framatome

Qualification of Components

JAVA^{Plus} Test Facility for Qualifying FCVS^{Plus}

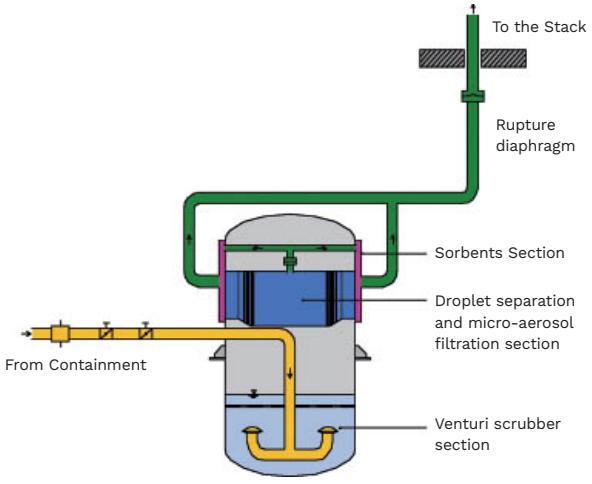
Filtered containment venting efficiently retains organic iodine

The Challenge

During a severe accident, the pressure inside containment might surpass the containment design pressure. To ensure containment integrity, the containment must be depressurized by venting. The vented gas must be filtered to the fullest extent possible to reduce the activity release to the environment. At the same time, the venting system must be operable under all conceivable conditions and function passively, that is, without electrical power.

The Solution

Framatome has developed the filtered containment venting system (FCVS), comprising a venturi scrubber and a metal fiber filter section. This system retains aerosols and elemental iodine with high efficiency. Recent research, such as the PHEBUS tests, indicates that organic iodine (CH3I) also carries significant amounts of activity during severe accidents. This substance, therefore, must also be filtered out. The new FCVS Plus is an innovative extension of the existing FCVS. It adds a passive superheating module and a molecular sieve (I-CATCH). As a result, the retention of organic and elemental iodine is significantly increased.



Filtered Containment Venting System Plus

The main components of JAVA^{Plus} are:

- 1st filtration stage: high speed venturi section retains significant quantities of iodine and most aerosols. The ability to flush the scrubbing liquid back to the containment following the venting sequence significantly decreases the activity inside the filter.
- 2nd filtration stage: the metal fiber filter retains residual droplets and aerosols, including hard-to-retain fine aerosols.
- 3rd filtration stage: This new passive superheating and sorbents section retains elemental and organic iodine.

Characteristics of JAVA^{Plus}

- Design Data:

Pressure:	10 bar
Temperature:	200 °C
Volume:	8000 l
Test media:	steam, air
Mass flow:	up to 2 kg/s (steam & air)

High and low pressure/temperature operation

Modular design:	sorbents stage
	scrubber stage

- Decontamination factors (DF):

For aerosols:

– Fine aerosols	> 10.000
– Large aerosols	> 100.000

For iodine:

– Aerosol iodine:	> 3.000.000

Under verification:

– Elemental iodine	> 1000
– Organic iodine	> 50

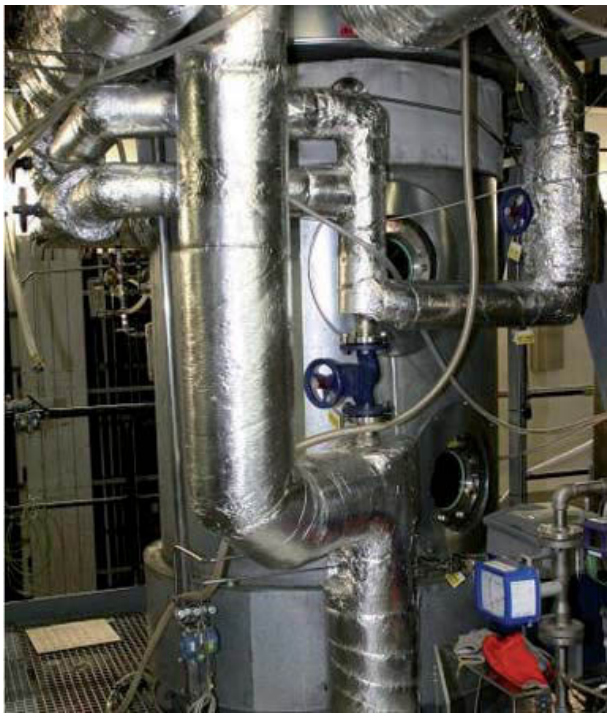
- State-of-the-art data acquisition

Your performance
is **our** everyday **commitment**

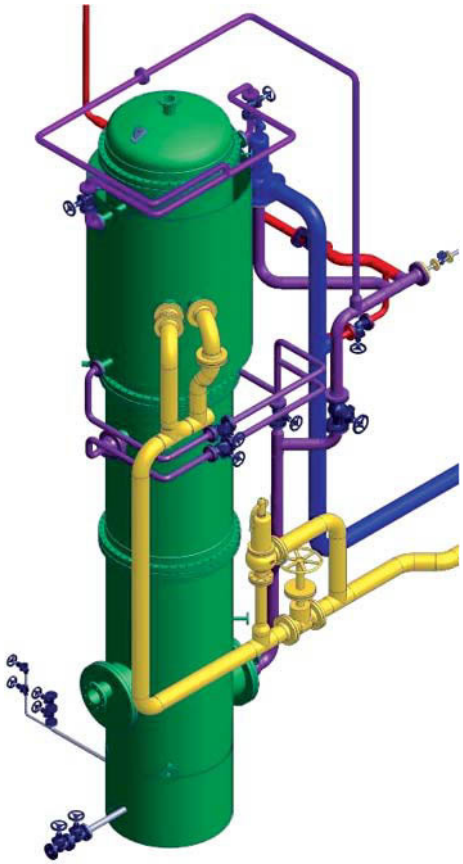
Versatile and Multifunctional Test Facility

Features

- Testing filtered containment venting system FCVS Plus for various reactor types: PWR, BWR, PHWR, CANDU and VVER
- Operation of large scale test facility:
  - Prototype equipment
  - Full height as original vessel
  - Mass flow scaled to ⅕ of real venting system
- Testing performance with various steam-to-air ratios



JAVA^{Plus} Test facility in operation



JAVA^{Plus} Test facility

FCVS Plus filters a greater number of radioactive species from containment gas vented during severe accident mitigation

Your benefits at a glance

- Representative results obtained by operating large-scale test facility (no penalties for laboratory effects)
- Organic iodine (CH3I) retention tests
- Participation in the European Union's PASSAM program
- Integration and access to Framatome's thermal-hydraulic platform
- Accredited test and inspection body
- Accepted by ILAC

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