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Tile Adhesive Formula (Dry Mix Mortar)

1. Standard Formula (per 1000 kg)

Raw Material	Dosage (kg)	Function
Portland Cement (CEM I 42.5R or 52.5R)	300-420	Main binder / strength
Graded Silica Sand (0.1-0.8 mm)	550-650	Aggregate / structural body
Calcium Carbonate (CaCO ₃)	50-150	Filling / workability
HPMC or MHEC (Cellulose Ether)	2.0-4.0	Water retention / open time
Redispersible Polymer Powder (RDP, VAE)	10-35	Adhesion / flexibility
Gypsum (set regulator)	3-10	Setting time control
Powder Defoamer	0.3-1.0	Air control / density stability
PP Fiber (optional)	0.5-1.5	Crack resistance
Anti-sag agent (optional)	0.2-1.0	Slip resistance improvement
Other additives	1-3	Performance tuning

2. Recommended Performance Version

High-performance Tile Adhesive (C2 TE S1 base)

Raw Material	Dosage (kg)
Cement (42.5R)	380
Silica Sand (well graded)	560
CaCO ₃	80
HPMC (60,000-75,000 mPa·s)	3.0
RDP (VAE, T _g 0-5°C)	28
Gypsum	5
Defoamer	0.6
PP Fiber	1.0
Functional additives	2.4

3. Functional Design Logic (Industry Standard)

3.1 Cement System

- Provides compressive strength and early hydration structure
 - Higher grade cement improves bonding reliability
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3.2 RDP (Redispersible Polymer Powder)

- Main adhesion and flexibility driver
 - Recommended dosage:
 - C1: 8-15 kg
 - C2: 18-35 kg
 - Improves:
 - Bond strength ↑
 - Water resistance ↑
 - Crack resistance ↑
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3.3 HPMC / MHEC

- Controls water retention and workability
 - Prevents:
 - premature drying
 - hollow tiles
 - Recommended dosage: **0.2-0.4%**
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3.4 Sand Gradation (Critical Factor)

Recommended distribution:

- 0.1-0.3 mm → 30%
- 0.3-0.6 mm → 50%
- 0.6-0.8 mm → 20%

Improper grading leads to:

- Sagging
 - Poor trowelability
 - Weak bonding
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4. Performance Targets

Property	Requirement
Adhesion strength (initial)	$\geq 0.5-1.0$ MPa
Water immersion strength	$\geq 0.5-1.0$ MPa
Open time	$\geq 20-30$ min
Slip resistance	≤ 0.5 mm
Adjustability time	≥ 2 hours

5. Common Problems & Solutions

✘ Tile falling off

- Increase RDP dosage
- Check cement quality

✘ Fast drying / poor workability

- Increase HPMC
- Improve sand grading

✘ Slippage during installation

- Reduce fine powder
- Use anti-sag additive

✘ Hollow sound / poor adhesion

- Increase water retention (HPMC quality issue)
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Industrial Recommendation

For stable production:

- Basic C1 adhesive: RDP 10-15 kg
- C2 adhesive: RDP 20-35 kg
- HPMC: 0.25-0.35%
- Sand grading is more important than additive cost optimization