Maric Constant Flow Valves

Constant Flow Rate Regardless of Pressure

50 Years

Est. 1963

Pressure Differential Characteristics of Maric Constant Flow Valves

The "Headloss" of Maric valves is commonly misunderstood. For determining what the headloss or pressure differential will be *prior to* installing a Maric valve, please refer to instructions over the page.

VALVE FUNCTION Maric valves maintain a constant, pre-set, flow rate, irrespective of pressure (within a range), by means of a precision moulded rubber control ring, whose orifice diameter varies, as the pressure differential across it varies. The greater the pressure, the smaller the orifice, and vice versa. Therefore constant flow rate.

HEADLOSS - DEFINITION Headloss, or "Pressure Drop" across the valve, is simply the difference between inlet and outlet pressure, and is determined by the installation, not necessarily the flow controller. The "PRECISION" range of valves is designed to provide constant flow, when pressure drop across them, is anywhere within the range of 140 to 1000 kPa. (14-100 metres, 20-150 psi, or 1.4-10 Bar).

**HEADLOSS - PRECISION MARIC VALVES**
Headloss at rated flow is 140 kPa At lower than rated flows headloss reduces significantly. ie; To obtain full rated flow (accurate to within +/- 10%), the system must provide for inlet pressure to be at least 140 kPa greater than outlet pressure.

Performance Curve for "Precision" Valves, 140 – 1000 kPa

The performance curve below, shows typical performance of all Precision valves, irrespective of body size or flow rate. As can be seen from the graph, peak flow rate is obtained when differential is around 400 kPa.

Extreme ends of the pressure range result in flows usually around 5 to 8% below rated.

Performance graph for standard valves with control rubber type, Precision
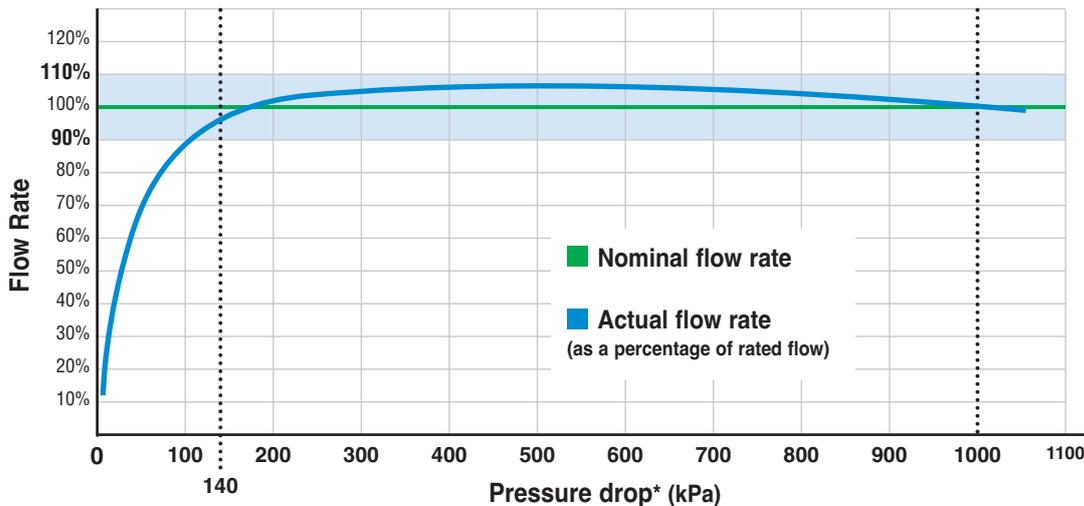
* Pressure drop is the difference between inlet and outlet pressure across the valve.

EXPLANATION The "Precision" range of valves is designed to handle most "mains" or similar pressure applications. It is often misunderstood when it is said that the headloss across the Maric valve is 140 kPa. This would be true if supply pressure was only 140 kPa, and outlet pressure was zero (atmospheric). If however supply pressure increases to 1000 kPa, and outlet pressure remains at zero, then headloss becomes 1000 kPa. In either case the valve will be operating within design parameters, and controlling flow. Therefore, the pressure drop *"range"*, of 140-1000 kPa, must always be considered. Not just the 140 kPa.

If 140 kPa headloss is too high for your application, or if 1000 kPa is not high enough, then the "low pressure" or "high pressure" type Maric valves should be used. See below for more information on these. If the demand for water is less than the valves nominal rated flow, i.e. less actual flow, then pressure drop across the valve will drop to much less than 140 kPa. For example, from the performance curve above, at 50% of rated flow, pressure drop across Maric valve is only around 30 kPa and at 30% of flow, only 12kPa.

Most Maric valves will handle a hydrostatic pressure of well in excess of 4000 kPa. Precision valves will function satisfactorily with inlet pressures above 1000 kPa, provided that outlet pressure is never more than 1000 kPa less than inlet pressure. This practice is not recommended however, because if the outlet pressure does ever drop to zero, then valve failure may result as below. If differential across valve is sufficiently high enough above specification, it may cause the rubber control ring to blow right through the orifice, and be lost downstream, resulting in either, the valve body having a relatively large diameter fixed orifice, and allowing a potentially very high and uncontrolled flow rate, or, the control rubber becoming lodged in a fitting downstream and blocking flow rate partially or completely.

www.maric.com

Telephone:
08 8431 2281
(+61 8 8431 2281)
Facsimile:
08 8431 2025

MARIC
FLOW CONTROL
AUSTRALIA

Maric Constant Flow Valves

Constant Flow Rate Regardless of Pressure

50 Years

Est. 1963

Where pressure differentials must exceed 1000 or 1500 kPa, the use of high pressure valves is strongly recommended.

Low Pressure Valves. Have a pressure differential operating range of approximately 40-400 kPa. Flow rate accuracy is +/- 20%
High Pressure Valves. There are two models available, 140-1500 kPa, and 170-2000 kPa. Flow rate accuracy is +/- 20%

The flow rate accuracy of the Maric valves (any valves for that matter) is not exact. All "Precision" control Rubbers are performance tested immediately prior to dispatch from the factory, and must not deviate above or below nominal flow by more than 10% throughout their entire pressure differential range. In most cases accuracy is better than +/-8%.

Calculating Headloss Prior to installation.

The following explanation is provided to assist in determining what the Headloss (pressure differential) will be across the Maric valve, before the valve is installed, for the purpose of determining the valves suitability for the application.

Firstly understand that the whole purpose, of installing a Maric valve, is to maintain constant flow rate, ***irrespective***, of the pressure drop across it, (provided that it is within the valves designed pressure drop range). However, Maric are still often asked; "What will the headloss be across the valve?".

<u>**We**</u> can not advise what the pressure differential will be. But it should be possible to calculate it if you have sufficient installation data available. It will then be possible to select a valve of the appropriate pressure differential range for the application.

The pressure drop across the valve will in fact be determined by the parameters of each individual installation.

If you are unsure if a Maric valve will be suitable for a particular application, it will be necessary to predict what the pressure differential will be across the valve by calculating as described below.

CALCULATING PRESSURE DROP

The differential across our valve, as explained earlier, will simply be the difference in pressure between the inlet and outlet. It sounds too simple to be worth stating, however, with potentially fluctuating inlet and outlet pressures, it is worthy of a brief explanation.

Firstly, let us assume the valve is limiting flow to the desired rate. Then determine, (at that flow rate) what will be the maximum and minimum possible *inlet* pressures. Then determine the maximum and minimum *outlet* pressures likely to be encountered.

The maximum pressure differential will be the maximum inlet, less the minimum outlet pressure.
The minimum pressure differential will be the minimum inlet pressure, less the maximum outlet pressure.

When performing these calculations, it is vital that they are done **at the desired flow rate**.

This calculated minimum and maximum pressure differential, should fall within the range of one of the Maric valves types available. If not, then installation design changes will be required.

Inlet Pressure calculations, - consider the following;
A   Supply pressure fluctuations.
B   The pumps performance curve. i.e., pressure produced at the required flow rate.
C   Associated line frictional losses between the pump and the valve.
D   Any vertical lift component which will reduce pressure to the valve.

www.maric.com
Telephone:
08 8431 2281
(+61 8 8431 2281)
Facsimile:
08 8431 2025

Outlet Pressure calculations, - consider the following;
A   Demand fluctuations.
B   Any vertical lift required after the valve.
C   Associated frictional line losses to the ultimate destination.
D   Pressure losses or requirements associated with downstream valves, filters, nozzles, other pumps, sprinklers, or stuffing box resistance etc.