

## Regarding the stability of Asahiklin-134a

Asahiklin-134a is extremely thermally stable, and when alone does not easily undergo thermal decomposition.

However, when it is with another substance, its stability degrades and since the amount of degradation depends on the coexisting substance type and weight, caution is required.

For example, if using Asahiklin-134a as a refrigerant, there are an extremely large number of types of coexisting substances that must be given consideration such as lubricants, metals, insulating materials, rubber, plastic, desiccants, as well as moisture and air, and compounds that use these items.

### 1) Stability when coexisting with metal

The results of the tests on the stability and metal corrosivity of Asahiklin-134a when coexisting with metal is compared with Asahiklin-12 and 22 and shown here.

Asahiklin-134a, as compared with Asahi Flon-12 and 22, has high stability and can be said to have generally low corrosivity towards metals (iron, copper, aluminium).

Stability when coexisting with metal 14 days

Refrigerant		AK-134a	AF-12	AF-22
Temperature (°C)		150		
Refrigerant	Acid content (ppm, asHF)	1>	1>	1>
Metal corrosivity	SS-41 (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Cu (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Al (mg/dm <sup>2</sup> /day)	5>	5>	5>
Temperature (°C)		175		
Refrigerant	Acid content (ppm, asHF)	1>	11	6
Metal corrosivity	SS-41 (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Cu (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Al (mg/dm <sup>2</sup> /day)	5>	5>	5>
Temperature (°C)		200		
Refrigerant	Acid content (ppm, asHF)	1>	170	37
Metal corrosivity	SS-41 (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Cu (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Al (mg/dm <sup>2</sup> /day)	5>	5>	5>

### 2) Stability when coexisting with metals, lubricants

The results of the tests on the stability and metal corrosivity of Asahiklin-134a when coexisting with metal and lubricants is compared with Asahiklin-12 and 22 and is shown here.

Asahiklin-134a, as compared with Asahi Flon-12 and 22, has high stability, low production of acid content, low degradation of oil, and can be said to have generally low corrosivity towards metals (iron, copper, aluminium).

Stability when coexisting with metals, lubricants 175°C x 14 days

Refrigerant		AK-134a	AF-12	AF-22
Lubricant		Polyalkylene glycol oil	Naphthene-type mineral oil	
Refrigerant	Acid content (ppm, asHF)	1>	6000	28
Oil	Total acid number (mgKOH/g)	0.01>	0.1<	0.01>
	Chromaticity (Gardner)	4	18	7
Metal corrosivity	SS-41 (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Cu (mg/dm <sup>2</sup> /day)	5>	5>	5>
	Al (mg/dm <sup>2</sup> /day)	5>	5>	5>

### 3) Effects from moisture

As compared to Asahiklin-12 and 22, Asahiklin-134a, due to its chemical structure has high polarity and therefore high water solubility,

and at the same time, polyalkylene glycol oil and polyester oil used as lubricants, as compared with traditional mineral oil-type lubricants,

have high hygroscopicity and so have a tendency to bring a high amount of moisture into the system.

Asahiklin-134a, as compared with Asahi Flon-12 and 22, has high stability and can be said to have low stability degradation due to mixing with moisture.

Stability when coexisting with moisture (moisture 1%) 175°C x 14 days

Refrigerant		AK-134a	AF-12	AF-22	AK-134a	AF-12	AF-22
Lubricant		None			PAG*	Mineral oil **	
Refrigerant	Acid content (ppm, asHF)	1>	5	2	1>	Unmeasurable	14
Oil	Total acid number (mgKOH/g)	-	-	-	0.03	''	0.02
	Chromaticity (Gardner)	-	-	-	4	''	2
Metal corrosivity	SS-41 (mg/dm <sup>2</sup> /day)	5>	5>	5>	5>	Corrosion large	5>
	Cu (mg/dm <sup>2</sup> /day)	5>	5>	5>	5>	Corrosion large	5>
	Al (mg/dm <sup>2</sup> /day)	5>	5>	5>	5>	Corrosion large	5>

\*: Polyalkylene glycol oil

\*\* : Naphthene-type mineral oil