

ANKOR[®] Dyne 30 MS

Foamless, PFOS-free Chrome Mist Suppressant

In most world markets, air borne emissions from chrome processes have become subject to regulations that are expected to become even more stringent in the years ahead. As ANKOR[®] Dyne 30 MS does not develop any foam, users can significantly lower surface tension versus other mist suppressants. The surface tension can be maintained at or below 30 dyne/cm (30 mN/m) versus approximately 35 dyne/cm offered with conventional technology.

With lower surface tension, the size of the gas bubbles evolving from the solution is reduced. Very small gas bubbles do not bring enough kinetic energy to the solution surface to generate chrome containing mist. In this way, ANKOR Dyne 30 cost-effectively addresses air borne emission regulations without the need to purchase and maintain expensive new equipment or equipment upgrades to comply with regulations. ANKOR Dyne 30 MS offers air borne emission control to customers and applications that can't use other chrome mist suppressants due to excessive foam or pin hole formation, a defect commonly associated with using traditional surfactants in hard chrome processes.

Why Foam-free versus a Low Foam Mist Suppressant?

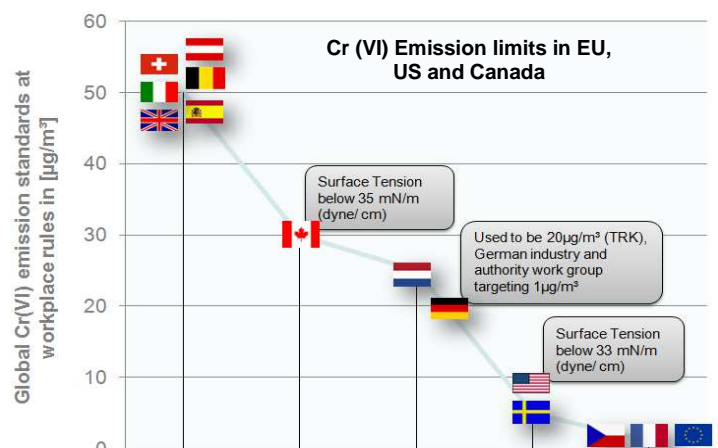
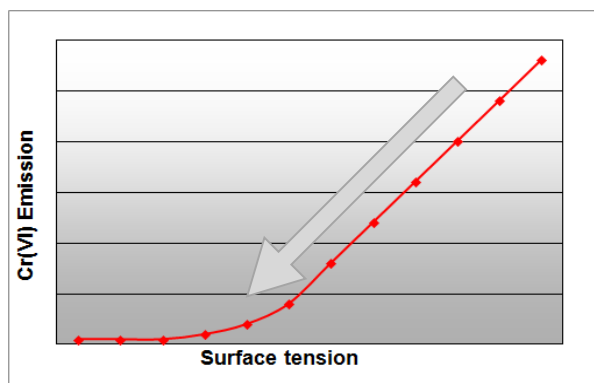
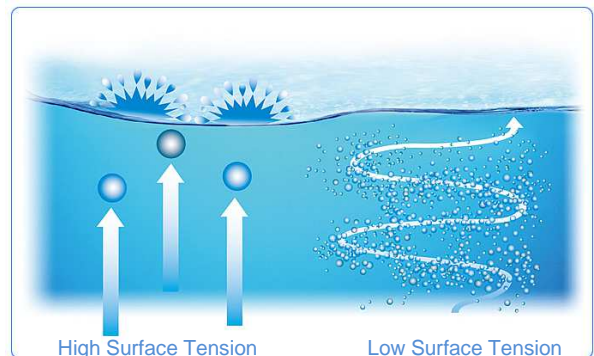
Foam-free surfactants generate significant benefits to the compared with low foaming types, including:

- Reduced drag-out, contaminations and maintenance of equipment and LEV
- Automated dosing, ampere-hour controlled
- Wide operating window, extended manual dosing intervals
- Elimination of potential hydrogen detonation
- Highly stable in oxidizing environment, even at higher electrolyte temperatures
- Excellent solubility in aged solutions; no risk of pores
- Simple and reliable analysis method and Cr(VI) emission management by surface tension
- Ideal for use in vacuum evaporating systems
- Meets future requirements now

Proven to Meet Global Regulations

In accordance with COMMISSION REGULATION (EU) No 757/2010 of 24 August 2010, the exemption for the continued use PFOS in electroplating expires. The use of PFOS in electroplating systems will not be allowed after 26 August 2015. An extension of the deadline is not to be expected, in view of the successful PFOS phase out in North America and the availability of PFOS-free

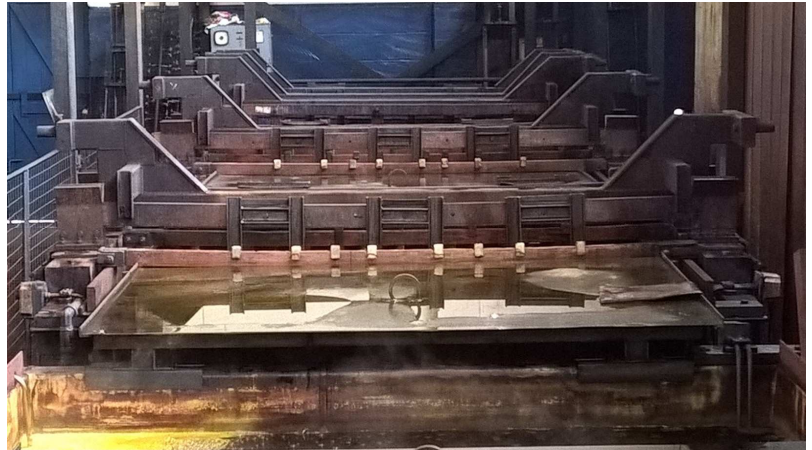
replacement products. PFOS has mostly been used as a surfactant in Cr(VI) solutions. Based on our broad experience and with the background of many customers now being PFOS-free in different applications, Enthone is the technology leader for PFOS-free solutions. Roughly half of our European customers have converted to alternative materials; many American customers have also converted over the last two years.



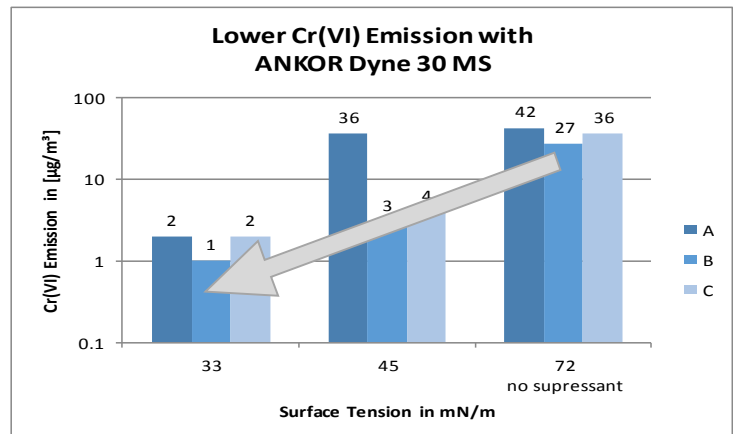
ANKOR Dyne 30 MS in hard chrome plating lines

- Plating line is equipped with local extraction ventilation
- Ratio of total current vs. bath surface I_s between 1000 – 2000 A/m², which is typical ratio for hard chrome
- Surface tension is controlled with ANKOR Dyne 30 MS
- Cr(VI)-Emissions is monitored by an independent and competent expert
- **Please note:** To comply with future Cr(VI)-Exposure levels of < 1 µg/m³, dictated by REACh, **Cr(VI)-Emission** at the line must not exceed **5 µg/m³** (please see chart)

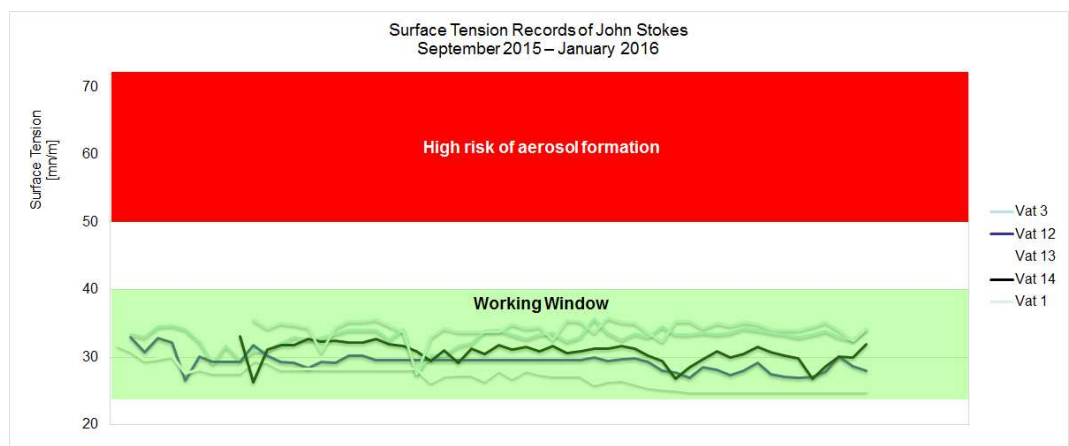
The mist suppressant in combination with local exhaust ventilation has proven to be an essential risk minimization measure that allows downstream users of chrome plated parts to plan with confidence beyond the sunset date.



Plating line at John Stokes Ltd.



As shown at John Stokes, frequent monitoring of the surface tension is easily possible and thereby enables the user to meet future exposure limits (e.g. by REACh).



AMERICAS: 350 Frontage Road, West Haven, CT 06516 • Tel: 203-934-8611 • americas@enthone.com
ASIA: 8/F., Paul Y Centre, 51 Hung To Road, Kwun Tong, Kowloon, Hong Kong • Tel: 852-2499-7299 • asia@enthone.com
EUROPE: Elisabeth-Selbert-Straße 4, 40764 Langenfeld, Germany • Tel: 49-2173-8490-0 • europe@enthone.com

enthone.com

Issued: December 2014
 Supersedes: New
 © Registered Trademark of Enthone Inc.
 © 2014 Enthone Inc.
 Tech Update 1_ANKOR Dyne 30 MS_Emissions Study_EN

enthone®
 an Alent plc Company