

# Safety valves

## 3061 - 3065



## General description

These safety valves series 3061 and 3065 are safety devices according to the definition given in Article 1, Point 2.1.3, 2<sup>nd</sup> dash of 97/23/EC Directive and are the subject of Article 3, Point 1.4) of aforesaid Directive.

The valves above mentioned are direct-loaded type, unbalanced, conveyed discharge. Valve opening is produced by the thrust the fluid under pressure exerts on the disc, when said thrust exceeds, under setting conditions, the opposing force of the spring acting on the disc.

The safety valves series 3061 and 3065 are manufactured in accordance with European standard EN ISO 4126-1: 2013, relative either to the design / construction of the valves or to the functional characteristics of the same.

## Construction

**Body:** squared, obtained through die forging and subsequent machining. It houses the following elements:

- the nozzle with flat sealing seat
- the disc guide
- the setting spring holder
- the threaded seat of the setting adjusting ring nut

In the body, above the disc guide, a small pressure relief duct is provided through which the spring holder is put into contact with the output connection. Utilized material: EN 12420-CW617N brass.

**Disc:** obtained through bar machining and equipped with gasket, it ensures the required sealing degree on the valve seat. The gasket is made with modified P.T.F.E. (Polytetrafluorethylene), a material that, during valve estimated service life, maintains a good strength and does not cause the disc to stick on the seat. The disc is properly guided in the body and the guide action can never fail; there are no glands or retaining rings that hamper the movement thereof. Utilized material: EN 12164-CW614N brass

**Spring:** it opposes the pressure and the fluid dynamic actions and always ensures valve re-closing after

pressure relief. The designed characteristics of the springs comply with European standard EN ISO 4126-7: 2013; specifically, the shutter is equipped with a mechanical stop that prevents the spring compression, on conditions of full discharge, exceed 80% of the total compression (free length – closed wound length).

Utilized material: EN 10270-2 – FDSiCr.

**Setting system:** hexagonal head, threaded ring nut to be screwed inside the body top by compressing the spring below. On setting completion, the position attained by the ring nut is maintained unchanged laying, in the threaded coupling, a bonding agent with high mechanic strength and low viscosity features to make penetration thereof easier. The setting system is protected against subsequent unauthorized interventions by means of a cap nut that is housed into the brass body and is fixed in this seat with an edge calking operation.

## Scope

**Use:** protection against possible overpressures of the apparatuses listed below, with regard to the operating conditions for which they have been designed:

- Refrigerating system and heat pump components, for instance: condensers, liquid receivers, evaporators, liquid accumulators, positive displacement compressor discharge, heat exchangers, oil separators, piping. (reference: EN 378-2:2008 Standard)
- Simple pressure vessels (reference: 2009/105/EC Directive)

**Fluids:** the valves can be used with:

- Refrigerant fluids, in the physical state of gas or vapour, belonging to Group 1 according to the definitions of 2014/68/EU Directive, Article 13, Point 1.a (reference to CE Regulation No 1272/2008).
- Air and nitrogen (reference: 2009/105/EC Directive)

## Valve selection

97/23/EC Directive requires that pressure equipment, in which permissible limits are reasonably likely to be exceeded, shall be fitted with suitable protection



devices, for instance safety devices such as safety valves. Such devices shall prevent pressure from permanently exceeding the max allowable pressure PS of the equipment they protect. In any case, a short pressure peak limited to 10% of admissible maximum pressure is permitted.

As to the selection and sizing of the suitable protection device, users shall refer to the specific product and sector standards.

EN ISO 4126-1: 2013 Standard: "Safety devices for protection against excessive pressure – Part 1: Safety valves", harmonized with 97/23/EC Directive, specifies general requirements for safety valves irrespective of the fluid for which they are designed.

EN 378-2 : 2009 Standard "Refrigerating systems and heat pumps – safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation", harmonized with 97/23/EC Directive, provides a general outline of the protection devices to be adopted in refrigerating systems and their features (par. 6.2.5). It also indicates the criteria for the selection of the device suitable to the type and sizes of the system component to be protected (par. 6.2.6).

EN 13136:2013 Standard "Refrigerating systems and heat pumps – Pressure relief devices and their associated piping – Methods for calculation", harmonized with 97/23/EC Directive, highlights the possible causes of overpressure in a system and makes available to users the instruments for pressure relief device sizing, among which the safety valves.

## Valve installation

As required under the European standard EN ISO 4126-1: 2013, the safety valves series 3061 and 3065 are guaranteed for reproducibility of performance, this means that after the valves have operated, open/close, the initial setting conditions are maintained. Nevertheless it is advisable to replace valve 3030 once it has discharged because during release, piping

debris, as metal shavings or solder impurities, can place on the valve gasket and then, inhibits the safety valve from reseating at its originally conditions.

As far as the installation of safety relief valves is concerned, the fundamental points listed below shall be taken into account:

- Safety valves shall be installed near an area of the system where vapours or gases are present and there is no fluid turbulence; the position shall be as upright as possible, with the inlet connector turned downwards.
- Vessels, joined together with piping rightly selected by the manufacturer and without any stop valve between them, may be considered as only one vessel for the installation of a safety valve.
- The union between the valve and the equipment to be protected shall be as short as possible. Furthermore, its passage section shall not be narrower than the valve inlet section. In any case, EN 13136:2013 Standard states that the pressure loss between protected vessel and safety valve, at discharge capacity, shall not exceed 3% of the setting value, including any accessory mounted on the upstream line.
- In selecting the safety valve location, it shall be taken into account that valve operation involves the discharge of the refrigerant fluid under pressure, sometimes even at high temperature. Where the risk exists to cause direct injuries to the persons nearby, an exhaust conveying piping shall be provided, which shall be sized in such a way as not to compromise valve operation. EN 13136:2013 Standard states that this piping shall not generate, at discharge capacity, a back pressure exceeding 10% of pressure  $p_0$ , for standard type valves, unbalanced.

To calculate the pressure loss either in the upstream line (between vessel and safety valve) or in the downstream line (between safety valve and atmosphere) refer to EN 13136:2013 Standard, Chapter 7.4.

## General Characteristics

| Catalogue Number                |             | 3061/2              | 3061/3   | 3061/4   | 3065/4   | 3065/6   |
|---------------------------------|-------------|---------------------|----------|----------|----------|----------|
| Connections                     | Inlet male  | 1/4" NPT            | 3/8" NPT | 1/2" NPT | 1/2" NPT | 3/4" NPT |
|                                 | Outlet male | 3/8" G-M            | 1/2" G-M | 1/2" G-M | 1" G-M   | 1" G-M   |
| Flow Diameter [mm]              |             | 7,5                 | 7,5      | 7,5      | 13,5     | 13,5     |
| Flow Section [mm <sup>2</sup> ] |             | 44,2                | 44,2     | 44,2     | 143,1    | 143,1    |
| Discharge Coefficient "Kd"      |             | 0,8                 | 0,8      | 0,8      | 0,92     | 0,92     |
| PS [bar]                        |             | 70                  |          |          |          |          |
| TS [°C]                         |             | - 50 / + 120        |          |          |          |          |
| Set Pressure Range [bar]        |             | 10 / 60             |          |          |          |          |
| Overpressure                    |             | 10% of set pressure |          |          |          |          |
| Blowdown                        |             | 15% of set pressure |          |          |          |          |
| Risk Category according to PED  |             | IV                  |          |          |          |          |



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Via Provinciale, 2-4 [C.P. 67] - 20060 Pessano con Bornago (MI) - Tel. +39 02.957021 - Fax +39 02.95741317 - email [info@castel.it](mailto:info@castel.it) - [www.castel.it](http://www.castel.it)