



**NUMBER: 1/0099\_18/2020**  
**DATE: 17.11.2020**



## **Technical Specification**

### **“Modernization of blast furnace gas cleaning installation for Blast Furnace no 2 in Dąbrowa Górnicza”**

concerns the project entitled “Development and demonstration of an innovative two-stage blast furnace gas treatment technology meeting the assumptions of minimizing the amount of generated waste in the form of sludge, increasing the degree of reuse of dust and meeting technological requirements for further energy management of blast furnace gas.” (project no. POIR.01.01.01-00-0099/18), co-financed from the funds of the European Regional Development Fund and as part of the Smart Growth Operational Program 2014-2020, sub-measure 1.1.1 (the call for proposals organized by the National Centre for Research and Development, no. 2/1.1.1/2018)

This specification is attached as Annex 2. to the request for quotation no **1/0099\_18/2020**

**ArcelorMittal Poland S.A.**  
**Dąbrowa Górnicza**



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## 1. INTRODUCTION

ArcelorMittal Poland S.A. (AMP), as part of its project "Modernization of Blast Furnace No. 2" is interested in modernization of Blast Furnace No. 2 (BF#2) gas cleaning plant. Detailed scope of the works covered by this Request for Quotation is given below.

ArcelorMittal Poland S.A. (AMP) operates in various branches in Poland, mainly concentrating steel production in Krakow and in Dąbrowa Górnicza and other important production units that are responsible for the production of various types of steel products in Poland.

The subject matter of the contract indicated in this specification concerns the project entitled "Development and demonstration of an innovative two-stage blast furnace gas treatment technology meeting the assumptions of minimizing the amount of generated waste in the form of sludge, increasing the degree of reuse of dust and meeting technological requirements for further energy management of blast furnace gas." (project no. POIR.01.01.01-00-0099/18), co-financed from the funds of the European Regional Development Fund and as part of the Smart Growth Operational Program 2014-2020, sub-measure 1.1.1 (the call for proposals organized by the National Centre for Research and Development, no. 2/1.1.1/2018)

The subject of the contract is the purchase, delivery (in accordance with DDP INCOTERMS 2010), installation and commissioning of a pilot installation for new gas cleaning plant for blast furnace no 2 located in Dąbrowa Górnicza.

Due to the Company's obligation to apply the competition principle, this technical specification constitutes a detailed description of the subject matter of the contract allowing for the preparation of tenders by the Bidders.

This specification has been drawn up with the utmost care in order to provide a full, unambiguous and exhaustive description of the subject matter of the contract so as to enable economic operators to determine all their obligations and risks and to calculate the price and other elements of the offer in a responsible way.

All of the purchases, services and supplies which are the subject of this enquiry must be incorporated and cooperate with the existing infrastructure and equipment in the Company and also must meet the same technological standards. Therefore, the need to maintain the same technological conditions and the need to maintain the unification of equipment resulting from the expansion of the existing infrastructure have determined the provisions of this specification. The provisions applied are justified by the need to ensure the smooth running of the project. The provisions indicated do not impose an obligation on Economic Operators to apply the solutions indicated but only inform about minimal parameters and standards. Using certain types of solutions is not obligatory but only exemplary. The indications in relation to the expected technical parameters, as well as indications concerning specific types and manufacturers' names are of a general nature, referring only to sample indications of equivalent products and



do not constitute the only acceptable solution. On this basis, the contracting authority shall accept equivalent solutions.

Bidders are expected to submit an offer taking into account the requirements of this Technical Specification

The offer must be complete in all respects and must include all components/devices necessary to achieve the sound design, operation and maintenance of the installation.

The Bidder must read this specification and ensure that the installation is technically feasible and also accept full responsibility for the guaranteed performance of the delivered installation and equipment in terms of efficiency, performance, smooth and reliable operation.

The detailed scope of the work subject to the Enquiry is presented later in this paper.

### **1.1. PROJECT OBJECTIVE**

The purpose of the project is extend the BF2 useful life minimum by 20 years campaign. The investor intends to achieve this objective by performing of modernization works on BF gas route and cleaning plant.

### **1.2. SPECIFICATION CONTENT**

This specification provides the environment-related data, information on Investor's location in Dąbrowa Górnicza, required technical norms and standards, technical data of BF#2 in operation, scope of Contractor's works, Customer's rights, requirements related to Contractor's technical potential, preliminary works schedule, requirements related to availability, replaceability, quality and safety and other information as required for the purposes of the Technical Offer (e.g. function guarantee).

## **2. STANDARDS, UNITS OF MEASURE, NORMS and REGULATIONS**

1. All other technical requirements should comply with the standards applied by ArcelorMittal Poland S.A., and should meet engineering standards such as DIN, ASME, BS and PN.
2. For Civil & Structural Design must be prepared by Polish version of Euro code.
3. Contractor's devices and technologies will be supplied based on the Contractor's knowledge of technology and standards effective world-wide and in Poland.
4. Devices, materials and parts used for the repair and revamping works should meet all technical and safety standards required by Polish law.
5. Project information is given in units and dimensions of the international metric system.
6. List of actual legal acts is presented in appendix 1.

### **2.1. DOCUMENTATION STANDARDS**

File formats - AMP standard:

1. Documents: \*.doc, \*.pdf, \*.xls (Microsoft Word 2010, Adobe Reader, Microsoft Excel 2010);
2. Time schedules: \*.mpp; (Microsoft Project 2010);
3. Mechanical documentation: \*.dwg, \*.dwt (AutoCAD ver. 13 or higher, Autodesk Design Review) is must
4. Electrical documentation: \*.zwt ; ( EPlan ver.5.5/P8);
5. Pictures, images: \*.jpeg;



6. 3D document format – refer to appendix 3 “AIM Addendum to tender - TLS EN V01”

## 2.2. INVESTOR'S STANDARDS

The Contractor is required to be familiar with and respect Investor's standards, in particular H&S standards and performance standards (Investor's standards are available at [www.arcelormittal.com/poland](http://www.arcelormittal.com/poland), tab “FOR CONTRACTORS”). Furthermore, Investor's standards are enclosed with the Contractor's Safety Manual and will be provided to the Contractor by the Investment Purchasing Office. The Contractor is obliged to respect and follow them at all times on a regular basis at all stages of the investment:

- ST 000 H&S Policy
- ST 001 Insulation
- ST 002 CONFINE SPACE
- ST 003 WORK AT HEIGHT
- ST 004 SECURE OF TRAIN RAILS
- ST 005 Audits
- ST 006 VEHICLES AND ROAD TRAFFIC
- ST 007 OVERHEAD CRANES AND LIFING EQUIPMENT
- ST 008 Contractor
- ST 009 Alarm
- ST 010 Safety indicators
- ST 011 Incident/Accident investigation
- ST 012 WORK AT GAZ HAZARDOUS AREA
- ST 014 HIRA (ang. Hazard Identification and Risk Assessment)
- ST 015 Golden Rules
- ST 018 Loading protection
- ST 201 H&S specification
- ST 301 Mobile phones

**NOTE: In case norms/standards define different requirements for the same topic which comply with the requirements above, the stricter norms/standards should be applicable!**

## 3. ENVIRONMENT- RELATED DATA

Investor's local environmental data for Dąbrowa Górnicza location, defined for project purposes, can be found in appendix 2 “Location and environmental data”.

## 4. TECHNICAL INFORMATION:

### 4.1. AVAILABLE BACKGROUND DOCUMENTATION

1. Investor has Concept Engineering prepared by Paul Wurth. It is attached to RFQ.
2. Background technical documentation is available in softcopy (PDF) or paper version. The cost of printing out the documentation necessary for Bid preparation is to be borne by the Potential Contractor.
3. Documentation provided by the Investor may not be complete, therefore it is necessary for Contractors to rely on their own stocktaking, tests of the



construction, foundations and land. Documentation provided by the Investor should not restrict the launch of works.

## 4.2. GENERAL DESCRIPTION

BF Operational Data, Gas Cleaning Plant (GCP) operational data:

- Nominal top gas flow rate (design) 450.000 Nm<sup>3</sup>/h dry
- Max. top gas flow rate 520.000 Nm<sup>3</sup>/h dry
- Min. top gas flow rate 160.000 Nm<sup>3</sup>/h dry
- Operating top gas pressure range 1,0 – 2,4 bar g
- Nominal top gas pressure 2,2 bar g
- Top gas temperature range 100 - 300 ° C
- Top gas temperature design 150 ° C
- Top gas temperature max 500 ° C during 20 min, 10 times per year, 800° C for 2 min peak up to 5 times per year
- Nominal dust content at inlet 15 g/Nm<sup>3</sup>
- Maximum dust content at inlet 25 g/Nm<sup>3</sup>
- Dust composition Coke, sand, iron ore, lime
- Dust particle distribution:
 

0-20 µm	15 %
20 – 100 µm	50 %
>100 µm	35 %
- Average dust particle density 2400 kg/m<sup>3</sup>
- Dust bulk density 1400 kg/m<sup>3</sup>
- Gas Composition:
 

CO	18 - 25 Vol-%
CO2	18 - 25 Vol-%
H2	0 - 6 Vol-%
N2	46 - 66 Vol-%
- Moisture in BF gas up to 60 g/Nm<sup>3</sup>

## 5. HEALTH & SAFETY

During the implementation of specific project phases, manufacturing and delivery to ArcelorMittal Poland S.A. Dąbrowa Górnicza Unit, the supplier has to fulfill safety requirements defined in ArcelorMittal Poland S.A. documentation:



1. Works contractors, before they start work, must receive trainings in scope of OH&S and fire protection regulations effective at AMP;
2. Works must be performed according to the technical conditions for the performance and acceptance of construction and assembly works and currently effective regulations and standards, OH&S rules and fire protection rules;
3. Regulations on personnel, vehicle and material traffic effective in the premises of AMP must be followed;
4. Works site must be secured against unauthorized third party access;
5. OH&S and fire protection for the site and works must comply with the regulations effective at AMP.
6. During investment realization period at AMP site, supplier must respect and apply all H&S rules mentioned in H&S book, including all appendix described in Investor Standards, mentioned in point 2.2.
7. In case of using forklift, jib cranes, others lifting equipment and devices, certification by Polish Technical Office UDT is a must. Others certificate are not accepted;
8. Employees, who will operate the hooks, lifting equipment must speak polish language.
9. Necessity to equip of all employees i.e. fire protection clothes, proper shoes, helmet with 4-point belt locked under the chin, safety glasses, gas detector CO and O<sub>2</sub>, in case of working at height - (individual) harness with safety ropes, shock absorber and other equipment which will be agreed during elaboration of project documentation or during execution at site.
10. **The Contractor will have a H&S inspector present on site 24h/day. The inspector will be responsible for safety of the Contractor during performance of works as well as for preparation of reports from safety audits carried out jointly with AMP representatives.**

## 6. CONTRACTOR'S SCOPE OF WORK

### 6.1. WORKS OBJECTIVES

1. The purpose of these technical assumptions is to present the scope of works related to the complete modernization of BF#2 Gas Cleaning Plant (GCP).
2. The BF Gas cleaning plant shall be equipped with the most advanced and reliable equipment for BF top gas cleaning at the present, consisting of:
  - Uptakes
  - Downcomer
  - Cyclone
  - The Annular gap scrubber
  - Demister
  - Clean gas main with supports
  - Connection to TRT and low pressure gas network equipped with goggle valve.
3. Main function of the GCP is the cleaning of the BF gas and control of the BF top gas pressure.

The design of the new gas cleaning plant allows an optimum process control of the blast furnace, not only during normal operation but also for startup and with TRT in operation



4. The main parameters the new installation needs to meet:
- Efficiency of dry separation – cyclone stage: at least 85%
  - Water flow after clarifiers going to gas cleaning plant: max. 1000 m<sup>3</sup>/h
  - Noise level (measurement acc. DIN in 1 m distance) ≤ 85 dB(A),
  - Clean gas temperature 50 - 70 °C  
Assumptions: gas temperature 150 C.  
Water from clarifiers temperature: 40 C  
Saturated steam injection: 20 t/h at 8 bar (g)
  - Clean gas dust content < 5 mg/Nm<sup>3</sup>
  - Clean gas droplet content < 10 g/Nm<sup>3</sup>
  - Maximum pressure loss level to achieve 5 mg/Nm<sup>3</sup>: 400 mbar
5. The work executed by the CONTRACTOR will include in particular:
- Basic and Detail Engineering
  - Input data to obtain building/environmental permit during BE phase – based on appendix 8.
  - On-site verification of drawings belonging to existing installations
  - Assembly layouts and detail drawings
  - Supply and provision
  - Manufacturing in the workshop
  - Shop test assembly and workshop tests
  - System Appliance Tests (SAT)
  - Factory Appliance Tests (FAT)
  - Packing, loading, transport, dispatching, unloading, delivery on site
  - Execution, erection including all on site adjustments,
  - Conducting of cold tests and hot tests, as well as performance tests
  - Regulatory tests (pressure, tightness, welding, functionalities in automatic mode)
  - Management and coordination of tests on site, by taking into account all operational constraints
  - Assistance during the Industrial Commissioning until reaching contractual performances
  - Training of AMP personnel
  - Complete documentation, necessary for startup, in original language, English and Polish language, operation and maintenance of the Equipment

Note: Before you submit your offer, it is advised to conduct onsite visit.

## 6.2. WORKS SCOPE

1. Modernization of the complete gas cleaning plant is requested as a turnkey project. Basics for engineering are attached to the RFQ as concept engineering files. Following elements have to be included:
  - a. New uptakes and down comer with refractory protection against abrasion and temperature. New downcomer shall have inclination min. 40 degrees



to avoid dust clogging. Wear protection must be compliant with requirements stipulated in “5. Appendix - Gas cleaning - corrosion and wear protection”

- b. The current valve to isolate the dust catcher must be replaced by a new and more efficient one i.e. gastight hydraulic goggle valve. Goggle valve specification is attached to this RFQ “6. Appendix - Goggle valve DN 3200 requirements”. Diameter of goggle valve can be proposed by contractor.
- c. An anti-implosion valve must be installed in the gas piping.
- d. The new cyclone shall meet following requirements:
  - Separation efficiency > 85 %
  - Dust storage capacity min. 12 hours
  - Regulation of dust separation point min. 3 working points
  - Intermediate vessel of dust evacuation or other solution in order to evacuate dust with reduced emission of dust and gas into atmosphere. Shall be equipped with weighting system. Emergency dust dumping line needs to be installed.
  - Wear protection must be compliant with requirements stipulated in “5. Appendix - Gas cleaning - corrosion and wear protection”
  - Equipment to moisturize dust and transport into wagons
- e. Horizontal pipe protected as described in “5. Appendix - Gas cleaning - corrosion and wear protection” with respect to compensation system and with design preventing from dust accumulation.
- f. Annular gap scrubber and demister with following features
  - max. pressure loss level to achieve dust content max. 5 mg/Nm<sup>3</sup> not higher than 400 mbar over whole gas cleaning system – from pressure measured at cyclone inlet up to pressure measurement after demister
  - waste steam injection installation to boost dedusting process, increase gas temperature and improve water quality
  - wear protection according to “5. Appendix - Gas cleaning - corrosion and wear protection”
  - regulation system of water flow control
  - at least 2 hydraulically actuated annular gap elements. In case of one’s failure another one needs to be able to control the pressure in desired range
  - top gas pressure needs to be regulated with max. 1% of deviation comparing to set point
  - safety measure for preventing uncontrolled gas emission atmosphere in case of equipment failure i.e. water seal pipe. Must include SIL-rated loops to address functional safety in accordance with European Directives and IEC 61508
  - max clarified water flow consumption lower than 1000 m<sup>3</sup>/h
  - clean gas droplet content <10 g/Nm<sup>3</sup>



- g. new connection to low pressure gas network as existing septum valves and demisters are going to be dismantled
  - equipped with gas tight goggle valve: fully enclosed with electric or hydraulic movement and clamping
  - with associated maintenance platform
- h. Equalizing piping, atmospheric piping with silencer and bleeder piping according to battery limits
- i. Stair tower, manhole access platform and bleeder valves platform can be partially refurbished, but in contractor scope is to design, supply and erect safe access to manholes and valves
- j. Take over points are stipulated in “10. Appendix - Battery limits”

## 2. Project and documentation

- a. Preparation of basic engineering and detail engineering for complete gas route for BF#2

Basic engineering shall include following points and should be aligned with AMP:

- necessary information by drawings and technical specifications for detail engineering of installations and constructions.
  - input for building permits
  - specifications for procurement of the different units.
  - functional descriptions.
  - dismantling specifications.
  - erection specifications.
  - static steel constructions specifications.
  - civil works specifications.
  - spare parts proposals.
  - commissioning specifications.
  - gas explosion zones elaboration
  - HAZOP or other risk analysis to be performed together with AMP team
  - Schedule of detail engineering, construction, installation, commissioning.
- b. Analysis of dust catcher foundation capacity to take a loads of new installations (foundation assessment to be provided by AMP)
  - c. 3D scanning to be performed prior to start engineering work. Requirements for 3D scanning are attached to this RFQ (“AIM Addendum to tender - TLS EN V01”). Presentation of new piping and new installation shall be based on 3D scan allowing to check collisions and non-ergonomic solutions.

## 3. Erection works on site



- a. Dismantling and removal of existing gas route elements such as: uptakes, downcomer, dust catcher with associated structures necessary to perform safe dismantling
- b. Civil works related to erect necessary foundations for main elements and support structures. Dust catcher foundations and steel supporting structure to be re-used.
- c. All piping, hydraulic, electrical, automation, instrumentation, refractory, erection works including supply as defined in BE and DE stages.
- d. Heavy equipment like cranes, vehicles, auxiliary equipment, scaffoldings are in scope of contractor.

#### 4. Operation, control, automation, power, electrics, hydraulics

##### a. Hydraulics

The hydraulic units for the annular gap elements should be fed from the central hydraulic room located next to the scrubber.

The hydraulic station shall comprise of at least two (2) pressure pumps, one (1) oil tank including filter, heating and cooling unit and circulating pump, one (1) accumulator station and miscellaneous filter units.

All hydraulic equipment is located in the bottom part of the scrubber or in an additional hydraulic room next to the scrubber.

- b. Design, delivery and implementation of the components of measurement, control and automation systems.
  - Water supply to scrubber shall be equipped with actuated valves allowing to control water flow.
  - Steam injection system equipped with actuated valves allowing to control steam flow
- c. Automation requirements according to attached document: "11. Appendix - Requirements for the Automation\_IT system for the contractor of the GCP"
- d. Automation and IT scope must be done in accordance with attached document: ("AIM Addendum to tender - automation system requirements EN V12")
- e. Electrical installations located in gas explosion hazard zones have to be compliant with ATEX

#### 5. Options:

- a. Wear protection for scrubber conditioning tower by:
  - i. Welding anchors S235 JR or equivalent min. 49 pcs / m<sup>2</sup>
  - ii. After welding anchors, or in general before applying the coating, paint or gunite all internal surfaces need to be sandblasted according to SA 2 ½ PN-EN ISO 8501-1
  - iii. Coating type: Tarpoxy PCN300, SIGMASHIELD 880/AMERLOCK 880, or equivalent with one layer of 200 µm thick



- iv. Gunning material: GUNEC 404 ALAG, Class E - Group 120, or equivalent 50 mm thick

### 6.3. ADDITIONAL INFORMATION

1. Enclosed drawings from concept engineering are for general guidance, however AMP could accept deviation from solutions described in the study provided that new solution will allow to meet project objectives and performance parameters.
2. Contractor is obligated to deliver support of onsite interpreter being present during whole dismantling/installation/commissioning phase (24/7).
3. Storage of material. Contractor is responsible for storage and security of delivered materials. AMP can provide open space based on provided requirement. The Contractor can build the temporary storage area with mutual agreement with AMP.
4. Preassembly and fabrication area – to be mutually agreed with AMP.

### 6.4. ACCESSIBILITY AND INTERCHANGEABILITY

1. Detail engineering need to take care of all working parts, as practicable, are to be arranged for convenience of operation, inspection, lubrication and ease of replacement / maintenance with minimum downtime. All like parts on the equipment furnished are to be interchangeable.
2. Maintenance access areas must be defined.

### 6.5. AVAILABLE MEDIA

1. The contractor should secure all the necessary tools to perform the task, such as scaffolding, lighting (if existing is insufficient), carrying devices, handles, etc.
2. The Purchaser will ensure the power supply for equipment and tools.

## 7. OFFER-RELATED REQUIREMENTS

1. Technical offer should include
  - a. General description and information about the service offered;
  - b. Scope of works under the bid (with defined quantity);
  - c. List of elements/works and quantity;
  - d. Exclusions (work to be performed by the buyer);
  - e. Responsibility matrix (i.e. division of work which clearly specifies Seller's and Customer's scope);
  - f. Contractor is obligated to secure all necessary heavy equipment (cranes; forklifts; excavators; etc.)
  - g. Contractor is obligated to deliver logistics plan and layout of works including all crane operations. Possible crane location areas will be defined by AMP.



- h. Cranes must be shared with other contractors in the working area if necessary, with defined priority for main contractor.
  - i. Necessary drawings
  - j. Works schedule on a daily basis with the milestones;
  - k. Performance parameters;
  - l. References (buyer's name, location, value and year);
  - m. List of potential sub-contractors for AMP approval;
  - n. List of utility requirements with parameters (nitrogen, oxygen, compressed air, instrument air, service water, steam etc.)
  - o. List of spare parts for at least two years of normal operation and for commissioning;
  - p. Declaration that Contractor's knowledge, experience and site visit are sufficient to perform the whole scope of work;
  - q. Declaration that the whole scope of work will comply with good construction practices and with the effective law;
  - r. Information on labor consumption related to task performance, in the break-up into individual areas;
  - s. Bid validity period;
  - t. **Other information disclosed by the Contractor which does not include any cost data that could influence the quality of the offer.**
- 2. Supplier will present in detail all the elements of their offer which vary from the technical conditions set forth here if they are not able to fully meet all conditions.
  - 3. The offer must contain a description of how the work will be organized, together with the anticipated human resources, heavy equipment for specific work groups. The contractor will present a plan for the organization of works, including places of work and storage of structural elements
  - 4. The offer in the final part must contain an index of all changes that will appear in the content as a result of technical meetings, arrangements. The index must contain a brief description of the change and the locations of the change in the offer text.
  - 5. Indication of subcontractors or partners in the case of a consortium, together with an indication of the relevant work packages
  - 6. The commercial part will have a price breakdown consistent with the breakdown of the request for quotation, including additionally for the supply of materials and labor.

## **8. REQUIRED CONTENT OF THE TECHNICAL DOCUMENTATION SUPPLIED BY SERVICE PROVIDER:**

- 1. Works schedule;
- 2. Detailed risk analysis for all the investment stages for the required scope of works (technical risk, OH&S risk) indicating preventive measures to be taken in order to eliminate or significantly reduce the risk. It must be agreed with and finally validated by the Investor before the repair and revamping works start.
- 3. Health and Safety plan;
- 4. Works organization plan;
- 5. Quality Assurance Plan for Investor's approval;



6. Manufacturing inspection documentation.
7. Division of works into tasks being the responsibility of the Contractor and Customer;
8. Weekly progress reports prepared according to the Customer's guidelines and defining the percentage of works done relative to the plan;
9. List of spare part for 2 years period of standard operation
10. Final report.

## **9. SUPERVISION, ASSEMBLY, TESTS AND COMMISSIONING**

1. Contractor will deliver all materials, tools and specialized equipment required for work completion. The Contractor undertakes to perform the commissioned work according to the arrangements made at the contract finalization stage. The contractor will perform the function of a Site/Works Manager and will have a H&S inspector present on site during the entire period of works performance.
2. Supplier undertakes to install and set all devices, commission, hand over the equipment for use and train AMP employees.
3. Commissioning
  - a. Cold commissioning  
Cold commissioning (partial) for equipment will be performed after works at a given point are completed, possible defects and faults removed, additional works that may turn out to be necessary to perform during the investment execution are completed, after the Buyer's safe work requirements are met, after the Contractor reports their readiness for cold commissioning and its conditions and date are agreed with the Buyer.
  - b. Hot commissioning  
Hot commissioning for equipment will be performed after all works are completed, after cold (partial) commissioning of equipment is done, possible defects and faults removed, additional works that may turn out to be necessary to perform during the investment execution are completed, after the Buyer's safe work requirements are met, after the Contractor reports their readiness for hot commissioning and its conditions and date are agreed with the Buyer.
4. The project will be put into use after PAC is signed for specific equipment groups and/or entire investment project.
5. Welding procedure:
  - a. The welding procedures should be submitted to the leader for previous approval before starting manufacturing. As per this specific technical condition for standards and drawing, the contractor will follow all the needed requests and will inform the welders and the responsible accordingly.
  - b. All the welders should submit their own welding qualifications through contractor to AMP before starting manufacturing.
  - c. The contractor should perform these welding tests as per the mentioned drawings and standards indications. The AMP has the right to check the welding at any moment. The contractor assistance to these controls (polishing, scaffoldings) is indispensable.



## 10. WORKS PERFORMANCE DEADLINE, IMPLEMENTATION STAGES

AMP plans for complete relining of BF#2 2<sup>nd</sup> half of 2022. Contractor is obligated to start works after contract signing. Preparatory works must be finished within 75 weeks from contract signature. BF#2 shutdown is planned in 2<sup>nd</sup> half of 2022. Contractor is obligated to perform tasks in the period of time no longer than **100 days** from the moment of handing over the work front during BF stoppage. All works on site shall be carried out in 2 or 3 shifts and will last 24 hours/day including all days as working.

### Major milestones:

- a. Submission of the information necessary to submit an application for a Building Permit (as per in attachment no. 8): 8 weeks after signing the contract.
- b. Submission of the Basic Engineering: 4 months after signing the contract.
- c. Submission of Detail Engineering: 10 months after signing the contract
- d. Completion of preparatory works – 75 weeks from contract signature
  - Execution of civil works
  - Delivery on site of all prefabricated and supplied elements
- e. Start of industrial commissioning of the installation: 100 days from the start of the BF#2 shutdown
- f. Verification of the guaranteed performance parameters: 30 days after the blow-in of BF#2

## 11. WORKS SCHEDULE

The Contractor should deliver the draft works schedule for Investor's consultation and approval.

Note 1: 2 or 3-shift work system must be planned. Work to be performed 24h/day

Note 2: Detailed works schedule will be coordinated with the potential Contractor implementing other revamping works.

### 11.1. PRELIMINARY SCHEDULE

The offer should include a preliminary schedule with specific time slots in which the Contractor will provide the Investor with drawings, documents and other materials, as well as time slots for the implementation of the specific Investment phases. Schedule dates will be guaranteed by the Contractor and will be subject to specific commercial clauses in the Commercial Offer.

### 11.2. DETAILED SCHEDULE

Detailed schedule of the works scope should be provided for approval by the Investor as part of Contractor's work performance, taking into consideration the stages of organization and securing of the site/works, arranging all the matters related to getting Investor's OH&S Office clearance for the works to be done on their premises, purchasing and prefabrication, erection, tests and commissioning, and putting into operation. This schedule should also include the description (specification) of the so-called critical path tasks and the so-called investment milestones.

## 12. RIGHTS OF THE CUSTOMER



1. All valuable materials /scrap/objects of archeological value recovered or found during works performance are the customer's property and will be handed over to them.
2. Customer reserves the right to restrict access to the plant for any person associated with the Contractor found to be e.g. under the influence of alcohol or in a condition that may create a threat to themselves and other people performing work or a group of people. Detailed information will be presented in Health & Safety Policy applied at ArcelorMittal. This policy shall constitute an integral part of the contract concluded with the Contractor.

### **13. DELIVERY AND QUALITY GUARANTEE**

1. Delivered solutions will be free of any defects being the result of faulty engineering, materials and/or poor quality of manufacturing. The Contractor will guarantee the delivery by the date and in the form as defined in the order.
2. The Contractor will guarantee the use of the state-of-the-art solutions.
3. The Contractor will guarantee high quality of the structural solutions, high quality of materials in the proposed solutions and high quality of performance for all individual and assembled elements of equipment parts, specific machines and equipment, offered by them on the basis of the required performance guarantees defined in the specification of the offer.
4. Performance guarantee will cover all individual elements and weighing and metering systems, as far as their accuracy, nominal values/capacity and integrated operation are concerned.
5. The minimum warranty period expected by the Investor is 24 months from the moment of signing the Preliminary Acceptance Certificate.

### **14. PERFORMANCE PARAMETERS AND CONDITIONS FOR PAC (PROVISIONAL ACCEPTANCE CERTIFICATE) SIGNING**

No.	Performance parameter	Guaranteed value	Acceptable limit
1	Clean gas dust content	$\leq 5 \text{ mg/Nm}^3$	$\leq 10 \text{ mg/Nm}^3$
2	Cyclone efficiency	$\geq 85\%$	$\geq 85\%$



3	Water consumption	≤ 1000 m <sup>3</sup> /h	≤ 1200 m <sup>3</sup> /h
4	Top gas pressure regulation to be regulated with max. 1% of	max. 1% deviation from set point	≤ 2 %
5	Noise level (measurement acc. DIN in 1 m distance)	≤ 85 dB(A)	≤ 95 dB(A)
6	Clean gas droplet content	≤ 10 g/Nm <sup>3</sup>	≤ 10 g/Nm <sup>3</sup>

## 15. CONTACT PERSONS

Item	Name and surname	Responsibility	Plant/Department	Phone / e-mail
1	Michał Kocot	Project Manager - Blast Furnaces Dept.	BF Plant AMP DG, Al. J. Piłsudskiego 92 41 – 308 Dąbrowa Górnicza	+48 32 776 89 49 / +48 608 360 025 <a href="mailto:Michal.Kocot@arcelormittal.com">Michal.Kocot@arcelormittal.com</a>
2	Michał Patola	Engineering Office Support	Engineering Office Al. J. Piłsudskiego 92 41 – 308 Dąbrowa Górnicza	+48 32 776 77 67 / +48 795 416 109 <a href="mailto:Michal.Patola@arcelormittal.com">Michal.Patola@arcelormittal.com</a>
3	Marta Bodnar	Purchasing Office	EPO Al. J. Piłsudskiego 92 41 – 308 Dąbrowa Górnicza	+48 668 562 376 <a href="mailto:Marta.Bodnar@arcelormittal.com">Marta.Bodnar@arcelormittal.com</a>

## 16. OTHER TOPICS (NOT DISCUSSED ELSEWHERE)

### 16.1. WASTE DISPOSAL

Contractor is responsible for the disposal of waste generated as a result of investment works. All waste products, which will be produced during the works, should be removed to the industrial waste storage area.

The only exception is scrap of non-ferrous materials and iron scrap which must be sorted so that it can be used as charge material and handed over to the Investor.

Total cost of disposal and sorting into charge scrap groups will be borne by the Contractor.

Below you can find the list of waste codes (according to Polish law), referring to the most frequent types of waste to be generated in the course of the Investment:

- Scrap of ferrous metals waste code 160117, 170405, 191001.
- Scrap of non-ferrous metals waste code 160118, 170401, 170402.
- Scrap of mixed metals waste code 170407.
- Ceramic waste waste code 161103, 161104.
- Concrete and debris waste waste code 170101.
- Electrical cables waste code 170411, 170604.
- Oils, greases waste code 130110, 130208.
- Electric motors scrap waste code 160216.



- Other waste individual waste codes.

## **16.2. ANALYSES AND MEASUREMENTS**

Below you can find the analyses and measurements to be done by the Contractor, at their own expense, as part of the investment project:

- Steel structures strength analysis within the work site.
- Inventory-taking geodetic measurements.
- Working geodetic measurements.
- As-build geodetic measurements (geodetic surveys).
- Installation measurements

## **16.3. CONTRACTOR'S PROPERTY SECURITY**

In the course of the Investment's duration, the Contractor is responsible for securing their own property and the property of their subcontractors, parts, subassemblies and entire equipment stored in the Investor's premises and planned for project purposes in the period of commissioning and hand-over to the Investor.

## **17. APPENDICES**

1. Appendix 1 - Legal acts
2. Appendix 2 - Location and environmental data
3. Appendix 3 - AIM Addendum to tender - TLS EN V01
4. Appendix 4 - AIM Addendum to tender - automation system requirements EN V12
5. Appendix 5 - Gas cleaning - corrosion and wear protection
6. Appendix 6 - Addendum - Goggle valve DN 3200 requirements
7. Appendix 7 - CE drawings
8. Appendix 8 - Data required for building and environmental permits
9. Appendix 9 - Gas main data
10. Appendix 10 - Battery limits



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**11. Appendix 11 - Requirements for the Automation\_IT system for the contractor of the GCP**

**12. Appendix 12 - Utilities**