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Meidensha Corporation

To members of the media

Meiden succeeds in commercializing ester-filled shunt reactors **Products designed to contribute to achieving a sustainable society**

Meidensha Corporation (Meiden) has added four varieties of shunt reactors to its lineup of products utilizing eco-friendly ester oils as an insulation fluid, following the successful launch of the Ester-filled Transformer. Sales of the shunt reactors are set to begin in May 2024.



Shunt reactors play a crucial role in maintaining the voltage stability of the power grid by regulating voltage surges at cable electricity transmission grids' receiving ends, especially during periods of lower grid loads such as nighttime. Driving the increasing demand for shunt reactors is the projected growth in power transmission and distribution networks to accommodate rising energy needs, as well as the increased adoption of renewable energy sources.

In recent years, there has been a growing demand for transformer equipment that utilizes plant-based ester oils instead of mineral oils due to environmental concerns. Meiden has responded to this trend by developing and launching shunt reactors that use one of three types of ester oils as a medium for insulating and cooling. These oils are plant-based, natural (vegetable oil), and synthesized esters, and are all classified

as Readily Biodegradable Electrical Insulating Oils*¹ under the JIS C 2390 standard. The plant-based ester featured in one of the products is palm fatty acid ester*² (hereafter referred to as palm oil), while the natural esters used in two types of shunt reactors are rapeseed and soybean oils.

■ Specifications and features of the ester-filled shunt reactors

- Voltage: Extra high voltage class
- Insulating oil circulation method: Natural circulation

Product name	Shunt reactor using palm oil	Shunt reactor using rapeseed oil	Shunt reactor using soybean oil	Shunt reactor using synthetic ester oil
Insulating oil type under JIS classification	Plant-based ester JIS C 2390-3	Natural ester (vegetable oils) JIS C 2390-2		Synthetic ester JIS C 2390-1
Type of oil	Palm fatty acid ester	Rapeseed oil	Soybean oil	Polyol ester
Features	Its exceptional cooling properties make it a perfect fit for compact equipment.	With high flashing and combustion points, they are well-suited for equipment intended for installation in locations that prioritize fire safety.		Superior liquidity at low temperatures makes it ideal for equipment designed for use in cold regions.

1. Shunt reactor using palm oil

Palm oil, a plant-based ester, stands out as a superior coolant among esters commonly utilized in insulating oils, making it ideal for compact shunt reactors utilizing ester oils. And due to its chemically stable fatty acid structure, palm oil exhibits greater oxidation stability than mineral oils.

2. Shunt reactor using rapeseed oil/Shunt reactor using soybean oil

Rapeseed oil and soybean oil, both natural esters, have high flashing and combustion points. That makes them excellent choices for inclusion in shunt reactors designed for

locations where fire safety is paramount. Rapeseed oil, a vegetable oil (categorized under fats and oils), remains Japan's most sought-after and domestically produced oil, ensuring a stable supply.

3. Shunt reactor using synthetic ester oil

Synthetic ester exhibits unparalleled liquidity at low temperatures compared with other esters, making it ideal for equipment designed for use in cold regions. With a combustion point of over 300°C, it offers exceptional fire safety. Additionally, its chemically stable molecular structure enhances oxidation stability as the insulating oil, surpassing that of mineral oils.

Utilizing palm, rapeseed, and soybean oils as plant-based insulating oils makes it possible to diminish greenhouse gas emissions throughout the product life cycle. This includes the disposal and incineration of post-usage insulating oils discarded from shunt reactors. This offers a more environmentally friendly solution when contrasted with equipment employing petroleum-based mineral oils as insulating fluids.

Meiden is committed to embracing challenges in developing new technologies and values to enhance clients' safety and satisfaction. As a sustainability partner, Meiden strives to contribute to the realization of a future society that is more affluent and comfortable to live in.

*1 JIS C 2390:2019 Readily Biodegradable Electrical Insulating Oils: The JIS C 2390 standard comprises three parts: Part 1 -- Synthetic ester (JIS C 2390-1:2019), Part 2 -- Natural esters (vegetable oils, JIS C 2390-2:2019), Part 3 -- Plant-based esters (JIS C 2390-3:2019).

*2 Palm oil (classified under fats and oils) can be produced in large quantities year-round, leading to yearly production escalation and associated challenges related to human rights, labor, and the environment. Meiden acknowledges the potential risks involving its business activities compromising sustainable development, and has implemented a procurement policy. This policy ensures that palm fatty acid oil is sourced exclusively from partners who actively support and promote measures to deal with these issues.

*3 From the website of the Ministry of Agriculture, Forestry and Fisheries.

■ Press release for referencing

“Meiden expands the lineup of Ester-filled Tansformer with the aim of realizing a sustainable society” (June 29, 2023)

https://www.meidensha.com/news/news_03/news_03_01/_icsFiles/afiedfile/2023/10/13/20230629.pdf