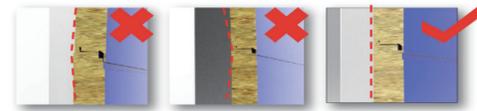


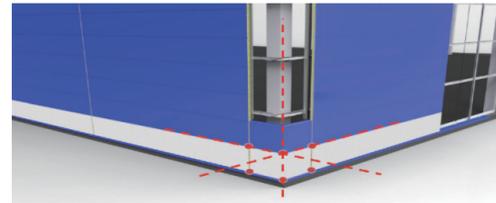
Precautions for wall panel installation:
When installing the wall panel, confirm the position to make sure that the upper and lower panels are spliced vertically. The sandwich panels shall be installed by natural falling.



The recess or convex along the wall panel joint may cause deformation of steel sheet at the splice interface.
The general causes may be that the purline is not perpendicular, or has great error, or that the wall panels tilt during installation.

6. Installation of corner panels

- The length of the corner panel shall be trimmed after the wall panels on both sides are installed to offset the installation error.
- During the installation of corner panels, it should be noted that the end panels on both sides and corner point shall be aligned on the same line. The panels shall be installed vertically.

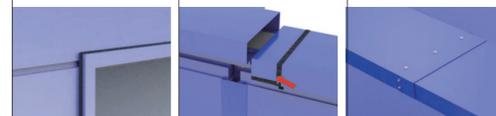


7. Doors, windows and parapet curbing

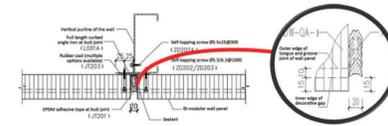
- Larrier shall be set at curbing of upper side of window, with a $\Phi 10\text{mm}$ drip hole opened @500mm.
- The curbing should be neat, and cut without blur, residues shall be cleaned timely to avoid rusting.
- The curbing of parapet coping greatly affected by wind pressure shall be fixed with nailing.



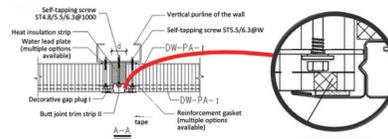
- Before applying the curbing sealant, make sure the applying surface is clean. The sealant shall be applied full ensuring neat appearance.
- Lap sealing with butyl sealant tape shall be firm and tight, with lap length < 100 mm.
- The lap joint shall be parallel with prevailing wind direction; pulling rivet shall be installed @60~80mm of the butyl sealant tape.



8. Construction of U-shaped decorative gap

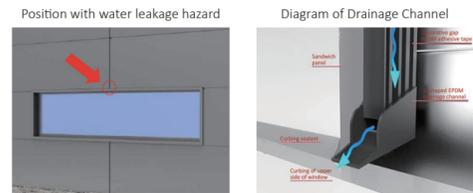


A: Sealant tape shall be provided around four-side-tongue-and-groove panel to the same depth with the decorative gap.



B: The sealant tapes on two sides of the U-groove of the two-side-tongue-and-groove panel are about 3-5mm from the flange cover.

Waterproof measures shall be provided on interfaces between bi-modular wall panel with window or decorative gap.



U-shaped EPDM drainage channel shall be installed before the decorative gap adhesive tape, and sealant shall be applied before installing the channel.

9. After completion, site cleaning and finished product protection



Project photo - contaminated board



- The butyl sealant tape will be applied on both sides of the U-groove about 3-5mm from the edges to avoid extrusion swell of butyl sealant out of the wall surface in high temperature.
- EPDM tape, polyethylene foam E-shaped sealing strip may be applied on both sides of the U-groove for sealing according to the actual condition.

Project photo - staggered panel joint



The flatness of purline can affect the overall appearance.

Project photo - depression at the nailing position



The self-tapping screw shall be driven in the sandwich panel with proper force to avoid depression caused by excessive force.

Project photo - ineffective self-tapping screw



At least 3 threads shall be exposed from the bearing surface.

Instruction for Panel Use

In order to ensure the quality of DUOWEI panel and use effect, please read this instruction carefully and follow strictly, to avoid delay of construction period and other losses caused by panel damage after real rights transfer.

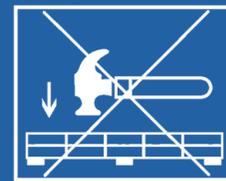
- Transportation and Handling
 - Please pay attention to personnel safety during transportation and handling.
 - During transportation, ensure that the panels are fixed reliably and free from looseness, heavy objects and sharp objects.
 - Please handle with care when unloading and handling panels. No hauling or trampling on panel surface. Do not use hard tools to touch, smash or damage the panel surface and core material.
 - Be careful when unloading or lifting with crane; The contact surface between lifting appliance and panel shall be protected with a cushion block to prevent panel damage; Panels longer than 5 meters must be lifted with lifting frame.
 - When forklift is used for unloading, soft materials shall be placed on the fork to prevent scratching or damaging the panel surface. For panels longer than 8 meters, two forklifts are required for unloading with the help of bridging piece.

II. Panel Storage

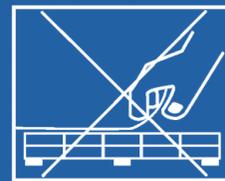
- The storage area shall be solid and smooth; The height of stacking in bulk shall not be greater than 1.5m, and the stacking in complete package shall not exceed 2 stacks or not higher than 2.4m.
- The stored panels shall be isolated from the ground by cushion blocks with spacing not be more than 2m. Ultra-hard or ultra-soft materials shall not be used for the cushion blocks, to prevent the panels from being damaged by ultra-hard materials or the stacks from collapsing caused by ultra-soft materials. It is recommended to use 16kgEPS plates.
- The place for stacking storage should be away from light, dry, cool and ventilated; countermeasures against rain, snow and sun exposure shall be taken for outdoor storage.
- No exposure to or storage adjacent to chemical materials, drugs.
- If disassembling or replacement is required, please pay attention to the surface protection of disassembled panels. If stacking is required, panels to be stacked shall be clean and free of hard objects, and stacked as per the order of products arrival, so as to avoid quality disputes.

III. Installation of Panels

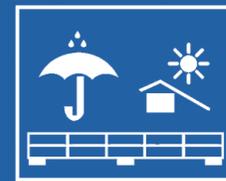
- Do not tear off or damage the protective film before proper installation, to avoid damage to the panel surface. After installation, the protective film should be torn off in time (≤ 30 days), otherwise, the residual glue on the surface will affect the appearance.
- During installation, do not use sharp tools to avoid scratching on the panel surface. Protection measures should be taken when cutting on site, to avoid iron chips splashing on the steel sheet, causing corrosion and rust of the panel surface.
- During installation, the dirt, screws, rivets, etc. left on the panel surface shall be cleaned in time to prevent the surface rusting due to dampness of the residues.



No Hard Objects



No Dragging



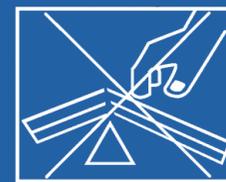
Storage Protection Needed



No Trampling



No Pushing



No Random Stacking



Headquarters address: Building 14, Zone 16, Headquarters Base, No. 188 South 4th Ring West Road, Fengtai District, Beijing

Service hotline: 400-650-5186

E-mail: info@duowei.net.cn

Website: www.duowei.net.cn

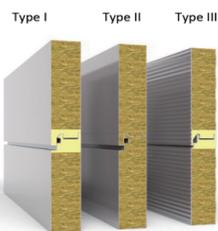
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Notes

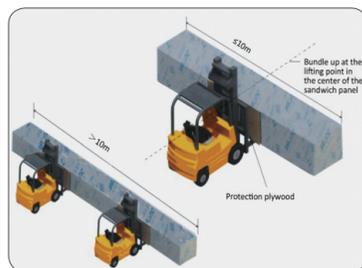
- This installation guide is a recommended document provided by DUOWEI Union Group Co., Ltd. to provide guidance in installation of metal curtain wall sandwich panels for users and their installers.
- This installation guide briefly introduces the materials, accessories, tools and machinery needed in the construction of metal curtain wall sandwich panels, and notes for attention.
- This installation guide only provides instructions and guidances for common issues of metal sandwich panel installation. In case of any substantive conflict between the actual situation and this installation guide, communication with the technical director of the project is required for confirmation. Construction personnel shall also follow the actual layout drawing of project technicians, construction milestones and technical disclosure.
- In case of omissions or mistakes in this installation guide, your comments are welcome.

Introduction of metal sandwich panel types

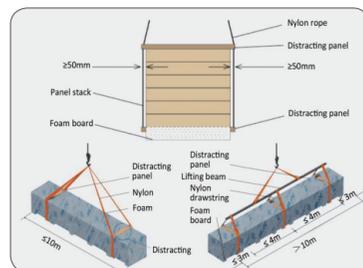
- Type I and Type III are with PU side seals
- Type II is pure rock wool
- Decorative gap options: 0mm / 10mm / 20mm
- Considering the color difference of color coated coil, one-time purchase of coils for external wall or preparation of coil for the same wall is recommended.
- Recommended coil thicknesses for different panels: flat (0.7mm-0.8mm) ; wave, square wave (0.5mm-0.7mm); embossed (0.5mm-0.6mm)



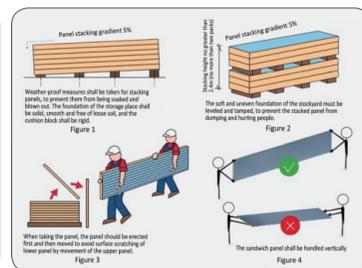
When forklift is used on site



When crane is used on site



Site storage and handling



Re-test of the previous procedure before installation

Steel structure installation shall meet the relevant acceptance standards in Code for Acceptance of Construction Quality of Steel Structures (GB50205-2017):

S/N	Item	Allowable deviation(mm)	Remarks
1	Purline flatness	H/1000 and not greater than 10.0	Refers to Standards for Acceptance of Construction Quality of Steel Structure Works (GB50205-2017)
2	Purline straightness	H/1000 and not greater than 10.0	
3	Purline torsion	H/1000 and not greater than 15.0	
4	Purline spacing	±5	
5	Perpendicularity of corrugated line of interior wall panel	H/800 and not greater than 25.0	
6	Perpendicularity of corner wall panel	H/800 and not greater than 25.0	
7	Perpendicularity of corrugated line of roofing contour plate to the ridge	H/800 and not greater than 25.0	
8	Parallelism between cornice and ridge	12.0	

Material and machinery preparation before installation

Installation of auxiliary material and construction tools

- Auxiliary materials for installation directly affect the safety, practicability and durability of metal sandwich panel curtain wall installation, so it is a must to purchase materials meeting the requirements of national standard.
- For items requiring "FM Approvals", material purchase shall meet requirements of "FM approval".



Material mobilization acceptance, unloading, storage, handling



Brick wall construction affecting the installation of metal sandwich panel curtain wall shall meet the relevant acceptance standards in Code for Acceptance of Constructional Quality of Masonry Structures (GB50203-2011).

S/N	Item	Allowable deviation(mm)	Inspection Method
1	Axis displacement	10	Inspection with ruler
2	Perpendicularity	3m or below: 5 Greater than 3m: 10	Inspection with 2m plumb ruler and bob or drop cord and ruler
3	Surface flatness	8	Inspect with 2m guiding rule and wedge-shaped feeler gauge
4	Width and the height of the door and window openings (frame erection after brickwork)	±5	Inspection with a ruler
5	Displacement of upper and lower window openings of external walls	20	Inspection with theodolite or suspension wire

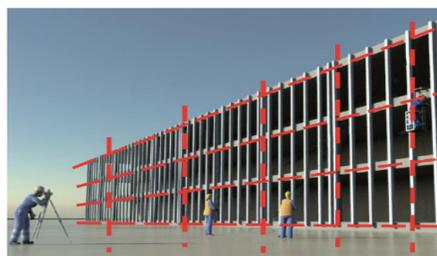
Concrete wall construction affecting the installation of metal sandwich panel curtain wall shall meet the relevant acceptance standards in Code for Quality Acceptance of Concrete Structure Construction (GB50204-2015).

S/N	Item	Allowable deviation(mm)	Inspection Method
1	Axis displacement	8	Inspection with ruler
2	Perpendicularity	6m or below: 10mm Greater than 6m: 12	Inspect with theodolite or drop cord and ruler
3	Surface flatness	8	Inspection with a ruler
4	Sectional dimensions	+10,-5	Inspection with a ruler
5	Elevation	Floor height ±10 Full height ±30	Check with level or drawn wire or ruler

Before wall panel installation, retest the installation dimension of wall keel

- Purline perpendicularity error > 10mm (theodolite)
- Purline surface overall flatness ±3mm (drawn steel wire)
- Deflection of purline to positioning axis ±3mm (steel ruler)

The installation accuracy of purline is strictly required to ensure the flatness of wall surface.



Common defects in wall panel installation:

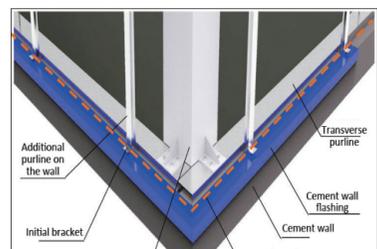


Installation process

Precautions before wall panel installation:

- When moving the sandwich panel, protection measures shall be taken. Special attention shall be paid to the upper and lower tongue and groove, which is the most fragile part. Excessive force on the inner steel sheet or outer steel sheet is forbidden during handling to prevent rock wool and steel sheet from peeling and deforming.
- Check the overall flatness of the wall panel for any deformation and edge warping in the upper and lower tongue and groove. If there is a problem with the panel surface, it should be adjusted and repaired first. If it cannot be repaired, the panel should be replaced. During handling, the wall panel should be maintained vertical, because when transporting the wall panel horizontally, the panel surface may be deformed due to deflection.
- Main installation tools shall be ready before the project starts. Other tools or machines as required according to the construction characteristics shall also be ready. Safety protection measures shall be taken before construction of project.

1. Elevation control line, corner paying off and positioning



- Determine the initial elevation of wall panel by using level and site locating points.
- The angle of intersection of different walls of building shall be closed.
- Install wall flashing and initial bracket on the wall according to the initial elevation.

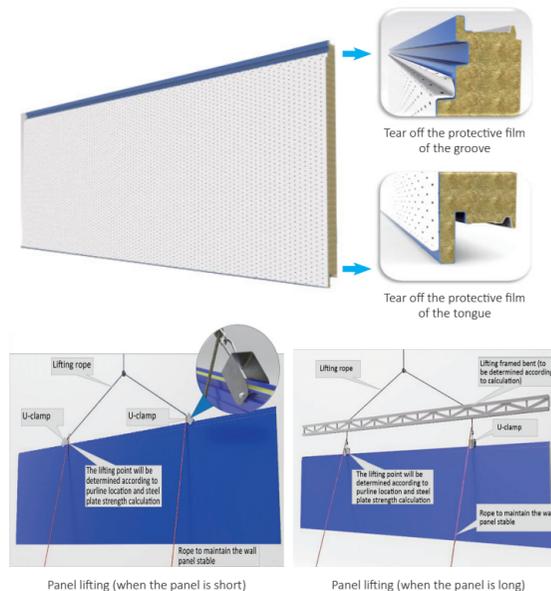
1.1: Wall sandwich panel initial bracket:

- bracket thickness: 2mm, material Q345B, mass of Zn coat 275g/m².
- Adjust the mold according to panel thickness.



2. Preparation before installation of the first wall panel

To prevent the contamination of the panel surface, for the initial panel, only the protective film that affects the tongue and groove match position need to be torn off. The durability of the protective film is considered to be one month, and all the protective films must be removed within one month.



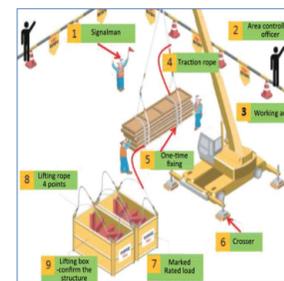
Recommendation on lifting rope:



Drilling standard
Thickness: above 1cm; spacing: above 3.5cm

Safety rules for lifting work (only for reference, adjustment according to actual situation is required)

- A signalman is required.
- Controlling officer shall be provided in working area (with loudspeakers/whistles)
- Safe working area shall be set (no access without authorization)
- Traction rope (one on each end)
- First fix the panel to be lifted - adopt different lifting methods according to different material length - adopt different lifting methods according to material shape
- A cushion timber must be provided below the leg of the crane extending out with the maximum length; lifting specifications must be followed.
- Rated load must be marked on the lifting box
- Lifting rope fixing -lifting box (4 fixing points) - strip material (≥2 fixing points)



3. Installation of the first wall panel

Safety precautions:
[External wall panel installation and external wall operation]

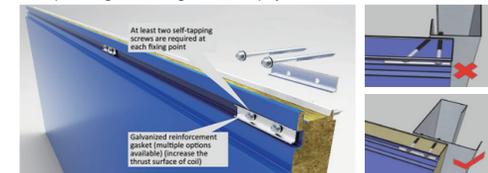
- Main rope and auxiliary rope shall be used
Main rope: Above φ22mm
Auxiliary rope: Above φ16mm
- Safety hooks shall be provided for lifting basket and arm
- The main rope and auxiliary rope shall be fixed twice
- Construction personnel shall use safety catcher
- Anti-overlift measures shall be taken
- Safety check before installation

Construction precautions:

- Lower the wall panel on the initial bracket to make the panel tongue fit in the groove.
- Provide strutting piece to fix the wall panel together with the self-tapping screws.
- When the fixing the self-tapping screws, the strength should be controlled by the strutting piece and hand feeling, and the strength should be moderate. Excessive force will cause depression on panel, and understrength will cause insufficient fixing.

3.1: Wall panel fastening fixture

Whether reinforcement gaskets are required should be determined through calculation by the designer according to the actual project.



3.2: Sandwich panel installation and construction personnel should be trained before work to avoid nailing defects.

- Common defects are as follows:
- Biased or inclined self-tapping screws, causing the screws unevenly stressed. This may cause breaking of self-tapping screws. The screw shall drill through the purline vertically.
 - Self-tapping screws omission. The screws shall be provided as per the designed number of screws at the fixing point. At least two self-tapping screws are required at each fixing point.
 - Improper length of self-tapping screw caused ineffective fixing. At least 3 threads shall be exposed.
 - Excessive force used on self-tapping screw caused depression, affecting the overall appearance. Proper force is required.
 - The contact surface between the sandwich panel and purline < 50mm. Screws are ≥15mm away from the edge, the screw spacing is ≥20mm.

4. Installation of adjacent panels

- Install the initial wall panels of adjacent spans according to construction schedule requirements.
- When installing wall panels in adjacent spans, the panel joint size shall be controlled.

5. Installation of upper panels in sequence

During the installation of wall panel, the flatness and perpendicularity should be re-measured every 5-10 panels, and ensure that the horizontal joints of panels in adjacent spans are not staggered and the vertical joints are straight. When measuring perpendicularity, it should be measured from the lowest control point to the top.

- If the vertical butt joint is an outer U-shaped groove decorative strip, when installing the upper wall panel, the waterproof sealing parts or silica gel shall be applied at the tongue and groove contact areas of the wall panels in advance. If there is no decorative gap at the tongue and groove interface of the wall panel, the waterproof sealing parts should be replaced with butyl adhesive tape, to enhance the waterproofing and sealing performance of the decorative gap.
- Here, the silicone weather-resistant sealant can also be used for filling and blocking treatment, and the duck-neck shaped waterproof sealing piece can increase the sealing performance of the gap.