APPLICATION FOR EXTENSION OF ESCC QUALIFICATION APPROVAL

Page 1

Component Title: **RESISTOR, FIXED, CHIP, METAL FOIL BASED ON TYPE SMP-PW, SMS-PW, SMT-PW according to ESCC Det. Spec. 4001/027 respectively BASED ON TYPE SMR-PW, SMV-PW according to ESCC Det. Spec.4001/028**

Appl. No. **285 H Rev. 2**

Executive Member: **German Space Agency at DLR** Date: **16/12/2025**

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Components (including series and families) submitted for Extension of Qualification Approval:

ESCC COMPONENT NO.	VARIANTS	RANGE OF COMPONENTS	BASED ON	TEST VEHICLE / S	COMPONENT SIMILAR
4001/027	**01** **05** **02** **02** **06**		**SMP-PW (2010)** **SMS-PW (2512)** **SMS-PW (2512)** **SMS-PW (2512)** **SMT-PW (2817)**	**SMP-R470-1.0-PW** **SMS-R005-1.0-PW** **SMS-R030-1.0-PW** **SMS-1R00-1.0-PW** **SMT-R005-1.0-PW**	**Variant 03 SMT-PW (2817)** **Variant 04 SMP-PW (2010)**
4001/028	**02** **02** **02**		**SMV-PW (4723)** **SMV-PW (4723)** **SMV-PW (4723)**	**SMV-R018-1.0-PW** **SMV-R039-0.5-PW** **SMV-R270-1.0-PW**	**Variant 01 SMR-PW (4723)**
4001/027	**07** **07** **07**		**SMT-PW (2817)** **SMT-PW (2817)** **SMT-PW (2817)**	**SMT-2R00-1.0-PW** **SMT-3R30-1.0-PW** **SMT-4R70-1.0-PW**	
4001/027	**01** **01** **01** **02** **02** **02** **03** **03** **03**		**SMP-PW (2010)** **SMP-PW (2010)** **SMP-PW (2010)** **SMS-PW (2512)** **SMS-PW (2512)** **SMS-PW (2512)** **SMT-PW (2817)** **SMT-PW (2817)** **SMT-PW (2817)**	**SMP-R010-0.5-PX** **SMP-R200-0.5-PX** **SMP-R560-0.5-PX** **SMS-R020-0.5-PX** **SMS-R039-0.5-PX** **SMS-R390-0.5-PX** **SMT-R004-0.5-PX** **SMT-R020-0.5-PX** **SMT-1R80-0.5-PX**	
4001/028	**02** **02** **02**		**SMV-PW (4723)** **SMV-PW (4723)** **SMV-PW (4723)**	**SMV-R015-1.0-PW** **SMV-R033-1.0-PW** **SMV-1R00-1.0-PW**	

Component Manufacturer 2

Isabellenhütte Heusler GmbH & Co. KG

Location of Manufacturing Plant(s) 3

Eibacher Weg 3-5
34683 Dillenburg
Germany

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Date of original qualification approval:
Date: **24/11/2008**
Certificate Ref No. **285**

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ESCC Specifications used for Maintenance of qualification testing:

Generic: **4001** Issue: **5**

Detail(s): **4001/027** Issue: **9**
4001/028 **6**

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Deviations to LVT testing and Detail Specification used:

No ☐ Yes ☒ (supply details in Box 15)

Deviation from current Specifications:

No ☒ Yes ☐ (Supply details)

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Qualification Extension Report reference and date:

1. **Requalification Test Report 2024 Certificate 285 G, D-QM-20, 24/06/2024**
2. **Delta-Qualifiactin Test Report 2024 Certificate 285 H, 19/09/2024**
3. **Delta-Qualifiactin Test Report 2025 Certificate 285 H, D-IE-032 19/03/2025**
4. **Delta-Qualification Test Report 2025 Certificate 285 H, 25/09/2025**

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Summary of procurement or equivalent test results during current validity period in support of this application (those to ESCC listed first)

Project Name	Testing Level	LAT	Date code	Quantity Delivered
See Appendix: Confidential: Orders 01/01/2022 - 24/06/2024				

PID changes since start of qualification 9

None ☐
Minor* ☐
Major* ☒

*Provide details in box:
See Appendix 2, Box 19

Current **PID** Verified by: **Burak Gökgöz, German Space Agency at DLR** 10

Name of Excutive Representative

Ref No: **D QS 010 / D QS 011**
Issue: **Iss. 10 (19/03/2025) / Iss. 11 (21/10/2025)** Date: Click here to enter a date.
Rev Date: **21.10.2025**

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Current Manufacturing facilities surveyed by: **Burak Gökgöz, German Space Agency at DLR** on **11/06/2024**

(Name of Executive Representative) (Date)

Satisfactory: Yes ☒ No ☐ Explain

Report Reference: **ISA-AUD-DLR-JUN-2024 Issue 1 (Date: 25.06.2024)**

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Failure Analysis, DPA, **NCCS** available: Yes ☒ No ☐ (Supply data)

Ref. No's and purposes: NC1CISA501: suspicious internal solder joint in one part in one microsection. The other Chart F3 &F4 test are OK. Considered as a maverick. NCCS is closed.

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The undersigned hereby certifies on behalf of the ESCC **Executive,** that the above information is correct; that the appropriate documentation has been evaluated; that full compliance to all ESCC requirements is evidence except as stated in box 15; that the reports and data are available at the ESCC **Executive** and therefore applies for ESCC qualification status to be extended to the component(s) listed herein.

Date: **16/12/2025**

Burak Gökgöz

Digital signiert von Burak Gökgöz
DN: PostalCode=51147, O=Deutsches Zentrum fuer Luft- und Raumfahrt e. V. (DLR), STREET=Linder Höhe, S=Nordrhein-Westfalen, C=DE, CN=Burak Gökgöz, E=burak.goekgoez@dlr.de
Grund: Ich bin der Verfasser dieses Dokuments
Ort: Bonn
Datum: 2025.12.18 10:33:41+01'00'
Foxit PDF Editor Version: 14.0.1

i.A. Burak Gökgöz

(Signature of the ESCC Executive Coordinator)

Continuation of Boxes above:

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Non compliance to ESCC requirements:

No.:	Specification	Paragraph	Non compliance
1			

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Additional tasks required to achieve full compliance for ESCC qualification or rationale for acceptability of noncompliance:

17

Executive Manager Disposition

Application Approval: Yes X No ☐

Action / Remarks:

Date: 31/12/2025

A. Zadeh: Head of the Avionics and EEE Division

ANNEX 1: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION

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Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD [redacted] (for ESCC/QML parts)

Tests vehicle identification/description:

SMP-R470-1.0-PW SMS-R005-1.0-PW SMS-R030-1.0-PW SMS-1R00-1.0-PW SMT-R005-1.0-PW	S03 (17526) R45 (29645) R45 (29643) R41 (29625) S02 (17518)

Detail Specification reference: 4001/027 issue 8 Ex: three-digit code year letter R=2023 / S=2024 + week number

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	S03, R45, R45, R41, S02	5 x 15	0	
	Rapid Change Of Temperature	☒	IEC 60068-2-14	S03, R45, R45, R41, S02	5 x 15	0	
	Vibration	☒	IEC 60068-2-6	S03, R45, R45, R41, S02	5 x 15	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	S03, R45, R45, R41, S02	5 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Robustness of Terminations	☐	IEC 60068-2-21				
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				
	Seal Test	☐	IEC 60068-2-17				
	Resistance to Soldering Heat	☒	IEC 60068-2-20	S03, R45, R45, R41, S02	5 x 6	0	
	Mounting	☒	IEC 60115-1 clause 4.31	S03, R45, R45, R41, S02	5 x 6	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	S03, R45, R45, R41, S02	5 x 6	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Insulation Resistance	☐	ESCC 4001, Para 8.3.1.2				
	Voltage Proof	☐	ESCC 4001, Para 8.3.1.3				
Endurance Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	S03, R45, R45, R41, S02	5 x 15	0	
	Operating Life	☒	ESCC 4001, Para 8.13	S03, R45, R45, R41, S02	5 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
Assembly Capability Subgroup	Solderability	☒	IEC 60068-2-20	S03, R45, R45, R41, S02	5 x 6	0	
	Permanence of marking	☐	ESCC 24800				
Additional Tests	Operating Life (8000h)	☐	ESCC 4001, Para 8.13				
	Seal Test	☐	IEC 60068-2-17				

ANNEX 1: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION

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Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD Click here to enter text. (for ESCC/QML parts)

Tests vehicle identification/description:

SMV-R018-1.0-PW SMV-R039-0.5-PW SMV-R270-1.0-PW	R45 (17204) R45 (17206) R45 (17205)
Click here to enter text.	

Detail Specification reference: 4001/028 issue 6 Ex: three-digit code year letter R=2023 + week number

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	R45	3 x 15	0	
	Rapid Change Of Temperature	☒	IEC 60068-2-14	R45	3 x 15	0	
	Vibration	☒	IEC 60068-2-6	R45	3 x 15	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	R45	3 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Robustness of Terminations	☐	IEC 60068-2-21				
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				
	Seal Test	☐	IEC 60068-2-17				
	Resistance to Soldering Heat	☒	IEC 60068-2-20	R45	3 x 6	0	
	Mounting	☒	IEC 60115-1 clause 4.31	R45	3 x 6	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	R45	3 x 6	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☒	IEC 60115-1 clause 4.31	R45	3 x 15	0	
	Insulation Resistance	☒	ESCC 4001, Para 8.3.1.2	R45	3 x 15	0	
	Voltage Proof	☒	ESCC 4001, Para 8.3.1.3	R45	3 x 15	0	
Endurance Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	R45	3 x 15	0	
	Operating Life	☒	ESCC 4001, Para 8.13	R45	3 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
Assembly Capability Subgroup	Solderability	☒	IEC 60068-2-20	R45	3 x 6	0	
	Permanence of marking	☐	ESCC 24800				
Additional Tests	Operating Life	☐	ESCC 4001, Para 8.13				
	Seal Test	☐	IEC 60068-2-17				

ANNEX 2: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION (introduction of Var07 to ESCC4001/027) 18

Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD [redacted] (for ESCC/QML parts)

Tests vehicle identification/description:

SMT-2R00-1.0-PW	S02 (Lot Code 17519)
SMT-3R30-1.0-PW	S02 (Lot Code 17522)
SMT-4R70-1.0-PW	S02 (Lot Code 17525)

Detail Specification reference: 4001/027 issue 9 Ex: three-digit code year letter S=2024 + week number

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	S02	3 x 15	0	
	Rapid Change Of Temperature	☒	IEC 60068-2-14	S02	3 x 15	0	
	Vibration	☒	IEC 60068-2-6	S02	3 x 15	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	S02	3 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Robustness of Terminations	☐	IEC 60068-2-21				
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				
	Seal Test	☐	IEC 60068-2-17				
	Resistance to Soldering Heat	☒	IEC 60068-2-20	S02	3 x 6	0	
	Mounting	☒	IEC 60115-1 clause 4.31	S02	3 x 6	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	S02	3 x 6	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Insulation Resistance	☐	ESCC 4001, Para 8.3.1.2				
	Voltage Proof	☐	ESCC 4001, Para 8.3.1.3				
Endurance Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	S02	3 x 15	0	
	Operating Life	☒	ESCC 4001, Para 8.13	S02	3 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
Assembly Capability Subgroup	Solderability	☒	IEC 60068-2-20	S02	3 x 6	0	
	Permanence of marking	☐	ESCC 24800				
Additional Tests	Operating Life (8000h)	☐	ESCC 4001, Para 8.13				
	Seal Test	☐	IEC 60068-2-17				

ANNEX 3: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION (new galvanic equipment) 18

Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD (for ESCC/QML parts)

Tests vehicle identification/description:

SMP-R010-0.5-PX SMP-R200-0.5-PX SMP-R560-0.5-PX SMS-R020-0.5-PX SMS-R039-0.5-PX SMS-R390-0.5-PX SMT-R004-0.5-PX SMT-R020-0.5-PX SMT-1R80-0.5-PX	Click here to enter text.

Detail Specification reference: 4001/027 issue 9

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup	Mounting	☐	IEC 60115-1 clause 4.31				
	Rapid Change Of Temperature	☐	IEC 60068-2-14				Performed under different conditions, see later
	Vibration	☐	IEC 60068-2-6				the change has no impact
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				the change has no impact
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				n/a acc. to det.spec.
	Robustness of Terminations	☐	IEC 60068-2-21				n/a acc. to det.spec.
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				n/a acc. to det.spec.
	Seal Test	☐	IEC 60068-2-17				n/a acc. to det.spec.
	Resistance to Soldering Heat	☐	IEC 60068-2-20				the change has no impact
	Mounting	☐	IEC 60115-1 clause 4.31				
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				the change has no impact
	Seal Test	☐	IEC 60068-2-17				n/a acc. to det.spec.
	Mounting	☐	IEC 60115-1 clause 4.31				n/a acc. to det.spec.
	Insulation Resistance	☐	ESCC 4001, Para 8.3.1.2				n/a acc. to det.spec.
	Voltage Proof	☐	ESCC 4001, Para 8.3.1.3				n/a acc. to det.spec.
Endurance Subgroup	Mounting	☐	IEC 60115-1 clause 4.31				
	Operating Life	☐	ESCC 4001, Para 8.13				the change has no impact on the long-term reliability
	Seal Test	☐	IEC 60068-2-17				n/a acc. to det.spec.
Assembly Capability Subgroup	Solderability	☒	IEC 60068-2-20	all	9 x 10		
	Permanence of marking	☐	ESCC 24800				n/a acc. to det.spec.
Additional Tests	Operating Life (8000h)	☐	ESCC 4001, Para 8.13				
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☒	IEC 60115-1 clause 4.31	all	9 x 10		
	Rapid Change Of Temperature	☒	IEC 60068-2-14	all	9 x 10		500 cycles, -55/+150°C, 30 min each

ANNEX 4: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION (new lead frame coating) 18

Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD (for ESCC/QML parts)

Tests vehicle identification/description:

SMV-R015-1.0-PW SMV-R033-1.0-PW SMV-1R00-1.0-PW	T23 (17309) T23 (17307) T23 (17308)

Detail Specification reference: 4001/028 issue 6 Ex: three-digit code year letter T=2025 + week number

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	all	3 x 15	0	
	Rapid Change Of Temperature	☒	IEC 60068-2-14	all	3 x 15	0	
	Vibration	☒	IEC 60068-2-6	all	3 x 15	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	all	3 x 15	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Robustness of Terminations	☐	IEC 60068-2-21				
	Climatic test Sequence	☐	ESCC 4001, Para 8.10				
	Seal Test	☐	IEC 60068-2-17				
	Resistance to Soldering Heat	☒	IEC 60068-2-20	all	3 x 6	0	
	Mounting	☒	IEC 60115-1 clause 4.31	all	3 x 6	0	
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	all	3 x 6	0	
	Seal Test	☐	IEC 60068-2-17				
	Mounting	☐	IEC 60115-1 clause 4.31				
	Insulation Resistance	☒	ESCC 4001, Para 8.3.1.2	all	3 x 15		
	Voltage Proof	☐	ESCC 4001, Para 8.3.1.3				
Endurance Subgroup	Mounting	☐	IEC 60115-1 clause 4.31				
	Operating Life	☐	ESCC 4001, Para 8.13		-		the change has no impact on the long-term reliability
	Seal Test	☐	IEC 60068-2-17				
Assembly Capability Subgroup	Solderability	☐	IEC 60068-2-20		-		the change has no impact on the solderability
	Permanence of marking	☐	ESCC 24800				
Additional Tests	Operating Life (8000h)	☐	ESCC 4001, Para 8.13				
	Seal Test	☐	IEC 60068-2-17				
	Rapid Change Of Temperature	☒	IEC 60068-2-14	all	3 x 15		500 cycles, -55/+150°C, 30 min each

NOTES ON THE COMPLETION OF THE APPLICATION FORM FOR ESCC QUALIFICATION EXTENSION APPROVAL

ENTRIES

Form heading	shall indicate: - the title of the component as given in its detail specification or the name of the series, family; - the Executive Member; - the entering date; - the certificate number and its sequential suffix.
Box 1	shall provide details given in the table; in particular there shall be listed: - the variants or range of variants; - the range of components (the ESCC code is recommended to indicate the values or values range, the tolerance, the voltage, etc); the designation given in the detail specification as 'base on'; - under Test Vehicle enter either an ESCC code or the specific characteristic capable of identifying the component tested (e.g., voltage of coil for a relay); - under component similar enter a cross if relevant.
Box 2; 3 and 4	As per QPL entry; otherwise, an explanation of the changes must be supplied.
Box 5	Will show the ESCC Generic and Detail specifications, including issue number and revision letter, current at the time the tests reported were performed. If the specifications are different from those current on the date of the application, see Box 6.
Box 6	Will show the deviations from the Generic and Detail Specifications listed in Box 5, in particular deviations from testing. In case of deviations this must be listed in Box 15. In case the referenced specification in Box 5 have currently a different issue and/or revision indicate also whether the test data deviates or not from such current documents.
Box 7	Must reference the report(s) supplied in support of the application.
Box 8	Should provide the details of procurement to the full ESCC System, documentation of all of which should already have been delivered to the ESCC Executive under the terms of the relevant Generic Specification. An appropriate table has been drawn in this box.
Box 9	If the PID evolved after the Original Qualification or after the last Extension of Qualification, adequate details of such evolution shall be provided together with the reasons for the changes. Major changes shall be clearly marked.
Box 10	Identify the current PID issue status, date and actual date of verification. The date of verification of the current PID should be arranged as close as possible to the required date of extension.
Box 11	This box can be completed only after a physical visit to the plant to confirm that no unexplained changes occurred and that the practices, procedures, material, etc. used in manufacturing the components are as described in the PID. This survey shall be carried out in accordance with the requirements of ESCC Basic Specification No. 20200 and its findings shall be recorded.
Box 12	Provide details of, or reference to, any Destructive Physical Analysis (DPA) and Failure Analysis reports as well as any Nonconformance(s) (NCCS) occurred during the qualification validity period, stating if established corrective action have produced satisfactory results.
Box 13	Enter only the name of the Executive Member (i.e., CNES, DLR, ESTEC, etc.) and the signature of the responsible Executive Coordinator.
Box 14	To be used when there is a need to expand any of the boxes from 1 through 12. Identify box affected and reference the Box 14 in the relevant Box. Box 14 can be broken into 14a, 14b, etc. if several boxes have to be expanded.
Box 15	Fill in Table as requested.
Box 16	Any additional action deemed necessary by the Executive Member to bring the submitted data to a standard likely to be accepted by the ESCC Executive should be listed herein or the reason(s) to accept the noncompliance.
Box 17	All Executive Manager recommendations on the application itself, special conditions or restrictions, modifications of the QPL or QML entry, letters to the manufacturer, etc. shall be entered clearly in Box 19, signed by the representative for ESA, and dated.
Box 18	Fill in Table as requested.
Box 19	Confidential Details of PID changes including those of a confidential nature, shall be provided.
Box 20	State noncompliance with reference to specification(s) and paragraph(s). To simplify reference in Box 16 each nonconformance shall be sequentially numbered. If relevant state 'None'.
Box 21	Any additional action deemed necessary by the Executive Member to bring the submitted data to a standard likely to be accepted by the ESCC Executive should be listed herein or the reason(s) to accept the noncompliance.
Box 22	Additional Comments.