

1. PURPOSE:

This document specifies general technical delivery conditions of round and square carburizing&quenching materials that Olimpa Makine San. Ve Tic. A.Ş. (SHORTLY Olimpa) uses for production of hydraulic breakers. The required material dimensions and quantity will be informed with order.

2. SCOPE:

This document is an attachment of "inquiry letter" and includes followings specifications of delivered materials:

- Chemical composition and mechanical properties.
- Dimension and tolerance
- Delivery conditions

3. PRODUCTION

Steel production information are given as below. If Olimpa needs an information about production, steel supplier will be responsible to give required information and inform the changes about production method.

3.1 Steel Production Method:

3.1.1 In Electric Arc Furnace

3.1.2 Boiling Method (Killed steel)

3.1.3 Vacuum Degassing

3.1.3.1 For Square Materials;

3.1.3.2 ... \geq 250x250 will be forging. Forging ratio should be min. 5:1.

3.1.3.3 ... $<$ 250x250 will be hot rolled or cold rolled. Reduction ratio should be min. 6:1

3.1.3.4 For Round Materials;

3.1.3.4.1 ... \geq Ø280 will be forging. Forging ratio should be min. 5:1.

3.1.3.4.2 ... $<$ Ø280 will be hot rolled or cold rolled. Reduction ratio should be min. 6:1

3.2 Chemical Composition (% Weight)

- The chemical composition is given by following table-1

Grade	Analysis	C	Mn	P	S	Si	Cr	Mo	Ni	Cu	Al	
20MnCr5		0,17 0,22	1,10 1,40	0,035 Max.	0,035 Max.	0,15 0,35	1,00 1,30				0,020 Min.	

Table-1 Chemical composition



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TECHNICAL REQUIREMENTS AND CONDITIONS FOR PURCHASE ORDER

- Unless be informed the inclusion, the values on the Table-2 are valid.

Element	% Weight
Cu	$\leq 0,20$
Sn	$\leq 0,030$
Al	0,015 – 0,040
N	$\leq 0,012$ (120 ppm)
H	$\leq 0,0002$ (2 ppm)
Cu+10 Sn	$\pm 0,60$

Table-2 Inclusion Element

3.3 Hardenability Band

The hardenability band should be according to EN 10084 as given following Table-3

Grade	Hardness HRC	Distance from end.														
		1,5	3,0	5,0	7,0	9,0	11,0	13,0	15,0	20,0	25,0	30,0	35,0	40,0	45,0	50,0
20MnCr5	Max.	49	49	48	46	43	42	41	39	37	35	34	33	32	-	-
	Min.	41	39	36	33	30	28	26	25	23	21	-	-	-	-	-

Table-3 Hardenability Band

3.4 Non-metalic Inclusions

Non-metalic inclusions level (K4 max.) should be 15, according to DIN 50602.

3.5 Grain Size

Grain Size should be 5-8

3.6 Heat Treatment

Annealed, max. 225 HB

3.7 Ultrasonic Test

... \leq 250 Square SEP 1921 D/d

... $>$ 250 Square SEP 1921-a

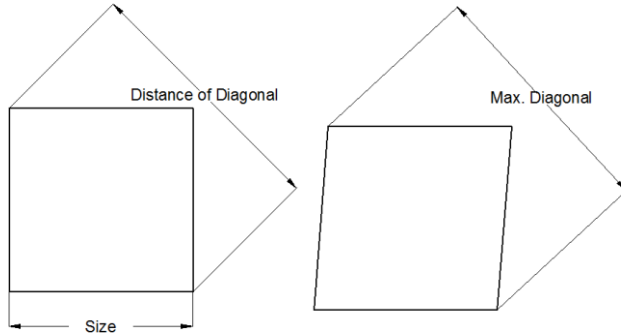
Will be % 100 Ultrasonic (SEP 1920 Table 1 class 3) test should be made and there shouldn't be any segregation, crack or cavity failures in material. Ultrasonic failures should be ≤ 3 .



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3.8 Size and Tolerance

3.8.1 *Diagonal Tolerance:* The diagonal tolerance mustn't be exceeded.



Size	Diagonal Distance (mm)	Max. Diagonal Tolerance (mm)
175x175	247	250
190x190	269	272
205x205	290	293
215 x215	304	307
250 x250	353	356
270 x270	382	386
285 x285	403	407
315 x 315	445	449
320 x320	452	456
330 x330	467	471
340 x340	481	485
350 x350	495	499
400 x400	565	569
450 x450	636	640
500 x500	707	711

3.8.2 *Tolerance:* Length and linearity ratios of material should be according to following table

Length (mm)	Tolerance (mm)
50	±0,8
100	±1,3
150	±2,0
190-350	±2,5

Table-5 Linearity

3.9 Mill Quality/Test Certificate

MTC should be acc.to EN10204 3.1 B and included below information:

- 3.9.1 Steel Grade
- 3.9.2 Dimension
- 3.9.3 Steel production method
- 3.9.4 Ratios of all elements in the chemical composition(According to the table).
- 3.9.5 Hardenability band
- 3.9.6 Grain size measurement.
- 3.9.7 Non-metallic inclusions.
- 3.9.8 Ultrasonic test
- 3.9.9 Delivery Hardness value.
- 3.9.10 Heat treatment information.
- 3.9.11 Forging/Reduction Ratio
- 3.9.12 Heat No
- 3.9.13 Heat Quantity

4. Pre-Acceptance

When the material is ordered, an independent AUDIT Company determined by Olimpa, will audit to follow up the production and analysis results. The manufacturer will allow this Audit Company to work in its laboratories for the necessary measurements and analyzes. After the end of the production, the compliance of the values specified in the Material Certificate in Article 3.10 with the values specified in the specification will be reported to Olimpa by the auditor. When the suitability is approved by Olimpa, the material pre-acceptance will be completed.

5. Packing and Shipping Instruction

Olimpa makes a shipment instruction after the independent auditor company notifies Olimpa about the approval of the material pre-acceptance. The following information will be stamped with cold stamp on the head of each size material

- Producer Name
- Material Grade
- Heat No
- Diameter
- Weight of steel bar



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6. Inspection and Rejection

- 6.1 **Material Pre-Acceptance:** In case the conformity specified in Article 4 is not achieved, the materials will be rejected and shipment approval will not be given. The manufacturer company will inform the reasons for the non-compliance by preparing an improvement plan and will offer a solution to eliminate the nonconformity
- 6.2 **Entry Quality Control:** The entrance control of the materials is controlled according to Olimpa Material Entry Control Procedure. In case of detection of nonconformity, the materials will be rejected and returned to the manufacturer. In the event of any material-related problem in the used material during manufacturing or in the final product, Olimpa will use its return authority and demand compensation from the manufacturer for the damage caused by the error.
- 6.3 **Objection:** The producer company should immediately investigate the reasons for rejection of the material and report the detected errors to Olimpa. The rejected material should be seen and examined on site within maximum of 2 weeks.

