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# ANTI - BURGLARY MANUAL

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Master Italy avails of its own R&D department that includes the MasterLab testing lab, which has been working on innovation since 2008, as well as on the evolution of legislation regarding doors and windows accessories and on the increasingly growing market.

MasterLab is equipped with the most modern software, methodological and experimental instruments to carry out:

#### **RESEARCH, STUDY AND DESIGN:**

- Design of new products and improvement of existing products;
- Prototyping and industrialization of the finished product with 3D conceptual development methods, Numerical validation by Finite Element Method and experimental validation of the concept in the laboratory;

#### **EXPERIMENTAL AND DEVELOPMENT ACTIVITIES:**

- Measurement of product performance with air permeability, water tightness, wind load resistance and durability tests;
- Mechanical specifications of the materials;
- Certification of products in collaboration with national and international notified laboratories;
- “Witness testing” and ITT (Initial Test Type) services offered to doors and windows accessories manufacturers to measure energy and safety performance with the to obtain the CE marking (work carried out in collaboration with national and international certification bodies);

#### **CUSTOMER SUPPORT ACTIVITIES:**

- Advice on customization of new products;
- Study and design for adapting parts to existing systems and evaluation of the consequent performance of the finished product.

MasterLAB has 71 national and international patents/utility models, many of which are internationally registered. We offer our services by constantly focusing on all aspects related to research and development, operating in the field of design, development and testing of accessories/components for opening and closing systems for doors and windows.

**WME** think,  
create,  
innovate,  
inspire.

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## Legal framework

Discussions between Member States and the consultation of national statistics on how apartment burglaries occur, have helped defining methodologies and procedures that, thanks to the combination of static loads, dynamic impact tests and the use of specific tools and attack times in manual testing, classify the strength of the door and window frame according to a series of classes corresponding to the modus operandi of the thief.

The result of sharing and discussing the needs of the various Member States has led to the establishment of rules, within the European framework, for the determination of the class of resistance to forced entry attempts and thus the release of the following regulations:

- EN1627 - Requirements and classification
- EN1628 — Test method for determining resistance under static load
- EN1629 — Test method for determining resistance under dynamic load
- EN1630 — Test method for determining resistance to manual attack

As you can see from the definitions of resistance classes below, the most significant leap occurs between classes 3 and 4.

The regulation highlights how the group of classes from 1 to 3 is associated with the behaviour of an occasional and opportunistic thief not willing to run high risks. Typically, theft attempts of this type are carried out avoiding noise and for a limited time. In fact, these are also the most widespread burglary methods. In fact, this manual focuses on the Master products belonging to resistance classes RC2 and RC3.

Classes 4 to 6 are related to theft attempts made by professionals with complex equipment and preceded by careful planning and organization. The duration of operations and noise are not a problem for them.

Below is a description of the intended method and attempts to intrude specified in the standards for the different classes of resistance to burglary defined in EN1627.

### **Resistance class 1**

The random burglar attempts to access using small and simple tools and physical strength by kicking, shoulder pushing, lifting, and tearing.

The thief typically tries to take advantage of opportunities, he has no specific information about the level of resistance offered by the construction product, and he is worried about both time and noise. There is no specific knowledge of the possible property to steal, and the level of risk that the thief intends to face is low.

### **Resistance class 2**

The random thief usually attempts to enter using simple tools such as screwdriver, pincers, wedges and, in the case of exposed grilles and hinges, small hand saws. Mechanical drilling tools are not associated with this type of thief as a result of the use of anti-drilling inserts in cylinders. The thief typically tries to take advantage of opportunities, he has poor knowledge



of the level of resistance and he is concerned both by time and noise. There is no specific knowledge of the possible property to steal, and the level of risk that the thief intends to face is low.

### **Resistance class 3**

The thief attempts to enter using a crowbar, an additional screwdriver and hand tools such as a small hammer, punches and a mechanical drilling tool.

By using the crowbar, the thief has the opportunity to apply more force. With the drilling tool, the thief is able to break vulnerable locking devices.

The thief typically tries to exploit opportunities, has some knowledge of the probable level of resistance and is concerned by both time and noise. There is no specific knowledge of the possible property to steal, and the level of risk that the thief intends to face is medium.

### **Resistance class 4**

The skilled thief additionally uses a heavy hammer, axe, chisels and a portable cordless drill. The heavy hammer, axe and drill give the thief a greater number of break-in methods. The burglar foresees a reasonable reward and can be determined in his intrusion effort. He is also less concerned about the level of noise made and he is prepared to take a greater risk.

### **Resistance class 5**

The experienced burglar also uses electrical tools such as drills, reciprocating saw and sabre saw and a grinding wheel with a disc of up to 125 mm in diameter. The use of the angle grinding wheel further expands the range of possible successful break-in methods. The burglar foresees a reasonable reward, is determined in his intrusion efforts and he is well organized. He is also little concerned about the level of noise made and is prepared to take a high level of risk.

### **Resistance class 6**

The experienced burglar also uses a mallet, high-performance power tools such as drills, reciprocating saw and sabre saw and an angle grinding wheel with a disc of up to 230 mm in diameter. Tools can be operated by one person, have a high level of performance and are very powerful and effective. The burglar foresees a good reward, is determined in his intrusion efforts and is well organized. He is also not concerned about the level of noise made and is prepared to assume a high level of risk.

## Infill

Starting from class RC2, the regulation provides minimum requirements for glazing, in the case of multi-panel insulating glazing, at least one must meet the following requirements. The resistance classes are defined in accordance with EN 356.

| Resistance class | Resistance class of glazing EN 356 |
|------------------|------------------------------------|
| RC1N/RC2N        | No requirements                    |
| RC2              | P4A                                |
| RC3              | P5A                                |
| RC4              | P6B                                |
| RC5              | P7B                                |
| RC6              | P8B                                |

TABLE 1 GUIDE FOR THE SELECTION OF GLASS FOR CERTIFIED ANTI-BURGLARY DOOR AND WINDOW FRAMES AND ACCESSORIES

## Resistance class RC2

### Place of installation

- home environment with high risk of burglary or sensitive areas of the workplace

### Expected break-in method

- The occasional burglar tries to force the window using simple tools: screwdrivers, wedges, pincers.

### Test procedure

- Static load test 3 kN (Figure 1)
- dynamic test  $H_{fall} = 450$  mm (Figure 3)
- manual attack test for tools in group A2  $T_{attack} = 3$  minutes (Figure 2)

### Minimum strength class of outer glazing sheet

- P4A (Table 1)

## Resistance class RC3

### Place of installation

- businesses at high risk of burglary (jewellery stores, banks, etc.)

### Expected break-in method

- The burglar attempts to enter using tools that allow him to apply greater force: crowbar, mechanical driller.

### Test procedure

- Static load test 6 kN (Figure 1)
- dynamic test  $H_{fall} = 750$  mm (Figure 3)
- manual attack test tools in group A3  $T_{attack} = 5$  minutes (Figure 2)

### Minimum strength class of outer glazing sheet

- P5A (Table 1)



FIGURE 1 PICTURE SHOWING A STATIC ATTACK TEST FOR RC2 OR RC3 TEST



FIGURE 2 PICTURE SHOWING A MANUAL ATTACK TEST FOR RC2 OR RC3 TESTS

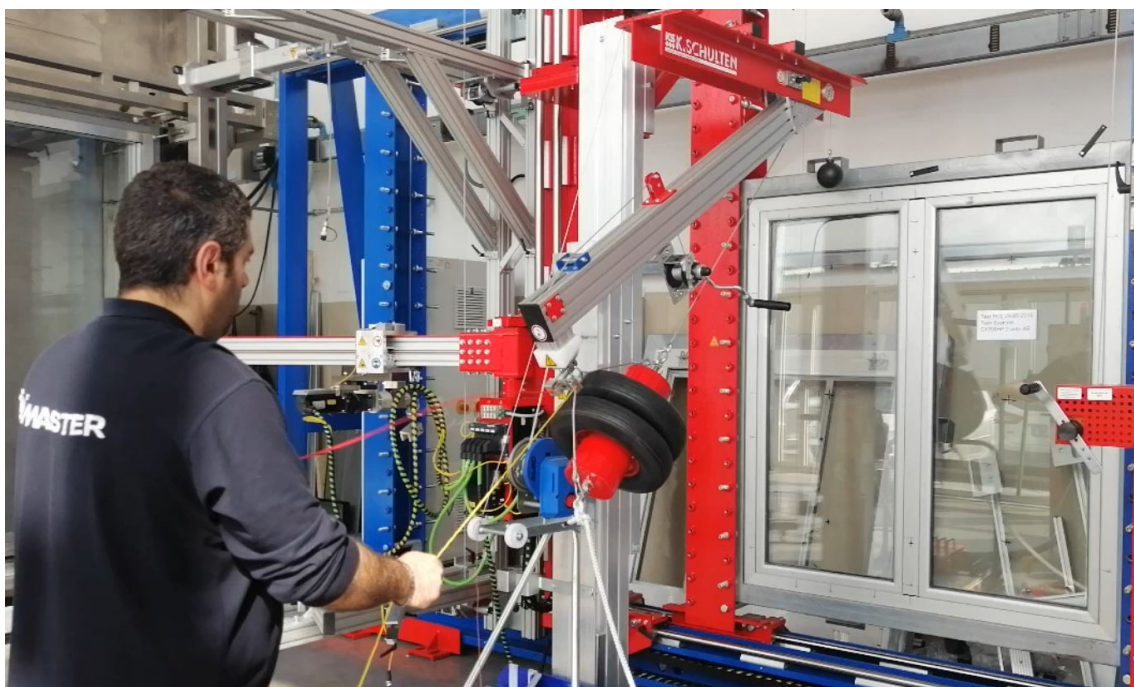


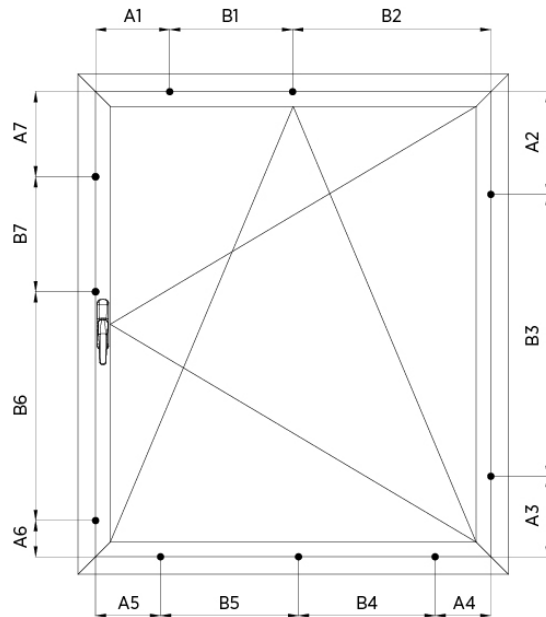
FIGURE 3 PICTURE SHOWING A DYNAMIC TEST FOR RC2 AND RC3 TESTS



## Extensibility rules

The standard allows extrapolating the results of a test according to the following extrapolation rules, if the frame size and the configuration are outside of these rules you must produce a complete technical documentation justifying the extension of the results of the test specimen.

- Variation Frame Area L x:
  - $H \pm 25\%$
- Distance of closing points from corner
  - $A1...A7 +5\%, -20\%$
- Distance between locking points
  - $B1...B7 +5\%, -30\%$



The number of closing points may be reduced only if the distance is less than that of the closing points of the test specimen.

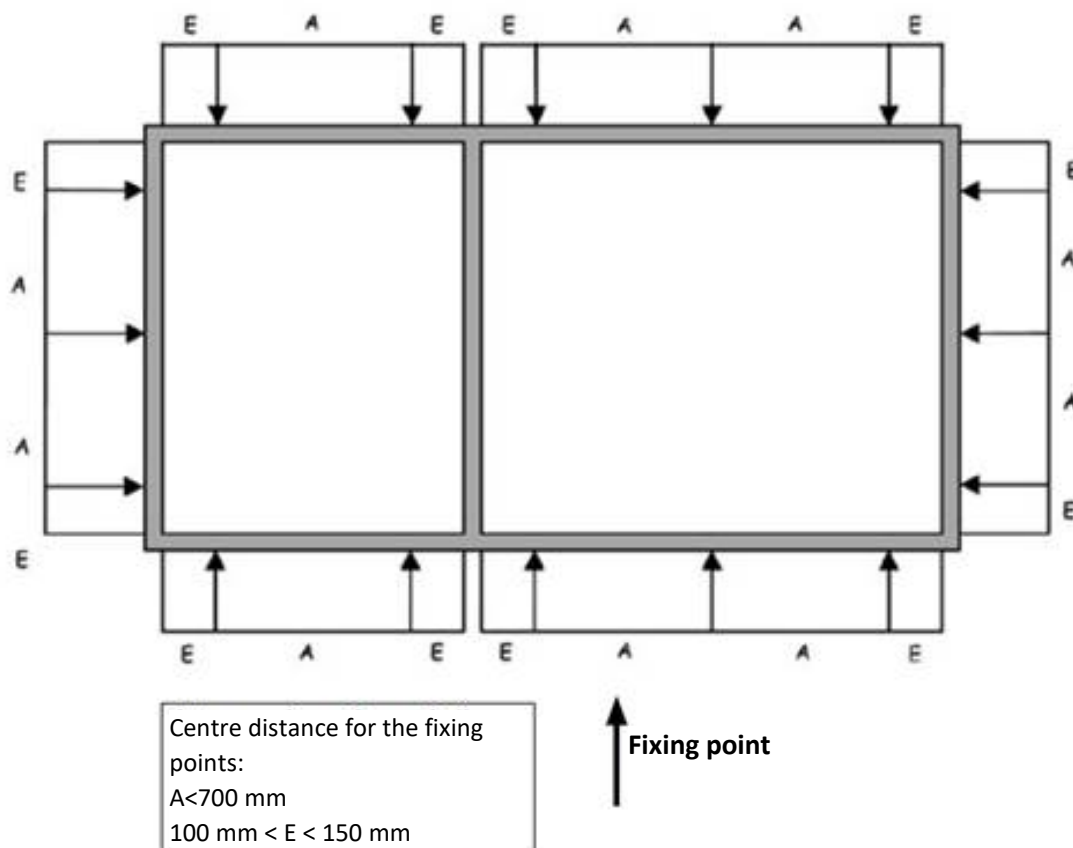
## Good practice rules

### Fixing to masonry

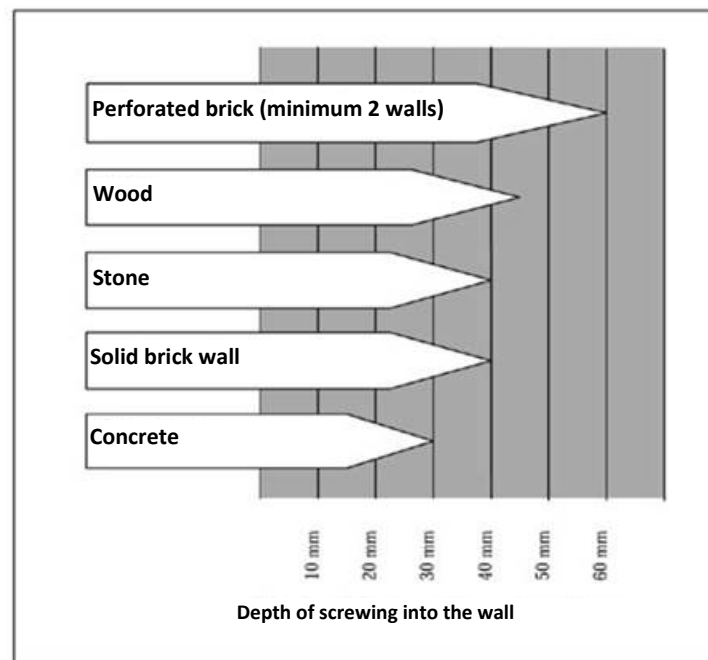
Use dowels suitable for different types of masonry able to ensure a sufficient anchorage to avoid the extraction of the same from the construction. Dynamic load tests (Figure 3) stress the anchorage points with shearing and bending force with panel and frame forces of 3000 N for class RC2 and 6000 N for class RC3

As a general indication, the following general indications can be observed as suggested in UNI 11673-1

1. the maximum distance between closing point and anchorage point to masonry is no more than 100 mm



2. Fixings must be properly sized according to the type of masonry



## Glass mounting

The glass must be installed with the glaze of the class specified in Table 1 from the outer side (anchoring side).

Having to pass the impact tests carried out with the aid of a 50 kg soft body dropped from a height of 450 mm for RC2 and 750 mm for RC3, it is appropriate to use a “*thread-in*” leaf system or install straight glazing beads, cut the latter in such a way as to block the shortest with the longest ones. The tubular glazing beads are a solution that ensures greater resistance.

An alternative solution is to use structural silicone (Dow Corning 895 type) to ensure the adherence of the glass to the profiles.

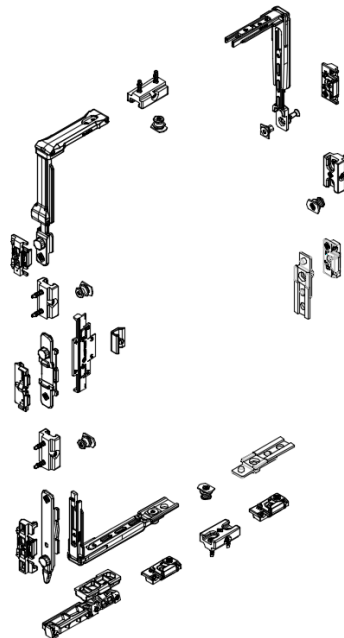
## The Master RC2 solution

### Eurogroove Chamber Profiles

The WEEN program for Eurogroove Chamber systems is characterized by a system of universal fasteners that match all types of hinges available in the Master offer, namely both exposed or concealed hinges, for one or two doors, therefore tilt and turn and casement.



The Master solution uses a burglar protection kit 3400A.53 that matches the basic solution, as shown in figure.



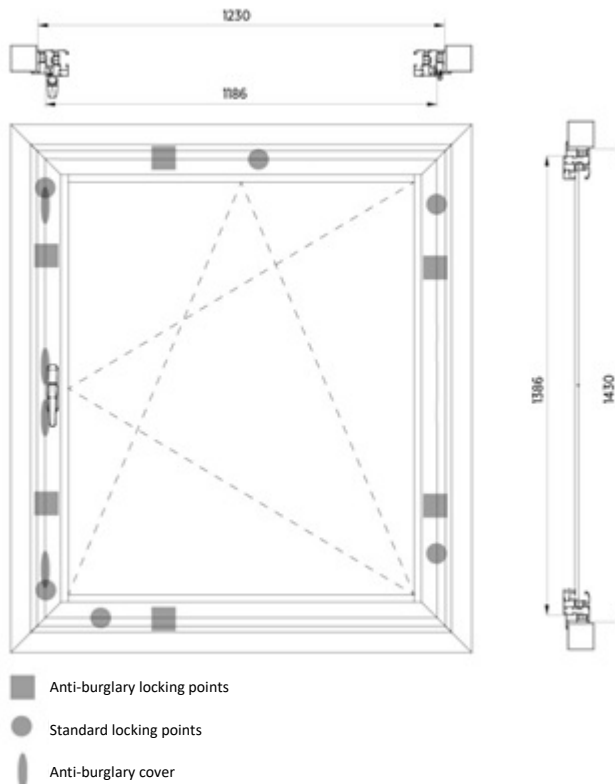
The number of anti-burglary locking points and their positioning are defined according to the profile, size and type of the frame.

The tests performed with the given dimensions have been successfully completed with the configuration shown in the figure.

## Window 1 leaf 1230 x 1430 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 29.8 \text{ cm}^4$
- Leaf:  $J_x \geq 37.7 \text{ cm}^4$



| Art.     | Description             | Pcs |
|----------|-------------------------|-----|
| 3320F.1  | Kit A/R Ween CE         | 1   |
| 3420.24* | Hinge Group Ween CE     | 1   |
| 3400.22* | Long Arm Ween           | 1   |
| 3400F.31 | Additional locking kits | 1   |
| 3420F.31 | Additional locking kits | 1   |
| 6037     | Cremone bolt with key   | 1   |
| 3400A.53 | Basic anti-burglary kit | 1   |

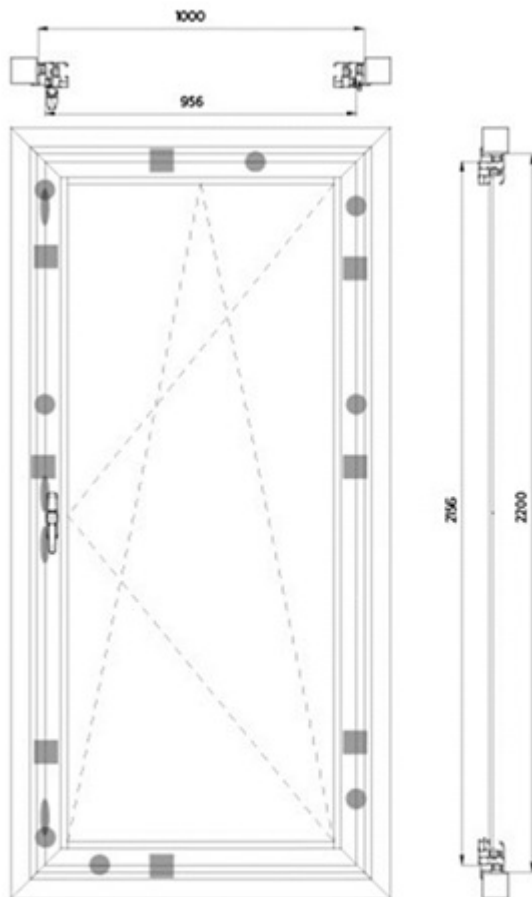
\* alternative hinge groups:

- Ween Hide 110: 3312D/S + 3312.20/21 D/S
- Ween Hide 180: 3302D/S + 3302.20/21 D/S

## Balcony door 1 leaf 1000 x 2200 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 29.8 \text{ cm}^4$
- Leaf:  $J_x \geq 37.7 \text{ cm}^4$



- Anti-burglary locking points
- Standard locking points
- ▬ Anti-burglary cover

| Art.     | Description                 | Pcs |
|----------|-----------------------------|-----|
| 3320F.1  | Kit A/R Ween CE             | 1   |
| 3420.24* | Hinge Group Ween CE         | 1   |
| 3400.22* | Long Arm Ween               | 1   |
| 3400F.31 | Additional locking kits     | 2   |
| 3420F.32 | Additional locking kits     | 2   |
| 6037     | Cremone bolt with key       | 1   |
| 3400A.53 | Basic anti-burglary kit     | 1   |
| 4247.7   | Anti-burglary locking point | 2   |

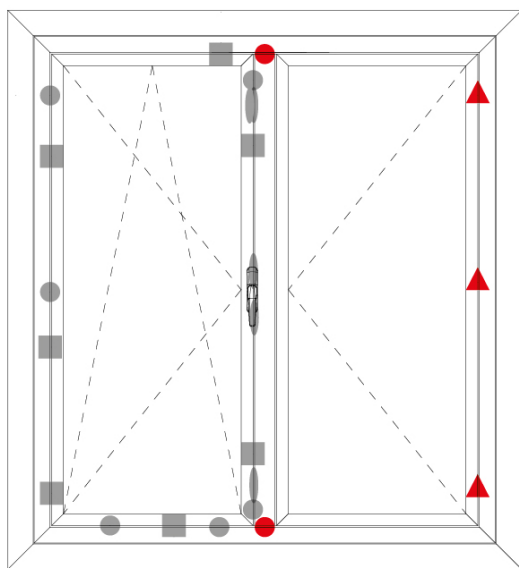
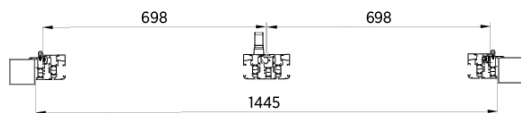
\*alternative hinge groups:

- Ween Hide 110: 3312D/S + 3312.20/21 D/S
- Ween Hide 180: 3302D/S + 3302.20/21 D/S

## Window 2 leaves 1445 x 1590 mm (W x H)

Reference sample:

- Frame:  $J_x \geq 29.8 \text{ cm}^4$
- Leaf:  $J_x \geq 37.7 \text{ cm}^4$
- Carry:  $J_x \geq 29.6 \text{ cm}^4$



-  Anti-burglary locking points
-  Standard locking points
-  Anti-burglary cover
-  Override
-  Steel poles



| Art.     | Description                         | Pcs |
|----------|-------------------------------------|-----|
| 3320F.1  | Kit A/R Ween CE                     | 1   |
| 3420.24* | Hinge Group Ween CE                 | 1   |
| 3400.22* | Long Arm Ween                       | 1   |
| 3420.23* | Kit A/R Ween CE side by side leaf   | 1   |
| 3400F.31 | Additional locking kits             | 2   |
| 3420F.32 | Additional locking kits             | 2   |
| 6037     | Cremone bolt with key               | 1   |
| 3400A.53 | Basic anti-burglary kit             | 1   |
| 4247.7   | Anti-burglary locking point         | 2   |
| 4532     | Anti-burglary kit side by side leaf | 1   |
| 4228     | Steel overrides                     | 3   |

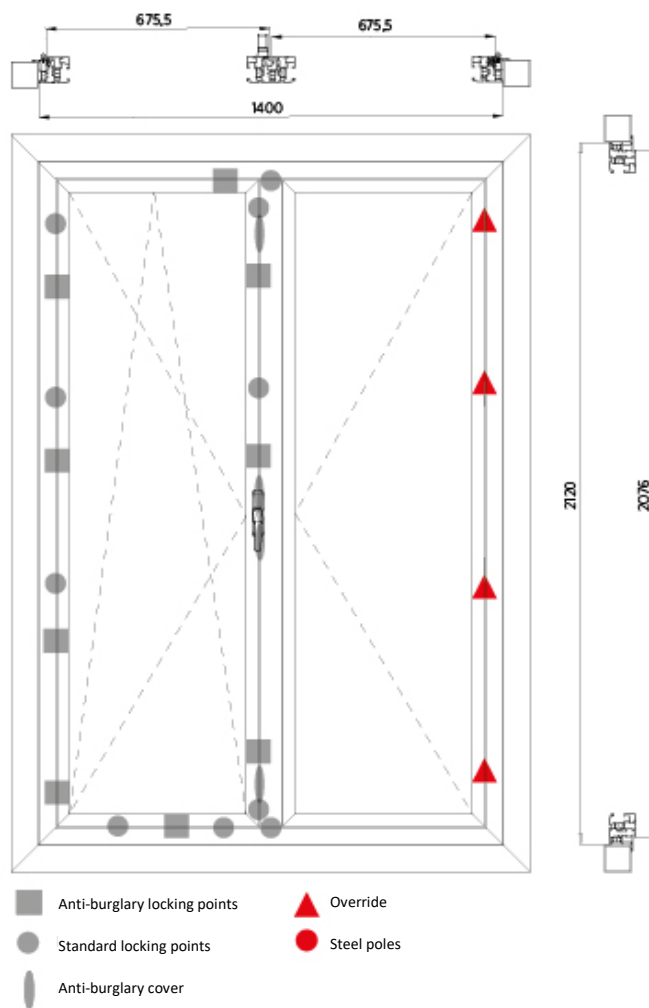
\* alternative hinge groups::

- Ween Hide 110: 3312D/S + 3312.20/21 D/S; 3312D/S + 3312.71D/S
- Ween Hide 180: 3302D/S + 3302.20/21 D/S; 3302 D/S + 3302.71 D/S

## Balcony door 2 leaves 1400 x 2120 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 29.8 \text{ cm}^4$
- Leaf:  $J_x \geq 37.7 \text{ cm}^4$
- Carry:  $J_x \geq 29.6 \text{ cm}^4$



| Art.     | Description                         | Pcs |
|----------|-------------------------------------|-----|
| 3320F.1  | Kit A/R Ween CE                     | 1   |
| 3420.24* | Hinge Group Ween CE                 | 1   |
| 3400.22* | Long Arm Ween                       | 1   |
| 3420.23* | Kit A/R Ween CE side by side leaf   | 1   |
| 3400F.31 | Additional locking kits             | 2   |
| 3420F.32 | Additional locking kits             | 4   |
| 6037     | Cremone bolt with key               | 1   |
| 3400A.53 | Basic anti-burglary kit             | 1   |
| 4247.7   | Anti-burglary locking point         | 3   |
| 4532     | Anti-burglary kit side by side leaf | 1   |
| 4228     | Steel overrides                     | 4   |

\* alternative hinge groups:

- Ween Hide 110: 3312D/S + 3312.20/21 D/S; 3312D/S + 3312.71D/S
- Ween Hide 180: 3302D/S + 3302.20/21 D/S; 3302 D/S + 3302.71 D/S

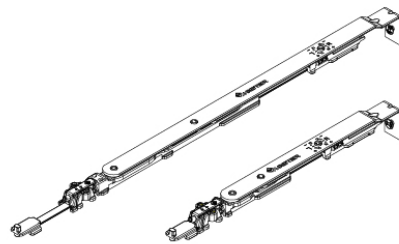
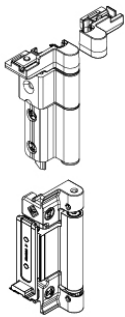


## ERRE groove

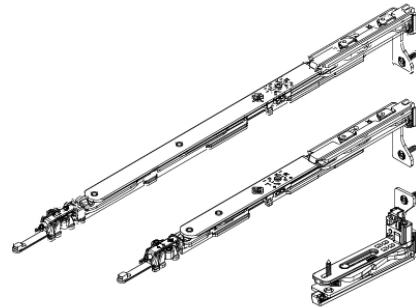
### Ween Tilt Leaf Program

The WEEN program for R40 systems is characterized by a system of universal fasteners that match all types of hinges available in the Master offer, namely both exposed and concealed hinges, for one or two doors, therefore tilt and turn and casement.

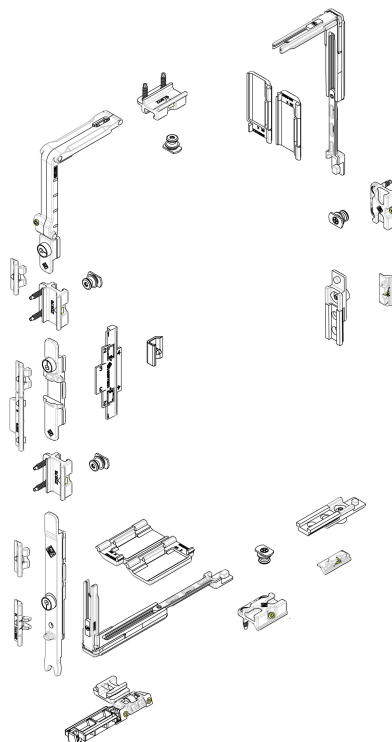
#### WEEN



#### WEEN HIDE 110



In combination with the standard Ween ERRE kit, the items of the anti-burglary kit 3421A.53 + A4533 must be used in accordance with the following schemes.



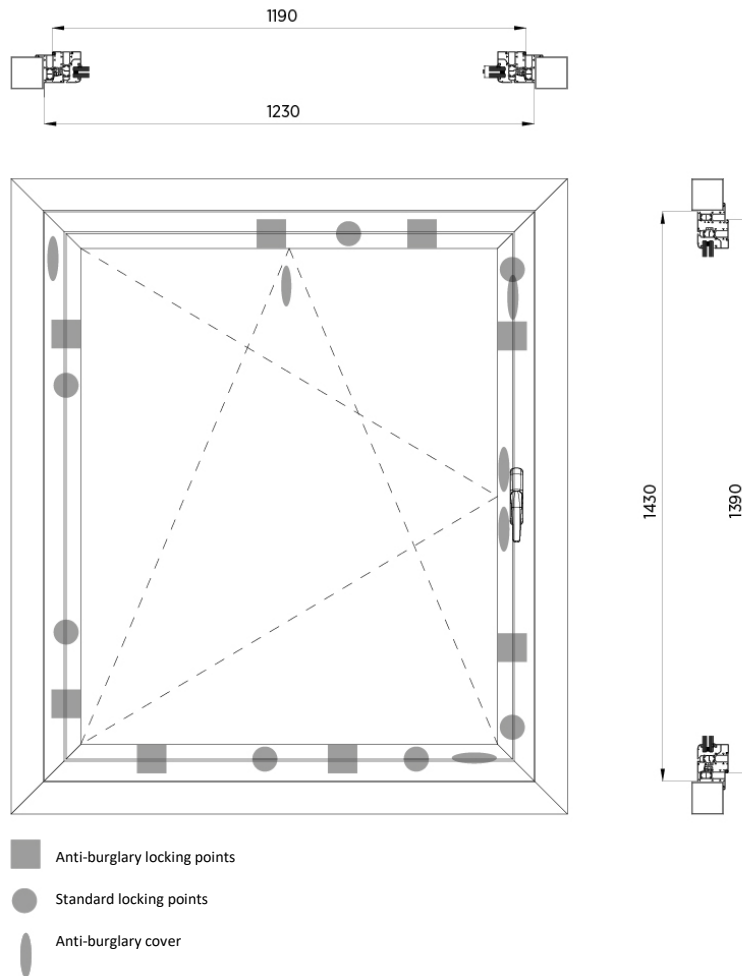
The number of anti-burglary locking points and their positioning are defined according to the profile, size and type of the frame.

The tests performed with the given dimensions have been successfully completed with the configuration shown in the figure.

## Window 1 leaf 1230 x 1430 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 30.6 \text{ cm}^4$
- Leaf:  $J_x \geq 38.1 \text{ cm}^4$



| Art.     | Description                    | Pcs |
|----------|--------------------------------|-----|
| 3321G.1  | Basic kit A/R<br>Ween ERRE     | 1   |
| 3421.24  | Hinge Group<br>Ween ERRE       | 1   |
| 3421.22  | Arm for A/R                    | 1   |
| 3421.31  | Additional<br>locking kits     | 2   |
| 3421.32  | Additional<br>closing points   | 2   |
| 6038     | Cremone bolt<br>with key       | 1   |
| 3421A.53 | Basic anti-<br>burglary kit    | 1   |
| 4247.8   | Anti-burglary<br>locking point | 2   |

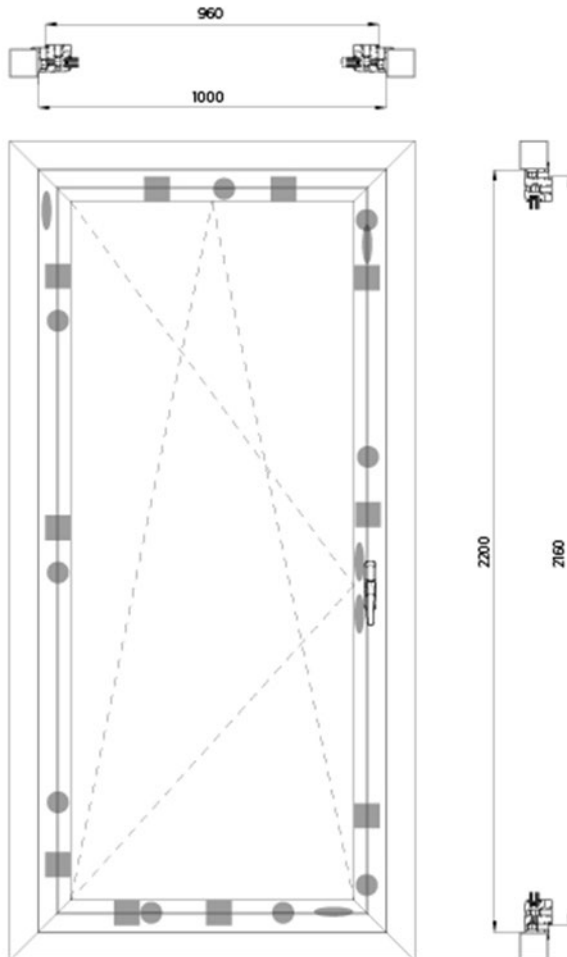
\*alternative hinge groups:

- Ween Hide 110: 3313D/S + 3313.20/21 D/S

## Balcony door 1 leaf 1000 x 2200 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 30.6 \text{ cm}^4$
- Leaf:  $J_x \geq 38.1 \text{ cm}^4$



- Anti-burglary locking points
- Standard locking points
- ◌ Anti-burglary cover

| Art.     | Description                 | Pcs |
|----------|-----------------------------|-----|
| 3321G.1  | Basic kit A/R Ween ERRE     | 1   |
| 3421.24* | Hinge Group Ween ERRE       | 1   |
| 3421.22* | Arm for A/R                 | 1   |
| 3421.31  | Additional locking kits     | 2   |
| 3421.32  | Additional closing points   | 4   |
| 6038     | Cremone bolt with key       | 1   |
| 3421A.53 | Basic anti-burglary kit     | 1   |
| 4247.8   | Anti-burglary locking point | 4   |

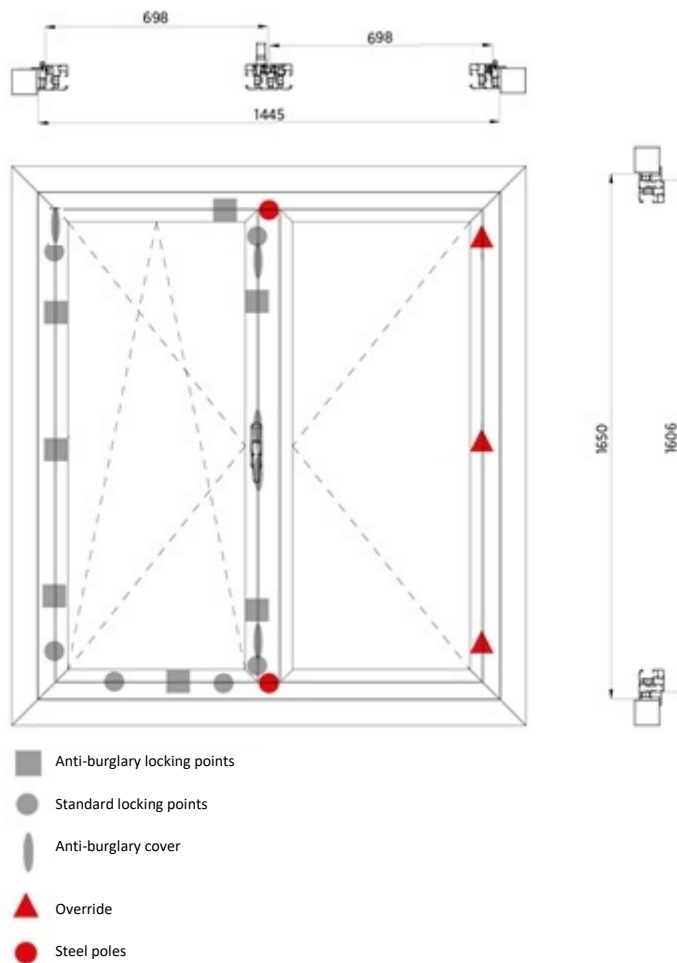
\* alternative hinge groups:

- Ween Hide 110: 3313D/S + 3313.20/21 D/S

## Window 2 leaves 1445 x 1590 mm (W x H)

Reference sample:

- Frame:  $J_x \geq 30.6 \text{ cm}^4$
- Leaf:  $J_x \geq 38.1 \text{ cm}^4$
- Carry:  $J_x \geq 30 \text{ cm}$
- 



| Art.     | Description                         | Pcs |
|----------|-------------------------------------|-----|
| 3321G.1  | Basic kit A/R Ween ERRE             | 1   |
| 3421.24* | Hinge Group Ween ERRE               | 1   |
| 3421.22* | Arm for A/R                         | 1   |
| 3421.23  | Kit A/R Ween ERRE side by side leaf | 1   |
| 3421.31  | Additional locking kits             | 2   |
| 3421.32  | Additional closing points           | 2   |
| 6038     | Cremone bolt with key               | 1   |
| 3421A.53 | Basic anti-burglary kit             | 1   |
| 4247.8   | Anti-burglary locking point         | 1   |
| 4533     | Anti-burglary kit side by side leaf | 1   |
| 4228     | Steel overrides                     | 3   |

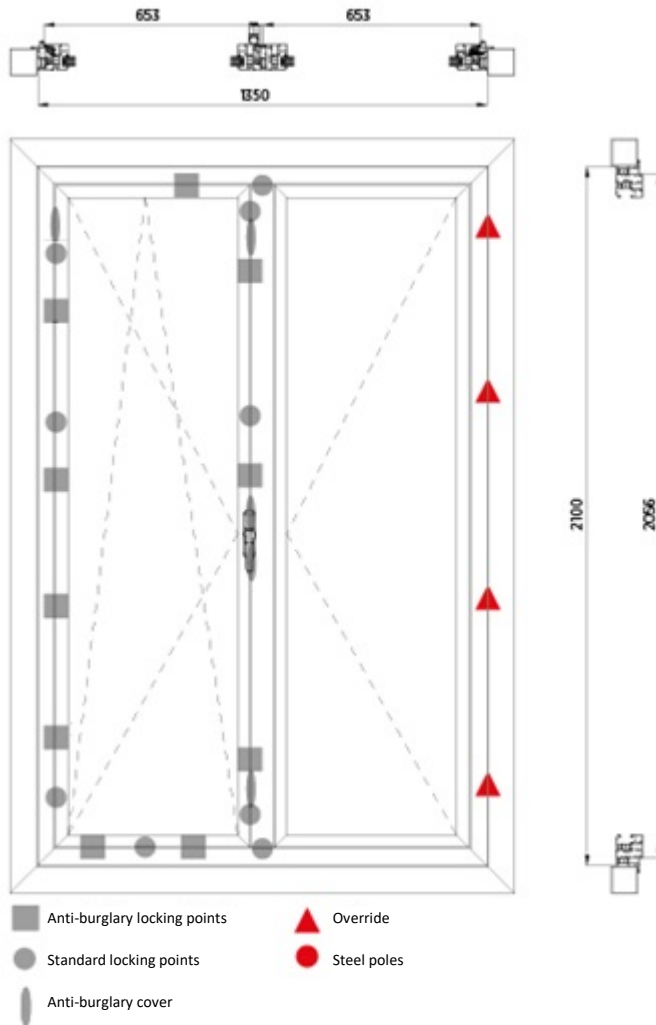
\* alternative hinge groups:

- Ween Hide 110: 3313D/S + 3313.20/21 D/S; 3313D/S + 3313.71D/S

## Balcony door 2 leaves 1350 x 2100 mm (L x H)

Reference sample:

- Frame:  $J_x \geq 30.6 \text{ cm}^4$
- Leaf:  $J_x \geq 38.1 \text{ cm}^4$
- Carry:  $J_x \geq 30 \text{ cm}$



| Art.     | Description                         | Pcs |
|----------|-------------------------------------|-----|
| 3321G.1  | Basic kit A/R Ween ERRE             | 1   |
| 3421.24* | Hinge Group Ween ERRE               | 1   |
| 3421.22* | Arm for A/R                         | 1   |
| 3421.23  | Kit A/R Ween ERRE side by side leaf | 1   |
| 3421.31  | Additional locking kits             | 2   |
| 3421.32  | Additional closing points           | 3   |
| 6038     | Cremone bolt with key               | 1   |
| 3421A.53 | Basic anti-burglary kit             | 1   |
| 4247.8   | Anti-burglary locking point         | 4   |
| 4533     | Anti-burglary kit side by side leaf | 1   |
| 4228     | Steel overrides                     | 3   |

\* alternative hinge groups:

- Ween Hide 110: 3313D/S + 3313.20/21 D/S; 3313D/S + 3313.71D/S

## Sliding

In order to certify an RC2 or RC3 anti-burglary sliding window, it is essential to observe some basic installation rules, which constitute the Best Practice for customised development of anti-burglary solutions that change according to the system and the characteristics of the latter.

Herein below are given, in a simplified and not exhaustive manner, the good practice for the construction of sliding frames, which complete the general indications relating to sealing and fasteners.

### Sliding 2 leaves 3000 x 2100 mm (L x H)

It has been proven that there is a direct correlation between the airtightness and the suitability of a system to be RC2 or RC3 certified. Specifically, the AAV resistance classes that affect the ability of a system to be certified as anti-burglary are air tightness and wind resistance. The higher these classes, the easier it will be to certify the door and window frame as anti-burglary.

Good practices include:

1. Availability of an anti-lifting and anti-skirting system. Figure 3

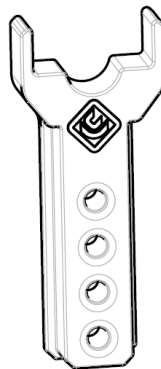


FIGURE 3 EXAMPLE OF ANTI-SKIRTING DOWEL

2. The use of a reinforced central profile.
3. Use of multi-point locks type **Fast Lock Inox**, art. master **658XA, 639XA**. These locks are essential to overcoming static loads and during forced entry attempts. The static load test on sliding systems provides for the application of forces in the direction of opening of the leaves next to the locking points with a value equal to those of orthogonal shear stress: 3000 N for RC2 and 6000 N for RC3. It is, therefore, necessary to evaluate the correct type of fastening of the fittings and of the locking system onto the profiles, installing appropriate reinforcement plates where the fixings are next to the insulation point. Figure

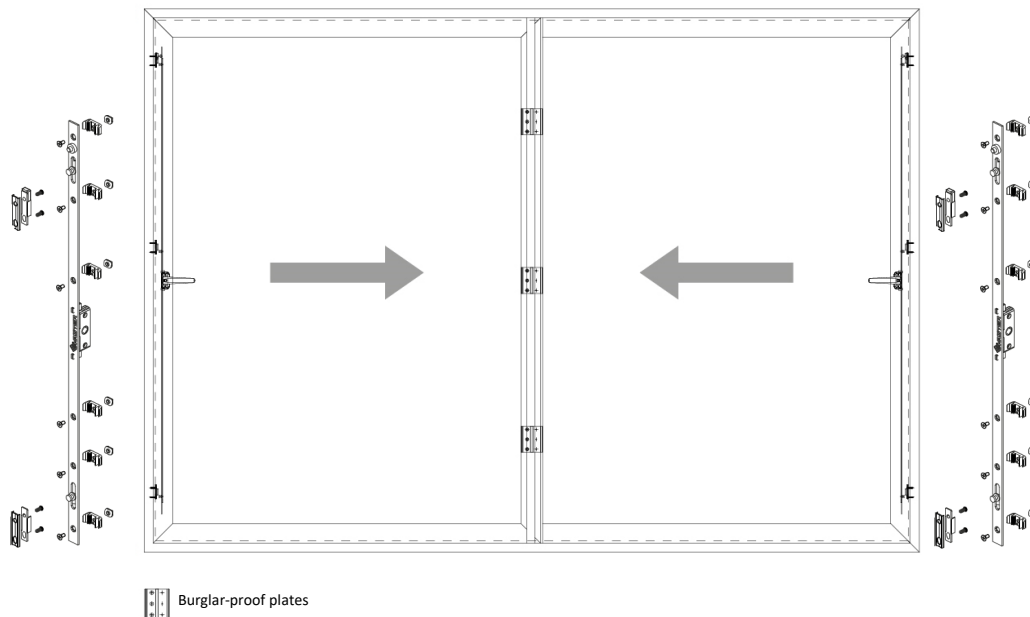


FIGURE 4 CONFIGURATION OF SLIDING LOCKS RC2/RC3

4. The use of tear-resistant overrides on the central node that do not allow separating the leaves by applying forces orthogonal to their surface. These elements are designed by **MasterLab** based on the characteristics of the central node and its geometry, example in Figure 5. The use of a tear-resistant override is essential for passing the test. In fact, these components, during the static and impact load tests, have the task of ensuring that the two leaves are secured in the central section, preventing deformations that could generate openings that make it possible to pass the test jigs, thus resulting in test failure.

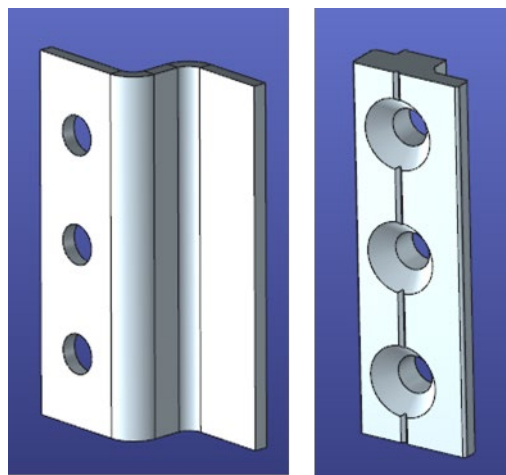


FIGURE 5 EXAMPLE OF CENTRAL SEALING OVERRIDES



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S.P.37 Conversano - Castiglione Km. 0,700 Z.I.  
70014 Conversano (BA) - ITALY - C.P. 112  
Tel.: +39 080 4959823  
Assistenza clienti: 366 2488323 (whatsapp)  
Email: masterlab@masteritaly.com  
P.I. 06835770725

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