

Construction of Dry Room for Pyroprocessing Automation Verification Mock-up

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1. Introduction

Recently, KAERI has designed a mock-up for verifying the automation of pyroprocessing equipment [1]. In this mock-up, the reliability and the operability of automated process equipment in high temperature or molten salt environment are going to be studied. The mock-up will not use any radioactive material, and its atmosphere will be maintained at low moisture to prevent from corrosion by salt. To support these objectives, the mock-up has four subsystems: dry room, drying system, remote systems and process equipment. This paper addresses the design and construction of the dry room.

2. Design of Dry Room

2.1 Design Specification

The dry room is mainly comprised of the process room and the auxiliary room. These rooms should have low leak rate to maintain the humidity of the room and they should also have the structural resistance against pressure up to a certain level. The process room should have an enough size so that two equipments could be operated. The main design specifications are listed in Table 1 [1].

Table 1. Design specification of dry room

Dew point	-40 °C
Temperature	25 ~ 30 °C
Pressure	50 mmH ₂ O
Leak rate	1 CMH
Size	5.2 x 4.1 x 4.45 m
Level difference	< 1 mm

2.2 Design and Modification

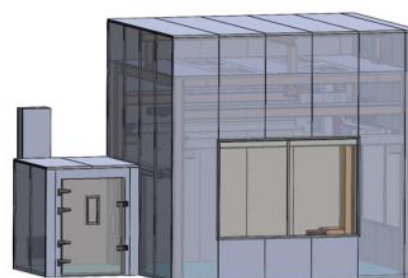


Fig. 1. Design of Dry Room for Mock-up.

Fig. 1 shows the designed dry room. As shown, the wall of the room is constructed with panels, and it has a gas tight door and two windows. Inside of the process room, there is a structure for remote handling equipment such as crane and gantry robot. Since vibration during the operation of the automated handling systems can deteriorate the sealing performance of the wall, the design was modified so that the structure was separated with the wall. In addition, support bars were considered to reinforce wall structure and a transfer port for gantry maintenance was added.

3. Construction of Dry Room

3.1 Construction Procedure

To build the dry room, floor, wall, double ceiling and handling systems are constructed. Since the structure of handling systems and wall are separated, the structure should be installed before the ceiling is constructed. In addition, in the middle of construction, several tests about floor level and welding quality were accompanied. The rough procedure was as follows: 1) Anchoring for handling system structure, 2) reinforcement and leveling of floor (check for welding and level), 3) construction of wall panel, 4) install of handling system structure and crane, 5) covering of double ceiling, 6) install of windows, door, and ports, 7) caulking of the room, and 8) reinforcement of the dry room wall.

3.2 Construction of the Dry Room

The dry room was constructed following the procedure. Followed figures are photos during the construction.



Fig. 2. Installation of Anchor.

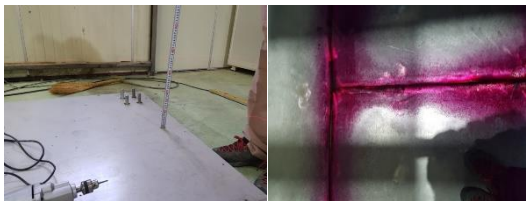


Fig. 3. Floor Construction and Test.



Fig. 4. Installation of Wall Panel.



Fig. 5. Installation of Crane Structure and Utility Ports.



Fig. 6. Constructed Dry Room.

4. Conclusion

A dry room for pyroprocessing automation verification mock-up has been designed and constructed. A drying system will be installed and connected with this room in the future. Then the automation of pyroprocess equipment will be verified.

REFERENCES

- [1] J. H. Lim, et al., "Design of Dry Room for Process Automation and Salt Test", Proc. of the SAREK 2017 Winter Annual Conference, Nov. 2017.