

TECHNICAL SPECIFICATION

This specification is attached as Annex no.2 to the request for quotation no.
1/0176/2018 dated **22.06.2018**

ArcelorMittal Poland S.A. (hereinafter also AMP) carries out its business in various divisions in Poland, with a main focus on steel production in Kraków and Dąbrowa Górnicza and in other important production plants responsible for manufacturing of various steel products in Poland.

The subject of the order indicated in this specification applies to the project entitled "Development of the innovative Zn-Al-Mg based coating for the production of hot deep galvanized sheets" (project no.: POIR.01.02.00-00-0176/16) Measure 1.2. "Sectoral R&D programmes" of the Intelligent Development Operational Program 2014-2020 co-financed by the European Regional Development Fund.

This specification has been prepared with the most care to determine the full, unambiguous and comprehensive description of the subject of the contract so as to enable Contractors to determine all their obligations and risks and to account for the price and other elements of the initial valuation.

AMP expects a technical solution to meet the requirements of the installation. Contractors are expected to submit a basic offer considering the requirements of this Technical Specification.

The package must be complete in all respects and valuation shall include all the components/equipment required to achieve proper construction, operation and maintenance of the installation.

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DESCRIPTION OF THE SUBJECT

The aim of the project is to put in operation the zinc pot and to adjust it to operate with zinc alloy Zn-Al-Mg. To achieve the above, it is necessary to:

- a) remove zinc remnants from the pot,
- b) remove lining from the pot and install new lining,
- c) replace steel edges of the pot with new ones, installation and dismantling as per the drawing,
- d) dismantle and install inductors,

- e) regenerate inductors,
- f) design and erection on new electrical cabinets,
- g) dismantle power cabinets and install new ones,
- h) integrate control system with the existing control system and HMI,
- i) start up the pot for regular operation.

Scope of civil works described in this technical specification does not require to apply for Building Permit.

SCOPE OF WORKS

- a) Preparation of access to the pot in the parking position:
 - i. installation of a cover securing the opening over the pot,
 - ii. installation of a physical protection of the opening. A fork lift with a 2-ton zinc block will drive over the installed cover,
 - iii. putting up scaffolding in the cellar to access the opening resulting from the removal of inductors,
- b) Protection of auxiliary equipment against dust (zinc pot no 2, electrical cabinets, fans, compressor room),
- c) Removal of zinc remnants and its storage in a place within the plant's premises indicated by AMP. Supplier is responsible for reprocessing of wastes,
- d) Removal of lining and its storage in a place within the plant's premises indicated by AMP. Supplier is responsible for reprocessing of wastes,
- e) Removal of steel edges from the pot,
- f) Dismantling of inductors,
- g) Regeneration of inductors, exchange of bushings, lining, drying, preparation for assembly,
- h) Lining the inside of the pot with refractory, drying, preparation for operation,
- i) Installation of new pot edges,
- j) Installation of regenerated inductors, electrical connection,
- k) Dismantling of existing power cabinets, storage of remaining elements in a place within the plant's premises indicated by AMP,
- l) Transport of power cabinets and their positioning, connection to inductors. Cable laying,
- m) Integration of the control system with the existing HMI system – cable connection, controller program change, modification of HMI,
- n) Thermal calculation for proposed refractories.
- o) Supervision over the start-up of the zinc bath. Switching inductors on.

SCOPE OF MATERIALS SUPPLY

- a) The pot lining must satisfy the following parameters:
 - i. minimum Al₂O₃ content of 80% or higher,
 - ii. maximum SiO₂ content of 0,5%,
 - iii. resistance to liquid Zn-Al-Mg alloy,
- b) Inductors lining must satisfy the following parameters:
 - i. minimum Al₂O₃ content of 92% or higher,
 - ii. maximum SiO₂ content of 0,5%,
 - iii. the required parts must be specified by the supplier during the site visit and inspection of inductors,
- c) Refractories must be prepared for Zn-Al-Mg alloy with parameters:
 - i. Al max. content 5,5%
 - ii. Mg max. content. 3,2%
 - iii. Temperature of alloy max. 445 deg. C.
- d) Inductors: power supply system adjusted to power consumption of regenerated inductors, electrical cabinets designed, prefabricated before delivery to ArcelorMittal Poland Świętochłowice,
- e) New pot edges – as per the drawing 050-009/301,
- f) Placing two covers over the parking positions of pot no. 1,
- g) Technical protection of the access opening to the pot.,
- h) Liquid zinc pumps – minimum flow 300kg/min, electrical supply - 2 pcs.

WASTE CODES

Generation, collection, transport, receipt, storage and disposal of waste produced during Project works shall be within the scope of responsibilities of the Bidder / Contractor. Waste materials generated during the works should be disposed of to a landfill. The Contractor is required to possess applicable permits and authorisations, as defined by the law, to complete the foregoing tasks, and if the Contractor does not hold such permits and authorisations, it shall commission a specialist company (companies) to complete those tasks.

An exception is made for non-ferrous metal scrap and iron alloy scrap that should be collected and sorted as scrap charge (in accordance with Attachment no. 6) and transferred to the Investor.

The costs of disposal and sorting / packing of scrap charge shall be fully covered by the Bidder / Contractor.

The list below contains codes of major waste materials (according to the Polish law) that will be handled as part of the Project:

- Ferrous metal scrap waste codes 160117, 170405, 191001.



- Non-ferrous metal scrap waste codes 160118, 170401, 170402.
- Mixed metal scrap waste code 170407.
- Ceramic waste waste codes 161103, 161104.
- Concrete waste and debris waste code 170101.
- Electrical cables waste codes 170411, 170604.
- Oils, lubricants waste codes 130110, 130208.

TECHNICAL DRAWINGS

- a) Drawing no. 050-009/301
- b) Drawing no. 718799
- c) Drawing no. ET-01-2009 sheet 1/2
- d) Drawing no. ET-01-2009 sheet 2/2
- e) Drawing no. ET-07-2843
- f) Drawing no. ET-07-2844