



UFR PN 16



Unmeasured-Flow Reducer **PATENTED**

Apparent (commercial) water losses

A major cause for apparent water losses is the fact that domestic water meters have difficulty in measuring very low flow rates mainly below Q_{min} .

The minimum flow rate (Q_{min}), where an accuracy of $\pm 5\%$ is required by the appropriate ISO standard for small domestic water meters ($Q_n 1.5$), is 30 l/h for class B water meters, 15 l/h for class C water meters and 11.25 l/h for class D water meters.

Loss of income due to the under-registration of water meters at low flow rates

Under-registration of low flow rates is the main reason for apparent water losses and it can account for 5%-10% of the total water sold to users by the water utility. For old water meters, where the measuring starting point is higher and for houses with water storage tanks, apparent water losses can be more than 10%.

Main reasons for leaks and low flow rates that cause under-registration of the water meter:

- Dripping or improperly closed faucet.
- Leaks in toilet tank seals.
- Very low flow rates at the end of the filling cycle of toilet tanks and water storage tanks.
- Pipework leaks downstream of the water meter.

A.R.I.'s Solution: UFR - Unmeasured-Flow Reducer

UFR - Is a smart and simple product, installed in the domestic water supply line (In-Line), adjacent to the water meter.

UFR - At low flow rates, changes the flow regime to batches that the water meter can measure.

UFR - Operating Principles

The UFR begins working at very low flow rates, below Q_{min} . The UFR regulates the water flow so there is no water flow at all through the UFR part of the time, while the rest of the time, the flow is high enough to be measured. A change in the flow discipline at low flow rates allows the existing water meter to measure those low flow rates it could not measure before. When the flow rate increases above Q_{min} , the UFR remains open, so that it does not interfere with normal measurements.

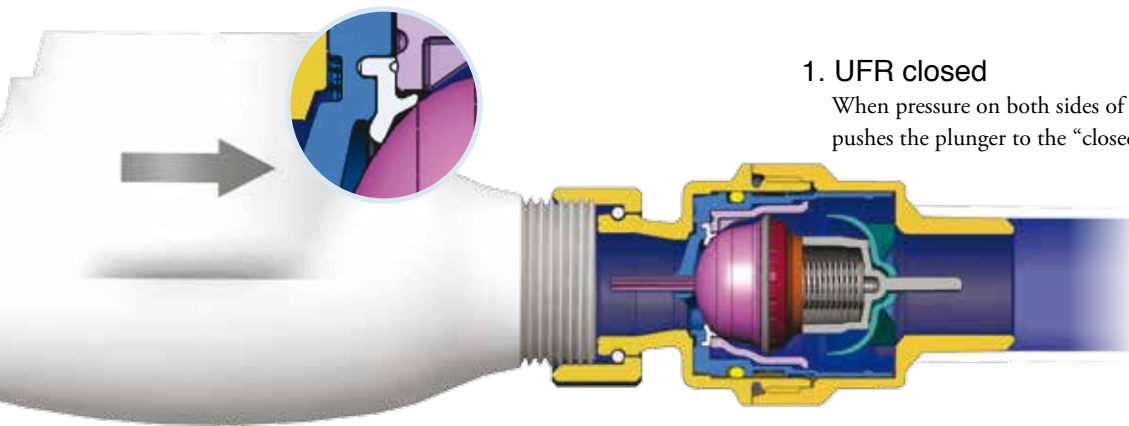
Advantages of the UFR

- Reduces unmeasured flow, cuts down apparent losses.
- Substantially increases the income of the water utility, up to 10%.
- The UFR is a high quality check valve preventing backflow and main pipe contamination.
- When water is billed in a block of flats according to the domestic water meter plus the mean difference between the domestic water meters and the main water meter, the UFR can make the billing fairer.
- Turns apparent water losses into revenue water.
- Reduces measurement differences between the main water meter and domestic water meters.
- Helps detect small leaks downstream of the water meter.

The A.R.I. UFR is approved by the following Standards authorities:

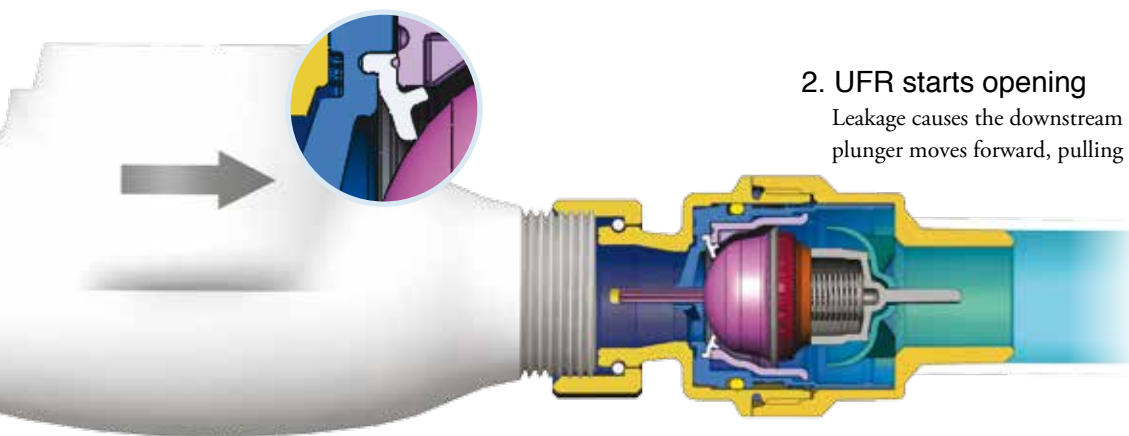
WRAS, PZH, The Standards Institution of ISRAEL.

How Does The UFR Work:



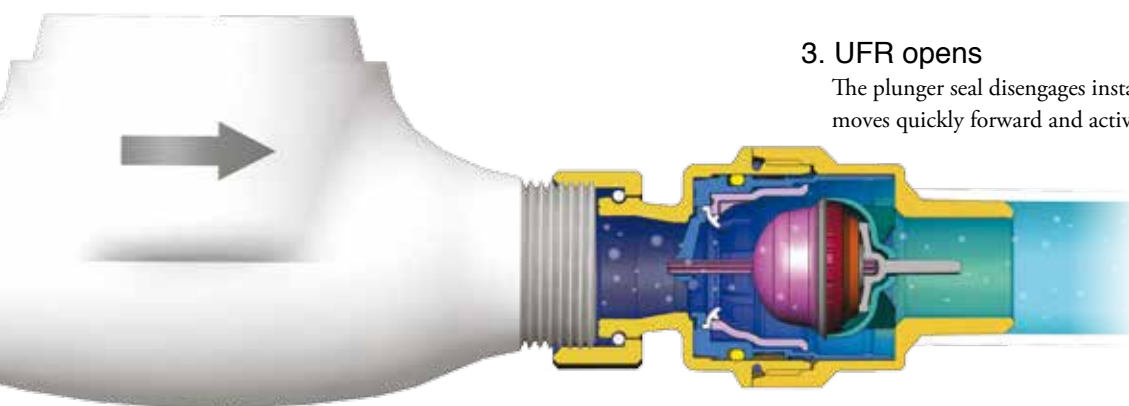
1. UFR closed

When pressure on both sides of the UFR is equal, the spring pushes the plunger to the "closed" position.



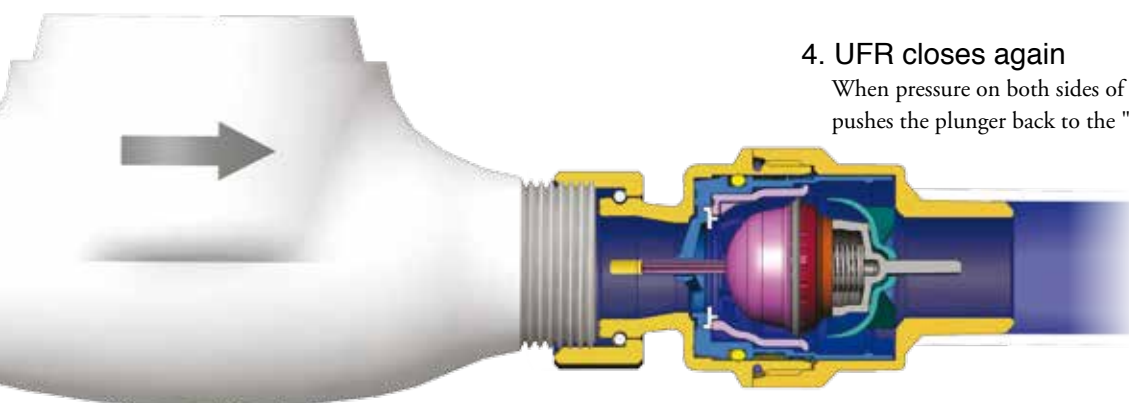
2. UFR starts opening

Leakage causes the downstream pressure to decrease - and the plunger moves forward, pulling the rubber seal with it.



3. UFR opens

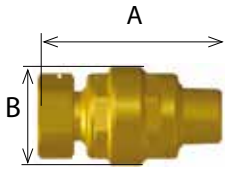
The plunger seal disengages instantaneously and the water batch moves quickly forward and activates the water meter.



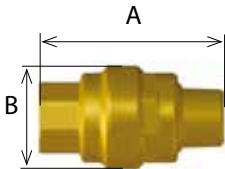
4. UFR closes again

When pressure on both sides of the UFR is equal the spring pushes the plunger back to the "closed" position.

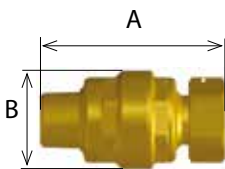
MODELS - DIMENSIONS AND WEIGHTS



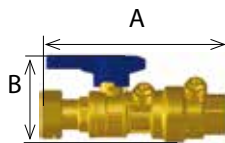
INLET	OUTLET	A mm	B mm	WEIGHT (g)
1" BSP-U	3/4" BSPT MALE	81	47	330
3/4" BSP-U	1/2" BSPT MALE	82.5	47	290
3/4" BSP-U	3/4" BSPT MALE	85	47	310



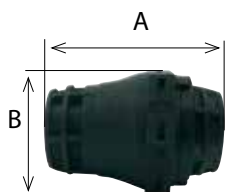
3/4" BSP FEMALE	3/4" BSPT MALE	83.5	47	290
1/2" BSP FEMALE	1/2" BSPT MALE	80	47	270
3/4" BSP FEMALE	1/2" BSPT MALE	81	47	280
1/2" BSP FEMALE	3/4" BSPT MALE	83	47	280
1" BSP FEMALE	1" BSP FEMALE	88.5	47	350



3/4" BSPT MALE	1" BSP-U	88	47	342
1/2" BSPT MALE	1" BSP-U	85	47	300
3/4" BSPT MALE	3/4" BSP-U	85	47	310
1/2" BSPT MALE	3/4" BSP-U	82.5	47	290

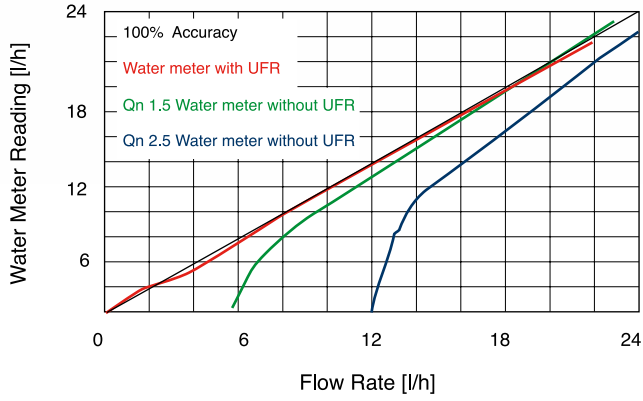


3/4" BSP-U	1/2" BSP FEMALE	140	65	555
1" BSP-U	3/4" BSP FEMALE	147	73	710



1/2" BSP FEMALE	1/2" BSP FEMALE	80	64	140
3/4" BSP FEMALE	3/4" BSP FEMALE	81	64	144
1/2" BSP FEMALE	3/4" BSP FEMALE	81	64	142
3/4" BSP FEMALE	1/2" BSP FEMALE	81	64	142
1" BSP FEMALE	1" BSP FEMALE	87	64	146

WATER METER ACCURACY WITH & WITHOUT UFR



HEAD LOSS VS. FLOW RATE

