

## Same Sized Three-Way Indwelling Urinary Catheters from Various Manufacturers Present Different Irrigation and Drainage Properties

### Abstract

**Background:** The three-way indwelling urinary catheter (IUC) is used for continuous bladder irrigation and is considered the cornerstone for clinical treatment of patients with macroscopic hematuria. Although there seems to be a logical relationship between catheter size and efficacy of irrigation and drainage, we often observe relevant variations in these parameters between different brands of catheters available on the market. The aim of this study was to compare the mechanical properties of different models of latex and silicone three-way catheters in an *in vitro* setting that resembles clinical use.

**Methods:** Three different three-way catheters were evaluated: Gold Silicone-Coated Rusch® (Model A), 100% Silicone Rusch® (Model B) and Coloplast X-Flow® (Model C). Irrigation channel, drainage channel, and overall cross-sectional areas were all digitally measured. Irrigation and drainage channel flow rates were measured and correlated with their corresponding catheter cross-sectional area values.

**Results:** Different catheter models of the same caliber have different internal irrigation port diameters, internal drainage port diameters and internal cuff port diameters. The Model C IUC internal irrigation port diameter is significantly larger than models A and B. When flows were evaluated, we found that in the same model, the increase in caliber of the IUC was related to an increased drainage flow, but not to an increased irrigation flow.

**Conclusion:** Precise measurements of the internal architecture of the three-way catheter, rather than relying on the caliber itself, could assist surgeons in choosing the best product for each specific patient, while minimizing complications.

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## Coloplast Key Takeaways

- The internal irrigation port diameter of the 20-Fr Coloplast X-Flow® is 48% larger than the Gold Silicone-Coated Rusch® and 66% larger than the 100% Silicone Rusch® IUC.
- The internal irrigation port diameter of the 22-Fr X-Flow is 45% larger than the Gold Silicone-Coated Rusch® and 39% larger than the 100% Silicone Rusch® IUC.
- The internal irrigation port diameter of the 24-Fr X-Flow is 47% larger than the Gold Silicone-Coated Rusch® and 64% larger than the 100% Silicone Rusch® IUC.
- The irrigation port external orifice of the X-Flow is 2.5 times greater than the 100% Silicone Rusch® and four times greater than the Gold Silicone-Coated Rusch®.
- The irrigation port external orifice diameter of the 20-Fr X-Flow is 11% larger than the 100% Silicone Rusch® and 52% larger than the Gold Silicone-Coated Rusch®.
- The irrigation port external orifice diameter of the 22-Fr X-Flow IUC is similar to the 22-Fr 100% Silicone Rusch® IUC. Both are 41% larger than the Gold Silicone-Coated Rusch® IUC.
- The irrigation port external orifice diameter of the 24-Fr X-Flow IUC is similar to the 100% Silicone Rusch® IUC. Both are 29% larger than the Gold Silicone-Coated Rusch® IUC.
- The 20-Fr X-Flow IUC presented an irrigation flow that was 45% greater than the 24-Fr Gold Silicone-Coated Rusch® IUC and 56% greater than the 24-Fr 100% Silicone Rusch® IUC.
- In cases of gross hematuria, it is necessary to change the model and not the size of the catheter if the doctor requires a more abundant infusion flow.

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The abstract and Coloplast's key takeaways herein are based on measurements performed by a third party and may not be indicative of clinical performance. Performance and experience may vary. Prior to use, refer to the products' Instructions for Use' for intended use and relevant safety information.

## X-Flow Catheters Brief Statement

### Indications

Foley catheters: urethral urinary catheterization.

Only straight 2-way Foley catheters with a maximum balloon volume of 15 ml may be used for the suprapubic approach (except for ribbed catheters).

3-way Foley catheters: urethral urinary catheterization and postoperative bladder irrigation-lavage.

Prostate catheters: short-term drainage of bladder urine, • postoperative bladder irrigation-lavage, • after prostate surgery: haemostasis of the prostatic fossa.

### Contraindications

Same as for urethral urinary catheterization and supra-pubic bladder drainage, and generally, known allergic reactions due to the device material (e.g. latex). Where indicated, some products contain latex.

### Warnings and Precautions

This type of device must only be used by trained and experienced professionals.

## Potential Complications

Several adverse events have been described with the use of balloon catheters. Some are related to the patient's conditions, the others to the procedure or the device:

- Related to the patient: bladder irritation symptoms, pain, urinary tract infection, incrustation and stone formation.
- Related to the procedure: urinary tract trauma.
- Related to the device: leakage, balloon burst or deflation.

Adverse events specifically related to the use of supra-pubic catheters have been described.

- Related to the patient: same as above and hematuria, any type of skin irritation.
- Related to the procedure: the potential adverse events are those observed with supra-pubic drainage, particularly if one forgets to check whether the bladder is full before puncturing it, among which peritoneal perforation with or without bowel perforation, misplacement/displacement.

- Related to the device: same as above and migration of the catheter, catheter knotting.

### Advice to the Patient

Patients should be educated on their indwelling catheter and the need for a regular monitoring.

The information provided is not comprehensive with regard to product risks. For a comprehensive listing of indications, contraindications, warnings, precautions, and adverse events refer to the product's Instructions for Use. Alternatively, you may contact a Coloplast representative at 1-800-258-3476 and/or visit the company website at [www.coloplast.com](http://www.coloplast.com).

**Caution:** Federal law (USA) restricts this device to sale by or on the order of a physician.

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