d) If an enclosed CIRCULATOR is intended for a hydraulically sealed APPLICATION SYSTEM, the LIQUID CONNECTION for filling of the BATH TANK or exhaust of a PRESSURE-RELIEF DEVICE may be marked with symbol 13 and/or symbol 101 and/or, the maximum and/or minimum working temperatures of the equipment in association with symbol 116.

Addition:

Add the following paragraph after the fourth paragraph:

For TEST CHAMBERS, INCUBATORS, and similar equipment with heating functions for high temperatures, there shall be an indication of the "ON" condition on each side of the equipment which has a door in it or has any other opening intended for loading of SPECIMEN.

Replacement:

Replace the conformity statement with the following:

Conformity is checked by inspection and by measurement as specified in 10.4, and by inspection of barriers to check that protection against accidentally touching surfaces exceeding temperatures above the values of Table 19 is appropriate, and that they cannot be removed without the aid of a TOOL.

10.2 Temperatures of windings

Addition:

Add the following text and table.

Conformity for motor-compressors is checked by measurement as specified in 10.4, in NORMAL CONDITION and in the applicable SINGLE FAULT CONDITIONS of 4.4.2.10, 4.4.2.101 and also in any other SINGLE FAULT CONDITIONS that could cause a HAZARD as a result of excessive temperature or pressure. The temperature limits for MOTOR-COMPRESSORS are defined by Table 102. The pressures are recorded for use in 11.7.2.

Table 102 – Maximum temperatures for MOTOR-COMPRESSORS

Part of the MOTOR-COMPRESSOR	Temperature (°C)
Windings with	
– synthetic insulation	140
– cellulosic insulation or the like	130
Housing	150

10.4 Conduct of temperature tests

10.4.1 General

Replacement:

Replace the text in 10.4.1 with the following:

Maximum temperature is determined by measuring the temperature rise under reference test conditions defined by clause 4.3.1 of this standard. Linear extrapolation is not permitted. Unless a particular SINGLE FAULT CONDITION *specifies otherwise, the* NORMAL USE *of the equipment as defined in 4.3.2 of this part of the standard and manufacturer's instructions concerning ventilation, cooling liquid, limits for intermittent use, etc. are followed. Any cooling liquid shall be at the highest* RATED *temperature. Operating pressures shall be monitored and recorded during all the temperature runs for use in the evaluation of PS.*

When measuring temperatures and pressures for REFRIGERATING SYSTEMS *the tests shall be started from a* SOAKED TEMPERATURE CONDITION *when all pressures have been fully equalized. Tests at the extremes of the input voltage (± 10 %) shall start under these voltage conditions and achieve a stable state but need not start from a* SOAKED TEMPERATURE CONDITION*. At the termination of the test, the monitoring shall continue after the equipment is switched off until the pressures from each* REFRIGERANT *stage have equalized or clearly demonstrate that maximum values have been reached.*

During the test, protective devices other than self-resetting thermal motor-protectors for MOTOR-COMPRESSORS *shall not operate. When steady conditions have been established, thermal motor-protectors for* MOTOR-COMPRESSORS *shall not operate.*

Unless thermocouples are embedding in the windings of the MOTOR-COMPRESSOR*, winding temperatures shall be taken using the change of resistance method in accordance with Annex E of IEC 60950 and, should be recorded at initial conditions and at steady-state. All other temperature and pressure measurements shall be taken continuously and the maximum temperatures and pressures recorded.*

For MOTOR-COMPRESSORS *conforming with IEC 60335-2-34 (including its Annex AA), the temperatures of the following parts are not measured:*

– MOTOR-COMPRESSOR *housing;*

– MOTOR-COMPRESSOR *windings and other accessories, such as parts for protection, start-up and, any other parts that are tested with* MOTOR-COMPRESSOR *in accordance with IEC 60335-2-34 (including its Annex AA).*

For MOTOR-COMPRESSORS *not conforming with IEC 60335-2-34 (including its Annex AA), the temperatures of the following parts shall not exceed the limits as specified in Table 102:*

– MOTOR-COMPRESSOR *housing;*

– MOTOR-COMPRESSOR *windings.*

Addition:

Add the following subclauses:

10.101 Overtemperature protection

When a single fault in the equipment could lead to a HAZARD from overheating of the equipment, or material being processed, a non-self-resetting TEMPERATURE-LIMITING DEVICE or system meeting the requirements of 14.3 shall de-energize the RESISTANCE-HEATING DEVICE and any other parts which could cause a HAZARD.

If an insufficient quantity of liquid HEAT TRANSFER MEDIUM could cause a HAZARD, a self-resetting or non-self-resetting LIQUID LEVEL CUT OUT shall de-energize the RESISTANCE-HEATING DEVICE and any other parts which could cause a HAZARD. When the temperature of a surface in direct contact with the FLAMMABLE LIQUID HEAT TRANSFER MEDIUM exceeds t_a – 100 °C, where t_a = AUTO IGNITION TEMPERATURE, the LIQUID LEVEL CUT OUT shall operate before this surface can be exposed to air.

If a HAZARD could result from an incorrect immersion depth, movable immersion CIRCULATORS, when combined with either an open BATH TANK or a refrigerating BATH resulting in a BATH or CIRCULATOR, shall be marked with the maximum and minimum depth of immersion. These markings may be horizontal lines if additional explanation is included in the documentation.

For equipment designed to contain FLAMMABLE LIQUIDS, either for treatment or for heat-transfer, TEMPERATURE-LIMITING DEVICES or systems shall ensure, when set as directed in the manufacturer's instructions, that the temperature of the liquid shall not exceed the value as specified in 9.5 a) in NORMAL USE or SINGLE FAULT CONDITION.

The equipment as a whole, or the relevant parts, shall be de-energized by one of the following methods:

a) for single-phase equipment, the proposed circuit and physical construction shall be examined to identify possible single faults. The TEMPERATURE-LIMITING DEVICE shall be placed in the pole of the supply that provides the better protection from single faults that could defeat the over-temperature protection in the event of a subsequent failure of the temperature control system. A device which isolates both phase and neutral conductors at the same time may provide double fault protection (depending on application) and should be considered if the residual RISK is unacceptable.

Conformity is checked by inspection of the circuit diagram, the data sheet for the TEMPERATURE-LIMITING DEVICE, and the method in which it is installed in the equipment, and, if necessary, by the tests specified in 14.3.

b) for polyphase equipment, either one single device or system disconnecting all phases or, an individual device or system for each phase;

c) a device or system providing disconnection from all poles of the supply.

Consideration shall be given to the following:

– In equipment designed for the cooling and/or heating of materials, HAZARDS may arise from overheating of materials being processed or, overheating of the liquid HEAT TRANSFER MEDIUM as well as from over-heating of parts of the equipment itself. For this reason a higher level of safety may be needed to provide in case of a SINGLE FAULT CONDITION in the equipment.

– In some cases a fall in the temperature of a heated medium (for example liquid in a BATH or CIRCULATOR) could cause a HAZARD. If this could occur as a result of the operation of a TEMPERATURE-LIMITING DEVICE or system after failure of the temperature controller, a second temperature controller may be fitted to maintain a safe temperature without the operation of a TEMPERATURE-LIMITING DEVICE.

NOTE NORMAL USE (which is use in accordance with the manufacturer's instructions) includes the correct setting of any adjustable TEMPERATURE-LIMITING DEVICE. If the OPERATOR is instructed to change the set point of the TEMPERATURE-LIMITING DEVICE (including providing the TOOL if required) then the incorrect setting of the TEMPERATURE-LIMITING DEVICE may be considered REASONABLY FORESEEABLE MISUSE – refer to clause 16.1 for additional guidance.

TEMPERATURE-LIMITING DEVICES necessary for safety shall be separate from any temperature controller. This applies not only to the temperature sensing means but also to all disconnecting devices in the circuits to be de-energized. Whether operated by temperature, pressure, liquid level, airflow or other means, they shall meet the requirements of 14.3.

Adjustable TEMPERATURE-LIMITING DEVICES and system shall be adjustable only with the aid of a TOOL or similar means that prevents unintended adjustment.

Conformity is checked by inspection and during the fault tests specified in 4.4.2.10, 4.4.2.11 and as applicable, tests in 4.4.2.101 to 4.4.2.107.

10.102 Restarting after interruption of cooling and/or heating

According to applications, a HAZARD could arise either by re-starting or by not re-starting after interruption of cooling and/or heating as result of termination of circulating or agitating in a BATH or CIRCULATOR and in an oven or TEST CHAMBER. Equipment shall be incorporated with means and, instructions shall specify whether equipment will re-start or not re-start, both in the case of MAINS interruption and in the case of a SINGLE FAULT CONDITION.

NOTE In some cases, it may be appropriate for an audible or visible signal to warn that an interruption has occurred.

Conformity is checked by inspection and test.

11 Protection against HAZARDS from fluids

This clause of Part 1 is applicable except as follows:

11.1 General

Addition:

Add the following paragraph and note 101 after the conformity statement:

Equipment intended to be connected to the water mains shall be constructed to prevent backsiphonage of non-potable water into the water mains.

NOTE 101 IEC 61770 gives requirements for preventing backsiphonage of non-potable water into the water mains and tests.

Conformity is checked by inspection.

11.3 Spillage

Addition:

Add the following text after the conformity statement:

The construction of a draining valve, nozzle and any other similar device shall be designed to prevent them from being opened or pulled out unintentionally.

Conformity is checked by inspection.

11.4 Overflow

Replacement:

Replace the title and text of 11.4 with the following:

11.4 Overflow and low level

Liquid overflowing from any container in the equipment which can be overfilled or overflowed, whether by the OPERATOR or for functional reasons as part of equipment operation, shall not cause a HAZARD during NORMAL USE or in SINGLE FAULT CONDITION, for example, as a result of the wetting of insulation or of internal un-insulated parts that are HAZARDOUS LIVE.

Equipment likely to be moved while a vessel is full of liquid shall be protected against liquid surging out of the vessel.

Equipment containing liquid, whether as HEAT TRANSFER MEDIUM or as result of treatment, experiencing expansion and contraction, evaporating, spraying, raining or collecting when being heated, cooled, atomized, irrigated or condensed shall be provided with means to protect against any HAZARD associated with the overflow or low level during NORMAL USE or in SINGLE FAULT CONDITION.

Conformity is checked by inspection and by carrying out each of the following treatments and tests, if applicable. Immediately after the treatment, the CLEARANCE and solid insulation shall pass the voltage tests of 6.8 (without humidity preconditioning) applicable to the type of insulation (see 6.7) and ACCESSIBLE parts shall not exceed the limits of 6.3.1 for NORMAL USE and 6.3.2 under SINGLE FAULT CONDITION.

For BATHS, CIRCULATORS and similar equipment incorporating a liquid vessel, operate the equipment as follows:

Fill the bath tank or any other liquid vessel of the equipment to its maximum level with water unless otherwise specified, following instructions of the manufacturer.

a) Spillage from overflow:

> *The filling is continued for additional amount equal to 20 % of the vessel capacity, not less than 0,25 l, or 1 min after the first evidence of overflow; Where no spillage occurs due to function of the LIQUID CONNECTION for overflow that prevents such spillage, the filling is continued for a further amount equal to 30 % of the vessel capacity, or 5 min following the overflow through the LIQUID CONNECTION.*
>
> *The LIQUID CONNECTION for overflow if equipped, shall be connected and fitted as instructed in the manual. If not specified by the manufacturer, use a filling rate of 10 l/min.*

Take the value resultant from least favourable situation. There shall be no wetting of conductive live parts.

For remotely controlled automatic refill system, a RISK *assessment shall be carried out according to Clause 17.*

b) Splash from low level

Drain the BATH TANK *or any other liquid vessel of the equipment to its minimum level or just prior to the evidence of the triggering of low* LIQUID LEVEL CUT OUT *if equipped, while keep the equipment running and functional assembly relying on appropriate liquid level operating, for example, the* CIRCULATING PUMP *and* HUMIDIFIER *are working.*

There shall be no wetting of conductive live parts.

c) Spillage from expansion and contraction

Use HEAT TRANSFER MEDIUM *with the widest temperature range and higher coefficient of expansion applicable for the equipment as instructed by the manufacturer.*

Set the working temperature of the equipment at ambient and, keep the CIRCULATING PUMP *running until the temperature is stabilized and:*

1) Set the temperature of the equipment to its minimum, then to its maximum applicable for the same liquid, and finally to ambient. Change the setting only if the temperature is stabilized at its setting or no evidence of further significant changing. Refill the BATH TANK *if necessary with the same liquid to its maximum level for* NORMAL USE *prior to subsequent tests;*

2) Set the temperature of the equipment to its maximum, then to its minimum, and finally to ambient. Change the setting only if the temperature is stabilized at its setting or no evidence of further significant changing. Refill the BATH TANK *if necessary with the same liquid to its maximum level for* NORMAL USE *prior to subsequent tests;*

3) Program the setting for the temperatures of the equipment to its maximum, minimum and time for the change that maximum difference of the temperature changing is possible. Run the program with 2 repetitions or until no evidence of more unfavourable situation is expected.

d) Surging from movement

Remove the plug from power supply, and operate the equipment as follows:

1) For equipment with castors, or provided with accessory trolleys specified by the manufacturer:

– The equipment is moved in forward direction on a smooth and solid surface at a speed of 0,5 m/s ± 0,1 m/s for 2 m, and then with one of the castors against a solid vertical plane obstacle. The obstacle shall have a rectangular cross section of 10 mm ± 0,5 mm high and at least 80 mm wide with a radius of 2 mm ± 0,1 mm at the top edges. Unless direction of movement is mechanically restricted or explicitly specified by the manufacturer, the longest side of the equipment should be aligned with the direction of travel.

– Equipment intended to be moved when fluid containing vessel is emptied shall be filled to 50% of the maximum level.

– Operate the equipment with the obstacle against different castors, and repeat each test for 3 times.

Take the value resultant from least favourable situation. There shall be no wetting of conductive live parts, or if a HAZARD could result, no wetting of OPERATOR's grips or handles.

A BATH TANK or any other liquid vessel incapable of sealed operation is left open. Equipment with fully enclosed fluid containing vessels is exempted from this test.

2) For equipment with lifting devices:

– Equipment up to 18 kg, including liquid, is subjected to a cycling 10° tilt-test as described below, across the short side of the equipment, or;

– Equipment over 18 kg, including liquid, is subjected to a cycling 5° tilt-test as described below, across the long side of the equipment;
In either case, the equipment is subjected to 3 tilt-test cycles, where one cycle consists of the positions flat, tilted left, flat, tilted right, cycled within 10 s.
There shall be no wetting of conductive live parts, and if a HAZARD could result, no spillage outside the equipment or wetting of OPERATOR's grips or handles.
A BATH TANK or any other liquid vessel incapable of sealed operation is left open. Equipment with fully enclosed fluid containing vessels is exempted from this test.

e) Spillage from condensate and simulated spraying, irrigating or raining

For equipment incorporating a drip pan, operate the equipment as follows:

Block the outlet of the drip pan. Fill the pan with water carefully to the brim without splashing. The drip pan is then subjected to a continuous overflow, the rate of which is adjusted to approximately 17 cm^3/s, or to its maximum RATING specified by the manufacturer. Apply an airflow of 1 m^3/s if the overflow is influenced by airflow of cooling or CIRCULATING FAN(S). The test is continued for a period of 30 min, or until water drains from the equipment.

Equipment incorporating a defrosting device is subjected to a complete cycle of defrosting process under the least favourable condition.

Equipment completed with spraying, irrigating or raining device, is subject to a complete cycle of spraying, irrigating or raining process under the most unfavourable condition.

Addition:

Add the following subclauses:

11.4.101 Salt mist, thawing, condensate and spray

Where a HAZARD could result by direct exposure to the spray, the saturated compressed-air for salt solution atomizing of salt spray corrosion TEST CHAMBER shall be designed to be interlocked by mechanism of the cover, so that it stops automatically or it will not start with the cover opened.

It is permissible for the interlock detailed above to be overridden where necessary for operation or maintenance and when spray is desired with the cover opened, only where activation of the spray is controlled by a device that needs to be continuously held in the active state by the OPERATOR and the following warning symbol and statement is placed on the equipment:

HAZARDOUS chemicals, use protective respirator, face mask, coverall or glove!

Conformity is checked by inspection and evaluation of the interlock to Clause 15 if relied upon to mitigate the RISK.

The refrigerating subassembly and piping, where necessary for safety, shall be properly insulated and protected against occurrence of condensate or accumulation of frost for NORMAL USE. Salt mist, thawing, condensing and spraying water shall be collected and discharged, ensuring that no leakage, spillage or overflow occurs.

Conformity is checked by inspection. In case of doubt, the CLEARANCES and solid insulation shall pass the voltage tests of 6.8 (without humidity preconditioning) applicable to the type of insulation (see 6.7) and ACCESSIBLE parts shall not exceed the limits of 6.3.1.

11.4.102 HAZARDS from liquids in relation to SPECIMEN and APPLICATION SYSTEM

Fixing devices, tube racks or insulated vessels, and flexible tubing, clamps, if necessary for safety, shall be provided with the equipment to fix the SPECIMEN or for connection to APPLICATION SYSTEM to protect them from getting in contact with the HEAT TRANSFER MEDIUM.

Where a HAZARD could be caused by excessive torque or pressure applied to high-viscosity liquid HEAT TRANSFER MEDIUM or pressure sensitive APPLICATION SYSTEM, for example through rupture of jacketed glass reactor, CIRCULATOR with discharge pressure exceeding 0.08 MPa, shall be incorporated with pressure indicating and adjusting devices. Safety device may be incorporated to interrupt the CIRCULATING PUMP and initiate an alarm signal if the torque or pressure rises above a preset value.

According to applications, a HAZARD could arise either by re-starting or by not re-starting after interruption of liquid circulating. Equipment shall be incorporated with means and, instructions shall specify whether equipment will re-start or not re-start, both in the case of MAINS or mechanical interruption and in the case of a SINGLE FAULT CONDITION.

Conformity is checked by inspection and in case of doubt by measurement of pressure.

11.4.103 HAZARDS from liquids in relation to SHAKER

Safety devices or means shall be provided with the SHAKER to protect against HAZARDS from splash and/or spillage of the liquids, accumulation of released volatile or hazardous substance or, condensation of the volatile. The safety device shall be independent of the controllers for MECHANICAL MOVEMENT and/or temperature, humidity etc.

Conformity is checked by inspection.

11.4.104 Construction and warning markings related to manual filling or draining

Equipment incorporating a BATH TANK or other liquid container intended for manual filling or incorporating a reservoir for collecting condensate that requires manual draining, if the liquid level is not visible in construction or location, shall be equipped with a clearly visible liquid level indicator. Alternatively, if the liquid level indicator cannot be made available, a warning marking shall be applied and clearly visible in close proximity to the LIQUID CONNECTION for filling or draining. Additional explanations including instructions for operation and maintenance requirements for the warning marking shall be included in the documentation.

Conformity is checked by inspection.

11.4.105 Movable immersion CIRCULATOR

Movable immersion CIRCULATOR when removed from the BATH TANK and placed horizontally or up-side down or during movement for NORMAL USE, if HAZARDS could arise because of the liquid penetrating or spillage, shall be marked with symbol 12 or symbol 14 of Table 1 for warning of electric or liquid HAZARD.

Conformity is checked by inspection.

11.4.106 Removable SPECIMEN holder for MECHANICAL MOVEMENT

If a HAZARD, such as spillage or overflow of the liquid could result during the removal or reinsertion, removable SPECIMEN holder for MECHANICAL MOVEMENT shall be marked with an appropriate warning symbol and text in close proximity to handles of the holder, and an explanation shall be included in the documentation.

Conformity is checked by inspection or by operation in accordance with instructions.

11.7.1 Maximum pressure

Addition:

Add the following after the conformity statement:

The maximum pressure to which a part of the REFRIGERATING SYSTEM can be subjected to under NORMAL CONDITION or SINGLE FAULT CONDITION shall not exceed the RATED MAXIMUM ALLOWABLE PRESSURE for the part. The RATED MAXIMUM ALLOWABLE PRESSURE of a component is determined by either its RATING if certified to the component requirements of 14.101 or, by design if the parts can pass the tests of 11.7.2.

The MAXIMUM ALLOWABLE PRESSURE (PS) of REFRIGERATING SYSTEMS shall be determined by test or by applying the saturated REFRIGERANT pressures at the minimum specified temperatures given in Table 103. When saturated REFRIGERANT pressures are used to define PS, the manufacturer is exempted from recording the pressures during tests for NORMAL USE and under SINGLE FAULT CONDITIONS. If the start-to discharge pressure

of a PRESSURE RELIEF DEVICE or the set pressure of a rupture member used in the REFRIGERATING SYSTEM is less than the SATURATED-VAPOUR PRESSURE from Table 103, it can be used to limit PS for that system. The value of PS when determined by test shall be considered to be the highest of the following:

a) the maximum pressure developed during the temperature test as defined in 10.4;

b) the maximum pressure developed during the test in SINGLE FAULT CONDITION for cooling as specified in 4.4.2.10;

c) the maximum pressure developed during the test in SINGLE FAULT CONDITION for extreme operating ambient abnormal in accordance with 4.4.2.106, if applicable;

d) the maximum pressure developed during the temperature test for transportation and storage as defined in 11.7.102;

NOTE 101 For single REFRIGERATING SYSTEM the pressure can be separated into two sections, the HIGH-PRESSURE SIDE and LOW-PRESSURE SIDE of each MOTOR-COMPRESSOR, the PS value can be different for each HIGH-PRESSURE SIDE and LOW-PRESSURE SIDE.

NOTE 102 Equipment meeting the requirements of 11.7 may not be accepted as conforming to national requirements relating to high pressures. There are notes applied to the relevant requirements which detail the modification of these requirements in order to be accepted as evidence of conformity with national regulations in the USA, in Canada, and in some other countries.

Table 103 – Minimum temperature for determination of SATURATED-VAPOUR PRESSURE of REFRIGERANT

Ambient conditions	**≤43°C**	**≤55°C**
HIGH-PRESSURE SIDE with air-cooled CONDENSER	63°C	67°C
HIGH-PRESSURE SIDE with water-cooled CONDENSER	Maximum leaving water temperature + 8°C	
HIGH-PRESSURE SIDE with evaporative CONDENSER in a CASCADE SYSTEM	43°C	55°C
LOW-PRESSURE SIDE with heat exchanger exposed to the outdoor ambient temperature	43°C	55°C
LOW-PRESSURE SIDE with heat exchanger exposed to the indoor ambient temperature	38°C	38°C
NOTE 1 For the HIGH-PRESSURE SIDE, the specified temperatures are considered the maximum which will occur during operation. These temperatures are higher than those during off cycle of MOTOR-COMPRESSOR. For the LOW-PRESSURE SIDE and/or intermediate pressure side, it is sufficient to base the calculation of pressure on the expected temperature during off cycle of MOTOR-COMPRESSOR. These temperatures are minimum temperatures and thus determine that the system will not be designed for MAXIMUM ALLOWABLE PRESSURE lower than the REFRIGERANT SATURATED-VAPOUR PRESSURE corresponding to these minimum temperatures. NOTE 2 The use of specified temperatures does not always result in REFRIGERANT SATURATED-VAPOUR PRESSURE within the system, e.g. a limited-charge REFRIGERATING SYSTEM or a system working at or above critical temperature, CO_2 in particular. NOTE 3 For zeotropic blends the MAXIMUM ALLOWABLE PRESSURE (PS) is the pressure at the bubble point.		

Conformity is checked by inspection of the RATINGS of the parts and, if necessary, by measuring pressures.

11.7.2 Leakage and rupture at high pressure

Addition:

Add the following subclauses:

11.7.2.101 Leakage and rupture of REFRIGERATING SYSTEMS

11.7.2.101.1 General

REFRIGERANT containing parts of a REFRIGERATING SYSTEM shall not cause a HAZARD through rupture or leakage. The specific requirements for REFRIGERATING SYSTEMS using FLAMMABLE REFRIGERANT or FLAMMABLE REFRIGERANT blends are addressed in 11.7.101.

For components subject to the pressure at HIGH-PRESSURE SIDE or LOW-PRESSURE SIDE of the REFRIGERATING SYSTEM, the structural strength of the fluid containing parts shall comply with 3 times the PS as defined in 11.7.1 for the HIGH-PRESSURE SIDE or LOW-PRESSURE SIDE.

Conformity is checked by inspection of the RATINGS of the components exposed to this pressure and, if a HAZARD could arise, by the pressure test in 11.7.2.101.2 and 11.7.2.101.3. Components that are certified to the component requirements in 14.101 and are used within their RATINGS (component pressure RATING ≥ PS) are deemed to comply with this requirement without test.

NOTE 1 For evidence of conformity with national regulations in the USA, in Canada, and in some other countries the structural strength of components are identical but design RATING of the component is different based on safety margin required in the national regulations. For example, in the USA the design RATING for a component complying with ASME boiler code is 1/5 of the structural strength of the component.

NOTE 2 In conjunction with NOTE 1, the minimum structural strength RATING of REFRIGERANT containing components in the USA and Canada is 5 × the PS measured during normal pressure tests and 3 x the PS measured during abnormal pressure tests, where PS is derived from tests in 10.4 for the HIGH-PRESSURE SIDE or LOW-PRESSURE SIDE and, test in 4.4.2.10 for the HIGH-PRESSURE SIDE only. Note the fact of these certification differences during selection of certified components from North America based on testing conducted in this standard.

11.7.2.101.2 Pressure test

The pressure of the component or assembly (Equipment Under Test, EUT) is raised, by air or non-HAZARDOUS gas or via a hydrostatic pressure test, gradually to the specified test value and is held at that value for 1 min. If the continuous operating temperature for the EUT is less than or equal to 125 °C for copper or aluminium, or 200 °C for steel, the test temperature of the EUT during this test shall be at least 20 °C. If the continuous operating temperature for the EUT exceeds 125 °C for copper or aluminium, or 200 °C for steel, the test temperature of the EUT during this test shall be at least 150 °C for copper or aluminium and 260 °C for steel. For other materials or higher temperatures, the effects of temperature on the material fatigue characteristics shall be evaluated.

The EUT is considered to comply with the requirements of this clause if it can withstand the pressure test without rupture. If the EUT does not comply, then an alternate method to demonstrate compliance is to subject the EUT to test in 11.7.2.101.3.