



European Union
European Regional
Development Fund



Technical specification of the project:

Demonstrative technology for cleaning flue gas from DL2 sinter belt in ArcelorMittal Poland S.A., Unit in Dąbrowa Górnicza, meeting the requirements specified in Best Available Techniques (BAT) for the production of iron and steel”

Short version before signing the NDA

(project no.: POIR.01.01.01-00-0782/17)



European Union
European Regional
Development Fund



ArcelorMittal Poland (AMP) runs its activities in various branches in Poland, mainly focusing on steel production in Kraków, in Dąbrowa Górnicza as well as in other important production units which are responsible for the manufacture of different types of steel products in Poland. These requirements apply to the construction of DL-2 sinter belt dedusting system in Dąbrowa Górnicza. ArcelorMittal Poland S.A. plans to modernize the system for dedusting flue gas from sinter belt #2 in the Blast Furnace Plant in Dąbrowa Górnicza in the years 2019-2022. **As part of this modernisation, a new dedusting system adapted to BAT (Best Available Techniques) requirements should be designed and installed by means of constructing Fabric Filters downstream existing electrostatic precipitators (2011).**

The object of contract indicated in this specification concerns the project entitled "Demonstrative technology for cleaning flue gas from DL2 sinter belt in ArcelorMittal Poland S.A., Unit in Dąbrowa Górnicza, meeting the requirements specified in Best Available Techniques (BAT) for the production of iron and steel" co-financed under sub-measure 1.1.1 of the Smart Growth Operational Programme 2014-2020 from the funds of the European Regional Development Fund.

Considering the Company's obligation to apply the principle of competition, this technical specification constitutes a detailed description of the contract subject matter in connection with request for proposal no. 1/0782/2019.

This specification has been prepared with the utmost care with regard to defining a complete, unambiguous and exhaustive description of the subject-matter of the contract in order to allow the Bidders for determination of all their obligations and risk, and responsible price calculation and other components of the bid.

All purchases, services and supplies that are subject of this request for determination of contract value must be included and cooperate with the existing infrastructure and equipment in the Company and must meet the same technological standards. In connection with the above, the need to preserve the same technological conditions and the need to maintain unification of devices resulting from the extension of the existing infrastructure determined the records in this specification. The applied records are justified by the necessity of ensuring efficient performance of the project in question. The indications with regard to the expected technical parameters as well as the indications with regard to the specified types and producers' names shall be general and refer solely to exemplary indications of equivalent products and shall not constitute the only acceptable solution. On this basis the Contracting Entity allows for equivalent solutions.



The Bidder is required to familiarize with this Specification and make sure that the devices are technically feasible, and to accept full responsibility for the guaranteed operation of devices to be delivered in terms of their capacity, parameters as well as smooth and reliable functioning.

This document contains the requirements concerning:

- Design of Fabric Filters #3 and #4 on DL-2 at the 2nd **dedusting stage** downstream the existing Electrostatic Precipitators #3 and #4 designed by BIPROMET SA and upstream sintering exhaust fans #3 and #4.
- Design, installation and commissioning of 2 Fabric Filters at the same time,
- Inclusion of both Fabric Filters to the sinter belt #2 dedusting system,
- Design and manufacture of guillotine dampers on the inlet and outlet of each fabric filter,
- Design and manufacture of bypass system for fabric filters (appendix no. 24),
- Manholes for quick assessment of the condition and servicing of bypass dampers, which could be made during short stop of the sinter belt, should be designed and installed.
- Commissioning of the dedusting system and conducting cold and hot tests as well as 72h hot test of the system,
- Making guarantee measurements
- Use of the existing foundations of electrostatic precipitators #2 and #5 for the construction of Fabric Filters #3 and #4, after checking by the Bidders.
- Preparation of working and as-built documentation,
- Completion of all acceptances resulting from the Polish law.
- 3D drawings in NavisWorks of complete system including FF, ducts and isolation gates

The Bid submitted by the Bidder should comply with the requirements set-forth in item 15. "INFORMATION REQUIRED FOR THE TECHNICAL BID" with the price as specified in a separate closed envelope addressed according to the information contained in the request.

The design package should be complete in all respects, and any works and materials necessary for proper performance of work (the order) will be included by the bidder in the bid.

The Bidder shall read the requirements included in this documentation and shall take full responsibility for the guaranteed level of operation of the system made in accordance with the documentation delivered by it with regard to the logic of the correctness of performed calculations and functionality consistent with good engineering practices.

All technical requirements should be consistent with PN, EN standards and should conform to the engineering standards, such as DIN, ASME, BS and PN.

The whole equipment and systems must be covered by the guarantee and meet the following legal regulations:

- Machinery Directive 2006/42/EC,



- Directive 2010/75/EU on industrial emissions,
- Energy Management System ISO 50001
- Pressure Equipment Directive 97/23/EC, PD 5500:2006, including A3:2008,
- Low Voltage Directive 73/23/EC,
- Welded Product/Welded Structures – DIN 8570 BF,
- Machining – ISO 2768/IS 2102,
- Polish Construction Law;
- Regulation of the Council of Ministers of 9th November 2004 on types of projects, which may affect natural environment and individual conditions meeting EIA requirements (Journal of Laws no. 257, item 2573).
- Environmental Protection Law.
- § 3.1 of the Regulation of the Ministry of Interior and Administration of 7 June 2010 on fire protection of buildings, other building facilities and areas, Journal of Laws no. 109 item 719,
- SEVESO II Directive.
- EN 13248 for low concentration particles
- For measurement of particles: EPA 5, EPA 17, ISO 9096 or similar standards

International Technical Standards:

CEN -	European Committee for Standardization;
CENELEC	European Committee for Electrotechnical Standardization;
DIN	Deutsche Industrie Normen;
EN	European Standard;
ETSI -	European Telecommunications Standards Institute;
ISO	International Organization for Standardization;

In case of other standards than those specified above the European/PN equivalents should be applied, in each case.

The Bidder/the Contractor is required to familiarize and apply the Owner's Standards, especially with regard to the OHS and Execution Regulations (the Investor's Standards are available on the website www.arcelormittal.com/poland in the tab “Contractors zone”. Moreover, appendices to the AMP Safety Book are also the Owner's standards and



will be made available to the Contractor by the Investment Purchases Office. In any case, the Contractor will be obliged to comply with them and apply them on the current basis during all stages of the Project.

3. Information for the needs of bid preparation

The list of attached drawings and documents according to Appendix no. 9

Scope of the Bidder's Works

1. Please submit:
 - a. Technical analysis,
 - b. Concept of the solution,
 - c. Initial design,
 - d. Preliminary implementation schedule,
 - e. Valuation of the construction of the proposed solution

 - f. OPEX/operating costs of proposed solution for its entire service life taking into account inspections and replacements of filter bags, as in the Table below (appendix no. 11)

in order to obtain dust emission parameters from Fabric Filters of Sinter Belt #2 at the level:

Dust concentration for dry conditions:	< 10 mg/Nm³
SOx concentration for dry conditions:	< 300 mg/Nm³
NOx concentration for dry conditions:	< 250 mg/Nm³
Mercury concentration for dry conditions:	< 0.03 mg/Nm³
Dioxins concentration for dry conditions:	< 0.1 ng I-TEQ/Nm³



NOTES:

1. The Contractor will be selected on the basis of presented materials. The Principal believes that a visit of the Bidder's group of specialists to AMP is recommended to develop a proper concept and undertakes to make all the necessary materials/systems available and to allow for making own analyses and taking relevant samples regardless of the attachments submitted to this RFQ.

The date of the on-site inspection shall be arranged after the Confidentiality Statement is signed and returned by the bidders. The Bidders will be entitled to perform a single on-site inspection. The date of the on-site inspection shall be agreed with the Bidder via electronic mail.

2. It is recommended to use foundations of electrostatic precipitators, including the foundations for flue gas ducts.
3. The design should cover de-SO_x systems to enable the use of different sorbents (lime, limestone powder, minisorb, others).
4. The design should include de-dioxin systems using powdered activated carbon (PAC).
5. Associated construction and civil works (modifications and new ones, if required) should be performed in such a way that the new Fabric Filter system is complete in every aspect.
6. Specify the demand for electric power:
 - For the entire facility
7. Design and build a dedusting system for sinter belt #2 in the form of fabric filters in the "turnkey" system.
8. A system for collection of dust precipitated in the fabric filters should be designed and installed. The system should operate automatically.

Due to high hygroscopicity of dust, hermetic integrity of the entire dust collection system is required.

The system should be designed in a way to avoid dust caking (heating of handling and storage system). From the AMP experience, continuous addition of a lime sorbent to the filter should be foreseen to neutralize the physico-chemical properties of dust that can cause spontaneous combustion (sintering) in addition to adding for de-SOX and protecting bags.

9. The control process should be visualized on the HMI monitor screen in the filter control room (min. 19") and SCADA or equivalent solution in the sinter belt #2 control room.
The installed devices should be equipped with working platforms and local push-button boxes protected against precipitation and bearing descriptions in Polish. The system should be designed and constructed taking into account the possibility of blocking the energy (LOTO-LockOut, TagOut). The supplier shall design, supply and install protection measures for all electrically driven equipment and all utilities (compressed air, nitrogen, etc.)



10. Dust transport system. Mechanical transport system from the hoppers and then pneumatic system to the dust silo. It should be heated, insulated and equipped with system for dust evacuating system to the cisterns.

11. A comprehensive, multi-discipline design should also take into account the device for continuous measurement of flue gas emission before directing it to the chimney (CEMS). Rooms for continuous measurement of emission and gravimetric measurements should be installed behind each fabric filter at a place that ensures obtaining correct results (preferably on the underground part of the flue gas duct or on the flue gas ducts downstream fabric filters) so that it meets the standards for this measurement system. Measurement rooms should be equipped with compressed air system, 230V system, mechanical ventilation, continuous CO measurement and interior heating.

- on the **OUTLET** of each of Fabric Filter no. 3 and no. 4 for tracking dust and gas measurement according BAT/Environmental Permit in range as below:

- dust emission
- NO_x
PN-EN 14792 (with a note: NO_x - expressed as NO₂ i.e. nitric oxide and nitrogen dioxide expressed as nitrogen dioxide)
- SO₂
- flue gas flow
- flue gas temperature
- negative pressure
- oxygen
- CO

12. Reuse of the existing system for continuous flue gas monitoring downstream ESP3 and ESP4 for tracking dust and gas concentrations downstream electrostatic precipitators. Possible change of location in the scope and on expense of the bidder.

Measurements:

- at the **INLET** to each of the Fabric Filter #3 and #4/ downstream Electrostatic precipitators #3 and #4:

- dust
- oxygen
- temperature
- negative pressure
- flue gas flow
- flue gas moisture content

The measurement system should comply with the requirements of QAL procedure in accordance with PN-EN 14181:2015.



13. **To install the generating system with the possibility of printing reports from continuous emission monitoring on sinter belt No. 2 in the Polish version in accordance with the standards and legal regulations in force in Poland** (appendix no. 25)
14. Broken bags detectors.
15. Information on the baghouse operation should be sent to sinter belt #2 control room in accordance with standards for visualisation systems (InTouch manufactured by Wonderware) applicable in the sinter plant area. (Appendix no. 4)
16. The guarantee service of instruments for continuous monitoring of flue gas during the guarantee period shall be provided by the CONTRACTOR. The service is to include any faults and calibration of measuring equipment to meet QAL requirements. Service inspections during the warranty period will be carried out by AMP, but after the QAL II test done by the Bidder.
17. The design should be adapted to weather conditions prevailing in Poland. The system will be subjected to the so-called cold start-ups from the ambient temperature (Appendix no. 7)
18. Air compressors should be equipped with deoiling and drying compressed air systems. The bidder will provide an appropriate reserve of compressed air compressors.
19. The Bidder's scope of electrical works shall include:
 - New 400 V motor control centre for FF-3 in ESP3 control room.
 - New 400 V motor control centre for FF-4 in ESP4 control room.
 - LV Motors as required.
 - Power and control junction boxes, local control panels and push-button stations.
 - Low voltage power supply and control cables.
 - Complete plant illumination system including emergency lighting.
 - Complete external earthing and lightning protection system
 - Repair network independent of power supply for technological equipment
20. Basic drawings and detailed working drawings shall be delivered to the customer in paper and electronic version in Polish and English. Number of copies: 4
21. Mechanical design basis



- Static calculation shall be based on a worst case scenario considering all hoppers completely filled up with dust.
- Loads from chain conveyors along with platforms shall be supported from the filter supporting structure. Supplier should take this load into account when designing the supporting structure. The access to this platform will also be designed and supplied by Supplier.
- Access to the inlet and outlet (guillotine) dampers and expansion joints shall be possible from the FF roof. These access ways and platform will be designed and supplied by Supplier. Avoid all types of ladders that can only be used as a last resort after AMP approval.
- Single function test manual (for each device) shall be prepared in the form of a clear check-list with step by step procedure.
- Access to platforms, staircase & lifting systems for maintenance of equipment should be considered.
- The equipment shall be designed for easy and safe access, assembly and disassembly for maintenance needs to all devices requiring constant or periodic maintenance.
- All main components shall be equipped with points allowing for lifting them by means of mechanical or electrical hoists.
- Emergency (by-pass) dust evacuation from the filter hoppers to wet scraper conveyor #2 and #5 should be included in the scope of supply.
- All parts shall be protected against corrosion according to local climatic conditions.
- Flange, gaskets, counter flange, bolts, nuts and washers and duct/pipe connection piece is included in the supply of the equipment.
- The ductwork shall be complete with hand holes, flange joints, supports etc. Manholes are to be provided at certain interval including strategic points. Liners of suitable thickness and material shall be provided in wear prone areas (bend portions) of gas lines for wear protection.
- The bottom part (1/3) of the hopper, dust silo should be fitted with SS liner (1.6 mm thick).
- All platform gratings and steps are to be hot dip galvanized.
- CFD analysis should be done for proper gas flow distribution Supplier has to submit the CFD analysis report during Basic Engineering.
- FF including incoming and outgoing portion of gas main shall be provided with suitable cladding and insulation to avoid any loss of temperature of waste gases.
- The dust hoppers shall be provided with low (H) and high (HH) dust level indicators and hopper heating.
- FF shall be provided with all safety equipment for safety of operating and maintenance personnel.
- FF roof shall be covered with a steel penthouse with sufficient clearance, space allowing for bag replacement and maintenance as well as electrical/mechanical hoist for maintenance - protection against wind and precipitation.
- The electrical hoist is required for maintenance of elements with filter bags.
- Inlet and outlet (guillotine) dampers of filter shall be operated remotely.
- Each Bypass damper shall be operated automatically (depending on the temperature of flue gas, pressure difference, etc.). Signals for closing, opening and closing shall be presented and agreed with the Customer.
- Continuous systems for draining rainwater from filter roof and oil from the compressor room should be ensured.
- All the instruments to be provided along with fabric filter. Filter, pressure regulator, lubricator shall be provided in the compressed air line



**European
Funds**
Smart Growth



The National Centre
for Research and Development

European Union
European Regional
Development Fund



- Dust silo shall have capacity allowing to store dusts generated during 3 days, the cone and silo at 1/3 of its height should be heated. The silo should be made of 5 mm (minimum) steel sheet with adequate stiffening elements. The silo bottom should be connected with a slide gate and rotary air lock valve. Retractable chute/bellow should be provided at the outlet of silo for unloading into dump truck/tank truck. Required aeration with dry nitrogen. Clearance between the bottom of the silo and the ground level should be minimum 5.0 m to facilitate traffic of dump/tank trucks. The disposal mechanism is to be environmental friendly with completely sealed arrangement to avoid any exposure to atmosphere (appendix no. 22)
- The chain and scraper plates of dust conveyor shall be made from special steel ensuring long operating life.
- The bulk density of the conveyed material is to be considered minimum 1.5 times of normal bulk density while selecting the motor of scraper conveyor
- All scraper conveyors and rotary air lock valves shall be provided with zero speed switches.



European Union
European Regional
Development Fund



