

Technical Specification

“Purchase and installation of the 9-roller vertical straightener at HSM in Dąbrowa Górnicza.”

Number: AMP/2021/DG/DWD/DWDL-6/92

concerns the project entitled

"Interoperational railway rails with standard and increased operating properties, intended for the construction of large- and conventional-speed railway lines, being characterized by very good flatness of the running surface and increased safety indicators resulting from the low level of residual magnetism"

(project No.: POIR.01.01.01-00-0784/17), 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 “Industrial research and development work carried out by enterprises”.

(This specification is constitutes appendix No 5 to the request for quotation no 3/0784/2021 dated 21.05.2021 for modernization of Control Block in rails finishing area of the rolling mill in Dąbrowa Górnicza)

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1. General introduction

ArcelorMittal Poland S.A. (AMP) as part of the project “Interoperational railway rails with standard and increased operating properties, intended for the construction of large- and conventional-speed railway lines, being characterized by very good flatness of the running surface and increased safety indicators resulting from the low level of residual magnetism” is interested in choosing a supplier for the modernization of the existing control block at the Heavy Section Mill in Dąbrowa Górnicza, including **design, delivery, assembly and start-up**:

- Designing new modules of the control block
- Project execution (schedule, deliveries, resources)
- All deliveries with accessories, in accordance with DDP INCOTERMS 2020
- Installation of new Control Block modules with the required equipment
- Commissioning and ramp up
- Training for AMP personnel
- Qualitative and quantitative supervision over the implementation of the project and construction works related to the project
- Elaboration of documentation (BE, DE, as-built doc.)

Detailed scope of work and deliveries being the subject of the Inquiry No. 3/0784/2021 is presented below in this specification.

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.

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.

It is expected that the tenderers will 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 a sound design, operation and maintenance of the installation. The tenderer must read this specification and make sure that the installation is technically feasible and assume full responsibility for the guaranteed operation of the supplied installation and equipment in terms of performance, efficiency, smooth and reliable operation.

The Bidder will read the requirements contained in this documentation and take full responsibility for the guaranteed level of operation of the installation made in accordance with the technical

arrangements, scope and documentation provided by him, with regard to the logic of correctness of the calculations made and functionality in accordance with good engineering practice and the latest technical knowledge

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, 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:

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 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

ATTENTION: In the case of different requirements in subsequent standards and / or standards, consistent with those mentioned above, more stringent standards and / or standards should be applied (more restrictive)!

2. TOPs and utilities parameters

TOPs and utilities parameters are provided in the documents attached to the RFQ. If TOPs are not defined at this stage, they will be defined during tender negotiations. The Bidder in his technical offer will provide media consumption for each device.

3. Bidders' scope of work

The Contractor must ensure H&S supervision over realized works on site. The Contractor or Contractor's representative must be present during a daily meeting during execution phase of the project and on every request of the AMP.

3.1. General requirements

The aim of the project is to replace two modules: for measuring the flatness, the profile meter, and installing a new cleaning machine. Details for each of the above mentioned modules can be found in section 3.2. The devices should be installed in place of existing modules without a necessity to move the rest of the measurement line. Disassembly of existing equipment on the ArcelorMittal side under the supervision of the Bidder.

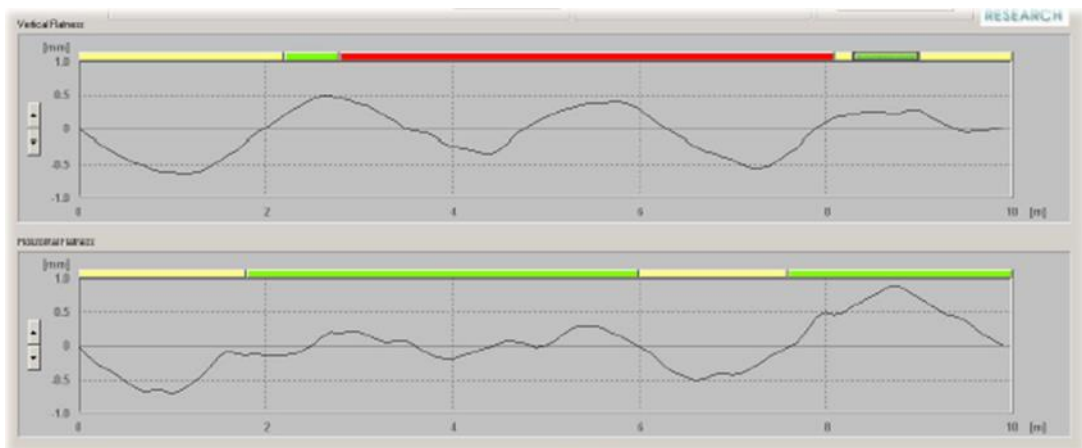
- A. Performance of the current state analysis
- B. Execution of project and technical documentation of the system in all necessary scopes.
Approval of the technical documentation by ArcelorMittal doesn't release the Bidder from responsibility of the proper functioning of the system.
- C. Preparation of as-built documentation for the scope in point B and commissioning protocols. Provision of certificates, declarations of conformity, warranty cards, measurement reports, technical documentation for installed devices. Protocols, technical documentation and any documentation provided in Polish.
- D. Prefabrication, delivery and assembly of structural components for the mechanical scope.
- E. Purchase, prefabrication and assembly of components of the automation, electrics – e.g. power supply/communication cables, mechanics, pneumatics / hydraulics, diagnostic tools and other components required for the implementation of the project including performing of cable trays if necessary.
- F. Start up a new control system - all programming and start up works up to the Bidder.
- G. Equipment for the project realization must be provided by the Bidder (e.g. driller, platform). AMP provides crane.
- H. Utilization and disposal of generated waste on the Bidder's side.
- I. The Bidder will provide a statement that he has the necessary knowledge and experience (installation, commissioning, start-up) and has the technical potential and personnel capable of performing the contract - this condition will be confirmed by a declaration regarding the implementation of the FMG flatness measurement module and a profilometer or reference delivery - a list of completed installations from the last 15 years must be submitted, including the name of the buyer, location, year, description of the scope, implementation time - at least one implementation.
- J. The Bidder is requested to provide dimensions of each device, weight, load per 1m² and media consumption level: electricity, hydraulic, air etc. (if applicable).
- K. Bidder will provide a list of spare parts necessary for 1 year of operation of new modules, worth 5% of the value of the commercial offer, and will provide spare parts necessary to start the system.

3.2. The scope of work and deliveries:

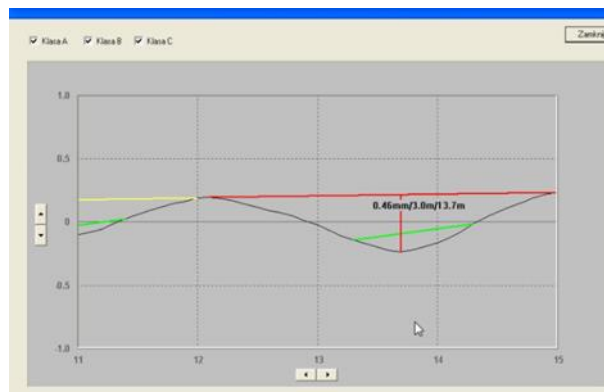
A. Flatness module – FMG:

1. The new flatness module must replace existing old system at the control block in its current location
2. Current chain conveyor must be use for railway rail transport in the FMG module
3. The new module must provide vertical and horizontal flatness measurement of railway rails according to ArcelorMittal catalogue.
https://poland.arcelormittal.com/fileadmin/Content/produkty/Szyny_kolejowe.pdf
4. Railway rails measurement and classification should be carried out on the basis of next standards: PN-EN 13674-1; AREMA 2016; GOST P 51685-2013; IRS-T-12-20
5. Required vertical flatness: up to 0,2 mm on the length of 3 m
6. Railway rails measurement position: on foot
7. No need to change device height for different type of railway rails
8. Railway rails measurement speed 1-2 m/s

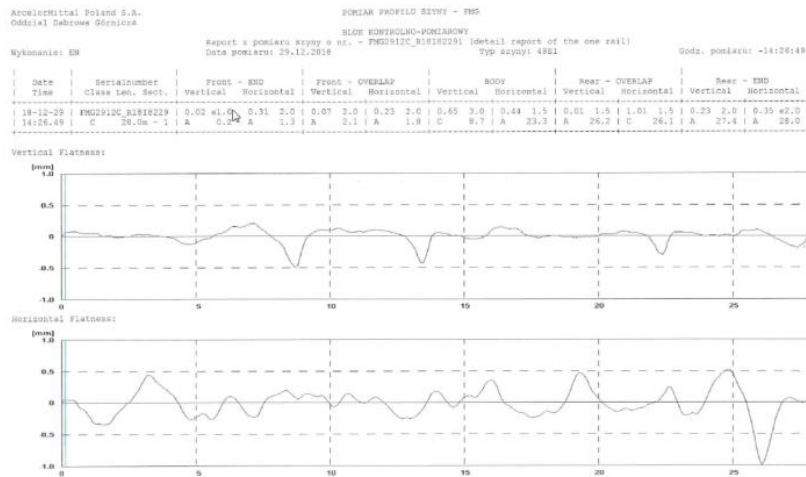
9. Length of railway rails: 10-130 m
10. Five sensor type flatness measurement system
11. Accuracy of the measurement $< \pm 0.05$ mm
12. The lowest measured value of amplitude 0,05mm
13. Possibility to change measuring tolerances
14. Visualization of vertical and horizontal flatness on one tab
15. Sampling rate in the longitudinal direction 50 mm
16. Graduation of classes over a graph of straightness representing a colour coded class of the appropriate area on a straightness chart. Example:



17. For the purposes of a detailed rectilinear view of the appropriate class on the scale, the mouse clicks on the appropriate class of the system should open a new dialog box with enlarged flatness chart details. Example:



18. Possibility to create daily and shifts reports and printout of vertical and horizontal flatness charts with the table of exceedances



19. Automatic measurement mode activated by switching the Automatic Mode from OFF to ON
20. Assumptions for the flatness measurement control system:
 - Control system based on the Siemens (or equivalent solution) PLC, preferred: S7-300, S7-1200 or S7-1500
21. Integration of the new module with the remaining part of the test line to ensure at least its current functionality in the field of control and diagnostics:
 - Ensuring the exchange of necessary signals between the current PLC and control block visualization system, and the new flatness measurement controller.
 - Perform necessary modifications in existing control systems to match them with the new flatness measurement module
 - Replacement of the railway rails transport visualization system (new computer set must be in line with automation department standards, WinCC version 7.5 or higher), including changes in the part concerning new cleaning machine, profile meter and flatness measurement.
 - Flatness module must be connected in to existing safety system
22. IT requirements (servers, computers, software, network devices) for FMG module
 - providing additional online result viewers (ability to view results on an additional computer with network access to the module database) and offline (the ability to view results on any computer without direct access to the module database, copying data to another computer)
 - segmentation, dividing of databases. A simple tool for splitting and creating new databases by the user (due to legal requirements - data should be stored for 10 years). Large databases will make it difficult to view them, transfer them.
 - software reporting tool. The tool should enable to create of any reports according to the users' requirements from the data contained in the database. The possibility of exporting reports to PDF, XLS.
 - the network hardware used should comply with the standards applicable at ArcelorMittal (specification in attachment - if possible, recommends using virtual machines running on the Vmware environment)
 - supplying specialized IT equipment as a spare parts (if computers, servers, and switches will be equipped with specialized cards / modules, such devices should be provided as a spare parts)

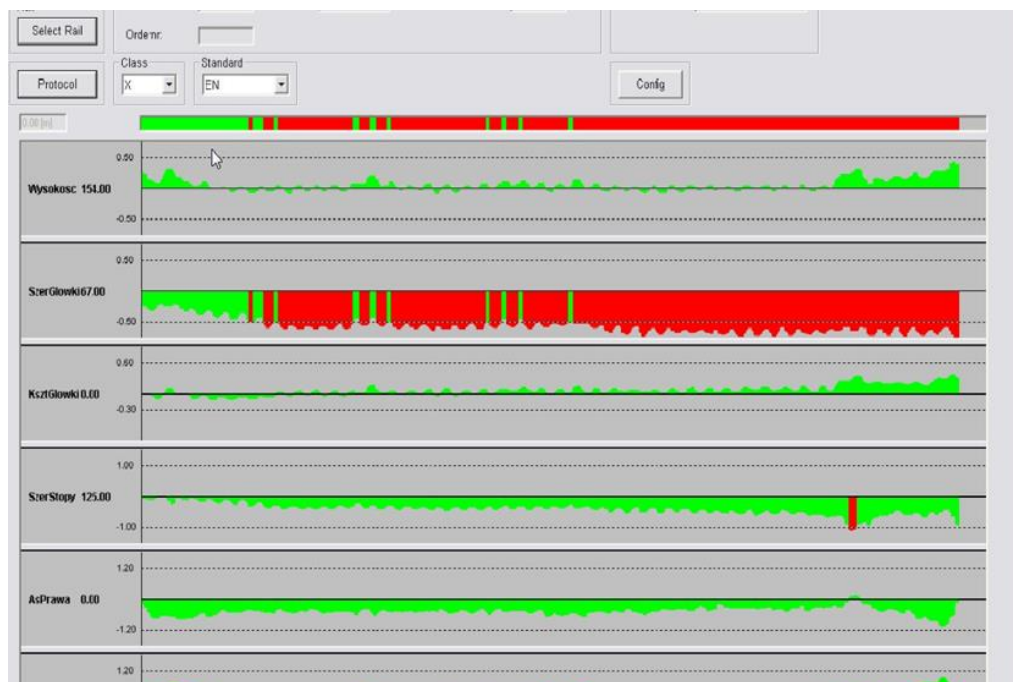
- computers, servers are supposed to work in the domain, on the user's account is to be installed by the McAfee antivirus program, the Acronis agent to perform backups.
- Integration of the module with the HSM tracking system (level L2)

B. Profile meter

1. The new profile meter must replace old system at the control block in its current location.
Function of new module: geometry and surface control of the railway rails
2. The new module must provide geometry measurement of railway rails according to ArcelorMittal catalogue.

https://poland.arcelormittal.com/fileadmin/Content/produkty/Szyny_kolejowe.pdf

3. Railway rails measurement and classification should be carried out on the basis of next standards: PN-EN 13674-1; AREMA 2016; GOST P 51685-2013; IRS-T-12-20
4. Railway rails measurement position: on foot
5. Length of railway rails: 10-130 m
6. No need to change device height for different type of railway rails
7. Railway rails measurement speed 1-2 m/s
8. Exit from the test line for service work not automated (manual)
9. Accuracy of the measurement < +/- 0.05 mm
10. Simple calibration with a single push button
11. Possibility to change measuring tolerances
12. A separate visualization bar for individual measured parameters and with visible tolerance excesses in a different colour. Example:



13. PMG module must provide measurement of below parameters:

- Railway rail height
 - Head width
 - Chambers on both sides
 - Foot width
 - Left asymmetry
 - Right asymmetry
 - Foot asymmetry
 - Chamber width
 - Twitching
 - Foot convexity
 - Head shape (head radius)
14. Manual with a detailed description of the measurement method of measured parameters
 15. Automatic surface inspection (detection and classification of surface defects)
 16. The surface inspection must cover 100% of the surface of the tested railway rail
 17. The railway rails numbers and convex marking on the rail can't be treated as a defect
 18. Adjust the sensitivity to surface quality must be done automatically
 19. The minimum detected defect with a depth of 0.3 mm
 20. 3D view with the possibility of any rotation of images.
 21. In the 3D view, the image of discontinuities with selected dimensions - (length, width, depth)
 22. The final report of the railway rail should state: the size of the defect and the exact location on the rail
 23. IT requirements (servers, computers, software, network devices) for PMG module
 - providing additional online result viewers (ability to view results on an additional computer with network access to the module database) and offline (the ability to view results on any computer without direct access to the module database, copying data to another computer)
 - segmentation, dividing of databases. A simple tool for splitting and creating new databases by the user (due to legal requirements - data should be stored for 10 years). Large databases will make it difficult to view them, transfer them.
 - software reporting tool. The tool should enable to create of any reports according to the users' requirements from the data contained in the database. The possibility of exporting reports to PDF, XLS.
 - the network hardware used should comply with the standards applicable at ArcelorMittal (specification attachment)
 - supplying specialized IT equipment as a spare parts (if computers, servers, and switches will be equipped with specialized cards / modules, such devices should be provided as a spare parts)
 - computers, servers are supposed to work in the domain, on the user's account is to be installed by the McAfee antivirus program, the Acronis agent to perform backups.
 24. Assumptions for the profile meter measurement control system:

- Control system based on the Siemens (or equivalent solution) PLC, preferred: S7-300, S7-1200 or S7-1500
25. Integration of the new module with the remaining part of the test line to ensure at least its current functionality in the field of control and diagnostics:
- Ensuring the exchange of necessary signals between current PLC and control block visualization system, and the new profile meter measurement controller.
 - Perform necessary modifications in existing control systems to match them with the new profile meter measurement module
 - Modification of the railway rails visualisation system (WinCC application on the operating station) to match the picture and signalling to the new profile meter module.
 - Incorporation of a new profile meter module into the current line safety system
 - Integration of the module with the HSM tracking system (level L2)

C. Cleaning machine

1. The new cleaning machine must be installed before the control block in its current location.
2. Cleaning the surface of the railway rail should be done without damaging its surface.
3. Cleaning surfaces: head, head sides, railway rail foot, chamber on both sides, upper foot.
4. Automatic adjustment of brushes when changing the profile of the tested rail.
5. The new module must provide geometry measurement of railway rails according to ArcelorMittal catalogue.
https://poland.arcelormittal.com/fileadmin/Content/produkty/Szyny_kolejowe.pdf
6. Dust extractor system for a separate container with dust filters.
7. In case of use of container for a thick mill scale the Bidder must provide a simple trolley for an exit and enter under the cleaning machine.
8. The cleaning machine should have a separate control panel with the option of bypassing the work of individual brushes, which allows the whole cleaning machine to work.
9. Railway rails measurement speed 1-2 m/s
10. Cleaning machine operation time: 24/7.
11. Connection in to the existing WinCC and control block control system.
12. Simple brush replacement.
13. Oferent określi w ofercie technicznej producentów szczotek, które można użyć w zaproponowanym rozwiązaniu.
14. Railway rails cleaning position: on foot
15. Use of the existing railway rails guiding system.
16. Due to the operation of the labelling machine and sticking the codes in the chamber of the rail from the side of the convex marking, the brush of cleaning module should pull out and not clean in that place to avoid damage of the labels.
17. Assumptions for the profile meter measurement control system:
 - Control system based on the Siemens (or equivalent solution) PLC, preferred: S7-300, S7-1200 or S7-1500
18. Integration of the new module with the remaining part of the test line to ensure at least its current functionality in the field of control and diagnostics:

- Ensuring the exchange of necessary signals between current PLC and control block visualization system, and the new cleaning machine controller.
- Perform necessary modifications in existing control systems to match them with the new cleaning machine module
- Modification of the railway rails visualisation system (WinCC application on the operating station) to match the picture and signalling to the new cleaning machine.
- Incorporation of a new profile meter module into the current line safety system

3.3. Plan of handover and tests:

1. Approval of the technical documentation by ArcelorMittal up to 4 weeks after delivery documentation from the Bidder.
2. Delivery of all equipment and materials acc. to the Purchase Order (min 14 days before assembly on site).
3. Installation of all delivered equipment and material acc. to the Purchase Order.
4. **Checking of installed equipment and quality of performed works:**
 - a. Checking quantity of installed equipment specified in the "Technical Specification" and approved the technical offer.
 - b. Checking quality of performer work specified in the "Technical Specification" and approved the technical offer.
 - c. Signing the protocol confirming the scope and quality of the works performed by the Bidder and AMP representative.

5. "Cold" tests /without material/:

- a. Checking functionality of all installed equipment.
- b. Checking the correctness of safety system operation – adjustments and control of all protections completed with protocols.
- c. Functional tests, voltage tests of electrical systems.
- d. Protocols confirming compliance of electrical parameters of installed devices.
- e. Pressure and leak-proof tests of hydraulic systems and ventilation (if required).
- f. Carry out tests that confirm the correctness of the modernization.

Note: Successful completion of cold tests will be base for signature of so-called "commissioning" protocol and starting hot tests.

6. Hot tests /with material/:

- a. Failure-free operation until the end of March 2023, in accordance with the current production plan.
- b. Hot tests will be performed by ArcelorMittal under the supervision of the Bidder.
- c. The basis for signing the Final Acceptance Protocol will be failure-free operation until the end of March 2023, delivery of a complete set of documentation, training of ArcelorMittal employees (operators and automation engineers) and confirmation of compliance with the assumptions described in point 3.2 A, B and C of this specification.
- d. Any defects that arise during the hot tests will be removed on an ongoing basis, up to a maximum of 24 hours from the date of reporting by ArcelorMittal. Notification by e-mail to the e-mail address provided by the Bidder in the technical offer.

7. Drawings and documents

1. List of all elements and parts used for project execution
2. List of necessary spare parts
3. Recommendations regarding periodical inspections and maintenance preventive activities, manuals – delivered documentation in Polish.
4. As-built documentation which will include:
 - Electrical diagram
 - Network diagram
 - Cable trays
 - Mechanical assembly and execution drawings
 - CE declaration for entire scope of the project
5. The documentation shall include a list of materials for all components and parts used (manufacturer, trade name, catalogue code with the name of the catalogue and their markings on the documentation and references to their location;
6. Complete mechanical documentation must be provided – assembly and executive drawings.

Documentation must be supplied in quantities: 3 x hardcopy, 3 x electronic and editable version. Software not protected by reading and editing.

8. Software

Required delivery of sources codes and copies /backup/ of any software made for needs of this project. This applies to software drivers, drives and visualization systems, as well as other programmable devices if used. Software not protected against editing and reading.

3.4. Guaranteed parameters for new devices:

No./ Nr	Performance parameter/ Parametry odbiorowe, wydajnościowe	Guaranteed value/ Gwarantowane wartości
1	FMG: Required vertical flatness	up to 0,2 mm on the length of 3 m
2	FMG: Railway rails measurement speed	Up to 2m/s
3	FMG: Length of railway rails	Minimum length 10m, maximum length 130m

4	FMG: Accuracy of the measurement	< +/- 0.05 mm
5	FMG: The lowest measured value of amplitude	0,05mm
6	FMG: Sampling rate in the longitudinal direction	50mm
7	PMG: Length of railway rails: 10-130 m	Minimum length 10m, maximum length 130m
8	PMG: Railway rails measurement speed	Up to 2m/s
9	PMG: Accuracy of the measurement	< +/- 0.05 mm
10	PMG: Module must provide measurement of below parameters:	<ul style="list-style-type: none"> - Railway rail height - Head width - Chambers on both sides - Foot width - Left asymmetry - Right asymmetry - Foot asymmetry - Chamber width - Twitching - Foot convexity - Head shape (Head radius)
11	PMG: The minimum detected defect with a depth of	0,3mm
12	Cleaning machine: Railway rails measurement speed	Up to 2m/s

4. Time of work completion

1. The works specified in these technical specifications will be performed in December 2022. The exact date of the shutdown will be agreed between AMP and the Tenderer.
2. The initial schedule will be attached to the offer, including specific timeframes within which the bidder shall submit to the Investor / execute technical assumptions for discussions, drawings, diagrams, elements of the system, software, assembly, integration, tests, commissioning etc.

Assumptions to the erection schedule:

- a. Documentation delivery
 - b. Production of accessories, including FAT (Factory Acceptance Test) acceptance at the Bidder's premises - up to 3 months before the start of work on the premises of AMP
 - c. Assembly and commissioning works: up to 10 calendar days
3. The schedule will be prepared after mutual agreement prior to contract conclusion. The schedule will be guaranteed by the Bidder and will be a part of the commercial provisions indicated in the Commercial Offer.

Schedule:

- Submission of basic documentation (Basic Engineering) for the entire required scope of the project - up to 3 months from signing the contract - condition confirmed by signing the protocol on both sides.
- Submission of detailed documentation (Detail Engineering) for the entire required scope of the project - up to 12 months from signing the contract - condition confirmed by signing the protocol on both sides.
- Completion and completion of complete deliveries up to 2 weeks before the start of the shutdown (planned shutdown in December 2022) - completion of deliveries will be confirmed by signing the protocol on both sides.
- 10 working days for assembly, programming and commissioning, which will result in a positive cold test and the signing of the Commissioning protocol, which will allow for the start of hot tests.
- After the cold tests are completed and the Commissioning protocol is signed, the hot tests will begin, during which the profiles and grades of rails will be tested according to the current production schedule - positive completion of the hot tests, training of AMP employees and the transfer of as-built documentation will be confirmed by a bilaterally signed Final Acceptance Protocol. Hot tests will last until the end of March 2023.

The positive completion of the hot tests and the signing of the Final Acceptance Protocol must take place within 17 months from the date of signing the contract, not later than on March 31, 2023.

5. Guarantee and warranty of delivery and execution quality

1. The Bidder shall guarantee high quality of works and of all specific and collective elements of the system. The bidder shall also guarantee high quality of systems/installations executed in accordance with his specification/design.
2. Required guarantee period – 24 months from signature of Final Acceptance Protocol protocol.
3. The required response time for reporting a failure (technical contact or VPN connection) up to max. 24h; in the scope of 24/7
4. The defect can be reported by e-mail
5. The Bidder should attach to the technical offer Responsibility Matrix for maintenance team for guarantee period.
6. The Bidder should attach to the technical offer failure notification procedure required service intervention.
7. The operational warranty shall include all elements of the system, including IT infrastructure, dedicated devices, software, electrical installations, etc. The fine for noncompliance with the warranty terms will be agreed upon in the commercial part during negotiations
8. The entire system compliant with the offer scope will be free of defects resulting from noncompliance with standards, good engineering practices, or from negligence during documentation execution. The bidder will be responsible for carrying out repairs and/or replacement of the faulty elements without additional charges.

6. Quality, workmanship, tests and control

1. Chosen and specified materials and devices must be of high quality, properly chosen for its purpose and compliant with practices and standards included in the requirement of this specification. All specified components used in later stages of works are subject to later inspections (checking) unless this obligation was withdrawn pursuant to the written statement submitted by the purchaser.
2. The purchaser reserves the right to re-inspect (by himself or by authorized parties) delivered data and documents. In the event of claims in reference to studies, documents or works – implementation of changes or improvements in works in accordance with presented remarks may be demanded from the Bidder.

7. Safety of work and installation executed based on the scope

All delivered data (in view of studies, drawings and specifications, lists and technologies of workmanship) are subject to risk analysis of the installation. The analysis will be accessible to the staff of the purchaser or to the persons authorized by the purchaser to safely carry out works foreseen in the detailed engineering, to have access to the equipment in case of carried out maintenance works or during regular works. The offer should include all safety elements normally used in such cases and HAZOP study.

8. Price

Price should be given for whole scope of work as detailed as possible. All elements should be divided into groups and described with a short identification. Price part of the offer should be executed based on the instruction delivered with RFQ or according to guidelines from Purchase Department.

9. Contact data

Project manager:

Zbigniew Gryt

+48 668 860 133

zbigniew.gryt@arcelormittal.com

Detailed technical consultation will be provided by:

1. Zdzisław Drożdżak
2. Artur Kaczmarczyk
3. Dariusz Piaskowski
4. Grzegorz Pelon
5. Artur Cupiał

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Approved by	Position	Date	Signature
Zbigniew Gryt	Project manager		
Zdzisław Drożdżak	Rails finishing area support manager		
Artur Kaczmarczyk	Specialist		
Dariusz Piaskowski	Specialist - automation		
Grzegorz Pelon	IT/network specialist		
Artur Cupiał	Specialist - automation		



Appendix no 1: Location, Environmental data.

Table 1. Location

Latitude	50°19'05"N
Longitude	19°14'14"E
The nearest agglomeration	Katowice
The nearest airport	Katowice-Pyrzowice (18 km)

Table 2. Environment-related data

DATA	VALUE
Max. temperature	36.0°C (historical value)
Min. temperature	-27.4°C (historical value)
Average annual temperature	8.4°C
Average yearly precipitation	671 mm
Highest monthly precipitation	94 mm
Average wind speed	1.7 m/s
Max. wind speed	3,4 - 5,5 m/s
Elevation above sea level	272 m

Appendix no 2: File formats for the documentation - standard acc. to ArcelorMittal Poland S.A..

1. Documents: *.doc, *.pdf, *.xls (Microsoft Word 2010, Microsoft Excel 2010, Adobe Reader)
2. Schedules: *.mpp (Microsoft Project 2010)
3. Mechanical documentation: *.dwg, *.dwt (AutoCAD ver. 13 or higher, Autodesk Design Review)
4. Electrical documentation: *.zw1 (PDF, EPlan ver.5.5/P8); *.dwg
5. Picture, figures: *.jpg

Appendix no 3: LOTO system

The Lockout Tagout System LOTO is used by Maintenance Workers to protect machines during maintenance and maintenance of machines against unauthorized use by unauthorized persons.

a) List of equipment and padlocks used in our Plant:



- We use two types of padlocks with a \emptyset brace according to the Master Lock catalog of 6 mm (in fact 4,762 mm - 3/16 ") and Brady \emptyset according to the 6.5 mm (in fact 6.35 mm - 1/4")



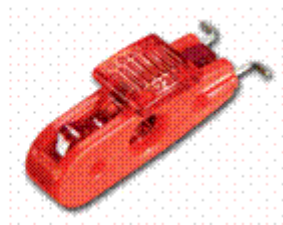
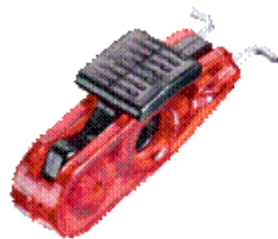
- Lock for locking small ball valves in open or closed position 1/2" - 2" (12.7 mm - 50.8 mm)



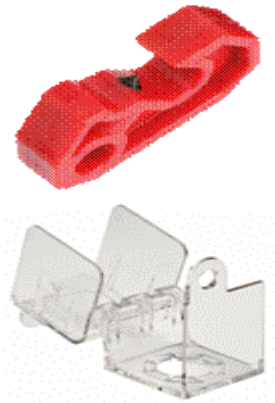
- Valve lock with knob \varnothing 2,71-8,12 cm, \varnothing 5,41 - 13,54 cm, \varnothing 10,83 - 17,6 cm, \varnothing 16,24 - 27,07 cm, \varnothing 21,66 - 35.19 cm (-47°C to + 177°C)



- Ball valve lock / hole \varnothing 30 mm



- Miniature circuit breakers with switch hole $\varnothing > 11$ mm and $\varnothing < 11$ mm



- Button / control switch or rotary switch with a diameter of 22.5-30.5 mm



- Automatic circuit breaker adjustable for long and wide switch levers



- Steel lock with vinyl coating - inner shaker 25 mm / plastic locking shackle 60 mm x 25 mm



Appendix no 4: VISUAL MANAGEMENT

Visual management is a series of practices that make it possible for a plant to work faster, more efficiently and more safely, and that maintenance work can be more efficient.

Visual management elements that should be applied to the device and in its area:

- Numbering, visualization of equipment review points for the Autonomous Maintenance Group (according to the AUR review checklist),
- Designation of the piping system and piping with the appropriate color,
- Description of the installation and piping referring to the transported medium and direction of flow, **Note - All descriptions on the device must be in Polish,**
- Marking of LOTO energy cut-off points, accessories for attaching locks,
- Marking of working ranges of manometers, direction of rotation of electrical machines, oil levels in tanks.
- Marking of grease and oil dispensing points **according to the Standards and OPLs used in the Plant,**
- Marking of electrical equipment, cables and wires, terminal strips,
- Descriptions of desktops, buttons, control lights - **metal, engraved,**
- Marking open closed valves,
- Marking of moving and protruding elements of equipment, guards and barriers,
- Marking of pedestrian route **according to the marking system used on the Plant**
- Railing of hazard zones and placement of warnings signs.
- Platforms and covers, well fitting, adhering, secured against moving, with information about the maximum load capacity.

1) Piping system designation in color depending on the medium being transported:

- Air - bright blue
- Gases (natural gas, coke oven gas, argon) - yellow
- Oxygen - white
- Compressed air - gray
- Water - green
- Oils and flammable liquids (hydraulic oil) - brown
- Acids and bases - purple
- Other liquids - black



2) Description in Polish of the installation and piping of the conveyed medium and flow direction in accordance with the following examples:



3) Marking of LOTO energy cut-off points and accessories for locking devices.



4) Marking of working ranges of manometers, direction of rotation of electrical machines, oil levels in tanks.

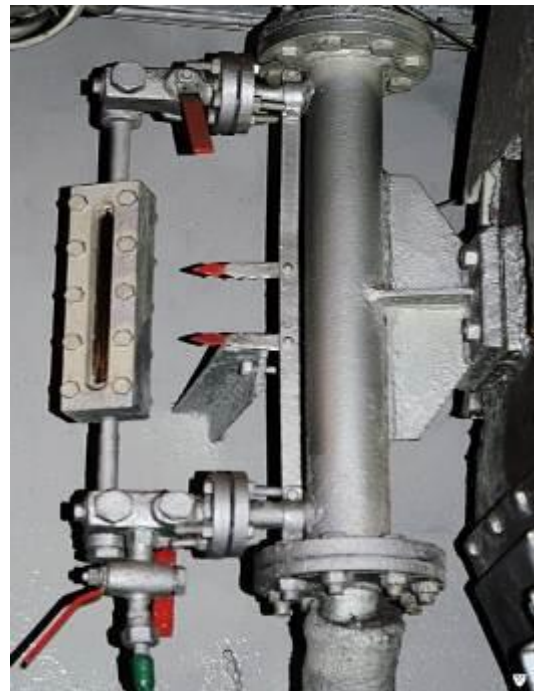
- a. Marked working range



a. Marked direction of rotation

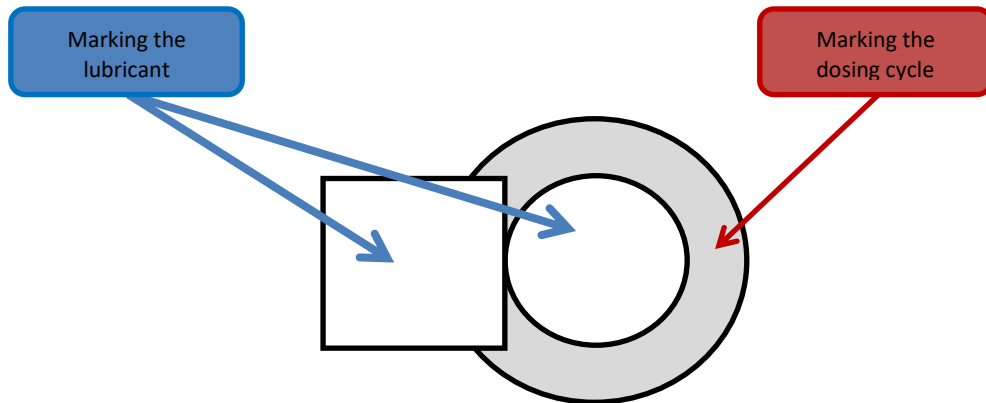


b. Optimal oil level range marked.

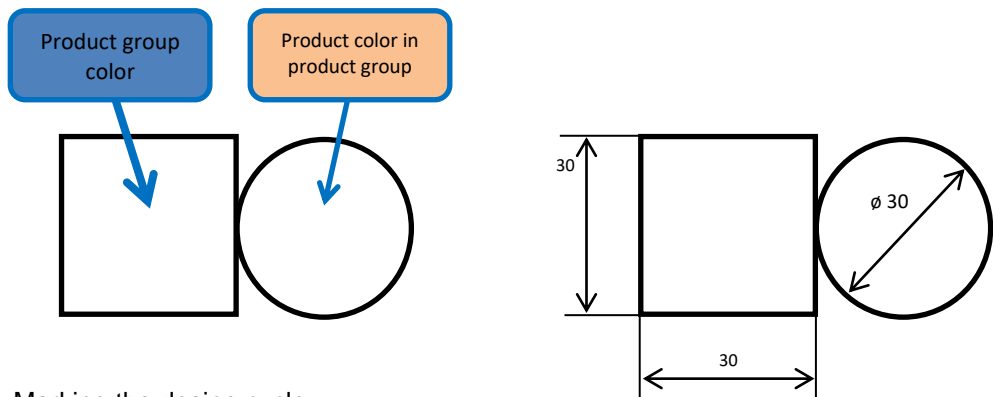


5) Marking of grease and oil dispensing points (on tanks, pumps, grease injection points, etc.)

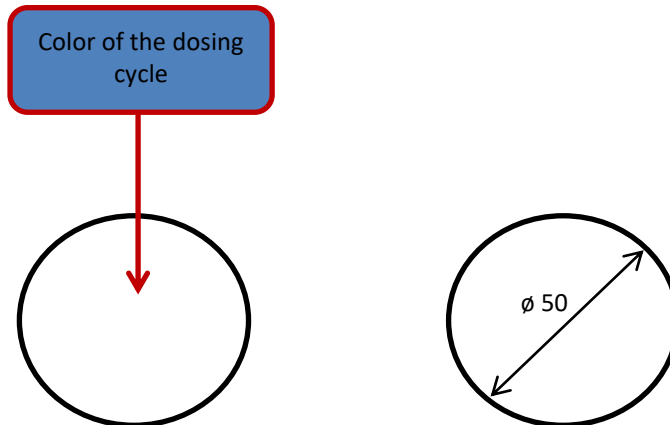
a. Marking pattern



a. Details of lubricant labeling





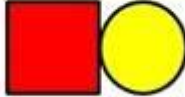

b. Marking the dosing cycle




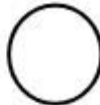

6) **Marking of lubricant and oil dosing points.**
The colors of the individual markings will be assigned to the metering points after receiving the exact specification of the device

a. Examples of lubricant markings



Lubricant product	Sign and color of lubricant product
Hydraulic oil Renosafe DU 46	 black (#000000) - white (#FFFFFF)
Hydraulic oil Quintolubric 888-68	 black (#000000) - blue (#0000FF)
Gear oil Mobilgear 600 XP 100	 red (#FF0000) - yellow (#FFFF00)
Gear oil Mibilgear 600 XP 220	 red (#FF0000) - red (#FF0000)

a. Examples of dosing cycles

Name of the cycle	Designation and color of the cycle
every 1 week	 green (#008000)
every 1 month	 white (#FFFFFF)
every 3 month	 red (#FF0000)

7) Marking of electrical appliances, cables and wires, terminal strips and blocks according to the indications in the wiring diagrams:



11) Railing of security zones and placement of warnings signs.



12) Platforms and covers, well fitting, adhering, secured against moving, with information about the maximum load capacity



Appendix no 5: Spare parts list.

No	Position	Quantity
1.		
2.		
3.		
4.		
5.		

Appendix no 6: Standardization requirements on HSM regarding electricity and automation

Requirements in the field of electrical and automation:

- a. All indicators and displays of current, voltage, power and other parameters supplied and mounted should indicate actual values.
- b. Suitable ergonomics of devices and elements should be ensured so that they are comfortable in operation, they did not cause the risk of accidental switching on and off the circuits.
- c. The Bidder is requested to familiarize himself with the requirements of the AIM (automation) department which are an attachment to the above specification.