

# Positioning of the injection zones

## Application: 2D junction problem with insert

### Goals

- Positioning of the injection / vent zones
- Oriented materials
- Multilayers
- Influence of an insert
- Isothermal filling

We consider a piece made of two complex "T" junctions, shown in Figure 1. This piece is composed of two plies of different fabrics and two inserts. We will study more particularly the various modes of filling as well as the influence of the zones "inserts".

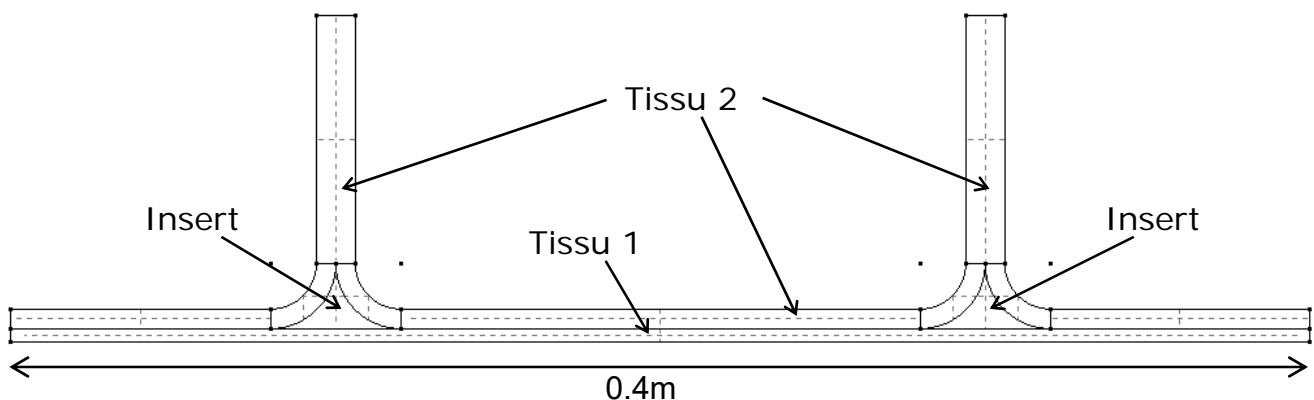


Figure 1 : Diagram of the part

Open the file *insert.unv* with Visual RTM.

### Material's properties

During the simulations, we will only focus on isothermal filling. The thermal properties of the resin and fibers will not be useful and can therefore be left at their default value.

## Fabric's properties

Density :  $\rho = 2560 \text{ kg.m}^{-3}$

|                 |                     |                              |                              |
|-----------------|---------------------|------------------------------|------------------------------|
| Reinforcement 1 | Porosity $\Phi=0.4$ | $K_1=10^{-10} \text{ m}^2$   | $K_2=10^{-11} \text{ m}^2$   |
| Reinforcement 2 | Porosity $\Phi=0.4$ | $K_1=3.10^{-11} \text{ m}^2$ | $K_2=5.10^{-12} \text{ m}^2$ |

The fabric 1 will be used for the ply at the bottom of the piece and the fabric 2 for the rest of the piece, except the insert.

## Resin properties

Density :  $\rho = 1100 \text{ kg.m}^{-3}$

Viscosity :  $\mu = 0.2 \text{ Pa.s}$

## Insert property

Two types of insert are used in the simulations. The properties are gathered below.

|          |                 |                     |                                |
|----------|-----------------|---------------------|--------------------------------|
| Insert 1 | Core            | Porosity $\Phi=0$   | $\rho = 500 \text{ kg.m}^{-3}$ |
| Insert 2 | Reinforcement 1 | Porosity $\Phi=0.9$ |                                |

## Simulations

- In the case of Insert No. 1, position the injection and vent point(s) appropriately. Justify your choice (filling time ...)
- Study the influence of the insert (insert n ° 1, insert n ° 2). Comment