

# Temperature relief - valve - I.S.P.E.S.L. approved

series 542



cert. n° 0003  
ISO 9001

01001/03 GB



## General

Temperature relief valves are made by Caleffi S.p.A. in compliance with the essential safety requirements laid down by Directive 97/23/CE of the European Parliament and the Council of the European Union for harmonisation of member States with regard to pressurised equipment.

## Function

Temperature relief valves are used in heating systems with the function of discharging water from the system when the calibrated limit temperature is reached.

These valves are "positive action" (fail-safe) devices, i.e. they will operate even in the case of failure of the sensor element.



## Product range

Series 542 Temperature relief valve - fail-safe action - I.S.P.E.S.L. approved \_\_\_\_\_ Sizes 1 1/2" M x 1 1/4" F, 1 1/2" M x 1 1/2" F

## Technical specification

### Materials:

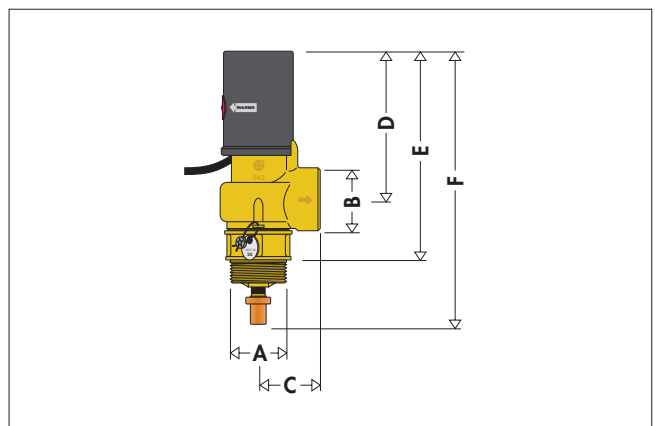
Body: brass EN 12165 CW617N  
Control spindle: brass EN 12164 CW614N  
Obturator seal: EPDM  
Seals: EPDM  
Springs: stainless steel  
Protective cover: PP

Working pressure:  $0,3 \leq P \leq 10$  bar  
Calibration temperature:  
1 1/2" x 1 1/4": 98°C  
1 1/2" x 1 1/2": 99°C  
Temperature range: 5÷100°C

Medium: water  
PED category: IV

Threaded connections: 1 1/2" M x 1 1/4" F  
1 1/2" M x 1 1/2" F

## Dimensions



| Code   | A      | B      | C  | D   | E   | F   |
|--------|--------|--------|----|-----|-----|-----|
| 542870 | 1 1/2" | 1 1/4" | 45 | 115 | 158 | 209 |
| 542880 | 1 1/2" | 1 1/2" | 53 | 131 | 183 | 239 |

## References to I.S.P.E.S.L. standards

According to the provisions of section "R" 1982 Edition, technical specification for application of chapter II of D.M. 1/12/75, regarding hot water systems (fluid temperature <100°C), the installation of temperature relief valves is required in the following cases:

### Open vented systems

- Heating systems having safety vent pipework which, for practical reasons, has an adverse slope. In this case, the heat discharge valve must be sized for the full output of the boiler (R.3.A. point 1.14).
- Systems with boilers fed with non-pulverized solid fuel, replacing the emergency heat exchanger (R.3.C. point 1).

### Sealed systems

- Heating systems where the required correlation between temperature increase and pressure rise does not exist (R.3.B. point 3.5).
- Heating systems with circulating pumps with no flow switch (R.3.B. point 5.4).
- Heating systems with a working pressure greater than 5 bar or of capacity greater than 300.000 kcal/h, replacing the second overheat thermostat (R.3.B. points 6.1 and 7.1).
- Water heaters with water supply temperatures above 100°C (R.3.E. point 1).

## Operating principle

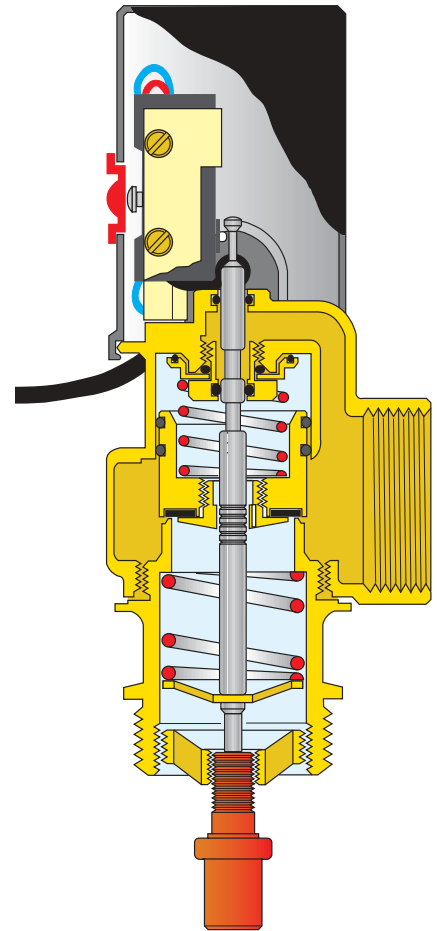
A temperature-sensitive element directly immersed in the fluid of the system acts on the valve actuator.

On reaching the calibrated limit temperature value, the valve opens and discharges water from the system.

The movement of the actuator in turn operates an electric switch which can be used to shut off the fuel supply to the burner or to activate the top-up reset device.

The position of the actuator and the consequent flow rate through the valve vary with the temperature of the fluid. When the limiting reclosing temperature is reached, the valve automatically closes.

The valve also features fail-safe operation; i.e. the discharge opens in the event of damage of the temperature-sensitive element.



## Operating characteristics

The values below represent the average results obtained in the certification test and are shown on the conformity certificates issued by the I.S.P.E.S.L.:

- calibration temperature at which the valve starts to open:
- discharge temperature at which the nominal discharge flow rate is achieved:
- reclosing temperature at which the valve re-closes in the temperature reduction phase:
- emergency intervention temperature at which the valve starts to open if the thermostatic element is damaged fail-safe action:
- discharge flow rate given by the graph, attached to each valve, based on the equation  $Gv = kv \cdot \Delta p^n$  where:

**Gv** is the flow rate in l/h of water at temperature t1, discharged by the valve;  
**kv** is the nominal characteristic flow rate of the valve, of value:  
 (the lower of that measured in normal operation and that measured in fail-safe action, when  $\Delta p = 1$  bar);  
 **$\Delta p$**  is the difference between the pressures upstream and downstream of the valve. When top-up reset is used,  $\Delta p$  is taken as the hydrostatic pressure at the point where the valve is installed, whilst otherwise,  $\Delta p$  takes the conventional set value of 0,5 bar;  
**n** is the exponent of the variable  $\Delta p$  of value:

- heat capacity P without top-up reset:

| 1 1/2" x 1 1/4"                   | 1 1/2" x 1 1/2"                   |
|-----------------------------------|-----------------------------------|
| t <sub>0</sub> = 98°C             | t <sub>0</sub> = 99°C             |
| t <sub>1</sub> = 104°C            | t <sub>1</sub> = 99°C             |
| t <sub>2</sub> = 95°C             | t <sub>2</sub> = 96°C             |
| t <sub>E</sub> = 99°C             | t <sub>E</sub> = 98,5°C           |
| 6.100 l/h                         | 20.300 l/h                        |
| 0,382                             | 0,495                             |
| <b>136 kW</b><br>(117.000 kcal/h) | <b>419 kW</b><br>(360.100 kcal/h) |

## Sizing

### With top-up reset

When total top-up of the water discharged by the valve is provided for, the valve must discharge, at working pressure, a flow of water:

$$G_v \geq G_r \text{ i.e. } (G_v = K_v \cdot \Delta p) \geq (G_r = P/80) \text{ [l/h]}$$

Where  $G_r$  is the required flow rate and  $P$  [Kcal/h] the rated output of the boiler.

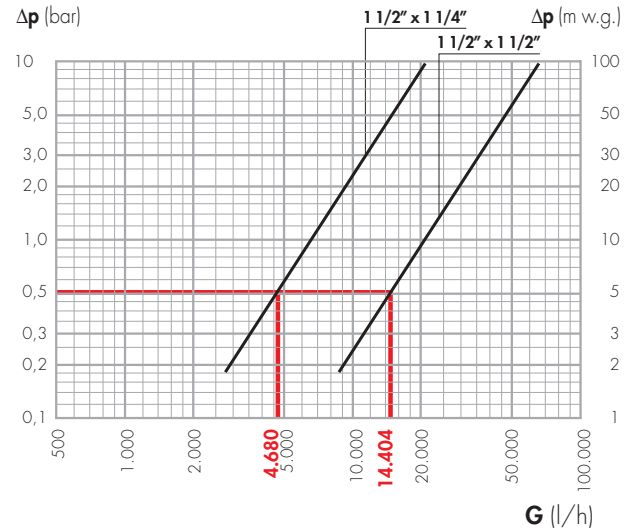
### Without top-up reset

When top-up resetting of the water discharged by the valve is not provided for, the valve must discharge, at a pressure of 0,5 bar, a flow of water:

$$G_v \geq G_r \text{ i.e. } (G_v = K_v \cdot 0,5) \geq (G_r = P/25) \text{ [l/h]}$$

Where  $G_r$  is the required flow rate and  $P$  [Kcal/h] the rated output of the boiler.

The discharge flow rate can also be calculated by using the graph shown alongside. The discharge flow rates without top-up reset are shown in red.



## Certification

### CE mark

The series 542 temperature relief valves meets the requirements of Directive 97/23/CE for pressurised equipment (also referred to as the PED). They are therefore classified in category IV and granted the CE mark. In addition, the electrical components meet the requirements of Directive 73/23/CE.

### I.S.P.E.S.L. mark

The series 542 temperature relief valves is a component which is also "I.S.P.E.S.L." approved. Devices of this type are covered by the following types of document:

**The approval certificate** is the document issued by the I.S.P.E.S.L. which confirms the positive result of the tests carried out on the prototype sample and consequently certifies that the series in question has been approved.

The document is valid for five years. Every item of the series covered by the certificate, which is manufactured during the five years' validity period, is approved for an indefinite period.

**The bench calibration report** is the document confirming the testing of each individual device included in the approved series. The test is carried out in the presence of an I.S.P.E.S.L. inspector who draws up the report after the test has been passed. The document gives the serial number of the valve, which is also to be found on the plate fixed to the valve body.

**There is only one copy of the report and it is therefore vital for it to be kept with the valve.**

## Installation

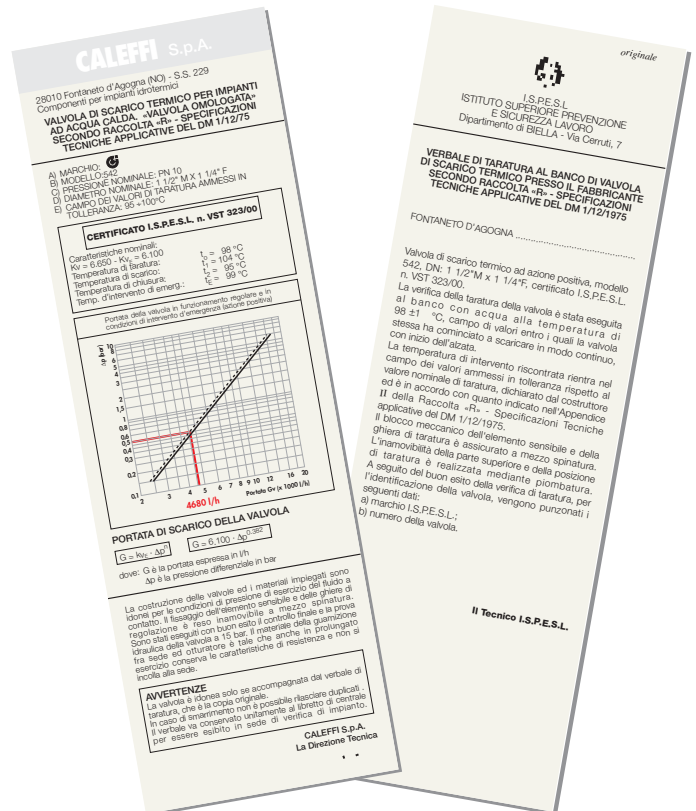
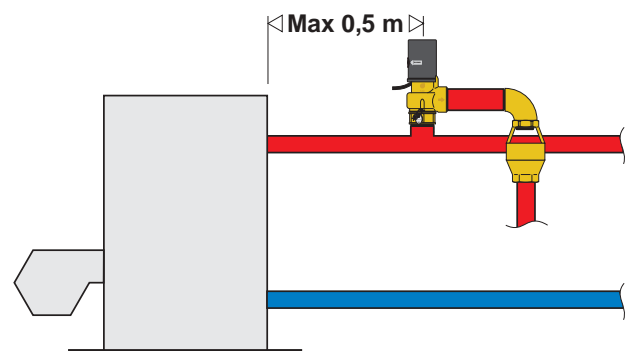
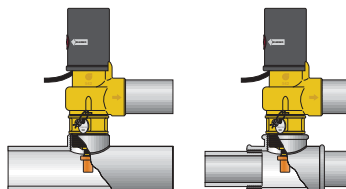
Before installing a temperature relief valve, correct sizing must be carried out by specialist technical personnel in accordance with the current legislation governing the specific applications. It shall not be used other than for its stated purpose.

The temperature relief valve must be installed by competent technical personnel qualified in accordance with current legislation. The temperature relief valve must be installed on line with the flow direction indicated by the arrow on the valve body.

The temperature relief valve should be installed as close as possible to the boiler, either on the top of the boiler or in the flow pipework within 0,5 metres of the boiler and upstream of any shut-off device.

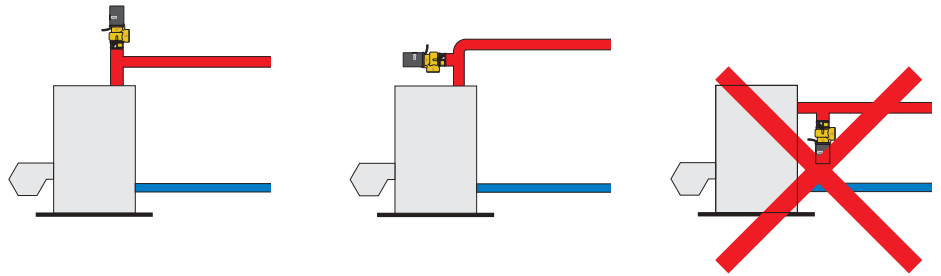
a) For pipework up to 2", use of a tee-piece is recommended;

b) for pipework of 2" and over, a welded connection may be used, whose collar height, for correct positioning of the temperature-sensitive element, must be 15 mm.



### Fitting

The temperature relief valve can be fitted vertically or horizontally, but not upside down. This prevents deposits of impurities from affecting correct functioning.

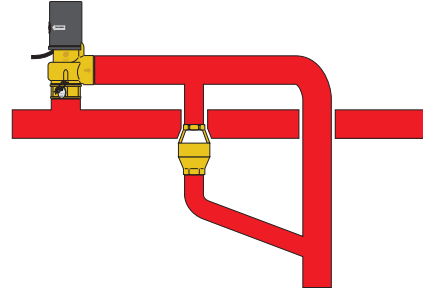


### Discharge pipework

As the temperature relief valve is designed to discharge, in relation to the pressures involved, considerable flows of water, the discharge pipework must be as short as possible, and of diameter not less than that of the outlet of the valve itself.

The discharge pipework from the temperature relief valve must be fitted in such a way as not to prevent the correct operation of the valve and not to cause damage or injury.

In accordance with current legislation, the outlet of the temperature relief valve must be visible and connected to a suitable drain pipework.



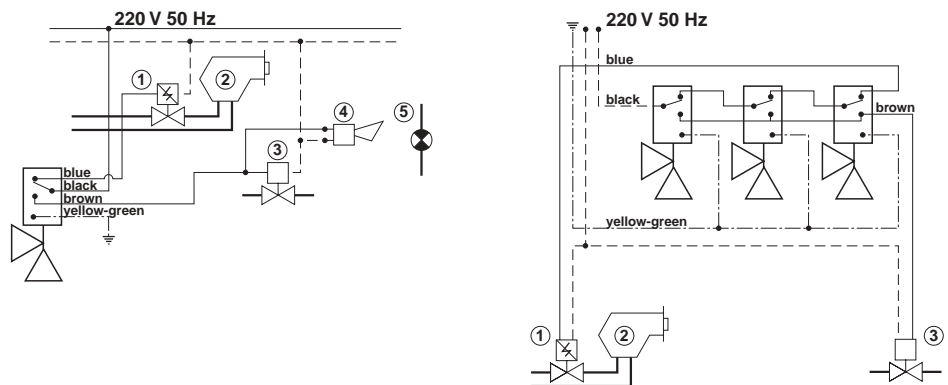
### Auxiliary micro-switch

The temperature relief valve has a micro-switch with changeover contact which is activated after the discharge has opened. This can be used, for example, to shut off the burner or to control the top-up reset device.

After the micro-switch has been activated, it must be reset manually by means of the pushbutton on the upper cover.

### Electrical connections

1. solenoid valve on the fuel supply;
2. burner;
3. motorised valve for supplying top-up water (optional);
4. audible alarm (optional, not mandatory);
5. visual alarm (alternative to the audible alarm).



## SPECIFICATION SUMMARIES

### Series 542

Temperature relief valve. I.S.P.E.S.L. approved and calibrated. Bearing CE mark as per Directive 97/23/CE and 73/23/CE. Positive action (fail-safe). Threaded connections 1 1/2" M x 1 1/4" F (1 1/2" M x 1 1/2" F). Brass body. Stainless steel springs. EPDM seals. Complete with 4-wire cable with manual reset electric changeover switch. Calibration temperature at which the valve starts to open: 98°C. Maximum working pressure 10 bar.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.

