Current and future trends in the wine industry:
Cooling equipment and electronic controls.

Adelaide June 2009 Markus Milz, GM WTG - Wine Technology GmbH, Germany

Agenda

- History
- Current situation and applications
- Trends
- Future possibilities
- Summary

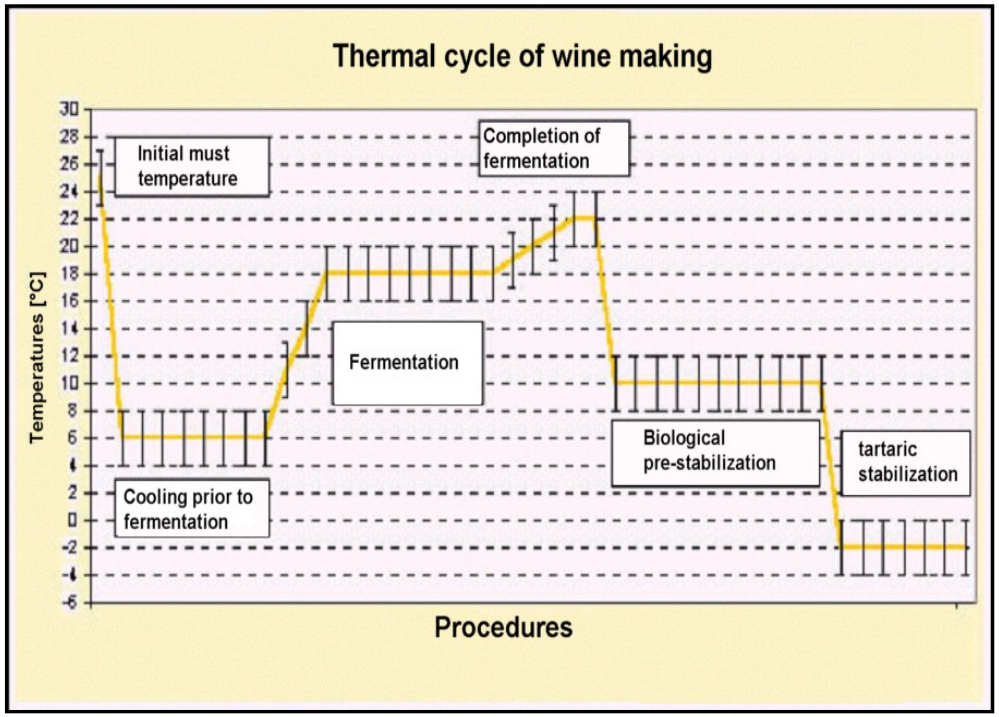
History

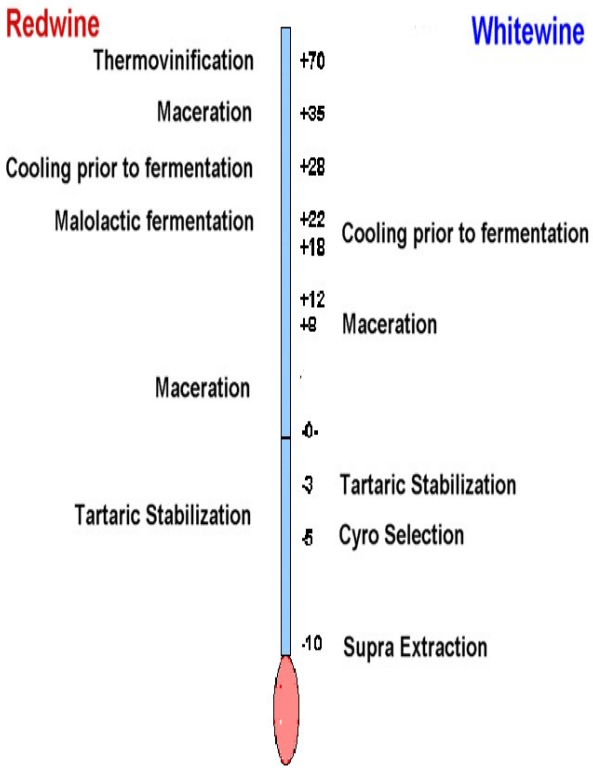
- Cooling equipment in wineries are used in a wide variety since the 1950s.
- First major push to enhance the quality in red and white wine in mass production in the 1970s in Europe.
- Electronic control‘s first investments following in the 1980/90s

Temperature influence in oenology

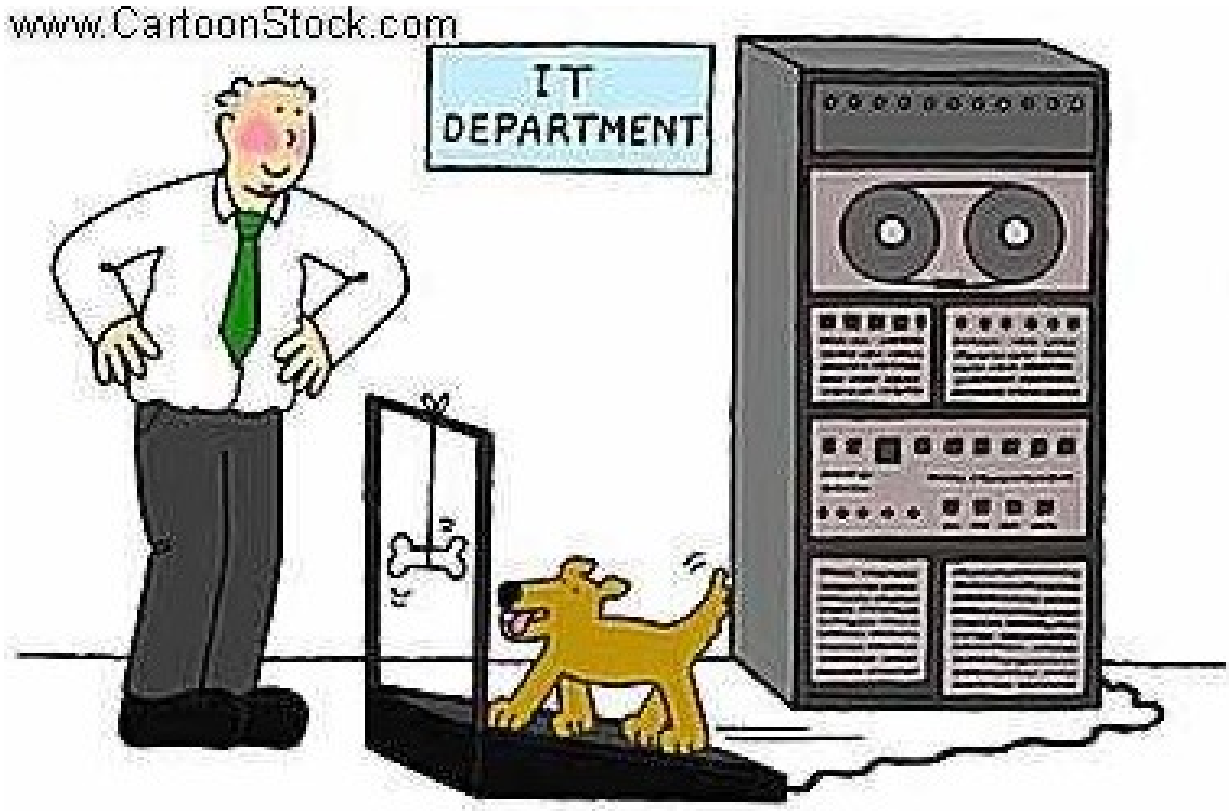
- Aromatic extraction
- Activity control of yeasts
- Duration control of fermentation
- Colour extraction
- Malolactic fermentation
- Stability of wine & alcohol
- Conservation of wine & alcohol

Temperature treatment of musts and wines





Where do we stand with energy management in wineries ?



Martin was pleased with his new source of sustainable energy…

Cooling equipment developments and trends

- Today most cooling plants work with HCF or NO3
- Currently in all European and US markets is a trend to develop environmental save cooling solutions.
- Energy conservation and control is a prime focus for new investments in Europe. This can be done with a variety of possibilities :

Current possibilities:

Cooling:

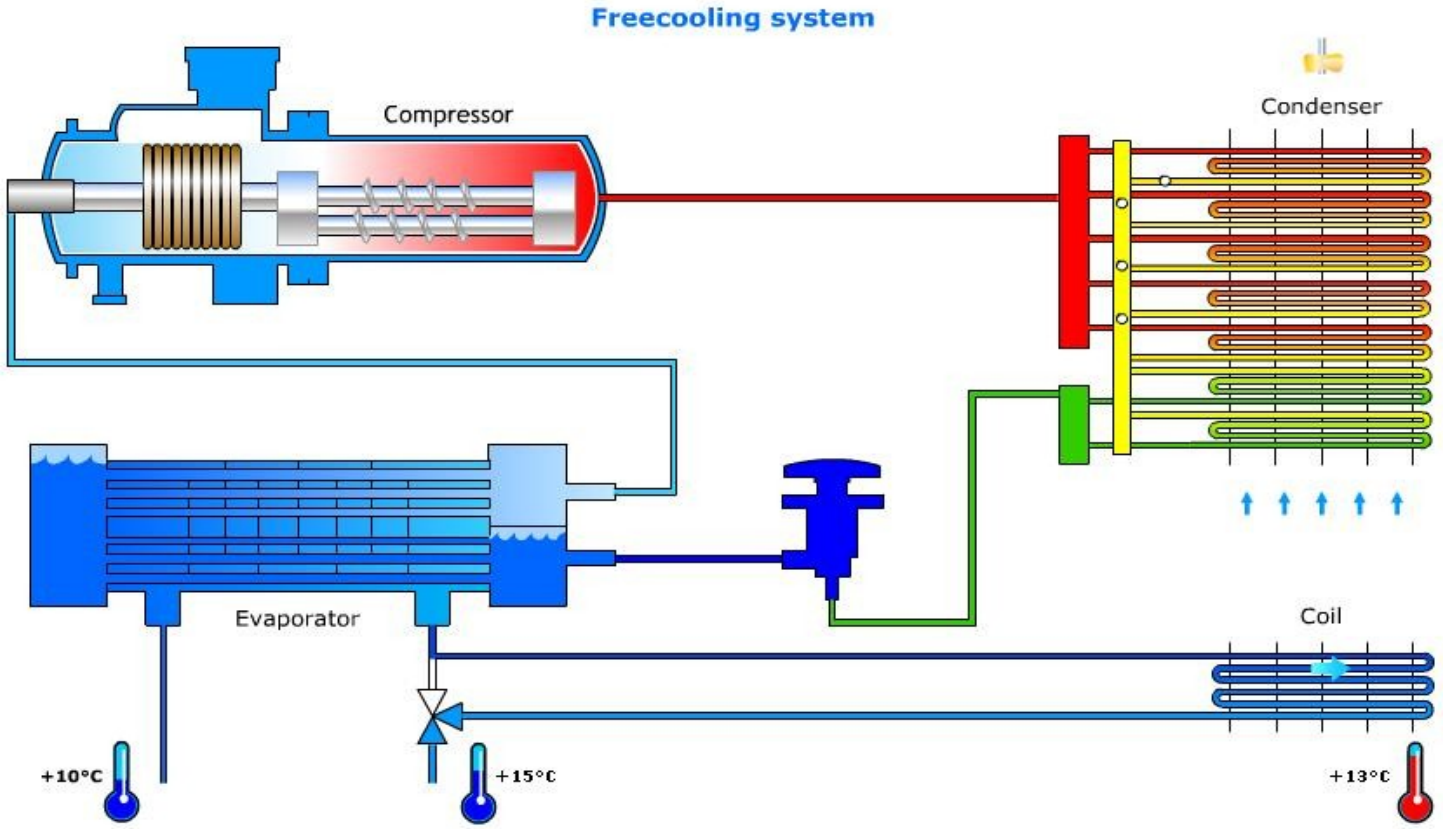
- Free cooling
- Absorption cooling
- Water cooling towers
- Solar & geothermal cooling
- Heat recovery
- Central power units
- Intelligent unit control
- Using environmental natural cooling fluids

Regulation:

- Electronic fermentation temperature regulation
- Co2 fermentation measurement
- Central PC organization of power usage

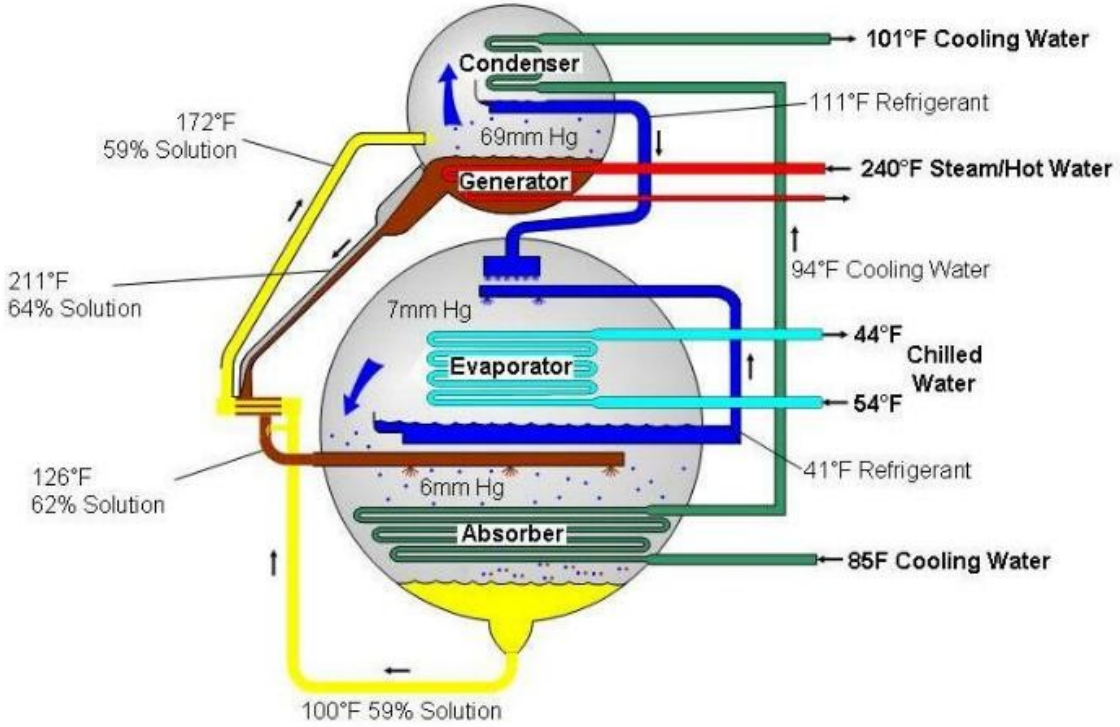
Free cooling

Operation in Mid-Season



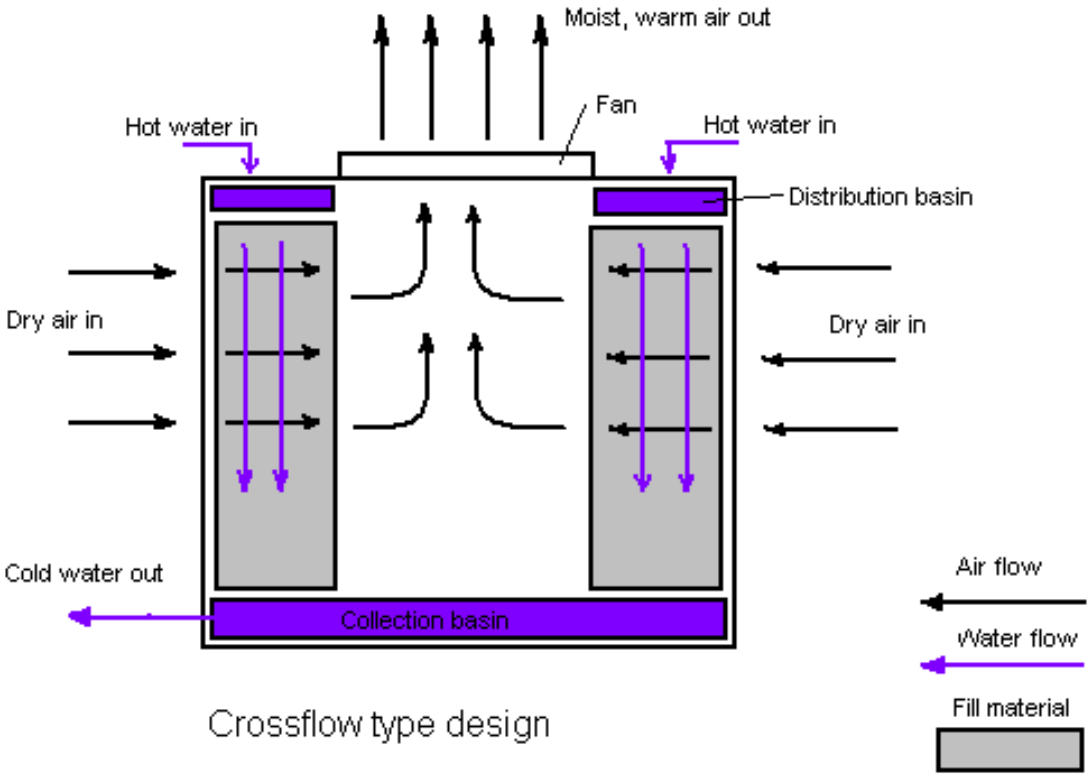
Operation in mid season
In the mid season it is possible to reduce the operation of the compressor thanks to the water pre-cooling in the free-cooling coil.

Absorbtion cooling



Absorptive refrigeration uses a source of heat to provide the energy needed to drive the cooling process. Frequent use in commercial climate control.

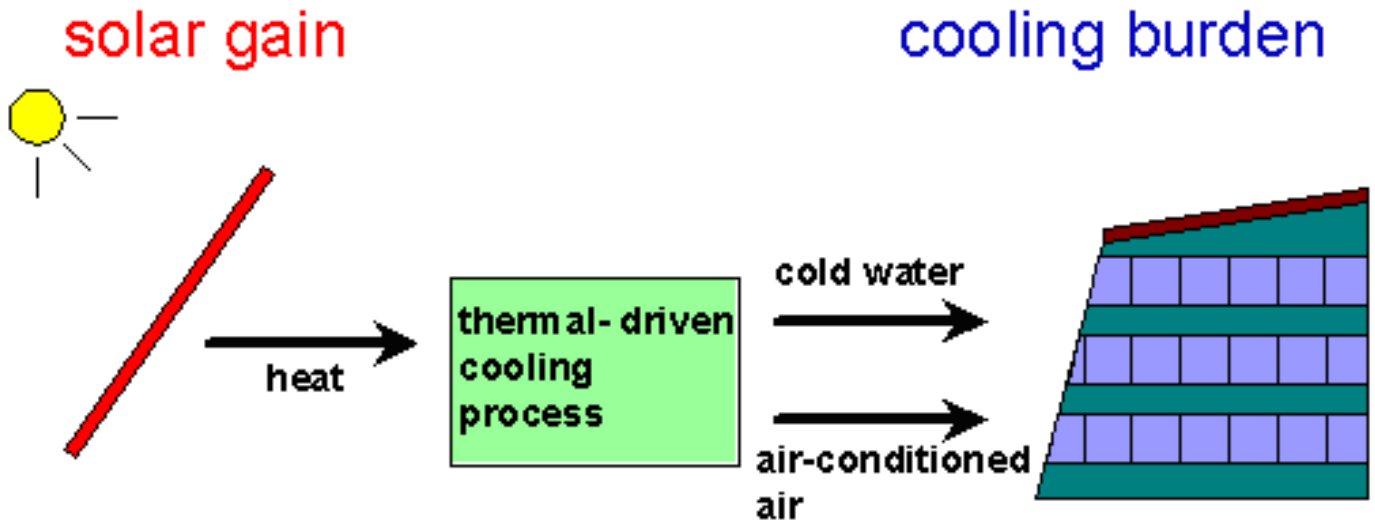
Water cooling towers



Crossflow type design

Cooling towers are heat removal devices used to transfer process waste heat to the atmosphere.

Solar & Geothermal sources



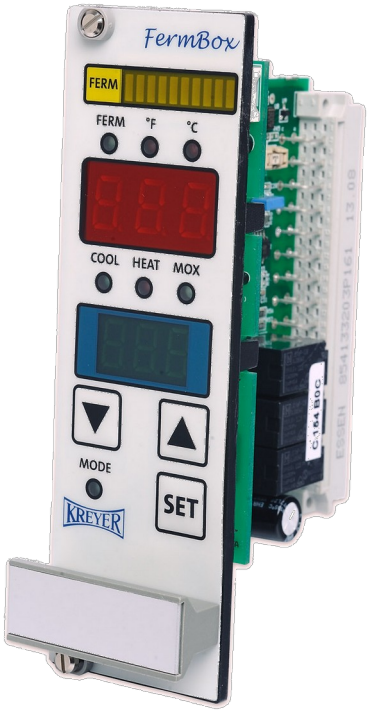
- **Solar cooling**: Solar air conditioning refers to any air conditioning (cooling) system that uses solar power. This can be done by photovoltaic conversion (sun to electricity) and other methods.

- **Geothermal heating** is the direct use of geothermal power and absorbed solar energy for heating applications. Common uses: sub-street heating in northern cities for frost prevention, heating large buildings, etc.

Today - Standard fermentation control:

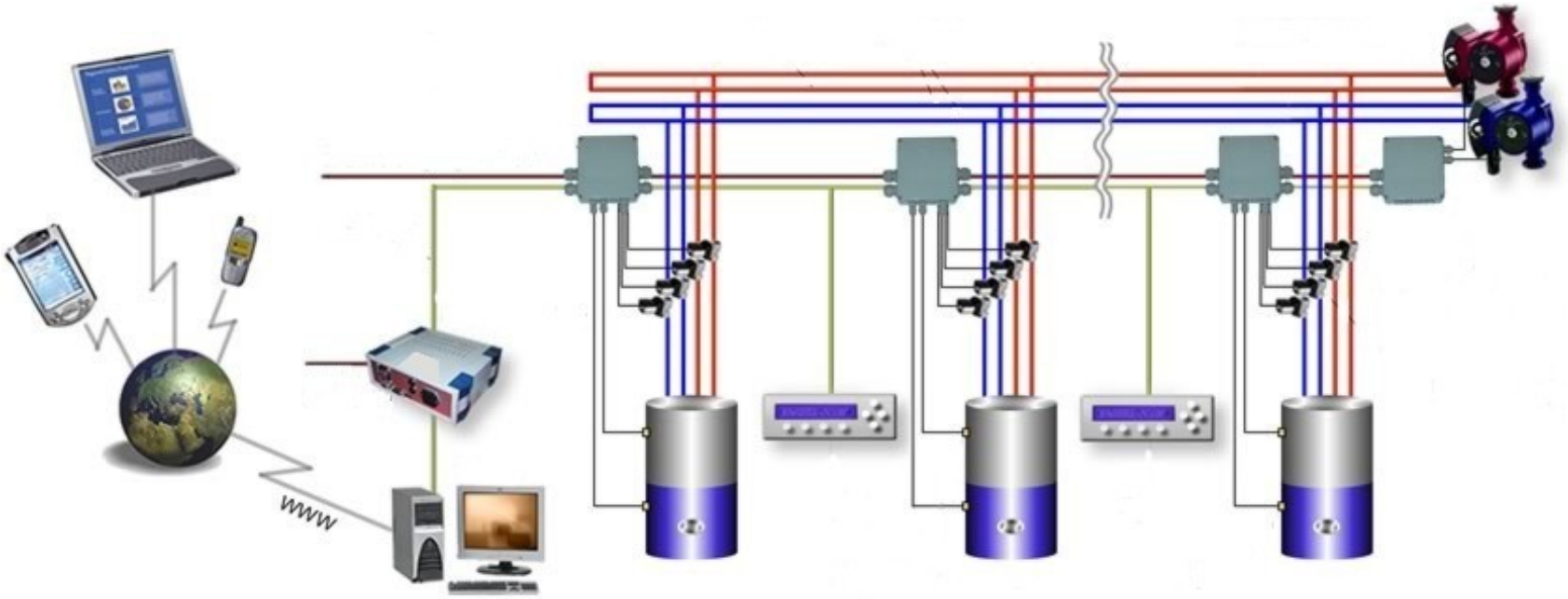
<u>Temperature Regulation</u>:

- Wine fermentation management through temperature adjustment
- Manual and/or computerized



Temperature regulation –

Today and into the Future:



Complete winery control:

- Fermentation (by temperature)
- Fermentation – natural, by CO2 emissions (wine sugar level)
- Various alarms per SMS to mobile
- Full cooling unit and winery equipment control
- Energy saving
- Full control over the internet

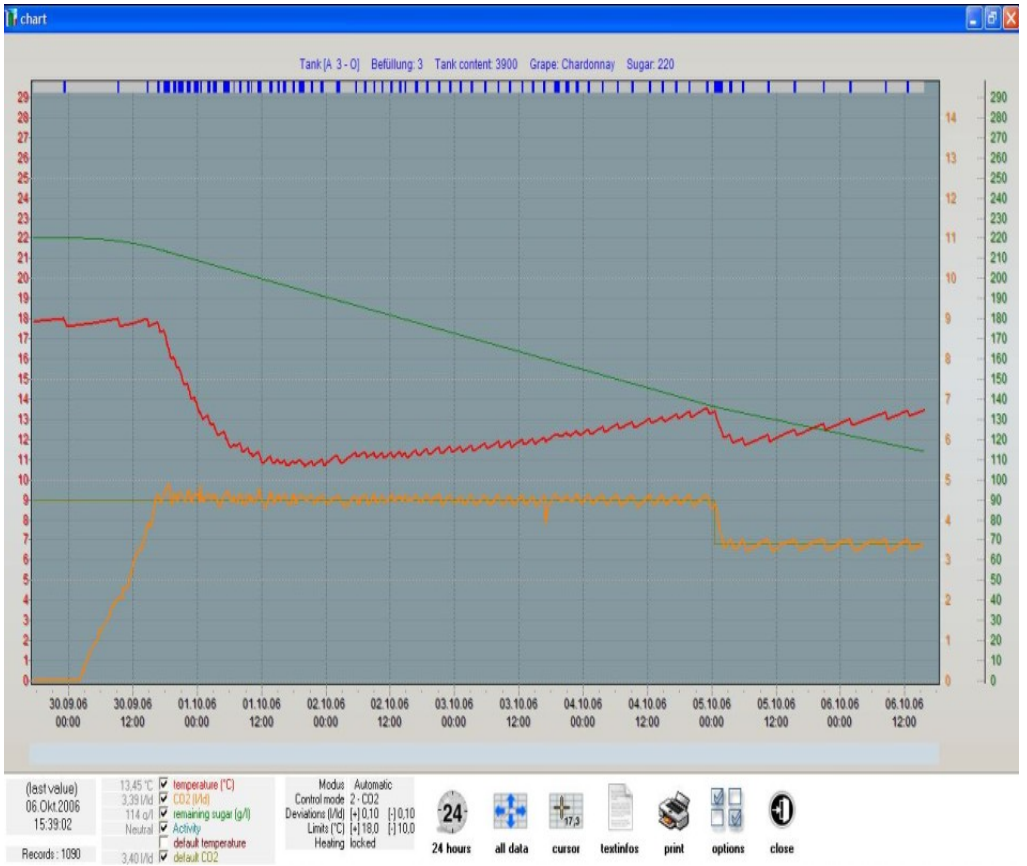
Temperature regulation by CO2 emissions

Natural, Energy saving,
the Future in winemaking!

- CO2 emission (sugar conversion rate) pre-set by the winemaker (orange)

  Temperature (cooling flow) adjusted accordingly (red line)

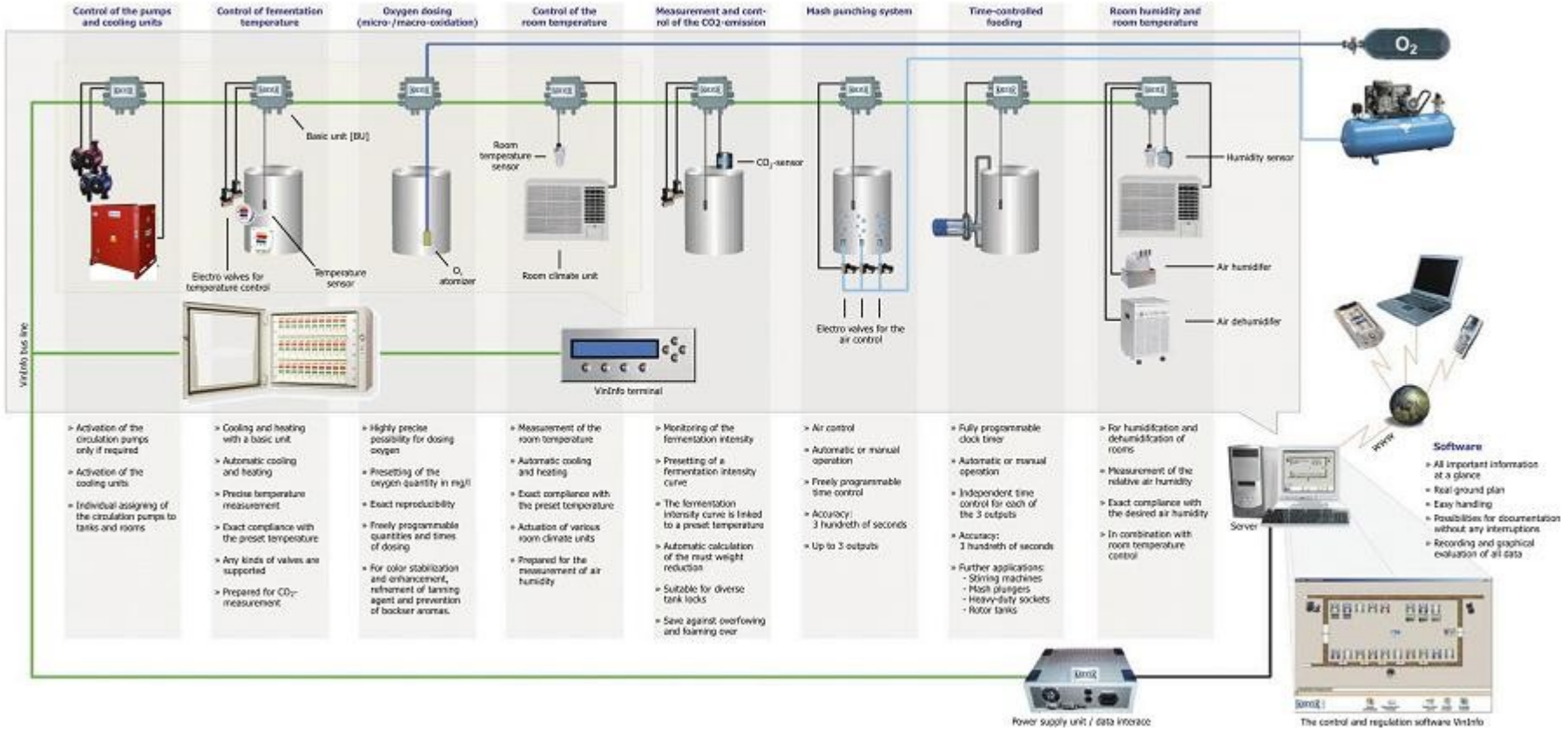
  Remaining sugar level displayed (green line)



VinInfo software chart (all rights reserved)

Computerised winery control

- Pumps and cooling unit control
  Temperature control
  Oxygen dosing (micro/macro)
  Room temperature control
- CO2 emissions fermentation control
  Mash air punching
  Flooding (pumping over)
  Room humidity control



Summary

Don‘t worry about doing the right thing. There‘ll be time enough for that when you‘re fired, retired and reincarnated.

Thank you for listening.

Questions and comments are welcome.

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* Photos and images: Wikipedia and informative internet websites