	Aerospace series Plates, plates and strips of titanium DINAnd titanium alloys Technical delivery conditions **（德国）航空航天用途，钛及钛合金 板和板带交货技术条件**	**DIN** **65 039**

Replacement for 替代
LN 65 039 / 02.7 4

Aerospace; Sheets, plates and strips of titanium and titanium alloys; Technical specification 航空航天；钛及钛合金 薄板、中厚板、卷带；技术规范
Aeronautique et espace; Töles, plaques and bandages en titane et alliages de titane; Specification technique 航空和空间；钛及钛合金薄板、板带；技术规范

This standard is recognized by the Swiss Federal Office of Defense Technology and Procurement and the Federal Aviation Office.
本标准由国防科技和采购联邦办公室和联邦航空管理局的认可。

Content 正文

1 Scope 范围

This standard is to be used for the production, testing and delivery of sheet metal, plates and strips of titanium and titanium alloys, hereinafter referred to as semi-finished products. If not expressly required, the semi-finished product to be supplied according to this standard is standard quality (STQ) according to DIN 65436 (currently draft).
本标准用于生产，测试和交付钛和钛合金的板材，板材和带材，以下称为半成品。如果没有明确要求，根据本标准提供的半成品是根据 **DIN 65436**（目前草案）的标准质量（STQ）。

2 terms 术语

2.1 Melting 熔炼
A melt (batch) in the meaning standard includes the total content of the material melted or melted in a unit (eg furnace or crucible). 在含义标准中的熔体（批料）包括在单元（例如炉或坩埚）中熔化或熔融的材料的总含量。
2.2 Lot 批次
A lot in the meaning standard consists of a semi-finished product of the same type, which is produced and heat-treated from a melt under the same conditions, and simultaneously presented for testing. 许多本标准的目的包括尺寸和材料相同其中从熔化物中产生的相同的条件和热处理下半成品的，并且将在同一时间进行测试呈现。
2.3 Nut plate 母板
A mother plate is a plate which is produced in one piece and can then be cut into individual plates. 母板是制成一体的板，然后可以切割成单独的板。
2.4 Sheet 薄板
A sheet is a flat-rolled semi-finished product with a rectangular cross-section and a thickness of up to 5 mm. 片材是具有矩形横截面且厚度高达 5mm 的平轧半成品。
2.5 tape 卷带
A strip is a flat-rolled semi-finished product with a rectangular cross-section and a thickness of up to 5 mm. Usually delivered in a coiled form. 带材是具有矩形横截面且厚度高达 5mm 的平轧半成品。通常以卷绕形式递送。
2.6 plate 中厚板
A plate is a flat-rolled or forged semi-finished product with a rectangular cross-section, a thickness of more than 5 mm and a width of more than 300 mm, the ratio: width: thickness being at least 5: 1. 板是具有矩形横截面，厚度大于 5mm 且宽度大于 300mm 的平轧或锻造半成品，宽度：厚度的比率为至少 5:1

3 requirements 要求

3.1 Organizational requirements 组织要求
3.1.1 Factory inspections 工厂检查
The manufacturer of the semifinished product is obliged to record the sequence and results of the production in such a way that the technological progress of the semifinished product can be demonstrated without any problems. These documents are to be made available to the purchaser upon request. The manufacturer is obliged to supervise his

production sufficiently and continuously by an independent control. 半成品的制造商是必需的，程序和生产保持这样的半成品的技术生涯适当记录的结果。
这些文件可根据要求，提供访问的客户。制造商有义务通过一个独立的控制充分，持续监控其生产。

3.1 .2 Testing equipment 测试设备

The manufac- turer of the semifinished product shall provide the labor, rooms, machinery, equipment, test equipment and operating materials required for quality control. 半成品的制造商具有用于质量控制人员，场所，设备所需的数据，设备，检测设备及耗材提供。

3.1.3 Experts 专家

As experts, the manufacturer of the semifinished product must designate at least two persons who are independent of the manufacturer and independent of the manufacturing companies. 作为专家，半成品的制造商必须指定至少两个独立于制造商并且独立于制造公司的人。

3.1.4 Inspection test certificate 检验测试证书

About the manufacturer 's tested and marked For each lot, an inspection certificate DIN 50 049 - 3.1 B issued by an expert of the manufacturer shall be signed by the customer
In at least three copies.
The supplies for which no by an expert
Are not in accordance with the technical delivery conditions.
The manufacturer of the semifinished products is responsible for the correctness of the
Test results, and that they should be carried out on prescribed specimens
The delivered in fact and under responsibility
Of the experts.

关于制造商的半成品测试，标记为每批检验证书 DIN50049 - 3.1 甲乙经制造商的专家制定了签订至少一式三份转发的购买者。
交付对于没有通过的专家
签署验收合格证都存在，不符合技术交付。
的半成品为的正确性的制造商
检验结果中列出的责任，这些样品在规定的距离
所提供的其实很多，责任
已检测出的专家。

3.1.5 Manufacturing Engineering 制造技术

The manufacturer is obliged to store production plans for 10 years (calculated from the date of the last
Delivery of the parts to the purchaser) and, if so desired, to the customer.
Changes to the production process, which may influence the quality characteristics, require the consent of the customer. A note in the inspection certificate is required for initial delivery according to the modified production plan.
The production plan is intended to define the production process clearly and reproducibly.
生产是必需的，生产计划保存 10 年（从最后的日期零件给客户）和请求的交付使顾客访问。
在生产顺序的变化，这可能影响质量特性，要求客户的同意。在修订后的生产计划后先发货，检验证书在一份报告中是必需的。
生产计划是清楚地和可重复地限定了制造过程。

3.2 Technical requirements 技术要求

3.2.1 Material and delivery condition 材料和交货条件

Only materials according to the Material Manual of German Aviation, Part I, Metallic Materials, Volume 2, may be used with the material states prescribed in the material performance sheets for the relevant semi-finished product. The requirements of the corresponding material performance sheet must be met.

只有在德国航空材料手册资料，第一部分，金属材料，第 2 卷，可以在指定的半成品材料状态的材料数据表中规定的条件下使用。相关材料数据表的要求必须得到满足。

If, in exceptional cases, the purchaser is entitled to use a material and / or material condition which is not contained in the Material Handbook of German Aviation, Part I, Volume 2, this must be specified in writing with the period of validity (see section 3.2.11).

如果在特殊情况下由购买，使用的材料和/或物质条件，这是不包括德国的航空材料手册中，第一部分，第 2 卷，理所当然的，这必须以书面形式规定，具有持续时间（见 3.2.11）。

The material must be produced by multiple melting, at least the last melting process being carried out under vacuum. A self-consuming as well as a non-self-consuming electrode can be used for the first melt. The subsequent remelting or remelting must be carried out with a self-consuming electrode.该材料必须通过反复熔化来制造，至少最后熔化过程是在真空条件下进行。对于 ersts-chmelze 既可消耗品和非消耗电极都可以使用。随后重熔或 Umschmelzungen 与耗电极进行。

【Dai-si-wei 翻译：产品用铸锭应经多次熔炼。首次可使用自耗电极、电子束冷床或等离子弧冷床炉熔炼。随后的一次或者多次熔炼应该采用真空自耗电弧炉在真空状态熔炼。】

In the case of plates for subsequent machining, these are delivered in the low-tension state.当板后续加工这些在低应力条件下提供的。

Unless explicitly stated by the purchaser, the manufacturer can choose the position of the panels to the direction of the rolling.

如果没有明确的购买者，制造商指定，板的位置空白轧制方向自由选择。

3.2.2 Heat treatment 热处理

The heat treatment is carried out according to LN 65084 part 1 to part 4 and is to be certified in the inspection certificate.

热处理是根据 **LN 65084** 第 1 部分进行了第 4 部分，并应在检验证书进行认证。

【Dai-si-wei：热处理制度是依据 **LN 65084** 第 1 至第 4 章，并提供热处理报告。】

3.2.3 Microstructures 微观结构

3.2.3.1 Microcircuits

The structure of sheet metal and strips can be agreed between the manufacturer and the customer. Plates of α + β / -alloys must have a globular lamellar structure.金属钢板和钢带的微观结构可以在制造商和买方商定。α+β 片/合金必须有一个球状片层组织。

Microgear alignment series as laid down in ETTC4 can be used as the basis for the plates.

显微图中 ETTC4 定义，可以作为通过对所述板结构的基础。

3.2.3.2 Grain size 粒度

The grain size can be agreed between the manufacturer and the ordering party on the basis of the ASTM-E-112 standard.

晶粒尺寸可以 **ASTM-E-112** 的制造商和购买者之间的基础上达成一致。

3.2.3.3 Superficial structure 近表面微观

The surface-to-surface structure of sheets and strips must not contain any alphastabilized zones.金属板和磁带的近表面微观结构必须有没有 Alpha 稳定区。

【Dai-si-wei：产品表面应无富氧层。】

Plates must be free of brittle diffusion zones stabilized by oxygen, insofar as they adversely affect machinability. A maximum surface hardness value can be agreed between the manufacturer and the customer.

板必须是从脆性自由，由氧气扩散区稳定化，只要它们影响可加工不利。最大表面硬度值可以在制造商和买方商定。

【Dai-si-wei 翻译：表面硬化及吸氧钝化等影响后续加工的因素是不可接受的，必要情况下，购需双方协商确定表面硬度值。】

3.2.4 Dimensions and permissible dimensional deviations 尺寸及允许偏差

The nominal dimensions and permissible dimensional deviations shall be

Meet the requirements of LN 9297. 标称尺寸及允许偏差必须符合 **LN9297** 的要求。

3.2.5 Properties of the edges 自然边缘的

The edges must neither have any cracks, nor can ridges protrude beyond the sheet plane. In the case of panels, the edges must be mechanically cut or machined unless otherwise agreed.

边缘必须包含无裂纹，不得毛刺温习片平面突出。对于板块的边缘应机械切割或机加工，除非另有约定。

3.2.5.1 Perpendicularity and straightness Of the edges 垂直度和直线度边缘

Rectangularness and straightness of the edges must meet the requirements of LN 9297.

边缘的垂直度和直线度必须达到 **LN9297** 的要求。

3.2.6 Flatness of plates, plates and strips 平整度的片材，板材和带材、片

The flatness of the plates, plates,Requirements of LN 9297.

板材和带材平整度有 **LN 9297** 的要求。

3.2.7 Surface texture 完成

The semi-finished product must have a metallically pure, descaled surface corresponding to its type of production. Slight surface defects such as, for example, scars, roller impressions and flat roll runners as well as grinding points are permissible, provided the given dimensional deviations are maintained and the use is not impaired.

所述半成品需要具有相应的纯金属的生产，除鳞表面。轻微的表面缺陷，例如，由于疤痕，滚动的展示和平板轧槽和研磨体被允许，只要在规定的尺寸公差得到遵守和使用不受损害。

3.2.7.1 Surface finish for sheets and strips 完成了薄钢板和钢带

Plates and strips are to be supplied in the execution type "h", "c2" or "o" according to DIN 17 440. This is agreed in the order.

板条是在“H”，“C2”或提供“O”符合 **DIN17440** 的要求。

3.2.7.2 Surface texture for panels 光洁度板

3.2.7.2.1 Delivery state de-chlorinated and pickled 交货状态

Plates are to be delivered in the version "c1" and "c2" according to DIN 17 440.

板是在“C1”可用，并提供“C2”根据 **DIN17440** 的要求。

The entire surface must be ultrasonically testable in accordance with section 4.2.8. Local surface defects are permitted：
整个表面必须 ultraschallprüfbar 按照第 4.2.8。当地表面缺陷，可以允许：
【Dai-si-wei：按照第 4.2.8 的要求进行 100%的超声波检查，以下表面缺陷是允许的：】
- up to a depth of 0.7 mm, in this case grinding out is not necessary
- 要为 0.7 毫米的深度，这不是一个必要的碾出
- Grinding is necessary within a depth of 1.0 mm below the minimum thickness.
- 在为 1.0mm 的最小标称厚度低于挖空的深度是必需的。

Surface defects must be flattened according to Table 1.
表面缺陷应根据下面的表 1 被研磨平坦。

Table 1. Abrasion of errors 表 1.缺陷修磨

Error depth 缺陷深度 mm	Grinding on a length Of at least 打磨出一段长度中的至少 mm
0.5	60
1.0	120
1.5	180
2.0	250

3.2.7.2.2 Delivery condition pre-machined on both sides 交货状态
Surface defects are no longer permissible in the case of machined panels. The center roughness value Ra may not exceed 6 µm.
当加工板表面缺陷不再允许。平均粗糙度 Ra 不超过 6 微米。
3.2.8 Internal error 内部缺陷检测
The semi-finished product must be free of material separations. The test class of the ultrasonic test according to MIL-I-8950 B (2) must be at least class A, unless otherwise agreed.

所述半成品必须无材料分离的。在根据 **MIL-L-8950 B（2）超声波探伤测试类必须至少为 A 级**相对应，除非另有约定。
3.2.9 Identification 识别
All semifinished products should be clearly marked with a rolling pin in the rolling direction. The color must be neutral to the material, good adhesion, non-blurring and should be sufficiently resistant to normal storage conditions. The color must not have a negative influence on the material during heat treatment.
所有半成品将被清楚地标示清晰与模具辊轧制方向。颜色有一个中立的方式材质，附着力好，不会有足够的抗 verwischbar 和正常储存条件。的颜色可以在热处理对材料没有负面影响。
The marking shall include: 标签必须包括：
A) Material code 材料标识
(B) Manufacturer's mark 制造商的标志

C) Melt number 热号
(D) Lot number 批号
(E) Semi-finished products 半成品厚度
Specimen sections must be marked in such a way that they can be assigned to the respective plate. Further markings are to be agreed between the manufacturer and the customer.
样品部分是以指示它们可以被分配给每个板。进一步的标志是供需双方商定。
3.2.10 Packaging and storage 包装及贮运
The manufacturer shall take all necessary measures to ensure that the semifinished product can not be damaged during storage and transport with proper handling. In addition, it must be adequately protected against edge damage on the front sides. Plates and strips must be protected from each other by intermediate layers of dry, clean and neutral material.
制造商必须采取一切必要措施的会议，使储存和运输过程中半成品如果管理得当不会被破坏。此外，它必须被保护，以防止到前侧登记到达边缘损坏。板条互相通过干燥，清洁，中性物质的中间层来保护。
The packaging must comply with the transport regulations of the modes of transport. The manufacturer is responsible for this.
包装必须满足运输的运输要求。为此，制造商负责。
3.2.11 Additional requirements 附加要求
Additional requirements agreed between the customer and the manufacturer shall be specified in the order.
更多的客户和制造商要求之间同意在采购订单中指定。
【Dai-si-wei：订购方有其它特殊要求时，应经双方协商并在合同中注明。】

4 Quality inspection 质量检验

The authorities responsible for the quality inspection shall be allowed to inspect the documents that are used for the preparation of the acceptance test certificate.
负责为客户或客户的质量控制的机构是用于创建允许的检验证书文件的审查。
The commissioner of this quality inspection body is entitled to participate in the required examinations.
质量测试的代理有权参与所需的测试。
4.1 Qualification examination 资格考试
The nature and extent of the qualification test shall be agreed between the manufacturer and the customer.
资格考试的性质和程度应制造商和买方商定。。
4.2 Acceptance test 验收测试
The tests listed below are to be carried out by the manufacturer, separated by lots. Unless otherwise stated, the test scope of Table A.1 can be found in Annex A, page 5. In the case of panels, the purchaser can also undertake a piece inspection if necessary.
下面列出所有的测试是由制造商进行，单独的批次。除非另有规定，试验是在附录 A 广泛表 1 取侧。5 在板块方面，购买者，如果需要的话，例行试验达成一致。。
4.2.1 Chemical composition 化学成分

For each melt, the elements specified in the Material Data Sheet are quantified according to a recognized method.
对于每一个给定的熔体通过批准的方法的材料数据表元素进行量化。
The hydrogen content shall be determined in the delivery condition of the semi-finished product for each heat treatment batch.
氢含量是在每个热处理批次的半成品的交接状态被确定。
4.2.2 Mechanical-technological tests 机械测试
4.2.2.1 Testing machines 测试
The material testing machines must comply with DIN 51 220, Class 1. They are to be approved according to DIN 51 300.

材料试验机 **DIN 512201** 级，分别为。他们应该 **DIN 51300** 批准

4.2.2.2 Sampling 取样
The samples are taken from the semi-finished product as delivered. If semi-finished products are supplied which are heat-treated by the manufacturer, the technological properties must be verified by the manufacturer on heat-treated samples.
样品是半成品作为供给耳鼻喉科接受。如果半成品输送，这是由制造商进行热处理，所以准备进行热处理的样品的生产商的技术性能证明。
Unless otherwise agreed, the sampling shall be carried out in accordance with DIN 9430 part 1 and part 3 (at present draft).

采样，除非另有约定，进行 **DIN B9430** 第 1 部分和第 3 部分（z.Z.草案）实施。

For plates in condition .7, the samples should be taken from the center of the plate thickness.并在状态 0.7 板从板厚度中部的样品是要采取。
If a plurality of plates are removed from a mother plate and heat treated under the same conditions, sampling at one end of each mother plate has been carried out at a mother plate length of more than 2,000 to 7,000 mm and sampling at both ends for lengths of more than 7000 mm At both ends and in the middle.
如果从母板上采取若干板和相同的条件下进行热处理，然后在母板长度高达 2000 毫米，采样的事件在长度超过 2000 的每个母板的一个端部至 7000 毫米，在两端，并在长度大于 7000 毫米采样，采样要发生在两端和在中间。
The specimen sections intended for the customer must be permanently marked and delivered simultaneously with the plates.
信函给买方化验的时间间隔是一致的标签和提供相同的板。
4.2.2.3 Tensile test 拉伸试验
The tensile test according to DIN 50 114 or DIN 50 145 is carried out on each semifinished product.每个半成品的拉伸试验根据 DIN 50114 或者 DIN 50145 要求进行
The strain rate up to the 0.2% strain limit shall be between 0.3 and 0.7% / minute, in cases of 0.5% / minute. After exceeding the 0.2% yield strength, the expansion speed at room temperature must be increased to at least 10% / minute, while the strain rate can be increased to a maximum of 5% / minute during the hot tensile test.
应变速率高达 0.2％耐力在仲裁例 0.3 和 0.7/分钟之间％，0.5％/分钟量。0.2％超出后 - 证明应力应变率是在室温下为至少 10％/分钟要增加，而应变速率可增加到在热拉伸试验中的最大的 5％/分钟。

In the determination of the 0.2% stress limit, diagram values 1: 1 are not permissible. In addition to the fine strain gauge, it is also possible to use measuring devices which apply the strain curve self-writing at least 200 times.
在确定的 0.2％屈服强度值图 1 是：1 不允许的。除了细应变计也可以与测量，即使在写入至少 200X 放大率应用于该菌株轨迹的设备中进行。
Scope of testing:范围：
Single rolled plates: 个别冷轧板：
According to Table A.1, Annex A, page 5 根据表 A.1，附件 A，第 5 页
Tapes and sheets from strip rolling 轧制卷带
At least one tensile specimen from the L and LT directions from the beginning and end of the strip 从卷带的开始和结束的 L-和 LT 方向上的至少一个检体
Plates: 板块：
The minimum values of each tensile plate in the L- and LT-direction on at least one tensile specimen per specimen section.
以每部分样品的至少一个试件的 L 和 LT 方向上的每个螺母板的检测到的最小值。
At a thickness of more than 40 mm per specimen section, to carry out the appropriate test. In the case of the sample section from the center of the plate (for nut plate lengths over 7000 mm), the test is omitted in the L direction.
执行测试，其中面板厚度为每个样品部分约 40mm。在示例部分从板的中心（与螺母板长度超过 7000 毫米），L 方向考试被淘汰。
4.2.2.4 Technological bending test 技术弯曲试验
The technological bending test shall be carried out in accordance with DIN 50111.

技术弯曲试验按 **DIN50111** 进行。

Scope of testing: 检查范围包括：
Single rolled plates: 个别冷轧板：
根据表 A.1，附件 A，第 5 页
Tapes and sheets from strip rolling: 轧制卷带：
At the beginning and end of the coil. 在卷带首位。
4.2.3 Structure 微观结构
4.2.3.1 Microstructures 显微
A micro-cut in the L-ST plane is to be investigated from the plate core and the plate surface.
从板芯，并在板面中的 L- ST 平面显微切片进行了研究。
Scope of testing: 范围：
1 per lot 每批次
4.2.3.2 Grain size 粒度
If agreed, the grain size should be determined according to ASTM-E-112.

如果同意，根据 **ASTM E-112** 的晶粒尺寸应确定。

Scope of testing: 检查范围包括：
1 sample per lot 每批样品 1
4.2.4 Dimensions and permissible dimensional deviations 尺寸及允许偏差
The nominal dimensions and permissible dimensional deviations are to be checked with

the measuring instruments adapted to the tolerances for compliance with the requirements set out in section 3.2.4.
标称尺寸及允许偏差必须与适应公差测量设备应符合第 3.2.4 节要求所规定的条件进行审查。
Scope of testing: 检查范围包括：
Is at the discretion of the manufacturer 在制造商决定
4.2.5 Texture of the edges 边缘的性质
Each semifinished product shall be subjected to a visual inspection to ensure compliance with the requirements set out in section 3.2.5.
每个半成品的目视检查符合第 3.2.5 平局底面规定的要求。
4.2.5.1 Squareness and straightness of the edges 垂直度和边缘的直线性
The squareness and straightness of the edges are tested according to LN 9297. 边缘的垂直度和直线度执行 LN9297 要求
4.2.6 Flatness of plates, plates and strips 平整度的片材，板材和带材
The flatness is checked according to LN 9297. 平整度执行 LN9297 要求
With coiled strips, the flatness is measured at one end of each coil in the transverse direction.
在卷绕带平坦度在在横向方向上的每个线圈的一端测量。
Scope of testing: 检查范围包括：
For plates and single rolled sheets: 对于板块和个别冷轧板：
100%
For strips and plates from strip rolling:卷带
According to Table A.1, Annex A, page 5 根据表 A.1，附件 A，第 5 页
4.2.7 Surface texture 完成
4.2.7.1 Visual inspection 目视检查
Each semi-finished product shall be subjected to a visual inspection to ensure compliance with the requirements set out in section 3.2.7.
每一个中间产品是经过目视检查是否符合在第 3.2.7 节要求所规定的条件。
4.2.7.2 Crack detection 裂纹检查
The plates must be tested for cracks in the pickled state using a suitable method.
该小组是在腌制条件检查裂缝合适的方法。
Scope of testing: 检查范围包括：
100％
A penetration cracking test can be agreed.渗透剂裂纹检测可以同意
4.2.8 Check for internal errors 内部缺陷检查
The test for duplications and material separations shall be carried out on each plate ≥12 mm thickness using ultrasound according to MIL-I-8950 B (2).
对于重复和材料分离的检查是在每个板的厚度≥12 毫米进行超声 **MIL-L-8950 B（2）**。
4.2.9 Identification 识别
Proper performance of the marking prescribed in section 3.2.9 shall be tested by means of

a random test.
在第 3.2.9 节标识规定要求的正确实施，必须随机进行检查。
4.2.10 Repeat check 重复检查
If the requirements are not met during tests, these tests can be carried out once more with twice the scope of the test. If the requirements are not met again, the lot must be rejected.
如果，当没有满足要求，这些测试可以再次与检测的两倍的程度进行。如果需求没有再次满足，很多被拒绝。
A supply of individual lots of the batch in question is admissible if the latter is checked for the object complained of and the requirements are met.
如果在有争议的财产那些检查了大量的各个部件的交付是允许的，满足要求。

5 Complaints 投诉

If it is established that the technical requirements of the customer are not met, the manufacturer of the semifinished product is entitled to verify the defects. The delivery data must be entered. The documents and the complained delivery must be kept until the parties concerned have agreed on how the complaint should be carried out.
如果确定该顾客的技术要求并不满足，半成品的制造商有权说服缺陷本人。他是交付数据显示。证据和指控的交付件已经这么长时间一直保持，直到有关各方已同意的投诉是如何做。
In the case of divergent opinions, the opinion of a state material testing institute, which is subject to the manufacturer and the customer, is to be consulted. The manufacturer of the semifinished product shall be free to allow his experts to participate in this investigation. The customer also has the right to participate.
不同意见的情况下，国家材料测试的意见，应使用，其中制造商和采购方提交。半成品的制造商是无害让其专家参与本次调查。还参与购买的权利。
The manufacturer has to ensure that discarded semifinished products are not presented or delivered again without reworking.
制造商必须确保没有补救扭曲半成品未重新提出或交付。

Annex A 附录 A

Table A.1 Scope of test for the acceptance test 验收测试表 A.1 范围

Lot size 批量 N	number of pieces n
2 to 50	N and 5 respectively (N 或 5)
Over 50 to 90	8
Over 90 to 150	13
Over 1 50 to 280	20
Above 280 to 500	32
Above 500 to 1200	50
Above 1200	80

Cited standards and other documents

引用标准和其他文件

DIN 9430 part1 (z. Z. draft) Luft- und Raumfahrt; Probenahme bei Halbzeug aus Leichtmetallen,AluminiumKnetlegierungen, Titan und Titanlegierungen, Allgemeines（žZ.草案）航空航天;的半成品由轻质铝合金制成，铝合金，钛及钛合金，一般采样

DIN 9430 part3 (z. Z. draft) Aerospace; Sampling of semi-finished products made of light metals, titanium and titanium alloys（žZ.草案）航空航天;半成品轻合金，钛及钛合金取样

DIN 17 440 Stainless steels; Quality standards 不锈钢;质量标准

DIN 50 049 Certificates of material testing 材料测试证书

DIN 50 111 Testing of metallic materials; Technological bending test (folding test) 金属材料试验;技术弯曲试验（折叠试验）

DIN 50 114 Testing of metallic materials; Tensile test without strain measurement on sheets, strips 金属材料试验;拉伸试验，无片材，条带上的应变测量 Or strips with a thickness of less than 3 mm 或厚度小于 3mm 的条带

DIN 50 145 Testing of metallic materials; Tensile test DIN 51 220 Material testing machines; general guidelines 金属材料试验;拉伸试验 DIN 51 220 材料试验机;一般准则

DIN 51 300 Testing of materials testing machines; General information 材料试验机试验; 一般信息

DIN 65 436 (currently draft) Aerospace; Standard (STQ) and Disc (DQ) quality of titanium and Titanium alloys; Requirements and tests（目前草案）航空航天;标准（STQ）和圆盘（DQ）质量的钛和钛合金;要求和测试

Material Handbook of German Aviation, Part I, Metallic Materials, 2nd Volume, Light Metals 德国航空材料手册，第一部分，金属材料，第二卷，轻金属

LN 9297 Titanium and titanium alloy plates, unalloyed or alloyed, dimensions and weights 钛合金和钛合金板，非合金或合金，尺寸和重量

LN 65 084 Part 1 Heat treatment of titanium and titanium alloys, General 第 1 部分钛和钛合金的热处理

LN 65 084 Part 2 Heat treatment of titanium and titanium alloys; glow 第 2 部分钛和钛合金的热处理;辉光

LN 65 084 Part 3 Heat treatment of titanium and titanium alloys; Low stress glow 第 3 部分钛和钛合金的热处理;低应力发光

LN 65 084 Part 4 Heat treatment of titanium and titanium alloys; Harden 部分钛和钛合金的热处理;硬化

MIL-1-8950 B (2) 1) Inspection ultrasonic, wrought metals, process for 检查超声波，锻造金属，工艺(Ultrasonic testing on kneading materials) （捏合材料的超声波试验）

ASTM-E-1 12 1) Standard methods for estimating the average grain size of metals 估算金属平均粒径的标准方法(Standard method for determining the average grain size of metallic materials) （确定金属材料的平均粒径的标准方法）

ETTC 4 2) (z. Z. draft) Microgear alignment series for plates made of α+β-titanium

alloys 目前可用）用于由 α+β 钛合金制成的板的微型对准系列

Other standards 其他标准

DIN 50 125 Testing of metallic materials; Tensile test specimens, production guidelines
金属材料试验;拉伸试样，生产指南

Earlier issues 早期问题

LN 65 039: 02.74

Changes 变化

The following changes have been made to LN 65 039 / 02.74: 对 LN 65 039 / 02.74 进行了以下更改：

A) Technical and editorial revised completely and translated into DIN standard. 技术和编辑完全修改并翻译成 DIN 标准。

B) Order number changed 订单号已更改

International patent classification 国际专利分类

B 21
B64

1) To be obtained by: 编著：
International standardization of the DIN German Institute for Standardization e. V., Burggrafenstraße 4-10, 1000 Berlin 30 DIN 德国标准化研究所的国际标准化。 V.，Burggrafenstraße4-10,1000 Berlin 30

2) To be referred to by: 引用：
Technical Committee European Titanium producer; European TItanium Technical Committee 技术委员会欧洲钛生产商; 欧洲 TItanium 技术委员会

For sources of information: 信息来源：
(NL) in the DIN German Institute for Standardization, Kamekestraße 8, 5000 Cologne 1.
（NL）在 DIN 德国标准化研究所， Kamekestraße 8, 5000 Cologne 1.