The overall effect is that KANPAC*-10 strongly coagulates substances suspended or colloidal dispersed in water to produce good flocs which settle down rapidly to form an easily filterable sludge (see figures 1 and 2), even at unusually low and high turbidity levels and, more importantly, with much lower consumption. Accordingly, water treatment with KANPAC*-10 can be performed in smaller facilities than are usually needed with alum treatment. Alternatively, higher output and reduced backwash of filters can be achieved from existing water treatment plants. KANPAC*-10 requires alkalinity only to react with the Al³⁺ portion of the product. The polymeric portion requires little or no alkalinity at all. Therefore, KANPAC*-10 can function as a coagulant in waters containing little or no alkalinity. Thus, the pH depression with KANPAC*-10 is much less, especially in the light of lower dosage employed.

Therefore, it can be concluded that, with KANPAC*-10, not so much alkali aid is needed as with other coagulants because the pH value of water remains almost neutral even if an overdose of KANPAC*-10 takes place. Figure 3 illustrates this point. The cationically charged intermediates of KANPAC*-10 hydrolysis are available over a broad pH range, including above pH 6. Hence, KANPAC*-10 works in a wider range of pH than alum or other coagulants. KANPAC*-10 is generally useful in the range of pH 6-9 (see figure 4), but in some cases it is also serviceable in a wider range of pH 5 to 10. KANPAC*-10, is specially suited for raw water treatment in power plants due to the lower ionic load in the treated water. The lower residual aluminium in the water treated with KANPAC*-10 extends the life of ion exchange resins. Furthermore, the lower Cl⁻ concentration in KANPAC*-10, as compared to SO₄²⁻ concentration in alum and lower KANPAC*-10 dosage, reduces consumption of caustic soda for resin regeneration.
Advantages

- Ease of application
- Strong coagulating/flocculating power even at low turbidity levels
- Capability of treating storm water of unusually high turbidity
- Rapid formation of stable flocs of larger size
- No requirement of other flocculation aids
- Reduced sedimentation times
- Higher output from existing water treatment plants
- Reduced backwash of filters, much less wastage of water
- Causes only a small drop in pH value
- Reduced or no alkali aids for pH correction
- Effective in wide pH range
- Functions efficiently, even at low temperatures
- Lower consumption than other known inorganic flocculants
- Lower residual aluminium and other heavy metals compared to alum
- About 30% less sludge, cuts sludge dewatering and disposal costs
- Improves water quality significantly

Performance

It is a known fact that the availability of charged polymeric aluminium hydroxide species is the primary reason why polyaluminium chloride coagulates more efficiently than alum. The special feature of KANPAC®-10 is that it is able to use multisite adsorption, charge-neutralisation and bridging in order to remove colloids and suspended substances at a higher rate than monomeric aluminium species. The rate of KANPAC®-10 hydrolysis to Al(OH)$_3$$(H_2O)$_3$ is slow enough to allow for full charge neutralisation/destabilisation of colloidal particles prior to sweep floc formation, allowing for the adsorption of these destabilised colloidal or suspended contaminants onto the intentionally formed flocs, to take place.
The products

KANPAC®-10 and KANPAC®-10 MB are the latest generation polyaluminium chloride-based liquid coagulants manufactured in India by M/s Aditya Birla Chemicals Ltd., using state-of-the-art technology. The very special feature of this technology is that the product has enhanced coagulation/flocculation power, effective at extreme turbidity levels, wide pH and temperature range, most importantly with lower consumption, 30-50% of alum.

Chemical constituents of KANPAC®-10 and KANPAC®-10 MB include ions of aluminium hydroxide, chloride and small quantity of sulphate. Unlike alum, in KANPAC®-10 and KANPAC®-10 MB aluminium is mostly present in form of oligomeric and polymeric structures, only a very small portion of aluminium is present in monomeric form.

Technical superiority of KANPAC®-10 and KANPAC®-10 MB over alum is due to their polymeric structure that helps to form significantly large and stable 'flocs' (aggregate) which adsorb the colloids and other impurities present in water more effectively than alum. Besides, presence of hydroxide ions restricts the drop in pH of treated water. Reduction of pH is much less with KANPAC®-10 and KANPAC®-10 MB than with alum.

Specifications*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>KANPAC®-10</th>
<th>KANPAC®-10 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Almost clear pale liquid</td>
<td>Almost clear pale liquid</td>
</tr>
<tr>
<td>Alumina as Al₂O₃ % w/w, Min</td>
<td>10.5 ± 0.3</td>
<td>9.7 ± 0.2</td>
</tr>
<tr>
<td>Basicity, percent by mass, Min</td>
<td>64</td>
<td>35</td>
</tr>
<tr>
<td>Chloride, percent by mass, Max</td>
<td>10.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Sulphate as SO₄, percent by mass, Max</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Specific gravity at 25°C, Min</td>
<td>1.21 ± 0.02</td>
<td>1.20 ± 0.02</td>
</tr>
<tr>
<td>pH of 5% solution w/V</td>
<td>2.5-4.5</td>
<td>2.0-4.5</td>
</tr>
<tr>
<td>Viscosity (dynamic) at 20°C</td>
<td>3-30 mPa</td>
<td>3-30 mPa</td>
</tr>
<tr>
<td>Insolubles, percentage by mass, Max</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Toxic Substances, ppm, Max</td>
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<td>0.2</td>
</tr>
<tr>
<td>Mercury (as Hg)</td>
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<td>6</td>
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<tr>
<td>Arsenic (as As)</td>
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<td>30</td>
</tr>
<tr>
<td>Cadmium (as Cd)</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Chromium (as Cr⁶⁺)</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

* Subject to change due to technological advances & other changes
Sparkling clear water is not a dream... it is now a reality with
KANPAC®-10
KANPAC®-10 MB
Latest generation polyaluminium chloride products with enhanced coagulation.

www.adityabirlachemicals.com

ADITYA BIRLA CHEMICALS (INDIA) LIMITED
Other Polyaluminium Chloride products under our 
KANPAC® series are: 
KANPAC®-18 & KANPAC®-14 for paper sizing, and KANPAC®-18w, 
KANTREaT & KANCLEAR range of products for effluent and sewage treatment.

Our products do not come alone. These are carefully packaged with allied technical 
services for ultimate customer satisfaction.

FOR MORE DETAILS, TECHNICAL SERVICE AND 
PRODUCT ENQUIRIES PLEASE CONTACT:

ADITYA BIRLA CHEMICALS (INDIA) LIMITED

Delhi Office: 
309, World Trade Centre, 3rd Floor 
Barakhamba Road 
New Delhi -110001, INDIA 
Tel.: +91 (11) 41377735 
Fax : +91 (11) 41377748 
email : ajay.todi@adityabirla.com alokkumar.singh@adityabirla.com

Calcutta Office: 
‘INDUSTRY HOUSE’ 
10, Camac Street (17th Floor) 
Kolkata – 700 017, INDIA 
Tel.: +91 080171 47141 (m) +91 (33) 22827694

Manufacturing works: 
Renukoot - 231217, Dist. Sonebhadra, (U.P.) 
Phones : +91-5446-252075, 252044, 252055 • Fax : +91-5446-252088

visit us at www.adityabirlachemicals.com
KANPAC®-10 functions efficiently even at low temperatures which are normally encountered in winter. Figure 5 illustrates that while alum begins to lose its efficiency as coagulant below 18°C, KANPAC®-10 permits effective cleaning of water at very low temperatures.

**Test Results**

Laboratory tests were conducted at various water treatment plants, and the comparative consumption of alum and KANPAC®-10 to achieve a given level of turbidity, is shown graphically in the figure.

**Application**

KANPAC®-10 / KANPAC®-10 MB can be applied as such to any existing water treatment plant/equipment. What is necessary is just adding the undiluted solution of KANPAC®-10 to the raw water, followed by immediate high agitation to ensure proper mixing. In most plants, satisfactory results may be obtained even if the agitating condition is not altered. However, KANPAC®-10 / KANPAC®-10 MB has a greater speed of floc formation than alum, so it would be possible to shorten the slow agitating (or retention) time. The feeding rate or dosage should be changed according to the quality of raw water and it is necessary to determine an optimum feeding rate before-hand by means of a jar-test. Dosing is recommended by means of a polypropylene dosing pump, easily available at an affordable price.

**Storage / Handling**

Storages tanks and piping material for KANPAC®-10 / KANPAC®-10 MB can be either rubber-lined MS or FRP/HDPE/PVC. Existing alum solution tanks can also be easily used for storage of KANPAC®-10 / KANPAC®-10 MB by epoxy coating or lining the same with acid proof tiles, at minimal cost.