



Ciba Poly-MEC™ TECHNICAL CASE STUDY

The use of Poly-MEC technology to optimise the dewatering of digested primary/activated (DP/A) sludge using belt filtration

Overview

In this case study the use of a Poly-MEC DN80 in combination with very high molecular weight flocculants was used in order to provide increased throughputs through the dewatering process and thus provide the customer with greater sludge processing capability. This was required without increase in polymer usage or decrease in cake dry solids (ds) performance.

Process Description

The sludge produced at this particular municipal sewage treatment plant is a typical digested primary/activated sludge with feed solids around 2.20-2.30 %.

Dewatering takes place across three belt presses with design throughputs up to 30m³/hour each. However, it is normally only possible to process around 20m³/hour through each press.

The standard product is a medium molecular weight flocculant, Ciba® ZETAG® 7504 and is applied at dose levels around 6-7 kg/tds, at normal flocculant solution concentration of 0.4%. Required performance is minimum 17% cake dry solids to achieve a stackable cake for landfill and generally 16-17% dry solids is achieved.

The use of alternative flocculant types alone could not provide the increase in throughputs required. This normally results in belt flooding and/or extrusion of cake from the dewatering section of the belt press.

Solution

Ciba Technical Service personnel undertook a full-scale plant trial in conjunction with the customer. Various flocculant types i.e. different cationic content/molecular weight variants were evaluated in combination with the Poly-MEC. The Poly-MEC for the purpose of the trial was connected in-line with the sludge prior to the belt press. The Poly-MEC then allows for different mixing energies to be applied to the sludge and flocculant solution prior to dewatering. A Poly-MEC speed of around 1400 rpm was found to be the optimum for the process. Also, two other important factors to note are:

- 1) Application of flocculants at higher than normal concentrations is also a distinct advantage leading to more efficient polymer consumption and lowering water consumption
- 2) Consideration should also be given to optimising the belt speed in conjunction with the mixer to give the best performance

Overall, the trial led to more benefits than originally anticipated. Increased sludge throughputs of at least 50% were obtained. Not only was the flocculant dose rate and technical performance maintained but flocculant dose reductions up to 25% were achieved and cake dry solids improved by 15%.

Results

Trial 1

Product	Polymer Dose (kg/tds)	Polymer Solution Conc (%)	Sludge flow (m ³ /hour)	Cake Dry Solids (%)	Poly-MEC used
ZETAG® 7504	7.0	0.4	21 (Max.)	16	No
ZETAG® 7504	6.9	0.4	21 (max.)	16.2	Yes
ZETAG® 7689	6.6	0.4	29	17.5	Yes
ZETAG® 7689	5.5	0.6	29	18	Yes
ZETAG® 7689	5.5	0.8	29	17.5	Yes

Trial 2

Product	Polymer Dose (kg/tds)	Polymer Solution Conc (%)	Sludge flow (m ³ /hour)	Cake Dry Solids (%)	Poly-MEC

ZETAG® 7504	6.0	0.4	21 (Max.)	17	Yes
ZETAG® 7689	4.9	0.5	27	17.5	Yes
ZETAG® 7689	4.4	0.5	27	14	No
ZETAG® 8680	4.5	0.5	30	19	Yes

The results show that the use of Poly-MEC in combination with the incumbent product, ZETAG® 7504 could not provide the increase in throughput required.

High molecular weight, ZETAG® 7689 in combination with Poly-MEC gave both the increase in throughput required and a lower dosage level.

The use of high molecular weight UMA Technology ZETAG® 8680 also gave further improvements in throughput and greatly improved cake dryness.

Features and Benefits

The above trial has shown that the following benefits in the customers dewatering process were achieved using either ZETAG® 7689 and UMA Technology ZETAG® 8680 in combination with Poly-MEC technology. :

Increased throughputs up to 50% were achieved through the belt press. In fact the increase flow was limited due to the maximum flow of the sludge pumps.

Flocculant dose could be reduced by up to 25% by using either ZETAG® 7689 or ZETAG® 8680 flocculants in combination with the Poly-MEC.

Cake dry solids were improved by around 15% above the existing performance when ZETAG® 8680 was applied.

Technical Service

Full technical advice and assistance in all aspects of product selection, laboratory tests and plant trials will be provided.

Health and Safety

Detailed information on handling and any precautions to be observed in the use of the product(s) described in this leaflet can be found in our relevant Health and Safety information sheet.

Important Information

Copyright © 2008 Ciba. All rights reserved.

All trademarks mentioned are either property of or licensed to Ciba and registered in relevant countries.

IMPORTANT: The following supersedes Buyer's documents. SELLER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results are based on controlled or lab work and must be confirmed by Buyer by testing for the intended conditions of use. The product(s) has (have) not been tested for, and is (are) therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended. *Please note that products may differ from country to country.*

Europe

Ciba Specialty Chemicals Ltd
Water & Paper Treatment Segment
P O Box 38
Low Moor
Bradford
BD12 0JZ
England

Tel: +44 1274 417812
Fax: +44 1274 417000
E-mail: WTBL@ciba.com

North America

Ciba Corporation
Water & Paper Treatment Segment
2301 Wilroy Road
PO Box 820
Suffolk
Virginia 23439-0820
USA

Tel: +1 757 538 3700
Fax: +1 757 538 5038
E-mail: wtnafta@ciba.com

South America

Ciba Especialidades Químicas Ltda
Water & Paper Treatment Segment
Av. Professor Vicente Rao, 90
Brooklin Paulista
Sao Paulo 04706-900
Brazil

Tel: +55 11 55 32 71 22
Fax: +55 11 55 43 72 52

Asia

Ciba Specialty Chemicals Pte. Ltd
Water & Paper Treatment Segment
No 3 International Business Park
#05-01 Nordic European Centre
Singapore 609927
Singapore

Tel: +65 890 6100
Fax: +65 6890 6104

© Ciba, 2008

® indicates a registered trademark

™ indicates a trade mark