

# BREWERY APPLICATION GUIDE

## FERMENTATION, AGING CELLARS & FINISHING CELLARS



Munters Integrated Custom Air Handling System (ICA) with PowerPurge™

## Complete Climate Control

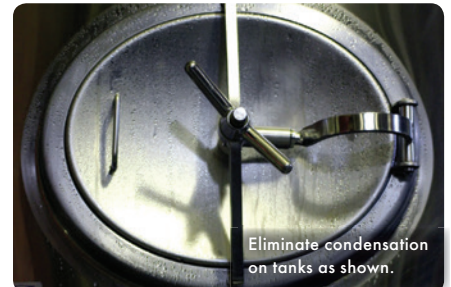
Reduce humidity and eliminate condensation while using energy recovery year round.

### Eliminate Condensation

Brewery fermentation, aging, and finishing cellars often have condensation on cold tanks, piping, and wall surfaces. If left untreated this condensation creates an ideal environment for mold and bacteria growth. The root of the condensation problem is the result of frequent tank cleanings, where a small film at 1/16" to 1/8" deep remains on the floor even when floor drains exist. This standing

water, combined with air handler cooling coils, that are designed for sensible cooling and not the cellar moisture, result in unsightly mold, peeling paint, and dripping pipes.

Munters solution utilizes dry desiccant dehumidification systems which discharge very low Dew Point (DP) air to maintain the cellar at the required Relative Humidity (RH), which can range from 30°F to 65°F depending



Eliminate condensation on tanks as shown.

on the brewery/tank design. Each Munters system is specifically sized for the expected moisture load from tank cleaning/washdown, door openings, and infiltration to the building. Munters dehumidification systems eliminate microbiological growth on all exposed surfaces even with multiple tank cleanings per day.

Cellar temperature and humidity design targets play an important role in equipment selection. Realizing that to prevent mold and condensation, cellars should be designed at 45% to 50% RH, no matter what the space temperature requirement is, the table to the right establishes cellar set points for mold-free design, either with glycol jacketed tanks or without integral tank cooling.

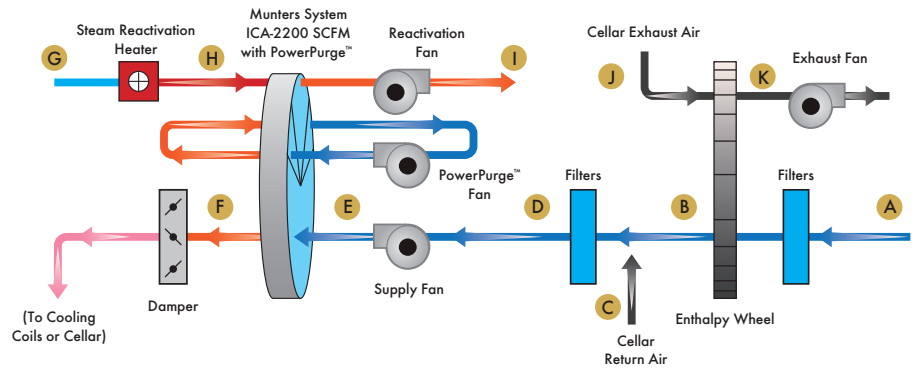
The moisture load from tank cleaning often requires a supply air Dew Point much lower than those obtainable with traditional glycol or ammonia DX cooling coils. Munters dry desiccant systems are designed with the lowest possible delivered air Dew Point, (as low as -30°F DP), to provide clients with as small a system as possible. The final result is that each brewery gets maximum dehumidification capacity, a small system footprint, and minimized energy consumption.

### Divide and Conquer

Munters encourages brewery customers to utilize a "divide and conquer" philosophy for their cellar latent (moisture) load and sensible (cooling) load. Due to the large size of many cellars, the cooling load is much greater than the moisture load. This means that large air volumes are needed for space temperature control. Munters only dries the volume of air needed for space humidity control and does not need to dry all of the cooling load air. The benefits of this "divide and conquer" philosophy include:

- Breweries can use multiple fan/coil units for space cooling with dry air blending in at the return ducts
- Coils will operate dry - no wet coils mean no defrost on cooling coils
- Smaller ductwork is used for the desiccant system when a low Dew Point is supplied
- Munters systems are corrosion free and much smaller in size than liquid desiccant systems, since liquid desiccant designs must dry 100% of the cellar air.

### Typical Munters Brewery DH System with Optional Enthalpy Wheel for Free Makeup Air Cooling (Cellar control at 45°F, 50% RH, 16,000 SCFM)



Dry Cellar Air	A	B	C	D	E	F
Airflow - SCFM	5,000	5,000	11,500	16,500	16,500	16,500
Temperature (F)	95.5	61.9	45.0	50.2	53.0	82.0
Moisture (gr/lb)	125.4	57.1	22.0	32.6	32.6	1.00

Reactivation/Exhaust	G	H	I	J	K
Airflow - SCFM	2,950	2,950	2,950	4,000	4,000
Temperature (F)	95.0	300.0	135.0	45.0	87.5
Moisture (gr/lb)	125.4	125.4	315.0	22.0	101.0

#### Performance Summary:

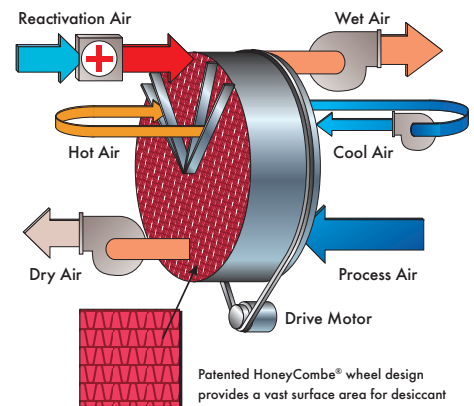
- Enthalpy wheel moisture removal: 222 lb/hr of water
- Desiccant wheel moisture removal: 331 lb/hr of water

### Control Levels for Brewery Cellars

Temp.	Relative Humidity (RH%)	Dew Point (°F)	Absolute Moisture (gr/lb)
30°F	50%	15.4°F	12.0 gr/lb
35°F	50%	19.8°F	14.9 gr/lb
45°F	50%	28.0°F	22.0 gr/lb
50°F	50%	32.1°F	26.6 gr/lb
60°F	50%	41.3°F	38.4 gr/lb
65°F	50%	45.9°F	45.9 gr/lb

### PowerPurge™ and Energy Recovery

- A Munters system with PowerPurge™ acts as an energy recovery system, collecting waste heat off of the desiccant wheel and using it to help with the regeneration. This reduces the energy load and, as a result, lowers energy costs for cooling. PowerPurge™ can also save on first cost by reducing the size of the desiccant rotor without diminishing the dehumidification capacity.
- Are you exhausting cool air from your cellar? If yes, Munters can utilize our energy recovery equipment in combination with the desiccant dehumidification system. Pre-condition your ambient air using one of Munters enthalpy, plate or heat pipe heat exchangers, to save additional energy.



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