



SLOVENSKI STANDARD
SIST EN 27841:2000
01-september-2000

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Automatic steam traps - Determination of steam loss - Test methods (ISO 7841:1988)

Kondensatableiter - Bestimmung des Dampfverlustes - Prüfverfahren (ISO 7841:1988)

Purgeurs automatiques de vapeur d'eau - Détermination de la perte de vapeur -
Méthodes d'essai (ISO 7841:1988)

Ta slovenski standard je istoveten z: **EN 27841:1991**

SIST EN 27841:2000
<https://standards.iteh.ai/catalog/standards/sist/0c758381-6058-45be-aca6-11c6de9ec9c6/sist-en-27841-2000>

ICS:

23.060.01 Ventili na splošno Valves in general

SIST EN 27841:2000 en

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EUROPEAN STANDARD

EN 27841:1991

NORME EUROPEENNE

EUROPAISCHE NORM

October 1991

UDC 621.646.9.057:621.186.1:620.1

Descriptors : Industrial valves, traps : drainage, water vapor, steam, tests, measurements, head losses

English version

Automatic steam traps - Determination of steam loss - Test methods (ISO 7841:1988)

Purgeurs automatiques de vapeur d'eau - Kondensatableiter - Bestimmung des Détermination de la perte de vapeur - Dampfverlustes - Prüfverfahren (ISO Méthodes d'essai (ISO 7841:1988) 7841:1988)

This European Standard was approved by CEN on 1991-09-30 and is identical to the ISO standard as referred to.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Ref. No. EN 27841:1991 E

Foreword

On the proposal of the Technical Committee CEN/TC 69
"Industrial valves"

BT has decided by resolution C67/1990
to submit the International Standard

ISO 7841:1988 : Automatic steam traps - Determination of steam loss -
Test methods

to Formal Vote.

This European Standard EN 27841 was approved by CEN on 1991-08-05

According to the Common CEN/CENELEC Rules, the following countries are
bound to implement this European Standard :

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland,
Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden,
Switzerland and United Kingdom.

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Endorsement

The text of the International Standard ISO 7841:1988
was approved by CEN as a European Standard without any modifications.



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INTERNATIONAL STANDARD

ISO
7841

First edition
1988-12-01



INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Automatic steam traps — Determination of steam loss — Test methods

Purgeurs automatiques de vapeur d'eau — Détermination de la perte de vapeur — Méthodes d'essai

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ISO 7841 : 1988 (E)**Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7841 was prepared by Technical Committee ISO/TC 153, *Valves*.

SIST EN 27841:2000

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Automatic steam traps – Determination of steam loss – Test methods

iTeh STANDARD PREVIEW (standards.iteh.ai)

1 Scope and field of application

This International Standard specifies two test methods to determine the steam loss of automatic steam traps to ISO 6552.

The object of these tests is to determine the amount of live steam, if any, that is lost through the steam trap. They are, therefore, tests to evaluate the ability of the traps to shut against steam during successive operations.

There is no measurement of the total heat energy lost by the trap. Such total heat loss would include radiation and convection components which can be established separately.

2 References

- ISO 651, *Solid-stem calorimeter thermometers.*
- ISO 652, *Enclosed-scale calorimeter thermometers.*
- ISO 653, *Long solid-stem thermometers for precision use.*
- ISO 4185, *Measurement of liquid flow in closed conduits – Weighing method.*
- ISO 6552, *Automatic steam traps – Definition of technical terms.*

3 Test arrangements

The test arrangements for steam loss determination are shown in figures 1 and 2. The minimum water capacity of the calorimeter tank (see figure 1) shall be 0,02 m³. It is most important that the condensate drainage device be fully capable of maintaining a dry line to the heat exchanger. The test device shall be located sufficiently below the heat exchanger to prevent condensate backing up into the heat exchanger, should the test device only operate infrequently.

All piping and equipment (including the heat exchanger) shall be insulated to a value of

$$R \geq 0,75 \times 10^{-3} \frac{\text{m}^2 \cdot \text{°C} \cdot \text{h}}{\text{J}}$$

to reduce thermal losses to a minimum.

The instruments used for the measurements shall comply with International Standards, if such standards exist, e.g.

- ISO 651, ISO 652, ISO 653 for temperature measurements;
- ISO 4185 for flow measurements.

The condensate removal device shall not be modified in any way from its commercial form.

4 Test method A

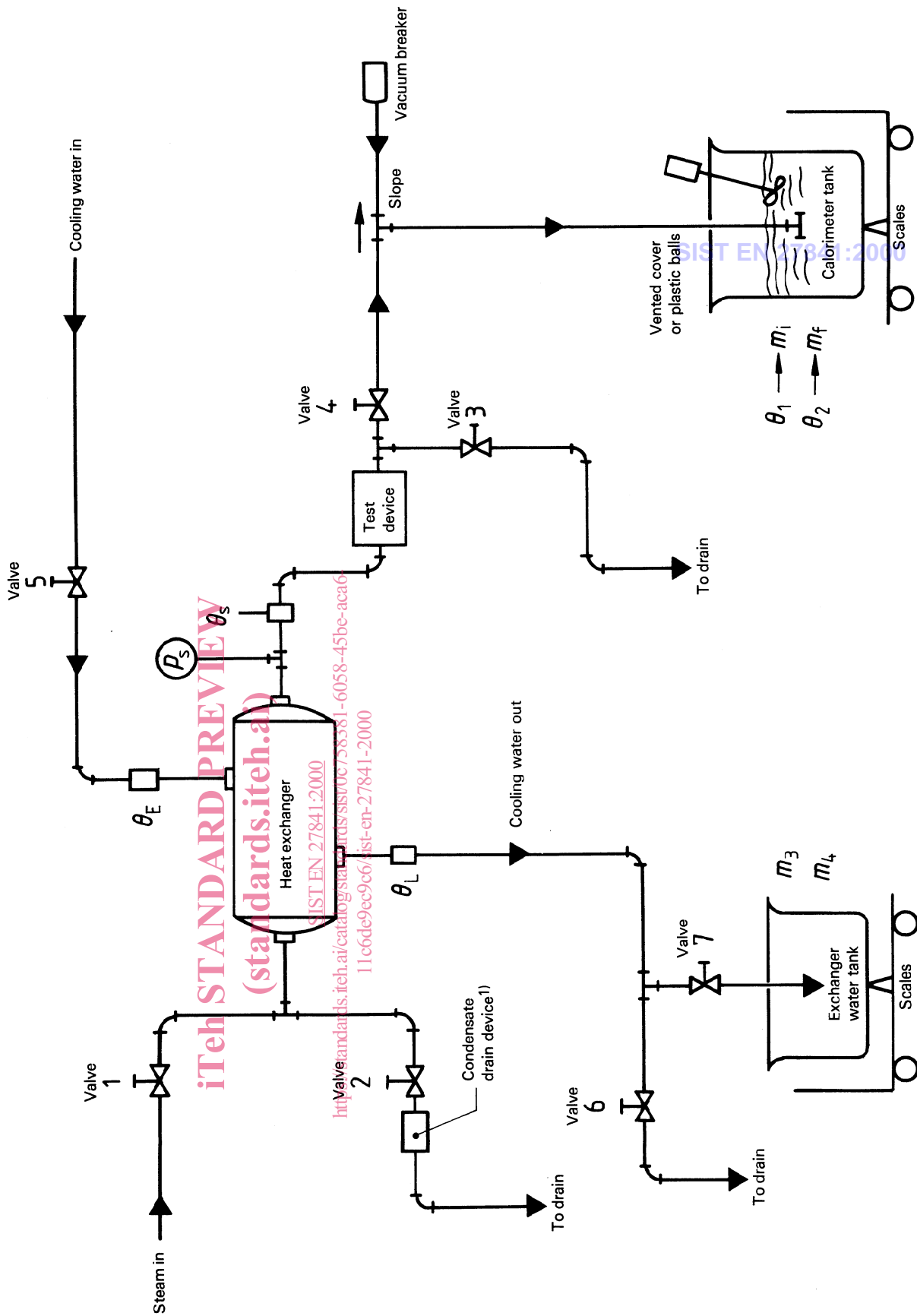


Figure 1 — Test arrangement for steam loss tests with test method A

1) Operating at steam temperature.

The test may be carried out at a pressure corresponding to the maximum working pressure of the trap, the test pressure not exceeding 32 bar¹⁾ with saturated steam (238 °C).

Load testing shall be carried out at 1 % of the maximum capacity of the trap at the corresponding test pressure with a minimum of 5 kg/h.

4.1 Procedure

4.1.1 No-load condition

Start with all valves closed and tanks empty.

4.1.1.1 Open valves 1, 2 and 3 to permit the drain and test devices to operate at test pressure p_s .

4.1.1.2 During warm-up, weigh and record the mass of the empty calorimeter tank m_t , and record the steam pressure p_s and steam temperature θ_s .

4.1.1.3 Fill the calorimeter tank with sufficient water (about half-full) to result in a test run of practical duration. The initial water temperature θ_1 should be at least 8 °C below ambient temperature θ_a . Record the water temperature θ_1 and mass of water plus tank m_1 .

4.1.1.4 When thermal equilibrium is reached, simultaneously and rapidly close valve 3, open valve 4, and start the timing interval. The use of a three-way valve is recommended to facilitate rapid closing and opening.

4.1.1.5 Stir the water in the tank as necessary to ensure a uniform water temperature.

4.1.1.6 When the temperature of the water in the tank is as many degrees above ambient as the initial temperature was below, rapidly close valve 4 and open valve 3 simultaneously, record the elapsed time, the final water temperature θ_2 and the mass of water plus tank m_2 .

4.1.1.7 Before the measurement, trial runs should be carried out to ensure that the test conditions have stabilized and that the pressure, temperature, initial amount of water in the calorimeter tank and load conditions are those required. When testing condensate removal devices, an error calculation is made from three consecutive tests to determine the accuracy of the test result. The error calculation is based on the instrumentation used and described in this International Standard; or the average result from three consecutive tests shall agree within 10 % or 500 g/h, whichever is the greater.

If this cannot be obtained, check the system for integrity and increase the calorimeter tank capacity.

4.1.2 Load condition

Start with all valves closed and both tanks empty.

4.1.2.1 Open valves 1, 2 and 3 to permit the drain and test devices to operate at test pressure p_s .

4.1.2.2 During warm-up, weigh and record the mass of the empty calorimeter tank m_t , and record the steam pressure p_s and steam temperature θ_s .

4.1.2.3 Open valves 5 and 6 to allow a flow of cooling water through the heat exchanger, to create the desired condensate load on the test device. After the system has come to equilibrium, this load can be determined by closing valve 6 and opening valve 7, to permit a known amount of water to be collected in a given time.

Record the temperature of water entering and leaving the heat exchanger, θ_E and θ_L , the initial and final mass of exchanger water plus tank, m_3 and m_4 , and the time Δt , in seconds, of run on the Data Sheet in 4.3. The approximate condensate load, in kilograms per hour, on the trap may then be calculated using the formula

$$\text{Load} = \frac{(\theta_L - \theta_E) (m_4 - m_3) \times 3\,600}{\Delta t \cdot h_{fgs}}$$

where h_{fgs} is the specific enthalpy of the evaporation at steam inlet conditions, in joules per kilogram.

4.1.2.4 If the load on the trap as determined in 4.1.2.3 is as desired, proceed to 4.1.2.5. If it is not as desired, adjust valve 5 accordingly and repeat the procedure in 4.1.2.3 until the desired load is obtained.

4.1.2.5 Fill the calorimeter tank with sufficient water (about half-full) to result in a test run of practical duration. The initial water temperature θ_1 should be at least 8 °C below ambient temperature θ_a . Record the water temperature θ_1 and mass of water plus tank m_1 .

4.1.2.6 When thermal equilibrium is reached, simultaneously and rapidly close valve 3, and open valve 4, and start the timing interval. The use of a three-way valve is recommended to facilitate rapid closing and opening.

4.1.2.7 Stir the water in the calorimeter tank as necessary to ensure a uniform water temperature.

4.1.2.8 When the temperature of the water in the calorimeter tank is as many degrees above ambient as the initial temperature was below, rapidly close valve 4 and open valve 3 simultaneously, record the elapsed time, the final water temperature θ_2 and the mass of water plus tank m_2 .

4.1.2.9 Before the measurement, trial runs should be carried out to ensure that the test conditions have stabilized and that the pressure, temperature, initial amount of water in the calorimeter tank and load conditions are those required. When testing condensate removal devices, an error calculation is made from three consecutive tests to determine the accuracy of the test result. The error calculation is based on the instrumentation used and described in this International Standard; or the average result from three consecutive tests shall agree within 10 % or 500 g/h, whichever is the greater.

1) 1 bar = 10⁵ Pa