

*Raker*

**Appliance Repair Professionals, Inc.**

Icemakers

Manual 9

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# **WARNING**

## **SAFETY PRECAUTIONS**

**Safety is very important when working on any appliance .**

**Disconnect power before servicing any appliance.**

**Always keep the work area and your shoes dry.**

**All appliances have sharp edges and should be handled carefully.**

**Before working on any gas appliance extinguish all open flames and before attempting any gas associated repair, cut off the gas feed.**

**Always sniff for gas leaks and soap bubble test any parts that may have been disturbed by repair work.**

**To minimize any potential buildup of gas in case there is a leak, always have the room open to the outside.**



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# ICEMAKERS

An icemaker is a very complicated, interesting device that has become a common household item. Homeowners have become dependent on icemakers and are willing to spend a lot of money to keep them in repair. In this lesson, we are going to cover the operating theory of icemakers so that you have a good overall understanding of how they work. Also, we will discuss the specific designs, and of course their failure patterns.

Most of our study will concentrate on icemakers found in the freezer compartment of a typical domestic refrigerator. The majority of service calls are on that style. Occasionally, in upper income homes, other types will be encountered. Several companies manufacture free standing icemakers, designed to fit under a counter. They are 12-18" wide and include an independent refrigeration unit. Normally, they are found in a separate bar area. These units will be covered toward the end of this lesson.

## *Uncle Harry's Story Time*

*My own personal record was repairing three icemakers in the same house! The kitchen had an icemaker in the huge SubZero freezer. The second one was a Whirlpool installed under a bar in a game room. Incidentally, to give you a feel for the house, the decorations in the game room included a full-sized mannequin of an umpire with his arms raised straight up.*

*The third icemaker was in a cabana house kitchen, next to a huge pool. The cabana was larger than most modest homes. In hindsight, I guess they needed three icemakers.*

Icemakers are like refrigerators, in that they are mysterious in their operation. Anything mysterious helps us out. The more obscure an operation, the higher the profit. Icemakers are a real money maker for appliance technicians. They fail frequently for numerous reasons. Even under ideal conditions, it is rare for one to last over ten years. Often chemicals in the water cause them to fail in a few years.

In many cases, the best and most profitable solution to a bad icemaker is total replacement. A replacement results in a profit of \$100.00-\$150.00! Stocking replacement kits on your truck can make you money in a hurry. As reserve cash becomes available, it is one of the first major parts investments to make. *Uncle Harry* carries four different ones on the truck. He is ready for almost anything.

Icemakers are handled in this course as a separate lesson for several reasons:

1. Icemaker logic and service are different from that of the refrigerator.
2. Since they are a big money maker, we need to carefully cover them so that you are prepared when opportunities arise.
3. They have a reputation for being very tricky to repair properly. We want to be very thorough, so that you don't run into callback problems.

*Uncle Harry's  
Story Time*

*Back in the 70's, after icemakers had been out for a few years, I remember running into a friend of mine, John Reese. John was already an old hand at appliance repairs. I had noticed that over a period of weeks, he had been buying a lot of parts for GE icemakers. One day my curiosity got the best of me.*

*"John, what are you doing buying all those icemaker parts?"*

*Without saying anything, he went out to his truck and came back in with a GE icemaker in his hands.*

*He said, "I've replaced the mold heater, the drive motor, the thermostat, the gears, the mold, and the comb in this icemaker, and it still won't work dependably."*

*"John, you've replaced every part of it. There's nothing left."*

*He said, "Yeah, I know, but it still won't work right."*

*Knowing John, he never gave up. I'm sure he eventually fixed it.*

Back then, we still attempted to repair the icemaker unit itself, but eventually we woke up to reality and gave up. By the end of this lesson you will have an insight into the experience gained by professional technicians over many years.

The proper strategy in icemaker repair is similar to freon systems. First, it is necessary to understand exactly how they work so that you can properly diagnose them. With that full understanding, it is possible to separate an icemaker failure into the three categories. Failures occur because of problems with:

1. The freezer temperature and air flow.
2. The water valve, water supply, and associated piping including:
  - A. The water supply line between the valve and the icemaker.
  - B. An ice jam in the fill spout.
  - C. The water supply line to the refrigerator.
3. The icemaker unit itself.

**Knowing for sure which of these three is the source of the problem eliminates any guess work and potential for callbacks.**

We will use a divide and conquer method for studying icemakers. We will start with the easy problems and work our way toward the difficult ones. First we will study the temperatures and conditions needed for an icemaker to work. Second we will study the various supply and piping systems.

Once these are fully understood, we will go in for the kill and study the icemaker unit itself. Believe it or not, the supply lines and the water valve are responsible for about half of all icemaker service calls.

## **1. Freezer Temperatures and Airflow**

**F**irst, let's talk about the perfect environment for an icemaker.

Remember back when we started on washing machines, we talked about electric and water supply, temperatures, drain lines, etc. The icemaker is similar. It needs its own special environment in order to function properly. Often an icemaker will stop working, not because of a problem in the icemaker unit, but rather, a problem in the freezer.

To function, an icemaker needs the air temperature to be less than 20°F. Ice makers are always installed directly in the air coming off of the evaporator. Often the air hitting the icemaker is below zero. This insures quick freezing of the water and a reasonable production of ice.

Incidentally, low production of ice (or the failure of an icemaker to work) is usually the first indicator of a problem with the refrigerator. Conversely, if the customer is complaining of poor refrigeration but the icemaker is still working, you immediately know that the freezer temperature is below 20°F. More than likely, the problem is going to be blocked air-flow or a control setting problem, instead of anything serious.

It is good to keep in mind that an icemaker is nothing more than a manual ice tray. It merely has a few gizmos attached to dump the ice every once in a while. It still needs to be in a cold environment for a good length of time to freeze the water. As a crude rule of thumb, a properly operating icemaker will fill up a typical icemaker bucket in about a day. Production is always better overnight. Production always drops down during the day because the freezer and refrigerator door are being opened. Temperatures shoot up for short periods of time and water won't freeze as fast.

A brand new refrigerator, freshly plugged in, will take over twelve hours, and sometimes as long as twenty-four, to make its first tray of ice. Calm down any panicky customer that gets antsy checking the freezer. Tell them to close the doors and leave it alone for a day. After waiting a full day, check it and only then draw conclusions.

*Uncle Harry's  
Story Time*

*A panicked customer paged me late one Friday afternoon. Another service company had left the house a few hours before. They had repaired the icemaker for the third time. Now the entire refrigerator was thawing out. The customer had called the other company and had only gotten an answering machine. He had my number from a mailer and paged me.*

*There I was, tired after a long week. My 10 year old daughter was with me and I had just pulled in my driveway when my pager went off!*

*I slowly walked into the house. Even though I didn't feel like it, I followed my own advice and immediately called the number.*

*After hearing his story, I asked the customer to check and make sure that the control was turned on. He said that he already done that. "Yes, it was on."*

*A customer with no refrigeration is a high priority call.*

*The house wasn't too far away, so reluctantly I went. Upon arrival, the first thing I checked was the cold control. It was an Amana and the primary control was behind frozen food in the freezer section. This is an unusual spot for the control; the damper in the fresh food side was set normally. Of course the fresh food one was the one the customer had checked. Naturally, the freezer control was turned off.*

*Apparently, my competitor was in such a hurry that, after fixing the icemaker, the dummy forgot to turn the unit back on.*

*I laughed at the ridiculous situation. The customer happily paid the service charge. He was back in service. I recommended that he call the other company and ask for a refund.*

*I couldn't wait to tease my competitor; the next time I met him. He was mightily embarrassed and had quickly refunded some of the money.*

*About two weeks later, the same customer paged me on a Sunday. Again his icemaker was dead, and he wasn't about to call my competitor again. I asked him a few questions. He had had a large party the night before.*

*I said, "I doubt that there is anything wrong with your icemaker. Keep the doors closed today, take two aspirins and if there is any further problem, call me in the morning. The icemaker just need to recuperate from the party."*

*I never heard another word from him.*

*Icemakers have a reputation for being difficult to diagnose. This is mostly because they are very slow acting and hard to test. It's important to understand exactly how they work in order to properly repair them.*

It's not practical to stand around for an hour or two while the water freezes and turns to ice. Only then will the icemaker cycle and dump the frozen cubes. Even the very best mechanic can only:

1. Repair or replace an icemaker,
2. Cycle it and watch it fill with water,
3. Cross his fingers,
4. Close the freezer door, and leave.

Instead of running the unit through a cycle like a dryer, the technician must rely on training and be able to **predict** what the icemaker will do rather than waiting around for it to happen.

### **Separating Freezer From Icemaker Problems**

**T**he very first step in diagnosing all icemakers is to carefully measure the temperature. Lay a thermometer on top of the cube tray and wait several minutes.

*Uncle Harry's*

Trick of the Trade # 130

If the temperature is above 20°F., investigate the freezer

If it's below 20°F., investigate the icemaker.

If the freezer has been turned off, it's unlikely that you will be able to diagnose the icemaker. It's still possible to run the icemaker through a cycle and make sure it fills with water. Cycling it will also check out the internal workings of the icemaker. However these are only a partial indication, not a sure test.

As with all refrigeration calls, before running an icemaker call, it's essential that the customer be told to leave the refrigerator on for over a day. Otherwise, it's better to postpone the call.

*"Well, it was broken, so I unplugged it,"*

Anytime you hear these words, you know you're in deep trouble. A graceful exit is the next best move. Stop back another day, after the unit has cooled off. Otherwise, you're just wasting your time.




**Don't forget, the icemaker will not work until it's below 20°F.**

## 2. The Water Valve and Associated Problems (Common to All Brands of Ice makers)

The water valve on the icemaker operates exactly like the washing machine water valve. Instead of rubber hoses, the supply line is a 1/4" copper or 1/4" plastic line. The small line is connected to the cold water supply by a tap valve. Often the tap valve is found under the kitchen sink. In other cases the line feeds through a hole in the floor to the basement.

**Fig. 09-01**  
**Tap Valve**

Tap Valve

**Icemaker Installation Kits**  
**Copper Tube**  
GEMLINE® kits use only copper tubing for proper installations. GEMLINE® kits also provide the installer the right components for the job for consistent one-trip installations.

**Standard Kits**

GEM NO.	LENGTH	CONTENTS INCLUDE
IM281	8'	Coil of 1/4" Copper Tube, 95149 1/4" Union & GSV2 Saddle Valve
IM381	16'	
IM291	25'	

**Kits Including Filter**

GEM NO.	LENGTH	CONTENTS INCLUDE
IM183	16'	Coil of 1/4" Copper Tube, 95149 1/4" Union, GSV2 Saddle Valve & WF270 Water Filter
IM253	25'	

**Flared Tubing Kits**

GEM NO.	LENGTH	CONTENTS INCLUDE
IM164	16'	Coil 1/4" Copper Tube Pre-Flared, 95122 1/4" Flare Nut, 95090 1/4" Flare Union & GSV2 Saddle Valve
IM254	25'	

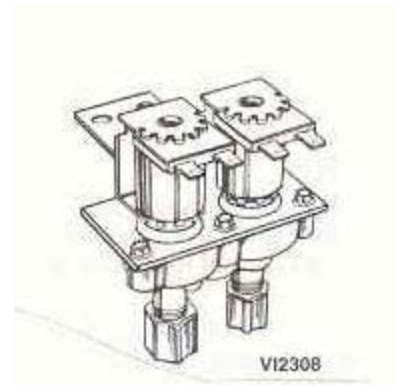
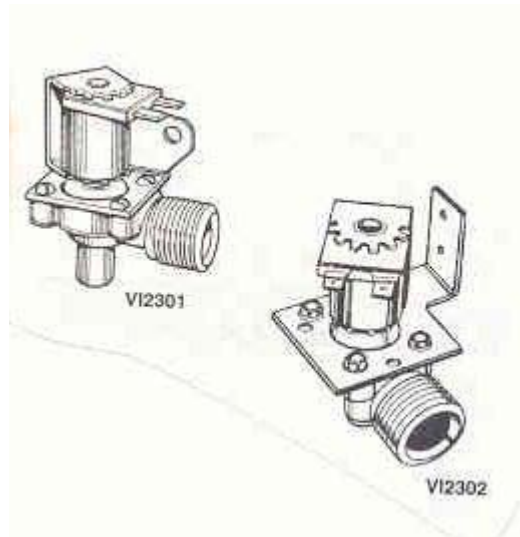
**GSV2 Self-Tapping Saddle Valve**

- Added brass insert for positive flow and seating capability.
- Quick and convenient line tap method for refrigerators, icemakers, etc.
- Adjusts from 3/8" through 1 1/8" O.D. copper tubing.
- Install and screw handle down to cut clean hole in the tubing.
- Can be used on steel or brass pipe in conventional manner by drilling pipe first.
- Outlet - 1/4" O.D. Compression fitting.

Handy Handy • Appliance Repair Course  
Lesson 9, Ice makers

At the refrigerator, the supply line connects to the icemaker water valve. The valve has an internal washer to restrict the water flow. The “metering washer” drops the flow to a rate of about 6 oz. of water in 10 sec. Frequently, the icemaker valve is combined with the valve that supplies the water to the door. This style is a double solenoid model that provides both needs from the same water line.

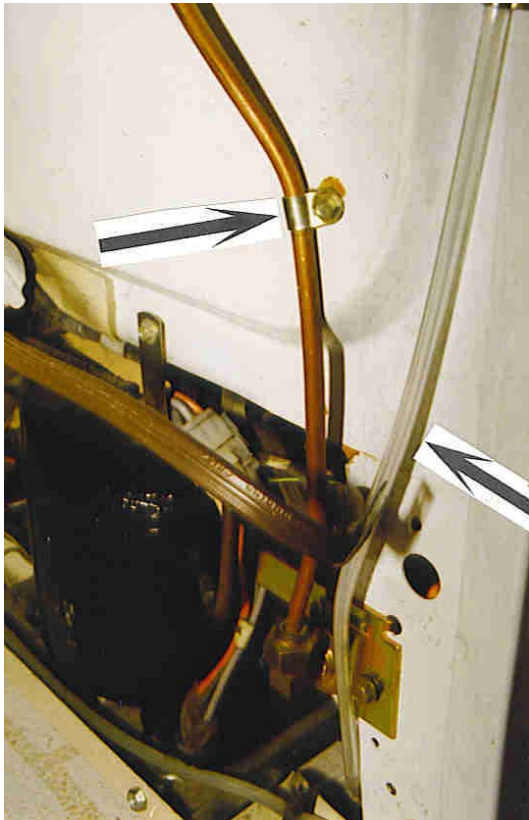
**Fig. 09-02**  
**Single and Double Water Valves**



Regardless of the configuration, icemaker valves fail the same way that the water valves fail in washing machines. The failures may create different symptoms from those on the washer, but the logic is the same. They fail in the following ways:

- 1) A dripping valve.
- 2) A flooding Valve
- 3) A bad coil.
- 4) Clogged water system.

**Fig. 09-03**  
**Copper Feed line and Plastic Outlet**  
**from the Water Valve**



### 1) A Dripping Water Valve

Water leaving the water valve travels up the back of the refrigerator through a 1/4" plastic tube.

It enters the refrigerator through a tilted spout. The spout pierces the insulated wall of the refrigerator. The exit end of the spout pours water into the icemaker.

**Fig. 09-04**  
**A Cracked Icemaker Spout Being Replaced**

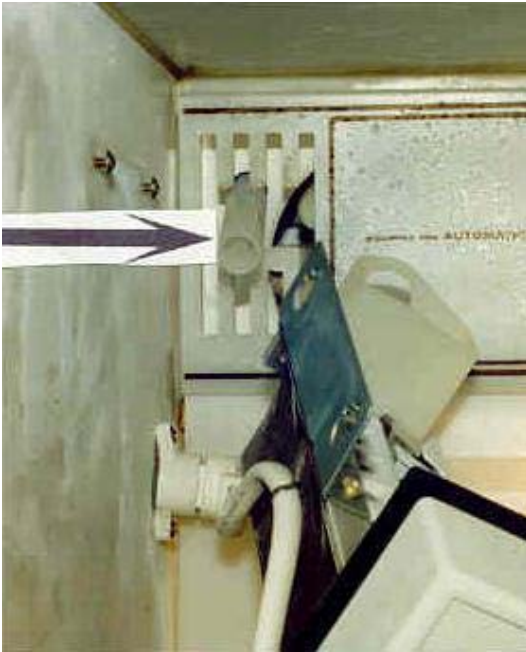


A most common valve failure is for it to leak small amounts of water into the icemaker while in the off position. A dripping water valve will cause one of two problems. If it's a very small drip, it will cause a freeze-up in the supply spout on the back wall of the refrigerator.

The supply tube is tilted so the water will drain into the icemaker mold. If the water flow is only a slow drip, it will freeze before it flows off the end of the supply tube. Gradually, the drips will build up like a glacier does, until it plugs the supply tube. Once plugged the icemaker occasionally cycles vainly waiting for water.

**Fig. 09-05**

**The Icemaker Spout as it Enters the Icemaker**



*Uncle Harry's*  
Trick of the Trade # 131

To thaw a frozen fill spout use your freezer "drain opening tool," the battery filling syringe. Using very hot water, squirt water up the tube until it thaws.

**Fig. 09-06**  
**Thawing a Frozen Spout**



In most cases a new water valve is needed to prevent refreezing of the spout. However there is one common exception.

*Uncle Harry's*  
Trick of the Trade # 132

Water spouts freeze up if a refrigerator is infrequently used. For instance, this problem will often arise while people are away on vacation. A simple flushing will solve the problem. A bad door gasket or partially open door will also cause spout freeze up.

Why is this problem caused by minimal usage and the increase of fresh air leaking in? Spout freezing occurs in the following steps:

1. The water spout pierces the insulation. Naturally, this creates a small cold spot on the back wall of the refrigerator.
2. The water spout is not air tight.
3. Air seeps in around the spout.
4. When it chills the surrounding air, a few drops of water condense, just like "dew" in the morning. This problem is aggravated by high humidity in the summer.
5. The condensate runs down the spout and freezes before it falls off the end.

6. Over a long period of time, with no icemaker water to flush it away, the condensate will build up enough to plug the line.

Look back at the photograph of the broken water spout. There is an arrow showing where putty installed by the factory to seal the spout at the back wall. Installing the putty minimizes air leakage and reduces freeze-up.

## 2) A Flooding Valve

A second but less common valve failure is flooding. If the valve fails to shut off, water will pour out of the icemaker and create a mess. The customer will desperately locate the cutoff and shut down the supply.

*Uncle Harry's*  
Trick of the Trade # 133

### **Be Careful!**

1. A bad icemaker can also cause a flood. The internal cam or microswitch may have failed and continuously called for water. Does water continue to come in even with the icemaker unplugged? If so, the valve is definitely bad.
2. A bad mold can cause a slow overflow (see mold problems)