Temperature relief valve certified and calibrated to INAIL (previously ISPESL) standards

542 series

01001/18
replaces dp 01001/03 GB

General

The temperature relief valves are made by Caleffi S.p.A. in compliance with the essential safety requirements laid down by Directive 2014/68/EU of the European Parliament and the Council of the European Union for harmonisation of member states with regard to pressurised equipment.

Function

The temperature relief valves are used in heating systems to discharge water from the system when the set temperature is reached. The valves have positive action, which means that they will always work, even if the sensitive element fails.

Product range

542 series Temperature relief valve with positive action, certified and calibrated to INAIL standards _____ sizes 1 1/2" M x 1 1/4" F, 1 1/2" M x 1 1/2" F

Technical specifications

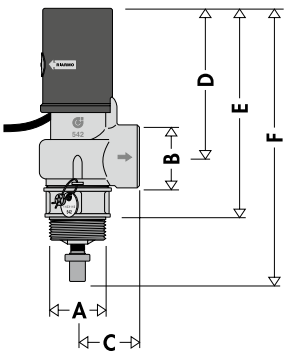
Materials

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

Performance

Medium: water		
PED category:		IV
Working pressure:		0.3 ≤ P ≤ 10 bar
Setting temperature:	- 1 1/2" x 1 1/4":	98°C
	- 1 1/2" x 1 1/2":	99°C
Operating temperature range:		5–100°C
Auxiliary microswitch contact rating:		15 A
Threaded connections:		1 1/2" M x 1 1/4" F
		1 1/2" M x 1 1/2" F

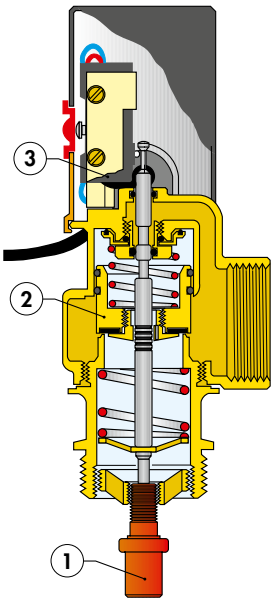
Dimensions



Code	A	B	C	D	E	F	Mass (kg)
542870	1 1/2"	1 1/4"	45	115	158	209	1,3
542880	1 1/2"	1 1/2"	53	131	183	239	1,7

Operating principle

A temperature-sensitive element (1), immersed directly in the system medium, acts on the obturator (2) of the valve.
On reaching the set temperature, the valve opens and discharges the water from the system.
The obturator movement actuates an electric switch (3), which can be used to stop the fuel supply to the burner or to turn on the refilling device.
The obturator position, and therefore the valve flow rate, vary according to the temperature of the medium. On reaching the set closing temperature, the valve closes automatically.
Moreover, the valves have positive action, which means that they will always open the drain, even if the sensitive element fails.



Reference standards

According to the provisions of Collection R Ed. 2009, technical application specifications of Heading II of Italian Ministerial Decree 1/12/75 regarding central heating systems using hot water with temperatures no greater than 110°C and a maximum nominal heat output from the firebox (or maximum total heat capacity of the firebox) greater than 35 kW, a temperature relief valve must be used in the following cases:

Open vessel systems

- Systems with generators supplied with non-pulverized solid fuel, in place of the consumption water heater or emergency heat exchanger (Chap. R.3.C., point 2.1).

Closed vessel systems

- Systems with closed expansion tanks (Chap. R.3.B., point 1, letter b).
- Heating systems with generators supplied with non-pulverized solid fuel (Chap. R.3.C., point 3.2) not including “assemblies” (pressure equipment provided by the manufacturer as an integrated functional assembly) covered by point C, paragraph 2, art. 3 of Italian Legislative Decree 25.02.2000 no. 93 (implementation of the 97/23/CE – PED Directive). For systems with nominal powers up to 100 kW and partial cut-off, the residual power dissipation device may consist of temperature relief valves alone.
- Systems with heat exchangers whose primary circuits are supplied with a medium at temperatures above 110°C (Chap. R.3.D., point 2.2.1, letter g)).
- Direct contact water heaters for domestic and technological use (Chap. R.3.E.). Follow the requirement of Chap. R.3.B..
- Systems with modular heat generators (Chap. R.3.F. point 2.2). In addition to the requirements of point 2.1, unless they are installed inside the outer jacket, the safety, protection and control devices, including the expansion system referred to in Chap. R.3.A. and Chap. R.3.B., must be installed on the flow pipe, immediately after the last module and no more than 1 m from the jacket, as long as the temperature and pressure in the single modules does not exceed the respective rated values.
- Solar panel systems (Chap. R.3.H., point 3.2.2., letter C)). See 542 SOL series (Tech. broch. 01244).

Certification

CE Mark

The 542 series temperature relief valves meet the requirements of Directive 2014/68/CE for pressurised equipment (also referred to as PED). They are therefore classified as category IV and are CE marked. Moreover, the electrical components comply with the requirements of Directive 2014/35/EU.

Collection R Ed. 2009

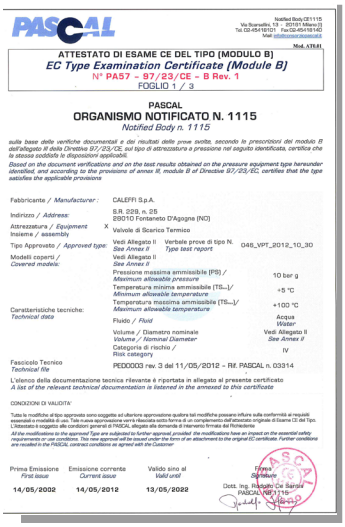
The provisions of point 7, chapter R.2.A of Collection R Ed. 2009, further reiterated by INAIL circular no. 1539 of 11 March 2011, establish that safety devices certified according to Directive 2014/68/EU (PED) shall be accepted automatically for the use covered by the Collection.

Also pursuant to Collection R Ed. 2009, such devices, and therefore also temperature relief valves, must be accompanied by the following documents: manufacturer's certificate and bench calibration report.

The manufacturer's certificate is a document that provides the technical specifications of the valve, which are derived from testing carried out during certification.
The manufacturer's certificate also contains details of the certification document.
Each part in the series covered by the manufacturer's certificate, manufactured in the period for which the PED certification is valid, is certified indefinitely (there is no expiry date).

The bench calibration report is a document that attests that the set temperature was tested for each single temperature relief valve.
This check is carried out in the presence of an INAIL official, who draws up and signs the report following a successful outcome.
The report indicates the serial number of the valve, which is also given on a plate secured to the valve body.
There is only one copy of the report, so it must be kept together with the valve.

Certified CE mark


PASCAL

ATTESTATO DI ESAME CE DEL TIPO (MODULO B)
EC Type Examination Certificate (Module B)
N° PA57 - 97/23/CE - B Rev. 1
FOGLIO 1 / 3

PASCAL
ORGANISMO NOTIFICATO N. 1115
Notified Body n. 1115

Fabbricante / *Manufacturer*: CALEFFI S.p.A.
Indirizzo / *Address*: S.R. 229, n. 25, 28010 Fontaneto D'Agogna (NO)
Attrezzatura / *Equipment*: X — Valvola di Scarico Termico
Insieme / *assembly*
Tipo Approvato / *Approved type*: Vedi Allegato II / *See Annex II* — Verbale prove di tipo N. / *Type test report*: 048_VPT_2012_10_30
Modelli coperti / *Covered models*: Vedi Allegato II / *See Annex II*
Caratteristiche tecniche / *Technical data*:
Pressione massima ammissibile (PS) / *Maximum allowable pressure*: 10 bar g
Temperatura minima ammissibile (TS-) / *Minimum allowable temperature*: +5 °C
Temperatura massima ammissibile (TS+) / *Maximum allowable temperature*: +100 °C
Fluido / *Fluid*: Acqua / *Water*
Volume / Diametro nominale / *Volume / Nominal Diameter*: Vedi Allegato II / *See Annex II*
Categoria di rischio / *Risk category*: IV
Fascicolo Tecnico / *Technical file*: PED0003 rev. 3 del 11/05/2012 - Rif. PASCAL n. 03314

L'elenco della documentazione tecnica rilevante è riportata in allegato al presente certificato
A list of the relevant technical documentation is listened in the annexed to this certificate

CONDIZIONI DI VALIDITA'

Prima Emissione / *First issue*	Emissione corrente / *Current issue*	Valido sino al / *Valid until*
14/05/2002	14/05/2012	13/05/2022

Firma / *Signature*
Dott. Ing. Rodolfo De Sanctis
PASCAL NB 1115

Manufacturer's certificate


CALEFFI Hydronic Solutions

28010 Fontaneto d'Agogna (NO) - S.R. 229 - N. 25

VALVOLA DI SCARICO TERMICO
PER IMPIANTI AD ACQUA CALDA.
RACCOLTA R - SPECIFICAZIONI TECNICHE
APPLICATIVE DEL DM 1/12/75

A) MARCHIO:
B) MODELLO: 542
C) PRESSIONE NOMINALE: PN 10
D) DIAMETRO NOMINALE: 1 1/2" M X 1 1/2" F
E) CAMPO DEI VALORI DI TARATURA AMMESSI IN TOLLERANZA: 95 ÷ 100°C

Caratteristiche nominali:
Kv_{tc} = 21.600 - Kv_{ti} = 20.300
Temperatura di taratura: t_c = 99°C
Temperatura di scarico: t_c = 99°C
Temperatura di richiusura: t_c = 95°C
Temp. d'intervento di emerg.: t_{ie} = 98,5°C

Portata della valvola in funzionamento normale e in condizioni di intervento d'emergenza (azione positiva)

PORTATA DI SCARICO DELLA VALVOLA

$G = Kv_{tc} \cdot \Delta p^{0,5}$ — $G = 20.300 \cdot \Delta p^{0,495}$

dove: G è la portata espressa in l/h
Δp è la pressione differenziale in bar

Certificato del fabbricante

La costruzione delle valvole ed i materiali impiegati sono idonei per le condizioni di esercizio del fluido a contatto. Il fissaggio dell'elemento sensibile e delle ghiere di regolazione è reso inamovibile a mezzo spinatura.
Il materiale della guarnizione fra sede ed otturatore è tale che anche in prolungato esercizio conserva le caratteristiche di resistenza e non si incolla alla sede.

Certificato PASCAL N. PA057

AVVERTENZE
La valvola è idonea solo se accompagnata dal verbale di taratura, che è la copia originale.
In caso di smarrimento non è possibile rilasciare duplicati. Il verbale va conservato unitamente al libretto di centrale per essere esibito in sede di verifica di impianto.

CALEFFI S.p.A.
La Direzione Tecnica

Bench test report


originale

INAIL
UNITÀ OPERATIVA TERRITORIALE DI CERTIFICAZIONE, VERIFICA E RICERCA DI BIELLA
Via Aldo Moro, 13

VALVOLA DI SCARICO TERMICO
PER IMPIANTI AD ACQUA CALDA.
VERBALE DI TARATURA AL BANCO PRESSO
IL FABBRICANTE SECONDO RACCOLTA R -
SPECIFICAZIONI TECNICHE APPLICATIVE
DEL DM 1/12/1975

FONTANETO D'AGOGNA .....

Valvola di scarico termico ad azione positiva, modello 542, 1 1/2" M x 1 1/2" F, certificato PASCAL N. PA057.

La verifica della taratura della valvola è stata eseguita al banco con acqua alla temperatura di 98 ±1°C, campo di valori entro i quali la valvola stessa ha cominciato a scaricare in modo continuo, con inizio dell'alzata.
La temperatura di intervento riscontrata rientra nel campo dei valori ammessi in tolleranza rispetto al valore nominale di taratura, dichiarato dal costruttore ed è in accordo con quanto indicato nelle vigenti disposizioni.
Il blocco meccanico dell'elemento sensibile e della ghiera di regolazione è assicurato a mezzo spinatura. L'inamovibilità della parte superiore e della posizione di taratura è realizzata mediante piombatura.
A seguito del buon esito della verifica di taratura, per l'identificazione della valvola, vengono punzonati i seguenti dati:

Marchio INAIL
Numero della valvola

Il Tecnico

S8229.10

Operating specifications

	1 1/2" x 1 1/4"	1 1/2" x 1 1/2"
The following are average results from the qualification tests and are given on the certificates issued by INAIL:		
- temperature setting, at which the valve starts to open:	t_o= 98°C	t_o= 99°C
- discharge temperature, at which the nominal flow rate occurs:	t_1= 104°C	t_1= 99°C
- closing temperature, at which the valve closes as the temperature drops:	t_2= 95°C	t_2= 96°C
- emergency trip temperature, at which the valve starts to open if the thermostatic element fails (positive action):	t_E= 99°C	t_E= 98,5°C
- discharge flow rate given by the graph that accompanies each valve, from the equation $G= Kv \cdot \Delta p^n$ where		
G is the flow rate in l/h of water at a temperature of t_1, discharged by the valve;		
Kv is the valve flow coefficient, i.e. its characteristic nominal flow, equal to: (the value given is the smallest among those measured during normal operation Kv_N and during positive action Kv_E with Δp = 1 bar, values derived from the manufacturer's certificate).	6,100 l/h	20,300 l/h
The following definitions apply:		
- Normal flow coefficient Kv_N: the valve flow rate in l/h at the discharge temperature with a pressure difference of 1 bar at the drain.	6,650 l/h	21,600 l/h
- Emergency flow coefficient Kv_N: the valve flow rate in l/h at the emergency trip temperature with a pressure difference of 1 bar at the drain.	6,100 l/h	20,300 l/h
Δp is the different in pressure before and after the valve. If there is refilling, Δp is the hydrostatic pressure at the point in which the valve is installed, otherwise, Δp is given a conventional set value of 0.5 bar;		
n is the exponent of the variable Δp and has a value of:	0.382	0.495
- heat flow P without refilling:	**136 kW (117,000 kcal/h)**	**419 kW (360,100 kcal/h)**
- flow rate without refilling (Kv= Kv_E, Δp=0.5 bar)	4,680 l/h	14,404 l/h

Sizing

For sizing, refer to Collection R Ed. 2009, chap. R.2.A., point 3 and related sub-points indicated in brackets.

With refilling

If there is total refilling from the water mains the following formula is used to calculate the discharge flow rate, unless using an autoclave (point 3.7.1):

$G = P/0.093$ Discharge flow rate [l/h]

where P is the nominal heat power of the generator expressed in kW. This flow rate value must not be higher than that obtained from the temperature relief valve diagram at the effective system operating temperature, or using the formula

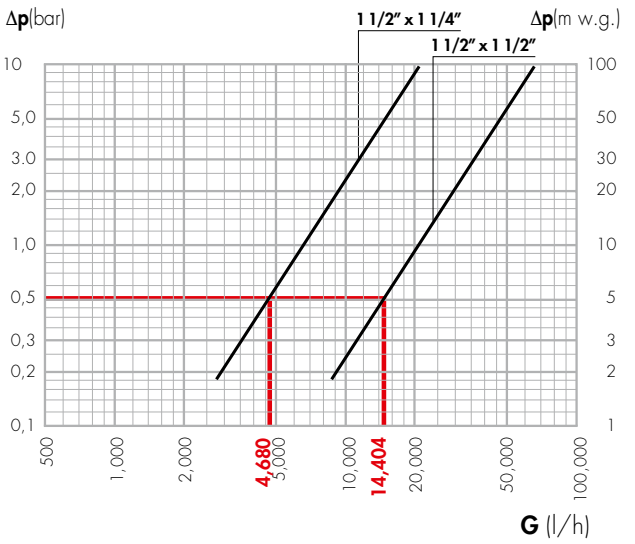
$G = Kv \cdot \Delta p^n$.

Partial or no refilling

Collection R Ed. 2009 considers partial refilling to be the same as no refilling (point 3.7.2.).
The discharge flow rate is calculated as:

$G = P/0.029$ Discharge flow rate [l/h]

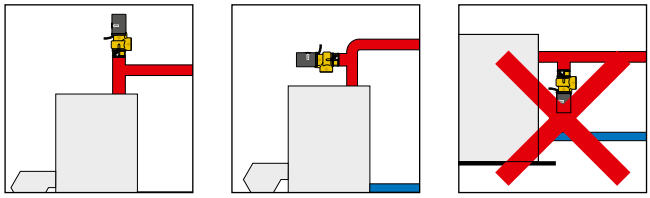
where P is the nominal heat power of the generator expressed in kW with an assumed conventional pressure of 0.5 bar.
This flow rate value must not be higher than that obtained from the temperature relief valve diagram at a discharge pressure of 0.5 bar, or using the formula $G = Kv \cdot \Delta p^n$, with a discharge pressure of 0.5 bar.



Size	1 1/2" x 1 1/4"	1 1/2" x 1 1/2"
Kv= Kv_E (l/h)	6,100	20,300

Mounting

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

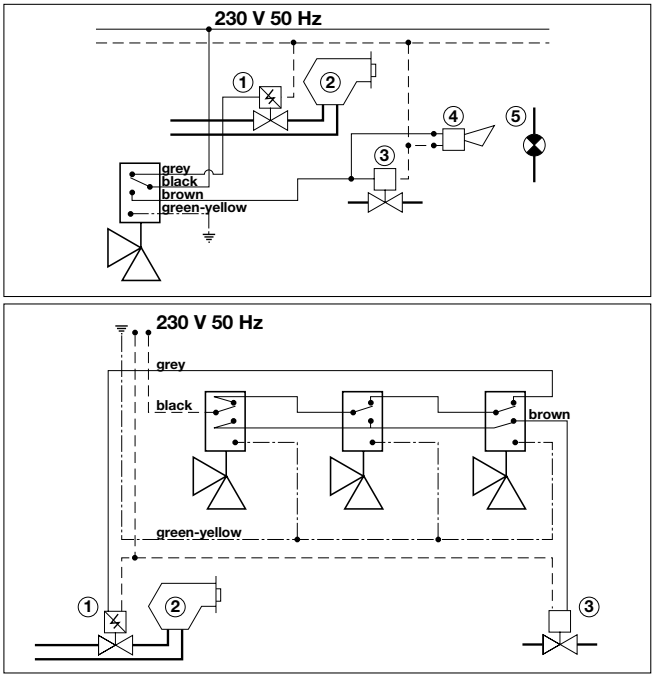


Auxiliary microswitch

The temperature relief valve has a microswitch with a changeover contact that switches when the discharge opens. It can be used, for example, to stop the burner or activate the refilling device.
After the microswitch has tripped, it must be reset manually using the button on the top cover.

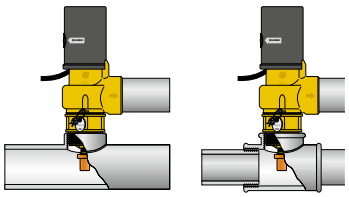
Electric connections

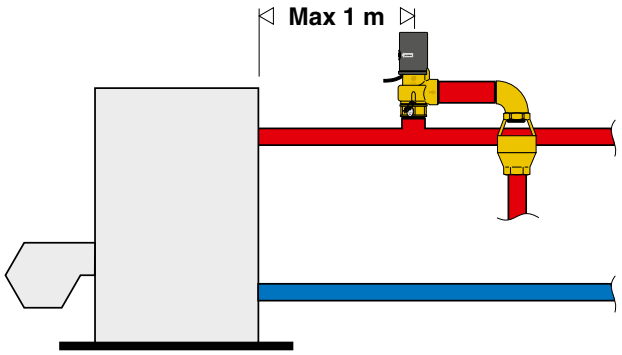
1. solenoid valve on the fuel supply;
2. burner;
3. possible motorised valve to supply the refilling water;
4. audible and/or visible alarm (5).



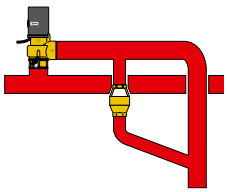
Installation

Before installing a temperature relief valve, it must be correctly sized by qualified technical personnel in accordance with the current regulations governing the specific applications. Any use other than the intended use is prohibited
Temperature relief valves must be installed by qualified technical personnel in accordance with current regulations.
The temperature relief valve must be installed in accordance 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 generator, at the top of it, or no more than 1 m away on the flow pipe, before any shut-off device.
a) For pipes up to 2", we recommend using a T fitting.
b) For pipes over 2", it is possible to solder a sleeve, which should be at a height of 15 mm to position the sensitive element properly.





Discharge pipe



Since the temperature relief valve is built to discharge significant water flow rates, considering the pressures involved, it is necessary to provide discharge pipes that are as short as possible, with a diameter at least as big as that of the valve outlet.
The temperature relief valve discharge pipe must not obstruct normal valve operation and must not endanger people or things.
In accordance with applicable regulations, the temperature relief valve drain must be visible and piped using suitable collection pipes.

SPECIFICATION SUMMARY

542 series

Temperature relief valve certified and calibrated to INAIL standards. CE marked in accordance with directives 2014/68/EU and 2014/35/EU. With positive action. 1 1/2" M x 1 1/4" F (1 1/2" M x 1 1/2" F) threaded connections. Brass body. Stainless steel springs. EPDM seals. PP protective cover. Medium: water Complete with 4-wire cable and electric changeover switch with manual reset. Microswitch auxiliary contact rating 15 A. Operating temperature range 5–100°C. Temperature setting at which the valve starts to open 98°C (1 1/2" x 1 1/4"), 99°C (1 1/2" x 1 1/2"). Maximum operating temperature 10 bar.

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