, Bulgaria, China, Colombia, Croatia, Cyprus, Czech Republic, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, India, Iran, Ireland, Italy, South Korea, Lithuania, Malaysia, Mexico, New Zealand, Pakistan, Poland, Portugal, Russia, Serbia, Spain, Switzerland, Taiwan, Thailand, Turkey, United Kingdom, USA.

3. ADMINISTRATIVE SITUATION

The firm shall:

- Not be involved in bankruptcy proceedings, prosecution for debt, sequestration or any analogous situation arising from a similar procedure provided for in law;
- Not have made arrangements of any kind with creditors for their benefit;
- Not have been subject of a judgment for fraud, corruption or any other illegal activity.

4. COMPETENCE AND EXPERIENCE

4.1 The firm shall have proven experience in at least one of the following field(s):

- Manufacturing of silicon sensors for ionizing radiation
- Manufacturing of silicon devices with similar properties to sensors for ionizing radiation: high voltage operation, fully depleted and high resistive bulk, on at least 150 mm diameter wafers.

4.2 The firm shall provide at least:

Three references of projects which are similar in scope, complexity and volume during the last 15 years.

The references shall be presented as detailed in the Technical Questionnaire.

CERN reserves the right to verify the references provided. In addition, the firm shall be prepared to arrange a visit by CERN to any of their references.

5. SIZE OF THE FIRM COMPILING THE QUESTIONNAIRE

5.1 Number of Employees

5.1.1 If the firm is interested in CMS and/or ATLAS strip sensors

CERN requires that the firm has at least 100 technical employees in semiconductor device fabrication of which at least two shall be specialised in the production of sensors for ionizing radiation sensors.

5.1.2 If the firm is interested only in CMS macro-pixel sensors

CERN requires that the firm has at least 25 technical employees in semiconductor device fabrication of which at least two shall be specialised in the production of sensors for ionizing radiation sensors.

5.2 Annual Turnover

5.2.1 If the firm is interested in CMS and/or ATLAS strip sensors

CERN requires that the firm shall have had an average annual turnover from semiconductor device fabrication during the last three years of at least 40 MCHF.

5.2.2 If the firm is interested only in CMS macro-pixel sensors

CERN requires that the firm shall have had an average annual turnover from semiconductor device fabrication during the last three years of at least 10 MCHF.

6. PRODUCTION AND TESTING CAPACITY

6.1 Overall production throughput

6.1.1 *If the firm is interested in CMS and/or ATLAS strip sensors*

The firm shall be able to sustain a throughput of at least 5000 wafer starts per month (6" and 8" combined).

6.1.2 *If the firm is interested only in CMS macro-pixel sensors*

The firm shall be able to sustain at least 500 wafer starts per month (6" and 8" combined).

6.2 Production throughput available to CERN

The firm shall have the capacity to produce the full quantity of ATLAS strip sensors or CMS strip sensors or CMS macro-pixel sensors, as specified in section 3.4 of the "Technical Description" within three years from the start of the series production, to be qualified for the respective supply.

6.3 Production throughput available to CERN in case of contract splitting

In the case of contract splitting, the firm shall accept to increase the production up to the full quantity of the supply of ATLAS strip sensors or CMS strip sensors or CMS macro-pixel sensors if any of the other contractors fail to fulfil their contractual obligations.

6.4 Production process stability

The firm shall agree that the pre-series and series production of sensors shall be made on the same equipment and use the same production processes as the samples delivered for qualification in step three of the qualification process describe in section 4.3 of the document "Technical Description". Any changes before or during the pre-series and the series production shall be documented and agreed with the experiments before implementation.

7. QUALITY ASSURANCE

7.1 Sensor acceptance tests

The firm shall have the necessary on-site test facilities and agree to perform all measurements described in section 3.6 of the document "Technical Description".

8. SCHEDULE

The firm shall respect the provisional delivery schedule as defined in section 5.1 of the document "Technical Description".

9. COMMUNICATION

9.1 Contact Persons

The firm shall make available at least one commercial contact person and one technical contact person for the entire duration of the contract.

9.2 Communication language

The contractual languages to be used for all communication with CERN shall be English.

10. QUALIFICATION PROCEDURE

The firm shall agree to follow the qualification procedure described in section 4 of the document “Technical Description”. All three steps shall be successfully completed for each of the sensor types to be fully qualified for receiving the Invitations to Tender for the respective sensor types (ATLAS strip sensors, CMS strip sensors and CMS macro-pixel sensors).