Technical Specification code: MAT-E&C-NC-2022-0098-GIN.
Version no. 0 dated 21/04/2022

Subject: Global Infrastructure and Networks – STEEL POLES FOR DISTRIBUTION NETWORKS

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

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THE HEAD OF NETWORK COMPONENTS
Fabrizio Gasbarri

1. DOCUMENT AIMS AND APPLICATION AREA

The aim of this document is to provide technical requirements for the supply of steel poles to be used in the distribution networks of 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 Distributie Banat Enel Distributie Dobrogea Enel Distributie Muntenia

Table 1 - Distribution Companies

This document shall be implemented and applied to the extent possible within the Global Infrastructure and Networks Business Line and in compliance with any applicable laws, regulations and governance rules, including any stock exchange and unbundling-relevant provisions, which in any case prevail over the provisions contained in this document.

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.

2. DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
01	21/04/2022	Issuing of “Global Infrastructure and Networks – STEEL POLES FOR DISTRIBUTION NETWORKS”

3. UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- Global Infrastructure and Networks: Engineering and Construction / Components and Devices Design unit / Network Components unit.

Responsible for authorizing the document:

- Global Infrastructure and Networks: Head of Network Components unit.
- Global Infrastructure and Networks: Head of 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.
- Enel Global Compliance Program (EGCP).
- Integrated Policy of Quality, Health and Safety, Environment and anti-Bribery.
- ISO 9001:2015 - Quality Management System – Requirements.
- ISO 14001:2015 - Environmental Management System - Requirements with guidance for use.
- ISO 45001:2018 - Occupational Health and Safety Management System - Requirements with guidance for use.
- ISO 37001:2016 - Anti-bribery Management System - Requirements with guidance for use.
- MAT-O&M-NCS-2021-0033-EGIN version 3 “Global Infrastructure and Networks – GSCG002 Technical Conformity Assessment.
- Packaging, transport, and delivery requirements rev.2.

International technical references related with the material:

- EN 10025. Hot rolled products of structural steels.
- EN ISO 1461. Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.
- EN ISO 10684. Fasteners - Hot dip galvanized coatings.
- EN ISO 15614-1. Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys.
- EN 1090-1. Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components.
- EN ISO 4016. Hexagon head bolts - Product grade C.
- EN ISO 4034. Hexagon regular nuts (style 1) - Product grade C.
- EN ISO 7091. Plain washers - Normal series - Product grade C.

- EN ISO 9606-1. Qualification test of welders - Fusion welding - Part 1: Steels.
- ASTM A123. Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- ASTM A563. Standard Specification for Carbon and Alloy Steel Nuts.
- ASTM A36. Standard Specification for Carbon Structural Steel.
- AWS D1.1. Structural Welding Code—Steel.
- 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.

Country laws

Argentina

- AEA95201 Asociación Electrotécnica Argentina: Reglamentación de líneas aéreas exteriores de baja tensión.
- AEA95301 Asociación Electrotécnica Argentina: Reglamentación de líneas aéreas exteriores de media y alta tensión.

Brazil

- NR-10 - Segurança em Instalações e Serviços em Eletricidade.

Colombia

- RETIE, Reglamento Técnico de Instalaciones Eléctricas.

Chile

- Reglamento de seguridad de las instalaciones eléctricas destinadas a la producción, transporte, prestación de servicios complementarios, sistemas de almacenamiento y distribución de energía eléctrica y todos sus Pliegos Técnicos.

Perú

- CNE - Código Nacional de Electricidad – Suministro 2011.

Italy

- D.Lgs n. 81 of the 9th of April 2008 and subsequent modifications.

- Nota Operativa PVR001 - Rev. 2 - Ott. 2012 - Gestione Garanzie dei materiali di ENEL Distribuzione.

Romania

- NTE 001/03/00 - Normativ privind alegerea izolației, coordonarea izolației și protecția instalațiilor electroenergetice împotriva supratensiunilor.
- NTE 003/04/00 - Normativ pentru construcția liniilor electrice aeriene de energie electrică cu tensiuni peste 1000 V.

Spain

- 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.
- 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 a 23.
- R.D. 223/2008, de 15 de febrero, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión y sus instrucciones técnicas complementarias ITC-LAT 01 a 09.
- Real Decreto 842/2002, de 2 de agosto, por el que se aprueba el Reglamento electrotécnico para baja tensión.
- UNE 207018. Apoyos de chapa metálica para líneas eléctricas aéreas de distribución.

Local replaced standards

- Argentina MAT-OMAR-NDS-20-0050-ESP, MAT-OMAR-NDS-20-0049-ESP
- Brazil PM-Br 305.10, PM-R 1744, PM-R 2216
- Colombia ET208
- Chile N/A
- Italy DS3012, DS3010, DS3015, DS3810
- Perú N/A
- Romania DS3012, DS3010, DS3015, DS3810
- Spain AND00400

5. ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Engineering and Construction

Macro Process: Devices and components development

Process: Standard Catalog Management

6. DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Technical Conformity Assessment (TCA)	A “conformity assessment” with respect to “specified requirements” 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.
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.

7. DESCRIPTION

7.1 LIST OF COMPONENTS

GS Type Code	Country	Country Code	Description	Number of sections	Type	Type of installation Embedded (E) or base plate (B)	Nominal Length [m] H	Length over the ground [m]	Embedment length [cm] (He)	number of sides	Top Diameter (d) [mm]	Butt Diameter (D) [mm]	Conicity (mm/m)	Ultimate design Load (En) [daN] (horizontal load)	Minimum failure load (Er) [daN] (horizontal load)	Safety factor (horizontal load)
GSS003/01	IT	237325	14/B/14	2	B	E	14	12,5	150	16	140	328	-	389	505	-
GSS003/02	IT	237333	12/C/14	2	C	E	12	10,7	130	16	140	312	-	545	670	-
GSS003/03	IT	237343	12/D/14	2	D	E	12	10,7	130	16	140	329	-	676	880	-
GSS003/04	IT	237344	14/D/14	2			14	12,5	150	16	140	360	-	684	885	-
GSS003/05	IT	237345	16/D/14	2			16	14,3	170	16	140	395	-	693	905	-
GSS003/06	IT	237353	12/E/17	2	E	E	12	10,7	130	16	170	401	-	1053	1325	-
GSS003/07	IT	237354	14/E/17	2			14	12,5	150	16	170	412	-	1070	1330	-
GSS003/08	IT	237355	16/E/17	2			16	14,3	170	16	170	448	-	1065	1365	-
GSS003/09	IT	237363	12/F/17	2	F	E	12	10,7	130	16	170	430	-	1331	1770	-
GSS003/10	IT	237364	14/F/17	2			14	12,5	150	16	170	475	-	1333	1770	-
GSS003/11	IT	237365	16/F/17	2			16	14,3	170	16	170	479	-	1323	1785	-
GSS003/12	IT	237366	18/F/17	2			18	16,1	190	16	170	537	-	1411	1820	-
GSS003/13	IT	237367	21/F/17	2			21	18,8	220	16	170	610	-	1488	1935	-
GSS003/14	IT	237373	12/G/24	2	G	E	12	10,7	130	16	240	495	-	2150	2665	-
GSS003/15	IT	237374	14/G/24	2			14	12,5	150	16	240	545	-	2223	2680	-
GSS003/16	IT	237375	16/G/24	2			16	14,3	170	16	240	596	-	2230	2735	-
GSS003/17	IT	237376	18/G/24	2			18	16,1	190	16	240	600	-	2215	2780	-
GSS003/18	IT	237377	21/G/24	2			21	18,8	220	16	240	676	-	2168	2700	-
GSS003/19	IT	237378	24/G/24	3			24	21,5	250	16	240	768	-	2229	2800	-
GSS003/20	IT	237379	27/G/24	3			27	24,2	280	16	240	836	-	2023	2870	-
GSS003/21	IT	237383	12/H/24	2	H	E	12	10,7	130	16	240	586	-	3804	5025	
GSS003/22	IT	237384	14/H/24	2			14	12,5	150	16	240	640	-	3737	5025	-
GSS003/23	IT	237385	16/H/24	2			16	14,3	170	16	240	705	-	3811	5025	-
GSS003/24	IT	237386	18/H/24	2			18	16,1	190	16	240	770	-	3898	5070	-
GSS003/25	IT	237387	21/H/24	2			21	18,8	220	16	240	880	-	4158	5100	-
GSS003/26	IT	237388	24/H/24	3			24	21,5	250	16	240	930	-	3810	5130	-
GSS003/27	IT	237389	27/H/24	3			27	24,2	280	16	240	1028	-	3897	5200	-
GSS003/28	IT	237393	12/J/28	2	J	E	12	10,7	130	16	280	668	-	5017	8988	-
GSS003/29	IT	237394	14/J/28	2			14	12,5	150	16	280	735	-	4990	9052	-
GSS003/30	IT	237395	16/J/28	2			16	14,3	170	16	280	801	-	4998	9119	-
GSS003/31	IT	237204	10/L/10	1	L	E	10	8,9	110	8	100	225	-	210	270	-
GSS003/32	IT	237207	10/A/10	1	A	E	10	8,9	110	8	100	250	-	257	331	-
GSS003/33	IT	237211	10/B/14	1	B	E	10	8,9	110	8	140	290	-	356	445	-
GSS003/34	IT	237213	12/B/14	1			12	10,7	130	8	140	260	-	330	461	-
GSS003/35	IT	237221	10/C/15	1	C	E	10	8,9	110	8	150	300	-	560	663	-
GSS003/36	IT	237223	12/C/15	1			12	10,7	130	8	150	300	-	545	671	-
GSS003/37	IT	237231	10/D/15	1	D	E	10	8,9	110	8	150	310	-	697	878	-
GSS003/38	IT	237233	12/D/15	1			12	10,7	130	8	150	335	-	676	882	-
GSS003/39	IT	237241	10/E/15	1	E	E	10	8,9	110	8	150	380	-	1041	1320	-
GSS003/40	IT	237243	12/E/17	1			12	10,7	130	8	170	425	-	1053	1325	-
GSS003/41	IT	237251	10/F/15	1	F	E	10	8,7	130	8	150	410	-	1381	1763	-
GSS003/42	IT	237253	12/F/17	1			12	10,7	130	8	170	455	-	1331	1767	-
GSS003/43	IT	237261	10/G/24	1	G	E	10	8,7	130	8	240	475	-	2163	2655	-
GSS003/44	IT	237263	12/G/24	1			12	10,7	130	8	240	525	-	2150	2658	-
GSS003/45	IT	237273	12/H/24	1	H	E	12	10,7	130	8	240	620	-	3804	5012	-
GSS003/46	IT	228011	10/G/24	1	G	E	10	8,7	130	8	240	475	-	2163	2655	-

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GS Type Code	Country	Country Code	Description	Number of sections	Type	Type of installation Embedded (E) or base plate (B)	Nominal Length [m] H	Length over the ground [m]	Embedment length [cm] (He)	number of sides	Top Diameter (d) [mm]	Butt Diameter (D) [mm]	Conicity (mm/m)	Ultimate design Load (Er) [daN] (horizontal load)	Minimum failure load (Er) [daN] (horizontal load)	Safety factor (horizontal load)
GSS003/01	RO	237325	14/B/14	2	B	E	14	12,5	150	16	140	328	-	389	505	-
GSS003/02	RO	237333	12/C/14	2	C	E	12	10,7	130	16	140	312	-	545	670	-
GSS003/03	RO	237343	12/D/14	2			12	10,7	130	16	140	329	-	676	880	-
GSS003/04	RO	237344	14/D/14	2	D	E	14	12,5	150	16	140	360	-	684	885	-
GSS003/05	RO	237345	16/D/14	2			16	14,3	170	16	140	395	-	693	905	-
GSS003/06	RO	237353	12/E/17	2			12	10,7	130	16	170	401	-	1053	1325	-
GSS003/07	RO	237354	14/E/17	2	E	E	14	12,5	150	16	170	412	-	1070	1330	-
GSS003/08	RO	237355	16/E/17	2			16	14,3	170	16	170	448	-	1065	1365	-
GSS003/09	RO	237363	12/F/17	2			12	10,7	130	16	170	430	-	1331	1770	-
GSS003/10	RO	237364	14/F/17	2			14	12,5	150	16	170	475	-	1333	1770	-
GSS003/11	RO	237365	16/F/17	2	F	E	16	14,3	170	16	170	479	-	1323	1785	-
GSS003/12	RO	237366	18/F/17	2			18	16,1	190	16	170	537	-	1411	1820	-
GSS003/13	RO	237367	21/F/17	2			21	18,8	220	16	170	610	-	1488	1935	-
GSS003/14	RO	237373	12/G/24	2			12	10,7	130	16	240	495	-	2150	2665	-
GSS003/15	RO	237374	14/G/24	2			14	12,5	150	16	240	545	-	2223	2680	-
GSS003/16	RO	237375	16/G/24	2			16	14,3	170	16	240	596	-	2230	2735	-
GSS003/17	RO	237376	18/G/24	2	G	E	18	16,1	190	16	240	600	-	2215	2780	-
GSS003/18	RO	237377	21/G/24	2			21	18,8	220	16	240	676	-	2168	2700	-
GSS003/19	RO	237378	24/G/24	3			24	21,5	250	16	240	768	-	2229	2800	-
GSS003/20	RO	237379	27/G/24	3			27	24,2	280	16	240	836	-	2023	2870	-
GSS003/21	RO	237383	12/H/24	2			12	10,7	130	16	240	586	-	3804	5025	
GSS003/22	RO	237384	14/H/24	2			14	12,5	150	16	240	640	-	3737	5025	-
GSS003/23	RO	237385	16/H/24	2			16	14,3	170	16	240	705	-	3811	5025	-
GSS003/24	RO	237386	18/H/24	2	H	E	18	16,1	190	16	240	770	-	3898	5070	-
GSS003/25	RO	237387	21/H/24	2			21	18,8	220	16	240	880	-	4158	5100	-
GSS003/26	RO	237388	24/H/24	3			24	21,5	250	16	240	930	-	3810	5130	-
GSS003/27	RO	237389	27/H/24	3			27	24,2	280	16	240	1028	-	3897	5200	-
GSS003/28	RO	237393	12/J/28	2			12	10,7	130	16	280	668	-	5017	8988	-
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GSS003/30	RO	237395	16/J/28	2			16	14,3	170	16	280	801	-	4998	9119	-
GSS003/31	RO	237204	10/L/10	1	L	E	10	8,9	110	8	100	225	-	210	270	-
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GSS003/34	RO	237213	12/B/14	1			12	10,7	130	8	140	260	-	330	461	-
GSS003/35	RO	237221	10/C/15	1	C	E	10	8,9	110	8	150	300	-	560	663	-
GSS003/36	RO	237223	12/C/15	1			12	10,7	130	8	150	300	-	545	671	-
GSS003/37	RO	237231	10/D/15	1	D	E	10	8,9	110	8	150	310	-	697	878	-
GSS003/38	RO	237233	12/D/15	1			12	10,7	130	8	150	335	-	676	882	-
GSS003/39	RO	237241	10/E/15	1	E	E	10	8,9	110	8	150	380	-	1041	1320	-
GSS003/40	RO	237243	12/E/17	1			12	10,7	130	8	170	425	-	1053	1325	-
GSS003/41	RO	237251	10/F/15	1	F	E	10	8,7	130	8	150	410	-	1381	1763	-
GSS003/42	RO	237253	12/F/17	1			12	10,7	130	8	170	455	-	1331	1767	-
GSS003/43	RO	237261	10/G/24	1	G	E	10	8,7	130	8	240	475	-	2163	2655	-
GSS003/44	RO	237263	12/G/24	1			12	10,7	130	8	240	525	-	2150	2658	-
GSS003/45	RO	237273	12/H/24	1	H	E	12	10,7	130	8	240	620	-	3804	5012	-
GSS003/46	RO	228011	10/G/24	1	G	E	10	8,7	130	8	240	475	-	2163	2655	-
GSS003/47	CO	230342	10/300 daN	2	-	E	10	8,9	110	8	180	300	-	294	735,5	2,5
GSS003/49	CO	230341	10/400 daN	2	-	E	10	8,9	110	8	180	315	-	412	1030	2,5
GSS003/50	CO	230340	12/300 daN	2	-	E	12	10,7	130	8	165	290	-	294	735,5	2,5
GSS003/51	CO	230339	12/400 daN	2	-	E	12	10,7	130	8	165	350	-	412	1030	2,5
GSS003/53	CO	230338	12/500 daN	2	-	E	12	10,7	130	8	165	410	-	529,6	1324	2,5
GSS003/54	CO	230337	12/1000 daN	2	-	E	12	10,7	130	8	280	410	-	1000	2500	2,5

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GSS003/74	CO	230336	12/1300 daN	2	-	E	12	10,7	130	8	340	470	-	1300	3250	2,5
GSS003/56	CO	230335	14/300 daN	3	-	E	14	12,5	150	8	140	320	-	294	735,5	2,5
GSS003/57	CO	230327	14/400 daN	3	-	E	14	12,5	150	8	164	375	-	412	1030	2,5
GSS003/58	CO	230334	14/500 daN	3	-	E	14	12,5	150	8	205	410	-	529,6	1324	2,5
GSS003/59	CO	230333	14/1000 daN	3	-	E	14	12,5	150	8	280	510	-	1000	2500	2,5
GSS003/64	CO	230332	14/2000 daN	3	-	E	14	12,5	150	16	340	700	-	2000	4000	2
GSS003/75	CO	230331	14/1300 daN	3	-	E	14	12,5	150	8	300	530	-	1300	3250	2,5
GSS003/61	CO	230330	16/500 daN	3	-	E	16	14,3	170	8	180	430	-	529,6	1324	2,5
GSS003/62	CO	230329	16/1000 daN	3	-	E	16	14,3	170	8	280	610	-	1000	2500	2,5
GSS003/63	CO	230328	16/2000 daN	3	-	E	16	14,3	170	16	340	750	-	2000	4000	2
GSS003/35	BR	230214	10/300 daN	1	-	E	10	8,9	110	8	150	300	-	300	600	2
GSS003/39	BR	230215	10/600 daN	1	-	E	10	8,9	110	8	150	380	-	600	1200	2
GSS003/79	BR	230246	10/1000 daN	1	-	E	10	8,7	130	8	240	475	-	1000	2000	2
GSS003/46	BR	230343	10/1000 daN	1	-	E	10	8,7	130	8	240	475	-	1000	2000	2
GSS003/36	BR	230245	12/300 daN	1	-	E	12	10,7	130	8	150	330	-	300	600	2
GSS003/02	BR	230243	12/300 daN	2	-	E	12	10,7	130	16	140	312	-	300	600	2
GSS003/40	BR	230241	12/600 daN	1	-	E	12	10,7	130	8	170	425	-	600	1200	2
GSS003/06	BR	230239	12/600 daN	2	-	E	12	10,7	130	16	170	401	-	600	1200	2
GSS003/76	BR	230237	12/1000 daN	1	-	E	12	10,7	130	8	240	525	-	1000	2000	2
GSS003/73	BR	230249	12/1000 daN	2	-	E	12	10,7	130	16	240	495	-	1000	2000	2
GSS003/77	BR	230248	12/2000 daN	2	-	E	12	10,7	130	16	240	586	-	2000	4000	2
GSS003/52	BR	230247	12/3000 daN	2	-	E	12	10,7	130	16	240	610	-	3000	6000	2
GSS003/07	BR	230244	14/600 daN	2	-	E	14	12,5	150	16	170	412	-	600	1200	2
GSS003/55	BR	230242	14/1000 daN	2	-	E	14	12,5	150	16	240	575	-	1000	2000	2
GSS003/64	BR	230240	14/2000 daN	2	-	E	14	12,5	150	16	240	600	-	2000	4000	2
GSS003/65	BR	230238	16/1000 daN	2	-	E	16	14,3	170	16	240	625	-	1000	2000	2
GSS003/66	BR	230236	16/2000 daN	2	-	E	16	14,3	170	16	240	790	-	2000	4000	2
GSS003/35	CL	230326	10/300 daN	1	-	E	10	8,4	160	8	150	300	-	300	600	2
GSS003/39	CL	230325	10/600 daN	1	-	E	10	8,4	160	8	150	380	-	600	1200	2
GSS003/79	CL	230324	10/1000 daN	1	-	E	10	8,4	160	8	240	475	-	1000	2000	2
GSS003/36	CL	230323	12/300 daN	1	-	E	12	10,2	180	8	150	300	-	300	600	2
GSS003/02	CL	230322	12/300 daN	2	-	E	12	10,2	180	8	150	330	-	300	600	2
GSS003/40	CL	230321	12/600 daN	1	-	E	12	10,2	180	8	170	425	-	600	1200	2
GSS003/06	CL	230320	12/600 daN	2		E	12	10,2	180	8	170	401	-	600	1200	2
GSS003/76	CL	230319	12/1000 daN	1	-	E	12	10,2	180	8	240	525	-	1000	2000	2
GSS003/73	CL	230318	12/1000 daN	2	-	E	12	10,2	180	8	240	495	-	1000	2000	2
GSS003/77	CL	230317	12/2000 daN	2	-	E	12	10,2	180	16	240	586	-	2000	4000	2
GSS003/52	CL	230316	12/3000 daN	2	-	E	12	10,2	180	16	240	610	-	3000	6000	2
GSS003/48	CL	230315	14/300 daN	2	-	E	14	12	200	8	150	360	-	300	600	2
GSS003/07	CL	230314	14/600 daN	2	-	E	14	12	200	8	170	412	-	600	1200	2
GSS003/55	CL	230311	14/1000 daN	2	-	E	14	12	200	8	240	575	-	1000	2000	2
GSS003/64	CL	230312	14/2000 daN	2	-	E	14	12	200	16	240	600	-	2000	4000	2
GSS003/65	CL	230313	16/1000 daN	2	-	E	16	13,8	220	8	240	625	-	1000	2000	2
GSS003/66	CL	230310	16/2000 daN	2	-	E	A	13,8	220	16	240	790	-	2000	4000	2
GSS003/35	PE	230309	10/300 daN	1	-	E	10	8,4	160	8	150	300	-	300	600	2
GSS003/39	PE	230308	10/600 daN	1	-	E	10	8,4	160	8	150	380	-	600	1200	2
GSS003/36	PE	230307	12/300 daN	1	-	E	12	10,2	180	8	150	330	-	300	600	2
GSS003/02	PE	230306	12/300 daN	2	-	E	12	10,2	180	8	140	312	-	300	600	2
GSS003/40	PE	230305	12/600 daN	1	-	E	12	10,2	180	8	170	425	-	600	1200	2
GSS003/06	PE	230304	12/600 daN	2	-	E	12	10,2	180	8	170	401	-	600	1200	2
GSS003/48	PE	230303	14/300 daN	2	-	E	14	12	200	8	150	360	-	300	600	2

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Version no. 0 dated 21/04/2022

Subject: Global Infrastructure and Networks – STEEL POLES FOR DISTRIBUTION NETWORKS

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

GS Type Code	Country	Country Code	Description	Number of sections	Type	Type of installation Embedded (E) or base plate (B)	Nominal Length [m] (H)	Length over the ground [m]	Embedment length [cm] (He)	number of sides	Top Diameter (d) [mm]	Butt Diameter (D) [mm]	Conicity (mm/m)	Ultimate design Load (En) [daN] (horizontal load)	Minimum failure load (Er) [daN] (horizontal load)	Safety factor (horizontal load)
GSS003/07	PE	230302	14/600 daN	2	-	E	14	12	200	8	170	412	-	600	1200	2
GSS003/72	PE	230301	14/800 daN	2	-	E	14	12	200	8	170	475	-	800	1600	2
GSS003/64	PE	230300	14/2000 daN	2	-	E	14	12	200	16	240	600	-	2000	4000	2
GSS003/67	PE	230299	16/300 daN	2	-	E	16	13,8	220	8	150	390	-	300	600	2
GSS003/08	PE	230298	16/600 daN	2	-	E	16	13,8	220	8	170	448	-	600	1200	2
GSS003/11	PE	230297	16/800 daN	2	-	E	16	13,8	220	8	170	479	-	800	1600	2
GSS003/66	PE	230296	16/2000 daN	2	-	E	16	13,8	220	16	240	790	-	2000	4000	2
GSS003/127	AR	0120-0504	8/400 daN	1	-	E	8	7	100	8	145	313	-	400	600	1,5
GSS003/128	AR	0120-0503	8/600 daN	1	-	E	8	7	100	8	145	313	-	600	900	1,5
GSS003/129	AR	0120-0502	8/1000 daN	1	-	E	8	7	100	8	200	368	-	1000	1500	1,5
GSS003/78	AR	0120-0507	10/400 daN	1	-	E	10	8,8	120	8	145	355	-	400	600	1,5
GSS003/130	AR	0120-0506	10/600 daN	1	-	E	10	8,8	120	8	145	355	-	600	900	1,5
GSS003/69	AR	0120-0505	10/1000 daN	1	-	E	10	8,8	120	8	200	410	-	1000	1500	1,5
GSS003/80	AR	0120-0508	12/400 daN	2	-	E	12	10,6	140	8	145	397	-	400	600	1,5
GSS003/131	AR	0120-0509	12/600 daN	2	-	E	12	10,6	140	8	145	397	-	600	900	1,5
GSS003/81	AR	0120-0510	12/800 daN	2	-	E	12	10,6	140	8	200	452	-	800	1200	1,5
GSS003/82	AR	0120-0511	12/1000 daN	2	-	E	12	10,6	140	8	200	452	-	1000	1500	1,5
GSS003/132	AR	0120-0512	12/2500 daN	2	-	E	12	10,6	140	8	240	552	-	2500	3750	1,5
GSS003/83	AR	0120-0500	14/400 daN	2	-	E	14	12,4	160	8	145	439	-	400	600	1,5
GSS003/133	AR	0120-0513	14/600 daN	2	-	E	14	12,4	160	8	145	439	-	600	900	1,5
GSS003/134	AR	0120-0514	14/800 daN	2	-	E	14	12,4	160	8	200	494	-	800	1200	1,5
GSS003/60	AR	0120-0515	14/1000 daN	2	-	E	14	12,4	160	8	200	494	-	1000	1500	1,5
GSS003/68	AR	0120-0501	14/2500 daN	2	-	E	14	12,4	160	16	240	565	-	2500	3750	1,5
GSS003/70	AR	0120-0516	14/3500 daN	2	-	E	14	12,4	160	16	240	640	-	3500	5250	1,5
GSS003/71	AR	0120-0517	14/5000 daN	2	-	E	14	12,4	160	16	260	715	-	5000	7500	1,5
GSS003/85	ES	230796	9/250 daN	1	-	E	9	7	150	8	110	-	19	250	375	1,5
GSS003/86	ES	230795	9/400 daN	1	-	E	9	7	165	8	145	-	21	400	600	1,5
GSS003/87	ES	230797	9/630 daN	1	-	E	9	7	180	8	145	-	20	630	945	1,5
GSS003/88	ES	230793	9/800 daN	1	-	E	9	7	190	8	200	-	21	800	1200	1,5
GSS003/89	ES	230794	9/1000 daN	1	-	E	9	7	200	8	200	-	24	1000	1500	1,5
GSS003/90	ES	230789	9/1250 daN	1	-	E	9	7	205	8	200	-	28	1250	1875	1,5
GSS003/91	ES	230790	9/1600 daN	1	-	E	9	7	220	8	200	-	28	1600	2400	1,5
GSS003/92	ES	230792	11/250 daN	1	-	E	11	9	165	8	110	-	19	250	375	1,5
GSS003/93	ES	230788	11/400 daN	1	-	E	11	9	180	8	145	-	21	400	600	1,5
GSS003/94	ES	230787	11/630 daN	1	-	E	11	9	190	8	145	-	20	630	945	1,5
GSS003/95	ES	230786	11/800 daN	1	-	E	11	9	200	8	200	-	21	800	1200	1,5
GSS003/96	ES	230785	11/1000 daN	1	-	E	11	9	210	8	200	-	24	1000	1500	1,5
GSS003/97	ES	230784	11/1250 daN	1	-	E	11	9	215	8	200	-	28	1250	1875	1,5
GSS003/98	ES	230783	11/1600 daN	1	-	E	11	9	230	8	200	-	28	1600	2400	1,5
GSS003/99	ES	230782	11/2500 daN	1	-	E	11	9	240	8	300	-	28	2500	3750	1,5
GSS003/100	ES	230781	13/250 daN	2	-	E	13	11	175	8	110	-	19	250	375	1,5
GSS003/101	ES	230791	13/400 daN	2	-	E	13	11	190	8	145	-	18	400	600	1,5
GSS003/102	ES	230779	13/630 daN	2	-	E	13	11	200	8	145	-	20	630	945	1,5
GSS003/103	ES	230780	13/800 daN	2	-	E	13	11	210	8	200	-	21	800	1200	1,5
GSS003/104	ES	230778	13/1000 daN	2	-	E	13	11	220	8	200	-	24	1000	1500	1,5
GSS003/105	ES	230798	13/1250 daN	2	-	E	13	11	220	8	200	-	28	1250	1875	1,5
GSS003/106	ES	230776	13/1600 daN	2	-	E	13	11	235	8	200	-	28	1600	2400	1,5
GSS003/107	ES	230775	13/2500 daN	2	-	E	13	11	250	8	300	-	28	2500	3750	1,5
GSS003/108	ES	230774	15/400 daN	2	-	E	15	13	195	8	145	-	18	400	600	1,5
GSS003/109	ES	230772	15/630 daN	2	-	E	15	13	210	8	145	-	20	630	945	1,5
GSS003/110	ES	230773	15/800 daN	2	-	E	15	13	220	8	200	-	21	800	1200	1,5

GS Type Code	Country	Country Code	Description	Number of sections	Type	Type of installation Embedded (E) or base plate (B)	Nominal Length [m] H	Length over the ground [m]	Embedment length [cm] (He)	number of sides	Top Diameter (d) [mm]	Butt Diameter (D) [mm]	Conicity (mm/m)	Ultimate design Load (En) [daN] (horizontal load)	Minimum failure load (Er) [daN] (horizontal load)	Safety factor (horizontal load)
GSS003/111	ES	230770	15/1000 daN	2	-	E	15	13	240	8	200	-	24	1000	1500	1,5
GSS003/112	ES	230771	15/1250 daN	2	-	E	15	13	230	8	200	-	28	1250	1875	1,5
GSS003/113	ES	230769	15/1600 daN	2	-	E	15	13	235	8	200	-	28	1600	2400	1,5
GSS003/114	ES	230768	15/2500 daN	2	-	E	15	13	260	8	300	-	28	2500	3750	1,5
GSS003/115	ES	230767	17/1000 daN	2	-	E	17	15	230	8	200	-	24	1000	1500	1,5
GSS003/116	ES	230766	17/1250 daN	2	-	E	17	15	235	8	200	-	28	1250	1875	1,5
GSS003/117	ES	230777	17/1600 daN	2	-	E	17	15	250	8	200	-	28	1600	2400	1,5
GSS003/118	ES	230765	17/2500 daN	2	-	E	17	15	265	8	300	-	28	2500	3750	1,5
GSS003/119	ES	230762	7/250 daN	1		B	7	7	-	8	110	-	19	250	375	1,5
GSS003/120	ES	230799	7/400 daN	1		B	7	7	-	8	145	-	18	400	600	1,5
GSS003/121	ES	230763	7/630 daN	1		B	7	7	-	8	145	-	20	630	945	1,5
GSS003/122	ES	230760	7/800 daN	1		B	7	7	-	8	200	-	21	800	1200	1,5
GSS003/123	ES	230761	7/1000 daN	1		B	7	7	-	8	200	-	24	1000	1500	1,5
GSS003/124	ES	230759	7/1250 daN	1		B	7	7	-	8	200	-	28	1250	1875	1,5
GSS003/125	ES	230758	7/1600 daN	1		B	7	7	-	8	200	-	28	1600	2400	1,5
GSS003/85	ES	230757	9/250 daN	1	-	B	9	9	-	8	110	-	19	250	375	1,5
GSS003/86	ES	230754	9/400 daN	1	-	B	9	9	-	8	145	-	21	400	600	1,5
GSS003/87	ES	230756	9/630 daN	1	-	B	9	9	-	8	145	-	20	630	945	1,5
GSS003/88	ES	230753	9/800 daN	1	-	B	9	9	-	8	200	-	21	800	1200	1,5
GSS003/89	ES	230755	9/1000 daN	1	-	B	9	9	-	8	200	-	24	1000	1500	1,5
GSS003/90	ES	230752	9/1250 daN	1	-	B	9	9	-	8	200	-	28	1250	1875	1,5
GSS003/91	ES	230751	9/1600 daN	1	-	B	9	9	-	8	200	-	28	1600	2400	1,5
GSS003/126	ES	230749	9/2500 daN	1		B	9	9	-	8	300	-	28	2500	3750	1,5
GSS003/92	ES	230748	11/250 daN	1	-	B	11	11	-	8	110	-	19	250	375	1,5
GSS003/93	ES	230750	11/400 daN	1	-	B	11	11	-	8	145	-	21	400	600	1,5
GSS003/94	ES	230746	11/630 daN	1	-	B	11	11	-	8	145	-	20	630	945	1,5
GSS003/95	ES	230747	11/800 daN	1	-	B	11	11	-	8	200	-	21	800	1200	1,5
GSS003/96	ES	230744	11/1000 daN	1	-	B	11	11	-	8	200	-	24	1000	1500	1,5
GSS003/97	ES	230745	11/1250 daN	1	-	B	11	11	-	8	200	-	28	1250	1875	1,5
GSS003/98	ES	230764	11/1600 daN	1	-	B	11	11	-	8	200	-	28	1600	2400	1,5
GSS003/99	ES	230800	11/2500 daN	1	-	B	11	11	-	8	300	-	28	2500	3750	1,5
GSS003/101	ES	230743	13/400 daN	2	-	B	13	13	-	8	145	-	18	400	600	1,5
GSS003/102	ES	230742	13/630 daN	2	-	B	13	13	-	8	145	-	20	630	945	1,5
GSS003/103	ES	230741	13/800 daN	2	-	B	13	13	-	8	200	-	21	800	1200	1,5
GSS003/104	ES	230740	13/1000 daN	2	-	B	13	13	-	8	200	-	24	1000	1500	1,5
GSS003/105	ES	230739	13/1250 daN	2	-	B	13	13	-	8	200	-	28	1250	1875	1,5
GSS003/106	ES	230738	13/1600 daN	2	-	B	13	13	-	8	200	-	28	1600	2400	1,5
GSS003/107	ES	230737	13/2500 daN	2	-	B	13	13	-	8	300	-	28	2500	3750	1,5
GSS003/111	ES	230736	15/1000 daN	2	-	B	15	15	-	8	200	-	24	1000	1500	1,5
GSS003/112	ES	230735	15/1250 daN	2	-	B	15	15	-	8	200	-	28	1250	1875	1,5
GSS003/113	ES	230734	15/1600 daN	2	-	B	15	15	-	8	200	-	28	1600	2400	1,5
GSS003/114	ES	230733	15/2500 daN	2	-	B	15	15	-	8	300	-	28	2500	3750	1,5

Table 2

Notes: Tolerance for nominal length "H": (-0; +50 mm)

Tolerance for top and butt diameter: ±3%.

For Spain:

- the tolerances shall be compliance with UNE 207018.
- the wind load multiplied by the safety factor must be added to Er (see par. 7.3.2).

- top diameter corresponds to the distance between the opposite faces.

Mass of pole, thickness of sheet metal and connection length is not included as a requirement, but it shall be informed in data sheet.

For Colombia: the number of sections can be different as the maximum weight of the sections must not exceed 250 kg. The upper and middle sections must be less than 200 kg. Moreover, the number of sides may be 8 or more depending on the manufacturer's design provided that all requirements of this document herein are met.

7.2 SERVICE CONDITIONS

Poles for distribution networks shall be suitable to operate in outdoor environments in the different countries where Enel operates:

- Maximum Ambient Air Temperature: + 50 ºC.
- Minimum Ambient Air Temperature: - 40 ºC.
- Maximum relative humidity: 100%.
- Maximum height, 2.700 m.
- Maximum solar radiation: 1.000 W/m2

For Peru, operation in an area with environmental classification climate category type C5-M "Very High" (coastal areas with high salinity) according to ISO 9223 and EN ISO 12944-2 must be considered.

For seismic requirement, the following table applies:

Seismic requirement	
Chile	Document ETG1020
Peru	E.030 NORMA TECNICA DISEÑO SISMORESISTENTE
Colombia	NSR010

Table 3 - Seismic requirement

7.3 TECHNICAL CHARACTERISTICS

7.3.1. Embedment length

The embedment length is the segment length of the pole buried firmly in the earth or concrete base.

Country	Embedment length (He)
Argentina	0,1*H [m] +0,2 [m]
Brazil	0,1*H [m] +0,1 [m][1]
Colombia	0,1*H [m] +0,6 [m]
Chile	0,1*H [m] +0,6 [m]
España	In accordance with Table 2
Italy	0,1*H+0,1 [m][2]
Perú	0,1*H [m] +0,6 [m]
Romania	0,1*H+0,1 [m][3]

Table 4 - Embedment length (He)

7.3.2. Mechanical Load and Safety Factor

Considering the Ultimate design Load, En, as the minimum load which all elements should just sustain without failure, during any specified duration and the Minimum failure Load, Er, as the minimum load which causes failure to occur in any element[4], we can define the Safety Factor[5], CS, as the relation between the Minimum Failure Load and Ultimate Design load[6]:

$$Cs = \frac{Er}{En}$$

Poles shall be defined with the Ultimate design Load. It shall be considered a value of Safety Factor according to Table 2 for the calculation of the Minimum Failured Load. The load case for testing shall be considered based upon the Minimum Failure Loads applied perpendicularly to the longitudinal pole axis at a distance “H1” from the top of the pole and increase with the wind effect as described in Table 5.

In order to apply the loads, it will be considered a theoretical ground line positioned at a distance He (embedment length), as explained in Table 4.

[1] For poles with length < 14m and minimum failure load (daN)> 1700 daN the embedment length shall be equals to 1,3 m.

[2] For poles with length < 14m and minimum failure load (daN)> 1700 daN the embedment length shall be equals to 1,3 m.

[3] For poles with length < 14m and minimum failure load (daN)> 1700 daN the embedment length shall be equals to 1,3 m.

[4] For Argentina, Brazil, Colombia, Chile, Spain and Perú application at this value must be added the wind load increased by the safety factor.

[5] For Italy and Romania, the legislation does not provide the safety factor but the calculation of the Minimum Failure Loads using the definition of "ultimate limit states".

[6] Note that sometimes in Colombia it is commonly used the expression Carga de diseño referred to Minimum Failure Load- Er- and Carga de trabajo to Ultimate Design load- En. Please, be careful as this specification will work the concepts defined in English.

Country	Distance "H1" from top of the pole Loads application point [mm]	Wind speed [km/h]
Argentina	100	145
Brazil	100	145
Colombia	100	145
Chile	100	145
España	250	120
Italy	100	NA
Perú	100	94
Romania	100	NA

Table 5 - distance H1

For Argentina, Brazil, Colombia, Chile, Spain and Perú application the load case for testing shall be considered based upon the Minimum Failure Loads applied perpendicularly to the longitudinal pole axis at a distance "H1" from the top of the pole and including the wind effect, the Vertical load and the Torsion load as described in Table 6. For torsion load, where applies CS = 1,2. The corresponding torsion and elastic bending tests are indicated in section 7.4.

En (daN)	En + overload (daN)			Cs (-)	Failure load (to be tested) (daN)		
	V [1]	*(M o S)+W* [2]	*T* [3]		*V'* [1]	*(M' o S')+W'* [2]	*T'* [3]
160	500	160 + W	-	1,5	750	240 + W'	-
250	700	250 + W	-	1,5	1.050	375 + W'	-
300	700	300 + W	-	1,5	1.050		-
400	700	400 + W	-	1,5	1.050	600 + W'	-
500	700	500 + W	-	1,5	1.050		-
600	700	600 + W	-	1,5	1.050		-
630	750	630 + W	-	1,5	1.125	945 + W'	-
800	800	800 + W	-	1,5	1.200	1.200 + W'	-
1000	1750	1.000 + W	-	1,5	2.625	1500 + W'	-
	1750	-	667	1,2	2.100	-	800
1250	1750	1250 + W	-	1,5	2.625	1.875 + W'	-
	1750	-	883	1,2	2.100	-	1000
1600	1750	1.600 + W	-	1,5	2.625	2.400 + W'	-
	1750	-	1.067	1,2	2.100	-	1.280
2000	1750	2.000 + W	-	1,5	2.625	3.000 + W'	-
	1750	-	1.650	1,2	2.100	-	1.980
2500	1750	2500 + W	-	1,5	2.625	3.750 + W'	-
	1750	-	1650	1,2	2.100	-	1.980
3000	1750	3.000 + W	-	1,5	2.625	4.500 + W'	-
	1750	-	1.650	1,2	2.100	-	1.980

[1] V and V' loads applied on the top of the pole in the direction of the pole axis.

[2] M/M' or S/S' loads applied horizontally at distance at distance H1 (Table 5) under the top of the pole. It shall be added the overload (W) produced by the wind over the pole considering wind effect. Wind load will also be multiplied by the Safety factor for determining the minimum Failure Load.

[3] T and T' loads applied perpendicular to the axis pole, at distance H1 (Table 5) under the top of the pole, at 1500 mm from the pole axis.

Table 6 – Load case for Spain applications

7.3.3. Maximum Sag admitted

Loads applied on the pole produce a sag, this standard specifies a Maximum Sag when the pole is loaded with the ultimate design load, including wind load when provided; furthermore, once the loads disappear, there is a remaining sag. Both sags (maximum and remaining) shall be as defined in the following table:

% of maximum sag	
Maximum sag when the pole is loaded [% about the length over the ground]	Remaining sag when load withdrawn [% about the length over the ground]
6*	0,5

Table 7 - Maximum and remaining sag

(*) The maximum deflection shall never exceed 1 m.

7.4 CONSTRUCTION CHARACTERISTICS

7.4.1. General Design

This standard considers hot-dip galvanized steel poles with a cross section in the shape of an eight- or sixteen-sided polygon.

Total length, base and top dimensions and number of sections for each Country code are informed in table 2 in addition to other information. In case the pole is built in different sections, each one shall be 11 m long as maximum.

All sections should be joined together by a bolt to prevent the sections from slipping during handling, the size of the bolt should be at the discretion of the manufacturer and its position is recommended at the lower end below the embedment line.

For all types of poles described in this document, the use of at least 10% recycled material is required.

7.4.2. Manufacturing materials

Hot galvanized steel S355JR type according to EN 10025 with following characteristics:

- Unit breaking load: R ≥ 510 N/mm2
- Unit yield strength Rs: ≥355 N/mm2

The use of a steel with higher properties (e.g. S500JR) is permissible[7] provided that the above minimum properties and are satisfied.

For Italy, Spain and Romania applications:

All metal parts must be hot dip galvanized, internally and externally, according to EN ISO 1461, after all the holes, threads, welds and positioning have been completed.

For Italy and Romania applications:

The screws/bolts, nuts must comply with EN ISO 4016 and EN ISO 4034 standard respectively.

[7] If national legislation permits. In this case the dimensional values given in Table 2 must be declared and re-defined at the TCA phase.

Nuts and bolts shall be marked in accordance with Standard EN ISO 4016 and Standard EN ISO 4034.

For Spain applications:

The screws/bolts, nuts must comply with UNE 17115 standard.

For Argentina, Brazil, Colombia, Chile and Perú applications:

All metal parts must be hot dip galvanized, internally and externally, according to ASTM A123, after all the holes, threads, welds and positioning have been completed. The galvanization must have a minimum thickness of 78 µm and an average of 86 µm, obtained at 7 measurement points along each sample.

The screws/bolts, nuts must comply with ASTM A36 and ASTM A563 standard respectively.

7.4.3.Welding process

For Italy, Spain and Romania applications:

The welding processes must be qualified according to the standard EN ISO 15614-1 and welding operators must be qualified according to the standard EN ISO 9606-1.

In addition, for Spain applications, according to UNE 207018, the longitudinal welds of the longitudinal axis shall have a penetration ≥ 80%, except in the female section of the telescopic assembly + 150mm where it shall be 100%. For "poles with base plate" supports, the weld cross-section shall be equivalent to the thickness of the sheet of the pole at this point.

For Argentina, Brazil, Colombia, Chile and Perú applications:

The technique to be used in welding, the execution, appearance and quality of the welds, as well as the welding process and the methods used to correct defects, must comply with AWS D1.1.

No intermediate transverse welds are allowed in each section and only one longitudinal weld is permitted.

7.4.4.Pole Straightness

Poles shall be as straight as possible, being admitted a tolerance of 0,3%. The measurement shall be made without load and with the support resting horizontally, as shown in the figure 1.

Figure 1

7.4.5.Maximum deflection

A maximum deflection of 1.5° per 3 m length of the supports shall be allowed and the verification shall be carried out as shown in the figure 2.

Figure 2

7.4.6. Drill holes

Poles shall present some drill holes for different uses (accessories and fittings including holes for the installation of a lifeline) disposed in the main and secondary direction as requested for each country.

Usually, the Main Direction or Cross Direction and to the longitudinal overhead line direction is defined as the direction perpendicular to the axis pole, this is the perpendicular direction to the overhead line. The Secondary direction or longitudinal direction is the perpendicular direction to the axis pole and perpendicular to the main direction (longitudinal direction to the overhead line) according with the Figure 3.

Figure 3

The holes shall have a good finish, without burrs. They shall be sealed prior to receive any other finishing layer. The holes shall support the fittings and accessories used in the line and for the maintenance. All holes must be protected with a removable plastic tap made of synthetic material resistant to outdoor conditions, UV radiation and with the same expected lifetime than the pole. The taps shall be able to resist transport, manipulation and the effect of the wind.

7.4.6.1. Fixation of accessories

Poles shall have different drill holes in two perpendicular planes coinciding with main and secondary direction.

The diameter of the holes and the position to be placed are defined in the table below:

Country	Ultimate design load [daN]	Height [m]	Hole diameter [mm]	Distance hole axis to the top Tolerance ± 1 mm [mm]	
				Main direction	Secondary direction
ES	160 and 250		17,5 ± 0,5	40, 125, 210, 380, 550, 975, 1145	85, 170, 255, 425, 595, 1020, 1190
ES	400 to 2500		17,5 ± 0,5	40, 125, 210, 380, 465, 550, 975, 1145, 1315, 2250	85, 170, 255, 425, 510, 595,1020, 1190, 1360, 2295
CO	-	10	20,0 ± 0,5	100, 300, 500	
CO	-	12	20,0 ± 0,5	100, 300, 500, 1900	
CO	-	14	20,0 ± 0,5	100, 300, 500, 3700	
CO	-	16	20,0 ± 0,5	100, 300, 500, 5700	
CL	-	10-12-14-16	22,0 ± 0,	200, 600, 800, 1200, 1500, 1800, 2100, 2350, 2650, 2950, 3250, 3550, 3850, 4150, 4450	150, 350, 750, 950, 1350, 1950, 2400, 2700, 3000, 3300, 3600, 3900, 4200, 4600, 5950, 7150, 7750
PE	300, 600	10,12	20,0 ± 0,5	400, 600, 800	300, 500
PE	300, 600, 800, 2000	14, 16	22,0 ± 0,5	300, 500, 700, 900, 1100, 1300, 1500, 1700, 1900, 2300, 2500,3100, 3400	600, 1000, 1400, 1600, 1800, 2200, 2600, 3200, 3400

Table 8 - Hole for accessories

For GS type GSS003/46 (pole for MV/LV transformer installation) 3 additional hole are required as show in Figure 11.

7.4.6.2. Lifeline. Fall protection system

For Argentina, Brazil, Colombia, Chile, Spain and Perú applications:

The pole shall have through holes in the secondary direction to install a lifeline. The holes shall have a diameter of 17,5 ± 0,5 mm and they will be placed according to the tables below:

Ultimate design load [daN]	Hole diameter [mm]	Length over the ground [m]				
		≤ 7	> 7 and ≤ 9	> 9 and ≤ 11	> 11 and ≤ 13	≥ 15
≤ 250	17,5 ± 0,5	3	3 - 5	3 - 7	-	-
> 250 and ≤ 800		3	3 – 4 – 5	3 - 4 - 5 - 6 -7	3 - 4 - 5 - 6 -7 - 8 - 9	3 - 4 - 5 - 6 -7 - 8 – 9 – 10 - 11
> 800	17,5 ± 0,5	3	3 – 4 – 5	3 - 4 - 5 - 6 -7	3 - 4 - 5 - 6 -7 - 8 - 9	3 - 4 - 5 - 6 -7 - 8 – 9 – 10 - 11

Table 9 - Holes to install a lifeline

When the lifeline hole coincides with the coupling of two sections, the hole shall be done preferably just over the coupling zone, with a tolerance of ±100mm.

When a lifeline hole coincides with an accessory hole or the distance between them is less than 400mm, it will remain the accessory hole, being the lifeline hole eliminated.

7.4.6.3. System to climb

This section applies only to Colombia.

The post shall include an embossing of 3 or 4 consecutive stripes in high relief along the length of the post and every 40 cm. These shall be adapted in the case of polygonal posts on an intermediate face or 4 times; in the case of circular posts 4 times on the perimeter of the post, forming 90°. The embossing shall have 3 or more stripes with the following minimum values: length 35 mm, width 5 mm, and height or depth 1.5 mm measured on the inside face of the die or embossing (see figure 4).

Figure 4

This section applies only to Spain.

The pole shall be able to be climbed through by means of climbing rungs. The pole shall have 21.5 mm diameter holes or rectangular holes of at least 22 mm x 16.5 mm every 500 mm on faces 2 and 8 for, as shown in figure 3 and shall be drilled from approximately 2.5 m above the ground line and up to approximately 500 mm below the last hole drilled as shown in table 8. In case of overlapping in areas of coupling of two sections, they must have sockets for the climbing rungs with the same dimensions and with an inner space between the metal sheet and the socket of at least 22mm.

7.4.6.4. Hole for grounding cable

This section applies to Argentina, Colombia, Chile and Perú:

Two additional holes are required to install the cable used in the grounding system.

In accordance with Figure 5 and Figure 6 there shall be 2 holes for the passage of the grounding cable. The first hole should be located 120cm below the top of the post (for poles with nominal length up to 10 m) or 140 cm below the top of the post (for poles with nominal length of more than 10 m). The second hole should be located 20cm below the embedment line.

Figure 5 - grounding hole (lower area)

Figure 6 - grounding hole (upper area)

7.4.7. Bituminous strip

In order to protect the pole against corrosion and damage, a bituminous strip should be applied to the base of the pole as follows.

The bituminous strip shall have a minimum thickness of 4 mm. The bituminous strip shall be made of bitumen, resins and glass fibers armor hot applied with calcium hydrate film. It must have a lifetime equal to the pole. It must be applied after galvanizing surface treatments, with center line in the embedment line (see design drawing).

For Brasil, Italy and Romania

In addition to the requirements mentioned in this paragraph, the bituminous strip shall have a minimum height of 60 cm and shall be positioned starting 30 cm above the burial line.

For Spain

In addition to the requirements mentioned in this paragraph, the bituminous strip shall have a minimum height of 30 cm and shall be positioned above the burial line. For poles with base plate the bituminous strip is not required.

For Argentina, Colombia, Chile and Perú:

In addition to the requirements mentioned in this paragraph, the bituminous strip must cover the entire underground area starting 30 cm above the embedment line.

7.4.8. Pole mass

Mass guaranteed by the supplier shall have a tolerance of + 15 - 10%. The mass is not requested in table 2 but it shall be informed in data sheet.

7.4.9. Grounding system

This section applies to Brazil, Italy and Romania.

Poles shall have a grounding nut and a cap earthing system as show in figure 7 and figure 8.

Figure 7 - Grounding nut

Figure 8 - cap earthing system (dimension in mm)

The positioning of the grounding nut/bolt is shown in the Figure 9 and Figure 10.

Figure 9 - Lenght = 10 m

Figure 10 - Lenght > 10 m

Figure 11 - GS type GSS003/46

This section applies to Colombia, Chile and Perú:

In accordance with Figure 5 and Figure 6 pole shall have two grounding bolts. These bolts shall be designed before any stage of the coating process to ensure electrical connectivity of the bolt to the pole structure at the end of finishing.

This section applies to Argentina

The poles shall be provided with two ½" chromium nickel steels for refining brass threaded nuts or cylinders, welded at not less than 15 cm above the embedment level on one side, and 20 cm from the top on the other side, to allow for earth connections.

This section applies to Spain:

The poles shall be provided with two devices with a hole capable of accommodating M12 bolts for earthing and allowing unbolting, in the case of embedded supports, above the concrete surface. They shall be on faces 3 and 7 of figure 3 (main direction) at a distance of 200±5mm from the earth line and offset 50mm from the axis of the support.

7.4.10. Anti-sinking system

This section applies only to Argentina, Colombia, Chile and Perú:

The pole shall have a metal support at the base with the same strength as the structure's sheet metal, in the form of a cross, to eliminate the possibility of the pole sinking into the ground. This support shall be fixed to the post structure by means of self-tapping screws.

7.4.11. End cap of the top pole

The poles shall have a welded hot-dip galvanized sheet metal cap at the top with the same strength as the structure's sheet metal.

For Brazil, Italy and Romania:

For poles with a height H up to 10 m, the end cap must be made of plastic taps made of synthetic material resistant to outdoor conditions, UV radiation and with the same expected lifetime than the pole. (Figure 8). For poles over 10 m high, and for pole type GSS003/46, the earthing cap system must be used (Figure 9 and Figure 10).

7.4.12. Drainage system

This section only applies to Spain.

Any cavities without drainage, in which rainwater can accumulate, should be avoided.

The drainage system described below is defined for embedded supports.

Figure 12

All poles in the base section shall be provided with openings on two or four sides in the shapes and dimensions shown in Figure 12.

The drainage opening shown as detail A shall have a minimum dimension of 60 mm x 25 mm on four opposite sides of the 90° support or double the surface area, 60 mm x 50 mm on two opposite sides.

The openings for the concrete inlet in the interior of the support indicated as detail B of figure 12, shall be two per face, being two faces where it is practised, arranged in opposition one to the other and at least in the same face as the opening for the drainage, as indicated in figure 12. The dimensions will depend approximately on the width of the face of the pole, as shown in table 10.

If needed the manufacturer shall reinforce the area of the drain opening to ensure that the mechanical stresses required in this document are met.

Type of poles	Windows for concrete inlet [mm]		Ultimate design Load [daN]
	H	L	
Octagonal pole	450±3	80±3	250-630
	600±3	120±3	800-2500

Table 10

Poles with a base plate must also have a drainage system for the accumulation of water.

In addition, the poles will have a cover at the top to prevent water penetration.

7.5 DESIGNATION

For Brazil, Italy and Romania

The poles are designated as follows:

- Total length in m (H)
- Type
- Top diameter in cm

For Argentina, Colombia, Chile, Perú and Spain:

- Letters CH (equivalent to Sheet metal support in Spanish)
- Ultimate design load in daN (En)
- Total length in m (H).
- Letter expressing the option for the installation of the pole. This shall be E (embedded support) or P in case of installation with base plate

7.5.1.Designation example

CH 400 - 13 E.

7.6 MARKING

7.6.1. Characteristics plate

The pole shall have a nameplate[8] made of anodized aluminum positioned at a height of 2 m above the theoretical ground line according to fig. 14 (for Spain between 2 and 2,5 m).

The nameplate shall include in a clear and indelible manner and in the language of each destination country:

- Supplier's name / supplier's code
- Year and month of manufacturing
- Production batch number and serial number[9]
- Designation according to previous point (7.5)
- Weight in kg
- CE marking according to EN 1090-1
- Additional information: Bar code and additional requirements according to some countries requirements:
  - For all countries: Bar Code according to CNS-O&M-S&L-2021-0032-EGIN
  - Spain: Spanish technical specification "UNE 207018"
  - Brazil: Brazilian technical specification "ABNT NBR 16989" and Order number
  - Colombia: Contract number

The height of the fonts shall be at least 20 mm.

For Brazil, Italy and Romania

The positioning of the characteristics plate shall be in accordance with figures 9, 10 and 11.

7.6.2. Risk of electric shock symbol

The poles of this standard shall be marked with the risk of electric shock symbol as represented below.

Figure 13 - Risk of electric shock symbol

[8] The characteristics could be marking by punching directly on the metal surface before the galvanizing process. The depth of the marking must be at least 0.5 mm deep; for Spain only the use of the nameplate is allowed.

[9] the reference to the lot number and the serial number of the pole can be replaced with the identification data of the supply lot that allow to trace back: all the production processes, the operators who intervened in the process, all the certificates of the material and the control reports produced at all stages of the process. For Spain the serial number is mandatory.

The symbol shall be according to IEC 60417 – 6042, with a minimal dimension at the basis of 140 mm.

The symbol shall be fixed to the pole 0,20 m below the characteristics plate and made in aluminum / aluminum alloy (the use of an alternative material with the same characteristics is accepted) material with thickness between 0.5 and 2 mm.

Warning symbol in black (RAL 9005), yellow background (RAL1021) and border in black (RAL 9005).

It shall be suitable for outdoor applications, durable and resistant to UV radiation.

The fixing to the pole must be guaranteed for the useful life of the pole, in the foreseen operating conditions.

Figure 14 - Characteristics plate and electrical shock risk symbol

7.6.3. Marking of embedment height (theoretical ground line)

The embedment height shall be marked with a horizontal green line with a length not less than 200 mm and wide not less than 25 mm, on diametrically opposite side on the surface of the pole.

It shall be durable and resistant to UV radiation.

For Spain

The marking shall be as many as the number of drainage openings. The width of the marking shall be 20 mm so as to be proportionate with the drainage opening. The marking shall be located above the drainage openings, one third of the way down, as shown in Figure 12.

7.6.4. Centre of gravity

This section applies only to Colombia.

It must have a strip, painted red, 30 mm wide and covering the semi-perimeter of the section, where it corresponds to the centre of gravity. As all the other marks, it shall be durable and resistant to UV radiation. When the pole is composed by several sections, each section shall have its own centre of gravity marked.

7.6.5.Lifting mark

The lifting marking shall be made to identify and indicate to the operator the exact position of the lifting sling. The lifting mark are intended for poles without any accessories installed.

To ensure correct lifting/transport/handling, the poles (each section) must be marked, using indelible red paint, with two stripes located 50 cm from the centre of gravity (see Figure 15). The strips shall have a length not less than 200 mm and wide not less than 25 mm.

The manufacturer, based on the calculations and the lifting tests he will carry out for each type of pole, will provide the length A indicated in fig. 15, which will determine the measure between the base of the pole and the first lifting mark. These lengths must be mentioned in the type A documentation and respected throughout the production.

The lifting scheme must also be created and be affixed to the accompanying notes (or attached to them).

Figure 15 - Lifting mark

7.6.6.Section Coupling Marking

For poles with more than one section, it is needed a marking to help the installation.

The inferior section will include two horizontal lines, covering on diametrically opposite sides of the pole, so that once installed, only the upper line will remain hidden under the superior section.

Moreover, each section shall have a vertical line to align both sections.

All these lines shall be indelible and 10 mm wide.

In addition, each section will be marked with a removable label informing:

- Nominal Length (in meters)
- minimum failure load (daN)
- section 1, or section 2, or section 3 respectively. Section 1 corresponds to the base section.

Figure 16 - Section coupling marking

7.6.7. Marking of telecommunication area

This section applies only to Colombia.

The poles shall be marked, using indelible blue paint, on diametrically opposite sides of the pole with two strips at a distance of 5,7 and 6,7 m from the embedment line. The strips shall have a length not less than 150 mm and wide not less than 25 mm. The positioning of the strips is always the same with respect to the embedment line of the pole, regardless of its height.

7.6.8. Marking of end cap of the top pole

This section applies only to Spain.

The upper part of the pole will be marked with a 40 mm+- 5 mm thick strip of indelible paint with a color according to the Ultimate Design Load, En, as shown in the following table. The casp will be painted the same color.

Ultimate design Load [daN]	Colour
160	Orange
250	Black
400	Blue
630	Red
800	Yellow
1000	Green
1250	Brown
1600	White
2500	Violet

7.7 TESTING

7.7.1.Type Tests

Type tests shall be performed before supplying a type of pole covered by this standard in order to demonstrate satisfactory performance characteristics to meet the intended application. Any additional tests, depending on the country of application, are indicated in the local section.

N°	Test	Requirement
1	Visual inspection	It consists in checking that the poles Fully complies with the requirements of section 7.4and any sections are complete with the accessories and markings provided and that they do not have macroscopic defects such as dents, cracks, detachment of the galvanizing, rusting. The weld must be regular, it must not have incisions, cracks or concavities. Además, debe comprobarse el cumplimiento de todos los requisitos verificables visualmente del apartado 7.4.
2	Dimensional verification	It must be verified that the drawings, dimensions and tolerances are in accordance with what is specified in this document (see clause. 7.1). The concentricity of the " cap earthing system " must also be checked.
3	Mass checking	The mass must be within the tolerance limits according to clause 7.4.12. The mass values include the protective coating and accessories.
4	Verification of mechanic resistance of earthing bolt	If applicable (Only specific countries are covered). It consists of screwing the ground terminal into the earthing bolt and checking that there are no cracks in the earthing bolt and/or in the area by tightening with a torque wrench with a torque of 10 daNm (see clause. 7.4.9).
5	Verification of the cap earthing system (Figure 8)	If applicable (Only specific countries are covered). A progressive load is applied on the appropriate test pin in a normal direction to the axis of pole until reaching 1/3 of the minimum failure load with a maximum of 800 daN. The test is considered valid if the test load can be achieved without breaks of the “cap earthing system”; injuries or deformations in the cap earthing system are accepted.
6	Elastic bending test with 50% of minimum failure load and verification of the mechanical resistance.	The pole must be assembled in accordance with the supplier's manual (attached to the approval documentation) and placed in a horizontal position and rigidly fixed throughout its Embedment length (“He” as defined in clause 7.3.1) (see the diagram in Figure 17). **Figure 17**

6	Elastic bending test with 50% of minimum failure load and verification of the mechanical resistance.	1) At a distance d = 0.1 m from the top (0,25 m for Spain applications), the pole will be subjected to a progressive load applied in a normal direction to the axis until reaching 50% of minimum failure load, under these test conditions the pole shall not show any deformation in the fixing areal nor in all its length and/or lesions in correspondence of the longitudinal weld. At the end of the test, the residual sag of the unloaded pole (without test load) shall be equal to 0 mm. The elastic curve shall be measured and recorded by the manufacturer. The displacements, relative to the initial position with the pole unloaded, shall be measured from the pole top every 2 meters. 2) At a distance d = 0.1 m from the top (0,25 m for Spain applications), the pole will be subjected to a progressive load applied in a normal direction to the axis until reaching 100% of minimum failure load. Under these test conditions the pole shall not show any deformation in the fixing area nor in all its length and/or lesions in correspondence of the longitudinal weld. Subsequently the load is increased until the effective breaking of the pole is reached; the effective breaking strength is the maximum reached indicated in the dynamometer or load cell. The dynamometer for measuring the pull must be calibrated before each test and must allow measurement with an accuracy of not less than ±3% of the minimum failure load. The tensile mechanism shall be such as to allow gradual application of the tensile load with an increase of not more than 20% of the breaking pull. For each test step, the tensile load shall be applied for at least 60 seconds. The elastic deformation curve under load shall be recorded during the test. The deflection values under the load of 10%, 20%, 40%, 50%, 67%, 75%, 90%, 95% and 100% of the minimum failure load shall be recorded. For Argentina, Brazil, Colombia, Chile and Perú, the test shall be carried out by applying the load V at the same time and taking the wind load into account (see Table 6). For Spain the test shall be carried out according to UNE 207018.
7	Verification of galvanization	The zinc plating will be carried out on the pieces, after drilling and marking, by the hot immersion process, it must be carried out in accordance with the requirements of EN ISO 1461 (for Brazil, Italy, Spain and Romania) or ASTM A123 (for Argentina, Colombia, Chile and Perú) and must be free from the defects. The excess zinc protrusions that may eventually form must be ground or sanded so that they do not protrude more than 3 mm from the surface. The measurement of the thickness of the zinc layer can be done by means of magnetic flux equipment. In case of doubt, the measurement result can be performed by laboratory methods. Screw holes must be sufficiently free from excess zinc so that suitable screws can be passed through without forcing them.
8	Verification of welding	The Manufacturer must keep a record of welding procedures and qualification of procedures, these procedures must be made available to Enel as soon as they are required. Certified inspection reports must be provided by the manufacturer to Enel for review and approval.
9	Verification of the characteristics of the material	The tests must be carried out in accordance with the requirements of EN 10025. The tests may be omitted if the Supplier submits a test certificate confirming the results of all the prescribed tests carried out on samples taken from the products supplied.

N°	Test	Requirement
10	Lifeline test	Test assembly Where: - V, vertical load - P, main load (Ultimate design load) - It shall be added the wind effect (60 km/h) to P load - Q, load equivalent to the fall of a person with weight 100 daN - Maximum distance between the pole and center of the load application ring shall be 100mm. *Test methodology* Q load shall be applied simultaneously to V and P loads **Methodology A (static)** It shall be applied a load Q of 600 daN (fall of a 100 daN man) according EN 353 (1 and 2). Load shall be applied for 20 seconds as minimum. **Methodology B (dynamic)** The simulation of the fall of the man for a 2m slope consists in leaving a 100 daN weight from the ring. The weight shall be attached with a device capable to absorb energy, according EN 353 (1 and 2). *Acceptance criterion* No deformation of the pole shall be found. *Note: In countries of South America it could be accepted the execution of this test according to ASCE 104 (Direct Load Shear Test).*

<table>
<tr><td>11</td><td>Torsion test</td><td>
The pole will be placed in a horizontal position and rigidly fixed throughout its Embedment length (“He” as defined in clause 7.3.1) (see the diagram in Figure 14).

Figure 18 - Assembly for torsion test

They could be used greater discs, but the pulley diameter plus the diameter of the disc coupled to the pole shall be equal to the diameter of the fixed support disc.

The disc coupled to the pole shall be fixed at distance “d” from the top of the pole, defined previously (0,1 m for all countries except for Spain, that applies 0,25 m). If there was a coupling ring, the disc shall be coupled in the coupling ring.

It shall be applied a torsion torque equivalent to the torque caused by the test load T’ in table 11 at 1.500 mm from the axis of the pole.

Vertical load and torsion torque from table 6 shall be applied simultaneously.

Vertical load is applied on the vertical axis of the pole. For vertical loads greater than 1.000 daN, the load shall be applied progressively, combined with the torsion load.

Other assemblies with equivalent test conditions are allowed.

Acceptance criterion

The pole shall support the test load at 100% for 1 minute. After this time, no permanent deformation or tear shall be appreciated, except for the elongation of the drill holes.

If the test is done with coupling rings, no tear o sliding is allowed between the pole and the ring.

<table>
<tr><td>Ultimate design load (En) [daN]</td><td>T’ [daN]</td></tr>
<tr><td>800<En≤ 1000</td><td>800</td></tr>
<tr><td>1000<En≤ 1250</td><td>1000</td></tr>
<tr><td>1250<En≤ 1600</td><td>1280</td></tr>
<tr><td>En> 1600</td><td>1980</td></tr>
</table>

Table 11

For Spain the test shall be carried out according to UNE 207018.
</td></tr>
<tr><td>12</td><td>Verification of Bituminous strip</td><td>
The thickness and characteristics of the bituminous strip shall be verified according to the requirements of this document.

The minimum adhesion of the bituminous strip shall be 400 PSI. Verification of adhesion shall be performed in accordance with ASTM 4541 or equivalent standard.
</td></tr>
</table>

7.7.2. Acceptance tests

Acceptance tests shall be performed during the delivery and shall be carried out in the Supplier's facilities. The acceptance tests list is indicated in the Table 12. Any additional tests, depending on the country of application, are indicated in the local section.

During the acceptance tests carried out independently, the supplier shall apply the following sampling criterion: Double sampling plan for reduced inspection, level II, AQL of 2.5% (ISO 2859-1 Ed V 2007) apply for each type of pole under FAT. The ISO standard requires that up to a quantity of 50 pieces, it is applied single sampling plan for reduced inspection, level II, AQL of 2.5%.

N.	Test	Test Method
1	Visual inspection	7.7.1.1
2	Dimensional verification	7.7.1.2
3	Mass checking	7.7.1.3
4	Verification of mechanic resistance of earthing bolt. Where applicable.	7.7.1.4
5	Verification of galvanization	7.7.1.7
6	Verification of welding	7.7.1.8
7	Verification of the characteristics of the material	7.7.2.1

Table 12

The test method and requirement are the same as detailed in section 7.7.1 (Type Tests).

During the repetition of the tests in the presence of the Enel inspector, the sampling is half of the sampling for acceptance tests performed independently by the supplier with a minimum of one pole per type. The certificates of conformity of the raw materials used in the manufacture of the poles must be available to the Enel Group.

7.7.2.1. Verification of the characteristics of the material

The verification is performed by checking, by means of a tensile test, that the mechanical properties of the steel correspond to those defined in this document. The test must be carried out in accordance with EN 10025.

The tests may be omitted if the Supplier submits a test certificate confirming the results of all the prescribed tests carried out on samples taken from the products supplied.

7.8 TECHNICAL CONFORMITY ASSESMENT

Technical conformity assessment shall be done according to Enel's procedure described in GSCG002. Documents type A shall include the description of the weight of raw materials and including the percentage of recycled material if any.

Local Certifications

For Colombia, RETIE certification shall be also provided according to local regulation.

7.9 GUARANTEE

Requirement of warranty will be indicated in the request for bids, indicating periods and standards, although any material will be warrantied 24 months as a minimum.

7.10 CONDITIONS OF SUPPLY

Manufacturers shall provide appropriate instructions, documents showing acceptance tests and information covering general conditions during transport, storage and installation of the poles. The instructions shall include the appropriated indications for the disassembly and recycle of the material, reporting the weight in kg of each raw material. The documents must be in English and in the local language of the destiny country. Enel will have the power to verify that the instructions given are in line with the standard practices in the sector.

The instructions shall also include the information about how to treat the device at the end of its life.

As described before, for poles with more than one section, a removable label shall be included on each section and with the information of the pole and number of sections.

The requirements regarding dimensions for delivery to ENEL deposits are reported in Packaging, transport and delivery requirements.

7.11 TECHNICAL CHECK LIST

The following table 13 indicates the minimum technical information that suppliers shall provide.

Item	Description	Unit	Value
1	**GENERAL INFORMATION**		
1.1	Supplier	-	
1.2	Factory	-	
1.3	Supplier Product Designation	-	
2	**MAIN FEATURES**		
2.1	Distribution Company and Country	-	-
2.2	Country Code	-	
2.3	GS Type Code		
2.4	Nominal Length	[m]	
2.5	Type		
2.6	Description		
2.7	Top Diameter	[mm]	
2.8	Butt Diameter	[mm]	
2.9	Conicity	[mm/m]	
2.10	Thickness of sheet metal	[mm]	
2.11	Numer of sections		
2.12	Mass of each section	[Kg]	
2.13	Total mass	[Kg]	
2.14	Ultimate design load (En)	[daN]	
2.15	Safety Factor		
2.16	Minimum failure load (Er)	[daN]	
2.17	Number of sides		
2.18	Connection lenght	[mm]	
2.19	Minimum thickness of galvanization	[µm]	
2.20	Average thickness of galvanization	[µm]	

Table 13

7.12 COUNTRY CODE CONVERSION TO OLD SPECIFICATIONS

The following table shows the association codes for materials that have changed code from previous specification revisions with equivalent characteristics. This table has been created using a conservative method in which the characteristics of the pole has been oversized. Other alternatives could be evaluated on a case-by-case basis.

GS Type Code GSS003 rev.1	Country	Description	Country Code	Replace code in previous standards
GSS003/35	BR	10/300 daN	230214	New
GSS003/39	BR	10/600 daN	230215	New
GSS003/43	BR	10/1000 daN	230246	New
GSS003/46	BR	10/1000 daN	230343	New
GSS003/36	BR	12/300 daN	230245	New
GSS003/02	BR	12/300 daN	230243	New
GSS003/40	BR	12/600 daN	230241	New
GSS003/06	BR	12/600 daN	230239	New
GSS003/44	BR	12/1000 daN	230237	New
GSS003/14	BR	12/1000 daN	230249	New
GSS003/21	BR	12/2000 daN	230248	New
GSS003/52	BR	12/3000 daN	230247	New
GSS003/07	BR	14/600 daN	230244	New
GSS003/55	BR	14/1000 daN	230242	New
GSS003/64	BR	14/2000 daN	230240	New
GSS003/65	BR	16/1000 daN	230238	New
GSS003/66	BR	16/2000 daN	230236	New
GSS003/47	CO	10/300 daN	230342	231054
GSS003/49	CO	10/400 daN	230341	231055
GSS003/50	CO	12/300 daN	230340	New
GSS003/51	CO	12/400 daN	230339	231052
GSS003/53	CO	12/500 daN	230338	New
GSS003/54	CO	12/1000 daN	230337	230015
GSS003/74	CO	12/1300 daN	230336	230005
GSS003/56	CO	14/300 daN	230335	New
GSS003/57	CO	14/400 daN	230327	231053
GSS003/58	CO	14/500 daN	230334	231092
GSS003/59	CO	14/1000 daN	230333	230013
GSS003/60	CO	14/2000 daN	230332	230008
GSS003/75	CO	14/1300 daN	230331	230006
GSS003/61	CO	16/500 daN	230330	231095
GSS003/62	CO	16/1000 daN	230329	New
GSS003/63	CO	16/2000 daN	230328	New
GSS003/35	CL	10/300 daN	230326	New
GSS003/39	CL	10/600 daN	230325	New
GSS003/43	CL	10/1000 daN	230324	New

GS Type Code GSS003 rev.1	Country	Description	Country Code	Replace code in previous standards
GSS003/36	CL	12/300 daN	230323	New
GSS003/02	CL	12/300 daN	230322	New
GSS003/40	CL	12/600 daN	230321	New
GSS003/06	CL	12/600 daN	230320	New
GSS003/44	CL	12/1000 daN	230319	New
GSS003/14	CL	12/1000 daN	230318	New
GSS003/21	CL	12/2000 daN	230317	New
GSS003/52	CL	12/3000 daN	230316	New
GSS003/48	CL	14/300 daN	230315	New
GSS003/07	CL	14/600 daN	230314	New
GSS003/55	CL	14/1000 daN	230311	New
GSS003/64	CL	14/2000 daN	230312	New
GSS003/65	CL	16/1000 daN	230313	New
GSS003/66	CL	16/2000 daN	230310	New
GSS003/35	PE	10/300 daN	230309	New
GSS003/39	PE	10/600 daN	230308	New
GSS003/36	PE	12/300 daN	230307	New
GSS003/02	PE	12/300 daN	230306	New
GSS003/40	PE	12/600 daN	230305	New
GSS003/06	PE	12/600 daN	230304	New
GSS003/48	PE	14/300 daN	230303	New
GSS003/07	PE	14/600 daN	230302	New
GSS003/10	PE	14/800 daN	230301	New
GSS003/64	PE	14/2000 daN	230300	New
GSS003/67	PE	16/300 daN	230299	New
GSS003/08	PE	16/600 daN	230298	New
GSS003/11	PE	16/800 daN	230297	New
GSS003/66	PE	16/2000 daN	230296	New
GSS003/95	AR	8/400 daN	0120-0504	0120-0453
GSS003/98	AR	8/600 daN	0120-0503	New
GSS003/96	AR	8/1000 daN	0120-0502	0120-0451
GSS003/78	AR	10/400 daN	0120-0507	New
GSS003/88	AR	10/600 daN	0120-0506	New
GSS003/69	AR	10/1000 daN	0120-0505	0120-0451
GSS003/80	AR	12/400 daN	0120-0508	New
GSS003/89	AR	12/600 daN	0120-0509	New
GSS003/81	AR	12/800 daN	0120-0510	New
GSS003/82	AR	12/1000 daN	0120-0511	New
GSS003/97	AR	12/2500 daN	0120-0512	0120-0498
GSS003/83	AR	14/400 daN	0120-0500	0118-0107 or 0120-0475
GSS003/90	AR	14/600 daN	0120-0513	0118-0108

GS Type Code GSS003 rev.1	Country	Description	Country Code	Replace code in previous standards
GSS003/91	AR	14/800 daN	0120-0514	New
GSS003/55	AR	14/1000 daN	0120-0515	New
GSS003/92	AR	14/2500 daN	0120-0501	0118-0112 or 0120-0497
GSS003/93	AR	14/3500 daN	0120-0516	0118-0113 or 0120-0499
GSS003/94	AR	14/5000 daN	0120-0517	0118-0114
GSS003/85	ES	9/250 daN	230796	New
GSS003/86	ES	9/400 daN	230795	New
GSS003/87	ES	9/630 daN	230797	New
GSS003/88	ES	9/800 daN	230793	New
GSS003/89	ES	9/1000 daN	230794	New
GSS003/90	ES	9/1250 daN	230789	New
GSS003/91	ES	9/1600 daN	230790	New
GSS003/92	ES	11/250 daN	230792	New
GSS003/93	ES	11/400 daN	230788	New
GSS003/94	ES	11/630 daN	230787	New
GSS003/95	ES	11/800 daN	230786	New
GSS003/96	ES	11/1000 daN	230785	New
GSS003/97	ES	11/1250 daN	230784	New
GSS003/98	ES	11/1600 daN	230783	New
GSS003/99	ES	11/2500 daN	230782	New
GSS003/100	ES	13/250 daN	230781	New
GSS003/101	ES	13/400 daN	230791	New
GSS003/102	ES	13/630 daN	230779	New
GSS003/103	ES	13/800 daN	230780	New
GSS003/104	ES	13/1000 daN	230778	New
GSS003/105	ES	13/1250 daN	230798	New
GSS003/106	ES	13/1600 daN	230776	New
GSS003/107	ES	13/2500 daN	230775	New
GSS003/108	ES	15/400 daN	230774	New
GSS003/109	ES	15/630 daN	230772	New
GSS003/110	ES	15/800 daN	230773	New
GSS003/111	ES	15/1000 daN	230770	New
GSS003/112	ES	15/1250 daN	230771	New
GSS003/113	ES	15/1600 daN	230769	New
GSS003/114	ES	15/2500 daN	230768	New
GSS003/115	ES	17/1000 daN	230767	New
GSS003/116	ES	17/1250 daN	230766	New
GSS003/117	ES	17/1600 daN	230777	New
GSS003/118	ES	17/2500 daN	230765	New
GSS003/119	ES	7/250 daN	230762	230336
GSS003/120	ES	7/400 daN	230799	230470

GS Type Code GSS003 rev.1	Country	Description	Country Code	Replace code in previous standards
GSS003/121	ES	7/630 daN	230763	230472
GSS003/122	ES	7/800 daN	230760	230474
GSS003/123	ES	7/1000 daN	230761	230476
GSS003/124	ES	7/1250 daN	230759	New
GSS003/125	ES	7/1600 daN	230758	New
GSS003/85	ES	9/250 daN	230757	230449
GSS003/86	ES	9/400 daN	230754	230471
GSS003/87	ES	9/630 daN	230756	230473
GSS003/88	ES	9/800 daN	230753	230475
GSS003/89	ES	9/1000 daN	230755	230477
GSS003/90	ES	9/1250 daN	230752	New
GSS003/91	ES	9/1600 daN	230751	New
GSS003/126	ES	9/2500 daN	230749	New
GSS003/92	ES	11/250 daN	230748	New
GSS003/93	ES	11/400 daN	230750	230425
GSS003/94	ES	11/630 daN	230746	230427
GSS003/95	ES	11/800 daN	230747	230428
GSS003/96	ES	11/1000 daN	230744	230285
GSS003/97	ES	11/1250 daN	230745	New
GSS003/98	ES	11/1600 daN	230764	230287
GSS003/99	ES	11/2500 daN	230800	New
GSS003/101	ES	13/400 daN	230743	230426
GSS003/102	ES	13/630 daN	230742	New
GSS003/103	ES	13/800 daN	230741	230300
GSS003/104	ES	13/1000 daN	230740	230286
GSS003/105	ES	13/1250 daN	230739	New
GSS003/106	ES	13/1600 daN	230738	230288
GSS003/107	ES	13/2500 daN	230737	New
GSS003/111	ES	15/1000 daN	230736	New
GSS003/112	ES	15/1250 daN	230735	New
GSS003/113	ES	15/1600 daN	230734	230289
GSS003/114	ES	15/2500 daN	230733	New

Table 14