# Moving Tribal Knowledge to Solid Science, Building a Quality Program

## Understanding The Points of Control for Your Process and Quality Program

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# Quality Design

- Phase One – Implement QC (sensory and lab centric product testing)  <100K BBL
- Phase Two – Implement QA (process control, standardization and education) >100K BBL
- Phase Three – Total Quality (satellite labs, in-line meters and on the spot quality checks) – World Class Brewery

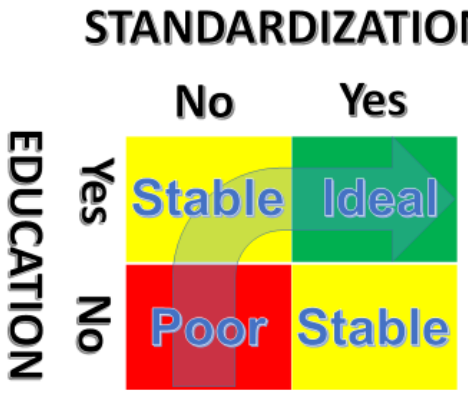
# Phase One: Implementing Quality Control

- Why? Because beer consumers are getting smarter about flaws and developing a more and more discerning taste everyday.
- For this reason it's important to prevent bad beer from hitting the shelves as you could lose customer loyalty or be staring at the business end of a beer blogger's comment.
- Implementing more QC functions will reduce dissatisfied customers but could increase your waste. Proper prioritization and value added exercises should be done before including any new QC function to your program.
- Examples of Implementation: Sensory panel, finished beer analysis for a myriad of quality parameters, shelf life coding and packaging testing of materials and labels.

# Phase Two: Implement Quality Assurance

- Why? Quality Control is key for keeping defective product from getting to your customers but quality assurance is key for keeping defective product from happening at all.
- For this reason it's important to have your quality team focus their control on the beer making processes.
- It is easy to quantify returns to expenditures in this phase by quantifying probable waste reduction.
- Examples of Implementation: SOPs, control charts, sensory classes, cross training on lab instruments and quality process improvement projects.

# MODEL FOR SUCCESS




Why invest in education before standardization?

A. It makes the standardization process easier.
B. People are the largest asset in a brewery.

# Phase Three: Implement Total Quality

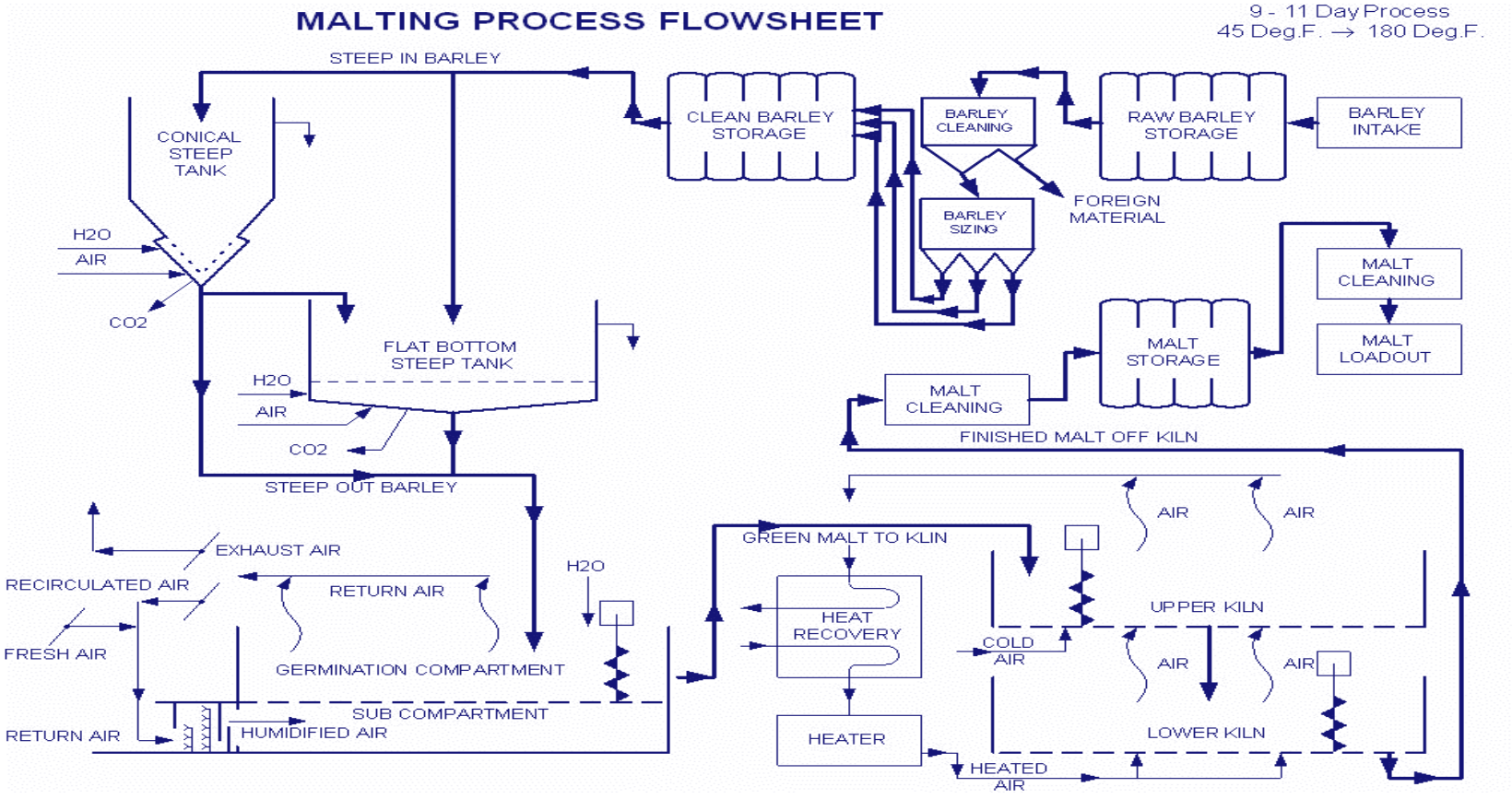
- Why? Quality audits happen in the lab but the quality work happens on the floor.
- For this reason, it's important to control process as much as possible at the source.
- With your organization as a whole focused on continuous quality improvements you will get more quality success overall.
- Examples of Implementations: In line bottle detectors, beer gas analyzers run real time on the packaging line and cellar yeast satellite lab

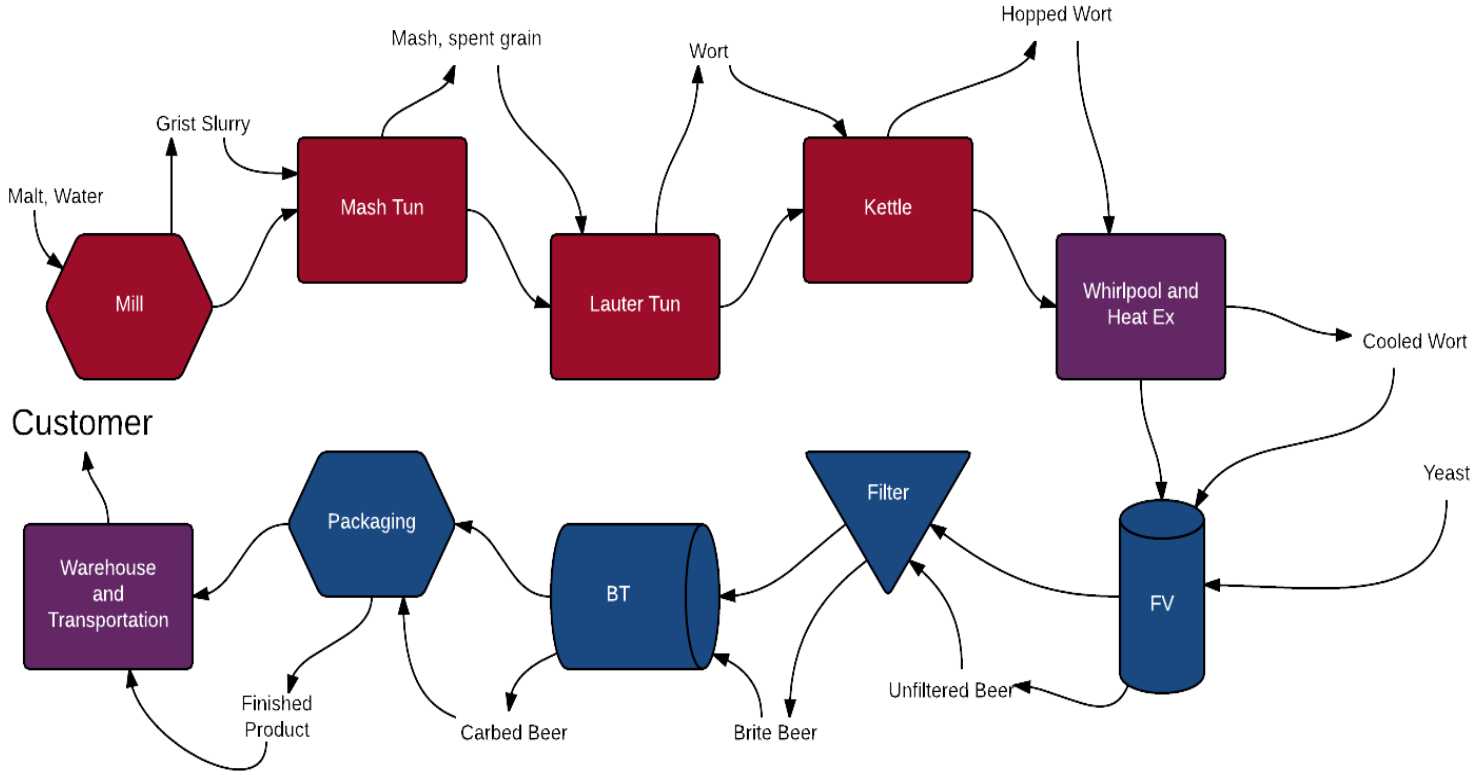
# Designing Your Quality Program

Where to start?

# Flow Charts and Process Mapping

- Flow Charts and Process Mapping are tools that help to illustrate your process.
- To clarify, process mapping is the development of flow charts for a process, in our case, malt and beer production.
- Inputs and Outputs should be shown on each process point.
- Control points should also be added to this list by auditing all inputs, outputs, processes and possible defects in each.
- The control points should come from what a consumer does and does not want.


MALTING PROCESS FLOWSHEET
9 - 11 Day Process
45 Deg.F. → 180 Deg.F.
STEEP IN BARLEY
CONICAL STEEP TANK
H2O
AIR
CO2
FLAT BOTTOM STEEP TANK
H2O
AIR
CO2
STEEP OUT BARLEY
CLEAN BARLEY STORAGE
BARLEY CLEANING
BARLEY SIZING
FOREIGN MATERIAL
RAW BARLEY STORAGE
BARLEY INTAKE
MALT CLEANING
MALT LOADOUT
MALT STORAGE
MALT CLEANING
FINISHED MALT OFF KILN
EXHAUST AIR
RECIRCULATED AIR
RETURN AIR
FRESH AIR
GERMINATION COMPARTMENT
SUB COMPARTMENT
RETURN AIR
HUMIDIFIED AIR
H2O
GREEN MALT TO KLIN
HEAT RECOVERY
HEATER
AIR
AIR
UPPER KILN
COLD AIR
AIR
AIR
LOWER KILN
HEATED AIR


Hopped Wort
Mash, spent grain
Wort
Grist Slurry
Malt, Water
Mash Tun
Kettle
Mill
Lauter Tun
Whirlpool and
Heat Ex
Cooled Wort
Customer
Yeast
Filter
Packaging
Warehouse
and
Transportation
BT
FV
Finished
Product
Carbed Beer
Brite Beer
Unfiltered Beer

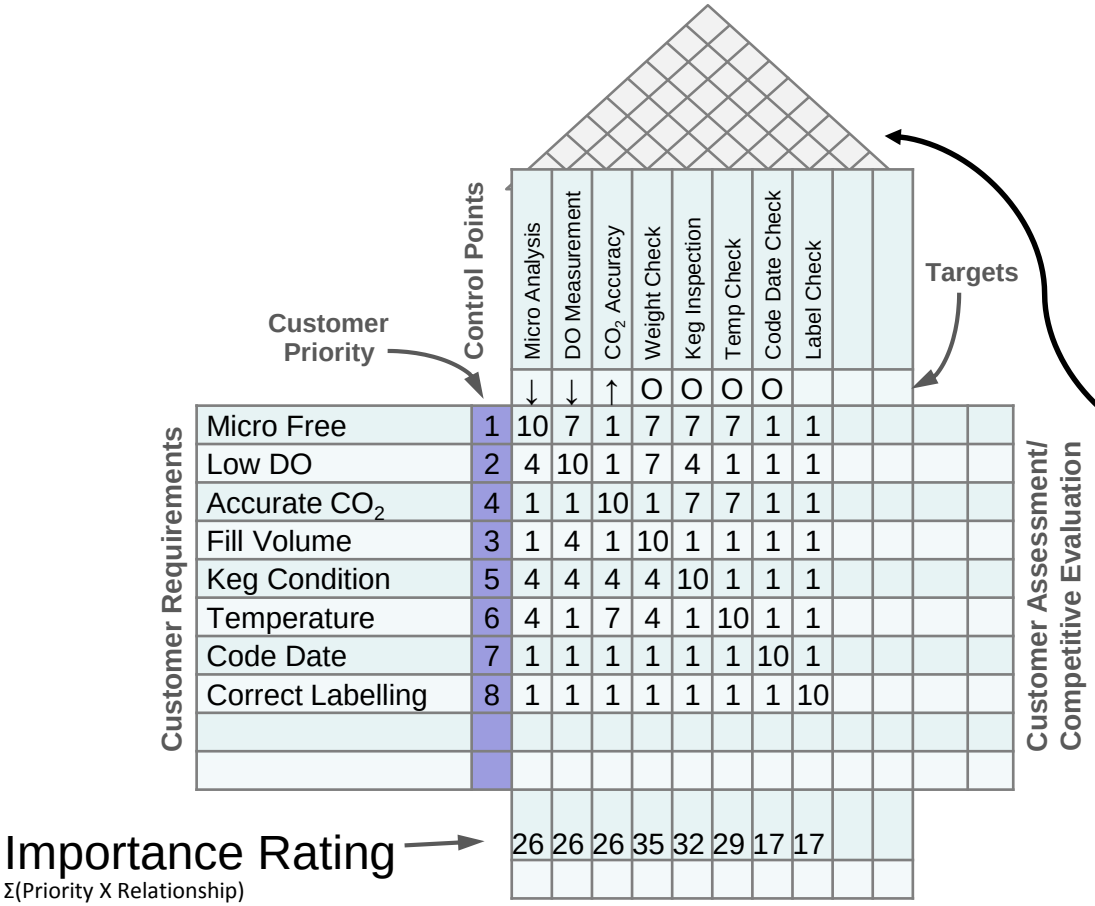
# Determining Control Points

- Using the Flow Chart examine all inputs outputs and processes for possible quality flaws.
- List beer characteristics that need to be controlled such as, BU measurements or %alcohol.
- Keep in mind that some of these control points may come from compliance or food safety and may not necessarily come from what a customer determines makes more consistent, high quality beer.
- It is usually good for a diverse team to discuss potential control points and their level of priority. A wide point of view will help with full ownership as well as complete coverage of your area.

# Prioritizing Control Points

- Voice of Customer
- Quality Function Deployment  - House of Quality – Quantifying Quality
- Compliance vs. Financial Return vs. Cost of Poor Quality
- Number of Characteristics Affected by Control Point

# HOUSE OF QUALITY - Racking




Correlations:
- Strong Positive
- Positive
- Strong Negative
- Negative

Relationships:
- Strongest= 10
- Strong= 7
- Fair= 4
- Weak= 1

# Other Tools

- Decision Trees and Escalation Plans
- Control Charts
- Graphs, Charts, Pictures
- Document Control
- HACCP – CCP vs. CQP
- Quality Manual
- Standup meetings

# Sustaining and Growing Your Program

- Continuous Improvement
- Educate – Training, Audits
- Standardize – SOPs, Specs, Audits, GMP, GLP
- Spot Checks and Quality Process Audits
- Validate Your tests
- Verify Your Results
- Grow your team
- Organize and Unite!
- Harness Passion

Questions?

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