

Appendix no 2 - Technical specification

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.

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.

Technical requirements

1. Air knives should make it possible to obtain zinc coating in the range from 30 g/m² to 350 g/m² in total on both sides of an annealed steel strip moving between 30-180 m/min.
2. The difference in coating distribution between the two sides A and B of the steel strip should be at the maximum level of 15%.
3. The possibility to use air and neutral gas (nitrogen) to control zinc coating.
4. The possibility to switch the blowing media during operation (max in 10 seconds).
5. Adjustment of the working parameters of the air knives:
 - the height of the knives - range: 30 – 800 mm,
 - gap: 5 – 20 mm from the knife to the steel strip,
 - blow pressure 0 – 1000 mbar
 - knives inclination angle -5° - +5°
6. The possibility to slide away the knives fast in the operating mode – 1 second.
7. Resistance of the devices to minimum temperatures of 150°C.

Functionality of air knives

1. Non-contact baffles preventing liquid zinc splashing.
2. Automation of baffles setting.
3. Device supporting the exchange of baffles
4. Automation of the cleaning or air knives gaps. The operation cycle (move from one edge to the other and back) may not take longer than 3 sec. The device must have a few modes of the cleaning cycle:
 - a) manual (started at the operator's demand)
 - b) automatic (started after the weld passes through the knives)



5. The air knives set must be controlled by existing control system of the line based on S7-400 drivers with the support of 1 out of 3 listed interfaces
 - a) profinet
 - b) profibus
 - c) input/output/digital/analogue
6. Screen for the gap in a place where steel strip does not move
7. The knives positioning system should offer the possibility to set them outside the zinc pot area.
8. The movement in the positioning system should be mechanical.
9. Platforms making it possible for the operator to enter the area where air knives operate and have direct access to the gap – on both sides of the steel strip.
10. Pressure control system controlling the zinc coating system should be prepared to facilitate connection of a superior air knives control system (operation in a closed loop with cold zinc gauge).
11. Adjustment of the air knives with respect to the steel strip should be available vertically, horizontally and slantwise.
12. Possibility to replace a set of air knives within 60 minutes maximum.
13. Set of air knives must be adopted to existing movable mounting system above zinc bath.

Scope of material supplies

1. Air knives: 1 set
2. Valves regulating utility flow
3. Nitrogen connection
4. Power cabinets of the blower along with inverters, supply cables
5. Control and measurement equipment (regulation valves, pressure transducers etc.)
6. Pneumatic systems (filters, regulators, connections, hoses)
7. Servicing station (pneumatic table with solenoid valves, service panel)
8. Platforms for air knives
9. Device for automatic cleaning of the air gap
10. Non-contact baffles
11. Spare parts for baffles: 4 handles, 10 spare plates.
12. Spare parts: flexible hoses supplying air knives connected to the station– 3 pcs,

The offerer's scope

1. Installation of air knives and all delivered equipment.
2. Installation of the device may not limit the functionality of the pot's tooling rollers submerged in the zinc bath.
3. Installation for nitrogen connection
4. Dismantling of valves regulating the utility flow.
5. Installation of valves regulating the utility flow.
6. Dismantling of old power cabinets and inverters.
7. Installation of new power cabinets and inverters.
8. Installation of new platforms on air knives.
9. Installation of a new servicing station.
10. Dismantling of control and measurement equipment (regulation valves, pressure transducers etc..)



11. Installation of control and measurement equipment (regulation valves, pressure transducer etc).
12. Dismantling of the pneumatic system (filters, reducers connections, hoses)
13. Installation of the pneumatic system (filters, reducers connections, hoses)
14. Installation of cables, pipes, connection covers etc.
15. Cables, pipes should be laid and protected against mechanical and thermal damage.
16. Installation of the device and integration with existing control system and HMI.
17. Start-up and testing the device at the test station.
18. Start-up and testing the device on the line.
19. Supervision over the start-up of the device and 4-day presence during tests.

Requirements

1. Site visit obligatory.
2. Necessary measurements of the existing air knives in order to assess the possibility to use the existing installation.
3. Identification of the necessary utilities and connections – identification of take-over points.
4. Identification of the location of the local control panel.
5. Selection of materials based on thermal conditions existing in the area where the equipment operates.
6. Submission of the project for approval.
7. Supervision over assembly.
8. Development and delivery of complete technical documentation in Polish – hard and soft copy.
9. The investment will be implemented during the stoppage of the HDG line. Internal transport in the plant is available.
10. The installation of the device may not limit the functionality of the Rolls of the bath's equipment submerged in the zinc bath.
11. Efficiency of the air knives, medium flow, noise during operation of the air knives, electricity consumption should be defined.
12. The blower system should operate the way it is operating now. Operation of one set or two sets at the same time.
13. Employee training:
 - a. Operators: 16 persons – as regards the operation of the device
 - b. Maintenance employees: 25 persons – as regards the operation of the device and its maintenance

Guaranteed parameters

1. The required guarantee for service performance is minimum 24 months.
2. Air knives should make it possible to obtain zinc coating in the range from 30 g/m² to 350 g/m² in total on both sides of an annealed steel strip moving between 30-180 m/min.
3. The difference in coating distribution between the two sides A and B of the steel strip should be at the maximum level of 15%