TECHNICAL REPORT 2

CENTRAL HIGH SCHOOL MID-ATLANTIC REGION

ADAM BROWN

MECHANICAL OPTION

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Submitted 10/4/13

Contents

Executive Summary

This report will discuss the load and energy simulation analysis of Central High School. Heating, cooling, energy consumption and operating costs will be reported.

Trane TRACE 700, software recognized in industry as a leading energy modeling program, was used to calculate both loads and energy consumption of the building. Roughly 300 spaces were modeled that were then put into their respective zones serviced by 20 energy recovery units. Block calculations done by TRACE 700 yielded a total cooling load of 678 [tons] and 13147 [MBH] for heating loads which was found to vary greatly from the design engineers calculations.

Energy consumption for Central High School came out to be 878,111 [kWh] per year. An energy model was run by a previous MEP team but could not be obtained for comparison.

The emissions report from TRACE 700 shows that Central High School puts out CO2 at 1,174,596 lbm/year, SO2 at 10,577 gm/year, and NOX at 2,204 gm/year.

Building Overview

Building Description

Central High School is a newly renovated high school located in the Mid-Atlantic region. At roughly 320,000 square feet it is an impressive state of the art school with two levels the top one being the addition. The building has food and science labs, classrooms, offices, gyms and an auditorium to serve the learning needs of the occupants. It is expected to be completed by February 2015.

Mechanical System Overview

Twenty energy recovery units are located throughout the building that delivers outdoor air to fan coil units with recirculated air serving the zones. Along with that, two air cooled chillers and boiler serve the energy recovery units and fan coil units.

Occupant and Project Team

Owner: Confidential

Construction Manager: Jacobs http://jacobs.com/

Architect: SHW Group, LLP http://www.shwgroup.com/

Structural Engineer: Adtek Engineers, INC. http://www.adtekengineers.com/

Mechanical and Electrical Engineers: SHW Group, LLP http://www.shwgroup.com/

Civil Engineers: Bowman Consulting http://www.bowmanconsulting.com/

Kitchen Consultant: Nyikos Associates http://nyikosassociates.com/

Acoustical and Technology: Polysonics Corporation http://www.polysonics-corp.com/

Load Calculation Procedure

To model the load and energy costs of the building, Trane TRACE 700 was the HVAC program used for this report. In order to create an accurate model, information was taken from specifications, mechanical floor plans and schedules. Assumptions were made to complete the model and will be stated later in this report.

Design Conditions

Central High School is a high school located in the Mid-Atlantic region. Baltimore, Maryland is the closet area to the building site found in the Weather Library in TRACE 700. Default settings for the thermostats were typical of the Baltimore, Maryland region.

Model Design

There are twenty zones throughout the building and within each one there are different occupancies, equipment and envelope loads to take into account. Central High School has eleven varieties of rooms and therefore eleven templates were created for these general spaces. The eleven templates are: Auditorium, Bathroom, Cafeteria, Classroom, Conference Room, Gymnasium, Hallway, Laboratory, Library, Office, and Reception. Outdoor air ventilation rates from the design specifications were used in place of ASHRAE Standard 62.1 rates. To further develop the model individual occupancies were used that were found in the design specifications. Exact areas of the rooms, ceiling heights and how much glass were included for each space. Directions of the walls were also included along with the entire direction of the building which is roughly 30 degrees from North.

Load Assumptions

Certain rooms did not fit under the templates made such as kitchens which were put under the cafeteria template. Lighting load information was not provided therefore basic ASHRAE Standard 90.1 design lighting densities were used. Standard school equipment was picked as the miscellaneous electrical loads on the building. Figure 1 shows the Construction Template used for each room template. An infiltration rate of 0.3 cfm/square foot (sf) of wall was inputted for a more accurate construction design. Schedules were selected from the TRACE 700 library and inputted into internal loads, airflows and thermostats.

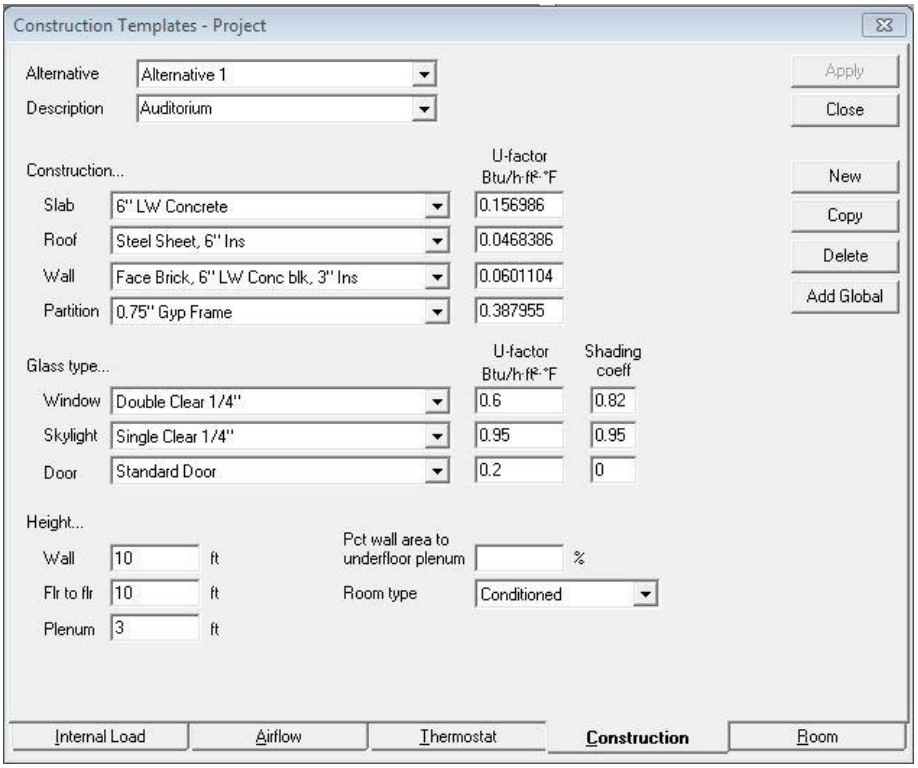


Figure 1 – Construction Template

Calculated vs. Design Load Analysis

An energy model was performed by a previous MEP team assigned to this project but could not be obtained, so the values shown in Table 1, under Design, were used. These values were acquired from the schedules listed in Appendix A, Figure 7. Table 1 gives the design calculations versus the model outputs. Note that there are varying degrees of differences between the design and the model. Discrepancies can be accounted for by how the systems and plants were modeled along with data inputted for construction types and infiltration rates. Heating loads were not as close as the cooling loads since there is a variance of 900 MBH compared to 173 ton difference among the two models . These of course would affect how the cooling square foot per ton and heating Btuh per square foot were calculated. The supply airflows from the model yielded almost twice the amount of cfm/sf versus the calculated design. More cooling and heating affected the amount of supply air to deal with the load in the space. Ventilation rates had little difference between the design and model. Differences in areas for spaces could be accounted for in the difference between the two rates.

	Design	Model
Cooling [tons]	505	678
Heating [MBH]	11289	13147
Cooling [sf/ton]	634	472
Heating [Btuh/sf]	35	41
Supply [cfm/sf]	0.51	1.22
Ventilation [cfm/sf]	0.48	0.41

Figure 2 – Design Calculations vs. Model Outputs

Energy Calculation and Operating Cost

Energy Consumption

The TRACE 700 report of energy consumption for Central High School is below in Figure 3. Electricity is the primary source of energy to the building with Natural Gas as the secondary source. Natural gas is used by the primary boiler in the mechanical room for the entire building as electricity powers the air cooled chillers. Consumption of electricity peaks in May which makes sense since much of the mechanical equipment including chillers are running. Even though in May there isn't the largest on peak demand the chillers still consume the most amount of energy at this time. Natural gas usage peaks in January and is not used in the summer months for the use of heating the zones.

MONTHLY ENERGY CONSUMPTION

By ACADEMIC

------- Monthly Energy Consumption -------

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Alternative: 1	**Central High School**												
Electric													
On-Pk Cons. (kWh)	63,134	56,815	69,836	69,075	101,159	65,924	74,500	71,221	99,198	75,626	69,947	61,678	878,111
On-Pk Demand (kW)	421	414	496	558	790	1,010	1,099	1,003	869	614	556	434	1,099
Off-Pk Demand (kW)	63	63	63	54	54	54	54	54	54	54	54	63	63
Mid-Pk Demand (kW)	330	330	339	397	649	839	975	894	711	456	384	339	975
Gas													
On-Pk Cons. (therms)	488	459	132	0	0	0	0	0	0	5	14	223	1,321
Off-Pk Cons. (therms)	570	499	42	0	0	0	0	0	0	0	30	298	1,440
Mid-Pk Cons. (therms)	3,008	2,644	2,172	969	1	0	0	0	2	1,345	1,726	2,308	14,176
On-Pk Demand (therms/hr)	18	18	7	0	0	0	0	0	0	1	2	12	18
Off-Pk Demand (therms/hr)	5	5	1	0	0	0	0	0	0	0	1	2	5
Mid-Pk Demand (therms/hr)	68	68	54	39	2	0	0	0	0	44	51	62	68

Energy Consumption		
Building	18,759	Btu/(ft2-year)
Source	43,092	Btu/(ft2-year)
Floor Area	250,039	ft2

Environmental Impact Analysis	
CO2	1,174,596 lbm/year
SO2	10,577 gm/year
NOX	2,024 gm/year

Figure 3 – Monthly Energy Consumption

Energy Inputs

No energy model could be provided by the original MEP team on the project. TRACE 700 template schedules were used as models for when equipment would be turned on/off were selected. Also occupancy times for schools were chosen using the occupancy templates. Fuel costs were taken to be baseline costs from TRACE 700 library of energy costs. All air and water flow rates along with equipment performances were taken from the equipment schedules.

Annual Operation Costs

Figure 4 and Figure 5 are monthly breakdowns for the end uses of heating, cooling, lighting, and miscellaneous loads. July has the highest month of end use by equipment at about $11,257. Utility cost per square area is $0.27 per square foot.

MONTHLY UTILITY COSTS

By ACADEMIC

					------- Monthly Utility Costs -------								
Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Alternative 1													
Electric													
On-Pk Demand ($)	4,211	4,143	4,960	5,575	7,900	10,103	10,995	10,028	8,694	6,142	5,563	4,339	82,652
Off-Pk Demand ($)	314	314	314	272	272	272	272	272	272	272	272	314	3,435
Total ($):	4,525	4,457	5,274	5,847	8,172	10,375	11,267	10,300	8,966	6,414	5,836	4,653	86,086
Gas													
On-Pk Cons. ($)	244	230	66	0	0	0	0	0	0	3	7	111	660
Off-Pk Cons. ($)	285	250	21	0	0	0	0	0	0	0	15	149	720
Total ($):	529	479	87	0	0	0	0	0	0	3	22	260	1,380
Monthly Total ($):	5,054	4,936	5,361	5,847	8,172	10,375	11,267	10,300	8,966	6,417	5,858	4,913	87,467

Building Area = 320,000 ft²

Utility Cost Per Area = 0.27 $/ft²

Figure 4 – Monthly Utility Costs

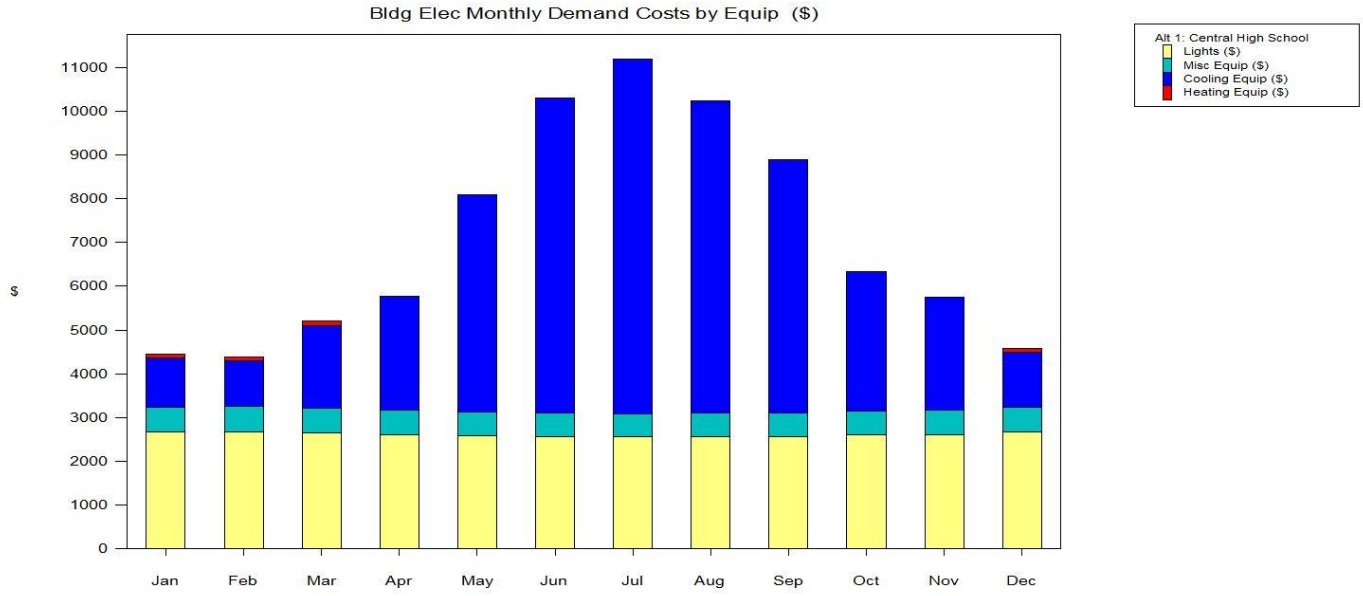


Figure 5 – Monthly End Use Cost

Emissions

Figure 6 gives the yearly environmental impact the building has on the environment. These output values were taken from the energy model done in TRACE 700. The condensing boiler is the primary pollutant of the building and attributes to most of these gases.

Environmental Impact Analysis	
CO2	1,174,596 lbm/year
SO2	10,577 gm/year
NOX	2,024 gm/year

Figure 6 – Yearly Environmental Impact

Summary

A load and energy simulation was performed for Central High School with the goal of finding loads, energy consumption and emissions. Inputs and assumptions for some of those inputs were included in this report. Discrepancies exist between calculations from the mechanical engineer and this TRACE 700 model.

All values were compared to calculations in the specifications and drawings done by the mechanical engineer. Therefore the assumptions made for the TRACE 700 model affected the outputs. Yet these outputs weren't too far off from the calculated values showing that the model was within a close range of accuracy.

The emissions report shows that there is room for improvement on the entire building system when it comes to polluting the environment. This will have a huge impact on how the re-designed system must perform with a goal to lower these emissions. To do so reducing energy consumption from natural gas and electricity will reduce emissions from the mechanical equipment.

References

SHW Group LLP "Final Bid Set". Reston, Virginia.

Central High School "Master Specifications".

ASHRAE. Standard 62.1-2010, Ventilation for Acceptable Indoor Air Quality. Atlanta, GA. American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

ASHRAE. Standard 90.1-2010, Energy Standards for Buildings Except Low-Rise Residential Buildings. Atlanta, GA. American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

Appendix A

Energy recovery unit schedule.

ENERGY RECOVERY UNIT SCHEDULE

SYMBOL	DESIGN OUTSIDE ENT. AIR TEMP.		DESIGN EXHAUST ENT. AIR TEMP.		WHEEL LAT AT DESIGN		SUPPLY FAN				EXHAUST FAN			ER WHEEL
	SUMMER D.B./W.B.	WINTER D.B.	SUMMER D.B./W.B.	WINTER D.B.	SUMMER D.B./W.B.	WINTER D.B.	DESIGN CFM	OA CFM	E.S.P.	H P	DESIGN CFM	E.S.P.	H P	H P
ERU-1	91°F/76°F	11°F	76°F/67°F	70°F	79°F/67°F	55°F	12,100	11,780	1.3"	7.5	10,800	0.8"	3 (x2)	1/20
ERU-2A/B					80°F/67°F	49°F	1,700	1,700	1.3"	2	1,650	0.8"	1.5	
ERU-3					79°F/66°F	57°F	6,990	6,990	1.3"	5	6,790	0.8"	5	
ERU-4					79°F/66°F	57°F	1,655	1,655	1.3"	2	1,580	0.8"	1	
ERU-5					79°F/67°F	54°F	6,000	3,500	1.3"	7.5	3,500	0.8"	7.5	
ERU-6					78°F/65°F	58°F	1,535	1,535	1.3"	2	1,515	0.8"	1	
ERU-7					80°F/67°F	55°F	20,393	20,130	1.3"	40	20,130	0.8"	25	1/2
ERU-8					80°F/67°F	55°F	28,655	28,360	1.3"	60	28,360	0.8"	40	1/2
ERU-9					78°F/65°F	54°F	5,570	5,570	1.3"	7.5	5,345	0.8"	5	1/20
ERU-10					78°F/65°F	54°F	4,700	4,700	1.3"	7.5	3,400	0.8"	5	1/20
ERU-11					79°F/66°F	54°F	8,480	4,500	1.3"	10	4,500	0.8"	7.5	
ERU-12					79°F/66°F	53°F	10,700	10,700	1.3"	15	10,700	0.8"	10	
ERU-13					79°F/66°F	53°F	10,700	10,700	1.3"	15	10,700	0.8"	10	
ERU-14					79°F/66°F	53°F	2,295	2,295	1.3"	2	2,175	0.8"	1	
ERU-15					80°F/67°F	53°F	10,660	10,660	1.3"	15	10,660	0.8"	10	
ERU-16					79°F/66°F	55°F	4,420	2,170	1.3"	5	2,170	0.8"	5	
ERU-17					79°F/67°F	54°F	4,050	4,050	1.3"	5	3,830	0.8"	3	
ERU-18					79°F/67°F	52°F	9,480	9,480	1.3"	15	9,000	0.8"	7.5	
ERU-19					79°F/67°F	52°F	9,480	9,480	1.3"	15	9,000	0.8"	7.5	
ERU-20					79°F/67°F	54°F	2,925	2,925	1.3"	3	2,475	0.8"	1.5	

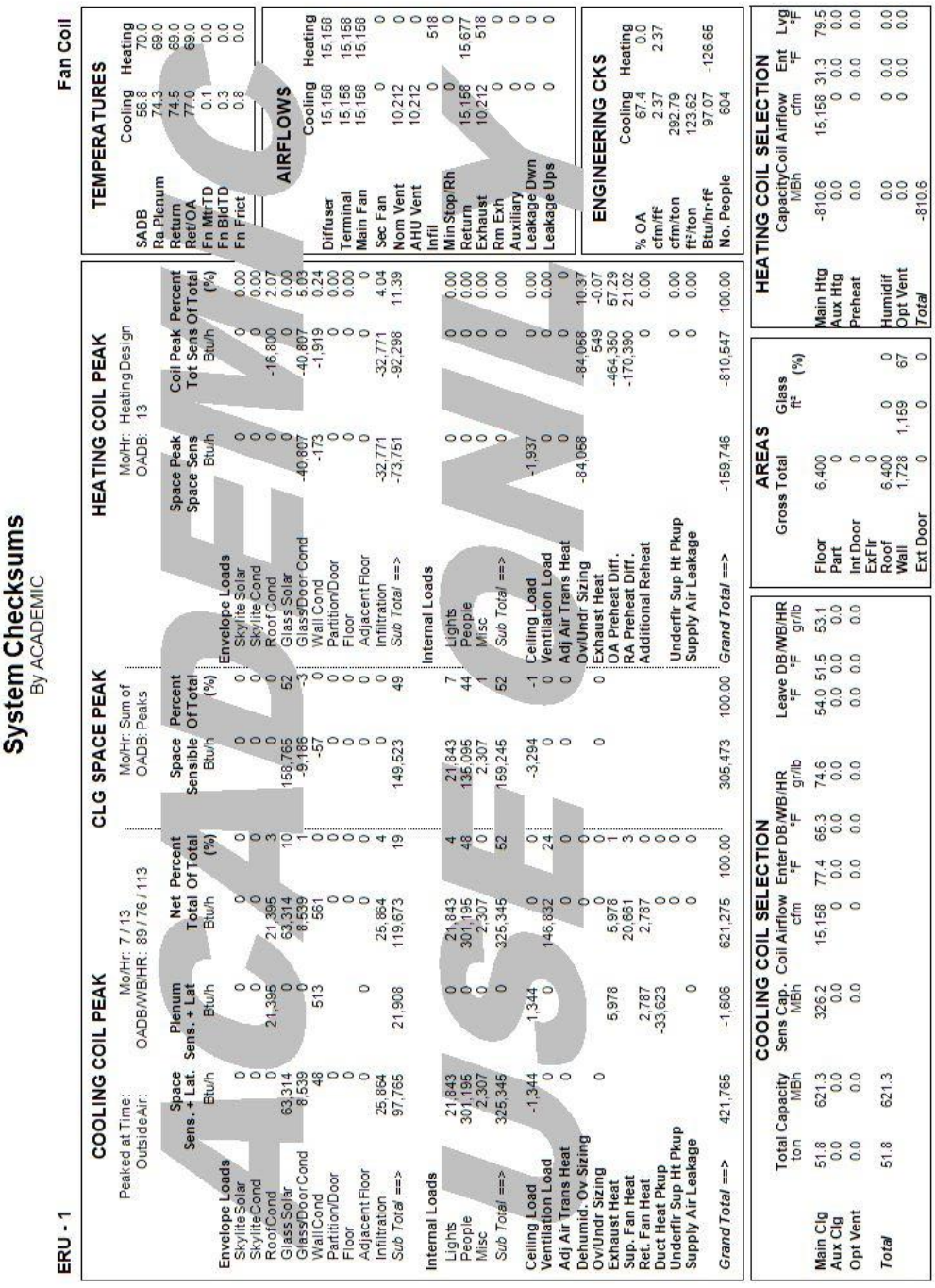
SYMBOL	COOLING COIL					HEATPIPE REHEAT		PREHEAT HEATING COIL				REHEAT HEATING COIL			
	TOTAL MBH	SENSIBLE MBH	LAT DB/WB	EWT	LWT	ROWS	LAT DB/WB	TOTAL MBH	LAT DB	EWT	LWT	TOTAL MBH	LAT DB	EWT	LWT
ERU-1	484.3	395.6	55°F/54°F	44°F	54°F	–	–	–	–	–	–	609.9	95°F	180°F	157°F
ERU-2A/B	65.1	45.5	55°F/54°F		54°F	–	–	–	–	–	–	66.7	95°F		155°F
ERU-3	166.6	151.0	55°F/54°F		54°F	3	66°F/59°F	–	–	–	–	313.5	98°F		158°F
ERU-4	40.5	36.2	55°F/54°F		54°F	3	66°F/59°F	–	–	–	–	86.5	99°F		158°F
ERU-5	222.9	158.2	55°F/54°F		54°F	–	–	–	–	–	–	329.3	104°F		152°F
ERU-6	40.5	36.2	55°F/54°F		54°F	3	66°F/59°F	–	–	–	–	86.5	99°F		158°F
ERU-7	840.7	574.4	55°F/54°F		54°F	4	66°F/58°F	1,535	70°F	180°F	160°F	339.1	70°F		150°F
ERU-8	1,160.0	799.6	55°F/54°F		54°F	4	66°F/58°F	2,263	70°F	180°F	150°F	480.7	70°F		150°F
ERU-9	196.5	145.0	55°F/54°F		54°F	4	65°F/58°F	573.5	95°F	180°F	160°F	63.4	65°F		150°F
ERU-10	171.0	125.1	55°F/54°F		54°F	4	65°F/58°F	573.5	95°F	180°F	150°F	57.7	65°F		150°F
ERU-11	333.3	233.2	55°F/54°F		54°F	–	–	–	–	–	–	336.5	95°F		155°F
ERU-12	395.0	273.5	55°F/54°F		54°F	–	–	–	–	–	–	590.6	107°F		155°F
ERU-13	395.0	273.5	55°F/54°F		54°F	–	–	–	–	–	–	590.6	107°F		155°F
ERU-14	50.7	43.6	55°F/54°F		54°F	3	66°F/59°F	–	–	–	–	97.3	96°F		160°F
ERU-15	395.0	273.5	55°F/54°F		54°F	–	–	–	–	–	–	590.6	107°F		155°F
ERU-16	154.4	112.6	55°F/54°F		54°F	–	–	–	–	–	–	244.1	105°F		155°F
ERU-17	110.4	95.6	55°F/54°F		54°F	3	64°F/58°F	–	–	–	–	178.1	95°F		160°F
ERU-18	385.4	263.1	55°F/54°F		54°F	–	–	–	–	–	–	576.1	108°F		155°F
ERU-19	385.4	263.1	55°F/54°F		54°F	–	–	–	–	–	–	576.1	108°F		155°F
ERU-20	71.1	56.3	55°F/54°F		54°F	3	66°F/59°F	–	–	–	–	131.6	95°F		160°F

BASIS OF DESIGN:
SEE SCHEDULE

WATER FLOW						BRANCH PIPING SIZE			UNIT ELECTRICAL DATA			MANUF.	MODEL	NOMINAL SIZE L" x W" x H"	MAX. OPERATING WEIGHT (LBS)	GENERAL LOCATION	SYMBOL
COOLING		PREHEAT		REHEAT													
GPM	WPD (PSI)	GPM	WPD (PSI)	GPM	WPD (PSI)	CLG	PREHEAT	REHEAT	MCA	MOP	VOLT/PHASE						
87.7	11.9'	–	–	54.1	13.1'	3"	–	2–1/2"	26.0	35	460V–3ø	GREENHECK	APEX–200H–30	289"x98"x98"	12,000	CAFETERIA – ROOFTOP UNIT	ERU–1
11.2	3.6'	–	–	7.2	1.0'	1–1/2"	–	1–1/4"	8.0	15	460V–3ø	GREENHECK	ERCH–20H–30	98"x56"x50"	1,800	STAGE – INDOOR UNIT	ERU–2A/B
32.4	1.1'	–	–	29.5	2.2'	2"	–	2"	18.5	25	460V–3ø	GREENHECK	ERT–74H–30	199"x97"x91"	9,800	EAST CLRM. ADDITION – INDOOR UNIT	ERU–3
8.2	0.5'	–	–	8.0	1.0'	1–1/4"	–	1–1/4"	7.2	15	460V–3ø	GREENHECK	ERT–52S–15	158"x69"x64"	4,500	CHILD DEV./CONF. – INDOOR UNIT	ERU–4
42.0	3.4'	–	–	24.0	3.2'	2–1/2"	–	2"	26.1	35	460V–3ø	GREENHECK	ERCH–55H–30	117"x76"x70"	4,500	MEDIA CENTER – INDOOR UNIT	ERU–5
8.2	0.5'	–	–	8.0	1.0'	1–1/4"	–	1–1/4"	7.2	15	460V–3ø	GREENHECK	ERT–52S–15	158"x69"x64"	4,500	MAIN LOBBY – ROOFTOP UNIT	ERU–6
152.2	9.5'	156.4	3.1'	22.4	1.0'	4"	4"	2"	105.2	175	460V–3ø	AIR ENTERPRISES	CUSTOM UNIT	368"x315"x122"	–	1ST FLOOR EXISTING CLASSROOM CORE	ERU–7
214.4	12.6'	147.1	9.5'	31.5	1.0'	4"	4"	2"	150.0	225	460V–3ø	AIR ENTERPRISES	CUSTOM UNIT	366"x315"x132"	–	2ND FLOOR EXISTING CLASSROOM CORE	ERU–8
37.7	14.2'	39.2	6.0'	11.5	1.0'	2–1/2"	2–1/2"	1–1/2"	27.8	35	460V–3ø	AIR ENTERPRISES	CUSTOM UNIT	252"x98"x77"	–	ADMIN./PART. CR. ADD. – INDOOR UNIT	ERU–9
31.8	10.5'	39.2	6.0'	10.5	1.0'	2"	2–1/2"	1–1/4"	27.8	35	460V–3ø	AIR ENTERPRISES	CUSTOM UNIT	252"x98"x77"	–	PART. CLRM. ADDITION – INDOOR UNIT	ERU–10
58.2	4.5'	–	–	37.7	3.3'	2–1/2"	–	2–1/2"	29.9	40	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	AUXILIARY GYM – INDOOR UNIT	ERU–11
71.9	6.5'	–	–	46.6	9.3'	3"	–	2–1/2"	41.6	60	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	NEW GYM – INDOOR UNIT	ERU–12
71.9	6.5'	–	–	46.6	9.3'	3"	–	2–1/2"	41.6	60	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	NEW GYM – INDOOR UNIT	ERU–13
10.2	0.5'	–	–	9.7	1.3'	1–1/4"	–	1–1/4"	7.2	15	460V–3ø	GREENHECK	ERT–52S–15	158"x69"x64"	4,500	GYM LOBBY/OFFICES – INDOOR UNIT	ERU–14
71.9	6.5'	–	–	46.6	9.3'	3"	–	2–1/2"	41.6	60	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	TEAM/LOCKER AREA – INDOOR UNIT	ERU–15
30.1	2.2'	–	–	19.6	2.4'	2"	–	2"	17.9	25	460V–3ø	GREENHECK	ERCH–45H–30	105"x65"x68"	3,500	FITNESS AREA – INDOOR UNIT	ERU–16
20.7	1.1'	–	–	18.4	2.2'	2"	–	2"	15.1	20	460V–3ø	GREENHECK	ERT–52H–30	158"x69"x64"	4,500	EXTERIOR MUSIC AREA – INDOOR UNIT	ERU–17
69.4	6.1'	–	–	45.2	8.8'	3"	–	2–1/2"	38.6	50	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	AUDITORIUM – INDOOR UNIT	ERU–18
69.4	6.1'	–	–	45.2	8.8'	3"	–	2–1/2"	38.6	50	460V–3ø	GREENHECK	ERCH–90H–30	130"x95"x85"	6,000	AUDITORIUM – INDOOR UNIT	ERU–19
14.4	0.5'	–	–	13.6	1.0'	1–1/2"	–	1–1/2"	9.8	15	460V–3ø	GREENHECK	ERT–52S–15	158"x69"x64"	4,500	INTERIOR MUSIC AREA – INDOOR UNIT	ERU–20

Appendix B

ERU-1 Checksum



System Checksums
By ACADEMIC

ERU - 1 — **Fan Coil**

COOLING COIL PEAK — Mo/Hr: 7 / 13 — OADB/WB/HR: 89 / 76 / 113

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	21,396	21,396	3
Glass Solar	63,314	0	63,314	10
Glass/Door Cond	8,539	0	8,539	1
Wall Cond	48	513	561	0
Partition/Door	0	0	0	0
Floor	0	0	0	0
Adjacent Floor	0	0	0	0
Infiltration	25,864	0	25,864	4
Sub Total ==>	97,765	21,908	119,673	19
Internal Loads				
Lights	21,843	0	21,843	4
People	301,195	0	301,195	48
Misc	2,307	0	2,307	0
Sub Total ==>	325,345	0	325,345	52
Ceiling Load	-1,344	1,344	0	0
Ventilation Load	0	0	146,832	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		5,978	5,978	1
Sup. Fan Heat			20,661	3
Ret. Fan Heat		2,787	2,787	0
Duct Heat Pkup		-33,623	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	421,785	-1,806	621,275	100.00

CLG SPACE PEAK — Mo/Hr: Sum of — OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	158,766	52
Glass/Door Cond	-9,186	-3
Wall Cond	-57	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	149,523	49
Internal Loads		
Lights	21,843	7
People	136,096	44
Misc	2,307	1
Sub Total ==>	159,245	52
Ceiling Load	-3,294	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		0
Ov/Undr Sizing		
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	305,473	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design — OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-16,800	2.07
Glass Solar	0	0	0.00
Glass/Door Cond	-40,807	-40,807	5.03
Wall Cond	-173	-1,919	0.24
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-32,771	-32,771	4.04
Sub Total ==>	-73,751	-92,298	11.39
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,937	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-84,058	-84,058	10.37
Exhaust Heat		549	-0.07
OA Preheat Diff.		-464,350	57.29
RA Preheat Diff.		-170,390	21.02
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-159,746	-810,547	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	70.0
Ra Plenum	74.3	69.0
Return	74.5	69.0
Ret/OA	77.0	69.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	15,158	15,158
Terminal	15,158	15,158
Main Fan	15,158	15,158
Sec Fan	0	0
Nom Vent	10,212	0
AHU Vent	10,212	0
Infil	0	518
Min Stop/Rh	0	0
Return	15,158	15,677
Exhaust	10,212	518
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	67.4	0.0
cfm/ft²	2.37	2.37
cfm/ton	292.79	
ft²/ton	123.62	
Btu/hr-ft²	97.07	-126.65
No. People	604	

COOLING COIL SELECTION

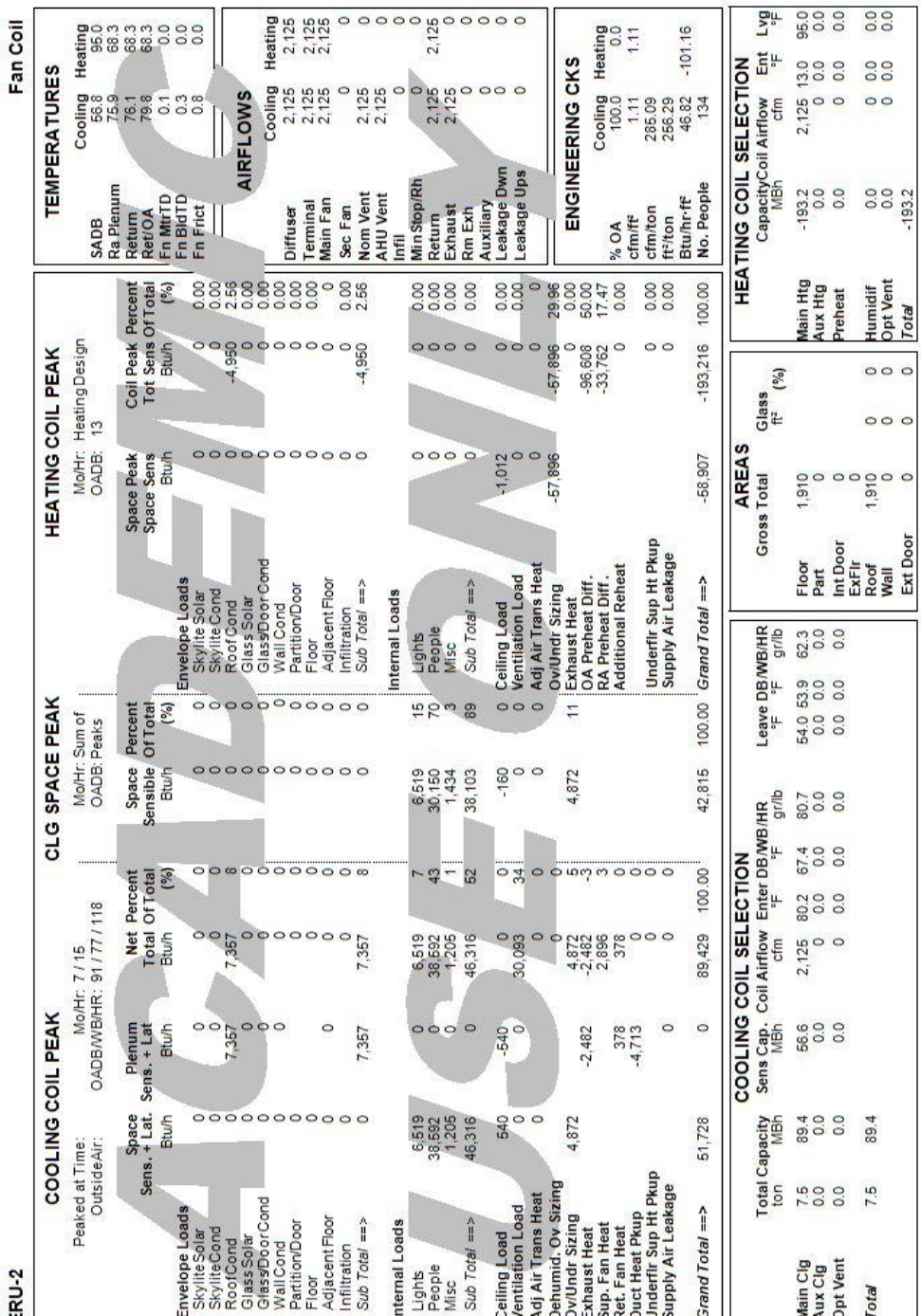
	Total Capacity ton	Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	°F	gr/lb	Leave DB/WB/HR °F	°F	gr/lb
Main Clg	51.8	621.3	326.2	15,158	77.4	65.3	74.6	54.0	51.5	53.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	51.8	621.3								

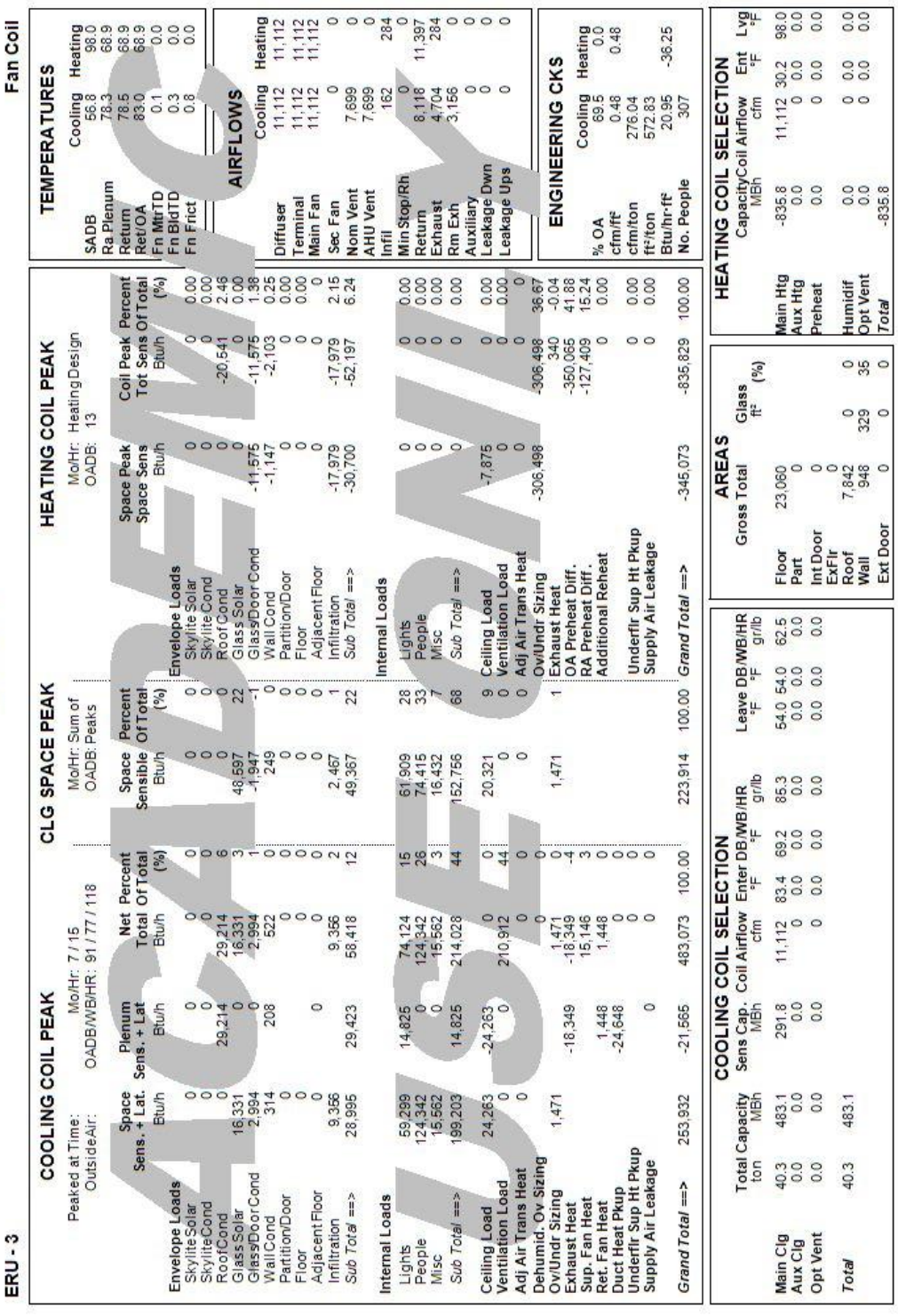
AREAS

	Gross Total	Glass ft²	(%)
Floor	6,400		
Part	0		
Int Door	0		
ExFlr	0		
Roof	6,400	0	0
Wall	1,728	1,159	67
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-810.6	15,158	31.3	79.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-810.6			


System Checksums
By ACADEMIC
ERU-2
Fan Coil
COOLING COIL PEAK
Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118
CLG SPACE PEAK
Mo/Hr: Sum of
OADB: Peaks
HEATING COIL PEAK
Mo/Hr: Heating Design
OADB: 13
TEMPERATURES
AIRFLOWS
ENGINEERING CKS
COOLING COIL SELECTION
AREAS
HEATING COIL SELECTION
ACADEMIC USE ONLY



System Checksums
By ACADEMIC

ERU - 3 — Fan Coil

COOLING COIL PEAK — Mo/Hr: 7 / 15 — OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
SkyliteCond	0	0	0	0
RoofCond	0	29,214	29,214	6
Glass Solar	16,331	0	16,331	3
Glass/DoorCond	2,994	0	2,994	1
Wall Cond	314	208	522	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	9,366		9,366	2
Sub Total ==>	28,995	29,423	58,418	12
Internal Loads				
Lights	59,299	14,825	74,124	15
People	124,342	0	124,342	26
Misc	15,562	0	15,562	3
Sub Total ==>	199,203	14,825	214,028	44
Ceiling Load	24,263	-24,263	0	0
Ventilation Load	0	0	210,912	44
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	1,471		1,471	0
Exhaust Heat		-18,349	-18,349	-4
Sup. Fan Heat			15,146	3
Ret. Fan Heat		1,448	1,448	0
Duct Heat Pkup		-24,648	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	253,932	-21,565	483,073	100.00

CLG SPACE PEAK — Mo/Hr: Sum of — OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
SkyliteCond	0	0
RoofCond	0	0
Glass Solar	48,597	22
Glass/DoorCond	-1,947	-1
Wall Cond	249	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	2,467	1
Sub Total ==>	49,367	22
Internal Loads		
Lights	61,909	28
People	74,415	33
Misc	16,432	7
Sub Total ==>	152,756	68
Ceiling Load	20,321	9
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		
Ov/Undr Sizing	1,471	1
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	223,914	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design — OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
SkyliteCond	0	0	0.00
RoofCond	0	-20,541	2.46
Glass Solar	0	0	0.00
Glass/DoorCond	-11,575	-11,575	1.38
Wall Cond	-1,147	-2,103	0.25
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-17,979	-17,979	2.15
Sub Total ==>	-30,700	-52,197	6.24
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-7,875	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-306,498	-306,498	36.67
Exhaust Heat		340	-0.04
OA Preheat Diff.		-350,065	41.88
RA Preheat Diff.		-127,409	15.24
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-345,073	-835,829	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	98.0
Ra Plenum	78.3	68.9
Return	78.5	68.9
Ret/OA	83.0	68.9
Fn MtrTD	0.1	0.0
Fn BltTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	11,112	11,112
Terminal	11,112	11,112
Main Fan	11,112	11,112
Sec Fan	0	0
Nom Vent	7,699	0
AHU Vent	7,699	0
Infil	162	284
Min Stop/Rh	0	0
Return	8,118	11,397
Exhaust	4,704	284
Rm Exh	3,166	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	69.5	0.0
cfm/ft²	0.48	0.48
cfm/ton	276.04	
ft²/ton	572.83	
Btu/hr-ft²	20.95	-36.25
No. People	307	

COOLING COIL SELECTION

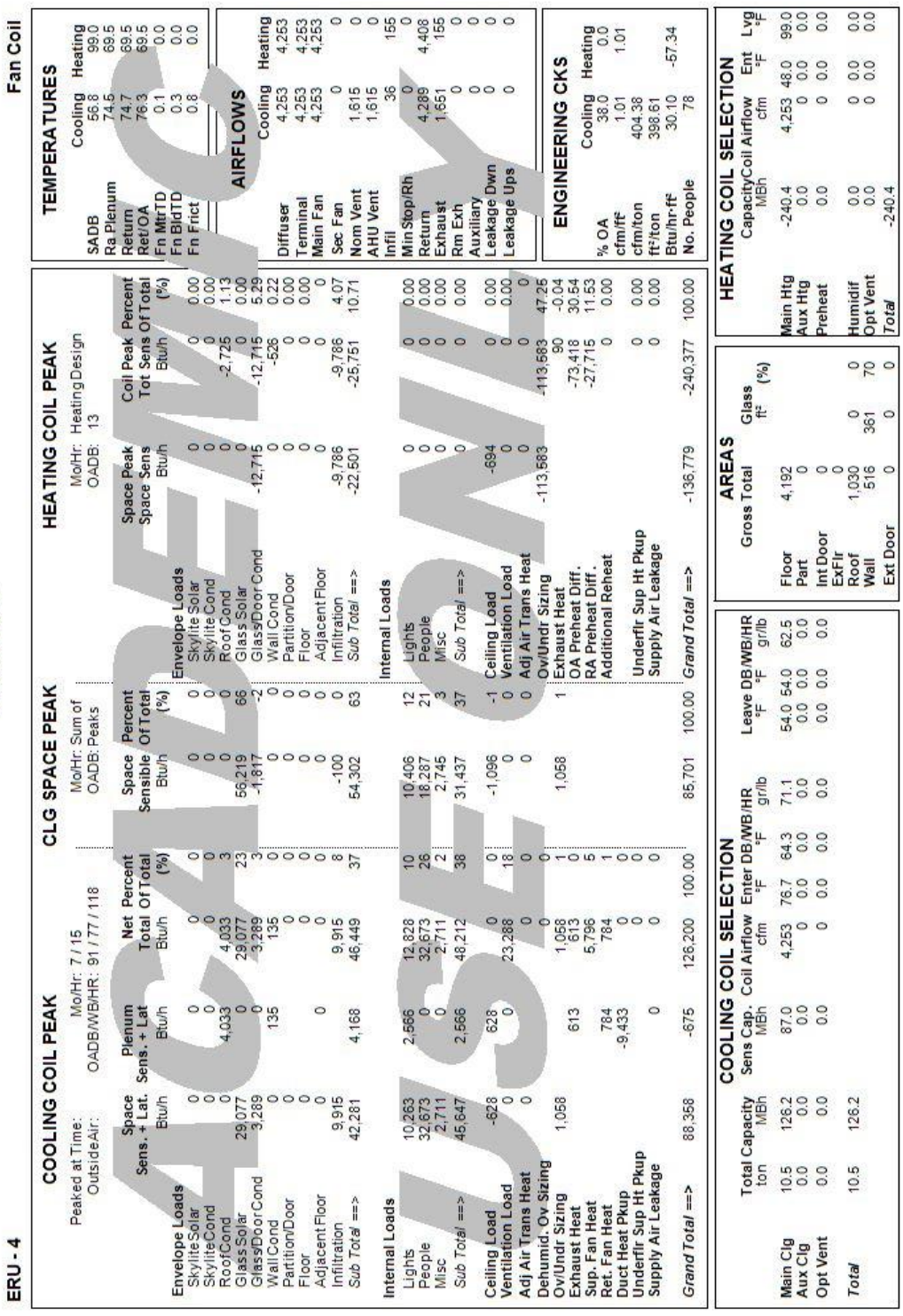
	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB/HR °F	Enter WB/HR gr/lb	Leave DB °F	Leave WB/HR °F	Leave WB/HR gr/lb
Main Clg	40.3	483.1	291.8	11,112	83.4	69.2	85.3	54.0	54.0	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	40.3	483.1								

AREAS

	Gross Total ft²	Glass ft²	(%)
Floor	23,060		
Part	0		
Int Door	0		
ExFlr	0		
Roof	7,842	0	0
Wall	948	329	35
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-835.8	11,112	30.2	98.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-835.8			



System Checksums
By ACADEMIC

ERU - 4 — Fan Coil

COOLING COIL PEAK — Peaked at Time: Mo/Hr: 7 / 15; Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	4,033	4,033	3
Glass Solar	29,077	0	29,077	23
Glass/Door Cond	3,289	0	3,289	3
Wall Cond	0	135	135	0
Partition/Door	0	0	0	0
Floor	0	0	0	0
Adjacent Floor	0	0	0	0
Infiltration	9,915	9,915	9,915	8
Sub Total ==>	42,281	4,168	46,449	37
Internal Loads				
Lights	10,263	2,566	12,828	10
People	32,673	0	32,673	26
Misc	2,711	0	2,711	2
Sub Total ==>	45,647	2,566	48,212	38
Ceiling Load	-628	628	0	0
Ventilation Load	0	0	23,288	18
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	1,058		1,058	1
Exhaust Heat		613	613	0
Sup. Fan Heat			5,796	5
Ret. Fan Heat		784	784	1
Duct Heat Pkup		-9,433	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	88,358	-675	126,200	100.00

CLG SPACE PEAK — Mo/Hr: Sum of; OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	56,219	66
Glass/Door Cond	-1,817	-2
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	-100	0
Sub Total ==>	54,302	63
Internal Loads		
Lights	10,406	12
People	18,287	21
Misc	2,745	3
Sub Total ==>	31,437	37
Ceiling Load	-1,096	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		0
Ov/Undr Sizing	1,058	1
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	85,701	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design; OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-2,725	1.13
Glass Solar	0	0	0.00
Glass/Door Cond	-12,715	-12,715	5.29
Wall Cond	0	-526	0.22
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-9,786	-9,786	4.07
Sub Total ==>	-22,501	-25,751	10.71
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-894	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-113,583	-113,583	47.26
Exhaust Heat		90	-0.04
OA Preheat Diff.		-73,418	30.54
RA Preheat Diff.		-27,715	11.53
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-136,779	-240,377	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	99.0
Ra Plenum	74.5	69.5
Return	74.7	69.5
Ret/OA	76.3	69.5
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	4,253	4,253
Terminal	4,253	4,253
Main Fan	4,253	4,253
Sec Fan	0	0
Nom Vent	1,615	0
AHU Vent	1,615	0
Infil	36	155
Min Stop/Rh	0	0
Return	4,289	4,408
Exhaust	1,651	155
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	38.0	0.0
cfm/ft²	1.01	1.01
cfm/ton	404.38	
ft²/ton	398.61	
Btu/hr-ft²	30.10	-57.34
No. People	78	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F		gr/lb	Leave DB/WB/HR °F		gr/lb
Main Clg	10.5	126.2	87.0	4,253	76.7	64.3	71.1	54.0	54.0	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10.5	126.2								

AREAS

	Gross Total ft²	Glass ft²	(%)
Floor	4,192		
Part	0		
Int Door	0		
ExFlr	0		
Roof	1,030	0	0
Wall	516	361	70
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-240.4	4,253	48.0	99.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-240.4			

System Checksums

By ACADEMIC

ERU - 5 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 6 / 9
Outside Air: OADB/WB/HR: 73 / 66 / 84

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	95,343	0	95,343	34
Glass/Door Cond	-2,140	0	-2,140	-1
Wall Cond	0	72	72	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	4,277		4,277	2
Sub Total ==>	97,481	72	97,552	35
Internal Loads				
Lights	28,989	7,247	36,237	13
People	74,203	0	74,203	26
Misc	7,744	0	7,744	3
Sub Total ==>	110,936	7,247	118,183	42
Ceiling Load	-3,451	3,451	0	0
Ventilation Load	0	0	48,815	17
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	1,068		1,068	0
Exhaust Heat		3,973	3,973	1
Sup. Fan Heat			11,514	4
Ret. Fan Heat		1,566	1,566	1
Duct Heat Pkup		-18,738	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	206,035	-2,429	282,673	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	95,343	56
Glass/Door Cond	-2,140	-1
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	-998	-1
Sub Total ==>	92,205	54
Internal Loads		
Lights	29,578	17
People	42,840	25
Misc	7,938	5
Sub Total ==>	80,356	47
Ceiling Load	-3,392	-2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	1,068	1
Grand Total ==>	170,238	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-38,019	-38,019	6.30
Wall Cond	0	-411	0.07
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-22,758	-22,758	3.77
Sub Total ==>	-60,777	-61,188	10.15
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-116	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-257,652	-257,652	42.72
Exhaust Heat		12	0.00
OA Preheat Diff.		-204,605	33.92
RA Preheat Diff.		-79,695	13.21
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-318,545	-603,128	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	104.0
Ra Plenum	74.1	70.0
Return	74.3	70.0
Ret/OA	73.3	70.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	8,448	8,448
Terminal	8,448	8,448
Main Fan	8,448	8,448
Sec Fan	0	0
Nom Vent	4,500	0
AHU Vent	4,500	0
Infil	360	360
Min Stop/Rh	0	0
Return	8,808	8,808
Exhaust	4,860	360
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	53.3	0.0
cfm/ft²	0.70	0.70
cfm/ton	358.62	
ft²/ton	515.11	
Btu/hr·ft²	23.30	-49.71
No. People	202	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	23.6	282.7	182.9	8,448	73.7	64.2	75.3	54.0	53.0	58.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	23.6	282.7								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	12,134		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	1,200	1,080	90
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-603.1	8,448	39.6	104.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-603.1			

System Checksums

By ACADEMIC

ERU - 6 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	7,235	7,235	12
Glass Solar	1,454	0	1,454	2
Glass/Door Cond	412	0	412	1
Wall Cond	52	30	82	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	2,549		2,549	4
Sub Total ==>	4,467	7,266	11,733	19
Internal Loads				
Lights	15,817	3,954	19,771	32
People	9,756	0	9,756	16
Misc	3,733	0	3,733	6
Sub Total ==>	29,306	3,954	33,260	54
Ceiling Load	5,869	-5,869	0	0
Ventilation Load	0	0	16,282	27
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-3,131	-3,131	-5
Sup. Fan Heat			2,383	4
Ret. Fan Heat		638	638	1
Duct Heat Pkup		-3,878	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	39,642	-1,019	61,166	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	3,487	10
Glass/Door Cond	100	0
Wall Cond	49	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	301	1
Sub Total ==>	3,937	11
Internal Loads		
Lights	16,496	47
People	5,834	17
Misc	3,857	11
Sub Total ==>	26,188	74
Ceiling Load	5,110	15
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat	0	0
Grand Total ==>	35,235	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-5,030	4.67
Glass Solar	0	0	0.00
Glass/Door Cond	-1,647	-1,647	1.53
Wall Cond	-214	-370	0.34
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-2,959	-2,959	2.75
Sub Total ==>	-4,820	-10,007	9.30
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,549	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-48,866	-48,866	45.41
Exhaust Heat		69	-0.06
OA Preheat Diff.		-35,942	33.40
RA Preheat Diff.		-12,865	11.95
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-56,235	-107,611	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	99.0
Ra Plenum	78.1	68.7
Return	78.4	68.7
Ret/OA	79.8	68.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,748	1,748
Terminal	1,748	1,748
Main Fan	1,748	1,748
Sec Fan	0	0
Nom Vent	790	0
AHU Vent	790	0
Infil	47	47
Min Stop/Rh	0	0
Return	1,795	1,795
Exhaust	637	47
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	45.2	0.0
cfm/ft²	0.29	0.29
cfm/ton	343.03	
ft²/ton	1,191.06	
Btu/hr·ft²	10.08	-17.73
No. People	24	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	5.1	61.2	44.9	1,748	80.2	65.7	72.2	54.0	54.0	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	5.1	61.2								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	6,071		
Part	0		
Int Door	0		
ExFlr	0		
Roof	1,929	0	0
Wall	156	47	30
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-107.6	1,748	43.5	99.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-107.6			

System Checksums

By ACADEMIC

ERU - 7 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	3,223	3,223	0
Glass Solar	95,175	0	95,175	6
Glass/Door Cond	13,204	0	13,204	1
Wall Cond	2,914	1,746	4,660	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	123,174		123,174	8
Sub Total ==>	234,468	4,969	239,437	16
Internal Loads				
Lights	135,876	33,969	169,845	11
People	384,715	0	384,715	26
Misc	36,092	0	36,092	2
Sub Total ==>	556,683	33,969	590,652	40
Ceiling Load	6,911	-6,911	0	0
Ventilation Load	0	0	603,150	40
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	20,956		20,956	1
Exhaust Heat		-6,617	-6,617	0
Sup. Fan Heat			41,138	3
Ret. Fan Heat		3,785	3,785	0
Duct Heat Pkup		-66,948	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	819,018	-37,753	1,492,502	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	207,961	34
Glass/Door Cond	-4,799	-1
Wall Cond	-409	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	7,306	1
Sub Total ==>	210,059	35
Internal Loads		
Lights	134,811	22
People	200,381	33
Misc	35,792	6
Sub Total ==>	370,984	61
Ceiling Load	6,238	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat	20,956	3
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	608,237	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-2,214	0.16
Glass Solar	0	0	0.00
Glass/Door Cond	-52,318	-52,318	3.80
Wall Cond	-11,572	-18,691	1.36
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-131,767	-131,767	9.56
Sub Total ==>	-195,658	-204,990	14.87
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,032	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		112	-0.01
OA Preheat Diff.		-846,816	61.44
RA Preheat Diff.		-326,646	23.70
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-198,690	-1,378,340	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	70.0
Ra Plenum	75.4	69.8
Return	75.6	69.8
Ret/OA	81.2	69.8
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	30,183	30,183
Terminal	30,183	30,183
Main Fan	30,183	30,183
Sec Fan	0	0
Nom Vent	18,623	0
AHU Vent	18,623	0
Infil	731	2,084
Min Stop/Rh	0	0
Return	21,760	30,730
Exhaust	10,201	547
Rm Exh	9,153	1,537
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	63.4	0.0
cfm/ft²	0.58	0.58
cfm/ton	242.67	
ft²/ton	416.16	
Btu/hr·ft²	28.84	-26.63
No. People	854	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	124.4	1,492.5	820.5	30,183	81.6	68.7	85.5	54.0	53.0	58.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	124.4	1,492.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	51,760		
Part	0		
Int Door	0		
ExFlr	0		
Roof	832	0	0
Wall	6,948	1,486	21
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1,378.4	30,183	34.8	75.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1,378.4			

System Checksums

By ACADEMIC

ERU - 8 **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	191,959	191,959	14
Glass Solar	67,302	0	67,302	5
Glass/Door Cond	10,944	0	10,944	1
Wall Cond	2,382	1,178	3,560	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	94,415		94,415	7
Sub Total ==>	175,044	193,136	368,180	27
Internal Loads				
Lights	121,764	30,441	152,206	11
People	497,340	0	497,340	37
Misc	31,528	0	31,528	2
Sub Total ==>	650,633	30,441	681,074	50
Ceiling Load	47,703	-47,703	0	0
Ventilation Load	0	0	330,102	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	10,494		10,494	1
Exhaust Heat		-87,361	-87,361	-6
Sup. Fan Heat			43,534	3
Ret. Fan Heat		5,982	5,982	0
Duct Heat Pkup		-70,847	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	883,874	23,649	1,352,005	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	138,161	21
Glass/Door Cond	455	0
Wall Cond	481	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	10,653	2
Sub Total ==>	149,750	23
Internal Loads		
Lights	129,782	20
People	292,084	45
Misc	34,399	5
Sub Total ==>	456,265	71
Ceiling Load	26,921	4
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	10,494	2
Grand Total ==>	643,430	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-131,002	7.86
Glass Solar	0	0	0.00
Glass/Door Cond	-43,511	-43,511	2.61
Wall Cond	-9,436	-15,033	0.90
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-108,099	-108,099	6.48
Sub Total ==>	-161,046	-297,645	17.86
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-41,481	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		4,834	-0.29
OA Preheat Diff.		-1,034,759	62.07
RA Preheat Diff.		-339,425	20.36
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-202,527	-1,666,995	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	70.0
Ra Plenum	77.9	67.5
Return	78.1	67.5
Ret/OA	80.5	67.5
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	31,940	31,940
Terminal	31,940	31,940
Main Fan	31,940	31,940
Sec Fan	0	0
Nom Vent	22,755	0
AHU Vent	22,755	0
Infil	925	1,710
Min Stop/Rh	0	0
Return	32,866	33,650
Exhaust	23,681	1,710
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	74.4	0.0
cfm/ft²	0.62	0.62
cfm/ton	283.49	
ft²/ton	455.90	
Btu/hr·ft²	26.32	-32.45
No. People	1,241	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	112.7	1,352.0	880.4	31,940	80.9	66.8	76.7	54.0	53.1	59.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	112.7	1,352.0								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	51,365		
Part	0		
Int Door	0		
ExFlr	0		
Roof	51,365	0	0
Wall	5,700	1,236	22
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1,667.0	31,940	28.7	75.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1,667.0			

System Checksums

By ACADEMIC

ERU - 9 **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	30,725	30,725	3
Glass Solar	540,249	0	540,249	50
Glass/Door Cond	71,036	0	71,036	7
Wall Cond	550	1,733	2,283	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	109,105		109,105	10
Sub Total ==>	720,939	32,458	753,398	70
Internal Loads				
Lights	38,337	9,440	47,776	4
People	87,240	0	87,240	8
Misc	10,034	0	10,034	1
Sub Total ==>	135,611	9,440	145,051	13
Ceiling Load	-6,499	6,499	0	0
Ventilation Load	0	0	80,169	7
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	1,017		1,017	0
Exhaust Heat		8,241	8,241	1
Sup. Fan Heat			82,033	8
Ret. Fan Heat		11,016	11,016	1
Duct Heat Pkup		-133,500	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	851,069	-65,846	1,080,925	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	1,151,949	95
Glass/Door Cond	-22,313	-2
Wall Cond	-310	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	4,314	0
Sub Total ==>	1,133,640	93
Internal Loads		
Lights	34,007	3
People	43,211	4
Misc	8,834	1
Sub Total ==>	86,051	7
Ceiling Load	-7,828	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	1,212,880	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-20,657	1.86
Glass Solar	0	0	0.00
Glass/Door Cond	-275,173	-275,173	24.76
Wall Cond	-2,113	-8,209	0.74
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-193,896	-193,896	17.44
Sub Total ==>	-471,182	-497,936	44.80
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,771	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-333,751	-333,751	30.03
Exhaust Heat		1,211	-0.11
OA Preheat Diff.		-203,414	18.30
RA Preheat Diff.		-77,614	6.98
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-806,704	-1,111,503	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	70.0
Ra Plenum	73.7	69.6
Return	73.9	69.6
Ret/OA	74.2	69.6
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	60,187	60,187
Terminal	60,187	60,187
Main Fan	60,187	60,187
Sec Fan	0	0
Nom Vent	4,473	0
AHU Vent	4,473	0
Infil	1,346	3,067
Min Stop/Rh	0	0
Return	61,533	63,254
Exhaust	5,820	3,067
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	7.8	0.0
cfm/ft²	3.84	3.84
cfm/ton	668.17	
ft²/ton	174.22	
Btu/hr·ft²	68.88	-70.83
No. People	221	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	90.1	1,080.9	898.9	60,187	74.6	62.7	66.5	54.0	54.0	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	90.1	1,080.9								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	15,693		
Part	0		
Int Door	0		
ExFlr	0		
Roof	7,786	0	0
Wall	10,224	7,817	76
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1,111.5	60,187	65.4	82.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1,111.5			

System Checksums

By ACADEMIC

ERU - 10 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 11
Outside Air: OADB/WB/HR: 84 / 74 / 111

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	14,887	14,887	4
Glass Solar	139,507	0	139,507	33
Glass/Door Cond	9,543	0	9,543	2
Wall Cond	0	270	270	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	26,988		26,988	6
Sub Total ==>	176,039	15,157	191,196	46
Internal Loads				
Lights	33,830	8,313	42,144	10
People	94,109	0	94,109	22
Misc	8,860	0	8,860	2
Sub Total ==>	136,799	8,313	145,112	35
Ceiling Load	-2,209	2,209	0	0
Ventilation Load	0	0	56,192	13
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	611		611	0
Exhaust Heat		2,213	2,213	1
Sup. Fan Heat			21,664	5
Ret. Fan Heat		2,935	2,935	1
Duct Heat Pkup		-35,256	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	311,239	-4,428	419,923	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	253,509	79
Glass/Door Cond	-9,250	-3
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	-1,697	-1
Sub Total ==>	242,562	76
Internal Loads		
Lights	30,342	10
People	41,106	13
Misc	7,690	2
Sub Total ==>	79,138	25
Ceiling Load	-3,271	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	611	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	319,040	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-18,890	3.78
Glass Solar	0	0	0.00
Glass/Door Cond	-80,347	-80,347	16.10
Wall Cond	0	-1,125	0.23
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-49,612	-49,612	9.94
Sub Total ==>	-129,959	-149,974	30.05
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,494	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-88,140	-88,140	17.66
Exhaust Heat		777	-0.16
OA Preheat Diff.		-191,755	38.42
RA Preheat Diff.		-70,034	14.03
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-221,593	-499,125	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.9	70.0
Ra Plenum	74.4	69.1
Return	74.6	69.1
Ret/OA	75.2	69.1
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	15,895	15,895
Terminal	15,895	15,895
Main Fan	15,895	15,895
Sec Fan	0	0
Nom Vent	4,207	0
AHU Vent	4,207	0
Infil	612	785
Min Stop/Rh	0	0
Return	16,507	16,679
Exhaust	4,819	785
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	27.2	0.0
cfm/ft²	1.29	1.29
cfm/ton	454.22	
ft²/ton	352.86	
Btu/hr·ft²	34.01	-40.42
No. People	212	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	35.0	419.9	310.4	15,895	75.6	63.5	68.9	54.1	54.0	62.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	35.0	419.9								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	12,348		
Part	0		
Int Door	0		
ExFlr	0		
Roof	7,188	0	0
Wall	2,616	2,282	87
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-499.1	15,895	54.3	82.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-499.1			

System Checksums

By ACADEMIC

ERU - 11 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	23,619	23,619	10
Glass Solar	19,402	0	19,402	8
Glass/Door Cond	2,537	0	2,537	1
Wall Cond	1,816	824	2,640	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	50,355		50,355	22
Sub Total ==>	74,110	24,443	98,553	43
Internal Loads				
Lights	21,577	0	21,577	9
People	49,500	0	49,500	22
Misc	4,035	0	4,035	2
Sub Total ==>	75,112	0	75,112	33
Ceiling Load	2,308	-2,308	0	0
Ventilation Load	0	0	55,449	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-7,449	-7,449	-3
Sup. Fan Heat			7,306	3
Ret. Fan Heat		1,126	1,126	0
Duct Heat Pkup		-11,890	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	151,530	3,922	230,096	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	28,364	26
Glass/Door Cond	2,513	2
Wall Cond	2,002	2
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	15,297	14
Sub Total ==>	48,176	45
Internal Loads		
Lights	21,577	20
People	33,750	31
Misc	2,421	2
Sub Total ==>	57,748	53
Ceiling Load	2,096	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Dehumid. Ov Sizing		
Ov/Undr Sizing	0	0
Exhaust Heat		
Sup. Fan Heat		
Ret. Fan Heat		
Duct Heat Pkup		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	108,019	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-16,241	3.93
Glass Solar	0	0	0.00
Glass/Door Cond	-10,138	-10,138	2.45
Wall Cond	-6,784	-9,989	2.41
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-61,446	-61,446	14.85
Sub Total ==>	-78,368	-97,813	23.65
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,316	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-65,935	-65,935	15.94
Exhaust Heat		2,322	-0.56
OA Preheat Diff.		-188,550	45.58
RA Preheat Diff.		-63,673	15.39
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-148,619	-413,650	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	95.0
Ra Plenum	76.2	67.9
Return	76.3	67.9
Ret/OA	79.2	67.9
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	5,360	5,360
Terminal	5,360	5,360
Main Fan	5,360	5,360
Sec Fan	0	0
Nom Vent	4,147	0
AHU Vent	4,147	0
Infil	972	972
Min Stop/Rh	0	0
Return	6,332	6,332
Exhaust	5,119	972
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	77.4	0.0
cfm/ft²	0.85	0.85
cfm/ton	279.55	
ft²/ton	329.71	
Btu/hr·ft²	36.40	-65.43
No. People	150	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	19.2	230.1	148.8	5,360	79.6	66.5	77.2	54.0	52.4	56.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	19.2	230.1								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	6,322		
Part	0		
Int Door	0		
ExFlr	0		
Roof	6,322	0	0
Wall	3,240	288	9
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-413.7	5,360	25.4	95.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-413.7			

System Checksums

By ACADEMIC

ERU - 12/13 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 5
Outside Air: OADB/WB/HR: 73 / 70 / 104

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	-2,962	-2,962	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	-2,962	-2,962	0
Internal Loads				
Lights	40,700	0	40,700	4
People	330,000	0	330,000	34
Misc	0	0	0	0
Sub Total ==>	370,700	0	370,700	38
Ceiling Load	-6,845	6,845	0	0
Ventilation Load	0	0	440,643	45
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	100,340		100,340	10
Exhaust Heat		34,021	34,021	4
Sup. Fan Heat			25,321	3
Ret. Fan Heat		3,303	3,303	0
Duct Heat Pkup		-41,207	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	464,195	0	971,365	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	40,700	11
People	225,000	60
Misc	7,521	2
Sub Total ==>	273,221	73
Ceiling Load	791	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	100,340	27
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	374,353	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-31,124	1.61
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	0	-31,124	1.61
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,823	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-757,502	-757,502	39.11
Exhaust Heat		0	0.00
OA Preheat Diff.		-844,739	43.62
RA Preheat Diff.		-303,353	15.66
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-762,325	-1,936,718	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	107.0
Ra Plenum	73.2	68.7
Return	73.4	68.7
Ret/OA	72.8	68.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	18,578	18,578
Terminal	18,578	18,578
Main Fan	18,578	18,578
Sec Fan	0	0
Nom Vent	18,578	0
AHU Vent	18,578	0
Infil	0	0
Min Stop/Rh	0	0
Return	18,578	18,578
Exhaust	18,578	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	100.0	0.0
cfm/ft²	1.56	1.56
cfm/ton	229.50	
ft²/ton	147.32	
Btu/hr·ft²	81.46	-162.41
No. People	1,000	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	81.0	971.4	380.4	18,578	73.2	69.7	104.3	54.0	53.5	60.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	81.0	971.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	11,925		
Part	0		
Int Door	0		
ExFlr	0		
Roof	11,925	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1,936.7	18,578	13.0	107.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1,936.7			

System Checksums

By ACADEMIC

ERU - 14 **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	5,848	0	5,848	6
Glass/Door Cond	962	0	962	1
Wall Cond	72	69	140	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	4,854		4,854	5
Sub Total ==>	11,735	69	11,804	13
Internal Loads				
Lights	29,905	7,476	37,382	41
People	10,870	0	10,870	12
Misc	6,701	0	6,701	7
Sub Total ==>	47,477	7,476	54,953	61
Ceiling Load	2,120	-2,120	0	0
Ventilation Load	0	0	19,328	21
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	666		666	1
Exhaust Heat		-953	-953	-1
Sup. Fan Heat			3,977	4
Ret. Fan Heat		533	533	1
Duct Heat Pkup		-6,472	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	61,998	-1,468	90,308	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	14,830	25
Glass/Door Cond	628	1
Wall Cond	52	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	773	1
Sub Total ==>	16,283	28
Internal Loads		
Lights	28,645	49
People	4,950	8
Misc	6,376	11
Sub Total ==>	39,971	68
Ceiling Load	1,880	3
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat	666	1
Grand Total ==>	58,800	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-3,717	-3,717	2.65
Wall Cond	-271	-543	0.39
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-5,007	-5,007	3.57
Sub Total ==>	-8,995	-9,267	6.61
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-139	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-75,006	-75,006	53.50
Exhaust Heat		3	0.00
OA Preheat Diff.		-40,251	28.71
RA Preheat Diff.		-15,665	11.17
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-84,140	-140,185	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	96.0
Ra Plenum	75.6	70.0
Return	75.8	70.0
Ret/OA	77.1	70.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	2,918	2,918
Terminal	2,918	2,918
Main Fan	2,918	2,918
Sec Fan	0	0
Nom Vent	885	0
AHU Vent	885	0
Infil	79	79
Min Stop/Rh	0	0
Return	2,997	2,997
Exhaust	964	79
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	35.7	0.0
cfm/ft²	0.26	0.26
cfm/ton	387.74	
ft²/ton	1,466.04	
Btu/hr·ft²	8.19	-12.71
No. People	25	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	7.5	90.3	67.9	2,918	77.5	64.6	70.8	54.0	54.0	62.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	7.5	90.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	11,033		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	264	106	40
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-140.2	2,918	52.7	96.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-140.2			

System Checksums

By ACADEMIC

ERU - 15 **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	379	172	551	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	8,583		8,583	3
Sub Total ==>	8,963	172	9,134	3
Internal Loads				
Lights	17,218	4,304	21,522	8
People	142,083	0	142,083	54
Misc	3,573	0	3,573	1
Sub Total ==>	162,873	4,304	167,178	64
Ceiling Load	-1,758	1,758	0	0
Ventilation Load	0	0	63,055	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	9,818		9,818	4
Exhaust Heat		4,594	4,594	2
Sup. Fan Heat			8,357	3
Ret. Fan Heat		1,122	1,122	0
Duct Heat Pkup		-13,600	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	179,896	-1,650	263,258	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	453	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	1,777	1
Sub Total ==>	2,230	2
Internal Loads		
Lights	18,113	15
People	91,200	74
Misc	3,868	3
Sub Total ==>	113,182	92
Ceiling Load	-1,666	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	9,818	8
Grand Total ==>	123,563	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-1,439	-2,055	0.33
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-11,379	-11,379	1.81
Sub Total ==>	-12,818	-13,434	2.14
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-142	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-238,648	-238,648	38.02
Exhaust Heat		14	0.00
OA Preheat Diff.		-270,513	43.10
RA Preheat Diff.		-105,119	16.75
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-251,608	-627,700	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	107.0
Ra Plenum	74.2	69.9
Return	74.3	69.9
Ret/OA	78.4	69.9
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	6,132	6,132
Terminal	6,132	6,132
Main Fan	6,132	6,132
Sec Fan	0	0
Nom Vent	5,949	0
AHU Vent	5,949	0
Infil	180	180
Min Stop/Rh	0	0
Return	6,312	6,312
Exhaust	6,129	180
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	97.0	0.0
cfm/ft²	0.92	0.92
cfm/ton	279.49	
ft²/ton	302.40	
Btu/hr·ft²	39.68	-94.62
No. People	372	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	21.9	263.3	160.0	6,132	78.8	66.9	80.2	54.0	52.9	58.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	21.9	263.3								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	6,634		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	600	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-627.7	6,132	14.7	107.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-627.7			

System Checksums

By ACADEMIC

ERU - 16 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 89 / 75 / 107

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	14,260	14,260	5
Glass Solar	127,821	0	127,821	44
Glass/Door Cond	11,309	0	11,309	4
Wall Cond	463	722	1,185	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	37,349		37,349	13
Sub Total ==>	176,941	14,982	191,923	66
Internal Loads				
Lights	10,481	363	10,844	4
People	33,000	0	33,000	11
Misc	1,434	0	1,434	0
Sub Total ==>	44,916	363	45,278	16
Ceiling Load	-742	742	0	0
Ventilation Load	0	0	35,504	12
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		1,499	1,499	1
Sup. Fan Heat			13,032	5
Ret. Fan Heat		1,838	1,838	1
Duct Heat Pkup		-21,209	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	221,115	-1,785	289,075	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	135,984	71
Glass/Door Cond	10,322	5
Wall Cond	482	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	10,513	5
Sub Total ==>	157,301	82
Internal Loads		
Lights	12,512	6
People	22,500	12
Misc	1,434	1
Sub Total ==>	36,446	19
Ceiling Load	-1,058	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	192,689	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-10,282	1.94
Glass Solar	0	0	0.00
Glass/Door Cond	-45,623	-45,623	8.62
Wall Cond	-1,776	-4,393	0.83
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-49,157	-49,157	9.29
Sub Total ==>	-96,556	-109,454	20.69
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,261	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-273,342	-273,342	51.66
Exhaust Heat		875	-0.17
OA Preheat Diff.		-107,780	20.37
RA Preheat Diff.		-39,393	7.45
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-371,159	-529,094	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	105.0
Ra Plenum	74.4	69.0
Return	74.6	69.0
Ret/OA	75.5	69.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	9,562	9,562
Terminal	9,562	9,562
Main Fan	9,562	9,562
Sec Fan	0	0
Nom Vent	2,370	0
AHU Vent	2,370	0
Infil	778	778
Min Stop/Rh	0	0
Return	10,339	10,339
Exhaust	3,148	778
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	24.8	0.0
cfm/ft²	2.44	2.44
cfm/ton	396.93	
ft²/ton	162.77	
Btu/hr·ft²	73.72	-134.94
No. People	100	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	24.1	289.1	226.3	9,562	75.9	63.5	68.2	54.0	53.2	59.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	24.1	289.1								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	3,921		
Part	0		
Int Door	0		
ExFlr	0		
Roof	3,921	0	0
Wall	2,592	1,296	50
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-529.1	9,562	55.1	105.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-529.1			

System Checksums

By ACADEMIC

ERU - 17 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	23,161	23,161	9
Glass Solar	50,240	0	50,240	19
Glass/Door Cond	8,260	0	8,260	3
Wall Cond	239	418	657	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	23,213		23,213	9
Sub Total ==>	81,952	23,578	105,531	40
Internal Loads				
Lights	14,324	3,581	17,905	7
People	66,147	0	66,147	25
Misc	3,208	0	3,208	1
Sub Total ==>	83,679	3,581	87,260	33
Ceiling Load	2,157	-2,157	0	0
Ventilation Load	0	0	63,976	24
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-4,839	-4,839	-2
Sup. Fan Heat			10,609	4
Ret. Fan Heat		1,453	1,453	1
Duct Heat Pkup		-17,265	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	167,788	4,351	263,990	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	113,034	72
Glass/Door Cond	6,437	4
Wall Cond	239	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	4,873	3
Sub Total ==>	124,582	79
Internal Loads		
Lights	9,965	6
People	18,997	12
Misc	2,149	1
Sub Total ==>	31,110	20
Ceiling Load	1,165	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	156,858	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-15,696	5.46
Glass Solar	0	0	0.00
Glass/Door Cond	-31,936	-31,936	11.10
Wall Cond	-921	-2,600	0.90
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-24,578	-24,578	8.54
Sub Total ==>	-57,435	-74,810	26.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-3,032	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-155,349	-155,349	53.99
Exhaust Heat		682	-0.24
OA Preheat Diff.		-43,100	14.98
RA Preheat Diff.		-15,156	5.27
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-215,816	-287,732	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	95.0
Ra Plenum	76.1	68.4
Return	76.3	68.4
Ret/OA	77.7	68.4
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	7,784	7,784
Terminal	7,784	7,784
Main Fan	7,784	7,784
Sec Fan	0	0
Nom Vent	948	0
AHU Vent	948	0
Infil	389	389
Min Stop/Rh	0	0
Return	8,173	8,173
Exhaust	1,337	389
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	38.6	0.0
cfm/ft²	1.29	1.29
cfm/ton	353.82	
ft²/ton	274.87	
Btu/hr·ft²	43.66	-47.58
No. People	164	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	22.0	264.0	167.5	7,784	78.1	64.8	71.2	54.0	53.6	61.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	22.0	264.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	6,047		
Part	0		
Int Door	0		
ExFlr	0		
Roof	6,047	0	0
Wall	1,680	907	54
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-287.7	7,784	61.7	95.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-287.7			

System Checksums

By ACADEMIC

ERU - 18/19 — **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	41,628	41,628	7
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	41,628	41,628	7
Internal Loads				
Lights	35,316	800	36,115	6
People	262,929	0	262,929	44
Misc	6,788	0	6,788	1
Sub Total ==>	305,032	800	305,832	51
Ceiling Load	1,867	-1,867	0	0
Ventilation Load	0	0	197,264	33
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	42,880		42,880	7
Exhaust Heat		-11,270	-11,270	-2
Sup. Fan Heat			19,566	3
Ret. Fan Heat		2,552	2,552	0
Duct Heat Pkup		-31,842	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	349,779	0	598,452	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	35,808	12
People	204,060	71
Misc	8,081	3
Sub Total ==>	247,949	86
Ceiling Load	-1,533	-1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	42,880	15
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	289,296	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-28,002	1.85
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	0	-28,002	1.85
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,940	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-600,066	-600,066	39.67
Exhaust Heat		0	0.00
OA Preheat Diff.		-652,770	43.16
RA Preheat Diff.		-231,677	15.32
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-605,006	-1,512,515	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	108.0
Ra Plenum	75.6	68.6
Return	75.7	68.6
Ret/OA	79.6	68.6
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	14,356	14,356
Terminal	14,356	14,356
Main Fan	14,356	14,356
Sec Fan	0	0
Nom Vent	14,356	0
AHU Vent	14,356	0
Infil	0	0
Min Stop/Rh	0	0
Return	14,356	14,356
Exhaust	14,356	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	100.0	0.0
cfm/ft²	1.33	1.33
cfm/ton	287.86	
ft²/ton	215.80	
Btu/hr·ft²	55.61	-140.54
No. People	904	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	49.9	598.5	376.9	14,356	80.0	67.3	80.7	54.0	54.0	62.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	49.9	598.5								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	10,762		
Part	0		
Int Door	0		
ExFlr	0		
Roof	10,762	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1,512.5	14,356	13.0	108.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1,512.5			

System Checksums

By ACADEMIC

ERU - 20 **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 91 / 77 / 118

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	31,008	31,008	22
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	31,008	31,008	22
Internal Loads				
Lights	20,024	5,006	25,030	18
People	45,577	0	45,577	33
Misc	5,184	0	5,184	4
Sub Total ==>	70,785	5,006	75,791	55
Ceiling Load	13,127	-13,127	0	0
Ventilation Load	0	0	40,616	29
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-14,277	-14,277	-10
Sup. Fan Heat			4,410	3
Ret. Fan Heat		575	575	0
Duct Heat Pkup		-7,177	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	83,911	2,009	138,123	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	22,017	34
People	28,250	43
Misc	5,842	9
Sub Total ==>	56,109	86
Ceiling Load	9,092	14
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	65,201	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-21,249	8.39
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	0	-21,249	8.39
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-9,087	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-80,626	-80,626	31.84
Exhaust Heat		0	0.00
OA Preheat Diff.		-115,777	45.71
RA Preheat Diff.		-35,608	14.06
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-89,713	-253,260	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.8	95.0
Ra Plenum	79.9	66.6
Return	80.1	66.6
Ret/OA	82.2	66.6
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.8	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	3,236	3,236
Terminal	3,236	3,236
Main Fan	3,236	3,236
Sec Fan	0	0
Nom Vent	2,546	0
AHU Vent	2,546	0
Infil	0	0
Min Stop/Rh	0	0
Return	3,236	3,236
Exhaust	2,546	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	78.7	0.0
cfm/ft²	0.38	0.38
cfm/ton	281.11	
ft²/ton	735.17	
Btu/hr·ft²	16.32	-29.93
No. People	113	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	11.5	138.1	96.9	3,236	82.6	67.5	77.4	54.0	53.8	61.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	11.5	138.1								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	8,462		
Part	0		
Int Door	0		
ExFlr	0		
Roof	8,462	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-253.3	3,236	24.4	95.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-253.3			