Annex 3.

**Technical task.**

*Restoration of the surface profile of rails and rail gears by welding. Rail grinding.*

1. **Renewal of rail profile wear by welding.**

The purpose of welding the worn rails is to restore the worn rail profile to the original one with a wear-resistant material welded to restore the rail profile, as well as to provide less friction between the tram wheels and the rail.

Execution of the contract includes:

* Grinding of the worn rail profile before welding, restoration of the profile by welding, treatment of the weld joint by grinding the rolling and side surface.
* Measurement of the degree of wear on the rails and the measurement of the data obtained before and after welding and storage of the rails.
* The turning measurement points on the terrain are marked, depending on the location, approximately 3-5 points for each welding curve.
* The measuring device must have a minimum measuring accuracy of at least 0,10 mm.
* The turning measurement points on the terrain are marked, depending on the location, approximately 3-5 points for each welding curve.
* The measuring device must have a minimum measuring accuracy of at least 0,10 mm.
* The data must be stored electronically.
* The presence of a measuring device is a prerequisite for starting work.
* Welding process used - welding of welding wire under fluxes.

Attēls, kurā ir laukums

Apraksts ģenerēts automātiski

Figure 1. Rail head restoration - (1) Worn rail edge, (2) Edge grinding 8, 10 or 12 mm, (3) Edge welding (3-5 times), (4) Weld grinding.

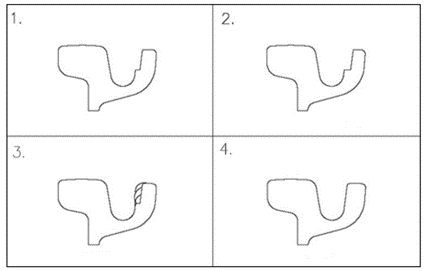


Figure 2. Rail lip restoration - (1) Worn rail edge, (2) Edge grinding 8, 10 or 12 mm, (3) Edge welding (3-5 times), (4) Weld grinding.

Work to be performed:

* transportation of equipment to / from the workplace;
* placement and removal of road signs and warning cones at the work site;
* protection of electrical cables required for machinery against road traffic;
* measurement of the profile of worn-out rails in the places specified by the Customer before grinding and welding and electronic storage of the obtained data;
* grinding the rail edge before welding to a wear of at least 8 mm:
* the necessary grinding of the welding layers and removal of slag;
* rail profile finishing grinding;
* the grinding of the rail profile shall be carried out to the required tolerances by horizontal, vertical and track gauge measurements;
* measurement of the welded rail profile at the places specified by the Customer and electronic storage of the received data;
* workplace arrangement and cleaning.



Figure 3. Rail profile updated.

If possible, welding should be done in the direction of travel. A smooth transition must be made at the beginning of the weld so that the tram wheels do not overload the welded material. If the started welding cannot be completed in one shift, the end of the weld must be in the wedge ratio 3: 100. Before continuing the welding work, the end must be ground.

The wear of the rail profile must be restored for LK1 / B1 profile rails (steel grade R260) and 62R1 profile rails (steel grade R200), see Figures 4 and 5.

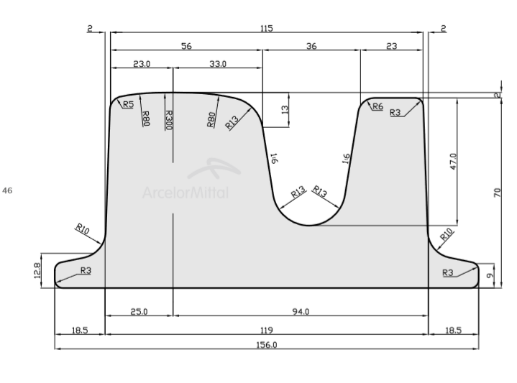


Figure 4. Rail LK1

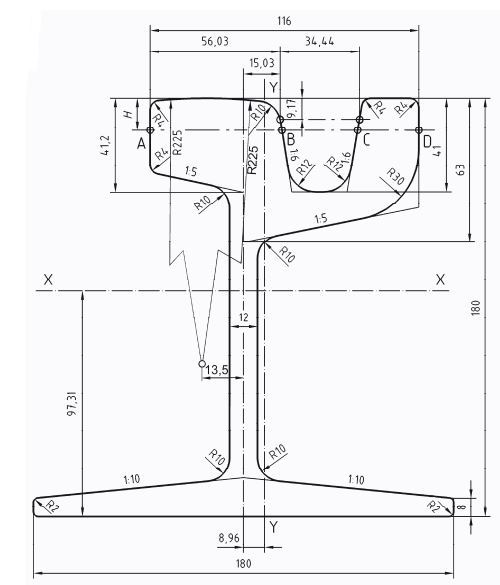


Figure 5. Rail 62R1

Welding is prohibited at temperatures below 0 ° C and in poor weather conditions where it is not possible to ensure that the accessories used remain dry.

**2. Wave grinding and grooving of the rail profile .**

Grinding the rail profile is the removal of waves and grooves from the profile.

Surface defects on the rails appear as short waves and grooves and are 5 to 15 cm long and 0.1 to 0.8 mm deep, depending on the condition of the rails.

The rails are ground with a special rail grinder , such as AT 1002, Mõser ROV- 228-2 or equivalent. The number of grinding strokes depends on the depth of defects, waves and grooves, but in most cases 4-6 grinding strokes back and forth in 4-6 steps with a depth of 0.5 mm throughout the profile are sufficient.

In the stroke 4.-6. the working edge of the profile is rounded, R = 10 mm.

The profile tolerance is ± 0.5 mm from the original profile.

Tolerance for rounding radius + 3 mm / - 2 mm (rounding radius can be between 13 and 8 mm).

Work to be performed:

* transportation of equipment to and from the workplace;
* placement and removal of road signs and warning cones at the work site;
* protection of electrical cables required for machinery against road traffic;
* rail grinding;
* inspection of grinding works up to the required grinding tolerances by performing horizontal and vertical measurements;
* workplace arrangement and cleaning .

**3. Restoration of the surface profile of the turnouts by welding.**

Grinding of the worn gauge surface profile before welding, restoration of the profile by welding, treatment of the weld seam by grinding the rolling and side surface.

The process also includes measuring the degree of wear on the rails and measuring the rails before and after welding and storing the data. The measuring device must have a minimum measuring accuracy of 0,10 mm.

Restoration of the transmission surface profile by welding shall be performed in accordance with the manufacturer's instructions in accordance with the documentation attached in Annex 1. Before starting welding, the welding area must be heated to the operating temperature of the transfer manufacturer's WPS (Annex 2). The purpose of rail gutter welding is to restore the original profile of the transfer surface by welding.

Welding is prohibited at temperatures below 0 ° C or in weather conditions where it is not possible to ensure that the accessories used remain dry.

If possible, welding should be performed in the direction of travel. A smooth transition must be made at the beginning of the weld so that the tram wheels do not overload the welded material. If the started welding cannot be completed in one shift, the end of the weld must be in a wedge ratio of 3: 100. Before continuing the welding work, the end must be ground.

Work to be performed:

* transportation of equipment to and from the workplace;
* placement and removal of road signs and warning cones at the workplace;
* protection of electrical cables required for machinery against road traffic;
* measurement of the worn track profile at the locations specified by the customer before grinding and welding and electronic storage of the obtained data;
* cleaning and grinding of the welding area before welding;
* welding, necessary grinding of welding layers and removal of slag;
* grinding to the required tolerances for horizontal, vertical and track gauge measurements;
* workplace arrangement and cleaning.

**4. Special instructions and requirements for the work to be performed.**

1. Surface elements qualified for melting must be cleaned and degreased of oils, greases and other identified contaminants;
2. All drains and all surface defects must also be removed from these surfaces: cuts, scratches, dents, curves and cracks. Surface defects can be corrected by sanding until a smooth surface with a metallic sheen is obtained;
3. Surfaces adjacent to reclaimed areas should be brushed or sanded to a width of at least 20 mm from the area to be melted;
4. rain and snow shields must be used when performing the melting process in adverse weather conditions (wind speed above 2 m / s, rain, snow) . It is forbidden to work without shields during rain or snowfall. If necessary, the rails must be dried from moisture using a propane-butane burner;
5. Automatic submerged arc melting at a rate of not more than 70 cm / min with a minimum energy consumption of 10 kJ / cm;
6. During melting , the rolling profile of the rail, the rail strip as well as the cross blade and the bottom cover of the groove (up to 12 mm below the SGA (mark on the rail head (support surface))) must be reproduced;
7. The transitions between the regenerated surface and the rest of the surface must be smooth;
8. The created seam must be carefully sanded;
9. The alloy formed must have a hardness of 300 to 330 HB ;
10. At the end of each working day, the Contractor shall ensure a smooth transition from the reproduced profile to the unmelted profile, so as to ensure the safe movement of trams;
11. The Contractor shall himself eliminate the unevenness of the track surface during the regenerative section, which makes it impossible for the welding equipment to move;
12. The Contractor shall delimit the place of work to be performed by him, thus ensuring the safety of vehicles, pedestrians and employees;
13. The contractor is obliged to arrange and vacate the tram tracks in the vicinity of the works;
14. The works shall be performed without disturbing the tram traffic during its night break;
15. Welding errors may not exceed 0,5% per meter or 2% per unit;
16. The contractor must be able to demonstrate that the grinding results meet the specified tolerances and the rail profile with the required radii;
17. The negligence and carelessness of the Contractor and his staff shall not damage the rails, the conveyor or any other property belonging to the Contracting Authority;
18. In order to be accepted, the work must be of high quality, fully completed, cleaned and inspected at the workplace;
19. The basis for acceptance of works is the Deed of Acceptance - Transfer of Works;
20. Acceptance of works takes place at least once a month;
21. Payments for the work performed shall be made in accordance with the acts of acceptance and transfer of work;
22. Payments for the work done are made within 14 (fourteen) working days after the acceptance of the work;
23. The guarantee for welding performed by the contractor is 1 (one) year from the date of signing the deed of acceptance and transfer of work.