Amendment on 27 June 2024
Resolved by Technical Committee on 30 January 2024

Tests for Rotating Machines

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part H
Rules for the Survey and Construction of Inland Waterway Ships
Guidance for the Survey and Construction of Steel Ships Parts GF, H, and N
Guidance for the Survey and Construction of Inland Waterway Ships

Reason for Amendment

IACS Unified Requirement (UR) E13(Rev.3) specifies test requirements for rotating machines, and these requirements have already been incorporated into the NK Rules.

In May 2022, IACS adopted UR E13(Rev.3)(Corr.1) to specify that reference values (upper limits of temperature rise) used for temperature rise tests of rotating machines are in accordance with relevant tables in IEC 60034-1:2017. Although the reference values for temperature rise tests specified in IEC 60034-1:2017 differ according to the cooling methods applied to rotating machines, the ones specified in the NK Rules do not. Therefore, it is necessary to classify the reference values for temperature rise tests specified in the NK Rules by cooling method in order to be consistent UR E13(Rev.3)(Corr.1). Accordingly, relevant requirements are amended in accordance with UR E13(Rev.3)(Corr.1).

In addition, tables related to shop tests and other tests required for rotating machines are amended to ensure they are consistent with requirements related to the omission of second and subsequent tests.

Outline of Amendment

(1) Classify the reference values for the temperature rise tests of rotating machines by cooling method
(2) Amend tables related to shop tests and other tests for rotating machines to ensure they are consistent with corresponding requirements related to the omission of second and subsequent tests.

Effective Date and Application

Effective date of this amendment is 27 June 2024.

ID: DD23-15

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
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RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part H ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

2.4.4 Modification of Limits of Temperature Rise*

Table H2.3 Limits of Temperature Rise for Rotating Machines (Based on an Ambient Temperature of 45 °C)

<table>
<tr><td rowspan="2">Item</td><td rowspan="2">Part of rotating machine</td><td colspan="3">Thermal class A</td><td colspan="3">Thermal class E</td><td colspan="3">Thermal class B</td><td colspan="3">Thermal class F</td><td colspan="3">Thermal class H</td></tr>
<tr><td>T</td><td>R</td><td>E.T.D</td><td>T</td><td>R</td><td>E.T.D</td><td>T</td><td>R</td><td>E.T.D</td><td>T</td><td>R</td><td>E.T.D</td><td>T</td><td>R</td><td>E.T.D</td></tr>
<tr><td>1a</td><td>A.C. windings of machines having outputs of 5,000 kW (or kVA) or more</td><td>-</td><td>55</td><td>60</td><td>-</td><td>-</td><td>-</td><td>-</td><td>75</td><td>80</td><td>-</td><td>95</td><td>100</td><td>-</td><td>120</td><td>125</td></tr>
<tr><td colspan="17">(Omitted)</td></tr>
<tr><td>7</td><td>Magnetic cores and all structural components, whether or not in direct contact with insulation (excluding bearings)</td><td colspan="15">The temperature rise is in no case to reach such values that there are risks of damage to any insulating materials on adjacent parts.</td></tr>
</table>

Notes:

1. In cases where the Super Position Method is applied to windings of machines rated 200 *kW* (or *kVA*) or less with Thermal Classes A, E, B and F, marked with *1, the limits for temperature rise given for the Resistance Method may be exceeded by 5 *K*
2. Also includes multiple layer windings marked with *2 provided that their under layers are each in contact with the circulating primary coolant.
3. Limits for temperature rise of “windings indirectly cooled by hydrogen” and “directly cooled windings and their coolants” are specified in reference to relevant tables in *IEC*60034-1:2017.
4. T = Thermometer Method, R = Resistance Method, E.T.D. = Embedded Temperature Detector

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RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part H ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

2.4.4 Modification of Limits of Temperature Rise*

</td>
<td>(Amended) only described
UR E13 rev.2 corr.</td>
</tr>
</table>

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
2.4.14 ***A.C.*** **Generators** **3** In cases where generators are driven at rated speeds, giving rated voltages and they are subjected to sudden changes of symmetrical loads within the limits of specified currents and power factors (see **2.4.15(4)**), voltages are not to fall below 85 % nor exceed 120 % of the rated voltages. Voltages of such generators are then to be restored to within ± 3 % of their rated voltage in a period of not more than 1.5 *seconds*. However, in the case of emergency generators, such voltage values may be increased to ± 4 % in a period of not more than 5 *seconds*.	**2.4.14** ***A.C.*** **Generators** **3** In cases where generators are driven at rated speeds, giving rated voltages and they are subjected to sudden changes of symmetrical loads within the limits of specified currents and power factors (see **2.4.15(2)**), voltages are not to fall below 85 % nor exceed 120 % of the rated voltages. Voltages of such generators are then to be restored to within ± 3 % of their rated voltage in a period of not more than 1.5 *seconds*. However, in the case of emergency generators, such voltage values may be increased to ± 4 % in a period of not more than 5 *seconds*.	To change of entry of 2.4.15, Rules of Part H
2.4.15 Shop Tests*	**2.4.15 Shop Tests***	
Rotating machines are to be tested in the following **(1)** to **(13)** in accordance with **Table H2.6**. In addition, all tests are to be carried out in accordance with *IEC* 60092-301:1980/AMD2:1995. However, those tests required by **(5)** and **(7)** below may be omitted subject to the Society's permission for each generator or motor which is produced in series having identical type with their unit. Furthermore, those tests required by **(6)** below may be omitted for each generator or motor which is of small capacity and which is produced in a series of identical types with their unit.	Rotating machines are to be tested in the following **(1)** to **(12)** in accordance with **Table H2.6**. In addition, all tests are to be carried out in accordance with *IEC* 60092-301:1980/AMD2:1995. However, those tests required by **(5)** and **(7)** below may be omitted subject to the Society's permission for each generator or motor which is produced in series having identical type with their unit. Furthermore, those tests required by **(4)** below may be omitted for each generator or motor which is of small capacity and which is produced in a series of identical types with their unit.	
(1) Visual examinations of rotating machines are to be carried out. Such visual examinations are to ensure, as far as is practicable, that rotating machines comply with their technical documentation (e.g. design drawings, specifications).	(1) Visual examinations of rotating machines are to be carried out. Such visual examinations are to ensure, as far as is practicable, that rotating machines comply with their technical documentation (e.g. design drawings, specifications).	(1) No change
(2) Immediately after those high voltage tests specified in **(9)** have been performed, the insulation resistance of such rotating machines is to be measured in	(2) In the case of generators, voltage regulation tests are to be carried out and comply with the requirements given in **2.4.13-4**, or **2.4.14-2** and **-3**. In the absence	Current (9) to (2)

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
accordance with **Table H2.8** and all values are not to be less than any of those specified in **Table H2.8**. In addition, during such measuring, temperatures of rotating machines are to be near operating temperature. However, in cases where this is difficult, appropriate methods of calculation may be used instead.	of precise information concerning the maximum values of any sudden loads when applying the requirement given in **2.4.14-3**, 60 % of the rated current with a power factor of between 0.4 lagging and zero is to be suddenly switched on with the generator running at no load, and then switched off after attaining steady-state conditions. However, the voltage regulation during transient conditions may be calculated values based upon the test records of identical type generators subject to the Society's permission.	
(3) Machine winding resistance is to be measured. The resistances of the machine windings are to be measured and recorded using either an appropriate bridge method, or a voltage and current method.	(3) Rotating machines with commutators are to work with fixed brushes settings from no loads to 50 % overloads without any harmful sparking.	Current (10) to (3)
(4) In the case of generators, voltage regulation tests are to be carried out and comply with the requirements given in **2.4.13-4**, or **2.4.14-2** and **-3**. In the absence of precise information concerning the maximum values of any sudden loads when applyingthe requirement given in **2.4.14-3**, 60 % of the rated current with a power factor of between 0.4 lagging and zero is to be suddenly switched on with the generator running at no load and then switched off after attaining steady-state conditions. However, the voltage regulation during transient conditions may be calculated values based upon the test records of identical type generators subject to the Society's permission.	(4) Overcurrent or excess torque tests for rotating machines are to be carried out in accordance with **2.4.5** and such machines are to have the capability to withstand such tests (see *IEC* 60034-1:2017).	Current (2) to (4)
(5) After rotating machines are run continuously under actual load methods at their rated output voltages, frequencies, and those duties for which they are being	(5) Steady short-circuit tests for synchronous generators are to be carried out and comply with the requirements given in **2.4.6-2**. However, the duration of a steady short-circuit may be of any time delay which will be	Current (7) to (5)

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
rated until their temperatures have reached a steady state, the temperature rise of each part is to be measured and is not to exceed the value given in **2.4.3** (see *IEC* 60034-1:2017). In cases where it is considered to be acceptable by the Society, such tests may be carried out in accordance with separately specified procedures.	fitted in the tripping device for selective tripping where precise data showing such time delay is available in accordance with the following **(a)** and **(b)**. The manufacturer's simulation model for the generator and the voltage regulator may be used where this has been validated through tests of identical types of the same model. (a) In order to provide sufficient information to the party responsible for determining the discrimination settings in the distribution system where the generator is going to be used, the generator manufacturer is to provide documentation showing the transient behavior of the short-circuit current upon a sudden short-circuit occurring when excited and running at nominal speed. (b) The influence of the automatic voltage regulator is to be taken into account, and the setting parameters for the voltage regulator are to be noted together with the decrement curve. Such a decrement curve is to be available when the setting of the distribution system's short-circuit protection is calculated. The decrement curve need not be based upon physical testing.	
(6) Overcurrent or excess torque tests for rotating machines are to be carried out in accordance with **2.4.5,** and such machines are to have the capability to withstand such tests (see *IEC* 60034-1:2017).	(6) Overspeed tests for rotating machines are to be carried out and comply with the requirements given in **2.4.7** (see *IEC* 60034-1:2017). Such tests, however, are not applicable to squirrel cage motors.	Current (4) to (6)
(7) Steady short-circuit tests for synchronous generators are to be carried out and comply with the requirements given in **2.4.6-2**. However, the duration of a steady short-circuit may be of any time delay which will be	(7) After rotating machines are run continuously under actual load methods at their rated output voltages, frequencies, and those duties for which they are being rated until their temperatures have reached a steady	Current (5) to (7)

Amended	Original	Remarks
fitted in the tripping device for selective tripping where precise data showing such time delay is available in accordance with the following **(a)** and **(b)**. The manufacturer's simulation model for the generator and the voltage regulator may be used where this has been validated through tests of identical types of the same model. (a) In order to provide sufficient information to the party responsible for determining the discrimination settings in the distribution system where the generator is going to be used, the generator manufacturer is to provide documentation showing the transient behavior of the short-circuit current upon a sudden short-circuit occurring when excited and running at nominal speed. (b) The influence of the automatic voltage regulator is to be taken into account, and the setting parameters for the voltage regulator are to be noted together with the decrement curve. Such a decrement curve is to be available when the setting of the distribution system's short-circuit protection is calculated. The decrement curve need not be based upon physical testing.	state, the temperature rise of each part is to be measured and is not exceed the value given in **2.4.3** (see *IEC* 60034-1:2017). In cases where it is considered to be acceptable by the Society, such tests may be carried out in accordance with separately specified procedures.	
(8) Overspeed tests for rotating machines are to be carried out and comply with the requirements given in **2.4.7** (see *IEC* 60034-1:2017). Such tests, however, are not applicable to squirrel cage motors.	(8) The high voltage levels specified in **Table H2.7** are to be applied for a period of 1 *minute* between live parts and frames of rotating machines, with those cores and windings not undergoing testing connected to such frames (see *IEC* 60034-1:2017). In the cases of machines with rated voltage above 1 *kV*, tests are to be carried out in accordance with the requirements given in **2.17.6-4**. Furthermore, where those temperature rise tests specified in **(7)** above are	Current (6) to (8)

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
	applied, high voltage tests are to be carried out after the test.	
(9) The high voltage levels specified in **Table H2.7** are to be applied for a period of 1 *minute* between live parts and frames of rotating machines, with those cores and windings not undergoing testing connected to such frames (see *IEC* 60034-1:2017). In the cases of machines with rated voltages above 1 *kV*, tests are to be carried out in accordance with the requirements given in **2.17.6-4**. Furthermore, where those temperature rise tests specified in **(5)** above are applied, high voltage tests are to be carried out after the test.	(9) Immediately after those high voltage tests specified in **(8)** above have been performed, the insulation resistance of such rotating machines is to be measured in accordance with **Table H2.8** and all values are not to be less than any of those specified in **Table H2.8**. In addition, during such measuring, temperatures of rotating machines are to be near operating temperature. However, in cases where this is difficult, appropriate methods of calculation may be used instead.	Current (8) to (9)
(10) No-load tests of rotating machines are to be carried out. Machines are to be operated at no load and rated speed whilst being supplied at rated voltage and frequency when used as a motor, or are to be driven by a suitable means and excited to give rated terminal voltage when used as a generator. During such tests, machine vibrations and bearing lubrication system operations are to be checked and confirmed to be in good order.	(10) Machine winding resistance is to be measured. The resistances of the machine windings are to be measured and recorded using either an appropriate bridge method, or a voltage and current method.	Current (11) to (10)
(11) Verification of degree of protection (IP) is to be as specified in *IEC* 60034-5:2000+AMD1:2006.	(11) No-load tests of rotating machines are to be carried out. Machines are to be operated at no load and rated speed whilst being supplied at rated voltage and frequency when used as a motor, or are to be driven by a suitable means and excited to give rated terminal voltage when used as a generator. During such tests, machine vibrations and bearing lubrication system operations are to be checked and confirmed to be in good order.	New (11) URE13(Rev.3)Corr.1 4.11
(12) Upon completion of the above tests, machines which have sleeve bearings are to be opened and examined	(12) Upon completion of the above tests, machines which have sleeve bearings are to be opened and examined	(12) No change

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
in cases where deemed necessary by the Society. (13) Rotating machines with commutators are to work with fixed brushes settings from no loads to 50 % overloads without any harmful sparking.	in cases where deemed necessary by the Society. (Newly added)	Current (3) to (13) (Amended) only described. clarification

Table H2.6 Tests for Rotating Machines

No.	Tests	Generators		Motors	
		First generator produced in a series of identical type units (1)	Other generators produced in a series of identical type units(2)	First motor produced in a series of identical type units(1)	Other motors produced in a series of identical type units(2)
1	Examination of the technical documentation, as appropriate and visual examination	x	x	x	x
2	Insulation resistance measurement	x	x	x	x
3	Winding resistance measurement	x	x	x	x
4	Verification of the voltage regulation system(7)	x	x(3)		
5	Rated load test and temperature rise measurements	x	x(8)	x	x(8)
6	Overload/overcurrent test	x	x(4)	x	x(4)
7	Verification of steady short circuit conditions(5)	x	x(8)		
8	Overspeed test	x	x	x(6)	x(6)
9	High voltage tests	x	x	x	x
10	No-load test	x	x	x	x
11	Verification of degree of protection	x		x	
12	Verification of bearings	x	x	x	x

Notes:

(1) Type tests on prototype machine or tests on at least the first batch of machines.

(2) The report of machines produced as part of a series of identical type units are to contain the manufacturer's serial number of the machine which has been type tested and the corresponding test results.

(3) Only functional tests of voltage regulator systems.

(4) Only applicable to machines with rated outputs above of 100 *kW* used for essential services.

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
(5) Verification of steady short circuit condition applies to synchronous generators only. (6) Not applicable to squirrel cage motors. (7) Not applicable to *D.C.* generators. (8) Tests may be omitted subject to Society approval for each rotating machine which is produced in series of identical type units.		

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

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RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

Part 8 ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

2.4.4 Modification of Limits of Temperature Rise*

Table 8.2.2 Limits of Temperature Rise for Rotating Machines (Based on an Ambient Temperature of 45 °C)

Item	Part of rotating machine	Thermal class A			Thermal class E			Thermal class B			Thermal class F			Thermal class H		
		T	R	E.T.D	T	R	E.T.D	T	R	E.T.D	T	R	E.T.D	T	R	E.T.D
1a	*A.C.* windings of machines having outputs of 5,000 *kW* (or *kVA*) or more	-	55	60	-	-	-	-	75	80	-	95	100	-	120	125
(Omitted)																
7	Magnetic cores and all structural components, whether or not in direct contact with insulation (excluding bearings)	The temperature rise is in no case to reach such values that there are risks of damage to any insulating materials on adjacent parts.														

Notes:

1. In cases where the Super Position Method is applied to windings of machines rated 200 *kW* (or *kVA*) or less with Thermal Classes A, E, B and F, marked with *1, the limits for temperature rise given for the Resistance Method may be exceeded by 5 *K*
2. Also includes multiple layer windings marked with *2 provided that their under layers are each in contact with the circulating primary coolant.
3. Limits for temperature rise of “windings indirectly cooled by hydrogen” and “directly cooled windings and their coolants” are specified in reference to relevant tables in IEC60034-1:2017.

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RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

Part 8 ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

2.4.4 Modification of Limits of Temperature Rise*

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(Amended) only described UR E13 rev.2 corr.

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Amended	Original	Remarks
4. T = Thermometer Method, R = Resistance Method, E.T.D. = Embedded Temperature Detector		
2.4.14 *A.C.* Generators **3** In cases where generators are driven at rated speeds, giving rated voltages and they are subjected to sudden changes of symmetrical loads within the limits of specified currents and power factors (see **2.4.15(4)**), voltages are not to fall below 85 % nor exceed 120 % of the rated voltages. Voltages of such generators are then to be restored to within ±3 % of their rated voltage in a period of not more than 1.5 *seconds*.	**2.4.14 *A.C.* Generators** **3** In cases where generators are driven at rated speeds, giving rated voltages and they are subjected to sudden changes of symmetrical loads within the limits of specified currents and power factors (see **2.4.15(2)**), voltages are not to fall below 85 % nor exceed 120 % of the rated voltages. Voltages of such generators are then to be restored to within ±3 % of their rated voltage in a period of not more than 1.5 *seconds*.	To change of entry of 2.4.15, Rules of Part H
2.4.15 Shop Tests* Rotating machines are to be tested in the following **(1)** to **(13)** in accordance with **Table 8.2.5**. In addition, all tests are to be carried out in accordance with *IEC* 60092-301:1980/AMD2:1995. However, those tests required by **(5)** and **(7)** below may be omitted subject to the Society's permission for each generator or motor which is produced in series having identical type with their unit. Furthermore, those tests required by **(6)** below may be omitted for each generator or motor which is of small capacity and which is produced in a series of identical types with their unit.	**2.4.15 Shop Tests*** Rotating machines are to be tested in the following **(1)** to **(12)** in accordance with **Table 8.2.5**. In addition, all tests are to be carried out in accordance with *IEC* 60092-301:1980/AMD2:1995. However, those tests required by **(5)** and **(7)** below may be omitted subject to the Society's permission for each generator or motor which is produced in series having identical type with their unit. Furthermore, those tests required by **(4)** below may be omitted for each generator or motor which is of small capacity and which is produced in a series of identical types with their unit.	
(1) Visual examinations of rotating machines are to be carried out. Such visual examinations are to ensure, as far as is practicable, that rotating machines comply with their technical documentation (e.g. design drawings, specifications).	(1) Visual examinations of rotating machines are to be carried out. Such visual examinations are to ensure, as far as is practicable, that rotating machines comply with their technical documentation (e.g. design drawings, specifications).	(1) No change
(2) Immediately after those high voltage tests specified in **(9)** have been performed, the insulation resistance of such rotating machines is to be measured in	(2) In the case of generators, voltage regulation tests are to be carried out and comply with the requirements given in **2.4.13-4**, or **2.4.14-2** and **-3**. In the absence	Current (9) to (2)

Amended	Original	Remarks
accordance with **Table 8.2.7** and all values are not to be less than any of those specified in **Table 8.2.7**. In addition, during such measuring, temperatures of rotating machines are to be near operating temperature. However, in cases where this is difficult, appropriate methods of calculation may be used instead.	of precise information concerning the maximum values of any sudden loads when applying the requirement given in **2.4.14-3**, 60% of the rated current with a power factor of between 0.4 lagging and zero is to be suddenly switched on with the generator running at no load, and then switched off after attaining steady-state conditions. However, the voltage regulation during transient conditions may be calculated values based upon the test records of identical type generators subject to the Society's permission.	
(3) Machine winding resistance is to be measured. The resistances of the machine windings are to be measured and recorded using either an appropriate bridge method or a voltage and current method.	(3) Rotating machines with commutators are to work with fixed brushes settings from no loads to 50% overloads without any harmful sparking.	Current (10) to (3)
(4) In the case of generators, voltage regulation tests are to be carried out and comply with the requirements given in **2.4.13-4**, or **2.4.14-2** and **-3**. In the absence of precise information concerning the maximum values of any sudden loads when applying the requirement given in **2.4.14-3**, 60 % of the rated current with a power factor of between 0.4 lagging and zero is to be suddenly switched on with the generator running at no load and then switched off after attaining steady-state conditions. However, the voltage regulation during transient conditions may be calculated values based upon the test records of identical type generators subject to the Society's permission.	(4) Overcurrent or excess torque tests for rotating machines are to be carried out in accordance with **2.4.5** and such machines are to have the capability to withstand such tests (see *IEC* 60034-1:2017).	Current (2) to (4)
(5) After rotating machines are run continuously under actual load methods at their rated output voltages, frequencies, and those duties for which they are being rated until their temperatures have reached a steady	(5) Steady short-circuit tests for synchronous generators are to be carried out and comply with the requirements given in **2.4.6-2**. However, the duration of steady short-circuit may be of any time delay which	Current (7) to (5)

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
state, the temperature rise of each part is to be measured and is not to exceed the value given in **2.4.3** (see *IEC* 60034-1:2017). In cases where it is considered to be acceptable by the Society, such tests may be carried out in accordance with separately specified procedures.	will be fitted in the tripping device for selective tripping where precise data showing such time delay is available in accordance with the following **(a)** and **(b)**. The manufacturer's simulation model for the generator and the voltage regulator may be used where this has been validated through tests of identical types of the same model. (a) In order to provide sufficient information to the party responsible for determining the discrimination settings in the distribution system where the generator is going to be used, the generator manufacturer is to provide documentation showing the transient behaviour of the short-circuit current upon a sudden short-circuit occurring when excited, and running at nominal speed. (b) The influence of the automatic voltage regulator is to be taken into account, and the setting parameters for the voltage regulator are to be noted together with the decrement curve. Such a decrement curve is to be available when the setting of the distribution system's short-circuit protection is calculated. The decrement curve need not be based upon physical testing.	
(6) Overcurrent or excess torque tests for rotating machines are to be carried out in accordance with **2.4.5,** and such machines are to have the capability to withstand such tests (see *IEC* 60034-1:2017).	(6) Overspeed tests for rotating machines are to be carried out and comply with the requirements given in **2.4.7** (see *IEC* 60034-1:2017). Such tests, however, are not applicable to squirrel cage motors.	Current (4) to (6)
(7) Steady short-circuit tests for synchronous generators are to be carried out and comply with the requirements given in **2.4.6-2**. However, the duration of steady short-circuit may be of any time delay which	(7) After rotating machines are run continuously under actual load methods at their rated output voltages, frequencies, and those duties for which they are being	Current (5) to (7)

Amended	Original	Remarks
will be fitted in the tripping device for selective tripping where precise data showing such time delay is available in accordance with the following **(a)** and **(b)**. The manufacturer's simulation model for the generator and the voltage regulator may be used where this has been validated through tests of identical types of the same model. (a) In order to provide sufficient information to the party responsible for determining the discrimination settings in the distribution system where the generator is going to be used,the generator manufacturer is to provide documentation showing the transient behaviour of the short-circuit current upon a sudden short-circuit occurring when excited, and running at nominal speed. (b) The influence of the automatic voltage regulator is to be taken into account, and the setting parameters for the voltage regulator are to be noted together with the decrement curve. Such a decrement curve is to be available when the setting of the distribution system's short-circuit protection is calculated. The decrement curve need not be based upon physical testing.	rated until their temperatures have reached a steady state, the temperature rise of each part is to be measured and is not exceed the value given in **2.4.3** (see *IEC* 60034-1:2017). In cases where it is considered to be acceptable by the Society, such tests may be carried out in accordance with separately specified procedures.	
(8) Overspeed tests for rotating machines are to be carried out and comply with the requirements given in **2.4.7** (see *IEC* 60034-1:2017). Such tests, however, are not applicable to squirrel cage motors.	(8) The high voltage levels specified in **Table 8.2.6** are to be applied for a period of 1 *minute* between live parts and frames of rotating machines, with those cores and windings not undergoing testing connected to such frames (see *IEC* 60034-1:2017). Furthermore, where those temperature rise tests specified in **(7)** above are applied, high voltage tests are to be carried out after the test.	Current (6) to (8)
(9) The high voltage levels specified in **Table 8.2.6** are to		Current (8) to (9)

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
be applied for a period of 1 *minute* between live parts and frames of rotating machines, with those cores and windings not undergoing testing connected to such frames (see *IEC* 60034-1:2017). Furthermore, where those temperature rise tests specified in **(5)** above are applied, high voltage tests are to be carried out after the test.	(9) Immediately after those high voltage tests specified in **(8)** above have been performed, the insulation resistance of such rotating machines is to be measured in accordance with **Table 8.2.7** and all values are not to be less than any of those specified in **Table 8.2.7**. In addition, during such measuring, temperatures of rotating machines are to be near operating temperature. However, in cases where this is difficult, appropriate methods of calculation may be used instead.	
(10) No-load tests of rotating machines are to be carried out. Machines are to be operated at no load and rated speed whilst being supplied at rated voltage and frequency when used as a motor, or are to be driven by a suitable means and excited to give rated terminal voltage when used as a generator. During such tests, machine vibrations and bearing lubrication system operations are to be checked and confirmed to be in good order.	(10) Machine winding resistance is to be measured. The resistances of the machine windings are to be measured and recorded using either an appropriate bridge method, or a voltage and current method.	Current (11) to (10)
(11) Verification of degree of protection (IP) is to be as specified in *IEC* 60034-5:2000+AMD1:2006.	(11) No-load tests of rotating machines are to be carried out. Machines are to be operated at no load and rated speed whilst being supplied at rated voltage and frequency when used as a motor, or are to be driven by a suitable means and excited to give rated terminal voltage when used as a generator. During such tests, machine vibrations and bearing lubrication system operations are to be checked and confirmed to be in good order.	New (11) URE13(Rev.3)Corr.1 4.11
(12) Upon completion of the above tests, machines which have sleeve bearings are to be opened and examined in cases where deemed necessary by the Society.	(12) Upon completion of the above tests, machines which have sleeve bearings are to be opened and examined in cases where deemed necessary by the Society.	(12) No change
(13) Rotating machines with commutators are to work with fixed brushes settings from no loads to 50 %	(Newly added)	Current (3) to (13)

Amended	Original	Remarks
overloads without any harmful sparking.		

Table 8.2.5 Tests for Rotating Machines

No.	Tests	Generators		Motors	
		First generator produced in a series of identical type units (1)	Other generators produced in a series of identical type units(2)	First motor produced in a series of identical type units(1)	Other motors produced in a series of identical type units(2)
1	Examination of the technical documentation, as appropriate and visual examination	x	x	x	x
2	Insulation resistance measurement	x	x	x	x
3	Winding resistance measurement	x	x	x	x
4	Verification of the voltage regulation system(7)	x	x(3)		
5	Rated load test and temperature rise measurements	x	x(8)	x	x(8)
6	Overload/overcurrent test	x	x(4)	x	x(4)
7	Verification of steady short circuit conditions(5)	x	x(8)		
8	Overspeed test	x	x	x(6)	x(6)
9	High voltage tests	x	x	x	x
10	No-load test	x	x	x	x
11	Verification of degree of protection	x		x	
12	Verification of bearings	x	x	x	x

Notes:

(1) Type tests on prototype machine or tests on at least the first batch of machines.

(2) The report of machines produced as part of a series of identical type units are to contain the manufacturer's serial number of the machine which has been type tested and the corresponding test results.

(3) Only functional tests of voltage regulator systems.

(4) Only applicable to machines with rated outputs above of 100 *kW* used for essential services.

(5) Verification of steady short circuit condition applies to synchronous generators only.

(6) Not applicable to squirrel cage motors.

(7) Not applicable to *D.C.* generators.

(8) The tests may be omitted subject to Society approval for each rotating machine which is produced in series of identical type units.

(Amended) only described clarification

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 27 June 2024.		

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part GF SHIPS USING LOW-FLASHPOINT FUELS** **Annex 1 GUIDANCE FOR EQUIPMENT AND FITTINGS OF SHIPS USING LOW-FLASHPOINT FUELS** **Chapter 3 FUEL PUMPS** **3.3 Materials, Construction and Strength** **3.3.2 Construction and Installation** **3** The electrical insulation materials and insulated cables of the driving motors of submerged type pumps are to sufficiently withstand the service environment, and the insulation resistance of the motor is not to be less than the value specified in **2.4.15(3), Part H of the Rules**.	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part GF SHIPS USING LOW-FLASHPOINT FUELS** **Annex 1 GUIDANCE FOR EQUIPMENT AND FITTINGS OF SHIPS USING LOW-FLASHPOINT FUELS** **Chapter 3 FUEL PUMPS** **3.3 Materials, Construction and Strength** **3.3.2 Construction and Installation** **3** The electrical insulation materials and insulated cables of the driving motors of submerged type pumps are to sufficiently withstand the service environment, and the insulation resistance of the motor is not to be less than the value specified in **2.4.15-10., Part H of the Rules**.	To change of entry of 2.4.15, Rules of Part H

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part H ELECTRICAL INSTALLATIONS** **H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN** **H2.4 Rotating Machines** **H2.4.15 Shop Tests** **3** The wording "separately specified procedures" referred to in **2.4.15(5), Part H of the Rules** means as follows: 4 (Omitted) **5** In those commutation tests specified in **2.4.15(11), Part H of the Rules**, any sparks arising between commutator segments and brushes in *D*.*C*. machines are categorized into eight types as shown in **Fig. 2.4.15-3**, and categories 5 through 8 are deemed to be harmful.	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part H ELECTRICAL INSTALLATIONS** **H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN** **H2.4 Rotating Machines** **H2.4.15 Shop Tests** **3** The wording "separately specified procedures" referred to in **2.4.15(7), Part H of the Rules** means as follows: 4 (Omitted) **5** In those commutation tests specified in **2.4.15(3), Part H of the Rules**, any sparks arising between commutator segments and brushes in *D*.*C*. machines are categorized into eight types as shown in **Fig. 2.4.15-3**, and categories 5 through 8 are deemed to be harmful.	To change of entry of 2.4.15, Rules of Part H

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part N SHIPS CARRYING LIQUEFIED GASES IN BULK** **Annex 1 GUIDANCE FOR EQUIPMENT AND FITTINGS OF SHIPS CARRYING LIQUEFIED GASES IN BULK** **Chapter 3 CARGO PUMPS** **3.3 Materials, Construction and Strength** **3.3.2 Construction and Installations** **3** The electrical insulation materials and insulated cables of the driving motors of submerged type pump are to sufficiently withstand the service environment, and the insulation resistance of the motor is not to be less than the value specified in **2.4.15(3), Part H of the Rules**.	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part N SHIPS CARRYING LIQUEFIED GASES IN BULK** **Annex 1 GUIDANCE FOR EQUIPMENT AND FITTINGS OF SHIPS CARRYING LIQUEFIED GASES IN BULK** **Chapter 3 CARGO PUMPS** **3.3 Materials, Construction and Strength** **3.3.2 Construction and Installations** **3** The electrical insulation materials and insulated cables of the driving motors of submerged type pump are to sufficiently withstand the service environment, and the insulation resistance of the motor is not to be less than the value specified in **2.4.15-10., Part H of the Rules**.	To change of entry of 2.4.15, Rules of Part H

Amended-Original Requirements Comparison Table (Tests for Rotating Machines)

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS **Part 8 ELECTRICAL INSTALLATIONS** **Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN** **2.4 Rotating Machines** **2.4.15 Shop Tests** **3** The wording "separately specified procedures" referred to in **2.4.15(5), Part 8 of the Rules** means as follows: 4 (Omitted) **5** In those commutation tests specified in **2.4.15(11), Part 8 of the Rules**, any sparks arising between commutator segments and brushes in *D*.*C*. machines are categorized into eight types as shown in **Fig. 8.2.4.15-3**, and categories 5 through 8 are deemed to be harmful. EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 27 June 2024.	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS** **Part 8 ELECTRICAL INSTALLATIONS** **Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN** **2.4 Rotating Machines** **2.4.15 Shop Tests** **3** The wording "separately specified procedures" referred to in **2.4.15(7), Part 8 of the Rules** means as follows: 4 (Omitted) 5 In those commutation tests specified in **2.4.15(3), Part 8 of the Rules**, any sparks arising between commutator segments and brushes in *D*.*C*. machines are categorized into eight types as shown in **Fig. 8.2.4.15-3**, and categories 5 through 8 are deemed to be harmful.	To change of entry of 2.4.15, Rules of Part H