AIR-RIGHT, INC.

Precise.Accurate.Reliable.

T.A.B. Report

Project:

The Medical Center of Aurora
Pharmacy
1501 S. Potomac St
Aurora, CO 80012

Prepared for:

Apollo Mechanical

Report issue date:
February 19, 2020

Air-Right, Inc.
Project Number
20007

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TESTING, ADJUSTING AND BALANCING BUREAU
THE PROFESSIONAL'S CHOICE™

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Test, Adjust, and Balance Report

The data presented in this report is an exact record of system performance and was obtained in compliance with NEBB procedural standards. Any variance from the design requirements shall be documented in this report.

The results shown and information presented in this report is certified to be accurate and complete to the extent possible by the equipment and procedures used to balance the project.

The final air distribution system measurements are in compliance with NEBB Procedural Standards for testing, adjusting, and balancing of environmental systems, and the project specifications.

CERTIFIED BY: _____ Date: January 1, 2020

The final Hydronic distributions system measurements are in compliance with NEBB procedural standards for testing, adjusting, and balancing of environmental systems, and the project specifications.

CERTIFIED BY: _____ Date: February 19, 2020

Air-Right, Inc. warrants the air and hydronic system presented in this report is operating at the specified levels as shown in this report at and only at this time. Air-Right, Inc. makes no other warranties, stated or implied, concerning the continued performance, operation, or safety in the use of this equipment past this this time.

NEBB Air and Hydronic Systems Certified Professional:
Timothy A. Topping NEBB Number 2589
Certification Expiration/renewal date: 03/31/2022



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ABBREVIATIONS

ACU	Air Conditioning Unit
AHU	Air Handling Unit
AMP(S)	Amps
ATMOS	Atmosphere
BAS	Building Automation System
CD	Ceiling Diffuser
CFM	Cubic Feet per Minute
CRAC	Computer Room Air Conditioner
CWP	Chilled Water Pump
DD	Direct Drive
DDB	Dual Duct Box
dP (DP)	Differential Pressure
EF	Exhaust Fan
EFF	Efficiency
EI	Exhaust Inlet
ERV	Energy Recovery Vessel
FCU	Fan Coil Unit
FFU	Fan Filter Unit
FL Amps	Full Load Amperage
FLR	Floor Register
FPM	Feet per Minute
FPVAV	Fan Powered Variable Air Volume
FR	Frame
FT. HD.	Feet of Head
FUR	Furnace
GPM	Gallons per Minute
HP	Horse Power
HRV	Heat Recovery Vessel
HWP	Heating (Hot) Water Pump
Hx (HX)	Heat Exchanger
Hz (HZ)	Hertz
MAU (MUA)	Make-Up Air Unit
Max	Maximum
Min	Minimum
NA	Not Applicable
NAC	No Access
NG	None (Not) Given
No	Number
OSA	Outside Air
PD	Pressure Drop
PDU	Pool Dehumidification Unit
PF	Power Factor
PH	Phase
PSI	Pounds per Square Inch
RF	Return Fan
RI	Return Inlet
RPM	Revolutions per Minute
RTU	Roof Top Unit
SF	Service Factor
SD	Supply Diffuser
SF	Supply Fan
SWR	Side Wall Register
TSTAT	Thermostat
VAV	Variable Air Volume
Volt	Voltage
VP	Velocity Pressure

VAV Summary

Summary

SUMMARY

Name	Address	K-Factor	Inlet Size	Max CFM			Min CFM			Heat CFM		
				Design	Actual	%	Design	Actual	%	Design	Actual	%
TU 1-01	04	1.91	8"	410	418	102	205	211	103	205	210	102
TU 1-02	5	1.91	11"	1100	1100	100	1100	1096	100	1100	1098	100
TU 1-03	6	2.053	10"	840	832	99	840	821	98	840	823	98
TU 1-04	7	1.45	9"	625	616	99	625	615	98	625	616	99
TU 1-05	8	2.436	6"	200	205	102	100	103	103	100	102	102
TU 1-06	9	2.384	8"	400	388	97	400	388	97	400	388	97
Totals				**3575**	**3559**		**3270**	**3234**		**3270**	**3237**	

NOTES:

Summary
TU 1-06 / Max CFM
SET ROOM FOR TOTAL AIR FLOW TO MAKE ROOM PRESSURES ACHIEVE DESIGN ..

TU 1-01 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Outlet-001	SD1	24 x 24	180	164	182	101
Outlet-002	SD1	24 x 24	180	150	185	103
Outlet-003	SD1	24 x 24	50	150	51	102
Totals			**410**	**464**	**418**	

TU 1-02 / Summary

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CONTACT:
Brian Birely

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
FFU-1	SD2	24 x 48	550	757	548	100
FFU-2	SD2	24 x 48	550	700	552	100
Totals			**1100**	**1457**	**1100**	

TU 1-03 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
FFU-3	SD2	24 x 48	420	428	418	100
FFU-4	SD2	24 x 48	420	490	414	99
Totals			**840**	**918**	**832**	

TU 1-04 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
FFU-5	SD2	24 x 48	310	235	306	99
FFU-6	SD2	24 x 48	315	225	310	98
Totals			**625**	**460**	**616**	

TU 1-05 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Outlet-001	SD1	24 x24	100		101	101
Outlet-002	SD1	24 x 24	100		104	104
Totals			**200**	**0**	**205**	

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CONTACT:
Brian Birely

Exhaust Fan

EF-1

UNIT DATA

Manufacturer	COOK	**Design CFM**	1455
Model	120 CPV	**Design Static**	1.15
Serial Number	041S147876		

MOTOR DATA

Manufacturer	BALDOR	**Frame**	56H
Motor HP	1	**Volts**	115/230
RPM	1725	**Amps**	12.8/6.4
Phase	1	**Power Factor**	74
S.F.	1.15	**Nom. Efficiency**	68

DRIVE DATA

Motor Drive	1VP56	**Motor Bore**	5/8
Fan Drive	AK41	**Fan Bore**	3/4
No. Belts	1	**Size**	A34

STARTER DATA

Manufacturer	FACTORY INSTALLED	**Set at (Amps)**	NA
Range	NA	**VFD set at**	NA Hz

TEST DATA

CFM	1490	**Amps T1**	12.1
RPM	2362	**Amps T2**	NA
VoltsT1-T2	119	**Amps T3**	NA
Volts T2-T3	NA	**Fan In**	-1.1
Volts T1-T3	NA	**Fan Out**	NO ACCESS

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NOTES:

TEST DATA

CFM

READ FAN FOR TOTAL

16x14= 1.55 SQ FT

1.55 SQ FT x 961 FPM = 1490 CFM

Amps T1

fan is running at max amps

EF-1 / Summary

SUMMARY

Name	Address	K-Factor	Inlet Size	Max CFM			Min CFM		
				Design	Actual	%	Design	Actual	%
ET-4	12	5.5	12"	825	846	103	825	846	103
ET-6	13	1.97	12"	377	370	98	377	370	98
Totals				**1202**	**1216**		**1202**	**1216**	

NOTES:

Summary

ET-4 / Max CFM

BAKER REQUIRES 460-845 CFM, SET ROOM FOR TOTAL AIR FLOW TO MAKE ROOM PRESSURES ACHIEVE DESIGN ..

EF-1 / ET-4 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Inlet-001	EG	Neck + 1 3/4	650	320	610	94
Inlet-002	EG-1	8 x 12	160	416	166	104
Totals			**810**	**736**	**776**	

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EF-1 / ET-6 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Inlet-001	EG	Neck + 1 3/4	162	200	170	105
Inlet-002	EG2	24 x 24	215	140	200	93
Totals			**377**	**340**	**370**	

NOTES:

Summary

Inlet-001 / Prelim CFM

BAKER REQUIERS 154-170 CFM, SET ROOM FOR TOTAL AIR FLOW TO MAKE ROOM PRESSURES ACHIEVE DESIGN ..

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CONTACT:
Brian Birely

Return VAV

Summary

SUMMARY

Name	Address	K-Factor	Inlet Size	Max CFM			Min CFM		
				Design	Actual	%	Design	Actual	%
RT-2	10	1.93	12"	900	905	101	900	904	100
RT-3	11	3.3	10"	640	635	99	640	639	100
Totals				**1540**	**1540**		**1540**	**1543**	

RT-2 / Summary

SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Inlet-001	RG-2	12 x 18	450	425	450	100
Inlet-002	RG-2	12 x 18	450	462	455	101
Totals			**900**	**887**	**905**	

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CONTACT:
Brian Birely

Return Inlet

Summary

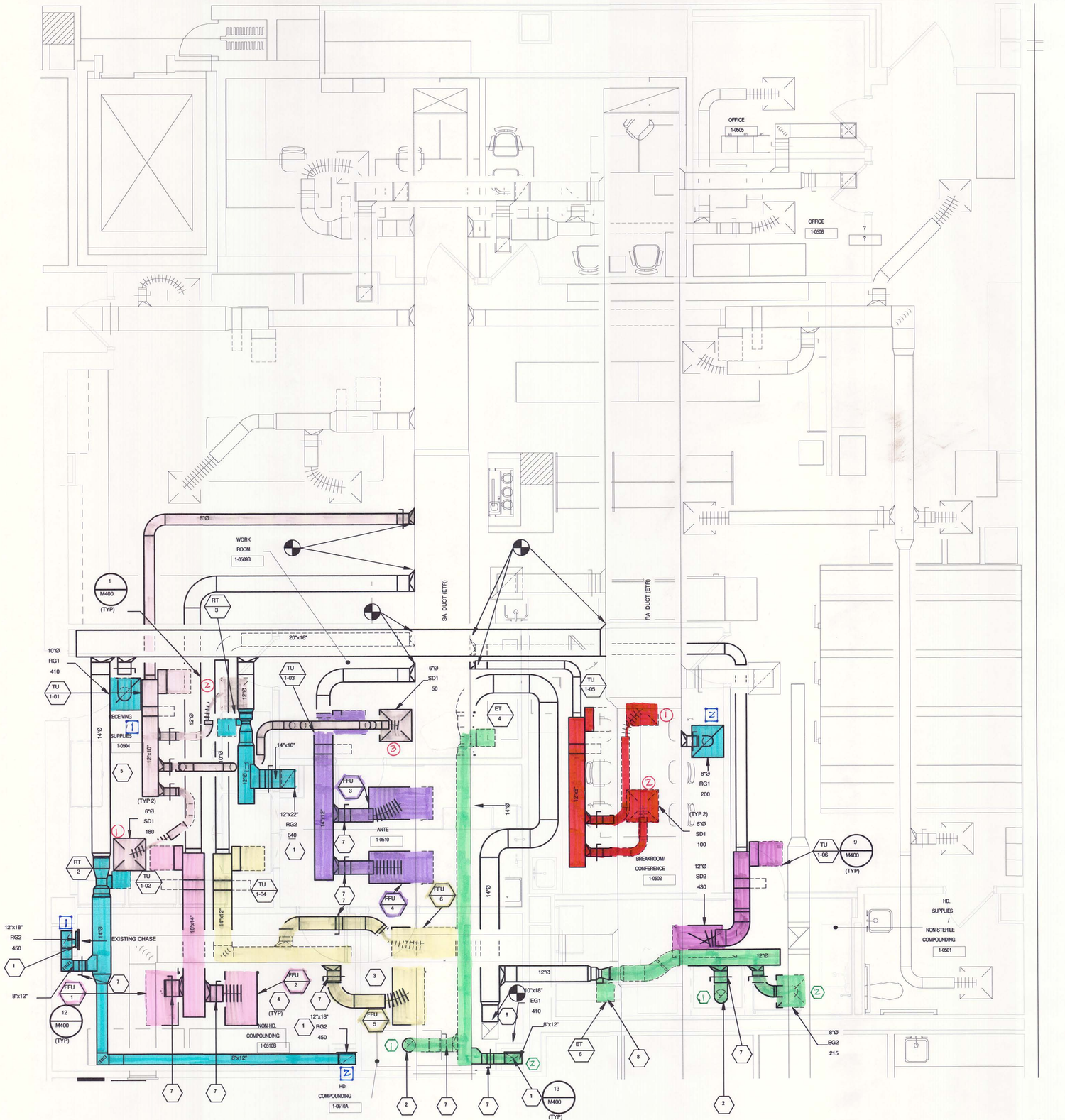
SUMMARY

Name	Type	Size	Design CFM	Prelim CFM	Final CFM	% of Design
Return Inlet-001	RG-1	24 x 24	410	330	330	80
Return Inlet-002	RG-1	24 x 24	200	215	208	104
Totals			**610**	**545**	**538**	

NOTES:

Summary
Return Inlet-001 / Final CFM
DAMPER IS 100% OPEN

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1 HVAC PHARMACY ENLARGED PLAN
1/4" = 1'-0"

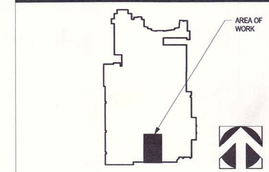
GENERAL MECHANICAL NOTES:

1. SEE M000 FOR GENERAL MECHANICAL NOTES.

MECHANICAL PLAN NOTES

1. INSTALL LOW-WALL RETURN/EXHAUST GRILLE AT 1'-0" A.F.F.
2. HOOD EXHAUST AIRFLOW: 415 CFM. PROVIDE 10"Ø CONTROL DAMPER AT CONNECTION TO BIOLOGICAL SAFETY CABINET (BSC), RUSKIN MODEL CDSR25 OR APPROVED EQUAL, WITH LOCKING HAND QUADRANT. LOCK DAMPER IN THE FULL OPEN POSITION. PROVIDE AIRGAP CANOPY CONNECTION IF HOOD IS NOT EQUIPPED WITH SUCH.
3. SEAL ALL DUCTWORK AND MECHANICAL EQUIPMENT PENETRATIONS OF CEILING AND WALLS, BOTH BELOW AND ABOVE CEILING, IN ROOMS WITH PRESSURE REQUIREMENTS AIR TIGHT. REFER TO M401 FOR PRESSURE REQUIREMENTS. COORDINATE WITH OTHER TRADES TO ENSURE ALL PENETRATIONS OF WALLS AND CEILING ARE SEALED, INCLUDING RECEPTACLES, SWITCHES, LIGHT FIXTURES, ACCESS DOORS, FIRE SPRINKLERS, PASS-THROUGH CABINETS, ETC.
4. T&B CONTRACTOR SHALL SET FINAL AIRFLOWS FOR ROOM DIFFERENTIAL PRESSURE REQUIREMENTS. REFER TO SHEET M401 FOR BALANCE PROCEDURE.
5. BALANCE DIFFUSERS WITHIN RECEIVING AREA TO AIRFLOWS SHOWN. BALANCE RETURN TO MAKE RECEIVING AREA SLIGHTLY NEGATIVE WITH RESPECT TO THE CORRIDOR. BALANCE GENERAL PHARMACY TO BE SLIGHTLY POSITIVE PRESSURE. PROVIDE AIRFLOW INDICATOR MODEL LAMIFLOW LN102F OR EQUAL IN WALL BETWEEN RECEIVING AND PHARMACY WORK AREA. INSTALL INDICATOR TO SHOW RECEIVING AREA AS SLIGHTLY NEGATIVE TO THE PHARMACY WORK AREA.
6. TRANSITION NEW 14"Ø EA DUCT INTO EXISTING 12X12 EA DUCT UP/ TO/ DOWN/ AS REQUIRED FOR CLEARANCE.
7. PROVIDE REMOTE OPERATED BALANCE DAMPER ABOVE CEILING. PROVIDE ACCESS PANEL IN CEILING.
8. PROVIDE ACCESS PANEL IN CEILING TO SERVICE TERMINAL UNIT.

KEY PLAN



HCA

Hospital Corporation of America℠

HCA Project Number: XXXXXX
ACHA Number: XXX-XXX

HCA DESIGN MANAGER: BRYAN SEELY
HCA CONSTRUCTION MANAGER: TROY DUGAN

HENDERSON ENGINEERS
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1850002125

#	DATE	CHANGE DESCRIPTION
1	04/25/2019	CITY COMMENTS
2	06/07/2019	ADDENDUM 2

The Medical Center of Aurora

The Medical Center of Aurora South Pharmacy Reno.
1501 S POTOMAC STREET
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Hospital Corporation of America

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DRAWING TITLE:
HVAC PHARMACY ENLARGED PLAN

COLORADO LICENSED
SEAN O. EISLER
52683
PROFESSIONAL ENGINEER

Aug 12 2019

02/01/2019
DRAWN BY: Author | CHECKED BY: Checker
18109.09

M101

CONSTRUCTION DOCUMENTS

SEAN O. EISLER

PRINT DATE: 8/12/2019 9:33:20 AM
FILE INFO: C:\Revit\Projects\18500002125 HCA MC AURORA MEP V18_arnekngnc_2019051200044.rvt