1. For all fans, the maximum required design airflow shall not exceed 80% of the manufacturer’s maximum rated air flow for that fan at the design pressure conditions.

2. Centrifugal fans are preferred for supply air.

3. Fans in central air systems are to be minimum Class II, or Class III for higher pressures. Select fans one class higher than the manufacturer’s selection charts. If a fan is at 75% of its capacity or higher then select the next rating up.

   **PROHIBITED:** Use of Class I fans. Failures and maintenance costs experienced with this fan class make its use unacceptable in U of A projects.

4. Fans shall be capable of accommodating static pressure variations of ±10% with no objectionable operating characteristics.

5. V-belt drives should be rated at 175 to 200% of the drive’s horsepower rating.

6. Belt guards shall meet OH & S requirements and be easy to remove & reinstall. Provide guards with expanded metal face that does not extend over the top and bottom of the sheaves.

7. Centrifugal fans are to be fully enclosed in a heavy gauge steel fan scroll casing reinforced for the required service and supplied by the fan manufacturer. Field fabricated fan enclosures are not acceptable. Fabricate fans with multi-blade wheels.

8. Provide V-belt drives with fan and motor mounted on a reinforced rigid steel base with a heavy duty two bolt adjustable motor mount.

9. For centrifugal fans, provide heavy duty, self-aligning, anti-friction bearings with locking pin and dimple system to prevent rotation. Use Felt-Lined Flinger Seal, Skwezloc shaft and locking collar. Lubrication lines are to be accessible without removing guards or shutting down the fan.

10. For fans requiring a drainage connection, provide a ball valve and plug at the scroll housing.

11. Ideally, belted vent sets and centrifugal fans over 17” (430 mm) diameter shall have die formed airfoil blades welded to the side of the back plate. These fans are known to have more reliable performance over time.

12. Control axial fan speed with VFD when practical. Where a VFD is not used, provide either adjustable die cast impeller blades with the motor an integral part of the hub design, or die formed blades with belt drive and motor mounted outside the air stream. Extend lubrication
fitting to outside of fan casing. Provide external terminal box and flanges in housing for duct connections. Provide inlet cones when fan is not connected to ductwork. Fan to be of vane-axial design.

13. Use of propeller fans is to be limited to wall installations in farm type buildings and sheds. Do not duct propeller fans. Directly connect steel or aluminum blade fans with heavy hubs to motor. Motor shall have self-aligning ball or sleeve bearings with adequate lubricating arrangements. Mountings shall be cast or die formed to smooth surfaces. Provide safety screens at inlet and backdraft dampers on outlet. Use neoprene vibration isolation between fan assembly and mounting plate.

14. VFD’s for fan systems at 25 Hp and greater.

15. Use high efficiency electric motors. Motors shall be certified to be compatible with the VFD’s that are listed in the U of A VFD Specification and shall have motor insulation that will withstand voltage levels and transients/peaks associated with VFD service. Motors shall be of premium efficiency design, and have minimum and nominal full load efficiency which will meet or exceed the values NEMA MG1 – 12.55’s Table 12-6B when tested in accordance with NEMA test standard MG1-12.54; IEEE Test Procedure 112, Method B using accuracy improvement by segregated loss determination including stray load measurements. (Use latest editions of aforementioned documents). Minimum efficiency shall be guaranteed.

16. Use VFD’s for all VAV supply and return fans. Use soft start on bypass circuit for all motors at 25hp and larger. Motors shall be certified to be compatible with the VFD’s that are listed in the U of A VFD Specification and shall have motor insulation that will withstand voltage levels and transients/peaks associated with VFD service. Motors shall be of premium efficiency design, and have minimum and nominal full load efficiency which will meet or exceed the values NEMA MG1-12.55’s Table 12-6B when tested in accordance with NEMA test standard MG1-12.54; IEEE Test Procedure 112, Method B using accuracy improvement by segregated loss determination including stray load measurements. (Use latest editions of aforementioned documents). Minimum efficiency shall be guaranteed. Approved VFD manufacturers are only those listed on the University of Alberta Website in the UofA VFD Specifications.

17. Provide balanced variable sheaves for motors 10KW and under and fixed sheaves for fan motors 15 kW and over. The use of VFD’s for system balancing shall not be done. All systems shall be balanced to 100% design flow at 100% VFD.

18. Roof mounted fans should be direct drive dome type centrifugal where ever possible (except fume hood exhaust) with direct discharge design, multi-directional independently mounted vibration...
isolators, one piece housings, with no welds or seams. Sound levels to be in accordance with AMCA Standard 300. If V-belt drives are used, the fan and motor are to be separated from the main housing with multi-directional independently mounted vibration isolators.

19. Heavy aluminum dome type housings shall be reinforced as necessary on sizes with a 500mm wheel and larger.

20. Provide all roof mounted exhaust fans with bird screen on inlet, local disconnect switch, curb caps and multi-blade, and rattle free backdraft dampers with felt lined blade edges.

21. Fume hood exhaust fans to be roof mounted, belted vent sets. Specify fan coating that is appropriate for the specific fume hood application. Fan discharge velocity to be a minimum of 20 m/s.