
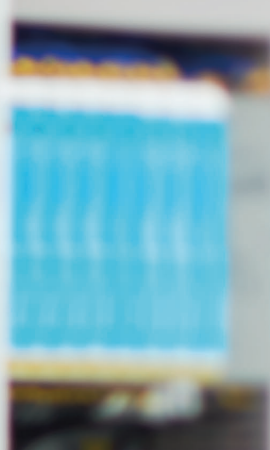
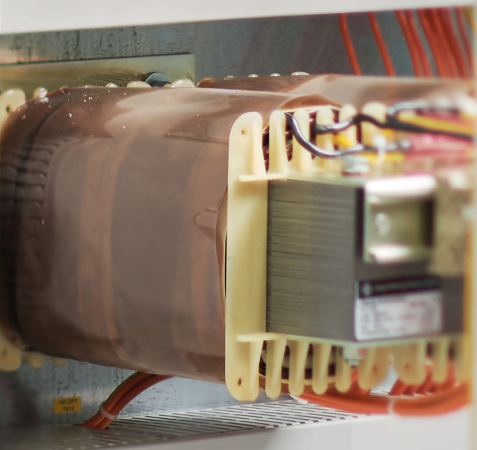


wöhner

 **61439**  
**NAVIGATOR**  
**GUIDEBOOK**  
**TO THE STANDARD**

ALLES MIT SPANNUNG

**KNOW-HOW  
ONLINE TOOL  
SUPPORT  
HOTLINE**



# **WÖHNER 61439 NAVIGATOR – OUR SERVICE FOR THE NEW STANDARD**

Since the new IEC/EN 61439 standard was published, it has been preoccupying our industry. In order to support you, as our customer, in dealing with the standard, Wöhner has developed the 61439 Navigator. The Navigator is an integrated service program, consisting of different tools as well as information and consultation modules.

The IEC/EN 61439 is the result of the work of technical committees and subcommittees composed of representatives of the full member national electrotechnical committees, each dealing with a particular subject.



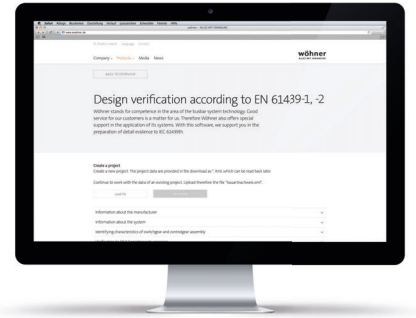
Page 6

# KNOW ONLY SUPPORT HO

Page 17



# 7-HOW NE TOOL T OTLINE



Page 13

Page 21



# THE NEW IEC/EN 61439 STANDARD: A BRIEF INTRODUCTION



IEC/EN 61439 is the new standard for the construction, application, characteristics and verification of switchgear and controlgear assemblies. It replaces the IEC/EN 60439 standard and became valid exclusively from 1 November 2014. The aim of the new standard is to harmonise all of the regulations and requirements for low-voltage switchgear and controlgear assemblies (ASSEMBLIES).

#### **FROM THE FIRST STANDARD TO THE LATEST STATE OF THE ART PRINCIPLES**

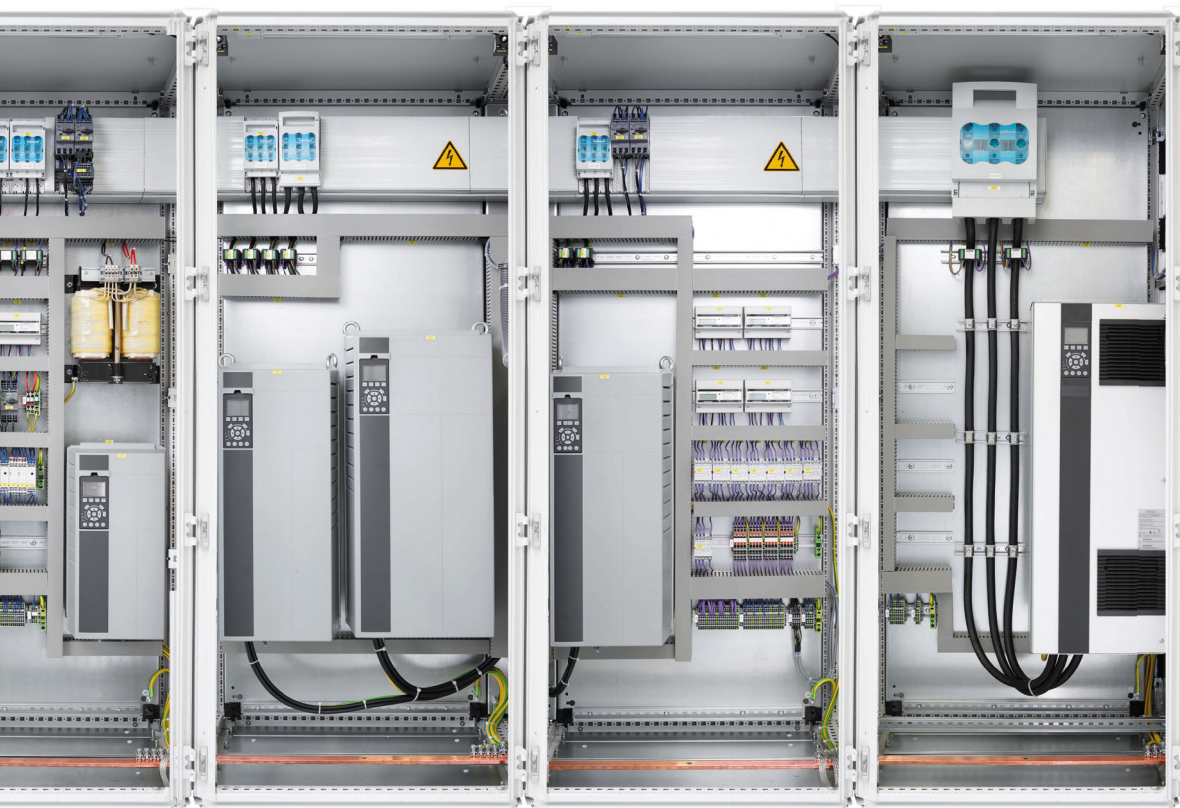
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Each of the 31 Cenelec member states have their own electrotechnical committee responsible for standardization work. In Germany, the German Commission for Electrical, Electronic & Information Technologies of DIN and VDE (DKE) is the responsible committee. One of its first DIN standards emerged as early as 1918.

Standards represent the “state of the art” and serve users as guidelines, e.g. for creating switchgear in the technically correct manner. Those who design their systems according to these recommendations are then permitted to identify the standard in their documentation. In Law, conformity with a standard is presumed during assessment. This means that the system was constructed in compliance with the standard, according to the latest “state of the art” principles.

In principle, there is no concrete obligation on the part of the system manufacturer to comply with standards. However, standards are often used in specifications or invitations to tender, in order to define a standard, e.g. for a desired product or building.





## THE BIG PICTURE IN PERSPECTIVE

The new IEC/EN 61439 standard was developed in key aspects by the IEC, Cenelec and DKE committees. In the IEC/EN 61439 standard, the responsibilities of the users, designers and manufacturers of ASSEMBLIES that are to be constructed, are now more clearly defined. Along with specifications on designing, the new standard also describes the documents that are to be produced as verification of the system's conformity.

Systems constructed in accordance with the IEC/EN 61439 standard, primarily differ in their documentation from systems constructed in accordance with the old IEC/EN 60439 standard. The systems used to be considered independently. This meant individually tested ASSEMBLIES could be merged without further testing, as long as they were equivalent to the type-tested

systems, and could be utilised under the assumption that they had been tested. The system manufacturer was responsible for the technical design, the safe control and operation of the switchgear.

In the case of the IEC/EN 61439 standard, a black-box principle is now assumed. The assessment is made based on the external conditions (inputs and outputs, on the installation site and on the enclosure). What is distinctly more important and complex about the new standard is the systems documentation down to its technical detail. The responsibility still rests with the manufacturer of the controlgear and switchgear assemblies.

# IEC



IEC standard: International  
Electrotechnical Commission

# CENELEC



EN standard:  
Cenelec – European  
Committee for  
Electrotechnical  
Standardization

# DKE



DIN standard:  
DKE – German Commission  
for Electrical, Electronic &  
Information Technologies of  
DIN and VDE

## THE OLD IEC/EN 60439 STANDARD

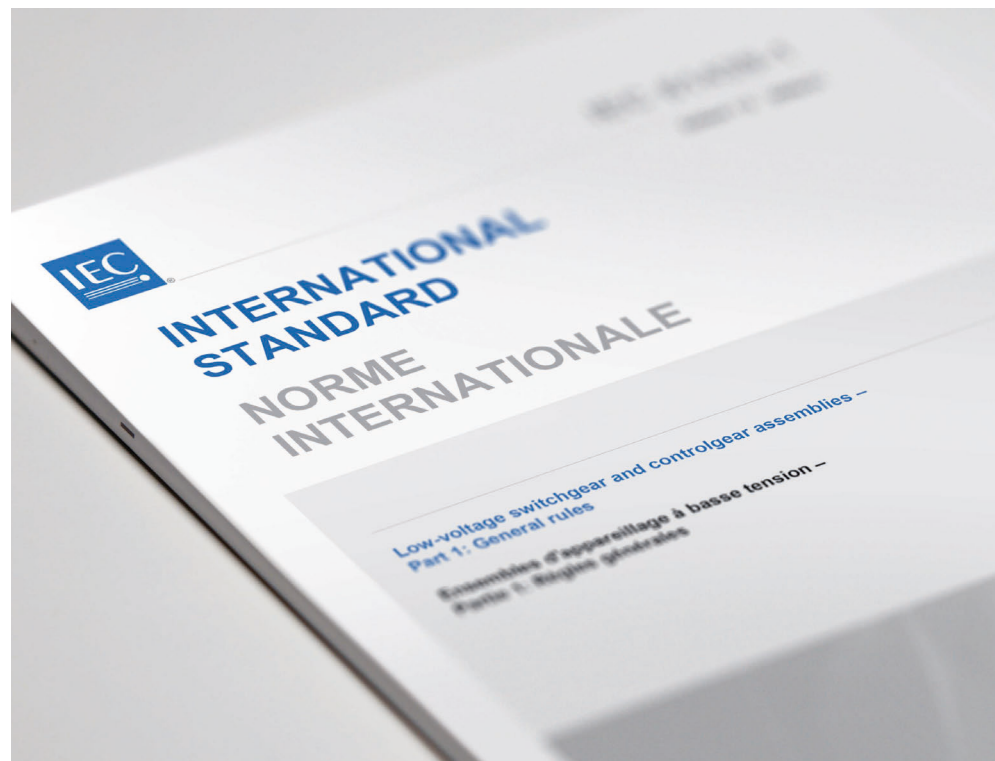
IEC/EN 60439 was a standard for the creation of low voltage switchgear and controlgear assemblies. In addition to the normative terms, the standard defined:

- the electrical features of an ASSEMBLY,
- the data for the ASSEMBLY,
- the operational and environmental conditions,
- the construction requirements
- the tests

Important evaluation criteria for designing an ASSEMBLY were construction and testing. When verifying the test of an ASSEMBLY, a distinction was made between type-tested ASSEMBLIES (TTA) and partially type-tested ASSEMBLIES (PTTA).

It was crucial that one of the verifications had to be performed. Here the installer of the ASSEMBLY either referenced the manufacturer's type-testing, or provided verification by extrapolation and/or conclusions by analogy

of the manufacturer's available type-tests. For this the installer evaluated the interaction between the components used (partially type-tested ASSEMBLY). Once the ASSEMBLY was designed and constructed, a routine test was carried out, regardless of whether it was a type-tested or partially type-tested ASSEMBLY. The installer was responsible for designing and carrying out the construction, and confirmed compliance with the standard with a legally binding signature on the EC Declaration of Conformity.



## THE NEW IEC/EN 61439 STANDARD

The new IEC/EN 61439 standard for low voltage switchgear and controlgear assemblies consists of not five, but seven parts, in contrast to the 60439 standard.

1. General rules
2. Power switchgear and controlgear ASSEMBLIES (PSC-ASSEMBLIES)
3. Distribution boards (to supersede IEC 60439-3)
4. ASSEMBLIES for construction sites (to supersede IEC 60439-4)
5. ASSEMBLIES for power distribution (to supersede IEC 60439-5)
6. Busbar trunking systems (to supersede IEC 60439-2)
7. Guidance to specifying ASSEMBLIES

In order to confirm conformity to IEC/EN 61439, it is always important to reference part 1 and the appropriate other parts. The standard is aimed at every manufacturer and operator of ASSEMBLIES of up to 1000V a.c. and 1500V d.c. Regardless of whether the ASSEMBLY is stationary or not; designed with or without an enclosure system.

As regards content, it corresponds to many parts of IEC/EN 60439, which expired on 1 November 2014. Here the various marginal conditions of a ASSEMBLY are also defined and determined.

The 61439 standard distinguishes more clearly than before, between the original manufacturer of an ASSEMBLY (formerly manufacturer), the manufacturer of an ASSEMBLY (formerly installer) and the user of the ASSEMBLY. Application-oriented adaptations often create an abundance of variations and associated deviations in the ASSEMBLY. The manufacturer therefore often becomes the original manufacturer in practice.

What is new about IEC/EN 61439 is that it not only defines the responsibilities of the original manufacturer and the manufacturer, but also those of the user of an ASSEMBLY. Similarly to the 60439 standard, the 61439

standard also requires a verification of compliance with the conditions demanded in the standard; these are registered in the design verification. The verifications can be provided by various processes:

- Testing
- Comparison to a reference design
- Assessment

A large amount of the verifications are extrapolated from the data sheets of the components used (enclosures, switchgear, etc.) and/or can be assured by design rules and production. The suitability of individual components is still orientated towards the respective type-tests and the underlying product standards. Verifications for temperature rise and short-circuit withstand strength are specifically focused on.

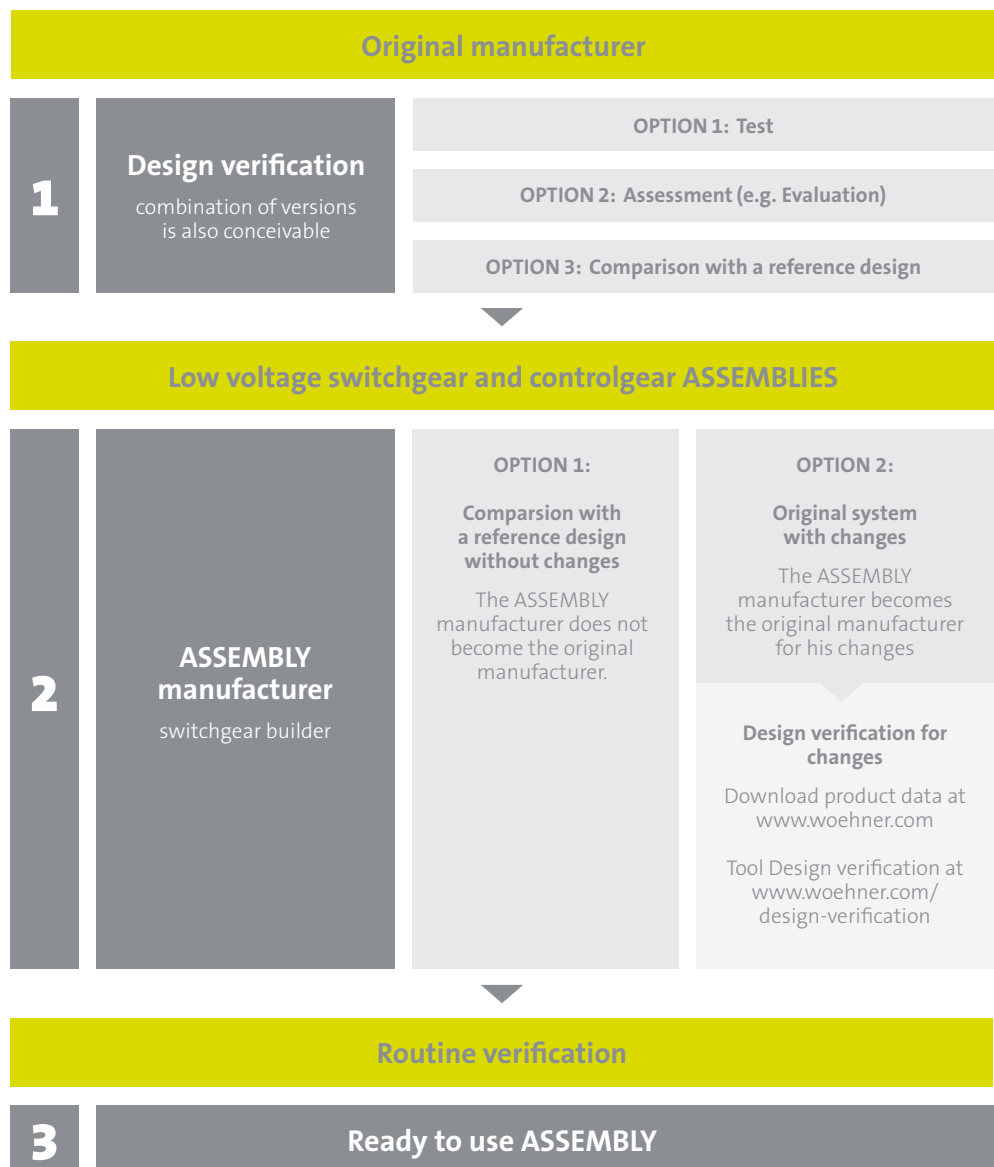
If an EC Declaration of Conformity has to be produced for the ASSEMBLY, the manufacturer declares compliance with the required standards with a legally binding signature.

**BRIEF AND IMPORTANT**

- IEC/EN 61439 is the new series of standards for the construction, application, characteristics and verification of switchgear and controlgear systems.
- With the introduction of the new standard, nothing substantial has changed overall. However, there are many alterations to the details.
- With the design verification the assembly manufacturer provides verification of the suitability of the system.
- Definitions of responsibilities for the user, designer and assembly manufacturer are now clearer.
- The assembly manufacturer still declares a system's conformity to the standard by signing the EC Declaration of Conformity.
- It is the assembly manufacturer's responsibility to deal with the standard and its changes.

**LOW VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES**

→  
Guidelines for designing a low voltage switchgear and controlgear ASSEMBLIES, according to the standard.



# STEP-BY-STEP TO THE FINISHED DOCUMENTATION

## OUR SUPPORT HELPS WITH THE DESIGN VERIFICATION PROCESS

The interaction of all components is judged in the ASSEMBLY during the design verification. Wöhner supplies its components to clients from various sectors, e.g. energy and control technology. The switchgear assemblies are mostly one-off or small batch series. Wöhner products generally only represent a part of the ASSEMBLY. By independently designing and constructing the ASSEMBLY, the client counts as the „original manufacturer“, according to the standard.

The responsibility therefore rests with the client, to provide all 21 individual verifications for the design verification. Wöhner supplies all the information on its products that is necessary to fulfil the points concerned in the design verification.



The product data for the design verification can be found at [www.woehner.com/products](http://www.woehner.com/products) in the relevant part of the download area.



## WÖHNER PREPARATION GUIDE FOR THE DESIGN VERIFICATION

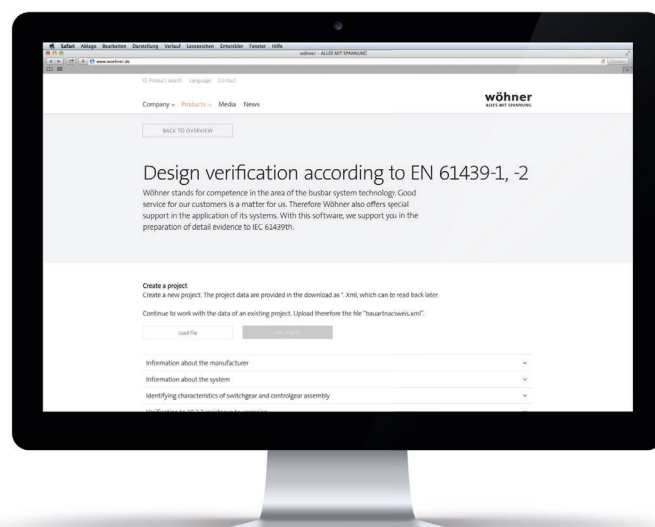
For the simple and quick creation of a design verification in accordance with IEC/EN 61439, Wöhner has developed an individual preparation guide. The majority of the necessary verifications already had to be provided in the past. They are usually based on the use of suitable materials and good work practices. The required verifications for the short-circuit withstand strength and temperature rise are more complex by contrast.

At the end you will receive a design verification for the entire system in the output formats PDF, rtf and XML. The XML file can be used again for new or similar projects. Additionally, you can attach the individual product data to your documentation for the design verification.



The Wöhner on-line tool for the preparation guide can be found at [www.woehner.com/design-verification](http://www.woehner.com/design-verification)

Our preparation guide provides you with all the important data regarding the Wöhner components – including information on short-circuit withstand strength and power dissipation.



## SHORT-CIRCUIT WITHSTAND STRENGTH VERIFICATION



If the maximum short-circuit current  $I_{pk}/I_{cw}$  cannot exceed 17/10kA, the verification of the short-circuit withstand strength of the ASSEMBLY is not required

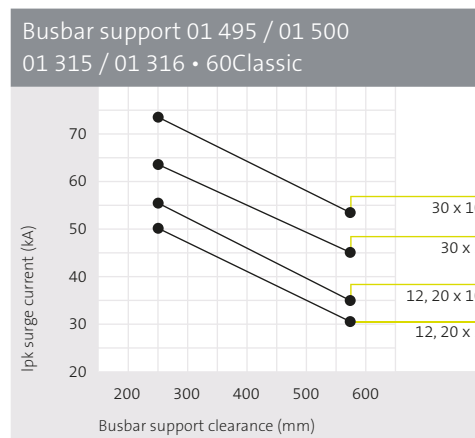
For verification of short-circuit withstand strength you can rely on a multitude of tests, which Wöhner has carried out with its components. When testing the busbar systems, the most unfavourable scenario was always carried out, i.e. the test without the upstream overload protection device. It has also been verified that an enclosure with the smallest possible dimensions has no influence on the short-circuit withstand strength of a pure busbar system.

The Wöhner preparation guide shows you how to verify the short-circuit withstand strength by means of the Wöhner test results. Based on the necessary short-circuit withstand strength of the ASSEMBLY, the consideration of protection devices and the comparison with a reference design, the short-circuit withstand strength is verified in accordance with IEC/EN 61439-1, Table 13.

## SHORT-CIRCUIT WITHSTAND STRENGTH DIAGRAMS ACCORDING TO IEC/EN 61439-1 FOR 60-, 100- AND 185MM BUSBAR SYSTEMS



You can find the calculation program at [www.woehner.com/short-circuit-strength](http://www.woehner.com/short-circuit-strength)



● Measured values from type tests

Wöhner provides several short-circuit withstand strength diagrams in the Product Manual, on pages 8/46 - 8/48, as technical support for the verification of the short-circuit withstand strength.

Along with the diagrams, the short-circuit withstand strength can also be ascertained via a calculation program on the Wöhner homepage.

## TEMPERATURE RISE VERIFICATION

With regards to the verification of temperature rise, Wöhner can fall back on insights from numerous application tests. For example, power dissipation has been determined for all products. You can therefore incorporate these into your temperature rise calculation. The temperature rise can be calculated in ASSEMBLIES up to 630A, as part of the design

verification, according to IEC/EN 61439. For ASSEMBLIES from 630A to 1600A, the calculation must be performed according to IEC 60890 with additional restrictions. Exceeding this limit, the client must measure the temperature rise in the ASSEMBLY or determine it by means of derivation from a comparable system.



**In case of rated current larger than 1600A, the temperature rise verification must be done by testing or derivation.**





## PRODUCT DATA FOR THE DESIGN VERIFICATION

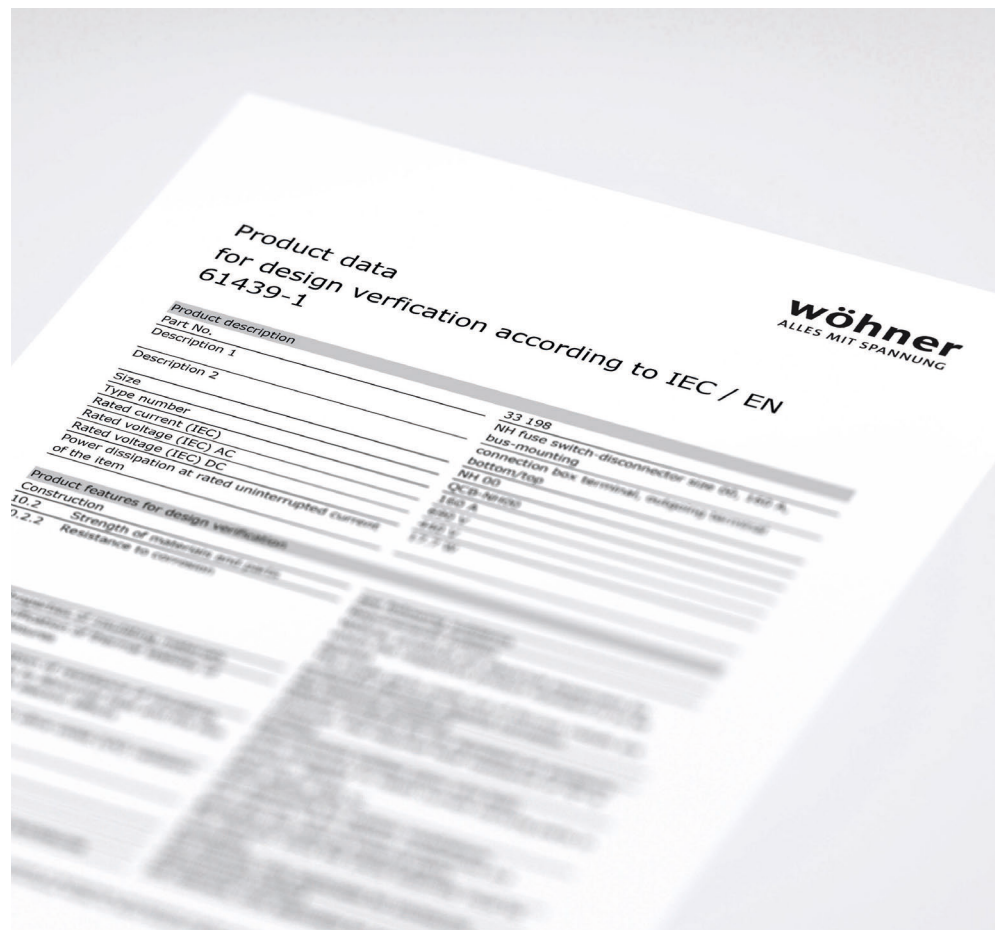
The product data for the design verification according to IEC/EN 61439-1 is available for all products from Wöhner. In these product data sheets all 21 individual verifications, as long as applicable, are applied to the relevant product.

The aim of these product data sheets is to be able to verify the potential application of the individual products in the ASSEMBLIES quickly and effectively. The product data sheets can

be found on-line at the respective product descriptions and can also be attached as an annex to the design verification with the preparation guide. This affords you simple and detailed documentation for your system.



Product data:  
Item no. 33198  
QUADRON®60Classic,  
NH bus-mounting fuse  
switch disconnecter



# EVERYTHING YOU NEED TO KNOW

## 61439 SEMINARS

Wöhner hosts seminars in which you can learn more about the new specifications for ASSEMBLIES. In particular they are about making you understand your responsibilities for the creation of design verifications according to IEC/EN 61439. You can find out when and where the seminars take place on our website at [www.woehner.com/IEC61439](http://www.woehner.com/IEC61439) or on our hotline (see page 26).

Many questions are always posed to us in these seminars. We have therefore compiled some of the most important questions and answers for you, on the following pages.

## CONTENTS

- Basics on specifications, standards and laws.
- IEC/EN 61439: general information, design verification, rated current, short-circuit withstand strength.
- Presentation of the software preparation guide for the IEC/EN 61439 design verification.



Further information  
can be found on  
[www.woehner.com/  
IEC61439](http://www.woehner.com/IEC61439)



# WHAT YOU ALWAYS WANTED TO KNOW ABOUT 61439...

## Q&A

### 1. What is an ASSEMBLY?

A combination of one or more low voltage switching devices with corresponding equipment for controlling, measuring, reporting, protecting and regulating; with all internal electrical and mechanical connections and structural components.

### 2. Does the new standard have to be complied with by law?

A standard basically has the characteristics of a recommendation. It is not legally binding. However: Standards should guarantee the safety of systems and represent the recognised requirements. Therefore, it is inherently recommendable to satisfy the contents – regardless of agreements and customer requirements.

### 3. ASSEMBLIES were formerly built and tested for functionality but did not provide any additional verifications. And Today?

If a manufacturer wants to produce a standard-compliant ASSEMBLY and place it on the market, it must create a design verification and routine verification. It is not compulsory to enclose a design verification and give it to the customer, but this is necessary for the routine verification.

### 4. Who is responsible for what?

There is a clear allocation of responsibility:

- The user (final customer): specifies, purchases and/or operates the ASSEMBLY
- The original manufacturer (switchgear builder or provider of ASSEMBLIES): Organisation that originally developed a switchgear system and supplies the associated verifications
- The manufacturer (in most cases the original manufacturer = switchgear builder): takes on responsibility for the finished ASSEMBLY

The design verification normally comes from the original manufacturer; the routine verification from the manufacturer. With the new standard the user/customer remains responsible for the switchgear ASSEMBLY.

### 5. What is a design verification?

The design verification confirms compliance with the standard and must be archived for ten years. The design verification consists of 21 individual verifications. Most of these verifications are relatively simple to satisfy, because they specifically refer to the application of suitable materials and good work practices. The verification for temperature rise and short-circuit withstand strength is more complex.

#### **6. How do I get a design verification?**

Normally the original manufacturer supplies the design verification. Wöhner offers the product data relevant to its components for the design verification at [www.woehner.com](http://www.woehner.com). These can be downloaded as PDF files. Technical support for the creation of the system's entire documentation, in accordance with IEC/EN 61439-1, -2 is offered free of charge, non-binding and without manufacturer bias at [www.woehner.com/design-verification](http://www.woehner.com/design-verification).

#### **7. What is a routine verification (EN 60439 „routine test“)?**

The routine verification, which is performed during and/or after manufacture, verifies that each ASSEMBLY complies with the requirements of the relevant ASSEMBLY standard.

#### **8. What does the term enclosure mean?**

An enclosure is a housing for the installed ASSEMBLY components, affording the type and degree of protection suitable for the intended application.

#### **9. Can Wöhner busbar systems still be used above 1600A?**

Yes they can. In this case a temperature rise test or a comparison with a tested reference design must be carried out.

#### **10. Can the switchgear builder still use products/manufacturers as usual and still comply with the standard?**

Yes, if the device manufacturer, e.g. Wöhner, complies with the requirements for the switchgear AND makes the product data available.

#### **11. What is the advantage of using complete systems (tested by the supplier)?**

The advantage is that the supplier of complete systems has carried out all the necessary tests for the special combinations of switchgear and can document these with a design verification. The disadvantage is that this system must be built in this configuration. You are consequently committed to these products, so tests etc are co-financed between you and the supplier. Any added value remains with the supplier.



### **12. Can products/manufacturers be exchanged?**

The components can be exchanged if they certify equivalent or better technical data (power dissipation and temperature rise). The physical alignment and rating of the functional unit must remain intact, or the existing design verification must be extended with product data from the new device. If the new device is a short-circuit device from another device manufacturer (i.e. circuit breaker), in every case a new short-circuit test must be carried out. The exceptions are devices of another range from the same device manufacturer, if the manufacturer confirms the characteristics of the new device is equivalent or better. Safety fuses and their manner of functioning are defined by the standard, therefore the above statement is not applicable to fuse switch disconnectors.

### **13. What is the advantage of using different makes of components?**

You remain flexible; the preferred components can be applied as desired and the added value remains in your own business. Provided you wish to deliver the system in accordance with the standard, it is more laborious, as the verifications have to be provided by yourself. There are preparation guides available at e.g. [www.woehner.com/tools](http://www.woehner.com/tools)

### **14. How can Wöhner help?**

On-line preparation guide at [www.woehner.com/design-verification](http://www.woehner.com/design-verification)  
Product verification at [www.woehner.com/products](http://www.woehner.com/products) in the relevant part of the download area.

The manufacturer receives a complete package consisting of:  
design verification in accordance with IEC/EN 61439-1, -2 as a PDF, RTF, XML,  
product data for the design verification,  
consultation by Wöhner.

# YOUR DIRECT LINE FOR THE STANDARD

## 61439 HOTLINE

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Naturally, you can have a Wöhner expert answer your questions. Our free hotline is available on the following number:

 **+800 61439 000**

Free of charge from landlines.  
Mobile phone prices can differ.

We can also be contacted by e-mail:  
[IEC61439@woehner.com](mailto:IEC61439@woehner.com)  
Get further information online:  
[www.woehner.com/IEC61439](http://www.woehner.com/IEC61439)



Our service times:  
Mon to Fri  
9:00 am to 5.00 pm



# FOR THE CORRECT TEMPERATURE IN THE ENCLOSURE

## TIPS AND TRICKS – TEMPERATURE MEASURING STRIPS

The measuring strips show the temperature by changing colour. Application is simple: The strip is stuck to the place where the temperature is to be measured. As soon as the maximum temperature has been reached the colour of the strip changes, in less than a second, from light grey to black. The colour change is non-reversible and the strip can therefore be archived as part of the test data. The accuracy of the temperature measurement is +/-1% of the indicated temperature value.

→  
You will find two  
test strips type 2/S  
(71 – 110 degrees)  
in the envelope

Do you want to know where to get  
more temperature gauges?  
We appreciate to help.  
Hotline +800 61439 000  
E-mail [IEC61439@woehner.com](mailto:IEC61439@woehner.com)  
[www.woehner.com/IEC61439](http://www.woehner.com/IEC61439)







