



GENERAL RULES AND REQUIREMENTS IN TODAY'S SWEET POTATO VENTILATION SYSTEMS

- 1) 1.5 TO 2 CFM PER BUSHELL IS REQUIRED FOR ADEQUATE VENTILATION – CURING, DRYING, COOLDOWN, THIS RATE WILL GIVE YOU ABOUT 6-8 DEG F TEMP DROP RATE WITH FULL FRESH AIR INTAKE, .75-1 CFM SYSTEMS WILL BE 3 DEG F OR LESS
- 2) HALF THE ABOVE AIR WILL BE NEEDED TO MAINTAIN GOOD QUALITY PRODUCT IN STORAGE AFTER COOLDOWN WHILE AT SETPOINT FROM 0.75-1 CFM/BU
- 3) ACCORDING TO NC STATE RESEARCH, SHRINK IN STORAGE VARIES FROM .75-1.5% PER MONTH BUT WITH NO HUMIDIFICATION APPLIED DURING HOLDING PERIOD YOU WILL LIKELY DOUBLE THE AMOUNT OF SHRINK THRU THE STORAGE SEASON
- 4) INTAKE/EXHAUST AIR EXCHANGE CAPACITY SHOULD EQUAL TOTAL AIR CIRCULATED – SO IF YOU CIRCULATE 20,000 CFM THRU THE STORAGE YOUR INTAKE FAN/LOUVER AND EXHAUST FAN SHOULD EQUAL THAT AMOUNT, HAVING ONLY EXHAUST LOUVER WILL NOT WORK, THIS WILL MAXIMIZE YOUR CURING/COOLDOWN CAPABILITY – SO YOU CAN MINIMIZE SPROUTING
- 5) INTAKE AND EXHAUST FANS/LOUVERS MUST HAVE MODULATING CONTROL – IT MEANS THAT FANS GRADUALLY SPEED UP/DOWN OR LOUVERS INCREMENTALLY OPEN/CLOSE, THIS PROVIDES GOOD AND STEADY TEMPERATURE/HUMIDITY CONTROL AT ANY GIVEN OUTDOOR TEMPERATURE EVEN AT 10 DEG F OUTSIDE, AIR EXCHANGE IS NOT IRRATIC AND CONDENSATION IS WELL CONTROLLED
- 6) LACK OF GOOD AIR CIRCULATION IN STORAGE CAUSES EXCESSIVE MOISTURE BUILD UP AND PREVENTS GROWER FROM DRYING/KEEP IT DRY THE PRODUCT ESPECIALLY IN WINTER LOW TEMP CONDITIONS, CONDENSATION BUILDUP IS NOT GOOD FOR STORAGE AND PRODUCT IN IT
- 7) USE OF HEAT EXCHANGERS WHEN EXTERNAL HEAT IS NEEDED OR USE OF ELECTRIC HEAT IS ABSOLUTE MUST, IF YOU RUN HEATER INSIDE THE STORAGE YOU WILL BURN UP OXYGEN, BUILD UP CO₂ AND CARBON MONOXIDE BUILDUP IS POSSIBLE IF HEATER DOES NOT HAVE ENOUGH OXYGEN TO BURN FUEL CORRECTLY, RESULT CAN BE – DAMAGE TO POTATOES DUE TO LACK OF OXYGEN IF HEATERS RUN EXTENDED PERIOD OF TIME INSIDE THE STORAGE
- 8) USE OF ULTRA LOW LEAKAGE LOUVERS AND THEIR MODULATION IS THE KEY TO KEEP STORAGE TEMPERATURES UP DURING COLD WEATHER AND KEEP TEMP DOWN DURING REFRIGERATION OPERATION TO MINIMIZE AIR INFILTRATION
- 9) IN NORTH CAROLINA STYLE STORAGE YOU MUST HAVE EXHAUST FAN IN ORDER TO HAVE PROPER AIR EXCHANGE AND IT NEEDS TO BE PROPERLY SIZED AND PROPORTIONAL TO THE INTAKE LOUVER
- 10) REFRIGERATION DESIGN – DESIGNATED REFRIGERANT THAT MATCHES OUR STORAGE TEMPERATURES AND MINIMIZES SHRINK DURING STORAGE IS R-407C, ONE TON/HP PER 1000 BUSHEL IS REQUIRED FOR PROPER TEMPERATURE PULLDOWN, 3/4TON/HP IS MINIMUM, UNIT COOLERS SHOULD HAVE 4 FINS PER INCH TO PREVENT PLUGGING UP DUE TO DIRT AND FLIES,



THAT IS NEARLY DOUBLE THE SPACE OF ANY STANDARD COIL AT 6 FINS PER INCH, DELTA T DESIGN OF 8-10 DEG F MEANS THAT YOUR COOLING COIL IS 8-10 DEG F COLDER THAN THE AIR COOLED AND THAT MINIMIZES YOUR MOISTURE REMOVAL BY COOLING COILS, SO LESS SHRINK

- 11) ACT/BTU HAS DESIGNED AND BUILT/REMODELED STORAGES THAT REQUIRE DX COILS ONLY INSTEAD OF UNIT COOLERS, THEY DO NOT PLUG UP WITH DIRT OR FLIES AND ARE EASILY ACCESSIBLE FOR CLEANING AND MAINTENANCE BEING ON THE GROUND LEVEL INSTEAD OF BEING HUNG OVER THE TOP OF THE POTATOES, DX COIL IS A COIL SLAB USING MAIN CIRCULATION FANS FOR AIR FLOW SO LESS EXPENSIVE, NO ADDITIONAL POWER IS USED, LESS MAINTENANCE, ALL AROUND WINNER
- 12) CO2 MONITORING AND CONTROL IS VERY IMPORTANT IN TODAY'S STORAGES, IT MANAGES HIGH CO2 SPIKES DURING CURING/COLD WEATHER, IT CAN INDICATE BREAKDOWN/ISSUES IN EARLY STAGES OF DEVELOPMENT DURING COOLDOWN/HOLDING PERIODS IF ELEVATED
- 13) VARIABLE SPEED DRIVES WORK WELL TO CONTROL INTAKE/EXHAUST FANS, THEY CAN BE INSTALLED ON 3 AND SINGLE PHASE SYSTEMS (MOTOR MUST BE 3 PHASE), CIRCULATION FANS ARE GREAT CANDIDATE FOR VFD'S AS WELL - IF YOU HAVE STANDARD AIR VOLUME TO START WITH, YOU CAN SLOW FANS DOWN TO 50% AND MAINTAIN AIR CIRCULATION WHILE SAVING 40-70% OF POWER, REBATES FROM POWER UTILITY MAYBE AVAILABLE, 50% FAN SPEED IS 10-13% POWER ONLY SO 5HP FAN WILL RUN AT 0.5HP AT 50% SPEED, BOOSTER FANS HALF WAY DOWN WILL CARRY THE AIR TO THE BACK OF THE STORAGE FOR FULL AIR CIRCULATION
- 14) WATER FREE HUMIDIFICATION (MEANS NO FREE WATER DROPLETS IN THE AIR) IS THE SAFEST WAY TO HUMIDIFY THE STORAGE, TO MANAGE EXCESS MOISTURE AND ELIMINATE GETTING PRODUCT WET FROM WATER NOZZLES – EVAPORATIVE COOLERS HAVE BEEN USED IN VEGETABLE INDUSTRY FOR 40 YEARS, THEY CAN ALSO PROVIDE COOLING EFFECT IN SOME VENTILATION DESIGNS WHERE ALL THE AIR FLOWS THRU THE COOLING MEDIA – YOU CAN GET UP TO 25 DEG F COOLING EFFECT, SO 85 DEG OUTSIDE AIR WILL COOL DOWN TO 60 DEG F WITHOUT REFRIGERATION AND WITH 90% PLUS RELATIVE HUMIDITY OUTPUT
- 15) IF YOUR STORAGE IS LONGER THAN 75 FEET YOU MUST HAVE BOOSTER FAN(S) MOUNTED HALF WAY TO MOVE AIR TO THE BACK OF THE STORAGE BAY FOR FULL AIR CIRCULATION, GENERALLY MAIN CIRCULATION FANS WILL HAVE A GOOD AIR THROW UP TO 50-60' ONLY
- 16) EVERY STORAGE CAN BE UPGRADED/IMPROVED, IMPROVEMENTS CAN BE DONE IN STEPS TO MINIMIZE COST STARTING WITH MOST CRITICAL COMPONENTS FIRST FOR MOST GAIN
- 17) BEFORE YOU UPGRADE STORAGES, THEY SHOULD BE ASSESSED FOR MAIN DEFICIENCIES SO RETROFIT PLAN CAN BE CREATED, REVERSE ENGINEERING IS OFTEN DONE TO FIND THE BEST AND ECONOMICAL APPROACH
- 18) COMPUTER CONTROL PANELS TYPICALLY COST BETWEEN \$4000-7000, IF YOU HAVE CROP ISSUES WITH PRODUCT IN STORAGE THEY WILL PAY MANY TIMES OVER IT'S COST FIRST YEAR OF USE



- THEIR CAPABILITIES FAR EXCEED THEROMSTATS/SIMPLE CONTROLS, YET THEY ARE EASY TO USE/VERY RELIABLE, 70-80% OF CONTROL ISSUES CAN BE FIXED OVER THE COMPUTER
- 19) ACT SYSTEMS HAVE 2 YEAR WARRANTY, OUR SERVICE THRU THE STORAGE SEASON IS VERY MINIMAL DUE TO HIGH QUALITY, EFFICIENT COMPONENTS ALSO AT COMPETITIVE PRICES
 - 20) ACT IS HERE TO CONSULT WITH YOU ON STORAGE NEEDS FREE OF CHARGE
 - 21) ROBERT DROZDOWSKI HAS ELECTRICAL AND HVAC DEGREE, 27 YEARS IN VEGETABLE VENTILATION, SERVICE, DESIGN AND R&D EXPERIENCE AS WELL AS STORAGE DISINFECTANT/DISEASE SUPPRESSANT/ SPROUT INHIBITOR EXPERIENCE
 - 22) ACT HAS OVER 1000 SYSTEMS WORLDWIDE AND 130 SWEET POTATO SYSTEMS THRU AR, MS, LA - MOST OF THEM ARE ACCESSIBLE VIA INTERNET FOR EASY ACCESS, MONITORING, ALARMING, PARAMETER CHANGES, SYSTEM RESET, TREMENDOUS HELP FOR TODAY'S BUSY FARMER, KEEPING AN EYE ON YOUR STORAGES FROM YOUR SMART PHONE AT ANY TIME IS ESSENTIAL IN TODAY'S STORAGE MICRO MANAGEMENT
 - 23) MOST VENTILATION EQUIPMENT PAYBACKS ARE SHORT, VFD'S 6-8 MONTHS, HUMIDIFICATION 6 MONTHS, PROPER VENTILATION CAN MEAN "TO BE OR NOT TO BE" FOR YOUR PRODUCT IN STORAGE IN SOME CASES OR JUST SIMPLY MAINTAINING HIGHER QUALITY PRODUCT THAT YOU WOULD NOT NORMALLY EXPECT – SO MINIMIZING STORAGE LOSSES WILL FAR EXCEED THE INVESTMENT COST OF BETTER VENTILATION WHETHER IT IS NEW OR IN REMODELED SYSTEM, USUALLY ON THE FIRST YEAR OF USE

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