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"SERVICE TOOLS FOR NATURAL REFRIGERANTS" "TOWARD COMMERCIALIZATON OF SERVICE TOOLS FOR NATURAL REFRIGERANTS SUCH AS HC, CO2, AND AMMONIA"

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EXTENDED ABSTRACT

1. Introduction

In Japan, conventional refrigerants have been shifting to natural refrigerants rapidly. Therefore, the commercialization of the various service tools for them is needed quickly. We are promoting the commercialization of the various service tools for HC refrigerants (R290, R600a), CO2 refrigerants (R744), and ammonia refrigerants (R717), and particularly focusing on the development of the service tools for HC refrigerants such as R290 and R600a, which are rapidly being converted from the conventional refrigerants. Here, we introduce the service tools for the various natural refrigerants that we are currently developing.

2. The service tools for natural refrigerants

The service tools for refrigeration and air conditioning equipment include manifolds, charging hoses, vacuum pumps, various fittings, and adapters. These products must be prepared depending on the type of refrigerant, and the same applies to natural refrigerants. Our company has been developing service tools for natural refrigerants and will introduce service tools for R290 and R600a to the market in 2025, following the service tools for R744 and R717 that have already been introduced to the market.

The service tools for natural refrigerants are designed based on different safety standards than those for fluorocarbons. The service tools for R744 are designed with high-pressure safety in mind because the pressure range is significantly higher than that for fluorocarbons. The service tools for R717 are designed with safety in mind, considering the hazards of the gas properties and their corrosiveness to copper alloys. The service tools for R290 and R600a are designed to prevent slight leaks and air contamination because they have low pressure but high flammability.

Fig.1 Service tool for R290, R600a

Although recovery is not required for R290 and R600a, they are flammable and must be released into the atmosphere in a well-ventilated area away from open flames.

For this reason, we are developing two sizes of recovery bags to transport the gas to a location where it can be released into the atmosphere safely.

To detect leaks of natural refrigerants, products different from those for the conventional fluorocarbons are required, and our company has already introduced a highly sensitive infrared leak detector for R744 to the market. We are also developing quickly an explosion-proof leak detector for flammable refrigerants such as R290 and R600a. As for vacuum pumps, we have already introduced the vacuum pump for R717 that does not use copper alloys but an exhaust method with a hose, and we are developing quickly an explosion-proof vacuum pump that can be used safely with flammable gases.

In equipment using R744 refrigerant, thick copper tubes are used due to the high pressure, and the conventional tools cannot be used for these copper tubes, so specialized tools are required. Our company has already introduced copper tube tools for R744 to the market.

We are currently conducting detailed market research to develop even more useful service tools.