

STRUCTURAL CARBON AND ALLOY STEEL FORGINGS
GENERAL SPECIFICATIONS
GOST 8479-70 Official Edition
Official Edition

结构碳素钢和合金钢锻件
通用规范
GOST 8479-70

官方版

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苏联部长理事会标准、测量和仪器委员会于 1971 年 1 月 1 日第 59 号法令规定的有效期，由 1981 年 12 月 31 日第 5873 号法令延长至 1987 年 1 月 1 日

Failure to comply with this Standard will result in legal proceedings

不遵守本标准将导致法律诉讼

This Standard applies to general-purpose forgings up to 800 mm in diameter (thickness) made from structural carbon, low-alloyed and alloy steel and manufactured by forging and hot stamping.

This Standard establishes groups of forgings and basic technical requirements for their acceptance and supply.

This Standard does not replace the standards, currently in effect, and the specifications for separate types of forgings, which require special means of production, surface quality, use of special types of heat treatment, etc.

(Amended Wording, Amendment No. 1).

本标准适用于直径（厚度）不超过 800 毫米的通用锻件，锻件由结构碳钢、低合金钢和合金钢制成，并通过锻造和热模锻制造。

本标准规定了锻件级及其验收和供应的基本技术要求。

本标准不代替现行有效的标准和要求特殊生产手段、表面质量、使用特殊热处理方式等的各类锻件的规范。

（修改措辞，修改第 1 号）

1. TECHNICAL REQUIREMENTS

1. 技术要求

1.1. Forgings shall be manufactured in accordance with the requirements of this Standard, from drawings approved in accordance with the established procedure, and specifications and technical documentation for particular products. Forgings, **depending on types of testing**, shall be subdivided into the groups specified in table 1.

锻件应按照本标准的要求，根据既定程序和特定产品的规范和技术文件批准的图纸制造。锻件，**根据试验类别**，应细分为表 1 中规定的级别。

1.2. Attribution of forgings to a particular group shall be done by the customer. The group number shall be specified in technical requirements on the drawing of a part.

将锻件归属于某一特定级别客户完成。级别在零件图纸的技术要求中注明。

1.3. At the customer's request, delivery of forgings shall be carried out with additional types of tests, not provided for by this Standard (testing of flakes, Bauman testing, ultrasonic and periscope testing, residual stresses determination, determination of yield point at operating temperatures, impact strength at operating and negative temperatures determination, macro- and microanalysis of steel structure, bend testing, grain size determination, etc.). In this case, forgings also fall into one of the groups: II, III, IV and V in accordance with table 1.

Note: The quality group of Forging shall be established by ultrasonic inspection in accordance with GOST 24507-80

应客户要求，在交付锻件时应进行本标准未规定的附加类型的试验（白点检验、鲍曼试验《材料脆性试验》、超声波和内窥镜检验、残余应力测定、工作温度下屈服点测定、工作温度和零下温度冲击强度测定、钢结构的宏观和微观分析、弯曲试验、晶粒度测定等）。在这种情况下，根据表 1，锻件也属于 II、III、IV 和 V 级之一。

注：锻件质量级按 GOST 24507-80 建立超声检验

表 1

Forging group 锻造级别	Test types 试验种类	Batch types 批量种类	Delivery Characteristics 交货性能
I	Without tests 无试验	Forgings of the same or different grades of steel 同一种或不同钢种的锻件	/
II	Hardness test 硬度试验	Forgings of the same grade of steel, that simultaneously passed heat treatment 同一种钢的锻件, 同时进行热处理	Hardness 硬度
III	Hardness test 硬度试验	Forgings of the same grade of steel, that passed heat treatment in identical conditions 同一种钢的锻件, 在相同条件下做的热处理	Above 同上
IV	1. Tensile test 2. Determination of impact strength 3. Hardness test	Forgings from the same melting of steel, simultaneously passed heat treatment 同炉同热处理的锻件	Yield point reduction of area impact strength
			/
V	1. Tensile test 2. Determination of impact strength 3. Hardness test	Each forging shall be accepted individually 每个锻件单独验收	Yield point Reduction of area impact strength
			/

Notes:

1. Removed.
2. Forgings, consecutively loaded in the furnace without break, are considered to have simultaneously passed heat treatment in continuous furnaces.
3. The customer has the right to establish other combinations of delivery characteristics for forgings of groups IV and V instead of those specified in table 1.
4. The hardness test of group V forgings may be carried out on samples intended for mechanical tests.

注:

1. 取消了.
2. 在连续炉中连续装炉而不间断的锻件, 被认为在连续炉中同时通过了热处理。
3. 客户有权不按表 1 的规定, 为 IV 级和 V 级锻件建立其他交付特性组合
4. V 级锻件的硬度试验可在用于机械试验的样品上进行。

(Amended Wording, Amendment Nos. 1 and 2)/ (经修订的措辞, 修订编号 1 及 2)。

The type, volume, standards and methods of additional tests shall be specified in the forging drawing or in the order.
附加试验的种类、数量、标准和方法应在锻造图或订单中规定。

(Amended Wording, Amendment No. 1)/ (修改措辞, 修正案 1)

1.4. (Removed, Amendment No. 2). / (删除, 第 2 号修正案)。

1.5. Ingots, cogged billets (blooms), forged or rolled billets, and also billets from installations of continuous steel casting (CCI) and various types of rolled products may be the source material for the manufacture of forgings.

制造锻件的原材料可采用钢锭、初轧坯(大方坯)、锻制或轧制坯料、连续铸钢设备(CCI)生产的铸坯,以及各类轧材。

1.6. Forgings shall be produced from carbon, low-alloyed and alloy steel and their chemical composition shall meet the requirements of GOST 380-71, GOST 1050-74, GOST 19281-73, GOST 4543-71 and other effective standards or specifications.

锻件应采用碳素钢、低合金钢和合金钢,其化学成分应符合 GOST 380-71、GOST 1050-74、GOST 19281-73、GOST 4543-71 等有效标准或规范的要求。

The recommended grades of steel, depending on diameter (thickness) of forgings and the required strength category after final heat treatment are reproduced in the Appendix.(Amended Wording, Amendment No. 1).

根据锻件的直径(厚度)和最终热处理后所需的强度类别,推荐的钢等级见附录。(修改措辞,修正案 1)。

1.7. Dimensions of forgings shall take into account machining allowances, dimensional tolerances and technological laps for forgings, manufactured by pressing in accordance with GOST 7062-79, by hammering in accordance with GOST 7829-70, and by hot stamping in accordance with GOST 7505-74, and also laps for samples for control tests. It is allowed to establish allowances and laps for forgings with a weight over 100 ton, manufactured by pressing, in the specifications and technical documentation for the particular forging.(Amended Wording, Amendment No. 2).

锻件尺寸应包含机械加工余量、尺寸公差及工艺余量,具体根据以下制造工艺确定:

按 GOST 7062-79 采用压力机锻造的锻件,按 GOST 7829-70 采用锤锻的锻件,按 GOST 7505-74 采用热模锻的锻件,同时需预留试样切割余量。对于重量超过 100 吨的压力机锻件,允许在具体锻件的技术规范文件中对余量及试样余量进行特殊规定。(修订版,第 2 号修改单)

1.8. (Removed, Amendment No. 1). / (删除, 第 1 号修正案)。

1.9. The mechanical characteristics of forgings, supplied after final heat treatment, shall be subdivided into categories of strength. The strength categories, standards of mechanical characteristics appropriate to them determined during testing on longitudinal samples, and hardness standards are specified in table 2

最后热处理后提供的锻件的机械特性应按强度细分。在纵向试样试验中确定的强度类别、与之相适应的机械特性标准和硬度标准见表 2。

The hardness standards for forgings of groups II and III and strength categories for forgings of groups IV and V shall be established by agreement between the manufacturer and the customer. A grade of steel for all groups shall be established by agreement between the manufacturer and the customer and specified in the drawing of a part and forging. At the customer's request, ultimate strength shall be higher than that specified in table 2 for the given strength category, by not over: 120 MPa (12 kgf/mm²) for the required σ_b less than 600 MPa (60 kgf/mm²), 150 MPa (15 kgf/mm²) for the required σ_b from 600 to 900 MPa (60 to 90 kgf/mm²), 200 MPa (20 kgf/mm²) for the required σ_b more than 900 MPa (90 kgf/mm²). (Amended Wording, Amendment No. 2).

第 II 类、III 类锻件的硬度标准和第 IV 类、第 V 类锻件的强度分类,由制造厂和用户协商确定。钢的牌号应由制造商和客户之间的协议确定,并在零件和锻件的图纸中规定。根据客户的要求,极限强度应高于表 2 中给定强度类别的规定,但不超过:

要求极限强度 σ_b 值小于 600 MPa (60 kgf/mm²) 的极限强度不超过 120 MPa (12 kgf/mm²),

要求的 σ_b 值为 600 至 900 MPa (60 至 90 kgf/mm²) 的极限强度不超过 150 MPa (15 kgf/mm²),

要求的 σ_b 值大于 900 MPa (90 kgf/mm²) 的极限强度不超过 200 MPa (20 kgf/mm²)。

(修改措辞,修正案 2)。

Table 2

Strength category	Mechanical characteristics, no less than														Brinell hardness number (on forging surface)	
	Yield point	Ultimate strength	Elongation δ_s , %			Reduction of area ψ , %				Impact strength KCU, $J/m^2 \times 10^4 (kgf \cdot m/cm^2)$						
	$\sigma_{0.2}$	σ_B	Diameter (thickness) of continuous section forging													
	MPa (kgf/mm ²)		Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Hardness number HB	d mm
КП 175	175 (18)	355 (36)	28	24	22	20	55	50	45	40	64 (6.5)	59 (6.0)	54 (5.5)	49 (5.0)	101-143	5.85-5.00
КП 195	195 (20)	390 (40)	26	23	20	18	55	50	45	38	59 (6.0)	54 (5.5)	49 (5.0)	44 (4.5)	111-156	5.60-4.80
КП 215	215 (22)	430 (40)	24	20	18	16	53	48	40	35	54 (5.5)	49 (5.0)	44 (4.5)	39 (4.0)	123-167	5.35-4.65
КП 245	245 (25)	470 (48)	22	19	17	15	48	42	35	30	49 (5.0)	39 (4.0)	34 (3.5)	34 (3.5)	143-179	5.00-4.50
КП 275	275 (26)	530 (54)	20	17	15	13	40	38	32	30	44 (4.5)	34 (3.5)	29 (3.0)	29 (3.0)	156-197	4.80-4.30
КП 315	315 (32)	570 (58)	17	14	12	11	38	35	30	30	39 (4.0)	34 (3.5)	29 (3.0)	29 (3.0)	167-207	4.65-4.20
КП 345	345 (35)	590 (60)	18	17	14	12	45	40	38	33	59 (6.0)	54 (5.5)	49 (5.0)	39 (4.0)	174-217	4.55-4.10
КП 395	395 (40)	615 (63)	17	15	13	11	45	40	35	30	59 (6.0)	54 (5.5)	49 (5.0)	39 (4.0)	187-229	4.40-4.00
КП 440	440 (45)	635 (65)	16	14	13	11	45	40	35	30	59 (6.0)	54 (5.5)	49 (5.0)	39 (4.0)	197-235	4.30-3.95
КП 490	490 (50)	655 (67)	16	13	12	11	45	40	35	30	59 (6.0)	54 (5.5)	49 (5.0)	39 (4.0)	212-248	4.15-3.85

Table 2 (cont.)

Strength category	Mechanical characteristics, no less than														Brinell hardness number (on forging surface)	
	Yield point $\sigma_{0.2}$	Ultimate strength σ_B	Elongation δ_s , %			Reduction of area ψ , %				Impact strength KCU, $J/m^2 \times 10^4 (kgf \cdot m/cm^2)$						
			Diameter (thickness) of continuous section forging													
	MPa (kgf/mm ²)	Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Up to 100	Over 100 to 300	Over 300 to 500	Over 500 to 800	Hardness number HB	d mm	
KП 540	540 (55)	685 (70)	15	13	12	10	45	40	35	30	59 (6.0)	49 (5.0)	44 (4.5)	39 (4.0)	2^3-262	4.05-3.75
KП 590	590 (60)	735 (75)	14	13	12	10	45	40	35	30	59 (6.0)	49 (5.0)	44 (4.5)	39 (4.0)	235-277	3.95-3.65
KП 640	640 (65)	785 (80)	13	12	11	10	42	38	33	30	59 (6.0)	49 (5.0)	44 (4.5)	39 (4.0)	248-293	3.85-3.55
KП 685	675 (70)	835 (85)	13	12	11	10	42	38	33	30	59 (6.0)	49 (5.0)	39 (4.0)	39 (4.0)	262-311	3.75-3.45
KП 735	735 (75)	880 (90)	13	12	11	-	40	35	30	-	59 (6.0)	49 (5.0)	39 (4.0)	-	277-321	3.65-3.40
KП 785	785 (80)	930 (95)	12	11	10	-	40	35	30	-	59 (6.0)	49 (5.0)	39 (4.0)	-	293-331	3.55-3.35

table 2. Designation KΠ: kgf/mm' shall be added to the name of column "Strength category";

for strength category KΠ 215 the value of ultimate strength shall be replaced: (40) with (44)

for strength category KΠ 685 the value of yield point shall be: 675 with 685:

表 2 里, 名称 KΠ: kgf/mm2 应加在强度类别一栏里

强度 KΠ215 的极限强度应用 44 替换 40

强度 KΠ685 的屈服点应为 685 替换 675

Notes:

1. The strength category is designated by the letters KΠ and a digit, indicating yield point

2. (Removed, Amendment No. 2).

3. It is allowed to determine, instead of conventional yield point ($\sigma_{0.2}$), physical yield point (σ_r), with observance of standards for ($\sigma_{0.2}$), specified in table 2 by agreement between the manufacturer and the customer.

4. Design cross-section for heat treatment shall be accepted as the thickness (diameter) of a forging".

1. 强度类别用字母 KΠ 和数字表示, 表示屈服点

2. (删除, 第 2 号修正案)。

3. 根据制造商和用户之间的协议, 可以根据表 2 中规定的标准 ($\sigma_{0.2}$) 来确定物理屈服点 (σ_r), 而不是传统的屈服点 ($\sigma_{0.2}$)。

4. 热处理的设计截面应接受为锻件的厚度(直径)。

1.10. Higher standards of plastic properties and impact strength may be established for forgings of groups IV and V in comparison with those specified in table 2 by agreement between the manufacturer and the customer. In this case, the letter C (special) shall be additionally marked near strength category, and the required characteristics shall be indicated in the drawing of a forging. (Amended Wording, Amendment Nos. 1 and 2).

根据制造商和客户之间的协议，可以为 IV 和 V 级别锻件制定比表 2 中规定的更高的塑性性能和冲击强度标准。在这种情况下，应在强度类别附近额外标记字母 C（特殊），并应在锻件图中注明所需的特性。（经修订的措辞，修订编号 1 及 2）。

1.11. A reduction of standards of mechanical characteristics in comparison with those specified in table 2, by the values specified in table 3, shall be allowed for determination of mechanical characteristics of forgings on cross, tangent or radial samples.

在横向、切线或径向试样上测定锻件的机械特性时，允许将机械特性标准与表 2 中规定的标准相比，按表 3 中规定的值进行降低。

Indicators of mechanical characteristics 机械性能指标	Permissible reduction of standards of mechanical characteristics,%			
	For cross samples 横向试样	For radial samples 径向试样	For tangent sample of	
			Forgings up to 300mm in diameter 直径小于 300mm 的锻件	Forgings over 300mm in diameter 直径超过 300mm 的锻件
Yield point	10	10	5	5
Breaking ultimate strength	10	10	5	5
Elongation	50	35	25	30
Reduction of area	40	35	20	25
Impact strength	50	40	25	30

Note For forgings of a ring type made by rolling, the standards of mechanical characteristics, received during testing of tangent samples, shall be established in accordance with the standards for longitudinal samples.

注：轧制环类锻件，切线试样试验时得到的机械特性标准，应按照纵向试样的标准制定。

1.12. Examples of conventional designations Forgings of group I:

Гр. I ГОСТ 8479-70. Forgings of group II (III) with hardness HB 143-179:

Гр. II (III) HB 143-179 ГОСТ 8479-70.

Forgings of group IV (V) with strength category КП 490: Гр. IV (V) КР 490 ГОСТ 8479-70;

forgings of group IV of strength category КП 490, reduction of area no less than 50 %, impact strength KCU of no less than 69 J/m²×10⁴ (7 kgf/mm²). Гр. IV-КП 490C-ψ 250-KCU269 ГОСТ 8479-70.

Forgings of group IV with strength category КП 490, ultimate strength σ_B of no less than 655 MPa, elongation δ₅ of no less than 14 % and impact strength KCU of no less than 64 J/m²×10⁴.

Гр. IV-КП490- σ_B > 655-δ₅ > 14-KCU264 GOST 8479-70.

I 级锻件的常规名称示例：

I 级 Г О С Т 8479-70。硬度 HB 143-179

II (III) 级锻件： II (III) 级 HB 143-179 Г О С Т 8479-70。强度等级为 К П 490：

IV (V) 组锻件： IV (V) 级 К Р 490 Г О С Т 8479-70； IV 组锻件强度类别 К П 490，断面收缩率不小于 50%，冲击强度 KCU 不小于 69 J/m²×10⁴ (7 kgf/mm²).

Гр. IV-КП490- σ_B > 655-δ₅ > 14-KCU264 GOST 8479-70

1.13. Surface quality requirements for forgings: There shall be no cracks, forging folds, scale pits, sand inclusions on the surface of forgings.

Dents from scale and nicks, and local grinding/stripping or gentle cutting of defects shall be allowed on rough surfaces of forgings, provided that the depth of the specified defects does not fall outside the limits of the least permissible dimensions of forgings in accordance with GOST 7062-79, or specifications and technical documentation for forgings over 100 tons.

Defects shall not be allowed on the surfaces subject to be hammered.

Individual defects, without their removal, shall be allowed on machined surfaces of forgings, if their depth, determined by control cutting or stripping, does not exceed 75 % the actual one-side allowance for machining of forgings, manufactured by forging, and 50 % of forgings, manufactured by die forging.(Amended Wording, Amendment No. 2).

锻件表面不得有裂纹、锻件褶皱、结疤、砂眼等。

在锻件的粗糙表面上允许有氧化皮和划痕磕碰造成的凹痕，以及缺陷的局部切修或打磨，只要指定缺陷的深度不超出 GOST 7062-79 规定的锻件最小允许尺寸的限制，或超过 100 吨的锻件的规格和技术文件。

指定的精压表面不允许有缺陷。

加工面允许个别未去除的缺陷，但需满足：对自由锻件，缺陷深度不超过实际单边加工余量的 75%。对模锻件，缺陷深度不超过实际单边加工余量的 50%。（修改措辞，修正案 2）。

1.14. Removal of defects by flat cutting with subsequent welding shall be allowed on forgings made from carbon and low-alloyed steel, for defect depths exceeding the actual one-side allowance for machining. The permissible depth of welding shall be agreed with the customer

对于碳和低合金钢的锻件，如果缺陷深度超过加工的实际单面余量，则允许通过轻切铲和随后的焊接来消除缺陷。允许的焊接深度应与客户商定。

1.15. Forgings shall be without flakes, cracks, and shrinkage looseness, whose absence shall be guaranteed by the manufacturer. Forgings, in which the above-mentioned defects are found, shall be rejected, and all other forgings of the given batch may be accepted only after individual testing.

锻件应无白点、裂纹和疏松，制造商应保证无此类现象。凡发现有上述缺陷的锻件，一律不予接受；同一批次的其他锻件，均须经单个检验后方可接受。

1.16. Heat treatment conditions shall be specified by the manufacturer. Forgings shall be exposed to heat treatment in rough condition and/or after preliminary machining (It is allowed to subject forgings only to preliminary heat treatment by agreement between the manufacturer and the customer. forgings of group I are followed not to be subjected to heat treatment.). Forgings shall be supplied after preliminary heat treatment by agreement between the manufacturer and the customer.

1.14-1.16. (Amended Wording, Amendment No. 1).

热处理条件应由制造商指定。锻件应在粗糙状态下和/或初步加工（根据制造商和客户之间的协议，允许锻件只进行初步热处理。第一类锻件允许不进行热处理”。）后进行热处理。锻件应在制造商和客户达成协议后进行初步热处理。

1.17. Forgings that have passed shaping after heat treatment in a cool or heated condition, shall be subjected to tempering for removal of internal stresses.

Forgings of groups I, II and III may be supplied without subsequent tempering if the manufacturer guarantees the required properties after shaping.

在冷却或加热条件下热处理后已成型的锻件，应进行回火以消除内应力。

如果制造商保证成型后的性能符合要求，则 I、II 和 III 组锻件可不经回火供应。

1.18. Forgings shall be exposed to cleaning from scale by agreement between the parties.

锻件应根据双方的协议进行清洁。

The means of cleaning shall be stipulated in the drawing or conditions of the order.

清洗方法应在订单的图纸或条件中规定。

1.19. (Removed, Amendment No. 1).1.20. / (删除, 第 1 号修正案)

1.20 A weight of forgings, determined in accordance with GOST 7062-79, shall not exceed the design weight determined in accordance with the greatest dimensions of forgings (taking a positive deviation of external dimensions and a negative deviation of internal dimensions and cavities into account).

根据 GOST 7062-79 确定的锻件重量不得超过根据锻件最大尺寸确定的设计重量(考虑外部尺寸的正偏差和内部尺寸和空腔的负偏差)。

(Amended Wording, Amendment No. 2)./ (修改措辞, 修正案 2)。

2. TEST METHODS/试验方法

2.1. Batches shall consist of forgings, manufactured from the same drawing. The conditions of completeness of a batch are specified in table 1.

It is allowed to combine in a batch those forgings, made from the same grade of steel from different drawings, similar in the configuration and dimensions.

批次应由锻件组成, 由同一图纸制造。表 1 规定了批处理的完备性条件。

允许批量组合用不同图纸、同种钢制成、外形和尺寸相似的锻件。

(Amended Wording, Amendment No. 1).

2.2. Each forging shall be subjected to external inspection without the use of magnifying devices, if other quality control is not stipulated in the order.

如果订单中没有规定其他质量控制, 则每个锻件应接受外部检验, 检验时不得使用放大装置。

2.3. For each group of forgings, except for group I, the volume of obligatory tests, shall be established specified in table 4.

除第一级外, 每一级锻件的强制性试验数量应按表 4 中规定。

Forgings group 锻造级	Types of tests 试验类型	Quantity of forgings in a batch, subjected to test 一批中接受测试的锻件数量
I	Without tests 无试验	/
II	Hardness test 硬度测试	5% from a batch, but no less than 5 pieces 一批的 5%, 但不少于 5 件
III	Hardness test/硬度测试	100%
IV	1. Elongation test 延伸率测试 2. Determination of impact Strength 冲击强度的测定 3. Hardness test 硬度测试	2 pieces for up to 100 pieces in a batch, 1%, but no less than 2 pieces(forgings with the lower and upper limits of hardness) for over 100 pieces in a batch 在 100 件以下的批次,每批使用 2 件。100 件以上的批次, 1% 件, 但不少于 2 件 (具有上下硬度限制的锻件)
		100%
V	1. Elongation test 2. Determination of impact strength 3. Hardness test	100%

Notes/注:。

1. The quantity of forgings of group II subjected to testing may be increased by arrangement with the customer.

第 II 级锻件的试验数量可与客户安排增加。

2. For forgings of group IV, determination of mechanical characteristics may be carried out on forgings without the lower and upper limits of hardness, but with standards of hardness within the limits of given categories of hardness. **In this case, the hardness number is an additional acceptance characteristic.**

对于第 IV 级锻件，可以对锻件进行机械特性的测定，不规定硬度的上下限，但硬度标准在给定硬度类别的范围内。**在这种情况下，硬度值是附加的验收特性。**

3. Determination of mechanical characteristics for forgings of group IV may be carried out on one forging, when the number of forgings in a batch is up to 20 pieces, if the difference in prints for hardness of the whole batch does not exceed 0.30 mm for КП 18 to КП45 and 0.20 mm for КП50 to КП80.4.

当第 IV 类锻件的批次数量不超过 20 件时，若全批次硬度压痕差异满足以下条件，可仅对一个锻件进行力学性能测定：材料硬度在КП18 至КП45（约 HB450）范围内时，压痕差 ≤ 0.30 mm；材料硬度在КП50 至КП80(约 HB800)范围内时，压痕差 ≤ 0.20 mm。**(КП → 硬度标尺代号) (Prints for hardness → 硬度压痕)**

The number of forgings for testing, supplied after preliminary heat treatment, shall be specified in the drawing of a forging.

在初步热处理后提供的用于测试的锻件数量应在锻件的图纸中注明。

2.4. Sampling for determination of chemical composition of metal forgings shall be carried out in accordance with GOST 7565-81.

测定金属锻件化学成分的抽样应按照 GOST 7565-81 进行。

2.5. The chemical analysis of metal forgings shall be carried out in accordance with/金属锻件的化学成份分析按照

GOST 22536.0-77-GOST 22536.13-77; GOST 12344-78, GOST 12345-80, GOST 12346-78,GOST 12347-77, GOST 12348-78, GOST 12349-83, GOST 12350-78, GOST 12351-81, GOST 12352-81, GOST 12353-78, GOST 12354-81, GOST 12355-78, GOST 12356-81,GOST 12357-66, GOST 12358-82, GOST 12359-81, GOST 12360-82, GOST 12361-82,GOST 12362-79, GOST 12363-79, GOST 12364-66. GOST 12365-66, and GOST 18895-81.

For the manufacture of forgings made from metal melted by the manufacturer, the chemical composition of steel shall be determined in accordance with the heat analysis of the ladle sample.

For the manufacture of forgings from rolled products and ingots, the grade of steel and chemical composition shall be specified in the quality certificate of the manufacturer of the metal.

对于由制造商熔化的金属制成的锻件，应根据钢包样品的热分析确定钢的化学成分。

用轧制产品和钢锭制造锻件的，应当在金属制造厂的质量证书上载明钢的牌号和化学成分。

(Amended Wording, Amendment No. 2).

(修改措辞，修正案 2)。

2.6. The mechanical characteristics of forgings shall be determined on longitudinal, cross, tangent or radial samples. The sample type, if it is not specified in the drawing of a part, shall be specified by the manufacturer.(Amended Wording, Amendment No. 2).

锻件的机械特性应在纵向、横向、切线或径向试样上测定。零件图纸中未注明样品型号的，由制造厂注明。(修改措辞，修正案 2)。

2.7. Samples for determination of mechanical characteristics of forgings of group V shall be cut out from laps, left on each forging, and for group IV shall be cut out from a lap for samples or from the body of a forging, for what the additional number of forgings shall be made.

It is allowed to cut out samples for mechanical tests of forgings of group IV from a sample of the same or greater section, separately forged from metal of the same melt and in similar forging conditions.

In this case, the sample must undergo all heating cycles including pre-forging and heat treatment simultaneously with the forgings in the same batch

用于测定 V 类锻件机械特性的样品应从留在每个锻件上的余量处取下；对于 IV 类锻件，应从样品工艺余量或锻件本体上取下--用于额外制作的锻件数量。

允许从相同或更大截面的样品中切割出用于 IV 类锻件机械试验的样品，这些样品分别由同炉金属材料在类似锻造条件下锻造而成。

在这种情况下，样品必须与同一批次的锻件同时进行所有的热循环，包括预锻和热处理。

2.8. The form, dimensions, and location of a lap for samples shall be determined by the drawing of a forging. Lap dimensions for samples shall be sufficient for making all required samples. For the manufacture of one forging from an ingot, a lap for samples shall be from the side of the exterior part. A lap for samples shall be stipulated from two sides on forgings such as shafts and rings of length over 3 m, at the appropriate indication in the drawing of a forging.

预留样品的形式、尺寸和位置应由锻件图纸确定。样品的预留尺寸应足以制作所有要求的样品。用铸锭制造一个锻件时，样品的预留余量应从外部部分的侧面开始。在长度超过 3 米的轴和环等锻件上，应在锻件图纸上的适当指示处，从两侧规定试样余量。

2.9. A lap for samples from forgings made from alloy steel shall be separated in a cold way, and for forgings made from carbon and low-alloyed steel, it shall be separated at the discretion of the manufacturer.

合金钢锻件预留样品的切割应用冷法分离，碳素钢和低合金钢锻件的预留样品应由制造商自行决定。

2.10. Samples for mechanical tests may not be subjected to additional heat treatment or any heating.

机械测试的样品不得进行额外的热处理或任何加热。

2.11. During the manufacture of several parts of one forging, one sample shall be selected, by the results of whose testing acceptance of all parts made from the given forgings shall be carried out.

在一个锻件制造几个部件时，应选择一个样品，根据其测试结果，对由给定锻件制成的所有部件进行测试验收。

2.12. Samples for mechanical tests of forgings of cylindrical and prism forms shall be cut out from a lap or from the body of a forging so that their axis shall be at the distance of 1/3 radius or 1/6 diagonal from the external surface of a forging.

用于圆柱形和棱形锻件机械试验的样品应从锻件的预留样品余量处或锻件的本体上切下，使其轴线与锻件外表面的距离为 1/3 半径或 1/6 对角线。

2.13. When cutting out samples from hollow or bored-out forgings with wall thickness up to 100 mm, samples shall be cut out at the distance of 1/2 the wall thickness of a forging, and with a wall thickness over 100 mm samples shall be cut out so that their axis shall be at 1/3 the wall thickness of a forging, from the external surface. The axis of cross or tangent samples shall pass at the same distance, as for longitudinal samples.(Amended Wording, Amendment No. 1).

用于圆柱形和棱形锻件力学试验的试样，应在距锻件外表面 1/3 半径或 1/6 对角线的距离处，从预留样品余量或锻件本体上切下。在壁厚不超过 100 毫米的空心或钻孔锻件上切割样品时，应在锻件壁厚的 1/2 处切割样品；在壁厚超过 100 毫米的锻件上，应使其轴线在锻件壁厚的 1/3 处从外表面切割样品。横向或切向样品的取样轴线应与纵向样品保持相同的距离。（修改措辞，修正案 1）。

2.14. The place of cutting out samples from forgings of non-cylindrical and non-prism form, when the

appropriate instructions in the drawing of a part are absent, shall be specified by the manufacturer.

当零件图纸中没有适当的说明时，从非圆柱形和非棱形锻件上切割样品的位置应由制造商指定。

2.15. Billets for samples may be taken from forgings (not from laps) by cutting with a hollow drill or by cuts from machining of forgings.

样品用的坯料可以用空心钻切割或锻件机加工时的切割从锻件（不是从预留样品）上取下。

2.16. The quantity of samples for mechanical tests from each sample shall be one for tensile test, and two for impact strength test.

每个样品的机械试验样品的数量应为拉伸试验一个，冲击强度试验两个。

2.17. The making of samples and tensile testing shall be carried out in accordance with GOST 1497-73, on samples of five-fold length and with a diameter of the design part of 10 mm.mm. It is allowed to use samples of five-fold length with a diameter of the design part of 5 or 6

样品的制作和拉伸试验应按照 GOST 1497-73 进行，样品长度为 5 倍，设计直径为 10mm。允许使用 5 倍长度的样品，设计直径为 5 或 6

2.18. Making of samples and impact testing shall be carried out in accordance with GOST 9454-78 on samples of type 1.

样品的制作和冲击试验应按照 GOST 9454-78 样品类型 1 进行。

2.19. The Brinell hardness number shall be determined in accordance with GOST 91259.

It is allowed to determine hardness by other devices ensuring accuracy $\pm 10\%$ hardness HB, if it is impossible to carry out test on a Brinell device

布氏硬度值应按照 GOST 91259 确定。

如果不可能在布氏装置上进行测试，则允许通过其他装置确定硬度，确保精度为 $\pm 10\%$ 硬度 HB

2.20. If mechanical tests results are unsatisfactory for even one of the indicators, re-testing against it shall be carried out on twice the number of samples taken from the same batch of forgings.

如果力学试验结果有一项指标不能令人满意，则应从同一批锻件中抽取两倍数量的样品进行重新试验。

If after re-testing, positive results are received, the entire batch of forgings shall be considered suitable.

如果在重新测试后，收到积极的结果，则应认为整批锻件是合适的。

If after re-testing, even one of samples gives unsatisfactory results, the entire batch of forgings may be subjected to repeated heat treatment.

如果在重新测试后，即使其中一个样品的结果不满意，整批锻件也要进行重复热处理。

2.21. The number of repeated heat treatments shall not be over two.

Additional tempering shall not be considered as heat treatment and the number of tempering is not limited. After each heat treatment or additional tempering, the batch of forgings shall be tested as a newly presented one.

A third heat treatment shall be allowed as a refinement on large forgings in cases where normalization by tempering does not provide the required mechanical characteristics.

(Amended Wording, Amendment No. 1). 2.20, 2.21. (Amended Wording, Amendment No. 1).

重复热处理次数不得超过 2 次。

额外回火不应视为热处理，回火次数不受限制。每次热处理或额外回火后，该批锻件应作为新提交的锻件进行试验。

如果回火正火不能提供所需的机械特性，则允许对大型锻件进行第三次热处理。

（修改措辞，修正案 1）。

2.22. (Removed, Amendment No. 1).

2.23. For quality control check of billets and their conformity to the requirements of this Standard by the customer, the above-mentioned rules of sampling and test methods shall be applied.

客户对钢坯的质量控制检查及其是否符合本标准的要求，应采用上述抽样规则和试验方法。

3 MARKING, TRANSPORTATION, STORAGE

标记、运输、贮存

3.1. The location of marking shall be indicated in the drawing of a forging. Marking shall be legible and contain the data specified in table 5.

标记的位置应在锻件图纸中注明。标记必须清晰易读，并包含表 5 中规定的的数据。表 3

Group number 级别号	Type of marking 标记种类			
	Quality Control Dep. Stamp 质控部章	Part drawing Number 零件图号	Melt number or steel grade 炉号或钢种	Forging number 锻造号
I	Indicated 标记	Indicated 标记	/	/
II	As above 同上	As above	Indicated 标记	/
III	As above 同上	As above	As above	/
IV	As above 同上	As above	As above	/
V	As above 同上	As above	As above	Indicated 标记

Note. The type of marking on stamped forgings shall be specified by agreement between the manufacturer and the customer.

请注意。冲压锻件上的标记类型应由制造商和客户之间的协议规定。

3.2. **Markings for a batch on a label shall be allowed for forgings with a weight up to 10kg..**

对于重量不超过 10kg 的锻件，允许在标签上标注批次。

3.3. Each batch of forgings or a forging, accepted by the Quality Control Department, shall be accompanied by a quality certificate, indicating the following:

name or trademark of the manufacturer;

number of the order;

quantity of forgings in a batch and their weight(for group V-the number of a forgings; 一批锻件的数量及其重量 (对于 v 组，即一个锻件的重量量))

number of drawing;

grade of steel and number of the standard or specifications;/材料牌号及标准或规范号

chemical composition;

melt number;

group of forgings;

strength category for groups IV and V or hardness standards for forgings of groups II and III, and the number of this Standard; 第 IV、V 组的强度类别或第 II、III 组锻件的硬度标准，以及本标准编号；

type of heat treatment;

test results stipulated by this Standard; 该标准规定的试验结果

results of additional tests stipulated by the drawing of a forging or conditions of the order.

Note. The content of the accompanying documents on forgings, made by die forging, shall be specified by agreement between the manufacturer and the customer.

请注意。模锻制造的锻件随附文件的内容，由制造商和客户协议规定。

3.4. Forgings shall be stored in dry closed warehouse premises. Storage of forgings under shelters or on platforms shall be allowed. 3.5.

(Removed, Amendment No. 2).

锻件应存放在干燥封闭的仓库内。应允许在遮蔽处或平台上存放锻件。

(删除，第 2 号修正案)。

(cont.)

Strength category	Diameter (thickness) of forgings, mm			
	Up to 100	From 100 to 300	From 300 to 500	From 500 to 800
КП 395	45, 30X, 40X, 50Г2 *, 15XM, 30 XMA, 40XH, 30XГC *, 34 XH1M *, 18 XГT	35X, 40X, 45X, 34XM, 35XM, 40XΦA, 40XH, 38XГH, 115X1M1Φ, 34XH1M*	40X, 45X, 40XH, 35XM, 38XГH, 40XΦA	40XH, 35XM, 38XГH
КП 440	40X, 35XM, 40XH, 38XГH, 25X1M1Φ *, 34XH1M, 30XMA, 15XM	40X, 45X, 35XM, 40XH, 30XMA, 35XMA, 25X1M1Φ *, 34XH1M, 45XHM*	45X, 35XM, 40XH, 34XH1M, 38XГH; 45XHM	40XH, 34XH1M, 45XHM *, 38X2H2MA, 40XH2MA
КП 490	55, 55X, 35X, 40X, 45X, 15XM, 35XM, 30XГCA, 30XMA, 38XM, 38XГH, 40XH, 25X1MΦ	40X, 45X, 35XM, 40XΦA, 40XH, 30XГCA, 35XГCA, 38XГH, 25X2M1Φ *, 25X1M1Φ, 20X1M1Φ1TP, 34XH1M, 30XH2MΦA, 45XHM* -	34XH1M, 30XH2MΦA, 40XH2MA, 45XHM	34XH1M, 40XH2MA
КП 540	38XC, 40XH, 40XΦA, 38XГH, 34XH1M, 25X1M1Φ, 30XГCA	45X, 50X, 35XH, 40XH, 30XHMA, 40XΦA, 35XГCA, 38XГH, 34XH1M, 40XH2MA	34XH1M, 40XH2MA	45XHM
КП 590	45X, 38XC, 38XГ, 35XГCA, 35XM, 40XH, 45XH, 38XГH, 30XH3A, 25X1MΦ, 30XГCA	50X, 34XHMA, 40XH, 25X1M1 Φ, 38X2MΦA, 35XHMA, 30XГCA, 34XH1M, 20X1M1Φ1TP, 25X2M1Φ, 40XH2MA, 34X1MA, 45XHM	34XH1M, 40X2H2MA, 45XHM	40XH2MA, 45XHM *
КП 640	45X, 50X, 45XH, 30XГCA, 35XГCA, 34XH1M	34XH1M, 40XH2MA, 34XH3M*	34XH3M, 38XH3MA, 40XH2MA, 40X2H2MA	38XH3MA, 38XH3MΦA, 34XH3M, 35XH1M2ΦA, 36X2H2MΦA

(cont.)

Strength category	Diameter (thickness) of forgings, mm			
	Up to 100	From 100 to 300	From 300 to 500	From 500 to 800
КП 685	30XГT, 30XГCA, 20XH3A, 20X1M1Φ1TP, 20XH3A, 25X2M1Φ *, 34XH1M, 34XH3M*	50XΦA, 25X1M1Φ, 25X2MΦ1, 34XH3M*, 34XH1M, 38XH3MA *, 38XH3MΦA*, 40XH2MA	34XH3M *, 38XH3MA*, 38XH3MΦA *, 38XH2MA, 18X2H4MA, 45XHM	38XH3MA, 38XH3MΦA, 34XH3M, 36X2H2MΦA
КП 735	34XH1M, 40XH2MA, 34XH3M*, 40X2H2MA, 38X2H2MA	34XH3M*, 40XH2MA, 38XH3MA*, 38XH3MΦA *, 18X2H4MA	34XH3M, 38XH3MA, 36X2H2MΦA	34XH3M, 38XH3MΦA
КП 785	18X2H4BA, 38XH3MΦA*, 34XH3MA *, 38X2H2MA, 40XH2MA	34XH1MA, 34XH3MA, 36X2H2MΦA, 38XH3MΦA, 40XH2MA, 38X2H2M	34XH3MA, 38XH3MΦA, 38XH3MA, 36X2H2MΦA	-

Note. The mark “*” means that steel is in normalized condition; in other steel grades, the appropriate strength category is ensured by quenching and tempering.

(Amended Wording, Amendment Nos. 1 and 2).

Appendix. Designation KP: kgf/mm² shall be added to column "Strength category"; steel grade: 15X1M1Φ shall be added to strength categories KP 275 and KP 345 for a diameter from 500 to 800 mm; steel grade: 34XM (34XMA) shall be added to strength categories KP 275 for diameters from 100 to 300 mm and from 300 to 500 mm; KP 315 for diameters up to 100 and from 100 to 300 mm; KP 345 for diameters from 500 to 800; KP 395 for diameters from 100 to 300 mm, from 300 to 500 mm and from 500 to 800 mm; KP 440 for diameters from 100 to 300 mm and from 300 to 500 mm; KP 490 for diameters from 100 to 300 mm.

合同附件。在“强度类别”栏中增加代号 KP: kgf/mm²；钢材等级：15X1M1Φ 应添加到强度类别 KP 275 和 KP 345（直径从 500 到 800 毫米）；

钢材等级：直径为 100 至 300 毫米和 300 至 500 毫米的，应在强度类别 KP 275 中增加 34XM (34XMA)；

KP 315 适用于直径 100 毫米和 100 至 300 毫米；

K P 345 适用于直径从 500 到 800；

K P 395 直径从 100 到 300 毫米，从 300 到 500 毫米和从 500 到 800 毫米；

KP 440 适用于直径 100 至 300 毫米和 300 至 500 毫米；

KP 490 适用于直径从 100 到 300 毫米。