



Information Bulletin:

Release of ES54 S0-04 and S1 Standards for 120/240 V Single-Phase Secondary Services up to 600 A

1.0 Items Covered

ES54 S0-04	Services General Notes Secondary Services
ES54 S1-01 R10	Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation
(ES54 S1-02	Secondary Single-Phase Services 320 A Self-Contained Meter Installation) – Hold for Future
ES54 S1-03	Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation
ES54 S1-04	Secondary Single-Phase Services 200 A to 600 A Pad-Mounted Kiosk and Pedestal, Self-Contained and CT-Based Meter Installation

2.0 Overview

This bulletin presents changes to the ES54 section S standards for single-phase 120/240 V services up to 600 A. ES54 S1-01 R9 *Secondary Single-Phase Services 120/240 V up to 600 A Revenue Meter Socket Installation* covered all aspects of underground service construction on private property, including civil work, jurisdiction issues, utility access, wall-mounted single and multiple main meter sockets, kiosks, and new service pedestals.

Technical Safety BC (TSBC) issued directive D-EL 2017-01 in 2017, before BC Hydro issued ES54 S1-01 R9, extending the utility exemption on private property to the point of utility connection. All electrical and civil work and materials from the property line to the utility point of connection shall be supplied and installed in compliance with BC Hydro standards.

Since TSBC directive D-EL 2017-01, BC Hydro has received requests for connecting new types of customer service assemblies and meter sockets and has connected and energized kiosks and pedestals without having adequate construction standards to define requirements.

BC Hydro has also received requests to upgrade existing 200 A 120/240 V residential services to 400 A for electric vehicle chargers. Future standard ES54 S1-02 will present

120/240 V 320 A service having a self-contained 320 A revenue meter as a less expensive alternative for residential services above 200 A.

In view of the above requirements and developments, Distribution Standards has divided ES54 S1-01 R9 into the four S1 standards listed in 1.0 *Items Covered*. These changes are made in response to numerous customer requests, changes to customer 120/240 V equipment, BC Electrical Code (BCEC) rule changes, BC Hydro customer policy and revenue metering revisions, and to align with the latest TSBC documents. New standard ES54 S0-04 summarizes requirements common to all secondary services.

2.1 ES54 S1-01 R10 Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation

Page	Section	Changes
1	Application Revision Notes Reference Standards Reference Documents	• New standards format • Scope reduced to single 200 A meter socket and multiple main up to 400 A • TSBC documents added as references
2-4	Note 1 General	• Customer wiring shall be completed before BC Hydro service is connected • New 22 kA interrupting capacity requirement for customer main breaker • Trenching and ducting shall comply with ES54 S0-05 • Table 1 reduced from previous revision • Figures 1 and 2 revised • BC Hydro accepts both grounding options per BCEC Rule 10-210 • Civil work for service trenches shall comply with BC Hydro standards • BC Hydro requires permanent support mounting structures – lumber and plywood unacceptable • Outdoor support structures for meter sockets shall be concrete, masonry or rock walls, or galvanized steel • Concrete pad shall extend minimum 150 mm below frost line • BC Hydro accepts combo meter socket and breaker panel subject to TSBC acceptance
5-6	Note 2 Service in Duct	• Meter socket installation details revised • Service trench and duct installation shall comply with new ES54 S0-05 • Concrete encasement requirements added • Added pictures of acceptable and unacceptable meter socket installations

Page	Section	Changes
6-9	Note 3 Concrete Encasement	• Compliance with BCEC Rule 6-208 • Added pictures of typical installations • Added BC Hydro requirement for visual inspection at the time of service connection • Added picture of access cavity around meter socket cover
10-11	Note 4 Meter Socket Requirements	• Utility supply duct left side entry • Multiple meter socket enclosure service grounding conductor shall be terminated inside customer meter socket portion
12	Note 5 Revenue Metering Requirements	• New section • BC Hydro no longer connects 100 A 120 V two-wire meter sockets, only 200 A 120/240 V three-wire meter socket services • Meter sockets submerged in water during flood periods shall be replaced • Each meter socket shall have a single cover plate. Plate removal does not require use of special tools in proximity of energized jaws
12	Note 6 Service Upgrade to 200 A	• New section • New BC Hydro requirements explained • If upgrade is not feasible using existing ducting, customer shall install new duct per ES54 S0-05 • Concrete encasement is not required when replacing meter socket only
13-14	Note 7 Standby Generator	• New section • Standby generator installation is jurisdiction of TSBC and BCEC Rules • Transfer switch shall be CSA certified • BC Hydro shall not accept customer-owned sleeve-type transfer switch installed on meter socket

2.2 Hold for Future – ES54 S1-02 Secondary Single-Phase Services 320 A Self-Contained Meter Installation

This standard will be released at a later date, after BC Hydro has completed field evaluations and system integration. The 320 A service option is not currently available.

320 A 120/240 V service connections will be subject to the results of trial installations and the availability of 320 A meter sockets in BC Hydro supply areas. These are expected by March 2023.

2.3 ES54 S1-03 Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation

Page	Section	Changes
1	Application Revision Notes Reference Standards Reference Documents	• New standard and format derived and expanded from ES54 S1-01 R9 • Scope educed to single 400 A and 600 A services • TSBC documents added as references
1-2	Note 1 General	• Acceptable service locations are different for commercial and residential services • BC Hydro accepts both grounding options per BCEC Rule 10-210 • New requirement of 22 kA interrupting rating for customer main breaker • Trenching and ducting shall comply with ES54 S0-05 • Customer wiring shall be completed before BC Hydro service connection
2	Note 2 Service in Duct	• Compliance with BCEC Rule 6-208 for concrete encasement
3-4	Note 3 Service Entrance	• Table 1 for service enclosure options • Table 2 for KO sizes and line lugs • Table 3 for a list of BC Hydro-supplied cable clamps • Requirement for C-channel and adjustable support angle brackets for service cables
4-5	Note 4 Construction Details for 400 A and 600 A Services	• Loadbreak switch no longer acceptable as customer service main • Circuit breaker only acceptable as service main • Specific design details and clearances for cable splitter provided
6-9	Note 5 400 A 120/240 V Service Assemblies	• Details for Hydel prefabricated service assembly with integral breaker and CT block • Further options for field-assembled 400 A services • Requirement for vertically mounted service splitter • Requirement for C-channel and adjustable support angle brackets for service cables • Service grounding connection shown

Page	Section	Changes
10-13	Note 6 600 A 120/240 V Prefabricated Service Assemblies	• Details for prefabricated and field-assembled 600 A services • Requirement for C-channel and adjustable support angle brackets for service cables • Equipment layout details for external revenue metering CT enclosure and separate breaker option • Details and installation requirements for service cable entry for top, side, and rear installation • Table 4 showing minimum duct size, pullbox, and wireway dimensions • Service grounding connection shown

2.4 ES54 S1-04 Secondary Single-Phase Services 200 A to 600 A Pad-Mounted Kiosk and Pedestal, Self-Contained and CT-Based Meter Installation

Page	Section	Changes
1	Application Revision Notes Reference Standards Reference Documents	• New standard and format derived and expanded from ES54 S1-01 R9 • Scope reduced to service pedestals and kiosks • TSBC documents added as references
1-2	Note 1 Installation Types	• New 200 A service pedestal acceptable for residential services • 200 A and 320 A service kiosks for reduced height municipal and standard height customer-owned installations • 400 A and 600 A CT-based kiosk with integral breaker and CT block • New complex up to 600 A meter center kiosk with service main breaker
2	Note 2 General	• BC Hydro accepts both grounding options per BCEC Rule 10-210 • Pedestals and kiosks shall have adequate concrete pad to withstand tipping resistance • 22 kA interrupting capacity requirement for customer main breaker • Loadbreak switch no longer acceptable as customer service main

Page	Section	Changes
2-3	Note 3 Concrete Pads and Service Ducts	• Vector diagram illustrating tipping resistance • Engineered enclosure base and anchors • Concrete pad shall extend minimum 150 mm below frost line • Certified engineering design of kiosk and concrete pad acceptable to BC Hydro
3	Note 3.1 200 A Pedestal	• Non-engineered concrete pad construction requirements
4	Note 3.2 200 A to 600 A Kiosk	• Non-engineered concrete pad construction requirements • Non-certified installation shall be discussed with BC Hydro designer for acceptance
5	Note 4 Pedestal and Kiosk Enclosure and Base Frame	• Dual access requirement for single and double door designs
5-6	Note 4.1 200 A Pedestal	• Design details and acceptable pedestal installation picture • Reduced pedestal height of 1200 mm is acceptable • 22 kA interrupting capacity requirement for customer main breaker
7-8	Note 4.2 200 A and 320 A Non-Municipal Kiosk	• Height, concrete pad, and access requirements • Mounting and installation for meter socket mounted outside enclosure
9	Note 4.3 200 A Low-Profile Municipal Kiosk	• 1200 mm minimum height, concrete pad, and access requirements • Installation and connection for non-metered kiosks
10-14	Note 4.4 400 A and 600 A CT-Based Kiosk	• Details for prefabricated kiosk • C-channel and adjustable support angle brackets for service cables • Equipment layout for integral CT-block and 5 A revenue meter enclosure • Kiosk restricted for BC Hydro access only • Service grounding conductor in ¾" duct inside CT compartment • Customer may have separate access • Service cable entry details and requirements for top, side, and rear installation • Design details and clearances for cable splitter

Page	Section	Changes
15-16	Note 5 Revenue Meter Centre Kiosk	• New section for meter centre kiosk requirements • Kiosk shall be equipped with dual access hasp • Height, concrete pad, and access requirements • Mounting and installation details for meter socket mounted outside enclosure • Fused loadbreak switch unacceptable • Weatherproof cutout on external door fitted with lexan cover required for wireless communication
17-18	Note 6 Hybrid Installations	• Installation details for overhead utility supply to pad-mounted customer-owned kiosk • Above ground duct side entry into kiosk is unacceptable • Customer shall supply and install class 4 pole • Service kiosk concrete pad, tipping resistance, and dual access requirements • Illustrative diagram of service installation on difficult slopping terrain

2.5 ES54 S0-04 Services General Notes Secondary Services

This is a new standard for secondary customer-owned single-phase and three-phase services.

Page	Section	Changes
1	Application Revision Notes Reference Standards Reference Documents	• New standards format • Scope reduced to secondary services only

Page	Section	Changes
1-3	Note 1 Typical Service Connections	Typical BC Hydro secondary voltage customer services are: • Single 200 A 120/240 V single-phase is the most common type of secondary underground service for residential dwellings • Multiple main up to 400 A 120/240 V single-phase combination panel may facilitate up to four 200 A 120/240 V • Single 320 A 120/240 V single-phase is a new type of secondary underground service for residential dwellings • Single 400 A or 600 A 120/240 V single-phase service is a combination panel comprising a service main breaker and CT-based revenue meter • Single 200 A to 600 A 120/240 V single-phase pad-mounted service is an outdoor-type free-standing pad-mounted service pedestal or kiosk • Multiple main 600 A splitter 120/240 V single-phase is a common field-assembled service for smaller commercial and industrial installations with relatively small 120/240 V single-phase loads • Single 200 A 120/208 V three-phase is a relatively common type of hot-style secondary underground service for residential and small commercial services and temporary construction power • Multiple main splitter up to 1600 A 120/208 V and 347/600 V three-phase / 4W are common field-assembled large services for commercial and industrial installations • Multiple main switchgear up to 1600 A 120/208 V and 347/600 V three-phase / 4W are the most common large factory-assembled and CSA-certified residential, commercial, and industrial secondary services up to 1600 A
3	Note 2 Customer Service Main	Main service protective device shall be capable of interrupting the available fault current up to: • 22 kA for single-phase 120/240 V up to 600 A • 45 kA for three-phase 120/208 V, wye-connected, grounded neutral up to 1600 A • 45 kA for three-phase 347/600 V, wye-connected, grounded neutral up to 1600 A

Page	Section	Changes
3-4	Note 3 Customer-Owned Transformation	Maximum customer service sizes rated for 80% continuous operation in areas where the primary service voltage is 12.5 kV, 25 kV, and 19.9/34.5 kV grounded wye (some rural applications): • 600 A at single-phase three-wire 120/240 V • 1600 A at three-phase four-wire (three-wire for 19.9/34.5 kV primary) 120/208 V • 600 A (1600 A for 25 kV primary) at three-phase four-wire 347/600 V
4-5	Note 4 Wireways and Pullboxes	• Summary of specific details for utility wireways and pullboxes • BC Hydro requires separate utility cable compartment for terminating supply service cables • Mid-run pullboxes may be required for longer pulls • Pullbox location shall be accepted by BC Hydro designer • Ducts entering concrete pullboxes shall terminate in bell ends
5-6	Note 5 Cable Pulling	• Customer switchgear and wireways are not rated for attachment of cable pulling gear • Cable pulling irons shall be located and accepted in consultation with BC Hydro designer • Maximum hand feed is 450 N • BC Hydro designer shall receive acceptance for hand feed from field manager • Customer shall provide engineered threaded inserts or attachments to building structure
6-7	Note 6 Cable Clamps	• Cable clamps are supplied and installed by BC Hydro • Customer shall provide 1$\frac{5}{8}$" C-channel mounted on adjustable single brackets
7	Note 7 Concrete Encasement of Supply Service Ducts	• In compliance with BCEC Rule 6-208
7	Note 8 Grounding	• BC Hydro accepts both grounding options per BCEC Rule 10-210 • The customer building or service grounding conductor connection to the neutral bus shall be done outside the utility compartment

Page	Section	Changes
7	Note 9 Standby Power and Transfer Switches	• A customer may operate an open-transition standby generator at secondary voltage as an emergency power supply, independent and disconnected from BC Hydro service. The generator must never operate in parallel with BC Hydro service. • Compliance and installation verifications and inspections of customer-owned open-transition transfer switches for secondary voltage customers is the jurisdiction of TSBC and the local electrical authority • BC Hydro only accepts CSA-certified utility transfer switches built specifically for this function, per applicable CSA C22.2 standards • BC Hydro does not accept sleeve-type transfers switch-mounted on 200 A CSA certified meter sockets

3.0 Action

The effective date for the new and revised ES54 section S standards is June 30, 2023. In-flight work approved by the local BC Hydro design office is not required to meet any new requirements within these standards.

Designers and Engineers

Designers and engineers should familiarize themselves with the revisions to ES54 S0-04 and the new ES54 S1 standards.

Civil Inspectors

Civil inspectors should familiarize themselves with the revisions to ES54 S0-04 and the new ES54 S1 standards.

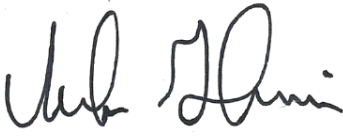
Customers and Customer Representatives

Customers and customer representatives, including electricians, project managers, consultants, and contractors, should familiarize themselves with the revisions to ES54 S0-04 and the new ES54 S1 standards. Please direct any questions or concerns to your local BC Hydro representative.

4.0 Distribution Standards Contact

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5.0 Approval

Recommended		Reviewed		Approved	
					
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Date:	2022-11-25	Date:	2022-11-25	Date:	2022-11-25