

Date: October 7, 2021

Subject: Transition to R452A Refrigerant for Precedent Trailer Units in North America

Bulletin Location: Asset Library\Bulletins\Service Bulletins

Units:

All Precedent units

Discussion:

Thermo King's commitment to sustainability is a foundational component to our winning strategy, and it extends to the environmental and social impacts of our products, services, operations, and people. We have pledged to lead the industry in delivering change that is impactful, and supportive of our customers' sustainability commitments while safeguarding their operations by staying ahead of industry regulations. Transitioning our products to a refrigerant with a lower global warming potential (GWP) further demonstrates this commitment.

With that, we are pleased to share that beginning in January 2022, we will transition from an R404A refrigerant to R452A starting with our Single and then Multi-Temp Precedent trailer refrigeration units (TRU). Thermo King's truck units will follow with the new refrigerant later in the year. This changeover not only positions us as the **first in the market** to make **R452A standard on our trailer units in North America**, but also comes **earlier than the California Air Resources Board's requirement** that TRUs operate with a refrigerant that has a GWP of 2200 or less. Our transition to R452A will **reduce the GWP of our TRUs by nearly 50 percent**.

To date, we have released two communications with high-level information regarding our plans to transition to a new refrigerant. These can be found in the Asset Library with the provided links:

- [PRB9170](#)
- [PRB9171](#)

Today, we are providing you with some of the technical information on the differences between the two refrigerants and how they perform in our products. Throughout the remainder of 2021, we will partner to further prepare you and our customers for the change, including technician trainings and providing dealers with the tools to help our customers understand how the lower GWP refrigerant will add value to their operations.

Quick Facts on R452A:

- Class A refrigerant, non-flammable
- No compromise on end user safety
- No compromise on equipment lifetime
- No compromise on cargo load safety

R452A Performance Results

There are no changes to the refrigerant oil and system internal components between units operating on R404A and units operating on R452A. Operating pressures, and efficiency are similar. TXV super heat setting is different between R404 and R452A. ***TXV replacement is required if a unit is converted from R404A to R452A.***

Refrigerant recovery and system evacuation and re-charge must be done according to the standard Thermo King recommended procedures. Like any other refrigerant R452A cannot be mixed with R404A or other refrigerant, therefore, to avoid cross contamination of recovered refrigerant it is vital that recovery systems including recovery pump and gauge manifolds and related hoses are purged completely prior to being used on any other refrigerant type.

Frequently asked questions about servicing units with R-452A refrigerant.

Question: Is there any additional specific handling rule for manipulating R-452A versus R-404A?

Answer: **No.** When handled properly with correct personal protective equipment, the rules for working with R-404A and R-452A are the same. R-452A is a non-ozone-depleting hydrofluoroolefin (HFO)-based refrigerant. R-452A is a safe and non-flammable refrigerant classified ASHRAE A1 (*American Society of Heating, Refrigerating and Air-Conditioning Engineers*) and is mixable with POE lubricants. If necessary, consult the R-452A Safety Data Sheet available on InfoCentral.

Question: Can I mix R-404A and R-452A?

Answer: **No.** R-452A cannot be mixed with R-404A or any other refrigerant.

As a reminder, in order to avoid cross-contamination of recovered refrigerant, it is vital that recovery systems including recovery pump and gauge manifolds and related hoses are purged completely prior to being used with any other refrigerant type.

Question: If units have no receiver tank with a service valve, can R-452A be recovered in vapor phase?

Answer: **Yes.** You can recover in vapor phase taking into consideration that you must recover the full charge contained in unit. When possible, Thermo King recommends starting with liquid recovery to optimize the speed for recovering the refrigerant. Refer to your recovery machine instructions for correct operation.

Question: If a unit with R452A is found low on charge how do I know how much refrigerant to add?

Answer: Any unit using R452A refrigerant that is found low on refrigerant must have the refrigerant recovered and weighed to determine how much of the refrigerant charge was lost. If more than 25% of the original refrigerant charge has escaped, the remaining refrigerant cannot be used in the system and 100% new virgin refrigerant must be used to charge the unit.

R-452A (Saturated Vapor)

° F	° C	Psig	Bar(g)	° F	° C	Psig	Bar(g)	° F	° C	Psig	Bar(g)
-49	-45	28 inHg Vacuum		32	0	67	4.70	98.6	37	221	15.30
-40	-40	3	0.20	33.8	1	70	4.90	100.4	38	227	15.70
-31	-35	7	0.50	35.6	2	72	5.00	102.2	39	233	16.10
-29.2	-34	8	0.60	37.4	3	75	5.20	104	40	240	16.60
-27.4	-33	9	0.70	39.2	4	78	5.40	105.8	41	246	17.00
-25.6	-32	10	0.70	41	5	81	5.60	107.6	42	253	17.50
-23.8	-31	11	0.80	42.8	6	84	5.90	109.4	43	259	17.90
-22	-30	12	0.90	44.6	7	87	6.10	111.2	44	266	18.40
-20.2	-29	13	1.00	46.4	8	91	6.30	113	45	273	18.90
-18.4	-28	15	1.10	48.2	9	94	6.50	114.8	46	280	19.40
-16.6	-27	16	1.10	50	10	97	6.70	116.6	47	287	19.90
-14.8	-26	17	1.20	51.8	11	101	7.00	118.4	48	295	20.40
-13	-25	18	1.30	53.6	12	104	7.20	120.2	49	302	20.90
-11.2	-24	20	1.40	55.4	13	108	7.50	122	50	310	21.40
-9.4	-23	21	1.50	57.2	14	111	7.70	123.8	51	317	21.90
-7.6	-22	23	1.60	59	15	115	8.00	125.6	52	325	22.50
-5.8	-21	24	1.70	60.8	16	119	8.20	127.4	53	333	23.00
-4	-20	26	1.80	62.6	17	123	8.50	129.2	54	342	23.60
-2.2	-19	27	1.90	64.4	18	127	8.80	131	55	350	24.20
-0.4	-18	29	2.00	66.2	19	131	9.10	132.8	56	359	24.80
1.4	-17	30	2.10	68	20	135	9.40	134.6	57	367	25.40
3.2	-16	32	2.30	69.8	21	139	9.70	136.4	58	376	26.00
5	-15	34	2.40	71.6	22	144	10.00	138.2	59	385	26.60
6.8	-14	36	2.50	73.4	23	148	10.30	140	60	394	27.20
8.6	-13	38	2.60	75.2	24	153	10.60	141.8	61	404	27.60
10.4	-12	40	2.80	77	25	157	10.90	143.6	62	413	28.60
12.2	-11	41	2.90	78.8	26	162	11.20	145.4	63	423	29.20
14	-10	44	3.00	80.6	27	167	11.60	147.2	64	433	29.90
15.8	-9	46	3.20	82.4	28	172	11.90	149	65	444	30.60
17.6	-8	48	3.30	84.2	29	177	12.20	150.8	66	454	31.40
19.4	-7	50	3.50	86	30	182	12.60	152.6	67	465	32.10
21.2	-6	52	3.60	87.8	31	187	13.00	154.4	68	476	32.80
23	-5	54	3.80	89.6	32	193	13.30	156.2	69	487	33.60
24.8	-4	57	4.00	91.4	33	198	13.70	158	70	498	34.40
26.6	-3	59	4.10	93.2	34	204	14.10				
28.4	-2	62	4.30	95	35	209	14.50				
30.2	-1	64	4.50	96.8	36	215	14.90				