

Mechanical Engineering - Capital Project Design Checklist

Project Name:		 UNIVERSITY OF SASKATCHEWAN	Project Number:	
Design Stage:	66% 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.

This checklist assumes all items included on previous design checklists have been included and are already shown on the drawings.

No.	Requirement	Consultant - Is Design Compliant? (Y/N)	Consultant - Deviations requests/comments	Usask Engineering - Is design acceptable? (Y/N)
SECTION 21 - FIRE SUPPRESSION				
1	Head Locations Shown on Plans			
1a	Sprinklers shall be fully recessed in public spaces with ceilings.			
1b	In all other areas, upright pendants shall be used. Chrome heads shall be used in public spaces.			
2	Sprinkler Piping Mains Shown on Plans			
2a	Fire system components shall be installed where they can be easily accessed with permanent drains and or test piping so they can be inspected, tested and maintained as per NFPA 25.			
3	Fire Pumps Sized and Located on Plans			
4	Siamese Connection Located on Plans			
5	Test Header Location Located on Plans			
5a	When fire pumps are installed ensure an external manifold for testing purposes.			
6	Test Header Schematic Included on Plans			
7	Specialty Systems Shown on Plans			
7a	For specialized applications, system type to be used shall be reviewed with USask Engineering group prior to finalization.			
7b	Where specialty equipment not normally within the expertise of local Mechanical Contractors is to be installed, start-up and/or installation by factory-trained representatives shall be specified.			
7c	Where sprinklers are subject to freezing, provide a dry system or non-freeze heads rather than an anti-freeze system.			
SECTION 22 - PLUMBING				
8	Riser Locations and Sizes Shown on Plans			
8a	Main storm water piping shall not be routed vertically through exterior walls.			
8b	Piping installed to service Washrooms shall be installed in accessible chases.			
9	Riser Diagrams are Shown on Plans and are generally complete			
9a	Provide isolation valve and drain valves on all risers.			
10	Branch Piping Shown on Plans			
10a	Where systems are demolished, remove unused lines back to main.			
10b	Hot water recirculation systems are required in all buildings with a central hot water system. Ensure maximum pipe velocity does not exceed 4fps. Connect hot water recirculation system as close as possible to electronic faucets.			
10c	Water hammer arrestors to be installed in accessible locations. Do not install behind drywall ceilings or walls.			
10d	Provide pressure reducing valves on water supplies to low flow fixtures. Outlet pressure shall be 55 psi.			

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10e	Ensure piping routing does not allow for freezing in spaces with access to the exterior.			
11	Water Heater is Selected, Shown on Plans, and Scheduled			
12	Water Meter and Backflow Locations are Shown on Plans			
12a	Provide approved back flow preventer (BFP) at the water service connection(s) to each building and at interconnections to fire suppression systems and other non-potable water systems. For buildings with only a single water supply, provide two parallel BFPs sized for full flow with necessary bypass valving.			
13	Consultant to verify site investigations for tie-in locations have been completed and confirmed.			
SECTION 23 - HVAC				
14	Equipment Sized, Selected and Scheduled			
14a	Design Environment shall meet ASHRAE Standards for all different space types on Campus. Discuss project particulars with USask Mechanical Engineer. a. Refer specifically to ASHRAE Handbook – HVAC Applications (current edition) for general temperature and humidity ranges to be followed. For spaces not represented in the Table, Discuss requirements with USask Mechanical Engineer. b. Ventilation requirements, both fresh air and exhaust air, shall meet ASHRAE Standard 62.1 (current edition). Control systems shall be utilized to use demand ventilation strategies wherever possible. c. Noise requirements shall meet ASHRAE Handbook – HVAC Applications (current edition).			
14b	All new ducting systems shall be low velocity, low pressure unless written approval is provided by USask Mechanical Engineer.			
14c	Temperatures in equipment rooms shall be maintained at a reasonable level; any excess heat should be reclaimed for use elsewhere whenever possible.			
14d	The central chilled water system is in operation during the months May to September only. The characteristics of the central chilled water system at the Building are as follows: a. Chilled water supply temperature: ~8.0oC. b. Temperature rise between supply and return: 6.7oC. c. Flow of chilled water per ton of cooling load: 0.126 l/s. d. Minimum differential head at site, to be determined in consultation with USask Mechanical Engineer.			
14e	Steam delivery pressure to the Building will be approximately 952 kPa (138 psig). Piping, fittings, etc., on the high pressure side of the pressure reducing station are to be selected for 2068 kPa (300 psig) service.			
14f	All terminal units shall be equipped with reheat coils.			
15	Piping shown on plans, sized for loads.			
15a	Where systems are demolished, remove unused lines back to main.			
15b	Control valves, vents, isolation valves, etc., shall be located above accessible ceilings over unoccupied spaces where possible.			
15c	Provide isolation valves on each main branch.			
16	Steam and Chilled water metering located and sized			
17	Terminal Equipment Located on Drawings and Sized			
17a	Use unit heaters at large door entries to replace lost heat quickly. Force flows shall be used in vestibules or at any public entrance to a building. Force flows shall not be installed in ceiling.			
17b	Air curtains shall not be used, unless expressly approved by USask Mechanical Engineer.			
18	Main Ducting Runs Located on plans and Sized			
18a	Designate air quantities in main ducts, etc. Specify balancing dampers in all duct run-outs in supply, return and exhaust systems.			

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19	Branch Ducting to Terminal Units Located on Plans and Sized			
20	Schedules are on Drawings and Populated			
20a	As the design of a Project nears completion and all pieces of equipment have been selected, the Consultant shall consult with USask Engineers for guidance on the nomenclature and numbering system to be used in scheduling equipment.			
20b	Heating to critical infrastructure shall be maintained in the event of a power failure.			
21	Sections and Elevation Views are on Drawings			
22	Consultant to verify site investigations for tie-in locations have been completed and confirmed.			
SECTION 25 - CONTROLS				
23	Thermostat/sensor locations shown on plans			
24	Sequences of Operation are Included on Drawings or in Specifications for Review.			
25	Controls Schedules are included and populated on Drawings.			
SPECIFICATIONS				
26	Full Table of Contents Provided			
27	Specialty Items Specifications Complete			
28	Base Specifications Included for Review			
ENERGY MODEL				
29	Preliminary Energy Model submitted for review.			