MS07 District Heating

UNIVERSITY OF LEICESTER

Document Control

Rev	Date	By	Comments
A	Oct'17	J. Hoare	Initial Document
B	Dec 17	UoL	Sign off for release
C	Mar'20	J. Hoare	March 2020 Issue
D	April 20	A. Singleton	General update to tracker and other minors.

Design Guidance

1. This document shall be read in conjunction with the University Guidance Document "GD" series of guides which give greater information regarding the philosophies of passive design and the need to try to minimise the services plant footprint.
2. This document shall also be read in conjunction with document MS01 Heating Installations.
3. The University has declared a Climate Emergency and needs to reduce its carbon footprint. Buildings should be designed with a view to greatly reducing the capacity of heating plant and emitters.
4. Reference should be made to the detailed University's mechanical technical specification. Where there are discrepancies between this document and the University standards clarification shall be obtained from the University before proceeding.
5. The University of Leicester operate several buildings which connect to a local area district heating system. This system is operated by a third party, namely ENGIE.
6. The district heating water supplied by Engie from their network is referred to below as "primary" water and the temperature, pressure, pressure differential and water quality of this water is controlled by the third party directly.
    a. No works to the Engie "primary" network shall be undertaken without specific agreement with the University and all communications needed with Engie shall be undertaken through the University itself.
    b. Any works to the "primary" network will need a Permit to Work to be issued.
    c. This "primary" water is generally supplied at around 95c flow temperature and requires a return water temperature well below 75c such that the CHP operates correctly.
    d. It operates with a network pressure rated to PN16.
7. If a project involves modifications to this primary Engie network then the following specifications will be required to be adhered to for the "primary" water pipework.
    a. Under no circumstances shall plastic, copper and/or Xpress/push fit systems be used.
    b. Pipes shall be mild carbon heavy grade steel to BSEN 10255 and BSEN 10220 with the exception of drains and vents which will need to be installed in copper.
    c. Welded connections shall be used for all pipework. Welding shall be to Class ll electric arc.
    d. Weld testing. 5% of joints shall be cut out and tested and any welded joint which fails the tests shall be repaired/replaced and a further 5% of welded joints tested. Further failures shall require 100% of welders work to be tested and made good as necessary.
    e. Use PN16 flanged valves.
    f. All pipework shall use full insulation thickness insulated pipework supports to limit heat loss or heat gain. All valves above 50mm are to be insulated.
    g. The amount of water drained away to allow works to progress and the amount of fresh water used to refill must be recorded. This information must be given to Engie who will then adjust network water treatment as required.
    h. Engie must be invited, through UoL, to witness the quality and testing of all works to the primary network.

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8. The UoL connections to the primary district heating water presently fall into two generic types.
    a. A primary district heating water (ENGIE) to secondary building water (UoL), water to water, plate heat exchanger.
        i. The primary Engie water is therefore hydraulically separated from the secondary building water which serves the various buildings heating and domestic hot water systems heat needs.
        ii. UoL are in full ownership of the secondary water system.
    b. A primary district heating (ENGIE) direct piped connection to an item of UoL plant.
        i. The "primary" Engie water therefore directly serves hot water generators or air handling unit heater batteries.
        ii. "Primary" Engie water will then flow within UoL buildings and route within the same to serve these items of plant.
        iii. Confusingly, UoL own these "primary" Engie water mains within buildings and are responsible for the maintenance of the same but are not in control of the water temperatures, pressures etc within the same as these are determined by ENGIE.
        iv. Such "primary" Engie water pipework must be installed to the specification standards noted earlier.
9. With regard to any connections to the district heating system UoL are obligated to provide low return water temperatures and therefore need to use two port valve control technology wherever possible to give lowest return water temperatures.
10. New capital development projects.
    a. On all such projects, where new connections to the district heating are required (and this is only one of several options available for new heat sources, see other documents including MS01) the University requirement is for the whole building development to be fully hydraulically separated from the primary ENGIE district heating network.
    b. Ensure ENGIE provide run and standby water to water plate heat exchangers to generate our UoL secondary water at whatever secondary temperature the designers require.
    c. Serve all UoL building heat needs from the secondary water side to include fabric heating, air systems heating, domestic hot water heating and any process heating.
    d. In new builds, connected to the district heat network, the design shall generate secondary water at a maximum flow temperature of 50c. This will allow simple conversion to zero carbon standalone buildings when the district heating contract expires.
    e. Engie will be responsible for the design of the primary water flow rates to the plates to give suitable return water temperatures to their CHP.
    f. No ENGIE primary water pipework must be run within UoL buildings except for those mains entering the plate heat exchanger plantroom which must be located at ground level.
11. Refurbishment or maintenance projects including minor works
    a. On all such projects it is hoped that no new connections to the district heating will be required. All heat sources should be taken from the building secondary systems.
    b. Where there is an opportunity to remove existing primary ENGIE water pipework from within the building this should be discussed and options explored although it is noted that the primary to secondary water to water plate heat exchangers may need a capacity increase to achieve this aim.
12. Where works are undertaken on any existing air handling units, hot water generators or heat emitters directly connected to the "primary" ENGIE water network the following should be noted.

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a. Many emitters are presently directly connected to the primary ENGIE network by means UoL owned pipework systems and use three port control valves.

b. Where this is the case the three port valves should be replaced with two port to make the system run under two port control and thus give lowest return water temperatures as required by ENGIE.

13. All primary water control valves must be two port, three port will not be allowed. The use of any two port control valves on any modifications works or new works to the “primary” Engie water network must ensure that
    a. The control valves are suitable for use with the high pressures used by ENGIE within the network. PN16 valves are required.
    b. The control valves are suitable for use with the high pressure differentials used by ENGIE within the network.
    c. Valves will be full water tight shut off against the high pressure differentials on the network.
    d. Differential pressure control valves are used when required
    e. System may need a local water system rebalance.
14. When existing three port valves have failed and need replacement then two port alternatives should be fitted and the bypass fully removed. The above requirements apply regarding pressures etc.

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