

RODE Task Force – Submersible Definitions Meeting Minutes

May 7, 2021 (2-3:30PM CDT) – Virtual

Chair: Karla Trost

Vice-Chair: Francois Soulard

Meeting Agenda

1. **Call to Order** Karla
The meeting was called to order at 2:01 PM CDT.
2. **6.3.2 Call for Patents/Copyright** Karla
A call for knowledge of patents and copyright was performed.
3. **Attendance & Affiliation**
Each attendee announced their name and affiliation.
4. **Review of Scope**
Draft definitions for RODE equipment (specifically C37.75 and C37.68) for Submersible, Temporary Immersion, and Prolonged Immersion and provide to RODE at the fall meeting.
5. **New Items:** Review current definitions (See Annex 2) and draft new language as required.
 - It was determined that the C572.12.32-2019 definition for “Submersible” is correct for use in C37.75, C37.68, and other RODE standards.
Constructed to be successfully operable when submerged in water under specified conditions of pressure and time.
 - It was determined that definitions for “Temporary Immersion” and “Prolonged Immersion” are not needed. Instead, the standards (specifically C37.68 and future apparatus standards) should define the Normal Service Conditions.
 - The Task Force drafted a recommended “Normal Service Condition” clause for C37.68.
Unless otherwise specified, the controls, including the operating devices and the auxiliary equipment that form an integral part of them, are intended to be used in accordance with their rated characteristics and the normal (usual) service conditions as listed in this subclause.

Subclause 3.2 of IEEE Std C37.100.1-2018 is applicable with the following additions.
Normal (usual) conditions for submersible equipment include the following:
 - Water head does not exceed 3 m above the top surface of the control enclosure for a duration not to exceed 10 days.
When the control is designed to be mounted separately from the apparatus, the manufacturer shall define the appropriate service conditions and the control shall pass all applicable design tests.
 - The Task Force recommended that the standards (C37.68, C37.75, and future apparatus standards) incorporate a “more severe condition” and address with a design requirement (like C57.12.32-2019) or a design test. For example, this topic from C37.62.
Exposure to chemical or electrochemical reactions may be encountered in a subgrade environment. These chemicals may contribute to mild corrosive reactions.

- It was noted that C37.62 references a water head of 3m from the *base* of the unit. The Task Force recommends that the C37.74 working group review the use of “base” versus “top” of the unit and also that IEEE 386 uses a depth of 1.8m vs 3m.
- The Task Force agreed this information can be shared with the Chairs of C37.68 and C37.75 so that they can work on incorporation prior to the fall RODE subcommittee meeting.

6. **Next Meeting** – Another meeting is not needed

7. **Adjournment** The meeting was adjourned at 3:22PM CDT.

Annex 2: Current Definitions

Submersible

From IEEE Dictionary:

- So constructed as to be successfully operable when submerged in water under specified conditions of pressure and time. FOUND IN [IEEE Std C57.12.80-2010 \(Revision of IEEE Std C57.12.80-2002\)](#)
- Constructed to be successfully operable when submerged in water under specified conditions of pressure and time. FOUND IN [IEEE Std C57.12.32-2019 \(Revision of IEEE Std C57.12.32-2002\)](#) [View Definitions](#)

From C37.75:

Equipment designed to maintain its performance characteristics in a non-publicly accessible environment that is susceptible to temporary or prolonged periods of time.

WG Comments:

- *Definition does not mention anything about immersion in water.* "Equipment designed to maintain its performance characteristics in a non-publicly accessible environment that is susceptible to immersion for temporary or prolonged periods of time."
- *Submersible equipment may be in publicly accessible areas, such as pad-mounted switchgear used on barrier islands. Remove "in a non-publicly accessible" and revise as appropriate.* "Submersible: Equipment designed to maintain its performance characteristics in an environment that is susceptible to temporary or prolonged periods of time."
- *Definition of submersible appears to be missing text.* "susceptible to temporary or prolonged periods of time". ""susceptible to temporary or prolonged periods of time" should be changed to "susceptible to submersion in water for temporary or prolonged periods of time". Alternatively, we can use the definition provided in the IEEE Standards Online Dictionary (from C57.12.32-2019), "Constructed to be successfully operable when submerged in water under specified conditions of pressure and time.""

From C37.68:

Load Break or Fault Interrupting Apparatus which are designed to be immersed for temporary or prolonged periods of time and which may remain energized and in operation during the immersion. Quality of switchgear equipment to maintaining its performance characteristics in an environment susceptible to be flooded temporarily or for a long period of time, energized under these conditions and which can be operated after having been draining the environment.

WG Comments:

- *Definition for submersible switchgear needs several editorial changes. Revise second sentence for clarity and concision*
- *Change sentence to read "The equipment shall maintain its performance"*
- *Repetitive Line. Remove sentence beginning with "Quality of switchgear equipment..."*

Temporary Immersion

From IEEE Dictionary:

- No definitions for Temporary Immersion nor for Immersion

From C37.75:

Environmental condition for which the submersible enclosure is submerged by rainwater or runoff. This condition can last for up to 24 hours followed by drainage, thus exposing the enclosure to a stress condition by contaminants in water and water pressure. After draining, a significant amount of conductive contaminants deposited on the enclosure surface can stress the dielectric resistance.

WG Comments:

- *The "cause" of submersion is immaterial, except for, perhaps securing the switchgear. Remove " by rainwater or runoff. This condition can last" "Temporary immersion: Environmental condition for which the submersible enclosure is submerged for up to 24 hours followed by drainage, thus exposing the"*
- *The sentence - "After draining... " is good information but doesn't seem to belong in the definition for Temporary immersion.*

From C37.68:

Environmental condition for which the submersible switchgear is submerged by rainwater or runoff. This condition can last for up to 24 hours followed by drainage, thus exposing the equipment to a stress condition by contaminants in water and water pressure. After draining, a significant amount of conductive contaminants deposited on the switchgear surface can stress the dielectric resistance.

WG Comments:

- *The electrical stress due to immersion depends on the specific design. add to the end of the sentence "depending on the specific design."*
- *The last sentence specifying restricted access is unnecessary since "Wet vault" is a type of "vault" and the definition for "vault" specifies restricted access. Delete last sentence*

Prolonged Immersion

From IEEE Dictionary:

- No definitions for Temporary Immersion nor for Immersion

From C37.75:

Environmental condition for which the submersible enclosure is submerged by rainwater or runoff during a period of time which can extend beyond 24 hours without drainage, thus exposing the enclosure to contaminant and water pressure stress condition. The immersion period of time can reach several months. Refer to the appropriate equipment standards and manufacturer documentation for equipment depth and duration ratings.

WG Comments:

- *The "cause" of submersion is immaterial, except for, perhaps securing the switchgear. Remove "by rainwater or runoff during" and insert "for" "Prolonged immersion: Environmental condition for which the submersible enclosure is submerged for a period of time which can extend beyond 24 hours without drainage, thus"*

From C37.68:

Environmental condition for which the submersible switchgear is submerged by rainwater or runoff during a period of time which can extend beyond 24 hours without drainage, thus exposing the equipment to contaminant and water pressure stress condition. The immersion period of time can reach several months. Refer to the appropriate equipment standards and manufacturer documentation for equipment depth and duration ratings.

WG Comments:

- *"The immersion period of time can reach several months." This sentence is redundant since the immediate following sentence refers to the equipment standard for duration of immersion. It is also not necessary to the definition.*