HOMOLOGATION DIRECTIVE MBT – 04

MECHANICAL SECURITY SYSTEMS FOR TWO-WHEELED VEHICLES

- Administrative regulations
- Requirements and test methods

Issued by:

Stichting ART
(Theft Prevention Two-wheeled Vehicles)

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Contents

Foreword

This MBT-04 **2026 version** is the revised MBT-04 2025 document including all the latest additions, new or revised requirements and corrections from the MBT-04 2019.

The Stichting ART has the aim to increase the level of anti-theft prevention of two-wheeled vehicles (bicycles, mopeds, scooters and motor cycles). Anti-theft prevention of two-wheeled vehicles can be promoted by influencing social behaviour, registration and tracing, guarded shelters and anti-theft provisions. The following organisations are represented in the Stichting ART:

- ANWB (Royal Dutch Tourist Board)
- RAI Vereniging (Dutch industry)
- BOVAG, division TWB (interest group for mobility, division for bicycle companies)
- Dutch theft insurance companies

The activities of ART are focussed on (mechanical) anti-theft provisions. ART promotes the safety provisions against theft by:

- arranging requirements for mechanical security systems for two-wheeled vehicles
- testing (by third parties) of systems for which an application for homologation was submitted
- certification of approved products
- promoting the use of approved mechanical security systems

For technical details of requirements and test methods, a Technical Committee (TC) will advise the Stichting ART. In this committee the following organisations are represented:

- ANWB (Royal Dutch Tourist Board)
- Insurance companies
- Police departments
- Testing Institute and Certification Institute
- Industry

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1 Scope

This homologation directive is applicable to mechanical anti-theft systems for bicycles, mopeds, scooters and motor cycles. In this, various mechanical security systems can be distinguished:

I: products which are mounted permanently to the frame of the two-wheeled vehicle, such as:
- ring locks
- shut pin locks
- some chain, cable, other
- steering locks
- crank locks
- pedal locks

II: products which are not mounted permanently to the frame of the two-wheeled vehicle, such as:
- u-shackle locks
- chain locks
- cable locks
- folding locks
- brake disc locks
- combinations of products with other locks or systems, such as:
  - chains, cables with u-shackle locks
  - chains, cables with padlocks
  - chains, cables with brake disc locks

III: products, which are mounted permanently to the floor or wall, offering a possibility to anchor the two wheeled vehicle to “the fixed world”.
- Anchorage elements

ART Categories:
All products are divided into five categories.
The ART category is also known as “ART Star level” (ART1, ART2, ART3, ART4 or ART5).
A lock from category **1**-is meant to use at a low risk of theft or to be used as an extra (2nd) lock to attach (tether) an already locked bicycle (e.g.: an expensive e-bike or a cargo-bike) to the fixed world.
A lock from category **5** has passed the heaviest tests from this directive and is meant to use at high risk of theft motorcycles (due to its heavy weight mainly for use at home or at storage/parking facilities).
(in practise, theft insurance companies will demand a lock of a certain category, as a condition for getting the vehicle insured).
Remarks:
- Anchorage elements (a wall, floor or ground anchor) can only be approved according to category 2 (ART2) and category 4 (ART4).
- Alternative locks can only be approved according to category 2.

Anchorage elements (a wall anchor, a floor anchor, a wall- and floor anchor or a ground anchor) can be certified without a lock or lock mechanism (e.g.: a loop-eye attachment only).
These should be used in combination with an ART approved lock.

Applications for the homologation of products, which are not mentioned in this homologation directive, can only be honoured after additional, specific requirements are drawn up.
The Board of ART will request the Technical Committee for advice in such cases.

1.1 Normative references

The following (draft-) standards or regulating documents or laid down documents in the form of general known requirements and test methods, contain regulations which are also regulations of this homologation directive, for the reason there have been references made to them in this document.

On the moment of publication of this homologation directive, the given versions were valid. Since all standards can be revised, parties using this homologation directive, are advised to explore the possibilities to apply the most recent versions of the following standards.

- TMS-05 / 1-6-2026 (2026):
  Document on test methods for locks (for mobile objects).

- ISO 9227 (second edition July 2006):
  Corrosion test in artificial atmospheres-Salt spray test.

- EN 12320 (January 2012):
  Building hardware: Padlocks and padlock fittings, requirements and test methods.

- EN 1670 (2007):
  Building hardware - Corrosion resistance, requirements and test methods.

- European Standard EN 15496 (January 2008):
  Cycles – Requirements and test methods for cycle locks

1.2 Definitions

1.2.1 General definitions

Lock: an anti-theft provision for two-wheeled vehicles which prevents to ride or push the two wheeled vehicle and offers the possibility to prevent free movement of the wheel(s).

A second lock (2nd lock): An extra lock (often a "not permanently mounted lock") which enable a user to firmly tethering his already locked vehicle to an object which is connected with the fixed world. *(often required by Dutch theft insurance companies to insure more expensive vehicles against theft)*

Permanently mounted lock: a lock mounted (by the manufacturer or after-market) "inseparable" on the frame of the two-wheeled vehicle, which can be considered as part of that vehicle.

Not permanently mounted lock: a lock which is no part of the vehicle or which is detachable of the vehicle without the use of any tools other than a key or code. A feature of not permanently mounted locks mostly is that they enable the user to connect his vehicle to another vehicle or to an object which is connected with "the fixed world" (anchorage element, tree, fence, lamppost, etc.).

Two-wheeled vehicle: bicycle, bicycle with additional propulsion, moped, motorcycle and other related vehicles.

Anchorage element: object, mounted to the "fixed world", offering a possibility to lock a vehicle to this "fixed world".

Alternative lock: a permanently mounted ART2 lock that does not prohibit enclosure of a section (or prevent rotation) of the wheel. The lock will prohibit any important function of a bicycle (traction (propulsion, cranking, pedalling, etc.) and/or steering) and prevent to ride or push the bicycle in a normal and safe way.

Bicycle Security System (BSS): a anti-theft system for a bicycle, which contains at least one (1) ART lock and one or more additional security features.

1.2.2 Technical definitions

Mechanical key: A coded (metal) key blank (or bit) that only fits into the keyway to which it belongs.

Smart key (code) locks: A lock using a non mechanical key such as an electronic keypad, an electronic code, biometric scanner, or wireless protocols like Bluetooth or Wi-Fi.

Power-key: A tool for breaking locks with brute force through the keyhole (often used by criminals).

ART Power-key: A simulated Power-key made from a spring steel Hex key L wrench (type PB 211.12) with a modified end part on the long side of the tool simulate the key blade part of a frame lock key.

Electronic unlocking device (e-key): A physical object containing or transmitting a digital or electronical code to authorize the operation of a lock.
Examples: touch key, remote, key-card, RFID card, security token, mobile phone, key-pad, etc.

Unlocking device by connected services: All unlocking methods which operate through applications on smart phones.

Key mechanism: that part of the lock recognising the key.

Blocking elements: metal parts in the form of pins, plates, wheels or other inside the (key) mechanism which realising the actual blocking situation.

Blocking mechanism: that part of the lock, which is putting the lock mechanism in motion.

Lock housing: part of the lock containing the key or code mechanism and blocking mechanism.

Theoretical key diversity: The arithmetically determined number of coding possibilities per key.
(calculated the following way: The key locking mechanism features a number of active blocking elements <“**b**”>, per blocking element a number of different cuts <“**a**”> might be used, this results in <$\mathbf{a}^{\mathbf{b}}$> possible keys (theoretical)).

Practical key diversity: The really applied number of coding possibilities per key
(equal to the theoretical key diversity after deduction of all the differs deleted by the manufacturer (e.g. due to technical constraints) and deleted by requirements in this directive (e.g. 4.1.12 till 4.1.15).

1.2.3 Definitions of the different types of locks

U-shackle lock: lock housing with (partially or totally) detachable U-shaped shackle.

Cable lock: a cable mainly made of wires, with one end fixated to the lock housing or consists of a cable and a separated (e.g.: padlock/U-shackle) lock.

Chain lock: a chain with a permanent fixed lock housing or combined with a padlock, U-shackle lock or other closing mechanism (sets).

Brake disc lock: a lock housing suitable to enclose a part of the brake disc; one of the (ventilation) holes in the brake disc is used by the blocking mechanism. ART certified brake disc locks can be ART3 or ART4 only (not to be used on bicycles).

Ring lock: a frame lock with a circular shackle, enclosing the cross section of the wheel rim totally when closed.

Shut pin lock: a frame lock using a part of the frame of the vehicle, shut pin and part of the frame together enclosing the cross section of the wheel rim.

Folding lock or pivoting lock: a number of bars, connected to each other by pivoting points, on one end fixated to the lock housing.

Anchorage elements: A wall, floor or ground anchor provided with an eye, a (pivoting) ring (or similar) or a locking system, which can be used to tether a vehicle (e.g.: by a chain or directly on a bike frame), assuming that the anchorage element itself is permanently connected to the "fixed world" (wall, floor, ground).

Steering lock: a key and blocking mechanism which is integrated in de steering-column or mounted on the frame enabling the user to fixate the steering wheel in one position. For this regulation this lock is considered to be an alternative lock.

Crank lock: a key and blocking mechanism which is integrated in the frame enabling the user to block the crank axle in one position. For this regulation this lock is considered to be an alternative lock.

Pedal lock: a key and blocking mechanism enabling the user to free-wheel or block the crank pedals in a clearly divergent position. For this regulation this lock is considered to be an alternative lock.

Hub lock: a key and blocking mechanism that blocks the wheel from turning. The wheel(s) also cannot be removed from the frame without a specific key or tool. According to these regulations, this lock is considered an alternative lock.

Frame lock: a lock where the (main) body with the blocking mechanism is permanently mounted to the two-wheeled vehicle.

Locks with an additional-2-wheeler security tether function: A frame lock with an (integrated) locking mechanism for (e.g.) a plug-in (chain/cable/other). The (optional) additional ART approved 2-wheeler security tether is an essential part of a specific frame lock variant (plug-in lock family).

2-wheeler security tether: An additional chain, cable or other part with an integrated frame lock connection point which enable a user to fasten his vehicle to an object which is connected with the fixed world.

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Electronically operated lock (a mechatronic or “e-lock”): A lock with an electronically operated (un)lock system (e.g. the main part to secure the two wheeled vehicle needed to be closed manually (by hand)).

Fully electronically operated lock (a mechatronic or “e-lock”): An electronically operated lock with an (e.g.) motorized closing system for the main part which prevents to ride or push the two wheeled vehicle.
(e.g.: a ring lock with a self-closing C-shackle or a crank- or hub lock with a self-closing blocking pin).

Mechanical dial lock (Combination lock) or Pin code lock: A lock that can be operated manually without a key and unlocked by moving parts of the lock in a certain pattern (e.g. when rotation discs are lined up correctly or a keypad combination).

1.2.4 Administrative definitions

Applicant: The manufacturer or a representative authorised in writing by the legal owner of the product and design for applying for a homologation.

Approval holder: An applicant or a representative who has rights and obligations arising from holding an ART approval and is the main contact with Stichting ART once the ART approval is granted.

Approval number: if a product has been tested with positive result, and all administrative regulations are fulfilled, an ART approval number will be granted.

Certified lock: an approved lock, which is certified by the Stichting ART.

Approved lock: a lock or a family of similar lock variants from which is determined after testing that it is in conformity with the requirements and an ART quality mark is granted.

Category: The ART Star rating to which a lock is tested/certified (ART1, ART2, ART3, ART4, ART5).

Type designation: a manufacturer's designation to a lock (for each variant and/or a type family).

Product- or Type-family: A series of locks that are technically equivalent, having the same or equivalent constructions, the same or equivalent materials and/or the same or equivalent dimensions.

Brand / Brand mark: a particular name, a visual image, a symbol or element used to identify a brand. Examples of marks include a company's logo, unique designed letters or a picture.

Homologation directive: all by Stichting ART drawn up requirements and regulations for the homologation of mechanical security systems for two-wheeled vehicles.

ART list: if a lock or lock system is approved after being submitted to the tests, it will be included to the list of approved products and it will remain on that list as long as the product is in conformity with the requirements and as long as all administrative regulations are fulfilled.

Type approval or type approval extension test: the procedure of the initial test (the first test and homologation procedure of a product).

Follow-up or Conformity of production (COP) test(s): one or more obligatory (annual) re-tests, depending on the number of ART certified products sold in the Netherlands, with a minimum and a maximum number of re-tests within 12 months.
During these COP tests a certain part of the total type approval tests is repeated, in order to be able to guarantee, in a remaining way, the quality which is imaged by the ART quality mark.

3 year validity extension: A re-approval project to keep an ART approval (certificate) valid every three (3) year time period after the first type approval. In general by means of a judgment and/or partially retested (in most cases only some extra attack tests shall be performed).

Key number: numerical- and/or letter designation related to the key bitting depth code of the key.

Lock number: unique numerical- and/or letter designation for each lock.

Packaging: the primary packaging of the product that includes the brand and the information about the product which a retailer uses to market or present goods in an appealing way (e.g.: a blister insert card, a carton box, a protective wrapping, a (carton) chain sleeve, an attached (display hanger) card or large label, etc).

2 Administrative requirements

2.1 ART quality mark

2.1.1 Applications for a Stichting ART quality mark

Applications for a Stichting ART quality mark are to be submitted to Stichting ART [the foundation for the prevention of the theft of two-wheeled vehicles, established to represent users, manufacturers and insurers of two wheeled vehicles].
Separate applications must be submitted for each product family (see par. 2.3.4 for details).
Each application must be accompanied by a recent test report on the product issued by a testing institute recognised by Stichting ART.

If the applicant is not the product manufacturer and/or legal owner, both the applicant and the manufacturer (or legal owner) must sign a statement. The manufacturer's signature authorises the applicant to act as the manufacturer's representative or authorise to use the approval information for a Privat Label application.
Stichting ART will process the applications in the strictest confidence.

2.1.2 Granting of a Stichting ART quality mark

Only the board of Stichting ART may take the decision to approve the granting of a Stichting ART quality mark with the related approval number and recording on the list of certified products. Stichting ART will inform the applicant in this regard.
On receipt of the issued quality mark the recipient is automatically obliged to comply with all the provisions set down in the homologation directive.
The Stichting ART quality mark may only be used for the product concerned from the time that Stichting ART notifies the applicant that the approved product has met all the obligations related to the quality mark.

2.1.3 Validity

Approval is valid:

- once Stichting ART has issued the certificate to the approval holder;
- as long as the test results of the follow-up inspection correspond to those of the original tests of the approved product;
- as long as the approval holder complies with all the requirements and provisions set down in the homologation directive;
- for the product or products delivered by the approval holder that are described in the certificate.

The term of validity of the approval (certificates) is three (3) years after the first type approval (or after the latest 3-year validity extension tests). To keep the related approval number valid the product must be re-approved again (judged and/or partially retested). In general, only some extra attack tests shall be performed. If Stichting ART issues a new MBT homologation directive (e.g. MBT-05) within this three-year period, the validity of the approval terminates 12 months from the date on which the new homologation directive goes into effect.

If the approval terminates, the lock will be removed from the list of certified locks. This means that approval is also cancelled for the locks that are at that moment in the distribution chain. The manufacturer / approval holder is responsible for exercising due care in its production planning and the information it provides to its distributors, to prevent large stocks of locks remaining in circulation while the chance is great that these locks will no longer be accepted by insurers.
(to be continued, see next page)

If the approval holder fails to comply with the provisions set down in the homologation directive, Stichting ART is entitled to withdraw the approval or have it withdrawn with immediate effect and to remove the product concerned from the list of certified products.

If the approval holder indicates that the product is no longer being made or if the approval holder no longer desires to use the quality mark and to have the product recorded on the list of certified products, the approval will be withdrawn and the product will be removed from the list. If for any reason whatsoever the quality mark for a product is terminated prematurely, the approval holder is to cease using – in the broadest sense of the word – the quality mark without delay. If requested, the approval holder is to return to Stichting ART by registered mail the certificate that was issued.

2.1.4 Withdrawal of the Stichting ART quality mark

If the approval holder fails to comply with the provisions set down in the homologation directive, Stichting ART may withdraw the approval with immediate effect or can decide to remove the product temporary from the list.
This withdrawal will than apply to all products that have the same approval number. A withdrawal means that all rights of the approval holder are cancelled with immediate effect.

2.1.5 Sanctions

The board of Stichting ART may take one or more of the following measures in respect of the approval holder or impose one or more of the following sanctions.

1. issue the instruction to quickly remedy a defect in the product;
2. issue a written reprimand;
3. impose a fine that is equal in amount to the most recent annual fee (base amount + variable fee);
4. suspend the certification so that from the time of the suspension the approval holder may no longer bring any certified products onto the market;
5. withdraw the certification so that from the time of the withdrawal the approval holder may no longer bring any certified products onto the market. The approval holder is obliged to cease using the quality mark and the name of Stichting ART. Stichting ART will immediately cancel the listing of the product concerned on the list of certified locks;
6. make public any abuses uncovered using all channels available to this end;
7. recall products or have them removed from the market;
8. rectify notifications regarding the certification of the product;
9. a measure/sanction to be decided later that is line with the objectives of Stichting ART and the interests of the users of the product.

Any of the sanction options mentioned above may be used if the approval holder fails to fulfil its obligations in one or more ways.
The above does not prejudice the statutory rights of Stichting ART pursuant to Dutch civil law.

2.1.6 Certificate

If a product meets the Stichting ART homologation directive and this is set down in a report from one of the testing institutes recognised by Stichting ART, a certificate can be awarded.

The following details, among others, will be included in the certificate:

- an approval number;
- the ART category for which the product is approved;
- the brand and type* of the approved product;
- the name of the manufacturer of the product;
- the name of the approval holder;
- the name and version of the Stichting ART homologation directive which the product meets;
- the name of the testing institute that determined that the product fulfils the type approval requirements;
- the report number of the testing institute report;
- the term of validity of the certificate.

**) Because of added evidence for two-wheeler theft insurers (whether or not it was closed in case of a claim) ART approved (permanently mounted) frame locks can have an additional* "[+]"© *or* "[E+]"© *classification add to their lock's type name by the certificating parties (this can be mentioned on the ART Certificate and on the ART list of approved products).*
For details regarding e-locks ("[E]"© *or* "[E+]"©*) see par. 4.3.10.9.*

If modifications are made to the brand/type, name of the manufacturer and/or name of the approval holder, a replacement certificate must be requested.
If the manufacture or distribution of the product is taken over by another party as a result of a merger or take-over before the period of approval validity has lapsed, a replacement certificate also must be requested.
Replacement certificates are issued with due observance of the other provisions set down in the Stichting ART homologation directive.

The applicant will bear the costs of drawing up additional certificates. For details see 2.6.3

2.1.7 Publication

If products meet the requirements and provisions of the homologation directive, Stichting ART will include them on the list of certified products. This list can be viewed on the internet at: www.stichtingart.nl.
The list is also available from the Stichting ART secretariat.

2.1.8 Amendments to the homologation directive

The board of Stichting ART may amend the homologation directive at any time and without prior notice.

2.2 Testing institutes

The testing institutes that carry out product tests are approved by Stichting ART and must meet at least the following requirements:

- general quality assurance requirements such as EN-ISO 9001/2015 or the equivalent;
- specific quality assurance requirements such as ISO/IEC 17025 for test laboratories and/or ISO/IEC 17020 for inspection institutions, demonstrable by a valid certificate or the equivalent accompanied by a recent list of activities on which the testing of locks for two wheelers in accordance with the Stichting ART homologation directive (version number) is explicitly mentioned.

Before Stichting ART recognises a testing institute, Stichting ART may impose additional requirements on the testing institute in question without prior notification and/or publication, if Stichting ART it so deems.
If Stichting ART recognises several testing institutes, the obligation to carry out mutual consultation is imposed on these testing institutes in order to harmonise subjective test elements and the interpretation of test criteria as set down in the test procedure.

2.3 Product testing for the granting and retention of a Stichting ART quality mark

Product testing of products the applicant makes available to the testing institute is carried out by a testing institute recognised by Stichting ART.
The products offered must be representative of serial production. Stichting ART may check this at any time by comparing the products supplied with locks available on the market.

If a lock complies to the technical requirements of the European standard for Cycle Locks EN 15496 and tested by a recognised test institute then the test results could be used for ART acceptation of a 1-star bicycle lock. The lock, however, shall be re-judged on the design and administrative ART MBT-04 requirements by a testing institute recognised by Stichting ART.

Further information on the testing of products is available from the recognised testing institutes. The list of recognised testing institutes can be viewed on the website: www.stichtingart.nl.

2.3.1 Processing of test applications

New applications for testing are processed in accordance with the most recent, valid version of the homologation directive.

2.3.2 Obligation to provide information for a new application product test

The testing institute must be provided with the following information for a product test:

- A completed and signed order form of the testing institute (will be supplied on request);
- Technical documents of the system in the form of:
  - general arrangement drawings (an exploded view if so requested);
  - dimensional drawings;
  - detail drawings;
  - parts list (for “e-locks”: main components only, not for each electronic component);
  - material specifications including the hardness in HV (or HRC) of the essential parts;
  - access control plan (a practical key bitting depth code or code variety database file). Remark: the theoretical variety may be included in this file or by an extra statement.

The documentation referred to above must at least contain the following:

- name of manufacturer;
- brand(s) and type(s) designation of the product;
- unique drawing numbers/ parts numbers;
- date(s).

(to be continued, see next page)

The following must also be submitted:

- A statement regarding the safety of the product (general and legal requirements known);
- (drafts of) Commercial documents (for example, leaflets, packaging design, etc.);
- If applicable according to 4.4.1 directions for use and/or user instructions preferably in Dutch, otherwise at least in English (this may be a draft);
- A statement regarding the identification of the production (a batch date or product series date) of the system to facilitate tracing;
- A statement regarding (visual) identification of the keys or the equivalent thereof;
- A statement regarding the length of life of the mechanism of the system (the lock in question must still be functioning well after being opened and locked 5000 times);
- A drawing with the position on the system where the ART quality mark is to be placed;
- A statement regarding the way in which it is to be affixed, and, if this is to be carried out by the applicant, a draft design of the ART quality mark that will be used;
- At the most 12* complete products and in addition 1 unassembled product in loose parts.
  Remarks: These samples must be representative of serial production (i.e. not prototypes). The products are to be selected at random from the production series.
  **) The number of systems to be submitted is dependent on the type of product or and the chosen ART category and may vary if a product family of locks is to be tested.*
- For locks with mechanical keys: 3 blank (uncut) keys and 3 special cut keys (for lock pick test purpose). The testing facility can supply the bitting (depth) code details (example images) of these 3 special cut keys.
- For frame locks with mechanical keys: 2* special made ART Power-key test tools with the specific key profile of that frame lock (these are special tool-steel made test keys needed to perform a destructive unlocking test on the key barrel).
  *) if there is a mirror image key profile available as well then, a total of 4 (2x2) ART Power-key test tools shall be submitted.
  Specifications of this "ART Power-key test tool are mentioned in test-method document TMS-05.

At least the technical drawings and (mechanical key) access control plan (the practical key cutting code list database file) shall be submitted electronically.

Stichting ART retains at all times the right to request the information referred to above from the testing institute for its perusal. Needless to say, Stichting ART will treat this information with the strictest confidentiality.

2.3.3 Reporting (test report)

The testing institute shall write down the results of the product tests in a report.
The report will contain at least the following information:

- a unique test report number;
- the aim of the product test;
- a description of the samples submitted;
- an image of the lock (including the keys if applicable);
- the total number of unlocking devices (e.g.: keys) provided with each lock;
- the sampling procedure;
- information regarding the test application;
- the testing method;
- the results of the measurements (measurement values);
- the conclusion (meet or does not meet the requirements), with reference to the ART category for which the product was tested;
- any design types of the tested product that meet or fail to meet the requirements;
- if the measurement methods are deviated from, the nature of and reasons for the deviation.

(to be continued, see next page)

The report will be sent to the product test applicant.
In case of type approval applications for a new approval number, Stichting ART will only receive a copy of the product test report if the product meets the requirements.

2.3.4 Product-family testing

A product-family test is a test in which variants of a product are tested partially or in full or are considered to have been tested.
The aim of a product-family test is that the applicant for a test of a particular product does not have to have all the possible product variants fully tested because the testing institute makes a choice from all variants based on the worst-case method.
Locks that are eligible for a product-family test are marked by having the same or equivalent construction and being made of the same or equivalent materials as the standard sample.
In consultation with Stichting ART or not, the testing institute determines which worst-case samples are to be tested. It is also possible that the decision will be made to test one or more variants alongside the standard sample.
For the final conclusion (meet or does not meets), the test report states which variants are approved or rejected together with the standard sample. Furthermore, a statement is included that declares that the judgement and conclusion of the variants was based on testing, measurements and the studying of drawings or brochures or the like.

2.3.5 Private label

If an approval holder wishes to bring onto the market his already ART approved object with another (changed) brand name the procedures of paragraph 2.3.7 shall be followed.

If a party other than the original approval holder wishes to bring onto the (Dutch) market (for sale under a private label) an already approved mechanical security system carrying an approval number (with no link visible on the ART site to the current approval holder), the following procedure applies:

- a company that wishes to bring onto the (Dutch) market with a Stichting ART quality mark label a product that already carries a Stichting ART approval number in the name of an approval holder, can commission the testing institute that performed the type approval to carry out a (largely administrative) test. The rights and obligations of the applicant approval holder will be confirmed by means of a statement;
- the company must submit, among other things, the following to the testing institute:
  - an official statement (e.g. a direct sent email or an original signed letter) from the original approval holder stating that the testing institute may use the information in the original test report for its report;
  - one (or more) complete product sample(s).
- the testing institute will perform that section of the type approval that has to do with the permanent labelling and instructions for use;
- the company will be requested to submit all documents and the like (e.g. its own leaflet and user manual) given the fact that it is regarded as the manufacturer;
- the company will be advised of all additional obligations in advance, such as the obligation to undergo follow-up testing and affixing the quality marks;
- if the result is positive, the new approval holder will be issued a new approval number;
- the new approval holder is obliged to pay a fee to Stichting ART for the use of the ART quality mark in accordance with the provisions set down in article 2.6.

If the approval holder does not give its consent to the testing institute to use the information in previous reports for another approval holder, but the manufacturer has given its consent to bring the product onto the market under a private brand, the applicant is obliged to undergo the full type approval procedure.

2.3.6 Follow-up tests (COP tests)

Follow-up tests are performed in order to guarantee to buyers of an approved product that the products from later production runs are of the same quality as those offered under the type approval. During the follow-up testing (production control) an examination is made of whether the product is still in accordance with the systems for which the type approval was awarded and whether the products still meet the provisions of the homologation directive.

2.3.6.1 Production Figures

In order to set or judge the frequency and number of follow-up tests, each approval holder must, on its own volition (or when requested by E-mail), provide the Stichting ART by e-mail (or letter) every year the figures for the numbers of ART certified products produced for (at least) the Dutch market, per approval number, measured over the last twelve (12) months.

2.3.6.2 Frequency

For every 5000 pieces produced for the Dutch market with the same approval number the approval holder is obliged, on its own volition (and at least when requested by ART or the testing institute), to submit 1 product for follow-up testing, with a minimum of 1 piece a year and a maximum of 25 pieces per 12 months (starting from the validity date of the certificate).

2.3.6.3 Performance

The follow-up test will be mandatorily performed by the testing institute that performed the type approval test.

2.3.6.4 Exchange of locks for follow-up tests

The testing institute is free to exchange the products provided by the approval holder for products available on the market and to carry out the follow-up test on these products.

2.3.6.5 The Products out of the market for follow-up tests

At all times the Stichting ART is authorized to acquire and check products with ART quality marks in order to have them tested in accordance with this directive.
The same procedures and consequents apply as for standard submitted follow-up test products.

2.3.6.6 Follow-up tests

The follow-up test consists of the repetition of at least one (1) of the machine tests of the type approval (e.g.: cutting test, torque test, tensile strength test, lock cylinder pulling test, corrosion test, dust test, frost test, etc.) whereby every result must comply with the homologation directive.
In addition, one or more attack tests can be carried out.
These attack tests are used in principle to build a testing history and do not automatically result in rejection with the accompanying consequences.
Because of the frequency it could be possible that not all the tests from the type approval are repeated. This, coupled with the fact that attack tests in the COP tests do not usually result directly in rejection, is the reason that an approval validity shall be renewed every 3 years.

2.3.6.7 Rejection in follow-up tests

If the machine tests (and/or attack test resistance time) falls below the limit set down in the homologation directive, this must be stated in the report. Any supplementary comments about the test results can be included in the report. The approval holder is informed of the findings through this report.
The testing institute is obliged to send Stichting ART a copy of the report.
Based on the latter, Stichting ART may take the decision to reject the product. This may, in exceptional cases, be the case for attack tests as well when the resistance time falls considerably due to the sudden emergence of new, widespread attack techniques. Examples of this are the use of the concreter's nippers on ring locks and ballpoint pen casings on tubular cylinders. Stichting ART will further determine the consequences of such rejections.

2.3.6.8 Procedures for deviations / faults found in products during follow-up tests

If the product is modified without prior notification to this effect and/or without the result mentioned in the notification being made known to the test institute, Stichting ART is entitled to disqualify the approval holder from further use of the quality mark and the name of Stichting ART. This disqualification may lead to the withdrawal of the approval and the immediately removal of the product from the list of certified products without any of the obligations of the approval holder becoming null and void.

If a product is rejected after a failed follow-up test, Stichting ART will contact the manufacturer and also report the rejection to the testing institute. The manufacturer is obliged to carry out an internal investigation and to inform Stichting ART of the findings.
During this time, the use of the quality mark and the name of Stichting ART will be suspended.
The approval holder is obliged to have the tests for which the earlier sample was rejected in the follow-up test, repeated for (e.g.) 3 products from the same production series or, if Stichting ART grand permission, (e.g.) 3 improved products.
If the products passed the retesting, the suspension will be lifted (release) and the approval holder may again use the quality marks and the name of Stichting ART.
If one (1) of the products failed the retesting, the approval can be irrevocably withdrawn together with the right to use the ART quality marks and the name of Stichting ART.
Retesting is to take place within 3 months of the suspension to avoid the automatic withdrawal of the approval. This means that the holder of the suspended approval must submit the products for retesting some 6 weeks (or sooner) after the suspension.

In the event of unforeseen circumstances regarding the retesting, Stichting ART will make the decision of whether to withdraw the quality mark or not.

2.3.7 Product modifications

The testing institute that carried out the product approval testing is to be informed of any modifications to the products before the products are brought onto the market and/or a quality mark is affixed.
This applies to modifications to the product's brand name and/or type designation, changes to a print design on the object, changes to a packaging with an ART quality mark (if applicable) and all modifications of the technical specifications of the product.

In the event of modifications, the testing institute is to be provided with the following information:

- drawings of the existing parts or constructions that are to be subjected to modification;
- descriptions of the relevant modifications to parts and/or constructions;
- a general assembly drawing (with part list) of the modified object
- detail technical drawings of each modified part (if technical specifications are changed);
- one or more samples of the modified product (if necessary and at least when technical specifications are changed)

In order to make a proper assessment of the modifications, the testing institute may at any time request additional information from the manufacturer and/or approval holder.
Once this information has been assessed, the testing institute will inform the approval holder that full or partial retesting must be carried out in order to retain the certification. The approval holder is to bear all the costs involved in this respect. If retesting is to take place, the results will be set down in writing in a report.

(to be continued, see next page)

Based on the applicant's information and the findings of the testing institute, the applicant will be informed as to the nature of the modification:

- within an approved product type (with the same approval number):
  an embodiment of an already approved type;
- another product type, deviating significantly from an approved product type:
  the applicant must submit an application for type approval;
- administrative approvals for changes to the name or address of the approval holder;
- changes to the name of the brand* or type of the approved product
  (paragraph 2.3.5, Private Label shall be followed in case of a new approval holder).

In all instances the results of an investigation are set down in a written report with a conclusion as to whether or not the requirements have been met.
The report is sent to the applicant and in the event of approval of the product, also to Stichting ART. Stichting ART will only include the modified product on the list of certified products if the requirements have been met.

If the applicant does not have a supplementary investigation carried out although the testing institute considers this necessary, the testing institute will report this without delay to Stichting ART. If the modified product is brought onto the market, this will result in the revoking of the approval of the product concerned with immediate effect. The affixing of quality marks must be ceased immediately, and the product will be immediately removed from the list of certified products without any of the obligations of the approval holder becoming null and void.

2.4 Rights and obligations of the approval holder

If an applicant receives an approval number in writing from Stichting ART, the applicant is then the approval holder (if not mentioned otherwise). The approval holder has rights and obligations arising from holding this approval. These rights and obligations are summarised below and elaborated further in the subsequent paragraphs:

- the approval holder may only use the name and ART quality mark of Stichting ART for the certified product;
- the name and ART quality mark of Stichting ART must be used in accordance with the images appended as Appendix 1 to this homologation directive;
- the approved product will be recorded on the list of certified security systems as administered and published by Stichting ART;
- the ART quality mark is to be affixed in the prescribed manner (cf. paragraph. 2.5.3) to every certified product to be sold (at least in the Netherlands);
- notification of each intended modification is to be made in advance to the testing institute that carried out the type approval testing;
- the approval holder is to observe the rules that apply to follow-up tests;
- it is not permissible to use the name and/or logo of the testing institute without the prior, written consent of the institute concerned.

2.5 Application of the ART quality mark

The following requirements apply for the correct use and application of the Stichting ART quality mark:

2.5.1 Approval number

Stichting ART issues an approval number to approved products.

2.5.2 Changing the approval number

If a lock is awarded a different number of stars, a new approval number will be issued to prevent confusion about the classification of the lock concerned. The intention here is to prevent locks being available on the market with the same brand/model and the same approval number but with different classifications.

2.5.3 ART quality mark on delivered products

If full type approval is undergone with a positive result, the approval holder is obliged to affix or have affixed the Stichting ART quality mark to all the locks or anchorage elements produced in the series for (at least) the Dutch market, in accordance with the requirements set out in articles 4.1.2.

2.5.4 Issuing labels with the ART quality mark

The ART quality marks may be issued as soon as Stichting ART has certified the product and issued an approval number.

2.5.5 Design of the affixed ART quality mark

For production under own management the approval holder is obliged to use the ART quality mark of this directive for this purpose with the proviso that the requirements set out in 2.5.3, 2.5.6 and 2.5.7 are met.

2.5.6 Requirements regarding affixing the ART quality mark

When affixing the ART quality mark by means of a sticky label and when used on a colour printed packaging, manual or commercial display the image of the ART quality mark shall be PMS 158 Orange on White (or similar).
If the ART quality mark on the product isn't a sticky label than there is no a required colour *(please refer to Appendix 1).*

2.5.7 Further use of the ART quality mark

In addition to the obligation to affix the ART quality mark onto the product, it is permissible to include this information on the packaging, in the user manual and to use this information in other commercial activities insofar as these involve the certified product(s).

2.5.8 Visibility of the ART quality mark

To have a clearly visible (non coloured) lasered or (injection) moulded ART quality mark on a product the (e.g. square) background for the ART quality mark image shall be a smooth surface (e.g. polished). In case lasering an ART quality mark will clearly change "the colour" of the lasered details on the surface, than the smooth background requirement does not apply.
The product and/or the packaging may also bear other markings, quality marks and manufacturer's information (brand/ type/ serial number or coded control number) as long as the individual quality marks and/or information are clearly distinguishable.

2.5.9 ART quality marks on loose and separate supplied lock parts

Loose and separate supplied items from ART approved lock sets (items with an ART quality mark on it) shall always be provided with a packaging or a large attached product label with the clearly visible ART quality mark(s) and provided with a clearly visible warning and information of the specific lock combinations where the ART approval mark(s) is (are) granted for.
Remark: for more details see paragraph 4.4.2 Packaging.

2.6 Costs related to the Stichting ART quality mark

The following costs are involved in the use of the Stichting ART quality mark and the related necessary tests.

2.6.1 Basic fee for the Stichting ART quality mark

The approval holder will pay an annual basic fee to Stichting ART for the use of the Stichting ART quality mark. This fee is payable in advance. The basic fee must still be paid even if the approval holder does not bring any products onto the (Dutch) market in a particular year.

2.6.2 Variable fee for the Stichting ART quality mark

A variable fee is payable annually based on a payment per product produced for the Dutch market. The approval holder is obliged to specify the correct production figures and to support the figures with an auditor's report if deemed necessary.
In order for the variable fee to be calculated, the approval holder must provide Stichting ART, when requested and/or at least once a year) with the figures for the numbers of products produced for the Dutch market, measured over the last 6 or 12 months.

2.6.3 Variable costs for drafting and preservation certificates or extra certificates

The applicant will bear the costs, based on a payment per extra certificate, of drawing up a new or replacement certificate. Stichting ART will determine the amount charged.

2.6.4 Control

Stichting ART may demand that the production and/or sales figures be confirmed by an auditor's report.

2.6.5 Determining the fee

The fee for the Stichting ART quality mark will be set no later than 2 months before the end of the calendar year and will be communicated by the Stichting ART.

2.6.6 Overview of product test costs

The applicant/approval holder will bear all the costs related to the first approval application, follow-up tests, retesting and subsequent tests.
The above includes the costs of:

- type approval or any tests performed
- design and affixing of ART quality marks (labels).
- modifications to an approval (modifications to the product)
- so-called administrative approvals (changes to the names, the brands, the types, etc.)
- mandatory follow-up tests
- any follow-up tests arising from retesting

2.6.7 Fixing the costs of a product test

The costs of the services of and the work carried out by the testing institute will be determined in consultation with Stichting ART. In principle, these costs will apply for a minimum period of 12 months. The charges for type approval do not form an integral part of the ART homologation directive in light of the fact that the term of validity of the homologation directive may be at a variance with the term of validity of the charges.
The testing institute will append the charges to the application for type approval. The charges are based on the performance of standard, uninterrupted testing and approval work.

2.6.8 Costs of product-family tests

The testing institute determines the costs of product-family type approval testing individually for each product family, in advance of the type approval testing (see 2.3.4 for details)

2.6.9 General

In any unforeseen cases the Board of Stichting ART will decide.

2.7 Disputes committee

2.7.1 Composition

Stichting ART observes an arrangement for settling disputes by the appointment of an ad-hoc committee consisting of 3 members: the disputes committee. This 3-member committee comprises one member appointed by SKG-IKOB with the aim of having one member who is an expert in the field of the product or service that is the subject of the dispute, one member appointed by the board of Stichting ART and one member appointed by the stakeholders. The designated persons do not belong to the stakeholder organisations.

2.7.2 Working methods

At the request of the approval holder or the party entitled to make a claim under the guarantee given by Stichting ART, the disputes committee will examine matters related to the settlement of guarantee claims (with the exception of the scope of the damages). An involved party that can demonstrate that its interests were directly harmed by a decision regarding the settlement of a guarantee claim, can, within two months of the date of the decision, request the board of Stichting ART in writing and giving its reasons, to have the disputes committee examine the decision. The disputes committee will investigate whether or not the decision was taken on the correct grounds.
The disputes committee may draw up rules of procedure in which its duties are set out in further detail. The disputes committee may hear experts (with the costs to be borne by the Stichting ART) in order to reach a ruling in a dispute before it.

2.7.3 Payment

Before a request is processed, the party concerned must pay an amount set by the board of Stichting ART. This payment will be returned if the complaint is found to be valid.

2.7.4 Decision-making

The disputes committee reaches its rulings by majority vote in a meeting at which at least two members of the disputes committee are present or represented. Blank votes are in valid.
The disputes committee delivers rulings that are binding on the parties, and, in so far as possible, are reached within three months of the receipt of the written request for a ruling. If no ruling has been reached within this time period, the disputes committee will inform the parties involved to this effect, stating its reasons, under the obligation of setting a
new – as short as possible – time limit, if the situation so allows.

3 Test equipment

3.1 General

If applicable, the equipment for testing mechanical anti-theft systems for two-wheeled vehicles is used as described in (or reference made to) (draft-) standards or regulating documents or laid down documents in the form of general known requirements and test methods as pointed out in paragraph 1.1, Normative references of this homologation directive.

3.2 Tolerances

Unless otherwise stated, the following tolerances apply:

- Force ± 2 %
- Torque ± 2 %
- Mass/weight ± 2 %
- Dimension ± 2 %
- Dimensions attack tools ± 10 %
- Time (attack tests) ± 5 s
- Time other ± 2 %
- Temperature ± 3 °C

4 Requirements, test methods and test results

4.1 Design requirements

Test methods for chapter 4.1, Design requirements:

- Visual inspection and empirical determination by the test institute.

4.1.1 The manufacturer should arrange, and is responsible, that their product meets the general and legal requirements in relation to safety.
The hand-in manufacturers statement will be judged.

4.1.2 If a product is tested with positive result, it has to be provided with the following information:
- the ART quality mark,
- the number of stars indicating the ART category for which the product is approved,
- the approval number.

This information can be affixed to the product on the following ways:
- as a sticker,
- directly on the product (e.g. by printing),
- the possibility as described above, but in negative,
- affixed in another way, e.g. by die-stamping.

All the information must be clear and legible
The information have to be:

- in conformity with the information as described in Appendix 1,
- indelible,
- readable in mounted position (for permanently mounted locks and anchorage elements),
- the minimum required dimension of the square ART quality mark (e.g.: outer lines) will be (at least*) 10 mm x 10 mm (*for visibility larger dimensions are preferred).

See par. 2.5.7 for details of further use of the ART quality mark (e.g. packaging or manuals).

To fulfil the requirements can only be checked at the first Follow-up (COP) test, for the reason that on the moment of a new type approval test some information, such as approval number, is not available yet.
Therefore, the applicant has to provide the test institute with the following information:

- a draft design of the ART quality mark with a dummy approval number (e.g.:4000),
- the place on the lock where the ART quality mark will be affixed,
- information about the material of the approval label or the method of making the ART quality mark on the product if it is not a label.

4.1.3 Combination with other markings and approval labels is allowed if the different markings are separated clearly from each other (in order to prevent confusion).

4.1.4 The product has to be provided with specific information;
- the trade name (or trade mark) have to be pictured (or made visible without use of tools),
- a type (or a product family type indication) have to be pictured (or made visible w.o. tools),
- for anchorage elements both details also have to be readable in mounted position.

4.1.5 Locks with (physical supplied) keys shall have their (mechanical / electronic) keys provided with a lasting readable identification, such as a trade name or registered trade mark.

4.1.6 On the mechanical keys of a frame lock (each permanently mounted lock) the key number has to be, durable and inextricable, on both keys itself.
For all other locks with mechanical keys, the key number has to be on the key itself or on a metal or plastic label, which must be delivered with the key set.
In case the key number is not on the key itself, the approval holder shall make provisions that, if a key is handed over, the key number can be obtained or checked in another way.

4.1.7 There will be no recognisable relation between a lock number and key number (if applicable).

4.1.8 All frame locks (e.g. ring-locks) with mechanical keys have to be provided with 2 keys only.
For all other locks the number of mechanical keys is limited to 2 or 3 functional keys only.

4.1.9 It must be possible to obtain or reorder spare (physical supplied) keys (original spare keys with trade names or registered trademarks and/or imitations without trade marks) locally in the Netherlands, by giving the “key” number.

4.1.10 Above mentioned reordered original spare keys (blanks or cut duplicates) have to be provided with an indelible indication "C" (copy) or "D" (duplicate).

4.1.11 For locks with mechanical keys the key mechanism has to have a practical key diversity of at least 1,000 per profile for ART1, ART2, ART3 and ART4. The key mechanism for ART5 locks must have a practical key diversity of at least 20.000 keys per profile.

4.1.12 For locks with mechanical keys the lock mechanism has to have at least 5 active blocking elements.
Remark: Deviation on this requirement is possible if the applicant can guarantee that the same level of security is achieved.

4.1.13 For locks with mechanical keys the key must be provided with at least 3 different depths of incision.

4.1.14 For locks with mechanical keys only 50% of the number of blocking elements can have the same incision. In case of broken values, the total number counts as calculated below:

Number of blocking elements	Number of equal incisions
5	2
6, 7	3
8, 9	4
10, 11	5

4.1.15 For locks with mechanical keys maximum 2 equal blocking elements can be placed besides each other (these also called: consecutive cuts).

4.1.16 The design of the lock mechanism has to be aimed to exclusion of usage in another way than with the correct key.

4.1.17 The blocking mechanism has to be constructed in a way that the lock can be opened in another way than with the correct key only with great difficulty.

4.1.18 Mechanical dial (combination) locks and pin code locks

For-combination locks and manually operated pin code locks the following requirements apply:

Sub 1: The category 1 (ART1) lock mechanism shall have at least 4 active blocking elements. All other shall have at least 5 active blocking elements. Deviation on this requirement is possible if the applicant can proof and guarantee that the same level of security is achieved.

Sub 2: The number of codes for-combination locks and pin code locks:
Category 1 (ART1) lock: ≥ 9.000. (e.g.: 4 code discs 10^4 = 10.000 theoretical)
Category (ART) 2 till 5 lock: ≥ 90.000 (e.g.: 5 code discs 10^5 = 100.000 theoretical)

Sub 3: If the unlocking code can be changed by the user, then the unlock code must be adjustable only when the lock is in unlocked condition. (or the code is only adjustable from a protected side).

Sub 4: For combination locks and-pin code locks (mechanically or electronically operated) shall be so designed that it is not possible to determine the correct code by visually inspecting external scratches or marks after 500 times of opening and closing the lock (a judgement of a manufacturer's statement or test report).

4.1.19 Signal and codes used on e-locks

For electronically operated locks (e-locks) the following requirements apply:

Sub 1: For *transmitting* devices it shall not be possible to generate, within twenty-four (24) hours with a chance greater than one (1) %, the correct code that can unset the system.

Sub 2: For *direct contact* devices it shall not be possible to generate, within twenty-four (24) hours with a chance greater than five (5) %, the correct code that can unset the system.

Sub 3: To prevent reading the signal in the air, the code used for unlocking of transmitting devices shall change "in random order" (or other technique providing the same function) after each transmission of a signal by the remote control.

Sub 4: At least a 32 Bits (binary) encryption code shall be used for transmitting devices.

Sub 5: Direct contact devices (e.g. "touch keys") shall have at least 1.000.000 different codes.

Remarks:
The manufacturer shall state how to fulfil the applicable above mentioned requirements (including a clear description and all the applicable information).

A way to prevent to generate the correct code within a certain time is:
- prevent accepting codes for a short period after a number of fault codes are given,
- using a huge number of codes (e.g. 128 bits codes or more),
- reducing the rate of accepting codes to be given,
- other…..

Unlocking procedures aimed at unsetting the system in an alternative way will have to satisfy the same standards for security as the above mentioned unlocking procedures.
The equality of the security level(s) shall be judged by the testing facility.

4.2 Performance requirements

If applicable (as described in appendix 2) the mechanical anti-theft systems for two-wheeled vehicles shall be tested and comply to the under mentioned requirements.

4.2.1 Durability

The manufacturer has to state that a lock which is submitted for an approval test must be capable of going through 5,000 full lock and unlock cycles and that it will function after that properly (regarding the maintenance manual).
Test method: visual inspection (at type approvals) or by a test according to TMS-05 (for COP frame locks only).

4.2.2 Corrosion resistance

Sub 1: After the corrosion (salt spray) test cycle (96 h, EN 1670, grade/class 3) and after dried for 24 hours, the lock has to function properly (within 120 seconds).
Sub 2: For the electronically operated and activated lock system the e-lock shall function properly after above mentioned test without having to change the batteries.
Test method: according to ISO 9227 and TMS-05.

4.2.3 Dust resistance

After an IEC-60529 IP5 dust test cycle (8 hr Arizona dust) the lock has to function properly (within 120 seconds).
Test method: according to TMS-05.

4.2.4 Frost resistance

Sub 1: Non-e-locks (mechanical locks): After the frost test (a test cycle at -20° C) the lock has to function properly (within 120 seconds).
Test method: according to TMS-04/05.
Sub 2: E-locks: After the e-lock frost cycle (4 hours at -10° C) the electronically operated and activated lock has to function properly.
Test method: according to TMS-05
Remark: For the functionality of the components of an electronically operated and activated lock system the frost resistance test shall be performed on an e-lock with new and/or fully charged batteries.

4.2.5 Torque strength

The lock has to stay in closed position if during the torsion test a twisting force will be exposed to the lock as stated in Appendix 2, depending of the ART category for which the lock is tested.
Test method: according to TMS-05.

4.2.6 Tensile strength (lock system)

The lock system (or an additional frame lock chain, cable or other mean as loop component) has to stay in closed position if during the tensile strength test a tensile force will be exposed to the lock as stated in Appendix 2, depending of the ART category for which the lock is tested.
Test method: according to TMS-05 (test 1 series).

4.2.7 Cutting resistance

The lock system (or an additional frame lock chain, cable or other means) has to stay in closed position during the test with the cutting machine with the test values as stated in Appendix 2, depending of the ART category for which the lock is tested.
Test method: according to TMS-05.

4.2.8 Resistance to attacks with tools

Locks have to withstand the number of attacking tests during a certain time, as stated in paragraph 4.5.2 and Appendix 2, depending of the ART category for which the lock is tested.
Test method: according to TMS-05.

4.2.9 Tensile strength (anchorage elements)

Anchorage elements using bolts have to stay fixed if during the tensile strength test a tensile force will be exposed to the anchorage element as stated in Appendix 2, depending of the ART category for which the anchorage element is tested.
Test method: according to TMS-05 (test 3).

4.2.10 Resistance to pulling out (or pushing out) the (mechanical) key mechanism

The lock cylinder has to stay in position if during the simulated pull tests or actual pull test a force will be exposed to the retainer device of the locking mechanism as stated in Appendix 2.
Test method: according to TMS-05 (test 4 series).

4.2.11 Tensile strength additional means (chain/cable/other connection point to the frame lock)

The connection point of an additional chain/cable or other means to a frame lock or alternative lock, including the first part of that chain/cable or other means has to stay in position if during the tensile pulling test, a tensile force will be exposed to the lock as stated in Appendix 2.
Test method: according to TMS-05 (test 5).

4.2.12 Resistance to free falls (remote controls and not permanently mounted e-locks)

Sub 1. After the drop-test (50 times a free fall) the remote control shall still function properly.

Sub 2. After the drop test (5 times a free fall) a loose e-lock shall function properly (<u>not</u> applicable for frame mounted e-locks).
Test method: according to TMS-05
NO drop tests (1 m drop height, on concrete floor) shall be performed on smart/mobile phones.
Remark: After the drop tests only the functionality will be judged (damaging is allowed).

4.2.13 Resistance to vibrations (electronically operated frame locks)

After the vibration test the electronically operated frame lock has to function properly.
Test method: according to TMS-05.
Remark: The endurance test will be performed according to the European Standard for testing bicycle luggage carriers (EN14872, February 2006).
This is a "vertical vibration test" (EN14872 paragraph 5.11.3) on the "frame mounted" lock part. (Frequency 7 Hz, vertical 10 mm stroke (sinusoidal motion), 100.000 cycles (≈ 4 hr.).

4.2.14 Resistance to torque on the key mechanism (ART Power-key test)

The frame-lock has to stay in closed position during the performance of an "ART Power-Key" test cycle (2.0 version 2024).
The "ART Power-Key" test shall only be performed during a type approval test and with the 3-year validity extension test.
Test method: according to TMS-05

4.2.15 Resistance to unwanted opening on E-locks (for mechatronic locks with passive remotes)

The E-lock/mechatronic lock with a passive operated remote can only be opened (in the passive mode) within 5 metres of that transmitting remote (unlocking device).
Test method: according to TMS-05.

4.2.16 Resistance to key removal in unlocked position (for Frame locks)

When the Frame lock is in open position, the key must remain in the lock when a torque of 1.5 Nm <u>and</u> a tensile force of 100 N is applied to the key in the outward direction.
Test method: according to TMS-05.

4.3 Specific construction requirements

Test methods for chapter 4.3:
Visual inspection and/or empirical determination by the test institute.

4.3.1 Frame locks:

4.3.1.1 The mechanical key of key-operated frame locks shall not be removable in unlocked position.

4.3.1.2 All frame locks have to be constructed in a way that unintentional locking is impossible.

4.3.1.3 All ring locks have to be constructed in a way that a circular shackle enclosing the cross section of the wheel rim totally when closed.

4.3.1.4 ART approved frame locks with a "functional" locking mechanism for an additional means (e.g. a plug-in) always shall have this mechanism tested.

4.3.1.5 ART approved frame locks with a "functional" locking mechanism for an additional means (e.g. a plug-in) always shall have at least one (1) ART approved additional means available for the market (optional as an extra part or standard as a lock set.

4.3.1.6 A frame lock key mechanism (the key barrel) shall withstand a destructive unlocking test with an ART "Power-Key". This machine test shall be performed with a special made key torque tool.
Specifications of this "ART Power-Key test tool are mentioned in document TMS-05.

4.3.2 Shut pin (frame) locks:

4.3.2.1 When in closed position, it shall be locked in axial and radial directions

4.3.2.2 Shut pin and locking cup shall be fixed inextricable to the frame by welding, bolting or an equivalent method.

4.3.2.3 All points of the periphery of the lock, with exception of frame parts, have to undergo all relevant and applicable tests.

4.3.3 Cable locks:

4.3.3.1 If the cable lock consists of a cable and a separated (pad)lock, both parts have to be marked in an indelible way as belonging together (e.g. the same brand marks).

4.3.4 Chain locks:

4.3.4.1 If the chain lock consists of a chain and a separated (pad)lock, both parts have to be marked in an indelible way as belonging together (e.g. the same brand marks).

4.3.4.2 Chain's without a permanently fixed lock body must have a lasting readable marking (such as a trade name or registered trade mark). This could be on the chain itself (stamped, etched, etc.) or on an extra permanently fixed part (impossible to remove without unrepairable damage to the marking element).

4.3.4.3 The minimal (inner size) dimensions of a (medium or large size) U-lock which is used as a padlock on a ART category 5 (ART5) chain lock shall be as mentioned in 4.3.9.4, sub c.

4.3.4.4 For an ART5 padlock-chain set (a loose chain in combination with a padlock or a short shackle U-lock) the "short padlock" shall have the maximum inner dimensions as mentioned in 4.3.9.4, sub b to connect the flexible part (e.g. insert one or more chain end link(s)).

4.3.4.5 If the result of the machine cutting force on a category 2 (ART2) chain link (without bonus) is equal or more than 62.5 kN then an attack test with the 60 cm boltcropper is not be applicable anymore (in that case a performed boltcropper attack test result is informative only).

4.3.5 Anchorage elements:

4.3.5.1 The anchorage element shall provide the possibility to put through a U-shackle lock with diameter 12 mm or more. If the anchorage element provides a chain, this chain shall fulfil the same demand.

4.3.5.2 The anchorage element does not have to provide a locking mechanism. If a locking mechanism is included, all relevant demands of MBT-04 do apply.

4.3.5.3 Anchorage elements not using bolts (a so called "Ground anchor"), need to have a total minimum mass of at least 25 kg for category 2 (ART2) and 50 kg for category 4 (ART4).
Remark: A trapezium form (shape) is recommended.

4.3.6 Alternative locks:

4.3.6.1 This category 2 (ART2) lock system (e.g.: steering, crank, pedal or other) is subject to the attacking tests as single part and judged as described in paragraph 4.5.2.2.

4.3.6.2 Alternative locks do not prohibit enclosure of a section (or directly prevent rotation) of the wheel and therefore shall have an additional system* to prevent to push (away) the bicycle. (*an integrated lock system to couple the two-wheeled vehicle to an object which is connected with "the fixed world").

4.3.6.3 This integrated lock system for the additional means is subject to the attacking tests as single part as described in paragraph 4.5.2.3.

4.3.6.4 For locks with mechanical keys removal of key must be only possible in locked situation and if the chain/cable insertion is inserted into the lock.

4.3.6.5 Original complete alternative locks and/or replacement (spare) parts are only available for bicycle manufacturers or their official bicycle dealers.

4.3.6.6 The lock system shall be not easy to lock in driving condition (see 4.1.1 as well).

4.3.7 Additional chains or cables for alternative locks (required) or frame locks (optional):

4.3.7.1 Approval is given to this specific combination (additional part and lock).
The additional means cannot have a separate approval number.

4.3.7.2 The additional means and the integrated lock system must comply to the requirements of 4.3.1.5 (availability), 4.5.2.3 (attack tests), 4.2.6 (tensile strength), 4.2.7 (machine cutting) and 4.2.11 (tensile strength of the connection) and (if applicable) 4.4.2 or 2.5.9 (packaging).

4.3.7.3 Both parts of a combination (additional means and the lock) have to be marked in an indelible way as belonging together (e.g. the same brand marks).

4.3.8 Bicycle Security Systems (BSS):

4.3.8.1 A BSS contains (a combination of) the following system features (examples):
a. → An E+ (frame) lock with a track & trace system and tilt movement detection (build in),
b. → A ring lock/plug-in **set** with a (build in) track & trace system and tilt movement detection,
c. → A set of a frame lock and a permanent mounted track & trace unit with movement detection (e.g. SCM certified),
d. → A set of both an ART frame lock and an ART certified 2nd lock with tether function (a cable lock / a chain lock / a folding lock / other).
remark: A BSS (a lock with one or more extra security features) can be specially mentioned on the ART list of approved products.

4.3.8.2 The set of two locks of above mentioned system "d" must have a similar key mechanism making it possible open the lock with the same key (e.g.: Key-Alike or ONE KEY key sets).

4.3.8.3 The number of keys for each system "d" lock shall be according to requirement 4.1.8).

4.3.8.4 The main lock (e.g: the frame lock) of the two locks must have a mechanism where the key shall not be removable in unlocked position (a so called "intelligent key mechanism").
The secondary lock of the two locks shall not have an intelligent key mechanism.

4.3.8.5 The tether system (a cable/chain/other) shall have a fixed lock head (e.g.: no loose padlocks).

4.3.9 Category 5 (ART5) locks

4.3.9.1 A category 5 (ART5) lock shall have the possibility to couple the motorbike to an object which is connected to the "world" (a brake disk lock only or a "small" U-shackle lock is not allowed for ART5).

4.3.9.2 An inflexible lock (e.g. U-lock sold without a chain) shall have the minimum dimensions to make it possible to catch two (2) round poles of at least 110 mm diameter with a center on center distance of 150 mm (e.g. possible to couple the motorbike wheel to an object (pole)).

4.3.9.3 Flexible locks (e.g. chains) must have a length of at least 90 cm.
Remark: This means the minimum stretched length or, if a loop, the inner measured length.

4.3.9.4 Flexible locks shall have as least one of the 4 features:
a. Flexible locks shall have a function that it is impossible to close the lock without the (matching) flexible part is used.
b. Flexible locks shall have a separate (short) padlock (maximum inner closing area dimensions of 25 mm x 35 mm) which normally cannot be used as a brake disk lock.
c. Flexible locks shall have a separate (at least medium size) U-lock (minimum inner U-part dimensions of 80 mm x 230 mm) which can be used as well as a lock when touring (park in "out of storage" situations).
d. Flexible locks shall have a lock body which is permanently (inextricable / indivisible!) fixed to the flexible part

A loose flexible protection device (e.g. a chain) in combination with a loose lock body is allowed for category 5 (ART5), however, under one of these first three (3) above mentioned "flexible lock" conditions only.

4.3.9.5 For ART 5-star (ART5) combination locks or pin code locks with a visible code will have the unlock code automatically reset (invisible?) when the lock is closed again or impossible to lock the system with the correct un-lock code still in use.

4.3.10 Electronically operated locks (mechatronic or e-locks)

4.3.10.1 Signals from fully electronically operated locks:

Sub 1: - It shall be clear for the user that a fully electronically operated lock is used.

Sub 2: - It shall be clear for the user that a fully electronically operated lock is fully locked.

Sub 3: - These signals for the user must come from the lock.

4.3.10.2 If there is a signal for the fully opened position as well than the "opened" and "closed" (locked) signals of a fully electronically operated lock shall be different.

4.3.10.3 The number of unlocking devices provided with the lock:
In case of loose, by the lock manufacturer supplied*, unlocking devices for electronically operated frame locks (*not a user's Smart phone), the frame lock shall have 2 unlocking devices only (e.g.: 2 remote controls, 2 cards or 2 contact keys). All other electronically operated locks shall have 2 or 3 (loose) unlocking devices only (if applicable).

4.3.10.4 Unintended locking by the unlocking device shall be prevented.

4.3.10.5 The marking of direct contact keys and remote controls for frame mounted locks shall fulfil the same (applicable) requirements as standard mechanical keys (e.g. identification, trademarks, serial number, copies, etc.).

4.3.10.6 Serial number of the remote control(s).
To prevent fraud (and to be checked by theft insurers) the serial number shall be (at least):

Sub 1: - on the main board of the remote control (if this part is possible to access) or

Sub 2: - on the outside if it is not possible to access the main board without clearly visible and lasting damage to the remote.

4.3.10.7 Power and batteries in e-locks

Sub-1: At least 20 times before malfunction due to an empty battery of both a lock or remote control the user shall be informed (no matter how, except light signals from the lock).
Remark: if a remote control will be more difficult to use when the batteries are low (discharged) then this "signal" to the user is accepted as well (applicable for the remote controls only).

Sub 2: Manufacturer shall add information to the manual:
- how to recognize "the signal" that the batteries must be changed or charged,
- which charger or batteries to be used (std. and/or replacement) and,
- how to replace batteries (and with which tools) if applicable.

Sub 3: If applicable and physically possible, changing batteries of the lock system shall be only possible with normal tools or special tools.

Sub 4: Exchanging the batteries of the lock system can be done in open and closed position but may never result in a change of status.

Sub 5: If a battery charger is supplied by the lock manufacturer for an electronically operated lock, this charger shall comply to applicable legal requirements (e.g.: CE).

Sub 6: Electronically operated and activated lock systems using the vehicles power and if this vehicle system using an alternator a double voltage test shall be performed according to ISO 7637 or equivalent.

4.3.10.8 Additional requirement for E-locks without OE or OEM-supplied unlocking devices:

Sub-1: If the electronically operated lock (a mechatronic or "e-lock") is supplied by the lock manufacturer without-(OE or OEM) unlocking devices (e.g. using an user's Smart phone instead) then the e-lock shall have a unique ID number in (or on) the lock housing part and

Sub 2: That unique ID number shall be delivered as well (together with the lock) on a document, ID-card, attached label or other which is meant for the end user.
remark: the ID may be stored (if easily accessible) on the smart phone (e.g. in the app) or on supplied another electronic way (e.g. supplied when making the account).

Sub 3: It shall be impossible to deduce the unlocking code by the ID or serial number.
Remark: impossible to link together with the unlocking code one way or another.

4.3.10.9 Additional type name classification for electronically operated locks:
Under hereunder mentioned conditions ART approved electronically operated locks shall have an additional "[E]" © or "[E+]"© classification add to their lock type name by the certificating party Stichting ART
remark: will be mentioned on the ART Certificate and on the ART list of approved products.

Sub 1: An **"[E]"©** classification applies to electronically operated locks (loose locks or frame locks)

Sub 2: The additional **"[E+]"©** classification only applies to electronically operated permanently mounted locks (e.g.: frame locks) with a detailed registration of the last setting by the regular* unlocking device (the so called "Evidence registration").

Sub 3: For that the manufacturer should arrange and is responsible that, if requested by the theft insurance companies or the end user, it can supply the following three (3) details:
- The lock's ID- or serial number were the request is applicable for,
- Whether or not the lock unit was closed by the regular* unlocking device before it was stolen
- The date and time of that setting.

Remark: regular means the unlocking device which is normally used. Registration of settings by a 2nd unlocking method (e.g. an emergency unlock procedure), if applicable, is not required.

Sub 4: If the evidence registration details are not supplied directly to the insurers companies then this information always shall be supplied in a secured way (e.g. a secured .pdf document).

4.3.10.10 All ART approved electronically operated locks shall have a counter measure against hacking* parts using transmitting trough air (remotes, cards, smart-phones, etc.) and systems using the Internet (e.g.: firewalls, encryption, etc.).
**) Remark: at least the public known methods and prescribed by the T.C. of Stichting ART*

4.3.10.11 For Electronically operated locks (e-locks) using transmitting unlocking devices where the lock can be unlocked automatically without* preform a physical action on the unlocking device (e.g. remote or smart-phone) the maximum functional distance for accepting an unlock signal (e.g. "protocol communication") between that (so called) "passive" transmitting unlocking device and the e-lock will be 5 meters (checked by a function test in an open field).
**Remark e.g. .open an e-lock while move or touch the lock without :- perform an action in the app of a (Blue tooth operated?) Smartphone, - without press a button on a remote or - when using tags.*

For lock types that are not mentioned above there are no specific construction requirements (yet).

4.4 Information for the user

4.4.1 User instructions

In principle the usage of a lock has to be clear for everyone.

Sub 1: If this is not the case or if the product has to be mounted, a clear user manual and/or mounting instructions have to be delivered with each lock.

Sub 2: The user's instructions shall contain recommendations about the best usage of the locks.

Sub 3: The text of the user manual is preferably in Dutch, otherwise at least in English.

Sub 4: It is allowed that those texts and/or symbols are printed on the packaging.

Sub 5: For anchorage elements the mounting instructions need to cover information on suitable material/constructions in which the element can be mounted, size of holes to be drilled or dug, etc.

Sub 6: For anchorage elements the mounting instructions shall have clear instructions to blow-out or vacuum clean the drilled holes before the plug is add (if applicable).

Sub 7: If symbols are used, these have to be clear and unambiguous (if possible, the use of general accepted and well-known symbols shall be applied, such as led down in international standards).

Sub 8: It is allowed to put an image of the ART quality mark in the user's manual, as long as this is in conformity with the applicable requirements and in conformity with the information as described in Appendix 1.

4.4.2 Packaging

Sub 1: The packaging (if applicable) can be provided with the ART quality mark as long as this is in conformity with the applicable requirements and in conformity with the information as described in Appendix 1.

Sub 2: Separate supplied additional means and loose units out of parted lock sets with an ART quality mark on a that separate part shall always be provided with a packaging (or a large attached product label) with the applicable ART quality mark(s) displayed on the front.
Remark: This applies to (e.g.): a separate supplied replacement padlock, a chain sample without the padlock attached or an additional means (applies to items from all ART approved lock sets).

Sub 3: All above mentioned separate supplied additional means and loose units of parted lock sets with an ART quality mark on a part shall always be provided with:
- a clearly visible **warnin**g* that the ART quality mark(s) **applies to a whole set only** and
- information of the specific lock combinations where the ART quality mark(s) is (are) granted for.
*) *The warning (or a clear text reference nearby the ART quality mark) shall be on the front.*

Sub 4: For medium or large size U-locks with an extra (e.g. steel) cable the packaging shall include clear details to prevent misuse of the set (e.g. a warning to always use the U-lock for secure the two-wheeler first (prevent to ride or push the vehicle) and only use the extra cable to lock bike parts (e.g. loose wheels) or secure the locked bike to the fixed world).

Remark: in case of new applications or product modifications the text for user manuals and packaging may submitted as a draft).

4.5 Attack tests and judgement of the test results

4.5.1 Condition for an approval

Mechanical security systems can be approved if they are in compliance with all applicable requirements of the homologation directive (for the ART category for which they are tested).

4.5.2 Attacking tests

Non-permanent mounted (loose) ART1 or ART2 locks with a possibility to attach or tether the vehicle (e.g. chains, U-locks, folding locks, cables, etc.) shall be tested on the top tube of a (men's) bicycle frame (e.g. a test rig).
Non-permanent mounted (loose) ART3, ART4 or ART5 locks with a possibility to attach or tether the vehicle can be tested on the ground (through a motorbike-wheel test rig).
For attacking tests which will be conducted during follow-up (COP) tests, the under mentioned classifications by points will be only applied to build up history. So, during the COP procedure it is not a direct disapproval criterion (see paragraph 2.3.6.6 as well).

4.5.2.1 **All locks and anchorage elements** (except for alternative locks or additional means)

The following classification by points is applied after the attacking tests:

- time needed to open the lock < 2 minutes : 0 points;
- time needed to open the lock between 2 and 3 minutes : 1 points;
- time needed to open the lock > 3 minutes : 2 points

A result of a test with 0 points will always result in disapproval.

Classification by points	**ART1**	**ART2**	**ART3**	**ART4**	**ART5**
(number of tests per ART category)	(5)*	(6)	(7)	(9)	(19)**
Maximum number of points which can be obtained per ART category	10	12	14	18	18
Minimum number of points needed for a positive result	8	10	12	16	18

*) For the necessary 5 attack tests on an **ART1 lock** it is agreed to perform the following tests: a lock pick test (test 1), a 30 cm HSS hand saw test (test 2), a (brute) key mechanism spanner/screwdriver torque test (test 3), a 200-gram bench hammer test (test 4) and a fifth free to choose test (test 5) if applicable.

**) including the 10 lockpick tests of 4.5.2.4.

Remarks:

- *Wall and floor anchors can only be approved and tested for **ART2** or **ART4**.*
- *In case of wall and floor anchors the testing facility can differ the number of tests.*
- *As a consequence of that the number of points may differ.*

The following has to be considered in relation to the vehicle itself after attacking tests are performed:

- the main frame of the vehicle shall function normally after attacking tests are performed, without risk for the user of the vehicle
- parts and accessories that can be replaced easily, may be damaged

An attempted attack is stopped if the lock (system) can actually be removed (and the vehicle can be moved), or the lock (system) loses its other anti-theft characteristics.

4.5.2.2 Alternative lock

For alternative locks the following classification by points is applied after the attacking tests:

- time needed to open the lock < 4 minutes : 0 points,
- time needed to open the lock between 4 and 5 minutes : 1 point,
- time needed to open the lock > 5 minutes : 2 points.
- **A result of a test with 0 points will always result in disapproval.**

Classification by points	**ART1**	**ART2**	**ART3**	**ART4**	**ART5**
(number of tests per ART category)	N/A	(6)	N/A	N/A	N/A
Maximum number of points which can be obtained per ART category	N/A	12	N/A	N/A	N/A
Minimum number of points needed for a positive result	N/A	10	N/A	N/A	N/A

Remarks:
An alternative lock can only be approved in ART2.
An alternative lock can be tested with the use of ART4 tools.

The following has to be considered in relation to the vehicle itself after attacking tests are performed:

- the main frame of the vehicle with an "opened lock" shall function normally after attacking tests are performed, without excessive risk for the user of the vehicle,
- parts and accessories that can be replaced easily, may be damaged,
- to pass the attack test with a time needed to open and/or removing the alternative lock without key in less than 4 minutes, must leave clearly visible damage to the bicycle after the test.

An attempted attack is stopped if the total locking system of the tested alternative lock lost its anti-theft characteristics and the vehicle itself can be moved in a "normal way".

4.5.2.3 2-wheeler security tethers (additional means) for frame locks

For additional-frame lock security tethers the following applies for the attacking tests:

- The connection point (bond) of the additional security tether to (or in) the frame lock, must withstand an attack resistance test with tools given in the applicable ART category for at least 120 seconds,
- Removing the security tether connection point to the frame lock may not influence the anti-theft performance of the frame lock (or alternative lock) itself.
  The lock must stay closed,
- The wire ropes (flexible part) of an additional security tether cable must withstand an attack resistance test with a 30 cm concreters nipper (see-appendix 5) for 60 seconds in total,
- The test result(s) of this extra tether part does not count for the (earlier mentioned) total number of attack test points that must be obtained per ART category for the frame lock.

4.5.2.4 Attack tests and judgement of the test results ART5 locks

Intelligent tests (manipulating/lock picking):

The manipulating/lock picking tests shall be performed according to EN-15496.
The "**normal time**" value used in formulas of the above-mentioned standard is: 180 seconds.

Remarks:
For this ART directive normative-, informative-, and extra-EN requirements are used.
A lock pick test is stopped after 270 seconds (150 % of the "normal time" of 180 s).
*(270 s will be **the maximum test time** value used in the formulas for calculating "**m***").*

Sub 1 When performed the 10 lock picking tests and one or more locks are opened then the lock shall gain a (calculated) lock picking test value "***m****" of at least 342.
*(if there are opened locks the value "**m***" can be calculated by divide the total picking time of all locks ("**u**") by the number of locks opened ("**d**")).*

Sub 2 Not more than one (1) lock shall be opened within 36 seconds.
(not more than 10% of the locks may be opened in less than 20% of the normal time).

Sub 3 At least 3 locks shall resist 270 seconds of lock picking.
(at least 30% of the locks must resist picking for 150 % of the normal time)

Sub 4 The **average picking time** during the 10 lock picking tests shall be at least 150 seconds.

Sub 5 If one lock is opened within 36 seconds then all 10 lock samples shall be re-tested again on this specific manipulating/lock picking method.
After additional testing, the new calculation of "***m****" shall be based on the 20 tests that have been carried out.
Remark: This is an extra ART requirement to prevent a theft method that can open all locks.

Sub 6 The last paragraph of EN-15496 requirement 6.8.5.3 does not apply.
This means that locks, opened by picking, shall not have to be function normally after the test.

Brute force tests:

Sub 7 Heavy tools are allowed for the brute attack tests (e.g. stubby hammer 1.5 kg, crowbar 1m).

Sub 8 The maximum number of 3 (complete) tools shall be used (because of the heavier tools used).
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Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

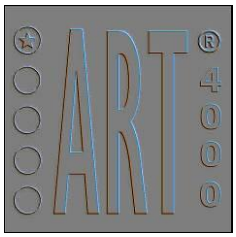
Appendix 1: Images of the ART quality mark

The ART quality marks (colour: PMS-158 or similar) to be used on stickers or printed on/in colour print packaging, user manuals, etc.

Examples of printed, lasered or die-stamped marks **on/in** the product:

Printed (e.g. B&W)

Printed in negative



Injection-molding

Explanation of the 4-digit ART number in the ART quality mark:

4 The Homologation Directive MBT version number (04)

0 0 0 Part of the unique ART (certificate) approval number (start with 001 in case of a new ART Directive (above))

Explanation of the number of stars in the ART quality mark:

1 Star/ART1 = Category 1 approved
(in general* a good 2nd lock for (E-)bikes/cargo-bikes)
(extra 2nd lock obligation by Dutch bike theft insurers)

2 Star/ART2 = Category 2 approved
(in general* for use on bicycles)
(the minimum level for Dutch bicycle theft insurers)

3 Star/ART3 = Category 3 approved
(in general* for use on high risk of theft bicycles, moped and scooters)

4 Star/ART4 = Category 4 approved
(in general* for use on motorcycles)
(at home and/or out door parking)

5 Star/ART5 = Category 5 approved
(in general* for use on high risk of theft motorcycles)
(mainly for at home use)

*) Remark: specific situations can always demand for a higher ART category.

Notes: The ART quality mark is copyright protected.
In case of a direct print of the ART quality mark on the approved product (e.g. on a lock body) it is allowed to represent the star(s) without circle(s).

Appendix 2: Kinds, number of tests and minimum required test values per ART category

(including requirement values for attacking, torsion, tensile strength and cutting tests)

TESTS	**ART1**	**ART2**	**ART3**	**ART4**	**ART5**
Attacking tests	**5 x 3 min**	**6 x 3 min** (alternative lock: 6 x 5)	**7 x 3 min**	**9 x 3 min**	**19 x 3 min** (lock pick: 10 x 4,5)
Corrosion test	**X**	**X**	**X**	**X**	**X**
Dust test	**X**	**X**	**X**	**X**	**X**
Frost test	**X**	**X**	**X**	**X**	**X**
Torque strength test		**0,5 kNm**	**1 kNm**	**1,5 kNm**	**2,0 kNm**
Tensile strength test (locks): * *Tensile test:* ***1a*** *or* ***1b*** *(loop test)* * *Tensile test:* ***1c*** *(one string test)*	**7 kN** **3,5 kN**	**15 kN** **7,5 kN**	**30 kN** **15 kN**	**70 kN** **35 kN**	**100 kN** **50 kN**
Cutting strength test: (see remarks below)	**30 kN** (w/wo 15%)	**55 kN** (w/wo 15%)	**70 kN** (w/wo 15%)	**80 kN** (w/wo 15%)	**120 kN** **100 kN***
Tensile strength test (anchorage elements only): * *Tensile test method:* ***3***		**30 kN**		**60 kN**	
Pulling or pushing test (key mechanism retainer): * *Tensile test method:* ***4***	**5 kN**	**5 kN**	**5 kN**	**5 kN**	**15 kN**
Pulling test (additional means connection): * *Tensile test method:* ***5***	**5 kN**	**5 kN**	**5 kN**	**5 kN**	

Remark regarding the table: **"X**" means: "must be tested", "empty" means: "not applicable"
"(w/wo 15%)" means: with or without 15% bonus (see below).

Remarks:
A chain link will be cut by a machine only at one side of the link (opposite to the weld of the loop).
"Bonus rule" for ART1 till ART4 chain locks: If the chain link is cut and, after maximum travel of the machine cutting beaks, that chain loop still is one (intact) part (no other links cannot be detached), an extra 15% shall be added to the applied (measured) force as a "test value bonus".

) All* ***bolt* *numbers (1a till 5) mentioned above in the most left column TESTS applies to the TMS-05 (tensile) test method numbering.*

The-ART5 cutting tests value >100 kN applies to "protected" padlock hasps (impossible to access with a 60 cm boltcropper)
The ART5 cutting tests value >120 kN applies to (all other) unprotected ART5 lock parts (e.g. chain links, U-lock shackles, uncovered padlock shackles, etc.).

(to be continued, see next page)

Appendix 2 (continued): Tests to be performed by test equipment per different type of locks (security system).

Kind of **test** (→) and Kind of **product** (↓)	Frost resistance	Corrosion resistance	Dust resistance	Torque strength	Tensile strength	Cutting resistance	Push or pull resistance (key retainer)	Free fall resistance	Vibration-resistance	ART Power-key resistance
Frame locks (e.g. ring lock and shut pin locks)	**X**	**X**	**X**			**X**	**X**			**X**
Additional tether (chain/cable/other)					**X** ***(b)***	**X**				
U-shackle lock	**X**	**X**	**X**	**X** ***(d)***	**X** **(test-1a)**	**X**	**X**			
Cable lock	**X**	**X**	**X**		**X**	**X** ***(a)***	**X**			
Chain lock	**X**	**X**	**X**		**X**	**X** ***(a)***	**X**			
Folding lock	**X**	**X**	**X**	**X** ***(d)***	**X**	**X**	**X**			
Brake disk lock	**X**	**X**	**X**			**X** ***(a)***	**X**			
Anchorage elements		**X**			**X**	**X**				

<u>Extra</u> tests to be performed on a mechatronic or "e-lock" and their parts.

Remote controls and e-locks								**X** ***(c)***		
Mechatronic or e-lock <u>frame locks</u>									**X**	

Remark regarding the tables: **"X**" means: "must be tested", "empty" means: "not applicable"

Remarks:
(a) For ART1 till ART4 locks the cutting test by a machine (test equipment) on a lock (e.g. padlock shackle) should be performed <u>only</u>, if there is enough space, in locked position, for performing an attacking test by a person using the scissors for reinforced metal (judged by means of a simple accessibility check).
For ART5 locks the machine cutting test (e.g. on a padlock hasp) must be performed always (no exceptions).

(b) The additional security tether (chain links, cable, other) as whole will be tensile strength tested in a-loop. On the connection point (bond) of the additional security tether to the frame lock (including e.g. the first link of the chain or the first part of the cable) a pulling test (4.2.11) should be performed (force applied in the direction of opening/extracting of that additional security tether).

(c) The drop tests <u>shall not</u> be performed on smart phones, mobile phones or on mechatronic frame locks.

(d) The (machine) torque strength test <u>shall not</u> be performed on ART1 locks.

Appendix 3: Tools that can be used during attacking tests, per ART category:

SET A (small tools)

	ART1	ART2	ART3	ART4	ART5
Scissor for reinforced metal 60 cm		X	X	X	X
Concreters nippers	X	X	X	X	X
Water-pump pliers 24 cm	X	X	X	X	X
Saw blades HSS	X	X	X	X	X
Saw blades tungsten		X	X	X	X
Adjustable wrench	X	X	X	X	X
Set of combination spanners (open-end)	X	X	X	X	X
Set of screw drivers	X	X	X	X	X
Set of chisels	X	X	X	X	X
Various standard pliers	X	X	X	X	X
Various standard knives	X	X	X	X	X
Bench hammer 200 gram	X				
Bench hammer 500 gram		X	X	X	X
Rim tool 30 cm	X	X	X	X	X
Pipe wrench 30 cm	X	X	X	X	X

Remark regarding the table: **"X**" means: "can be used", "empty" means: "not allowed"

SET B (mechanical lock picking tools)

	ART1	ART2	ART3	ART4	ART5
Tools for tubular locks	X	X	X	X	X
Picking set	X	X	X	X	X
Pistol pick	X	X	X	X	X
Disc cylinder lock pick	X	X	X	X	X
Tools for various key profile locks	X	X	X	X	X

Remark regarding the table: **"X**" means: "can be used", "empty" means: "not allowed"

SET C (various "simple objects" for manipulating use)

	ART1	ART2	ART3	ART4	ART5
Paperclips etc.	X	X	X	X	X
Ballpoints	X	X	X	X	X

Remark regarding the table: **"X**" means: "can be used", "empty" means: "not allowed"

(See the appendix 5 pages below for a description and images of the above mentioned tools)

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 3 (continued): Tools that can be used during attacking tests, per ART category:

SET D (large tools)

	ART1	ART2	ART3	ART4	ART5
Cable pliers			**X**	**X**	**X**
Water-pump pliers 50 cm			**X**	**X**	**X**
Nail puller 50 cm			**X**	**X**	**X**
Slide hammer 1000 gr.			**X**	**X**	**X**
Pipe spanner 60 cm			**X**	**X**	**X**
Rim tool 50 cm			**X**	**X**	**X**

Remark regarding the table: **"X"** means: "can be used", "empty" means: "not allowed"

SET E (cordless (battery powered) tools)

	ART1	ART2	ART3	ART4	ART5
Cordless drilling machine 14,4 V			**X**	**X**	**X**
High Speed Steel (HSS) drills (set)			**X**	**X**	**X**
Cobalt steel drills (set)				**X**	**X**
Cordless angle grinder 12V				**X**	**X**
Abrasive cut-off discs (1 mm thick)				**X**	**X**

Remark regarding the table: **"X"** means: "can be used", "empty " means: "not allowed"

SET F (electrical lock picking)

	ART1	ART2	ART3	ART4	ART5
Electrically powered lock picking tool				**X**	**X**

Remark regarding the table: **"X"** means: "can be used", "empty" means: "not allowed"

SET G (Heavy tools, for ART2 or ART4 <u>anchorage elements</u> and <u>ART5 locks</u>)

	ART1	ART2	ART3	ART4	ART5
Stubby hammer 1500 gram		**X**		**X**	**X**
Crow bar 100 cm (pinch)		**X**		**X**	**X**
Crow bar 140 cm (wedged)				**X**	

Remark regarding the table: **"X"** means: "can be used", "empty" means: "not allowed" or N/A.

(See the appendix 5 pages below for a description and images of the above mentioned tools)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 4: Number of attacking tests per ART category and tools for those tests

	ART1	ART2	ART3	ART4	ART5
Brute force tests	4	≥ 4	≥ 4	≥ 6	9
Intelligent tests	1	≥ 1	≥ 2	≥ 2	10
Total number of tests	**5**	**6**	**7**	**9**	**19**
Sets of tools (to choose from)	A+B+C	A+B+C	A+B+C+ D (+E)	A+B+C+ D+E+F	A+B+C+ D+E+F+G

Remarks:
In case of (wall/floor/ground) anchorage elements, the testing facility can differ the number of tests.

Division and performance of brute and intelligent attacking tests
If the exact division between brute force tests and intelligent tests (lock picking or manipulating) cannot be followed, at least it must be tried that the total number of tests should be performed.

For ART5 the intelligent tests shall be performed according to the EN15496 lockpick-test method (for details see paragraph 4.5.2.4).
For ART4 and ART5 the intelligent tests are preferred to be divided into tests using the mechanical manipulating tools and tests using electrical powered / cordless powered manipulating tools.

Restrictions in the use of attack test tools
For various tools and categories (ART1 till ART5) there is a limitation on the use of specific tools.
Each limitation for the use of the tools is clearly described in the tool list of Appendix 5.
Examples of restrictions to the use of (attack) tools:

- Time to use a tool (allowed time to use a hacksaw (≤ 30, 45, 60, 90 s.) or bench hammer (≤ 90 s.)),
- The length of a tool (the larger dimension tool versions are used for higher ART categories only),
- The use of battery powered tools (those are used for higher ART categories only),
- How to use a tool (a bolt cropper or pipe-spanner must not be used as hammer tool),
- Etc.

Combination of various tools during an attack test
For various tools and categories (ART1 till 5) there is a limitation on the combination of different tools.
Each limitation for the combination of the attack tools is clearly described in the tool list of Appendix 5.
Combination of tools from different sets (till the "highest" set as for the applicable ART category) is permitted (preferred) and this has to be common practice.
Example: before performing lock picking tests, the plastic covering of the lock housing can be removed with tools from another set, in order to get better access to the cylinder with picking tools.
For ART5 locks the number of tools to use is limited to 3 tools (max!) because these tools are heavier.

Use of tools and additional small equipment
If a tester or lock expert has doubts about the quality of a lock during the performance of attacking tests, it is permitted to repeat the test with use of exactly the same tools, on another sample.
It is allowed to use small pieces of rope or tie wraps etc. to fixate a lock that is not mounted to the two-wheeled vehicle.

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5: Specification and the use of the tools as mentioned in Appendix 3

The tools are standard tools, small adaptations are allowed (e.g. sharpening a screwdriver); large adaptations are not allowed (e.g. welding attachments to the tools). Tools has to be used as could be used in common practice (e.g. screwdriver can be used as a small chisel or to pry open the lock). Only a hammer is to be used as "hammering tool" (e.g. a pipe spanner cannot be used as hammer).
REMARK: Trade mark (brand) and/or **Type number** of under mentioned tools can change if the tool is similar and can match the quality of the original tool (judgement by visual inspection and/or testing).

Photo 1:
Tool: **Bolt cropper (Scissors for reinforced metal)**
Brand: **BAHCO / FACOM**
Type info: **990.BF1 / B1 (± 60cm or 24")**

Category: **ART2:**
- Not to be used after a hacksaw attack (sawing),
- Cutting with one scissor arm on the floor is allowed (if possible in practice).

Categories: **ART3, ART4** and **ART5:**
- Cutting after a hacksaw attack (sawing) is allowed,
  Cutting with one scissor arm on the floor is allowed (if possible in practice).

Remarks: It is not allowed anymore to use the bolt cropper for ART1 tests (since 2022).
It is not allowed to use this tool as (e.g.) a hammer or use the arms as a crow bar.

Photo 2:
Tool: **Concreters nippers**
Brand: **KNIPPEX**
Type info: **99-00-300 (± 30cm)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 30 cm (or ≤ 12").

Photo 3:
Tool: **Water-pump pliers (medium)**
Brand: **GEDORE**
Type info: **142-10 (± 25cm)**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 25 cm (or ≤ 10").

Photo 4:
Tool: **Water-pump pliers (large)**
Brand: **GEDORE**
Type info: **145-20 (± 50 cm)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum length 50 cm (or ≤ 20").

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 5:

Tool: **Hacksaw with HSS saw blade**
Brand: **SANDFLEX/BAHCO**
Type info: **HSS Bi-Metal 12"/300 mm, 18 TPI or 24 TPI**

Categories: **ART1** and **ART2:**
- To be used for a maximum sawing time of 45 seconds (≤ 45 s), No change of hacksaw blades during the test.

Categories: **ART3, ART4** and **ART5:**
- To be used for a maximum sawing time of 90 seconds (≤ 90 s), No change of hacksaw blades during the test.

Photo 6:

Tool: **Hacksaw with Tungsten/Carbide grit) saw blade**
Brand: **RemGrit/BAHCO/Stanley**
Type info: **GH 12" / K4 Tungsten / Carbide grit 12"/300 mm,**

Category: **ART2:**
- To be used for a maximum sawing time of 30 seconds (≤ 30 s),
- No change of hacksaw blade during the test.

Categories: **ART3, ART4** and **ART5:**
- To be used for a maximum sawing time of 60 seconds (≤ 60 s),
- No change of hacksaw blades during the test.

Remark: It is not allowed anymore to use the Tungsten hacksaw blade for ART1 tests (since 2022).

Photo 7:

Tool: **Adjustable wrench**
Brand: **GEDORE**
Type info: **60 P / 10-250 (± 25 cm)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 25 cm (or ≤ 10”).

Photo 8:

Tool: **Set of combination spanners (single open-end)**
Brand: **GEDORE**
Type info: **Series 1B or No. 7 spanners (various lenghts)**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 25 cm (or ≤ 10”).

Categories: **ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 60 cm (or ≤ 24”).

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 9:

Tool: **Set of screw drivers (slot/philips/torx, etc.)**
Brand: **GEDORE**
Type info: **2154SK series (sets: hexagon bolster versions)**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 25 cm (or ≤ 10").

Categories: **ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 40 cm (or ≤ 16").

Photo 10:

Tool: **Set of chisels and pinches**
Brand: **PB SWISS TOOLS / HABERO / Stanley**
Type info: **Various sets**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 15 cm (or ≤ 6").

Categories: **ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 25 cm (or ≤ 10").

Photo 11:

Tool: **Various standard pliers, cutters and scissors**
Brand: **GEDORE / KNIPPEX / OTHER**
Type info: **Max length ± 20 cm (or 8")**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use. Maximum length 20 cm (or ≤ 8").

Photo 12:

Tool: **Various standard knives**
Brand: **Not applicable (with or without brand marking)**
Type info: **Not applicable (easy to find or low cost knives)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 13:
Tool: **Bench hammer (light)**
Brand: **GEDORE / PEDDINGHAUS /HABERO**
Type info: **200 gr. Hickory handle + sleeve (DIN/ISO: 1041)**

Category: **ART1 only:**
- To be used for a maximum hammer time of 90 seconds (≤ 90 s).

Photo 14:
Tool: **Bench hammer (medium)**
Brand: **GEDORE / PEDDINGHAUS /HABERO**
Type info: **500 gr. Hickory handle + sleeve (DIN/ISO: 1041)**

Category: **ART2:**
- Not to be used after a hacksaw attack (sawing),
  To be used for a maximum hammer time of 90 seconds (≤ 90 s).

Categories: **ART3, ART4** and **ART5:**
- To be used for a maximum hammer time of 90 seconds (≤ 90 s).

Photo 15:
Tool: **Stubby hammer (heavy)**
Brand: **GEDORE / PEDDINGHAUS / HABERO**
Type info: **1500 gr. Hickory handle + sleeve (DIN/ISO: 6475)**

Categories: **ART2** or **ART4** (wall/floor/ground) anchorage elements:
- To be used for a maximum hammer time of 90 seconds (≤ 90 s).

Category: **ART5** locks:
- To be used for a maximum hammer time of 90 seconds (≤ 90 s),
  Not more then 2 other tools can be used during an ART5 attack test.

Photo 16:
Tool: **Rim tool (small)**
Brand: **GEDORE**
Type info: **No. 38/12" (± 30 cm)**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 30 cm (or ≤ 12").

Photo 17:
Tool: **Rim tool (large)**
Brand: **GEDORE**
Type info: **No. 38/20" (± 50 cm)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum length 50 cm (or ≤ 20").

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 18:
Tool: **Pipe wrench(es) (small)**
Brand: **BAHCO**
Type info: **No. 140/141 Swedish Model 90°**

Categories: **ART1** and **ART2:**
- No restrictions in test use. Maximum length 30 cm (or ≤ 12").

Photo 19:
Tool: **Pipe wrench (large)**
Brand: **GEDORE**
Type info: **No. 175 series DIN/ISO 5234 (± 60 cm)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum length 60 cm (or ≤ 24").

Remark: It is not allowed to use this tool as a hammer.

Photo 20:
Tool: **Mechanical lock picking tools (tubular lock picks)**
Brand: **HPC / OTHER (WENDT)**
Type info: **Various types (easy to purchase, reasonable price)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

Photo 21:
Tool: **Mechanical lock picking tools (picking sets)**
Brand: **Various brands (e.g. WENDT)**
Type info: **Various types (easy to purchase, reasonable price)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

Photo 22:
Tool: **Mechanical lock picking tools (pistol picks)**
Brand: **HPC / ILCO / OTHER (WENDT)**
Type info: **Various types (easy to purchase, reasonable price)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 23:
Tool: **Mechanical lock picking tools (lock picks for discs)**
Brand: **SILVERBULLET / H&H / OTHER (WENDT)**
Type info: **Various types (Magic Bullet II / Pick and Decoder)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

Photo 24:
Tool: **Mechanical lock picking tools (key-specific design)**
Brand: **Various brands (e.g. WENDT)**
Type info: **Various types (easy to purchase, reasonable price)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

Photo 25:
Tool: **Various simple objects (tools) for manipulating**
Brand: **Not applicable (with or without brand marking)**
Type info: **Not applicable (easy to find or low cost tools)**

Categories: **ART1, ART2, ART3, ART4** and **ART5:**
- No restrictions in test use.

Photo 26:
Tool: **Electrical powered / Cordless powered lock picker**
Brand: **ZIEH-FIX / OTHER (WENDT)**
Type info: **Electro-Pick 3600**

Categories: **ART4** and **ART5 only:**
- No restrictions in test use.

Photo 27:
Tool: **Cable plier (large)**
Brand: **FELCO / OTHER**
Type info: **C 16 (± 60 cm)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum length 60 cm (or ≤ 24”).

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Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 28:
Tool: **Nail puller (large)**
Brand: **FACOM / HABERO**
Type info: **1260.50 / 120 – 500 (± 50 cm)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum length 50 cm (or ≤ 20").

Remark: It is not allowed to use this tool as a hammer.

Photo 29:
Tool: **Slide hammer (medium impact mass)**
Brand: **MIDLOCK / WENDT**
Type info: **With ZIEH FIX® Pull Screws (slider mass ± 1 kg)**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use. Maximum slider mass 1 kg (or 2 lbs),
- The Cordless drill machine can be used for insert "Pull Screws".

Photo 30:
Tool: **Cordless drill (with HSS twist drill bits)**
Brand: **MAKITA / OTHER**
Type info: **DDS440 (14,4V, 3.0Ah) / HSS steel quality drill set**

Categories: **ART3, ART4** and **ART5 only:**
- No restrictions in test use.
- Change emptied batteries or drills during the test is allowed,
- The machine with screw bits can also be used for attack tests. (e.g.: remove nuts, bolts, screws or insert "Pull Screws")

Photo 31:
Tool: **Cordless drill (with HSS-Cobalt twist drill bits)**
Brand: **MAKITA / OTHER**
Type info: **DDS440 (14,4V, 3.0Ah) / HSS-Cobalt steel drill set**

Categories: **ART4** or **ART5 only:**
- No restrictions in test use,
- Change emptied batteries or drills during the test is allowed.

(to be continued, see next page)

Appendix to ART homologation directive MBT-04, mechanical security systems for two-wheeled vehicles.

Appendix 5 (continued): Specification and the use of the tools as mentioned in Appendix 3

Photo 32:

Tool: **Cordless angle grinder (+abrasive cut-off discs)**
Brand: **BOSCH / OTHER**
Type info: **GWS 12V-76 (3.0 Ah) / disc INOX 76x1 mm**

Category: **ART4:**
- To be used for a maximum grinding time of 60 seconds (≤ 60 s),
- Open the anti-theft device only by means of abrasive cutting,
- No other (attack) tools to be used (before-during-after a test),
- Change emptied batteries or discs during a grinder attack test is allowed,
- Remark: If there are access difficulties, the tools protective cover can be temporarily removed.

Category: **ART5:**
- To be used for a maximum grinding time of 120 seconds (≤ 120 s),
- Open the anti-theft device only by means of abrasive cutting,
- No other (attack) tools to be used (before-during-after a test),
- Change emptied batteries or discs during a grinder attack test is allowed.
- Remark: If there are access difficulties, the tools protective cover can be temporarily removed.

Photo 33:

Tool: **Pinched crowbar (heavy)**
Brand: **DEWIT / HABERO / OTHER**
Type info: **7006 / 152 – 1000 (± 100 cm)**

Categories: **ART2** and **ART4** (wall/floor/ground) anchorage elements
- No restrictions in test use. Maximum length 100 cm (or ≤ 40”),

Category: **ART5 (**locks):
- No restrictions in test use. Maximum length 100 cm (or ≤ 40”),
  Not more then 2 other tools can be used during the ART5 attack test.

Photo 34:

Tool: **Wedged crowbar (heavy)**
Brand: **DEWIT / HABERO / OTHER**
Type info: **7003 / 151 – 1500 (± 140 cm)**

Category: **ART4** (wall/floor/ground) anchorage elements **only**
- No restrictions in test use. Maximum length 140 cm (or ≤ 56”),