Our Tour begins up the stairs and on the bridge overlooking the Brewery.

The Dam Tour

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The Brewing Process

At the Dillon Dam Brewery we brew both **Ales** and **Lagers** with a 15-barrel stainless steel system manufactured by JW Northwest.

Annual total production is approximately **2,000 barrels** of beer. With 31 gallons per barrel, we brew approximately 62,000 gallons of beer per year. That means we serve 496,000 pints of beer in just one year.

The process all begins with **barley**, a grass. The basic recipe and method of brewing beer is:

- Barley is turned into malt
- The malt is cooked in hot water
- Hops are added as an agent of flavoring and preservation
- Yeast is introduced to bring about fermentation.

The Brewing Process

We have 50,000 pounds of **Two-Row Malted Barley** stored in our silo outside. We bring it into the mill room using an automated auger feed.

In the **Mill Room** we crush the grain with a roller malt mill. Also in the **Mill Room** we add and crush the specialty malts and grains for recipe formulation.

After crushing, we move the grains into the **Grist Case** where we weigh the malt, which usually weighs about 900 pounds, and then we feed the malt into the **Mash Tun** below.

In the **Mash Tun** we add hot filtered water. The large, carbon-filtration **Stack Filter** in the right hand corner of the Brewery filters all our water. It is then stored in the 1,500-gallon **Hot Liquor Tank** in preparation for brewing.

The malt steeps in the **Mash Tun** at 150 degrees Fahrenheit for 45 minutes during which time enzymes are converting the starches present in barley and malt into sugars.

After another 45 minutes we use the **Lauter Tun** (the small re-circulation tank just behind the Mash Tun) to circulate the sweet liquid over the mash.

This settles the malt into a filter bed, allowing a clean run-off, free of malt husks and other debris

Then we slowly drain the sweet liquid (now called **Wort**) out of the bottom of the **Mash Tun** and rinse fresh hot water through the top to collect all the sugars.

The Wort goes into the **Boiling Kettle** where we bring 600 gallons up to a boil for two hours. This is the basic volume of a single batch of brew.

Due to evaporation and Wort lost in the **Trub Pile** (spent hops and grain husks that resemble green mash potatoes left at the bottom of the kettle), we actually net about 500 gallons per brew day. The total brewing process takes approximately 8 hours.

It takes two eight-hour days to fill one of our 1,000-gallon **fermenters.**

During the two-hour boil in the **Kettle** we will make up to four hops additions. The longer the hops are boiled the more bitterness is extracted.

Later **hop additions** give the brew its floral, fruity or spicy aromas and flavors.

After the two-hour boil we pass the beer through a heat exchanger, which rapidly cools the beer before we move

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Brewmaster Mike Bennett checks the temperature in the Mash Tun. You can watch the brewers work from the bridge overlooking the brewery.

The Fermentation Process

The fermentation process can take anywhere from 7 to 21 days.

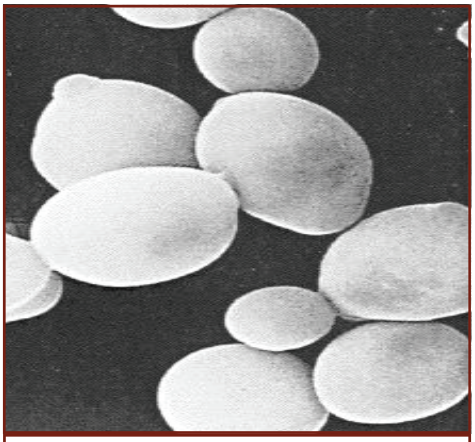
For example, the **Here's Your DAM IPA** takes 2-3 weeks because it's dry hopped. **Ales** ferment at 68 degrees for a faster fermentation and bolder, fresher, more aggressive flavors.

Our Lager styles take 10-20 days. **Lagers** are fermented at 50 degrees. The slow fermentation provides cleaner, crisper flavors and a more aged flavor.

In the **Fermenters** yeast consumes the sugars and converts them into liquid alcohol and carbon dioxide gas. This is fermentation.

The red hoses on the right side of the **Fermenters** release the carbon dioxide into bleach water to ensure a clean environment.

Each **Fermenter** is glycol jacketed. Glycol, a coolant, is circulating between the inner and outer skins of the **Fermenter** and cools the beer. The **Glycol Lines** are the six pink lines on the side of the **Fermenter.**



Yeast photographed by an electron microscope.. Yeast reproduces by budding. You can see a bud on the yeast cell to the left.

After fermentation the beer is cooled to 32 degrees. The cooler temps put the yeast to "sleep" so it will settle to the bottom where we can re-harvest it.

After a 5-day rest period we pump the beer into the **Filter Room**. All equipment in the brewing process is connected with stainless steel pipes or hoses. Pumps move the liquid from one brewing stage to another.

We use the **Brewing Control Panels** to regulate **Mash Tun** and **Kettle** temperatures, to regulate water flow rates and the pumps.

A **Black Control Panel** at the back of the room controls the fermentation temperatures.

We also recycle our spent grain as part of the process. A local farmer collects it for "cow chow."

We brew 2-4 times per week and produce 1,000 pounds dry weight of spent grain per batch.

The Brewing Process

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it into the freshly cleaned **Fermenter.** In the **Fermenter** approximately 30 gallons of yeast is waiting.

The shape of the bottom of the fermenter is conical so it can gather the yeast. We pump the yeast from one completely fermented batch into a new batch.

We re-crop our yeast from each batch and reuse it for 10-15 generations. As the yeast dies, we replenish it with lab-raised, liquid yeast. We store yeast in the yeast propagator until it is needed.

Brewmaster Mike Bennett uses a long-handled paddle to stir the Wort which steeps at 150 F inside the Mash Tun.

Laboratory Tests

In the **Laboratory** we test every stage of the process from brewing to packaging. **Cleanliness** is the key to good beer.

We test for beer contaminants or off-flavors. We test for carbonation and air levels in our bottled product. We take samples from the taps, bottles, serving tanks, fermenters, and all the plumbing and storage tanks.

Our brewers also conduct yeast analysis. Samples of yeast from the fermenters are diluted and then individual yeast cells are counted and examined under a microscope to determine whether they are alive or dead.

This tells us how much volume of yeast to use for the next beer style to be brewed.

Malting

Before malting, **barley** is rock hard. After malting the barley acquires a pleasant, biscuit-like flavor and consistency. Barley malt is the soul of all good beers.

The purpose of malting is to

Barley growing in the field. The seeds of the barley are used.

make the **starches (carbohydrates and sugars)** that are contained in the seed of the barley or wheat dissolve in water.

Malting begins by steeping barley in water and letting it **sprout.** Then the barley is **dried** to stop the germination. This sprouted and dried grain is called **Malt**.

Malt is further darkened and its flavors enhanced by **roasting** at temperatures between 350 and 450 degrees Fahrenheit or by **smoking.**

The **Roller Mill** in the corner of the **Mill Room** lightly crushes the grain; it does not turn it into the consistency of flour. It just breaks the barley pieces in half, exposing the starch inside.

In this room workers use dust protection respirators and the fan for dust exhaust.

Malts and Hops Used At the Dam Brewery

Two-Row Pale Malt – Basic malted barley housed in our silo.
Pilsner Malt – Lightly roasted barley.
Wheat Malt – Lightly roasted wheat.
Carapils Malt – Roasted barley that adds body, but does not add fermentable sugars.
Munich Malt – Barley roasted in the European Tradition
Vienna Malt – Barley roasted in the European Tradition
Carmel 30 -- #30 is a measurement of the darkness of the Barley.
Crystal 80 -- #80 in darkness. The larger the number the darker is the malt.
Brown Malt – Has a toasted, nutty flavor, without nuts.
Chocolate Malt – Has a chocolate sweetness, but does not contain any chocolate.
Black Malt -- Bittersweet
Roast Barley – coffee like but does not contain coffee.
Hops – this flower is manufactured into pellets, but also comes fresh from the field.

Hop Cone, a flower.

Recipe Formulation

Here at the Dam Brewery, we create our own beer recipes based primarily on **classic beer styles and the ingredients that are unique to the geography of those regions** where the styles were created.

Recipe development is based somewhat on our own unique flavor perceptions.

We brew to our tastes and the perceived tastes of our customers.

Over the years, The Dam Brewery has brewed many different styles of beer.

These beers are brewed according to our traditional, award winning recipes, or as seasonal recipes which make appearances throughout the year.

Some of these Seasonals have become so popular, we now brew them year round.

With over 24 taps available to pour beer from, we are constantly coming up with new brews for our patrons to enjoy.

The beers are typically brewed to fit a certain style category, and many times will include various non-traditional beer ingredients.

Our creative seasonal beers, specialty beers and experimental beers sometimes spring from our tasting experience at a beer festival, from a variation we want to try or a new flavor we want to test.

Flavoring Additions

We add ingredients such as chilies, raspberries, pumpkin, oranges, spices, coffee, fresh from the field hops and more to create unique beers.

Filter Room & Serving Tanks

Filter Room

The beer is pumped from the **Fermenters** to the **Plate-and-Frame Filter** which uses fabric sheets impregnated with diatomaceous earth, Perlite, and cellulose. These are compressed between plastic plates.

By using **different grades of sheets, the brewers are able to control the level of filtration** of each beer depending on style.

The beer is pumped through the sheets into the serving tanks. Along the way, it passes a Carbonation stone that force carbonates the beer.

Beer cannot be filtered if it is carbonated; therefore, we remove the carbon dioxide during fermentation and replace it after filtering.

The **carbon dioxide tanks** in this room not only carbonate the beer, but also push all our beer through the serving lines and run the bottler.

Serving Tanks

We have six, 1,000 gallon or 30 barrel **serving tanks** in this room. Located downstairs are four additional 15-barrel **serving tanks** and a 5 barrel small batch serving tank. We also use kegs that hold 15.5 gallons or ½ barrel to store our experimental, specialty and seasonal beers.

From the **serving tanks**, the beer flows to our **24 taps** in the bar, and downstairs into the **bottling** and **kegging** room.

We also have **whiskey barrel** and **nitro barrel taps**. In total we can serve up to **17 beer styles at one time.**

Bottling Room

Our Bottling Room is not visible on the tour.

Our **HDP Bottler** is a four-head, four-spout bottle filler. It is not fully automated and requires a person to operate it.

We bottle 22 oz Limited Edition Bombers that are only sold at the Brewery and 12 oz bottles usually sold in 6-Packs. There's always new seasonal beers available to-go.

Our labeling machine for the 12 oz Bottles was originally designed in 1920 and manufactured before 1942.

Our 22 oz Bombers have custom labels developed by our staff.

Assistant Brewer JJ Miles readies clean bottles to be filled and capped by the bottler and assures that the labeler mechanically adheres labels to clean bottles.

Dam Brewery Awards

2013 North American Beer Awards
Bronze Hoporter

2012 World Beer Cup
Gold Art of Science Schwarzbier
Bronze Sweet George's Brown

2012 North American Beer Awards
Gold McLuhr's Irish Stout
Bronze Sweet George's Brown Ale

2011 North American Beer Awards
Bronze Sweet George's Brown Ale
Bronze McLuhrs Irish Stout

2010 Great American Beer Festival
Silver McLuhrs Irish Stout

2010 World Beer Cup
Gold McLuhrs Irish Stout

2009 North American Beer Awards
Gold Sweet George's Brown Ale
Gold Dam Lyte
Silver Dam Straight Lager
Silver McLuhrs Irish Stout

2008 Great American Beer Festival
Gold Sweet George's Brown Ale

2008 World Beer Cup
Silver Sweet George's Brown Ale

2005 North American Beer Awards
Gold McLuhrs Irish Stout
Gold YoHann Bock
Silver Dam Straight Lager
Bronze Sweet George's Brown Ale

Tour Ends Here. Thanks for Taking the Dam Tour!