

# Bending regime influences oak component extraction



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Barrel Associates International

Given the variables that undermine a cooper's ability to produce one reasonably-consistent type of wine barrel, skeptics wonder why would Barrel Associates International multiply those obstacles times three? What distinguishing features could a winemaker reliably expect?

## Fire-bent American oak

Fire-bent American oak barrels are the classic format. Most wine barrels of any origin are efficiently coopered this way; using the same fire to soften, bend and toast the stave wood conserves production space, labour and fuel (generally oak stave trim). Frustrations include stave wood's tendency to char, and the limited heat produced by the fuel.

Well-toasted fire-bent American oak barrels deliver a rich, balanced texture, aromatic vanilla, pepper and allspice flavors, assuming the wood is seasoned and first-grade. The specified toast determines varying degrees of assertive toasted nut character imparted to the wine's finish. Incompletely toasted fire-bent American oak barrels contribute disagreeably harsh and coarse texture, and may impart sawdust or raw sawn-plank character. Even the most elegant examples in American oak do not necessarily marry best to all varietals and stylistic objectives.

## Water-bent American oak

Water-bent American oak barrels are unusual. Barrel Associates International has represented Tonnellerie Dargaud et Jaegle in the

US for many years, and pioneered water bending for American oak after training our coopers in France. (DJ's Australian representative is Geoff Henriks, John Belsham is the New Zealand representative.) Certain subtle improvements make this regime work magnificently with rugged American oak, a far denser wood than its European cousins.

Submerging stave wood in hot water has three principal benefits. First, the lignins soften, so the wood can be bent to shape. Second, some harsh, soluble oak tannins are released into the water. Third, the combined fire temperature and high moisture content allows toasting to occur, without charring, at a higher temperature than in the fire-bent regime. Figure 1 shows this increase, water conducts heat better than air does.

Green, sappy character from poorly-seasoned stave wood can be masked somewhat by fire-bending. Water bending exaggerates such unattractive flavours unmercifully. Thoroughly-seasoned

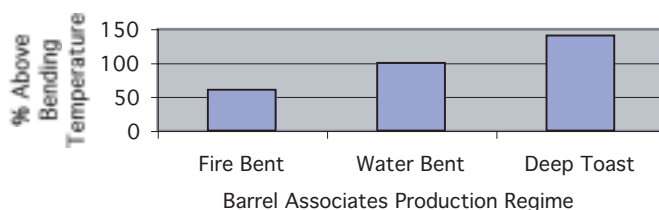


Fig. 1. Maximum toasting temperatures.

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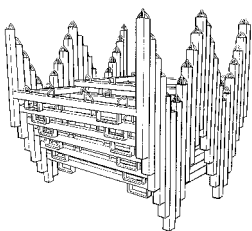


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American oak, however, imparts vanillin, well-defined spices and a wonderfully rich mouthfeel in the finish, when expertly waterbent. The subtle and elegant results make these barrels stunning showcases for premium fruit.

#### DeepToast™ barrels

DeepToast barrels are garnering notice in tastings from satisfied clients and unhappy competing cooperage reps. Not to be confused with “heavy toast”, the DeepToast regime from Barrel Associates International is available in any toast level, including light and medium toast. This proprietary production regime uniquely employs fire, water and air to raise the stave wood toasting temperature above that obtained by the other two methods.

The ratio of our toasting temperatures is shown in Figure 1. Toasting temperature is not the only difference between the three production regimes, but it demonstrates how Barrel Associates International consistently delivers the varied results winemakers desire. Air-dried, seasoned stave wood, plus hand-selection of grain and unswerving flaw removal are essential for elegant results. Subsequent manipulation, allowing controlled temperatures to deeply penetrate that seasoned wood, affects production of extractable toasty oak character, such as Guaiacols and vanillin. The temperature and duration of water immersion affects both toasty oak character, and the profile of other extractable oak characters, such as Lactones and Eugenol.

The profiles were aggregate samples from 20 barrel lots of each regime, analysed by the Australian Wine Research Institute (AWRI) standard assay (see Table 1). This data is best viewed proportionally, due to the +/-10% window of uncertainty. Remarkable parity in values between first and second-fill water-bent samples, and greater total oak extraction after three water-bent fills are supportable interpretations. Also, the relative prominence of lesser-occurring compounds rises, due to the “lactonesubtraction” effects of the water-bent and DeepToast regimes. Although not shown by this assay, the “furfural” family of components, offering caramel, cotton-candy, crème brûlée-type characters, rise especially well in prominence, when unmasked by lowered overt lactone levels.

Considering fine oak’s unique post harvest role in flavour and texture development, Barrel Associates International offers a “spice rack”, that enables winemakers to select from a broad palette. Particular fruit qualities and stylistic objectives might call for a fire-bent barrel, to add structure, a dominant spice or an assertive finish. An especially juicy, jammy lot might be better showcased by the nuances of a water-bent barrel. Such disparate varieties as Pinot Noir and Shiraz could both benefit from the showy contribution of the DeepToast regime, albeit at differing toast levels. Harmonious complexity derives from blending these complementary oak regimes. Factors such as diversity in taste, desire for complexity, foreign competition, and especially

weather-related crop changes between barrel order and harvest, demand the winemaker’s thoughtful planning and occasional clairvoyance. The summary of key differences among Barrel Associates International’s three production regimes (see Figure 2, page 67) aims at a pre-harvest strategy flexibly anticipating the chaotic little surprises that may occur anytime, but invariably arise during crush.

*Further consultation and colleague references may be obtained from Edward Schulz, Barrel Associates International brand manager, on freecall 1-800-006-580, or ed@wineoak.com.*

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Table 1.

BAI Bending Method	Fire Bent			Water Bent			Deep Toast		
AWRI No.	JA2433	IB1337	JC0428	JA2434	IB1338	JC0427	JA2435	IB1339	JC0426
Analysis Date	Oct-00	Oct-01	Oct-02	Oct-00	Oct-01	Oct-02	Oct-00	Oct-01	Oct-02
Measure	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Cis-Oak Lactone	488	302	248	419	438	252	385	260	235
Eugenol	49	30	28	42	48	29	49	34	31
Vanillin	330	200	164	308	261	197	296	230	196
Guaiacol	17	8	9	32	18	11	31	16	11
4-Methylguaiacol	9	2	5	11	8	6	12	5	5
4EP	ND	ND	ND	ND	ND	ND	ND	ND	ND
4EG	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 Months in Bbl/ Fill #	1	2	3	1	2	3	1	2	3

Same barrels, originally delivered to Winery for Harvest 1999, first, second and third fill data

BAI Bending Method	Fire Bent			Water Bent			Deep Toast		
AWRI No.	IB1334	JC0425		IB1335	JC0424		IB1336	JC0423	
Analysis Date	Oct-01	Oct-02		Oct-01	Oct-02		Oct-01	Oct-02	
Measure	µg/L	µg/L		µg/L	µg/L		µg/L	µg/L	
Cis-Oak Lactone	395	283		291	350		305	220	
Eugenol	45	30		35	38		33	24	
Vanillin	273	136		247	175		258	136	
Guaiacol	19	11		14	11		18	10	
4-Methylguaiacol	8	5		5	6		7	5	
4EP	ND	ND		ND	ND		ND	ND	
4EG	ND	ND		ND	ND		ND	ND	
9 Months in Bbl/ Fill #	1	2		1	2		1	2	

Same barrels, originally delivered to Winery for Harvest 2000 first, second and third fill data

Barrel Type	New unfilled barrel aroma	Barrel aroma in wine	Barrel flavor in wine	Barrel texture added to wine
Fire Bent	Pungent, spicy wood smoke	Assertive toasty oak nose, spicemingled with varietal fruit aroma.	Oak integration throughout palate, pepper and brown spice in fore-palate and finish.	Balanced richness well distributed front to back
Water Bent	Subtle smoke, earth and vanilla	Varietal fruit aroma first, vanilla and spice undertones.	Highest vanilla content of the three. Pleasant nutmeg, cinnamon, toasted nut accents to varietal character. Little or no resinous aspect.	Rich velvety sweetness (from wood sugar) in finish. Nice palate extension and balance
DeepToast	Fruity smoke, burnt sugar	Varietal fruit aroma mingled with caramel, toasted oak.	Varietal fruit with nutmeg, cinnamon, caramel accents, some complex vanilla. Multi-layered effect. Low resin content.	Richness in fore and mid-palate. Creaminess in whites, silkiness in reds. Subtle polish to finish acids.

Fig. 2. Barrel Associates International generalised barrel characters.