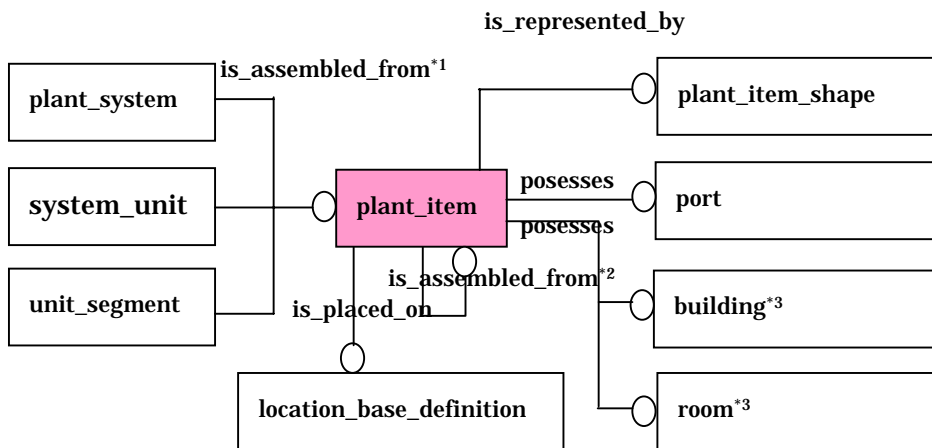


## NPM Class Library

### 5. plant\_item

An identifiable item that has a shape and that may be used as a component of the plant, i.e. THINGS (physical object). Configuration and placement of plant\_item is shown in the figure 4 and the table 5, except classification.



**Fig. 1 Main configuration of plant\_item related classes.**

\*1 If there are no lower components, the upper class is assembled from plant\_item classes directly.

\*2 plant\_item class can be assembled from other plant\_item classes.

\*3 They are sub type of a plant\_item class.

**Table 1 Class list related to plant\_item.**

class name	contents
plant_system	Same contents as in the table 4.
system_unit	
unit_segment	
plant_item	
location_base_definition	Location base of the placement for plant_item. In 3D representation, building coordinate system is used. In 2D representation, drawing coordinate system is used.
plant_item_shape	See 8. <a href="#">geometry</a> .
port	See 6. <a href="#">port</a> .

building	process plant building
room	room inside building

Lower classes classified from plant\_item class are described in the figure 5 and the table 6.

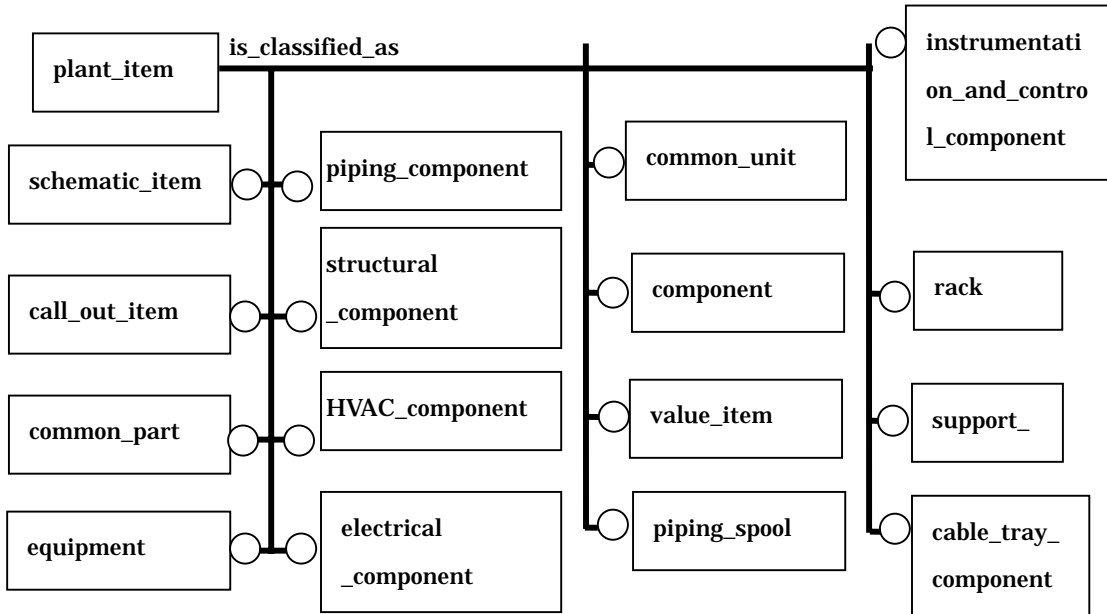
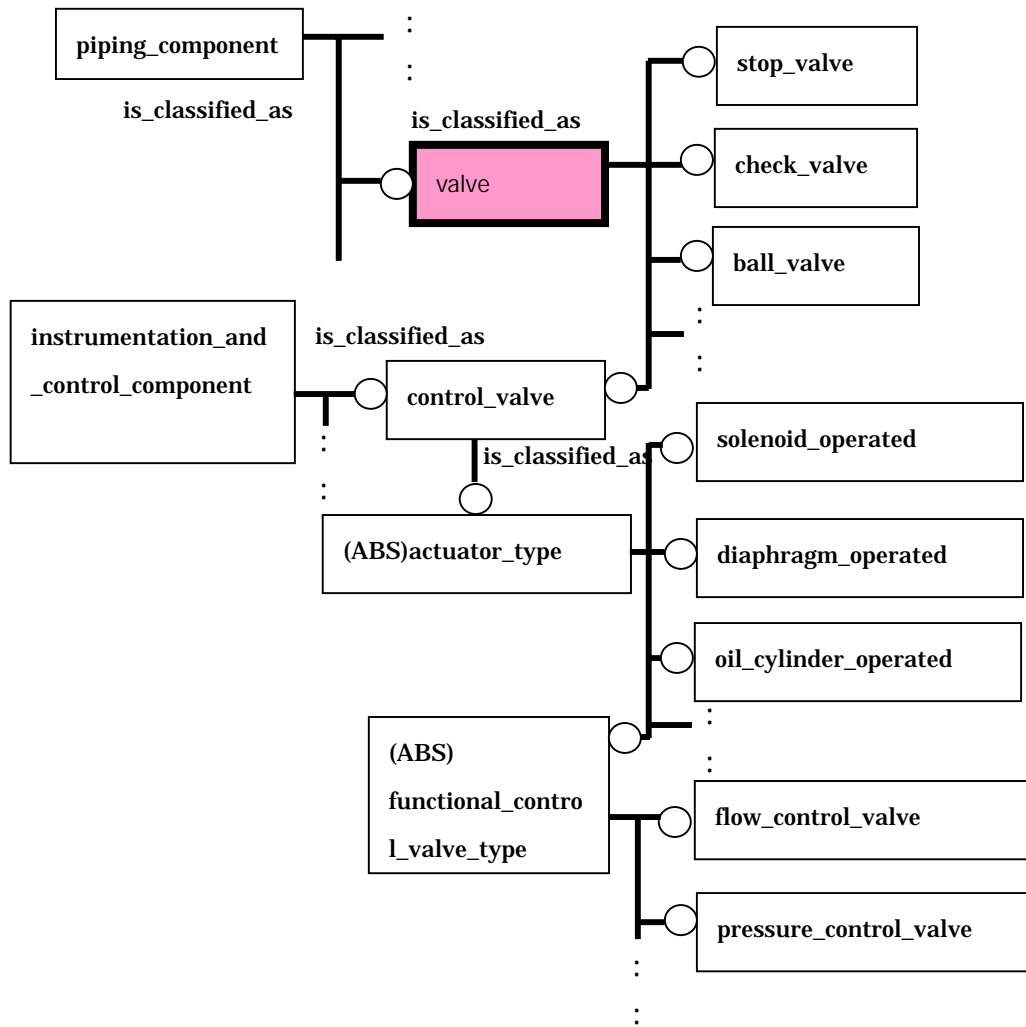


Fig. 2 Classification under the plant\_item class.

**Table 2 Classified list under the plant\_item class.**

class name	contents
plant_item	Same contents as in the table 4.
schematic_item	An item that is not recognized geometric parts.
call_out_item	An item that is called out from other drawings, and it might be entrance of materials or exit of products. It represents the diagram that is connected to outer resources.
common_part	A common part.
equipment	equipment
pipng_component	A straight pipe, a bend, a elbow, a valve, a flange and so on.
structural_component	A steel structure or a wall, a floor and so on. A civil component.
HVAC_component	A ducting component
electrical_component	An electrical component.
common_unit	A common component that is assembled from several parts.
component	A component that is not classified. This is not used in NPM. In NPM, use of plant_item is recommended.
value_item	A numerical value with objects that is measured or controlled. Although this is lower class of plant_item, it is not a THING.
pipng_spool	A group of piping component that is treated as a manufactured group.
instrumentation_and_control_component	An instrumentation component
rack	A rack that contains instruments.
support_unit	A component which supports piping component.
cable_tray_component	A component for cable tray.

The number of classes classified from plant\_item is huge; therefore a complicated valve class is explained as a sample in the figure 6 and the table 7. Other classes are explained in the Relation Diagrams for NPM Class Library [2]. The child classes under the valve class, such as stop\_valve, check\_valve and ball\_valve are inherits valve and control\_valve attributes, it is called multiple inheritance.



**Fig. 3 valve related classes.**

**Table 3 Contents of valve related classes.**

class name	contents
pipng_component	A straight pipe, a bend, a elbow, a valve, a flange and so on.
instrumentation_and_control_component	An instrumentation component
valve	A general valve
stop_valve	A stop valve
check_valve	A check valve
ball_valve	A ball valve
control_valve	A control valve
(ABS)actuator_type	A type of control valve with operation methods (abstract class).
solenoid_operated	An electromagnetic valve.
diaphragm_operated	A diaphragm operated valve
oil_cylinder_operated	A hydraulic cylinder operated valve.
(ABS) functional_control_valve_type	A type of control valve with control objectives (abstract class).
flow_control_valve	A flow control valve
pressure_control_valve	A pressure control valve