SNC·LAVALIN

PASSIVE AUTOCATALYTIC RECOMBINER (PARS)

Removes hydrogen from the containment of a nuclear power plant during an accident

- Compact, easy to install and easy to inspect
- Reduces outage time
- Controls and mitigates hydrogen generation

NUCLEAR

OPERATIONS AND MAINTENANCE
DESIGN & INNOVATION

Passive hydrogen recombiner technology

Our Passive Autocatalytic Recombiner (PAR) catalyst technology is unique in the power reactor market. It catalytically combines hydrogen with oxygen in the air to form water vapour. Our PARs are compact, easy to install and can be inspected in minutes, saving hours of valuable outage time.

The issue

Public safety remains at the forefront of all we do. PARs controls and mitigates hydrogen generation in an accidental release.

For any reactor type

PARs are designed for high-capacity hydrogen removal. They can be used in CANDU® or pressurized water reactor (PWR) containment buildings following an accidental hydrogen release. PARs operate over a wide range of temperature and humidity levels, most notably at low temperatures and high humidity (condensing).

PAR catalysts

Our PAR catalyst formulations were developed specifi cally for application in nuclear reactor containment. The catalysts have high activity for hydrogen oxidation and are not deactivated by water vapour or steam. They are specially formulated to operate over a wide range of temperatures. The catalysts have also been shown to be unaffected by high radiation doses or PWR molten-core aerosols. We offer PARs in three sizes to allow for fl exibility in application. PARs automatically activate without the need for external power or operator action, effectively preventing hydrogen buildup in containment.

-	PAR-1	PAR-2	PAR-3
Size hxdxw (cm)	80x62x32	80x62x32	100x100x60
Number of plates	32	47	67
Capacity (kg H2/hr) with 4% vol. H2 at 25ºC and 1 bar	0.82	1.15	2.8

How it works

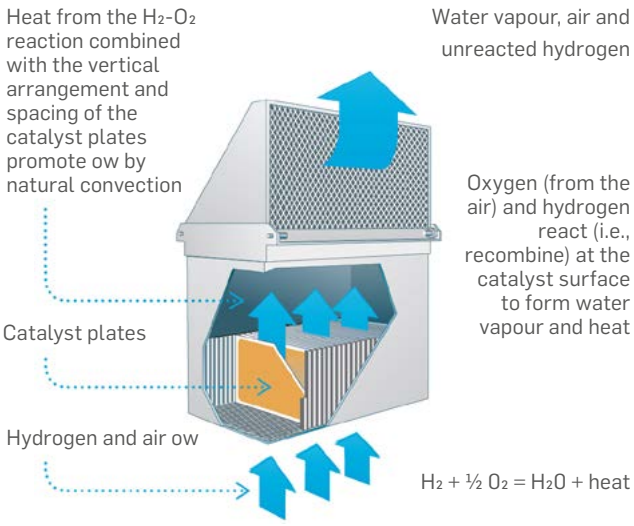
An exothermic reaction occurs at the surface of the catalyst plates when hydrogen and oxygen are present in the atmosphere. The heat of the reaction, combined with the vertical arrangement and spacing of the catalyst plates, promote natural convective flow through the recombiner. Warm humid air and unreacted hydrogen are exhausted through the top grating while fresh air and hydrogen are drawn through the bottom.

Easy installation & maintenance

The compact stainless steel PAR housing is designed for ease of installation and minimal maintenance. Catalyst plates can be accessed easily for inspection and on-site verifi cation using a PAR whole plate tester. Each PAR unit is installed in a mounting support, which is anchored to containment concrete or welded to structural steel. Supports for fl oor- and wall-mounting were seismically qualifi ed for use in a design basis earthquake.

Passive autocatalytic recombiner

A hydrogen management system



- Self-starting
- No power required
- No operator required
- Easily retrotted to any existing facility
- Removes hydrogen in non-ammable atmospheres

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