



ELEMENTIS
SPECIALTIES

RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

TINT-AYD®

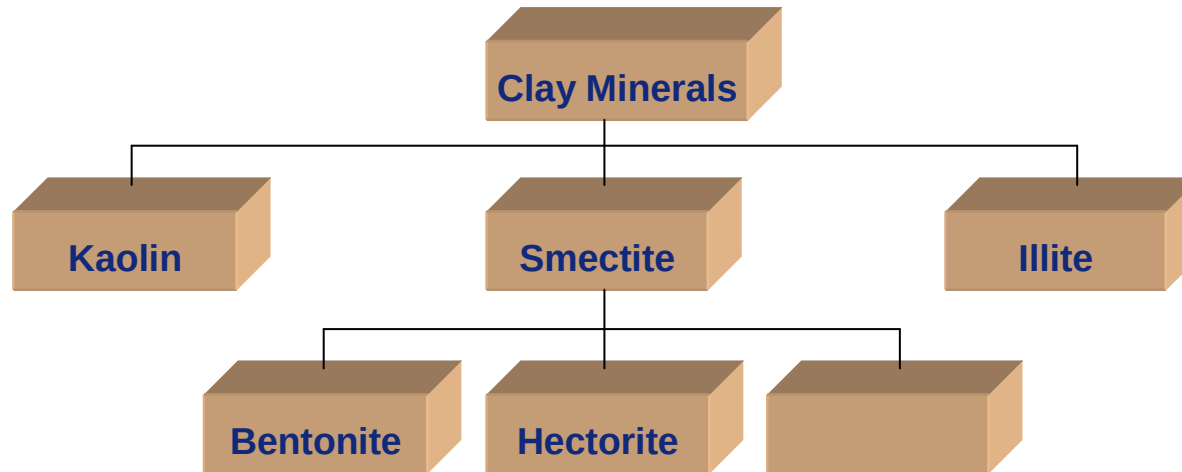
Spray Dried Hectorite Applications

喷雾干燥型锂蒙脱石

What do we know about hectorites ?

/我们了解锂蒙脱石多少？

Smectite clays /绿土



Metal Oxide = Al_2O_3 (Pyrophyllite)

= MgOAl_2O_3 (Montmorillonite = Bentonite)

= MgOLi_2O (Hectorite)

Hectorite / Bentonite 锂蒙脱石/蒙脱石

	Hectorite/锂蒙脱石 [Na-Mg-Li-Silicate]	Bentonite/蒙脱石 [Na-Al-Mg-Silicate]
H ₂ O	12.5	13.7
Colour	cream	green
Platelet shape	elongated	equidimensional
Platelet size	0.08 x 0.8 x 0.001 μ m	0.8 x 0.8 x 0.001 μ m
Swelling ability	24 x	16 x

Hectorite



800 x 80 x 1 nm

Bentonite



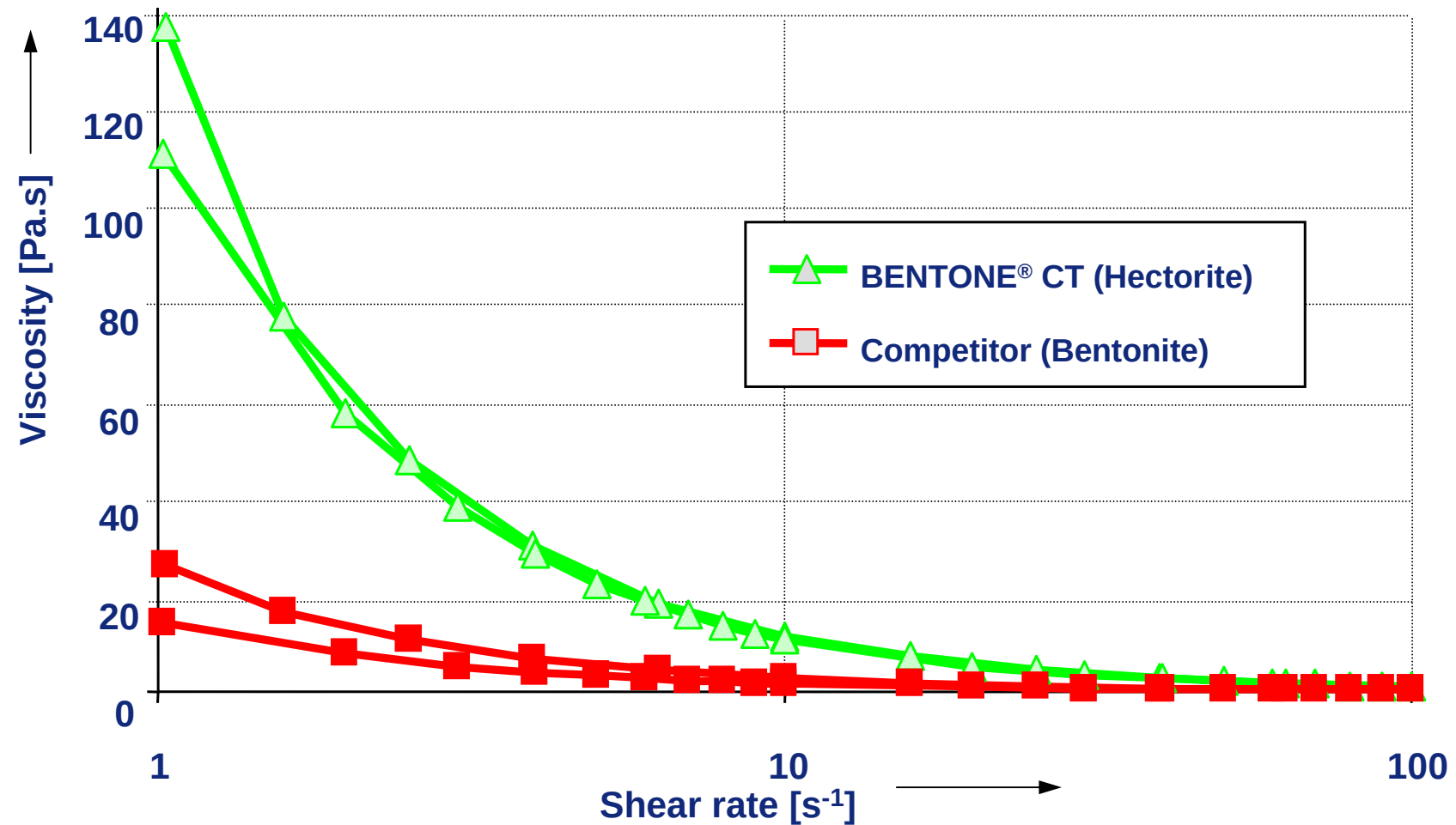
800 x 800 x 1 nm

Hectorite = more particles per gram and greater gelling capacity.

Hectorite / Bentonite 锂蒙脱石/蒙脱石

ELEMENTIS
SPECIALTIES

10% pre-gel in demin. Water /10%预凝胶



Spray Dried Hectorite



Products

- BENAQUA 4000
- BENTONE LT
- BENTONE DE
- BENTONE EW
- BENTONE GS
- BENTONE HC
- BENTONE MA

- Water treatment/水处理
- Ceramics/陶瓷
- Construction/建材
- Sealants/密封胶
- Coatings/涂料



RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

TINT-AYD®

ELEMENTIS
SPECIALTIES

Water Treatment/水处理 (paint detackifier /涂料凝聚剂)



Applications – Water Treatment

- Detackifier/coagulant chemicals are added to the water of the spray booth to build flocculates with the paint droplets/ 添加凝聚剂到喷房废水中以促进涂料液滴的絮凝
- The coagulum can either sink or float and be removed easily to allow re-processing of the water/絮凝物结团后下沉或漂浮，有利于清洁处理，便于废水重新利用



Applications – Water Treatment/水处理



- Historically strong bases (pH >8) were used to denature (saponify) the binding agent leading to a “destroyed” and detackified paint/较高PH的基料常常会对粘结剂本身产生皂化作用。
- Reduction of stabilising surface charges of particles (paint droplets) “break” emulsions (demulsify), clay adsorb (“bread”) paint droplets and detackify/降低涂料液滴的表面电荷，进行反乳化，同时粘土吸附到涂料液滴表面
- Coagulation agent reacts with particle - Formation of microflocs by several different proposed mechanism/凝聚剂同粒子进行反应，形成絮状物

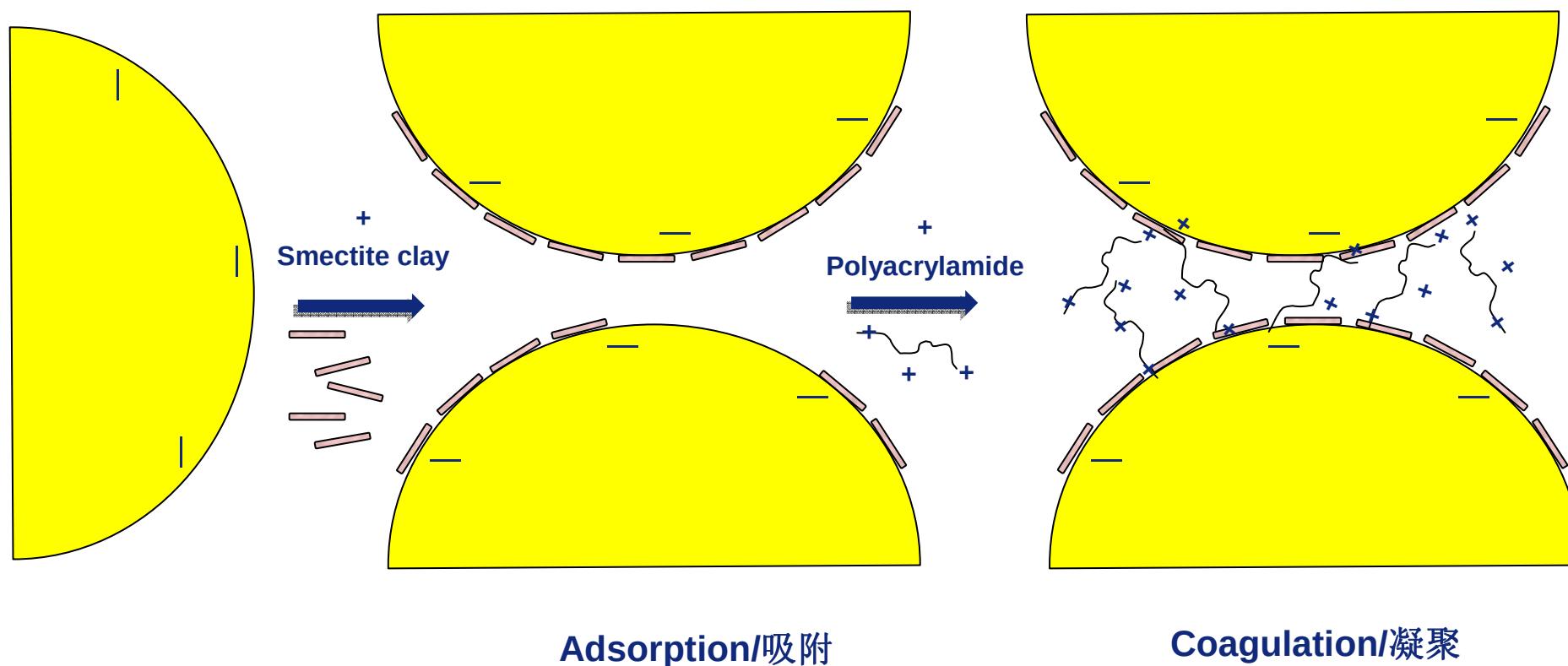
Applications – Water Treatment/水处理



- **Clay-based coagulation systems have the following advantages/粘土优点**
 - high adsorption/absorption power (large edge area)/高吸附能力
 - used in combination with conventional technology for the adsorption of heavy metals/和传统技术搭配使用
 - used for solvent- and waterborne paints including clear coats/适合于溶剂型和水性涂料体系，甚至清漆
 - Both sinking and floating coagulum can be adjusted/可调整其沉降性与漂浮性
- **Disadvantages of clays can be/粘土缺点**
 - too high viscosity of suspension (dosage)/较高粘度
 - sometimes difficult to de-water the sludge/有时难排除污渣
- **Hectorites have the following advantages over bentonites/锂蒙脱石优点**
 - higher coagulation power due to larger edge area/高效
 - reduced sludge build-up compared to bentonites/减少泥渣
 - better coagulation of waterborne paints, clear coats and high solids/更适合于水性涂料、清漆和高固含体系
 - cost-efficient/经济有效

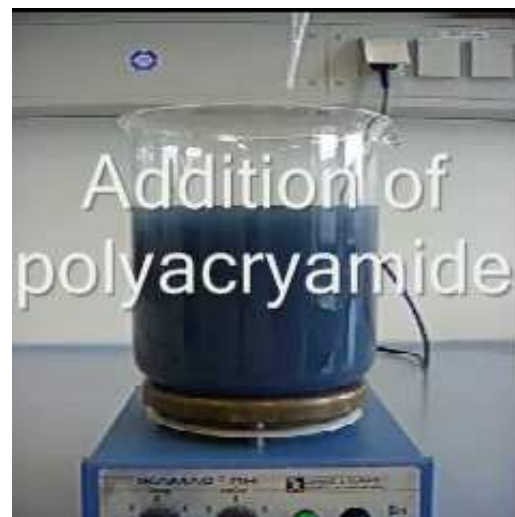
Water Treatment – Mechanism/水处理机理

ELEMENTIS
SPECIALTIES



Water Treatment – Mechanism/水处理机理

ELEMENTIS
SPECIALTIES



paint flocculation new.wmv

Applications – Water Treatment/水处理



BENTONE CT

- low cost applications/低价产品

BENTONE HC

- highly efficient standard product, might require a dispersing agent to reduce “slurry” viscosity/高效产品，可能需要分散剂去降低体系粘度

BENTONE DE

- highly efficient, very low “slurry” viscosities at high concentration/高效，在高浓度时具有非常低的粘度



RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

TINT-AYD®

ELEMENTIS
SPECIALTIES

Ceramics /陶瓷系统



ELEMENTIS Position



- large sales volumes to a few accounts/对一些大客户有较大的销量
- limited experience/较少的实际经验

Background and Definition/相关资料

- **Definition of Glazes/ 釉料的定义**
 - A glaze is a thin coating of glass fused to the surface of a ceramic part like a clear coat /釉面为一种熔化在陶瓷表面的透明状玻璃涂层
 - The glaze provides decorative effects (colour, texture, opacity) and functional qualities (hygienic surface, strengthened ceramic)/提供优异的装饰效果，并提高其表面功能性
- **Definition of frits/玻璃料的定义**
 - A frit is powdered glass (glaze) commercially produced to include specific oxides/粉状玻璃，其中包括粉状特殊氧化物
 - Collection of raw materials are melted and cooled down rapidly (glass), then ground to fine powder - “Glaze masterbatch”/原材料熔化快速冷却后，形成釉料母料
- **Glazes consist of up to 100% of frits/釉料本身含有将近100%的玻璃料**

Application of Glazes/釉料的应用

- **The powdered glaze raw materials are suspended in water and applied by/粉体釉料分散在水中，通过下列方式施工：**
 - Spraying, brushing/喷涂或刷涂
 - Dipping/浸涂
 - Bell waterfall, airless spraying/淋涂或无气喷涂
- **Glazed materials can be/釉料常用于**
 - Tableware/dinnerware, china/餐具和瓷器
 - Sanitaryware, vitreous china, tiles and many others/卫生洁具，陶瓷，瓷砖和其他用品

Rheology of Glazes/釉料之流变

ELEMENTIS
SPECIALTIES

- **The glaze suspension needs controlled rheology**
 - Suspension control/悬浮性
 - Antisettling/防沉降
 - Sag resistance/抗流挂
- **Rheological additives used/流变助剂**
 - Smectite clays like hectorite and bentonite
锂蒙脱石和蒙脱石
 - China clay (Al-silicate)/高岭土
 - Organic thickeners like CMC, Guar gum, starch
纤维素醚, 顶风米
 - Salts like Ca-chloride



Hectorites in Glazes/釉料

ELEMENTIS
SPECIALTIES

- **Advantages/优点**
 - Very high rheological efficiency, high yield value/优异的流变性能
 - Stable viscosity on time/粘度稳定
 - High purity, no magnetic metals, e.g. Fe (discoloration during firing)/高纯度
 - No thermal decomposition (gas bubbles)/无热分解
 - Bio-inert/生物惰性

Hectorites for Ceramics/陶瓷



- **BENTONE® EW**
 - Refined and beneficiated spray-dried hectorite clay/精细型雾化干燥锂蒙脱石
 - Easy to disperse/易分散
 - Glaze rheology modifier/流变助剂
- **BENTONE HC**
 - Refined hectorite clay/精细型锂蒙脱石
 - Used as a temporary binder in ceramic mass (body) giving green strength/作为陶瓷毛坯临时基料，良好的生坯强度
- **BENTONE CT**
 - Unrefined hectorite clay, 50% active/50%非精制型
 - Used as a temporary binder in ceramic mass (body) giving green strength/作为陶瓷毛坯临时基料，良好的生坯强度
- **BENTONE OC**
 - Unrefined hectorite clay/非精制型锂蒙脱石
 - Green strength additive/良好的生坯强度



ELEMENTIS
SPECIALTIES

RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

TINT-AYD®

Construction

/建材系统



Hectorite Application – Construction/建材

ELEMENTIS
SPECIALTIES

System	pure mineralic powder	latex modified mineralic powder	latex based paste/liquid
products	BENTONE OC BENTONE CT „BENTONE HC“ „BENTONE GS/EW“	BENTONE CT BENTONE HC BENTONE EW/GS BENAQUA 4000	„BENTONE CT“ BENTONE HC BENTONE EW/GS
purpose	slump control workability tooling pumpability stability	slump/sag control workability tooling pumpability „viscosity control“	storage stability sag control viscosity control workability „pumpability“
used as	additional additive	additional additive „partial replacement to cellulose“	additional additive partial replacement to cellulose
application	lime cement plaster self levelling floorings	tile adhesives plasters EIFS construction adhesives	plasters joint fillers tile adhesives (paste) construction adhesives

Construction – EIFS/外保温系统

Latex-modified EIFS – Thermal Insulation Plaster

	Flow table value [cm]	Open time [h]	Sag as a layer thickness of [mm]	Workability with toothed trowel
0.20% Cellulose ether	13.2	0.5	14	acceptable application, very sticky, profiles remain intact, surface almost smooth
0.15% Cellulose ether; 0.08% BENTONE® GS	13.3	0.6	18	good application, sticky, profiles remain intact, surface slightly uneven

Exterior Insulation And Finishing System

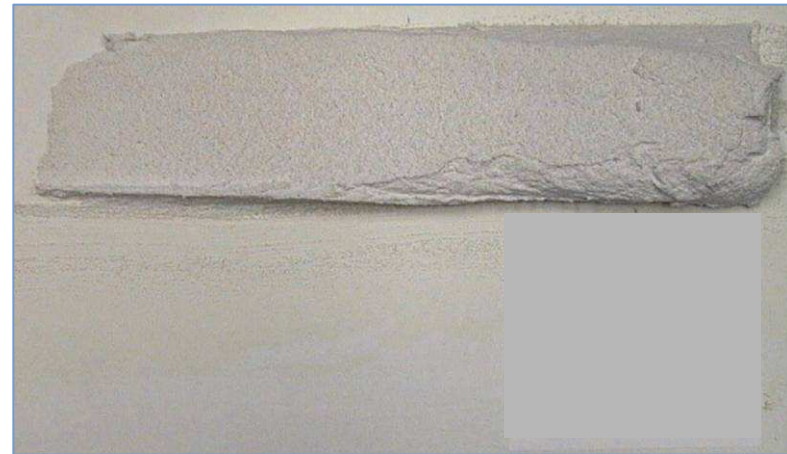
Construction – EIFS/外保温系统

ELEMENTIS
SPECIALTIES

Sag/slump resistance of powdered thermal insulation adhesives



0.2% Cellulose ether



0.15% Cellulose ether & 0.08% BENTONE® GS

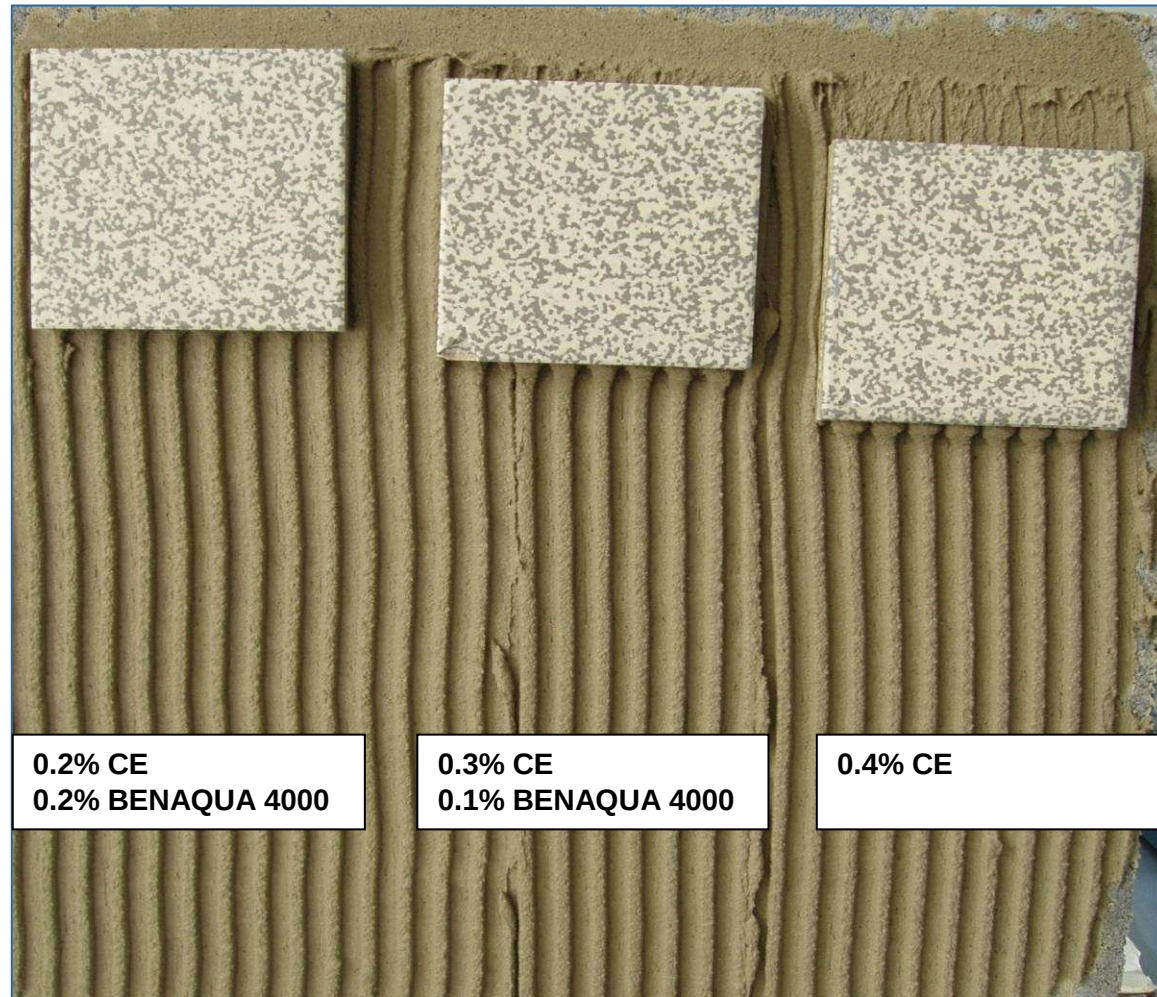
Construction – Thinset mortar/砂浆

Latex-modified cementitious tile adhesive

Base mix contains	Spread rate [cm]	Yield value [Pa]	Water retention [%]	Open time [%/min]	Slump [mm] Method		Application properties
					1	2	
0.40% Cellulose ether	12.9	267	99.8	50/18	0	29	poor workability; very sticky
0.30% Cellulose ether 0.10% BENAQUA® 4000	12.8	315	99.4	55/15	0	15	acceptable workability; low stickiness
0.20% Cellulose ether 0.20% BENAQUA 4000	12.8	380	99.4	50/15	0	0	very good workability; low stickiness
0.10% Cellulose ether 0.30% BENAQUA 4000	12.7	477	99.5	55/12	0	0	very good workability; low stickiness

Construction – Thinset mortar/砂浆

ELEMENTIS
SPECIALTIES



Construction – Emulsion Plaster/灰泥

	Parts by weight	Supplier
1. Water	5.60	
2. Calgon N, 10% in water	0.30	BK Ladenburg
3. Mowiplus XW 330	0.30	Clariant GmbH
4. Agitan 315	0.10	Münzing Chemie
5. Mergal K 10	0.20	Troy Chemicals
6. Kronos 2160	4.00	Kronos Titan GmbH

Dispersing at high speed with tooth blade dissolver

7. Mowilith LDM 1871	13.20	Clariant GmbH
8. Dowanol DPnB	0.50	Hoesch Chemie
9. Butyl diglycolacetate	0.80	Merck Chemie

Stirring at low speed

10.Omyacarb 130 GU	14.00	Omya GmbH
11.Calcilit 0,2 – 0,5	36.00	Alpha Calcit
12.Calcilit 0,5 – 1,0	11.00	Alpha Calcit
13.Calcilit 1,5 – 2,0	8.40	Alpha Calcit
14.NaOH, 10% in water	0.20	

Stirring at low speed

15.Water	5.4 – X	
16.Rheological additive	X	variable

100.0

TSR 03013

Construction – Emulsion Plaster/灰泥

	Additive loading [%]	Viscosity after 24 h @ 6.3 s ⁻¹	Sag resistance [mm]	Open time	Water resistance	Workability	Storage stability
0.55% Cellulose ether	0.55	66.7	4	32	strong softening; strong rehardening	acceptable, slightly sticky	slight syneresis
0.33% Cellulose ether; 0.17% BENTONE® GS	0.50	63.4	5	31	softening; strong rehardening	very easy, slightly sticky	no syneresis
0.37% Cellulose ether; 0.12% BENTONE® GS	0.49	63.8	5	30	softening; strong rehardening	very easy, slightly sticky	no syneresis



RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

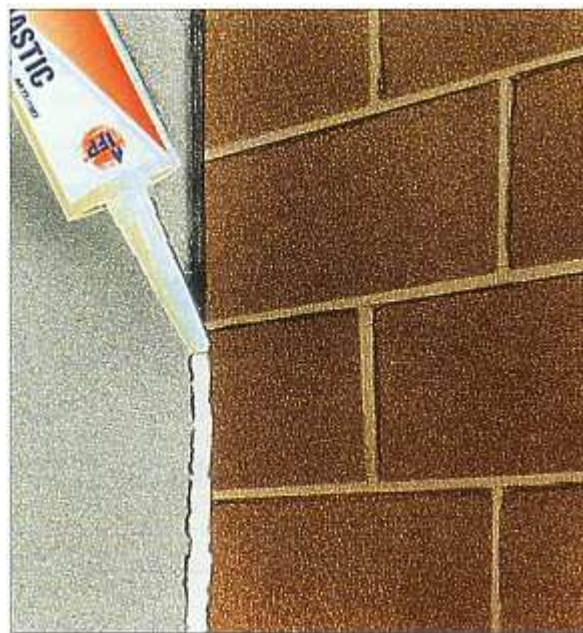
TINT-AYD®

ELEMENTIS

SPECIALTIES

Waterborne Sealant

水性密封胶



Hectorite Application – Sealants/密封胶



- excellent workability/优异的施工性
- sag resistance/抗流挂
- Stability/稳定性

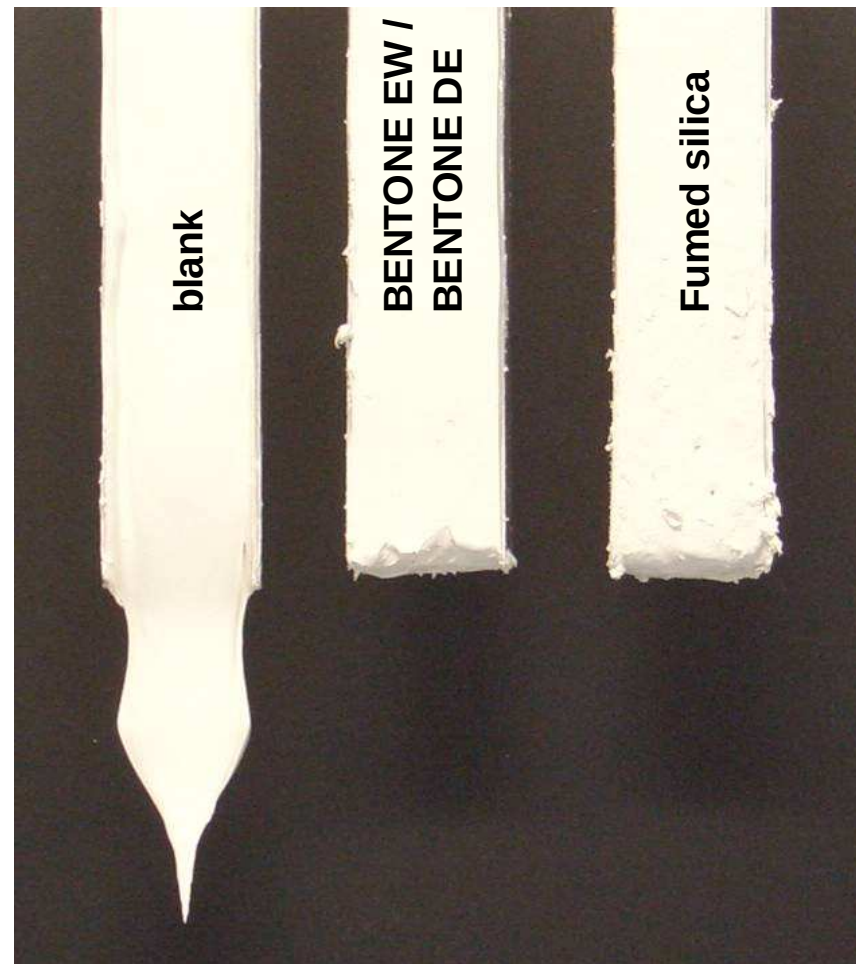
Acrylic Sealant/丙烯酸密封胶

ELEMENTIS
SPECIALTIES

Ingredients	Weight [%]	Function	Supplier
Acronal 81 D	32.00	Binder	BASF
Plastilit 3060	3.80	Plastisiser	BASF
Pigment paste (Kronos 2056/ Plastilit 3060 1:1)	9.60	colorant	BASF/Kronos Titan
NUOSPERSE® FX 605	0.05	dispersing agent	Elementis Specialties
NUOSPERSE FN 265	0.30	wetting agent	Elementis Specialties
DAPRO® DF 7005	0.05	defoamer	Elementis Specialties
Microtalk AT-1	7.60	extender	Omya
Omya BLP-3	42.60	extender	Omya
Water	3.50	extender	Omya
rheological additive	0.50	rheological additive	various
Total	100.00		

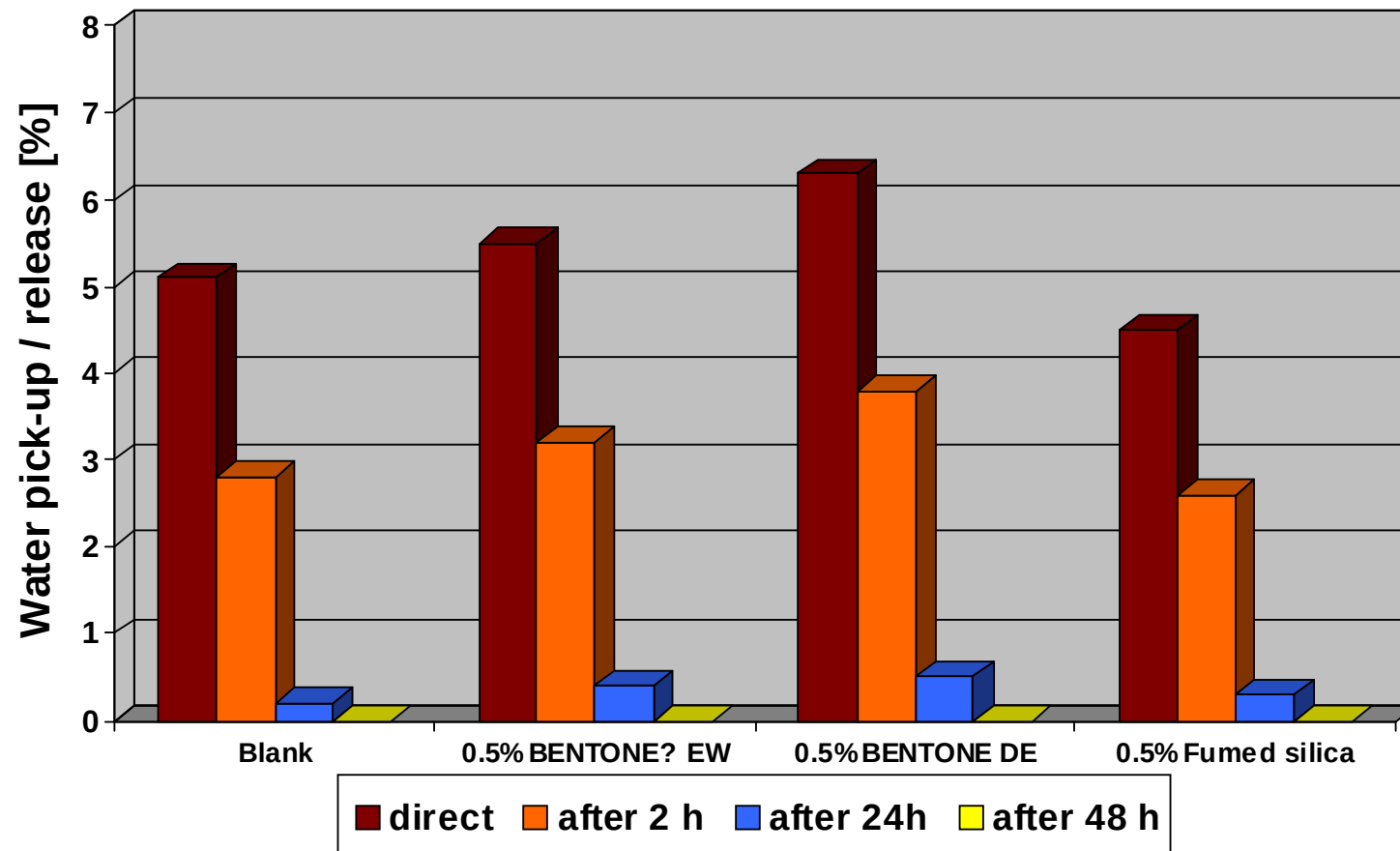
Acrylic Sealant/丙烯酸密封胶

ELEMENTIS
SPECIALTIES



Acrylic Sealant/丙烯酸密封胶

ELEMENTIS
SPECIALTIES





ELEMENTIS
SPECIALTIES

RHEOLATE®

BENTONE®

THIXATROL®

NUOSPERSE®

RHEOX®

DAPRO®

TINT-AYD®

Coatings/涂料



Hectorite Applications – Coatings/涂料

ELEMENTIS
SPECIALTIES

Application/体系	Hectorite grades	Purpose/
indoor latex paint	BENTONE EW BENTONE LT	syneresis control /抗分水 anti-settling/防沉 pigment suspension/防沉性 Workability/施工性 ease of application/易添加
exteriour latex paint (silicate paints)	BENTONE EW BENTONE LT	syneresis control/抗分水 anti-settling/防沉 pigment suspension /悬浮性 Workability/施工性 ease of application/易添加
trim paints	BENTONE EW BENTONE LT	syneresis control/抗分水 anti-settling/防沉 pigment suspension/悬浮性
wood laquers	BENTONE EW BENTONE LT	syneresis control/抗分水 anti-settling/防沉 pigment suspension/悬浮性

Hectorite Applications – Coatings/涂料



Application/体系	Hectorite grades	Purpose
General industrial	BENTONE EW BENTONE DE	Sprayability/喷涂性 Thixotropy/触变性 sag resistance/抗流挂 ease of application/易添加 low viscosity build/提供低剪粘度
Epoxy primer	BENTONE EW BENTONE DE BENTONE LT	Sprayability/喷涂性 Thixotropy/触变性 sag resistance/抗流挂 ease of application/易添加
Dip coatings	BENTONE EW	pigment suspension/悬浮性 syneresis control/抗分水 anti-settling/防沉
Joinery	BENTONE EW BENTONE LT	sag resistance/抗流挂

Latex paint PVC 77.5% / 乳胶漆

0.35 % HEC	KU	ICI	Brookfield Viskosität ...rpm				Brush-out levelling	Sag resistance
			10	20	50	100		
	[Units]	[P]	[mPa.s]	[mPa.s]	[mPa. s]	[mPa.s]	0= poor 5= excellent	[µm]
blank	80	1.2	5200	3320	1896	1280	2	300-350
+ 0.2% Hectorite	87	1.1	8240	4860	2488	1512	3	400
+ 0.2% Bentonite	80	1.0	5320	3260	1744	1100	3	350

Trim Paint/装饰涂料

ELEMENTIS
SPECIALTIES



+ 0.1%
bentonite

+ 0.1 %
BENTONE DE

+ 0.2 %
BENTONE DE