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COMPANY WITH
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= ISO 9001 =

FRP LADDERS

MM06

22.05.2020 Rev. 5

FRP LADDERS

COMPOSITE SOLUTION

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1. USE AND CHARACTERISTICS



The FRP ladders are built by assembling fiberglass and isophtalic resin profiles; they provide many advantages if compared to the metal ones:

- a. High resistance to chemical and atmospheric aggressions
- b. High mechanical/weight ratio
- c. Durability
- d. Lightness
- e. Dimensional Stability
- f. Good dielectric properties
- g. No maintenance
- h. Easy to install

2. REFERENCE NORMS

Ladders are designed and built in accordance with the following norms:

<p><u>UNI EN ISO 14122-1: 2016</u></p> <p>Safety of machinery Permanent means of access to machines. Part 1: Choice of fixed means and general requirements of access</p>	<p>This Standard defines the general requirements for safe access to machines, defined according to UNI EN 12100-2, and gives advice about the correct choice of means of access when the necessary access to the machine is not possible directly from the ground level or from a floor.</p> <p>This Standard applies to:</p> <ul style="list-style-type: none"> – all machinery (stationary and movable) where fixed means of access are necessary; – means of access which are a part of a machine; – means of access to that part of the building (e.g. working platforms, walkways, ladders) where the machine is installed, considering that the main function of that part of the building is to provide a means of access to the machine; – means of access not permanently fixed to the machine, which may be removed or moved to the side for some operations of the machine (e.g. changing tools in a large press). <p>This norm doesn't apply to:</p> <ul style="list-style-type: none"> – lifts; – lifting platforms; – any other machine designed in order to lift people between two levels.
<p><u>UNI EN ISO 14122-4: 2016</u></p> <p>Safety of machinery Permanent means of access to machines. Part 4: fixed ladders</p>	<p>This Standard applies to:</p> <ul style="list-style-type: none"> – all machinery (stationary and movable) where fixed means of access are necessary; – fixed ladders which are a part of a machine; – fixed ladders to that part of the building (e.g. working platforms, walkways, ladders) where the machine is installed, considering that the main function of that part of the building is to provide a means of access to the machine; – ladders which are not permanently fixed to the machine and which may be removed or moved to the side or pivoted (swivel-mounted) for some operations of the machine (e.g. changing tools in a large press). <p>This norm doesn't apply to:</p> <ul style="list-style-type: none"> – machines which are manufactured before the date of publication of this standard by CEN.
<p><u>UNI EN 131-2</u></p>	<p>The Standard states the general project features, the requirements and the test methods for the ladders.</p> <p>This Standard applies to:</p> <ul style="list-style-type: none"> – portable ladders. <p>This Standard doesn't apply to:</p> <ul style="list-style-type: none"> – ladders with specific use as fire department ladders or extension ladders.



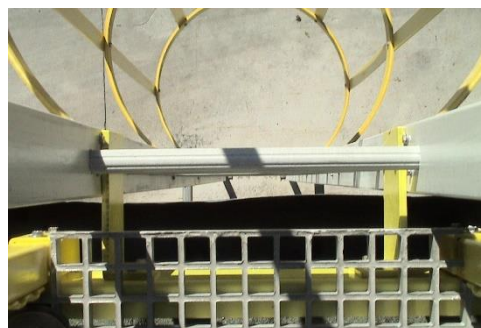
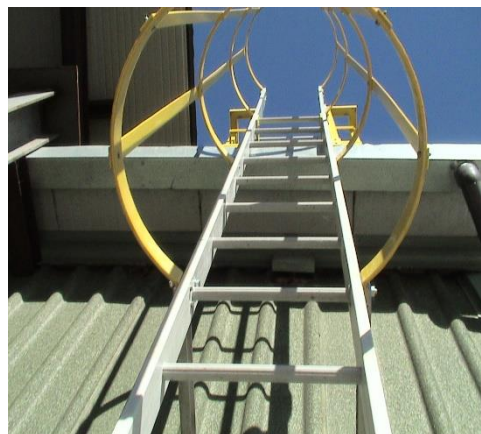
Products showing this symbol are declared suitable to be used in contact with potable water by Italian and France Health Ministry.

3. APPLICATIONS

MM's LADDERS can be installed in any plant, but they are mainly used in **corrosive environments** where their characteristics are emphasized, in plants where conventional materials are not long lasting or need continuous varnishing or protection with high maintenance costs and, in any case, do not guarantee safety in the working environment.

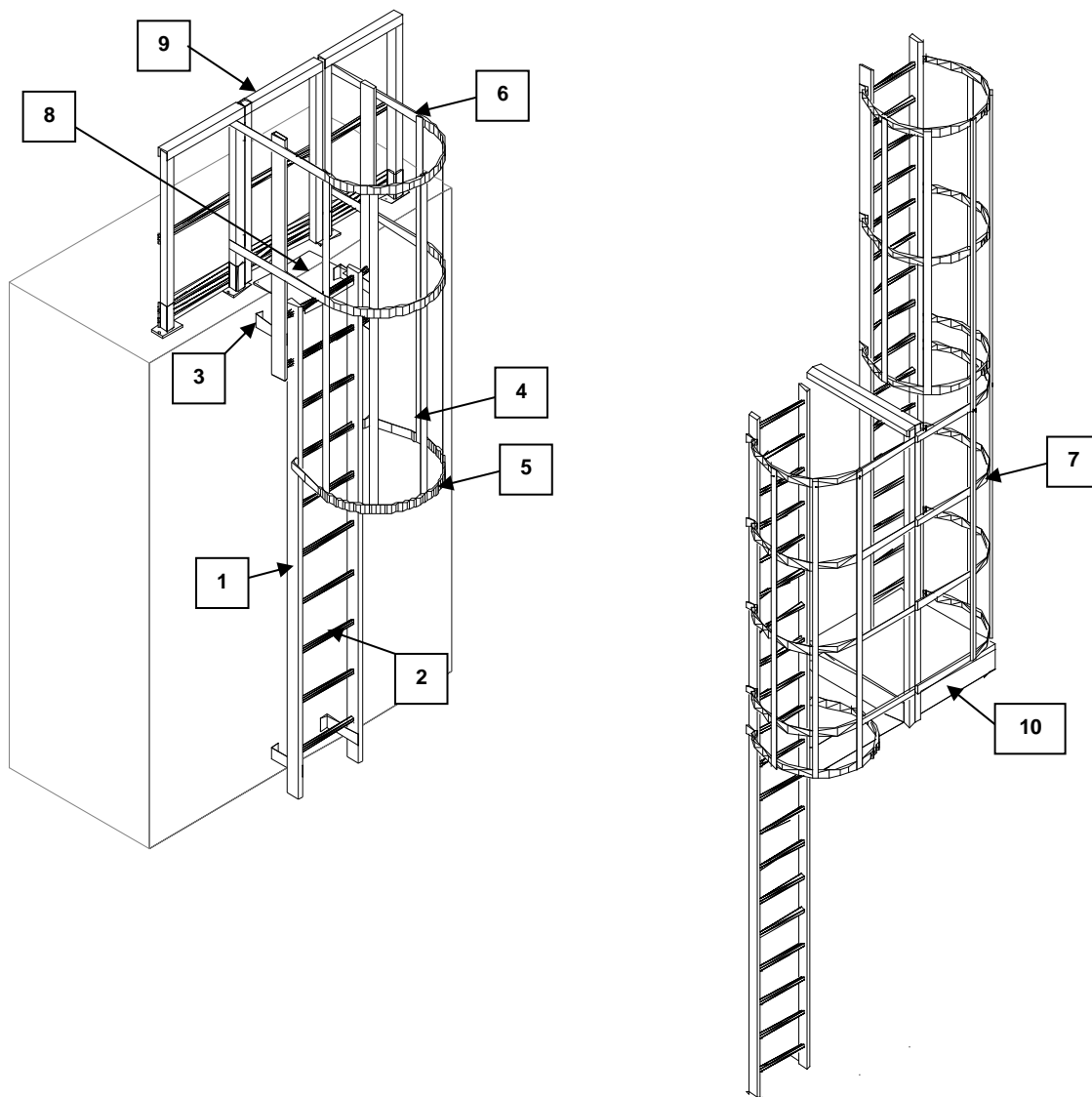
Possible applications of MM's LADDERS are:

- **Chemical Industries**
- **Galvanic plants**
- **Mineral industries**
- **Textile industries**
- **Food industries**
- **Electric stations**
- **Electric distribution cabins**
- **Oil plants**
- **Tanneries**
- **Water treatment plant**
- **Surge tanks**
- **Marine field**
- **Paper factories**



4. MATERIALS

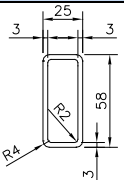
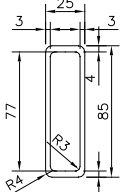
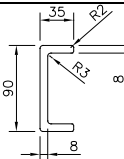
4.1 LADDER PARTS



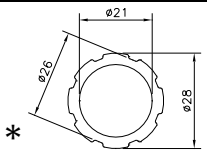
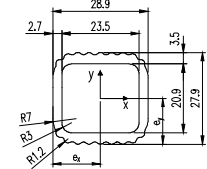
Legend

1. Stile (see table 4.2).
2. Rung (see table 4.3).
3. Anchor bracket (see table 4.5).
4. Safety cage vertical members (see table 4.4).
5. Standard safety cage hoop (see table 4.4).
6. Safety cage hoop for front exit section (see table 4.4).
7. Safety cage hoop for lateral exit section (see table 4.4).
8. Platform step (see point 7.1).
9. Safety gate (see point 7.1).
10. Rest platform.

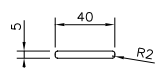
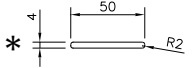
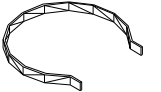
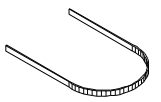

4.2 STILE PROFILES

PROFILES	CODE	DESCRIPTION	DIMENSIONS (mm)	BARS LENGTH (m)	WEIGHT (Kg/m)	COLOR
	53R58253I	Stile Ladder type 02	58x25x3	6	0.80	Grey RAL 7035
	53R85253I	Stile Ladder type 01	85x25x3	6	1.17	Grey RAL 7035
	53C90358I	Stile Ladder type 03	90x35x8	6	2.10	Grey RAL 7035

4.3 RUNG PROFILES

PROFILES	CODE	DESCRIPTION	DIMENSIONS (mm)	BARS LENGTH (m)	WEIGHT (Kg/m)	COLOR
	53O2821.3I	Antiskid rung	Ø 28x21.3	6	0.50	Grey RAL 7035
	53R29283I	Rectangular antiskid rung	28x29x3	6	0.46	Grey RAL 7035

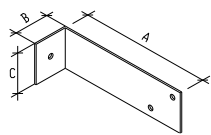
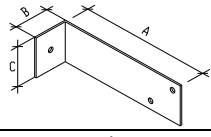
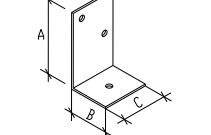
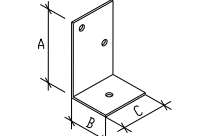
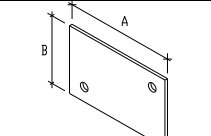
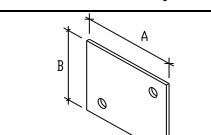
4.4 SAFETY CAGE PROFILES

PROFILES	CODE	DESCRIPTION	DIMENSIONS (mm)	BARS LENGTH (m)	WEIGHT	COLOR
	53P405I	Flat profile	40x5	6	0.36 Kg/m	Grey RAL 7035
	53P504I	Flat profile	50x4	6	0.36 Kg/m	Grey RAL 7035
	5504CERCHIO7035 also made with flat profile	Standard hoop	Ø: 700 width: 50 thickness:10	-	0,90 Kg	Grey RAL 7035
	5506CERCHIO7035 also made with flat profile	Front exit section hoop	Ø: 700 width: 50 thickness:10	-	1,50 Kg	Grey RAL 7035
	5505CERCHIO7035 also made with flat profile	Lateral exit section hoop	Ø: 700 width: 50 thickness:10	-	1,00 Kg	Grey RAL 7035

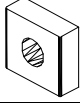

* available also in



4.5 ANCHOR BRACKETS

CLAMPS	CODE	DESCRIPTION	DIMENSIONS (mm)	COLOR
	56ASTAFFA5	S.S. AISI 316 wall and floor anchor bracket	A: 228 B: 50 C: 70 Thk. 3	-
	CSTAFFA12	FRP E23 pultruded wall anchor brackets	A: 285 B: 100 C: 60 Thk. 15	Grey RAL 7035
	CSTAFFA13	FRP E23 pultruded floor anchor brackets	A: 100 B: 100 C: 60 Thk. 15	Grey RAL 7035
	CSTAFFA14	FRP E23 pultruded floor anchor brackets	A: 300 B: 100 C: 80 Thk. 15	Grey RAL 7035
	CPIASTRA1	FRP counter-plate for bracket fixing on ladder type 1	A: 85 B: 70 Thk. 3	Grey RAL 7035
	CPIASTRA2	FRP counter-plate for bracket fixing on ladder type 2	A: 58 B: 70 Thk. 3	Grey RAL 7035

4.6 FIXING DEVICES

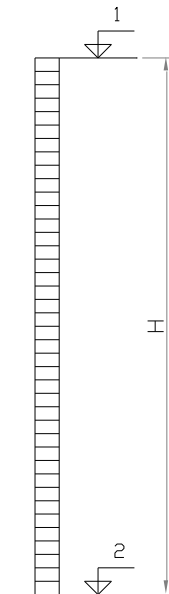
PROFILES	CODE	DESCRIPTION	DIMENSIONS (mm)	COLOR
	53P5825I	FRP rung fixing block	70X58 Th. 25	Grey RAL 7035
	5306I	FRP rung fixing pin	Ø 6 mm	Grey RAL 7035
S.S. BOLTS & NUTS	CODE	DESCRIPTION	DIMENSIONS	-
A4 S.S. SCREWS	56	Screw used for the fixing of the S.S. bracket to the stile, for ladder types 1 and 2	M8x40 screw	-
A4 S.S. SCREWS	56	Screw used for the fixing of the S.S. bracket to the stile, for ladder type 3	M8x25 screw	-
A4 S.S. SCREWS	56	Screw used for the fixing of the FRP bracket to the stile, for ladder types 1 and 2	M8x50 screw	-
A4 S.S. SCREWS	56	Screw used for the fixing of the FRP bracket to the stile, for ladder type 3	M8x35 screw	-
A4 S.S. SCREWS	56	Screw used for the fixing of the hoops to the vertical rod, types 1 and 2	M8x45 screw	-
A4 S.S. SCREWS	56	Screw used for the fixing of the hoops to the vertical rod, type 3	M8x30 screw	-
A4 S.S. SCREWS	56	Button head screw for the fixing of the flat profiles on the hoops	M6x25 screw	-
A4 S.S. WASHERS	56	Washers	M8 M6	-
A4 S.S. BOLTS	56	bolts	M8 M6	-

5. DIMENSIONS OF THE LADDERS

5.1 HEIGHT OF THE LADDERS

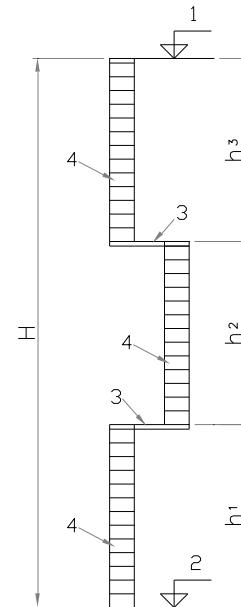
Legend:

1. Walking surface of the arrival area
2. Walking surface of the departure area
3. Rest platform
4. Ladder flight



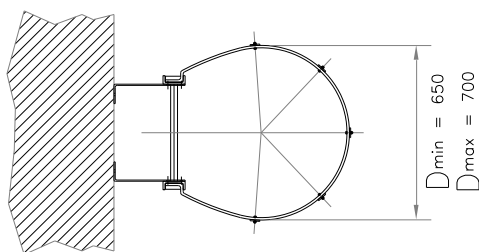
$H_{\max} = \text{mm } 10000$

Ladder without rest platform (single flight)

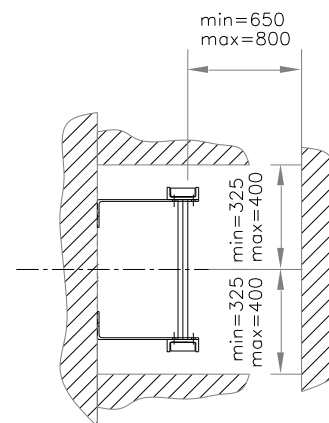


$h_{\max} = \text{mm } 6000$

Ladder with staggered flights

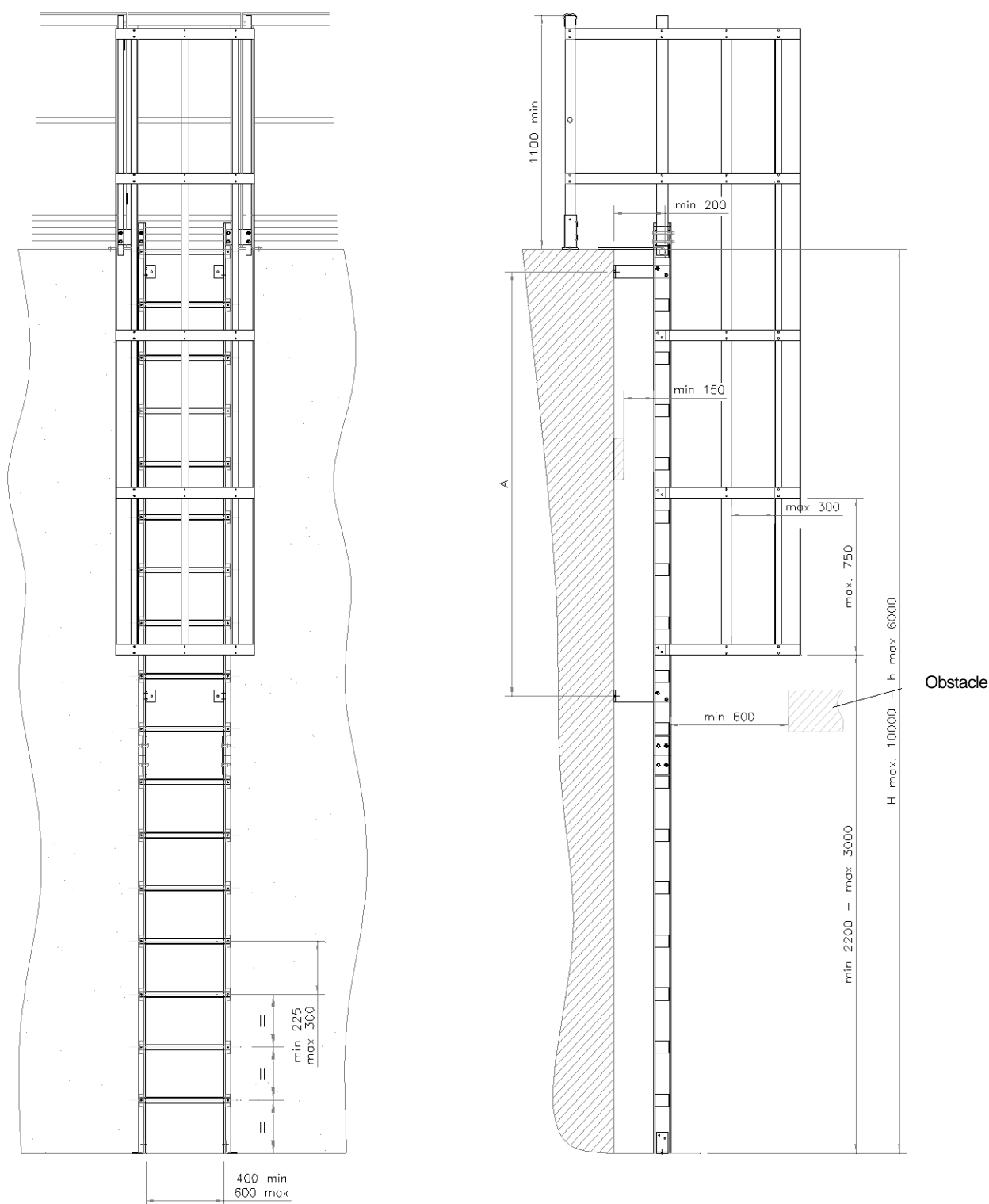


Top view of the ladder with safety cage



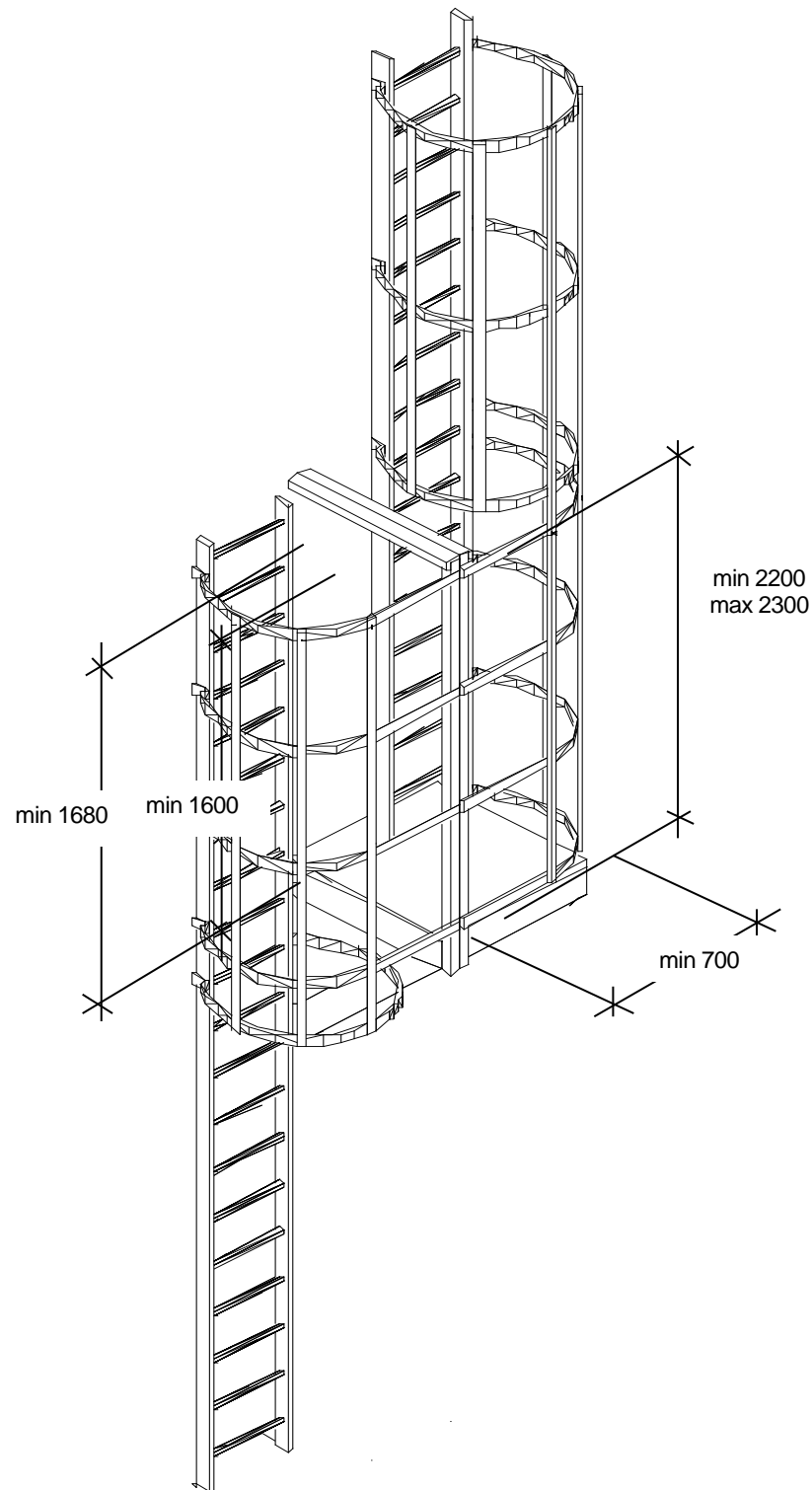
Top view of the ladder without safety cage

5.2 MAIN DIMENSIONS OF THE LADDER AND THE SAFETY CAGE



	Type of ladder	Max distance between anchor brackets
A	Ladder type 1	mm 2000
A	Ladder type 2	mm 1200
A	Ladder type 3	mm 5000

5.3 MAIN DIMENSIONS OF THE LADDER WITH A REST PLATFORM




6. TYPES OF LADDERS

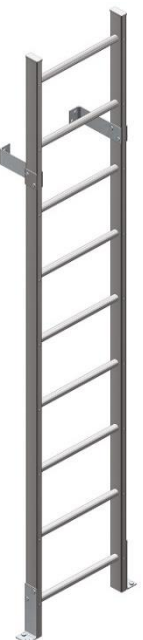
6.1 STANDARD LADDER

The ladders are supplied prefabricated. FRP pins are used for the fixing of the rungs to the stiles. The safety cage is entirely made with FRP profiles, assembled with S.S. screws.

6.1.1 STANDARD LADDER TYPE 1

	CSCALA1 – STANDARD LADDER TYPE 1			
	This type of ladder is used for the access to manhole-closed areas. To ease the access and exit it is recommended to use a safety extension (see point 7.1).			
	Stile: rectangular profile type 85x25x3 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Safety cage hoop: diameter of 700 mm			
	Safety cage vertical members: flat profile 40x5 mm			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 450 mm			
	Spacing between rungs: 300 mm			
	The total height of the safety cage*: calculated on the whole height minus 2500 mm (h = H-2500)			
	Maximum distance between hoops: 1000 mm			
	Maximum distance between the anchor points: 2000 mm			
	H ladder mm	*h safety cage mm	minimum nr. of anchor brackets	
	2000	NN	4	
	3000	NN	6	
	4000	1500	6	
	5000	2500	8	
	6000	3500	8	
	7000 ¹	4500	12	
	8000 ¹	5500	12	
	9000 ¹	6500 ²	14	
	10000 ¹	7500 ²	14	
1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)				
2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.				

6.1.2 STANDARD LADDER TYPE 2

	CSCALA2 – STANDARD LADDER TYPE 2			
	This type of ladder is used for a maximum height of 3000 mm .			
	Stile: rectangular profile type 58x25x3 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 450 mm			
	Spacing between rungs: 300 mm			
	Maximum distance between the anchor points: 1200 mm			
	H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
	2000	NN	6	
	3000	NN	8	

6.1.3 STANDARD LADDER TYPE 3



CSCALA3 – STANDARD LADDER TYPE 3

This type of ladder is used for the access to manhole-closed areas. To ease the access and exit it is recommended to use a safety extension (see point 7.1).

**ACS STATEMENT – RED FILAGREE ON THE PROFILE
USABLE IN CONTACT WITH POTABLE WATER**

Stile: "C" profile type 90x35x8 mm

Rung: rectangular profile type 28x29x3 mm with antiskid surface

Safety cage hoop: diameter of 700 mm

Safety cage vertical members: flat profile 40x5 mm or 50x4 (ACS)

Color of the profiles and of the safety cage is grey RAL 7035

Usable width of the rung: 400 mm

Total width of the ladder: 470 mm

Spacing between rungs: 300 mm

The total height of the safety cage*: calculated on the whole height minus 2500 mm
(h = H-2500)

Maximum distance between hoops: 1000 mm

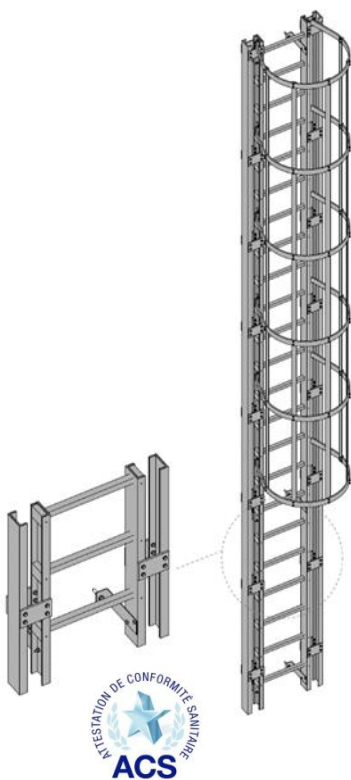
Maximum distance between the anchor points: 5000 mm

H ladder mm	*h safety cage mm	minimum nr. of anchor brackets	
2000	NN	4	
3000	NN	4	
4000	1500	4	
5000	2500	4	
6000	3500	6	
7000 ¹	4500	10	
8000 ¹	5500	10	
9000 ¹	6500 ²	10	
10000 ¹	7500 ²	10	

1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)

2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.

6.1.3 LADDER TYPE 3 PLUS



CSCALA3 PLUS – LADDER TYPE 3 PLUS

Reinforced type 3 ladder. In case of lack of fixing points and/or with great wind exposure, it guarantees maximum stability and however maintains the characteristics of lightness and of simple installation. Its particular shape allows the ladder to reach 10 m high elevation

**ACS STATEMENT – RED FILAGREE ON THE PROFILE
USABLE IN CONTACT WITH POTABLE WATER**

Stile: double "C" profile type 90x35x8 mm

Rung: rectangular profile type 28x29x3 mm with antiskid surface

Safety cage hoop: diameter of 700 mm

Safety cage vertical members: flat profile 40x5 mm or 50x4 (ACS)

Color of the profiles and of the safety cage is grey RAL 7035

Usable width of the rung: 400 mm

Total width of the ladder: 680 mm

Spacing between rungs: 300 mm

The total height of the safety cage*: calculated on the whole height minus 2500 mm
(h = H-2500)

Maximum distance between hoops: 1000 mm

Maximum distance between the anchor points: 6000 mm


H ladder mm	*h safety cage mm	minimum nr. of anchor brackets	
4000	1500	4	
5000	2500	4	
6000	3500	4	
7000 ¹	4500	8	
8000 ¹	5500	8	
9000 ¹	6500 ²	8	
10000 ¹	7500 ²	8	

1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)


2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.

6.2 LADDER WITH FRONT EXIT

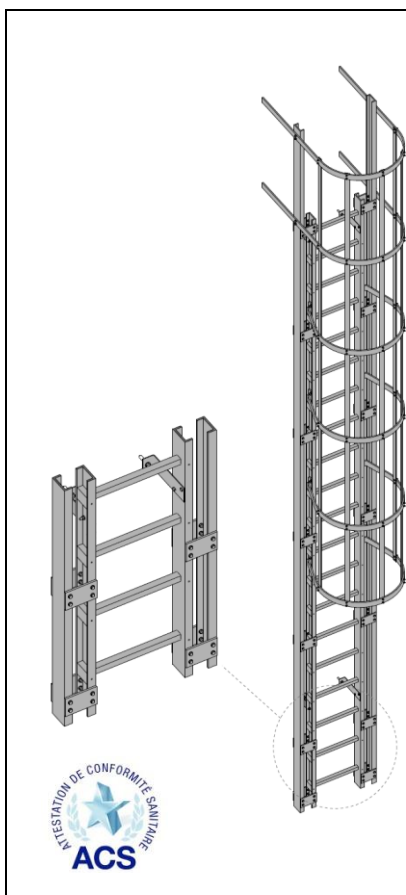
6.2.1 LADDER TYPE 1 WITH FRONT EXIT

	CSCALA1UF – LADDER TYPE 1 WITH FRONT EXIT			
	This type of ladder is provided with a widening on the top that eases the exit and has no rungs on the last 1100 mm long section (see point 7.4). For this type of ladder we strongly recommend the supply of a safety step and a safety gate (see point 7.1 and 7.2)			
	Stile: rectangular profile type 85x25x3 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Safety cage hoop: diameter of 700 mm			
	Front exit safety cage: diameter of 700 mm			
	Safety cage vertical members: flat profile 40x5 mm			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 450 mm			
	Spacing between rungs: 300 mm			
	Maximum distance between hoops: 1000 mm			
	Maximum distance between the anchor points: 2000 mm			
	DIMENSIONS OF THE EXIT: height 1100 mm from the last rung, usable width 680 mm			
	H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
1000+1100	NN		4	
2000+1100	NN		4	
3000+1100	1600		6	
4000+1100	2600		6	
5000+1100	3600		8	
6000+1100 ¹	4600		8	
7000+1100 ¹	5600		12	
8000+1100 ¹	6600 ²		12	
9000+1100 ¹	7600 ²		14	
10000+1100 ¹	8600 ²		14	
1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)				
2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.				

6.2.2 LADDER TYPE 3 WITH FRONT EXIT

	CSCALA3UF - LADDER TYPE 3 WITH FRONT EXIT			
	This type of ladder is provided with a widening on the top that eases the exit and has no rungs on the last 1100 mm long section (see point 7.4). For this type of ladder we strongly recommend the supply of a safety step and a safety gate (see point 7.1 and 7.2)			
	ACS STATEMENT – RED FILAGREE ON THE PROFILE			
	USABLE IN CONTACT WITH POTABLE WATER			
	Stile: "C" profile type 90x35x8 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Safety cage hoop: diameter of 700 mm			
	Front exit safety cage: diameter of 700 mm			
	Safety cage vertical members: flat profile 40x5 mm or 50x4 mm (ACS)			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 470 mm			
	Spacing between rungs: 300 mm			
	Maximum distance between hoops: 1000 mm			
	Maximum distance between the anchor points: 5000 mm			
	DIMENSIONS OF THE EXIT: height 1100 mm from the last rung, usable width 680 mm			
	H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
1000+1100	NN		4	
2000+1100	NN		4	
3000+1100	1600		4	
4000+1100	2600		4	
5000+1100	3600		4	
6000+1100 ¹	4600		6	
7000+1100 ¹	5600		10	
8000+1100 ¹	6600 ²		10	
9000+1100 ¹	7600 ²		10	
10000+1100 ¹	8600 ²		10	
1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)				
2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.				

6.2.3 LADDER TYPE 3 PLUS WITH FRONT EXIT



CSCALA3 PLUS – LADDER TYPE 3 PLUS WITH FRONT EXIT

Reinforced type 3 ladder. In case of lack of fixing points and/or with great wind exposure, it guarantees maximum stability and however maintains the characteristics of lightness and of simple installation. Its particular shape allows the ladder to reach 10 m high elevation.

This type of ladder is provided with a widening on the top that eases the exit and has no rungs on the last 1100 mm long section (see point 7.4). For this type of ladder we strongly recommend the supply of a safety step and a safety gate (see point 7.1 and 7.2)

ACS STATEMENT – RED FILAGREE ON THE PROFILE

USABLE IN CONTACT WITH POTABLE WATER

Stile: double "C" profile type 90x35x8 mm

Rung: rectangular profile type 28x29x3 mm with antiskid surface

Safety cage hoop: diameter of 700 mm

Front exit safety cage: diameter of 700 mm

Safety cage vertical members: flat profile 40x5 mm or 50x4 mm (ACS)

Color of the profiles and of the safety cage is grey RAL 7035

Usable width of the rung: 400 mm

Total width of the ladder: 680 mm

Spacing between rungs: 300 mm

Maximum distance between hoops: 1000 mm

Maximum distance between the anchor points: 6000 mm

DIMENSIONS OF THE EXIT: height 1100 mm from the last rung, usable width 680 mm


H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
4000+1100	2600	4	
5000+1100	3600	4	
6000+1100 ¹	4600	4	
7000+1100 ¹	5600	8	
8000+1100 ¹	6600 ²	8	
9000+1100 ¹	7600 ²	8	
10000+1100 ¹	8600 ²	8	

1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)


2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.

6.3 LADDER WITH LATERAL EXIT

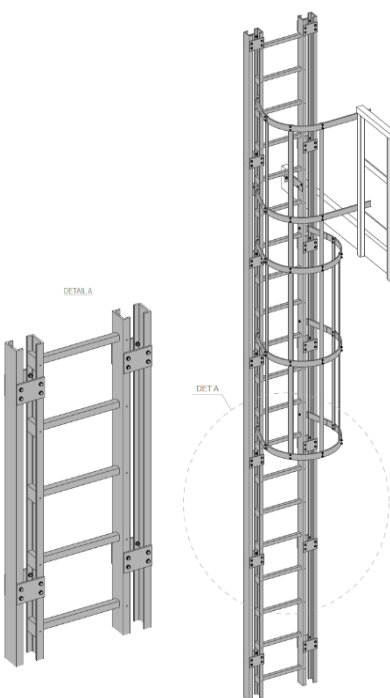
6.3.1 LADDER TYPE 1 WITH LATERAL EXIT

	CSCALA1UL - LADDER TYPE 1 WITH LATERAL EXIT			
	This type of ladder is necessary in case of left or right ladder exit			
	Stile: rectangular profile type 85x25x3 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Safety cage hoop: diameter of 700 mm			
	Lateral exit safety cage hoop: diameter of 700 mm partial hoop			
	Safety cage vertical members: flat profile 40x5 mm			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 450 mm			
	Spacing between rungs: 300 mm			
	Maximum distance between hoops: 1000 mm			
	Maximum distance between the anchor points: 2000 mm			
	HEIGHT OF THE EXIT: 1680 mm from the last rung			
	H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
	1000+1680	NN	6	
	2000+1680	1180	6	
	3000+1680	2180	8	
	4000+1680	3180	8	
	5000+1680 ¹	4180	12	
	6000+1680 ¹	5180	12	
	7000+1680 ¹	6180 ²	14	
	8000+1680 ¹	7180 ²	14	
	9000+1680 ¹	8180 ²	16	
	10000+1680 ¹	9180 ²	16	
	1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)			
	2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.			

6.3.2 LADDER TYPE 3 WITH LATERAL EXIT

	CSCALA3UL - LADDER TYPE 3 WITH LATERAL EXIT			
	This type of ladder is necessary in case of left or right ladder exit			
	ACS STATEMENT – RED FILAGREE ON THE PROFILE			
	USABLE IN CONTACT WITH POTABLE WATER			
	Stile: "C" profile type 90x35x8 mm			
	Rung: rectangular profile type 28x29x3 mm with antiskid surface			
	Safety cage hoop: diameter of 700 mm			
	Lateral exit safety cage hoop: diameter of 700 mm partial hoop			
	Safety cage vertical members: flat profile 40x5 mm or 50x4 mm (ACS)			
	Color of the profiles and of the safety cage is grey RAL 7035			
	Usable width of the rung: 400 mm			
	Total width of the ladder: 470 mm			
	Spacing between rungs: 300 mm			
	Maximum distance between hoops: 1000 mm			
	Maximum distance between the anchor points: 5000 mm			
	HEIGHT OF THE EXIT: 1680 mm from the last rung			
	H ladder mm	h safety cage mm	minimum nr. of anchor brackets	
	1000+1680	NN	4	
	2000+1680	1180	4	
	3000+1680	2180	4	
	4000+1680	3180	6	
	5000+1680 ¹	4180	10	
	6000+1680 ¹	5180	10	
	7000+1680 ¹	6180 ²	10	
	8000+1680 ¹	7180 ²	10	
	9000+1680 ¹	8180 ²	10	
	10000+1680 ¹	9180 ²	12	
	1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)			
	2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.			

6.3.3 LADDER TYPE 3 PLUS WITH LATERAL EXIT



CSCALA3 PLUS – LADDER TYPE 3 PLUS WITH LATERAL EXIT


Reinforced type 3 ladder. In case of lack of fixing points and/or with great wind exposure, it guarantees maximum stability and however maintains the characteristics of lightness and of simple installation. Its particular shape allows the ladder to reach 10 m high elevation. This type of ladder is necessary in case of left or right ladder exit.

**ACS STATEMENT – RED FILAGREE ON THE PROFILE
USABLE IN CONTACT WITH POTABLE WATER**

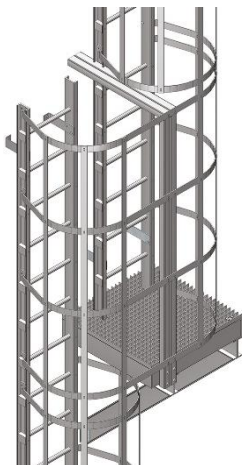
Stile: double "C" profile type 90x35x8 mm
Rung: rectangular profile type 28x29x3 mm with antiskid surface
Safety cage hoop: diameter of 700 mm
Lateral exit safety cage hoop: diameter of 700 mm partial hoop
Safety cage vertical members: flat profile 40x5 mm or 50x4 mm (ACS)
Color of the profiles and of the safety cage is grey RAL 7035
Usable width of the rung: 400 mm
Total width of the ladder: 680 mm
Spacing between rungs: 300 mm
Maximum distance between hoops: 1000 mm
Maximum distance between the anchor points: 6000 mm
HEIGHT OF THE EXIT: 1680 mm from the last rung

H ladder mm	h safety cage mm	minimum nr. of anchor brackets
1000+1680	NN	4
2000+1680	1180	4
3000+1680	2180	4
4000+1680	3180	4
5000+1680 ¹	4180	8
6000+1680 ¹	5180	8
7000+1680 ¹	6180 ²	8
8000+1680 ¹	7180 ²	8
9000+1680 ¹	8180 ²	8
10000+1680 ¹	9180 ²	8

1. For this height it is necessary to divide the ladder in two parts. Junction devices will be supplied (see point 8.1)
2. For this height it is necessary to divide the cage in two parts, add a hoop and supply junction devices.



6.4 REST PLATFORMS



CPIATTAFORMA - REST PLATFORM

This platform is necessary for ladders higher than 10 m.

Minimum length: 700mm

Structure: FRP profile "C" 150x45x8 mm, grating type "SCH 52/30"

Structural brackets: minimum nr. 2, profile type "I" 150x75x8 mm

Safety gate structure: profile type "Q" 50x50x5 mm

Safety cage vertical members: flat profile 40x5 mm

Color of the profiles and of the safety cage is grey RAL 7035

Maximum distance between hoops: 1000 mm

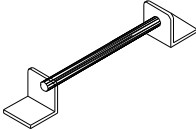
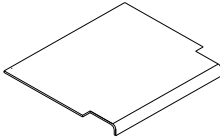
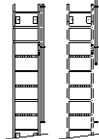
HEIGHT OF THE EXIT: height 2000 mm from the last rung

Maximum height of each flight: 6000 mm

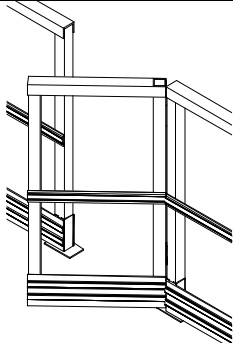
H total mm	N of flights	n. of intermediate platforms	
11000	2	1	
12000	2	1	
13000	3	2	
14000	3	2	
15000	3	2	
16000	3	2	
17000	3	2	
18000	3	2	

7. ACCESSORIES TO BE COMBINED WITH THE LADDERS



7.1 SAFETY ACCESSORIES

	CODE	DESCRIPTION	COLOR
	CMANIGLIAPRFV	Wall bar made with FRP profiles, maximum length 440 mm	Grey RAL7035
	55STCN40	Safety step used for the connection between the last rung and the landing floor. Dimensions 470x345 mm, Thk. 4 mm	Grey RAL7035
	CPROLUNGAMENTO	S.S. Safety extension pole	-

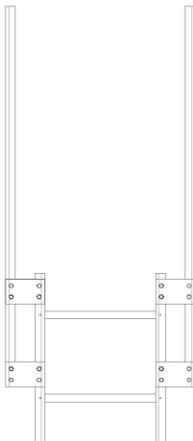
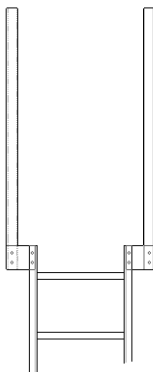
7.2 SAFETY GATE

	CODE	DESCRIPTION	COLOR
	CPORELLO	Safety gate in FRP with spring hinge. Maximum width 800 mm (the two stanchions for the fixing of the gate are not included)	Grey RAL7035

7.3 SAFETY CLOSING DEVICE

	CODE	DESCRIPTION	COLOR
	CCHIUSURASCALA1	Vertical safety closing device for FRP ladders. Dimensions of the board mm 2000x450 mm.	Grey RAL7035
	CCHIUSURASCALA2	Horizontal safety closing device for FRP ladders.	Grey RAL7035

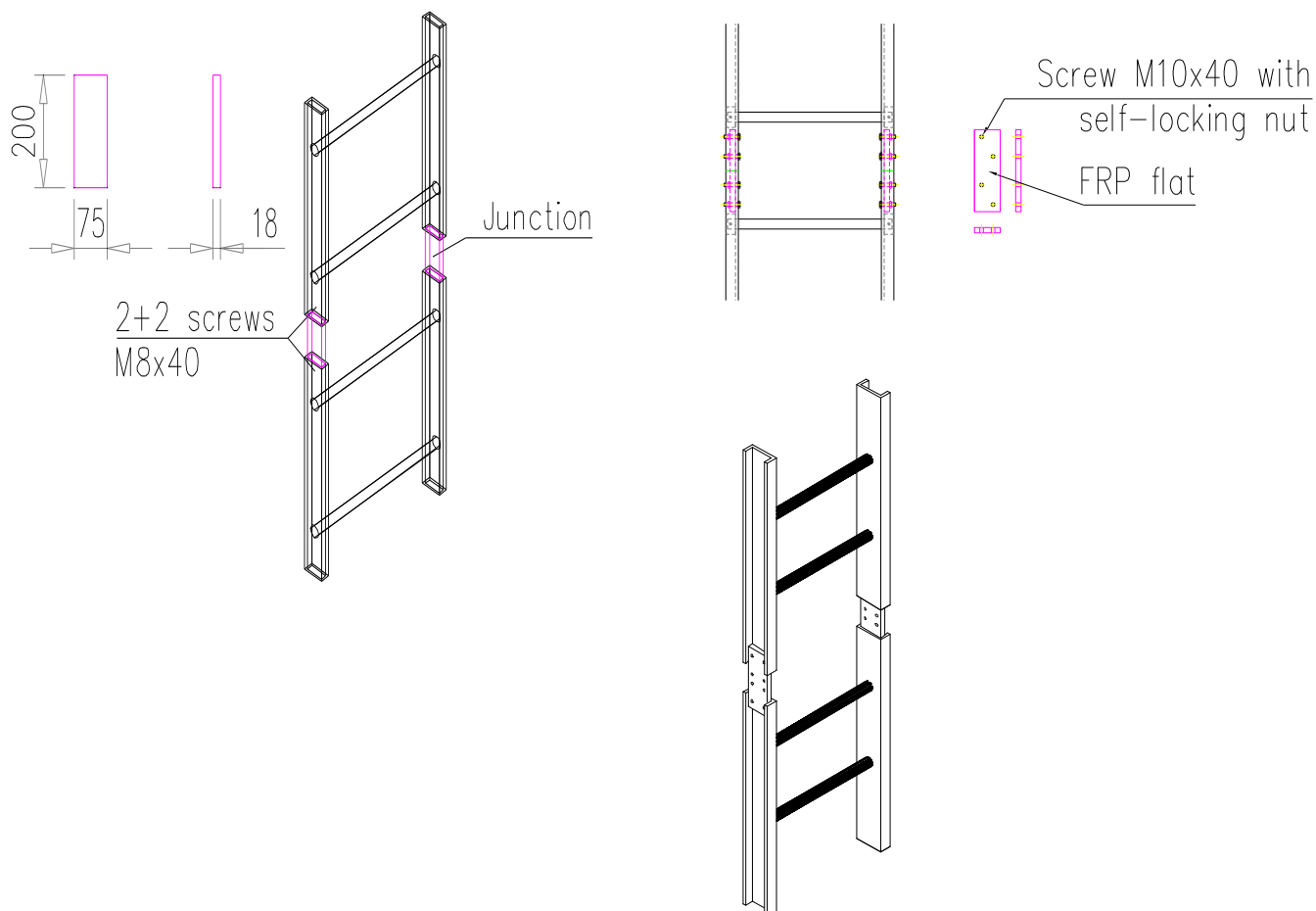
7.4 WIDENING

	CODE	DESCRIPTION	COLOR
	CSLARGO1	Ladder type 1 widening with junction kit	Grey RAL7035
	CSLARGO2	Ladder type 3 widening	Grey RAL7035

8. ASSEMBLING INSTRUCTIONS

8.1 LADDER EXTENSION

For ladders longer than 6 m, junction devices made of FRP profiles and pins must be used (fig. 1).



TYPE 1 LADDER JUNCTIONS

FRP flat profile dimensions 200x78 mm thk. 18 mm
hand laminated

TYPE 3 LADDER JUNCTIONS

FRP flat 230x72 mm thk. 15 mm
Pultruded E23 class

Fig. 1 Junction devices for ladders

8.2. LADDER FIXING

The FRP ladders are fastened with S.S. or FRP anchor brackets. The following table shows the maximum spacing between anchoring points depending on the ladder type.

Type of ladder	Max distance between clamps
Ladder type 1	mm 2000
Ladder type 2	mm 1200
Ladder type 3	mm 5000
Ladder type 3 PLUS	mm 6000

For ladders longer than 6 m provided with a junction devices as per par.8.1: anchor brackets must be provided immediately before and after the junction points.

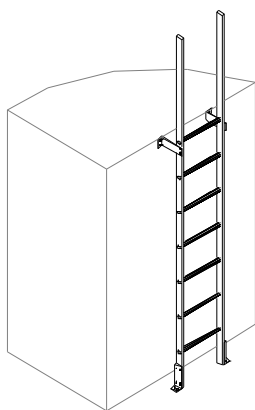
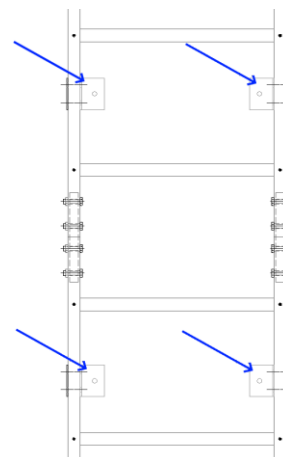


Fig. 2 Ladder with two wall anchor brackets

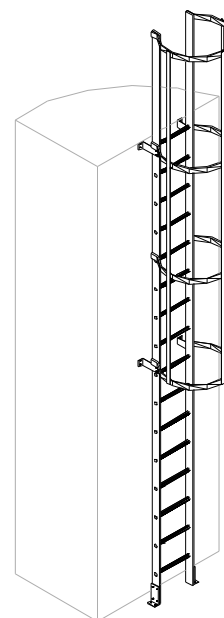


Fig. 3 Ladder with more anchor points

8.2.1 FIXING TO CONCRETE

For the fixing of a ladder to concrete, S.S. or FRP anchor brackets must be used (see table 4.5). Fixing is made using S.S. screws with minimum diameter M8 mm and anchoring dowels at least 60 mm long (Fig. 4).

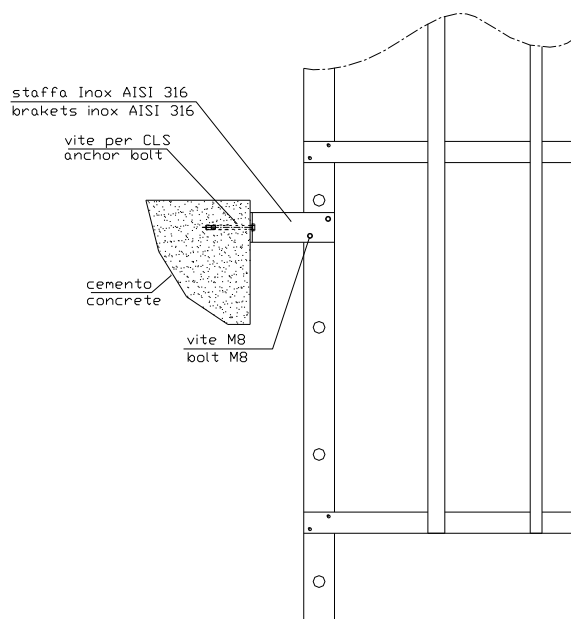


Fig. 4 Fixing to concrete

8.2.2 FIXING TO FRP WALKWAY

For the fixing of a ladder to an FRP walkway S.S. or FRP anchor brackets must be used (see table 4.5). Fixing is made by using S.S. AISI 316 screws and self-blocking nuts (Fig. 5).

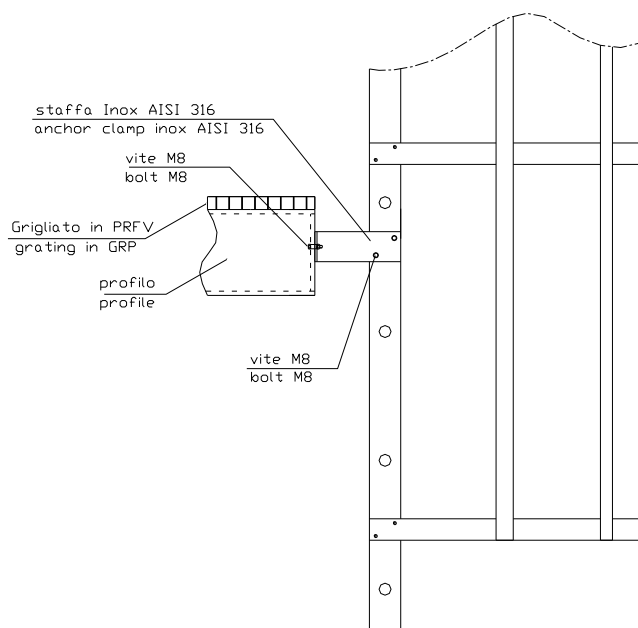


Fig. 5 Fixing to FRP walkway

8.3. ASSEMBLING THE SAFETY CAGE

The safety cage has to be used for ladders which reach an arrival level higher than 3m from the departing floor. The safety cage is supplied pre-assembled and complete with all the devices to allow a fast and easy assembly (Fig. 6). In order to avoid backlash, the drilled holes must have the same diameter of the screws.

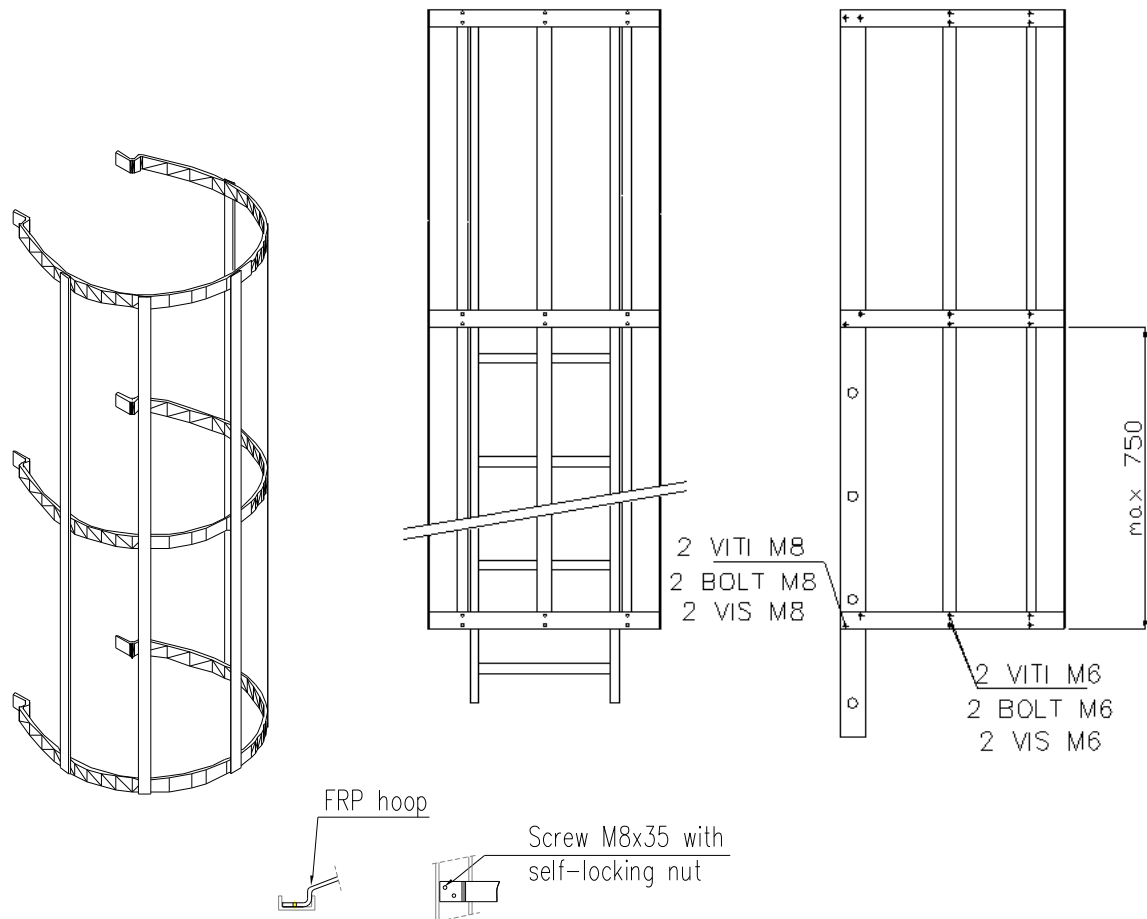


Fig. 6: safety cage assembly