h2team® Hydrogen engineering

Pour l'accompagnement de vos projets de mobilité hydrogène terre-air-mer !

HOMOLOGATION - APPROVAL SUPPORT

Our methodology based on ISO 26262

1 ITEM DEFINITION

- Analysis of up-to-date regulations and standards of the product
- Analysis of the product lifecycle, elements of the environment and specifications of the hydrogen system
- Functional analysis (internal and external)

2 HAZARD ANALYSIS AND RISK ASSESSMENT

- Identification of risks and hazardous events (preliminary risk analysis)
- Evaluation and classification of hazardous events in the line with ISO 26-262 (ASIL)
- Definition of safety goals and characterization of safe states

3 FUNCTIONAL SAFETY CONCEPT

- Modelling events using Fault Trees Analysis (FTA)
- Identification of Functional Safety Requirements (FSR) and Technical Safety Requirements (TSR)
- Definition of detection and reaction times for system safety

4 SAFETY ANALYSIS

- Failure Modes and Effects Analysis (FMEA) : dysfunctional analysis (product or system)

5 GLOBAL SAFETY CONCEPT

- Hydrogen system leak-tightness by design
- ATEX studies for implementation of HP/MP/LP components from the hydrogen circuit : classification of ATEX, evaluation of hazard distances, recommendation by design
- Definition of leak-detection safety strategy

Ref•ATEX INERIS

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6 VERIFICATION, VALIDATION AND TESTING PLAN

- Recommended-actions plan
- Set-up validation plan based on the FMEA study and FSR-TSR document : tests action plan, design review, user guide, maintenance manual
- Identification of regulatory tests related to the installation of the hydrogen system onboard a vehicle

7 HOMOLOGATION / APPROVAL SUPPORT - SAFETY CASE

- Establishment of a functional safety case comprising technical proofs needed to build a constructor file in accordance with the mandatory regulations for homologation
- Support for communication with official test laboratory and national approval authorities

The V-model

Our onboard studies are based on a V-model. The descending phase of the V concerns all the safety and technical studies which will be carried out for homologation of the vehicle.

The ascending phase of the V checks all the studies done in the previous phase, through validation plan up to vehicle presentation to the national approval authorities.

V-model steps