Guide to Step Mashing

Step mashing is a technique that was developed by brewers at a time when malts were less well modified than they are now. When malting takes place the aim is to break down glucans and proteins, making it easier for home brewers to extract sugars. By performing different rests at different temperatures, brewers could perform some of this modification in the mash, increasing the amount of sugar they could extract from the malt and therefore increasing their efficiency.

Most homebrewers now choose not to follow a step mash schedule because malts are so well modified that the general consensus is a step mash will not increase conversion by any great amount. However, there are reasons beyond conversion that you might want to perform a step mash.

The Steps:

The Acid Rest: 35-45°C (20 minutes)

- The acid rest is a step designed to lower the pH of the mash. This can assist in breaking down beta-glucans which is useful if using a high proportion of wheat or oat malts.

Ferulic Acid Rest: 43-45°C (15 minutes)

- In beer, a molecule called 4-vinyl-guiaicol is credited with giving beer a clove-like aroma that is desirable in styles such as Hefeweizen. Ferulic acid is a pre-cursor to this molecule which is normally bound to other molecules present in the wort. By performing a rest in this temperature range you can release more ferulic acid into the wort, giving you more of the precursor to 4-vinyl-guiaicol.

The Protein Rest: 44-59°C (20 minutes)

- If you have too many long chain proteins present in your worth you may find you have issues with protein haze and instability during prolonged storage of the beer. Conversely you require some medium chain proteins in your beer as they help with head retention and body in the finished beer.

The Saccharification Rest: 61-71°C (40 minutes)

- This is the required rest for brewers and many brewers will utilise just one extended (60 minute) rest within the temperature range. The purpose of the saccharification rest in to convert starches to sugar. Two enzymes are important here, alpha-amylase and beta-amylase. Alpha-amylase is most active around 68-72°C and creates long sugar chains which result in a sweeter, fuller-bodied beer. Beta-amylase is most active from 60-63°C, creates shorter sugar chains, and results in high-fermentable worts for drier finish beers.

Example Steps for Styles:

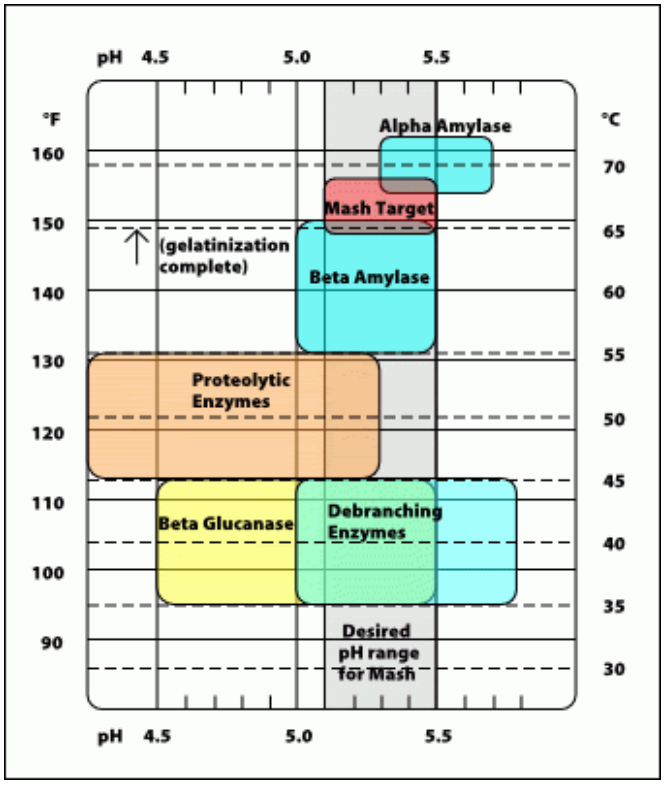
American Pale Ale/IPA		
	Temp	Time
Dough-In	40°C	
Protein Rest	52°C	20 mins
Maltose Rest	63°C	20 mins
Saccharification	66°C	35 mins
Mash Out	75°C	10 mins

Wheat beer/Hefeweizen		
	Temp	Time
Dough-In	38°C	
Ferulic Acid Rest	43°C	15 mins
Protein Rest	52°C	20 mins
Maltose Rest	63°C	35 mins
Saccharification	66°C	35 mins
Mash Out	75°C	10 mins

Lager/Pilsner		
	Temp	Time
Dough-In	38°C	
Protein Rest	50°C	20 mins
Maltose Rest	59°C	35 mins
Saccharification	63°C	35 mins
Mash Out	75°C	10 mins

Saison		
	Temp	Time
Dough-In	40°C	
Protein Rest	52°C	20 mins
Maltose Rest	59°C	35 mins
Saccharification	62°C	35 mins
Mash Out	75°C	10 mins

English Ale		
	Temp	Time
Dough-In	40°C	
Protein Rest	50°C	20 mins
Maltose Rest	63°C	35 mins
Saccharification	68°C	35 mins
Mash Out	75°C	10 mins



Information credited to How to Brew by John Palmer and grainfather.com where appropriate