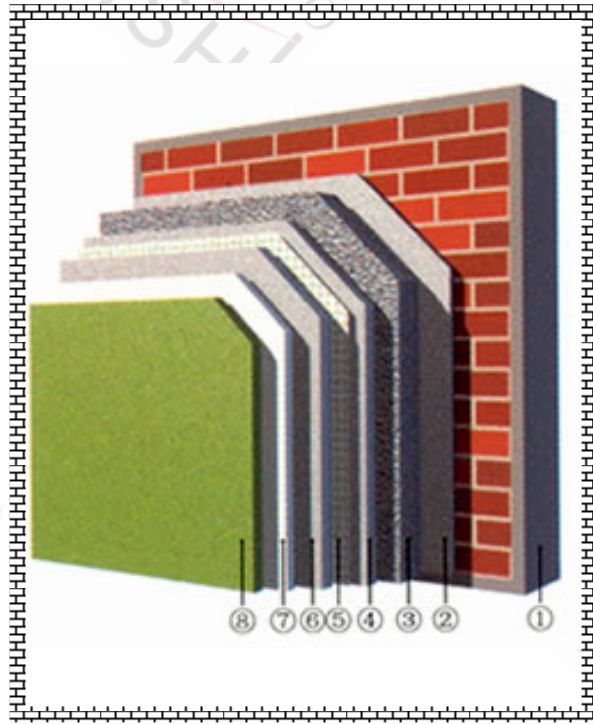


## Exterior Insulation Wall Decorated with Adhesive Polystyrene Granule

### Construction Scheme

胶粉聚苯颗粒面砖饰面外墙外保温施工方案



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## ONE Reference

- 1、 Selected Costruction Products  
《建筑产品优选集》(2001YJ114)
- 2、 Methods of Adhesive Polystyrene Granule for Exterior wall Insulation  
《胶粉聚苯颗粒保温材料外墙外保温工法》(YJGF41-2000)
- 3、 Guides for Decorated Construction Quality Inspections.  
《建筑装饰装修工程质量验收规范》(GB50210-2001)
- 4、 Guides for Exterior Insulation Wall Construction  
《外墙外保温施工技术规程》DBJ/T01-50-2002
- 5、 System Exterior Insulation Wall with Adhesive Polystyrene Granule  
《胶粉聚苯颗粒外墙外保温系统》(JG 158-2004)

## TWO Project General Situation

Omit (According to specific Project)

## THREE Project Organized Arrangement

Item Organization , Item Manager

Construction site Charge

Quality Inspector , Technician, Safety Controller

## FOUR Preparations Before Project Construction

- 1、 Sole contractor or Owner should offer the construction detailed requirements & technical data presentation.
  - 2、 Before making exterior insulation, some areas' degree of plainness exceeds 10mm, such areas should be eliminated by the owner or sole contractor, who should make sure the completion of base course wall processing, and exterior wall would be level up, smooth, free of blot, no crack, vertical(线角顺直)、solid and completely dry, that will contribute to insulation quality.
  - 3、 Any adjustments occurred during the constructing period, the owner or sole contractor should delivery the written discussion in shortest time, to help the duly correction and avoid unnecessary loss.
  - 4、 Due to the sole contractor & bad weather or any other force majeure, the caused delay should be confirmed by written notice in time, and meanwhile adjust the schedule.
  - 5、 Supply the auxiliary facilities such as water supply, power supply , falsework, nacelle, storehouse  
Workers' dorm and dinner place.
  - 6、 Timely check and accept of every steps of construction which had completed.
  - 7、 Smoothing very step of handover and taking strict measures to prevent mutual pollution to qualify the visual beauty of exterior wall.
  - 8、 Prepared power mortar mixer, vertical transport machine, trolley, portable mixer, bucket , scissors, rolling brush, shovel, broom, hammer, wallpaper knife etc.
- Usual inspecting tools: theodolite, pulling string tools(放线工具)、 board for strings(托线板), ruler, probe(探针), steel rule(钢尺)etc.

## FIVE Exterior Insulation Constriction Condition

- 1、The basic surface of wall must accord with GUIDES FOR CONCRETE STRUCTURE QUALITY INSPECTION (《混凝土结构工程施工质量验收规范》, GB50204-2002和《砌体工程施工质量验收规范》GB50203-2002)
- 2、The base course wall must be free of blot and floating dust, eliminated the infirm & air slaking areas, weeding up the projecting thing equal to or exceeding 10mm. drainpipes & pips for equip (设备洞口管道) should be finished before considering the thickness of the insulation , and rounding areas of the hole should be smoothed by concrete, and all the surface must be dry. All steps should be accorded with the technical standards and construction requirements, and then handover with the sole contractor.
- 3、Double shelf or movable nacelle must be accorded with National Safety Guides, and the distance between the outer shelf and the wall equals to or exceeds 20CM .
- 4、Power supply : 380V、220V on the construction site.
- 5、All the materials that will be mixed round must under a shed to prevent Polystyrene Granule scattered, Other materials on the open air should be covered.
- 6、Polystyrene Granule (聚苯颗粒轻骨料) must be packaged well to prevent broken.
- 7、Doorframe should be covered with sheet iron to prevent damage from loading car.
- 8、The temperature of construction site and surface wall should not under 5℃ , wind power should not exceed grade 5, no rain.

## SIX Material performance & Deposit/Transport Condition

- 1、Solid brand interface cementing main technical performance: it is according with Applied Technique for Building used Interface Adhesive (《建筑用界面处理剂应用技术规程》DBJ/T01-40-1998)

Item	Unit	Performance
Appearance	--	Ivory-white liquid
Interface mortar Original strength	MPa	≥0.70
compressive shear	MPa	≥0.50
Water Proof adhesive strength: Frost Proof	MPa	≥0.50
Remarks: Interface Mortar composite's weight Ratio Solid brand cementing: mid-fine sand: concrete =1: 1: 1, using portable mixer.		

Deposit/Transport Condition: 5~30℃ deposit for 6 months validity, prevent from sunlight, transport as non-dangerous goods.

- 2、Polystyrene Granule main technical performance:

Item	Unit	Performance
Accumulated Density	kg/m <sup>3</sup>	12.0~21.0
Granularity	mm	0.5~5

Deposit/Transport Condition: Prevent Fire, put in shade, no rain or insolate. Prevent crack when transport, It is better to check along with insulation powder granule when delivered.

3、Insulation powder granule main technical performance:

Item	Unit	Performance
Initial Setting time	h	≥4
Final setting time	h	≤12
Invariability	-	Fine
Stretching Adhesive strength	MPa	≥0.6 (Normal Temperature 28 days)

Deposit/Transport Condition: Under dry and ventilated condition have 6 months of validity, can be transport as non-dangerous goods, it is better to check along with Polystyrene Granule when delivered.

4、Latex polystyrene granule thick liquid main technical performance:

Item	Unit	Performance
Wet Apparent Density	Kg/m <sup>3</sup>	≤420
Dry Apparent Density	Kg/m <sup>3</sup>	180-250
Thermal Conductivity	W/M.K	≤0.059
Coefficient of thermal storage	W/M <sup>2</sup> .K	≤0.95
Flame Retardance	-	B <sub>1</sub> Grade
Pressure Resistance	kPa	≥200
Compressive shear adhesive strength	kPa	≥50
Linear shrinkage rate (linear expansion coefficient)	—	≤0.3%
Softening coefficient	—	≥0.7

5、Anti-crack mortar main technical performance:

Item	Unit	Performance	
Ratio between anti-pressure and anti-break★	—	≤3.0	
Working hour	h	≥1.5	
Stretching Adhesive Strength (with cement mortar)	Original strength	MPa	≥0.7
	Water proof	MPa	≥0.5
	During the working hour	MPa	≥0.7

Deposit/Transport Condition: 5~30℃ deposit for 6 months validity, prevent from sunlight, can be transport as non-dangerous goods.

★(压折比)Ratio between anti-pressure and anti-break: Same material's intensity of anti-pressure and anti-break, the ratio of two, it is an important technical specification.

6、Galvanized steel wire mesh technical requirements:

Item	Unit	Performance
Technic	--	Galvanized electric welding wire mesh
Wire Diameter	mm	0.9±0.04
Mesh square	mm	18×18
Melting Joint Tension resistance (焊点抗拉力)	N	>65
Weight of galvanized layer	g/m <sup>2</sup>	≥122

7、Anchor bolt main technical performance:

Plastic expansion anchor bolt usually including bolts and bushing with a disc (带圆盘的塑料膨胀套管), metal bolts usually is stainless or special processed avoiding rust, plastic bolts and bushing(带圆盘的塑料膨胀套管) is made by thermal-conductivity macromolecule plastic material, no using recycled material, the effective length of anchor bolt should over 25mm, and diameter of disc should over 50mm, and bearing weight of every single anchor bolt should over 0.8KN( C25 Concrete).

8、Cement:

Cement: Strength Grade 42.5 common portland cement, and performance accords with PORTLAND CEMENT/COMMON PORTLAND CEMENT(GB175-99). 《硅酸盐水泥、普通硅酸盐水泥》(GB175-99)

9、Medium Sand: According with COMMON CONCRETE SAND QUALITY STANDARD & INSPECTATION (JGJ-92) ,ARTICLE OF Fineness Module, (《普通混凝土砂质量标准及检验方法》JGJ-92) and sediment content less than 3%.

## SEVEN、 MATERIAL COMPOSITION

1、 Mortar composition for construction interface processing usage

The quantity ratio is Solid brand interface cementing: mid-fine sand: cement=1:1:1, using portable puddler to mix round. Firstly adding Solid brand interface cementing and mid-fine sand fully mixed, then adding cement.

2、 Adhesive Polystyrene Granule thermal insulation mortar composition

Opening Mortar mixer firstly, pouring 35-40kg water in it and then pouring a 25kgs bag of adhesive powder to mix round for 3-5min, secondly adding 200L of Polystyrene Granule to fully mix round for 3min, and then the finish of the mortar which must be used up within 4 hours, the mortar should be prepared according to every quantity of usage, Manual mixture is prohibited.

3、 Anti-crack mortar composition

The quantity ratio is : anti-crack mortar dry powder: water =10:3, using the mortar mixer or portable mixer, it should be prepared once and used up within 2 hours, during the usage, no adding water random.

#### 4、 External wall insulation special bonding Mortar composition (保温墙面砖专用粘粘砂浆)

The quantity ratio is : Bonding mortar dry powder: water=10: 2~2.2, using portable mixer to mix round, and the anti-crack mortar should be prepared once and used up within 2 hours, during the usage, no adding water random.

#### 5、 Tile Crack Sealer Composition

The quantity ratio is: Crack adhesive powder : water=10:2.5, using portable mixer to mix round and anti-crack

### EIGHT、 CONSTRUCTION TECHNIC FLOW AND ESSENTIAL POINTS

#### ( I ) CONSTRUCTION TECHNICS FLOW

Material preparation、 Base course wall processing

Composite interface using mortar, brush the base course wall with special interface mortar

Fix bolts, and tail pulled on 2# galvanized lead thread.

(固定带尾孔射钉双向@500, 尾部穿22# 镀锌铅丝)

Compositing adhesive Polystyrene Granule thermal insulation mortar

Hanging vertical, square(套方\*)、 write control line.

square(套方\*) Using the right triangle ruler

Using the insulated mortar to make ash cake(灰饼\*), screed strip(冲筋\*), hammer the L-shape steel sheet to every layer(作口)

(灰饼\*)ash cake: this processing is to control the uprightness and smoothness by make several ash cakes.

(冲筋\*)screed strip: It is a strip made by mortar according to ash cakes, to control the wall uprightness and smoothness.

Plastering insulation mortar (each time the thickness is 20mm, interval 24 hours)

Compositing anti-crack mortar 5days later

Plastering anti-crack mortar

Cut galvanized steel wire, spread and paste, anchoring four angle of the wire to make it more solid to the concrete

Bonding length & flatness check and accept

Plastering anti-crack mortar

Anti-crack protection layer check & accept

Tile decorating layer construction, check & accept

#### ( II ) CONSTRUCTION TECHNICS REMARKS

##### 1、 Base course wall processing

The surface of wall must be free of blot and floating dust, eliminated the infirm & air slaking areas, weeding up the projecting thing equal to or exceeding 10mm.

##### 2、 Interface roughening

To assure the interface mortar fitting to the construction, the ratio between cement and water is 1:1, the use of interface adhesive can be adjusted in order to reach a fine density. Roughening should not be too thick, but be sure every surface of concrete should have roughening.

##### 3、 Hanging vertical, square, write control line, make ash cake, screed strip, hammer the L-shape steel sheet to every layer

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According to the needed insulation thickness, on the top wall (顶部墙面大角处) fixed steel string to hanging vertical. According to vertical control string, make ash cake in the vertical direction, between two ash cakes, make the insulation ash cake, the distance between each one should not exceed 2M. The ash cake could be made by either insulation mortar or wasted polystyrene panel (3cm×3cm) bonding together.

(根据垂直控制通线做垂直方向灰饼, 再根据两垂直方向灰饼之间的通线, 做墙面保温层厚度灰饼, 每灰饼之间的距离(横、竖、斜向)不超过2m。灰饼可用保温浆料做, 也可用废聚苯板裁成3cm×3cm小块粘贴。)

#### 4、Plaster insulation mortar

A professional person should be arranged to mix round the insulation mortar and anti-crack mortar, in order to keep the accuracy ratio for the time and composition. Insulation mortar should be used out within 4 hours.

Adhesive polystyrene granule thermal insulation mortar's fine thickness is about 20mm, for each plastering, the interval should be 24 hours, when temperature is lower, the interval should be longer. Constructing processing should be from the top to bottom, when last plastering, the thickness must reach thickness that can bear ash cake & screed strip, surface of wall must be smooth.

#### 5、Fix, spread and bonding the galvanized steel wire mesh

According to the construction dimension, spread the four-angle wire mesh, the longest length of mesh should not exceed 3m, in order to keep quality of the margin, the steel of each angle should be folded to right-angle before spread. There are more than 3 anchoring bolts on the window areas, and the distance between each bolt is no more than 50CM.

Careful spread the mesh along with its own direction, when using the special anchoring bolts, the plan is showed as **Picture One(Missing)**, each bonding margin between meshes must exceed 40mm, the bonding parts not exceeding 30CM should be tied up by the galvanized lead thread, some unsmooth areas can be adjusted by type -U 12# galvanized lead thread.

#### 6、On the areas of holes to add a strengthening mesh in the direction of 45° (200×300mm), turnover cover mesh is 100 mm.

#### 7、Plastering anti-crack mortar

On the surface of anti-crack mortar, using wood fibered plaster firstly roughing, supply a better interface for next layer, it could be add more density when plaster on the four-angle mesh, finally, make sure smoothness, it will not carry out next steps until this step up to designed strength (about 7 days), some inspector must check and accept this base course. (抗裂砂浆抹灰, 在镀锌钢丝网抹抗裂砂浆面层用木抹子搓毛, 为下一层的连接提供相应的界面。在四角网抹抗裂砂浆应适当增加稠度, 砂子可采用稍粗些的, 抹时要求上杠找平最后可用木抹子搓平, 一直达到设计强度时(大约7天)进行下道工序, 但必须经过有关方面对基层的验收。)

#### 8、Facing Bricks Fix

Fixing the facing bricks may adapt the ordinary methods, using the specialized bricks glue, the ratio as follow for reference, adhesion powder(面砖粘结干粉料) : water = 1:0.2, Tolerance acceptance according to local standards when doing acceptance testing.

## 9、Facing Bricks pointing joint

面砖勾缝

Pointing Joint Adhesive powder mixing with 20-25% water to make the special glue. Sweeping cleanly after the finish, checking the whole surface of wall to make sure the visual beauty.

### NINE、 CONSTRUCTION REMARKS

1、 Essential places inspected & controlled during the construction

1.1 Base course processing requirements: surface cleaned, solid, uniform interface roughening, solid bonding.

1.2 Adhesive polystyrene granule mortar thickness & smoothness requirements: every layers not exceeding 20mm when plaster that mortar, reach the designed thickness, no hollowing & crack, surface smooth, angle/door/window vertical.

1.3 Control the thickness of anti-crack mortar: thickness of anti-crack mortar layer should be 8-10mm, no visible bonding & plastering areas, surface smooth, angle/door/window vertical.

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