

**DEPENDABLE ANTIFOULANT PROTECTION
FOR CRITICAL CGC SYSTEMS**



**EFFICIENT
CGC
PERFORMANCE
THAT
LASTS**

DORF KETAL

*Innovation isn't just what we do.
It's who we are.™*

Protection for
the Heart of Your Ethylene Plant

CGC system efficiency declines over time as wear and deposits accumulate. Although you can't prevent the process, you can slow it down dramatically with monitoring and treatment optimized by Dorf Ketal for your plant's feedstock and operating conditions.



CGC Fouling
Is Continuous and Costly

Fouling is a continuous process driven by free radical chain propagation, oxidative and catalytic polymerization, and Diels Alder reactions.

Styrene, isoprene and related monomers in the process stream polymerize at typical CGC discharge temperatures of 80 °C (176 °F) or more. Catalytic action of iron oxide and oxygen or peroxides speeds the process.

Typical Monomers in CGC Foulants

Monomer	Boiling Point	
Naphthalene	218 °C	(424.4 °F)
Styrene	145 °C	(293 °F)
Propynyl benzene	181 °C	(357.8 °F)
Indene	177 °C	(350.6 °F)
Cyclohexadiene	80 °C	(176 °F)
Cyclopentadiene	41 °C	(105.8 °F)
Isoprene	34 °C	(93.2 °F)
Vinyl acetylene	6 °C	(42.8 °F)
1,3 Butadiene	-4 °C	(24.8 °F)

Their relatively high molecular weights cause polymerized foulants to fall out and adhere. Over time these polymers dehydrogenate, turning to dense, brittle coke-like deposits. Critical tolerances degrade and high-speed rotating components become unbalanced. Vibration and wear increase.

Wash Water and Wash Oil
Aren't Enough

Although you can lower discharge temperatures with wash water, high injection rates can cause surface erosion and pH must be controlled to prevent corrosion that can damage system components and further catalyze the fouling process.

If aromatic content is high enough, wash oil can also act as a solvent that helps keep foulants in the process stream for later removal. But wash oil isn't always available and it can be costly.

Dorf Ketal's Program Protects Three Ways

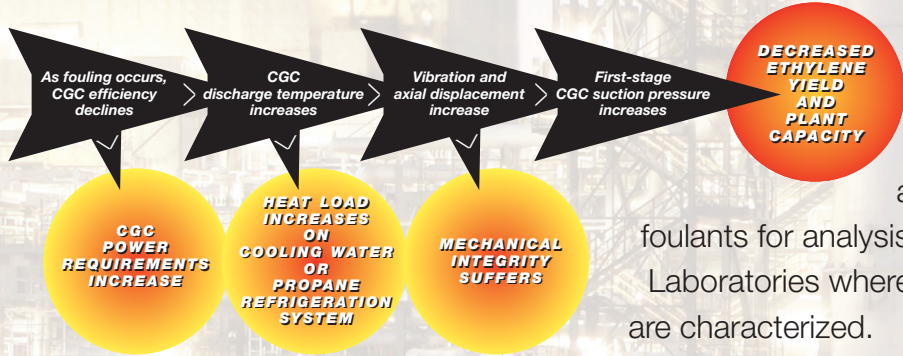
- 1. Highly Effective Chemical Treatment
- 2. Monitoring and Simulation
- 3. Exceptional On-Site Support

1

Highly Effective Chemical Treatment

Dorf Ketal antifoulants make wash water and wash oil treatment more effective by inhibiting polymerization. Unlike conventional amine-based formulations, Dorf Ketal's proprietary low-nitrogen antifoulant chemistry terminates free-radical formation, even in the presence of H2S.

The formulation includes a highly effective inhibitor that prevents solids/polymer formation in CGC systems.



2

Monitoring and Simulation

Fouling symptoms can appear suddenly and become severe very quickly. Monitoring and timely treatment with the right chemistry are critical.

Dorf Ketal's FAT™ (Fouling Assessment Tool) collects samples quickly and retracts to safely deliver

foulants for analysis by Dorf Ketal R&D Laboratories where key fouling reactions are characterized.

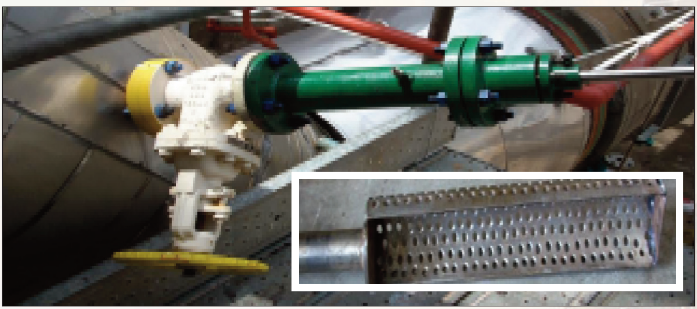
Energy consumption, polytropic efficiency and axial displacement trends are evaluated regularly by Dorf Ketal's technical services team. Dorf Ketal simulation tools model system

Your CGC systems will run cleaner, longer,
whatever you're feeding and whether you're using wash
water, wash oil or both.

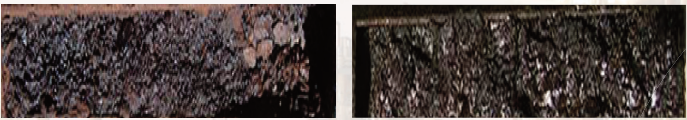
3

Exceptional On-Site Support

On-site Dorf Ketal technical support is available on request and includes a wealth of clear, actionable reports and on-the-spot analysis and recommendations by experienced professionals.



Dorf Ketal FAT™ (Fouling Assessment Tool) in Use
(insert shows FAT™ sample collection probe)



Typical FAT™ Samples

dynamics to provide you with valuable insight into CGC operation and accurate, effective recommendations tailored to your plant's unique requirements.

Improve
Efficiency and
Extend Run Length
Specify Dorf Ketal
Antifoulant Protection
for your
Ethylene
Plant

INNOVATIVE
TREATMENT

EFFICIENT CGC PERFORMANCE THAT LASTS

DORF KETAL

Innovation isn't just what we do. It's who we are.™



*Innovation isn't just what we do.
It's who we are.*TM

E-mail: Innovation@dorfketal.com
www.dorfketal.com

Discover what Dorf Ketal can do for you.

Dorf Ketal Chemicals (I) Pvt. Ltd.
#1 Dorf Ketal Tower, D'Monte Street
Orlem, Malad (W), Mumbai 400 064
Maharashtra, India
Tel: +91-22-2883-3900

Dorf Ketal Chemicals (I) Pvt. Ltd.
Manama, Kingdom of Bahrain
Tel: +97-33-678-0547

Dorf Ketal Brasil Ltda
Rua Luiz Manoel Gonzaga 450/601
Porto Alegre – RS – Brasil
CEP: 90470-280
Tel: +55-51-3061-2211

Dorf Ketal Chemicals Shanghai Ltd.
City Center, 100 Zunyi Road, Unit 1504, Tower A
Shanghai 200051, China

Dorf Ketal B.V.
De Ring, Weegschaalstraat 3
5632 CW Eindhoven
Netherlands
Tel: +31-40-290-1385

Dorf Ketal Chemicals Pte. Ltd.
#04-56 German Centre
25 International Business Park
Singapore 609916
Tel: +65-6562-8250

Dorf Ketal Chemicals LLC
11200 Westheimer Road – Suite 400
Houston, Texas 77042
USA
Tel: +1-713-343-2377