

# Rules of construction

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The user finds here the elements in order to understand how to build the wall boundary conditions. The wall boundary conditions are defined with different types of namelists :

- The namelists describing the type of wall boundary conditions applied to different physical quantities (temperature, velocity, species). This group of namelist is here named the **“Wall Boundary Condition Type” (WBCT)** :
  - The enthalpy or temperature : [Namelist "Heat\\_Wall\\_Boundary\\_Condition\\_Setup"](#)
  - The velocity components : [Namelist "Velocity\\_Wall\\_Boundary\\_Condition\\_Setup"](#)
  - The species mass fractions : [Namelist "Species\\_Wall\\_Boundary\\_Condition\\_Setup"](#)
- The namelists defining the positions of walls that belong to the immersed bodies. Such a namelist is here named an **“Immersed body descriptor” (IBD)** :
  - [Namelist "Polyhedral\\_Immersed\\_Bodies"](#)
  - [Namelist "Cylindrical\\_Immersed\\_Bodies"](#)

**The following points are really important to understand how to construct the wall boundary conditions.**



- A full set of wall boundary conditions (**“WBCT”**) is created when the namelists related to the heat, velocity or species have got the same name, namely when the common variable 'Wall\_BC\_DataSetName' is set with the same character string (see examples below).
- Each immersed body (**IBD**) has to be linked to one of the **WBCT** defined in the data file. The link is made by means of the variable 'Wall\_BC\_DataSetName' belonging here to the namelists ["Polyhedral\\_Immersed\\_Bodies"](#) or ["Cylindrical\\_Immersed\\_Bodies"](#). This variable must match with these ones of the namelists ["Heat\\_Wall\\_Boundary\\_Condition\\_Setup"](#), ["Velocity\\_Wall\\_Boundary\\_Condition\\_Setup"](#) or ["Species\\_Wall\\_Boundary\\_Condition\\_Setup"](#).
- The walls placed at the ends of the domain are always linked to the **WBCT** whom Wall\_BC\_DataSetName= "Set1".
- Different **IBD** can be linked to the same **WBCT** in order to prevent any redundant **WBCT** in the data file.
- The explicit setting of a namelist can be omitted if the physical quantity is not required in the simulation. For example :
  - For any case without multi-species fluids, the namelist ["Species\\_Wall\\_Boundary\\_Condition\\_Setup"](#) can be omitted.
  - For any case without thermal transfer, the namelist ["Heat\\_Wall\\_Boundary\\_Condition\\_Setup"](#) can be omitted.
- If an usual boundary condition are used for **all the walls** of the geometrical configuration, the associated namelist can be removed. For example :
  - For adiabatic walls the namelist ["Heat\\_Wall\\_Boundary\\_Condition\\_Setup"](#)



- can be removed.
- For no-slip and impermeability conditions, the namelist "Velocity\_Wall\_Boundary\_Condition\_Setup" can be removed.
  - For no wall effect on species (zero gradient condition), "Species\_Wall\_Boundary\_Condition\_Setup" can be removed.

## Examples of wall boundary conditions

[Click here to read them](#)

From:

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Last update: **2020/01/30 10:54**

