

TIPS FOR HANDLING WARRANTY CLAIMS

SANDEN INTERNATIONAL (U.S.A.), INC.

TIPS FOR HANDLING COMPRESSOR RETURNS

I. GOAL:

To provide a basic screening procedure which will define a failed compressor that is acceptable for your warranty consideration and to outline a procedure for reviewing warranty returns.

II. OBJECTIVE:

This procedure will eliminate many rejected warranty claims and significantly reduce costly freight charges, report lead-time, paperwork and disputed claims.

III. PROCEDURE:**Is the compressor an original Sanden genuine compressor?**

- a) Check the label for original Sanden logo and manufacturing location



- b) Sanden does not paint compressors – check the finish

ITEM 1. VERIFY THAT THE COMPRESSOR IS WITHIN YOUR ALLOWED WARRANTY OFFERING

Products are warranted for a finite period of time. Any compressor which has exceeded the allowed warranty period should not be returned for analysis.

Most standard compressor warranty is based on the date of compressor manufacture and/ or mileage.

The date of compressor manufacture is indicated on the compressor serial number. Any compressor returned for analysis after the allowed warranty date will not be analyzed and will be listed on the report as "O/W, Out of allowed warranty".

TIPS FOR HANDLING WARRANTY CLAIMS

The details of a warranty agreement may vary depending on the specific type of system and application. The agreement is made between your company and your customer.

For additional information on specific terms of warranty, please contact your respective sales representative.

COMPRESSOR IDENTIFICATION

SAMPLE STANDARD SERIAL NUMBER 1 2 3 4 5 6 0 1 5 7 0

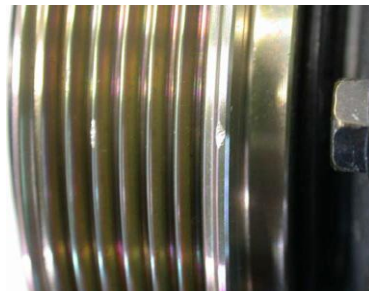
<u>1 2 3 4 5 6</u>	<u>01</u>	<u>5</u>	<u>70</u>
SERIAL NUMBER	Month of Mfg (Jan.)	Year of Mfg. (1995)	Mfg Location

When a returned compressor is analyzed for failure responsibility, the serial number should be recorded to aid in tracking compressor history. If the label is removed or otherwise rendered illegible, the warranty is void.

ITEM 2. FREIGHT DAMAGE.

Compressors must be individually packaged to prevent shipping damage.

Compressors that are damaged as a result of transportation should not be returned for warranty consideration. Freight damaged parts are the responsibility of the Carrier.



ITEM 3. CUSTOMER DAMAGE.





SANDEN INTERNATIONAL (U.S.A.), INC.

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TEL. NO. (972) 442-8400

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Customer damage refers to instances where compressor failure is caused by improper installation, mishandling and / or incorrect system application.

When a returned compressor is analyzed for failure responsibility, the physical condition of the compressor is examined to determine if the compressor was subjected to handling damage and / or improper installation.

If the compressor has external indications, or shows evidence that it was subjected to extreme conditions which caused the failure, then the cause of the failure may be determined to be customer damage.

Customer damage includes but is not limited to the following:

- Over-torquing of mounting bolts which may break compressor ear mounts. (Clearance between the compressor and bracket should not exceed 0.2mm {0.008in} per ear for 8 ear type compressors or 0.4mm {0.016in} total for 2 ears. Exceeding these limits could result in leaks and/or abnormal wear.)
- Over-torquing of hose fittings which can result in stripped threads or broken ports.
- Improper field service. Parts that are incorrectly replaced or installed can result in subsequent compressor failure.
- Mechanical damage to the clutch, scratches, nicks, dents, air gap modified, lead wires pulled out, pinched, cut etc.
- Mechanical damage to the compressor cylinder block.
- The addition of none approved chemicals to the compressor or system.
- Improper packaging or handling of the compressor.
- Improper modification of the compressor i.e. painting, plating, polishing etc.

ITEM 4. SERVICE HISTORY.

Obtaining a complete service history of the A/C system on the vehicle greatly simplifies the analysis of returned compressors.

When collecting claims from dealers, special attention should be given to related system failures and the original cause for replacement of the A/C Compressor. This information is used to pinpoint the specific cause of failure and to reduce the time required to complete compressor analysis.

Compressors returned with incomplete or inadequate Service Histories often require a complete spectrum of time consuming tests to determine the primary defect. This extensive examination often results in the complete disassembly of a good compressor.

Studies have shown that the majority of compressor failures are due to a failure in an A/C system component. The undetected system defect can lead to numerous compressor failures. The following is list of a few common system defects:

- ***Lack of refrigerant and/ or oil from a system leak.***
- ***Lack of condensing performance/ condenser and / or fan failure.***



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- ***Thermostat failure or incorrect setting.***
- ***Malfunction of cut-out switches high/ low.***
- ***TXV failure or orifice tube blocked off.***
- ***Blocked off or restriction in Receiver dryer.***

If one or more of these reasons were originally stated on the service claim, it is likely to be the primary reason for compressor failure.

ITEM 5. OBTAIN RETURN AUTHORIZATION.

All material returned for warranty consideration must be pre-authorized.

This authorization is granted by the assignment of a **Return Material Authorization** number (RMA #). The RMA number is used to authorize, receive, track and report on a specific return.

To obtain a **Return Material Authorization** number, or if you have questions regarding warranty return procedures please (between the hours of 8:00am - 5:00pm CST, Mon - Fri) contact:

Warranty Administrator

YOUR ADDRESS

Once obtained, the **RMA number must be prominently displayed on the outside of the container.** This is necessary to properly receive and to track the analysis of the returned material. The RMA number notifies the receiving department that the material has been given proper authorization to be returned. **Material that is returned without a valid RMA # will be rejected and RETURNED TO SENDER without analysis.**

All material being returned for warranty consideration must be securely and individually packed to prevent secondary damage to returns.

SHIP TO:

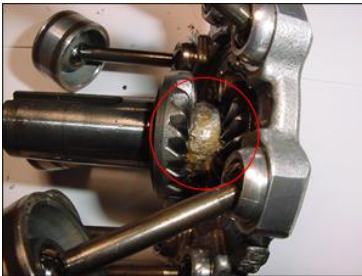
WARRANTY DEPARTMENT

Compressors that are properly returned for warranty consideration will be evaluated to determine the root cause of failure. A copy of the completed report will be mailed to the customer. Please reference the assigned RMA# when making an inquiry about returns. In order to provide for efficient processing of returned materials, the RMA # is used as the sole means for tracking warranty returns. It is not feasible nor time efficient to utilize any form of customer generated reference number, claim number, reject number or dealer number etc., to track returns.

The following will assist you in understanding compressor failure modes and diagnosis procedures to help educate your customer and reduce unwarranted claims.

TIPS FOR HANDLING WARRANTY CLAIMS<http://www.sanden.com/index.php?tag=MTExOTk3OTEyNw9>**Compressor Failure Modes**

Sanden compressors are subject to failure if the proper system conditions are not maintained. Below is a list of some common compressor failure modes caused by external factors and are not a responsibility of Sanden's quality or workmanship.



- Center ball Seizure
- <http://www.sanden.com/index.php?tag=centerball>
- Clutch Slipping
- <http://www.sanden.com/index.php?tag=clutch>
- Customer Damage
- <http://www.sanden.com/index.php?tag=cust-damage>
- Moisture Contamination

<http://www.sanden.com/index.php?tag=MTExOTkxNjE5OA1>**Sanden Technical Bulletins****General Information**

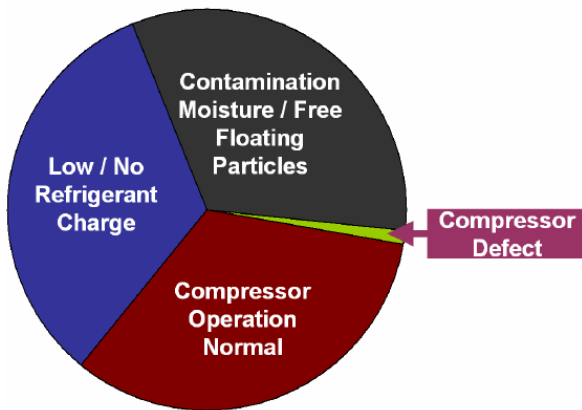
- Identify and Solve Compressor Noise Issues
- http://www.sanden.com/originals/images/Compressor_Noise.pdf
- R12 to R134a Retrofit Procedure
- <http://www.sanden.com/originals/images/retro.pdf>
- Compressor Rotor Groove Type Descriptions
- <http://www.sanden.com/originals/images/groove.pdf>
- Compressor Installation Procedure
- http://www.sanden.com/originals/images/Compressor_Installation_Instructions.pdf

Careful Read the Sanden Service Manual<http://www.sanden.com/index.php?tag=MTExOTk3OTEwNw6>

TIPS FOR HANDLING WARRANTY CLAIMS



Why are compressors removed from vehicles?



Loss of Charge

Cold refrigerant entering the compressor from evaporator provides cooling. Without refrigerant the compressor simply overheats.

Contamination

Moisture will increase discharge pressures, degrade lubricant and reduce cooling performance. Particles will foul bearings and other moving parts of compressor.

Compressor Operation Normal

Misdiagnosis results in the wrong part being removed. Misdiagnosis can be prevented by using compressor function check list below.

Confirm compressor failure before removing.

The time to diagnose a compressor is on the vehicle and can be determined using a few simple steps. In many instances compressors are removed due to low refrigerant or a blown fuse.

1) Is compressor rotation smooth?

With vehicle off turn the compressor shaft with a 14mm socket to check for smooth rotation. Grinding or hanging during shaft rotation is caused by broken components within the compressor.

Yes - Continue with steps 2 through 4
 No - Remove compressor and return for evaluation

2) Is field coil receiving greater than 11.5 volts?

This test should be conducted with engine running and clutch engaged.

Yes - Continue with steps 3 through 4
 No - Correct vehicle electrical system

3) Is field coil resistance between 2.8 and 4.4 ohms?

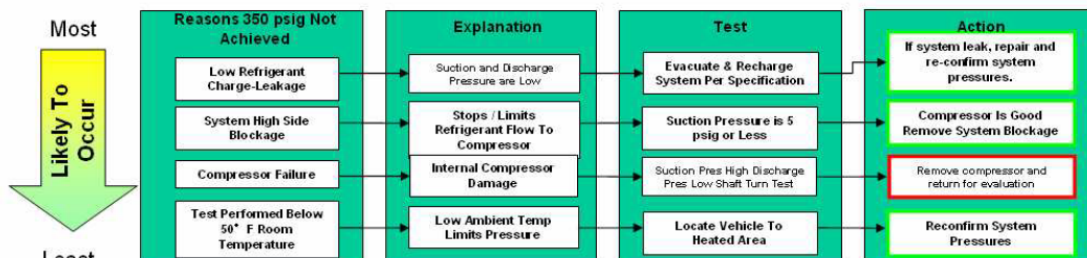
Coil resistance outside of this range will not engage or will cause fused circuits to open.

Yes - Continue with step 4
 No - Remove compressor and return for evaluation

4) Is compressor capable of producing 350 psig or more?

Excessive high pressures can be artificially produced by preventing air flow across the condenser, thus minimizing heat removal from the system. This can be best accomplished by disconnecting the fan switch / relay, or simply blocking the condenser with a sheet of cardboard.

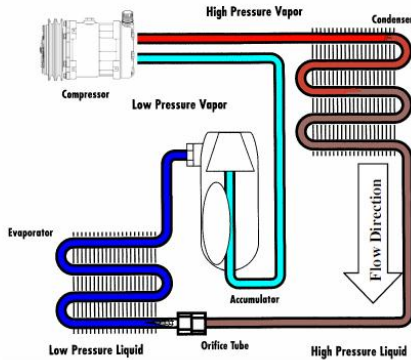
Yes - Compressor is functioning do not remove compressor
 No - Use flow chart below



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Contamination (Keep It Clean and Dry)



Refrigerant and oil circulate through the refrigeration loop during compressor operation. Contamination from rust due to moisture, desiccant or metal particles from a failed compressor will travel with the refrigerant oil mixture and settle throughout the system.

If a new compressor is placed in a dirty refrigerant system the new compressor will suck in loose contamination particles and fail quickly.

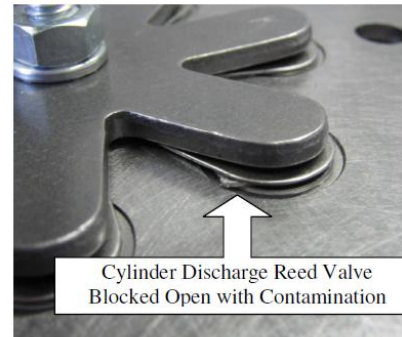
Inspect the oil and expansion devices for signs of grit or foreign particles. If foreign particles are present it is imperative that the system is fluid flushed.



Clean Orifice Tube



Dirty Orifice Tube removed from contaminated system. **This system must be flushed before a new compressor can be installed.** If not damage like the blocked discharge valve in the photo at left will occur.



When flushing a system never flush compressors, expansion valves, orifice tubes, receiver driers or accumulators. These components should be replaced with new parts.

Water Boils under a Vacuum	
System Vacuum Inches Hg	Boiling Point Degrees Fahrenheit
24.04	140
25.39	130
26.45	120
27.32	110
27.99	100
28.50	90
28.89	80
29.18	70
29.40	60
29.66	50
29.71	40
29.76	30
29.82	20
29.86	10
29.87	5

System Evacuation

System Evacuation is the process where moisture and air are removed from the system before charging with refrigerant. It is important to note that water boils at specific temperatures and pressures according to the table to the left.

Example—Water will boil at 70° F once vacuum reaches 29.18 “ Hg or lower at sea level.



Warning

Vacuum pumps with contaminated oil will **not be capable** of reaching the vacuum level necessary to boil water. It is critical to maintain all equipment per the manufactures recommendation. Failure to do so can result in newly repaired systems leaving the shop with moisture contamination.

TIPS FOR HANDLING WARRANTY CLAIMS



Loss of Refrigerant Charge

Refrigerant not only cools the vehicle interior but it also provides necessary cooling of the compressor. As each ounce of refrigerant is lost the compressor runs hotter and hotter. The photos below are examples of how refrigerant loss/overheating effect the compressor.

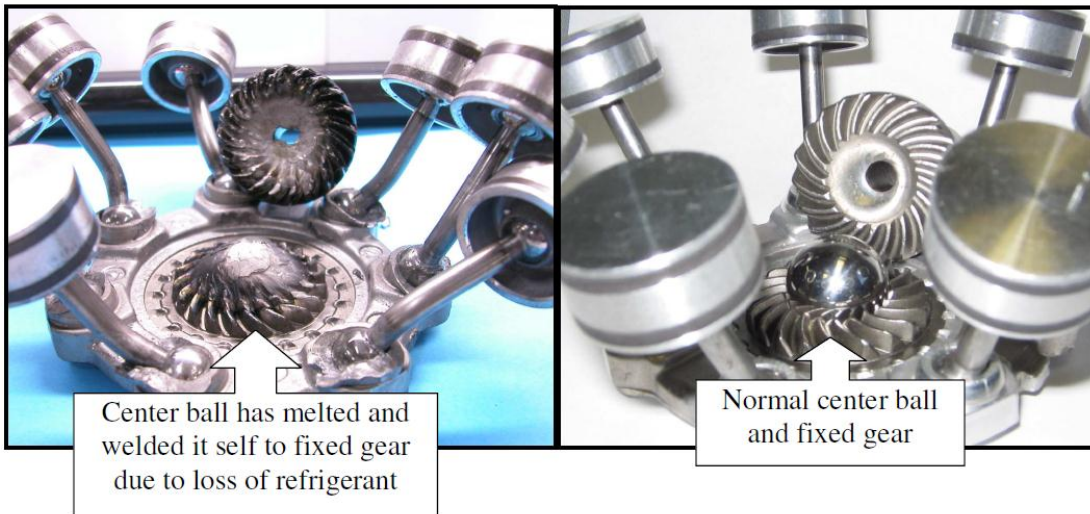


Oil after extended use should be clear. In this particular example the compressor had 150,000 miles when removed. As long as the system is operating normally, has a full refrigerant charge and is free of contamination no oil degradation will occur.

This example is from a compressor exposed to either partial loss of charge or high discharge pressures. Once the cause of high temperature is corrected the compressor and system should function normally.

Black oil results from extreme compressor over heating from loss of refrigerant charge. Normally contamination in the form of metal bits will be found in black oil and it is critical that the system be flushed before installing the new compressor.

Without adequate refrigerant charge the internal components will actually melt

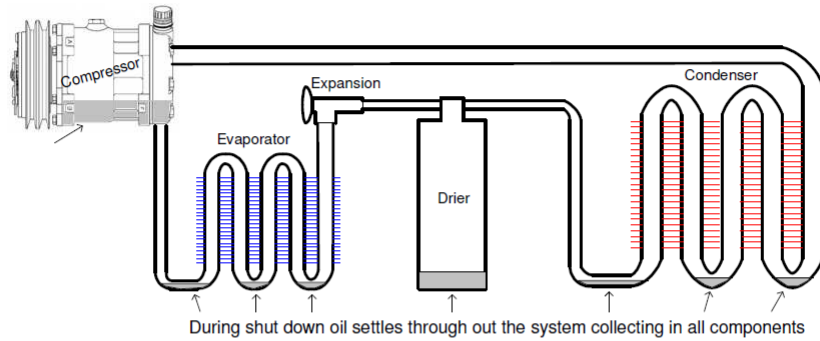


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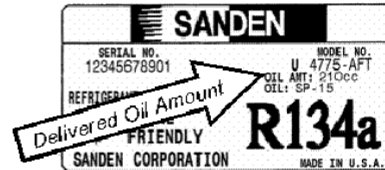
System Oil Amount

Oil circulates with the refrigerant during operation. During off periods oil will settle in all system components with more collecting in cool components like evaporators and suction lines.



Oil Replacement during service activities

When replacing a system component or oil the goal is to restore to the original factory oil amount. This amount can be found on the compressor label. Use the chart below as a guide line for restoring oil quantities when replacing system components.



Component	Typical Oil Amount Large Truck		Typical Oil Amount Passenger Car	
	fl. oz.	cc	fl. oz.	cc
Major System Leak				
Suction Line To Rear Evaporator	3	88	1.5	44
Accumulator				
Condenser				
Evaporator	2	60	1	30
Receiver Drier				
Minor System Leak				
Suction Line To Front Evaporator	1	30	.5	15
Other Hoses or Hard Lines				
Compressor	Equal to amount drained from old compressor			

Example

Large truck with no leak requires new compressor, suction hose and drier.

Drain oil from old compressor = 3 oz
 Oil lost from old suction hose = 1oz (from table)
 Oil remaining in old drier = 1oz (from table)
Amount to added = 5 oz

Note: New compressors are delivered with oil. It will be necessary to add or subtract from the delivered oil amount so the total in the compressor **equals the amount to be added.**

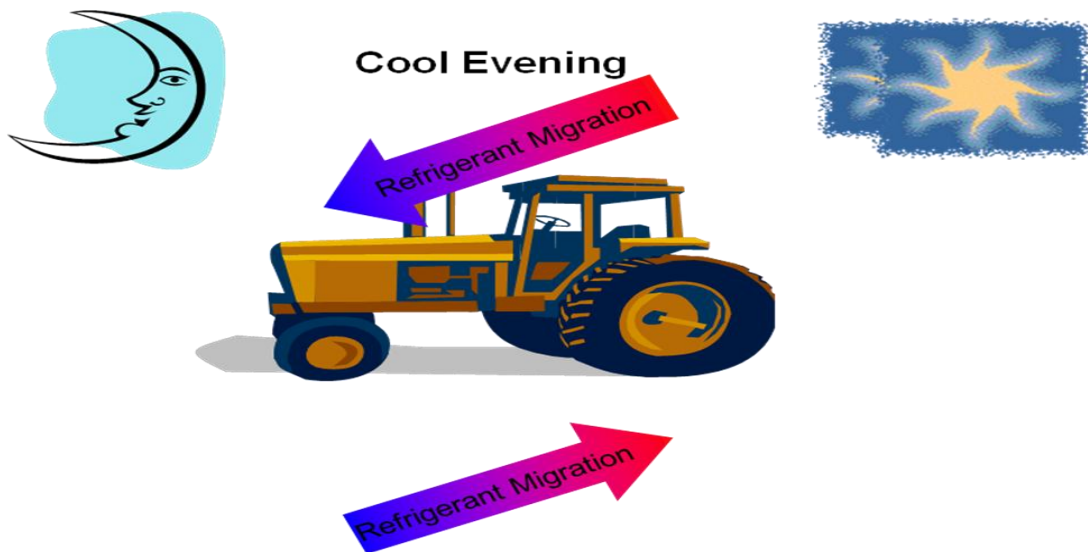
Example—If the new compressor contains 8 oz (240 cc) you must drain 3 oz so the total in the compressor is **5 oz.**

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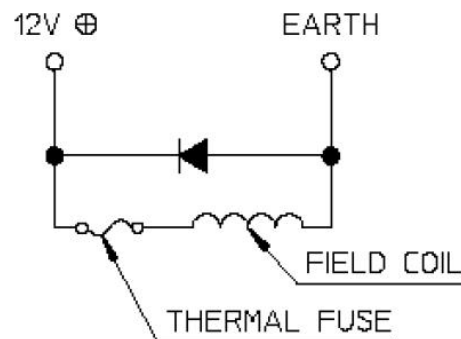
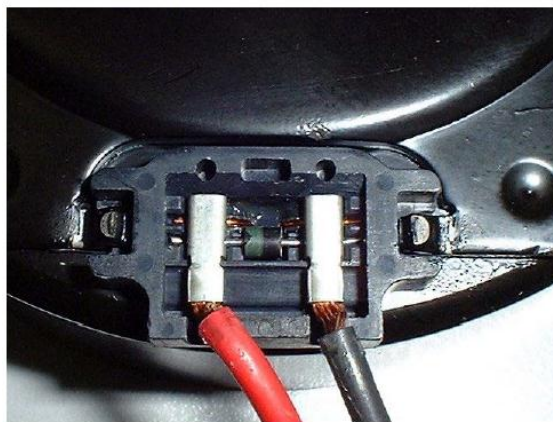
Thermal Oil Siphoning/Migration

Thermal oil siphoning can occur when vehicles are parked for extended periods. Examples are farm and earth moving equipment.

Customer complaint will be "I started the AC system and it immediately locked up the compressor". Some customers call this Dry Lock



Short Circuit



Root cause:

- Wrong polarity applied to compressor

TIPS FOR HANDLING WARRANTY CLAIMS

Frequently Asked Questions**Q: Do Sanden compressors contain refrigerant oil?**

A: Refrigerant oil is installed in Sanden compressors at the factory. Check the compressor label for the type and amount of oil.

Q: Can I buy compressors directly from Sanden?

A: Sanden sells compressors to manufacturers and select distributors only. Please view our ["Where to Buy"](#) list for our distributor's contact information.

Q: How do I identify the part number of a Sanden Compressor?

A: Look at the label on the compressor. The Sanden part number is listed under "Model Number" on the label. The part number is a 4 digit number. Please disregard any leading alpha characters. See example below.

**Q: Does Sanden rebuild compressors?**

A: No. Sanden does not believe that compressors can be rebuilt with an acceptable quality level. We recommend new, not rebuilt, compressors when replacing a broken unit.

Q: Is there a cross reference from a manufacturer's part number to a Sanden part number?

A: Please view our ["Product Search"](#) page to see cross reference information

Q: Should I be concerned about counterfeit Sanden compressors?

A: Yes. There are many poor quality copies of Sanden compressors. Please contact one of our authorized distributors to ensure that you are buying an original, high quality, Sanden compressor. Please contact Sanden directly if you feel you have been sold a counterfeit Sanden compressor.

Q: Does Sanden make any replacements for light vehicles that didn't original come with a Sanden compressors?

A: Yes. Please view our "Application Look-up" to find compressors for light vehicle applications including those that didn't originally contain a Sanden.

Q: Does Sanden still provide replacements for older compressors designed for use in R-12 refrigerant systems?

A: Due to low demand, Sanden has discontinued R-12 models. This includes the following R-12 compressor series (SD505, SD507, SD508, SD509, SD510, SD708, SD709, TR70, TRF90, and TRF105). There are R134a replacements for the R12 models in most cases. Please contact one of our distributors for more information.

Q: Does Sanden offer a warranty on compressors?

A: Most customers that buy directly from Sanden receive warranty coverage on compressors. If you purchase compressors directly from Sanden, please view our [warranty return procedure](#) to understand our warranty claim process. Please contact your distributor to make a warranty claim if you do not purchase compressors directly from Sanden.

Q: Will cooling performance improve if compressor speed or capacity is increased?

TIPS FOR HANDLING WARRANTY CLAIMS**Q: Will cooling performance improve if compressor speed or capacity is increased?**

Cooling performance could improve by increasing compressor speed or capacity; however, HVAC system capacity is not based solely on compressor capacity. Control algorithms, evaporator and

A: condenser sizing, as well as a host of other factors contribute to system capacity, so simply speeding up your compressor or upgrading to a higher-capacity compressor will not necessarily increase your actual system performance. Please consider consulting an aftermarket HVAC systems company if you need help in upgrading your system.

Q: Can Sanden compressors be used for applications other than air conditioning?

A: No. Sanden compressors are designed and validated for use on mobile air conditioning applications only.

