

October, 2022



# **CHROME FREE PASSIVATION ALTERNATIVE**

# INTRODUCTION

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** and in the UK, as these substances have been identified as Substances of Very High Concern (SVHC) resulting in their inclusion in REACH Annex XIV (Authorisation list).

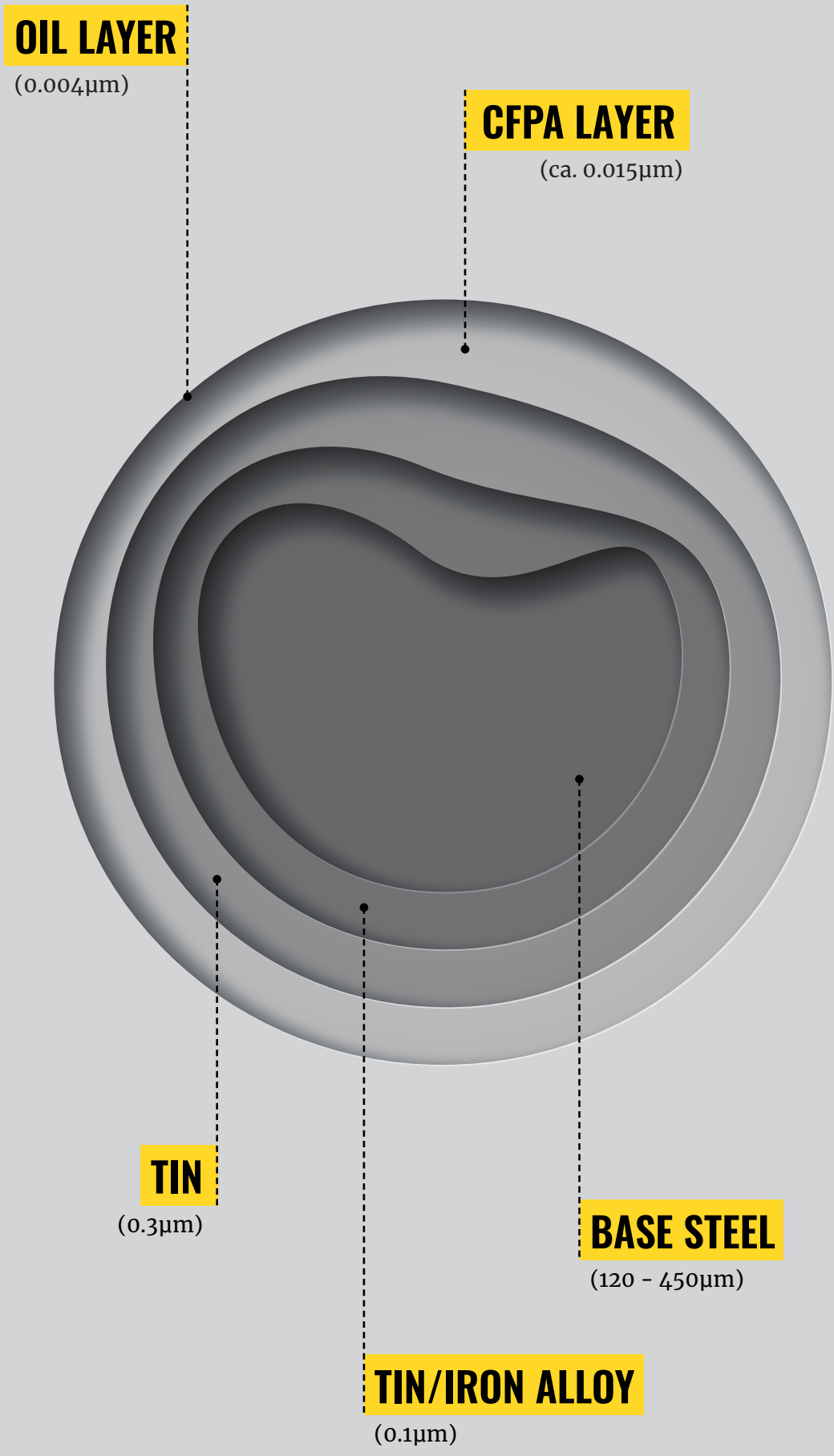
Though no hexavalent chromium is present in or on the end product, its use in passivation will no longer be permitted in the EU/EEA, and **will** be phased out within the time-limited authorisation period – currently set at 2024 in the EU and UK for the entire sector – as the alternative is qualified.

APEAL- the Association of European Producers of Steel for Packaging – and its members have been actively developing an **alternative process to the use of hexavalent chromium in the passivation of tinned steel (ETP)**.

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

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**CFPA PASSIVATED MATERIAL HAS BEEN COMMERCIALY AVAILABLE FOR SEVERAL YEARS FROM APEAL MEMBERS TO CUSTOMERS AROUND THE WORLD FOR BOTH TRIALS AND FULL-PRODUCTION. FULL SUPPORT IS OFFERED TO HELP CAN-MAKERS TRANSITION TO THIS INNOVATIVE, SUSTAINABLE AND GREEN ALTERNATIVE.**



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 **85.5 % recycling rate**.<sup>1</sup> In addition, as a permanent material it can be infinitely recycled without any loss of its intrinsic properties.

CFPA contains Titanium and Zirconium oxides and 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. It can be applied via spray or roll coating. As chromium passivation and CFPA demonstrate equivalent control of tin oxide growth, their shelf-lives are equivalent.<sup>2</sup>

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

Furthermore, CFPA is a robust, mature process, with multiple sources of supply ensuring broad

customer choice in terms of material specification.

## **Standards:**

Within the EuroNorm (EN 10202) standards are defined for CFPA passivated tinplate for both of the material variants (505 and 555) for tin oxide, and titanium coating weight. These have been agreed and updated in the most recent version of the standard that was published in 2022.

APEAL have also been liaising with the committees responsible for the ASTM and ISO standards for ETP material. The updates to these standards will, therefore, also include references to CFPA.

## **Food Contact approvals for CFPA:**

CFPA complies with food contact regulations for human food in Europe, Mercosur<sup>4</sup> and China<sup>5</sup>. CFPA has also obtained an FDA Food Contact Notification (FCN) for human food and dry infant formula to cover the USA<sup>6</sup>.

<sup>1</sup> APEAL 2020 rates EU27+ Norway, Switzerland & UK.

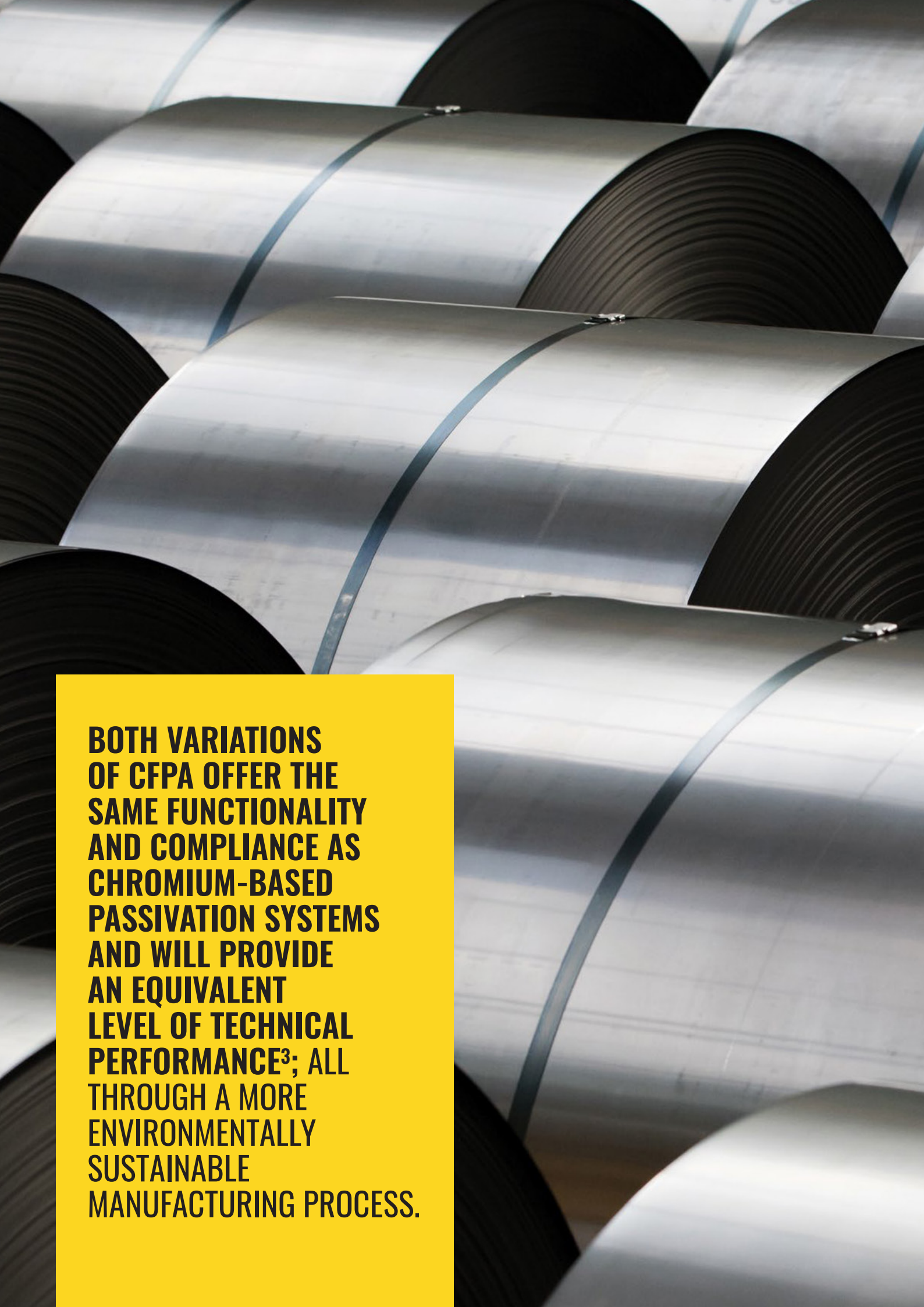
<sup>2</sup> Please contact your APEAL tinplate supplier to discuss your requirements for specific shelf-life.

<sup>3</sup> Pack-testing of CFPA is recommended to ensure equivalent performance in all desired product applications.

<sup>4</sup> Resolution MERCOSUR/GMC/RES. No. 03/92

<sup>5</sup> GB 4806.9-2016 National Standard for Food Safety Metal Materials and Products for Food Contact

<sup>6</sup> FCN1661



**BOTH VARIATIONS  
OF CFPA OFFER THE  
SAME FUNCTIONALITY  
AND COMPLIANCE AS  
CHROMIUM-BASED  
PASSIVATION SYSTEMS  
AND WILL PROVIDE  
AN EQUIVALENT  
LEVEL OF TECHNICAL  
PERFORMANCE<sup>3</sup>; ALL  
THROUGH A MORE  
ENVIRONMENTALLY  
SUSTAINABLE  
MANUFACTURING PROCESS.**

## Functionality and Usability of CFPA:

CFPA passivated tinplate can be used to manufacture all product types.

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*
<b>Product range</b> (tempers, dimensions, surface finishes (oil, roughness))	↔
<b>Market segments and applications</b> (Food, Beverage, Aerosol, General Line, Closures, etc.)	↔
<b>Surface appearance</b>	↔
<b>Passivation homogeneity</b>	↔
<b>Tin oxide growth resistance / Yellowing</b>	↔
<b>Formability</b>	↔
<b>Weldability</b>	↔
<b>Wettability</b>	↑+
<b>Direct printability</b>	↔
<b>Lacquer / laminate adhesion<sup>§</sup></b>	Evaluations are ongoing by canmakers. Performance depends on a combination of lacquer / laminate system, filling good and testing parameters
<b>Sulphide staining resistance</b>	
<b>Corrosion resistance</b>	

\* 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 given that there is not much time left for hexavalent chromium-based systems.**

CFPA will offer equivalent performance in a more green and sustainable way. It has been developed to ensure continued supply of high-quality material and is available to all customers around the world.

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



## APEAL

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## APEAL MEMBERS

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**Tata Steel** [www.tatasteeleurope.com/packaging](http://www.tatasteeleurope.com/packaging)

**thyssenkrupp Rasselstein** [www.thyssenkrupp-steel.com/products/packaging-steel](http://www.thyssenkrupp-steel.com/products/packaging-steel)

**U.S. Steel Košice** [www.usske.sk](http://www.usske.sk)

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



**TATA STEEL**

