UNIVERSITY OF SASKATCHEWAN
Planning, Design & Construction
Campus Engineering & Sustainability

Mechanical Engineering - Capital Project Design Checklist

University Services
Building
110 Maintenance Road

Project Name:		UNIVERSITY OF SASKATCHEWAN	**Project Number:**	
Design Stage:	**33% Review**		**Consultant:**	
Usask PM:			**Usask Engineer:**	

This checklist reflects the information found within the Usask Mechanical Design Guidelines, along with other pertinent design elements that must be complete at the current design stage. Usask Engineering will use this checklist to confirm all elements of the design below are included in the current package. The design package will be rejected if any applicable element in the list below is not included without adequate justification. It is the Consultant's responsibility to ensure all information is included. The Consultant is responsible for any delays in the project due to resubmissions and supplemental reviews required to satisfy USask requirements.

No.	Requirement	Consultant - Is Design Compliant? (Y/N)	Consultant - Deviations requests/comments	Usask Engineering - Is design acceptable? (Y/N)
	SECTION 21 - FIRE SUPPRESSION			
1	Fire Pumps Located on plans			
2	Site Service Identified on plans			
3	Fire main shown on schematics			
4	Riser diagrams shown on plans			
	SECTION 22 - PLUMBING			
5	**Site Services Identified on plans**			
5a	The point of entry of utilities to the building shall be selected to minimize the length of the connections back to the utility mains. Final locations will be determined in consultation with Facilities & Operations Group. Responsibility for extension of utilities will be determined on a project-by-project basis.			
5b	Non-freeze hose bibs shall be located so hoses do not cross walkways or roads or use lengths in excess of 50 m to reach all landscaped areas.			
6	**Main Lines (Domestic, Sanitary, Storm, Utility Piping, etc) - Sized and located on plans**			
6a	All water mains shall be sized for 50% greater future fixture unit load.			
6b	Plumbing mains shall be routed over unoccupied spaces wherever practical. All system components, where not installed immediately upstream or downstream of a fixture, shall be installed in an accessible location in the ceiling or wall. Route plumbing mains to follow building lines.			
6c	All main drain lines shall be sized for 50% greater future fixture unit load.			
6d	Main lines shall be routed below or above unoccupied spaces, where practical.			
6e	Ensure piping routing does not allow for freezing in spaces with access to the exterior.			
6f	Drainage points shall be installed at low points in each building.			
7	**Fixture Cuts/Selections Provided for Review by Usask**			
8	**Fixtures Located on Drawings**			
8a	Pipe access space shall be provided behind fixture walls for maintenance purposes and also to isolate noise from adjoining areas. All valves shall be accessible.			
9	**Water Entry Schematic is Included on Drawings**			
9a	Provide Water Meters at incoming main water service, upstream of hot water equipment and any major process needs.			
10	**Domestic Water Schematic is included on Drawings**			
	SECTION 23 - HVAC			
11	**Site Services Identified on plans**			
11a	All buildings shall be connected to the central chilled and steam systems, unless otherwise directed by USask Mechanical Engineer.			
11b	The pressure reducing station is to be located as close to the steam entry point as possible and in a location where the noise will not be objectionable.			

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12	**'Plant' Equipment Layout Complete and Shown on Plans**			
12a	All fan equipment shall be installed in a mechanical room. Centralize equipment where possible.			
12b	Equipment generating heavy vibration and/or noise shall be located away from occupied spaces.			
12c	Equipment and mechanical shafts shall not be placed near instructional, office or research spaces.			
12d	All building equipment shall be accessible for servicing, repair or replacement as necessary. This implies not only provision of service platforms, access panels or doors, but also room within which to work provided in locations where access will not be an unnecessary hardship. Equipment shall be installed indoors. Any roof mounted equipment requires access.			
12e	In equipment rooms, floor mounted mechanical equipment shall be set on concrete housekeeping pads. Where ductwork or piping passes through floors above occupied spaces, pipe or concrete curb weirs shall be provided. In large mechanical rooms provide adequate floor drains to accommodate future equipment. Generally, mechanical rooms shall not be placed above occupied spaces. Penthouse locations are preferred for air handling systems. All exposed plenums and duct work in equipment rooms are to be painted.			
12f	All mechanical equipment shall be drawn to scale on plans. Provide drawing sections and elevations to clearly identify equipment location and spacing required for servicing.			
12g	Intake and exhaust air installations shall adhere to minimum discharge/intake distances required by ASHRAE 62.1.			
12h	Fresh air intakes shall be located to at least 5m from ground level and 1m above any horizontal surface to avoid snow buildup. Size intake louver to avoid water penetration. Coarse bird screening mesh (about 25 mm) shall be provided.			
13	**Piping Mains Located and Shown on Plans**			
13a	Ensure piping routing does not allow for freezing in spaces with access to the exterior.			
13b	Drainage points shall be installed at low points in each building.			
14	**Main Ducts Located and Shown on Plans**			
15	**Main System Schematics are Shown on Drawings**			
15a	Any new district services being fed to a building shall have metering at a building level. This includes steam, condensate, and chilled water.			
15b	Isolation valves shall be installed to isolate all components in a piping system.			
15c	Drain valves are required at all terminal units, at the base of all risers and main take-offs.			
15d	Install a strainer upstream of every control valve.			
15e	Pumps should typically be installed in pairs and in duty-standby sequence, alternated based on a timed schedule.			
15f	Designers shall indicate flow quantities and estimated system volumes on drawings.			
15g	Throttling type control valves must be installed on all coils, no bypass type control valves are allowable on any chilled water piping.			
15h	Provide filters ahead of all coils, including exhaust coils on heat reclaim run around systems. Access shall be provided on both sides of coils to permit cleaning or repair.			
15i	Steam force-flow and unit heaters shall be installed with a two position control valve operated by a thermostat. An aquastat located on the condensate line shall cycle the fan and act as a low limit protection device. Where it is absolutely necessary to lift condensate out of a heater, no control valve will be used. Instead these units will be on a steam line with a CCMS control valve that will be closed in warm weather.			
15j	Relief lines from all safety relief valves on steam pressure reducing valve stations shall be carried to atmosphere above the roof.			
15k	Two condensate return pumps shall be used, alternating in operation. The condensate receiver must have an emergency drain connection to the sewer which is above the normal operating level of the receiver, but below the lowest heating coils in the ventilation system.			
15l	Provide design for the installation of a globe valve upstream of each condensate pump isolation valve for pump flow control.			

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15m	The Building ventilation system shall be designed to take advantage of natural cooling by the outdoor air when temperature and humidity conditions are favorable.			
15n	Ensure ventilation rates for all spaces conform to most recent edition of ASHRAE Standard 62.1 – Ventilation for			
15o	Energy reclaim techniques must be designed into all systems.			