

**CC8 Recommended Practices**  
**Specification and Configuration /**  
**Product Coding /**  
**Documents and Transformation Matrices**

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## 1 Introduction

This paper reflects the work of the working group 1.3 (WG 13) of the PDMI2 project and the continuing work of the project group "Specification and Configuration" within the ProSTEP Association. These working groups deal with the representation of Bill of Material (BoM) and Product Coding (PC) data applying AP 214 (DIS) , CC8i. Changes and extensions of the FDIS version are added in this document. This work was performed on a regular bases within the PDMI2 project and the ProSTEP Association and was directed to the following overall objectives:

1. Investigate the ability of the STEP AP214 CC8 data model to represent the Product Coding
2. Understand what information can be exchanged with AP214
3. Understand what level of quality can be achieved in the exchange of data
4. Understand what type of information needs to be transferred manually and what information can be transferred automatically using STEP
5. Investigate whether/which overall agreements need to be taken between the STEP members, to allow the STEP standard to be applied

There were very few pre-existing experiences regarding this conformance class and its application. Therefore and as the above listed objectives suggest, the investigation about the application was performed on basic level to discover if the users needs and requirements could be represented appropriately.

In order to understand the companies requirements a representative number of instantiation examples were prepared. These examples were mainly used to achieve a common understanding in the group and to enable the participants to discuss their requirements in "one language" - STEP. The examples themselves are neither complete nor perfect but were developed as far as necessary for the above mentioned purpose.

Participants in the group came from the companies which are listed below (in varying compositions), and were usually dealing with the companies internal BoM and PC systems.

- BMW AG
- DaimlerChrysler AG
- Delphi Automotive Systems GmbH
- Continental Teves AG & Co. oHG
- Robert Bosch GmbH
- Scania AB
- Volkswagen AG
- Volvo AB
- Dr.Ing.h.c.Porsche AG
- EDS/UG
- Eigner+Partner GmbH
- SAP AG
- Steyr-Daimler-Puch Fahrzeugtechnik AG (SFT)

All systems of which data was instantiated and therefore represented by STEP are in-house developments of the involved companies. The main purpose for these system developments were the following two aspects:

- Documentation of product structures and variants

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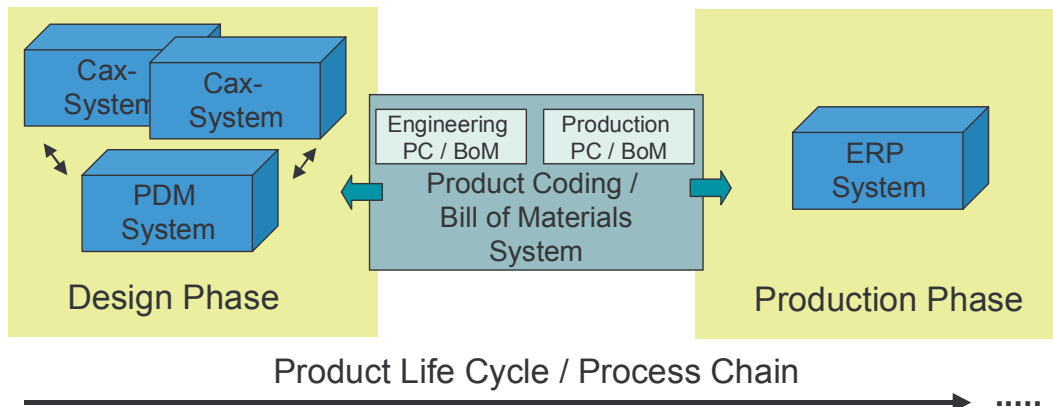
<sup>i</sup> \*ISO 10303 STEP:Standard for the Exchange of Product Model Data ;

AP 214 Application Protocol 214: Core Data for Automotive Mechanical Design Processes;

CC8: Conformance Class 8 - Conformance Class for configuration controlled design without shape representation

- Purpose of evaluation of valid orders or technically feasible products

The Figure 1.1 below shows the environment of today's BoM systems in the automotive industries.



**Figure 1.1: BoM Systems and environment**

These systems cover in detail the following functionality:

- Management of product classification
- Management of product structures (variants and assemblies)
- Management of configuration structures (rules etc.)
- Management of changes
- Management of effectivity
- Management of Bill of Material
- Evaluation of valid single vehicles

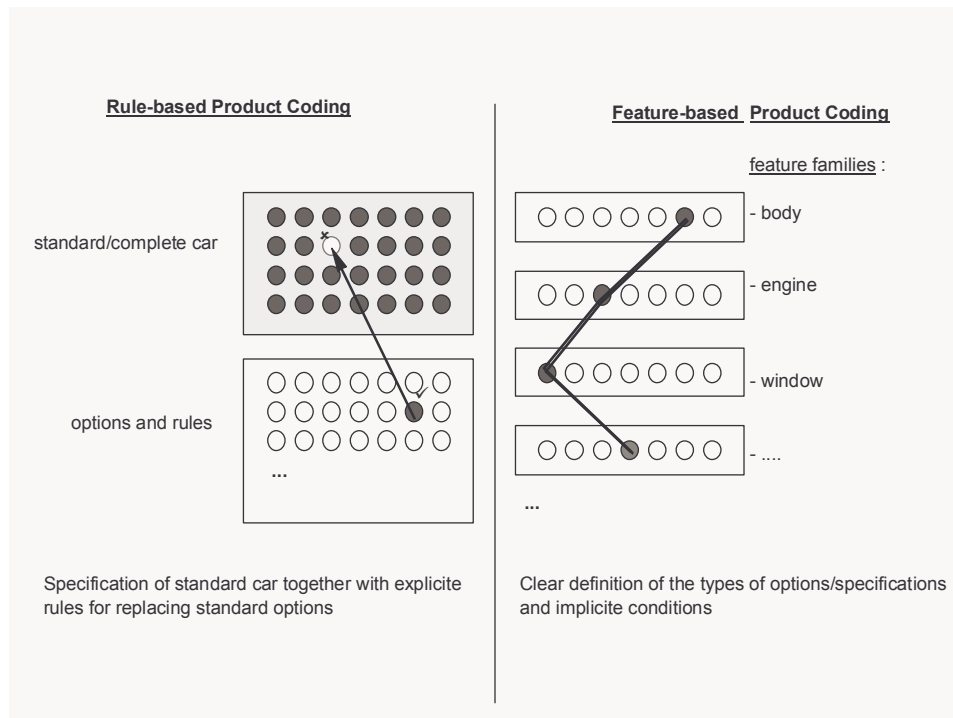
This document also involves results and experiences from the following projects or application projects: PCI (BMW - Rover), DaimlerChrysler - SFT (PDM12 Application Project) and TBB (Integration truck manufacturers and truck body builders)

#### Principle approaches of Product Coding

In general two basic approaches to product coding exist (see Fig. 2).

Rule-based product coding systems define standard vehicles, which comprise the maximum amount of components of one certain vehicle family. Additionally defined rules and options allow the determination of particular components of single vehicles by specifications and specification combinations.

Feature-based systems use feature families, which each comprises all possible variants of that certain feature family. Within the product structure of a single vehicle exactly one variant of each feature family is allowed to be chosen. The variants are defined mutually exclusive in one feature family.



**Fig. 1.2: Approaches to Product Coding**

Transferring information from one approach to the other might probably cause a loss of information. A specific adoption might be necessary in those cases. For this, STEP AP 214 provides the common basis for concrete data exchange scenarios and projects.

## 2 Scope

In order to provide a practical recommendation for the application of objects of AP 214 CC8 a specific application scenario to be addressed has been defined as the basis for the considerations which lead to this document.

In order to develop a recommendation of how to apply AP 214 ARM objects for the exchange of Bill of Material and Product Coding information, the mentioned work groups agreed to focus in its consideration on the exchange of this type of information between OEMs and their suppliers. In this exchange scenario this type of information is already exchanged today.

The purpose of this exchange is to communicate which parts and structures have changed in a specific period of time to a supplier. These changes are the basis for the supplier to control his development activities for the client. This also involves information about which changes are of interest for the supplier (which are the relevant variants of the product).

As more and more supplier develop systems for their customers, which usually can be used for a number of different variants of a product, this type of information becomes more and more important. In long terms there will also be a feedback of Product Coding information from the suppliers side.

The described recommendations should apply to first and second (or further) row suppliers.

## 3 Glossary

Due to the complexity of specification and configuration of variant products the various terms used in this area are used with various different semantics. In this section the main terms are explained in the way the project group members do understand them.