

# BELGIAN BEER


















TESTED AND TASTED



THE COMPLETE GUIDE

MIGUEL RONCORONI & KEVIN VERSTREPEN

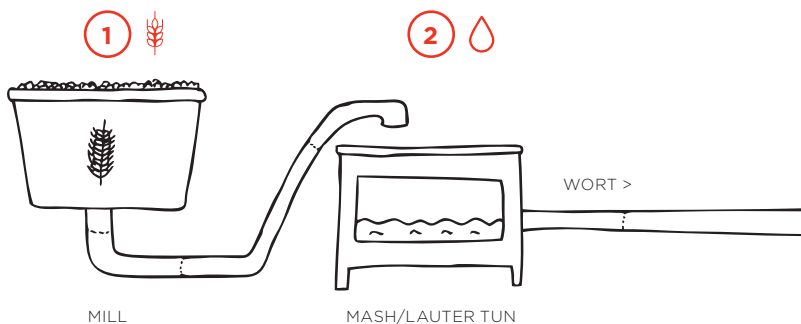


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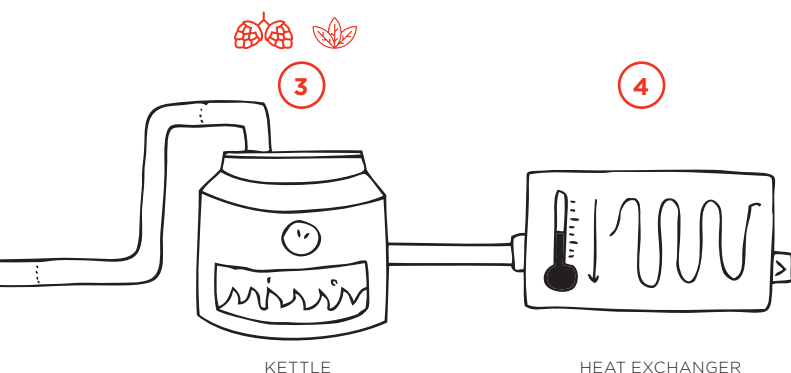
# INTRODUCTION

## BREWING

Brewing is a complex process. Below is an overview of the most important steps and ingredients necessary for making good beer.



- 1 Milling:** the dried malt and other cereals are prepared for mashing. They are milled to expose the starches.
- 2 Mashing:** water is mixed with the milled grains to form the mash. The mash is gradually heated and held at different temperatures (rests), mainly to allow malt-derived enzymes to digest the starches into smaller-chain carbohydrates and fermentable sugars. These sugars, along with other nutrients, colour and aroma compounds, dissolve into the liquid to make the wort. The wort is drained off, and the mash is rinsed with hot water to extract more sugars. The latter can also happen in a different vessel called the 'lauter tun'. Worts from different rinsings are called 'runnings'; later runnings contain less sugar.



- 3 Boiling:** the wort is boiled to kill any micro-organisms and effectively sterilize it. Hops are added early during the boil to add bitterness, or later to add flavour and aromas. Spices can also be added during this stage. Most breweries will boil the wort for 60-90 minutes, although some lambic boils can last up to 4 hours.
- 4 Cooling.** The wort is passed through a heat exchanger and cooled to a temperature that will suit the yeast and the type of fermentation desired. Lambic brewers use an open, shallow cooling pool made of copper, called the 'cool ship' ('koelschip'). The wort cools overnight in this vessel and is exposed to air microflora.



## TASTING

Sensory assessment of beer ('beer tasting') is the most important aspect of beer analysis. It tells us how beer smells, tastes and feels. We selected and trained a panel of 15 members for sensory assessment of beer. The panel (composed of 7 females and 8 males, from 7 different countries, aged between 20 and 40) was taught to recognize and quantify the different aromas and flavours of beer.

### BLIND TASTING

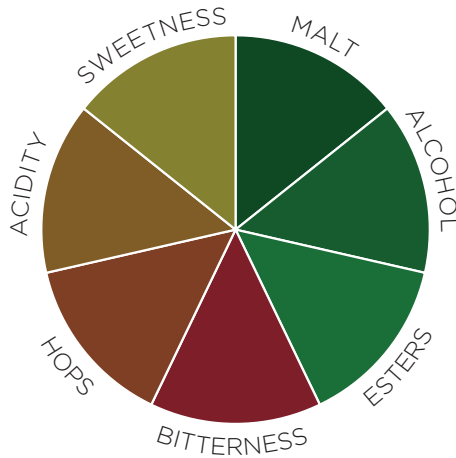


- 1 All tastings for this book were done blind, which means none of the tasters knew which beers were being tasted. This included using black-tinted glasses, so the tasters could not see the colour of the beer.
- 2 Beers are poured at 12-16°C, one by one, in a pre-determined order. A lid on top of the glass prevents the aromas from escaping.
- 3 A gentle swirl of the glass releases the aroma compounds from the beer into the headspace of the glass so the taster can smell the beer. Next, the taster takes a sip to analyze the taste. In contrast to wine tasting, beer is not spit out, but swallowed to better evaluate the bitterness and aftertaste. The volatile aroma compounds and flavours from the beer can be detected and quantified by a trained taster.

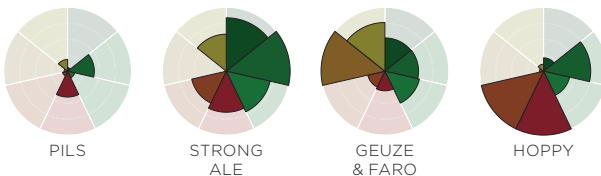
| SMELL        | TASTE        |             |
|--------------|--------------|-------------|
| MALT         | MALT         | SWEETNESS   |
| HOPS         | HOPS         | SOURNESS    |
| ESTERS       | ESTERS       | BODY        |
| OFF-FLAVOURS | OFF-FLAVOURS | CARBONATION |
|              | BITTERNESS   | AFTERTASTE  |

Each aroma ('smell') and flavour ('taste') aspect of a beer was scored from 0 (completely absent) to 6 (overwhelming). Two beers served at every tasting session provided a frame of reference for the tasters.

## SENSORY WHEEL



The most important aspects of beer were selected to make the sensory wheel. It shows the relative score for each sensory aspect. Each beer style has a unique sensory signature:

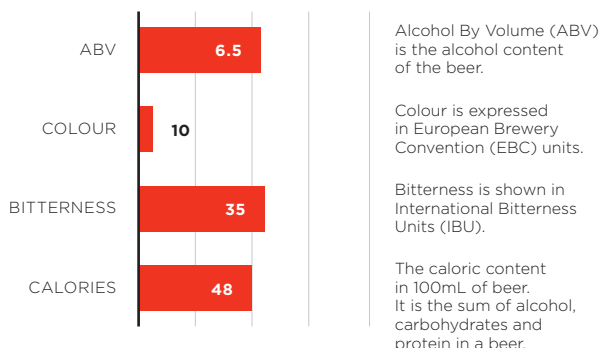


# HOW TO READ THIS BOOK

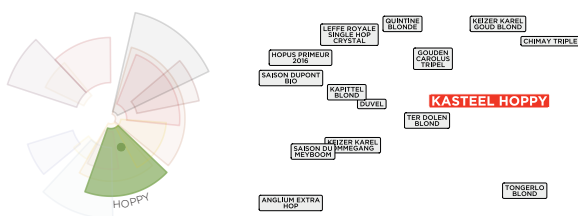
This book contains complex information on beer composition summarized in easy-to-read plots. This section will guide the reader through the different plots and what information they contain.

## VITAL STATS

This plot contains the most basic information about a beer.



## MAP LOCATION

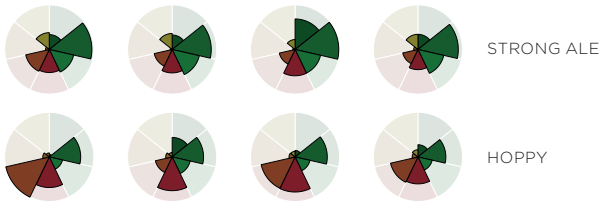
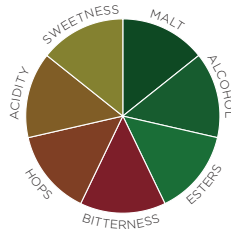


The location of the beer in the map is shown on the left. The 'zoom-in' on the right shows the neighbouring beers. These are the beers that most closely resemble its chemical and aroma composition, even though some might still taste quite different due to certain key aroma compounds.



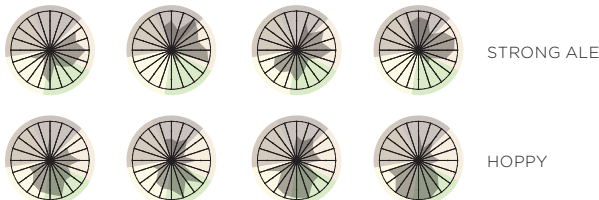
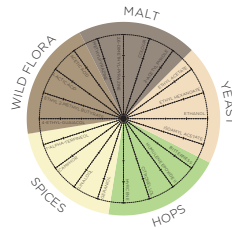
## SENSORY DATA

This chart summarizes the data obtained by the sensory panel. Each beer was tasted blind by an average of 9 trained panel members. The plot shows the relative values of the most relevant sensory aspects. Beers of the same style share a common sensory 'signature'.



## CHEMICAL DATA

This plot shows the relative concentrations of 20 important chemical compounds. The compounds are arranged according to the brewing ingredient that produces them. The shading in the different ingredient areas reveals the relevance of it to a particular beer. Beer styles tend to have similar chemical compositions and thus similar shading patterns.



- **PILS**
- 1. Bavik Super Pils
- 2. Bel Pils
- 3. Cristal Alken
- 4. Estaminet
- 5. Jupiler
- 6. Maes
- 7. Mongozo Premium Pilsener
- 8. Monsieur Rock
- 9. Primus
- 10. Stella Artois
- 11. Volga

- **WITBIER**
- 12. Blanche de Namur
- 13. Blanche du Hainaut Bio
- 14. Brugs (Tarwebier)
- 15. Celis White
- 16. Grisette Blanche Bio
- 17. Hoegaarden
- 18. Jan De Lichte
- 19. La Trappe Witte Trappist
- 20. St. Bernardus Witbier
- 21. Steenbrugge Wit
- 22. Timmermans Lambicus
- 23. Blanche
- 24. Vedett Extra White
- 24. Watou's Wit

- **SAISON**
- 25. 28 Saison
- 26. De Vlier Saison
- 27. Pajais Saison
- 28. Saison de Dottignies
- 29. Saison du Meyboom
- 30. Saison Dupont
- 31. Saison Dupont Bio
- 32. Saison St-Feuillien
- 33. Saison Voisin

- **BLOND**
- 34. Achel 8 Blond
- 35. Affligem Blond
- 36. Averode
- 37. Chimay Dorée
- 38. Ciney Blonde
- 39. De Vlier Brut
- 40. Egotripel
- 41. Ename Blond
- 42. Engelszell Nivard
- 43. Floreffe Blonde
- 44. Ginder Ale
- 45. Grimbergen Blond
- 46. Guldenberg
- 47. Hertenheer
- 48. Kapittel Blond
- 49. Keizer Karel Ommevang
- 50. Kortrijk-dütsel
- 51. La Chouffe
- 52. La Trappe Blond
- 53. La Trappe Puur
- 54. Leffe Blonde
- 55. Leffe Royale Whitebread
- 56. Palm Royale
- 57. Postel Blond
- 58. Quintine Blonde
- 59. Seefbier
- 60. Ter Dolen Blond
- 61. Tongerlo Blond
- 62. Troubadour Blond
- 63. Westvlietereen Blond

- **HOPPY**
- 64. Arandium Extra Hop
- 65. Delta
- 66. Duvel Triple Hop
- 67. Gouden Carolus Hopsinjoor
- 68. Hopus
- 69. Hopus Primeur 2016
- 70. Houblon Chouffe Dobbelen IPA Tripel
- 71. Kasteel Hoppy
- 72. Leffe Royale Single Hop
- 73. Crystal
- 74. Pajais IPA
- 75. Palm Hop Select
- 76. Préaris IPA
- 77. Saison Dupont Cuvée Dry Hopping
- 78. Thorberg Five Hop IPA
- 79. Urthel Hop-It
- 80. Vedett IPA
- 81. XX Bitter

- **TRIPLE**
- 82. 28 Tripel
- 83. Arend Tripel
- 84. Bertinchamps triple
- 85. Brigid
- 86. Brugge Tripel
- 87. Chimay Tripel
- 88. Cornet
- 89. Delirium Tremens
- 90. Delvaux
- 91. Duvel
- 92. Ename Tripel
- 93. Finesse
- 94. Gouden Carolus Tripel
- 95. Hoegaarden Grand Cru
- 96. Judas
- 97. Kapittel Tripel Abt. 10°
- 98. Keizer Karel Goud Blond

- 99. Leffe Triple
- 100. Lucifer
- 101. Malheur Cuvée Royale
- 102. Maredsous Triple
- 103. Omer
- 104. Postel Tripel
- 105. Satan Gold
- 106. Schuppenboer
- 107. Straffe Hendrik
- 108. Tripel Karmeliet
- 109. Troubadour Magma
- 110. Val-Dieu Triple
- 111. Watou Tripel
- 112. Westmalle Tripel
- 113. Zwijntje

- **AMBER - BROWN - DUBBEL**
- 114. Achel 8 Bruin
- 115. Affligem Dubbel
- 116. Bon Secours Brune
- 117. Brugse Zot Dubbel
- 118. Chimay Rouge
- 119. Ciney Brune
- 120. De Koninck
- 121. Ename Dubbel
- 122. Engelszell Benno
- 123. Floreffe Double
- 124. Gordon Finest Scotch
- 125. Gouden Carolus Classic
- 126. Kapittel Dubbel
- 127. Keizer Karel Robijn Rood
- 128. La Trappe Dubbel
- 129. La Trappe Isid'or
- 130. Leffe Brune
- 131. Maredsous Brune
- 132. Mc Chouffe
- 133. Palm
- 134. Pauwel Kwak
- 135. Petrus Dubbel Bruin
- 136. Postel Dubbel
- 137. Ramée Ambrée
- 138. Rochefort 6
- 139. Scotch C.T.S.
- 140. Scotch Silly
- 141. Special De Ryck
- 142. Spencer Trappist Ale
- 143. St. Bernardus Pater 8
- 144. St. Bernardus Prior 8
- 145. Tongerlo Bruin
- 146. Tre Fontane
- 147. Waase Wolf
- 148. Watneys Scotch Ale
- 149. Westmalle Dubbel
- 150. Westvlietereen 8
- 151. Zundert

- **STRONG ALE**
- 152. Alpaide
- 153. Bush Ambrée
- 154. Chimay Bleue
- 155. Delirium Nocturnum
- 156. Deus
- 157. Engelszell Gregorius
- 158. Gordon Finest Gold
- 159. Grimbergen Optimo Bruno
- 160. Gulden Draak
- 161. Kapittel Prior 9°
- 162. Kasteel Donker
- 163. La Trappe Quadrupel
- 164. Malheur Dark Brut
- 165. Piraat
- 166. Rochefort 8
- 167. Rochefort 10
- 168. St. Bernardus Abt 12
- 169. Troubadour Westkust
- 170. Westvlietereen 12

- **STOUT & PORTER**
- 171. 28 Imperial Stout
- 172. Broeder Jacob Double Port
- 173. Brusselseir
- 174. Hercule Stout
- 175. Kempisch Vuur Haverstout
- 176. La Corne du Bois des Pendus
- 177. La Trappe Rookbier
- 178. Monk's Stout
- 179. Oesterstout
- 180. Stout Leroy
- 181. Stoutenik
- 182. Troubadour Obscura
- 183. Viven Porter
- 184. Wolf 8

- **CHRISTMAS**
- 185. Delirium Christmas
- 186. Gauloise Christmas
- 187. Gouden Carolus Christmas
- 188. Kapittel Winter
- 189. Leffe Noël
- 190. St. Bernardus Christmas Ale
- 191. St. Feuillien Cuvée de Noël
- 192. Val-Dieu Bière de Noël
- 193. Winter Mess 2016

- **FLEMISH ALES**
- 194. Bacchus
- 195. Bourgogne des Flandres
- 196. Bruin
- 197. Cuvée des Jacobins
- 198. Dichtegem de Bourgogne
- 199. Ichtgem's Oud Bruin
- 200. Liefmans Goudenband

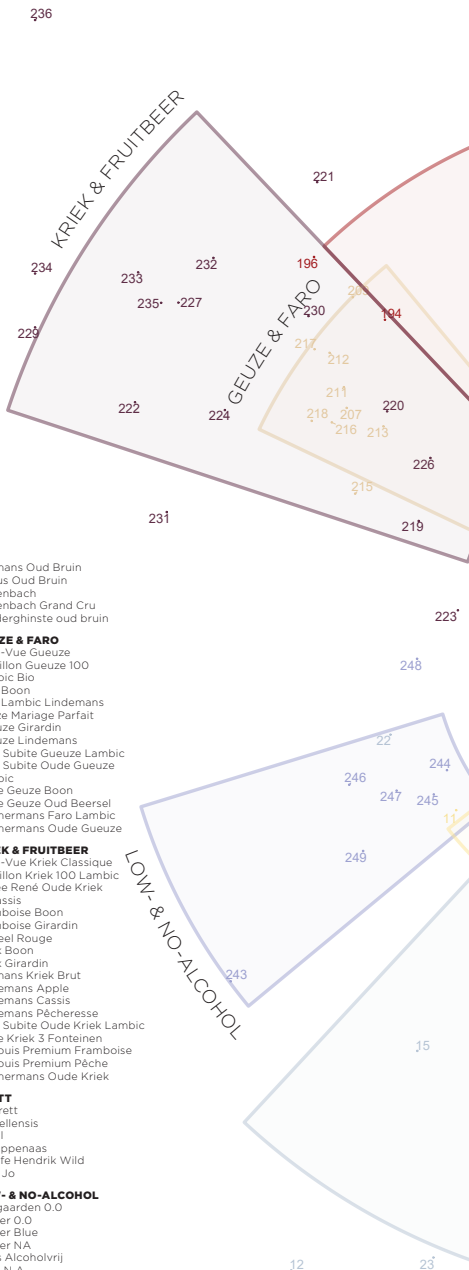
- 201. Liefmans Oud Bruin
- 202. Petrus Oud Bruin
- 203. Rodenbach
- 204. Rodenbach Grand Cru
- 205. Vanderhinstout oud bruin

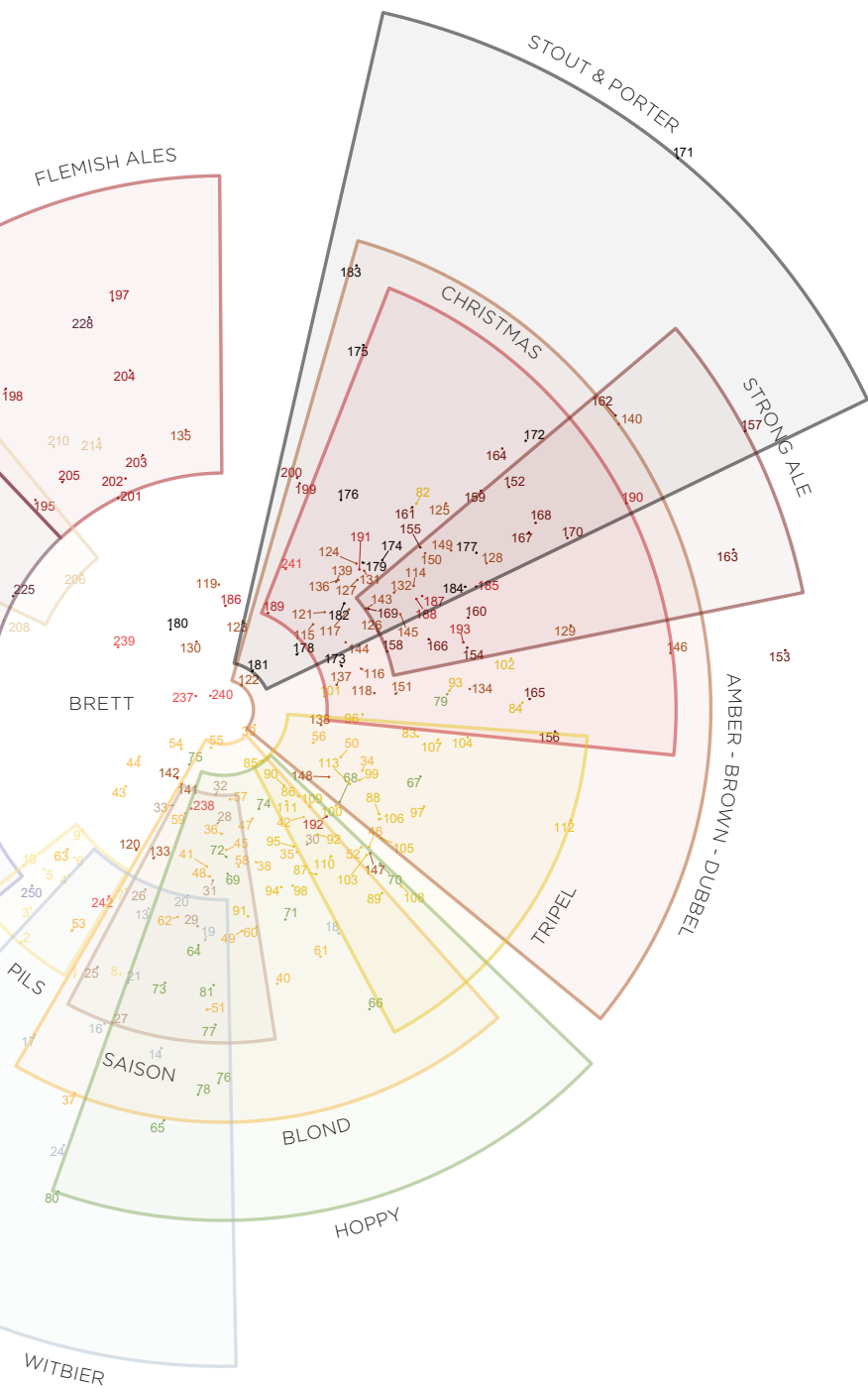
- **GEUZE & FARO**
- 206. Belle-Vue Geuze
- 207. Cantillon Geuze 100
- 208. Lambic Bio
- 209. Faro Lambic Lindemans
- 210. Geuze Mariage Parfait
- 211. Geuze Girardin
- 212. Geuze Lindemans
- 213. Mort Subite Geuze Lambic
- 214. Mort Subite Oude Geuze
- 215. Oude Geuze Boon
- 216. Oude Geuze Oud Beersel
- 217. Timmermans Faro Lambic
- 218. Timmermans Oude Geuze

- **KRIEK & FRUITBEER**
- 219. Belle-Vue Kriek Classique
- 220. Cantillon Kriek 100 Lambic
- 221. Cuvée René Oude Kriek
- 222. Ducassis
- 223. Framboise Boon
- 224. Framboise Girardin
- 225. Kasteel Rouge
- 226. Kriek Boon
- 227. Kriek Girardin
- 228. Liefmans Kriek Brut
- 229. Lindemans Apple
- 230. Lindemans Cassis
- 231. Lindemans Pêcheresse
- 232. Mort Subite Oude Kriek Lambic
- 233. Oude Kriek 3 Fontein
- 234. St. Louis Premium Framboise
- 235. St. Louis Premium Pêche
- 236. Timmermans Oude Kriek

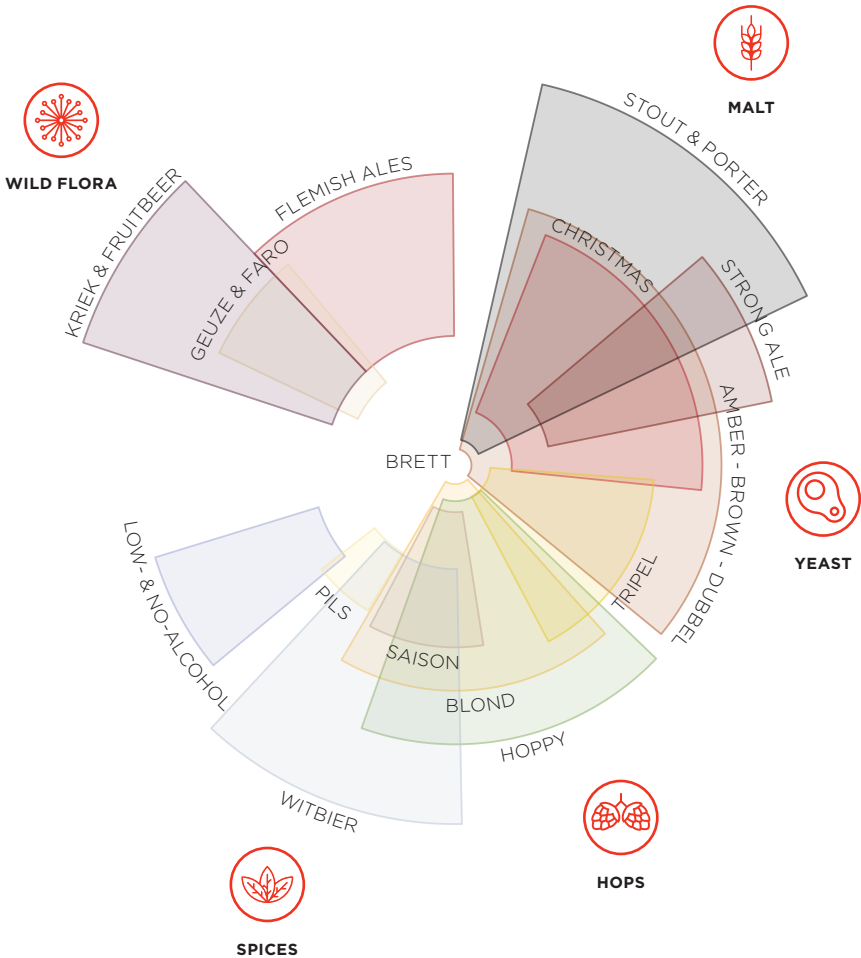
- **BRETT**
- 237. 28 Brett
- 238. Bruxellensis
- 239. Orval
- 240. Schuppenaas
- 241. Straffe Hendrik Wild
- 242. Wild Jo

- **LOW- & NO-ALCOHOL**
- 243. Hoegaarden 0.0
- 244. Jupiler 0.0
- 245. Jupiler Blue
- 246. Jupiler NA
- 247. Maes Alcoholvrij
- 248. Palm N.A.
- 249. Piedbœuf Blonde
- 250. Piedbœuf Tripel





# BELGIAN BEER STYLES



## PILS

Pilsner, Pilsener or Pils, is the most popular beer style worldwide in terms of volume consumed. Although the popularity of Pils is decreasing in favour of ales and other speciality beers, close to 90% of the beer consumed in the world is Pils and, with the exception of Guinness, so are the top 20 of most-consumed beer brands. Despite the enormous variety of beer styles and breweries in Belgium, here too the best selling beers are Pilsners.

Pilsner takes its name from its place of origin, Plzeň (Pilsen), in the Czech Republic. In the mid-19<sup>th</sup> century, Bavarian brewer Josef Groll was hired by a Bohemian brewery in Pilsen. Groll combined his knowledge on lager brewing techniques with the local ingredients (Hana barley, malted to a very pale colour; Saaz hops; and soft water) to create his new beer. He fermented it at low temperature using the lager yeast, *Saccharomyces pastorianus*. *S. pastorianus* is largely responsible for the refreshing and clean character of Pils beers, because it



# BAVIK SUPER PILS



## BROUWERIJ DE BRABANDERE

RIJKSWEG 33, B-8531 BAVIKHOVE

AUTHORS' CHOICE

PILS

### The Beer

This Pils features a balanced mix of grassy hop aromas with slight fruitiness in the nose. The palate reveals bread and cereal malt notes. The bitterness is harmonious with the flavours, creating a well-balanced beer.

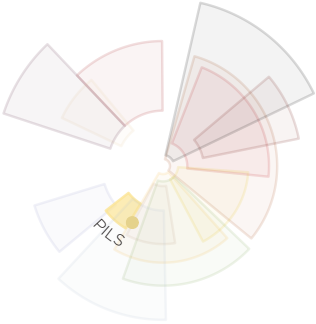
### The Brewery

#### Brouwerij De Brabandere

Brewery De Brabandere (between 1990 and 2013 also called Brewery De Bavik) was founded in 1894 by Adolphe De Brabandere, a farmer from the village of Bavikhove, West Flanders. Today the brewery is still in the hands of the family De Brabandere and produces a wide range of beers, including Bavik Super Pils (5.2% ABV), Wittekerke (Wit, 5.0% ABV and Rosé, 4.3% ABV), Kwaremont (blond, 6.6% ABV), the Petrus tradition range (Blond 6.6% ABV, Dubbel Bruin, 6.5% ABV, Tripel, 7.5% ABV, Speciale, 5.5% ABV) and Petrus sour barrel aged blends (Roodbruin, 5.5% ABV, Aged Pale, 7.3% ABV and Aged Red, 8.5% ABV).



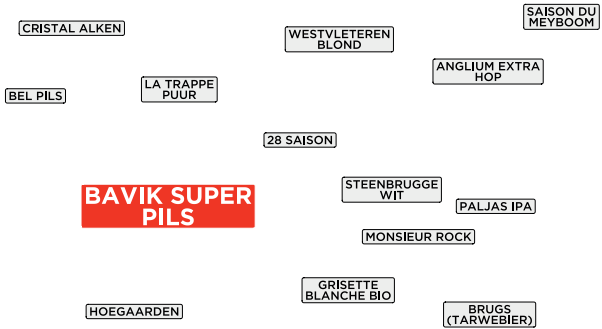
MAP



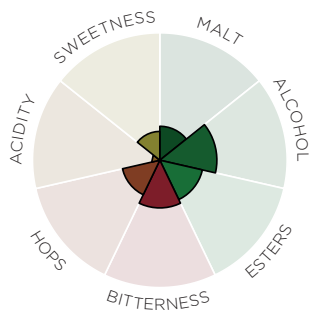
VITAL STATS



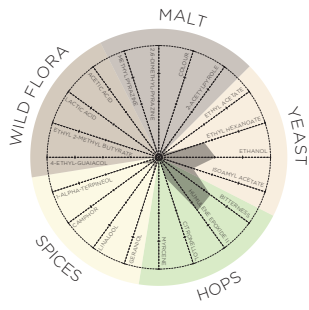
SIMILAR BEERS



SENSORY PROFILE



ANALYTICAL PROFILE





## BROUWERIJ DUVEL MOORTGAT

BREENDONK-DORP 58, B-2870 PUURS

PILS

### The Beer

A malty nose of cereal, bread and candy aromas accompanied by very slight fruity notes. The bitterness is perfectly balanced and makes this a good example of the style.



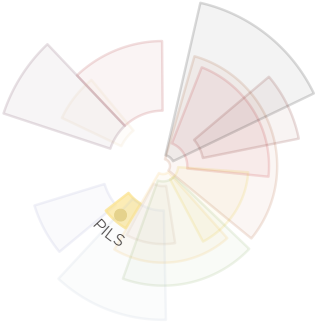
### The Brewery

#### Brouwerij Duvel Moortgat

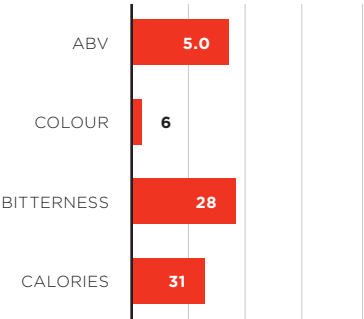
Brewery Moortgat was started in 1871 as a farm-brewery in Breendonk (Puurs) by Jan-Leonard Moortgat. His son Albert introduced 'Victory Ale', a Scotch ale named after the victory in WWI. In 1923, this beer was renamed 'Duvel', allegedly after the reaction of a patron to the beer's strength. Following a collaboration with Prof. De Clerck, the dark ale was replaced by a golden variant that became a massive success. The brewery is still in family hands and produces other variants of Duvel, including Groen ('green', 6.8% ABV), a lighter version without bottle refermentation, and the dry-hopped Tripel Hop series (9.5% ABV). It also produces the Vedett Extra range (Blond, 5.2% ABV, White 4.7% ABV, IPA, 5.5% ABV and Session IPA, 2.7% ABV), Bel Pils (5.0% ABV), and the Maredsous beers. The group has acquired other breweries: Liefmans, De Koninck and d'Achouffe in Belgium, as well as Bernard (CZ), 't IJ Amsterdam (NL), Ommegang, Boulevard and Firestone Walker in the US.



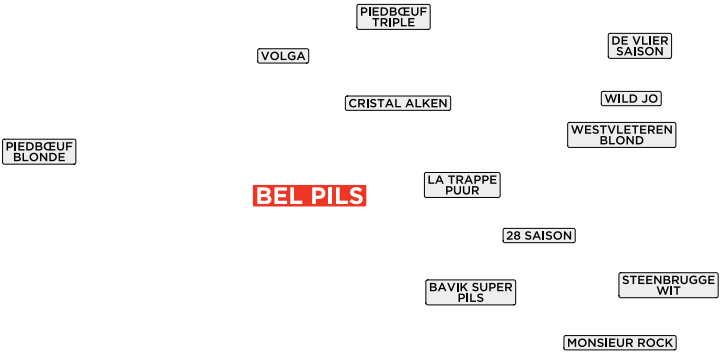
MAP



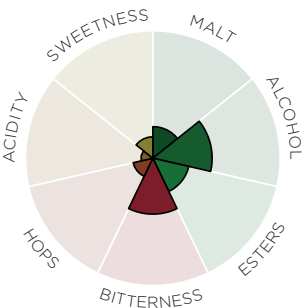
VITAL STATS



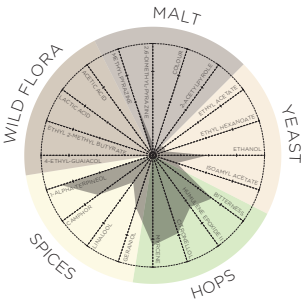
SIMILAR BEERS



SENSORY PROFILE



ANALYTICAL PROFILE



# CRISTAL ALKEN



## BROUWERIJ ALKEN

STATIONSSTRAAT 2, B-3570 ALKEN

AUTHORS'  
CHOICE



PILS

### The Beer

Very restrained nose with aromas of bread dough, hay, pears and apples. It is a light-bodied beer with faint grassy hop flavour and medium bitterness.

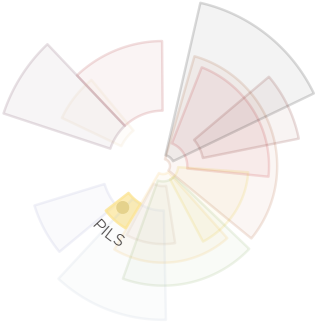
### The Brewery

#### Brouwerij Alken

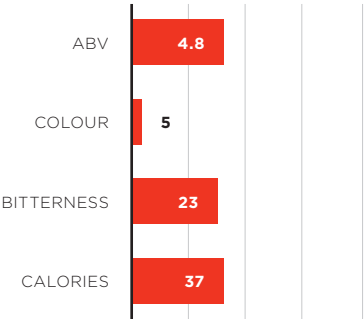
In 1881, Edouard Boes started Brewery Sint-Aldegondis in Alken. The brewery survived WWI and in 1923, Arthur's son Edward joined forces with passionate brewer Jozef Indekeu to form Brewery van Alken. Their first beer was a Bock lager, but Josef was determined to brew a Pilsner-style beer. In 1928, a Belgian classic was born with the launch of Cristal Alken Pils. In 1988, Alken merged with Maes and became known as Brewery Alken-Maes, now owned by Heineken. Over the years, the group incorporated several other Belgian beer firms, including Brewery De Keersmaeker (now called Mort Subite), Brewery Affligem, and the brands Brugs Tarwebier and Ciney. The Alken-Maes beer portfolio is very large, and includes Maes Pils (5.2% ABV), Cristal (Pils, 5.0% ABV), Radler (2.0% and 0.0% ABV), the strong blond Judas (8.5% ABV), Brugs Tarwebier (Wit, 4.8% ABV), Watneys Scotch Ale (8.0% ABV), Hapkin (Tripel, 8.5% ABV) and the Mort Subite, Ciney, Postel and Grimbergen ranges.



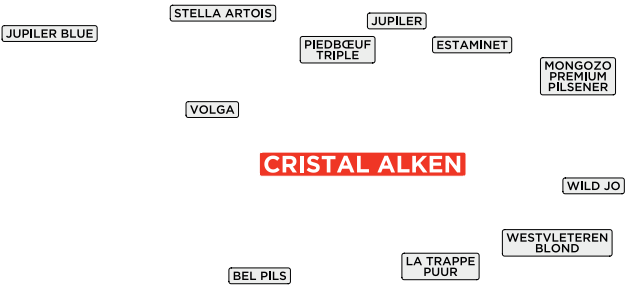
MAP



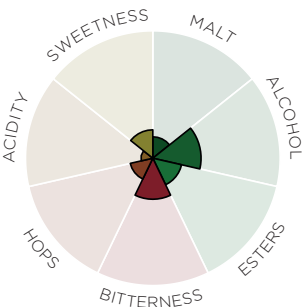
VITAL STATS



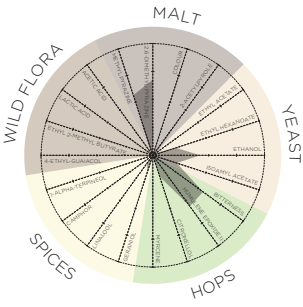
SIMILAR BEERS



SENSORY PROFILE



ANALYTICAL PROFILE



**Kevin Verstrepen** is professor in Genetics and Genomics at Leuven University and Group Leader in Systems Biology at VIB (Flanders Institute for Biotechnology). He serves as director of the Leuven Institute for Beer Research and director of the VIB Center for Microbiology. He obtained his MSc and PhD in biological engineering at Leuven University and served as a postdoctoral fellow in the lab of Dr. Gerald Fink at M.I.T. In 2005, Verstrepen was appointed as Fellow and lecturer at Harvard University, where he led a team of researchers specialized in yeast genetics, whom he brought with him to Leuven after his appointment there in 2007.

**Miguel Roncoroni** is originally from Argentina and studied biotechnology in the U.S. He obtained his MSc And PhD from the University of Auckland, New Zealand, where, in between cycling and surfing, he studied the genetics of yeast applied to winemaking. To prove that wine before beer does not make you feel queer, he moved to Belgium, where he has been researching the composition and diversity of Belgian beer in Kevin's lab at the KU Leuven, as well as in the pub.

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