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European Organisation for
Technical Assessment
Organisation Européenne
pour l'évaluation technique

European Technical Assessment – ETA 19/0307 of 19/06/2019

(English language translation; the original version is in Italian)

GENERAL PART

Trade name of the construction product

**S20 in the versions: S20-GL; S20-GM;
S20-GMN**

Product family to which the construction product belongs

**PAC 34: BUILDING KITS, UNITS, AND
PREFABRICATED ELEMENTS.
Prefabricated stair kits.**

Manufacturer

**Solidarietà Intrapresa Soc. Coop. Sociale
Onlus
Via Campo dei Fiori, 3/b – I – 47122 Forlì
(FC) – Italy**

Manufacturing plant

**Via Campo dei Fiori, 3/b – I – 47122 Forlì
(FC) – Italy**

This European Technical Assessment contains:

**16 pages, including 11 Annexes which form
an integral part of this Assessment**

This European Technical Assessment is issued in accordance with Regulation (EU) n° 305/2011, on the basis of

**European Assessment Document (EAD)
340006-00-0506**

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SPECIFIC PARTS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

“S20” is a stair kit which realizes a stair system without load-bearing strings, in which steps are connected to the side wall by means of specific anchors in three different models, illustrated in Annexes 5-6.

Supporting elements for steps, steps, brackets and posts are made of S235JR or S275JR steel or stainless AISI 304 steel.

With regard to steps, there are three alternatives in the kit: beech glued laminated timber steps, 40 or 60 mm thick (“GL”); flat sheet 10 mm thick metal steps (“GM”); flat sheet 3 mm or 5 mm thick metal steps, tread-riser continuous profile (“GMN”).

Steps are fixed to the bottom floor at the beginning of the stair and to the top floor at the landing through appropriate plugs and screws depending on the step typology, installed every step as shown in Annex 1.

External overall dimension of the staircase may vary from mm 500 to mm 1000. Riser height ranges from a minimum of mm 160 up to mm 250, tread width ranges from mm 200 to mm 280 (step mm 260 and mm 340). Staircase may have up to 16 steps, and a maximum height between two floors of mm 4250.

For every layout of the stairs, the riser dimension remains unchanged along the whole flight.

Further complements of the stairs are different typologies of railings constituted by either steel vertical posts or steel vertical posts coupled with bands of tubular bars parallel to the handrail and equally distanced from each other along the whole post height. All the railings illustrated in Annexes 8-9 are employed with “GL” steps, while with “GM” and “GMN” steps only the type “R10” is matched. With “GL” steps, the conditions illustrated in Annex 2 (table) for what concerns the railing types and the presence of the riser bar apply. The handrail can be made of solid beechwood or a steel tubular bar positioned at a height of 970 ÷ 1170 mm. No handrail in “R10” railing type.

Geometry, dimensions and construction details are illustrated in Annexes 1 to 10 to this ETA.

2. SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° EAD 340006-00-0506

“S20” stairs are intended to be used as indoor stairs in buildings of category “A” according to EN 1990 with air temperature between +5°C and +30°C and relative humidity between 30% and 70%.

The provisions made in this European Technical Assessment are based on an assumed working life of the stairs of at least 50 years, provided that the conditions laid down hereafter for installation, packaging, transport and storage as well as for appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the Manufacturer, but are to be regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

This ETA is issued for stair kit “S20” on the basis of admitted information/data, deposited with ITC-CNR, which identify the kit that was assessed. Only the components described in clause 1 with characteristics in accordance with clause 3 of this ETA can be used for the kit “S20”.

The characteristics of the components and of the system not mentioned in this ETA nor in the Annexes shall correspond to the respective values laid down in the Technical Documentation of this ETA, checked by ITC-CNR.

Manufacturing process scheme is deposited with ITC-CNR. Concerning packaging, transport and storage it is the responsibility of the Manufacturer to undertake the appropriate measures and to advise his clients on the transport and storage, as he considers necessary in order to reach the declared performances. In particular, the components shall be protected from moisture during transport and storage. The components have to be protected against damage and well identified as part of the kit.

The information about installation and recommendations about installers’ qualification and maintenance are provided with the technical documentation from the Manufacturer (Installation Manual), and it is his responsibility to assure that the information about design and installation of the system “S20” is effectively communicated to the concerned people. The information can

be given using reproductions of the respective parts of this European Technical Assessment; furthermore, all the data concerning the execution shall be indicated clearly on the packaging and/or on the enclosed instruction sheets using one or several illustrations. In any case, it is appropriate to comply with national regulations, and particularly concerning fire.

The first maintenance service is carried out after six months and consists in evaluating the fastening state of all the connecting screws of the different components. For the maintenance operations of the "S20" stairs the Manufacturer recommends to follow the following instructions. The stairs can be cleaned with a water-moist cloth or, if required, with a non-aggressive detergent. All cleaning tools that may cause wear on the surface of the components of the stair and all products containing abrasive agents and chemical solvents of any kind whatsoever, shall be avoided in any case.

Any localised damage due to accidental actions shall be timely repaired.

3. PERFORMANCES OF THE PRODUCT AND REFERENCE TO THE METHODS USED FOR ITS ASSESSMENT

The calculations and tests for performance assessment of "S20" were carried out in compliance with EAD 340006-00-0506 according to the methods reported herein; performances are valid as long as the components of the kit fully correspond to those described in § 1.

Essential characteristic	Performance
BWR 1: Mechanical resistance and stability	
Load-bearing capacity of the stair	See Annex 11
Load-Displacement behaviour	See Annex 11
Vibration behaviour of the stair	No Performance Assessed
Prevention of progressive collapse	Failure of individual components of the stair does not lead to a progressive collapse of the complete stair
Residual load-bearing capacity	Local material failure does not lead to an abrupt total loss of the load-bearing capacity of the steps
Long-term behaviour	Load-bearing capacity is ensured under an appropriate use and maintenance over the indicated working life
Resistance to earthquake	No Performance Assessed
Durability against physical, chemical, biological agents of the components of the stair	Acceptable for the intended use under appropriate use and maintenance
BWR 2: Safety in case of fire	
Reaction to fire: classification of the components of the kit	
Assessment without the need for testing according to EC Decisions	Class
Steel components according to Decisions 96/603/EC and 2000/605/EC	A1
Glued laminated timber components according to Decision 2005/610/EC	D – s2, d0
Polyamide components	No Performance Assessed
Resistance to fire	No Performance Assessed
BWR 3: Hygiene, health and the environment	
Release of formaldehyde	No Performance Assessed
Release of pentachlorophenol	No Performance Assessed
Radioactive emissions	Not relevant
BWR 4: Safety and accessibility in use	
Geometry	See Annexes 1 to 10
Slipperiness	No Performance Assessed
Safety equipment	No Performance Assessed
Safe breakage	No brittle failure of individual components
Impact resistance	No Performance Assessed

4. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

4.1 System of assessment and verification of constancy of performance

According to the Decision n. 1999/89/EC of the European Commission, the system of assessment and verification of constancy of performance (AVCP) applied to this product (see Annex V to Regulation (EU) 305/2011) is System 2+.

In addition, with regard to reaction to fire, the AVCP system applied according to Decision n. 2001/596/EC is System 4.

4.2 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ITC-CNR.

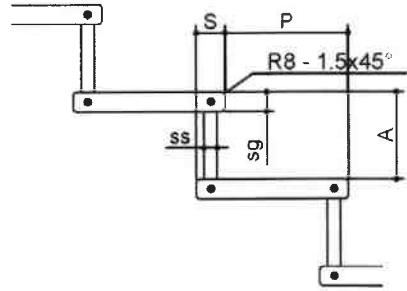
**Issued in San Giuliano Milanese, Italy on 19/06/2019
by ITC – CNR**

**Prof. Antonio Occhiuzzi
Director of ITC-CNR**

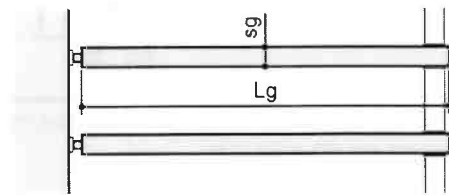


Stair with S20-GL wooden step – an example

Lateral view of the stair



Front view of the stair



Description	Symbol	Value (mm)
Step width	Lg	500 -1000
Tread	P	200 - 280
Riser	A	160- 250
Step thickness	sg	40 - 60
Overlapping	S	60
Structure thickness	st	8 -10

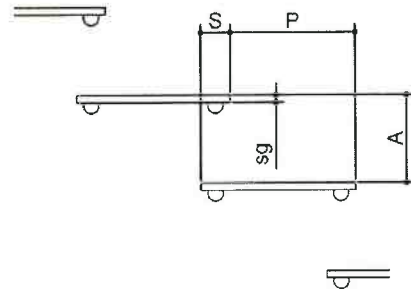
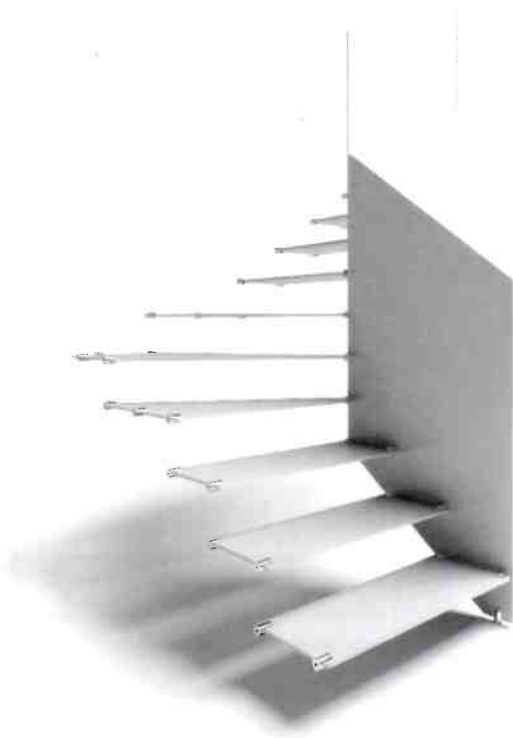
The use of railing types R1-R2-R4-R7-R8 is only allowed if the GL step is integrated with riser bar; the presence of the riser bar is not necessary with railing types R5-R6-R10

"S20"	Annex 2 of European Technical Assessment 19/0307: flight stair kit "S20"
Example of a stair structure with wooden steps (GL)	

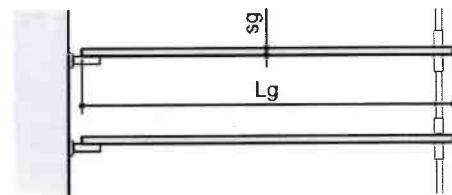
Annex 3 of European Technical Assessment 19/0307: Flight stair kit “S20”

Stair with S20-GM metal step – an example

Lateral view of the stair



Front view of the stair



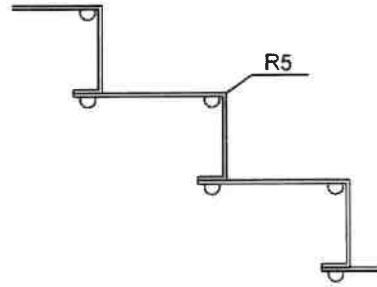
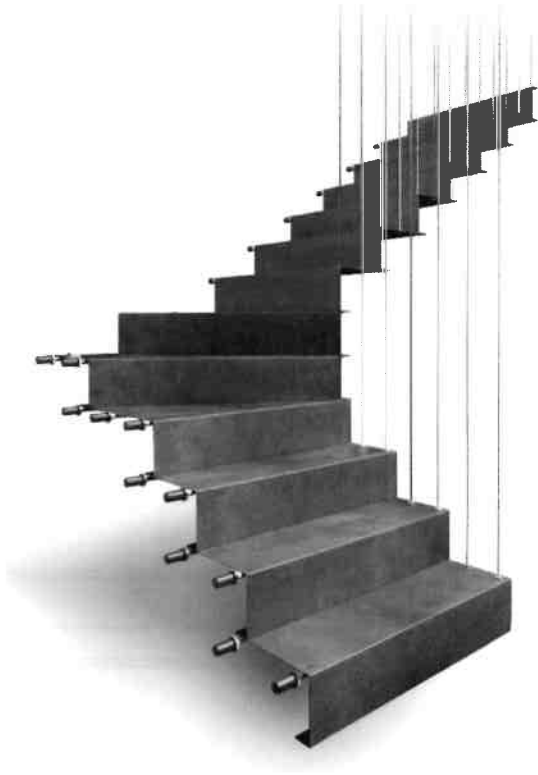
Description	Symbol	Value (mm)
Step width	Lg	500 -1000
Tread	P	200 - 280
Riser	A	160- 250
Step thickness	sg	10
Overlapping	S	60
Structure thickness	st	8 -10
It is only possible to use railing type R10 with GM steps		

“S20”	Annex 3 of European Technical Assessment 19/0307: flight stair kit “S20”
Example of a stair structure with metal steps (GM)	

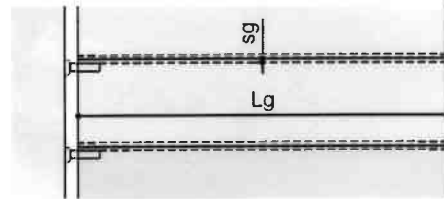
Annex 4 of European Technical Assessment 19/0307: Flight stair kit “S20”

Stair with S20-GMN metal tread-riser continuous step – an example

Lateral view of the stair



Front view of the stair

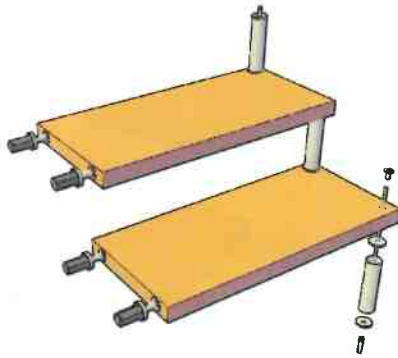


Description	Symbol	Value (mm)
Step width	Lg	500 -1000
Tread	P	200 - 280
Riser	A	160- 250
Step thickness	sg	3 bent
Overlapping	S	60
Structure thickness	st	8 -10
It is only possible to use railing type R10 with GMN steps		

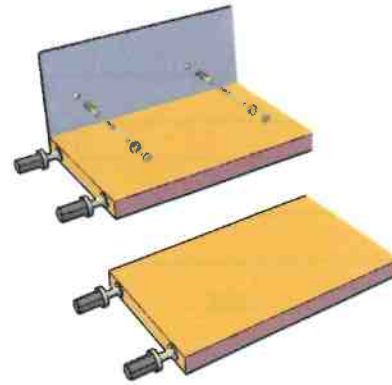
“S20”	Annex 4 of European Technical Assessment 19/0307: flight stair kit “S20”
Example of a stair structure with metal tread-riser continuous steps (GMN)	

Annex 5 of European Technical Assessment 19/0307: Flight stair kit “S20”

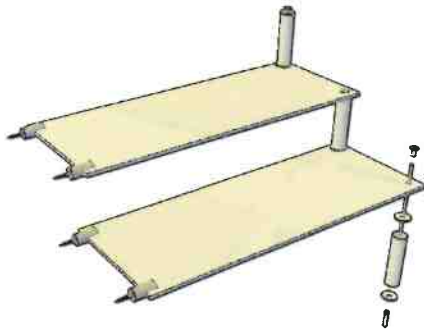
Fixing to the bottom floor of wooden step (GL)



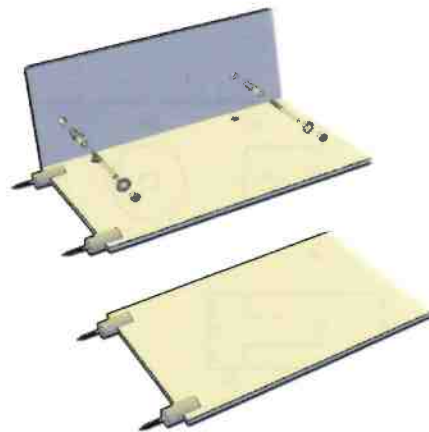
Fixing to the landing floor of wooden step (GL)



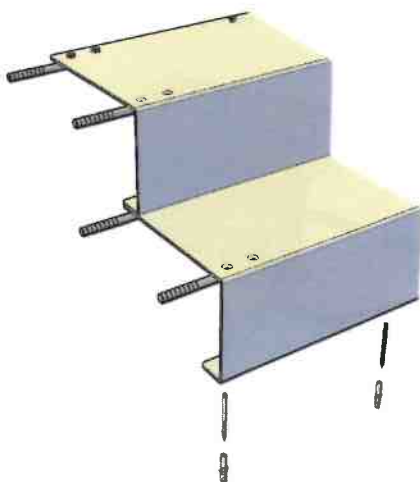
Fixing to the bottom floor of metal step (GM)



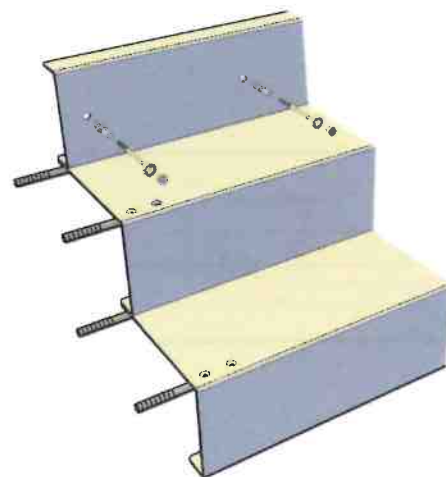
Fixing to the landing floor of metal step (GM)



continuous step (GMN)



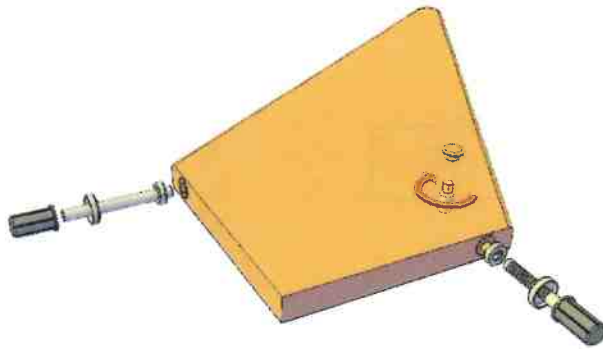
continuous step (GMN)



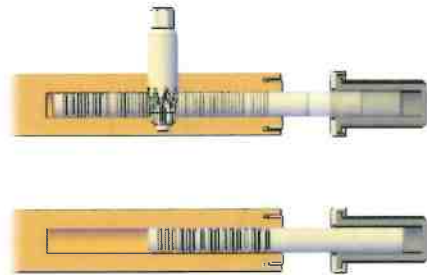
<p>“S20”</p> <p>Fixing of wooden steps (GL), of metal steps (GM) and of metal tread-riser continuous steps (GMN) to the floor at starting and to the landing floor</p>	<p>Annex 5</p> <p>of European Technical Assessment 19/0307:</p> <p>flight stair kit “S20”</p>
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Annex 7 of European Technical Assessment 19/0307: Flight stair kit “S20”

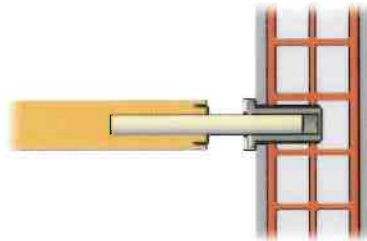
Fixing of wooden step (GL) to the corner walls



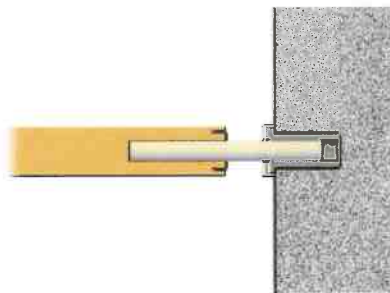
Detail of the adjustable bolt



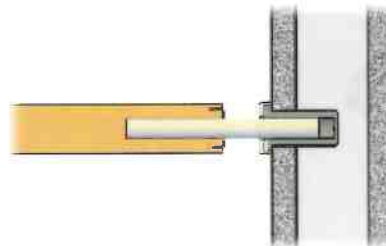
Hollow brick wall with rendering



Concrete wall



Wall made of wood panels



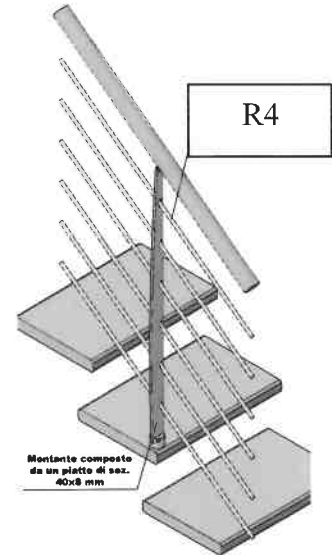
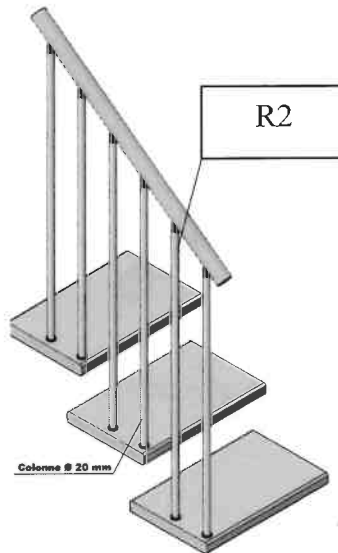
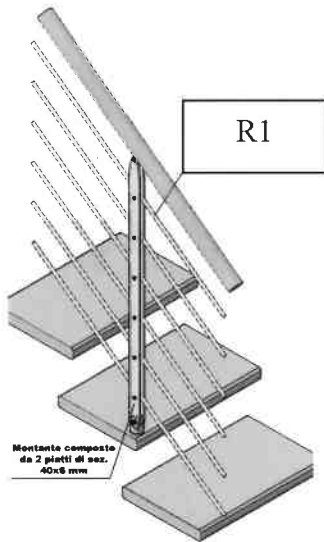
“S20”	Annex 7
Fixing of wooden steps (GL) to the corner walls and graphic description of different wall typologies for the connection of the stair to the side wall	of European Technical Assessment 19/0307: flight stair kit “S20”

Annex 8 of European Technical Assessment 19/0307: Flight stair kit “S20”

Post with 2 flat bars 40x6 mm and 6 round bars Ø 6/12 mm

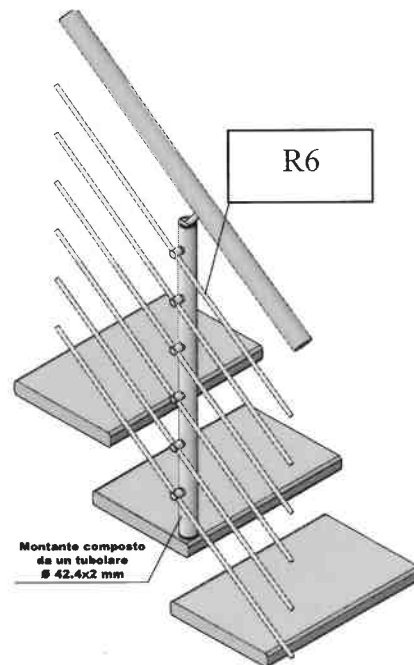
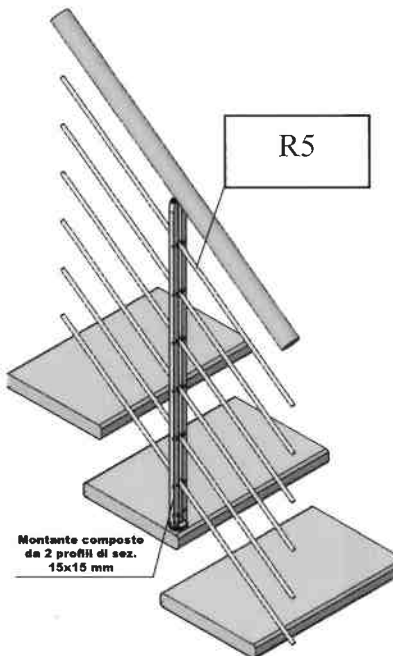
Balusters Ø 20 mm

Post with 1 flat bar 40x8 mm and 6 round bars Ø 6/12 mm



Post with 2 profiles 15x15 mm and 6 round bars Ø 6/12 mm

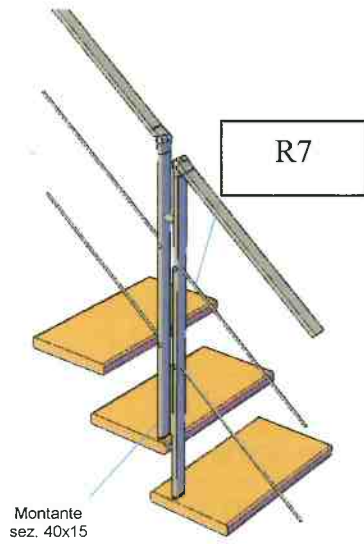
Post with 1 tubular bar Ø 42,4 mm and 6 round bars Ø 6/12 mm



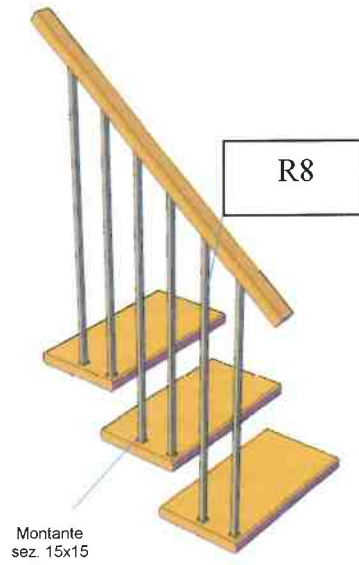
“S20”	Annex 8 of European Technical Assessment 19/0307: flight stair kit “S20”
R1, R2, R4, R5, R6 railings, details	

Annex 9 of European Technical Assessment 19/0307: Flight stair kit “S20”

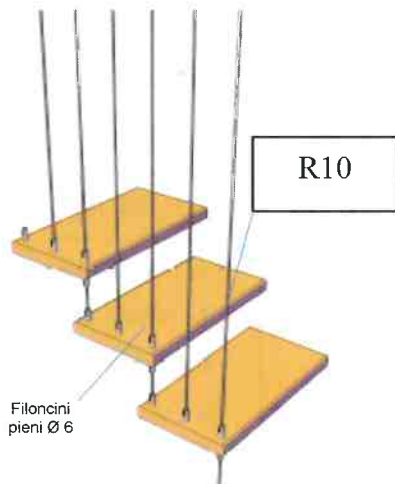
Post with 2 tubular bars 40x15 mm
and 2 round bars Ø 6 mm



Square profiles 15x15 mm



Bars with solid section Ø 6 mm from step to ceiling



“S20”	Annex 9 of European Technical Assessment 19/0307: flight stair kit “S20”
R7, R8, R10 railings, details	

Annex 10 of European Technical Assessment 19/0307: Flight stair kit “S20”

Parameter	Value (mm)
Height between floors	From 320 up to 4250
Number of risers	From 2 to 17
Riser	From 160 to 250
Length of the step	260 and 340
Tread width	From 200 to 280
Width of the step	From 500 to 1000
Thickness of the wooden step	40 - 60
Thickness of the metal sheet for steps	5 - 10
Length of the median line of the flight of stairs	5330 ⁽¹⁾
Height of the handrail	From 970 to 1170
Outer dimension of the railing posts	- (2)
Outer diameter of the handrail	42 - 50
Distance between the railing balusters	From 80 to 900

(1) with 17 average height risers and maximum tread

(2) the post dimension varies depending on the typology of the railing

Components	Materials	Type	Mechanical characteristics
Supporting structures for steps, steps, brackets and posts	Steel	S235 JR EN 10025	$f_{tk} = 360 \text{ N/mm}^2$
		S275 JR EN 10025	$f_{tk} = 430 \text{ N/mm}^2$
		Inox AISI 304	$f_{tk} = 500 \text{ N/mm}^2$
Nuts and bolts	Steel	8.8 class	$f_{tk} = 800 \text{ N/mm}^2$ $f_{vk} = 640 \text{ N/mm}^2$ $f_{d,N} = 560 \text{ N/mm}^2$ $f_{d,V} = 396 \text{ N/mm}^2$
Steps and handrail	Finger Joint beech	Beech glued laminated timber GL 24h EN 14080	$f_{mk} = 24 \text{ N/mm}^2$ $f_{vk} = 19.2 \text{ N/mm}^2$ $f_{ck} = 24 \text{ N/mm}^2$
Accessories	Polyamide	PAV 6 30% glass fibres	$f_{tk} = 66 \text{ N/mm}^2$ $f_{yk} = 38.1 \text{ N/mm}^2$

“S20”	Annex 10 of European Technical Assessment 19/0307: flight stair kit “S20”
Geometry and materials of the stairs	

Annex 11 of European Technical Assessment 19/0307: Flight stair kit "S20"

Load-bearing capacity of the stair at ultimate limit state - Characteristic values of resistance

Assessment according to the limit state design method as proposed in EN 1990, by testing and calculation

Type of loading	Level kN	Level kN/m ²	Level kN/m	γ_M^1
Vertical variable point load acting on a step in the most unfavourable position Q_{Rk}	3,00			$\gamma_s = 1,05$ $\gamma_w = 1,5$
Vertical variable uniformly distributed load q_{Rk}		3,00		$\gamma_p = 2,0$
Horizontal variable uniformly distributed load acting on the barrier at the level of the handrail h_{Rk}			NPA	$\gamma_Q = 1,5$

- 1) γ_s = partial safety factor of steel
 γ_w = partial safety factor of wood
 γ_p = partial safety factor of polymers
 γ_Q = partial safety factor taking account of the model's uncertainties and dimensional variations (EN 1990:2002/A1:2005/AC)

Load-displacement behaviour at serviceability limit state – Deflections under loading

Assessment by testing and calculation – worst cases considered

		Level
Deflection of the step under service load F_s (point load $Q = 2,00$ kN) related to the median line of the step w_Q	$l \leq 1000$ mm	7 mm
Deflection of the stair under service load F_s (uniformly distributed load $q = 2,00$ kN/m ²) related to the clear width of the stair w_q	$l \leq 5330$ mm	14 mm

Proof of serviceability limit state is only given if the design value of the loads (F_k) does not exceed the values (F_s): $F_k \leq F_s$

Load-bearing capacity – Admissible loads

Minimum values from proof of ultimate limit state and serviceability limit state			
Vertical variable uniformly distributed load	$q =$	2,00	[kN/m ²]
Vertical variable point load	$Q =$	2,00	[kN]
Horizontal variable uniformly distributed load	$h_s =$		NPA

"S20"	Annex 11 of European Technical Assessment 19/0307: flight stair kit "S20"
Load-bearing capacity	

