# T15 Types of Malt

I shoot for about 400 words with my answers. This is based on Hommel’s answer for technical questions which was around this length.

**Types of Malt:**

**Base malts** - those which make up the backbone of beer recipes. They malts are malted and lightly kilned to usually 2-3L. They are the primary source of enzymes and fermentable sugars in beer. They impart light toasty, biscuit and grainy sweet flavors in beer. They impart a very light color in beer. Straw to yellow.

**Kilned malts** – Made by increasing the kilining temperatures used for base malts. These malts are from 4-25L. They impart reds, oranges and amber colors in beer. Flavors are deeply toasty, biscuit, nutty. Similar to base malts but more intense.

**Caramel malts** – These malts have undergone a special heat "stewing" process after the malting which crystallizes the sugars. These sugars are caramelized into longer chains that are not converted into simple sugars by the enzymes during the mash. They add distinct malty sweet, caramel, honey, candy like flavors in beer. Colors range from 10L to 220L

**Roasted malts** – These highly roasted malts contribute a coffee or burnt toast flavor to porters and stouts. Generally, 400L or greater in color. Adding dark brown and black colors to beer.

**Types of malt associated with beer styles:**

**Pilsner malt** is primarily associated with Pilsen beer styles such as Czech pilsner and German pilsner.

**Maris Otter** is primarily associated with English beer styles. It’s an excellent choice for English pale ale.

**Munich malt** is associated with Oktoberfest/Marzen beer style.

**Wheat malts** are most directly associated with Weizens. Red wheat is authentic for Germen Hefeweizen.

**Five Distinct Yeast Strain Selection Considerations:**

**Off Flavor Production** – Such as ester production of fruity flavors in beer by yeast. Some are appropriate and some are not. English ale yeast produce pear, ripe apple and cherry which are appropriate to that style. Certain phenolic characteristics are desirable in Belgians but not appropriate in other beers.

**Apparent Attenuation** – The likely amount of sugars that will be fermented by the yeast resulting in either a sweet or dry beer. American ales need a fairly high apparent attention so that they are drier than their English counterpart which are a little sweeter.

**Fermentation Temperature** – Lower termperature fermenters generally have cleaner flavor and aroma. Pilsners need lager yeast which ferment at a low temperature for clean characteristics.

**Flocculation** – The ability of a yeast to clump together and fall out of solution after fermentation. Certain beers favor low-flocculators such as German Hefeweizen which should have some yeast in the beer.

**Alcohol Tolerance** – Each yeast will have a stated alcohol tolerance range. Some perform better in higher alcohol ranges than others. If brewing American Barleywine you will want something that can dependably go past 9%.

# T15. Malt and Yeast Question

 This question addresses two separate ingredients, malt and yeast. Please provide the following information in your answer: (1) Identify and describe the different types of malts by their color and the flavor they impart to the beer, and give at least four distinct styles with which specific malts are associated.

(2) Provide five distinct considerations in selecting the appropriate yeast strain for a given beer style.

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| --- | --- |
| 25% | Identify types of malt. |
| 35% | Identify types of malt associated with at least four beer styles |
| 40% | Provide five distinct yeast strain selection considerations |

# **Question T15 “Malt and Yeast” Sample Answer**

**Terminology**

 ***° Lovibond (°L):*** Measure of malt & beer color used by U.S. brewers, ranging from . Roughly corresponds to SRM (Stand. Reference Measurement). °EBC (European Brewing Convention) = ~ °Lovibond x 2. Color scale for Lovibond ranges from 0° (clear) to 500°+ (black).

 ***° Lintner:*** Measure of diastatic power, the ability of the malt to fully convert its starches, used by U.S. brewers. Ranges from 0° (no diastatic power) to 150°+ (excessive diastatic power, typical of “hot” American 6-row lager malts designed to be used with adjunct grains). The European equivalent is °Windisch-Kolbach (abbreviated °W-K).

**1. Pale Malt (AKA Base Malt)**

Dried at 90 °F, kilned at 120-140 °F for 12-20 hours, cured at 175-185 °F for 4-48 hours.

 ***Characteristics:*** *\* Highest diastatic power* (40-150 °Lintner). *\* Lightest color.* *. \* Must be mashed.* \* Some types have excess diastatic power and can be used to convert adjunct grains \* Forms the majority of the grist for almost all beer styles.*\* Color:* 1.8 - 4 °L (makes straw to golden color beer).

 ***Flavor/Aroma:*** Bready, grainy, malty, sweet, sometimes slightly toasty.

 ***Examples:*** American 2-row, American 6-row, Pilsner, English Pale, English Mild, Belgian Pale.

 ***Associated Styles:***All pale beers, e.g., American light lagers (American 6-row), Pilsner (Pilsner malt), English pale ale (English pale), Mild (Mild malt), American ales (American 2-row malt).

**2. Amber/Toasted Malt**

Dried at 90 °F, kilned at 120-145 °F for 12-20 hours. Cured at ~220 °F until proper color achieved.

 ***Characteristics:*** *\* Reduced diastatic power* but usually capable of self-conversion (i.e., converting own starches, but not adjunct grains, 20-40 °Lintner). *\* Most must be mashed.* *\* Adds color and complexity to beer.* \* Usually forms 5-20% of grist for amber/copper-colored beers. \* Can be made at home by toasting base malt. \* Higher kilning temperatures produce melanoidins from amino acids and malt sugars. *\* Color:* 4-70 °L (makes golden to dark amber beer).

 ***Flavor/Aroma:*** Grainy, malty and sweet with hints of toast to bready, biscuity, crusty or toasty.

 ***Examples:*** Vienna, Munich, Aromatic/Melanoidin (e.g., Dark Munich, Biscuit™, Victory™), Amber, Brown, Special Roast.

 ***Associated Styles:***All amber and brown beers, but especially malt-oriented styles, e.g., Vienna lager (Vienna malt), Oktoberfest (Munich malt), Bock (Munich, Vienna), California common, American brown ale, English brown ales, mild.

**3. Crystal/Caramel Malt**

 Fully-modified, green malt is kilned at 50% moisture content at 150-170 °F for 1.5 - 2 hours without ventilation to “mash” starches within husk. It is then kilned at higher temperature to achieve desired color & flavors.

 ***Characteristics:*** *\* No diastatic power. \* Can be steeped.* \* Usually forms 1-5% (up to 10%) of grist to adjust color, mash pH, and/or to add aroma and flavor. \* Different maltings produce unique products with distinct flavor profiles. *\* Color:* 2-220 °L (makes golden to dark brown beer).

 ***Flavor/Aroma:*** Sweet, caramel, honey, toffee, toasted, burnt sugar, dark fruit.

 ***Examples:*** Dextrin, Crystal, Cara-™, malts, BruMalt™, Special B™.

 ***Associated Styles:***Sweet, full-bodied beers, especially Bock, Southern English brown, some Stouts (e.g., Russian Imperial Stout), strong Belgian ale, strong ales.

**4. Roasted/Kilned Malts**

 After curing to 5% moisture, this malt is roasted at high temperatures (425-450 °F), for up to 2 hours, depending on the degree of roastiness desired.

 ***Characteristics:*** *\* No diastatic power. \* Can be steeped. \* Different flavors & properties due to special kilning techniques.* \* Usually forms 5-10% of grist for color, body, complexity. \* Typically undermodified (less than 50%) or made from non-premium malt. \* No protein rest needed, since starches and proteins degraded by roasting. \* Many have proprietary names. \* Hard “glassy” texture to endosperm. *\* Color:* 300-600 °L (makes dark brown to black beer).

 ***Flavor/Aroma:*** Nutty, bittersweet, bitter, chocolate, coffee, roasted.

 ***Examples:*** Chocolate malt, Rostmalz, Black/Patent malt.

 ***Associated Styles:***Dark beers, especially dark lagers, porter and stout.

**5. Non-Barley Malts**

 A variety of malts made from grains other than barley, but processed using methods similar to those used for barley malt.

 **Characteristics:** \* Usually made in a manner similar to pale malt. \* Often huskless. \* Higher in proteins & gums, so more prone to stuck mash, haze & flavor instability. \* Limited diastatic power, but pale malts are capable of self-conversion. \* Unique flavor, aroma and texture characteristics. \* Sometimes up to ~10% of grist to improve body, head retention, add complexity. \* Forms 25-70% of grist in wheat/rye beers (must be 50+% by law for German wheat & rye). \* Color: 2-3 °L for pale malts, up to 600 °L for darker varieties.

 ***Flavor/Aroma:*** Dry, slightly sour, spicy, creamy, grainy. Darker versions can have amber/brown or roasted/kilned notes.

 ***Examples:*** Wheat malt, Rye malt, Oat malt.

 ***Associated Styles:***Wheat & rye beers.

**A) Malt types**

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| --- | --- | --- |
| Identify/Describe | Flavor | Styles |
| **Base/Pale:** \* Dried @ 90 °F, kilned @ 12-140 °F for 12-20 h., Cured @ 175-185 ° F for 4-48 h. \* Forms most of the grist for almost all beer styles. \* Full diastatic power. \* Must be mashed. \* Ex. Amer. 2-row, Amer. 6-row, Pilsner, English Pale, Eng. Mild, Belg. Pale. \* 1.8 - 4 °L straw, golden. | Grainy, malty, sweet, slightly toasty | Esp. pale beers: Light Lager, Pilsner, Pale ale. |
| **Amber/Toasted:** \* Dried @ 90 °F, kilned @ 12-140 °F for 12-20 h., Cured @ ~220 ° F until proper color achieved. \* Reduced diastatic power, us. capable of self-conversion. \* Most must be mashed. \* Us. 5-20% of grist for color, complexity. \* Ex. Vienna, Munich, Aromatic/Melanoidin (e.g., Dk. Munich, BiscuitTM , VictoryTM), Amber, Brown, Special Roast. \* 4-70 °L - amber to brown. | Grainy, malty, sweet, toasty hints to bready, biscuity, toasted or bread crust | Amber/Brown beers, esp. malt-oriented styles: Amber Lager, Bock, California Common, Brown Ale |
| **Crystal/Caramel** \* Green malt heated to 150 - 170 °F for 2 h. in closed kiln to “mash” starches within husk. Kilned at higher temp. to get desired color & flavor. \* No diastatic power. \* Can be steeped. \* Us. 5-10% of grist for color, body, complexity. \* Many flavors & properties due to kilning techniques. \* Ex. Dextrin, Crystal, Cara-TM malts, BruMaltTM, Special B TM. \* \* 2-200 °L - straw dark brown. | Sweet, caramel, honey, toffee, toasted, burnt sugar, dark fruit. | Full-bodied beers, esp. Amber Lager, Bock, S. Eng. Brown, some Stouts (e.g., RIS), Strong Belgian Ale, Strong Ale. |
| **Roasted/Kilned** \* Roasted @ high temp., up to 450 °F, for up to 2 h. \* Ex. Chocolate, Rostmalz, Black/Patent. \* Us. undermodified or made from lower-grade malt. \* No diastatic power. \* Can be steeped. \* Us. 1-5% (up to ~10%) of grist to adjust color, mash pH, add aroma/flavor in dark beers. \* 300 -600 °L - dk. brown-black. | Nutty, bittersweet, bitter, chocolate, coffee, roasted. | Dark beers, esp. Dark Lager, Porter, Stout. |
| **Non-Barley** \* Ex. Wheat, Rye, Oat, etc. \* Made in manner similar to pale malt. \* Often huskless. \* High in proteins & gums - prone to stuck mash, haze & flavor instability. \* Low diastatic power, can self-convert. \* Unique flavors, aromas and textures. \* Us. up to ~10% of grist to improve body, head retention, add complexity. \* 25-70% of grist in wheat/rye beers (=>50% by law for German wheat & rye). \* 2-3 °L - straw, golden. | Dry, slightly sour, spicy, creamy, grainy | Wheat & rye beers, Oatmeal Stout |

**B) 5 Yeast Strain Considerations**

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| --- | --- |
| Consideration | Effect |
| Apparent Attenuation | High attenuation (>75%) = Less residual sweetness, more alcohol, less body. Low attenuation (<70%) = more residual sweet, lower ABV, fuller body |
| Alcohol Tolerance | Better yeast health/performance in high gravity or high-alcohol wort. Most brewing strains OK to ~9% ABV, start struggling above that, can’t go past ~15% without “feeding,” aeration and other special techniques. Wild or non-brewing strains die above ~2-3% ABV. |
| Flocculation | High flocculation = Less time required for clearing, clearer beer, less need to filter, better bottom cropping. But, yeast might fall out of suspension too soon, leaving VKD/acetylaldehyde - might need to be roused. Poorly flocculant/”powdery” yeasts (e.g., Pride of Ringwood) must be removed by fining or filtration, don’t crop well, but don’t drop out prematurely. Historically, top vs. bottom cropping (AKA “top fermenting” vs. “bottom fermentation”) for yeast propagation was a factor. Modern commercial brewers mostly bottom crop. |
| Fermentation Temp. | Higher temp = more esters, phenols, fusel oils, shorter fermentation time. Lower temp. = cleaner flavor & aroma, but slower working. Stress on yeast at low temp. can prod.VKD/acetylaldehyde and H2S. Diacetyl rest @ 50-60 °F for 1-3 days might be necc. Lager yeasts ferment 45-55 °F range, hybrids 55-65 °F, ale 60-75 °F (e.g., Scottish Ale vs. Trappist yeast). Lager and hybrid yeasts require special homebrewing equipment. |
| Ester, Phenol, Diacetyl Production | Esters = fruity, floral. Phenols = spicy, peppery, clove. Diacetyl = buttery, butterscotch, perception of fuller body. Not appropriate for many styles of beer. “Belgian” yeasts noted for spicy phenols and tree and tropical fruit esters (e.g., pear, cherry, guava, pineapple, bubblegum). American ale yeasts = relatively neutral - light apple esters. English ales = full fruity floral notes (pear, ripe apple, cherry). Lager = neutral, occasionally some light diacetyl (Bohemian) or sulfur (German) OK. |