SECRET/CLASSIFIED

NUMBER Ty 14-1-381-72

SHEET 1 OF 8

SUPERSEDES.

I-3865

TY-136

STRUCTURAL STEEL BARS FOR DIESEL INDUSTRY TECHNICAL SPECIFICATIONS Ty 14-1-381-72.

O.F.PH.No: I-3865.

8

TRANSLATED	Padmavathi		14.11.84	Ordnance Factory Project Hyderabad.
AUTHENTICATED	VICTOR			
TYPED	T.GIRI KUMAR		31.12.84	
EDITED	SEBASTIAN		21.2.85	APPROVED
	NAME	SIGN.	DATE	

Ordnance Factory Project Hyderabad.		NUMBER TY 14-1-381-72 SHEET 2 OF 8

The present technical specifications refer to hot rolled, calibrated, silver coated structural steel bars of super quality, grade 10, 20, 35, 40, 45, 95, 65Γ, 38xa, 40x, 38xc, 40x2H2OH2M(20HM), 40xH, 45xH, 12xH2, 12xH3A 40xH2M2(40xHMA), 20xH3A, 40x2H2MA (40xHMA), 38xH3MA, 18x2H4MA, 20xH2A, 30x2MIOA (38xMIOA) and are suppliment for standard items which require special agreement of parties.

1. CLASSIFICATION.

1.1 Type of steel supplied:

a) Hot rolled steel bars with a dimension upto 260 mm incl[usive]

b) Calibrated steel bars

c) Silver coated steel bars

REMARK: As per the agreement of parties, round steel bars may be delivered with turning surfaces.

1.2 Depending upon the prupose of rolled stock, hot rolled steel is devided in to sub groups:

a) For hot pressure shaping and cold drawing (semifinished rolled stock)

b) For cold mechanical working (turning, gouging milling etc)

While ordering, the purpose of steel (sub group) should be specified.

2. RANGE OF PRODUCTS.

2.1 The range of products should meet the requirements specified in standards and of specilized manufacturing factories.

a) Hot rolled round bars GOST 2590-71

b) Hot rolled square bars GOST 2591-71 (Bars with a dimension of less than 100mm ma y be delivered with angles, rounded radius, not exceeding 0.15 of the square side) GOST 4693-57.

c) Hot rolled hexagonal bars- GOST 2879-69

d) Calibrated hexagonal bars- GOST 8560-67

e) Silver coated bars - GOST 14955-77

f) Spring steel.

3. TECHNICAL REQUIREMENTS.

3.1 Chemical composition of grades 38xA, 40xØA, 12xH3A, 40xH2MA(40xHMA), 40X2H2MA(40x1HBA), 38xH3MA, 18x2H4MA, 20xH4ØA, 38x2M10A(38xMHA) should comply with GOST 4543-71.

Chemical composition of steel, grade 50xØA should co mply with GOST 14959-79.

Steel of grados 10, 20, 35, 40, 4585, 65g, 40x, 45x, 38xC 20H2M(20HM), 40xH, 45xH, 12xH2 are of two designs: of quality- with chemical composition as per GOST 1050-74, GOST 14959-79 and GOST 4543-71 and of super quality-with chemical composition as per GOST 1050-74, GOST 14959-79 and GOST 4543-71 excluding sulfur and phosphorus, contents of which should meet the requirement of table 1.

Table 1.

GRADE OF STEEL	Sulphur	Phosphorous
	% not exceeding	
10, 20, 35, 40, 45, 85, 65, 40x, 45x 38xC 20H2M(20HM) 40xH, 45xH	0,030	0,030
12xH2	0,025	0,025

REMARK: 1. In case if the design is of super quality letter A should be added to the alloyed steel designation.

2. Specification for the delivery of high quality steel (grade and dimensions) should be agreed with the supplier.

3.2 Complete or partial replacement of molibdane with tungsten, (W) is allowed in steel of grades 40x2HzMA. (40x1HBA) 38xH3MA and 18x2H4MA. If molibdane is partially replaced with tugnsten, one part of molibdane weight should be replaced with three parts of tungsten weight. As a reult of this, the total contents of molibdane and tugnsten should not exceed the standards of table 1, GOST 4543-71. In such cases the description of grade is not changed.

In case if molibdane is replaced completely with tungsten, the description of steel grade and the contents of tungsten in them are to be as follows:

40x2H2BA	0,60 to 0,90%
30xH3BA	0,50 to 0.80%
18x2H4BA	0,80 to 1.20%

In case of requirement the consumer may order steel of specified grades with ~~tungsten~~ tungsten.

3.3 In case if the requirements of these technical specifications are observed, the chemical contents in a finished rolled stock may deviate from the standards within the value specified for the corresponding standards.

3.4 As per the agreement of both parties, the steel of grades 12xH3A, 20xH3A, 18x2H4MA, 38xH3MA, 40x2H2MA(40x1HBA) 20xH4ØA, 40xH2MA, 40xØA, 50xØA, 38x2MØA (38xMØA) may be smelt out by electroslag remelting (ESR).

Contents of sulphur in steel (melted by ESR) should not exceed 0.015%

3.5 Steel is delivered without heat treatment, the customers requests, the steel (which has been ordered) may be subjected to heattreatment (annealed normalized and high-temperature tempered) before its delivery.

Hardness of steel for delivery of grade 10, 20, 35, 40, 45, 85, should be as per GOST 1050-74, and steel of grade 65Γ should be as per 1495-20.9-79

Hardness of alloyed steel which has undergone heat treatment, should mett the standards specified in table 2.

Table 2.

Grade of steel	Brinnel hardness Imprint diameter, mm, min
40xH2MA(40xHMA), 40x2H2MA (40xIHBA)	3.7
38xH3MA, 18x2H4MA, 20xH4ØA	3,8
50xØA	3,9
40xØA	
38xA, 40x, 45x, 38x0, 20H2M(20HM), 40xH, 45xH, 12xH2, 12xH3A, 20xH3A, 38x2MØA, (38xMØA)	4,0

I 3865

REMARK: Results obtained after measuring the hardness of steel, grade HzM(20HM) are optional . However they are entered in the certificate.

3.5 Compliance of mechanical properties of steel determi-ned as per the samples which have undergone heat treatment or as per samples amnufactured from those blanks which have undergone heat treatment should be as follows:

a) For steel of grades 10,20,35,40,45,35-as per GOST 1050-74.

b) For steel of grades 38xC,38xA,40x,45x,40xH,12xH2, 40xØA,40xH3MA (40xHMA), 38xH3MA, 40x2H2MA(40xIHBA) 38x2MØA(38xMØA)- as per GOST 4548-71.

c) For steel of grades 65Г, 50xØA- as per GOST 14959-79.

Mechanical properties of steel,grades 12xH3A,20xH3A, 20xH4ØA,18x2H4MA,20H2M(20HM) checked on test samples and manufactured from blaks (which have under gone heat treatment) should meet the standards specified in table 3.

Grade of Steel	Heat treatment: Hardening: Temperature of first hardening °C	Hardening: Temperature of second hardening. °C	Hardening: Cooling Medium	Tempering: Temperature °C	Tempering: Cooling Medium	Yield Point. σ_T kgf/cm² min	Ultimate strength σ_B kgf/cm² min	Elongation δ_5 % min	Reduction of Area ψ % min	Impact strength a_H kg Cm/Cm² min	Hardness (diameter of imprint) mm
12xH3A	860	800	oil	150-air 170		70	95	II	55	II	3,7-3,2
20xH4ØA	850	--	"--	520	"	90	110	10	50	9	3,5-8,3
18x2H4MA	950	850	air	170	"	85	115	11	50	12	3,35-8,1
-"-	" -950	860	"	525 575	"	85	110	12	50	12	3,5-3,2
20H2M (20HM)	860	-	oil	180	"	70	90	11	50	9	3,6-3,2
20xH3A	830	-	"	400 500	Water or oil	85	100	10	55	10	3,5-3,1

R EMARK: 1. Alternate mechanical properties of Steel, grade 18x2H2MA should be specified in the order, supplier determines the alternate mechanical properties in case if it is not specified in the order.

2. 15% of bars from the ordered Steel, grade 18x2H4MA may be dispatched after low tempering with below specified mechanical properties:

a)	yeild point (σ_T)	-90kgf/mm^2 min.
b)	Ultimate strength(σ_B)	-120kgf/mm^2 min
c)	Elongation(δ_5)	-10% min.
d)	Reduction of area (ψ)	-45% min
e)	Impact strength (α_n)	-10kgf/m^2 min
f)	Hardness(diameter of imprint)	-8.80 to 3.05 mm min

3. Samples of Steel, grade 18x24HMA may be hardered in clamps.

4. Test results of mechanical properties of Steel, grade 20x~~4~~4ØA are optional however they are to be entered in the certificates.

5. When blanks are subjected to heat treatment as per the conditions of table 3. The ~~xxxxx xxxx xxxx~~ heating temperature may deviate;

a)	during hardening	±15%
b)	At low tempering	±20°c
c)	at high tempering	±50°c

3.7 Depending upon the purpose (sub group a or b) the condition of hot rolled steel surfaces should comply with the following:

a) Steel of grade 65Γ and 50xØA as per GOST 14959-79.
b) Carbon Steel, a s per GOST 1050-74.
c) Alloyed steel as per GOST 4543-71
with the followigg:

ADDITION: One cross section of bar with a dimension of more than 140mm deisgned for hot mechanical working or cold drawing (sub group a) should have not more than one dressing of maximum depth. While dressing the actual depth of fault should be taken intp consideration.

I·3865

3.8 The surface quality of calibrated bars should meet the requirements GOST 1051-73 group "B" and of silver coated bars- of GOST 14959-79, group "B" "Г" and "А".

3.9 Macrostructure of steel, grades 65Г and 50хФА should meet the requirements of GOST 14959-79 and of alloyed steel of remaining grades-GOST 4543-71.

Macro structure of carbon steel checked in pickled templet or infracture should be free of shrinkage cavaties, porosity, bubbles, cracks, lamination, flakes, slag inclusions detected naked eye and should conform to the requirements of GOST 10243-75 in numbers.

a) Central porosity 2max
b) Spot-non-uniformity 2max
c) Liquation square 3max

REMARK: For carbon steel marcostructure test reuslts are optional for 50 smeltings and they are to be entered in the certificate, after that the norms are corrected and entered in the table

3.10 Hairline crack on metal should be checked by magnetic method.

3.11 Steel, grade 38х2МФА(38хМФА) should be checked for non metallic contaminations.

Average number taken from maximum numbers of 6 samples should not exceed those specified in table 4.

Table 4.

Number as per GOST 1778-70			
Oxidies(ОС, СХ, СП)		sulphide	
For ordinary melting metal	For metal Down	For ordinary melted metal	for metal Down
3	2	3	2

REMARK: As per the agreement of both parties other grades of steel may be subjected to checking for non,etallic inclusions . The standards of non-metallic inclusions should be set as per the agreement of parties.

3.12 Steel of all grades should be checked for the growth of grains, for steel of all grades, the value of grain size should not exceed number 5. But for carbon steel meant for cold mechanical working-it should bot exceed number 4, as per GOST 5639-65.

3.13 According to the agreement of both sides, the inner defects in the square cross section of bars of 180mm should be checked by ultra sound.

4. ACCEP TANCE RULES AND TEST PROCEDURE.

4.1 Acceptance rules and test procedure, marking, packing and documents should be used in compliance with standards specified for grades under consideration with following additions:

a) In addition to its grade, steel which has been smeleted electroslag remelting shoud have letter and steel which has been smelted by synthetic slag should add to its smelting number letters "ĆW".

b) The size of grain in determined as per GOST 5639-65.

c) The macrostructure is determined as per GOST 12043-75

d) Non metallic inclusions are determined as per. GOST 1778-70.

4.2 If results of any tests referred to in these technical specifications are not satisfactory, a doubled number of samples are subjected to retests. Repeated tests results are considered as final.

4.3 If flakes are detected on even one of the bars, the metal of this given batch is rejected without retesting.

No: 85055/OFPM/DS/87-88 Notification No.71

Date: 14.05.87.

NOTIFICATION OF AMENDMENTS TO SPECIFICATIONS

The following Corrections/Amendments are now required to be carried out in the documents as below:

Documents details : TY 14-1-381-72

OFPM Regn.No. : I 3865

Details of amendments:-

Sl.No. Details

1. Ref : page No.2, 1.2, first line
   Delete : 'prupose'
   Add : 'Purpose'
2. Ref : page No.4, 3.5, third para, last line
   Delete : 'mett'
   Add : 'Meet'
3. Ref : page No.5, 5.6, II 3rd line
   Delete : 'annufactured'
   Add : 'manufactured'
4. Ref : page No.7 , 3.9, second para, 4th line
   Add : word 'by' in between 'detected' and 'naked eye' to read as 'detected by naked eye'.

AWM/DS

'Thro AWM/PDO'

AF/P.D.O

Copy to:CI, ICV.

Sl.No. Details

5. Ref : page No.7

a) continuation of Table 5 ; In the third column against 'steel of grade' 1 x 17 42 (9N 268)

Delete: 65

Add : 85

b) In the 4th column against the same above given grade,

Add : 'O' before 65 to readx as O 65

6. Ref : page No.10, Notes - 2nd

Under

Delete : 'd' of bard' and

Add : 'S' in place of 'd' - To read as 'bars'

7. Ref : page No.12, Note.3, first line

Delete : K 17H2 (74268)

Add : 1 X 1742 (9 N 268)

'Sd/-' AWM/PDO'

AWM/DS

AP/PDO

Copy to : CE, ICV.