CHROME FREE PASSIVATION ALTERNATIVE

INTRODUCTION

APEAL is the Association of European Producers of Steel for Packaging.

APEAL and its members have been actively developing an **alternative process to the use of hexavalent chromium in the passivation of tinplated steel (ETP).** Hexavalent chromium is used globally for the passivation of steel for packaging; passivation being the process by which the growth of tin oxide is controlled on tinplate. Control is necessary because continued growth of an oxide layer could impair lacquer adhesion and affect welding.

The continued use of hexavalent chromium substances in the manufacture of ETP is **subject to a time-limited authorisation permit at European Union level** as these substances have been identified as Substances of Very High Concern (SVHC), resulting in their inclusion in REACH Annex XIV (Authorisation list).

So even though no hexavalent chromium is present in or on the end product, its use in passivation **will no longer be permitted in the EU/EEA[1],** and will be phased out within the time-limited authorisation period as the alternative is qualified.

The **new innovative tinplate passivation system,** developed in Europe by APEAL's members, is called **Chrome Free Passivation Alternative (CFPA).**

CFPA PASSIVATED MATERIAL IS COMMERCIALLY AVAILABLE FROM APEAL MEMBERS FOR BOTH TRIALS AND FULL-PRODUCTION. FULL SUPPORT IS OFFERED TO HELP CAN-MAKERS TRANSITION TO THIS NEW, INNOVATIVE DEVELOPMENT.

[1] The EEA is the EU plus Norway, Iceland and Liechtenstein

OIL LAYER
(< 0.001μm)

CFPA PASSIVATION LAYER
(0.003μm)
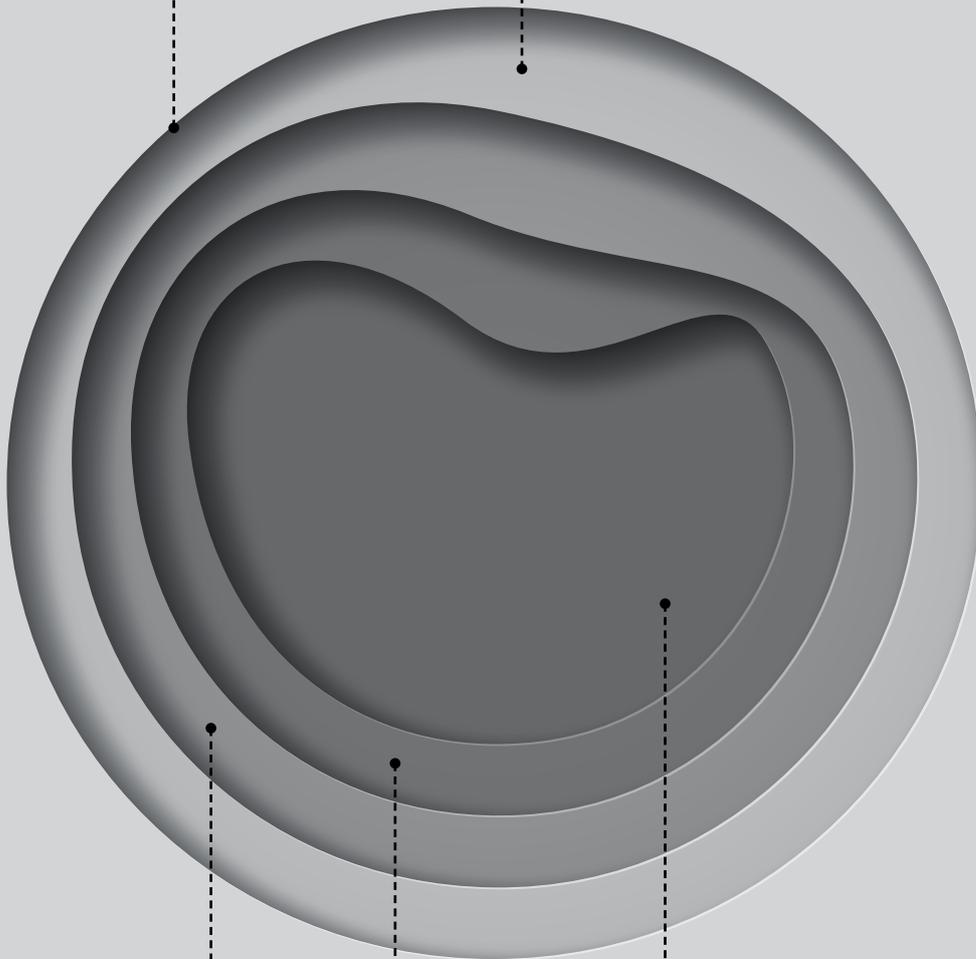
FREE TIN
(0.3μm)

BASE STEEL
(120 – 450μm)

TIN/IRON ALLOY
(0.1μm)

Schematic structure (not to scale) of tinplate showing the main functional layers

INNOVATIVE & SUSTAINABLE PRODUCTION

Steel for Packaging is the most recycled packaging material in Europe with a more than **80 % recycling rate.** In addition, being a permanent material, it can be infinitely recycled without any loss of its intrinsic properties.

CFPA is 100 percent hexavalent chromium-free. The protective layer stabilises the tin oxide in a similar manner to chromium passivation, preventing further surface oxidation and ensuring the desired product performance. As chromium passivation and CFPA demonstrate equivalent control of tin oxide growth, their shelf-lives are equivalent.[2]

CFPA is also available in 2 variations: Code 505 (without a conditioning step) and Code 555 (with a conditioning step).

EuroNorm (EN10202): Within the EuroNorm (EN 10202), standards are defined for CFPA passivated tinplate for both variations of the material variants (505 and 555) for e.g. tin oxide. This has been agreed and updated, and will be published in 2021.

Food Contact approvals for CFPA: CFPA complies with food contact regulations for human food in Europe and is in the process of being finalised in Mercosur and China. CFPA has also obtained a listing on FDA Effective Food Contact Notification (FCN) inventory for human food and dry infant formula to cover the USA.

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[2] Please contact your APEAL tinplate supplier to discuss your requirements for specific shelf-life.
[3] Packtesting of CFPA is recommended to ensure equivalent performance in all desired product applications.

BOTH VARIATIONS OF CFPA (505 & 555) OFFER THE SAME FUNCTIONALITY AND COMPLIANCE AS CHROMIUM-BASED PASSIVATION SYSTEMS AND WILL PROVIDE AN EQUIVALENT LEVEL OF TECHNICAL PERFORMANCE[3]; ALL THROUGH A MORE ENVIRONMENTALLY SUSTAINABLE MANUFACTURING PROCESS.

Functionality and Usability of CFPA:

CFPA passivated tinplate can be used to manufacture all product types, subject to successful packtesting of the material. In addition, CFPA material has equivalent speed compatibility to chromium passivated material meaning that there are no negative impacts to the can making process.

CFPA is also equivalent to (⬌) or (⬆✦) better than chromium passivated material in key technical specifications and functionalities:

PARAMETER	CFPA STATUS / PERFORMANCE*
Product range (tempers, dimensions, surface finishes (oil, roughness))	⬌
Market segments and applications (Food, Beverage, Aerosol, General Line, Closures, etc.)	⬌
Surface appearance	⬌
Passivation homogeneity	⬌
Passivation tolerances	⬌
Tin oxide growth resistance	⬌
Formability	⬌
Weldability	⬌
Wettability	⬆✦
Direct printability	⬌
Lacquer / laminate adhesion[§]	Evaluations are ongoing by canmakers. Performance depends on a combination of lacquer / laminate system, filling good and testing parameters
Sulphide staining resistance	
Corrosion resistance	

* Performance when compared to chromium passivated tinplate.
§ Lacquer adhesion and compatibility with lacquers is critical to ensure chemical resistance but depends on the performance of the whole system. Consequently, specific systems should be checked to ensure expected results.

THE TIME TO ACT IS NOW!

The current hexavalent chromium-based technology will be replaced due to regulatory action at an EU level. If you have not already started, **it is advised that you engage in testing CFPA material as there is not much time left** **for hexavalent chromium-based systems.** CFPA will offer equivalent performance, in a more sustainable way; and has been developed to ensure continued manufacture of high-quality material.

ACT NOW BY CONTACTING YOUR APEAL TINPLATE PROVIDER TO DISCUSS THE BEST WAY FORWARD FOR YOUR COMPANY.

![APEAL]

APEAL

Avenue Ariane 5 | BE-1200 | Brussels | Belgium
Tel: +32 2 537 9151
www.apeal.org
www.steelforpackaging.org

APEAL MEMBERS

ArcelorMittal www.arcelormittal.com/packaging
Liberty www.libertyhousegroup.com
Tata Steel www.tatasteeleurope.com/packaging
thyssenkrupp Rasselstein www.thyssenkrupp-steel.com/products/packaging-steel
U.S. Steel Košice www.usske.sk

APEAL – the Association of European Producers of Steel for Packaging – unites the five producers of steel for packaging in Europe. Founded in 1986, APEAL represents:

METAL
recycles
forever