

 BY JOHNSON CONTROLS	<b>YIA and YPC SOLUTION SAMPLING PROCEDURES</b>	
<b>SERVICE</b>	Supersedes: 155.17-SA1 (1009)	Form: 155.17-SA1 (313)

**PLEASE READ THE FOLLOWING INSTRUCTION COMPLETELY BEFORE ATTEMPTING TO REMOVE A SOLUTION SAMPLE!**

**TAKING A SAMPLE FOR LABORATORY ANALYSIS**

**Suggested Tools and Materials**

- Spindle Valve Adapter (922-08869-001)
- Allen Wrench (3/8")
- Barbed Fitting (1/4" barb x 1/2" MPT)
- Hydrometers
- Clear Vacuum Hose (028-12514-000)
- Hose Clamps
- Protective Face Shield and Gloves
- Solution Sample Kit (028-15065-000)  
(Or order from Rocky Research 702-293-0851)
- Silicone Vacuum Grease (011-00901-000)
- Plastic Bucket (2-5 gal)
- Hydrometer Flask
- Pipe Sealant (013-02023-000)
- Loctite Cleaner (013-02899-000)
- Vacuum Flask
- Small Plastic Funnel (50 ml)



*When taking samples, wear a full face shield, protective gloves and apron to avoid the danger of hot solution splashing on the skin or eyes. Do not use glass sample flasks. Use polypropylene or other vacuum suitable, laboratory grade plastic containers.*

To take a solution sample for lab analysis, it is very important to get a representative sample from the unit. Incorrect sampling techniques could lead to a sample that is not a true indicator of the system chemistry.

Strict adherence to the following rules when taking a sample for lab analysis is strongly advisable.

1. The unit should be running in the cooling mode for at least 4 continuous hours prior to taking the sample.

2. New units or units where chemicals have recently been added should be allowed to run until the purging of non-condensables has subsided before resampling.
3. If a unit has recently been de-crystallized, do not sample it until it has run at least 8 hours without any signs of crystallization.
4. Remove the sample from the solution pump discharge sampling valve. This point should be in a positive pressure when the pump is running, although it is always best to prepare the sampling flask as though a vacuum is present. Do not allow air to enter the unit!
5. For the most accurate analysis results, the sample drawn from the unit should be as close as possible to the solution base concentration.

This will be the following:  
 Advaguard 750 and Nitrate = 53%  
 Molybdate = 55%  
 Chromate = 54%

If the unit is running at or close to full load, the sample drawn will be at a higher concentration. Blow down the refrigerant to lower the concentration and allow the solution to circulate for a few minutes before taking the sample.

**NOTE: Samples submitted for analysis should be between 45% and 55% concentration.**

6. Always wash out the sample apparatus with at least one sample before taking the actual sample for analysis.
7. Use clean, plastic (polypropylene or nalgene) containers to draw and handle solution samples. Do not use glass.
8. Generally speaking for preventive maintenance purposes, two samples should be taken on each unit per year. One at the beginning of the cooling season and one near the end. After chemical corrections are made to a unit, resampling should be done as necessary.

## HOW TO TAKE A SAMPLE

In order to take a sample from any sample point on the unit, it is necessary to connect a sample flask using the proper fittings and suitable vacuum tubing.

Be aware that if the unit is equipped with spindle-type valves for sampling, you must use a special spindle valve adapter fitting. The spindle valve has a special internal straight thread. If you screw in a 1/2" pipe nipple, it may appear to work; however, it will leak and possibly damage the internal valve threads.

### **Never assume that a sample point is in a positive pressure!!**

Evacuate the sample flask to a pressure lower than the sample point so that the solution will flow into the sample flask and air will not enter the unit. To do this, you may use the unit purge pump or a separate vacuum pump if one is available. When using the unit purge pump, install a tee and an isolation valve between the manometer and the purge piping. The manometer is used as the vacuum indicator when evacuating the sample flask. Since accidents do happen, it is a good idea to install a trap of some kind between the sample flask and the manometer. The refrigerant removal tank may be used for this purpose. When connecting hoses to fittings, the use of vacuum grease will ease installation and help prevent air leaks.

After completing the tubing connections to the sample flask, open the valve to the flask and any isolation valves between the flask and the vacuum source. Evacuate the flask to 1-3 mm Hg absolute. Slowly open the sample valve until solution or refrigerant begins to flow into the flask. Hold the sample flask so that the incoming solution does not exit the flask through the vacuum connection. As the sample flask fills up, it is normally possible to close the valve on the vacuum connection to the flask and then close the unit sample valve. It is not important what order the valves are closed in, but it is very important to avoid introducing air into the unit or sucking solution into the vacuum pump. After ensuring that the sample valve is completely closed, remove the sample flask. To break the vacuum in the sample flask, hold the flask upright and slowly open the valve

on the vacuum connection of the flask. Pour the contents into a hydrometer flask. Empty the contents of the hydrometer flask into a bucket. This solution may later be returned to the system. Its purpose was to wash out the sample apparatus and flush the sample valve. Never use the first sample drawn.

Re-install the sample flask and repeat the above procedure.

Using an accurate thermometer, measure the temperature of the second sample. Gently stir the thermometer in the solution until the temperature stabilizes. Record the temperature. Select a hydrometer that is in the correct density range of the sample liquid. Normally, this will be the 1.600-1.800 hydrometer. Carefully read the specific gravity of the liquid and record it. Using the solution tables, find the concentration equivalent to the specific gravity and temperature of the sample. It should be less than 55% for lab analysis purposes.

Remove the two sample bottles and one piece of the filter paper from the Solution Sample Kit.

Using one piece of the filter paper, fold it into quarters so that it fits into a small funnel. Place the funnel into the filtered bottle. Pour solution from the hydrometer flask into the filter paper in the funnel and carefully allow the bottle to fill with filtered solution. This may take some time. When the bottle is nearly full, replace the cap, insuring it is tight.

Be sure both bottles have a tracking number label on them and that the tracking number matches the label on the Sample Submittal Form.

Carefully fill out the "Sample Submittal Form" completely, making sure that all data is printed in a legible fashion. **The unit serial number is the tracking identification for future trending of analysis data, so it is very important that the number is totally correct.**

Make a copy of the form for the customers and put the original copy of the form, with the tracking number label that matches the bottles, back in the Sample Kit Box along with the two samples. Be sure the laboratory address label is on the outside of the box. Seal the box and mail it immediately. Postage is not prepaid.



## SPECIAL NOTES

