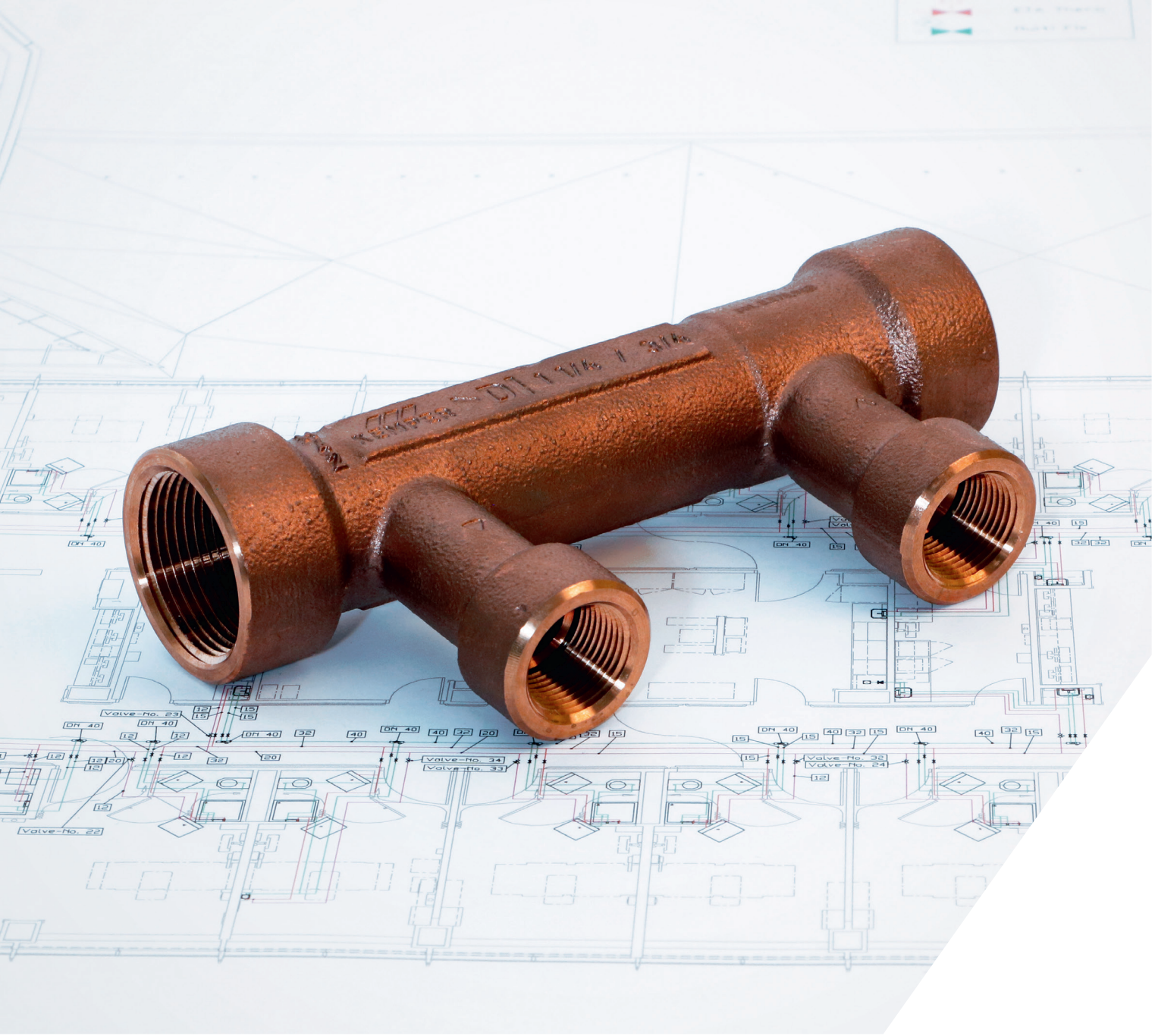


FLOW-SPLITTER

Potable Water Hot and Circulation

// Reduce non-circulating pipe lengths
// Minimize heat loss in the hot water installation

Potable Water Cold

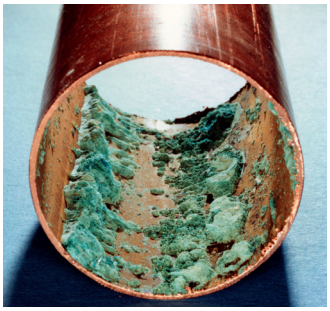
// Maintain water quality throughout the installation
// Avoid stagnation and heat gain in the piping system

KEMPER

DRIVING PROGRESS

Potable water quality maintained?

Potable water installation – potential health and safety risk



Potable water quality, economy and ecology in focus

Water quality experts consistently find inadequate water quality in potable water installations. The problems occur in both cold and hot water systems. Professionals claim stagnation to be one of the leading factors contributing to poor water quality. Stagnation in building water systems occurs when water stops flowing during periods of non use.

Stagnation in building water systems can result from dead legs, dead ends or from the infrequent use of fixtures in a room. Stagnant water can lead to water quality issues including the growth of biofilm and bacteria. It has therefore become common practice for building owners to remove dead ends as well as fixtures that are not being "used as intended".

"Use as intended" means that a calculated frequency of water usage needs to be maintained after the commissioning of the water system. This calculated usage is often not achieved requiring the use of controlled water changes in order to maintain water quality. If water use does not occur as designed the growth of biofilm and bacteria can lead to poor water quality.

The Flow-Splitter was developed in order to assist engineers and building owners with code and compliance requirements associated with potable water systems. It is an innovative valve designed to minimize stagnation and the consequential negative impact of stagnant water. The Flow-Splitter supports the maintenance of high quality water while increasing user comfort levels.

Why does the Flow-Splitter make sense?

Maintaining potable water quality

QUALITY
Clean potable water

// helps to maintain potable water quality (microbiological, chemical and physical)
// reduces the risk of stagnation
// helps to maintain cold and hot water temperatures

ECONOMY
Reduces costs and conserves resources

// reduces installation, labor, material and operating costs
// provides for more efficient piping design layouts
// supports compliance with plumbing and energy codes

ECOLOGY
Protects the environment and saves energy

// helps to conserve water
// supports the distribution of disinfectants and helps to increase residuals
// reduces heat loss in hot water circulation systems

The Flow-Splitter can contribute significantly to the maintenance of hot and cold potable water quality in both new and existing buildings. Every building is a "prototype" because of its individual usage characteristics. Even two buildings of the same kind cannot be compared equally – they are always specific objects that have to be regarded individually. The "intended usage" which is a basic assumption in the design of potable water installations, should be maintained after commissioning of the water system. The Flow-Splitter technology introduces new, innovative solutions that positively impact potable water quality, economy and ecology. The installation and operation of a plumbing system with Flow-Splitters contributes to the safeguarding of public health and safety while conserving our planet's valuable resources.

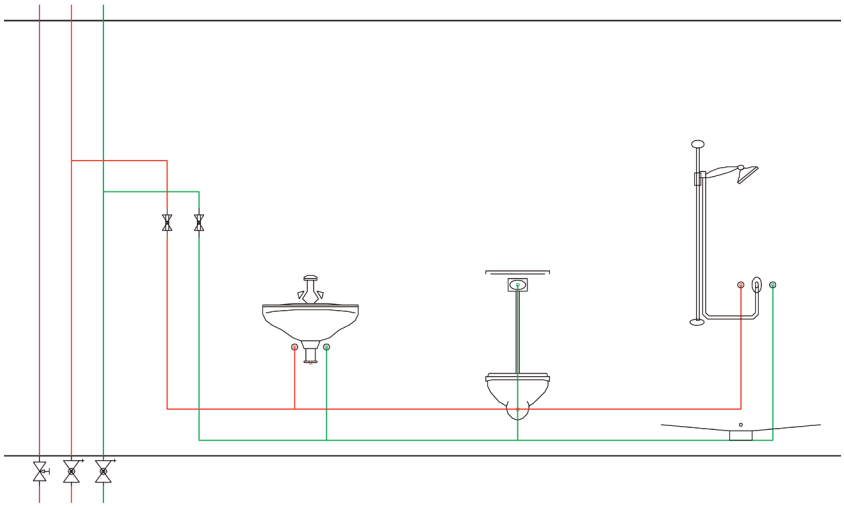
Preventing stagnation manually

With costly labor intensive measures

Labor-intensive and costly manual flushing protocols are becoming commonplace as building operators attempt to eliminate stagnation.

The challenge of minimizing the growth of bacteria in hot and cold water is of prime importance for operators of large potable water installations. Historically, trunk and branch piping configurations have been a common design practice for potable water installations in public and private buildings (hotels, hospitals, schools, etc.). This has resulted in the potential for stagnant water to remain in pipes leading to seldom used fixtures. For a frequent water change and to reduce water age, extensive and costly manual flushing procedures are performed on a daily basis.

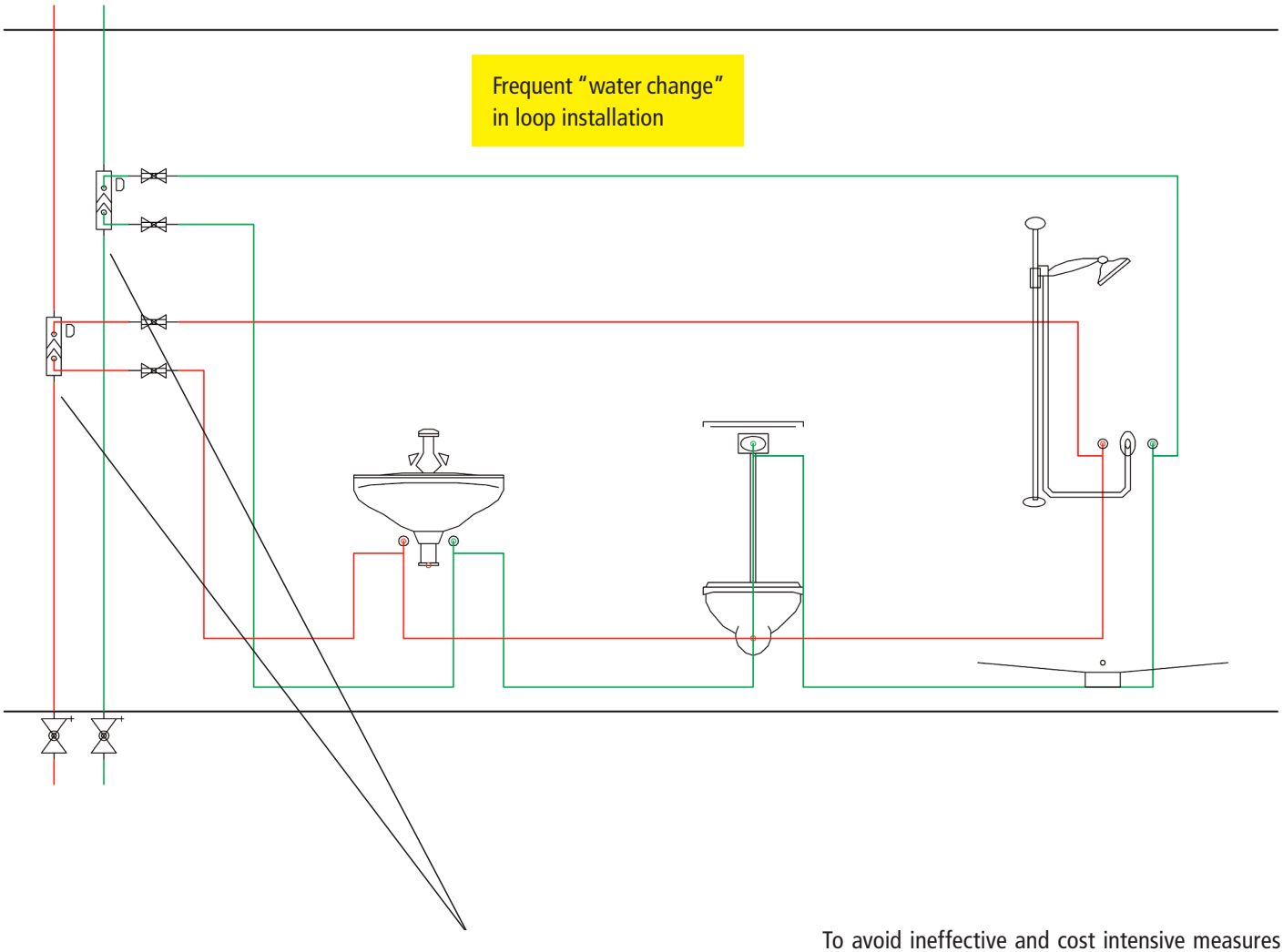
These flushing measures are commonly carried out by nursing staff and maintenance personnel and have, in the long run, proven to be ineffective, disruptive and costly.



Standard T-installation. Stagnation occurs increasing the risk of bacteria growth with infrequent water draw at the fixture.

Preventing stagnation automatically

With the innovative Flow-Splitter from KEMPER



Flow-Splitter Unit, Figure 651 06

To avoid ineffective and cost intensive measures to minimize stagnation, the piping layout shown above should be considered in the design of hot and cold potable water installations.

This innovative pipe layout in combination with the Flow-Splitter creates a water change in the loop pipework when water is demanded down-stream of the Flow-Splitter – even if there is no use of water in the loop itself.

Flow-Splitter

The Flow-Splitter can be installed in cold and hot water distribution pipework of a plumbing installation.

The function is based on the principle of the Venturi nozzle. In case of water flow through the Flow-Splitter, a small pressure difference is created by the Venturi to direct a portion of the water flow through the connected loop piping. The result is a parallel flow through both the loop and through the main pipe of the Flow-Splitter.

The Venturi cartridge insert generates a maximum flow through the loop when the occuring flow in the main pipe is much lower than the designed peak flow rate.

The use of the Flow-Splitter leads to an innovative plumbing design, which can benefit both cold and hot water installations.

Benefits of the Flow-Splitter in a cold water installation:

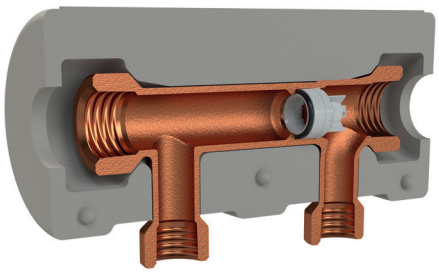
// reduces stagnation
// reduces cold water temperature gain due to high environmental temperatures
// increases water quality
// supports the distribution of disinfectants
// increases user comfort

Benefits of the Flow-Splitter in a hot water installation:

// less hot water return pipework
// reduces energy consumption
// reduces installation and operating costs
// increases user comfort
// maintains targeted hot water temperatures throughout the installation

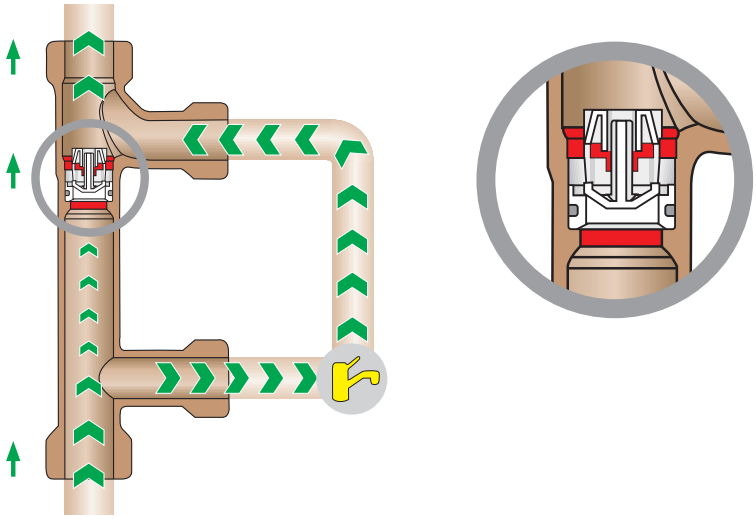
Lead- and dezincification-free brass alloy material in compliance with the Uniform Plumbing Code (UPC) and National Plumbing Code of Canada.

Certifications:
NSF/ANSI 61
NSF/ANSI 372
IAPMO IGC 302-2017

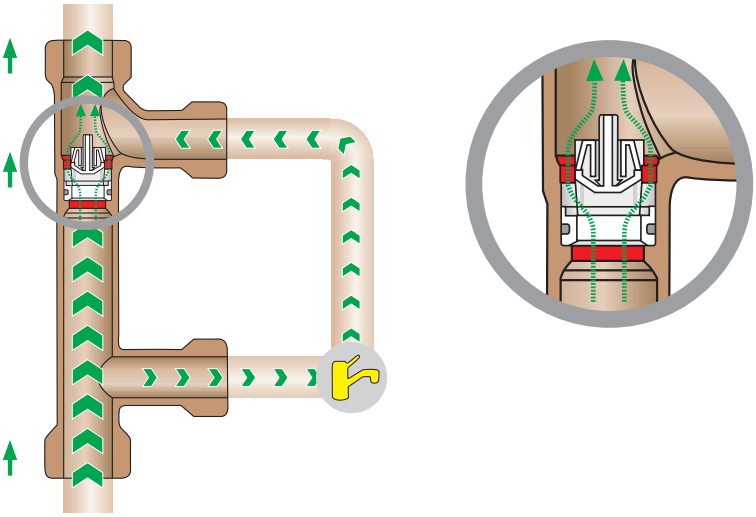


Flow-Splitter (cut sample), female thread,
Figure 651 20

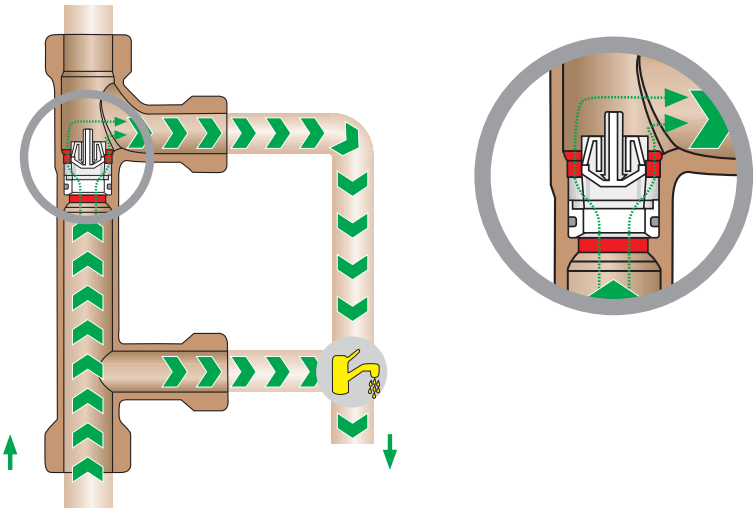
Low flow rate in the distribution pipe:
The Venturi cartridge remains in a minimum open position. The pressure to open the cartridge further is not reached. Therefore water bypasses the cartridge via the loop.



High flow rate (peak flow) in the distribution pipe:
The Venturi cartridge is fully open to let the majority of the water pass. The pressure drop of the Venturi causes a parallel flow through the loop.



Water consumption at an outlet in the loop:
The outlet is supplied with water from both sides of the loop. Therefore the loop can be installed with smaller diameter piping. The loop pipe creates less pressure drop which benefits the pipe sizing and the booster pump requirements.



Hot water installation with Flow-Splitter

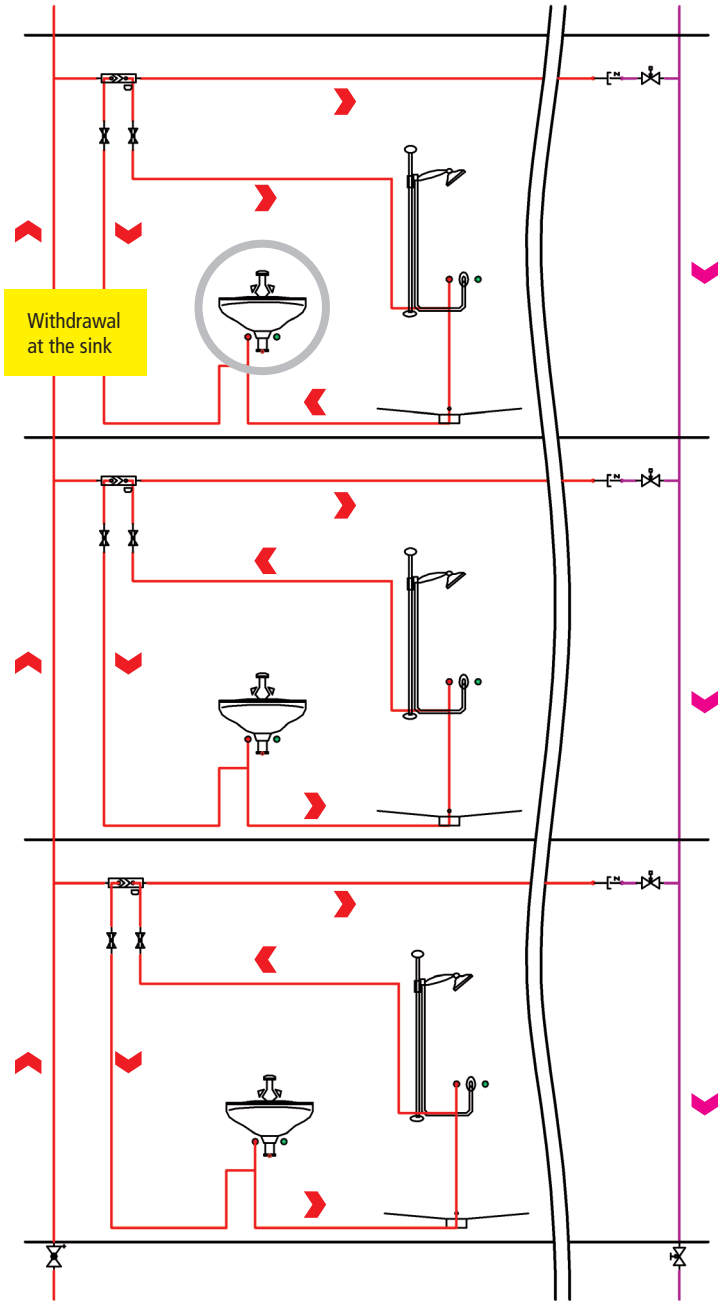
Minimize installation and operating costs

Optimized circulation with energy and cost saving benefits

It is beneficial to use the Flow-Splitter in the hot water system of many buildings. However, this depends on the shape of the building and the routing of the pipework. As shown in the illustration to the right, outlets in a bathroom are connected via a Flow-Splitter and a loop installation. A hot water return pipe is not required in the corridor, as hot water circulation in the room is realized by the Flow-Splitter and the loop installation. At the end of the corridor, the hot water pipework is connected to a hot water return riser and a MULTI-THERM automatic balancing valve. During periods without hot water consumption, the pump driven circulation volume is led through the entire pipework via the venturi effect of the Flow-Splitter. This maintains the hot water temperature in all loops up to the connection point of every outlet.

In the event of water consumption at an outlet, e.g. at the washbasin on the 3rd floor, the outlet will be supplied from both sides of the loop installation improving the supply at each outlet. Reducing hot water circulation pipework with the use of the Flow-Splitter and the MULTI-THERM automatic balancing valve can lead to a 15 % reduction of heat loss throughout the system.

To design a hot water installation with Flow-Splitters, traditional layouts with hot water supply and return piping, in parallel, should be avoided in favor of the layout shown to the right. As a rule of thumb for the design of a hot water installation with Flow-Splitters, the total length of each loop shall not be more than approximately 100 ft (30 meter) and there should not be more than approximately 15 Flow-Splitters in series. Design information and support will be provided by Kemper Water Control Systems Inc.



Prevent stagnation and effectively maintain temperature

// no stagnation due to Flow-Splitters and loop installation
// temperature maintenance in the hot water pipework during consumption and circulation periods through loop installation
// increased user comfort due to the immediate availability of hot water

Cold water installation with Flow-Splitter

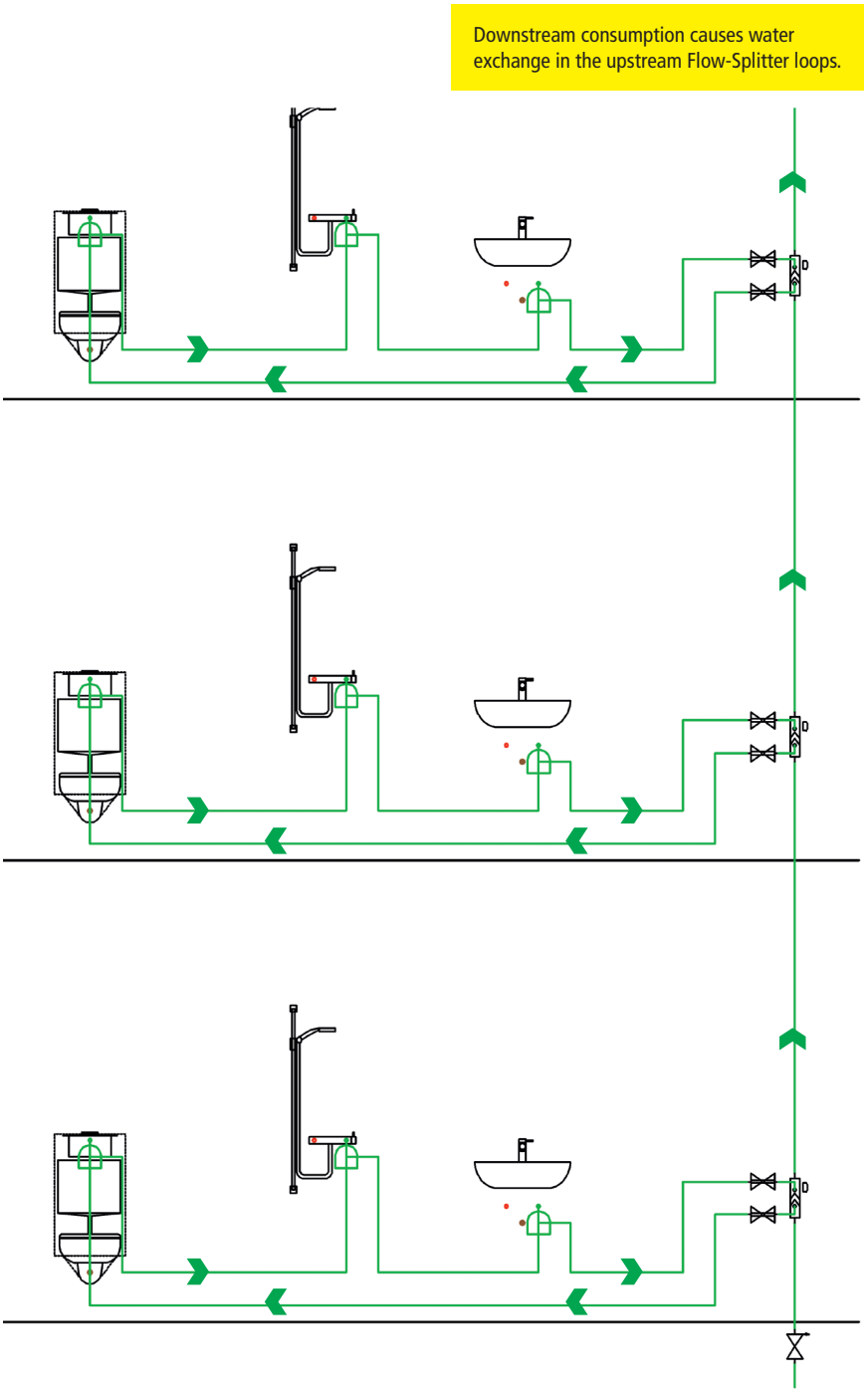
Avoid stagnation and maintain water quality

Stagnant water in pipes of seldom used outlets can be found in many potable water installations. The installation of a Flow-Splitter prevents stagnation when flow occurs as a result of downstream water consumption.

It is recommended to connect frequently used outlets, with high water demand, at the end of a loop or distribution pipe and to connect seldom used outlets via the Flow-Splitter loop further upstream.

The frequently and seldom used outlets should be identified during the design phase by the plumbing designer in order to determine the proper locations for the Flow-Splitter.

A unique installation of the Flow-Splitters on a riser and an innovative piping layout in the bathrooms is shown to the right. Water flow in the riser due to downstream consumption causes a water change in the loops of the bathrooms effectively avoiding stagnation.



Principle: Water movement – minimize stagnation

// frequent water change
// reduce temperature gain
// water movement in the majority of the pipework

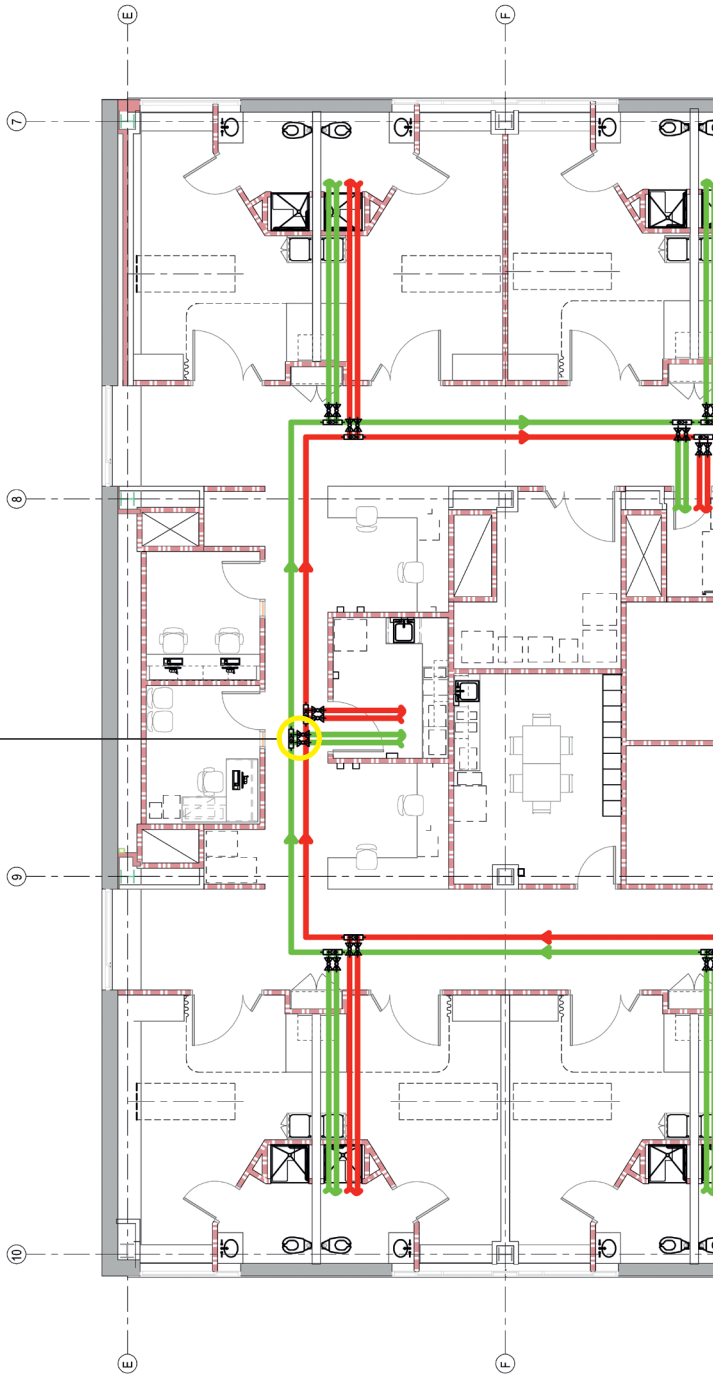
Horizontal layout of hot and cold-water master loop distribution utilizing KEMPER Flow-Splitters

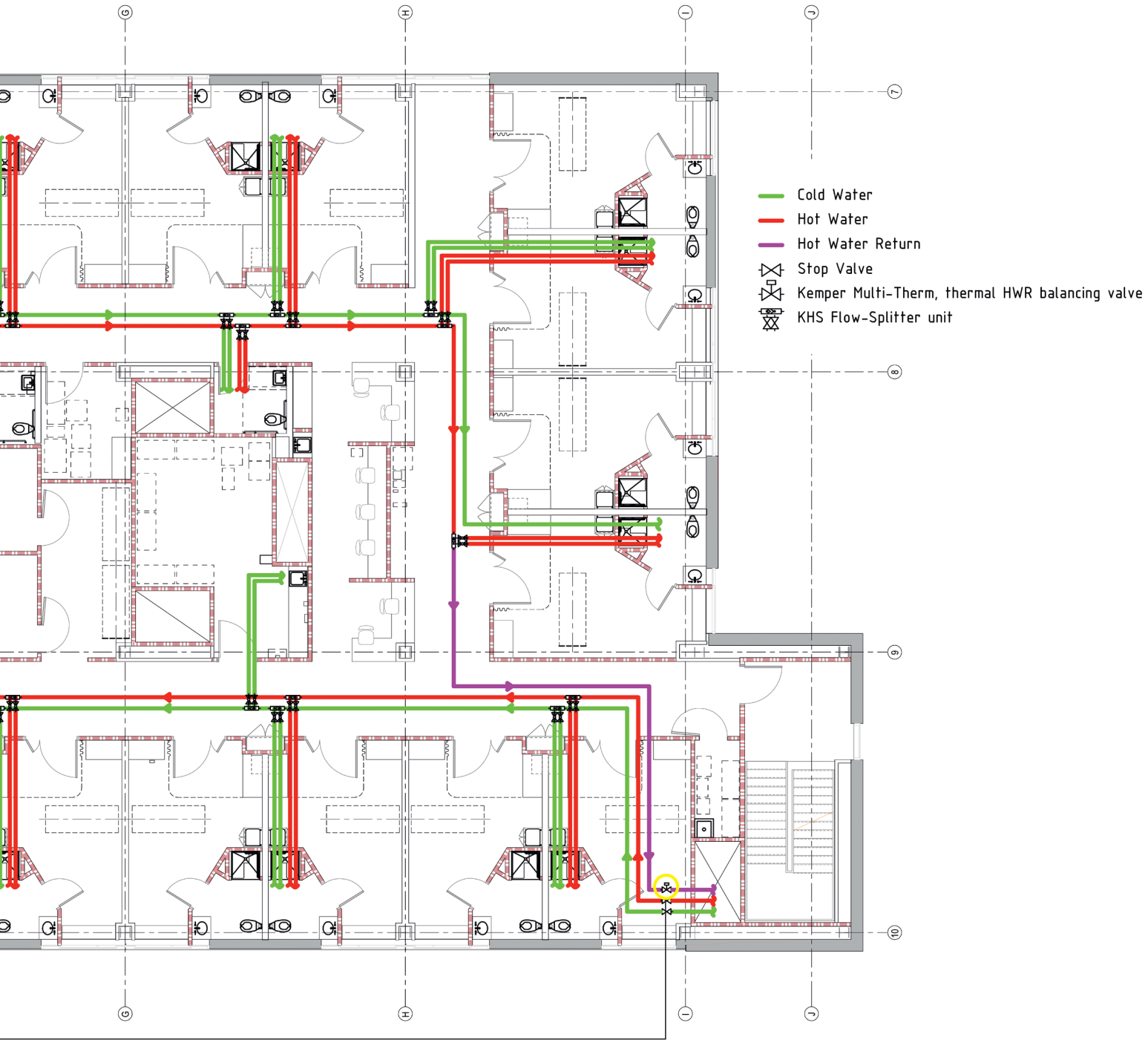
Pipe savings, energy savings, water conservation and reduced stagnation

Innovative hot and cold-water distribution design using KEMPER Flow-Splitters in primary, horizontal loops located in a ceiling. The risers are located at the bottom right hand corner of the drawing and provide water for distribution throughout the floor via two master distribution loops. The Flow-Splitters are installed on each master distribution loop which, in turn, serve to create smaller connected circulating loops into each room. Non-circulating pipe lengths have been minimized and the hot water return piping has been greatly reduced. This pioneering design utilizes proven KEMPER technology to reduce piping costs, save energy, conserve water and reduce stagnation.

Flow-Splitter Unit, Figure 651 06

MULTI-THERM Automatic
Balancing Valve, Figure 154 02




G
H
I
J
7
8
9
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Cold Water
Hot Water
Hot Water Return
Stop Valve
Kemper Multi-Therm, thermal HWR balancing valve
KHS Flow-Splitter unit

KEMPER

DRIVING PROGRESS

KEMPER

WATER CONTROL SYSTEMS

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Flow-Splitter 05/20