1. SCOPE

This document lists the categories shown below, which are Approved for supply to, use in or connection onto the SP Distribution plc, SP Manweb plc and / or SP Transmission plc networks, as applicable.

Approved Transformer Factories
Approved Transformer Designs
Approved HV Bushings
Approved Tap Changers
Approved Insulating Fluids
Approved Transformer Refurbishment Service Providers

2. ISSUE RECORD

This is a Reference document. The current version is held on the EN Document Library.

It is your responsibility to ensure you work to the current version.

Issue Date	Issue No.	Author	Amendment Details
November 2019	6	Jose Quintana	Issue 6: General Update
November 2020	7	Jose Quintana	Issue 7: Annual Review. Addition of refurbishment contractors
March 2022	8	Jose Quintana	Issue 8: Annual Review. Update on Tier 2 Distribution and System transformers. Addition of Refurbishment contractors for System transformers
June 2023	9	Jose Quintana	Issue 9: Annual Review
April 2025	10	Jose Quintana	Issue 10: Annual Review. Addition of Voltage Regulating Distribution Transformers (VRDTs). Update to BEBS-T2 retrofit bushings.

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
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4. REVIEW

This is a Reference document which has a 3-year retention period after which a reminder will be issued to review and extend retention or archive.

5. DISTRIBUTION

This document is part of the SPD and SPM System Design Virtual Manuals maintained by Document Control but does not have a maintained distribution list. This document is published on the SP Energy Networks website.

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6. CONTENTS

1. SCOPE **1**
2. ISSUE RECORD **1**
3. ISSUE AUTHORITY **1**
4. REVIEW **1**
5. DISTRIBUTION **1**
6. CONTENTS **2**
7. DEFINITIONS **3**
8. REFERENCE DOCUMENTS **4**
8.1 International and National Standards 4
8.2 Iberdrola Networks Specifications 5
8.3 SP Energy Networks Specifications 5
9. STANDARD REQUIREMENTS **6**
9.1 Transformers 6
9.1.1 Distribution Transformers (11kV Voltage class) 6
9.1.2 System Transformers (33kV Voltage class) 6
9.1.3 Grid Transmission Double-Wound Transformers (132 and 275kV Voltage class) 6
9.1.4 Supergrid Transmission Auto Transformers (275 and 400kV Voltage class) 6
9.1.5 Shunt reactors 6
9.1.6 Earthing / Auxiliary Transformers 7
9.1.7 Special Transformers 7
9.1.8 Neutral Earthing Resistors 7
9.2 HV Bushings 7
9.3 Tap Changers 7
9.4 Insulating fluids 7
10. APPENDICES **8**
10.1 Approved Transformer Factories 8
10.1.1 Distribution Transformers (11kV Voltage class) 9
10.1.2 System Transformers (33kV Voltage class) 10
10.1.3 Grid Transmission Double-Wound Transformers (132 and 275kV Voltage class) 11
10.1.4 Supergrid Transmission Auto Transformers (275 and 400kV Voltage class) 12
10.1.5 Dry-type Air-core Reactors 12
10.1.6 Earthing / Auxiliary Transformers 13
10.1.7 Neutral Earthing Resistors 13
10.2 Approved Distribution Transformer Designs (11kV Voltage class) 14
10.2.1 Pole Mounted Distribution Transformers 14
10.2.2 Ground Mounted Unit Type Distribution Transformers 15
10.2.3 Ground Mounted Unit Type Voltage Regulating Distribution Transformers 15
10.2.4 Ground Mounted Cable Connected Distribution Transformers 16
10.3 Approved System Transformer Designs (33kV Voltage class) 17
10.4 Approved HV Bushings 18
10.5 Approved Tap Changers 20
10.5.1 On Load Tap Changers (OLTC) 20
10.5.2 De-Energised Tap Changers (DETC) 20
10.6 Approved Insulating Fluids 21
10.6.1 Uninhibited Mineral Oils 21
10.6.2 Inhibited Mineral Oils 21
10.6.3 Synthetic Esters 21
10.7 Other Components 22
10.8 Approved Transformer Refurbishment Service Providers 23
10.8.1 On-site refurbishment works 24
10.8.2 Factory refurbishment works 25
10.8.3 On Load Tap-Changer service and maintenance 25
10.8.4 Oil treatments 25

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7. DEFINITIONS

For the purpose of this document, the following definitions shall apply:

The Company	Refers to SP Distribution plc, SP Transmission plc and SP Manweb plc
SP Distribution plc	The Distribution Licence Holder for the distribution service area formerly known as ScottishPower – hereafter referred to as SPD
SP Transmission plc	The Transmission Licence Holder for the transmission service area formerly known as ScottishPower – hereafter referred to as SPT
SP Manweb plc	The Distribution Licence Holder for the distribution service area formerly known as Manweb – hereafter referred to as SPM
SP Energy Networks	The brand name for the division of the ScottishPower group of companies that encompasses SP Distribution plc, SP Transmission plc, SP Manweb plc and SP Power Systems Limited
The Engineer	The Company's nominated representative having authority over technical matters contained within this document
Approved	Equipment Approved in accordance with The Company's Equipment Approvals Procedure, and which is considered suitable for installation on The Company's networks
The Tenderer	The supplier invited to tender in accordance with this document
The Contractor	The successful Tenderer (may be one or more)

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8. REFERENCE DOCUMENTS

8.1 International and National Standards

IEC 60076-1	Power Transformers - Part 1: General
IEC 60076-2	Power Transformers - Part 2: Temperature rise for liquid-immersed transformers
IEC 60076-3	Power Transformers - Part 3: Insulation levels, dielectric tests and external clearances in air
IEC 60076-5	Power Transformers - Part 5: Ability to withstand short circuit
IEC 60076-7	Power Transformers - Part 7: Loading guide for oil-immersed power transformers
IEC 60076-8	Power Transformers - Part 8: Application guide
IEC 60076-10	Power Transformers - Part 10: Determination of sound levels
IEC 60076-18	Power Transformers - Part 18: Measurement of frequency response
IEC 60076-22-1	Power transformers - Power transformer and reactor fittings - Protective devices
IEC 60076-22-2	Power transformers - Power transformer and reactor fittings - Radiators
IEC 60076-22-3	Power transformers - Power transformer and reactor fittings - Liquid to air coolers
IEC 60076-22-5	Power transformers - Power transformer and reactor fittings - Pumps
IEC 60076-22-6	Power transformers - Power transformer and reactor fittings - Fans
IEC 60076-22-7	Power transformers - Power transformer and reactor fittings - Accessories and fittings
IEC 60137	Insulated bushings for alternating voltages above 1000V
IEC 60214-1	Tap-changers - Part 1: Performance requirements and test methods
CR (EU) 548/2014	Commission Regulation (EU) No. 548/2014: on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers
CR (EU) 2019/1783	Commission Regulation (EU) 2019/1783 amending Regulation (EU) No. 548/2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers
BS EN 50180	Bushings above 1kV up to 36kV and from 250A to 3,15kA for liquid filled transformers
ENA TS 35-1 Part 1	Distribution Transformers Part 1 Common Clauses
ENA TS 35-1 Part 2	Distribution Transformers Part 2 Ground Mounted Transformers – not close-coupled
ENA TS 35-1 Part 3	Distribution Transformers Part 3 Ground Mounted Transformers – close-coupled
ENA TS 35-1 Part 4	Distribution Transformers Part 4 Pole Mounted Transformers
ENA TS 35-3	Continuous Maximum Rated (CMR) System Transformers (for use on systems up to 132kV)

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8.2 Iberdrola Networks Specifications

INS 00.08.04	Supplier Qualification Process
INS 72.00.01	Power Transformers
INS 72.30.05	Distribution Transformers
INS 72.81.00	Insulated Bushings Rated from 48.3kV to 420kV for use in Oil-Immersed Power Transformers
INS 72.96.01	Tap Changers For Use In Oil-Immersed Power Transformers

8.3 SP Energy Networks Specifications

ASSET-02-002	SP Energy Networks Equipment Approvals Procedure
SUB-03-009	Technical Specification for Mineral Insulating Oil and Dielectric Insulating Liquid for Transformers and Switchgear
TRAN-03-007	Neutral Earthing Resistors
TRAN-03-020	Specification for 33kV System Transformers
TRAN-03-021	Specification for Distribution Transformers 6.6kV-11kV, 25kVA-1000kVA
TRAN-03-022	Specification for Transmission System Double Wound Transformers
TRAN-03-024	Specification for Transmission Autotransformers
TRAN-03-025	Specification for 33/0.415kV Earthing/Auxiliary Transformers
TRAN-03-031	Specification for Refurbishment Works on 33kV System Transformers
TRAN-03-033	Specification for Dry Type Air-Core Shunt Reactors
TRAN-03-034	Specification for Refurbishment Works on Grid and Supergrid Transformers and Liquid-Immersed Reactors
TRAN-03-121	Specification for Voltage Regulating Distribution Transformers
TRAN-03-126	Specification for 33kV Fault Current Limiting (Series) Oil Immersed Reactors
TRAN-03-127	Specification for 33kV Fault Current Limiting (Series) Dry-Type Air-Core Reactors
TRAN-03-132	Specification for Transmission System Shunt Reactors

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9. STANDARD REQUIREMENTS

SP Energy Networks have a number of Approved transformer factories for supply of the different voltage class transformers required by the Company. Transformer designs are Approved on a contract specific basis due to the technical and commercial considerations of the transformer design and manufacturing process. Approved transformer designs manufactured in a non-Approved facility are not Approved for use on the SP Energy Networks system.

9.1 Transformers

9.1.1 Distribution Transformers (11kV Voltage class)

The equipment assessment and approval process for a new transformer design within the classification of Distribution Transformers is conducted against the technical requirements defined in Iberdrola Networks Technical Specification INS 72.30.05 and SP Energy Networks Technical Specification TRAN-03-021, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.1.2 System Transformers (33kV Voltage class)

The equipment assessment and approval process for a new transformer design within the classification of System Transformers is conducted against the technical requirements defined in Iberdrola Networks Technical Specification INS 72.00.01, SP Energy Networks Technical Specification TRAN-03-020, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.1.3 Grid Transmission Double-Wound Transformers (132 and 275kV Voltage class)

The equipment assessment and approval process for a new transformer design within the classification of Grid Transmission Transformers is conducted against the technical requirements defined in Iberdrola Networks Technical Specification, INS 72.00.01, SP Energy Networks Technical Specification TRAN-03-022, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.1.4 Supergrid Transmission Auto Transformers (275 and 400kV Voltage class)

The equipment assessment and approval process for a new transformer design within the classification of Supergrid Transmission Auto Transformers is conducted against the technical requirements defined in Iberdrola Networks Technical Specification, INS 72.00.01, SP Energy Networks Technical Specification TRAN-03-024, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.1.5 Shunt reactors

The equipment assessment and approval process for a new Shunt reactor design is conducted against the technical requirements defined in SP Energy Networks Technical Specification TRAN-03-132 for liquid-immersed technology or TRAN-03-033 for dry-type air-core technology, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

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SP Energy Networks general transformer factory approval does not automatically cover shunt reactors. For this reason, references, experience and competence of the potential suppliers on the required shunt reactor type are a key part of a tender technical evaluation stage.

9.1.6 Earthing / Auxiliary Transformers

The equipment assessment and approval process for a new transformer design within the classification of Earthing / Auxiliary Transformers is conducted against the technical requirements defined in SP Energy Networks Technical Specification TRAN-03-025, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.1.7 Special Transformers

Other types of distribution or power transformer not included in the above categories may be required by the Company (e.g. single phase railtrack feeder transformer, HVDC converter transformer, phase-shifting transformer…). SP Energy Networks Technical Specifications are also available to define the main functional requirements for such types of transformers. Where this is not the case, they will be developed on an ad-hoc basis. The equipment assessment and approval process for a new design of a special transformer type will be conducted against the applicable SP Energy Networks Technical Specification(s), all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

SP Energy Networks general transformer factory approval does not automatically cover special transformer types. For this reason, references, experience and competence of the potential suppliers on the required transformer type are a key part of a tender technical evaluation stage.

9.1.8 Neutral Earthing Resistors

The equipment assessment and approval process for a new Neutral Earthing Resistor design is conducted against the technical requirements defined in SP Energy Networks Technical Specification TRAN-03-007, all relevant national and international standards referenced within, and any additional documentation or amendment that may have been determined as required either in advance or during project development and tendering stage.

9.2 HV Bushings

The equipment assessment and approval process for a new HV bushing product is conducted against the technical requirements defined in Iberdrola Networks Technical Specification INS 72.81.00, and all relevant national and international standards referenced within.

9.3 Tap Changers

The equipment assessment and approval process for a new On-load or De-energised Tap Changer product is conducted against the technical requirements defined in Iberdrola Networks Technical Specification INS 72.96.01, and all relevant national and international standards referenced within.

9.4 Insulating fluids

The equipment assessment and approval process for a new Insulating Fluid product is conducted against the technical requirements defined in SP Energy Networks Technical Specification SUB-03-009, and all relevant national and international standards referenced within.

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10. APPENDICES

10.1 Approved Transformer Factories

The following transformer factories are Approved for the supply of transformers to SP Energy Networks or connection into its network.

The Approved status is generally valid for 5 years since the FAT of the last contract awarded, unless significant changes have been experienced in the supplier or factory in question within this time span. In these cases, SP Energy Networks reserve the right to review the approval status at an earlier stage.

SP Energy Networks reserve the right to review a transformer factory approval status at any given time making use of the procedures available in Iberdrola Networks Supplier Qualification Policy INS 00.08.04. This can be triggered, amongst other reasons, by widespread non-compliances with any of the technical or contractual requirements; overall loss of quality of the manufactured equipment; significant changes in the design, manufacturing or testing practices; poor contract management and overall customer relationship; lack of technical and/or commercial support; etc.

Transformer factories whose Approved status has lapsed or has been temporarily suspended are also included in this register for information purposes. These factories may be invited to participate in a tender process but shall not be used by third parties as additional or complementary assessment and performance monitoring is required from SP Energy Networks. The same applies to transformer factories that are currently undergoing, but not completed, a qualification process.

Only the Approved transformer factories specified in this document have Approved status. The Approved status is factory specific and does not cover multiple manufacturing locations from a same supplier. Different manufacturing locations from the same supplier shall be assessed and Approved individually prior to supplying transformers to SP Energy Networks.

All transformers supplied from an Approved factory will be subject to separate equipment assessment and approval by SP Energy Networks.

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10.1.1 Distribution Transformers (11kV Voltage class)

Supplier	Location of works	Address	Notes and Special applications	Expiry date
Kyte Powertech	Cavan (Ireland)	Dublin Road, Cavan, Ireland	Current Framework Supplier	2033
Koncar D&ST	Zagreb (Croatia)	Ul. Josipa Mokrovića 8, 10000, Zagreb, Croatia	Current Framework Supplier	2033
Mid Central Electric	Wisconsin (USA)	880 North Market Street, Oregon, Wisconsin 53575 USA	Only PM1 (1ph 11kV 500VA)	2027
Toshiba T&DS	Hyderabad (India)	Rudraram Village, Patancheru Mandal, Hyderabad, Telangana 502329, India	Current Framework Supplier	2033

Supplier	Location of works	Address	Notes and Special applications	Expiry date
Efacec Energia	Porto (Portugal)	Parque Empresarial Arroteia Poente 4466-952, São Mamede de Infesta, Porto, Portugal	Ongoing Qualification. Current Framework Supplier	N/A
Emirates T&S	Dubai (UAE)	Dubai Investment Park - 1, Dubai, UAE	Ongoing Qualification	N/A
Gedelsa	Salamanca (Spain)	c/ Zeppelin, nº 46 - Pol. Ind. El Montalvo I - 37008 Salamanca, Spain	Approval Lapsed	
Hitachi Energy	Dudullu (Turkey)	Osb 2. Cd D.16 Yukarı Dudullu, Dudullu Organize Sanayi Bölgesi, Istanbul, 34776,Turkey	Ongoing Qualification	N/A
Hitachi Energy	Lodz (Poland)	Aleksandrowska 67/93, 90-001 Łódź, Poland	Ongoing Qualification. Current Framework Supplier	N/A
Ormazabal Cotradis	Madrid (Spain)	Polígono El Caballo - Parcela 56, 28890 Loeches, Spain	Approval Currently Suspended	N/A
SGB Matla	Cape Town (South Africa)	1 Buitenkant St, Pretoria Townlands 351-Jr, Pretoria, 0183, South Africa	Ongoing Qualification	N/A
Tyree Transformers	Mittagong (Australia)	10 Tyree Pl, Braemar NSW 2575, Australia	Ongoing Qualification. Current Framework Supplier	N/A

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10.1.2 System Transformers (33kV Voltage class)

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Hitachi Energy	Dudullu (Turkey)	Osb 2. Cd D.16 Yukarı Dudullu, Dudullu Organize Sanayi Bölgesi, Istanbul, 34776,Turkey	Up to 33kV, 10MVA	Y	2025
Hitachi Energy	Monselice (Italy)	Via Campestrin 6/A, Monselice, 35043, Italy		Y	2025
Hyosung	Chagwon (S.Korea)	(51529) 171, Yeondeok-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea		Not assessed	2033
Kolektor Etra	Ljubljana (Slovenia)	Šlandrova ulica 10, 1231 Ljubljana - Črnuče, Slovenia	Current Framework Supplier	Y	2033
Kolektor Etra	Beograd (Serbia)	Svetosavska 394 d, Barajevo 11460, Serbia	Up to 33kV, 10MVA. Current Framework Supplier	N	2033
Koncar D&ST	Zagreb (Croatia)	Ul. Josipa Mokrovića 8, 10000, Zagreb, Croatia		Y	2033
SGB	Regensburg (Germany)	Ohmstraße 10, 93055 Regensburg, Germany		Y	2029
Siemens	Linz (Austria)	Kraußstraße 1-7, 4020 Linz, Austria	Inc. Reactors	Y	2027
Siemens	Weiz (Austria)	Elingasse 3, 8160 Weiz, Austria	Inc. Reactors	Y	2028

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Efacec Energia	Porto (Portugal)	Parque Empresarial Arroteia Poente 4466-952, São Mamede de Infesta, Porto, Portugal	Approval Lapsed	N	N/A
Hitachi Energy	Vaasa (Finland)	Vaasa Strömbergin Puistotie 15 Transformers, Finland	Approval Lapsed	Not assessed	N/A
SBG	Neumark (Germany)	Ohmstrasse 1, Neumark, Sachsen, Germany	Approval Currently Suspended	Y	N/A
SGB Retrasib	Sibiu (Romania)	Strada Ștefan cel Mare 156, Sibiu 550321, Romania	Ongoing Qualification	Not assessed	N/A
Wilson Transformers	Victoria (Australia)	310 Springvale Road (PO Box 5), Glen Waverley, Vic 3150, Victoria, Australia	Approval Lapsed	Y	N/A
Winder Power	Leeds (UK)	Grangefield House, Richardshaw Rd, Pudsey LS28 6QS, UK	Ongoing Qualification. Current Framework Supplier	Not assessed	N/A

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10.1.3 Grid Transmission Double-Wound Transformers (132 and 275kV Voltage class)

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Hitachi Energy	Bad Honnef (Germany)	Lohfelder Strasse 19-21, 53604 Bad Honnef, Nordrhein-Westfalen, Germany		Not assessed	2030
Hitachi Energy	Monselice (Italy)	Via Campestrin 6/A, Monselice, 35043, Italy	Up to 132kV, 90MVA	Y - Up to 132kV	2025
Hyosung	Chagwon (S.Korea)	(51529) 171, Yeondeok-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea		Not assessed	2033
Hyundai	Ulsan (S.Korea)	1000, Bangeojinsunhwan-doro, Dong-gu, Ulsan, 44032, South Korea		Not assessed	2033
Kolektor Etra	Ljubljana (Slovenia)	Šlandrova ulica 10, 1231 Ljubljana - Črnuče, Slovenia		Y - Up to 132kV	2033
Koncar D&ST	Zagreb (Croatia)	Ul. Josipa Mokrovića 8, 10000, Zagreb, Croatia	Up to 132kV, 120MVA	Y - Up to 132kV	2033
SGB	Regensburg (Germany)	Ohmstraße 10, 93055 Regensburg, Germany	Up to 275kV, 120MVA	Y - Up to 132kV	2029
Siemens	Linz (Austria)	Kraußstraße 1-7, 4020 Linz, Austria	Inc. Reactors	Y	2027
Siemens	Weiz (Austria)	Elingasse 3, 8160 Weiz, Austria	Inc. Reactors	Not assessed	2028
SMIT	Nijmegen (Netherlands)	PO Box 9107, 6500 HJ Nijmegen, The Netherlands		Not assessed	2029

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Efacec Energia	Porto (Portugal)	Parque Empresarial Arroteia Poente 4466-952, São Mamede de Infesta, Porto, Portugal	Approval Lapsed	N	N/A
Hitachi Energy	Lodz (Poland)	Aleksandrowska 67/93, 90-001 Łódź, Poland	Ongoing Qualification	Not assessed	N/A
Hitachi Energy	Ludvika (Sweden)	Lyviksvägen 4, Ludvika, 771 80, Dalarnas Län, Sweden	Approval Lapsed	Not assessed	N/A
Hitachi Energy	Vaasa (Finland)	Vaasa Strömbergin Puistotie 15 Transformers, Finland	Approval Lapsed	Not assessed	N/A
SGB Retrasib	Sibiu (Romania)	Strada Ștefan cel Mare 156, Sibiu 550321, Romania	Ongoing Qualification	Not assessed	N/A
Siemens	Nuremberg (Germany)	Katzwanger Strasse 150, 90461-Nuernberg, Germany	Approval Lapsed	Y	N/A
Wilson Transformers	Victoria (Australia)	310 Springvale Road (PO Box 5), Glen Waverley, Vic 3150, Victoria, Australia	Approval Lapsed	Not assessed	N/A

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10.1.4 Supergrid Transmission Auto Transformers (275 and 400kV Voltage class)

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Hitachi Energy	Bad Honnef (Germany)	Lohfelder Strasse 19-21, 53604 Bad Honnef, Nordrhein-Westfalen, Germany		Not assessed	2030
Hyosung	Chagwon (S.Korea)	(51529) 171, Yeondeok-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea		Not assessed	2033
Hyundai	Ulsan (S.Korea)	1000, Bangeojinsunhwan-doro, Dong-gu, Ulsan, 44032, South Korea		Not assessed	2033
Siemens	Weiz (Austria)	Elingasse 3, 8160 Weiz, Austria	Up to 400kV, 360MVA. Inc. Reactors	Not assessed	2029
Kolektor Etra	Ljubljana (Slovenia)	Šlandrova ulica 10, 1231 Ljubljana - Črnuče, Slovenia	Up to 275kV, 360MVA	N	2033
SMIT	Nijmegen (Netherlands)	PO Box 9107, 6500 HJ Nijmegen, The Netherlands	Inc. Reactors	Not assessed	2029

Supplier	Location of works	Address	Notes and Special applications	Alternative fluids (Y/N)	Expiry date
Hitachi Energy	Lodz (Poland)	Aleksandrowska 67/93, 90-001 Łódź, Poland	Ongoing Qualification	Not assessed	N/A
Hitachi Energy	Ludvika (Sweden)	Lyviksvägen 4, Ludvika, 771 80, Dalarnas Län, Sweden	Approval Lapsed	Not assessed	N/A
Siemens	Nuremberg (Germany)	Katzwanger Strasse 150, 90461-Nuernberg, Germany	Approval Lapsed	Y	N/A
Siemens Koncar	Zagreb (Croatia)	Josipa Mokrovica 12, 10090 Zagreb, Croatia	Ongoing Qualification	Y	N/A

10.1.5 Dry-type Air-core Reactors

Supplier	Location of works	Address	Notes and Special applications	Expiry date
Coil Innovation	Linz (Austria)	Nikola Tesla Straße 1, A-4070 Eferding, Linz, Austria		2030
Trench	Linz (Austria)	Paschinger Str. 49, 4060 Leonding, Austria		2029

Supplier	Location of works	Address	Notes and Special applications	Expiry date
GE	Itajuba (Brazil)	BR-383, 1021 - Piedade, Itajubá - MG, 37504-358, Brazil	Ongoing Qualification	N/A

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10.1.6 Earthing / Auxiliary Transformers

Supplier	Location of works	Address	Notes and Special applications	Expiry date
IST	Manchester (UK)	Sharston Industrial Estate, Longley Lane, Wythenshawe, Manchester, M22 4RU	Current Framework Supplier	2030
Kyte Powertech	Cavan (Ireland)	Dublin Road, Cavan, Ireland		2033
Koncar D&ST	Zagreb (Croatia)	Ul. Josipa Mokrovića 8, 10000, Zagreb, Croatia		2033

Supplier	Location of works	Address	Notes and Special applications	Expiry date
Efacec Energia	Porto (Portugal)	Parque Empresarial Arroteia Poente 4466-952, São Mamede de Infesta, Porto, Portugal	Approval Lapsed	N/A
SBG	Neumark (Germany)	Ohmstrasse 1, Neumark, Sachsen, Germany	Approval Currently Suspended	N/A
T&R	Guilford (UK)	15 16 Woodbridge Meadows, Guildford, Surrey GU1 1BJ	Ongoing Qualification	N/A
Winder Power	Leeds (UK)	Grangefield House, Richardshaw Rd, Pudsey LS28 6QS, UK	Ongoing Qualification	N/A

10.1.7 Neutral Earthing Resistors

Supplier	Location of works	Address	Notes and Special applications	Expiry date
Cressall	Leicester (UK)	Evington Valley Road, Leicester, LE5 5LZ	Current Framework Supplier	2032

Supplier	Location of works	Address	Notes and Special applications	Expiry date
MS Resistances	St.Chamond (France)	ZI Du Coin, Rue du Crêt de la Perdrix, 42400 Saint-Chamond, France	Ongoing Qualification	N/A

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10.2 Approved Distribution Transformer Designs (11kV Voltage class)

The following distribution transformer designs are Approved for use by SP Energy Networks or connection into its network. Compliance of the different transformer designs have been assessed against Iberdrola Networks Technical Specification INS 72.30.05 Issue 1 (2022), SP Energy Networks Technical Specification TRAN-03-021 Issue 8 (2023), and where applicable, also against TRAN-03-121 Issue 1 (2021). Currently Approved three phase distribution transformer designs are fully compliant with the maximum losses requirements of Tier 2 implementation period defined within CR (EU) 548/2014.

The reference codes used are defined in SP Energy Networks Technical Specification TRAN-03-021.

SP Energy Networks reserve the right to review a transformer design approval status at any given time making use of the procedures available in Iberdrola Networks Supplier Qualification Policy INS 00.08.04. This can be triggered, amongst other reasons, by non-compliance with any of the technical or contractual requirements; identification of underlaying type defects or recurrent quality issues; unauthorised or unagreed changes into the designs; etc.

The Approved status will be deemed no longer valid, irrespective of the supplier, where fundamental changes are introduced in the relevant Iberdrola Networks or SP Energy Networks Technical Specifications to the extent that full re-assessment of the transformer designs will be required to demonstrate compliance. This can also be caused by changes in any applicable national or international legislation.

10.2.1 Pole Mounted Distribution Transformers

Ref	Type	Rated power (kVA)	Ratio	KYTE (Cavan)	KONCAR (Zagreb)	TOSHIBA (Hyderabad)	HITACHI (Lodz)	SPEN Material code (Oil)	SPEN Material code (Ester)
PM1	1ph	0.5kVA	Standard					30981059	N/A
PM2	1ph	25kVA	Standard	Approved		Approved		30981058	N/A
PM3	1ph / Split	50kVA	Standard / Split	Approved		Approved		30981057	N/A
PM4	Split	100kVA	Split	Approved		Approved		30981056	N/A
PM5	3ph	50kVA	Standard	Approved	Approved	Approved	Ongoing	30980983	N/A
PM6	3ph	100kVA	Standard	Approved	Approved	Approved	Ongoing	30980982	N/A
PM7	3ph	200kVA	Standard	Approved	Approved	Approved	Ongoing	30980981	N/A

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Ref	Type	Rated power (kVA)	Ratio	TYREE (Mittagong)	MCE (Wisconsin)	XXX	XXX	SPEN Material code (Oil)	SPEN Material code (Ester)
PM1	1ph	0.5kVA	Standard	Ongoing	Approved			30981059	N/A
PM2	1ph	25kVA	Standard	Ongoing				30981058	N/A
PM3	1ph / Split	50kVA	Standard / Split	Ongoing				30981057	N/A
PM4	Split	100kVA	Split	Ongoing				30981056	N/A
PM5	3ph	50kVA	Standard					30980983	N/A
PM6	3ph	100kVA	Standard					30980982	N/A
PM7	3ph	200kVA	Standard					30980981	N/A

10.2.2 Ground Mounted Unit Type Distribution Transformers

Ref	Type	Rated power (kVA)	Ratio	KYTE (Cavan)	KONCAR (Zagreb)	TOSHIBA (Hyderabad)	XXX	SPEN Material code (Oil)	SPEN Material code (Ester)
GM2	Unit Type	500kVA	Standard	Approved	Approved	Approved		30983045	30983040
GM3	Unit Type	500kVA	Dual-ratio	Approved	Approved	Approved		30983035	30983041
GM5	Unit Type	1000kVA	Standard	Approved	Approved	Approved		30983038	30983043
GM6	Unit Type	1000kVA	Dual-ratio	Approved	Approved	Approved		30983037	30983044

10.2.3 Ground Mounted Unit Type Voltage Regulating Distribution Transformers

Ref	Type	Rated power (kVA)	Ratio	KYTE (Cavan)	XXX	XXX	XXX	SPEN Material code (Oil)	SPEN Material code (Ester)
GM2-VR	Unit Type	500kVA	Standard	Approved				TBC	TBC
GM3-VR	Unit Type	500kVA	Dual-ratio					TBC	TBC
GM5-VR	Unit Type	1000kVA	Standard					TBC	TBC
GM6-VR	Unit Type	1000kVA	Dual-ratio					TBC	TBC

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10.2.4 Ground Mounted Cable Connected Distribution Transformers

Ref	Type	Rated power (kVA)	Ratio	KYTE (Cavan)	KONCAR (Zagreb)	TOSHIBA (Hyderabad)	EFACEC (Porto)	SPEN Material code (Oil)	SPEN Material code (Ester)
GM8	CC Type 1	500kVA	Standard	Approved	Approved	Approved	Ongoing	30983026	30039846
GM9	CC Type 1	500kVA	Dual-ratio	Ongoing	Ongoing	Ongoing	Ongoing	30983027	30039847
GM10	CC Type 1	1000kVA	Standard	Ongoing	Approved	Approved	Ongoing	30983028	30039852
GM11	CC Type 1	1000kVA	Dual-ratio	Ongoing	Approved	Ongoing	Ongoing	30983029	30039853
GM12	CC Type 2Y	500kVA	Standard	Approved	Approved	Approved	Ongoing	30983030	30039848
GM13	CC Type 2Y	500kVA	Dual-ratio	Approved	Approved	Approved	Ongoing	30983031	30039849
GM14	CC Type 2X	500kVA	Standard	Approved	Approved	Approved	Ongoing	30983032	30039850
GM15	CC Type 2X	500kVA	Dual-ratio	Approved	Approved	Approved	Ongoing	30983033	30039851

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10.3 Approved System Transformer Designs (33kV Voltage class)

The following system transformer designs are Approved for use by SP Energy Networks or connection into its network. Compliance of the different transformer designs have been assessed against Iberdrola Networks Technical Specification INS 72.00.01 Issue 5 (2020) and SP Energy Networks Technical Specification TRAN-03-020 Issue 11 (2023). Currently Approved system transformer designs are fully compliant with the peak-efficiency index requirements of Tier 2 implementation period defined within CR (EU) 548/2014.

The reference codes used are defined in SP Energy Networks Technical Specification TRAN-03-020.

SP Energy Networks reserve the right to review a transformer design approval status at any given point time making use of the procedures available in Iberdrola Networks Supplier Qualification Policy INS 00.08.04. This can be triggered, amongst other reasons, by non-compliance with any of the technical or contractual requirements; identification of underlaying type defects or recurrent quality issues; unauthorised or unagreed changes into the designs; etc.

The Approved status will be deemed no longer valid, irrespective of the supplier, where fundamental changes are introduced in the relevant Iberdrola Networks or SP Energy Networks Technical Specifications to the extent that full re-assessment of the transformer designs will be required to demonstrate compliance. This can also be caused by changes in any applicable national or international legislation.

Ref	Rated power (MVA)	Description	Fluid	Kolektor Etra (Ljubljana)	Kolektor Etra (Belgrade)	SGB (Regensburg)	Winder Power (Leeds)	SPEN Material code
ST10	10	Standard	Min.Oil	Approved	Approved		Ongoing	30053276
ST10-M	10	Standard	Syn.Ester	Approved				30053291
ST10-DR	10	Dual-ratio	Min.Oil	Approved	Ongoing			30053278
ST10-DRM	10	Dual-ratio	Syn.Ester	Approved				30053279
ST10-E	10	Extended tapping	Min.Oil					30053280
ST10-LN	10	Low noise	Min.Oil					30062419
ST20	20	Standard	Min.Oil	Approved	Ongoing		Ongoing	30053281
ST20-M	20	Standard	Syn.Ester	Approved		Approved		30053282
ST20-DR	20	Dual-ratio	Min.Oil					TBC
ST20-DRM	20	Dual-ratio	Syn.Ester			Approved		30053283
ST20-LN	20	Low noise	Min.Oil					30062418
ST20-M-LN	20	Low noise	Syn.Ester	Approved				TBC
ST32	32	Standard	Min.Oil	Approved				30053284
ST32-M	32	Standard	Syn.Ester	Approved				30053295
ST32-DR	32	Dual-ratio	Min.Oil					TBC
ST32-DRM	32	Dual-ratio	Syn.Ester					TBC

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10.4 Approved HV Bushings

The following HV bushings are Approved for use on SP Energy Networks transformers. SP Energy Networks only accept the use of Resin Impregnated Paper (RIP) technology with polymeric external insulation for 132kV and above applications as defined in Iberdrola Networks Technical Specification INS 72.81.00.

Where a full family range of products are indicated to be Approved, the suitability of a specific product type within the family for a particular application is still subject to assessment by SP Energy Networks in terms of insulation level, current ratings and general compliance against the required duty and installation arrangements.

Supplier	Model / Brand	Technology	Range	Notes
Hitachi Energy	GSA-OA	RIP	Full family range	
Hitachi Energy	GSB	RIP	Full family range	
Hitachi Energy	AirRIP/RKTF	RIP	Full family range	
HSP	SETFt	RIP	Full family range	
Moser Glacer	DTOI	RIP	Full family range	

The following HV bushings are Approved for use on SP Energy Networks transformers as compatible replacements of legacy BEBS-T2 Oil Impregnated Paper (OIP) HV bushings.

Supplier	Model / Brand	Technology	Range	BEBS-T2 references	Legacy model references
Hitachi Energy	AirRIP/RKTF	RIP	RTF 145-650/1000 KSI Drawing ref.no. 1ZCD068358	-	-
Moser Glacer	DTOI	RIP	DTOI 145/800 E800 Drawing ref.no. 610.20.0014	BEBS-T2 1966 61/5542 (300 & 600A)	120HA164, 120HA341, 120HA581, 120HA852, A6805455, 120HA1114
Moser Glacer	DTOI	RIP	DTOI 145/2000 E700 Drawing ref.no. 613.24.0005	BEBS-T2 1976 61/5224G (1600 & 2000A)	Brush OV (A9703516)
Moser Glacer	DTOI	RIP	DTOI 300/800 E400 Drawing ref.no. 613.22.0009	BEBS-T2 1958 Plate 1 (600A)	300HA27, I1003 (A2925)
Moser Glacer	DTOI	RIP	DTOI 300/900 E686 Drawing ref.no. 610.15.0178	BEBS-T2 1966 61/3411 (900A)	300HA73, I1057 (900A), 601L3402-025, 601L3402-001 (900A), 300HA126, 229997 (900A), Haefly 0-63B-689, 228091 (900A)

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Supplier	Model / Brand	Technology	Range	BEBS-T2 references	Legacy model references
HSP	SETFt	RIP	SETFtr 1050-300-C E6,8 B spez. NG Drawing ref.no 320013	BEBS-T2 1966 61/3411 (900A)	300HA73, I1057 (900A), 601L3402-025, 601L3402-001 (900A), 300HA126, 229997 (900A), Haefly 0-63B-689, 228091 (900A)
HSP	SETFt	RIP	SETFtr 1050-300-2750 E6 spez. NG Drawing ref.no 320000	BEBS-T2 1976 61/5225 (1600, 2000 & 2750A)	300HA193, 300HA225, I1052
				BEBS-T2 1966 61/6089 (2400A)	300HA389, 300HA114, 601L3402-026E, 601L3402-048
HSP	SETFt	RIP	SETFtr 1425-420-2000 E8 spez. NG Drawing ref.no 321930	BEBS-T2 1976 61/5226 (1600 & 2000A)	400HA170

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10.5 Approved Tap Changers

The following tap changers are Approved for use on SP Energy Networks transformers. SP Energy Networks only accept the use of in-tank vacuum technology for On-Load Tap Changers (OLTC) as defined in Iberdrola Networks Technical Specification INS 72.96.01.

Where a full family range of products are indicated to be Approved, the suitability of a specific product type within the family for a particular application is still subject to assessment by SP Energy Networks in terms of insulation level, current ratings and general compliance against the required duty and installation arrangements.

10.5.1 On Load Tap Changers (OLTC)

Supplier	Model / Brand	Technology	Range	Notes
Hitachi Energy	VUBB	In-tank Vacuum	Full family range	
Hitachi Energy	VUCG	In-tank Vacuum	Full family range except forced current splitting designs (VUCL.E,T) and VUCL performance upgrade range (Ir>1300A)	
MR	Vacutap VV	In-tank Vacuum	Full family range	
MR	Vacutap VM	In-tank Vacuum	Full family range	
MR	Vacutap VR	In-tank Vacuum	Full family range except forced current splitting designs (VRF/G I 2602) and VRL performance upgrade range (Ir>1300A)	

10.5.2 De-Energised Tap Changers (DETC)

Supplier	Model / Brand	Technology	Range	Notes and Applications
CAPT	090 Series	Linear Direct-drive	Simple 1ph & 3ph. Types 01 to 07	Distribution transformers
CAPT	095 Series	Linear Direct-drive	2 positions switches - AF285 & AF290	Distribution transformers
CAPT	099 Series	Linear Cable-operated	Full family range	Distribution transformers
Elettromaule	S/P	Linear Direct-drive	Simple 1ph & 3ph	Distribution transformers
ASP	Cable type	Linear Cable-operated	Full family range	Distribution transformers
Samrakshana Elec.	PDTL	Rotary	Full family range	Distribution transformers
ASP	FII	Linear Direct-drive	Simple 1ph	Railtrack feeder transformers
MR	DU I	Linear Direct-drive	Simple 1ph	Railtrack feeder transformers

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10.6 Approved Insulating Fluids

The following insulating fluids are Approved for use on SP Energy Networks transformers. Uninhibited mineral oils are generally used by SP Energy Networks on Distribution and System transformers (11kV and 33kV voltage classes). Inhibited mineral oils are generally used by SP Energy Networks on Grid and Supergrid Transmission Transformers (> 132kV voltage class). Alternative insulating fluids may be required on specific applications.

10.6.1 Uninhibited Mineral Oils

Supplier	Model / Brand	Range	Notes
Nynas	Nytro Taurus	N/A	
Nynas	Nytro Libra	N/A	
Ergon	Hyvolt I	N/A	

10.6.2 Inhibited Mineral Oils

Supplier	Model / Brand	Range	Notes
Nynas	Nytro Gemini X	N/A	
Nynas	Nytro Lyra X	N/A	
Nynas	Nytro Bio 300X	N/A	Readily biodegradable (OECD301)
Ergon	Hyvolt III	N/A	
Shell	Diala S4 ZX	N/A	

10.6.3 Synthetic Esters

Supplier	Model / Brand	Range	Notes
M&I Materials	Midel 7131	N/A	
Ergon	SE	N/A	
Nycodiel	1255	N/A	Ongoing qualification

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10.7 Other Components

Supplier	Type	Application	Notes
Webster & Wilkinson	HV Cable Box with CTs: Drawing / Ref No. - C8569	500kVA (Single and Dual Ratio) Type 2 Cable Connected Distribution Transformers HV Cable Box	For use Type 2 CC transformers as replacement for resin filled cable box or one new Type 2 CC transformers

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10.8 Approved Transformer Refurbishment Service Providers

The following transformer refurbishment service providers are Preliminary Approved to undertake this type of works on SP Energy Networks assets within the license areas of SP Transmission, SP Manweb and SP Distribution. Preliminary Approved status has been granted based on a desktop type assessment of the Contractor experience, capabilities and level of competence demonstrated by submission of relevant supporting documentation, both in the form of internal procedures and sample Risk Assessment / Method Statements from previous projects for other customers.

Consolidation of this Preliminary Approved status would be achieved by successful assessment during works on SP Energy Networks projects. This assessment could comprise of on-site audits and will consider SP Energy Networks own experience in terms of technical capabilities, ability to resolve unforeseen circumstances, level and readiness of technical and project management support, adherence to SP Energy Networks safety rules and other applicable statutory regulation, quality of the completed works, etc. Where consolidated status has already been achieved, this is indicated on the “Status” column of the table below as (C).

SP Energy Networks reserve the right to review a transformer refurbishment service provider approval status at any given time making use of the procedures available in Iberdrola Networks Supplier Qualification Policy INS 00.08.04. This can be triggered, amongst other reasons, by widespread non-compliances with any of the technical or contractual requirements; overall loss of quality; significant changes in the working or testing practices; poor contract management and overall customer relationship; lack of technical and/or commercial support; etc.

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10.8.1 On-site refurbishment works

Contractor	Address	Original / Legacy equipment rights	Limitations	Status
Brush Transformers	Nottingham Rd, Loughborough LE11 1HW, UK	Hawker Siddley, Yorkshire Electric, Fuller	On 132kV and above: Own original / legacy transformers only	
GE Grid Solutions UK	The Lord Nelson Building, William Bagnall Drive, Redhill Business Park, Stafford ST16 1WS, UK	GE, GEC, British Thomson-Houston, AEI/Metro Vicks, English Electric, Metropolitan Vickers, Hackbridge & Hewittic	-	
Hitachi Energy UK	Oulton Road, Stone, Staffordshire, ST15 0RS, UK	ABB, Nitran, NI Transformers, Bonar Long	-	
Hornbill Engineering	Norton House, Darcy Business Park, Llandarcy Neath, SA10 6EJ, UK	None - General purpose contractor	Up to 33kV only	(C)
Rosh Engineering	4 Riverside Court, Factory Rd, Blaydon-on-Tyne NE21 5SA, UK	None - General purpose contractor	-	(C)
Siemens Services	Faraday House, Sir William Siemens Square, Frimley, Camberley, GU16 8QD, UK	Siemens, Bruce Peebles, Parsons Peebles, NEI Peebles, Ferranti, E.B.T., VA Tech	-	
SMIT Services	Groenestraat 336, 6531 JC Nijmegen and Energieweg 16, 6541 CX Nijmegen, The Netherlands	SMIT, SGB	On 132kV and above: Own original / legacy transformers only	
Transerv Europe	Unit J Beacon Business Park, Weston Road, Stafford ST18 0WL, UK	None - General purpose contractor	-	
Winder Power	Grangefield House, Richardshaw Rd, Pudsey, LS28 6QS, UK	Winder Power	Up to 33kV only	(C)

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10.8.2 Factory refurbishment works

Contractor	Address	Original / Legacy equipment rights	Limitations	Status
GE Grid Solutions UK	The Lord Nelson Building, William Bagnall Drive, Redhill Business Park, Stafford ST16 1WS, UK	GE, GEC, British Thomson-Houston, AEI/Metro Vicks, English Electric, Metropolitan Vickers, Hackbridge & Hewittic	-	
Hitachi Energy UK	Oulton Road, Stone, Staffordshire, ST15 0RS, UK	Hitachi, ABB, Nitran, NI Transformers, Bonar Long	-	
Siemens Services	Faraday House, Sir William Siemens Square, Frimley, Camberley, GU16 8QD, UK	Siemens, Bruce Peebles, Parsons Peebles, NEI Peebles, Ferranti, E.B.T., VA Tech	-	
SMIT Services	Groenestraat 336, 6531 JC Nijmegen and Energieweg 16, 6541 CX Nijmegen, The Netherlands	SMIT, SGB	-	

10.8.3 On Load Tap-Changer service and maintenance

Contractor	Address	Original / Legacy equipment rights	Limitations	Status
Brush Transformers	Nottingham Rd, Loughborough LE11 1HW, UK	Fuller, ATL	-	(C)
BTRAC	Stafford Park 12, Telford TF3 3BJ, UK	MR		(C)
Fundamentals	Unit 2 Hillmead Enterprise Park, Marshall Road, Swindon, Wiltshire, SN5 5FZ, UK	Ferranti, AEI, British Thomson-Houston, English Electric, GEC, Hackbridge & Hewittic, Metropolitan Vickers	-	(C)
Hitachi Energy Comp.	Lyviksvägen, 771 31 Ludvika, Sweden	ABB, Hitachi	-	(C)
MR	Falkensteinstr. 8, 93059 Regensburg, Germany	MR	-	(C)
Powerserve UK	Mead Park, 23, River Way, Harlow CM20 2SE, UK	None - General purpose contractor	-	(C)
Tap Changer Services	Brookside Rd, Uttoxeter ST14 8AU, UK	None - General purpose contractor	Up to 132kV	(C)

10.8.4 Oil treatments

Contractor	Address	Original / Legacy equipment rights	Limitations	Status
EOS	5 Bridges Rd, Ellesmere Port CH65 4EQ, UK	N/A	-	(C)
Hitachi Energy UK	Oulton Road, Stone, Staffordshire, ST15 0RS, UK	N/A	Oil reconditioning only	(C)
Utility Oils	3 Redgate Rd, Ashton-in-Makerfield, Wigan, WN4 8DT, UK	N/A	-	

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