WELLDONE

A Global Chemical & Service Supplier

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# Shandong Welldone Environmental New Materials Co.,Ltd.

Shandong Welldone Environmental New Materials Co.,Ltd., as a subsidiary of WELLDONE CHEMICAL GROUP, is a worldwide competitor and manufacturer of Polyacrylamide for EOR, drilling mud, bored piling, wastewater treatment..., with more than 20 years of experience in manufacturing high quality PHPA, polyacrylamide. WELLDONE products have passed the ISO9001& ISO14001, FDA, Halal, Kosher certificates and been spread to North America, Europe, Middle East, South-east Asia, and Latin America. We had been listed as CHINA TOP 5 polymer manufacturer, annual production capacity beyond 100,000 metric tons.

Expecting to offer GREEN CHEMICAL and ENVIRONMENTAL FRIENDLY CHEMICAL, 23 professional engineers are focusing on environmental production technical improvement, 2 teams focusing on offering staff safety guarantee. We look forward to establishing long term cooperation with company from all over the world.

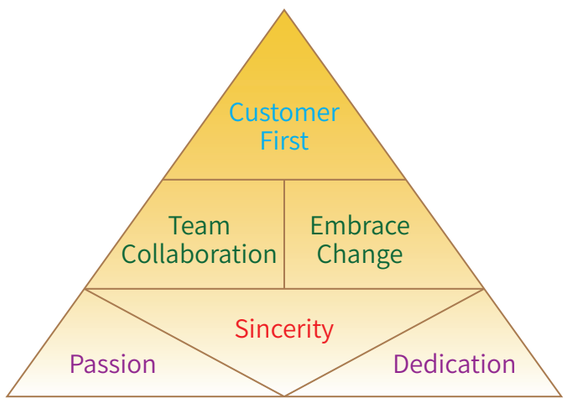
## Corporate Vision

Becoming the first choice to provide green chemicals

## Corporate Mission

Let the world fall in love with chemicals from China

## Corporate Values








★★★★ Factory

★★★★ Factory

★★★★ Laboratory

★★★★ Production

★★★★ Production

★★★★ Warehouse

★★★★ Warehouse

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# ENHANCED OIL RECOVERY

WELLDONEPAM SERIES

**Choosing the right product technology and application strategy for each individual reservoir is extremely important in maximizing oil recovery. WELLDONE has gained considerable knowledge since 1998 from its experience working with petroleum industry on EOR projects. We use our expertise and on site experience to help our customers evaluate the reservoir characters**

**Polymer flooding is the injection of long-chain polymer molecules dissolved in water to increase the viscosity of injected water. This method improves the oil-water mobility ratio, vertical and areal sweep efficiency. The polymer causes a reduction in the permeability and propagation through high-permeability zones in the reservoir ensuring water diversion to lower permeability zones. This lowers flow velocity**

| Product lines | Characteristics |
|---|---|
| WELLDONEPAM I | This line use for enhanced oil recovery in reservoirs with moderate salinity and temperatures. Linear HPAM |
| WELLDONEPAM II | This line suitable for reservoirs with medium salinity and temperature. Linear HPAM with AMPS |
| WELLDONEPAM III | This Line is designed for high-salinity and high-temperature reservoirs. Linear |
| WELLDONE OFFSHORE POLYMER | The products of this line are designed for offshore polymer flooding. They dissolve quickly in sea and high-salinity produced water, salinity and temperature-resistant and |

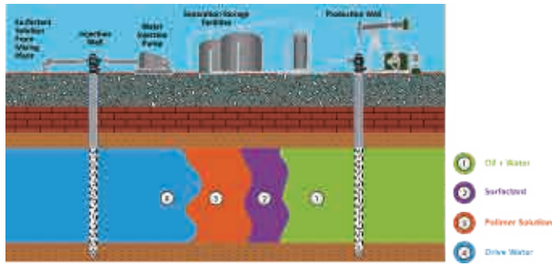
# WELLDONEPAM III SERIES-SALINITY AND TEMPERATURE RESISTANT POLYMERS

Polymer flooding is one of the most common and effective methods of EOR methods. Until recent time, there were no cost-effective polymers for high-salinity and high-temperature reservoirs. Large number of oil reservoirs throughout the world have low oil recovery factors and being potential target for polymer flooding are characterized by harsh conditions-elevated salinity and temperature. WELLDONE introduced its WELLDONEMUD®II series to provide high-performing polymers for EOR projects where produced water is used for injection and with high salinity and temperatures reservoir conditions.

Main requirements for EOR polymer:
1)Dissolve completely in injection water within a short period of time, in order to eliminate injectivity problems and minimize surface facility investment.
2)Maintain target apparent viscosity over time under reservoir high-temperature and high-salinity conditions to maximize sweep efficiency, minimize severe permeability reduction and additional water treatment caused by precipitation of polymers.

Summary of WELLDONE polymers' characteristics

1.WELLDONEMUD® polymers have no hydrophobic monomers incorporated that cause associative behavior. Therefore, they have minimal adsorption and do not bring injectivity issues.
2.WELLDONEMUD® will dissolve in produced water directly within required time. This minimizes surface facility requirements and eliminates injectivity problem caused by in complete dissolution.
3.WELLDONEMUD® will maintain higher viscosity at high temperatures and salinity conditions. Different products will be recommended according to customers' requirements for long term stability to ensure maximized technical success and optimal chemical cost for polymer flooding project.
4.WELLDONEMUD® series is the leading temperature and salinity resistant EOR polymer type offered on the market to date.








# SERVICES

WELLDONE designs, develops and provides chemical enhanced oil recovery(CEOR)technologies that increase the field development effectiveness and improve oil recovery. WELLDONE Chemicals technologies have been successfully applied in some of the most challenging reservoir conditions across the globe. For instance, polymer flooding applications resulted in an additional production of 50-120 tons of oil per ton of polymer applied.

WELLDONE provides services to evaluate CEOR opportunities for the target reservoir and to select the best technology. Our polymer solutions can be tailored according to specific reservoir conditions. The facilities engineering design is the field-and location-specific.

WELLDONE has dedicated significant resources to R&D program since 1998. WELLDONE has the technical support team existing for more than 20 years; its team members possess strong knowledge and experience in polymer flooding and conformance control techniques and implementation. Additionally, WELLDONE has certified laboratory for EOR analysis. Further,we partner in joint R&D programs with academic institutions. For instance, with Chinese Academy of Sciences we successfully collaborated on technologies development and commercialization including offshore polymer flooding technology.

WELLDONE have over 70 units of analytical testing equipment: AXP work station, Sun work station, Micro EOR laboratory, RS-75 rheometer, long core flood test facility, Hitachi Z-5000 atomic absorption spectroscopy equipment, Brookfield viscometer, loopline for offshore polymer testing operations. We also possess specialized software required for experimentation, chemistry, field static and dynamic modeling, facilities control.

# SERVICES

With over 30 staff members working in the R&D department, WELLDONE allocates 4% of its annual sales to the development and deployment of new products, facilities as well as to the improvement of current products and facilities.

Our R&D center collaborates with Chinese Academy of Sciences, working on and commercializing several leading technologies successfully including offshore polymer flooding technology.

Our R&D department supports the followings research activities on daily basis:
Products selection/application:

*1.Evaluation together with customers so the most suitable products are selected to obtain the maximum investment return:*

| Polymer evaluation and selection criteria for EOR application | | |
|---|---|---|
| Molecular weight | Apparent and real viscosity | Hydrolysis degree |
| Core flooding test | Filtration and screen factor test | Dissolution time |
| Long term stability | Injectivity test | Adsorption test |
| Other polymer rheology tests | | |

*2.Develop customer specific solutions to ensure the cost-effective program is developed:*

| | |
|---|---|
| Project evaluation | Reservoir feasibility |
| Pilot test | Optimize polymer selection |
| Full field implementation | Experimental program |



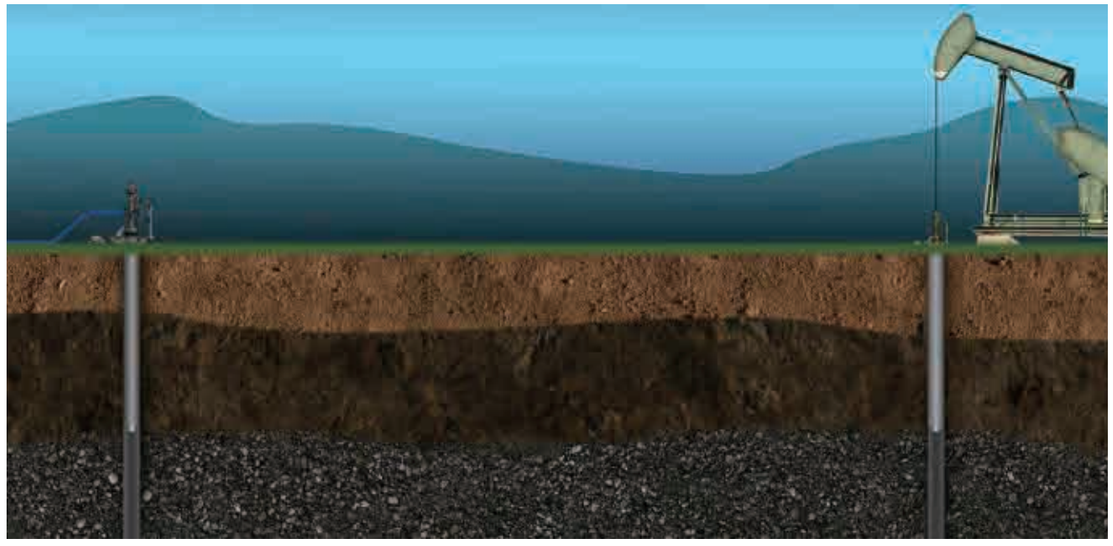




*3.Polymer product performance improvement as ongoing R&D work for existing customers with the following characteristics:*

| | |
|---|---|
| Viscosity development | Temperature resistance |
| Shear resistance | Salinity resistance |
| Dissolution ability | Better compatibility with reservoir fluids |
| Recovery efficiency | Cost reduction |
| Improving long-term and thermal stability | |

Introducing viscous polymer solutions to the flooding process, the efficiency of the volumetric sweep increases, reducing water channeling and break through. These effects result in improved oil recovery.
WELLDONE different polymer technologies offer our customer the very effective and economically attractive development option for their fields. Please refer to EOR section for more information on WELLDONEMUD® product lines for EOR application.



# Drilling Mud Additives

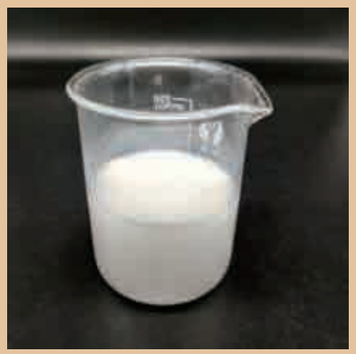
Certain types of polymers have been used successfully for many years in oil fields as drilling mud additives for viscosity modification shale inhibition/clay stabilization and fluid loss control. A wide range of products is available to suit the particular type of water based drilling mud system used by the operator to achieve the optimum performance. Each specific application is given below:

**Viscosity Modification:**

Polymers are used as extenders. Increase in the drilling fluid viscosity provides improvement in the removal of cuttings and better control of fluid densities and lubrication of the drilling bit. In addition, during down time, the cuttings will be held in suspension, thus, not causing problems with solids settlement.

Typical DMY polymers or PHPA's are used along or in conjunction with bentonite, as extenders, to increase the drilling mud viscosity thereby resulting in improvements in (1) the removal of cuttings (2) better control of mud densities and (3) lubrication of the drill bit. Additionally, during downtime, due to the thixotropic nature of the drilling mud system, the cuttings will be held in suspension, which thereby would not cause any major problems with solids settlement.

The WELLDONEMUD® series polymers with a wide range of viscosity modifiers are effective in both freshwater and saline brines including seawater. Offering higher viscosity buildup, meaning less dosage, and better stability in high salinity and temperature environment.







**Shale Inhibition/Clay Stabilization:**

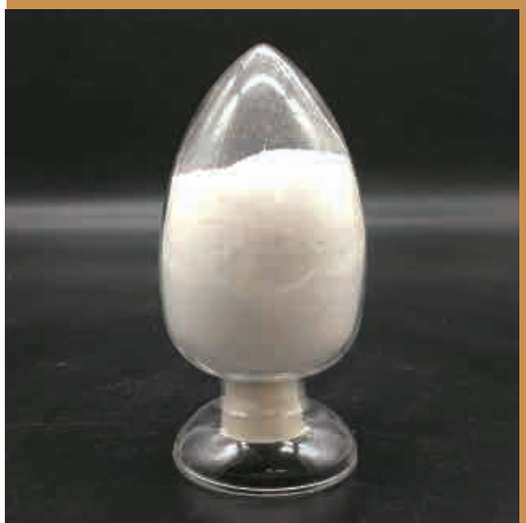
Our range of shale inhibitors can prevent clay swelling. The addition of clay stabilizer would inhibit the clay and fines migration to block pore throats in acidization, fracturing and profile modification. The shale inhibitor adsorbs onto the cuttings and the borehole wall to protect the borehole. As a result, larger cuttings float to the surface and can then be removed. In addition, these inhibitors/stabilizers would prevent the collapse of the borehole, maintain the integrity of cuttings, stabilize the borehole surface, reduce the filter loss, improve the efficiency of the mud cake and also has the benefit of lubrication and emulsification.

**Fluid Loss Control:**

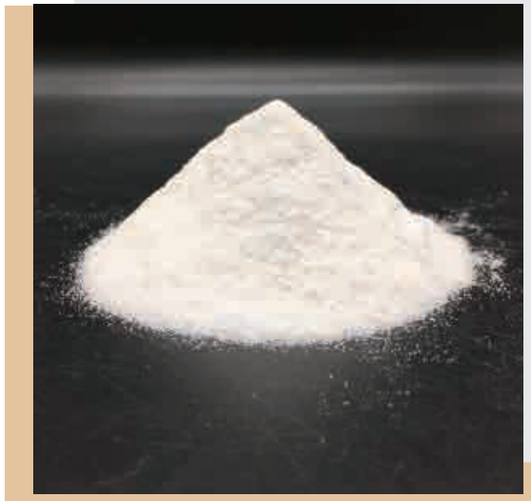
By the addition of WELLDONEMUD® in drilling mud, a fluid loss control agent, formation damage can be controlled and drilling rates can be improved (by ~ 3-8%). Additionally, effective in providing a stronger filter cake along the wellboer, maintaining fluid loss control. Therefore, the use of WELLDONEMUD® in the drilling process can effectively reduce the fluid loss, avoid formation damage, improve drilling rates and stabilize borehole conditions.

WELLDONEMUD® is effective at bottom-hole temperature up to 450 ℉, thereby, providing mud stability at high temperature. WELLDONEMUD® additives will also tolerate 500 ppm of free $Ca^{2+}$ in drilling mud.

**Shale InhibitionClay Stabilization**



**Fluid Loss Control**



Friction Reducer

Oil Sand Tailings
Flocculation and Thickening

**Friction Reducer:**

Polymers can effectively reduce fluid friction in the pipe. The friction loss can be minimized by 50-80%with small amounts of PAM added to the liquid phase.
WELLDONE friction reducers are designed to be used in waters with different properties (fresh water, 2% NaCl equivalent,7% NaCl equivalent, varying $CaCl_2$waters). WELLDONE friction reducer will diminish the friction by as 60% or more. WELLDONE friction reducers include both dry-powder and emulsion polymers with fast-dissolution ability, targeting high salinity and temperature environment, and still keep an efficiency without need to increase its dosage.

**Oil Sand Tailings: Flocculation and Thickening**

Polymers are also used to thicken a variety of sludge in both neutral and acidic conditions.PAM used for thickening may have special structures such as branched and cross-linked.
WELLDONE polymers for oil sand tailings offer fast and effective flocculation with better turbidity. WELLDONE assists our customers in selecting the suitable polymers providing consultancy and laboratory tests.





# Bored Piling

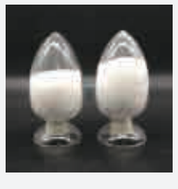
Bored Piling is one of the common and modern-day techniques for building a solid pile foundation for construction of various building types and structures. Bored Piling is a process whereby steel circular casings are installed into the ground by the simultaneous process of drilling and soil removal. This is then followed by the concreting of the piles, which then forms a strong pile foundation for the structure. This process is usually required when soil replacement instead of soil displacement is required.
In many of today's rapidly-developing cities, redevelopment and new construction works commonly require the use of bored piles. This is usually the case when surrounding site conditions, especially adjacent structures require minimal vibration and noise. This method also offers considerable flexibility in pile length, ground and soil conditions, without the hassle of large excavations and subsequent backfill of soil.

PHPAs are water-soluble synthetic polymers which carry a negative charge on the molecules. PHPAs now used in the foundation industry have a high molecular weight, so that when dissolved in water they form a non-Newtonian solution which may be used in replacement of bentonite slurry for excavation support. Unlike bentonite, polymer fluids do not form a gel when left undisturbed (nonthixotropic) and have negligible yield stress, although they can still have very high viscosity, up to 105 MPa´s at low shear rates. Polymer fluids have been found to offer many benefits such as smaller site footprint, ease of fluid mixing, and better concrete–sand interface resistance.

Bored Piling

# Profile Modification

It is known that certain type of amphoteric and anionic polymers will form either weak or strong gels in oil reservoirs with cross-linking agent. By controlling the temperature and degree of the cross linking process,the gel strength may be adjusted for different type and degree of profile modifications. In some cases, strong gels (or bulk gels) are stable for months in reservoirs with temperatures up to 150 ℃ and the brine TDS up to 150,000 ppm.



# Polyacrylamide for Mineral Processing Industry

*WELLDONEFLOC® polymer is widely used in mineral processing industry, such as*

| | |
|---|---|
| Coal | Gold/Silver |
| Copper | Lead/Zinc |
| Alumina | Uranium |
| Iron/steel | Titanium Dioxide |
| Nickel | Sand/Gravel |
| Phosphates | Phosphoric Acid |
| Potash processing | |

In most mineral processes where there is a flocculant requirement for either sedimentation or centrifugation, then a high molecular weight polymer is desired. WELLDONEFLOC® anionic polymer has ultra high molecular weight which ensure best performance and cost efficiency for sedimentation or centrifugation.
We are manufacturing full range of anion/cation polymers from low to high for all kinds of processing need.





# Polyacrylamide for Paper Making Industry

WELLDONEFLOC® polymers are widely used in paper making industry, especially in paper wastewater treatment and retention aid. Our polymer can be used in various of paper manufacturing.
It is very important to use polymer as retention aid on paper machine, it can highly improve the retention of fibers and fillers so as to save dosage of water by a designed passing volume.
In order to select a most suitable polymer as retention aid, we should make sure the purpose of using polymer, normally they are used to improve the ability of drainage and/or retention, also we should take the type of fibers and fillers into consideration. High molecular weight polymer has better performance in retention, and low molecular weight polymer is good at drainage.

| Grade | Ionicity | Molecular Weight | Ion Charge Density | Application |
|---|---|---|---|---|
| WD-7361 | Anion | Medium-High | Low | A, C |
| WD-7341 | Anion | Medium-High | Medium | A, B, C |
| WD-7281 | Anion | High | Medium | A, B |
| WD-7461 | Anion | High | Medium-High | A, B |
| WD-7103 | Cation | Medium-High | Low | A, C |
| WD-7123 | Cation | Medium-High | Low | A, C |
| WD-7143 | Cation | Medium-High | Medium | A, B, C |
| WD-7163 | Cation | Medium-High | Medium | A, B, C |
| WD-7183 | Cation | Medium-High | High | A, B, C |
| WD-7203 | Cation | High | High | B |
| WD-7223 | Cation | High | High | B |

A: Paper wastewater treatment
B: Paper retention aid
C: Paper filter aid

# Polyacrylamide for Coal Washing

After the coal is mined and sized, it is then ground down by ball mills and then separated from the waste by gravity in a medium of water. The coal floats and the waste sinks with the subsequent coal again sized and separated into the finished product.

During the process fine coal particles are generated which require further processing to recover these fine coal particles. This is normally achieved by a flotation process where a flotation agent is added to promote the separation of the coal from the waste. Again the coal floats and the waste sinks.

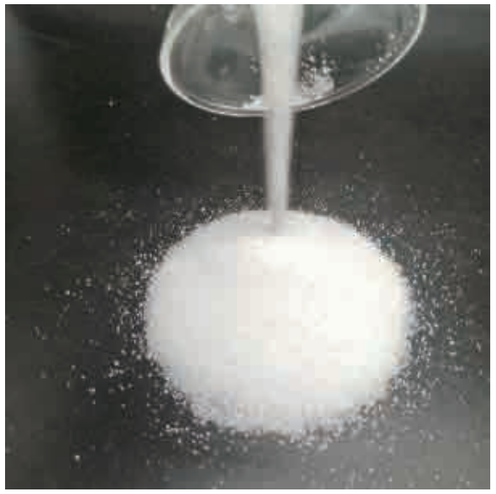
The fine coal is then recovered by sedimentation and then by filtration or centrifugation. Flocculants are used in the sedimentation process to promote solid liquid separation and subsequent rapid settlement in the thickeners so by producing clean water from the overflow of the thickeners for recycling back to the preparation plant. The fine coal, which settles, is subsequently recovered by filtration/centrifugation as the fine grade coal product. Again during the filtration/centrifugation process flocculant is added to enhance the separation process.

When processing brown coal, or coal with high clay content, it is sometimes necessary to use a coagulant prior to the addition of a flocculant for settlement applications so as to achieve efficient solids capture and an acceptable overflow clarity.





| Grade | Ionicity | Molecular Weight | Ion Charge Density | Application |
|---|---|---|---|---|
| WD-7361 | Anion | Medium-High | Low | B, C |
| WD-7341 | Anion | Medium-High | Medium | A, C, D |
| WD-7281 | Anion | High | Medium | A, B, C, D |
| WD-7301 | Anion | High | Medium-High | A, B, C, D |
| WD-7461 | Anion | High | High | A, B, C, D |
| WD-7102 | Nonionic | Medium-High | Very low | A, B, C, D |



A: Settlement/Clarification of fine coal slurry in the thickening vessels.
B: Enhancing solid-liquid separation of the fine coal
C: Settlement/ Clarification of wasted slurry (tailings) in the thickening vessels.
D: Enhancing solid-liquid separation of the tailings.

# Polyacrylamide for Gold/ Silver

Most Gold and Silver processes of extracting the mineral by using either Carbon in Pup (CIP) or Carbon in Leach (CIL) processes. The activated carbon dissolved in cyanide is used to recover Gold/Silver.
Before leaching, crush and screen the mineral first, then go through ball mills with water and lime. Add flocculants in each thickener to speed up the flocculation, and the underflow will go through series of leaching tanks for leaching which will offer longer time of dissolving in cyanide solutions.

The mineral slurry passes through series of carbon adsorption tanks where the gold and silver are extracted from solution. This is done by adding activated carbon in opposite direction of slurry flow, Gold/Silver will be extracted by activated carbon particles.

This loaded activated carbon is pumped to the elution tank where the Gold/Silver are washed off with superheated water. The washed solution is passed to the electrolytic tank for metals recovery.

| Grade | Ionicity | Molecular Weight | Ion Charge Density |
|---|---|---|---|
| WD-7341 | Anion | Medium-High | Medium |
| WD-7281 | Anion | High | Medium |
| WD-7461 | Anion | High | Medium-High |
| WD-7321 | Anion | High | High |

**Polyacrylamide for Gold/ Silver**





**Polyacrylamide for Copper**

# Polyacrylamide for Copper

The ore is crushed and ground to separate the copper-bearing mineral from the wasted materials or gangue. The separated ores will be further crushed by ball mills. The final material particle size will be less than 100 microns.

During the final milling collectors are added to the slurry which preferentially absorb the copper sulphide and make the sulphide particles hydrophobic. These copper minerals are then concentrated by flotation when air bubbles are pumped into the slurry. Frother is normally added to the slurry to stabilize the copper particle to be loaded in bubbles at the top of the slurry when creating froth. The slurry or tailings from the flotation lagoons will be delivered to thickener where flocculants are added to promote rapid sedimentation and generation of a clear overflow, which returns to the process water circuit. The thickened tailings are normally further dewatered by filtration where a flocculant is added as a filtration aid.

The copper laden froth (copper concentrate) is removed from the overflow by mechanical means and is then thickened and dewatered where flocculants are used to improve the sedimentation and filtration rates. The resultant concentrate or cake contains approximately 25 to 35% copper, which is then recovered by pyrometallurgical processing.

| Grade | Ionicity | Molecular Weight | Ion Charge Density | Application |
|---|---|---|---|---|
| WD-7361 | Anion | Medium-High | Low | A |
| WD-7341 | Anion | Medium-High | Medium | A, B |
| WD-7281 | Anion | High | Medium | A, B |
| WD-7461 | Anion | High | Medium-High | A, B |

A: Sedimentation of the copper concentrate/ flotation tailings.
B: Filtration aid of the thickened tailings/thickened copper concentrate.

# Polyacrylamide for Alumina

Processing bauxite ore produces alumina. After crushing and grinding the ore to less than 1mm it is then subjected to high temperature and pressure after the addition of concentrated sodium hydroxide. The alumina dissolves in the highly caustic liquor and only silicon is soluble among all the impurities.

After digestion the sand particles are removed with the slurry being settled in primary thickeners where the flocculant is added. This is a critical stage in achieving very clear overflow clarities. The underflow, or red mud, then passes to a counter current decantation process where further alumina from the liquor is recovered via a series of washer decanters. Again flocculant is used here to promote settling and get a clear overflow.

The high aluminum content liquor from the primary thickeners is filtered, then cooled (taking up to 48 hours) and seeded with alumina hydrate to promote precipitation of alumina trihydrate. Filtering, washing and calcining to produce alumina.


| Grade | Ionicity | Molecular Weight | Ion Charge Density |
|---|---|---|---|
| WD-7102 | Nonionic | Medium | Low |
| WD-7281 | Anion | High | Medium |
| WD-7461 | Anion | High | High |





# Polyacrylamide for Municipal Wastewater Treatment

The WELLDONEFLOC® range of polymers and coagulants are widely used in the treatment of wastewater from both municipal and industrial wastewater treatment plants. Our polymers can be used in all solid-liquid separation processes like:
1. Primary sewage treatment.
Usually, Anionic polymer in combination with organic coagulants can reduce the biological loading of ihe secondary treatment. Additionally, adding polymers to accelerate settlement speed in the primary clarifiers which will reduce clarifiers' volume and save more costs.
2. Activated sludge treatment.
Products choose are entirely depend on the application, normally a medium to high charge cationic polymer is required.
3. Digested sludge treatment.
A higher charged cationic polymer is more effective, and molecular weight should be based on the solid-liquid separation process.

| Grade | Ionicity | Molecular Weight | Ion Charge Density | Application |
|---|---|---|---|---|
| WD-7341 | Anion | High | Medium | Primary sewage treatment |
| WD-7281 | Anion | High | Medium-High | Primary sewage treatment |
| WD-7461 | Anion | High | High | Primary sewage treatment |
| WD-7183 | Cation | Medium | Medium-High | Activated sludge treatment |
| WD-7203 | Cation | Medium | Medium-High | Activated sludge treatment |
| WD-7223 | Cation | Medium-High | High | Digested sludge treatment |
| WD-7243 | Cation | Medium-High | High | Digested sludge treatment |

# Polyacrylamide for Industrial Wastewater Treatment

The WELLDONEFLOC® range of polymers and coagulants are widely used in the treatment of industrial wastewater, such as:

Paper
Textiles
Leather
Petrochemical
Oilfield
Food
Breweries
Electroplating
Pharmaceutical
Slaughterhouses

**Polyacrylamide for Industrial Wastewater Treatment**



Normally, it will be more effective by using combination of two or three types to get better results, particularly there are color matters in the waste water results, should accompany with coagulants for pre-treatment. Occasionally the pre-treatment may involve PH adjustment, then add coagulant and finally add flocculants to achieve the desired results.
If the wastewater had a biological treatment, a single cationic polymer will reach a desired result, and if there are too much BOD, COD, Oil and color matters, a pre-treatment is required.
After the treatment of flocculation, dewatering is required to increase the sludge mud density which will save more costs in transportation and treatment.

# Polyacrylamide for Sugar Industry

Effectively treating sugar syrup and wastewater, as well as improving the clarification and filtration of syrup, are crucial in sugar industry production. To address these issues, Polyacrylamide is widely utilized in the sugar industry. As an efficient ion polymer, Polyacrylamide provides an ideal solution for the sugar industry, effectively enhancing production efficiency, reducing energy consumption, and lowering environmental pollution.

## Product Features

**Efficient Flocculant:** Polyacrylamide performs excellently in syrup treatment, rapidly adsorbing suspended solids and impurities to form larger flocs, thereby increasing the clarity of syrup.

**Excellent Filtration Aid:** Polyacrylamide improves the filtration performance of syrup, reducing the moisture content of filter cakes, and enhancing filtration speed and efficiency.

**High Solubility:** The product demonstrates outstanding solubility, quickly and uniformly dispersing in syrup without forming lumps or residues, ensuring consistent treatment effects.

**Wide Adaptability:** Polyacrylamide can be adjusted according to the process requirements of different sugar factories to meet the needs of various treatment environments.

**Environmentally Friendly and Sustainable:** As an environmentally friendly product, Polyacrylamide does not generate harmful substances during use, making it eco-friendly and aligning with the sustainable development concept of modern sugar industry.





## Applications

**Sugar Syrup Treatment:** Polyacrylamide is used in sugar syrup treatment to aid in sugar extraction, reduce impurities in sugar syrup, and improve syrup quality.

**Syrup Clarification:** During syrup clarification, Polyacrylamide rapidly flocculates suspended solids, achieving the desired clarity of syrup.

**Wastewater Treatment:** As an efficient flocculant, Polyacrylamide is applied in sugar industry wastewater treatment to purify wastewater and meet discharge standards.

**Filtration Aid:** In syrup filtration processes, Polyacrylamide serves as a filtration aid, enhancing filtration efficiency and reducing energy consumption.

Polyacrylamide, as an important auxiliary agent in sugar industry production, plays an irreplaceable role in sugar syrup treatment, syrup clarification, and wastewater treatment. Its efficient, environmentally friendly, and sustainable characteristics make it an ideal choice for modern sugar industry production. We believe that choosing Polyacrylamide will bring higher efficiency and better quality products to your sugar industry production.

# Polyacrylamide for Textile Industry

WELLDONE CHEMICAL offers a wide range of rheology modifiers, thickeners, film formers and chemical additives to increase the productivity of the textile industry while reducing environmental impact by reducing wastewater discharge, water consumption and energy consumption. Polyacrylamide has various applications in the textile industry, including the following aspects:

**Thickening Agent:** PAM is widely used as a thickening agent in textile dyeing processes. It increases the viscosity of dye solutions, helping the dyes to evenly distribute on the fiber surface, thus improving the uniformity and quality of dyeing.

**Dispersing Agent:** PAM serves as a dispersing agent for textile dyes. It aids in the uniform dispersion of dyes in dye liquor, preventing dye particles from aggregating and precipitating, ensuring consistency and uniformity in dyeing.

**Antistatic Agent:** Static electricity is often generated during textile production and usage, leading to fiber adhesion and wrinkling. PAM, as an antistatic agent, reduces static electricity generation, improving the appearance and comfort of textiles.

**Modifier:** PAM can also function as a modifier for textiles, enhancing fiber softness, luster, and hand feel, thus providing textiles with better texture and comfort.

**Wastewater Treatment Agent:** Textile production generates a significant amount of wastewater containing various organic compounds and dyes. PAM can be used as a wastewater treatment agent to purify and treat textile wastewater, reducing water pollution.textiles.

In summary, PAM plays a crucial role in the textile industry, improving dyeing effects, enhancing production efficiency, and contributing to environmental protection and resource utilization.