DYNACORD

Questions & Answers:

Certification of voice alarm control and indicating equipment (VACIE) systems and their components, according to EN 54-16 and EN 54-4

1. Is certification for voice alarm control and indicating equipment (VACIE) according to EN 54-16/EN 54-4 (and voice alarm loudspeakers according to EN 54-24) required in Europe and why?

Yes, it is required, because voice alarm systems – consisting of voice alarm control and indicating equipment (VACIE), their power supply equipment (PSE) and voice alarm loudspeakers – are subject to the European Construction Products Directive (EU-CPR No. 305/2011).

Link to document EU-CPR No. 305/2011:
https://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32011R0305&from=DE

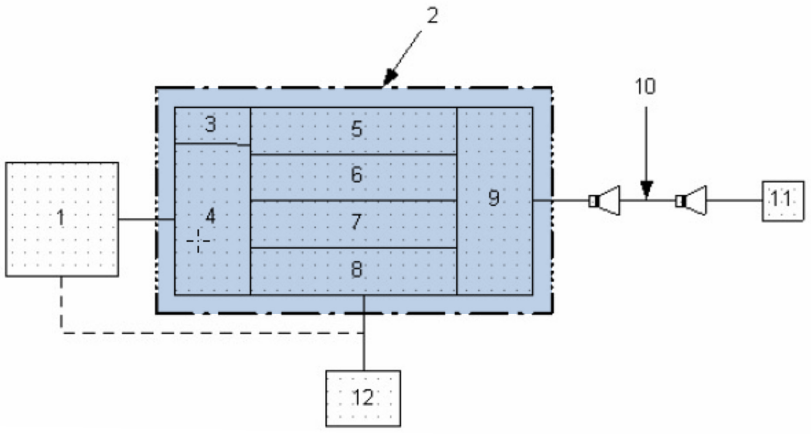
The EU Construction Products Regulation (CPR) applies to a construction product when it is placed or made available in the European Union (EU) market; i.e., when the product is available for sale it is covered by harmonized standards, such as EN 54-16, EN 54-4 and EN 54-24 for voice alarm (VA). These **harmonized standards** are drawn up in accordance with the EU Construction Products Regulation (CPR) and published by the European Commission in the Official Journal of the EU (OJ).

Alternatively, the construction product is covered by a European Technical Assessment (ETA). This can be issued at the request of the manufacturer for that product and is a completely legal alternative to the harmonized standards.

2. What are the system components of a voice alarm control and indicating equipment (VACIE) system according EN 54-16 and EN 54-4?

According to EN 54-16, a VACIE consists of the following system components: emergency microphone(s), fire alarm interface, indicators, processing and signal routing, message generation (message generator), amplification and voice alarm output. The power supply equipment is covered by EN 54-4.

EN 54-16:2008, Figure D.1 shows the components of a VAS:



Key

1	CIE (to EN 54-2)	7	message generation
2	VACIE	8	amplification
3	emergency microphone(s)	9	voice alarm output
4	fire alarm interface	10	voice alarm zone
5	indicators	11	end-of-line device
6	processing and signal routing	12	power supply equipment

Source:
EN 54-16:2008-06, Figure D.1 — Schematic diagram of a simple fire alarm voice alarm system

3. Which of these components of the voice alarm control and indicating equipment (VACIE) must be certified according to EN 54-16?

The VACIE is tested and certified as a whole system according to EN 54-16, i.e. all system components including amplifiers, signal processors, monitoring units and call stations must be tested together by an accredited and notified body.

ATTENTION: It is not permitted to use an amplifier (A) which is certified as a system component of a VACIE (A) system together in another VACIE (B) system. When certifying a VACIE system, all the components must be assessed and certified as a whole. A single device – such as a power amplifier – cannot be assessed without the rest of the VACIE system components (ref. Question 2).

4. Is it possible to certify an individual amplifier or other individual system components that are part of the VACIE, according EN 54-16?

No. As per the explanation in question 3, a single amplifier or any other single system component cannot be certified individually (as a standalone product) according to EN 54-16. They can only be listed as a system component of a VACIE of a specific manufacturer that is fully assessed and certified according to EN 54-16. Consequently, there are no valid EN 54 certificates that can be issued for individual components. An EN 54-16 certificate can only be issued for a complete and tested VACIE.

5. Can individual components of a certified voice alarm system be used as a "certified product" in any other systems / installations and thus turn these installations into an EN 54-16 certified VAS?

No. Systems cannot be upgraded to an EN 54-16 certified VACIE just by using single components (e.g., a power amplifier) of a certified VACIE.

6. Is it possible to exclude individual components of the VACIE from certification?

No. see explanation in question 3.

7. Is it possible to use a VACIE according to EN 54-16 without a power supply according to EN 54-4?

No. as it is clearly directed in EN 54-16, chapter 4.3:

"4.3 Power supply – Power supply equipment, external or included in the VACIE, shall comply with the requirements of EN 54-4."

Therefore, if the system power supply does not comply with EN 54-4, it cannot ever be certified under EN 54-16.

8. Why is an EN 54-4 certified 230 V UPS not available?

The product standard EN 54-4 is specifically designed for power supply equipment used in fire alarm systems. Fire alarm systems are usually equipped with DC power supplies between 6 V DC and 48 V DC.

A VACIE is considered part of a fire detection system (FDS); in case of fire, it is used to achieve the protection objective for building evacuation. A VACIE can also be used for hazardous situations outside of the fire situation. However, depending on structural and architectural acoustic conditions, special equipment such as line-array loudspeakers may be required to achieve protection objectives. Otherwise, required speech intelligibility (STI >= 0.5) and the associated sound pressure level (SPL) required to evacuate the building may not be achieved. To control these pro audio system components, it may be necessary to use special power or high-performance amplifiers with additional DSP characteristics. Such amplifiers usually work with 230 V AC or even 400 V three-phase AC current to drive output power of up to 20 kW per amplifier.

For that power range, uninterruptible power supplies (UPS) can be used as emergency system power supplies (from a technical perspective), in compliance with EN 62040-x or EN 50171. However, these standards are not part of the EN 54 series for building products in fire detection technology, **and the architecture of a UPS does not allow certification according to EN 54-4.**

9. Why are Dynacord IPX series amplifiers not EN 54-16 certified?

Dynacord IPX series professional power amplifiers are multi-channel models for permanent installations, designed to provide a total output power of between 5 kW and 20 kW at 4 ohms. Because this level of power output cannot be realistically generated by 6-48 V DC supplies, these amplifiers are only operated with 100-240 V AC mains.

Power supplies certified to EN 54-4 can´t be used for any of these high-powered amplifier types, as the power requirements are not covered by the power supply technology described in EN 54-4.

10. (A) Nevertheless, how could Dynacord amplifiers be used in a VAS with a VACIE system certified according to EN 54-16?

(B) What should be done if the power supply of the VACIE or the power supply for parts of the VACIE (e.g., power amplifiers) can´t be certified according to EN 54-4?

For such cases, the European Technical Assessment (ETA) is available. An ETA allows construction products to be marketed throughout Europe even **if they are not or not fully covered by a harmonized standard** (i.e. EN 54-16 / EN 54-4)

Note: In 2020, Bosch started to investigate the possibility of applying for an ETA for the Bosch PRAESENSA and Dynacord PROMATRIX 9000 VACIEs together with Dynacord IPX series amplifiers.

11. What is the risk if the VACIE in my project is not or only partially planned, installed and put into operation with certified building products?

A VACIE must be certified and provided with a CE mark in accordance with the EU Construction Products Regulation (CPR). This CE mark proves the conformity of the product (i.e., the VACIE as a system) through the Declaration of Performance (DoP), i.e., the conformity of the construction product with its declared performance according to the harmonized standard EN 54-16.

If this CE mark is missing or the VACIE (according to EN 54-16) contains components that have not been assessed and certified with the VACIE in accordance with the EU CPR, the VACIE must not be placed on the EU market or used in Europe as a construction product. Otherwise this would constitute a serious legal violation of the EU CPR and the corresponding construction/building regulations of the EU member state where the product will be installed.

12. Does EN 54-16 and EN 54-4 also impose requirements for the design, construction, installation, commissioning and maintenance of a complete voice alarm system (VAS)?

No, EN 54-16 and EN 54-4 are product standards to cover the VACIE system as one single construction product consisting of the components according to question 2.

EN 54-16 does specify requirements, test procedures and performance characteristics of a VACIE systems for use in the event of fire, that are installed in buildings. The alarm signal is transmitted by voice recordings, acoustic signals and live announcements.

EN 54-4 only specifies requirements, test methods and performance characteristics of power supply equipment (PSE) installed in conjunction with fire alarm systems (FDS) or voice alarm systems (VAS).

13. What standards and regulations govern the design, construction, installation, commissioning and maintenance of voice alarm systems (VAS)?

Requirements for planning, implementation, installation, commissioning and maintenance of VAS are defined by national application standards in the respective EU member states. Below are the application standards of some European countries as an example:

Europe – General:
CEN/TS 54-32:2015
Fire detection and fire alarm systems. Planning, design, installation, commissioning, use and maintenance of voice alarm systems

EN 50849:2017
Sound systems for emergency purposes
Note: This European Standard does NOT apply to emergency sound systems used for evacuation in case of FIRE EMERGENCY, whether connected to a fire detection and fire alarm system or not.

France:
NF S61-936 May 2013
Fire safety systems - Alarm equipment for evacuation - Design requirements - Systèmes de sécurité incendie (SSI)

PD CEN/TS 54-32:2015 Juillet 2015
Systèmes de détection et d‘alarme incendie. Planification, conception, installation, mise en service, utilisation et maintenance des systèmes d‘alarme

United Kingdom (UK):
BS 5839-8:2013
Fire detection and fire alarm systems for buildings.
Code of practice for the design, installation, commissioning and maintenance of voice alarm systems

BS 7827:2019
Designing, specifying, maintaining and operating emergency sound systems for sports grounds, large public buildings, and venues. Code of Practice

PD CEN/TS 54-32:2015
Fire detection and fire alarm systems. Planning, design, installation, commissioning, use and maintenance of voice alarm systems

Italy:
UNI ISO 7240-19:2010
Sistemi fissi di rivelazione e di segnalazione allarme d‘incendio - Parte 19: Progettazione, installazione, messa in servizio, manutenzione ed esercizio dei sistemi di allarme vocale per scopi d‘emergenza

UNI CEN/TS 54-32:2015
Sistemi di rivelazione e di segnalazione di incendio
- Parte 32: Pianificazione, progettazione, installazione, messa in servizio, esercizio e manutenzione dei sistemi di allarme vocale

The Netherlands:
NEN 2575-2:2012
Fire safety of buildings - Evacuation alarm installations - System and quality requirements and guidelines for locating of alarm devices
- Part 2: Loud alarm evacuation alarm installation type A

NEN 2575-3:2012
Fire safety of buildings - Evacuation alarm installations - System and quality requirements and guidelines for locating of alarm devices
- Part 3: Loud alarm evacuation alarm installation type B

Austria:
ÖNORM F 3012:2011 03 15
Elektroakustische Notfallsysteme, bestehend aus Einzelkomponenten – Anforderungen

ONR CEN/TS 54-32:2014 12 15
Brandemeldeanlagen - Teil 32: Projektierung, Montage, Inbetriebnahme, Betrieb und Instandhaltung von Sprachalarmsystemen

ÖNORM F 3074:2020 05 15 ENTWURF
Instandhaltung von elektroakustischen Notfallsystemen (ENS)

Poland:
PN-EN 60849:2001
Sound Systems for emergency purposes

CEN/TS 54-32:2015
Fire detection and fire alarm systems. Planning, design, installation, commissioning, use and maintenance of voice alarm systems

EN 50849:2017
Sound systems for emergency purposes
Note: This European Standard does NOT apply to emergency sound systems used for evacuation in case of FIRE EMERGENCY, whether connected to a fire detection and fire alarm system or not.

Spain:
UNE-EN 60849:1998 (Ratificada)
Sistemas electroacústicos para servicios de emergencia

PNE 23007-32 (Proyecto)
Sistemas de detección y alarma de incendios
- Parte 32: Planificación, diseño, instalación, puesta en marcha uso y mantenimiento de sistemas de alarma por voz
Version Español basada en CEN/TS 54-32:2015

Switzerland:
SES-Richtlinie „Sprachalarmanlagen (SAA) & Elektroakustische Notfallwarnsysteme (ENS) - Planung, Einbau und Betrieb“:2017-01

Germany:
DIN VDE 0833-4:2014-10
Gefahrenmeldeanlagen für Brand, Einbruch und Überfall
Teil 4: Festlegungen für Anlagen zur Sprachalarmierung im Brandfall

DIN CEN/TS 54-32 VDE V 0833-4-32:2016-04
Fire detection and fire alarm Systems - Part 32: Planning, design, installation, commissioning, use and maintenance of voice alarm systems; German version CEN/TS 54-32:2015
Note: Only applicable with prior legally binding agreement with the building supervisory authorities.

DIN EN 50849 VDE 0828-1:2017-11
Sound systems for emergency purposes; German version EN 50849:2017
Note: Only applicable for evacuation purposes OUTSIDE fire.

When planning and implementing a voice alarm system (VAS) in Germany, primarily the construction supervision law of the federal states has to be considered.