RDS-PP – Transition from the KKS to an international standard

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Abstract:

New and withdrawn standards and the revised EU Directives relating to reference designation and plant documentation also have a significant impact also on the KKS power plants reference designation system run by VGB PowerTech.

To gain acceptance on the international markets, to ensure compliance with valid standards in conjunction with conformity declarations and to satisfy safety provisions in plants, both manufacturers and operators needed to adopt the KKS to current rules and regulations.

The work was carried out in the VGB "Reference Designation and Plant Documentation" Working Panel and resulted in a technical standard for reference designation in power plants and a key for power plant systems - the "system key". Experience and known potentials for improvement in the use of KKS complete the adoption and creation of the KKS replacement system. The new standardized reference designation system is called

Reference Designation System for Power Plants RDS-PP

The technical standard is based on the basic principles of international standards and takes into account nearly all the KKS structures. Around 90% of the code letters in the KKS function key were transferred to the new system key. KKS aggregate and equipment key will be replaced in the new reference designation system by a standard in which the code letters are standardised globally for specialist areas and sectors. These code letters do not unfortunately always match the KKS-specifications.

There are tools available for comparing RDS-PP to KKS and for performing the required conversion from KKS to RDS-PP. These tools support the transfer of the KKS function key to the RDS-PP system key and from the aggregate and equipment key to the code letters in the international standard.

The article depicts the development of the new reference designation system from the point of view of standardisation, describes the main features, mentions offers of support by the VGB “Reference designation and plant documentation” working panel and provides recommendations for future use.

1. General

The KKS Identification System for Power Stations has been successfully used worldwide since the early nineteen seventies for the designation of plants, technical equipment and components in power plants.

The issuing of international basic standards on reference designation in the year 1996 and the quoting of such standards in European directives and harmonized standards called for an adjustment of the KKS to such specifications.

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The main motivation for this was for the manufacturers to assert themselves in the European and worldwide markets by ensuring conformity with the standards and for the power plant operators to avail themselves of a standardized equipment designation basis for their work.

The basic principles necessary for such adjustment and certain amendments of the KKS were developed in the VGB Working Panel "Reference Designation and Plant Documentation" jointly by manufacturers and operators and contributed to the national and international standardizing activities. The main objective was to arrive at a sector-specific standard for power plants. The result is now available:

In April 2007, the Joint Committee for Reference Designation Systems (GAKS) at the DIN published the national standard DIN 6779-10 "Structuring principles for technical products and technical product documentation – Part 10: Power plants".
The reference to the basic standard IEC 61346-1 bearing the subtitle "Structuring principles and Reference designation" then gave the name for the KKS successor system:

Reference Designation for Power Plants – RDS-PP.

2. History

In March 1969, three manufacturing companies published in the technical journal "*Elektrizitätswirtschaft*", an article entitled "*System zur Kennzeichnung von Geräten und Anlagen in Wärmekraftwerken*" (System for the designation of components and plant equipment in thermal power plants). The designation system referred to in this article was designed for the needs of planning, constructing and operating mechanical and electrical systems and in application became known by the name of "*Anlagenkennzeichnungssystem*" (Plant Designation System), in short "AKS" or "AKZ System". The system used various code letters from other standards, e.g. the "device identifier" for electrical components from DIN 40719, supplementary sheet 1.

In the early nineteen seventies, the experience gained in the application of the AKZ System resulted in the further development of the system by the VGB Working Panel "Technical Classification Systems", in which operators, experts, authorities and manufacturers were equally represented.

The result, the "KKS Identification System for Power Stations" was published by VGB as Guideline B105. The guideline was complemented by so-called "Key Parts" (function, equipment unit and component keys) and "Application Explanations". Apart from electrical components, also equipment items of mechanical systems could be identified according to the KKS specifications. Furthermore, the KKS was used as a basis for the designation of signals, connections and documents.

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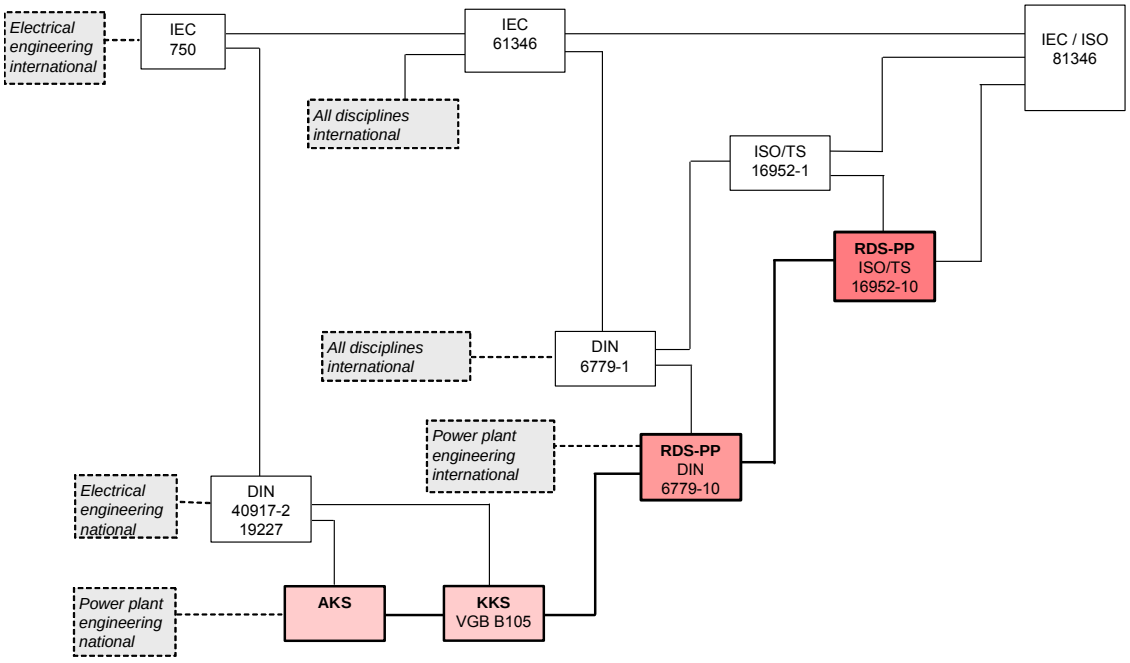


Fig. 1 – Development of the sector-specific standard for power plants

The publication of IEC 61346-2 and DIN EN 61346-2 for the classification of technical objects across all technical disciplines and the associated withdrawal of DIN 40719-2 in the year 2000 resulted in a situation where KKS code letters are used that are not covered by a valid standard. International specifications and requirements were thus no longer reflected in the KKS.

This was an urgent reason to revise the KKS and adjust it to the new requirements resulting from the international codes. Taking into account DIN 6779-1, members of the VGB Working Panel "Reference Designation and Plant Documentation" (successor panel of the Working Panel "Technical Classification Systems") were instrumental in developing the sector-specific standard for power plants DIN 6779-10 entitled " Structuring principles for technical products and technical product documentation – Part 10: Power plants".

This national standard was submitted as a proposal to the ISO and accepted. It is currently undergoing the consultation process and is expected to be published in early 2008 as an international standard under the number ISO TS 16952-10. IEC and ISO have agreed to publish the various standards relating to reference designation resulting from the ongoing revision work under a common series of standards with the number 81346.

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3. Characteristic features

The Reference Designation System for Power Plants – in short RDS-PP – results from the consistent further development of the successful KKS Identification System for Power Plants. It has thus the characteristic features of a proven identification system:

- applicability to all power plant types,
- consistency throughout the entire life cycle,
- identity in sense for all technical disciplines,
- language independence.

The RDS-PP expands the KKS by the designation blocks

- "Conjoint designation" for the designation of plant sites and plant complexes, and
- "Functional allocation" for the designation of dynamic processes.

The RDS-PP is based on structuring principles, designation rules and letter codes specified in international standards published by IEC and ISO and fulfils the prerequisites for

- finding worldwide acceptance, and
- application of the same, standardized code letters.

The RDS fulfils the requirements of European Directives in terms of

- operational safety,
- ergonomics,
- procurement, and
- declaration of conformity.

The RDS-PP is in full agreement with the national/international sector-specific standards for power plants DIN 6779-10:2007-04 and ISO/TS 16952-10 and thus complies with the mentioned international standard for reference designation systems.

The RDS-PP can thus be considered to be a standard-conforming designation system.

4. Codes of practice

The Reference Designation System for Power Plants RDS-PP consists of the following standards, guidelines and application explanations:

- Sector-specific standards DIN 6779-10 and ISO TS 16952-10,
- Guideline VGB B101d and B101e for power plant systems (System key)
- Basic standards DIN 6779-2 and IEC PAS 62400
- Discipline-specific and power plant-specific application explanations.

Figure 2 gives an overview of the codes of practice, including the basic standards

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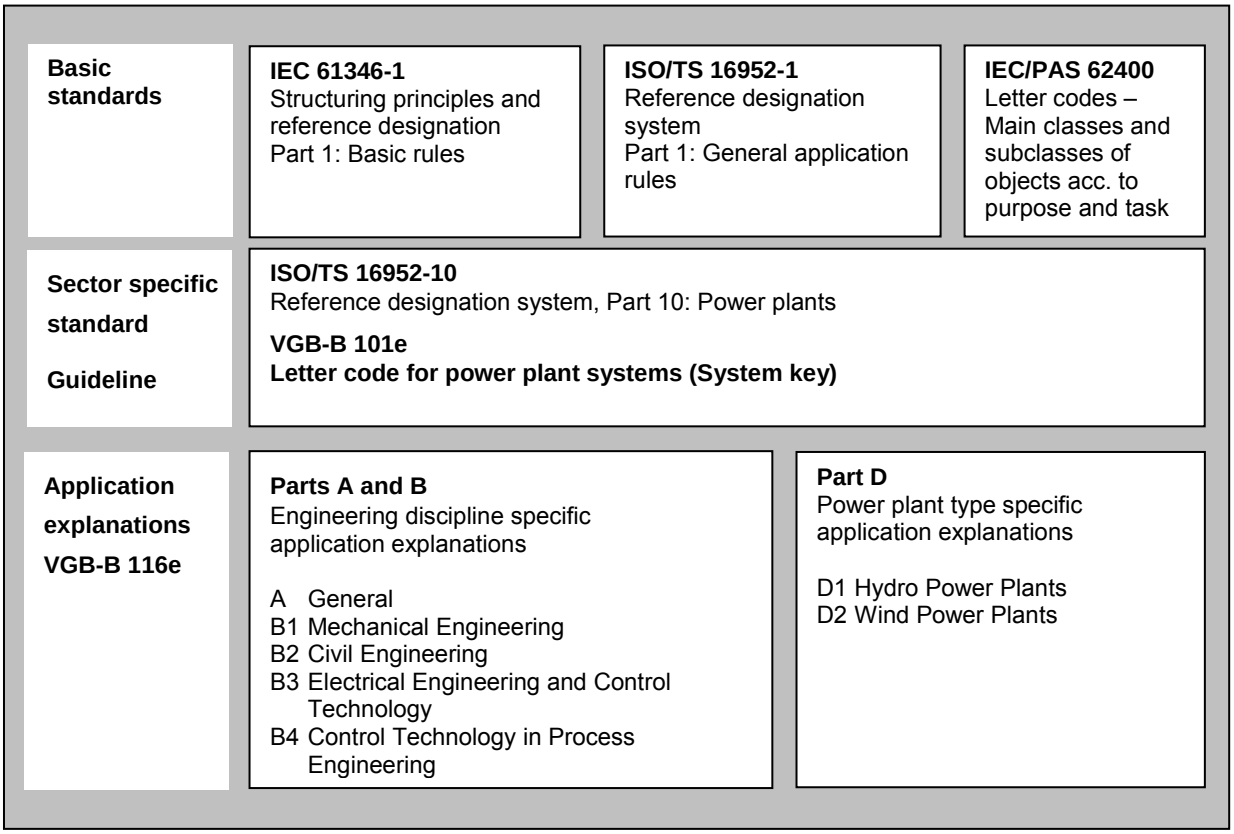


Fig. 2 – Overview of codes of practice for RDS-PP, including basic standards

4.1 Sector-specific standard

The sector-specific standard DIN 6779-10 is based on the general basic standards (see Fig. 2) and contains sector-specific specifications and rules relating to designation tasks, code structure and code representation as well as examples of use. The appendix (informative) offers a check list for the definitions between the project-taken part as well as application examples.

The sector-specific standard is comparable with VGB guidelines B105 for the KKS.

Hereinafter, the main focuses of the sector-specific standard are described, pointing out differences from the KKS.

The general code structure consists of a maximum of three parts that can be combined according to defined rules:

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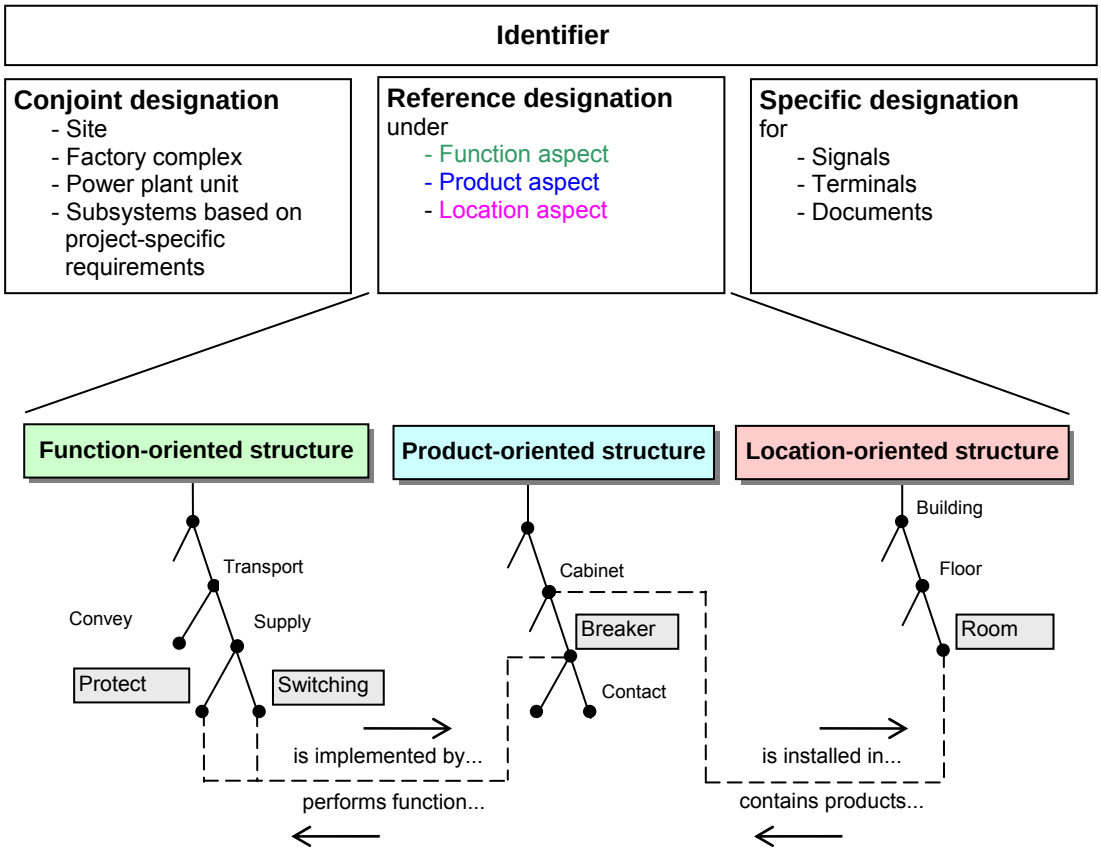


Fig. 3 – Maximum scope of the designation code, aspects, structure and relations

The sector-specific standard fully satisfies the basic principles of structuring which can be done under various aspects. The power plant is broken down according to the aspects "Function", "Product" and "Location". The Function aspect views an object by its functionality, the Product aspect by its physical composition. The Location aspect describes which locations are made available by the same object for other objects. For each view/aspect, a tree structure can be developed in which the rules of partitive relation prevail ("consists of"/"is part of"), the relations between the trees are so-called role relations (dashed lines in Fig. 3).

The designation for various aspects or tasks is done in designation blocks with a fixed structure. The general structure consists of a prefix followed by a designation code consisting of letters and numbers. Letters are used for the classification of technical objects, using code letters from the VGB System Key and DIN 6779-2 and IEC PAS 62400, respectively; numbers are used to distinguish between objects designated by the same code letter.

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The following figure shows the prefixes and their meanings.

Prefix		Designation	Designation tasks/aspect	Prefix origin, basic principles specified in
1	2			
	#	Number	Conjoint designation	ISO/TS 16952-1
	=	Equals	Function-oriented designation	IEC 61346-1
=	=	Equals-Equals	Functional allocation	ISO/TS 16952-1
	+	Plus	Point of installation	IEC 61346-1
+	+	Plus-Plus	Location	ISO/TS 16952-1
	-	Minus	Product-oriented designation	IEC 61346-1
	:	Colon	terminal designation	IEC 61666
	;	Semicolon	Signal designation	IEC 61175
	&	Ampersand	Document designation	IEC 61355

Fig. 4 – Prefixes for designation tasks

Hereinafter, the designation blocks according to RDS-PP are described.

Designation block "C o n j o i n t d e s i g n a t i o n"

This designation block can be used for identifying sites, plants, power plant units and has to be agreed between the parties involved in the project. It represents none of the three basic aspects, application of this designation block is optional.

This designation block is a new feature. It includes the structural level GS0 of the KKS.

The following figure shows several sites, hydroelectric power plants and control stations in the upper Danube area.

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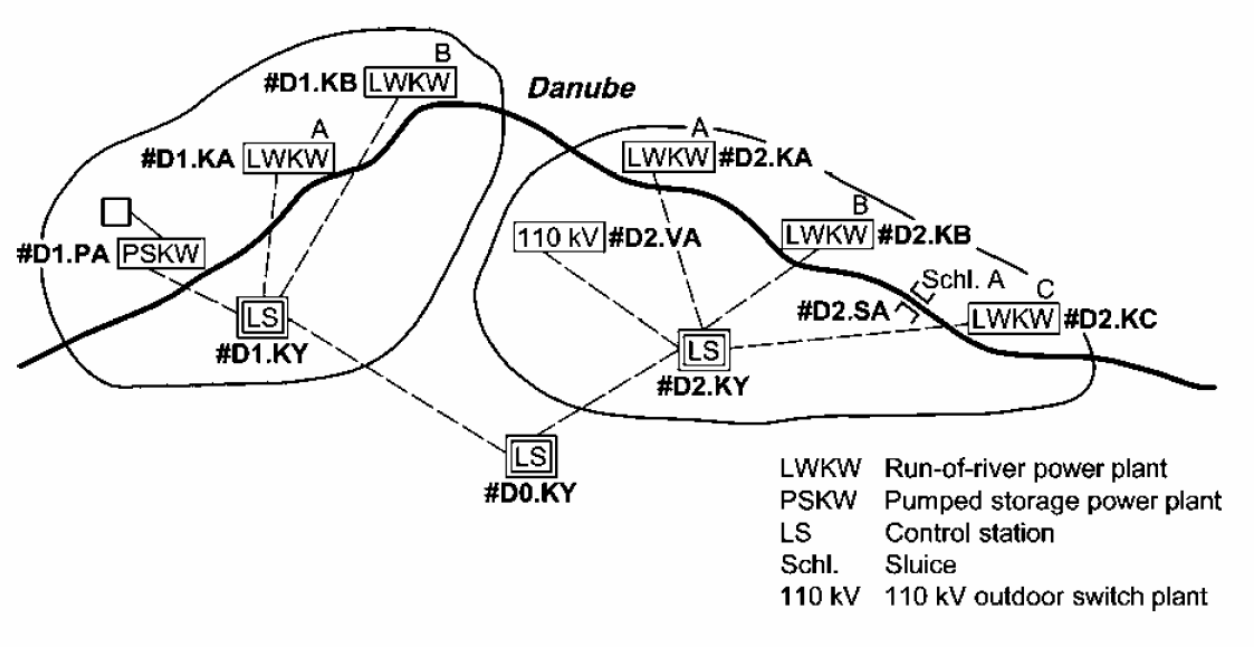


Fig. 5 – Example for the "Conjoint designation"

Designation Block "F u n c t i o n"

This designation block is used for function-oriented designation, from the view of task and purpose of the technical object. It corresponds to the breakdown levels 1 and 2 of the KKS process-oriented identification code, but without the prefix number of the system code and the additional equipment unit code (see also 4.2.3).

A novelty compared to the KKS is the change of breakdown level 0. If necessary, several systems can be combined here.

The following figure illustrates this option, using the example of a gas and steam turbine combined cycle plant.

It is not possible to define universally valid coding letters for the breakdown level 0. For the specific application case, the coding letters have to be agreed between the parties involved in the project. The letters used in the following figure were chosen arbitrarily.

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