

Laboratory Benchmarking Tool



Laboratory Benchmarking Tool: Data Fields

This document lists of all the current Laboratory Benchmarking Tool (LBT) data entry fields, with notes on units of measurement, allowed ranges, available field options, and a copy of the LBT help text, as applicable for each field. Required fields (which must be provided for each building) are shown in **red text**. Fields appearing in the Operational Practices Module are shown in **blue text**. The list is intended for use by owners preparing to enter their building data in the LBT.

Please contact lbt@i2sl.org with any questions on this document or on the LBT.

Field Name	Units	Allowed Values	Help Text
Facility Name	-	-	Give your building a name you'll recognize.
Year Built	-	1600 - current year + 5	
Building Status	-	Existing, In Design, Test Data	Indicate whether this is a real building (existing or in design), or just test data. We want to keep fake buildings out of the peer group dataset!
Address (Street & City)	-	-	Format however is most useful to you; specific street addresses are not checked by the tool.
State	-	Dropdown menu of states	US states only.
Zip Code	-	-	Enter 5-digit zip code (US only).
Organization Type	-	Academic: Higher Ed Academic: K-12 Government: Federal Government: State and Local Commercial: Biotech Commercial: Pharmaceutical Commercial: Electronics Commercial: Chemical / Oil & Gas Commercial: Consumer Goods Commercial: All Others Healthcare Other Or Combination	Choose the option that most closely matches the type of organization that occupies the building.
Predominant Lab Use Type	-	R&D: Basic Research R&D: Product Development Process Development / Pilot Plant Manufacturing Teaching Testing / Quality Control Crime Lab / Forensic Other Unknown	Choose the option that most closely represents the type of work done in the building's labs.
Total Number of Occupants	#	0-10000	The total number of occupants present during normal operations.
Occupied Hours per Week	hrs/wk	1-168	The total number of hours per week that the building is occupied at normal levels. This does not include occasional overnight occupancy.



Field Name	Units	Allowed Values	Help Text	
Number of (Lab) Buildings	#	1-100	This is normally 1. If you are entering data for a group of buildings together (not typical), enter number of buildings in group.	
Gross Floor Area	sf	500-7000000	Include total floor area of building (aka gross square footage) but exclude area of open spaces such as parking garages, guard shacks, etc.	
Net Floor Area	sf	500-7000000 (and < gross area)	Net assignable space only, i.e., excludes circulation spaces, restrooms, utility spaces, mechanical rooms etc. This is an optional field. Net area must be less than gross area.	
Total Lab Area	sf	500-7000000 (and < gross area)	Lab area is generally speaking the total area of spaces in the building requiring 100% outside air for ventilation, including open labs and support spaces such as equipment rooms, procedure rooms, etc. It also includes physics labs, maker spaces, and cleanrooms, which may include recirculated air. It does not include language labs, computer labs, or other similar non-lab spaces. Lab area is less than total building area!	
Component Lab Areas				
Lab Area	Biology	sf	Total equal to total lab sf	Biological labs are used for biology and life sciences, including medical research. They may have fume hoods and biosafety cabinets. They also tend to have thermal environments (e.g., cold rooms, warm rooms) and equipment rooms.
	Chemistry	sf		Chemistry labs are used for organic, inorganic, physical and analytical chemistry. They are typically fume hood intensive.
	Physics / Engineering	sf		Physics/engineering labs are typically "dry" labs. They tend to have high plug loads and may include clean spaces, laser tables, etc.
	Vivarium	sf		Vivarium spaces are used for animal housing. Animal procedure rooms and vivarium support spaces should be included in vivarium area.
	Maker / Workshop Area	sf		Maker/workshop spaces are typically not highly controlled environments but may include machine shops and industrial art spaces.
	Other Lab Type (Not Listed)	sf		Use this for types of lab space not covered by any of the above categories.
Specialty Lab Types				
Biosafety Laboratory (BSL3/BSL4) Area	sf	Area < total lab sf	The total area of BSL3/BSL4 areas in the building. Please also include this area in the total lab areas by type above.	
Cleanroom (ISO5 / Class 100) Area	sf	Area < total lab sf	The total area of ISO 5 / Class 100 clean rooms in the building. Please also include this area in the total lab areas by type above.	
Cleanroom (ISO6 / Class 1000) Area	sf	Area < total lab sf	The total area of ISO 6 / Class 1000 clean rooms in the building. Please also include this area in the total lab areas by type above.	
Cleanroom (ISO7 / Class 10000) Area	sf	Area < total lab sf	The total area of ISO 7 / Class 10000 clean rooms in the building. Please also include this area in the total lab areas by type above.	
Number of ULT Freezers	#	0-1000	Enter total number of ultra-low temperature (-80C) freezers here. ULT freezers may be in freezer farms or in lab spaces. Tool accepts values up to 1000.	
Major Imaging Equipment (MRIs, PETs)	-	Yes, No	Indicate whether the building includes major imaging equipment such as MRIs and PETs.	



Field Name	Units	Allowed Values	Help Text
Predominant HVAC System Type	-	Constant Volume with Reheat Variable Volume with Reheat Dedicated Outdoor Air System with Chilled Beams Dedicated Outdoor Air System with Fan Coil Units Displacement ventilation Dual-duct Constant Volume Dual-duct Variable Volume Multi-zone Other Unknown	Select the best match to the HVAC system type serving the building's lab spaces.
Predominant HVAC Control Type	-	Pneumatic Direct Digital Control Mixture of Pneumatic and DDC Other Unknown	Select the best match to the HVAC control system type serving the building's lab spaces. Note: this question is about the type of control, not the type of mechanical actuation used by the control system. If the controls are digital and the actuators are pneumatic, the correct answer is DDC.
Predominant Cooling System Type	-	District cooling / CHW from campus central plant Chiller plant in building: air cooled Chiller plant in building: water cooled DX cooling Other Unknown	Select the best match to the cooling system serving the building's lab spaces.
Predominant Heating System Type	-	District heating / HW or steam from campus central plant Boiler plant in building: steam Boiler plant in building: non-condensing HW boilers Boiler plant in building: condensing HW boilers Heat pump heating Other Unknown	Select the best match to the heating system serving the building's lab spaces.
Exhaust Air Energy Recovery	-	None Glycol run-around High-performance glycol run-around Enthalpy wheel or plate Heat pipe Other Unknown	Select the best match for the type of exhaust air energy recovery system (if any) serving the building's lab spaces.
Building-Level CHP?	-	Cogen (electricity and heating) Trigen (electricity, heating, and cooling) Other None Unknown	Indicate whether building is equipped with an on-site combined heat and power system. Do not include campus central plants in this answer.
Renewable Energy Generation at Building?	-	Solar PV Solar Hot Water Wind Turbine None Other Unknown	Indicate whether the building is equipped with any on-site renewable energy generation. Do not include campus-wide or off-site renewables.
Geothermal Heat Pump?	-	Yes, No	Indicate whether building is served by geothermal (ground-source) heat pumps.
Heat Recovery Chiller?	-	Yes, No	Indicate whether the building is equipped with a heat recovery chiller providing chilled water and hot water.
Data Center kW	kW	0-10000	If the building has a significant data center electrical load, enter approximate load here.

Building Systems

Field Name	Units	Allowed Values	Help Text
Fume Hoods and Ventilation Rates			
Number of Ducted Fume Hoods	#	0-1000	Total number of ducted fume hoods in the facility. Ducted fume hoods are connected to the building exhaust system.
Number of Filtering Fume Hoods	#	0-1000	Total number of filtering fume hoods in the facility. Filtering fume hoods contain fans and filters to extract chemical contaminants from hood air. This count does not include biosafety cabinets.
Total Linear ft of Fume Hoods	ft	0-10000	The total length of fume hoods (ducted and filtering) in the building.
Fume Hood Operating Sash Height	in	6-30	Predominant design sash height for fume hoods in the building.
Fume Hood Face Velocity	fpm	20-200	Design hood face velocity under occupied conditions. Normally between 60 and 100 fpm. If not, please select N. Leave blank only if you do not know the answer.
Predominant Fume Hood Control Type	-	Constant Volume Variable Volume Other Unknown	Choose the option that most closely matches the predominant fume hood control type in the building.
Automatic Sash Closers	-	Yes, No	Select Y if ANY automatic sash closers are in use at this building. If not, please select N. Leave blank only if you do not know the answer.
Hood Face Velocity Setback	-	Yes, No	Select Y if ANY hoods in the building are equipped with occupancy-based hood face velocity setback controls. If not, please select N. Leave blank only if you do not know the answer.
Filtering Fume Hoods	-	Yes, No	Select Y if ANY filtering fume hoods are in use in the building. If not, please select N. Leave blank only if you do not know the answer.
High-Performance Hoods	-	Yes, No	Select Y if ANY hoods in the building are high-performance hoods (operating at 80 fpm or lower). If not, please select N. Leave blank only if you do not know the answer.
Lab Ventilation Management Program (LVMP) in Place	-	Yes No No, but an LVMP is in development	Is a lab ventilation management program in place at this building? If not, please select N ((or In Development, if applicable). Leave blank only if you do not know the answer.
Laboratory Occupied Minimum Air Change Rate	ACH	0.1-50	The predominant minimum ventilation rate assigned to occupied labs in the building. Normally determined in coordination with EH&S department.
Laboratory Unoccupied Minimum Air Change Rate	ACH	0.1-50	The predominant minimum ventilation rate assigned to unoccupied labs in the building. Normally determined in coordination with EH&S.
Source of Lab Minimum Ventilation Rates	-	Organizational Policy Building Code Requirements Used Hazard Assessment Driven By Fume Hoods Other Unknown	How were lab minimum ventilation rates assigned at this building. Please choose the option that matches the predominant method used for this building.
Building Controls Features			
Supply Air Temperature Reset	-	Yes, No	Supply air temperature reset (demand or outside temperature based) for air handling systems serving labs.
Static Pressure Reset - Supply Air	-	Yes, No	Demand-based duct static pressure setpoint reset controls for supply air handling systems serving labs.
Static Pressure Reset - Exhaust Air	-	Yes, No	Demand-based duct static pressure setpoint reset controls for exhaust air handling systems serving labs.
Unoccupied Airflow Setback in Labs	-	Yes, No	Reduced minimum airflow setpoints for lab spaces during unoccupied periods. May include an occupancy override via sensor or override button. If not present, please select N. Leave blank only if you do not know the answer.
Unoccupied Temp Setback in Labs	-	Yes, No	Widened room temperature deadband for lab spaces during unoccupied periods. May include an occupancy override via sensor or override button. If not present, please select N. Leave blank only if you do not know the answer.
Pump Head Reset	-	Yes, No	Demand-based reset of hydronic loop differential pressure setpoint.
Exhaust Fan - Wind Speed Response	-	Yes, No	Reset of minimum exhaust stack velocity based on actual (live) measured wind conditions.
Chemical Sensing and Airflow Response in Labs	-	Yes, No	Reset of lab minimum airflow rates based on actual (live) measured air quality.
Other Design Features			
Low Pressure Drop Design - Air Side	-	Yes, No	-
Low Pressure Drop Design - Water Side	-	Yes, No	-
Exhaust Dispersion Analysis Used	-	Yes, No	Select Y if an exhaust dispersion analysis (wind tunnel or CFD) was used to set exhaust fan control parameters. If not, please select N. Leave blank only if you do not know the answer.
True VAV Exhaust (No Bypass Air)	-	Yes, No	-
Cascade Air Use	-	Yes, No	-
Water-Cooled Lab Equipment	-	Yes, No	-
High-Efficiency ULT Freezers	-	Yes, No	-
Cooling Plant Capacity	tons	0-1000000	Total cooling capacity (in tons) of any cooling plant equipment (chillers and any DX rooftop AHUs) installed in the building.
Installed Lighting W/sf in Labs	W/sf	0.1-10	Average lighting power density (in watts per sf) of lighting installed in lab spaces in the building. Often available from code compliance forms and/or lighting design documentation; may also be estimated based on installed fixtures.



Field Name	Units	Allowed Values	Help Text
Building Energy Manager	-	Yes, No	Does this building have an energy manager? If so, please select Y. If not, please select N. Leave blank only if you do not know the answer.
Building Energy Efficiency Policy/Targets	-	Yes, No	Does this building have an energy efficiency and/or sustainability policy with specific goals and targets? If so, please select Y. If not, please select N. Leave blank only if you do not know the answer.
Automatic Fault Detection and Diagnostics	-	Yes, No	Examples: SkySpark, Clockworks. If so, please select Y. If not, please select N. Leave blank only if you do not know the answer.
Three Biggest Barriers to Efficiency	-	Can't interrupt research Lack of funding Safety concerns Lack of information on options Staff bandwidth Building not high priority Already very efficient Labs won't be used long-term Other Unknown	What are the 3 biggest barriers to increased efficiency/sustainability at this building? Please select 3 options (in any order) from the list provided.
Occupant Engagement			
Active Occupant Engagement (Green Labs) Program	-	Yes, in most labs at the building (>75%) Yes, in some labs in the building (25-75%) Yes, but not widespread (<25%) No	Is an occupant engagement (green labs) program active at this building?
If yes, please indicate which of the following occupant program components are in place:			
Fume Hood Sash Management	-	Yes, No	If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.
Switching Off Unused Lab Equipment	-	Yes, No	If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.
Resource Sharing	-	Yes, No	Example: freezer sharing. If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.
Procurement of Energy-Efficient Lab Equipment	-	Yes, No	Example: ENERGY STAR ULT freezers. If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.
Recycling / Landfill Diversion	-	Yes, No	If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.
Green Chemistry	-	Yes, No	If part of program, select Y. If not, please select N. Leave blank only if you do not know the answer.

Programs



Field Name	Units	Allowed Values	Help Text
Overall Utility Usage and Cost			
Data Year	-	2000-current year	Enter year for which utility data was gathered (tool accepts 2000 or later). Year should be same for all fuels. Calendar year data is preferred but not required.
Annual Electric Use	kWh	Warning issued if calculated Site EUI is outside of the range 20-3000 kBtu/sf/yr.	Must also indicate whether each value is measured (directly metered) or estimated (e.g. metering allocations where one meter serves multiple buildings).
Annual Natural Gas	therms, MMBtu, ccf		
Annual Fuel Oil	gal, MMBtu		
Annual Other Fuel	MMBtu		
Annual District Chilled Water	ton-hours, MMBtu		
Annual District Hot Water	MMBtu		
Annual District Steam	klbs, MMBtu		
Annual Total Energy Cost	\$	-	Total annual cost of above utilities, in U.S. dollars.
Water Usage	gal, ccf	-	Total potable water usage. Includes cooling tower water use where present. Must also indicate whether each value is measured (directly metered) or estimated (e.g. metering allocations where one meter serves multiple buildings).
Water/Sewer Cost	\$	-	Total water + sewer cost, in U.S. dollars.
System-Level Energy Usage and Related Data			
Overall Peak Electric Demand	kW	-	Maximum annual electrical demand. If data is available for multiple intervals, use 15-minute interval.
Process/Plug Annual Electric Usage	kWh	-	Electricity consumed by equipment plugged into electrical outlets (plus any other process equipment that consumes electricity) in the building. Data normally only available if end-use electrical submeters are installed.
Ventilation System Annual Elec Usage	kWh	-	Electricity consumed by ventilation equipment (i.e., fans) in the building. Data normally only available if end-use electrical submeters are installed.
Cooling Plant Annual Electric Usage	kWh	-	Electricity consumed by cooling plant equipment (chillers, pumps, cooling tower fans) in the building. Include energy consumed by AHU DX cooling systems if applicable and available. Data normally only available if end-use electrical submeters are installed.
Lighting Annual Electric Energy Usage	kWh	-	Electricity consumed by lighting systems in the building. Data normally only available if end-use electrical submeters are installed.
Annual On-Site Renewable Electricity Generated	kWh	-	Total amount of electricity generated by on-site renewables such as building-mounted solar photovoltaics or building-mounted wind turbines. This should only include renewables that reduce electric consumption recorded by the main electric meter for the building.
Process/Plug Peak Electric Demand	kW	-	Peak electric demand of equipment plugged into electrical outlets (plus any other process equipment that consumes electricity) in the building. Data normally only available if end-use electrical submeters are installed.
Ventilation System Peak Electrical Demand	kW	-	Peak electric demand of ventilation equipment (i.e., fans) in the building. Data normally only available if end-use electrical submeters are installed.
Cooling Plant Peak Electric Demand	kW	-	Peak electric demand of cooling plant equipment (chillers, pumps, cooling tower fans, and AHU DX cooling systems if applicable) in the building. Data normally only available if end-use electrical submeters are installed.
Lighting Peak Electric Demand	kW	-	Peak electric demand from lighting systems in the building. Data normally only available if end-use electrical submeters are installed.
Building Peak Airflow	cfm	-	Peak total building ventilation (outside) airflow, including air delivered to both lab and non-lab areas.
Peak Cooling Load	tons	-	Peak cooling load (measured in tons) from the building. This may be available from chiller plant historical data, or may be estimated based on experience with the building systems.

Utility Usage