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

Up-dated version of an article from
VGB PowerTech 8/2007 concerning RDS-PP

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New and withdrawn standards and the revised EU Directives relating to reference designation and plant documentation also have a significant impact also on the KKS power plants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

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General

The KKS Identification System for Power Plants 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.

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 Technical Committee "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". This standard has been published as an international standard ISO/TS 16952-10 "Technical product documentation – Reference designation system – Part 10: Power plants" in 2008.

The KKS successor system is named: Reference Designation System for Power Plants – RDS-PP.

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 was used 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

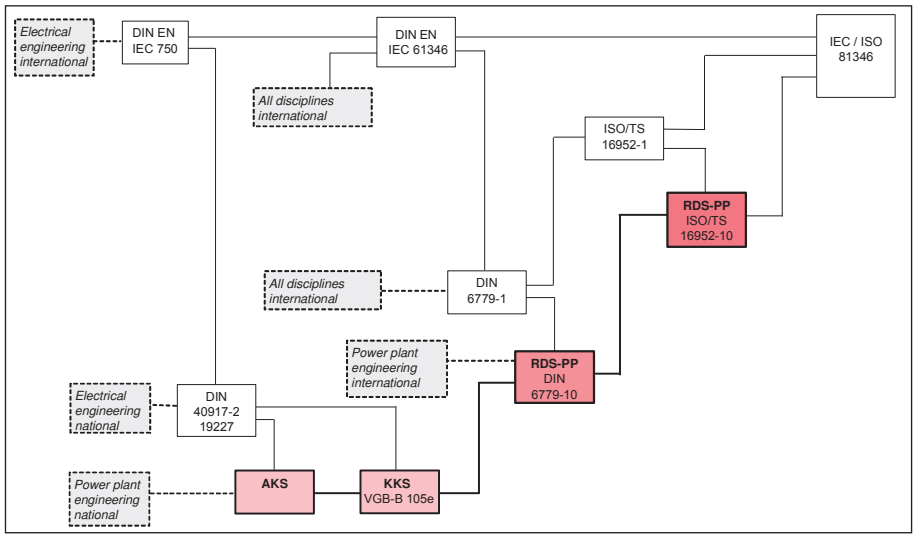


Figure 1. Development of the sector-specific standard for power plants.

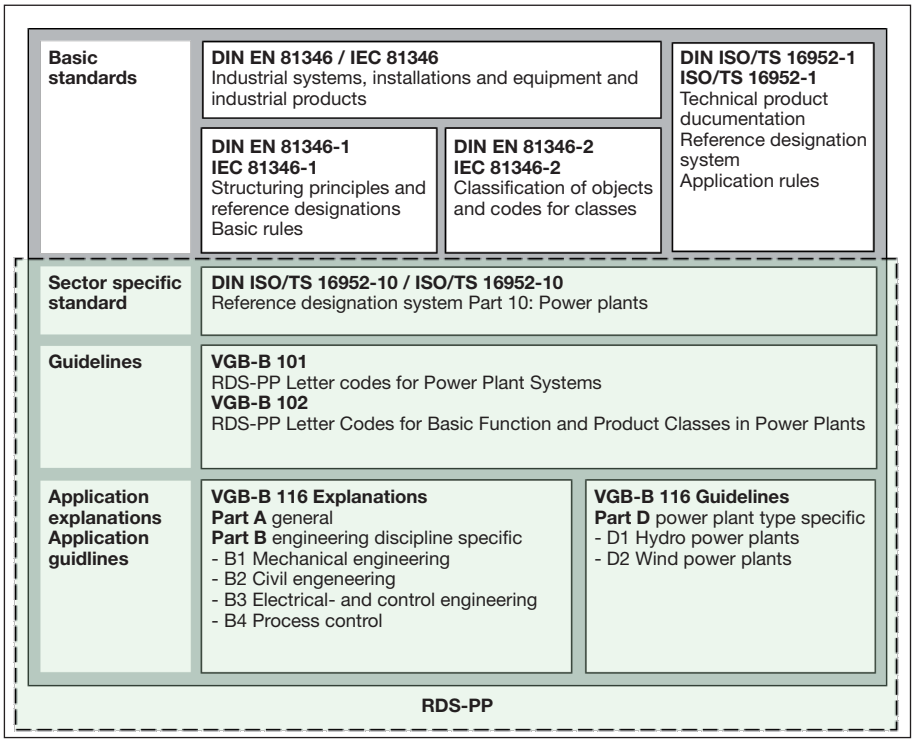


Figure 2. Interrelation of designation standards, guidelines and application explanations.

equally represented.

The result, the "KKS Identification System for Power Stations" was published by VGB as Guideline VGB-B 105e. 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 (Figure 1).

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 were used which were 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 Technical Committee "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 has been published in the meantime as an international standard under the number ISO TS 16952-10 and DIN 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.

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 ISO/TS 16952-10 and DIN 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.

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 ISO/TS 16952 and ISO TS 16952-10,
- Guideline VGB-B 101e and VGB- B 102 for power plant Letter Codes (Systems and/or pasic functions and product classes)
- Discipline-specific and power plant-specific application explanations and guidelines.

Figure 2 depicts the relation between the basic standards and application guidelines

Sector-specific standard

The sector-specific standard ISO TS 16952-10 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 VGB-B 105e 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 (Figure 3):

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 Figure 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 letter codes VGB-B 101e and VGB-B 102, respectively; numbers are used to distinguish between objects designated by the same letter code.

Table 1 shows the prefixes and their meanings.

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

Designation block „Conjoint designation"

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.

Figure 4 shows several sites, hydroelectric power plants and control stations in the upper Danube area.

Designation Block „Function"

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.

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

Figure 5 illustrates this option, using the example of a gas and steam turbine combined cycle plant.

It is not possible to define universally valid letter coding 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 Figure 5 were chosen arbitrarily.

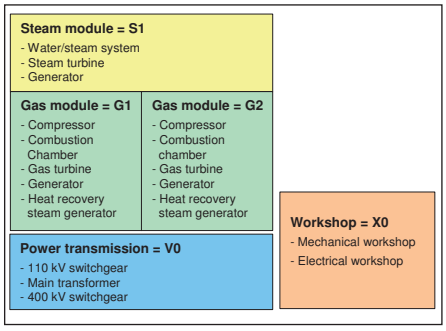


Figure 5. Example for breakdown level 0 in the designation block „Function" for a CCCP.

Designation block „Functional allocation"

This designation block is used for function-oriented designation under the aspect of interaction of technical objects. It differentiates between group level and individual level.

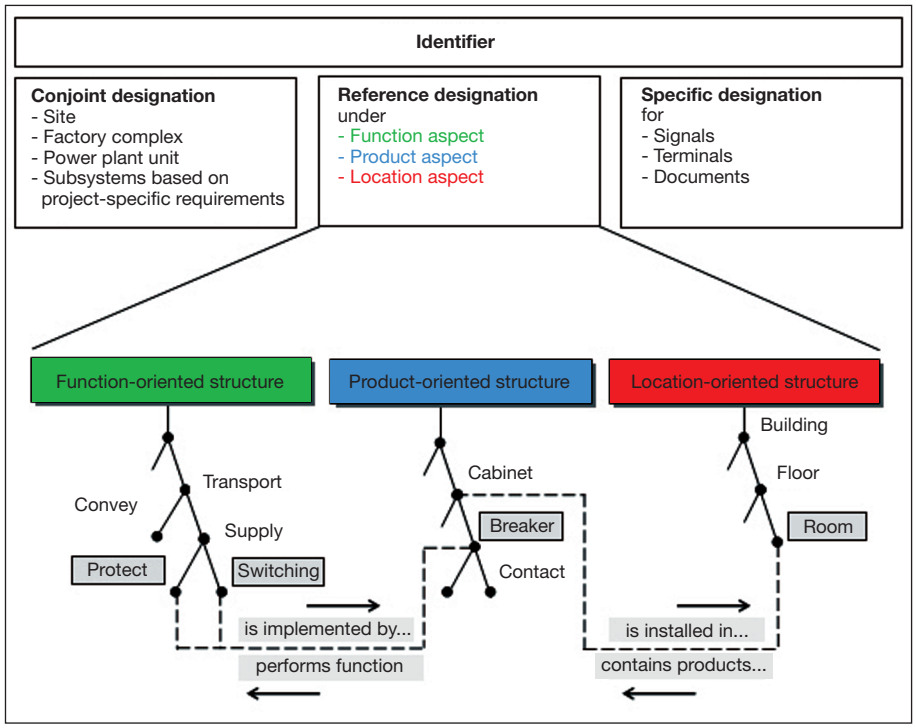


Figure 3. Maximum scope of the designation system, taken aspects, structure and relations into account.

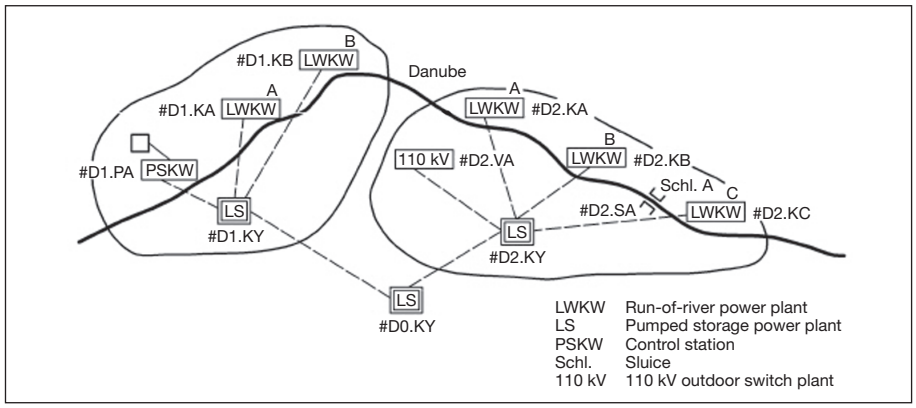


Figure 4. Example for the "Conjoint designation".

Table 1. Prefixes for designation tasks.

Prefix 1	Prefix 2	Designation	Designation tasks / aspects	Prefix origin, basic principles specified in:
	#	Number	Conjoint designation	IEC 81346-1
	=	Equals	Function-oriented designation	IEC 81346-1
=	=	Equals- Equals	Functional allocation	ISO/TS 16952-1
	+	Plus	Point of installation designation	IEC 81346-1
+	+	Plus-Plus	Location designation	ISO/TS 16952-1
	–	Minus	Product-oriented designation	IEC 81346-1
	:	Colon	Terminal designation	IEC 61666
	;	Semicolon	Signal designation	IEC 61175
	&	Ampersand	Document designation	IEC 61355

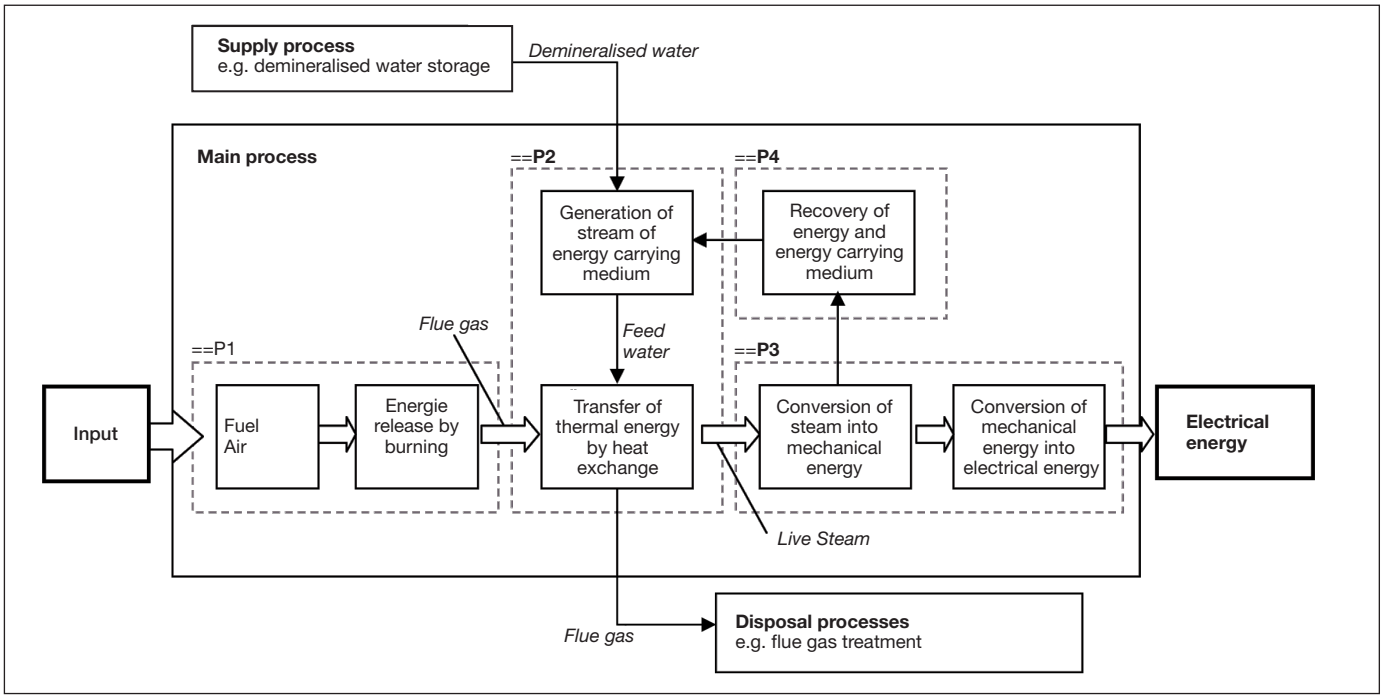


Figure 6. Example of "Functional allocation".

This designation block is new. It governs the uniform designation of processes and the allocation of control tasks, which used to be done differently in the KKS.

The basic flow diagram in Figure 6 shows the process of a thermal power plant, identifying the uppermost structural levels, the functional areas.

Designation block „Product"

This designation block is used for product-oriented designation of electrical and mechanical objects. Together with the designation block "Function" forms the unambiguous component designation code.

Designation block „Equipment"

This designation block is used for unambiguous identification of technical objects (see Table 2). It makes use of the possibility to consider objects following in succession according to different aspects and allocate different prefixes to them. For power plants, the transition from function to product aspect is used.

This designation block corresponds to the "process-oriented identification" used in the KKS.

Among other things, the component code is used as an identifier for plant data management systems and can be related to equipment items and/or product types and their data. Figure 7 shows the basic principle.

Designation block „Point of installation"

This designation block is used for designating the points of installation of technical objects. In addition to the hitherto existing possibil-

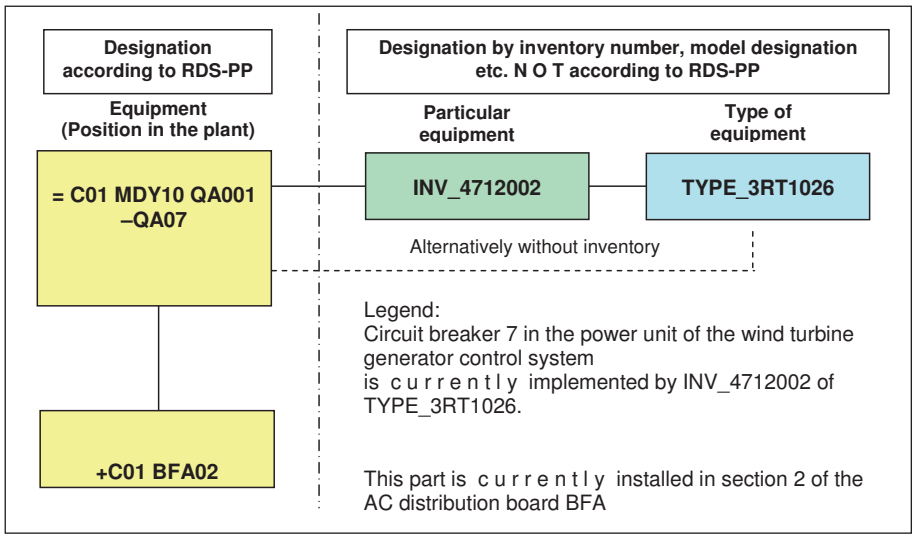


Figure 7. Example for use of the equipment designation in a maintenance tool.

Table 2. Designation block "equipment", with an example.

	Function aspect			Product aspect		
	Level 0	Level 1	Level 2		Level 1	Level 2
=	**AN(N)**	**AAANN**	**AANNN**	-	**AA(N)NN**	**AA(N)NN**
Prefix	Main system	System/ subsystem	Technical equipment	Prefix	device/ assembly	Component
=	**C01**	**MDY10**	**QA001**	-	**QA07**	

Designation block "Function" | **Designation block "Product"**

Equipment designation

Example: **= C01 MDY10 QA001 –QA07**
Wind power plant C01 (series C, No. 1)
Electrical control and protection system MDY10, power unit QA001, circuit breaker QA07

ity to identify electrical and I&C installation units, designation masks were created for the location-oriented designation of mechanical equipment. This permits, for instance, accurately locating the sampling point for a measured value on a pump set by using the component code under the location aspect.

Designation block „Location“

This designation block is used for designating locations, such as structures, areas etc.

Signal designation

The unambiguous designation of signals is achieved by combining the reference designations and the signal name according to the following structure:

Reference designation	; Signal name

For power plants, the general provisions in IEC 61175/DIN EN 61175 were specified for the signal name. Structure and code letters of the signal name were transferred from the KKS to the standard without any change.

Prefix	Signal name	
;	**AA**	**(N)NN**

Ranges of numbers were defined for the signal sections (2nd letter of the signal name) “B = single control”, “G = binary process signals” and “H = limit signals”, e.g. XB01 for check-back signal ON/OPEN, XB02 for check-back signal OFF/CLOSED.

Terminal designation

The unambiguous designation of terminals on electrical or mechanical equipments is accomplished by combining reference designations and terminal designations according to the following structure:

Reference designation	Terminal designation

For power plants, IEC 61666/DIN EN 61666 are applicable without any reservations.

Document designation

Non-manufacturer-specific, object-related designation of documents is achieved by combining the object designation with the document type class key according to the following structure:

Object designation	&	Document kind classification code, counting number	/	Sheet nummer

As object designation, primarily the reference designation should be used, but other classification systems may also be used depending on the application case, e.g. type designation for the dimension drawing of a series product.

The structure of the document kind classification code DCC with counting number and the code letters are fully in accordance with IEC 61355-1/DIN EN 61355-1.

The power plant specific document kind classification codes are collected in the VGB Guideline VGB-B 103.

Table 3. Allocation of code letter sections to codes of practice.

Designation block	**Function**						**Product**		
Breakdown level		0	1		2			1	
Section		0	1	2	3	4		1	2
Data digit/type	=	AN(N)	**AAA**	NN	**AA**	NNN	-	**AA**	(N)NN

Designation of systems according to **VGB-B 101e**

Classification of technical equipment and product classes according to **VGB-B 102e**

Guideline and standard for letter codes

The sector-specific standard allocates tables from two different codes of practice (VGB Guidelines) to alpha digits of the individual designation blocks.

Guideline VGB-B 101e „Letter code for power plant systems (system key)“

For breakdown level 1 of the designation block “Function” Guideline VGB-B 101e, “Letter code for power plant systems (system key)” is applicable. The system replaces the KKS function key.

Guideline VGB-B 101e was developed by the VGB Working Panel “Reference Designation and Plant Documentation” and is the binding letter code for power plant systems. Due to the reference contained in the sector-specific standard ISO/TS 16952-10, this guideline gets normative significance.

The guideline VGB-B 101e is based on the basic standard IEC 81346-2/DIN EN 81346-2 (Table 3) and provides a framework for a classification model for so-called infrastructure objects. In this table, the letters A, V to Z are generally specified, whereas the letter range from B to U is available for sector-specific specifications.

This free range from B to U was used to incorporate - almost without changes – the function key of the KKS. Systems of new technologies like CO_2 separation, air separation system, fermentation, central solar energy utilization etc., have been implemented.

The system key uses a three-digit letter code and defines the limits for certain systems. With regards to the designations, some ad-

Table 4. Excerpt from the “VGB System Key” VGB-B 101e.

150 VGB B101e : 2010-04

4.14.2 Data characters 1 (S_1), 2 (S_2) and 3 (S_3)

a	M	Systems for transformation in and transmission of electrical energy
	MA	**Steam turbine system**
	MAA	High pressure turbine ***Limits:*** *from incl. steam admission (main stop valve) or combined main stop and control valve* *to incl. extraction nozzles, tapping nozzles and exhaust nozzles and* *to incl. inlet/outlet other turbine-internal systems*
	MAB	Intermediate pressure turbine ***Limits:*** *from incl. crossover line, incl. actuator or* *from incl. intercept valve* *to incl. extraction nozzles, tapping nozzles and exhaust nozzles and* *to incl. inlet/outlet other turbine-internal systems*
	MAC	Low pressure turbine ***Limits:*** *from incl. crossover line, incl. actuator or* *from incl. intercept valve or steam inlet nozzles (in reheat system without intercept valve)* *to incl. extraction nozzles, tapping nozzles and exhaust nozzles and* *inlet/outlet other turbine-internal systems*

Table 5. Examples according to VGB-B 102.

KKS (Equipment unit key)		**RDS/PP** (VGB-B 102)
AA Valves, dampers etc.	Can become	**FL** safety valve **FM** fire protection damper **QM** isolating valve **QN** control valve **RM** non-return valve
BB Storage equipment (vessels, tanks)	becomes	**CM** Storage of materials; containers, tanks, boilers, silos
CT Direct measuring circuit temperature	becomes	**BT** Conversion of an input variable temperature

justments were made to reflect the terminology currently used in international codes and standards.

The system key is constantly updated by the VGB Working Panel "Reference Designation and Plant Documentation". Table 4 shows an excerpt from the VGB-B 101e System Key.

Guideline VGB-B 102 Letter codes for Basic functions and Product classes

For breakdown level 2 of the designation block "Function" and for the breakdown level 1 of the designation block "Product", the guideline VGB-B 102 has to be applied. This standard replaces the KKS equipment unit key and the KKS component key.

The guideline VGB-B 102 is based on IEC 81346-2/DIN EN 81346-2, classifying technical objects according to their purpose or task and providing letter code for main- and subclasses.

The guideline VGB-B 102 was developed by the VGB Working Panel "Reference Designation and Plant Documentation" and is the binding letter code for the power plant.

These specifications are generally applicable to all disciplines, such as civil, process, mechanical and electrical engineering, across all sectors of industries.

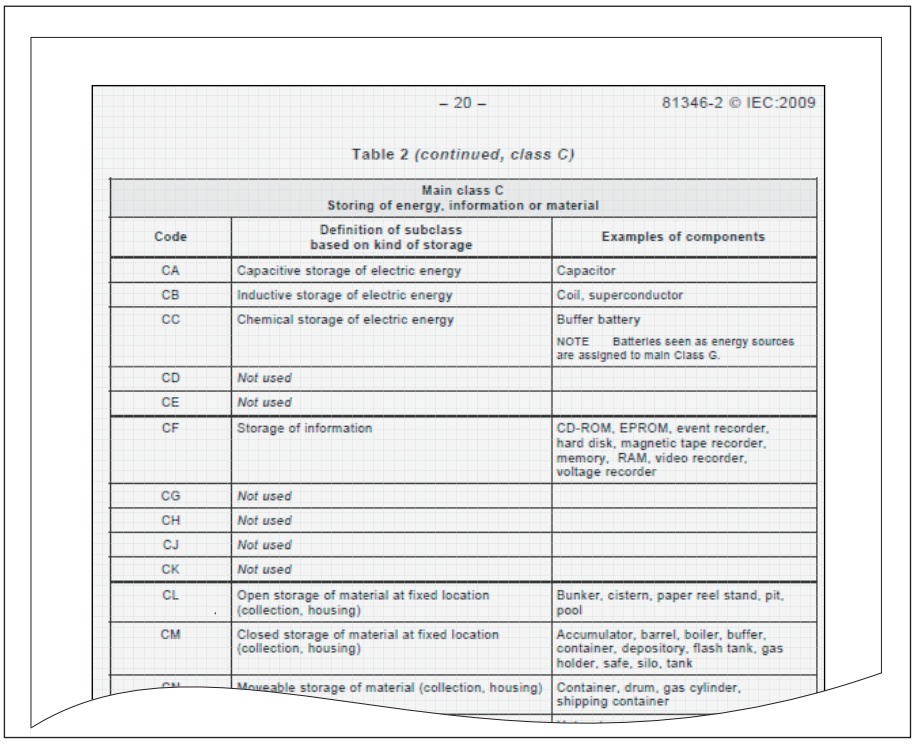
Table 5 shows some examples to illustrate the differences in letter codes and designations.

Table 6 shows an excerpt from the IEC 81346-2, including the subdivision by technical disciplines according to an example of main class "Storage of material and information".

CA – CE
Storage of electric energy
CF – CK
Storage of information
CL – CY
Storage of materials, thermal and mechanic energy

Table 7 shows in an excerpt the conversion of table 2 of the basic standard DIN EN 81346-2 with amendments by power plant-specific terms in the Guideline VGB-B102.

Table 6. Excerpt from the basic standard IEC 81346-2.



– 20 – 81346-2 © IEC:2009

Table 2 *(continued, class C)*

Main class C Storing of energy, information or material		
Code	**Definition of subclass based on kind of storage**	**Examples of components**
CA	Capacitive storage of electric energy	Capacitor
CB	Inductive storage of electric energy	Coil, superconductor
CC	Chemical storage of electric energy	Buffer battery NOTE Batteries seen as energy sources are assigned to main Class G.
CD	*Not used*	
CE	*Not used*	
CF	Storage of information	CD-ROM, EPROM, event recorder, hard disk, magnetic tape recorder, memory, RAM, video recorder, voltage recorder
CG	*Not used*	
CH	*Not used*	
CJ	*Not used*	
CK	*Not used*	
CL	Open storage of material at fixed location (collection, housing)	Bunker, cistern, paper reel stand, pit, pool
CM	Closed storage of material at fixed location (collection, housing)	Accumulator, barrel, boiler, buffer, container, depository, flash tank, gas holder, safe, silo, tank
CN	Moveable storage of material (collection, housing)	Container, drum, gas cylinder, shipping container

Comparison of structure and content between KKS and RDS-PP

Based on the functional designation aspect, the difference between KKS and RDS-PP is depicted in the Figure 8.

Application explanations and instructions

Standards provide general rules and specifications. In order to facilitate efficient implementation in practice, application explanations and application instructions have been developed by the VGB Working Panel "Reference Designation and Plant Documentation". They provide detailed guidance, starting with a cross-discipline Part A and then addressing the specific engineering disciplines of mechanical engineering, civil engineering, electrical and I&C engineering, and I&C functions in process systems (Parts B1 to B4). The application instructions are for particular types of power plants (Part D1 and D2).

The application explanations contain examples from practice and are also available for training.

Consequences

Frequently asked questions in connection with the introduction of the RDS-PP include:

What does this now mean for
- my existing plant,
- my plant which is currently in the pipeline, or
- a new plant I will set up in future?

– From which time you should make use of the RDS-PP?
– Is the KKS no longer valid?
– … and so on.

Unfortunately no simple "Yes/No" answers or binding deadlines can be given to answer these very important and specific questions.

In general it has to be said that standards are not binding laws, their application has to be agreed between the parties to the contract. However an obligation to apply a standard can result from legal or administrative regulations or from contracts or other legal grounds.

Standards always become a matter of particular interest if no amicable solution between contracting parties is found or if man or equipment suffers damage. In these cases, the basic principle is applicable that the requirements can be deemed fulfilled if the state of the art (which is normally reflected in standards) has been adhered to. That may be the requirements of a specification in the bidding process, but that may also be the requirements for the safety of man and equip-

ment. If no valid standards are used, the party concerned will have to prove – if necessary with the assistance of third parties – that the solution chosen by such party likewise meets the requirements.

These explanations do certainly not provide a concrete answer to the questions asked above and do not nearly fully cover the complex of tendering procedures, product safety, industrial safety etc.; they are merely meant to outline the complexity of the issue.

Nevertheless the following facts can be summed up and should be considered in making a decision on the designation system to be used:

- The KKS is an (international) „house standard" of VGB, which in absence of normative standards reflected the state of the art until international standards were published.
- The RDS-PP – as published ISO/TS 16952-10 – is a designation system which is supported by other international standards.
- The RDS-PP integrates systematic structures and letter codes which are applicable to all industries, which – in medium term – will result in an easier integration of „standard packages" into the power plant business.
- Suppliers of „standard packages" can not decline the request for designation according to RDS by just alluding to standards that are applicable in other industries or to their house standards. This makes it easier to make also such suppliers adhere to the RDS-PP; this will relieve planners and operators of time consuming and costly reworking.
- KKS and RDS-PP will coexist for many years and will also have to be supervised.
- Possible problems or additional expenses may result for the operator if different designation systems are used at the same site; these problems may concern the safety of plant and persons but also the operation and maintenance management systems.
- All users have to develop in-house know-how for RDS-PP; the VGB training centre for power plant operating staff Kraftwerksschule (KWS) support this process with suitable training courses.
- First experiences with the application of RDS-PP are available.

However, the authors do not want to get around concrete recommendations:

Existing plants:

Currently, there is no need for action, decisions should be made in the individual instance, on occasion of substantial plant modifications or retrofit projects.

Table 7. Excerpt from VGB-B 102.

VGB 37

B102:2010-11

Kennbuchstabe Letter code	Benennung	Denomination
BZ	***Anzahl von Ereignissen, Zählungen, Kombinierte Aufgaben***	***Number of events, counts, combined tasks***
BZ	Ereignisanzahlmessung	Event-number measuring
BZ	Kombiwandler (Spannung und Strom)	Combined instrument transformer (Voltage and current)
BZ	Messung von Anzahl von Ereignissen	Measurement of number of events
C_	**Speichern von Energie, Information oder Material**	**Storing of energy, information or material**
CA	***Kapazitive Speicherung elektrischer Energie***	***Capacitive storage of electric energy***
CA	Kompensationskondensator (elektrisch)	Correction capacitor (electrical)
CA	Kondensator (elektrisch)	Capacitor (electrical)
CA	Koppelkondensator	Coupling capacitor
CB	***Induktive Speicherung elektrischer Energie***	***Inductive storage of electric energy***
		Inductive storage

Plant retrofit or modernization projects:

Existing projects or projects that are in the pipeline should be continued as planned; decisions should be made in the individual instance, on occasion of substantial plant modifications or retrofit projects.

New plants

For completely new plants which are not yet in the pipeline, RDS-PP should be used from 2008 on; the only arguments against such a decision could be safety-specific aspects at a common plant site with "KKS power plants" (Note: there are also various sites where KKS and the predecessor system AKZ coexist).

For plants already in the pipeline, the efforts necessary to change the plans need to be considered.

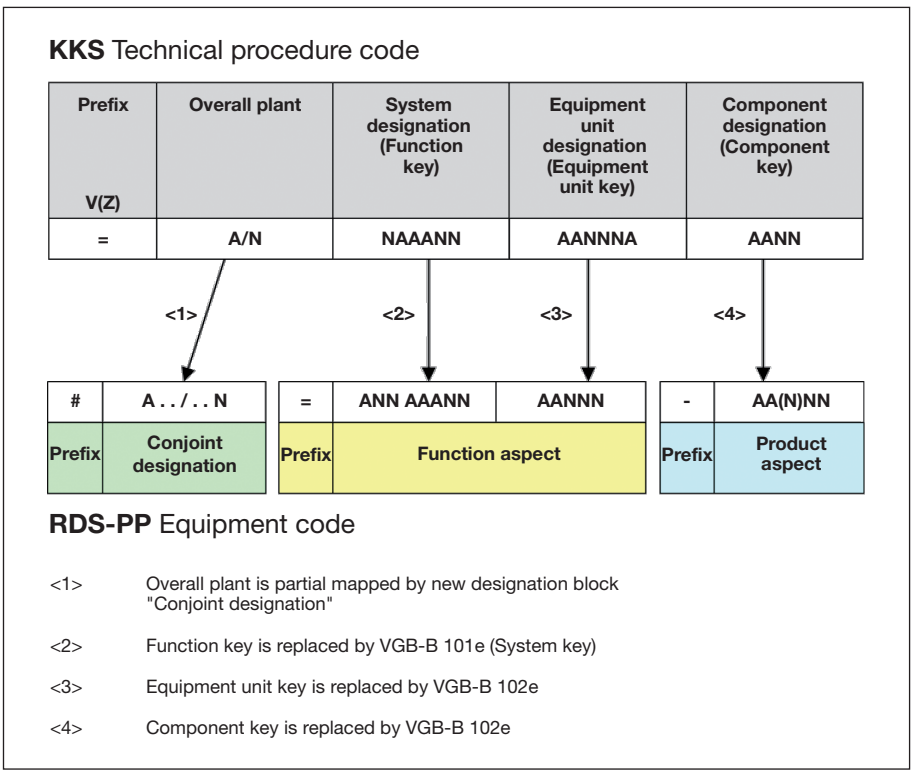


Figure 8. Designation structure and designation content KKS vs. RDS-PP.

Maintenance of the RDS-PP and application support

The Working Panel "Reference Designation and Plant Documentation" as a collaborator in standardization and author of the VGB guidelines relating to RDS-PP is well aware that suitable assistance will be needed to support the introduction of the RDS-PP.

Questions should be addressed directly to the VGB office (ak-ad@vgb.org). The persons interested in RDS-PP will be registered and supplied with information about current developments. Current information will also be provided on the VGB website (www.vgb.org/db_rds.html).

There are thematic core teams from the VGB working panel for specific technical inquiries. The answers of the first level are free of charge. The core teams are furthermore available for engineer services or can arrange equivalent contacts. Basically, such effort needs to be charged.

The VGB training centre for power plant operating staff, which is likewise a member of the Working Panel "Reference Designation and Plant Documentation", will provide training courses and seminars of RDS-PP on demand.

Literature

EU Directives

DIRECTIVE 2004/17/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 March 2004. Coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors

DIRECTIVE 2004/18/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 March 2004. On the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts

DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006. On machinery, and amending Directive 95/16/EC (recast)

DIRECTIVE 2001/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 3 December 2001. On general product safety

National laws/ordinances

BetrSichV

"Operational Safety Ordinance" of 27 September 2002 (Federal Law Gazette I p. 3777), last amended by Article 5 of the ordinance of 6 March 2007 (Federal Law Gazette I p. 261)"

Ordinance on safety and health protection in the provision of equipment and its use at the workplace, on safety during the operation of plant subject to inspection and on the organisation of occupational health and safety (Betriebssicherheitsverordnung – BetrSichV)

GPSG

"Equipment and Product Safety Act" of 6 January 2004 (Federal Law Gazette I p. 2 (219)), last amended by Article 3 Para 33 of the law of 7 July 2005 (Federal Law Gazette I p. 1970) Act on Technical Work Equipment and Consumer Products (Geräte- und Produktsicherheitsgesetz - GPSG)

Standards

IEC 60204-1; DIN EN 60204-1

Safety of machinery - Electrical equipment of machines - Part 1: General requirements

IEC 61355-1; DIN EN 61355-1

Classification and designation of documents for plants, systems and equipment

IEC 61175; DIN EN 61175

Industrial systems, installations and equipment and industrial products – Designation of signals

IEC 61666; DIN EN 61666

Industrial systems, installations and equipment and industrial products - Identification of terminals within a system

IEC 81346-1; DIN EN 81346-1

Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules

IEC 81346-2; DIN EN 81346-2

Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 2: Classification of objects and codes for classes

ISO/TS 16952-1; DIN ISO/TS 16952-1

Technical product documentation – Reference designation system – Part 1: General application rules

ISO/TS 16952-10; DIN ISO/TS 16952-10

Technical product documentation – Reference designation system – Part 10: Power Plants

VGB Guidelines

VGB-B 101e

Reference Designation System for Power Plants RDS-PP, Letter Codes for Power Plant Systems (System Key) – 2010

VGB-B 102

Reference Designation System for Power Plants, Letter Codes for Basic Functions and Product Classes - 2010

VGB-B 103

Designation codes for document kind classification code (DCC key) - 2010

VGB-R 171e

Provision of Technical Documentation (Technical Plant Data, Documents) for Power Plants – 2010

Technical articles

Horst Anders, Philipp Freymeyer, Helmut Hotes: System zur Kennzeichnung von Geräten und Anlagen in Wärmekraftwerken. "Elektrizitätswirtschaft" Vol. 68, issue 6, 17 March 1969, pp. 181 - 192

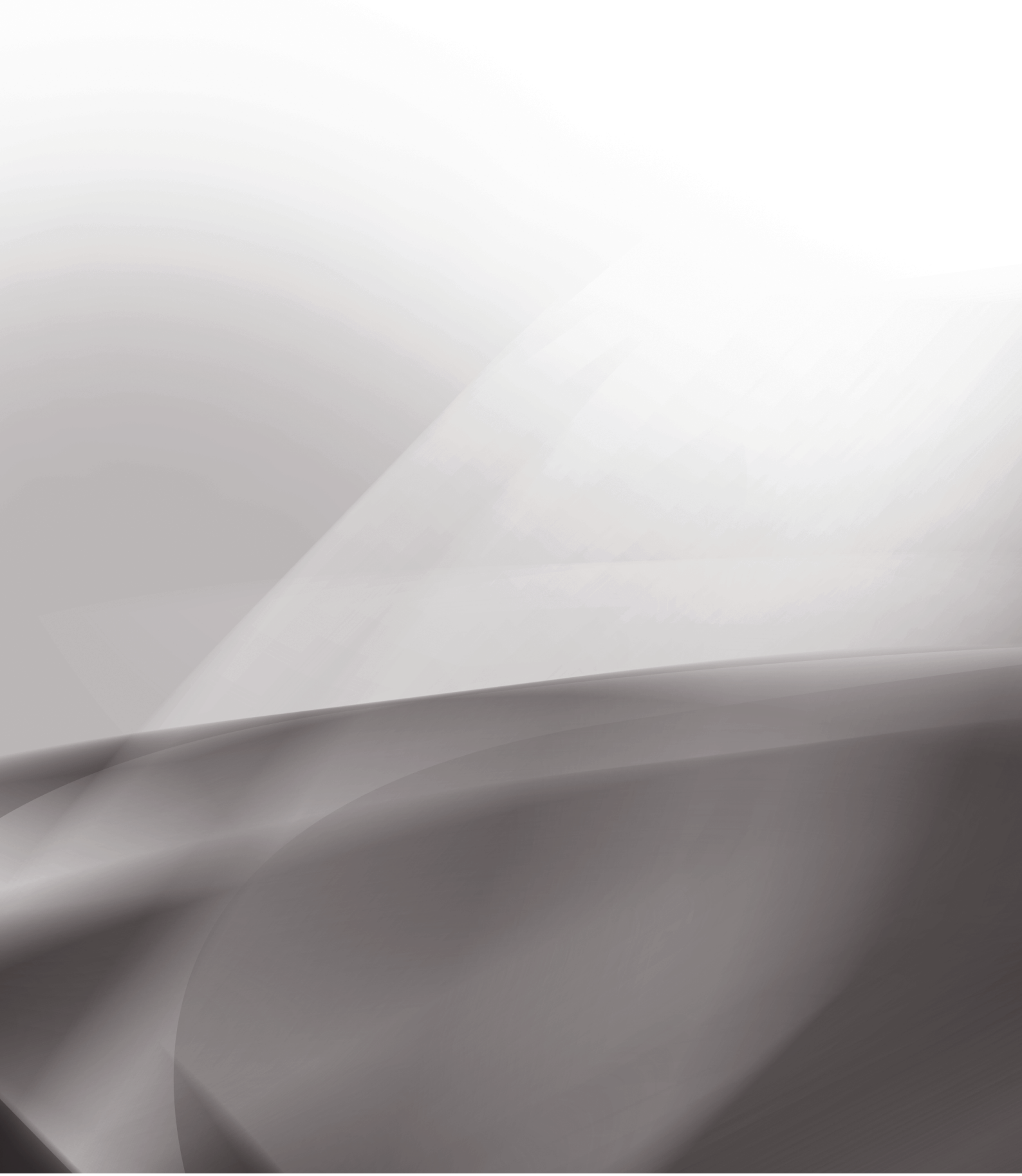
Horst Anders, Philipp Freymeyer, Helmut Hotes: Kennzeichnung der elektrotechnischen, mess- und regeltechnischen Anlagen, Anlagenteile und Geräte in Wärmekraftwerken. "Elektrizitätswirtschaft" Vol. 68, issue 6, 17 March 1969, pp. 193 - 197

Hugo Popp: Die neue Vornorm DIN V 6779-1. VGB Kraftwerkstechnik 72 (1992), issue 7

Hugo Popp: Der Norm-Entwurf DIN 6779-10/Mai 1998. VGB Kraftwerkstechnik 3/99

Heinz Müller, Rainer Ahleff: Referenzkennzeichnung nach ISO/TS 16952-1 and DIN ISO/TS 16952-1. DIN Mitteilungen, 3/2007

Rainer Ahleff, Zbynek Cihlar : ISO/IEC structuring and designation standards – A framework for industry. ISO Focus May 2007 □



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