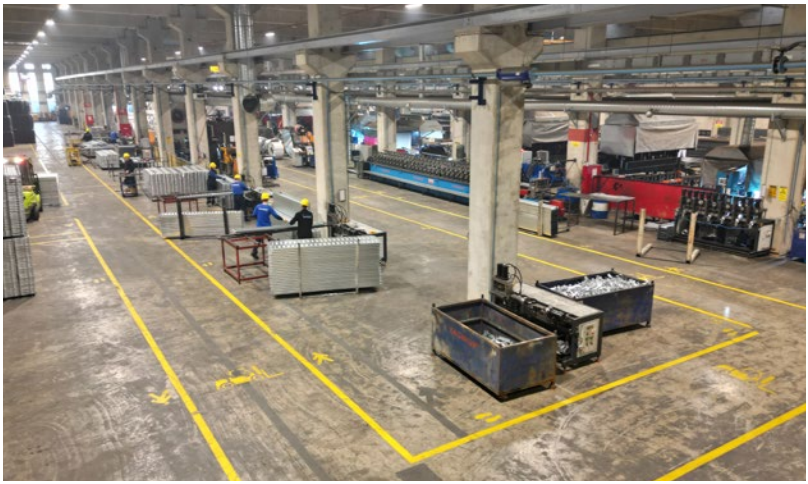
YAĞMUR®
SCAFFOLDING SYSTEMS

MULTIDIRECTIONAL SCAFFOLDING

PRODUCT MANUAL

The preference of those who value their time...

ABOUT US



In 2007, our partners combined their experiences they have gained since 1997 under the roof of **YAĞMUR SCAFFOLDING SYSTEMS**. Today we operate in three different locations with a total area of 34.000 m², 16.000 m² of which is closed. Since its establishment, our company has not compromised on the principle of quality service and product.

We aim to develop a strong relationship with our customers that does not end with sales and to continue this relationship with technical consultancy after sales. Growing rapidly in a highly balanced and healthy structure our company stands out with its reliable services and has also reinforced its quality policy with the certificates it has received.

PRODUCTION

We produce our products in our own modern facility in Gebze and Dilovası. It is our main principle to provide our customers with high-quality products at the most affordable prices possible and on time, thanks to our high production capacity and permanent stock.

RENTAL AND SALES

We will be pleased to offer you our multidirectional scaffolding systems for sale, rental, and buy-back options. You can consult our sales representatives to determine the most cost-effective procurement model for your project.

TECHNICAL SUPPORT

After the necessary load calculations are made by our technical team, your projects will be analyzed optimized and material quantities will be calculated. Scaffold installation plans and sections will be prepared in CAD environment and presented to you. The technical team will be on-site during the initial setup to provide necessary support.

QUALITY POLICY

To be always a pioneer in quality.
To increase customer and employee satisfaction by applying the philosophy of continuous improvement.
To increase the domestic and international market share by offering on-time, high quality and affordable products to the customers.
To use the latest technology for reducing the product costs and achieving the zero defect production target.
To ensure the adoptation of all personnel to the total quality philosophy and to continue on going training activities.
To support our suppliers to increase their quality levels based on the understanding that the customer satisfaction can be provided by supplying quality input.

1. GENERAL INFORMATION ABOUT THE MULTIDIRECTIONAL SCAFFOLDING SYSTEM

Multidirectional scaffolding system can be used in new ship building and ship repairs at the shipyards, restoration of engineering structures, power plants, aircraft maintenance-repair facilities, industrial factories, construction areas such as tunnel dams and all kinds of facade works especially in industrial buildings. It provides a very safe working environment.

Thanks to its unique connection technique, multidirectional scaffolding consists of vertical braces with securely and firmly welded “flanges” featuring eight connection points, and horizontal braces with a locking mechanism called steel ledger ends.

Eight horizontal or diagonal braces can be connected on each flange of the vertical braces from different directions. This connection system ensures 360-degree mobility for the horizontal braces around the verticals.

Thus, it adapts to all kinds of recesses and protrusions on the building surface and provides a practical workflow. System safety is kept at the highest level with horizontal and diagonal braces and toe boards produced in accordance with all kinds of flange spacing. This system is very easy to install and dismantle by two people. The steel ledger end is attached to the flange of the vertical brace. The assembly of the wedge is completed with the help of a 500 g hammer.

It can also be used as a mobile working platform with the help of wheels added to the base adjustments. The system has no risk of tilting and tipping over due to its robust connections.

2. GENERAL INFORMATION ABOUT STANDARD

Each scaffolding area created for working purposes should be arranged to provide favorable conditions for the working place and also meet the following criteria:

- To protect worker from the risk of falling,
- To ensure the safe storage of the materials and equipment used,
- To protect workers at lower levels and those passing around the scaffolding against damage caused by objects that may fall from above.

The eaves should be created across the entire width of the working area and appropriate side protection should be provided before use. The connections between the joined parts must be sufficient and easily visible from the outside. These connections should be easy to install and there should be adequate fixing pins against accidental disconnection.

2.1 Width Classes

The clear opening between the vertical braces should be at least 600 mm, and the net width of the ladders should not be less than 500 mm.

The width determined in each working area, including the corners, must be maintained along the entire length of the deck.

Width Class	W (m)
W06	0,6 ≤ w ≤ 0,9
W09	0,9 ≤ w ≤ 1,2
W12	1,2 ≤ w ≤ 1,5
W15	1,5 ≤ w ≤ 1,8
W18	1,8 ≤ w ≤ 2,1
W21	2,1 ≤ w ≤ 2,4
W24	2,4 ≤ w

Table 1 – Width classes

2.2 Head Clearance

The minimum net size of the head clearance dimension h_3 between the working areas should be 1.90 m.

The requirements regarding the head clearance for the height h_{1b} between the connections and the working areas or the height h_{1a} between the horizontal connections and the working areas are given in Table 2.

Class	Net Head Clearance		
	Between work areas h_3	Between the connections or horizontal connections and the working area h_{1a} h_{1b}	Minimum clear height at shoulder level h_2
H_1	$h_3 \geq 1{,}90$ m	$1{,}75 \text{ m} \leq h_{1a} < 1{,}90$ m $1{,}75 \text{ m} \leq h_{1b} < 1{,}90$ m	$h_2 \geq 1{,}60$ m
H_2	$h_3 \geq 1{,}90$ m	$h_{1a} \geq 1{,}90$ m $h_{1b} \geq 1{,}90$ m	$h_2 \geq 1{,}75$ m

Table 2 – Head clearance classes

2.3 Load Classes

This standard defines six load classes and seven width classes for the working areas to meet different working conditions. Service loads are shown in Table 3.

The load class for the working areas depends on the intended use of the scaffolding.

Note - In exceptional cases where the scaffolding cannot be included in a single load class or is used in very heavy conditions, different parameters can be applied and determined after the analysis of the conditions of the scaffolding. The specific tasks performed on the scaffolding should be considered. Below are some examples of the factors that should be considered:

a. Weight of all equipment and materials placed on the working area,
b. Dynamic effects caused by the from machines operated with external power source used on the working area,
c. Loads from manually operated vehicles such as wheelbarrows.

The materials placed on the scaffoldings included in load class 1 are not included in the service loads given in Table 3.

Load Class	Uniformly distributed load q_1 kN / m²	Single Load Over 500 x 500 mm Area F_1 kN	Single Load Over 200 x 200 mm Area F_2 kN	Partial Area Load	
				q_2 kN/m²	Partial Area Coefficient a_p [1]
1	0,75[2]	1,50	1,00	-	-
2	1,50	1,50	1,00	-	-
3	2,00	1,50	1,00	-	-
4	3,00	3,00	1,00	5,00	0,4
5	4,50	3,00	1,00	7,50	0,4
6	6,00	3,00	1,00	10,00	0,5

Table 3 – Service loads on the working area

YAĞMUR SCAFFOLDING SYSTEMS
HAS CERTIFICATE ACCORDING TO
UNE EN 12810-4D-SW06/300-H2-A/B-LA STANDARD.

3. GENERAL PRINCIPLES OF MULTIDIRECTIONAL SCAFFOLDING SYSTEM

The scaffoldings consisting of wooden and prefabricated steel and aluminum alloy components to be used on the exteriors of building construction's

- performance and design requirements calculations,
- structural arrangements required for horizontal and vertical life lines,
- detailed drawings of connection points,

are performed by the relevant project designer. The calculations and detailed drawings of the facade scaffolding are submitted to the relevant administration with in the static project by the building owner or their legal representatives to obtain a building license.

3.1 Responsibilities

The calculations and detailed drawings made by the manufacturer company are submitted to the contractor. Nevertheless, this does not relieve responsibilities of the contractor and the project designer.

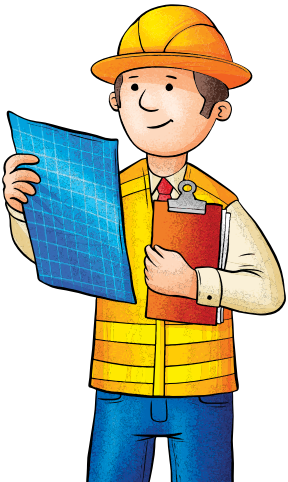
3.2 Obligations

- In cases where the facade scaffolding height exceeds 13.50 m, the entire scaffolding should consist of steel and/or aluminum alloy components.
- Being limited to the road facing sides of the parcel where the building is located; it is obligatory that the outer surface of the scaffolding established within the approach distance of the building is completely covered with sack fabric, net, tarpaulin, plate or similar scaffolding cover that can perform the same function.

4. GENERAL EXPLANATIONS FOR INFORMATION AND DEMONSTRATION PURPOSES REGARDING THE DESIGN AND IMPLEMENTATION RULES OF SCAFFOLDINGS

- Scaffoldings consisting of prefabricated steel and aluminum alloy components should be designed in accordance with UNE EN 12811-1 and UNE EN 12810-2 standards in a way that they will not accidentally move or collapse and can be used safely.
- Failure to use damaged multidirectional scaffolding elements is crucial in terms of the general rigidity of the scaffolding system and safety.
- The maximum weights that steel decks can carry should be written on the plates and hung on the appropriate and visible places of the scaffolding. Care should be taken to uniformly distribute these specified weights and loads exceeding these weights should not be loaded on the decks.
- In cases where night work is necessary and mandatory and daylight is insufficient, appropriate and sufficient lighting has to be provided, and electrical cables and devices have to be deployed in a way that they do not pose any danger to both the scaffolding and the workers.
- It should be ensured that the existing working areas and passages on the scaffolding do not become slippery due to natural factors such as ice, snow, rain and other factors such as dirt, rust, oil, by taking preventive measures and regular maintenance.

SHOULD NOT WORK ON SCAFFOLDINGS IN RAINY AND SNOWY WEATHER AND IN CASES WHERE THE WIND SPEED EXCEEDS 45 KM/HOUR.



- While calculating the system, the largest loads and working wind load should be applied separately perpendicular and also parallel to the facade.
- Horizontal stability of the scaffolding should be ensured by attaching the scaffolding to the adjacent building with anchors.
- Working areas should be as horizontal as possible, the slope should not exceed 20%.
- The dismantling of the scaffolding should start from the top floor and proceed to the bottom floor.
- Deformed and corroded components should not be used in scaffolding systems.
- The metal elements of the scaffolding system must be properly grounded against static electricity.
- If the height between the uppermost deck surface and the bottom edge of the baseplate is above 24 m, additional calculations should be made besides the standard system configurations.
- Head clearance between working areas must be at least 190 cm.
- Passages for scaffolding transitions should be at least 60 cm wide with appropriate guardrail systems on the edges.
- The main guardrail should be at least 1 m high from the deck and resistant to a load of at least 125 kilograms from any direction.
- At least 15 cm high toe board should be installed directly adjacent to the deck.
- Intermediate guardrails shall be provided so that the clearance between the toe board and the main guardrail does not exceed 47 cm.
- All components to be used in the installation should be individually inspected. In case of any damage, such as those described above, those components should be replaced with new ones and the installation of the scaffolding should continue.
- Being limited to the road facing sides of the parcel where the building is located; it is obligatory that the outer surface of the scaffolding established within the approach distance of the building is completely covered with sack fabric, net, tarpaulin, plate or similar scaffolding cover that can perform the same function.

5. PROCEDURES TO BE FOLLOWED IN CASE OF TEMPORARY REMOVAL OF CONNECTIONS OR WHEN THE SCAFFOLDING HEIGHT EXCEEDS 25 METERS IN A MULTIDIRECTIONAL SCAFFOLDING SYSTEM

In the event that the wall connection kit of the scaffolding should be temporarily removed, this process should be carried out by removing only one wall connection kit at a time in order not to jeopardize the general rigidity of the scaffolding. After the process is completed and the wall connection kit is reassembled than the removal of the other one must be carried out. Otherwise, undesirable dangerous situations may occur on the scaffolding.

In cases where the scaffolding height exceeds 25 m or different application is required from the proposed project, the authorized technical personnel of the manufacturer should be contacted. Installation has to be made with different projects to be proposed by the technical personnel.

6. SAFETY MEASURES TO BE TAKEN ON SCAFFOLDINGS

In the installation of facade scaffoldings consisting of prefabricated components, it is ensured that the vertical and horizontal braces of the system are used completely and the system is reinforced with adequate diagonal braces.

For prefabricated facade scaffolding systems, the nominal outer diameter of circular vertical and horizontal braces shall be at least 48.3 millimeters, and the nominal wall thickness shall be appropriate with the material type and minimum yield strength.

Facade scaffoldings are installed as close as possible to the building, and when this is not possible, measures are taken to prevent the workers from falling between the building and the scaffolding.

7. CLASSIFICATION

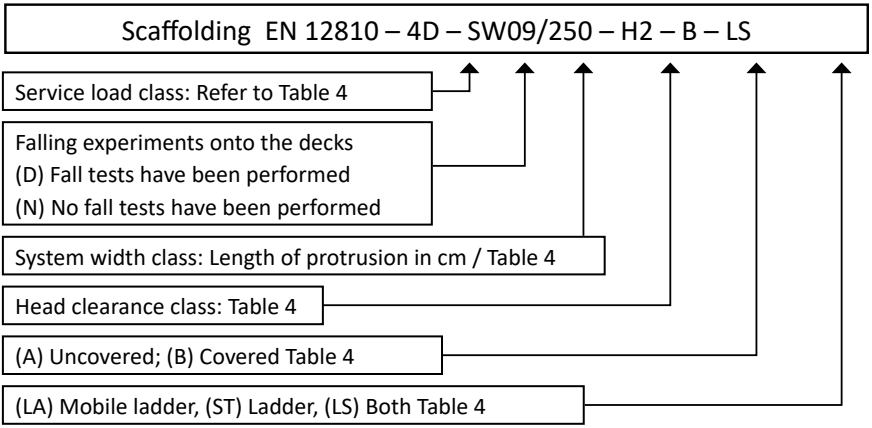
A scaffolding system must be classified in accordance with Table 4.

Classification criteria	Classes
Service load	2, 3, 4, 5, 6 in accordance with EN 12811-1 Table 3
Decks and supports	(D) Designed by fall test (N) Not designed by fall test
System width	SW06, SW09, SW12, SW15, SW18, SW21, SW24
Head clearance	H1 and H2 in accordance with EN 12811-1 Table 2
Covering	(B) Covered (A) Uncovered
Vertical movement method	(LA) Mobile ladder (ST) Ladder (LS) Both

Table 4 – Scaffolding System Classification

7.1 SHORT DISPLAY

A brief illustration of a scaffolding system should include the following parts in accordance with this standard.



SW09/250: The system width is between 0.9 m and 1.2 m, and the protrusion length is 2.5 m.

H2: The head clearance between the working area and horiztonal connections is at least 1.9 m.
B: Covered ladder.

LS: The scaffolding is accessed via both mobile and regular ladders.

If a scaffolding system contains more than one load class or dimension, a separate short display line should be provided for each one.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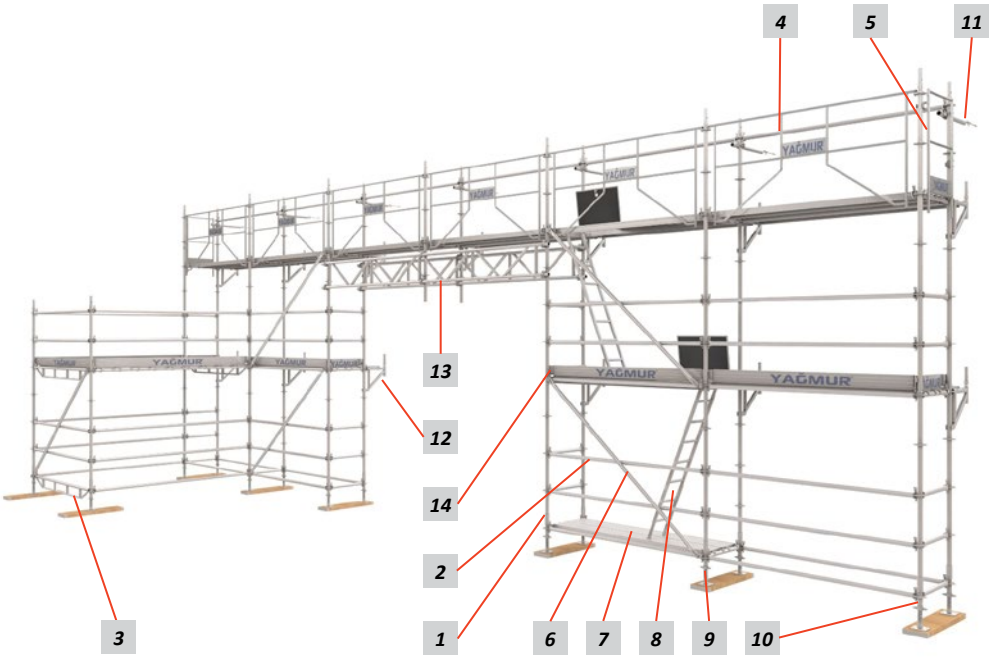
8. MULTIDIRECTIONAL SCAFFOLDING SYSTEM PART LIST



1	*Vertical Brace*	8	*Access Deck with Ladder*
2	*Horizontal Brace*	9	*Base Adjustment*
3	*Reinforced Horizontal Brace*	10	*Starting Member*
4	*Rear Guardrail*	11	*Wall Connection Kit*
5	*End Guardrail*	12	*Console*
6	*Diagonal Brace*	13	*Lattice Beam*
7	*Steel Deck*	14	*Steel Toe Board*

8.1.1 VERTICAL BRACE	CODE	SIZE (cm)	WEIGHT (kg)
	M.201.048.300	300	13,30
	M.201.048.250	250	11,00
	M.201.048.200	200	8,90
	M.201.048.150	150	6,80
	M.201.048.100	100	4,80
	M.201.048.050	50	2,90

8.1.1

8.1.2

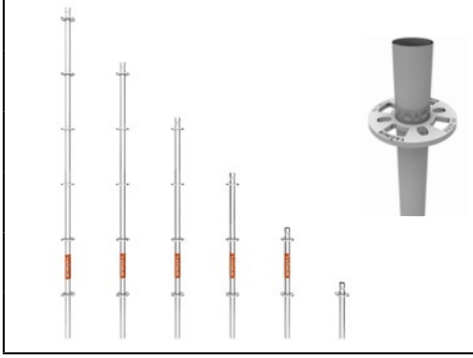
8.1.3

Vertical braces are the main load-bearings of the multidirectional scaffolding system and are made of St52 pipe.

On the vertical braces, 8 mm thick flanges are located at 50 cm intervals to ensure connection with horizontal and diagonal braces. 4 small holes on the flanges provide the connection of the horizontal braces at a right angle. 4 large holes provide the connection of horizontal and diagonal braces at the desired angle.

VERTICAL BRACE RESISTANCE TABLE	
PRESSURE BUCKLING LENGTH (cm)	COMPRESSIVE STRENGTH (kN)
300	12,60
250	17,50
200	25,20
150	38,70
100	50,00
50	50,00

** Load safety coefficient: 1.50*

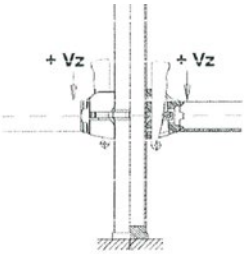
8.1.2 VERTICAL BRACE (Without Spigot)	CODE	SIZE (cm)	WEIGHT (kg)
	M.202.048.300	300	12,50
	M.202.048.250	250	10,20
	M.202.048.200	200	8,10
	M.202.048.150	150	6,00
	M.202.048.100	100	4,00
	M.202.048.050	50	2,10

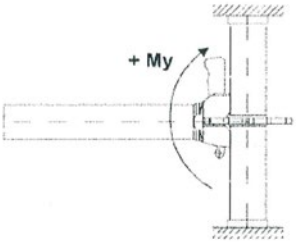
8.1.3 VERTICAL BRACE (Special Design Flange)	CODE	SIZE (cm)	WEIGHT (kg)
	M.203.048.300	300	13,00
	M.203.048.250	250	10,75
	M.203.048.200	200	8,70
	M.203.048.150	150	6,65
	M.203.048.100	100	4,70
	M.203.048.050	50	2,85

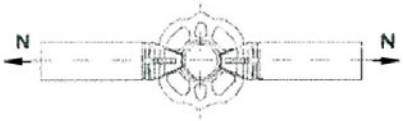
Yağmur multidirectional scaffolding system is practical; it saves time and labor.

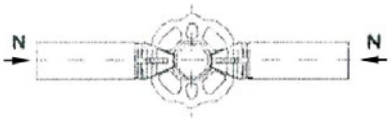
8.1.4

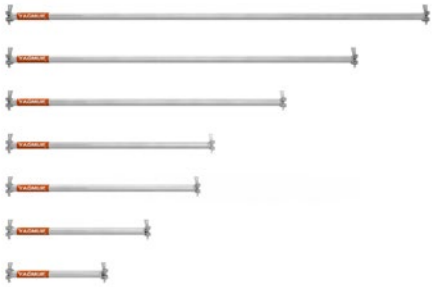
8.1.4 LOAD-BEARING CAPACITY OF MULTIDIRECTIONAL SCAFFOLDING JOINTS

8.1.4.1 VERTICAL SHEAR FORCE		
	**Avarage Value** (kN)	20,10

8.1.4.2 BENDING MOMENT		
	**max** (kNcm)	+/- 72,9

8.1.4.3 TENSION SHEAR FORCE		
	**Avarage Value** (kN)	4,04

8.1.4.4 COMPRESSION SHEAR FORCE		
	**Avarage Value** (kN)	51,0

8.2.1 HORIZONTAL BRACE	CODE	SIZE (cm)	WEIGHT (kg)
	M.211.048.300	300	8,70
	M.211.048.250	250	7,40
	M.211.048.200	200	6,10
	M.211.048.150	150	4,80
	M.211.048.140	140	4,60
	M.211.048.105	105	3,50
	M.211.048.075	75	2,80

8.2.2 REINFORCED HORIZONTAL BRACE	CODE	SIZE (cm)	WEIGHT (kg)
	M.216.048.300	300	14,40
	M.216.048.250	250	11,80
	M.216.048.200	200	9,30
	M.216.048.150	150	6,90
	M.216.048.140	140	6,40

8.2.1.1

8.2.1.2

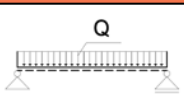
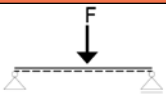
The ledger end, located at both ends of the horizontal brace, is attached to the flange of the vertical brace and the assembly is completed using a wedge.

The connection is strengthened by hammering the wedge.

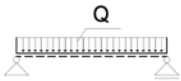
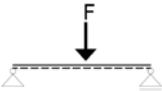
Horizontal braces installed parallel to the facade serve as guardrails, while horizontal braces installed in the vertical direction allow the installation of the steel decks.

Reinforced horizontal braces are used to prevent deflection where 4 or more decks need to be installed.

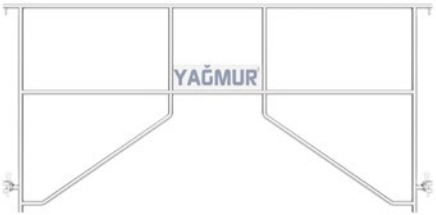
Lattice beams are used when clearance of more than 3 m is required.

HORIZONTAL BRACE RESISTANCE TABLE		
HEIGHT (cm)	 **UNIFORMLY DISTRIBUTED LOAD (kN/m)**	 **MEDIUM SINGLE LOAD (kN)**
300	0,75	1,70
250	1,12	2,00
200	1,80	2,50
150	3,40	3,30
140	3,95	3,50
105	7,55	4,60
75	16,60	6,60

** Load safety coefficient: 1.50*

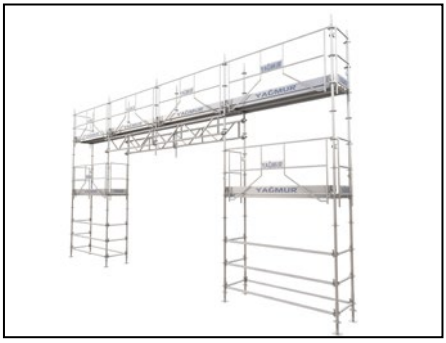
REINFORCED HORIZONTAL BRACE RESISTANCE TABLE		
HEIGHT (cm)	 **UNIFORMLY DISTRIBUTED LOAD (kN/m)**	 **MEDIUM SINGLE LOAD (kN)**
300	3,30	4,40
250	4,60	5,20
200	7,30	5,50
150	14,20	9,00

** Load safety coefficient: 1.50*

8.3.1 REAR GUARDRAIL	CODE	SIZE (cm)	WEIGHT (kg)
	M.271.120.300	300	17,20
	M.271.120.250	250	15,70
	M.271.120.200	200	13,80
	M.271.120.150	150	11,10

8.3.2 END GUARDRAIL	CODE	SIZE (cm)	WEIGHT (kg)
	M.272.120.105	105	9,5
	M.272.120.075	75	7,7

The rear and end guardrails are attached to the vertical braces before moving to the upper levels. They ensure the safety of the workers going upstairs to complete scaffolding installation. It is very easy to assemble; it saves time and labor. It is not necessary to use diagonal braces in the scaffolding system where the rear guardrails are used.



8.3.1.1

8.3.2.1

8.4 DIAGONAL BRACE	CODE	SIZE (cm)	WEIGHT (kg)
	M.221.048.365	365 (H:200 L:300)	9,60
	M.221.048.324	324 (H:200 L:250)	8,50
	M.221.048.287	287 (H:200 L:200)	7,60
	M.221.048.254	254 (H:200 L:150)	7,20
	M.221.048.249	249 (H:200 L:140)	6,60
	M.221.048.231	231 (H:200 L:105)	6,10
	M.221.048.219	219 (H:200 L:75)	5,80

8.4.1

Both ends of the diagonal braces are fitted with articulated ledger ends. The wedge in the ledger end is inserted into the large hole in the flange of the vertical brace. The connection is strengthened by hammer stroke.

The diagonal brace used at the beginning of scaffolding assembly ensures the squareness of the scaffolding.

Diagonal braces increase the resistance of the scaffolding system against lateral loads and wind load.

8.4.2

8.4.3

DIAGONAL BRACE STRENGTH TABLE		
HEIGHT (cm)	COMPRESSIVE STRENGTH (kN)	TENSILE STRENGTH (kN)
365	6,80	16,14
324	8,30	16,14
287	10,20	16,14
254	12,40	16,14
249	12,80	16,14
231	14,20	16,14
219	14,80	16,14

** Load safety coefficient: 1.50*

8.5.1 STEEL DECK - W: 30 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.234.031.300	30x300	18,70
	M.234.031.250	30x250	16,00
	M.234.031.200	30x200	13,30
	M.234.031.150	30x150	10,60
	M.234.031.140	30x140	10,00
	M.234.031.105	30x105	8,00
	M.234.031.075	30x75	6,60

8.5.2 STEEL DECK - W: 30 cm (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.236.030.300	30x300	19,80
	M.236.030.250	30x250	17,00
	M.236.030.200	30x200	14,20
	M.236.030.150	30x150	11,20
	M.236.030.140	30x140	10,50
	M.236.030.105	30x105	8,50
	M.236.030.075	30x75	7,10

Steel decks produced in roll form lines have high strength and they provide a safe working area.

The embossed holes on the surface of the decks prevent slipping and the accumulation of mortar, paint and other materials.

The balance hook and locking pin on steel decks prevent the deck from rotating and being blown away by the wind.

DECK SIZE (cm)	WORKING LOAD (daN/m²)	LOAD CLASS
300 cm	300	4
250 cm	450	5
200 cm	600	6
150 cm	600	6
100 cm	600	6
75 cm	600	6

8.5.3 STEEL DECK - W: 20 cm (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.232.020.300	20x300	14,60
	M.232.020.250	20x250	12,30
	M.232.020.200	20x200	10,00
	M.232.020.150	20x150	7,80
	M.232.020.140	20x140	7,70
	M.232.020.105	20x105	5,60
	M.232.020.075	20x75	4,30

8.5.4 STEEL DECK - W: 20 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.237.020.300	20x300	13,60
	M.237.020.250	20x250	11,40
	M.237.020.200	20x200	9,20
	M.237.020.150	20x150	7,00
	M.232.020.140	20x140	6,70
	M.237.020.105	20x105	5,20
	M.237.020.075	20x75	4,00

8.5.5 STEEL PLANKS - W: 40 cm (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.233.040.250	40x230	22,00
	M.233.040.200	40x180	17,20
	M.233.040.150	40x130	12,50
	M.233.040.105	40x85	8,30
	M.233.040.75	40x55	6,50

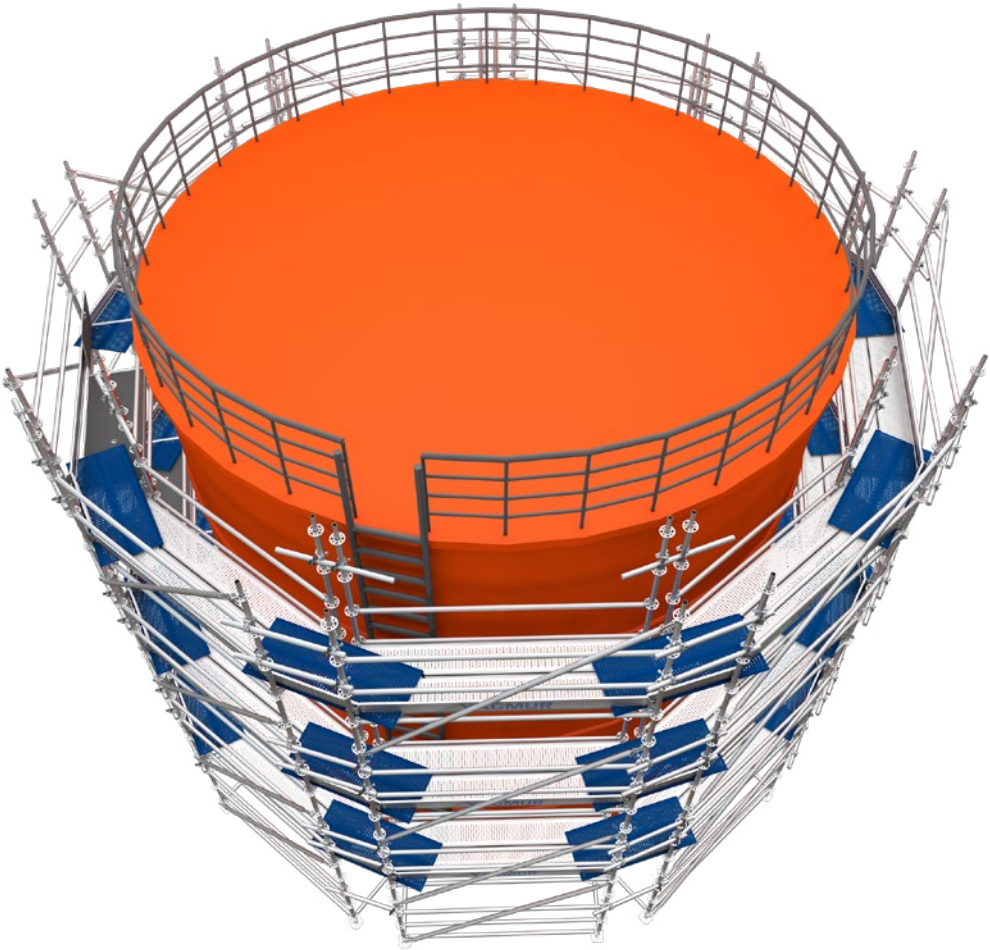
8.5.6 STEEL PLANKS - W: 30 cm (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.233.030.250	30x230	17,60
	M.233.030.200	30x180	13,80
	M.233.030.150	30x130	10,00
	M.233.030.105	30x85	6,60
	M.233.030.075	30x55	4,60

8.5.7 STEEL PLANKS - W: 20 cm (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.233.020.250	20x230	13,00
	M.233.020.200	20x180	10,20
	M.233.020.150	20x130	7,40
	M.233.020.105	20x85	4,80
	M.233.020.75	20x55	3,30

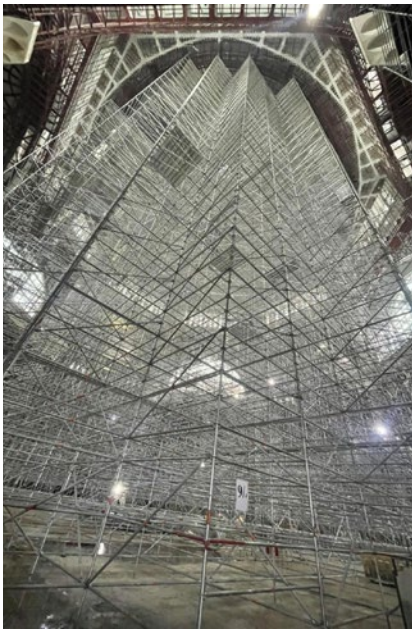
8.5.8 STEEL PLANKS - W: 40 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.238.040.250	40x230	20,50
	M.238.040.200	40x180	16,10
	M.238.040.150	40x130	11,70
	M.238.040.105	40x85	7,70
	M.238.040.075	40x55	6,10

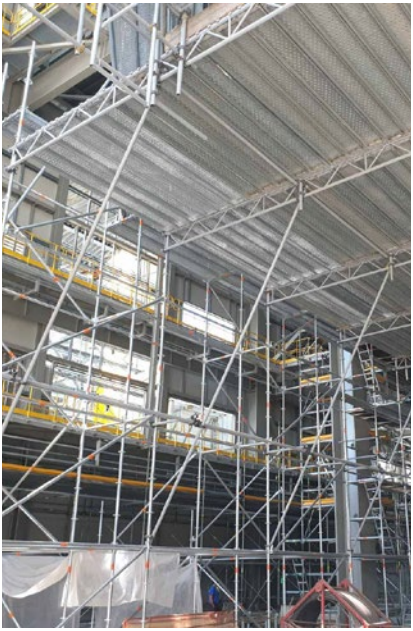
8.5.9 STEEL PLANKS- W: 30 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.238.030.250	30x230	16,40
	M.238.030.200	30x180	12,90
	M.238.030.150	30x130	9,40
	M.238.030.105	30x85	6,20
	M.238.030.075	30x55	4,30

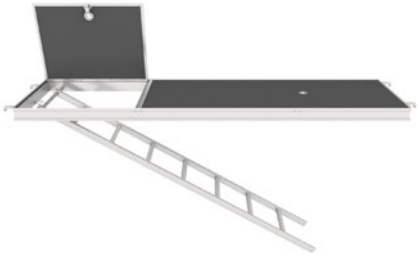
8.5.10 STEEL PLANKS- W: 20 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.238.020.250	20x230	12,10
	M.238.020.200	20x180	9,50
	M.238.020.150	20x130	6,90
	M.238.020.105	20x85	4,50
	M.238.020.075	20x55	3,10



Angled clearances that cannot be closed with standard steel decks are closed with the steel planks. The steel planks placed on the steel decks are fixed with a bolt.

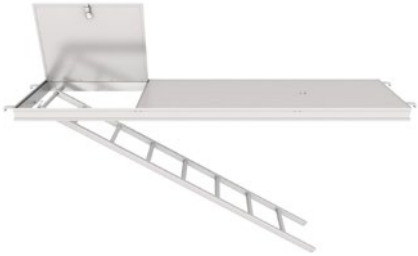




8.6.1 ALUMINUM DECK WITH LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.461.060.300	60X300	26,50
	T.461.060.250	60X250	22,50
	T.461.060.200	60X200	19,50

8.6.2 ALUMINUM ACCESS DECK	CODE	SIZE (cm)	WEIGHT (kg)
	T.456.060.300	60X300	22,50
	T.456.060.250	60X250	18,50
	T.456.060.200	60X200	15,50
	T.456.060.185	60X185	14,50
	T.456.060.150	60X150	12,50
	T.456.060.135	60X135	11,50

8.6.3 ALUMINUM DECK	CODE	SIZE (cm)	WEIGHT (kg)
	T.451.060.300	60X300	22,40
	T.451.060.250	60X250	18,40
	T.451.060.200	60X200	15,40
	T.451.060.185	60X185	14,40
	T.451.060.150	60X150	12,40

8.6.4 ALUMINUM DECK WITH LADDER (Aluminum Surface)	CODE	SIZE (cm)	WEIGHT (kg)
	T.462.060.300	60X300	27,00
	T.462.060.250	60X250	23,00
	T.462.060.200	60X200	19,80

8.6.5 ALUMINUM ACCESS DECK (Aluminum Surface)	CODE	SIZE (cm)	WEIGHT (kg)
	T.457.060.300	60X300	23,70
	T.457.060.250	60X250	19,50
	T.457.060.200	60X200	16,30
	T.457.060.185	60X185	15,20
	T.457.060.150	60X150	13,10
	T.457.060.135	60X135	12,00

8.6.6 ALUMINUM DECK (Aluminum Surface)	CODE	SIZE (cm)	WEIGHT (kg)
	T.452.060.300	60X300	23,60
	T.452.060.250	60X250	19,40
	T.452.060.200	60X200	16,20
	T.452.060.185	60X185	15,10
	T.452.060.150	60X150	13,00

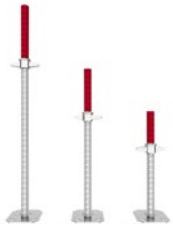
Aluminum access decks with ladders are manufactured in a width of 60 cm. Without the need to build a ladder tower, it can be descended by opening the trapdoor or closed and worked on. In order not to prevent the operation, the end of the ladder that presses the surface is lifted and fixed to the bottom of the deck. The locking system at the bottom of the deck allows easy opening and closing of the ladder. In cases where the ladder is left locked, the hole in the deck surface allows the ladder to be unlocked from the upper floor.

8.6.1.1

8.6.2.1

8.6.7 SAILOR LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	M.243.032.215	32x215	8,00

8.6.8 PORTABLE LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.244.032.215	32X215	3,80

8.7.1 BASE ADJUSTMENT (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.608.038.100	100	5,40
	M.608.038.070	70	4,20
	M.608.038.050	50	3,40

8.7.2 ARTICULATED BASE ADJUSTMENT (Hot-Dip Galvanized)	CODE	SIZE (cm)	WEIGHT (kg)
	M.609.038.100	100	7,00
	M.609.038.070	70	5,50
	M.609.038.050	50	4,50

8.7.1.1

Base adjustments are manufactured by opening 8-pitch thread. It has a spherical cast iron nut that allows the adjustment. It has a stopper to prevent over extension for safety. The minimum section that must remain inside the pipe is painted in red color. The embossed base plate ensures even load distribution. Base adjustments are manufactured in various heights to meet all kinds of needs. Articulated base adjustments are used on inclined surfaces.

8.7.2.1

BASE ADJUSTMENT JACK RESISTANCE TABLE	
EXTENSION (cm)	VERTICAL LOAD (kN)
40	32,5
30	39
20	46
10	50

**Load safety coefficient 2.0*

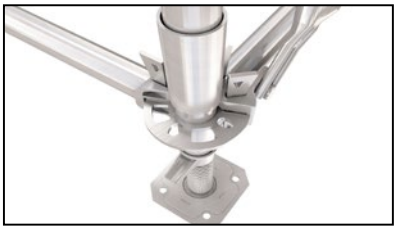
**These values are given based only on vertical load conditions. In the event of horizontal loads on the base adjustment jack, the load-bearing capacity will decrease depending on the weight of the horizontal load.*

8.8 STARTING MEMBER	CODE	LONGUEUR (cm)	POIDS (kg)
	M.258.048.025	25	1,60
	M.259.048.025	25	1,55

The flanged starting member provides the connection of the vertical brace and the base adjustment. A flanged starting member is mounted on the base adjustment placed on solid ground.

The first row of horizontal braces is mounted on the flanges on the flanged starting member. After the base floor installation is completed, the multidirectional scaffolding is easily brought to the scale.

The vertical brace is attached to the flanged starting member. A diagonal brace is mounted on the flange of the vertical brace corresponding to a height of 2 m from the flange on the flanged starting member and the multidirectional scaffolding is brought to the square.



8.8.1

8.8.2

8.9.1 WALL CONNECTION PIPE	CODE	SIZE (cm)	WEIGHT (kg)
	M.631.048.100	100	3,85
	M.631.048.090	90	3,50
	M.631.048.080	80	3,15
	M.631.048.070	70	2,80
	M.631.048.060	60	2,45
	M.631.048.050	50	2,10
	M.631.048.040	40	1,75

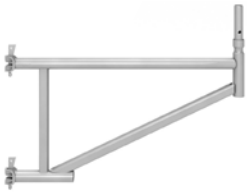
8.9.2 FIXED COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	M.641.048.048	Ø48XØ48	1,00

8.9.3 WALL FIXING BOLT	CODE	SIZE (cm)	WEIGHT (kg)
	M.632.012.021	21,5	0,20

8.9.4 WALL FIXING PEG	CODE	SIZE (cm)	WEIGHT (kg)
	T.622.012.050	M12	0,10

The wall connection kit is used to fix the multidirectional scaffolding to the building facade. The wall connection kit consists of connection pipe, fixed coupler, bolt and peg. Different lengths of connection pipes are used when the clearance between the facade and the multidirectional scaffolding varies.

A Ø16 hole with a minimum depth of 7 cm is drilled with a charged hand drill to coincide with the concrete parts of the structure (column, shear wall, beam or slab). An M12 drop-in peg is placed in the hole, the fixing bolt is mounted on the peg. The Z part of the Ø48x3.2 mm pipe welded to the Ø16 transmission rod, is mounted to the fixing bolt and its straight part is connected to the vertical brace with a fixed coupler.

8.10 CONSOLE	CODE	SIZE (cm)	WEIGHT (kg)
	M.261.048.100	105	9,70
	M.261.048.075	75	7,50
	M.261.048.045	45	5,50

The console is used to approach to the facade and work on the eaves in the scaffolding system installed at a distance from the facade.

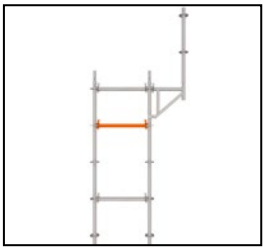
A safe working area is created with steel decks placed on the consoles produced in different sizes.

It is easily mounted by attaching the ledger end on the console to the flange of the vertical brace. The ledger end is struck with a hammer to secure the connection.

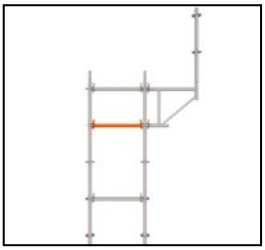
8.10.1

8.10.2

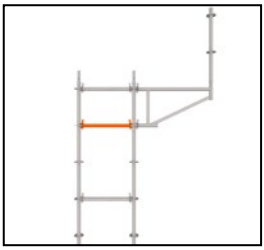
8.10.3



45 cm



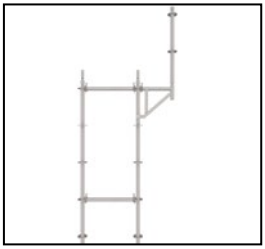
75 cm



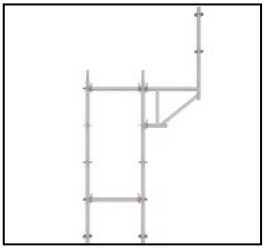
105 cm

CONSOLE RESISTANCE TABLE - VERTICAL BRACE SUPPORTED BY HORIZONTAL CONNECTION		
HEIGHT (cm)	**Q** **UNIFORMLY DISTRIBUTED LOAD (kN/m)**	**SINGLE LOAD FROM CONSOLE END (kN)**
105	5,90	5,90
75	11,60	6,90
45	24,00	8,50

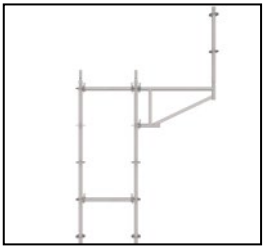
** Load safety coefficient: 1.50*



45 cm



75 cm



105 cm

CONSOLE RESISTANCE TABLE - VERTICAL BRACE NOT SUPPORTED BY HORIZONTAL CONNECTION		
HEIGHT (cm)	**Q** **UNIFORMLY DISTRIBUTED LOAD (kN/m)**	**SINGLE LOAD FROM CONSOLE END (kN)**
105	4,20	2,10
75	8,60	2,90
45	18,00	3,80

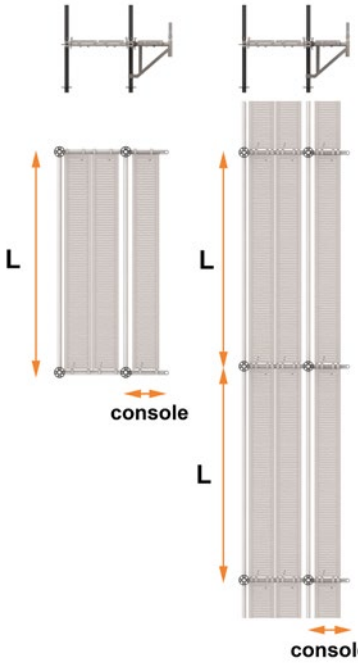
** Load safety coefficient: 1.50*

Load-bearing capacity of prefabricated consoles

The load-bearing capacities indicated in below tables (expressed in kN/m²) are determined by the following limitations:

- Resistance of steel decks subjected to a uniformly distributed load,
- Bending capacity of consoles, with a maximum acceptable deflection limited to L/200.

Note: The additional loads transmitted to the main structure by the diagonal braces must be taken into account. It is essential to verify the overall stability of the load-bearing structure under the combined effect of vertical and horizontal loads.



LOAD CLASS 6:	6,00 kN/m²
LOAD CLASS 5:	5,00 kN/m²
LOAD CLASS 4:	4,50 kN/m²
LOAD CLASS 3:	3,00 kN/m²
LOAD CLASS 2:	2,00 kN/m²

NON-SUPPORTED VERTICAL BRACE							
SINGLE BALCONY-TYPE CONSOLE							
Load capacity of the console in kN/m²							
		Steel Deck Length (L)					
		70	100	150	200	250	300
DIMENSIONS OF THE CONSOLE	45	6,00	6,00	6,00	6,00	6,00	6,00
	75	6,00	6,00	6,00	6,00	6,00	5,73
	100	6,00	6,00	5,60	4,20	3,36	2,80

NON-SUPPORTED VERTICAL BRACE							
CONTINUOUS CONSOLE							
Load capacity of the console in kN/m2							
		Steel Deck Length (L)					
		70	100	150	200	250	300
DIMENSIONS OF THE CONSOLE	45	6,00	6,00	6,00	6,00	6,00	6,00
	75	6,00	6,00	5,73	4,30	3,44	2,87
	100	6,00	4,20	2,80	2,10	1,68	1,40

SUPPORTED VERTICAL BRACE							
SINGLE BALCONY-TYPE CONSOLE							
Load capacity of the console in kN/m²							
		Steel Deck Length (L)					
		70	100	150	200	250	300
DIMENSIONS OF THE CONSOLE	45	6,00	6,00	6,00	6,00	6,00	6,00
	75	6,00	6,00	6,00	6,00	6,00	6,00
	100	6,00	6,00	6,00	5,90	4,72	3,93

SUPPORTED VERTICAL BRACE							
CONTINUOUS CONSOLE							
Load capacity of the console in kN/m²							
		Steel Deck Length (L)					
		70	100	150	200	250	300
DIMENSIONS OF THE CONSOLE	45	6,00	6,00	6,00	6,00	6,00	6,00
	75	6,00	6,00	6,00	5,80	4,64	3,87
	100	6,00	5,90	3,93	2,95	2,36	1,97

8.11.1 LATTICE BEAM - H:30 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.171.030.820	30X820	79,00
	M.171.030.720	30X720	69,00
	M.171.030.620	30X620	59,00
	M.171.030.520	30X520	49,00
	M.171.030.420	30X420	39,00
	M.171.030.320	30X320	29,00

8.11.2 LATTICE BEAM - H:45 cm	CODE	SIZE (cm)	WEIGHT (kg)
	M.171.045.820	45X820	83,00
	M.171.045.720	45X720	72,50
	M.171.045.620	45X620	62,00
	M.171.045.520	45X520	51,50
	M.171.045.420	45X420	41,00
	M.171.045.320	45X320	30,50

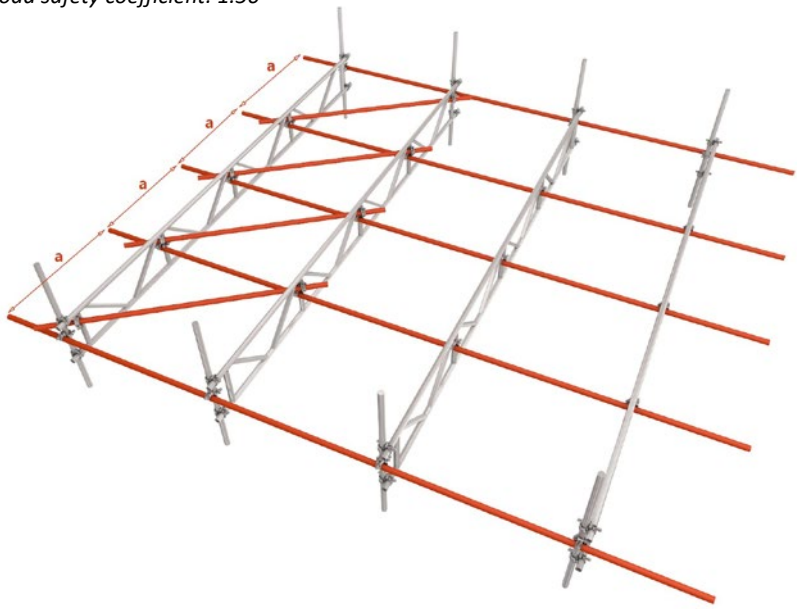
Lattice beams are used to pass clearances between 3 m and 8 m where it is not possible to erect the standard scaffolding. Special lattice beams are produced for larger clearances thus savings are achieved by reducing the amount of scaffolding for such areas. The lattice beams are mounted to the vertical braces of the scaffolding with double couplers. In cases where the scaffolding must rise above the lattice beam, the vertical braces are attached to the lattice beam with a fixed coupler. A safe working area is formed on the steel decks laid on the lattice beams.

8.11.1

LATTICE BEAM RESISTANCE TABLE (30 cm)		
LENGTH (cm)	UNIFORMLY DISTRIBUTED LOAD (kN/m)	MEDIUM SINGLE LOAD (kN)
30x820	1,25	7,20
30x720	1,70	9,85
30x620	2,45	10,90
30x520	3,70	15,40
30x420	5,60	16,60
30x320	9,00	22,00

LATTICE BEAM RESISTANCE TABLE (45 cm)		
LENGTH (cm)	UNIFORMLY DISTRIBUTED LOAD (kN/m)	MEDIUM SINGLE LOAD (kN)
820	2,40	15,10
720	3,10	16,00
620	3,90	18,10
520	5,20	19,60
420	7,40	22,50
320	10,00	24,20

** Load safety coefficient: 1.50*

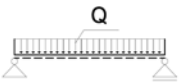
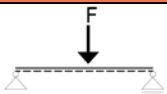


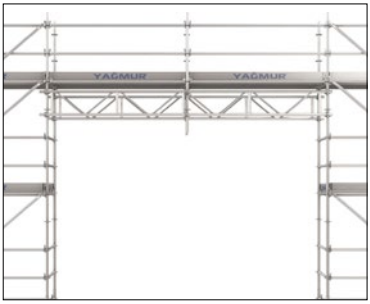
** The lattice beam top will all be covered with steel decks and the deck locks will be locked, or the connection pipes to the lattice beam top pipe will be connected with couplers at a maximum distance of 1m to prevent buckling.*

** The switch subhead will be connected with pipes and clamps with a maximum distance of 1m to prevent sprain.*

8.11.3 ALUMINUM LATTICE BEAM - H:45 cm	CODE	SIZE (cm)	WEIGHT (kg)
	T.481.045.820	45X820	34,00
	T.481.045.720	45X720	30,00
	T.481.045.620	45X620	26,00
	T.481.045.520	45X520	22,00
	T.481.045.420	45X420	18,00
	T.481.045.320	45X320	14,00

Aluminum lattice beams are lighter than standard lattice beams and provide ease of installation. In this way, the load on the scaffolding is reduced. Lattice beams are used to pass clearances between 3 m and 8 m where it is not possible to install standard scaffolding. In this way, the amount of scaffolding is reduced and savings are achieved. A safe working area is created thanks to the steel decks laid on the lattice beams.

LATTICE BEAM RESISTANCE TABLE		
LENGTH (cm)	 UNIFORMLY DISTRIBUTED LOAD (kN/m)	 MEDIUM SINGLE LOAD (kN)
820	2,10	11,00
720	2,30	11,90
620	3,45	13,60
520	3,90	14,60
420	4,20	15,70
320	7,20	17,00



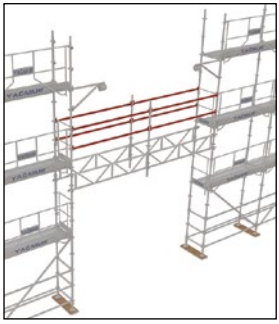
** Load safety coefficient: 1,50*

8.11.4 LATTICE BEAM INSTALLATION

8.11.4.1

Lattice beams equipped with vertical braces are lifted to the connection point using a lifting system or ropes.

The lattice beams are fixed to the scaffolding on both sides using four fixed couplers.



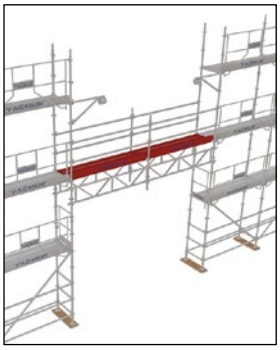
8.11.4.2

The horizontal braces used for the guardrail are mounted on the vertical braces over the lattice beams.

8.11.4.3

Access is provided via steel decks to the vertical braces mounted on the lattice beams.

The horizontal brace on which the steel decks will be mounted, is joined to the vertical braces on the lattice beams.



8.11.4.4

Decks and toe boards are mounted.

8.11.4.5

The installation of the upper levels of the scaffolding continues on the deck created with lattice beams.

Detailed image

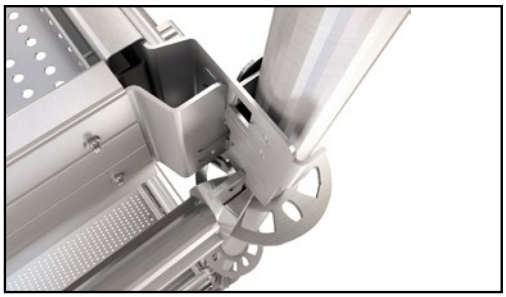
8.12 STEEL TOE BOARD	CODE	SIZE (cm)	WEIGHT (kg)
	M.251.015.300	300	6,50
	M.251.015.250	250	5,50
	M.251.015.200	200	4,50
	M.251.015.150	150	3,50
	M.251.015.140	140	3,30
	M.251.015.105	105	2,70
	M.251.015.075	75	2,10

The steel toe board is produced by giving form to the galvanized sheet metal in the roll-form line. These forms increase the strength of the toe board.

The steel toe boards prevent the unconscious workers from falling off the scaffolding by rolling over.

In addition, it protects the people on the ground from occupational accidents by preventing the materials such as rubble, scrap, etc. and the hand tools used in the working area from falling from height.

The steel toe board is inserted between the pipe of the vertical brace and the wedge.



8.12.1

8.12.2

8.13.1 Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	M.282.090.300	90x300	77,00
	M.282.090.250	90x250	70,00
	M.281.060.300	60x300	65,00
	M.281.060.250	60x250	58,00

8.13.2 INNER GUARDRAIL for Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	M.286.100.200	100x200	10,00

8.13.3 EXTERNAL GUARDRAIL for Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	M.287.100.250	100x250	18,00
	M.287.100.300	100x300	21,00

8.13.4 BOTTOM GUARDRAIL for Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	M.288.050.150	50x150	6,00

8.13.5 ALUMINUM Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.472.090.300	90x300	32,00
	T.472.090.250	90x250	28,00
	T.471.060.300	60x300	20,00
	T.471.060.250	60x250	17,00

8.13.6 INNER GUARDRAIL for ALUMINUM Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.476.100.200	100x200	5,70

8.13.7 EXTERNAL GUARDRAIL for ALUMINUM Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.477.100.250	100x250	6,70
	T.477.100.300	100x300	7,70

8.13.8 BOTTOM GUARDRAIL for ALUMINUM Z LADDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.478.050.150	50x150	3,50

8.14 USAGE OF FIXED COUPLERS AND PIPES

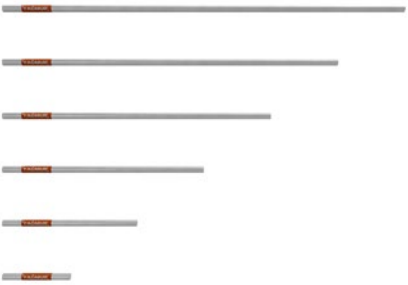
Fixed couplers are used to connect vertical and horizontal pipes. Mechanical characteristics of pipes:

- Material: S355 steel, minimum yield strength 400 N/mm²
- Diameter: 48.3 mm x 3.2 mm
- Scaffolding tubes must comply with EN39 or equivalent standards.

It is common to use fixed couplers in multidirectional scaffolding system for various anchoring points and reinforcements.

Tightening torque: 50 Nm

The fixed couplers comply with European standard EN 74-1.

8.14.1 PIPE	CODE	SIZE (cm)	WEIGHT (kg)
	M.612.048.600	600	21,00
	M.612.048.500	500	17,50
	M.612.048.400	400	14,00
	M.612.048.300	300	10,50
	M.612.048.200	200	7,00
	M.612.048.100	100	3,50

8.14.2 FIXING APPARATUS	CODE	SIZE (cm)	WEIGHT (kg)
	M.654.000.075	75	3,50

8.14.3 SPIGOT WITH COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	T.653.048.150	Ø48	1,10

8.14.4 ADJUSTMENT WITH COUPLER	CODE	SIZE (cm)	WEIGHT (kg)
	M.610.038.100	100	4,80
	M.610.038.070	70	3,60
	M.610.038.050	50	2,80

8.14.5 FIXED COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	M.641.048.048	Ø48-Ø48	1,00

8.14.6 SWIVEL COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	M.642.048.048	Ø48-Ø48	1,10

8.14.7 GIRDER COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	M.645.048.000	Ø48	1,40

8.14.8 ROSETTE CLAMP	CODE	SIZE (mm)	WEIGHT (kg)
	T.650.125.000	Ø125	1,20

8.14.9 HORIZONTAL ROSETTE CLAMP	CODE	SIZE (mm)	WEIGHT (kg)
	T.651.048.000	Ø48	1,20

8.14.10 DOUBLE LEDGER END	CODE	SIZE (cm)	WEIGHT (kg)
	T.652.048.048	10	1,10

8.14.11 VERTICAL LEDGER END	CODE	SIZE (cm)	WEIGHT (kg)
	T.648.048.048	10	1,10

8.14.12 HORIZONTAL LEDGER END	CODE	SIZE (cm)	WEIGHT (kg)
	T.649.048.048	10	1,10

8.14.13 FIXING PIN	CODE	SIZE (mm)	WEIGHT (kg)
	T.657.010.010	Ø10	0,20

8.14.14 PIN	CODE	SIZE (mm)	WEIGHT (kg)
	T.656.006.010	Ø10	0,10

8.14.15 PUTLOG COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	T.647.048.000	Ø48	0,70

8.14.16 SLEEVE COUPLER	CODE	SIZE (mm)	WEIGHT (kg)
	T.646.048.048	Ø48-Ø48	1,00

8.14.17 INNER JOINT COUPLER	CODE	SIZE (cm)	WEIGHT (kg)
	T.646.038.150	15	0,70

8.14.18 STEEL LATTICE GIRDER	CODE	SIZE (cm)	WEIGHT (kg)
	T.659.038.500	50	3,40

8.14.19 SPIGOT	CODE	SIZE (cm)	WEIGHT (kg)
	T.658.038.150	15	0,30

8.15.1 CONTAINER	CODE	SIZE (cm)	WEIGHT (kg)
	T.661.080.125	80x130	60,0
8.15.2 OPEN BOX-S	**CODE**	**SIZE (cm)**	**WEIGHT (kg)**
	M.663.105.125	115x140x90	44,0
8.15.3 OPEN BOX-L	**CODE**	**SIZE (cm)**	**WEIGHT (kg)**
	M.664.105.125	115x140x130	46,0
8.15.4 CLOSED BOX-S	**CODE**	**SIZE (cm)**	**WEIGHT (kg)**
	M.665.105.125	115x140x90	60,0
8.15.5 CLOSED BOX-L	**CODE**	**SIZE (cm)**	**WEIGHT (kg)**
	M.666.105.125	115x140X130	62,0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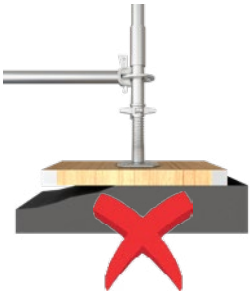
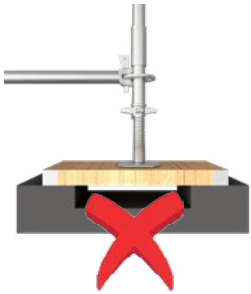
9. INSTALLATION STEPS

9.1 WOODEN PLANKS

Wooden planks transfer scaffolding loads from vertical, horizontal and diagonal members as well as from the base adjustment to the ground. They prevent the scaffolding from sinking and slipping.

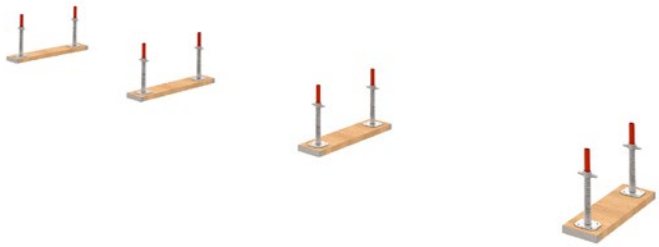
For damaged and soft ground, larger base planks should be preferred. When applicable, long base planks extending along two vertical posts can also be used.



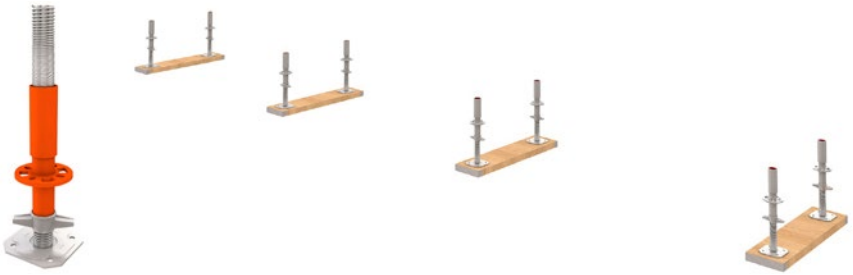


CONSIDERATIONS FOR WOODEN PLANKS INSTALLATION

Wooden planks must be placed on a levelled surface. This prevents the scaffolding from sinking and shifting. Wooden planks should not be placed on surfaces with cavities. Unstable and waste materials such as bricks, stones, and pieces of wood should not be used under starting member. These materials can easily break and crumble when subjected to the weight of the scaffolding. There should be no cavities or holes under wooden planks.



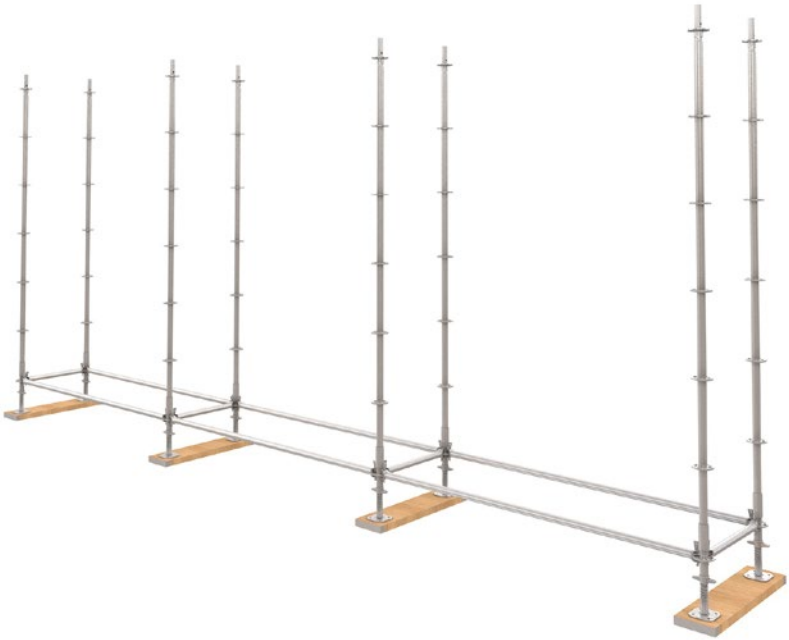
9.1.1 The ground to be scaffolded is leveled, if possible, leveling concrete is poured. Base adjustments are placed on wedges and placed at the points specified in the project.



9.1.2 Starting members are mounted on the base adjustments.

9.1.3 Horizontal braces are attached to the flanges on the starting members.

9.1.4 The scaffolding is taken to the scale and the system is brought to the square.



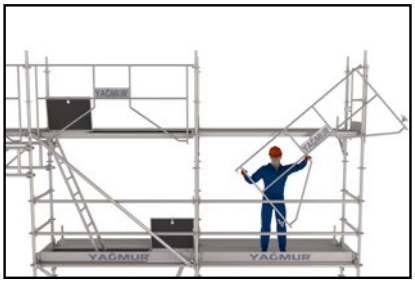
9.1.5 Vertical braces are mounted on the starting members.

9.1.6 Horizontal and diagonal braces are mounted on vertical braces.

9.1.7 Steel decks and steel access deck with ladder are mounted and locked on horizontal braces. The ladder leads to the next floor. A safe working area is created by installing steel toe boards and horizontal braces.

9.1.8 The scaffolding is anchored to the wall with the wall connection kit. These processes are repeated and the installation of the multidirectional scaffolding system is completed.

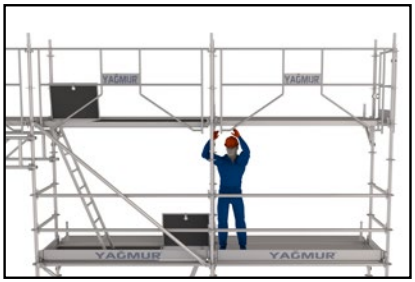
9.2 SAFE INSTALLATION STEPS FOR THE REAR GUARDRAIL



9.2.1

9.2.1 After the scaffolding installation of the first level is completed, the installation of the second level begins.

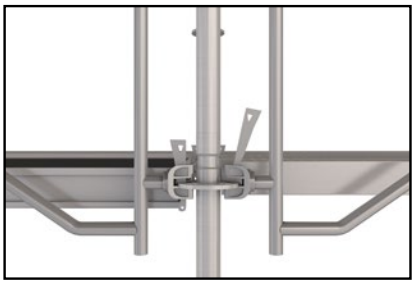
The pin located at the end of the rear guardrail is inserted into the flange positioned at the 3 m level from the first level.



9.2.2

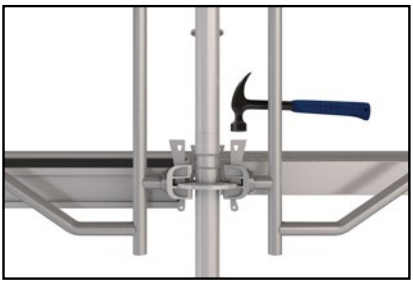
9.2.2 Then, the other end of the rear guardrail is lifted and the pin at its end is inserted into the flange at the same level.

Once all the rear guardrails are installed, workers can ascend to the upper level.



9.2.3

9.2.3 The ledger ends located at the bottom of the guardrails are attached to the flange at the 2 m level.



9.2.4

9.2.4 The wedges of the ledger ends are hammered in and the installation of the rear guardrails is completed.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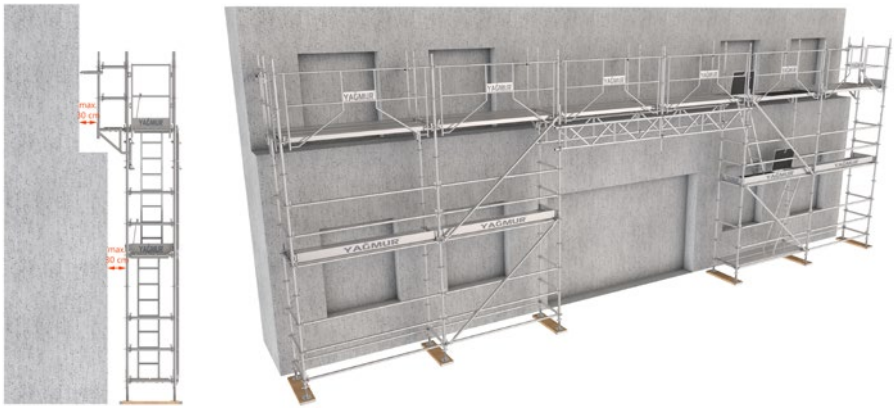
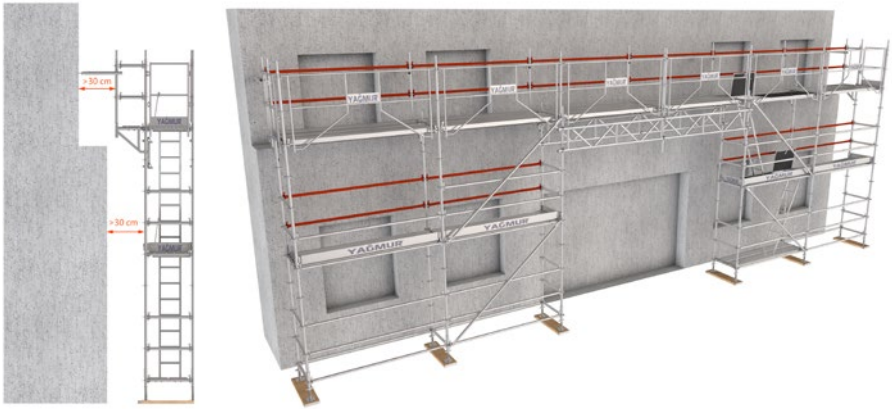
9.2 THE DISTANCE BETWEEN THE SCAFFOLDING AND THE FACADE



In the cases where the scaffolding extends a maximum of 30 cm from the facade, there is no need for a guardrail at the front.



If the scaffolding extends more than 30 cm from the facade, a guardrail is required at the front.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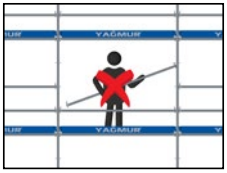
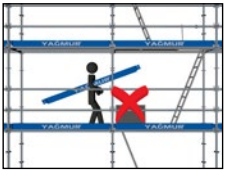
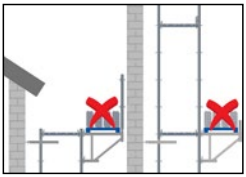
9.4 GENERAL WARNINGS



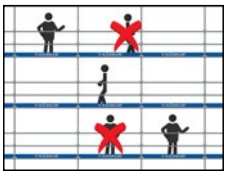
Any changes to the scaffolding should be carried out by installation specialists.



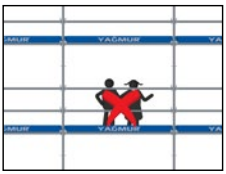
Don’t leave the trapdoors open when not in use.



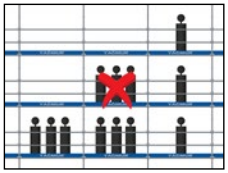
No materials must be placed on the working areas supported by the consoles.



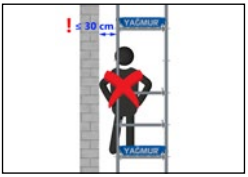
No worker must be positioned above or below another worker on the same line.



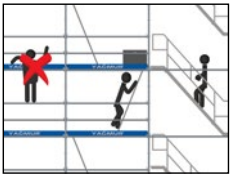
Children must be kept away from the scaffolding.



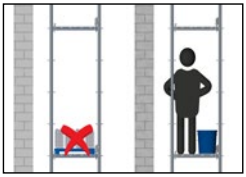
The load applied on the same vertical line of the scaffolding must not exceed the calculated load.



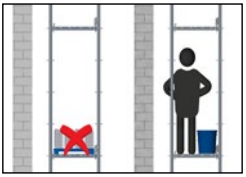
The gap between the facade and the scaffolding should not exceed 30 cm.



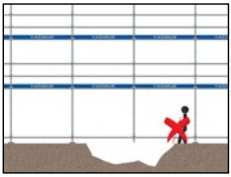
Transition between floor levels should only be carried out via the ladder.



Don’t fill the entire working area with materials.



Don’t jump on the scaffolding.



Do not carry out excavation work under the scaffolding.

10. GENERAL WARNINGS

The rear and end guardrails or the horizontal braces installed at 50 cm and 100 cm used in our scaffolding system, are all members of fall preventing system. When the scaffolding extends more than 30 cm from the facade, full safety is ensured by the guardrails provided at the front of the scaffolding.

By using toe boards, the risk of materials falling is also prevented.

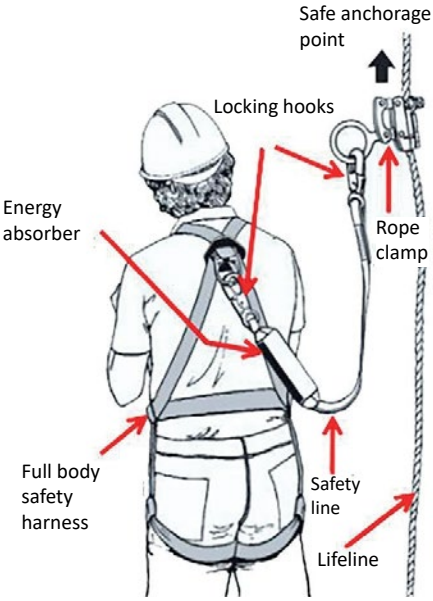
The locking mechanism located under the steel decks provides stability and the vertical access safety of the decks with ladder provides the necessary equipment to prevent falls.

Some Warning and PPE Usage Signs

The Regulation on the Use of Personal Protective Equipment (PPE) in Workplaces, which is based on Article 30 of the Occupational Health and Safety Law No. 6331 and Directive 89/656/EEC, applies to workplaces classified as industrial and within the scope of the Labour Law.

PPE (Personal Protective Equipment) are wearable or attachable devices designed to protect workers against work-related risks, ensure their safety and health, and improve existing working conditions.

10.1 PERSONAL PROTECTIVE EQUIPMENT (PPE) AND USAGE

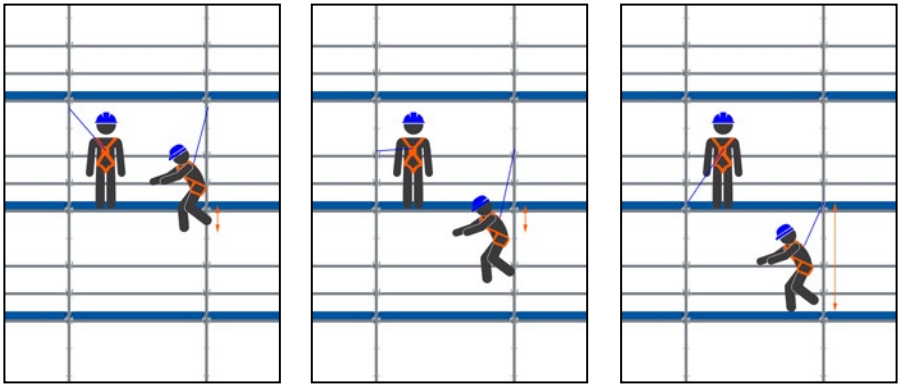


Use of Fall Preventing System

Full Body Safety Harness

- A safety harness must be used for work performed at heights above 1.3 m. The safety harness should be a parachute-type, fully enclosing the body.
- Simply wearing a safety harness does not prevent falls. It must be attached to a secure anchor point.
- Before each use, the harness hook, lanyard and connections should be inspected.
- Damaged safety harnesses should not be used and should be immediately handed over to occupational safety specialist.

10.2 CONNECTION POINTS FOR PERSONAL PROTECTIVE EQUIPMENT AGAINST FALLS



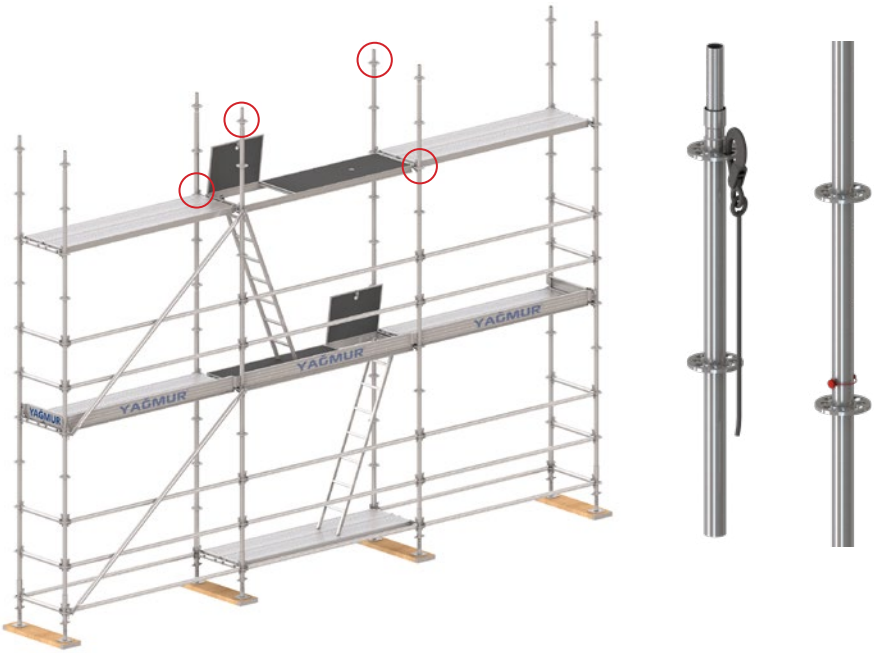
For the fall preventing system, the safe anchor point should be at least 100 cm above the working area. The lower the anchor point is from the working area, the greater the fall distance from the ground. A secure anchoring point is provided by;

- attaching the full body safety harness to the horizontal brace,

- and inserting it into the flange holes on the vertical braces 100 cm and above.

Approved positions, circled in red for flanges;

- The flange must be positioned at least 1.0 m above the floor of the upper level.
- Ensure the vertical brace is connected to the pin located at least 0.50 m below the top floor (to ensure maximum impact capacity at the top of the pin).
- The vertical braces must be secured with a safety pin (see figure on the right).
- Using a free vertical brace as a PPE attachment point is prohibited.
- Authorized points must not be used for lifeline attachment.
- In the event of a fall, components that remain under load must be fully inspected by an authorised person.



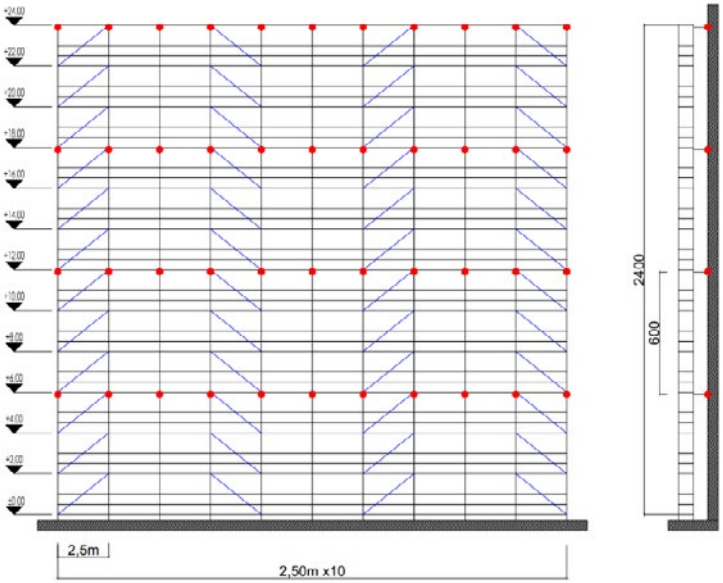
Approved positions for securing on the horizontal braces (red line):

- Connection points used must always comply with local regulations and professional association guidelines.
- Connection points should be positioned as high as possible above the working platform, with a minimum of 1.0 m above the working floor.
- The safety harness hook must be attached to closed ends of the scaffolding elements to prevent detachment. Open sections, such as tube ends, must not be used as harness connection points.
- The use of a safety harness equipped with an energy-absorbing lanyard is only permitted when the vertical distance between the connection point and the ground is at least 5.75 meters.

11. MULTIDIRECTIONAL SCAFFOLDING SYSTEM ANCHORAGE DETAILS

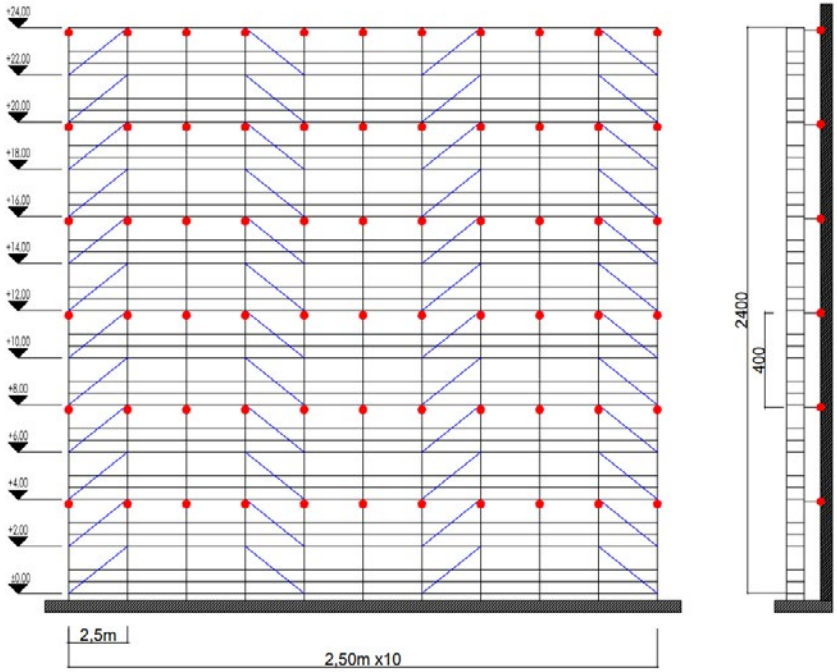
The installation is completed by anchoring the wall connection kit to all of the vertical braces horizontally. And vertically; the scaffolding system has to be anchored with 6 meters intervals in uncovered applications, 4 meters intervals in mesh applications, and 2 meters intervals in tarpaulin applications.

UNCOVERED MULTIDIRECTIONAL SCAFFOLDING ANCHORAGE SYSTEM FOR LOAD CLASS 4



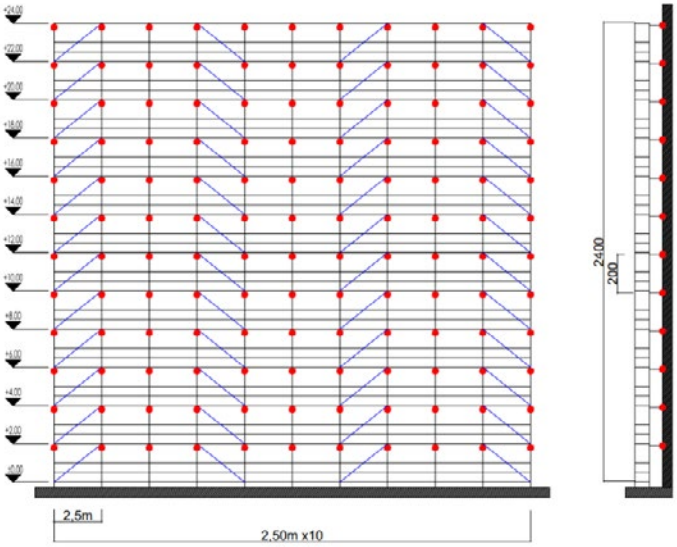
System Width	0.74 m
Height Between Floors	2.00 m
Overall Height	24,00 m
Distance of the Scaffold from the Facade	0.30 m
Applied Load	3,00 kN/m^2
Covering	None
Workable Wind Load	0,2 kN/m^2
Force on Wall Connection from Wind Load	3,33 kN
Force on Base Plate	29,45 kN

ANCHORAGE SYSTEM FOR MULTIDIRECTIONAL SCAFFOLDING COVERED WITH SEMI-PERMEABLE MESH FOR LOAD CLASS 4



System Width	0,74 m
Height Between Floors	2,00 m
Total Height	24,00 m
Distance of the Scaffold from the Facade	0,30m
Applied Load	3,00 kN/m^2
Covering	Semi-Permeable Network
Workable Wind Load	0,2 kN/m^2
Force on Wall Connection from Wind Load	4.61 kN
Force on Base Plate	30,74 kN

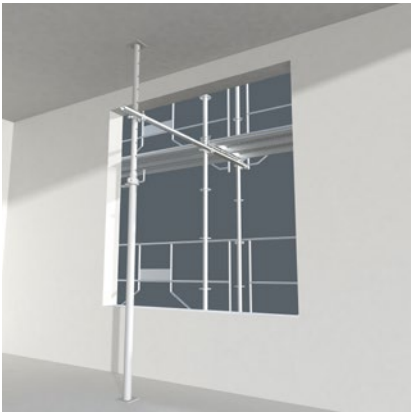
ANCHORAGE SYSTEM FOR MULTIDIRECTIONAL SCAFFOLDING COVERED WITH IMPERMEABLE MESH FOR LOAD CLASS 4



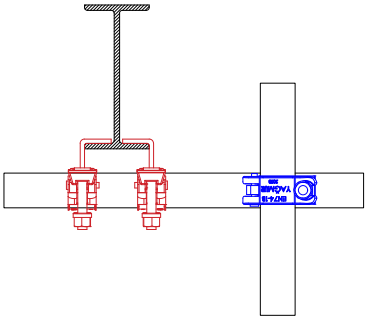
System Width	0,74 m
Height Between Floors	2,00 m
Total Height	24,00 m
Distance of the Scaffold from the Facade	0,30m
Applied Load	3,00 kN/m^2
Coating	Impervious Coating
Workable Wind Load	0,2 kN/m^2
Force on Wall Connection from Wind Load	7,32 kN
Force on Base Plate	30,67 kN

Wall connection kit and fixed couplers are used to fix the Multidirectional Scaffolding System to the structure. A Ø16 hole with a minimum depth of 7 cm is drilled with a charged hand drill to coincide with the concrete parts of the structure (column, shear wall, beam or slab). An M12 drop-in peg is placed in the hole, the fixing bolt is mounted on the peg. The Z part of the Ø48x3.2 mm pipe welded to the Ø16 transmission rod, is mounted to the fixing bolt and its straight part is connected to the vertical brace with a fixed coupler.

Anchoring in window openings: Inside the building, in the window openings, the telescopic vertical brace is fixed between the ground and the ceiling. The scaffolding and the telescopic vertical brace are then mounted on top of one another by using a pipe and a fixed coupler. Thus, the scaffolding is fixed to the building.



Anchoring to steel profile: Two girder couplers are mounted on the steel profile and a pipe is mounted on the girder coupler. The two vertical braces and the pipe mounted on the girder couplers are fixed to one another by using three fixed couplers and pipes. Thus, the scaffolding is fixed to the building.



Top view

12. DISMANTLING

- Before dismantling, a sufficiently large area is prepared where the materials to be dismantled from the scaffolding can be stacked regularly. The application of the designated area for vehicle entry and exit is checked. Safety measures are taken on the access roads to the stacking area against risks such as material falling, risks arising from work equipment, tripping, etc.
- Warning signs indicating that disassembly has been carried out are hung.
- Before dismantling, it is ensured that critical parts (wall connection, diagonals, buttress, etc.) for the stability of the scaffolding are intact.
- The suitability of the weather conditions for the dismantling process is checked.
- Other materials on the scaffolding decks (work-related building materials, residual materials, etc.) are removed from the scaffolding before dismantling.
- Damaged, unusable materials detected during dismantling are separated from solid materials.
- Protection systems have to be installed against the risk of falling from height. It is ensured that all workers have full body seat belts and related anchorages. Workers are provided with the proper use of full body safety belts in line with the training they receive and are warned not to remove them.
- Attention should be paid to the use of personal protective equipment such as helmets, steel toe shoes, gloves, etc.
- Before dismantling, none of the diagonal braces or supports should be taken from the scaffolding for any reason.
- The scaffolding should be dismantled starting from the top part with a sequence opposite to the assembly steps followed in the installation. The building connections of the scaffolding should be removed after the removal of the decks and in order from top to bottom.
- In the dismantled floor, end guardrails with the steel toe boards in the first stage, anchors in the second stage, horizontal connections and vertical braces in the third stage is done. The dismantling of the decks is done in the fourth stage from downstairs and the floor dismantling is completed. The deck with the ladder should be in the locked position before the dismantling stage.
- If there are coverings such as nets and tarpaulins on the scaffolding surface, the coverings of the dismantled floor are removed before the dismantling.
- The dismantled scaffolding parts should never be thrown down, they should be lowered safely with the help of appropriate equipment (pulley system, elevator, etc.).

13. MULTIDIRECTIONAL SCAFFOLDING ELEMENTS DAMAGE INDICATOR

The fact that the elements of Yağmur multidirectional scaffolding system are not used in the following damage situations is important in terms of the general rigidity of the scaffolding system and occupational safety.

These situations are;

- Deformation of the pipe of the vertical braces, warping and tearing in the flanges,
- Permanent deformation of horizontal and diagonal braces, fracture or cracking of the ledger ends,
- Being a tear on the steel deck, a breakage and bending on the hooks,
- Deformation of the steel deck with the ladder, breakage and bending on the hooks, unstable access deck and failure of the locking systems,
- Damage to the threads of the base adjustments, broken or cracked nut,
- Damage to the threads of the couplers,
- Deformation of the pipes in the wall connection kit, destruction of threaded materials,
- Permanent deformation of the steel toe boards, rupture or tear at the ends,

in such cases, these elements should never be used.

Otherwise, there is a high probability of encountering irreversible accidents, especially in terms of occupational safety.

The elements to be used before installation should be reviewed one by one.

In case of the above reasons or similar destruction, the damaged elements should be replaced with new ones.

After the missing materials and accessories are provided, scaffolding installation should be started.

Never repair permanently deformed materials by welding or straightening.

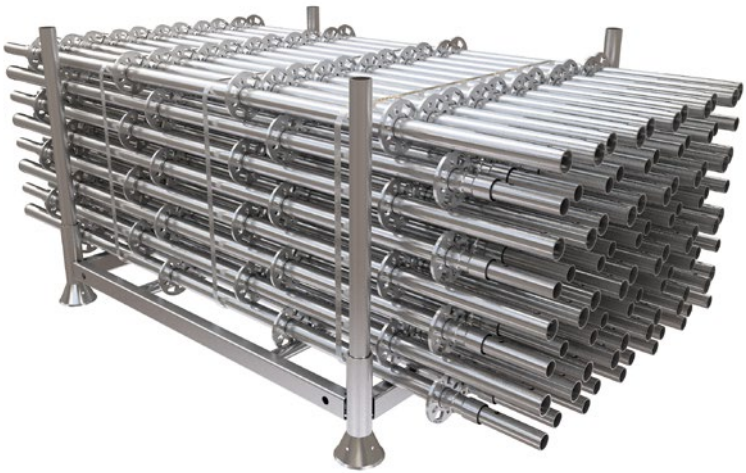
All parts must be sent to the manufacturer for repair; the technical team of Yağmur Scaffolding will decide whether the products can be repaired or not after performing the checks.

Products repaired under the supervision of the technical team will be returned to the customer.

14. MULTIDRIECTIONAL SCAFFOLDING SYSTEM STORAGE INSTRUCTIONS

- Use the containers and open boxes of Yağmur Scaffolding Systems for transportation and storage.
- Containers and open boxes prevent products from deforming during transportation and storage. Since stacking can be done on top of each other, it provides space advantage in storage.

VERTICAL BRACE (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Vertical Brace 300	Open Box-S	88	112	325	90	1214
Vertical Brace 250	Open Box-S	88	112	275	90	1012
Vertical Brace 200	Open Box-S	88	112	225	90	827
Vertical Brace 150	Open Box-S	176	112	325	90	1241
Vertical Brace 100	Open Box-S	176	112	225	90	889
Vertical Brace 50	Open Box-S	264	112	175	90	809



HORIZONTAL BRACE (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Horizontal Brace 300	Open Box-S	150	112	320	90	1349
Horizontal Brace 250	Open Box-S	150	112	270	90	1154
Horizontal Brace 200	Open Box-S	150	112	220	90	959
Horizontal Brace 150	Open Box-S	150	112	170	90	764
Horizontal Brace 140	Open Box-S	150	112	160	90	734
Horizontal Brace 105	Open Box-S	300	112	230	90	1094
Horizontal Brace 75	Open Box-S	300	112	170	90	884

REINFORCED HORIZONTAL (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Reinforced Horizontal 300	Open Box-L	120	112	320	128	1774
Reinforced Horizontal 250	Open Box-L	120	112	270	128	1462
Reinforced Horizontal 200	Open Box-L	120	112	220	128	1162
Reinforced Horizontal 150	Open Box-L	120	112	170	128	874
Reinforced Horizontal 140	Open Box-L	120	112	160	128	814

DIAGONAL BRACE (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Diagonal Brace 365	Open Box-S	150	112	360	90	1484
Diagonal Brace 324	Open Box-S	150	112	320	90	1319
Diagonal Brace 287	Open Box-S	150	112	290	90	1184
Diagonal Brace 254	Open Box-S	150	112	255	90	1124
Diagonal Brace 249	Open Box-S	150	112	250	90	1034
Diagonal Brace 231	Open Box-S	150	112	235	90	959
Diagonal Brace 219	Open Box-S	150	112	220	90	914

STEEL DECK (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Steel Deck 300	Open Box-L	48	112	320	128	996
Steel Deck 250	Open Box-L	48	112	270	128	862
Steel Deck 200	Open Box-L	48	112	220	128	728
Steel Deck 150	Open Box-L	48	112	170	128	584
Steel Deck 140	Open Box-L	48	112	160	128	550
Steel Deck 105	Open Box-L	96	112	230	128	862
Steel Deck 75	Open Box-L	96	112	170	128	728

DECK WITH LADDER (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Deck With Ladder 300	Open Box-L	20	112	320	128	576
Deck With Ladder 250	Open Box-L	20	112	270	128	496
Deck With Ladder 200	Open Box-L	20	112	220	128	436

STEEL TOE BOARD (cm)	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Steel Toe Board 300	Open Box-L	222	112	320	128	1489
Steel Toe Board 250	Open Box-L	222	112	270	128	1267
Steel Toe Board 200	Open Box-L	222	112	220	128	1045
Steel Toe Board 150	Open Box-L	222	112	170	128	823
Steel Toe Board 140	Open Box-L	222	112	160	128	779
Steel Toe Board 105	Open Box-L	444	112	230	128	1245
Steel Toe Board 75	Open Box-L	444	112	170	128	978

REAR GUARDRAIL (cm)	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Rear Guardrail 300	45	123	305	135	774
Rear Guardrail 250	45	123	255	135	707
Rear Guardrail 200	45	123	205	135	621
Rear Guardrail 150	45	123	155	135	500

PRODUCT NAME	PACKAGE TYPE	QUANTITY	WIDTH (cm)	LENGTH (cm)	HEIGHT (cm)	WEIGHT (kg)
Fixed Coupler	Container	700	75	127	83	760
Swivel Coupler	Container	700	75	127	83	830
Starting Member	Container	200	75	127	83	380
Base Adjustment 50 cm	Container	120	75	127	83	468
Base Adjustment 70 cm	Container	80	75	127	83	396
Base Adjustment 100 cm	Container	65	75	127	83	411
Galvanized Pipe 100 cm	Container	175	75	127	83	673
Wall Connection Pipe 40 cm	Container	355	75	127	83	681
Wall Connection Pipe 50 cm	Container	265	75	127	83	617
Wall Connection Pipe 60 cm	Container	265	75	127	83	709
Wall Connection Pipe 80 cm	Container	155	75	127	83	548
Wall Connection Pipe 100 cm	Container	155	75	127	83	657

YAĞMUR®
SCAFFOLDING SYSTEMS

FACTORY - 1
OSB Mahallesi
5. Cadde No: 10 / 2
Dilovası / Kocaeli / TÜRKİYE

FACTORY - 2
Barış Mahallesi
Koşuyolu Caddesi No: 19
Gebze / Kocaeli

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