

TECHNICAL REPORT ABOUT A "ZERO DRAIN" CLEANING AND PROTECTION OF HEATING SYSTEM according to standard UNI 8065 (D.P.R. 74/13)

System managing company: **A2A CALORE E SERVIZI**

System manager: **Sig. Giovanni Reniero**

System interested by our intervention: **School complex – Via F.lli Calvi n. 8 – Bergamo (BG)**

System features:

- Heat exchanger (district heating): total power kW 800
- System water volume: 3.000-4.000 liters
- System operational flow rate: 83,5 mc/h (Sum of 4 circulating pumps)
- System operational temperature: 70-80 °C
- Heating terminals: no. 300 cast iron radiators and no. 8 hot-air heaters
- Water treatments: water softener



Picture 1

- Water circulating treatments:
In line filtration named "magnetic filter" (picture 1)

Water system features:

Description:	black turbid with much sediment (see picture 2)
Main factors:	water circulating pH: slightly <7
Iron in solution:	> 5 ppm
Sample taken point:	return system- floor 0
Protective product:	absent



Picture 2

The hot water in the system does not comply with standard UNI 8065, because the iron water value is excessive (max. 0,5 ppm). Moreover, there is not any chemical protective product in the water in order to avoid any water corrosion phenomena.

INTERVENTION PROPOSAL

TEMPORARY INSTALLATION of the filtering system MAG CLEANER (2 – 3 months)

- Filter type installed: MAG CLEANER 120
- Connections DN 40 (1" ½)
- Accessories mounted in the filter outlet: flowmeter and circulating pump
- MAG CLEANER system flow rate: min. 4 m³ max. 10 m³



CHEMICALS INTRODUCED IN THE SYSTEM: 0,5%

- PROTECT 1: Inhibitor by Buildcert certified
- CLEAN 1: Permanent, non-corrosive and dispersant product.

INTERVENTION PROCEDURE:

MAG CLEANER by pass Installation facility; chemicals introduced in the system; recirculation flow-rate check - products concentration check - filters cleaning every 1 - 2 weeks.

10th October 2016: it has been checked our MAG CLEANER correct installation and functionality at the presence of Mr Cattaneo, a technician in charge by the company A2A.

It has been proceeded to the introduction of the following chemicals: PROTECT 1 (inhibitor by Buildcert certified) and CLEAN 1 (non-corrosive and dispersant product).

The chemicals introduced quantity has been calculated according to the initial water volume estimate provided by the system managing company.

After eight days it has been effected the first system check and the first magnetic filter cleaning. From the water check, it has resulted a low concentration of the chemicals (Picture 2).

Picture 2 – Inhibitor concentration rate in all the samples taken in the different system areas.



4th and 18th November 2016: it has been checked the products concentration on site, and according to the results, it has been considered to introduce an additional products quantity.

During both the checks it has been cleaned the magnetic filter, replaced the filtering bag and checked the constancy of MAG CLEANER recirculation flow rate.

18th November 2016: it has been introduced another quantity of PROTECT 1 and CLEAN 1 products, bringing their concentration rate to 0,5% of the system water volume. Consequently, it has been proved the correct system water volume: 8.000-9.000 litres.



Magnetic filter draining



Filtering sock removal and substitution

7th and 30th December 2016: during both the inspections it has been checked as usual the products concentration, the recirculation flow rate and the filters cleaning.

26th January 2016: it has been experienced a stabilized situation, where the water has resulted always clear, slightly yellowish (this is a typical colour given by the presence of the inhibitor PROTECT 1), without any sediment in the various water return circuit (see picture 3.). Consequently, the operation could be considered finished.

Picture 3



26th January 2017: SAMPLES TAKEN VALUES, AS FOLLOWS:

- pH: 8
- Hardness: 12 °F
- Iron: < 0,5 ppm.
- Inhibitor concentration rate: sufficient

Conclusions:

Over a period of about 3 months, the system has been restored during normal operation and set again into its optimal operating conditions, without any type of invasive intervention and according to standard UNI 8065.

Thanks to our ZERO DRAIN system procedure, it has been achieved the metal oxides removal from water system circulation without any system powerflushing or draining and without any forced stop due to the several rinsing operations. Meanwhile, just from the beginning, the system has been protected by an appropriate inhibitor (PROTECT 1) to avoid corrosion and limescale formation and the water pH has been maintained into a neutral value (between 7 and 8).



Picture 4

The excellent result achieved has been highlighted by the water sample taken from the system return, which has represented the initial and more compromised situation (picture 2). Now, as it can be seen from picture no. 4, the water has turned out clear and free from any sediment.

From this stage onwards, our MAG CLEANER magnetic filter system can be disconnected.

It is suggested to install a permanent magnetic filter as our T-MAG XL in order to collect and remove any magnetic particles that may be formed.

It is also suggested to maintain a sufficient amount of our inhibitor PROTECT 1 into the system. Periodically, the product concentration rate has to be checked by KIT PROTECT 1 test device on site, in order to guarantee the absence of any corrosive phenomena caused by water circulation and maintain the maximum energy efficiency.

Hereunder the technicians who carried out and checked the intervention:

FORIDRA SRL

Area technician
Sig. Dante Losi

FORIDRA SRL

Laboratory Manager
Dott. Richard Dernowski

A2A

CALORE E SERVIZI
Sig. Giovanni Reniero