



Technical Specification code: MAT-O&M-NCS-2021-0035-EGIN

Version no. 2 dated 28/05/2021

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

CONTENTS

1	DOCUMENT AIMS AND APPLICATION AREA	2
2	DOCUMENT VERSION MANAGEMENT	3
3	UNITS IN CHARGE OF THE DOCUMENT	3
4	REFERENCES	3
5	ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY	3
6	DEFINITIONS AND ACRONYMS.....	4
7	DESCRIPTION	7
8	ANNEXES	19

THE HEAD OF Network Components Standardization
Maurizio Mazzotti

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

1 DOCUMENT AIMS AND APPLICATION AREA

The aim of this document is to describe the construction and use characteristics of 12Vdc hermetically sealed, Valve-Regulated Lead-Acid (VRLA) type, Absorbent Glass Mat (AGM) and Gel technologies, to be used as battery pack, composed by two series monobloc, for Remote Terminal Unit **enel** Global standard GSTR001/1 to be installed in the MV/LV substations (secondary substation) or pole transformer point of the Enel Group Distribution Companies, listed below:

Country	Distribution Company
Argentina	Edesur
Brazil	Enel Distribuição Rio Enel Distribuição Ceará Enel Distribuição Goiás Enel Enel Distribuição São Paulo
Chile	Enel Distribución Chile
Colombia	Codensa
Iberia	e-distribución
Italy	e-distribuzione
Peru	Enel Distribución Perú
Romania	Enel Distribuție Banat Enel Distribuție Dobrogea Enel Distribuție Muntenia

Table 1 - Distribution Companies

1.1 RELATED DOCUMENTS TO BE IMPLEMENTED AT COUNTRY LEVEL

This document applies to both Enel Global Infrastructure and Networks Srl Company and to Infrastructure and Networks Business Line perimeter, when each Company does not have to issue further documents.



Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
1	18/01/2016	Issuing of “Global Infrastructure and Networks GSCB001 Stationary Lead-Acid Battery VRLA Type for MV-LV Substation and pole transformer point” technical specification.
2	28/05/2021	General revision of document in compliance with IEC standards. Added documents to be submitted for tenders, including check list.

3 UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- Global Infrastructure and Networks: Operation and Maintenance / Network Components Standardization unit.

Responsible for authorizing the document:

- Global Infrastructure and Networks: Head of Operation and Maintenance unit;
- Global Infrastructure and Networks: Head of Health, Safety, Environment and Quality unit.

4 REFERENCES

- Code of Ethics of Enel Group;
- Enel Human Right Policy;
- The Enel Group Zero Tolerance of Corruption (ZTC) Plan;
- Organization and management model as per Legislative Decree No. 231/2001;
- RACI Handbook Infrastructure and Networks no. 06;
- Enel Global Compliance Program (EGCP);
- Integrated Policy of Quality, Health and Safety, Environment and anti-Bribery;

5 ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Networks Management

Macro Process: Materials management

Process: Network components standardization

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

 Perimeter: *Global*

Staff Function: -

Service Function: -

 Business Line: *Infrastructure & Networks*

6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Manufacturer Product	Component manufactured by a Supplier in accordance with a technical specification
Technical Conformity Assessment (TCA)	A “conformity assessment” ¹ with respect to “specified requirements” ² consists in functional, dimensional, constructional and test characteristics required for a product (or a series of products) and quoted in technical specifications and quality requirements issued by Enel Group distribution companies. This also includes the verification of conformity with respect to local applicable regulation and laws and possession of relevant requested certifications
Conformity assessment body	Body that performs the conformity assessment activities [ISO 17000]
Enel Equipment Key code	It's an equipment representative for a group (family) of similar equipment chose by Enel
Enel Equipment Family code	Equipment belonging to a specific group (family) in which another equipment is identified as key code
TCA systems	The “conformity assessment systems”, is applicable specifying that the rules and procedures to carry on the TCA are those specified in the present document
Type A documentation	Not confidential documents used for product manufacturing and management from which it is possible to verify the product conformity to all technical specification requirements, directly or indirectly

¹ Definition 2.1 of ISO/IEC 17000

² Definition 3.1 of ISO/IEC 17000

**Technical Specification code: MAT-O&M-NCS-2021-0035-EGIN**

Version no. 2 dated 28/05/2021

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point**Application Areas**Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

Type B documentation	Confidential documents used for product manufacturing and management where all product project details are described, in order to uniquely identify the product object of the TCA
TCA report	Document describing the activities carried out for TCA
TCA dossier	Set of final documents delivered by the Supplier for the TCA
Material LifeCycle Management (MLM)	Integrated IT platform to manage the processes of Technical Specifications (TSM), Technical Conformity Assessment (TCA), Quality Control Tools (QCA), Defects Managing (CMD), Warranties and Materials Shipping (MSH)



Technical Specification code: MAT-O&M-NCS-2021-0035-EGIN

Version no. 2 dated 28/05/2021

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

6.1 ENEL GLOBAL INFRASTRUCTURE AND NETWORKS COUNTRIES REFERENCE STANDARDS

Reference documents listed below (amendments included) shall be the edition in-force at the contract date.

ISO/IEC 17000	Conformity assessment – Vocabulary and general principles
ISO/IEC 17020	General criteria for the operation of various types of bodies performing inspection
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
ISO/IEC 17050-1	Conformity assessment - Supplier's declaration of conformity - Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15)
ISO/IEC 17050-2	Conformity assessment - Supplier's declaration of conformity - Part 2: Supporting documentation (ISO/IEC 17050-2:2004)
ISO/IEC 17065	Conformity assessment – Requirements for bodies certifying products, processes and services

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7 DESCRIPTION

7.1 LIST OF COMPONENTS

List of components please refer to ANNEX B.

7.2 APPLICABLE LAWS AND REFERENCE STANDARDS

Reference documents listed below (amendments included) shall be the edition in-force at the contract date. For South America destinations, the reference standards are the IEC/ISO, whilst for Europe destinations the reference standards are the correspondent European ones (EN).

7.2.1 International standard

- IEC 60896-21 “Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test”;
- IEC 60896-22 “Stationary lead-acid batteries - Part 22: Valve regulated types – Requirements”;
- IEC 60695-11-10 “Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods”;
- IEC 60695-11-20 “Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods”;
- EN 61429/A11 “Marking of secondary cells and batteries with the international recycling symbol iso 7000-1135 and indications regarding directives 93/86/EEC and 91/157/EEC”;
- IEC 60332-1-2 “Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame”;
- EN 50399 “Common test methods for cables under fire conditions - Heat release and smoke production measurement on cables during flame spread test - Test apparatus, procedures, results”;
- ISO 7000-1135 “General symbol for recovery/recyclable”;
- DIN 41773 “Static power converters; semiconductor rectifier equipment with IU-characteristics for charging of lead-acid batteries, guidelines”.

7.2.2 enel standards

- MAT-O&M-NCS-2021-0033-EGIN version 3 “Global Infrastructure and Networks – GSCG002 Technical Conformity Assessment”;
- GSTR001/1 rev.1 “Remote Terminal Unit for secondary substation (UP)”;

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

- Contractual Requirements for Components and Materials Quality management;
- CNS-O&M-S&L-2021-0032-EGIN “Global Infrastructure and Networks Barcode specification;
- Packaging, transport, and delivery requirements rev.2.

7.2.3 Argentina

- Art 1° de la Resolución 544/94 “Residuos Peligrosos” de la secretaria de Recursos Naturales y Ambiente Humano, de la Nación (Boletín Oficial N° 28043 del 21/12/94) referido a la aplicación de la ley 24051.

7.2.4 Brazil

- NR-10 – Segurança em instalações e serviços em eletricidade.

7.2.5 Chile

- Elec 4/2003 – Instalaciones de consumo en baja tensión;
- NSEG 5. E.n.71 - Reglamento de Instalaciones Eléctricas de Corrientes Fuertes.

7.2.6 Colombia

- RETIE – Reglamento Técnico de Instalaciones Eléctricas;
- Resolución 0372 de 2009, Ministerio de Medio Ambiente - Establece los elementos que deben contener los planes de gestión de devolución de productos posconsumo de baterías usadas plomo acido;
- Annex PVR006 – “Current revision - Bar Codes, guarantee and traceability of ENEL Codensa materials”.

7.2.7 Perú

- CNE – Suministro - Código Nacional de Electricidad – Sumnistro 2011.

7.2.8 Italy

- D.Lgs n. 81 of the 9th of April 2008 and subsequent modifications;
- D.P.R. n. 43 of the 27th of January 2012;
- Decreto Ministeriale Ambiente n. 20 – 24 Gen. 2011;
- CEI R021 – Sicurezza ambientale riciclo accumulatori;

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

- Nota Operativa PVR001 – Rev. 2 – Ott. 2012 - Gestione Garanzie dei materiali di ENEL Distribuzione;
- Nota Operativa PVR006 – Rev. 2 – Ott. 2012 - Codici a Barre, garanzia e rintracciabilità dei materiali di ENEL Distribuzione;
- Allegato alla N.O. PVR006 – Rev. 2 – Ott. 2012 – Note esplicative per la definizione e gestione dei barcode per le batterie di Cabina Primaria e di Cabina Secondaria.

7.2.9 Spain

- R.D. 337/2014, de 9 de mayo, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01÷23;
- R.D. 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico;
- Ley 22/2011, de 28 de julio, de residuos y suelos contaminados;
- R.D. 106/2008, de 1 de febrero, sobre pilas y acumuladores y la gestión ambiental de sus residuos;
- R.D. 943/2010, de 23 de julio, por el que se modifica el Real Decreto 106/2008, de 1 de febrero, sobre pilas y acumuladores y la gestión ambiental de sus residuos;
- R.D. 710/2015, de 24 de julio, por el que se modifica el Real Decreto 106/2008, de 1 de febrero, sobre pilas y acumuladores y la gestión ambiental de sus residuos.

7.2.10 Romania

- Legea securității și sănătății în muncă nr.319/2006, cu modificările și completările ulterioare;
- Ordonanța de Urgență nr. 195/22.12.2005 privind protecția mediului, cu toate modificările și completările în vigoare;
- Legea nr. 211/25.11.2011 privind regimul deșeurilor;
- H.G. 856/2002 privind evidența gestiunii deșeurilor și pentru aprobarea listei cuprinzând deșeurile, inclusiv deșeurile periculoase, completată de HG 210/2007;
- H.G. 1037/03.11.2010 privind deșeurile de echipamente electrice și electronice;
- H.G. nr. 1132/18.09.2008 privind regimul bateriilor și acumulatorilor și al deșeurilor de baterii și

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: *Infrastructure & Networks*

acumulatori.

7.2.11 Europe

- Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006;
- Directive 2004/108/EC electromagnetic compatibility.

7.3 SERVICE CONDITIONS

12 Vdc monoblocs shall compliant with standards defined in this document, furthermore they shall be able to function satisfactorily for the following values indicated in the table 2.

Reference for environmental conditions	
Altitude (m)	< 2000 s.l.m.(2700 s.l.m for Colombia) (*)
Operating temperature (°C)	-20 ÷ +50
Storage and transport temperature (°C)	-25 ÷ +70
Atmospheric pressure (kPa)	70 ÷ 110
Relative humidity	≤ 95%

Table 2 - Service Conditions

(*) in case that, for > 2000 altitude, limitations or de-ratings are foreseen by supplier, they are subjected to specific **enel** approval.

7.4 TECHNICAL CHARACTERISTICS

Below the maximum dimensions that the 12 Vdc monobloc shall comply are shown:

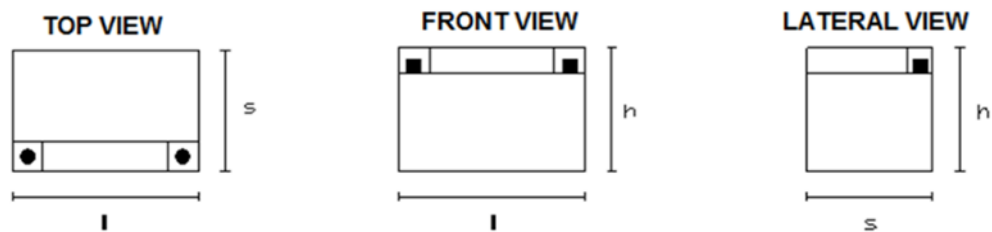


Figure 1 - 12 Vdc monobloc dimensions

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

The possible installations are described in the figure below:

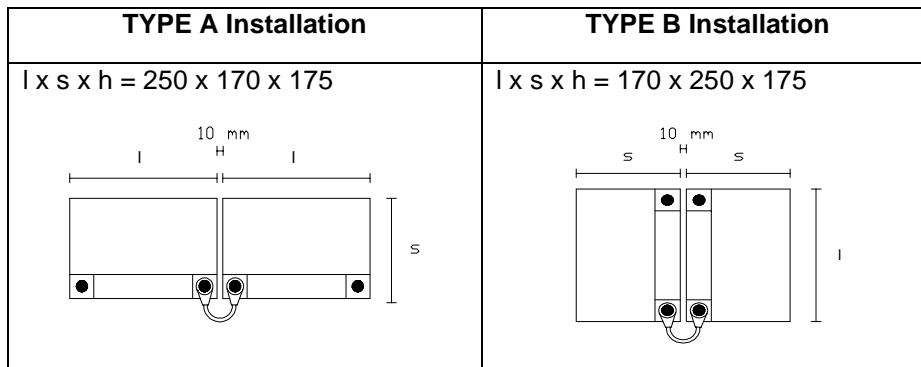


Figure 2 - 24 Vdc monoblocs series dimensions

The series of 12 V monoblocs are intended to be installed in one compartment of the rack cabinet of MV/LV substation or pole transformer point (see GSTR001) as shown in the picture below:



Figure 3 - 24 Vdc monoblocs series installation

The monoblocs will be kept charged, in float operation, by a rectifier contained inside the RTU which, in addition to charging the monoblocs, provides energy continuously to a load absorbing a constant current of about 0.5 A and, occasionally, to electrical switchgear motors representing an additional peak charge.

Adjustment of the floating voltage to temperature change will be achieved using a temperature sensor, connected to the rectifier, located on the side of the monobloc, usually located in the most critical position as far as cooling is concerned.

The table below contains the required technical features:

Life expectancy(years)	≥ 12 "Long life" (considering 250 days at 60°C and 750 days at 40°C operating conditions)
Maximum dimensions l x t x h (length x thickness x height) The maximum height refers to a fully equipped 24 Vdc battery (including terminals and terminal covers) (mm)	250 x 170 x 175 (or 170 x 250 x 175)

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

 Perimeter: *Global*

Staff Function: -

Service Function: -

 Business Line: *Infrastructure & Networks*

Maximum weight (kg)	15
Monobloc number of cells	6
Rated voltage (Vdc)	12
Float voltage at 20 °C Uflo (Vdc)	$(2,26 \div 2,30) \times 6$
Rated capacity C10 (Ah) capacity at 20 °C, at 10 h rate of discharge with final discharge voltage of 10.8 Vdc (Ufinal =1.8 Vpc each cell)	≥ 25
Rated capacity C3 (Ah) capacity at 20 °C, at 3h rate of discharge with final discharge voltage of 10.2Vdc (Ufinal =1.7 Vpc each cell)	$\geq 88\%$ of C10
Charge retention factor Crf per month at 20°C (Ah)	$\geq 98,75\%$ of C10
Internal resistance (Ri) (mΩ)	< 8
Maintenance	monobloc shall be maintenance-free for entire life
Recharge diagram	DIN 41773

Table 3 - Monoblocs technical features

7.5 CONSTRUCTION CHARACTERISTICS

7.5.1 Construction characteristics of the monobloc

Characteristics of the monobloc case ⁽¹⁾	Made of acid-resistant, shockproof plastic material with flammability rating of materials V-0 according to IEC 60707/ 60695-11-10; Case shall not release impurities to the electrolyte
Positive and Negative grid material	Presence of antimony and cadmium not allowed. Ca and Sn presence allowed with following limitation for positive grid Ca<150 ppm and Sn<1,5%
Acid solution quantity (liters) with a density of 1,27 kg/dm³ ⁽¹⁾	To be declared by manufacturer (Liters - for neutralizing calculation)
Intervention pressure of safety valves ⁽¹⁾	Pressure value not exceeding 20% of the breaking point of the case
Safety valve ⁽¹⁾	Shall be resistant to acids and prevent the entry of air into the monobloc. Following intervention, they shall guarantee the absence of acid or aggressive vapors emissions.

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

Manufacturing date of two monoblocs constituting the battery	The corresponding dates shall be identical for the two monoblocs of a same battery. Date of construction must be no more than 90 days before the Transport Document date.
---	---

Table 4 - Monoblocs construction features

(1) The Manufacturer must provide a declaration that the monoblocs are in compliance with the specifications stated in this point.

7.5.2 Construction characteristics of the connecting cable

Built	Flexible single-core cable with 450/750V as minimum insulation class and Cca-s1b,d1,a1 as minimum fire reaction described below. <ul style="list-style-type: none"> - Cca: EN 50399: Flame Spread (FS) $\leq 2,00m$; Total Heat Release (THR) $\leq 30MJ$; Maximum Heat Release Rate (HHR) $\leq 60kW$; Fire Growth Rate, index of heat release rate (FIGRA) $\leq 300Ws^{-1}$ /// IEC 60332-1-2: Flame Spread, vertical flame propagation $H \leq 425$ mm; - s1b: Total Smoke Production (TSP1200) ≤ 50 m²; Smoke Production Rate, maximum smoke (SPR) 0,25 m²/s; transmittance $\geq 60\%$ < 80%; - a1: electrical conductivity < 2,5 $\mu S/mm$; pH > 4,3; - d1: No flaming droplets/particles persisting longer than 10 s within 1200s. The connection shall be designed by constructor in order to avoid distancing between the monoblocs and in order to guarantee that the voltage drop between monoblocs terminals (two poles) does not exceed 6 mV with a passing current equal 0,1 I10
Section (mm²)	≥ 6
Length (mm)	100 ÷ 150 in any case such as to ensure a correct arrangement of the two monoblocs (spaced at least 10 mm) in both configurations of Fig. 2
Caps or connection insulation devices	Protection degree IP2X

Table 5 - connection cable characteristics

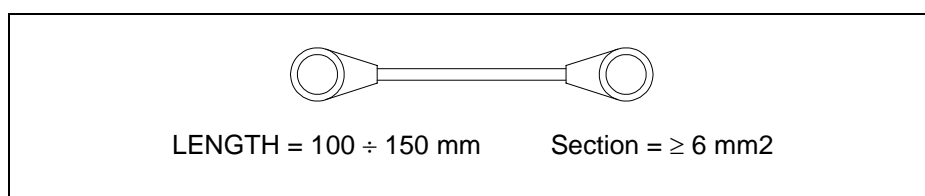


Figure 4 - Connecting cable

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3 Marking of the monoblocs

Each monobloc shall be marked a code with technical information of the Table 10 of the standard IEC 60896-22

Additionally, the following information shall be indicated:

- **enel** type;
- **enel** material code;
- International recycling symbols compliant with ISO 7000-1135 and EN 61429/A11;
- Bolts torque value (N/m).

7.6 TESTING

The VRLA batteries and related monoblocs shall be compliant with the requirements of the previous chapters and considered as “Tested according to IEC 60896-21 and compliant with defined requirements of IEC 60896-22”.

Tests are divided in:

- Type tests.
- Routine tests.
- Acceptance test

Technical Conformity Assessment (TCA) shall be compliant with MAT-O&M-NCS-2021-0033-EGIN.

7.6.1 Type tests

Following indication are given for the listed subset of type tests. Type tests compliance required by relevant standards not listed below shall be demonstrated by test reports on samples chosen at supplier’s responsibility and according ISO requirement for prototype selection in Conformity Assessment process.

Type tests of battery and related monoblocs shall be compliant in the IEC 60896-21 and IEC 60896-22.

As described in the previous standards type tests shall be regrouped as follow:

- Type tests listed in “Safe operation characteristics” Table 1 IEC 60896-21 and IEC 60896-22;
- Type tests listed in “Performance characteristics” Table 2 IEC 60896-21 and IEC 60896-22;
- Type test listed in “Durability requirements” Table 3 IEC 60896-21 and IEC 60896-22.

All type tests of tables 1, 2 and 3 of IEC 60896-21 and 60896-22 shall be performed.

“Service life at an operating temperature of 40 °C” type test of table 3 of IEC 60896-21 and 60896-22 shall be performed, or alternatively, demonstrated by documental evidence.

Test set up shall be compliant with chapter 5 of IEC 60896-21.

Type tests and their procedure shall be compliant with IEC 60896-21 and IEC 60896-22 with the additions and clarifications described in the paragraphs below.

Last edition of previous standards shall be utilized, paragraphs indicated are referred to current edition.

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.6.1.1 Visual inspection

This verification shall be added to standard type test list.

Compliance of **enel** type with the prescriptions contained in this document shall be checked.

Shall be checked the following points:

- Technical and construction characteristics;
- Dimensions and weight of the monoblocs and internal parts performed under component dismantling:
 - o Plates main characteristics, number, plates traceability, grid patterns;
 - o Separator and electrolyte main characteristics, plates number, plates traceability, grid patterns;
 - o Cast-On-Strap (COS) dimension;
 - o Other characteristics declared in constructor documentations. ;
- Construction characteristics of the monobloc connection;
- Case characteristics;
- Absence of manufacturing defects;
- Plate and marking.

7.6.1.2 Drop voltage verification of monoblocs connection

This type test shall be added to standard type test list.

Voltage drop of connection between the monoblocs terminals shall be checked. Voltage drop shall be less than 6 mV with a passing current equal to 0.1 I₁₀.

7.6.1.3 Float service with daily discharges

Clause and test of IEC 60896-21 and IEC 60896-22	Requirement and service environment
6.13 Float service with daily discharges	Reliable mains power (no unit below 50)

7.6.1.4 Requirement for service life at an operating temperature of 40 °C

Clause and test of IEC 60896-21 and IEC 60896-22	Requirement and service environment
6.15 Requirement for service life at an operating temperature of 40 °C	Medium duration exposure time, ≥ 750 days

7.6.1.5 Impact of a stress temperature

Clause and test of IEC 60896-21 and IEC 60896-22	Requirement and service environment
6.16 Impact of a stress temperature of 60 °C	Long duration exposure time, ≥ 250 days/ 60 °C/ Capacity monitored 3 h discharge test

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.6.2 Routine and Acceptance test

The routine tests shall be the following:

- Visual inspection;
- Discharge capacity test in order to check type test values result;
- Short-circuit current and d.c. internal resistance test in order to check type test values result.

Acceptance test shall be the same of the Routine tests.

Acceptance test shall be carried out on a sample basis, on a number of samples which depends on the consistency of the supply according conditions establish in document “Contractual Requirements for Components and Materials Quality management”.

7.6.2.1 Visual inspection

The compliance of each monobloc with the documents of the TCA Dossier (see par. 7.7) shall be checked.

In particular, shall be checked the following points:

- Dimensions and weight of the monoblocs and internal parts (positive and negative grids, separator) performed under component dismantling;
- Plate and markings;
- Congruity of the terminals with the drawings;
- Monobloc connection series and presence of tip voltage measurement of the individual poles;
- Same dates of manufacture and charging for all monoblocs of same battery;
- Presence of the barcodes;
- Absence of visible manufacturing defects;
- Accuracy of the construction.

7.6.2.2 Short-circuit current and d.c. internal resistance test

Test shall be compliant with paragraph 6.3 of IEC 60896-21 and IEC 60896-22.

The values determined for each monobloc, whether short-circuit current (I_{sc}) or internal resistance (R_i), shall fall within $\pm 10\%$ of type test values.

7.7 TCA DOSSIER

TCA dossier compliant with MAT-O&M-NCS-2021-0033-EGIN shall be product by Manufacturer

Documents of TCA dossier are listed in the MAT-O&M-NCS-2021-0033-EGIN with the following additions and clarifications:

- Statement relating to the degree of purity of the Pb;
- Statement regarding the compatibility between battery series and GSTR001 and its annexes;
- Statement described in table 4 note 1;

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

- Type A documents compliant with MAT-O&M-NCS-2021-0033-EGIN with following additions and clarifications:
 - Dimensions and weight of the positive and negative plate (the declared weight shall be taken dry with uncertainty of $\pm 5\%$);
 - Case main characteristics (material, color, flame-retardant characteristics, over-pressure valve, etc.);
 - Monobloc terminal type;
 - Plates, separator and electrolyte main characteristics (number plates, traceability, grid patterns dimension, COS dimension etc);
- Annex B of IEC 60896-22 filled by Constructor as type test result with the following additions
 - Uflo buffer voltage value at 20 °C and the Uflo curve (T);
 - Value of the voltage drop on the connection between the monoblocs constituting the battery;
 - Intervention pressure value of the safety and rupture valves of the monobloc container;
 - Tightening torque of the terminals nominal value;
 - Self-discharge trend during the storage phase;
 - Parameters to define the charging process according to DIN 41773;
 - List of materials contained in packaging.

7.8 CONDITIONS OF SUPPLY

The ready-to-use monoblocs shall be provided in packaging, such as to ensure suitable protection during transport and storage.

The supply shall include:

- N°2 monoblocs, with the same construction and charging date (the charge shall be carried out within 90 days from the date of the transport document);
- N°1 accessory for the series connection of the monoblocs, consisting of single-core flexible cable with proper terminations;
- N. 2 eye lugs for cable section $3 \times 4 \text{ mm}^2$ compliant with monobloc terminals;
- self-adhesive markings and plates showing the data and symbols described in paragraph 7.5.3 for each monobloc;
- N°4 caps or connection insulation devices with IP2X protection degree (these insulating caps shall not be provided in case of recessed poles covered with insulating casing material forming an integral part of the container or of the lid of the accumulator);
- Instruction manual in supply country language, relating to operation and maintenance with the relevant safety warnings and any other document that the manufacturer deems necessary. The safety recommendations shall include, the indication of the electrolyte volume, expressed in liters, contained in each monobloc (see table 4);



Technical Specification code: MAT-O&M-NCS-2021-0035-EGIN

Version no. 2 dated 28/05/2021

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

- Series of barcodes (Bar Code) for each monobloc according to CNS-O&M-S&L-2021-0032-EGIN “Global Infrastructure and Networks Barcode specification, and local standard”.

7.8.1 Warranty

60 months of warranty period.

7.8.2 Packaging

For transport and handling in storage ENEL Group shall use packaging compliant to “Packaging, transport and delivery requirements - rev. 2”.

7.9 DOCUMENTATIONS TO BE PROVIDED IN TECHNICAL OFFER

Documentations to be provided in the technical offer:

- Check list, see annex A, to fill in for each **enel** type code;
- Drawings with overall dimensions;
- Supplier declaration of compliance of offered products with present TS and main standards and laws;
- Deviations letter (if any).

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

8 ANNEXES

8.1 ANNEX A - TECHNICAL CHECK LIST

Technical specification:		Offer number:	
Constructor:		Site of production:	
enel type code:		Constructor type code or designation:	
enel material code:			
Technical ratings		Request	Constructor offer
1	Maximum Operating temperature (°C)	50	
2	Minimum Operating temperature (°C)	-20	
3	Maximum storage and transport temperature (°C)	70	
4	Minimum storage and transport temperature (°C)	-25	
5	Maximum altitude (m)	2000	
6	Maximum altitude (m) for Colombia	2700	
7	Maximum atmospheric pressure (kPa)	110	
8	Minimum atmospheric pressure (kPa)	70	
9	Maximum relative humidity	95%	
10	Minimum life expectancy (years)	12	
11	Monobloc number of cells	6	
12	Monobloc rated voltage (Vdc)	12	
13	Maximum Length /Height/Dept (mm)	Table 3	
14	Maximum Weight (kg)	15	
15	Rated capacity C10 (Ah) at 20 °C and 1,8 Vpc	≥ 25	
16	Rated capacity C8 (Ah) at 20 °C and 1,75 Vpc	Constructor Information	
17	Rated capacity C3 (Ah) at 20 °C and 1,70 Vpc	≥ 88% of C10	
18	Rated capacity C1 (Ah) at 20 °C and 1,6 Vpc	Constructor Information	
19	Rated capacity C 0,25 (Ah) at 20 °C and 1,6 Vpc	Constructor Information	
20	Charge retention factor per month at 20°C (Ah)	≥ 98,75% of C10	
21	Short-circuit current (A)	Constructor Information	
22	Internal resistance (mohm)	< 8	
23	Float voltage Uflo (Vdc)	(2,26 ÷ 2,30) x 6	
24	Positive/Negative number of plates	Constructor Information	
25	Positive and negative plate weight	Constructor Information	
26	Positive and negative plate dimension	Constructor Information	
27	Plates traceability	Yes/No	
28	Grid patterns dimension	Constructor Information	
29	COS dimension	Constructor Information	
30	Separator dimensions	Constructor Information	
31	Materials present in the plate with them percentual	Constructor Information	

Table 6 - Technical check list



Technical Specification code: MAT-O&M-NCS-2021-0035-EGIN

Version no. 2 dated 28/05/2021

Subject: Global Infrastructure and Networks – GSCB001 Stationary Lead-Acid Battery VRLA Type for MV - LV Substation and pole transformer point

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

8.2 ANNEX B - GLOBAL TYPECODES

12 Vdc monoblocs are used as couple monoblocs, connected in series to make 24V battery, for **enel** it is identified as follows (single monobloc).

Type code	Description	Argentina	Brazil	Chile	Colombia	Italy	Perú	Rumania	Spain
GSCB001/1	VRLA Lead – acid 12Vdc monobloc	0130-0076	164621	160496	160496	162068	160496	162068	160231 (couple of monoblocs)

Table 7 - Material codes