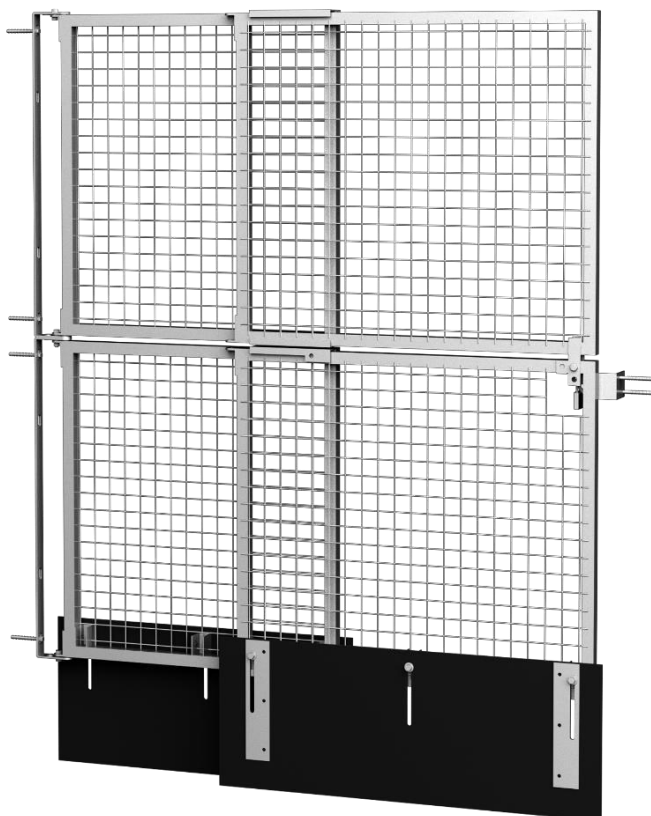


## PROTECTION OF ELEVATOR AND TECHNICAL SHAFTS

SAFE WORKS AT HEIGHTS



## CONTENTS:

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- II. TECHNICAL DATA**
- III. DESIGNER'S STATEMENT**

+48 515 515 445  
biuro@strumin.pl  
www.strumin.pl

Strumin Equipment  
Spółka z ograniczoną odpowiedzialnością  
Morawica 191, 32-084 Morawica



## I. TECHNICAL DOCUMENTATION

### ATTENTION!!!

BEFORE EVERY USE OF THE SAFETY SYSTEM: ELEVATOR AND TECHNICAL SHAFTS (ZSWT) THE USER SHALL READ THIS TECHNICAL DOCUMENTATION AND ALWAYS ACT IN COMPLIANCE WITH THE RULES DESCRIBED HEREIN. THE INSTRUCTIONS ARE INTENDED TO ALL WORKERS AND PEOPLE, WHO ARE GOING TO BE ENGAGED IN THE TRANSPORT, UNLOADING, ASSEMBLY, DISASSEMBLY, STORING, CONTROLLING AND ALL OTHER ACTIONS CONNECTED WITH THE ZSWT SYSTEM.

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## INTRO

This **Technical documentation** contains the guidelines concerning the proper use of the **ZSWT system**. Workers and other people using the system shall always observe the guidelines contained herein. In case of any events not described in this document, the occupational safety and health regulations and other regulations, appropriate to the specific situation, shall be observed.

### 1. MANUFACTURING BASIS

The manufacturing basis for the project of elevator and technical shafts “ZSWT” is the announced by SKANSKA S.A. need to produce a device ensuring safety during works performed at a construction site.

That need concerned securing the technical shafts and other places where there is the risk of falling.

The project was prepared on the basis of cooperation between SKANSKA S.A. And P.P.H.U. STRUMIN.

The general project and requirements of the system and the rules of the device’s operation have been strictly described by the commissioning party and the project works were performed under the supervision of the main occupational safety and health specialist at SKANSKA S.A. - Mr. Przemysław Przybylski, as well as other people engaged in the occupational safety and health problems.

The project was prepared in five stages: “Initial prototyping” - “technical project” - “production of the prototype series” - “building tests” - “final project”.

On the basis of the experiences from building sites there were introduced some necessary adjustments to the project. Thanks to the double-stage prototyping of the device it was possible to prepare such form of the technical securing which will serve different functions simultaneously.

The protection of elevator and technical shafts [ZWST] project was prepared in compliance with the EN-13374+A1\_2019-02E standard. Temporary edge protection systems.

The ZWST system was also prepared in compliance with the following standards:

EN 1090-2:2012:

EN 1090--1:2009+A1:2011, Technical requirements for the execution of steel and aluminium structures,  
Part 1: The principles for assessing the compliance  
of constructional elements,

EN 1090--2:2008+A1:2011, Technical requirements for the execution of steel and aluminium structures,  
Part 2: Technical requirements concerning the steel  
constructions

EN ISO 3834--2:2007; Quality requirements for the welding of  
metal materials,

EN ISO 14122-3 (Requirements for stepladders and guard-rails) and EN 12811-1 (Temporary constructions used at a working site),

EN 12811-2: 2004 (Temporary works equipment),

EN 364: 1993 (Personal protective equipment, securing the workers from falling),

The “ZSWT” project was also based on the ordinance of the Minister of Infrastructure of 6 February 2003 r. concerning the safety and work hygiene during construction works (Journal of Laws No. 47, item 401), - guard rails.



## 2. TECHNICAL

### 2.1 PURPOSE AND SCOPE OF USAGE

The ZWST system is aimed to secure elevator and technical shafts in places where there is the risk of falling.

It is used as the security measure for workers who perform their duties in or close to shafts.

The gate protects people and objects from falling into elevator and technical shafts and secures people standing below.

The ZSWT system is a 4-part gate with the possibility to adjust to a given width and opening of the upper half (movable wing).

The gate was designed to make it possible to open it from both inside and outside.

The system provides easy, universal and quick assembly in a niche and on a wall. It is characterized by low weight and the ease of operation.

Thanks to the lightness and flexibility of the system, it is possible to adjust it to all building conditions.

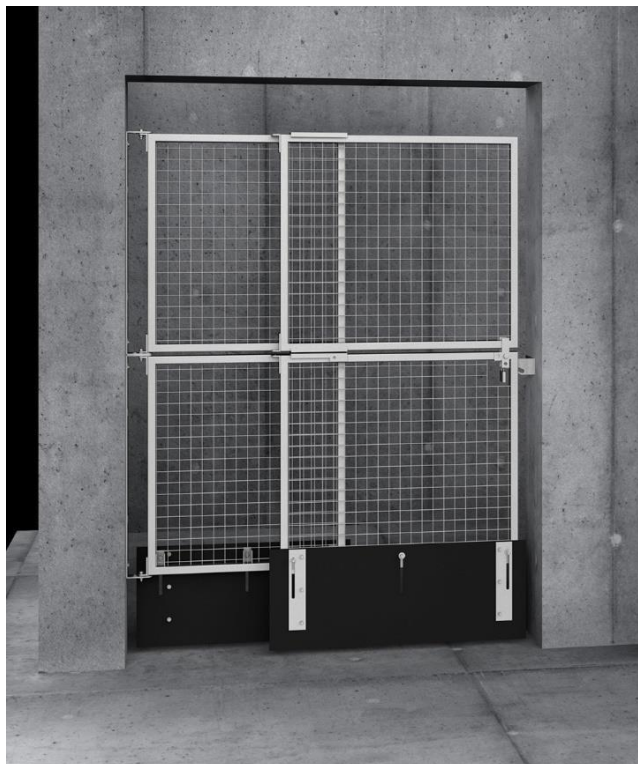
The use of the **ZSWT** system is allowed only on condition that the user adheres to this Technical Documentation, as well as the proper occupational safety and health regulations.



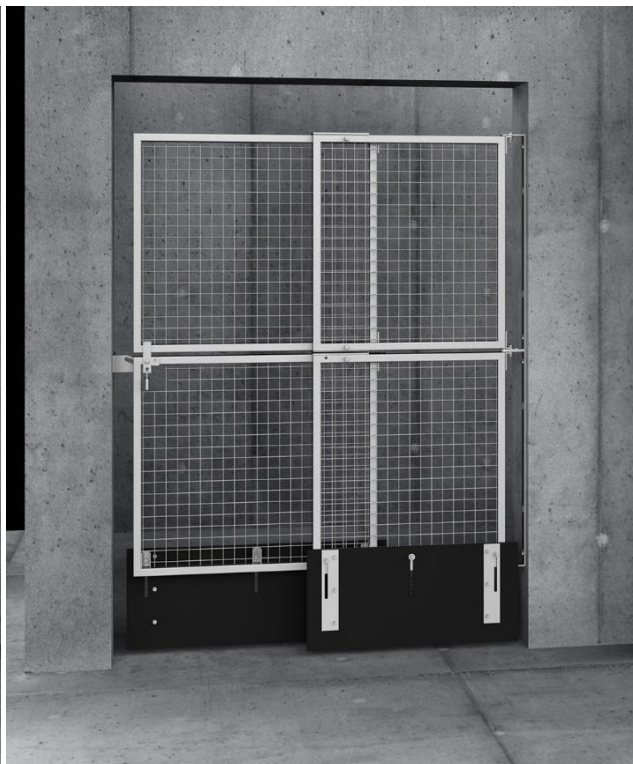
## 2.2 TECHNICAL PARAMETERS.

### 2.2.1 The basic configurations of the ZSWT system

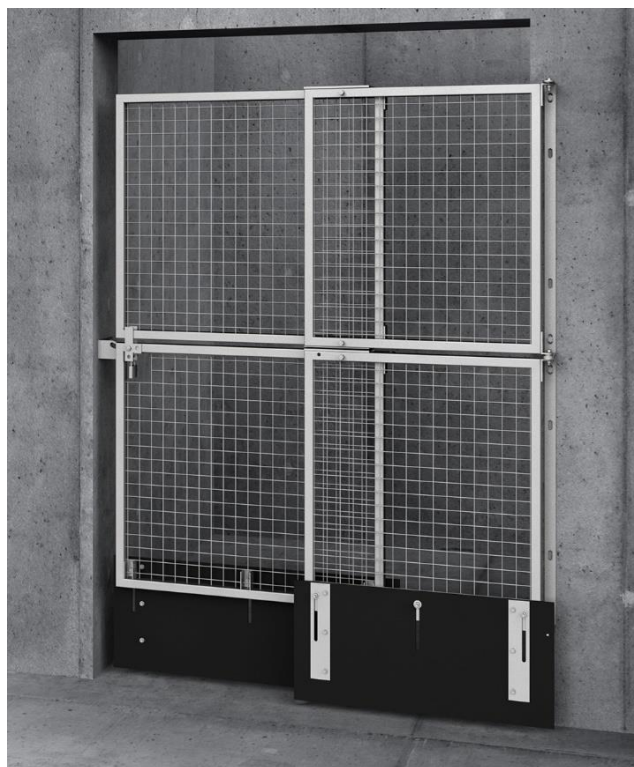
FULL LEFT PROTECTION



FULL RIGHT PROTECTION



FULL PROTECTION, ASSEMBLY TO THE WALL



2.2.2A The basic configurations of the ZSWT

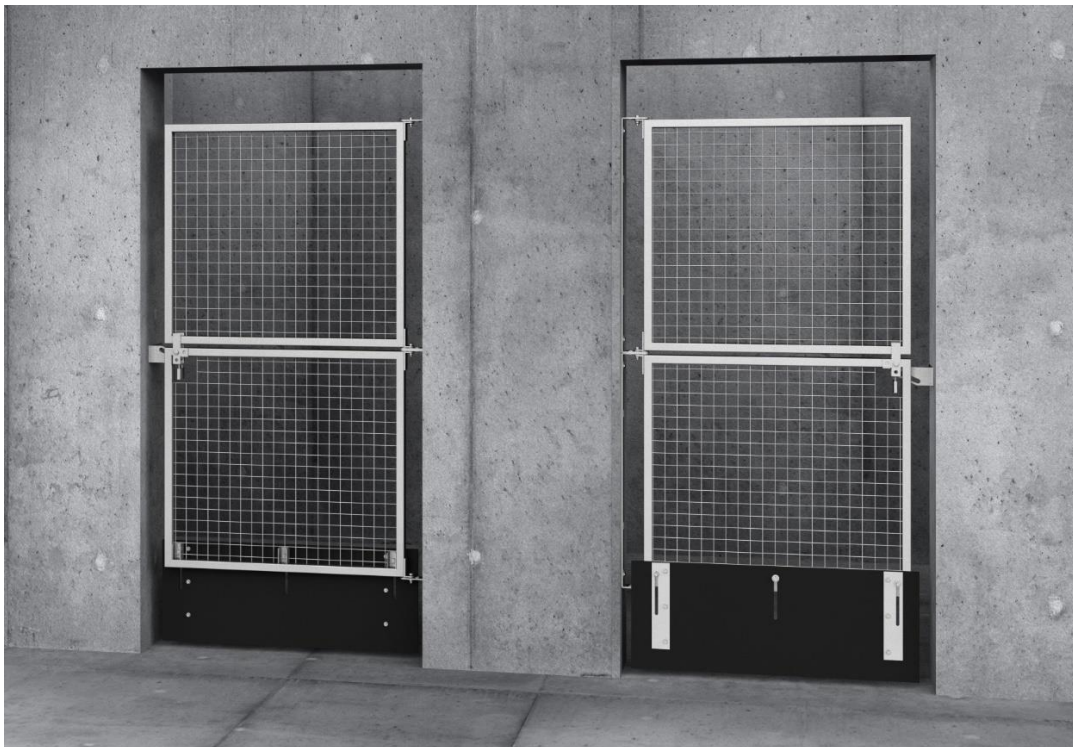
SINGLE LEFT FIXED WING

SINGLE RIGHT FIXED WING



SINGLE LEFT MOVEABLE WING

SINGLE RIGHT MOVEABLE WING





2.2.2B The basic configurations of the ZSWT

FIXED LOWER WING

MOVEABLE LOWER WING



### 2.2.3 SYSTEM'S ELEMENTS DIMENSIONS. FULL PROTECTION - ADJUSTMENTS LIMITATIONS.

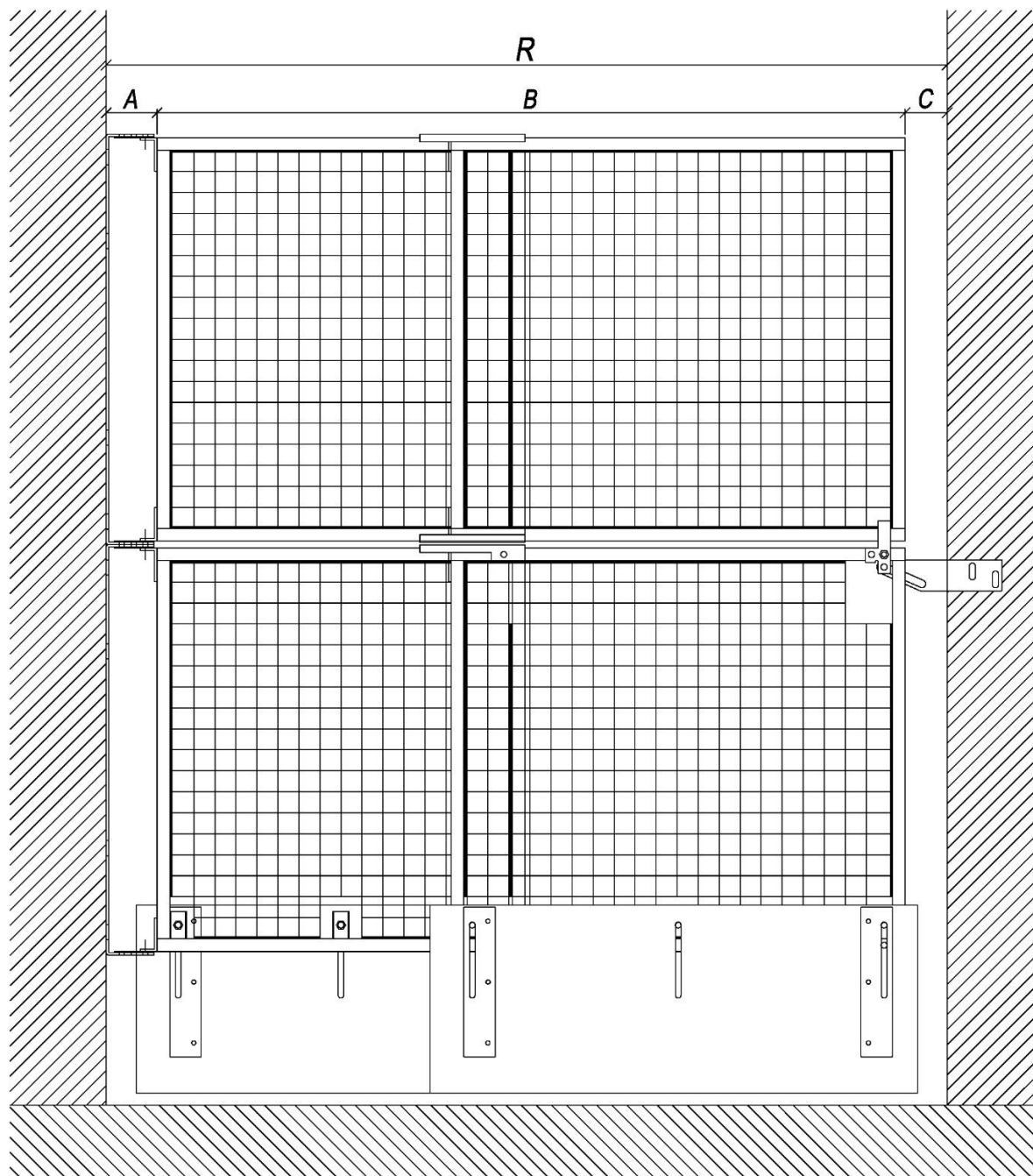
The full ZSWT system has a few adjustment ranges which influence the final width of the protection.

The R regulation limit consists of three ranges:

A – step regulation on the hinges' profiles,

B – smooth regulation performed over the wing and locking in sockets of the fixed wings,

C – smooth regulation on the hinge. Details were provided in the below table.

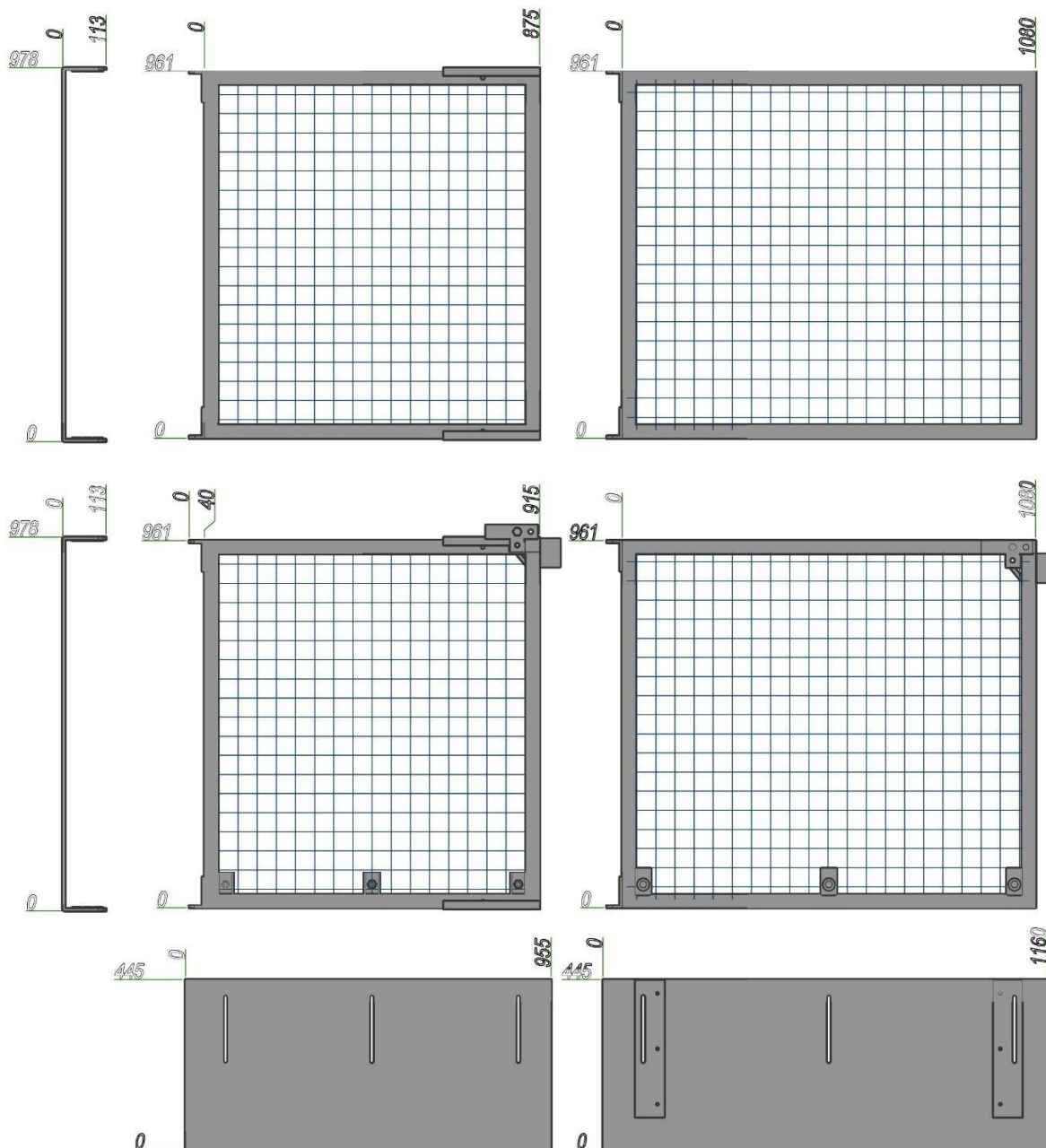


**FULL PROTECTION - ADJUSTMENT LIMITS - TABLE.**

| Span No.                   | A (step regulation) | B (smooth regulation) | C (smooth regulation) | R [mm] |  |
|----------------------------|---------------------|-----------------------|-----------------------|--------|--|
| 1                          | 65                  | 1080 min.             | 10 min.               | 1155   |  |
| 2                          | 65                  | 1080 min.             | 100 max.              | 1245   |  |
| 3                          | 65                  | 1780 max.             | 10 min.               | 1855   |  |
| 4                          | 65                  | 1780 max.             | 100 max.              | 1945   |  |
| 5                          | 93                  | 1080 min.             | 10 min.               | 1183   |  |
| 6                          | 93                  | 1080 min.             | 100 max.              | 1273   |  |
| 7                          | 93                  | 1780 max.             | 10 min.               | 1883   |  |
| 8                          | 93                  | 1780 max.             | 100 max.              | 1973   |  |
| 9                          | 121                 | 1080 min.             | 10 min.               | 1211   |  |
| 10                         | 121                 | 1080 min.             | 100 max.              | 1301   |  |
| 11                         | 121                 | 1780 max.             | 10 min.               | 1911   |  |
| 12                         | 121                 | 1780 max.             | 100 max.              | 2001   |  |
| List of items              |                     | Quantity              |                       |        |  |
| FIXED LOWER WING           |                     | 1                     |                       |        |  |
| FIXED UPPER WING           |                     | 1                     |                       |        |  |
| MOVEABLE LOWER WING        |                     | 1                     |                       |        |  |
| MOVEABLE UPPER WING        |                     | 1                     |                       |        |  |
| "FIXED" LOWER TOE BOARD    |                     | 1                     |                       |        |  |
| "MOVEABLE" LOWER TOE BOARD |                     | 1                     |                       |        |  |
| HINGES' PROFILES           |                     | 2                     |                       |        |  |
| NARROW WING BOLT (rotary)  |                     | 1                     |                       |        |  |
| WALL PLATE OF THE BOLT     |                     | 1                     |                       |        |  |

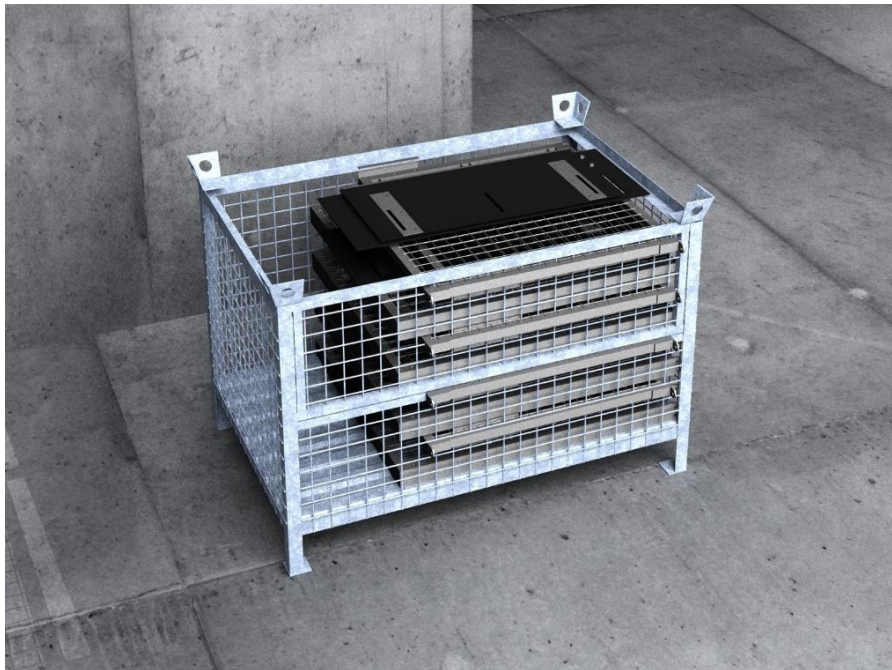


2.2.3 CD. SYSTEM'S ELEMENTS DIMENSIONS



2.2.3. SYSTEM'S DIMENSIONS

| Name of an element  | profile      | dimension [mm] | dimension [mm] | weight [kg] |  |
|---------------------|--------------|----------------|----------------|-------------|--|
| fixed lower wing    | RP 30×30×2   | 875            | 960            | 12.0        |  |
| fixed upper wing    | RP 30×30×2   | 875            | 960            | 11.1        |  |
| moveable lower wing | RP 30×30×2   | 1080           | 960            | 11.34       |  |
| moveable upper wing | RP 30×30×2   | 1080           | 960            | 10.4        |  |
| wings fill          | Ø3           |                |                | 4.1         |  |
| small toe board     | Rubber 5 mm  | 905            | 445            | 4.8         |  |
| large toe board     | Rubber 5 mm  | 1150           | 445            | 6           |  |
| hinges' profiles    | Flat 45×6    |                |                | 5.1         |  |
| finish              | hot-dip zinc |                |                |             |  |
|                     |              |                |                |             |  |
|                     |              |                | <b>TOTAL</b>   | <b>64.8</b> |  |
|                     |              |                |                |             |  |

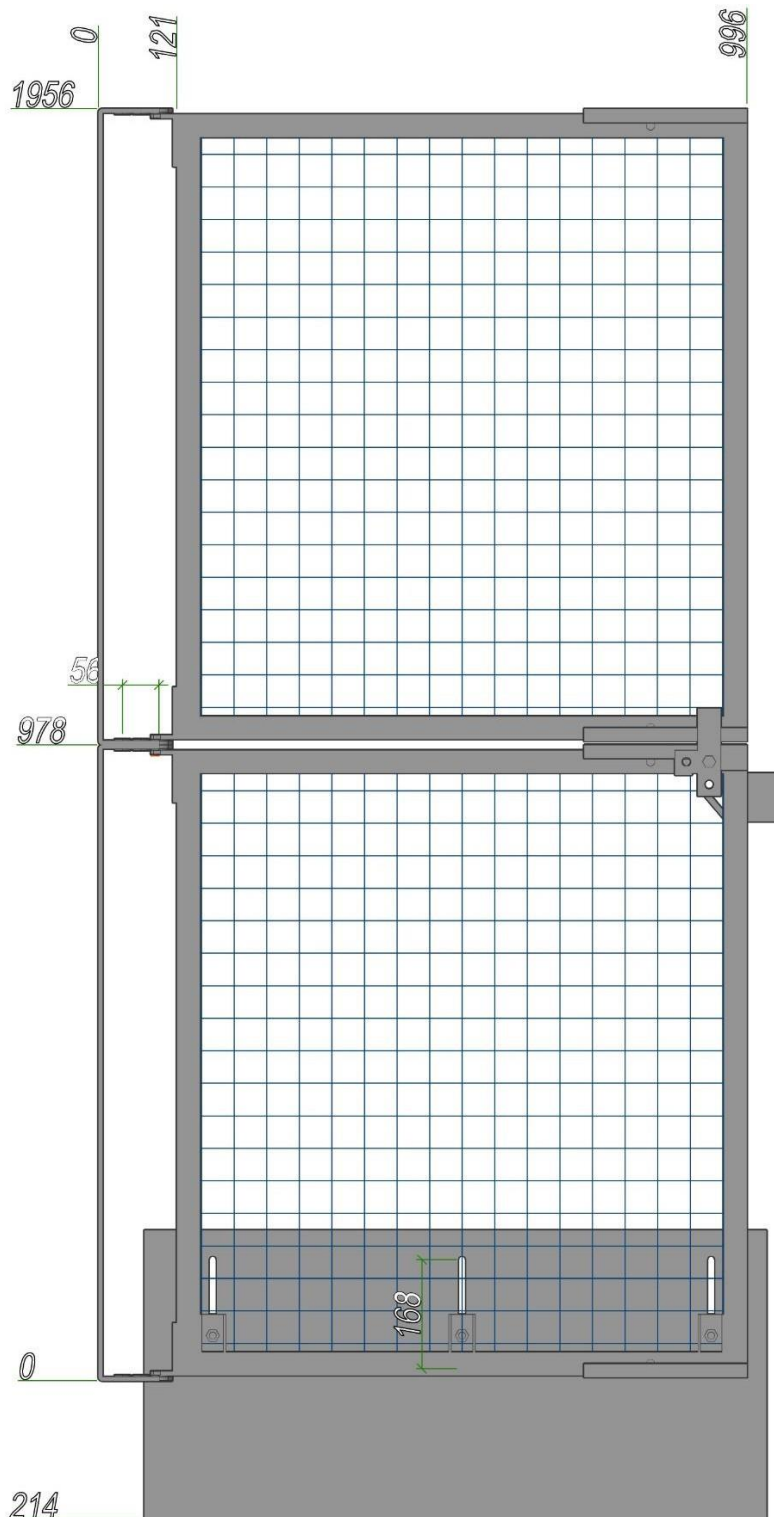


| TRANSPORT BASKET                     |                    |  |  |  |  |
|--------------------------------------|--------------------|--|--|--|--|
| NET WEIGHT OF THE BASKET             | 50 kg              |  |  |  |  |
| GROSS WEIGHT OF THE BASKET           | 115 kg             |  |  |  |  |
| dimensions (length / width / height) | 130 × 105 × 110 cm |  |  |  |  |
| CAPACITY                             | 5 kmpł             |  |  |  |  |
|                                      |                    |  |  |  |  |



### 2.2.4 CONFIGURATION OF A FIXED WING (NO MOVEABLE WING).

In this configuration there is the possibility to adjust the width of the gate on the holes of the hinges' profiles and on the plate rotary bolt



**2.2.4 A. CONFIGURATION OF THE FIXED WING (NO MOVEABLE ARM, ASSEMBLY IN THE HOLE'S CONTOUR) - ADJUSTMENT LIMITATIONS.**

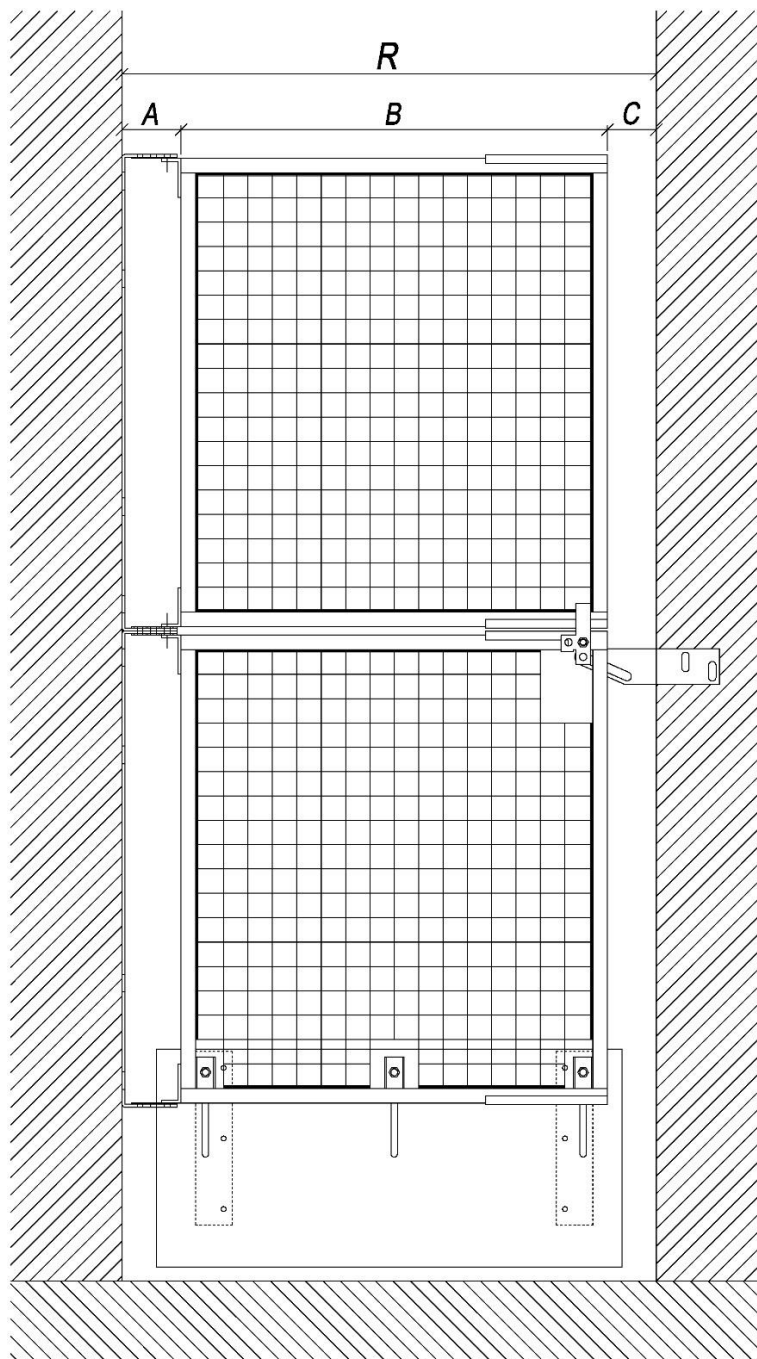
The ZSWT system in the single fixed wing configuration has two regulation scopes which influence the final width of the protection. The R regulation limit consists of three ranges:

A – step regulation on the hinges' profiles,

B – the width of the wing = 875 mm,

C – smooth regulation on the hinge.

Details were provided in the below table.



**2.2.4 A. CONFIGURATION OF THE FIXED WING - ADJUSTMENT LIMITATIONS  
 (ASSEMBLY IN THE HOLE'S CONTOUR) - TABLE.**

| Span No.                  | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|---------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                         | 65                  | 875       | 10 min.               | 950    |  |
| 2                         | 65                  | 875       | 100 max.              | 1040   |  |
| 3                         | 93                  | 875       | 10 min.               | 978    |  |
| 4                         | 93                  | 875       | 100 max.              | 1068   |  |
| 5                         | 121                 | 875       | 10 min.               | 1006   |  |
| 6                         | 121                 | 875       | 100 max.              | 1096   |  |
| List of items             |                     | Quantity  |                       |        |  |
| FIXED LOWER WING          |                     | 1         |                       |        |  |
| FIXED UPPER WING          |                     | 1         |                       |        |  |
| "FIXED" LOWER TOE BOARD   |                     | 1         |                       |        |  |
| HINGES' PROFILES          |                     | 2         |                       |        |  |
| WIDE WING'S BOLT (rotary) |                     | 1         |                       |        |  |
| WALL PLATE OF THE BOLT    |                     | 1         |                       |        |  |
|                           |                     |           |                       |        |  |



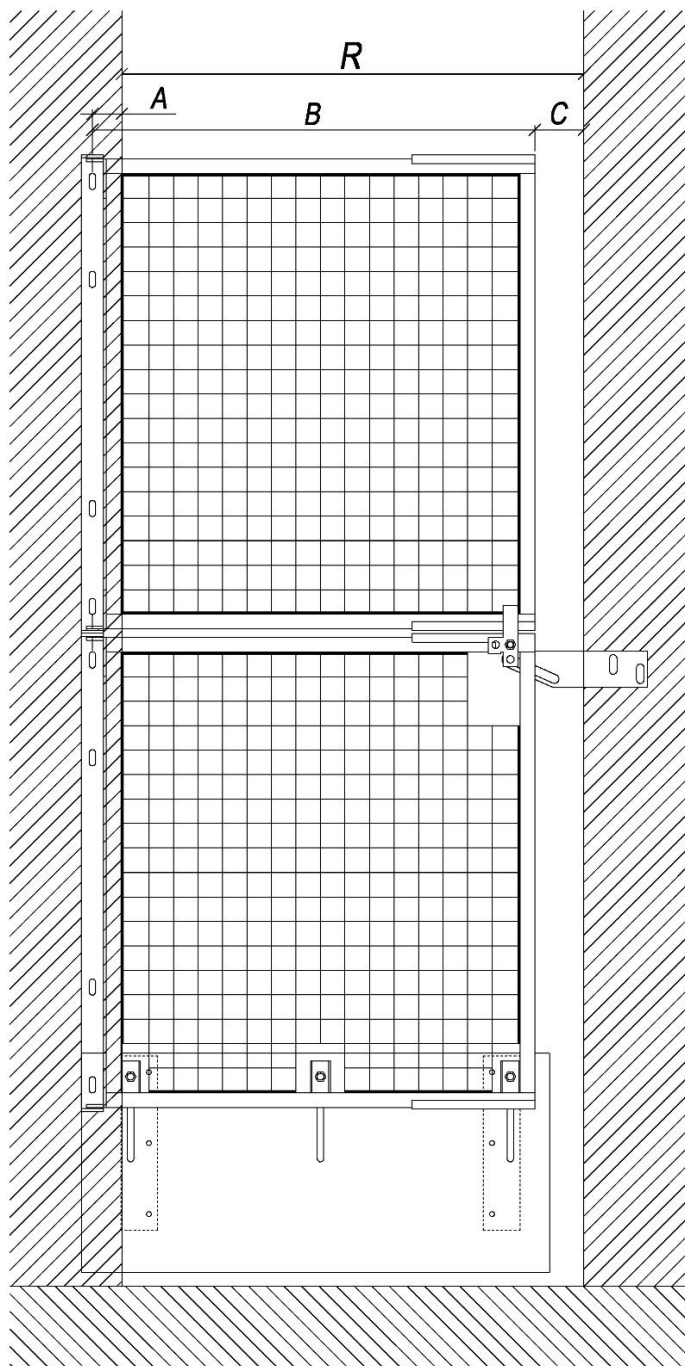


**2.2.4 B. CONFIGURATION OF THE FIXED WING (NO MOVEABLE WING,  
ASSEMBLY TO THE WALL) - ADJUSTING LIMITATIONS.**

The ZSWT system in the single fixed wing configuration has two regulation scopes which influence the final width of the protection. The R regulation limit consists of three ranges:

- A – Hinge axis offset from the hole's edge,
- B – wing's width = 903 mm (to the hinge axis),
- C – smooth regulation on a wall plate of the hinge.

The components were shown in the below table.



**2.2.4 B. CONFIGURATION OF THE FIXED WING – REGULATION LIMITATIONS  
 (ASSEMBLY ON THE PROFILE) – TABLE.**

| Span No.                          | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|-----------------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                                 | 60                  | 903       | 10 min.               | 853    |  |
| 2                                 | 60                  | 903       | 100 max.              | 943    |  |
| 3                                 | 80                  | 903       | 10 min.               | 833    |  |
| 4                                 | 80                  | 903       | 100 max.              | 923    |  |
| 5                                 | 100                 | 903       | 10 min.               | 813    |  |
| 6                                 | 100                 | 903       | 100 max.              | 903    |  |
| List of items                     |                     | Quantity  |                       |        |  |
| FIXED LOWER WING                  |                     | 1         |                       |        |  |
| FIXED UPPER WING                  |                     | 1         |                       |        |  |
| "FIXED" LOWER TOE BOARD           |                     | 1         |                       |        |  |
| HINGES' PROFILES                  |                     | 2         |                       |        |  |
| WIDE WING'S BOLT (rotary)         |                     | 1         |                       |        |  |
| WALL PLATE OF THE BOLT – STRAIGHT |                     | 1         |                       |        |  |



**2.2.4 C. CONFIGURATION OF THE FIXED LOWER WING (NO MOVEABLE WING, ASSEMBLY IN THE HOLE'S CONTOUR) – REGULATION LIMITS.**

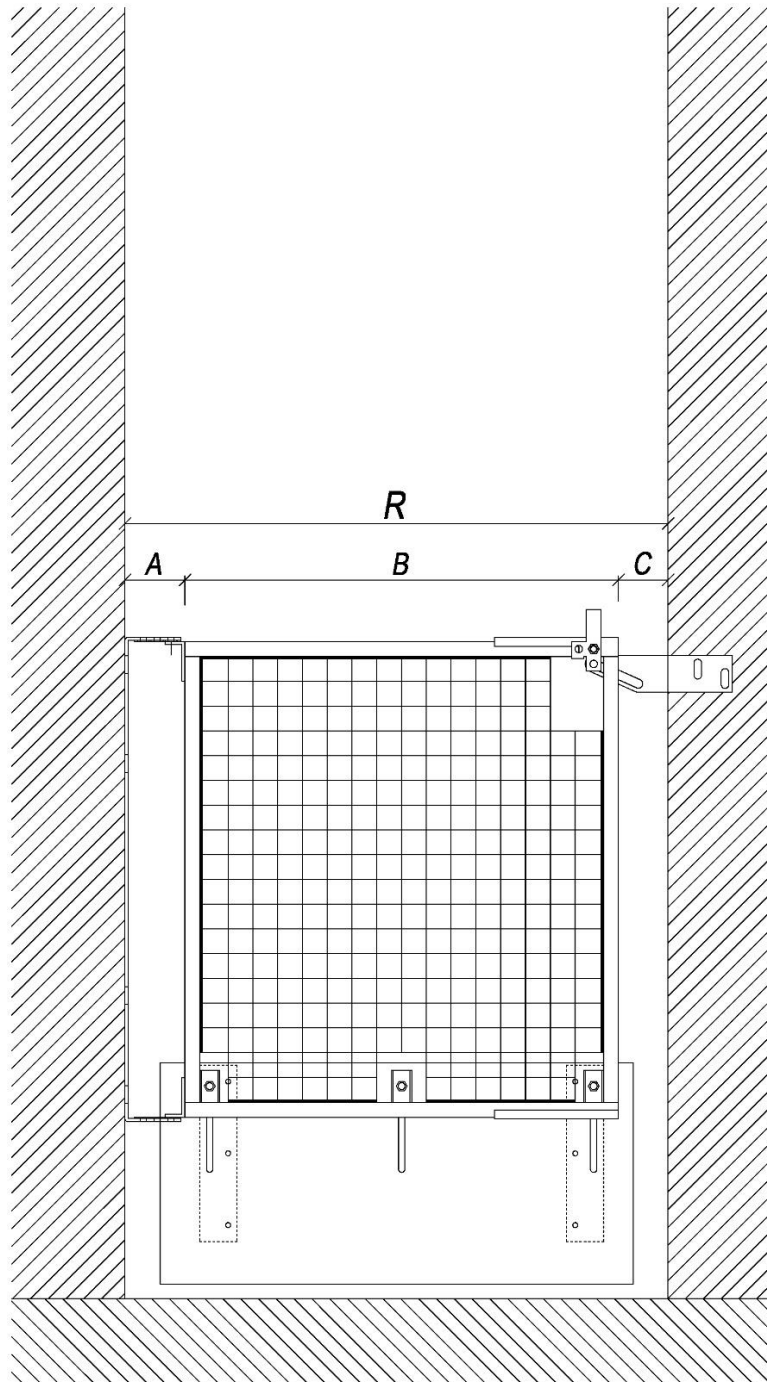
The ZSWT system in the single fixed wing configuration has two regulation scopes which influence the final width of the protection. The R regulation limit consists of three ranges:

A – step regulation on the hinges' profiles,

B – the width of the wing = 875 mm,

C – smooth regulation on the hinge.

Details were provided in the below table.



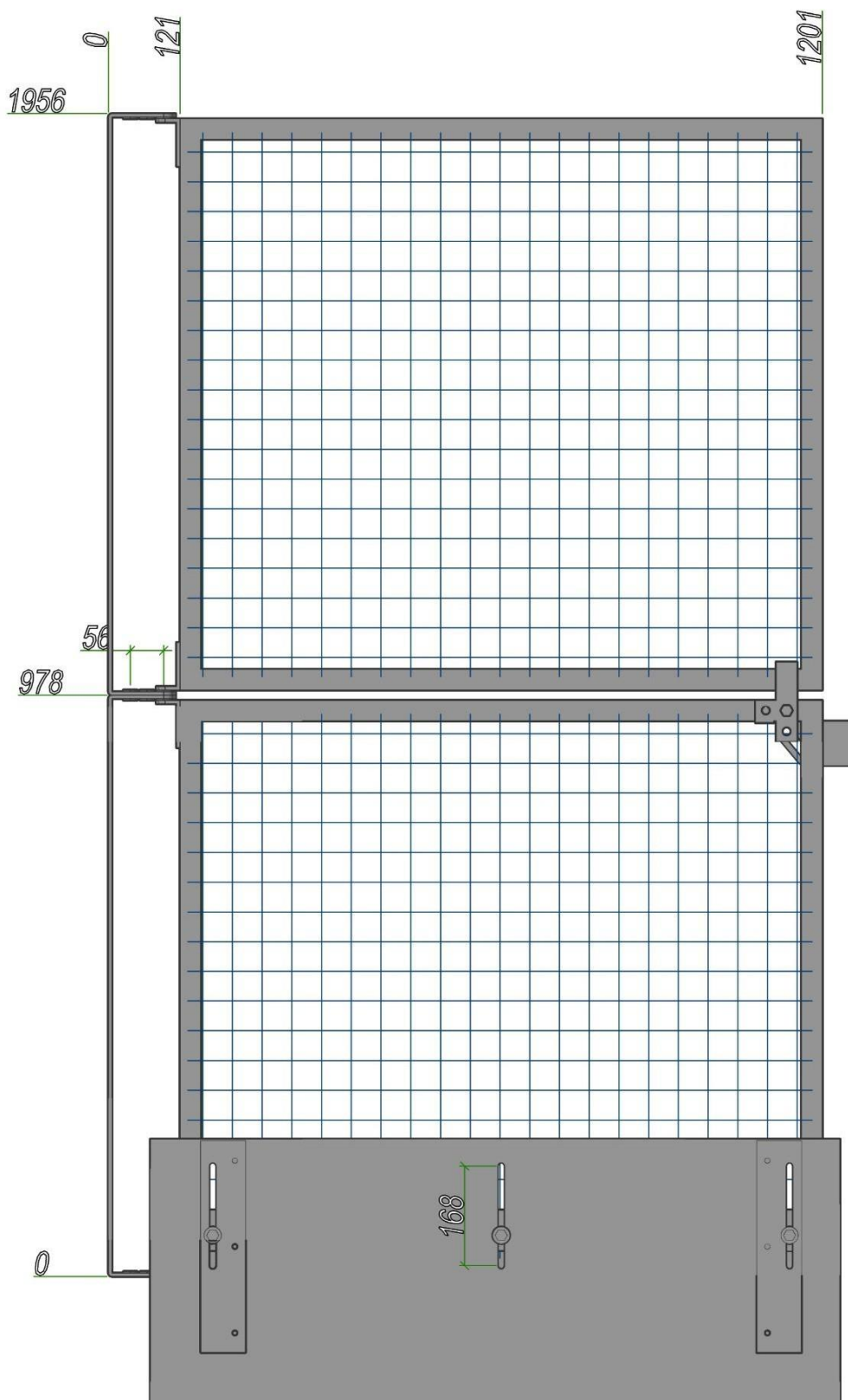
**2.2.4 C. CONFIGURATION OF THE FIXED LOWER WING – REGULATION LIMITS  
 (ASSEMBLY IN THE HOLE'S CONTOUR) - TABLE.**

| Span No.                  | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|---------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                         | 65                  | 875       | 10 min.               | 950    |  |
| 2                         | 65                  | 875       | 100 max.              | 1040   |  |
| 3                         | 93                  | 875       | 10 min.               | 978    |  |
| 4                         | 93                  | 875       | 100 max.              | 1068   |  |
| 5                         | 121                 | 875       | 10 min.               | 1006   |  |
| 6                         | 121                 | 875       | 100 max.              | 1096   |  |
| List of items             |                     | Quantity  |                       |        |  |
| FIXED LOWER WING          |                     | 1         |                       |        |  |
| FIXED UPPER WING          |                     | 1         |                       |        |  |
| "FIXED" LOWER TOE BOARD   |                     | 1         |                       |        |  |
| HINGES' PROFILES          |                     | 2         |                       |        |  |
| WIDE WING'S BOLT (rotary) |                     | 1         |                       |        |  |
| WALL PLATE OF THE BOLT    |                     | 1         |                       |        |  |



### 2.2.5 CONFIGURATION OF THE MOVEABLE WING (NO FIXED WING).

In this configuration there is the possibility to adjust the width of the gate on the profile's holes of the hinge and on the place blocking the revolving bolt.



### 2.2.5 CONFIGURATION OF THE MOVEABLE WING (NO FIXED WING – ASSEMBLY IN THE HOLE'S CONTOUR) – REGULATION LIMITS.

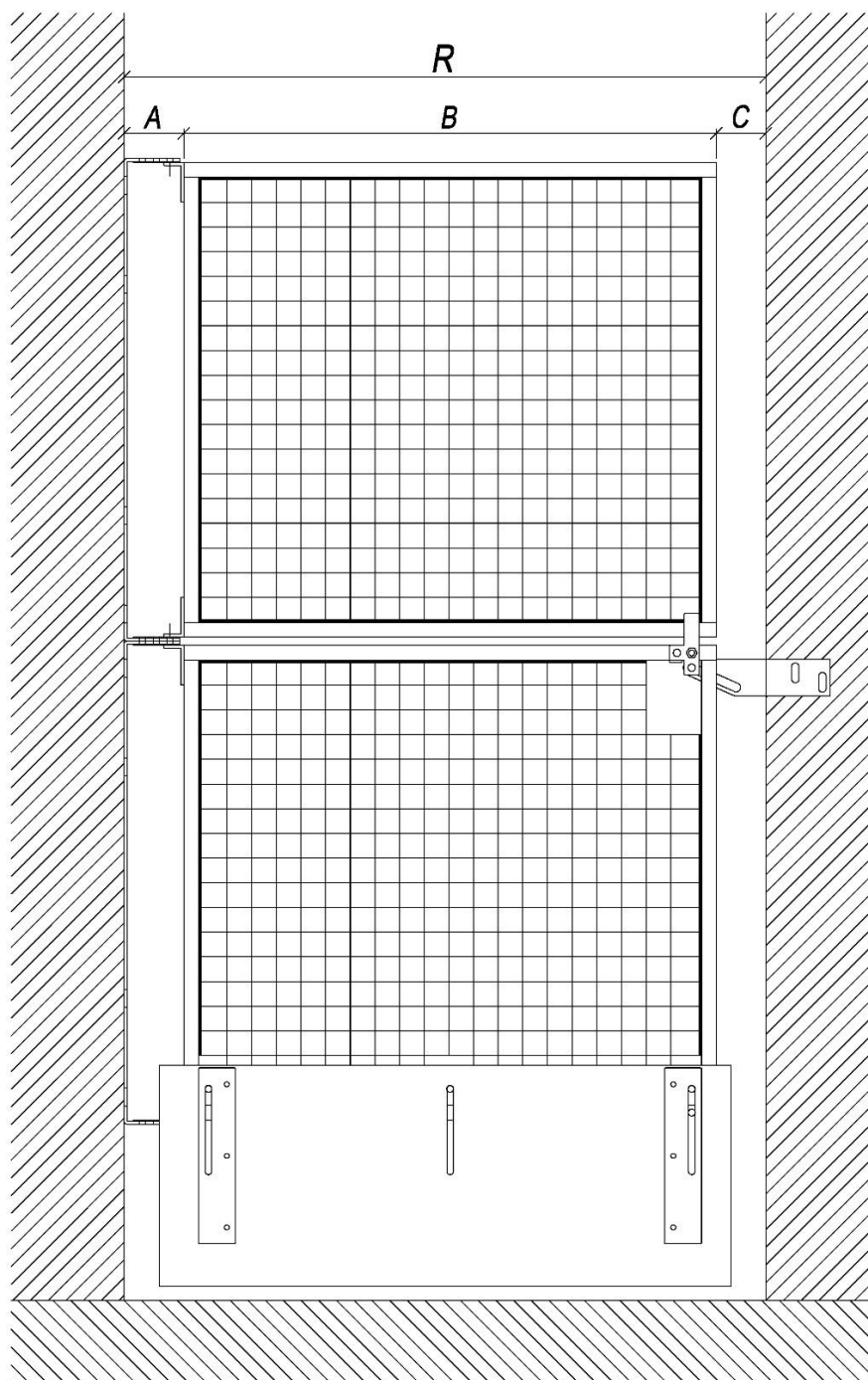
ZSWT in the configuration of a single moveable wing has two regulation scopes which affect the final width of the protection. The R regulation limit consists of three ranges:

A – step regulation on the hinges' profiles,

B – wing's width = 1080 mm,

C – smooth regulation on the hinge.

Details were provided in the below table.



**CONFIGURATION OF THE MOVEABLE WING – REGULATION LIMITS (ASSEMBLY IN THE CONTOUR)  
 – TABLE**

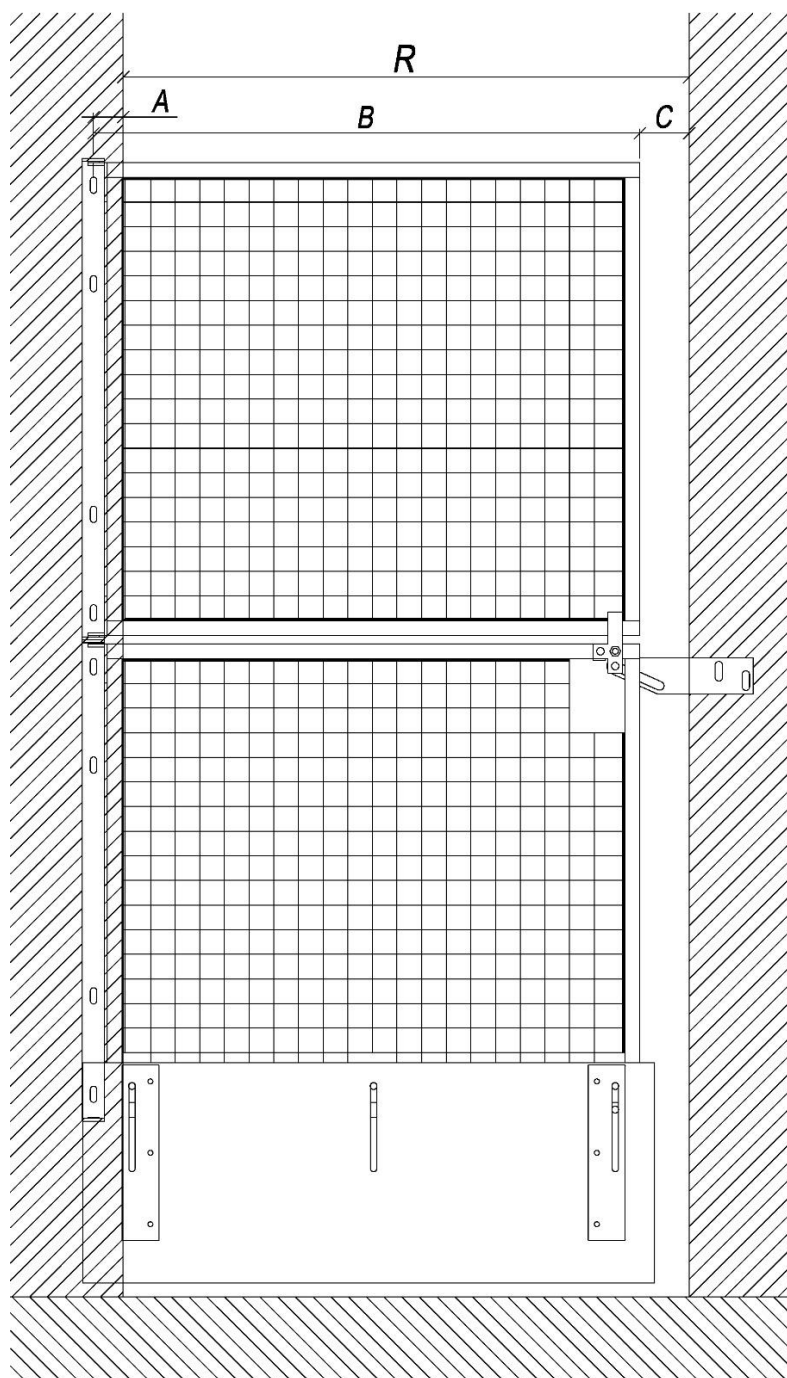
| Span No.                   | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|----------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                          | 65                  | 1080      | 10 min.               | 1155   |  |
| 2                          | 65                  | 1080      | 10 max.               | 1245   |  |
| 3                          | 93                  | 1080      | 10 min.               | 1183   |  |
| 4                          | 93                  | 1080      | 10 max.               | 1273   |  |
| 5                          | 121                 | 1080      | 10 min.               | 1211   |  |
| 6                          | 121                 | 1080      | 10 max.               | 1301   |  |
| List of items              |                     | Quantity  |                       |        |  |
| MOVEABLE LOWER WING        |                     | 1         |                       |        |  |
| MOVEABLE UPPER WING        |                     | 1         |                       |        |  |
| "MOVEABLE" LOWER TOE BOARD |                     | 1         |                       |        |  |
| HINGES' PROFILES           |                     | 2         |                       |        |  |
| NARROW WING BOLT (rotary)  |                     | 1         |                       |        |  |
| WALL PLATE OF THE BOLT     |                     | 1         |                       |        |  |
|                            |                     |           |                       |        |  |



**2.2.5 B. CONFIGURATION OF THE MOVEABLE WING (NO FIXED WING,  
ASSEMBLY ON THE WALL'S PROFILE) – REGULATION LIMITS**

ZSWT in the configuration of a single moveable wing has two regulation scopes which affect the final width of the protection. The R regulation limit consists of three ranges:

- A – Hinge axis offset from the hole's edge,
  - B – wing's width = 1108 mm (to the hinge axis),
  - C – smooth regulation on a wall plate of the hinge.
- The components were shown in the below table.





**CONFIGURATION OF THE MOVEABLE WING – REGULATION LIMITS (ASSEMBLY ON THE WALL’S PROFILE) – TABLE**

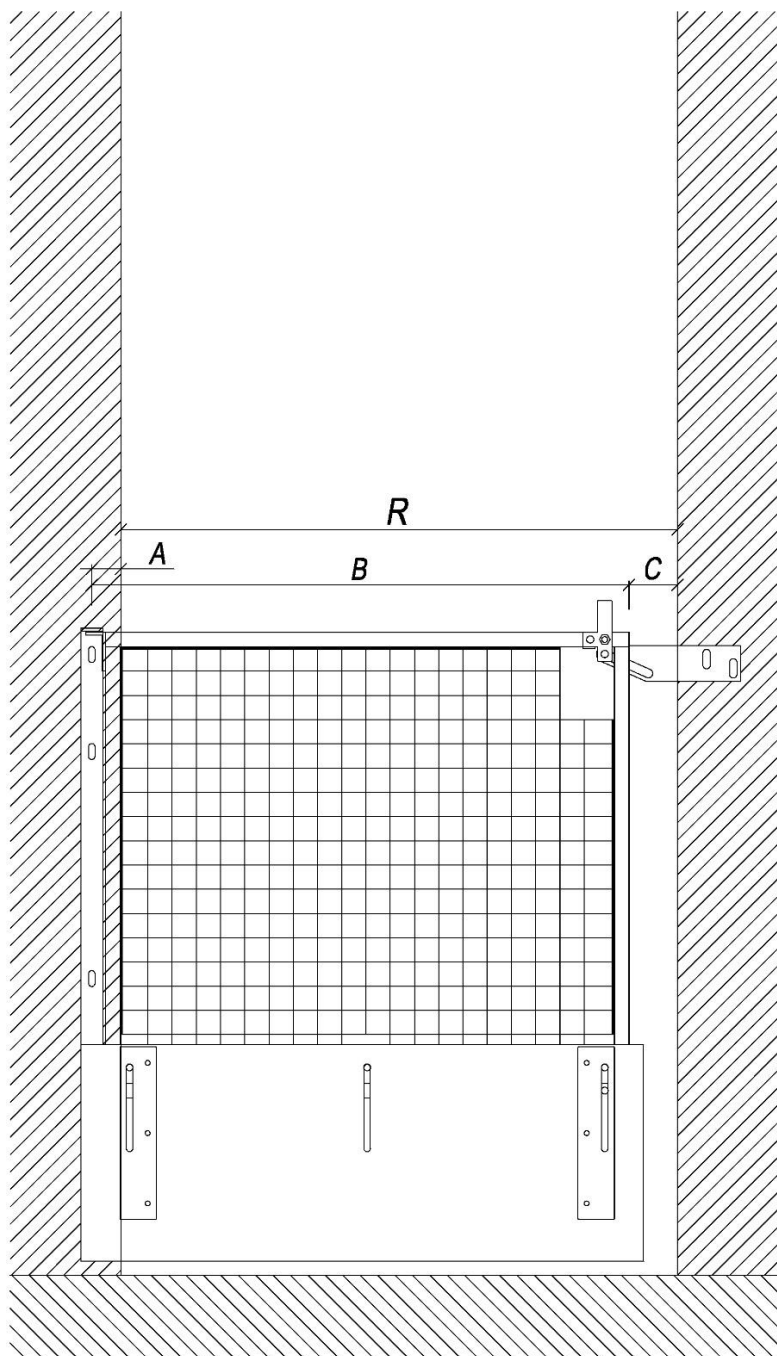
| Span No.                     | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|------------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                            | 60                  | 1108      | 10 min.               | 1058   |  |
| 2                            | 60                  | 1108      | 100 max.              | 1148   |  |
| 3                            | 80                  | 1108      | 10 min.               | 1038   |  |
| 4                            | 80                  | 1108      | 100 max.              | 1128   |  |
| 5                            | 100                 | 1108      | 10 min.               | 1018   |  |
| 6                            | 100                 | 1108      | 100 max.              | 1108   |  |
| List of items                |                     | Quantity  |                       |        |  |
| MOVEABLE LOWER WING          |                     | 1         |                       |        |  |
| MOVEABLE UPPER WING          |                     | 1         |                       |        |  |
| "MOVEABLE" LOWER TOE BOARD   |                     | 1         |                       |        |  |
| HINGES' PROFILES             |                     | 2         |                       |        |  |
| NARROW WING BOLT (rotary)    |                     | 1         |                       |        |  |
| BOLT'S WALL PLATE – STRAIGHT |                     | 1         |                       |        |  |



**2.2.5 C. CONFIGURATION OF THE LOWER MOVEABLE WING (NO FIXED WING, ASSEMBLY ON THE WALL'S PROFILE) – REGULATION LIMITS.**

ZSWT in the configuration of a single moveable wing has two regulation scopes which affect the final width of the protection. The R regulation limit consists of three ranges:

- A – Hinge axis offset from the hole's edge,
  - B – wing's width = 1108 mm (to the hinge axis),
  - C – smooth regulation on a wall plate of the hinge.
- The components were shown in the below table.



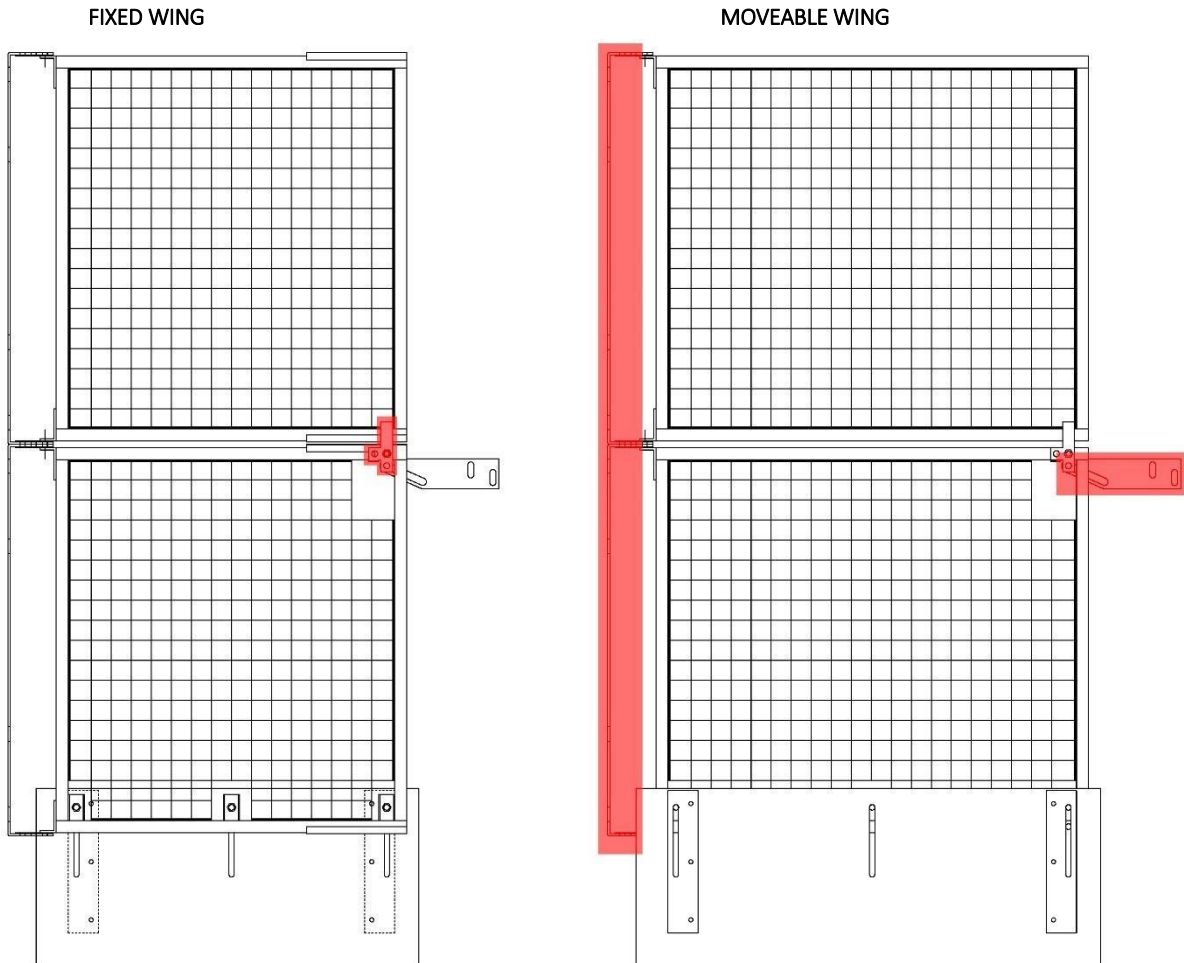
**CONFIGURATION OF THE LOWER MOVEABLE WING – REGULATION LIMITS  
 (ASSEMBLY ON THE WALL'S PROFILE) – TABLE**

| Span No.                          | A (step regulation) | B (fixed) | C (smooth regulation) | R [mm] |  |
|-----------------------------------|---------------------|-----------|-----------------------|--------|--|
| 1                                 | 60                  | 1108      | 10 min.               | 1058   |  |
| 2                                 | 60                  | 1108      | 100 max.              | 1148   |  |
| 3                                 | 80                  | 1108      | 10 min.               | 1038   |  |
| 4                                 | 80                  | 1108      | 100 max.              | 1128   |  |
| 5                                 | 100                 | 1108      | 10 min.               | 1018   |  |
| 6                                 | 100                 | 1108      | 100 max.              | 1108   |  |
| List of items                     |                     | Quantity  |                       |        |  |
| MOVEABLE LOWER WING               |                     | 1         |                       |        |  |
| MOVEABLE UPPER WING               |                     | 1         |                       |        |  |
| "MOVEABLE" LOWER TOE BOARD        |                     | 1         |                       |        |  |
| HINGES' PROFILES                  |                     | 2         |                       |        |  |
| NARROW WING BOLT (rotary)         |                     | 1         |                       |        |  |
| WALL PLATE OF THE BOLT – STRAIGHT |                     | 1         |                       |        |  |



**2.2.6 FIXED AND MOVEABLE WING FROM A COMPLET ZSWT SYSTEM.**

In case of spreading out the complete ZSWT system on two separate wings (fixed and moveable wing) it should be remembered to use additional equipment for the wings. The figure below shows two separate wings configured, consisting from a complete ZSWT system and additional elements of the equipment. Additional elements were marked with red.



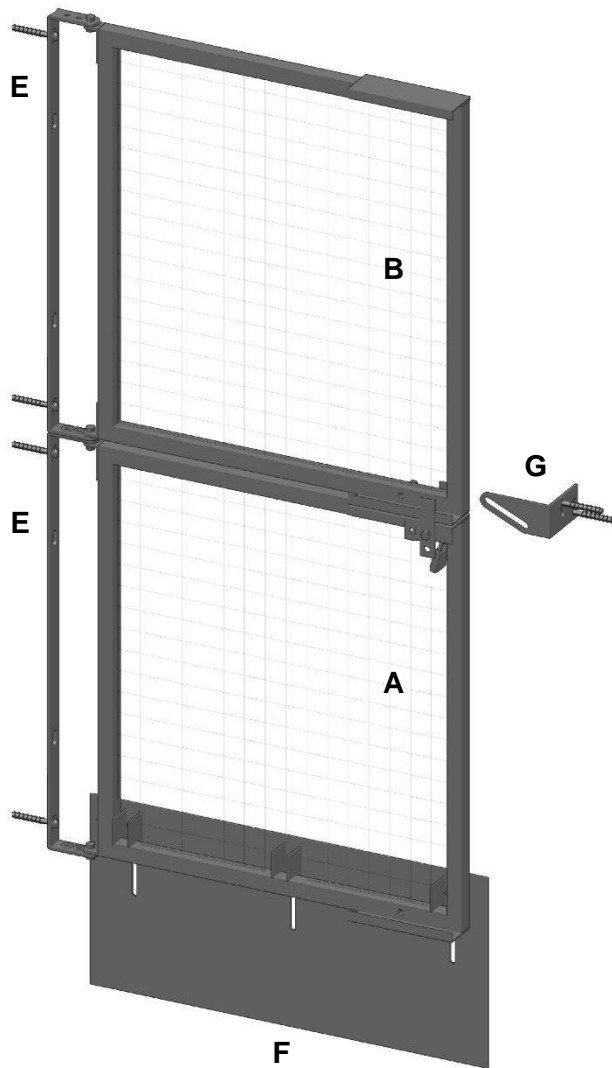
| List of items                    | Quantity      | important notes   |  |  |
|----------------------------------|---------------|---|--|--|
| <b>FIXED WING</b>                |               |   |  |  |
| FIXED LOWER WING                 | 1             |   |  |  |
| FIXED UPPER WING                 | 1             |   |  |  |
| "FIXED" LOWER TOE BOARD          | 1             |   |  |  |
| HINGES' PROFILES                 | 2             |   |  |  |
| <b>WIDE WING'S BOLT (rotary)</b> | 1             | The wide bold belongs to the ZSWT system is a loose element, not used in the complete ZSWT configuration. |  |  |
| WALL PLATE OF THE BOLT           | 1             |   |  |  |
| <b>MOVEABLE ARM</b>              |               |   |  |  |
| MOVEABLE LOWER WING              | 1             |   |  |  |
| MOVEABLE UPPER WING              | 1             |   |  |  |
| "MOVEABLE" LOWER TOE BOARD       | 1             |   |  |  |
| <b>HINGES' PROFILES</b>          | Additional: 2 |   |  |  |
| <b>NARROW WING BOLT (rotary)</b> | 1             |   |  |  |
| <b>WALL PLATE OF THE BOLT</b>    | Additional: 1 |   |  |  |
|                                  |               |   |  |  |
|                                  |               |   |  |  |



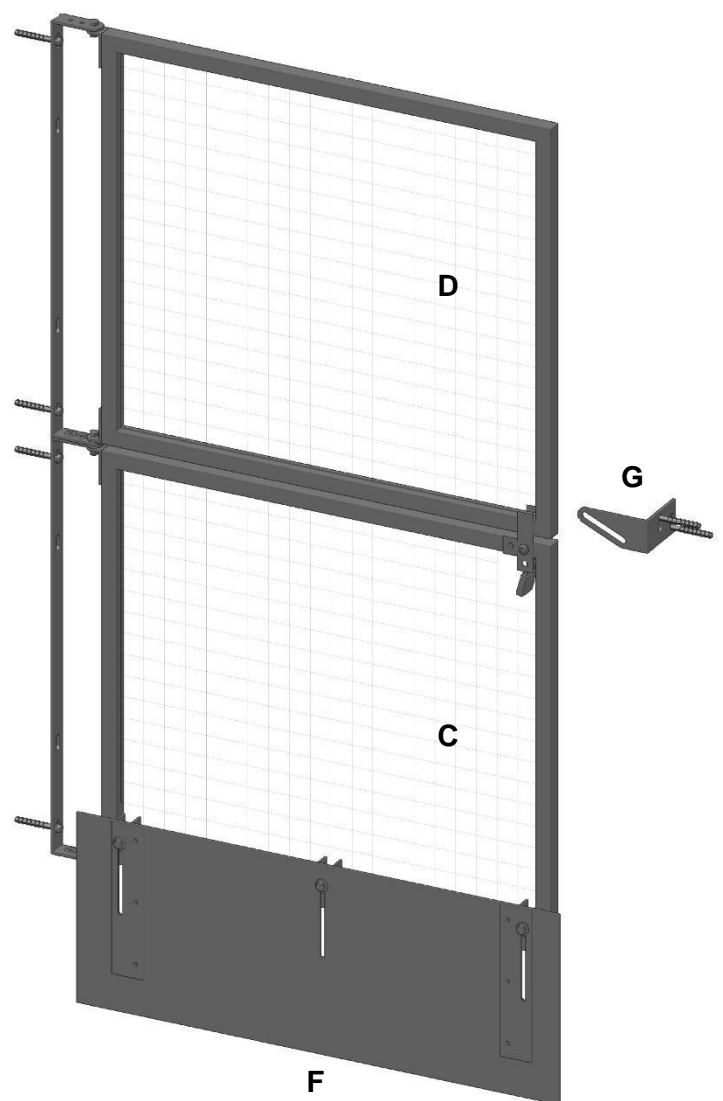
### 2.3 TECHNICAL CHARACTERISTIC, ZSWT SYSTEM CONSTRUCTION.

The Safety system ZSWT is a steel construction consisting of six main parts: a fixed lower wing **A**, a fixed upper wing **B**, a moveable lower wing **C**, a moveable upper wing **D** and hinges' profiles **E**. Additional accessories are a rubber toe boards **F**, a closing bolt **G** and a wall plate of the bolt with a padlock.

FIXED WING



MOVEABLE WING



### 2.3.1 LOWER FIXED ARM.

The Steel frame with a steel net  $\varnothing 3: 50 \times 50$ .

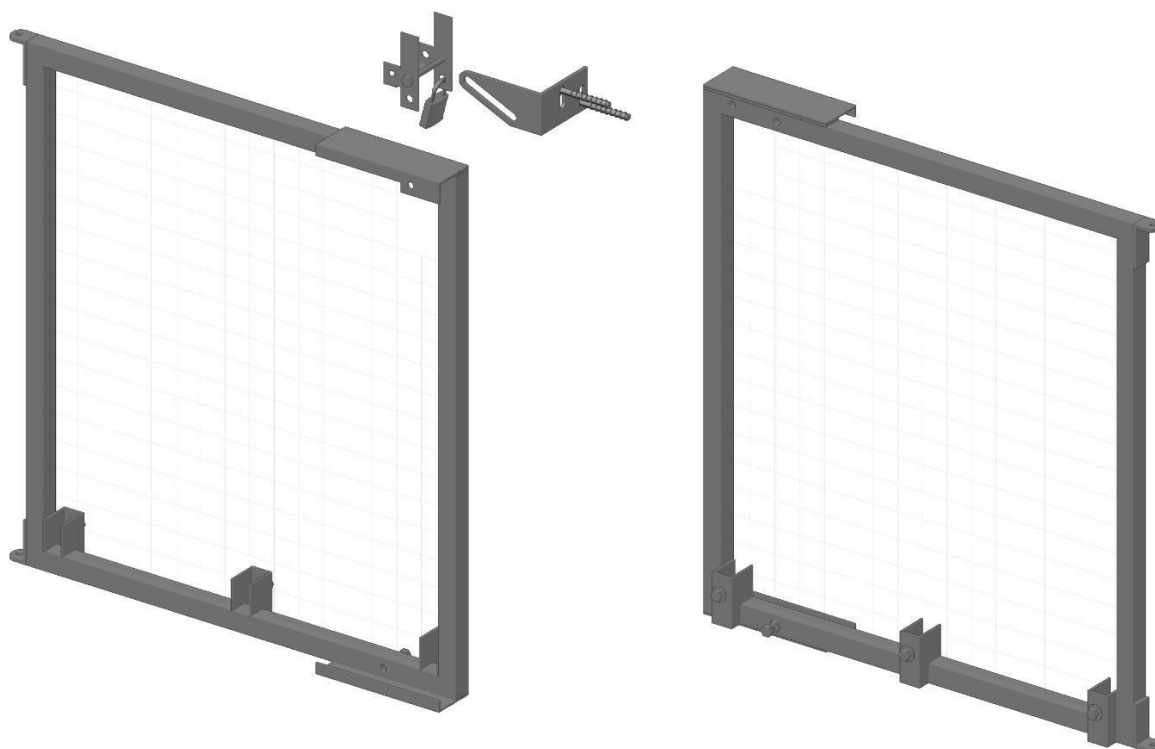
The steel frame is equipped with hinges' holders and slide sockets to adjust the position of the moveable wing of the gate.

There is an assembly point of the locking bolt (2-position) in the upper slide socket.

The locking bolt in this situation is an optional element, used in case of disassembly of the moveable wings.

The slide sockets are equipped with a locking screw M12, used for locking the moveable wings in a given position.

The fixed upper wing is equipped with three anchoring points of the toe board.

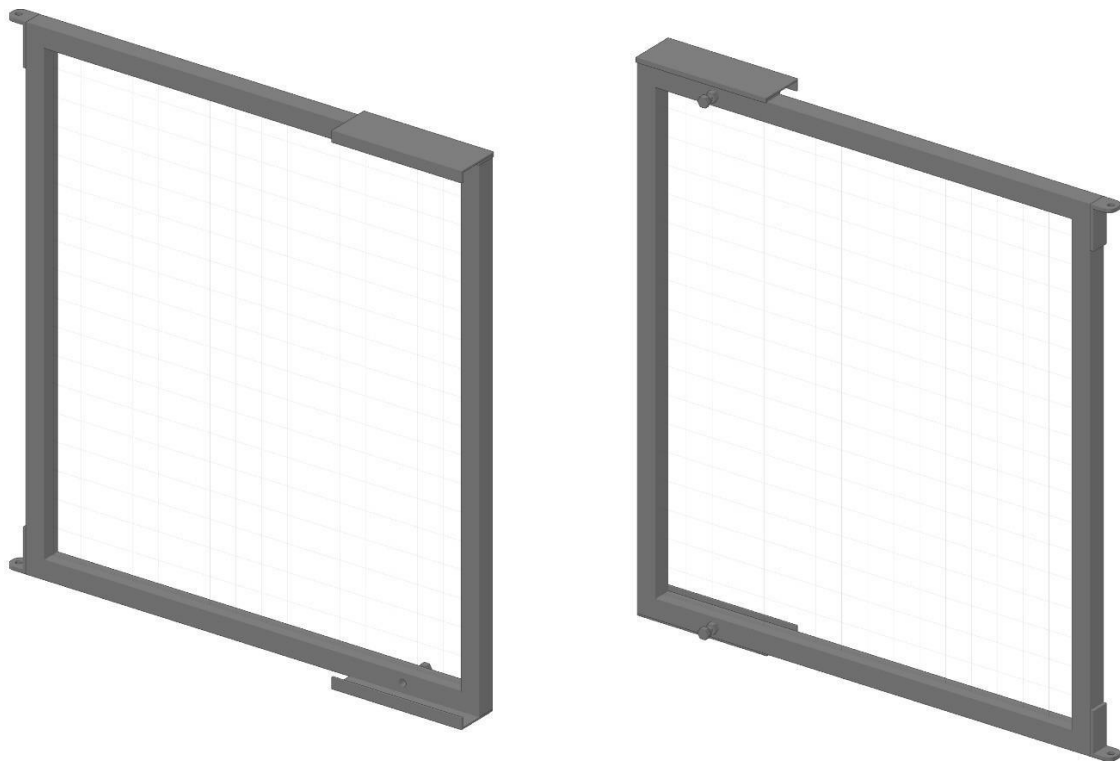


### 2.3.2 FIXED UPPER WING

The Steel frame with a steel net Ø3: 50x50.

The steel frame is equipped with hinges' holders and slide sockets to adjust the position of the moveable wing of the gate.

The slide sockets are equipped with a locking screw M12, used for locking the moveable wings in a given position.



### 2.3.3 FIXED LOWER WING.

The Steel frame with a steel net Ø3: 50x50.

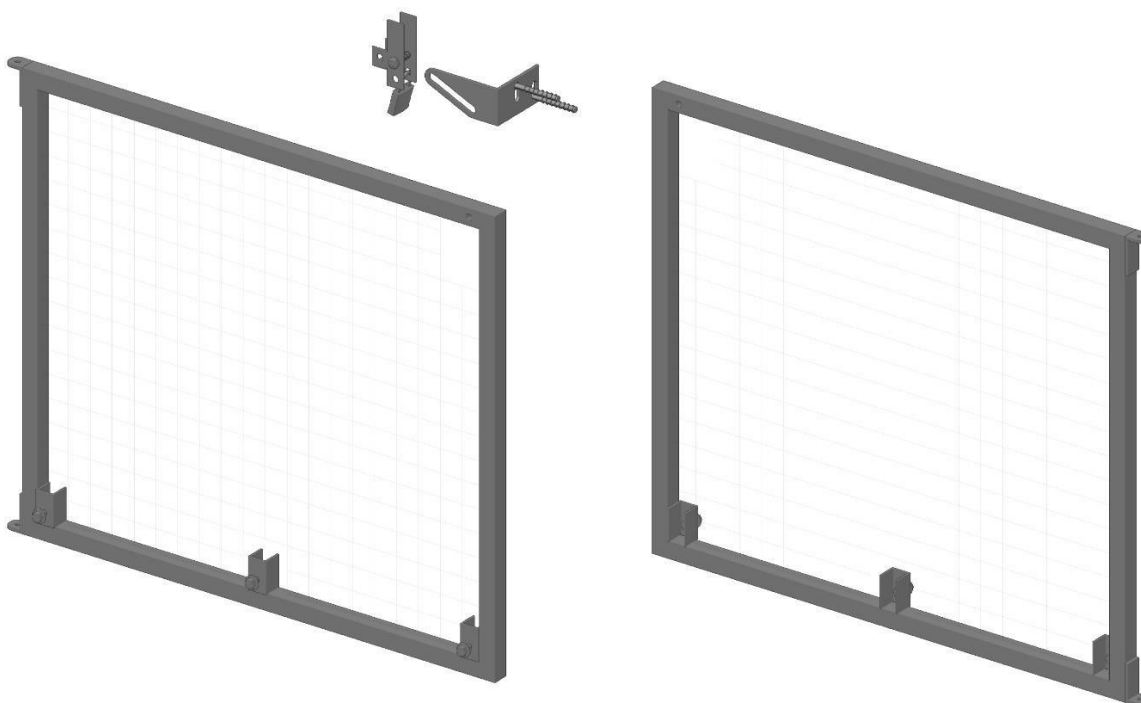
The wing's frame is equipped with hinges' holders which are used in a single gate configuration consisting only of moveable wings.

In the upper right part of the frame there is an assembly point of the locking bolt (2-position).

The locking bolt in this case is a basic element of the system, used for the

Whole gate or a single gate consisting from moveable wings – its operating principle is described further in this document.

The lower moveable arm is also equipped with three assembly points of the adjusted toe board.

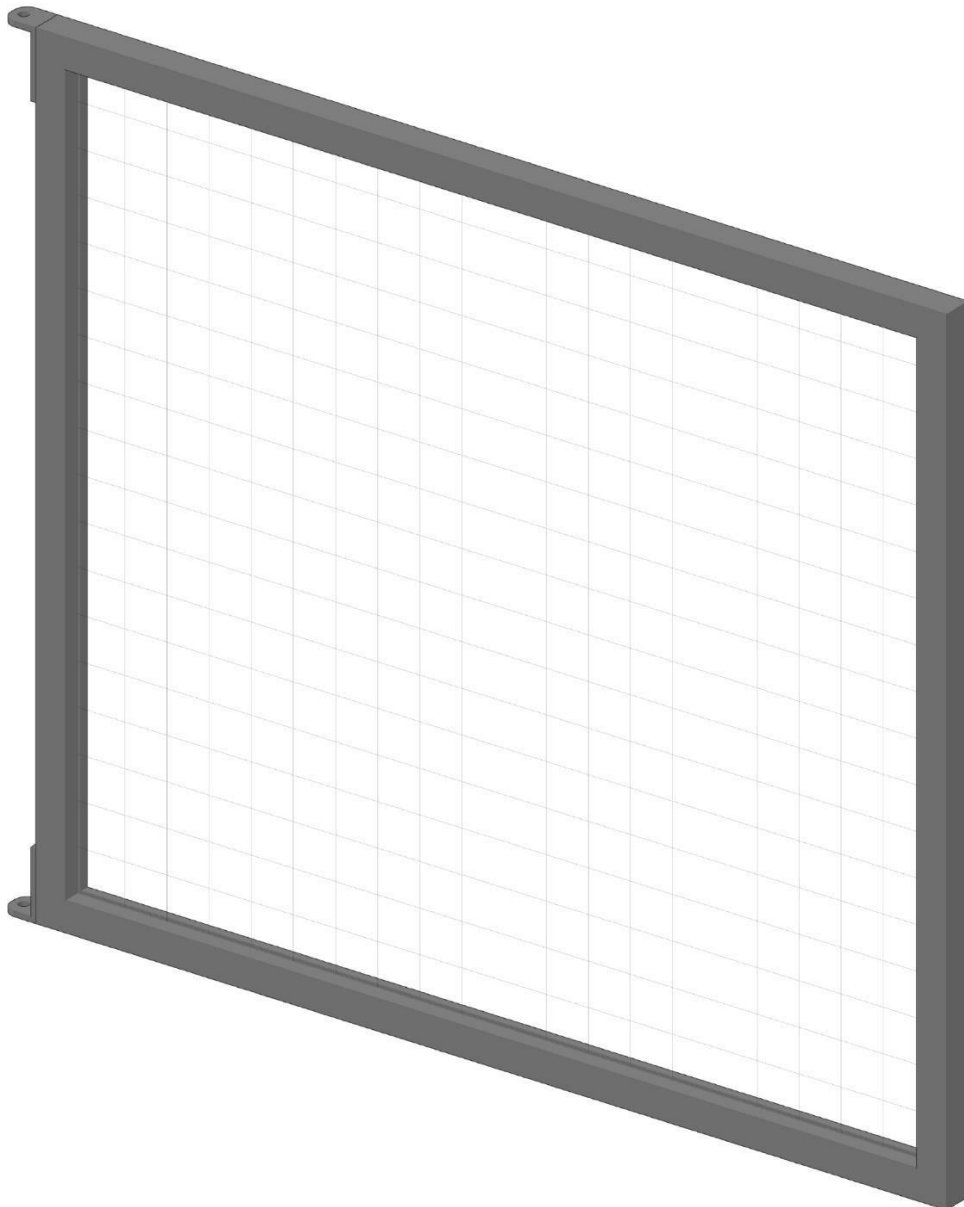




#### 2.3.4 UPPER MOVEABLE WING.

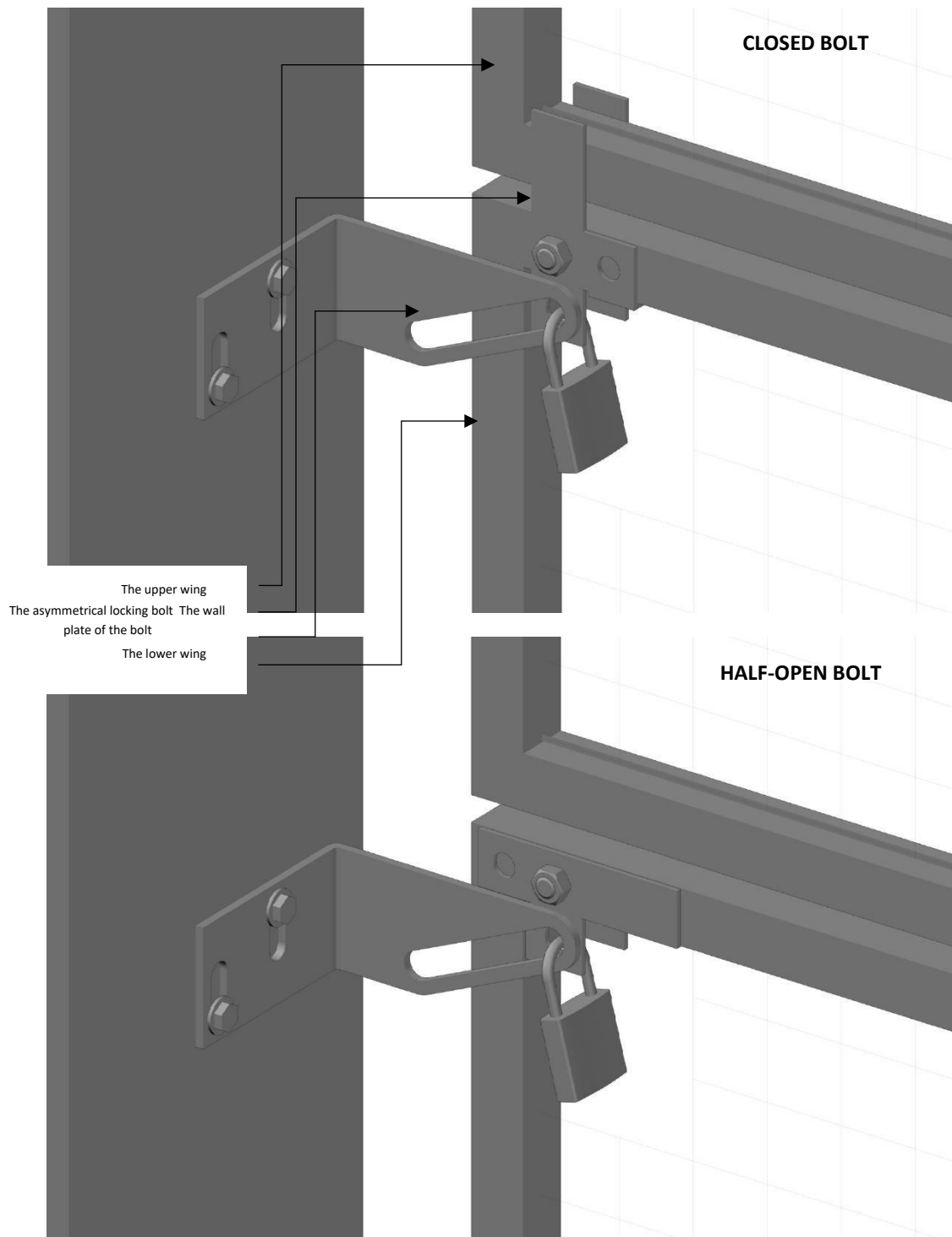
Steel frame with a steel net  $\varnothing 3: 50 \times 50$ .

The wing's frame is equipped with hinges' holders which are used in a single gate configuration consisting only of moveable wings.



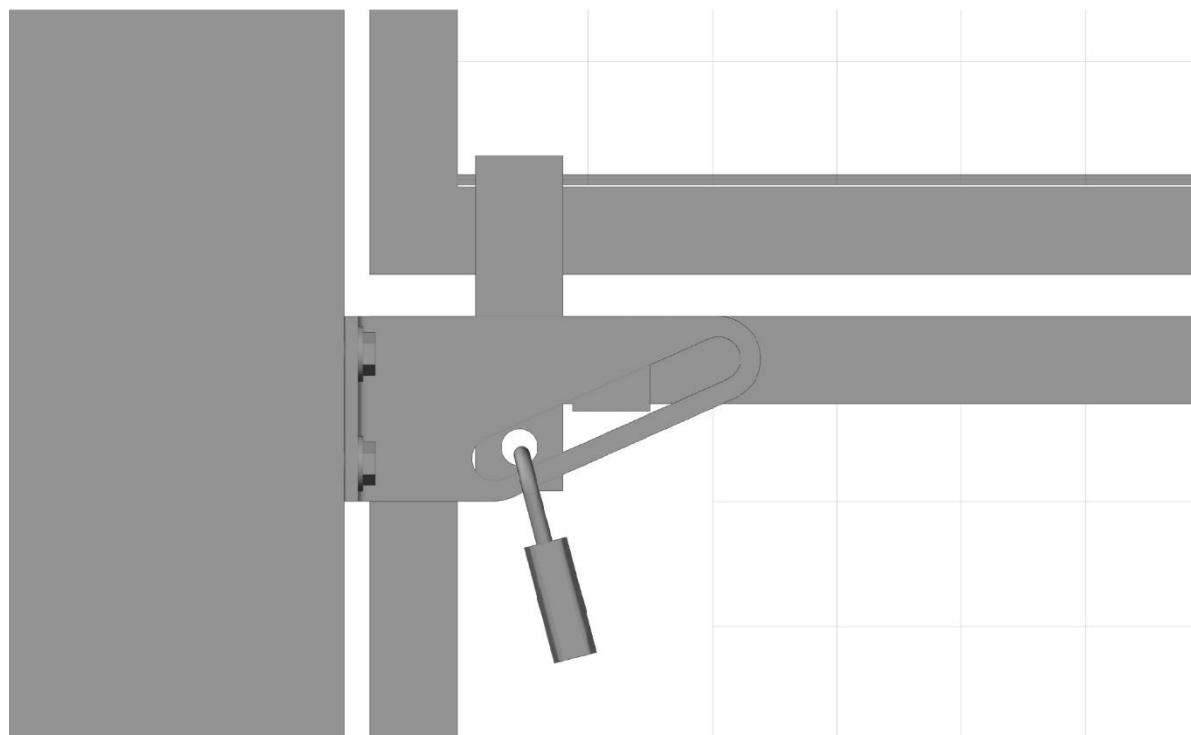
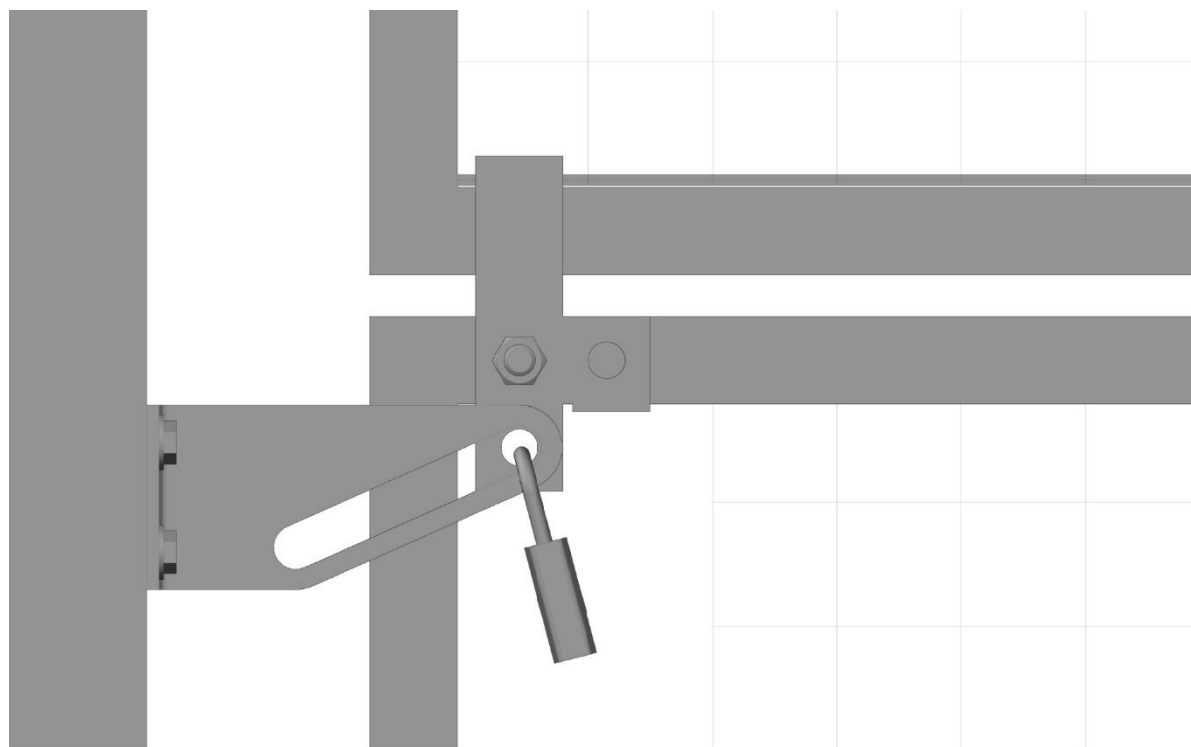
### 2.3.5 ASYMMETRICAL LOCKING BOLT.

The asymmetrical locking bolt is used to completely or partially close the gate. The complete closing means locking both the upper and lower wing. The locking bolt is in this case set in a vertical position (the longer arm upwards). The partial closing means unlocking the upper wing. The bolt is placed in a horizontal position (the longer arm of the bolt in a horizontal position).



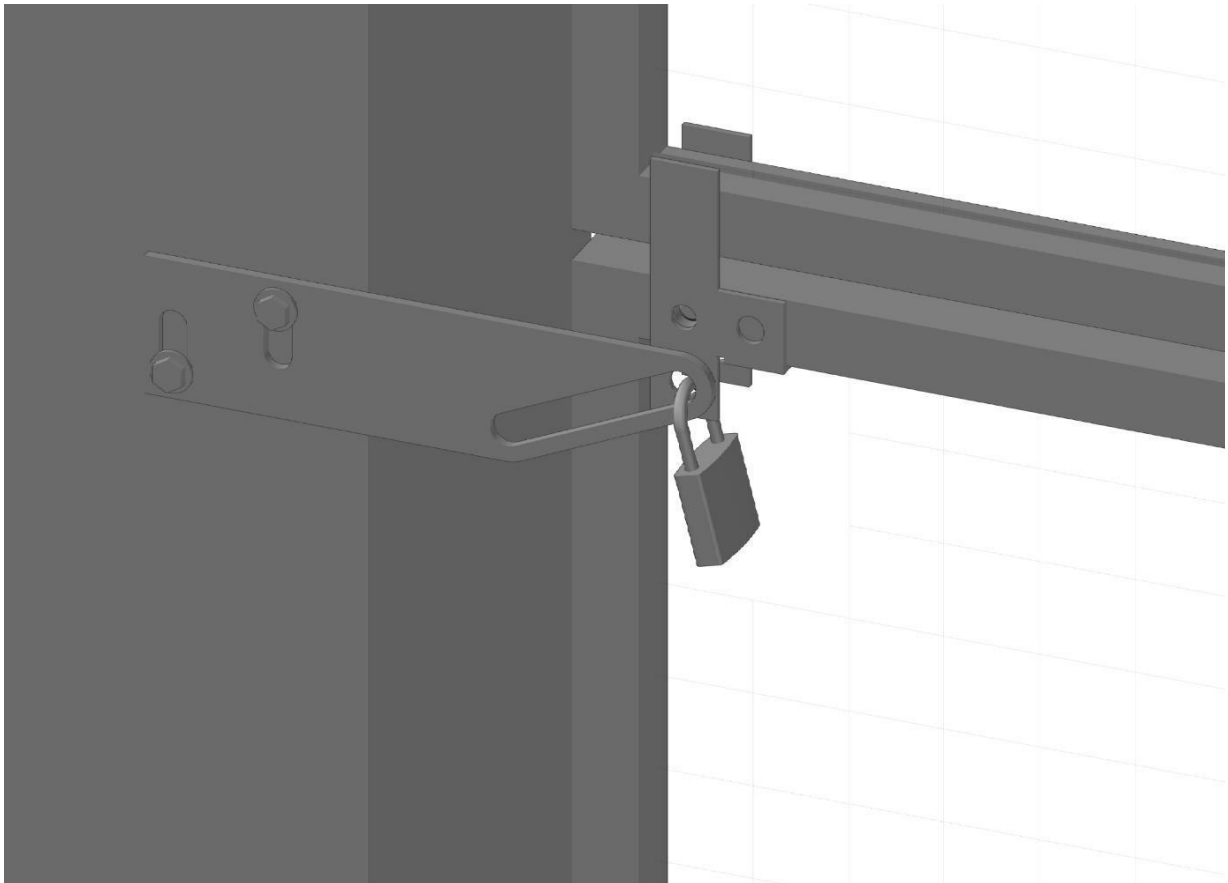
### 2.3.6 LOCKING BOLT – REGULATING WALL PLATE OF THE BOLT (ANGLE).

The triple-arm bolt is closed with a locker to the angle plate of the bolt.  
The plate of the bolt is assembled to the wall (i.e. with screws to concrete).  
The plate of the bolt was designed in order to allow smooth regulation of the distance between the bolt and the plate. This solution allows to adjust the gate to a given hole.  
Specific information about the regulation scope can be found on pages: 9, 14, 17 (variable C).



### 2.3.6 B LOCKING BOLT – REGULATION WALL PLATE OF THE BOLT (STRAIGHT).

The triple-arm bolt is closed with a locker to the straight plate of the bolt.  
The plate of the bolt is assembled to the wall (i.e. with screws for concrete).  
The plate of the bolt was designed in order to allow smooth regulation of the distance between the bolt and the plate. This solution allows to adjust the gate to a given hole.  
Specific information about the regulation scope can be found on pages: 15, 20 (variable C).



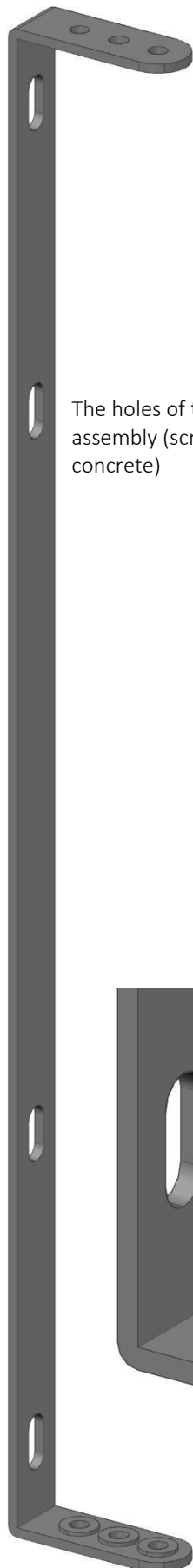
### 2.3.7 WALL HINGES.

The C-shape steel flat bars contain three adjustment holes for the wings (fixed and moveable). Specific information about the regulation scope can be found on pages: 9, 14, 17 (variable A).

They contain two pairs of assembly points (elongated) allowing to adjust to the gate's wings. The assembly of the hinges demands using both pairs of the assembly points. The second pair of the assembly points is optional – used in case of problems with the assembly in other points.

The hinge can be configured for two positions, in the wall's profile or inside the hole's niche.

A part of the hinge assembling the wings has two pads connected to the holes which ensure smooth rotation.



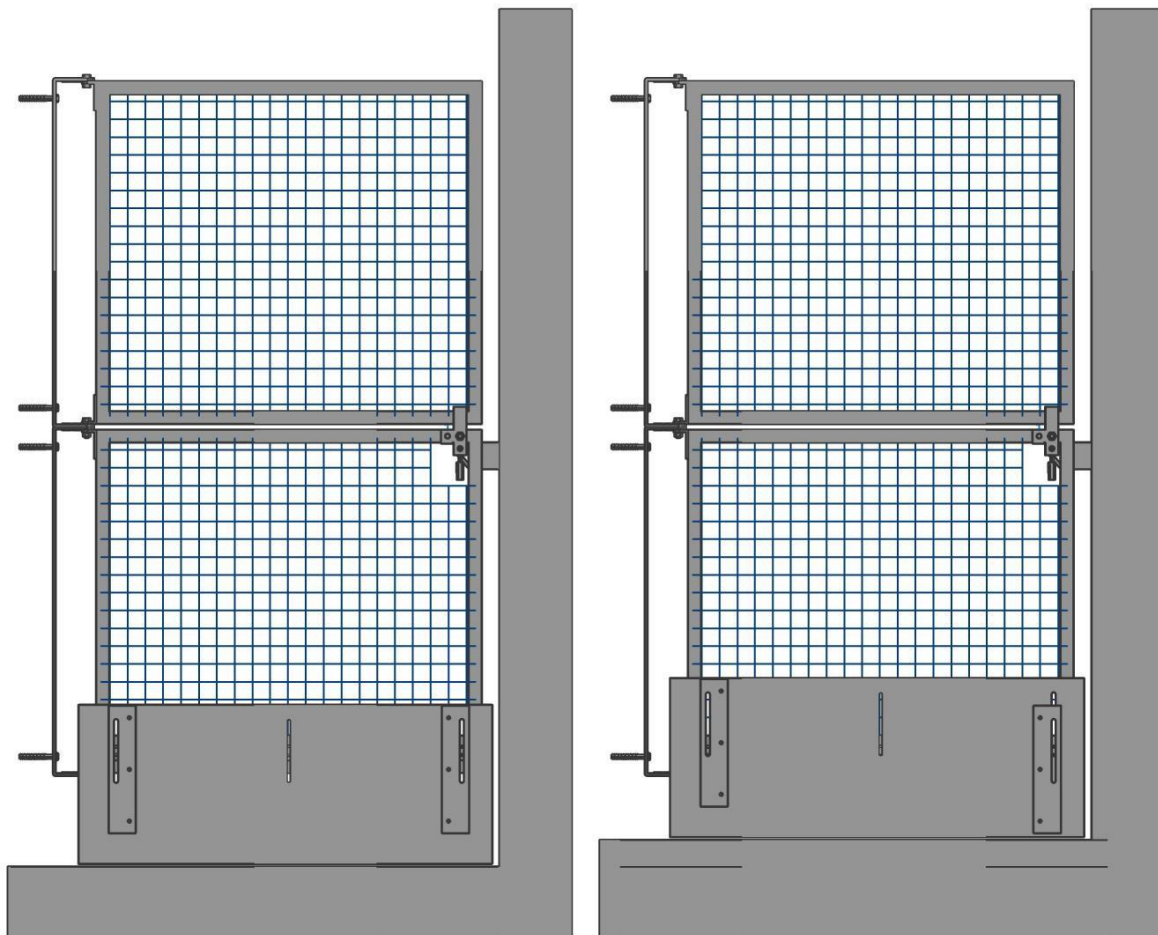
The holes of the wall assembly (screws for concrete)

The hinge's regulation holes



### 2.3.8 RUBBER TOE

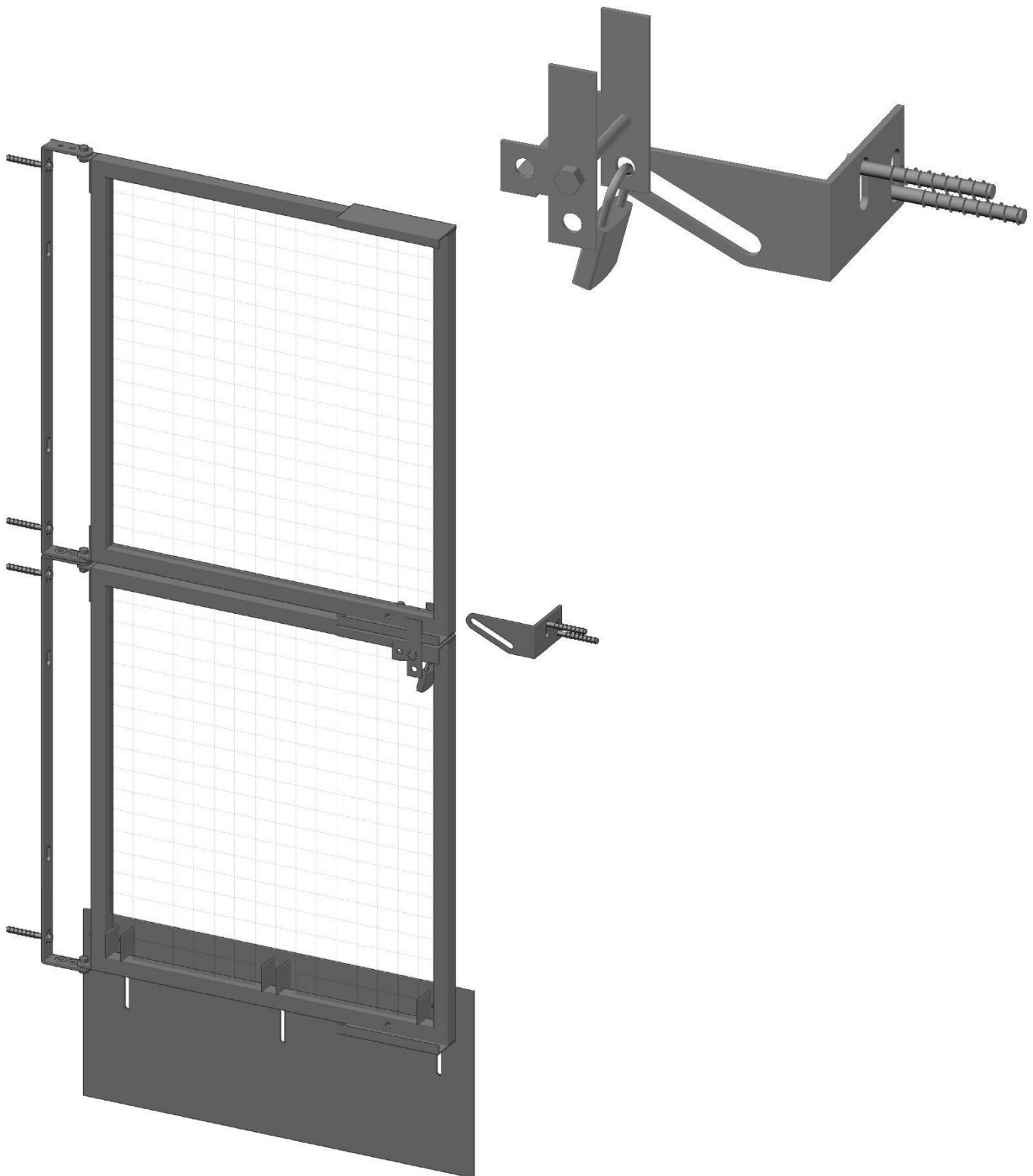
The rubber toe board allows to adjust the distance between the gate's frame and the current floor level. If there are any works connected e.g. with preparing the concrete floor, it reduces the distance between the concrete floor and the gate. In such situation it is enough to rise the toe board and lock it with M12 screws. The toe board made of rubber is flexible and practical, it removes any flaws of the dimensions, hardcore etc.



### 2.3.9 SINGLE GATE "FIXED"

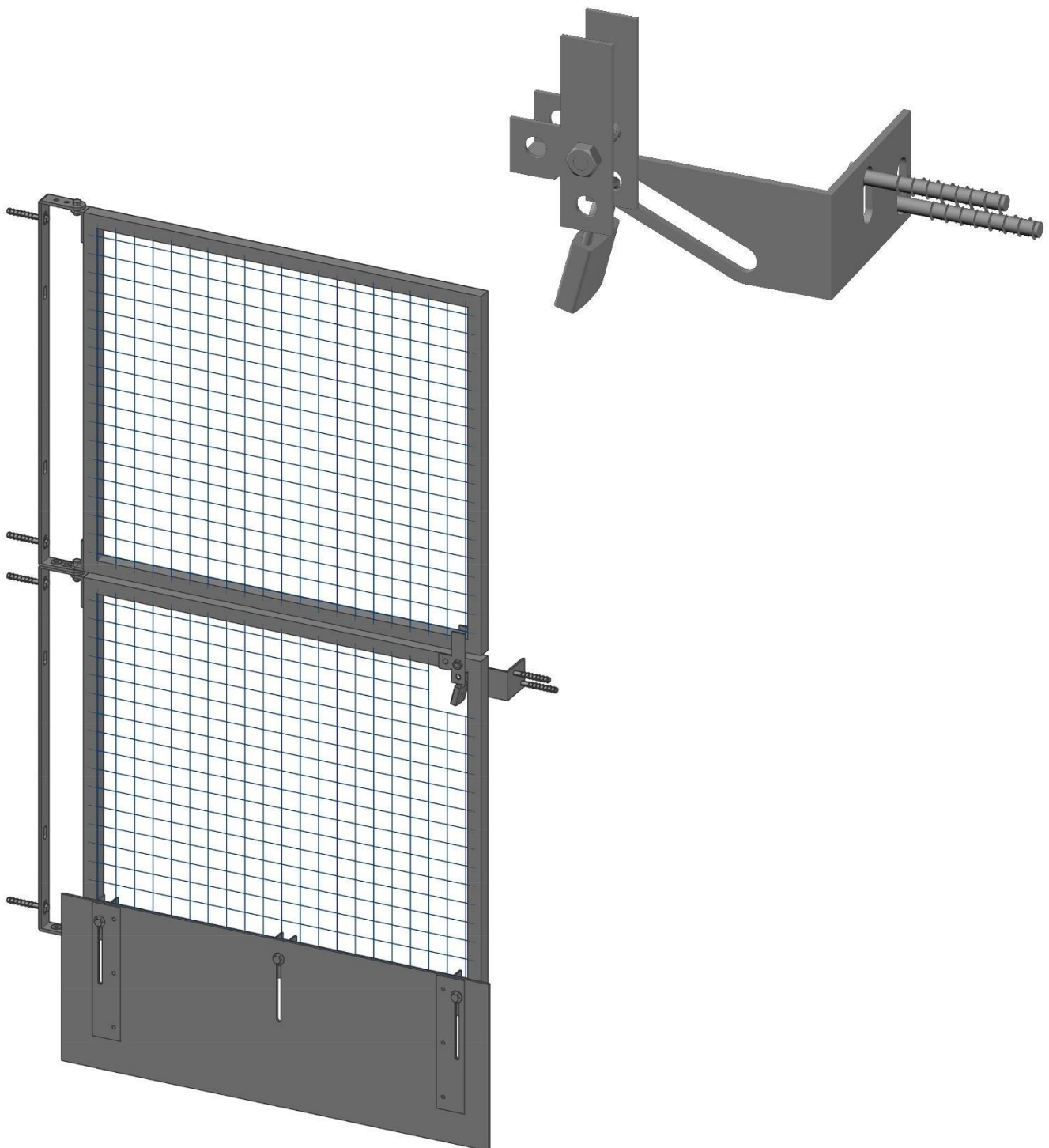
The gate in a single "fixed" version consists of two fixed wings which are assembled to the hinges' profiles and is equipped with an asymmetrical wide bolt and the bolt's plate.

The gate allows for a jumping adjustment on the hinges' profiles and adjust to a given hole's width.



### 2.3.10 SINGLE GATE "MOVEABLE"

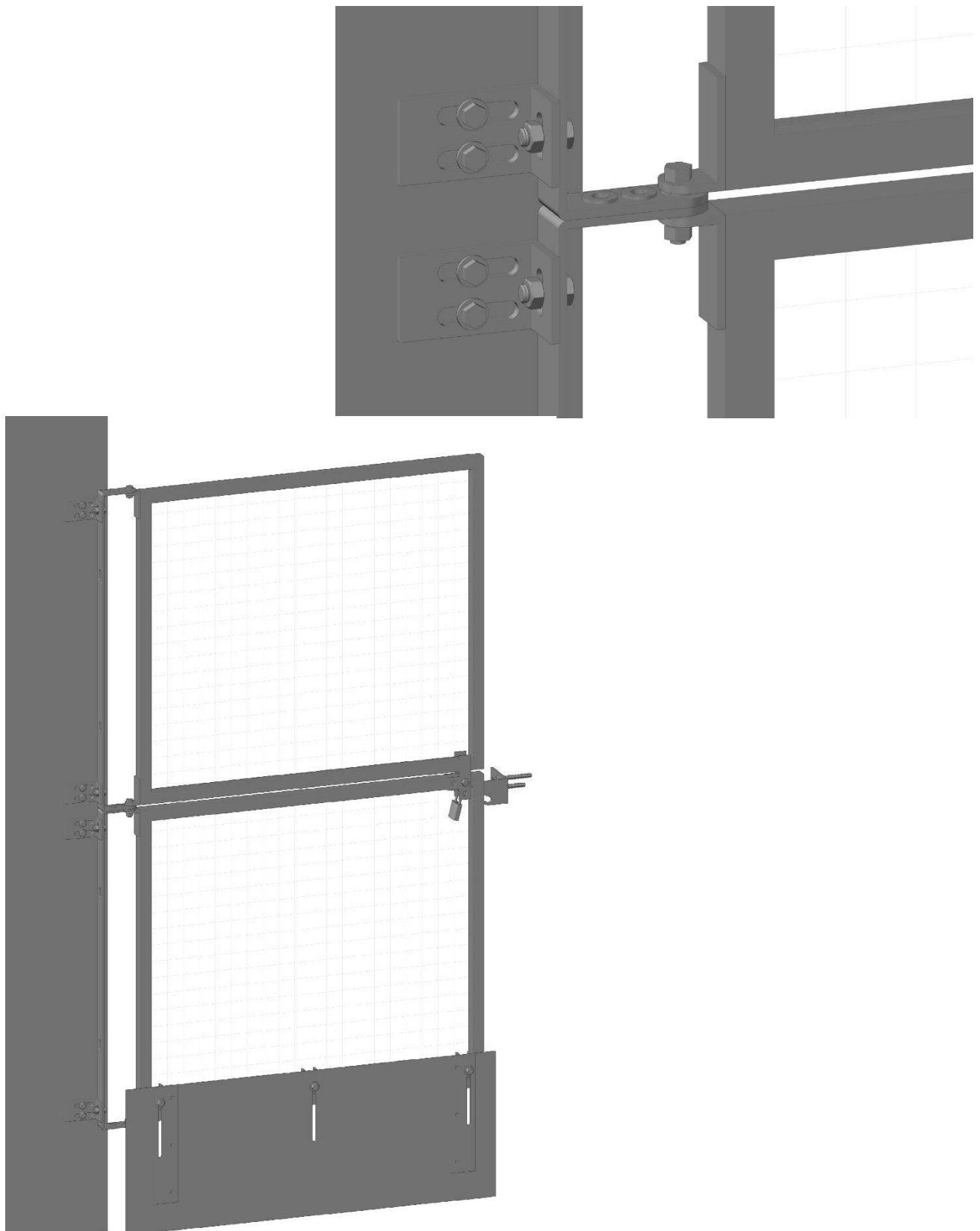
The gate in a single "moveable" version consists of two moveable wings which are assembled to the hinges' profiles and is equipped with a normal asymmetrical bolt and the bolt's plate. The gate allows for a jumping adjustment on the hinges' profiles and adjust to a given hole's width.





### 2.3.11 ANGLE ADAPTER OF THE HINGES' PROFILES

When there is a need for a side assembly of the hinges' profiles to the wall's profile, the gate can be optionally equipped with an angle assembly adapter.



### 3. USAGE

The safety system ZSWT shall be used only for the purposes described in this manual. Any use not in compliance with this manual entails risk of accidents and poses threat to health and life.

Any use not in compliance with the Technical Documentation voids the guarantee.

The ZWST system is aimed to secure elevator and technical shafts in places where there is the risk of falling.

It is used as the security measure for workers who perform their duties in or close to shafts.

The gate protects people and objects from falling into elevator and technical shafts and secures people standing below.

In case on an improper use of the system, it poses a risk for the user as well as other people near the user.

Before using the Safety System ZSWT the worker shall read this manual.

During the use of the Safety System ZSWT, the workers shall meet all the requirements described in the Technical Documentation and in any laws and regulations that apply

Any works connected to the assembly, elements installation and anchoring lie within the responsibility of the site manager.

The whole scope of works connected to the everyday use of the product lies within the responsibility of the site manager. After an accident that resulted in damaging any elements of the system, it should be immediately withdrawn from further use. The damaged elements shall be replaced with new elements

#### IMPORTANT NOTES:

- Elements not delivered with the complete device shall not be attached to the system. It may have a negative impact on mechanical parameters and affect the operational safety.
- The ZSWT safety system was designed in accordance with the EN- 13374+A1\_2019-02E standard – B-type protection. The system provides security in terms of static loads and low dynamic loads. It can bear loads resulting from people leaning against a barrier and provides the possibility to hold while passing next to the protection barrier. It holds person or people walking or falling on the barrier. It holds person or people sliding or falling on the barrier over an inclined surface.
- In case of selling the device, the seller shall provide the product's manual in the language of a country where the equipment is to be used.
- For elements not produced by STRUMIN, please adhere to a given element's product manual.



### 3.1 ACTIONS PERFORMED BEFORE THE USE OF THE SAFETY SYSTEM ZSWT

- Visually check all elements of the system. Ensure that there are no damages.
- During the transport, workers shall act carefully in order to avoid possible impact to the constructional elements. In case of damaging any elements of the device, it shall be immediately withdrawn from further operation,
- In case of damaging any elements the device shall be immediately replaced.
- If the device or the transport basket containing the device is transported with a crane, workers shall pay special attention to any movements of a crane and keep safe distance from it.
- In case of using a crane, all works connected to joining the sling to the device shall be performed by a person holding the permissions for a hook operator,

### 3.2 QUALIFICATIONS OF THE PEOPLE USING THE SAFETY SYSTEM (ZSWT)

Workers operating the system shall:

- Read the full Technical Documentation of the Safety System (ZSWT) during the morning briefing – the information about the training shall be entered into the Instructions of Safe Work.
- Finish a training on the occupational safety and health (work at heights).
- Undergo a training about using the personal and collective protective equipment.
- Hold current medical examinations proper for a given work.

### 3.3 ASSEMBLY OF THE SAFETY SYSTEM (ZSWT)

Any works connected to the assembly of the safety system (ZSWT) shall be performed in accordance with this manual and under a supervision of people that finished the required trainings.

The assembly of the ZSWT system shall be performed by minimum 1 person equipped with the right tools and PPE which protects during the assembly works.

Before commencing the works, the deployment and assembly plan of the ZSWT system shall be prepared, individually for each construction site and for each variant of the system. It allows to properly use the safety system.

The assembly of the Safety System (ZSWT) can be performed only by a worker that has read the system's Technical Documentation. The site manager or a different person that obtained a permission from the site manager is responsible for the deployment and the choice of places that are to be protected.

Before the assembly, it shall be checked visually if the system is complete and has no visible signs of damage.

The assembly shall be performed with caution. In case of damaging any elements of the system, it shall be immediately replaced.

Before starting any assembly works, there shall be determined a danger zone within the area where there is a danger of falling objects – 1/10 of the height, but no less than 6 m.

No elements that do not belong to the device can be assembled to the Safety System.

### 3.4 DISASSEMBLING AND MOVING THE DEVICE BETWEEN WORKPLACES

During the disassembly of the Safety System (ZSWT), workers shall keep all security measures and comply with the same regulations as during the assembly process.



### 3.5 ZSWT SYSTEM ASSEMBLY

The assembly process contains a few key stages that shall be performed correctly. The basic principle of the assembly process is reading this documentation (both the theoretical and the practical part). The knowledge about elements of the system and dependencies between them determines the speed of the assembly process.

#### 3.5.1 ASSEMBLY INSTRUCTION – ASSEMBLY OF THE HINGES' PROFILE

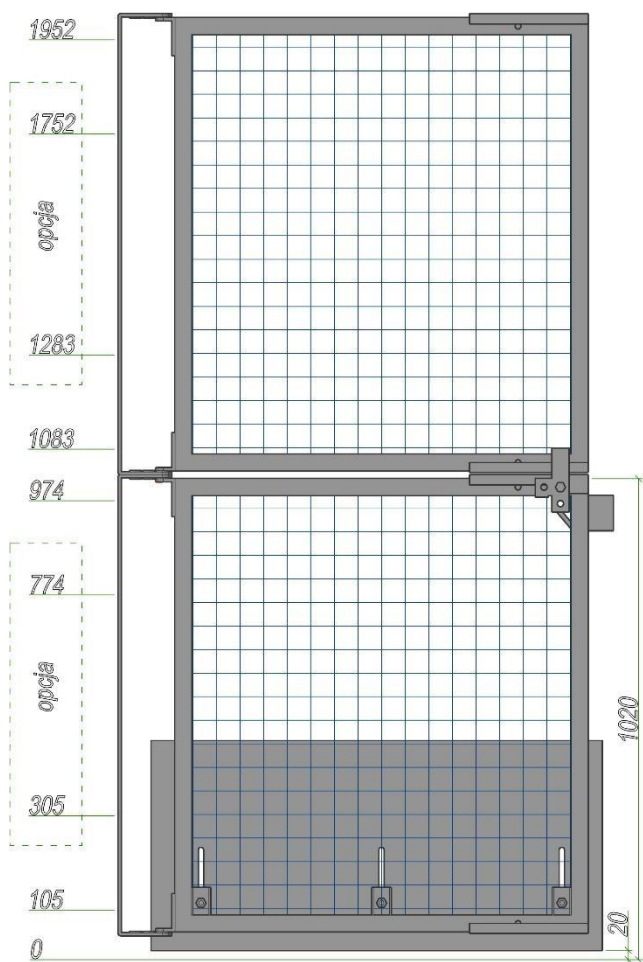
Assembly the profiles with screws for concrete FBS 10x100.

The hinges' profiles shall be assembled in the correct configuration for a given gate type (see p. 6–7)

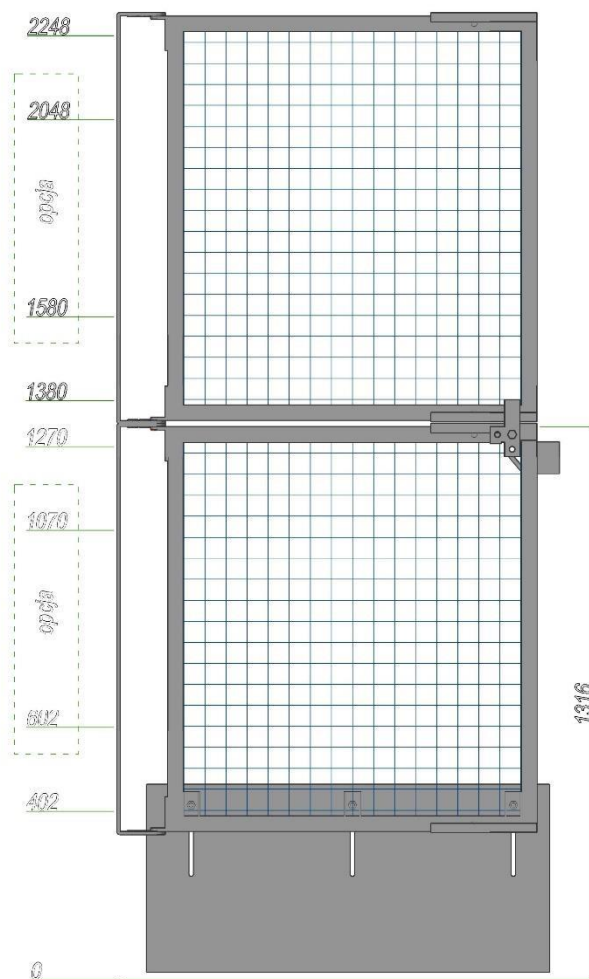
Tools:

- A driller for concrete,
- A bit for concrete  $\varnothing 10$
- An Impact wrench, Cap  
for screws,

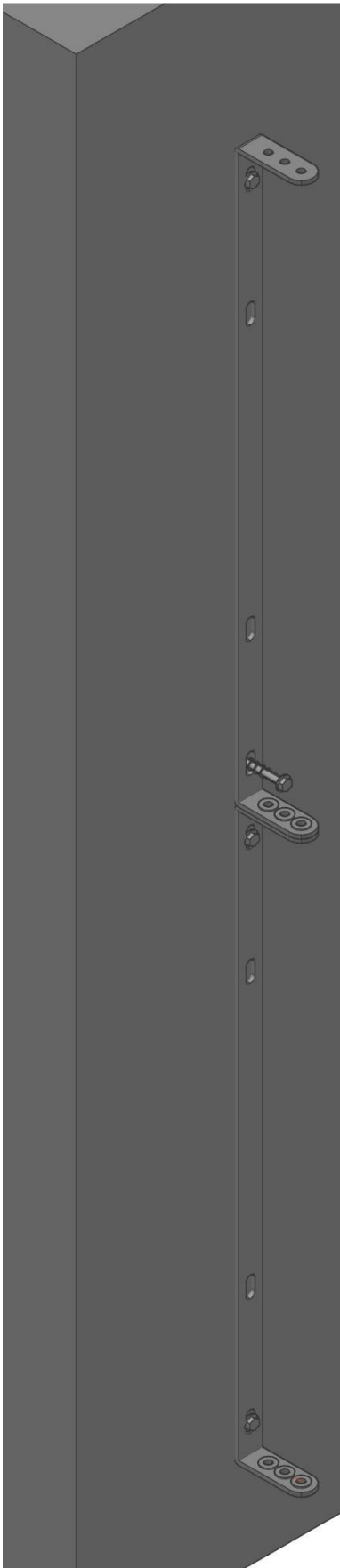
Positions of holes for the minimum  
opening of the toe board.



Positions of holes for the maximum  
opening of the toe board.



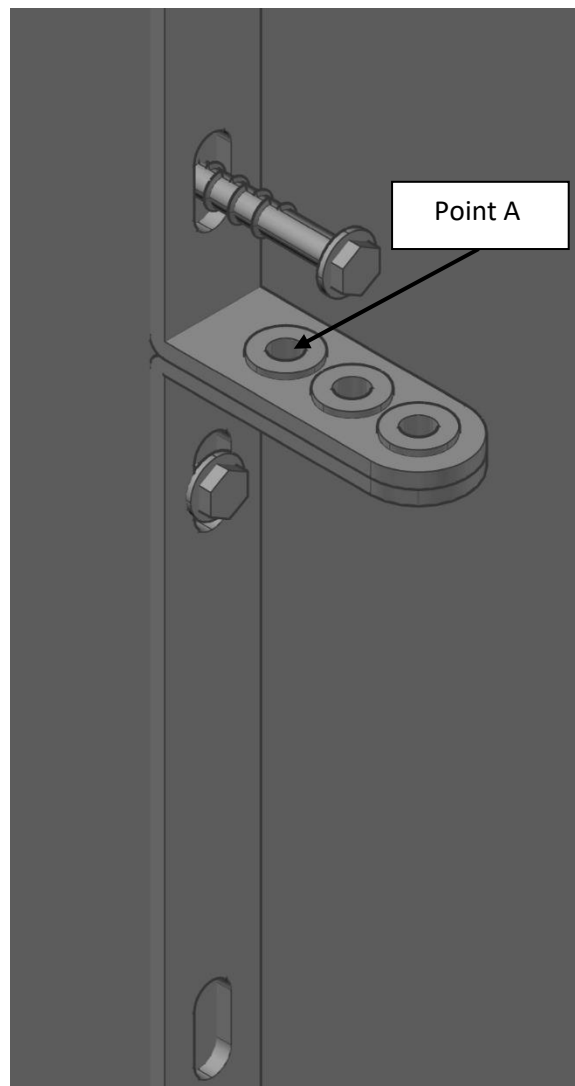
**3.5.1 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE HINGES' PROFILE (3D EXPLANATORY FIGURE)**



The hinges' profiles contain two pairs of assembly points. The assembly of the hinges demands using both pairs of the assembly points. The second pair of the assembly points is optional – used in case of problems with the assembly in other points.

It is best to start the assembly from the lower profile, place the upper profile on the top of the lower profile and, in order to make the assembly easier, temporarily connect both profiles with a M12 screw. → (Point A).

Then the upper profile shall be assembled. The user shall take notice of the vertical line and the axis of both elements.



+49 515 515 445  
biuro@strumin.pl  
www.strumin.pl

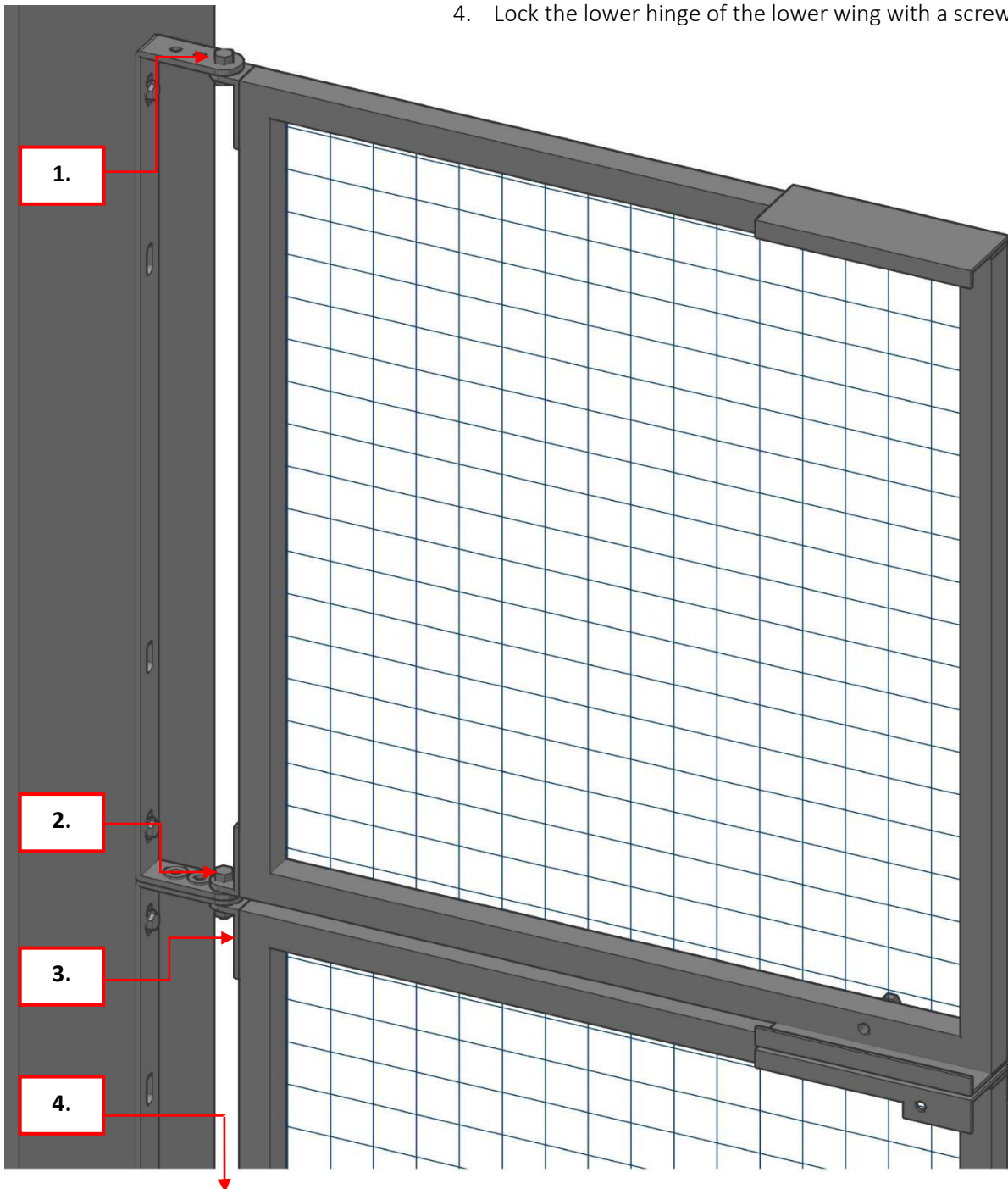
Strumin Equipment  
Spółka z ograniczoną odpowiedzialnością  
Morawica 191, 32-084 Morawica



### 3.5.2 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE UPPER AND LOWER FIXED WING.

It is best to start the assembly of the fixed wings from the upper wing. It will make it easier to assembly the lower wing. The figure shows the order of mounting the screws and placing the hinges of the wings.

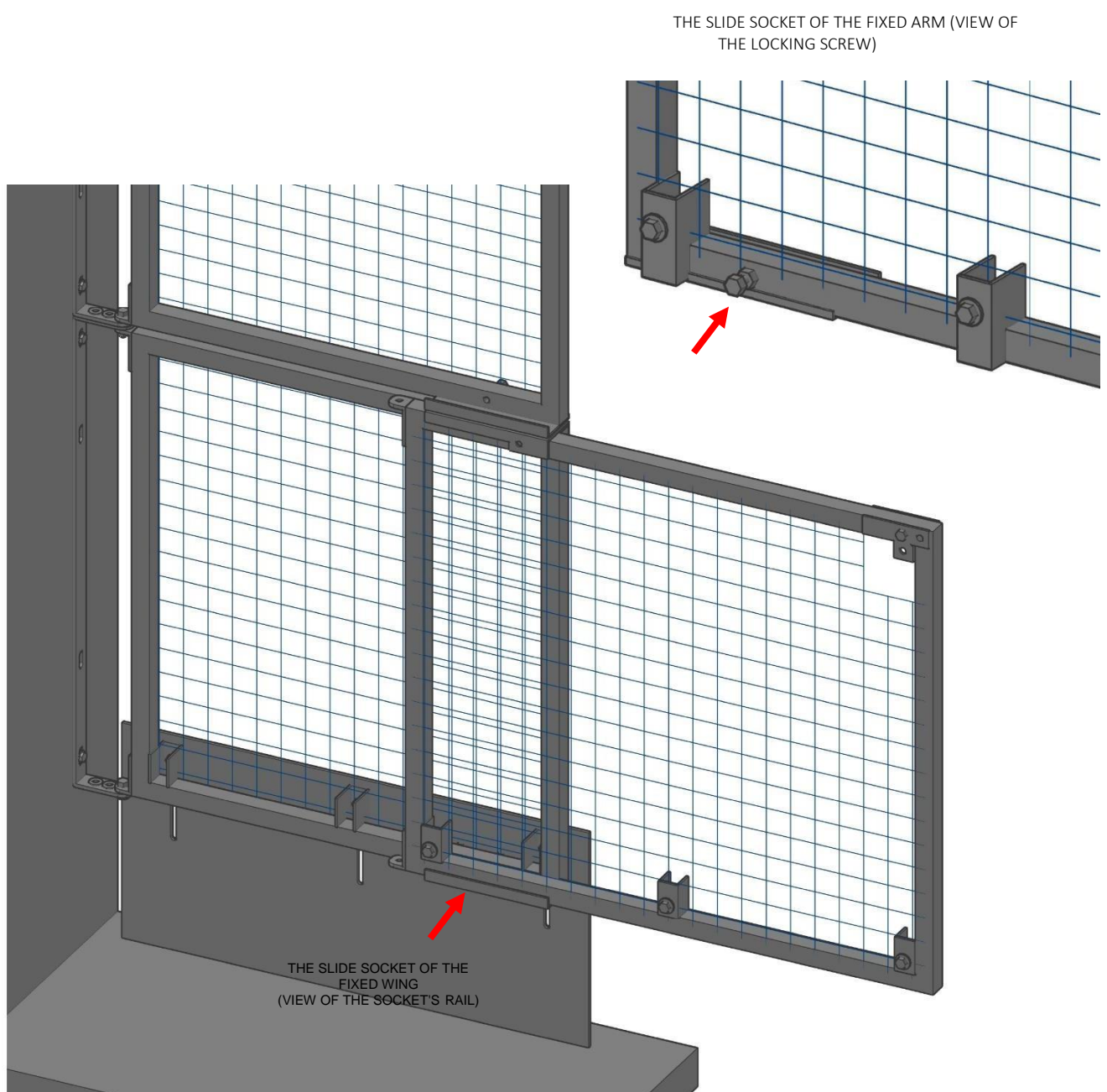
1. Place the M12x40 screw on the upper hinge of the upper wing.
2. Place loosely the M12x60 screw on the lower hinge of the upper wing.
3. Place the lower wing on the screw from point 2.
4. Lock the lower hinge of the lower wing with a screw.



### 3.5.3 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE MOVEABLE LOWER WING

The assembly of a moveable wing demands loosening the locking screws in the fixed wings. The slide sockets of the fixed wings have locking screws that shall be tighten in order to lock the moveable wing in the correct position.

This operation can be performed without the assembled toe board of the moveable arm or together with the toe board – without the need to disassembly.

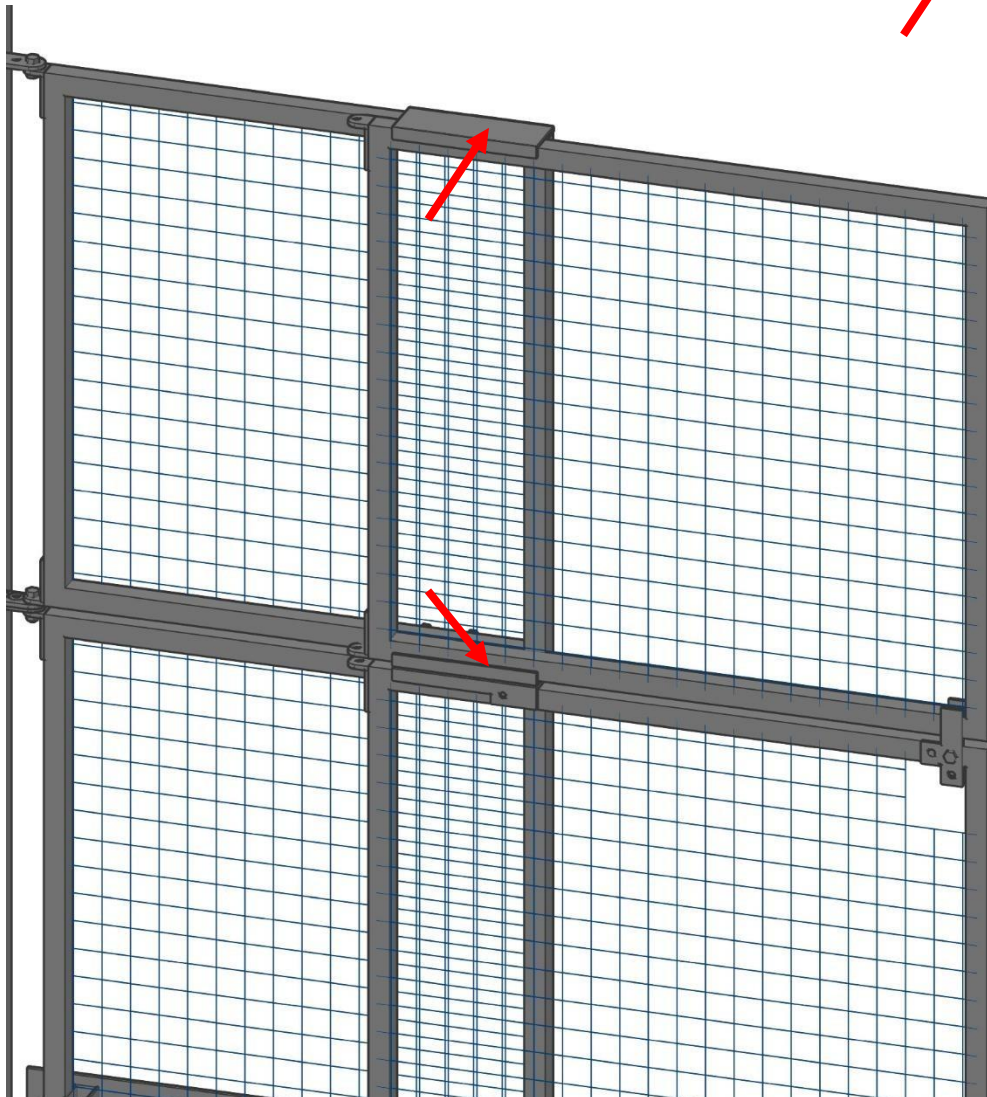
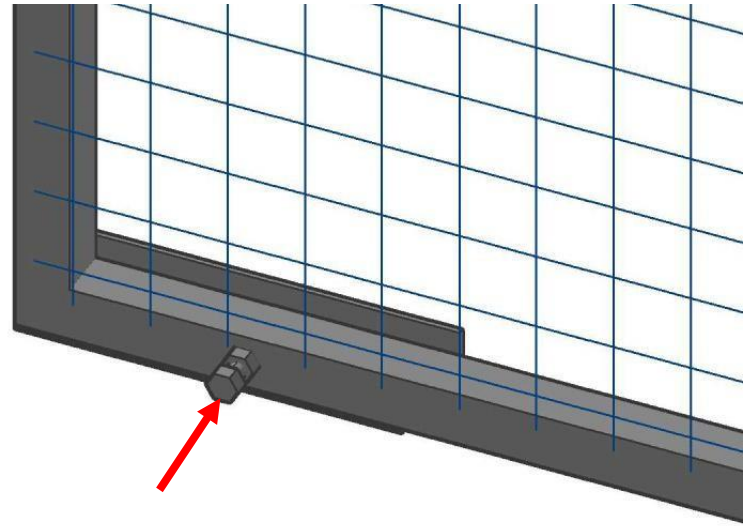




### 3.5.4 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE MOVEABLE UPPER WING

The assembly of the moveable wing demands loosening the locking screws in the fixed wing sockets. The slide sockets of the fixed wings have proper locking screws that can be tighten in order to lock the moveable wing in the correct position.

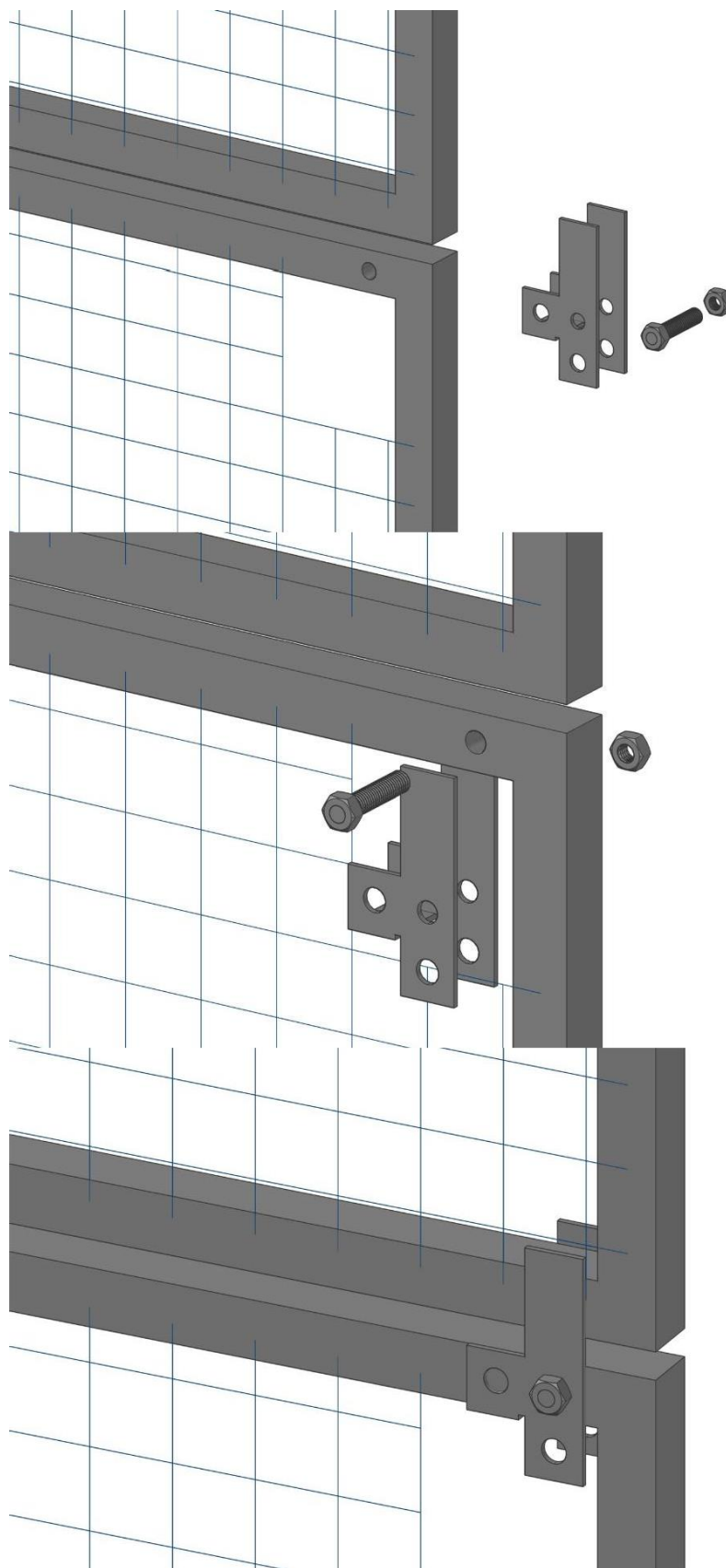
THE SLIDE SOCKET OF  
THE FIXED ARM (VIEW OF  
THE LOCKING SCREW)



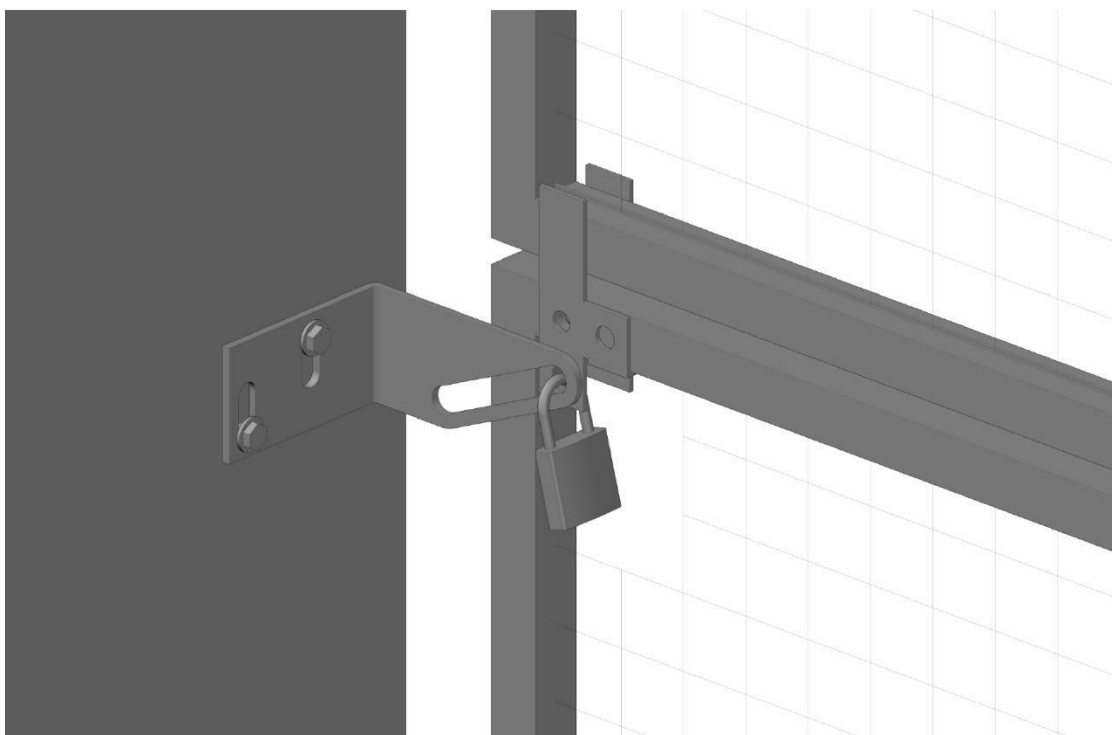
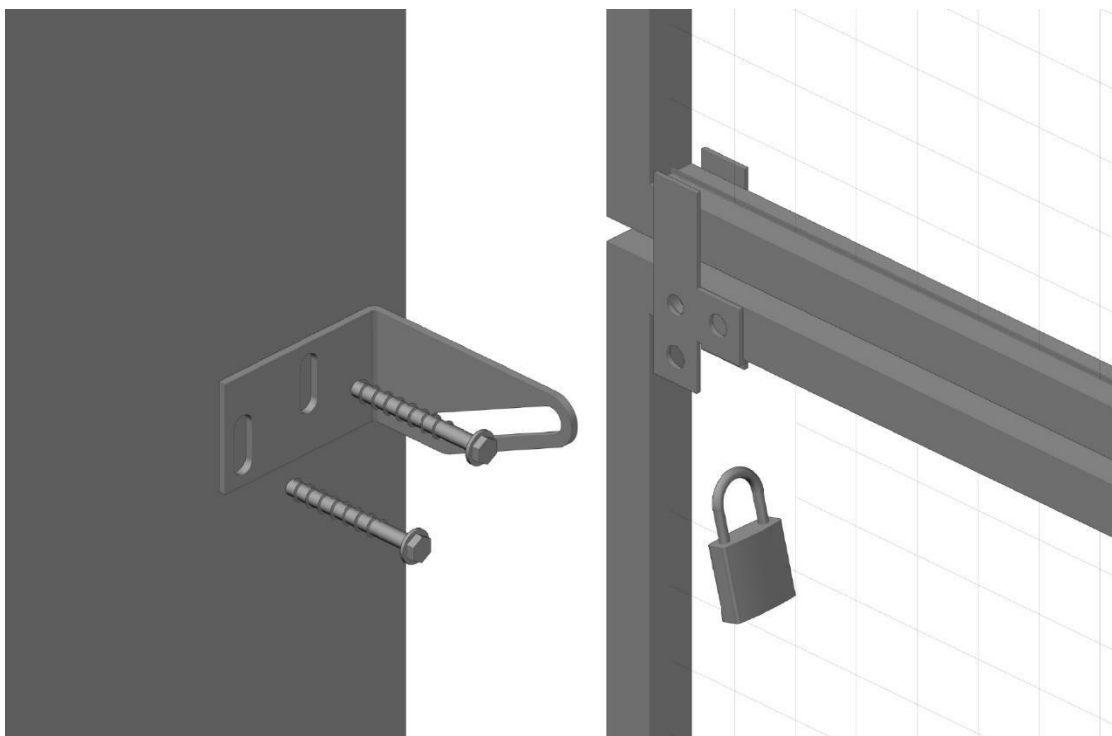
THE SLIDE SOCKET OF  
THE FIXED WING  
(VIEW OF THE SOCKET'S RAIL)



3.5.5 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE BOLT



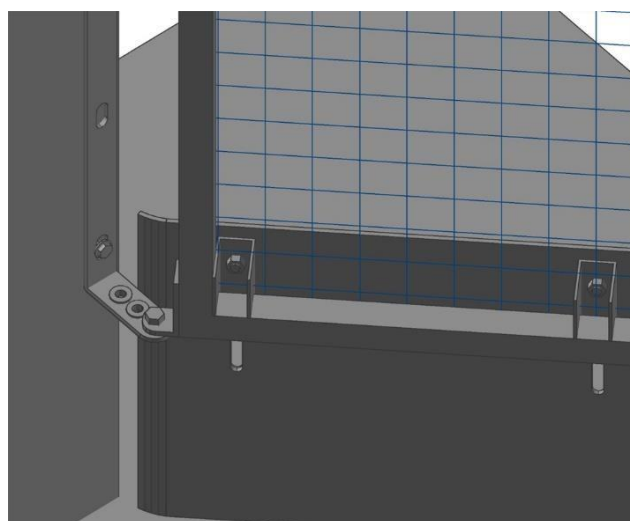
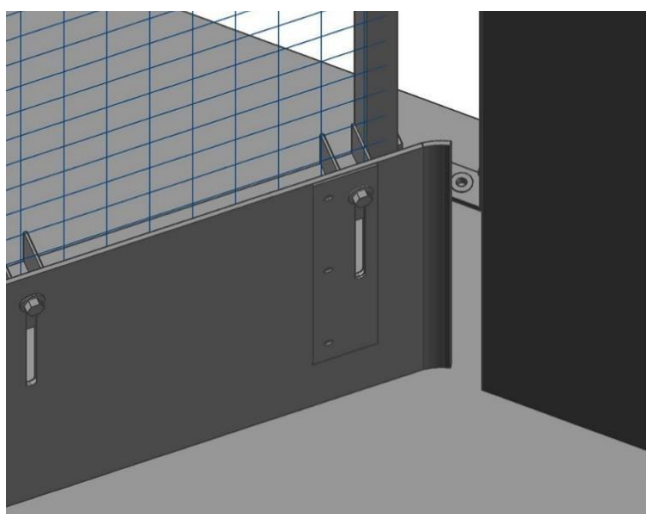
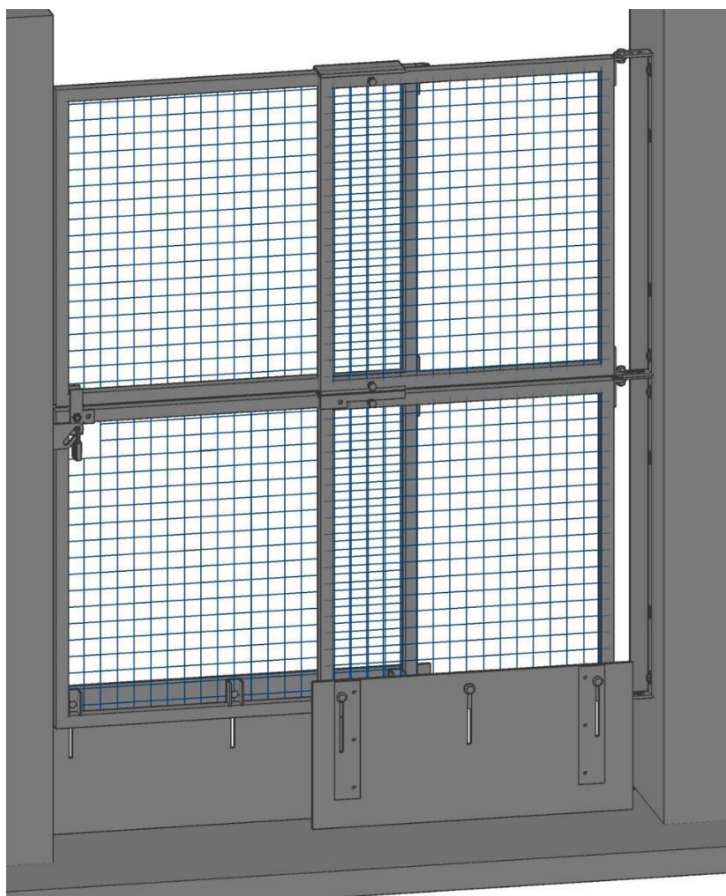
3.5.6 ASSEMBLY INSTRUCTIONS – ASSEMBLY OF THE BOLT'S PLATE



### 3.5.7 ASSEMBLY INSTRUCTIONS – RIGHT ASSEMBLY.

The right assembly is limited to turning the whole ZSWT gate by 180 degrees and assembling in accordance with the guidelines described above.

During the opening, the rubber toe board can brace the hinges' profile and be deformed – what is intended. It was shown in the figures below.



#### 4.0 TIPS FOR A SAFE USE

Pay attention to the safety of users, personnel and other people affected by the operation of the system while using it.

During any works with the safety system (ZSWT) the personnel:

- shall read the system's Technical Documentation,
- shall verify if parts of the system attached to walls are stable, the gate has no visible signs of damages and other elements also bear no damages,
- shall wear proper personal protective equipment.

#### 4.1 RISK ANALYSIS

| No. | Danger                               | Risk  | Risk assessment   | Safety measures  |
|-----|--------------------------------------|---|---|--|
| 1   | Not sufficient mechanical durability | Using of damaged hinge' profiles.   | Fall of the construction.<br>Danger to health and life.   | Check, control and properly store the elements of the system.  |
|     |                                      | Using a damaged or destroyed bolt.  | Fall of the construction.<br>Danger to health and life.   | Check, control and properly store the elements of the system.  |
|     |                                      | Damaging or destroying the bolt's holder.   | Fall of the construction.<br>Danger to health and life.   | Check, control and properly store the elements of the system.<br>Do not allow the risk of heavy objects falling from heights to arise.   |
| 2   | Smashing, squashing                  | Placing a foot, hand or other body part under the holders while twisting or tightening, | Smashing, cutting, injuring or scraping any part of the body.<br>Danger to health and life,                           | Be careful while assembling and, especially, while placing the hinges' profiles. The risk of falling from height, use personal protective equipment. Use gloves, shoes and protective helmets with a chin strap. |
| 3   | Hitting                              | The risk of being hit by the system's elements during transport and moving.             | Hitting the construction or other working surface with one's head / other body parts.<br>Danger to health and life.   | Be careful while moving and avoid carrying long elements by only one worker.<br>Use a protective helmet with a chin strap.   |
|     |                                      | Not locking the bolt while the assembly process.  | Hitting with head or any other part of the body.<br>Danger to health and life.  | Be careful while assembling, take notice of any protective measures of elements and avoid uncontrolled movements, i.e. turning, moving, slipping etc.  |
|     |                                      | Not securing the moveable wing from sliding out.  | Risk for people on the lower levels of hitting with head or any other part of the body.<br>Danger to health and life. | Be careful while assembling, take notice of any protective measures of elements and avoid uncontrolled movements, i.e. turning, moving, slipping etc.  |



|   |                                       |  |  |   |
|---|---------------------------------------|--|--|---|
| 4 | <b>Falling or thrown away objects</b> | Improper securing of the objects at the working place. | Hitting, breaking, injuring or burning any part of the body.<br>Danger to health and life. | Wear proper personal protective equipment. Define the safe work's system. Define a safety area during the assembly and disassembly of the system which amounts to (horizontally) 1/10 height of the building, but no less than 6 m. |
| 5 | <b>Weather conditions</b>             | Hitting by a lightning, wind.                          | Electrocuting, burning.<br>Danger to health and life.                                      | Avoid performing any works near the system during a storm and strong wind (over 10 m/s).  |

## 5. MAINTENANCE

Parts of the system are covered with zinc layer.

In case of any chips, they should be filled with the proper lacquered layer (zinc paste or top coat). It is forbidden to use corroded or mechanically damaged elements.

## 6. TECHNICAL INSPECTION

### 6.1 QUICK INSPECTION

Perform a visual check of the general condition of the system before every assembly, in terms of:

- a) completeness of the system's elements,
- b) completeness of screws, connectors,
- c) no damages to any welds,
- d) any bent, broken, cut or otherwise damaged elements,
- e) check if all assembly holes are unobstructed.

#### **Weekly inspection.**

After the assembly of the safety system (ZSWT), every week shall be performed an inspection of connections and technical condition of the gate.

The aim of the weekly inspection is to ensure that no changes have been made to the system's construction that could lead to a construction disaster or pose a threat to people using it.

#### **Daily inspection.**

The daily inspection shall be documented by employees working within the area equipped with the system. The daily inspection includes:

- checking if the gate was no damaged,
- checking if the elements of the system: wings, connections, hinges' profiles, were no deformed.
- checking if the anchoring elements are properly assembled,
- checking if there were no factors that have had a direct influence on the user's safety (e.g. if the connections were damaged, there was a deformation of constructional elements due to strong winds, heavy rains, hailstorms or snowfall etc.).

It is forbidden to independently repair the elements of the system and elements of the gate. The assembly of a system that was repaired by unauthorized people causes a threat to health and life.

In case of a dangerous event, e.g. a fall, any works shall be stopped and the incident shall be reported to the site manager and the first aid shall be provided to an injured person.



**7.0** MANUFACTURER'S WARRANTY

The manufacturer of the safety system (ZSWT) gives the warranty for the product for 36 months.  
The parts of the system are interchangeable, the elements of the safety system can consist of a few protective sets in order to gain comprehensive safety / lack of damages or faults.  
Combining different parts within a one safety system has no negative effect on the parameters, strength, safety and usefulness of the system.



### III. DESIGNER'S STATEMENT

According to art. 20(4) of the "Building Code" I hereby declare that  
this project documentation of the constructional part of the  
ZSWT Safety System

was drawn in accordance with the provisions of the code, rules and guidelines of technical knowledge (art. 20 point 4 of the 16 April 2004 Act, amending the 7 July 1994 Act – "Building Code" Journal of Laws no. 6, pos. 41/2004), binding technical and building provisions, as well as Polish and European Standards, and was handed in full to serve its purpose.

mgr inż. Jan Bąba  
Uprawnienia budowlane do projektowania  
i kierowania robotami budowlanymi  
bez ograniczeń w specjalności  
konstrukcyjno-budowlanej  
czytelny podpis w pieczęci projektanta

**Projektant**

Kraków, August 2021

