NUOVA GENERAL INSTRUMENTS

MAINTENANCE AND USE MANUAL

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The use and maintenance manual is the document that accompanies the valve from its construction to its scrapping. It is therefore an integral part of it. Read the manual before performing any operations on the equipment, including handling and unloading it from the transport vehicle. Instruct personnel responsible for installation. The user and the maintenance technician must be familiar with the contents of this manual.

CAUTION: The user is responsible for checking the compatibility of the valve type and the construction material with the fluid and the operating and process conditions. Checks made by NGI are based solely on the information provided by the buyer/user. The user is responsible storage, installation, periodic checks and maintenance.

Take the utmost care in the use of safety valves, as this manual is not, and cannot be, exhaustive and does not provide for all its possible installations and uses. NGI safety valves are designed for fluids such as gases, vapours and liquids. The passage of dust and/or solids through the seal seat can compromise functioning. The following factors were not taken into consideration in the design: Stress caused by earthquakes, Wind loads, Fatigue stresses. In case of external fire when the operating temperature is exceeded, the seal seat of the safety valve collapses and the latter will be automatically discharged. To avoid this, make use of suitable cooling and protection systems.

1. WARRANTY - Whenever communicating with NGI, always mention the type of valve and the serial number indicated on the valve body. NGI products are guaranteed for a period of 12 months (depending however on the law in force) from the testing date shown on the certificate. All parts found to be defective in material or workmanship will be replaced free of charge ex NGI. Other claims due to wear and tear, dirt, incompetent handling, etc. shall be rejected by NGI, as well as other contractual guarantees. Any complaints relating to the goods received in a quantity or execution different from that ordered must be received by NGI in writing within a maximum of 10 days of receipt of the material. The average life of elastomer seal seat safety valves in their specific operating conditions is approximately 24-36 months. The average life of metal/PTFE seal seat safety valves in their specific operating conditions is approximately 36-48 months. At the end of this period, an external visual check must be made to ensure that the valves are in good condition (no serious oxidations - erosion and with the slits/discharge connections free from obstructions). If there is no obvious oxidation, erosion, fouling and/or damage due to outside causes, the average life is extended by the same period described above.

2. GENERAL DELIVERY INFORMATION - Upon receipt of the valve, make sure that: The packaging is intact, the material supplied corresponds with the order specifications (see the delivery note and/or invoice), there is no damage. If hard copy certificates have been requested in the order, deliver these documents to the office in charge. CAUTION: DOCUMENTS CANNOT BE DUPLICATED. In the event of damage or missing parts, immediately inform the carrier, NGI or its local representatives with details. Drawings and any other documents delivered with the valve are the property of NGI, which reserves all rights, and may not be made available to third parties. Any full or partial reproduction of the text or illustrations is therefore prohibited. **RECOMMENDATION: INSTALL VALVES IMMEDIATELY AND DO NOT LEAVE THEM INACTIVE FOR A LONG TIME.**

3. VALVE DESCRIPTION - Data identifying the manufacturer, the model, the calibration pressure value, identification of the construction material, the minimum and maximum temperature peaks that the valve can reach, the DN In x Out (where present) and the serial number are all marked on the body of the safety valve. NGI spring-loaded safety valves for steam, gases and liquids are the result of extensive experience gained over decades of application in various fields and largely meet all the requirements for final protection of pressure vessels. They are fully capable of preventing maximum permitted pressures from being exceeded, even if all other independent safety devices installed at points upstream have failed to work. NGI safety valves consist of a brass or stainless steel body that is highly resistant to high and low temperatures. They are fitted with a stem, a seat and a disc that guarantee maximum efficiency over time. Unified connections allow any type of coupling. All valves are factory-calibrated to ensure maximum safety and minimum maintenance. To this end, please carefully read this manual to ensure all the benefits and safety required on systems where NGI valves are installed.

4. SAFETY REQUIREMENTS - Valves must be installed on the systems whose construction materials are suitable for operation in the expected conditions (nature and physical state of the fluid, external environment). Make sure that safety valve connections comply with the specifications of the system on which they are to be installed. In particular, take into account the forces and momentum generated by the passage of the fluid through the valve when sizing the valve connection nozzle. If the valve discharges into the atmosphere, it must be pointed in a direction that will not cause harm to persons or property. Any adjustments or tuning must be performed by specialised technicians who are familiar with the dangers of safety valves. Put on GOGGLES, GLOVES and other PERSONAL PROTECTIVE EQUIPMENT and make sure that the system is at zero pressure and at room temperature before performing any adjustments or tuning. Before performing any operations on the valve, make sure it is at zero pressure and at room temperature. **BEWARE OF TOXIC OR HARMFUL GASES.** Vibrations may occur if the valve is not properly secured. Therefore, make sure that the fastenings are completely tightened. The valve may only be used after having been tested by NGI or by other authorised entities. The marking on the safety valve contains the exact calibration pressure, the construction material and the minimum and maximum temperature peaks that the valve can reach. **DANGER OF COLD BURNS OR SCALDING. THE OUTSIDE SURFACE MAY REACH THE TEMPERATURE OF THE FLUID CONTAINED INSIDE. NEVER UNDER ANY CIRCUMSTANCES TAMPER WITH THE VALVE NOR REMOVE THE LEAD/MANUFACTURER'S SEAL FOR ANY REASON.** Do not lubricate for any reason. Contact NGI immediately in the event of defective operation. **CAUTION: ONLY STAINLESS STEEL VALVES OR VALVES COMPATIBLE WITH THE CONTACT FLUID MUST BE USED IN CORROSIVE ENVIRONMENTS. CAUTION: NOT SUITABLE FOR UNSTABLE FLUIDS**

5. TRANSPORT - Depending on size, NGI valves can be transported in boxes or in crates. Smaller valves must however be transported by hand, while larger sized valves with a forklift or crane. **CAUTION: VIBRATIONS, IMPACT AND IMPURITIES CAN DAMAGE VALVE FUNCTIONING. VALVES MUST THEREFORE BE HANDLED WITH CARE, WITHOUT REMOVING THE CAPS ON THE CONNECTIONS WHICH PREVENT IMPURITIES FROM ENTERING INSIDE BEFORE INSTALLATION.**

6. INSTALLATION - Valves are supplied by NGI with the required calibration and lead-sealed. **CAUTION: MAKE SURE THAT THE LEAD/MANUFACTURER'S SEAL IS NOT DAMAGED. BREAKAGE OF THE SEAL WILL VOID THE WARRANTY.** To secure the valve to the equipment being protected, use suitable tools and only use the seat fitted at the bottom of the body near the inlet connection. Install the valves in a position that is accessible but protected from impact and tampering to prevent personal injury during discharge and to facilitate checks and periodic inspections. Do not install shut-off or throttling devices between the tank (or system) and the valve. The valve connection pipe must be as short as possible and must have a cross-section no smaller than the input and output connections. Spring-loaded safety valves with a pressure calibrated to less than 1 bar (0.1 MPa - 14.5 psi) must be installed with the cap facing upwards. The assembly position is irrelevant to correct operation for calibration pressures over 1 bar (0.1 MPa - 14.5 psi) for fluid gas. For liquids, vapours and condensates, they must be installed with the cap facing upwards. **BE CAREFUL not to damage the surface, remove the caps and install the valve according to the system specifications.** If the discharge needs to be connected to outside pipes, these must be as short as possible to prevent unforeseen backpressure. The maximum backpressure permitted is 10% of the calibration pressure. Prevent supports or pipes from transmitting forces or reaction moments to the valve. Inlet and outlet connection pipes can transmit static, dynamic and thermal stresses to the valve, both when closed and in the discharge phase, which can compromise safety valve stability. Pipes must therefore be designed, constructed and installed in such a way as to prevent the safety valve from being subjected to additional stresses, in addition to those caused by internal pressure and tightening. For conveyed discharge safety valves, connect the bleeder hole to a pipe to convey it into a non-hazardous area. To ensure a good safety valve seal, the operating pressure of the protected equipment must not exceed 90% of the safety valve calibration pressure. In the event of a pulsating pressure, the operating margin must be further reduced, depending on the amplitude and frequency of the pulsation, to a maximum value of 80% of the calibration pressure. Malfunctions in system operation that cause overflow of the valve can compromise its subsequent sealing capacity. **Make sure the valve is properly earthed, even through the same input connection.** Depending on the installation, affix appropriate indications (signs) to inform the user of the residual risks of moving parts (motion) and the operating temperature. Before starting up the system, make sure that there are no solid bodies inside it that could damage the valve seal seat. Sealing problems can occur on all "metal" or "PTFE" sealed valves any time tiny fragments of various materials (welding slag or other impurities present in the system piping) are deposited between the seat and the disc surfaces. Where conditions (nature of the fluid and operating temperature) allow it, a "soft seal" can be used. In the event of prolonged discharge at high temperature, there may be a change in the tangential modulus of elasticity of the spring construction material, resulting in decrease calibration pressure and an increase in safety valve blowdown. For the purpose of safety valve operation, make sure that there is no fluid leakage between the surfaces of the seat and the disc. If this occurs, intervene as soon as possible to restore the correct seal. If crystallisation or polymerisation of the process fluid can occur in the section upstream of the safety valve, make the entry connection as short as possible and equip the valve with a heating jacket or equivalent system. Crystallisation or polymerisation of the fluid in the area downstream of the disc (low pressure side of the valve body) or in the valve cap can cause the valve to lock. In order to avoid such an inconvenience from occurring, it is important to monitor the safety valve, taking care to detect any fluid leakage that would cause it to lock.

7. CLEANING AND LUBRICATION - NGI safety valves have been built to work without lubrication; they simply need to be kept clean and efficient.

8. ROUTINE MAINTENANCE - INSPECTIONS - Valves are very delicate mechanisms. It is the duty of the system operator to monitor the efficiency and, if necessary, contact a specialised technician or send the valve to NGI. Safety valves must be inspected by authorised entities according to the specific legal regulations in force in the country of installation. **CAUTION: NGI IS IN NO WAY LIABLE FOR UNAUTHORISED INTERVENTIONS OR TAMPERING. NGI IS NO LONGER RESPONSIBLE FOR THE VALVE ITSELF AFTER REPAIRS, RECALIBRATIONS, REPLACEMENT OF PARTS OR ANY OTHER WORK CARRIED OUT WITHOUT ITS DIRECT SUPERVISION.**

9. Periodic checks on safety valves equipped with a manual opening device with elastomer seal seat for steam. - Safety valves must be tested periodically to ensure that they continue to operate in good working order. For this purpose, they shall be opened manually by means of the lever or the opening ring nut. This test shall be carried out maintaining a pressure in the protected equipment of between 80 and 90% of the valve calibration pressure. The valve must open cleanly and release an abundant amount of fluid, and then must close completely once the lever is released or the ring nut is re-tightened. This operation should be short and performed only once. The frequency depends on the system conditions (greater or lesser probability that the valve will become dirty or that salts contained in the water will be deposited). **Carry out the test at system start-up and then comply with the standard and/or legal requirements of the country of installation.** The above-described procedure is not applicable to safety valves without manual opening. For any periodic checks, the various system safety devices must be bypassed and/or a bench test must be carried out to reach the calibration pressure. NGI reserves the right to change product characteristics, performance and drawings without prior notice.