

With the aim of manufacturing and exporting NaCMC (Sodium Carboxymethylcellulose), Denkim Kimya Inc., was established and started to operate in the plants located in Denizli in 1995. Since its establishment, any technical types of CMC are manufactured at international standards, adopting a customer-focused approach.

As of today, Denkim Kimya Inc. is a well known manufacturer and exporter around the world for CMC and PAC (Polyanionic Cellulose) products.

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Denkim Kimya Inc. has adopted international quality and testing standards such as ASTM (American Standard Testing Method) and API (American Petrol Institution) as a sustainable quality standard for manufacturing and R&D processes, and all products are manufactured in accordance with these standards and specifications.

Denkim Kimya Inc. ISO 9001 holds a quality system certificate.

Denkim Kimya Inc. has multinational company references demonstrating that it is a globally recognized company for collaboration in projects, logistics solutions, technical support, and quality and sales services of international standards.

Product Type	Sectors	2% Brookfield Viscosity (cps.)	Substitution Range	Appearance
Dencell-D Type	Powder Detergent, Cream Detergent, Viscosifier, Binder	20-800	Medium, High	G, T, F
Dencell-T Type	Textile, Paint, Paper, Ceramic, Mine Flotation, Binder, Construction Chemical	40-600	Medium, High	G, T
Dencell-B Type	Paint	100-500	Medium, High	G, T
Drilling Type CMC and PAC	Drilling, Mine Flotation, Fluid Loss Control, Viscosifier	Every viscosity range	High	T+G
Alfacell	Glue, Viscosifier, Binder	200-600	High	G
Betacell	Glue, Viscosifier, Binder	150-400	High	T
Ultracell	Glue, Viscosifier, Binder	600-1200	High	G
EW	Glue, Viscosifier	400-800	High	F

\* G= Granule, T= Powder, F=Fluffy

## Dencell-D Type

Our Dencell-D type is a technical CMC product used in manufacturing powder and cream detergents. In-vitro studies in detergent industry have demonstrated that CMC constitutes an (H) bond with cotton fibers in cotton weaving. The dirt trap occurs between negatively (-) charged powder particles and the negatively charged carboxymethyl groups. In this way, CMC traps the dirt in powder detergents and allows anti-redeposition with rinse water. It is therefore referred to as anti-redeposition agent. Furthermore, it improves the detergency and performance, resulting in economical benefits.

A higher viscosity CMC is used in cream detergents because higher water retention is required.

Our Dencell-D type products are within generally accepted detergent specifications and can be manufactured in different chemical specifications and physical appearance as required by the customer.

This flexible manufacturing and the differences allow us to achieve higher customer satisfaction, price adjustment, and performance expectations.

The type of detergents in our product portfolio fall into two groups by their usage:

### Types of Powder Detergents

Dencell-DT types are generally used in manufacturing powder detergents. They can also be used in different industries as per their specifications.

In powder detergent industry, our CMC products fall into 4 standard subtypes, DTE, DT, DTA and DTH, by customer demand, market-price conditions, economy, and outstanding color and physical form features. We can also manufacture any products in accordance with customer demand other than these standard types.

### Types of Cream Detergents

Dencell-DK types can be manufactured in different ranges of specifications by various viscosity values. These types can be used in cream detergents and as viscosifier (viscosity increasing agent) in various industrial divisions to avoid excessive and quick water loss in hot countries because they provide high viscosity.

Except for the products listed above, we can also manufacture specific products in accordance with customer demand as well as create flexible solutions by modifying specifications of standard products.

## Dencell-T Type

### Textile Industry

Dencell-T type is commonly used in thread sizing process and preparation of printing paste, and is preferred for easily and quickly soluble in cold water, film formation, and adhesive power. It enhances the weaving performance and can be removed after weaving without using an enzyme thus the need for water and steam is decreased. It can be used in combination with and/or instead of starch in sizing process. The followings are the advantages of Dencell-T over starch in sizing process:

1. In contrast to starch, Dencell-T is soluble in the cold water.
2. Saves on power costs since no steam and heat treatment is needed in sizing process.
3. Desizing after weaving is performed by only washing with cold water. No enzyme or heat treatment is needed.
4. When sizing with starch, a certain amount of starch still remains on the thread no matter how well the desizing is performed after weaving. Barré (difference in color) may occur during dyeing process because starch particles remain on the thread, resulting in defects in dyeing and quality of finished product. However, Dencell-T may not cause such problem since it can be thoroughly rinsed with cold water, eliminating the risk of barré (difference in color).
5. Dencell-T allows for saving on cost with properties listed above when compared to the starch thus it is much more economic and efficient.
6. 3 kilograms of starch is substituted with 1 kg of Dencell-T in use.

### Paper Industry

Dencell-T series products are used in paper manufacturing to optimize certain specifications of thin and thick cartons due to their cellulosic features. It increases the strength, improves the quality of printing, enhances performance of printing, and clears the printing quality through its property to form a film when added to the pulp. It allows adding more filler in the paper. It increases the effect of characteristics of other auxiliary paper materials when used alone or in combination with these materials. The better results can be seen not only in adhesion, adhesion robustness, retention of filling materials, dyeing materials, and opacities but also in printing technique.

### Ceramic Industry

Dencell-T is preferred in ceramic industry for viscosity stabilization and binding features. It helps to achieve smooth surface products by means of face glazing and controlled water loss. More viscous types should be used in vitrified products in order to preserve pattern design before drying process.

## **Dencell-B Type**

### **In Dyeing Industry**

Dencell-B increases the viscosity of dye by its thickening characteristics. The viscosity control in dye manufacturing is performed by cellulose derivatives such as Dencell-B. The dye does not leave stain and contributes to formation of a smooth surface by means of generating a film.

### **In Building and Construction Chemicals**

Our Dencell-B group products are used as adhesive, freeze retardant, strength-enhancer admixture in building industry, and cement and gypsum mortar. Because it is freeze retardant, and cement and gypsum mortar can be kept with no drying, it allows for a smooth and crack-free surface based on both application and slow water loss. It enables gypsum and cement to remain not thickened for long, prolonging the time of process. Freeze retardant is also used in concrete mortars to avoid crack formation during thickening

## **Drilling Type CMC and PAC**

Our cellulose derivative products utilized in drilling industry are used as performance-enhancer admixture in oil drilling through their feature such as film formation, water retention (avoidance of liquid loss) and lubricant-greaser. PAC (Polyanionic Cellulose) and CMC (Carboxymethyl Cellulose) keeps the mud used in drilling homogeneous to avoid excessive water loss during drilling. In this way, it reduces the resistance of soil of different characteristics to drilling machine thus enhances the performance. Because of the lubricity to the mud, it becomes easy to take the drilled soil out. It particularly maintains suspension of the mud which is made of dispersion of clay, barite and bentonite in water in oil industry, and allows for viscosity. With avoidance of water loss through pores and lubricity of CMC and PAC, it is widely used to take the waste soil out. Our drilling type products are particularly used as admixture to enhance performance of drilling mud utilized in oil drilling.

## Glues and Adhesives

Developed as paper walls, our ALFACELL, SUPERALFACELL, BETACELL, EXTRA WHITE, ULTRACELL products are perfect film formers and water soluble cellulosic polymers. In addition to utilization in adhesion of wall papers, our products are used in carpet underlay, ceramic mortar, filler for wood parquet, and preparing putty for satin paint. Furthermore, it is used as freeze retardant admixture in gypsum and cement mortars. It is also used for wall papers, and leather and wood adhesion because it is thickener, binder and easily dissolve in water.