Quality Control

Of Roasting and Packaging Coffee

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Green Coffee Procurement

- Receipt of samples
  - Assign internal reference number
  - Log receipt data

- Sample roasting
- Cupping
- Cupping log
  - Sample evaluation notes/approvals, etc.
- Sample retention

Roasting

- Determination of Roast Profile
- Roast color – degree of roast
- Water Quenching/Cooling
- Roast batch control
- Inventory control

Roast Profile

- Impact of length of roast on flavor
- Measuring and controlling roast color
  - SCAA color discs
  - Agtron Color Meter
- Other considerations
  - How will the coffee will be brewed?
  - Is the coffee part of a blend?
  - Will the coffee be flavored?

Measuring Roast Color

- SCAA Color Discs

- Agtron Color Meter

Why Water Quench?

- Larger roast machines have more exothermic energy to dissipate at the end of the roast.
- Better control at the end of roast.
- Enhances quick cooling of the coffee and retention of flavor.
- Helps seal hydroscopic surface of the beans for better flavor retention.
- Assists in more uniform grinding of the beans.

Controlling Moisture in Finished Roasts

- Only enough water should be used to enhance the quality of the coffee.
- Too much water can negatively affect flavor.
- Set a standard for optimum moisture levels:
  - Cup to determine best level of quench
  - Regularly test roast samples to ensure optimum levels
    - Moisture analysis equipment (% moisture by weight)
    - Brewing and cupping

Moisture Analysis Scale

Controlling the Roasting Process

- Roast Orders (initiating the roasting process)
  - Details information for roast machine operators
    - Date of roast
    - Roasting equipment used
  - Assigns a unique batch number for each roast
  - Green coffee specified by type
  - Batch size (no. of pounds per roast)
  - Purpose of roast (how the coffee will be packed)

Controlling the Roasting Process (cont.)

- Completed Roast Orders (as record of completed roasts)
  - Roast machine operator's name
  - Record of actual roast times
  - Finished roast weights (for calculating shrinkage)
  - Agtron scores
  - Used to balance/reconcile green coffee inventory and account for inventory of roasted coffee

Controlling the Roasting Process (cont.)

- Issuance of Roast "Tags"
  - Each completed roast gets a tag which follows it through production to finished product
  - Roast Tag information:
    - Roast machine operator
    - Roast batch number (from Roast Order)
    - Roast batch weights and Agtron scores
    - Grind information (WB, AD, URN, etc.)
    - Flavor information (for flavored coffees) – batch control
      - Flavor used and lot number
      - Quantity used and % total weight
    - Intended purpose for batch (what product will be packed and on what machine? – should match Roast Order)

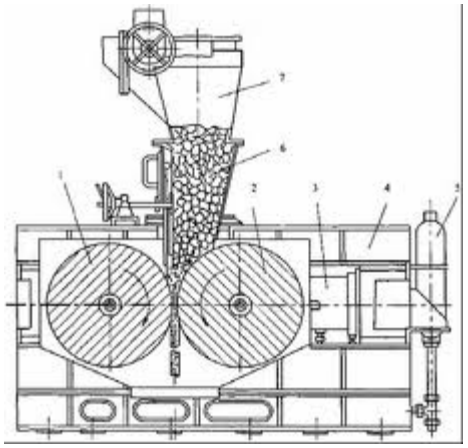
Controlling the Grinding Process

- Standards for grinds (Auto Drip vs. French Press, Urn, Fine Grind, Turkish, etc.)
- Methods of grind analysis:
  - Sieve analysis – "Ro-Tap" machine
  - TDS (Total Dissolved Solids) in brewed coffee
  - Coffee brewing hydrometer
  - Tasting finished brews as related to:
    - Ratio of coffee grounds to water (strength of coffee) vs.
    - Extraction relative to grind particle size
    - Other factors:
      - Water quality/condition
      - Water temperature

Grinding Coffee

- Whole Bean vs. Ground
- Types of grinders
  - Disc-style

  - Roller-style



Ro-Tap Sieve Analyzer

Ro-Tap Screens

Regular/Drip Grinds (800 micron average)

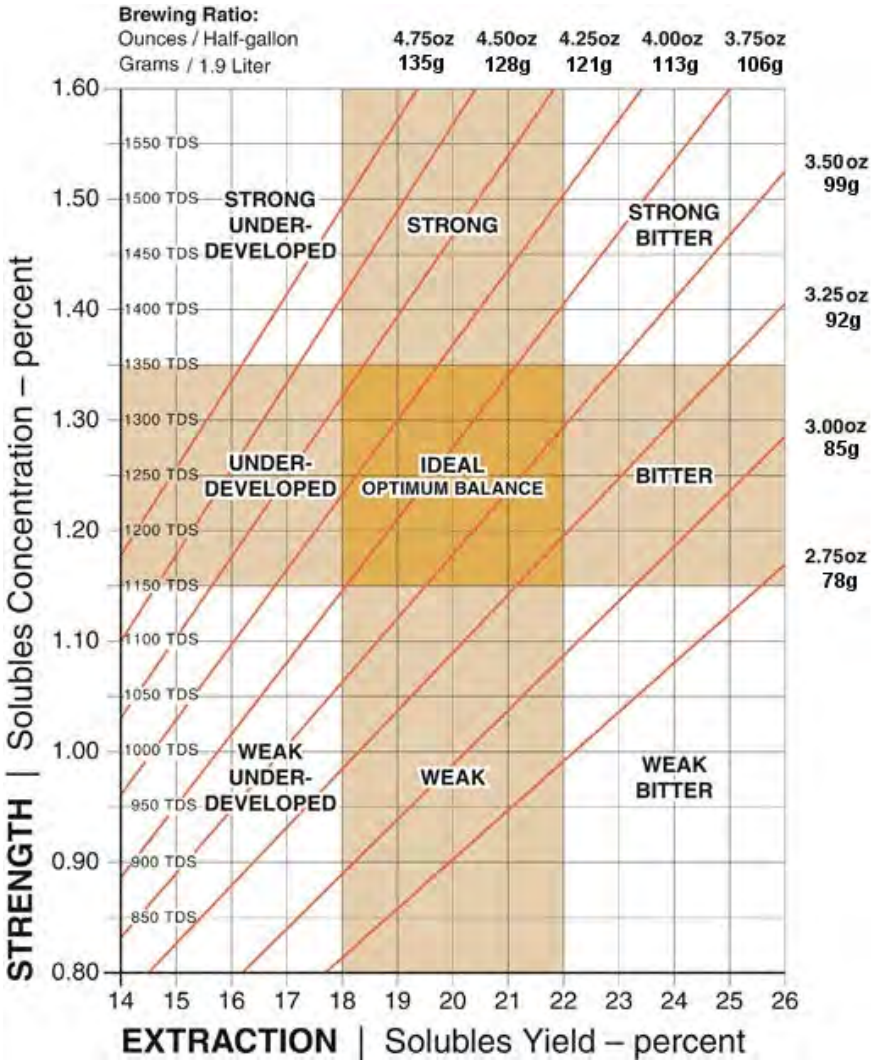
Tyler	U.S.
10	12
14	16
20	20
28	30
Pan	Pan

Fine Grinds (600 micron average)

Tyler	U.S.
20	20
28	30
35	40
48	50
60	60
Pan	Pan

TDS Measurement

Coffee Brewing Control Chart



Packaging

- Packaging equipment
  - Manual
  - Automatic (VFFS)
  - Packaging scales
  - Check weighing equipment

Vacuum and Nitrogen Flush

- Vacuum with nitrogen gas flush

- Nitrogen flush flow control (in SCFM)

Bag Sealing Equipment

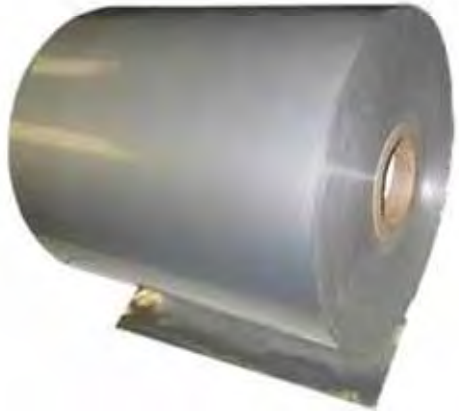
Continuous Vertical Sealer

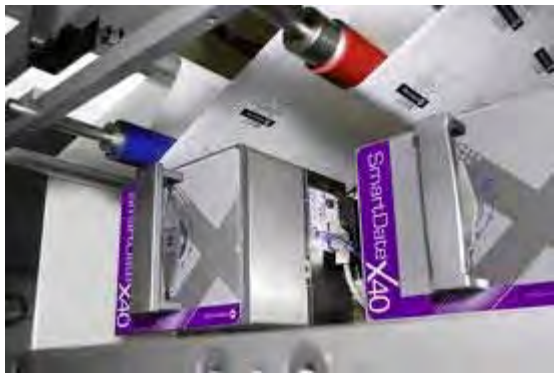
Impulse Sealer w/ Vacuum

GL9 Vacuum Sealer w/ Carousels

Packaging Components

- Packaging materials – flexible packaging
  - Bags
  - Packaging film
  - Degassing valves (enables packaging of freshly roasted coffee)
  - Labels (or in-line printers)





Packaging Control

- Bill of Materials (BOM)
  - Facilitates planning and control of materials
  - Gives specific instructions for packaging crew
  - Correct components
    - Correct coffee/grind/flavor
    - Correct bag/film
    - Correct label/print/UPC/date
    - Correct box and label for master carton

Packaging Control (cont.)

- Quality Control Log Sheet – Checklist for critical components of the package
  - All seals intact
    - Inspection of all seal areas (top, bottom, fin seal)
    - Leak test tank – for detection of micro leaks or weak seal areas
  - Degassing valve – intact, fused to bag and functional
  - Proper location of labels and print impressions
  - UPC scans correctly – scan log located on computer

Leak Detection Tank

Packaging Control (cont.)

- Quality Control Log Sheet (cont.)
  - Test weights recorded throughout run
    - Correct bag tare
    - Correct net weight
  - Record of roast batch packed (copied from Roast Tag)
  - Nitrogen gas flow rates for gas flushing
  - Oxygen head space analysis

Oxygen Headspace Analyzer

Conclusion

- Aspects of quality in a product have to be defined and identified
  - Some quality elements are more subject to measurement and control
  - Some quality elements, like flavor, need to be evaluated organoleptically through continuously tasting your product
    - From the original receipt of green coffee through the roasting process, and
    - Finally, to the finished package of coffee
- Once quality elements are determined, they must be built in through the production process