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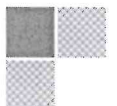
Supply of Metallic Material Technical Specification

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1. INTRODUCTION

1.1 SUBJECT

This technical specification includes the minimum technical and general characteristics of base metal materials such as plates, sheets, profiles, bars, forgings, castings, which the Administration will purchase in accordance with the determined conditions, regardless of the production method.

The bidder shall submit a solution fully compliant with the requirements of this specification.

After the signing of the contract, possible deviations from this specification or other specifications and norms specified in this document will be confirmed by written agreements between TÜRASAŞ and the Contractor.

This Technical specification and its annexes already prepared in Turkish and English language. The Turkish language shall be prevailing in case of any discrepancy among them.

2. DEFINITIONS

The abbreviations and explanations used in this technical specification are given below.

- by "administration"; Türkiye Rail System Vehicles Industry Inc.
- by "contractor"; The company that won the tender and will supply the products within the scope of this specification,
- by "bidder"; the company that wishes to participate in the tender for the supply of the product that is the subject of this specification.

3. TECHNICAL SPECIFICATIONS

3.1 Technical Information to be Provided by the Administration in Material Supply

- amount to be delivered
- the shape of the product,
- Steel name or steel number (TS EN 10027-1, TS EN 10027-2),
- Aluminum alloy name or aluminum alloy number (EN 515)
- Nominal dimensions, tolerances on size and shape,
- Additional requirements for inspection and testing and inspection documents as specified in EN 10025-2 - EN 10025-6.
- Other additional preferences

Items a and b will be in TPLF-01 form, information in other items will be indicated on the technical drawing.

3.2 Options

If the administration deems necessary, it can make additional choices to indicate on the technical drawing and in the special product specification. Some additional preferences that may be requested in the delivery of the product are described below. If the order does not indicate a request for the fulfillment of any of these preferences, the products must be delivered in accordance with the basic provisions.

3.2.1 Additional Options

If necessary, the following preferences are valid for the products and these will be indicated in the technical drawings.

- 1) The production method of the relevant product should be notified to the customer.
- 2) Part analysis should be done. The number of samples should be agreed upon.
- 3) Required marking type should be determined
- 4) Steel products must be suitable for hot-dip zinc coating.
- 5) For flat products which are thickness is 6 mm or greater size, the absence of internal defects must be verified according to EN 10160.

3.3 Basic Provisions to be Used in the Supply of Products

In order to verify whether the products meet the conditions determined during the order, "Special Inspections" will be applied to the products to be delivered in accordance with the product specification determined in the order or to the test unit consisting of a part of them.

3.3.1 Special Inspection Certificates Prepared in accordance with TS EN 10204 Article 4

a) Inspection certificate 3.1 "type 3.1"

Document issued by the manufacturer in which he declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results. The test unit and the tests to be carried out are defined by the product specification, the official regulation and corresponding rules and/or the order. The document is validated by the manufacturer's authorized inspection representative, independent of the manufacturing department.

It shall be permissible for the manufacturer to transfer on to the inspection certificate 3.1 relevant test results obtained by specific inspection on primary or incoming products he uses, provided that the manufacturer operates traceability procedures and can provide the corresponding inspection documents required.

b) Inspection certificate 3.2 "type 3.2"

Document prepared by both the manufacturer's authorized inspection representative, independent of the manufacturing department and either the purchaser's authorized inspection representative or the inspector designated by the official regulations and in which they declare that the products supplied are in compliance with the requirements of the order and in which test results are supplied. It shall be permissible for the manufacturer to transfer on to the inspection certificate 3.2 relevant test results obtained by specific inspection on primary or incoming

products he uses, provided that the manufacturer operates traceability procedures and can provide the corresponding inspection documents required.

3.4 Technical Supply Conditions

The metallic material definitions, technical specifications and dimensional tolerances that can be supplied within the scope of this specification are defined below. Conditions of delivery will be in accordance with the Technical Supply Conditions specified in Table – 1, Table – 2, Table – 3 below.

TS 12708 shall be based on the classification and properties, sampling, inspection and tests of unprocessed or processed steel castings used in self-propelled or hauled vehicles working on railways.

Table – 1 Carbon Steels Product Standards*

Products	Technical Supply Conditions	Dimension	Tolerances
I and H Profiles	TS EN 10025–2 TS EN 10025–3 TS EN 10025–4 TS EN 10025–5 TS EN 10025–6 Relevant standard	-	TS EN 10034
Conical Flanged I Profiles		-	TS EN 10024
Hot Rolled U Profile		-	TS EN 10279
L Profiles and Gussets		TS EN 10056-1	TS EN 10056-2
T-Profiles		TS EN 10055	TS EN 10055
Plates, Sheets and Strips		-	TS 3736 EN 10051
Thick Steel Plates		-	TS 2163 EN 10029
Solid bars and profiles		TS EN 10017, TS EN 10058, TS EN 10059, TS EN 10060, TS EN 10061	
Hot finished and fine grain steel hollow profiles	TS EN 10210-1	TS EN 10210-2	TS EN 10210-2
Welded non-alloy structural steel pipes	TS EN 10219-1	TS EN 10219-2	TS EN 10219-2
Seamless non-alloy structural steel pipes	TS EN 10216-1 TS EN 10216-2 TS EN 10216-3 TS EN 10216-4 Relevant standard	TS EN 10216-1 TS EN 10216-2 TS EN 10216-3 TS EN 10216-4 Relevant Standard	

Table – 2 Stainless Steel Product Standards*

Products	Technical Characteristics	Tolerances
Sheets, plates and Strips	TS EN 10088-2	TS 2163 EN 10029 TS EN 10048, TS 3736 EN 10051 TS EN ISO 9445
Welded Pipes	TS EN 10296-2,	TS 6814 EN ISO 1127
Seamless Pipes	TS EN 10297-2,	TS 6814 EN ISO 1127
Solid bars and profiles	TS EN 10088-3,	TS EN 10017 TS EN 10058 TS EN 10059 TS EN 10060 TS EN 10061

Table – 3 Aluminum and Aluminum Alloys Product Standards

Products	Technical conditions for inspection and delivery	Tolerances
Extruded products	TS EN 13981-1	EN 755-3, EN 755-4, EN 755-5, EN 755-6, EN 755-7, EN 755-8 ve EN 755-9
Plates and sheets	TS EN 13981-2	EN 485-3, EN 485-4
Cast	TS EN 13981-3	ISO 8062
Forged	TS EN 13981-4	EN 586-3

3.5 Thickness Tolerances

Thickness tolerances will be determined according to EN 10029. Unless specified, class B dimensions are taken as basis for structural steels thicker than 3 mm. Unless specified, class A dimension tolerances will be used for other steels and stainless steels. Thickness tolerances for aluminum and aluminum alloys will be determined according to EN-485-3

3.6 Surface Conditions

The surface conditions of carbon steels are as follows:

- Delivery Conditions of Plate and Wide Flat Steels will be TS EN 10163-2 class A2.
- The Delivery Conditions of the Profiles will be TS EN 10163-3 class C1.

4. GENERAL CHARACTERISTICS

Compliance of metallic materials should be documented with a special inspection document. Inspection reports must be prepared in accordance with TS EN 10204 article 4. The reports will be submitted for the approval of the Administration together with the product.

4.1 Packing

The materials will be delivered to the Administration-Adapazarı warehouses in a way that they will not be damaged from the effects of the external atmosphere that may occur during the shipment, and from the impacts that may occur during loading and unloading. The manufacturer's trade name and necessary information such as manufacturing date and charge number should be placed on the packaging.

4.2 Guarantee

24 months from the acceptance of the products by the Administration.

4.3 Test, Control and Acceptance Procedures

Test and acceptance procedures will be carried out according to the inspection reports prepared in accordance with TS EN 10204 article 4. The compatibility of the charge/slab numbers of the label on the product package with the special inspection document (3.1 certificate) will be confirmed. If requested, the administration has the right to make a special inspection or have it done on behalf of the contractor in order to determine the features defined by the standards.

Marking required to ensure product traceability will be made by the company during manufacturing.

Permanent marking (laser, paint, stamp, data matrix, etc.) will be made on the sheet, plate, pipe and solid materials to be supplied in order to ensure traceability.

For marking, the following points will be included as a minimum.

- 1- Material quality and main dimensions (wall thickness for sheet, plate)
- 2- Lot number
- 3- Contract number

Marking will be done at least two times per meter. The marking method depends on the contractor and will not cause corrosion on the product. It will be proportional to the piece size and readable.

Example:

S355J2-Cu t:8mm
Lot# 0023658745
SN 20180678B

S355J2-Cu t:8mm
Lot# 0023658745
SN 20180678B

4.4 Delivery

The delivery place of the materials is the Administration-Adapazarı warehouses.

5. APPENDIX

Appx. 1: Example of Inspection Document (Prepared in accordance with TS EN 10204 article 3.1)

Appx. 2: Demonstration Example of Steels (Prepared in accordance with TS EN 10027-1)

Appx. 3: Demonstration Example of Stainless Steels (Prepared in accordance with TS EN 10088)

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INSPECTION CERTIFICATE BS EN 10204 3.1.B																				
CUSTOMER					TEST CERTIFICATE NO.					TEST CERTIFICATE NO.										
West Trade s.r.o.					DATE: 0.VIII.07					T9380-B7/L7										
P/O No. 2007/007/003					OUR REF. 30887															
Description / Description / Die Beschreibung			Material / Matière			Heat Analysis / Analyse Chimique et Mécanique / Die Chemische und Mechanische Analyse														
QTY	SIZE / DRAWING	SPEC	GRADE	CAST	Werkstoff	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	N	Al	Ti	W	CAST CODE	
2700	5/8" UNC X 86MM STUDBOLT	A320	L7	06-3351		0.410	0.830	0.270	0.014	0.008	1.030		0.200							
TENSILE TEST - OBTAINED VALUES					IMPACT TEST OBTAINED VALUES					HARDNESS ON SAMPLE AFTER H.T. 24 HRS					FINAL HARDNESS					
ToC	YIELD RP 0.2 KSI	TENSILE KSI	E %	R.A %	ACT TEST	T _{oc}	ABSORBED ENERGY			HB	HRB	T _{oc}	MIN	BHN	HB	HRC	MIN	MAX	PROOF LOAD	CONDITION
							1	2	3											
	125	135	18	55	TEMP	-101	33	33	30											
<p>COATING</p> <p>BLUE</p> <p>BLACK</p> <p>RED</p> <p>GREEN</p> <p>YELLOW</p> <p>WHITE</p> <p>OTHERS:</p>																				
<p>NOT DIPPED GALVANISED ISO 1461</p> <p>ZINC PLATED BS 3382</p> <p>CADMIUM PLATED BS 3332</p> <p>PTFE COATED</p> <p>A-QUENCHED & TEMPERED</p> <p>B-SOLUTION TREATED</p> <p>C-SOLUTION TREATED / AGED</p> <p>D-SOLUTION TREATED/STRAIN HARDENED</p> <p>E-NORMALIZED AND TEMPERED</p>																				
<p>CERTIFICATE OF CONFORMITY STATEMENT:</p> <p>Certified that the goods detailed herein have been inspected and tested in accordance with the conditions and requirements of the Contract or Purchase Order and unless otherwise stated above, conform in all respects to the specification(s) and / or drawing(s) relevant thereto.</p>																				
<p>PRINTED IN COMPLIANCE WITH BS EN 10204</p> <p>AUTHORISED ON BEHALF OF STUBOLT MANUFACTURING LIMITED</p>																				

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Notations will be defined in accordance with TS-EN 10027-1 Short Designation
Formats of Steels.

Non-alloy structural steel

TS EN 10027-1(Yeni)	DIN 17100 (Eski)	DEOKSIDASYON	C % (Maksimum)
S185	St 33	---	---
S235JR	St 37-2	---	0,20
S235JRG1	USt 37-2	FU	0,20
S235JRG2	RSt 37-2	FN	0,20
S235J0	St 37-3 U	FN	0,17
S235J2G3	St 37-3 N	FF	0,17
S235J2G4	-----	FF	0,17
S275JR	St 44-2	FN	0,22
S275J0	St 44-3 U	FN	0,18
S275J2G3	St 44-3 N	FF	0,18
S275J2G4	-----	FF	0,18
S355JR	-----	FN	0,24
S355J0	St 52-3 U	FN	0,22
S355J2G3	St 52-3 N	FF	0,22
S355J2G4	-----	FF	0,22
S355K2G3	-----	FF	0,22
S355K2G4	-----	FF	0,22
E295	St 50-2	FN	---
E335	St 60-2	FN	---
E360	St 70-2	FN	---

Azot Miktarı

Deoksidasyon Türü FU < % 0.009

Deoksidasyon Türü FN < % 0.007

Deoksidasyon Türü FF 0

TŞ-42.172 Appx.-3

Designations of Stainless Steels will be defined in accordance with TS- EN 10088-1

Çeliğin gösterilişi	Numarası	Kütlece %										Ni	Diğerleri
		C	Si	Mn	P en çok	S	N	Cr	Cu ^c	Mo	Nb		
X5CrNi17-7	1.4319	≤0,07	≤1,00	≤2,00	0,045	≤0,030	≤0,11	16,0 - 18,0	-	-	-	6,0 - 8,0	-
X10CrNi18-8	1.4310	0,05 - 0,15	≤2,00	≤2,00	0,045	≤0,015	≤0,11	16,0 - 19,0	-	≤0,80	-	6,0 - 9,5	-
X9CrNi18-9	1.4325	0,03 - 0,15	≤1,00	≤2,00	0,045	≤0,030	≤0,11	17,0 - 19,0	-	-	-	6,0 - 10,0	-
X2CrNi18-7	1.4318	≤0,030	≤1,00	≤2,00	0,045	0,10 - 0,20	0,10 - 0,20	16,5 - 18,5	-	-	-	6,0 - 8,0	-
X2CrNi18-9	1.4307	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,5 - 19,5	-	-	-	8,0 - 10,0	-
X2CrNi19-11	1.4306	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	18,0 - 20,0	-	-	-	10,0 - 12,0 ^d	-
X5CrNi18-10	1.4315	≤0,06	≤1,00	≤2,00	0,045	≤0,015 ^b	0,12 - 0,22	18,0 - 20,0	-	-	-	8,0 - 11,0	-
X2CrNi18-10	1.4311	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	0,12 - 0,22	17,0 - 19,5	-	-	-	8,5 - 11,5	-
X5CrNi18-10	1.4301	≤0,07	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,0 - 19,5	-	-	-	8,0 - 10,5	-
X8CrNiS18-8 ^a	1.4305 ^a	≤0,10	≤1,00	≤2,00	0,045	0,15 - 0,35	≤0,11	17,0 - 19,0	≤1,00	-	-	8,0 - 10,0	-
X6CrNi18-10	1.4541	≤0,08	≤1,00	≤2,00	0,045	≤0,015 ^b	-	17,0 - 19,0	-	-	-	9,0 - 12,0 ^d	Ti: 5 x C - 0,70
X6CrNiNb18-10	1.4550	≤0,08	≤1,00	≤2,00	0,045	≤0,015 ^b	-	17,0 - 19,0	-	-	10 x C - 1,00	9,0 - 12,0 ^d	-
X4CrNi18-12	1.4303	≤0,06	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,0 - 19,0	-	-	-	11,0 - 13,0	-
X1CrNi25-21	1.4335	≤0,020	≤0,25	≤2,00	0,025	≤0,010	≤0,11	24,0 - 26,0	-	≤0,20	-	20,0 - 22,0	-
X2CrNiMo17-12-2	1.4404	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	16,5 - 18,5	-	2,00 - 2,50	-	10,0 - 13,0 ^d	-
X2CrNiMo17-11-2	1.4406	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	0,12 - 0,22	16,5 - 18,5	-	2,00 - 2,50	-	10,0 - 12,0 ^d	-
X5CrNiMo17-12-2	1.4401	≤0,07	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	16,5 - 18,5	-	2,00 - 2,50	-	10,0 - 13,0	-
X1CrNiMo25-22-2	1.4466	≤0,020	≤0,70	≤2,00	0,025	≤0,010	0,10 - 0,16	24,0 - 26,0	-	2,00 - 2,50	-	21,0 - 23,0	-
X6CrNiMo17-12-2	1.4571	≤0,08	≤1,00	≤2,00	0,045	≤0,015 ^b	-	16,5 - 18,5	-	2,00 - 2,50	-	10,5 - 13,5 ^d	Ti: 5 x C - 0,70
X5CrNiMo17-12-2	1.4580	≤0,08	≤1,00	≤2,00	0,045	≤0,015 ^b	-	16,5 - 18,5	-	2,00 - 2,50	10 x C - 1,00	10,5 - 13,5	-
X2CrNiMo17-12-3	1.4432	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	16,5 - 18,5	-	2,50 - 3,00	-	10,5 - 13,0	-
X2CrNiMo17-13-3	1.4429	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	0,12 - 0,22	16,5 - 18,5	-	2,50 - 3,00	-	11,0 - 14,0 ^d	-
X3CrNiMo17-13-3	1.4436	≤0,05	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	16,5 - 18,5	-	2,50 - 3,00	-	10,5 - 13,0 ^d	-
X3CrNiMo18-12-3	1.4449	≤0,035	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,0 - 18,2	≤1,00	2,25 - 2,75	-	11,5 - 12,5	-
X2CrNiMo18-14-3	1.4435	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,0 - 19,0	-	2,50 - 3,00	-	12,5 - 15,0	-
X2CrNiMo18-12-4	1.4434	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	0,10 - 0,20	16,5 - 19,5	-	3,0 - 4,0	-	10,5 - 14,0 ^d	-
X2CrNiMo18-15-4	1.4438	≤0,030	≤1,00	≤2,00	0,045	≤0,015 ^b	≤0,11	17,5 - 19,5	-	3,0 - 4,0	-	13,0 - 16,0 ^d	-
X2CrNiMo17-13-5	1.4439	≤0,030	≤1,00	≤2,00	0,025	≤0,015	0,12 - 0,22	16,5 - 18,5	-	4,0 - 5,0	-	12,5 - 14,5	-
X1CrNiMoCu24-22-8 [*]	1.4652 [*]	≤0,020	≤0,50	2,00 - 4,0	0,030	≤0,005	0,45 - 0,55	16,5 - 18,5	0,30 - 0,60	7,0 - 8,0	-	21,0 - 23,0	-
X1CrNiSi18-15-4	1.4361	≤0,015	3,7 - 4,5	≤2,00	0,045	≤0,010	≤0,11	16,5 - 18,5	-	≤0,20	-	14,0 - 16,0	-
X11CrNiMn19-8-6	1.4369	0,07 - 0,15	0,50 - 1,00	5,0 - 7,5	0,030	≤0,015	0,20 - 0,30	17,5 - 19,5	-	-	-	6,5 - 8,5	-
X12CrMnNi17-7-5	1.4372	≤0,15	≤1,00	5,5 - 7,5	0,045	≤0,015	0,05 - 0,25	16,0 - 18,0	-	-	-	3,5 - 5,5	-
X2CrMnNi17-7-5	1.4371	≤0,030	≤1,00	6,0 - 8,0	0,045	≤0,015	0,15 - 0,20	16,0 - 17,0	-	-	-	3,5 - 5,5	-
X12CrMnNi18-9-5	1.4373	≤0,15	≤1,00	7,5 - 10,5	0,045	≤0,015	0,05 - 0,25	17,0 - 19,0	-	-	-	4,0 - 6,0	-
X8CrMnNi18-9-5	1.4374	0,05 - 0,10	0,30 - 0,60	9,0 - 10,0	0,035	≤0,030	0,25 - 0,32	17,5 - 18,5	≤0,40	≤0,50	-	5,0 - 6,0	-
X8CrMnCuNb17-8-3	1.4597	≤0,10	≤2,00	6,50 - 8,50	0,040	≤0,030	0,15 - 0,30	16,0 - 18,0	2,00 - 3,5	≤1,00	-	≤2,00	B: 0,0005 - 0,0050
X3CrNiCu19-9-2	1.4560	≤0,035	≤1,00	1,50 - 2,00	0,045	≤0,015	≤0,11	18,0 - 19,0	1,50 - 2,00	-	-	8,0 - 9,0	-
X2CrNiCu19-10	1.4550	≤0,08	≤1,00	≤2,00	0,045	≤0,015	≤0,08	18,5 - 20,0	≤1,00	-	-	9,0 - 10,0	-