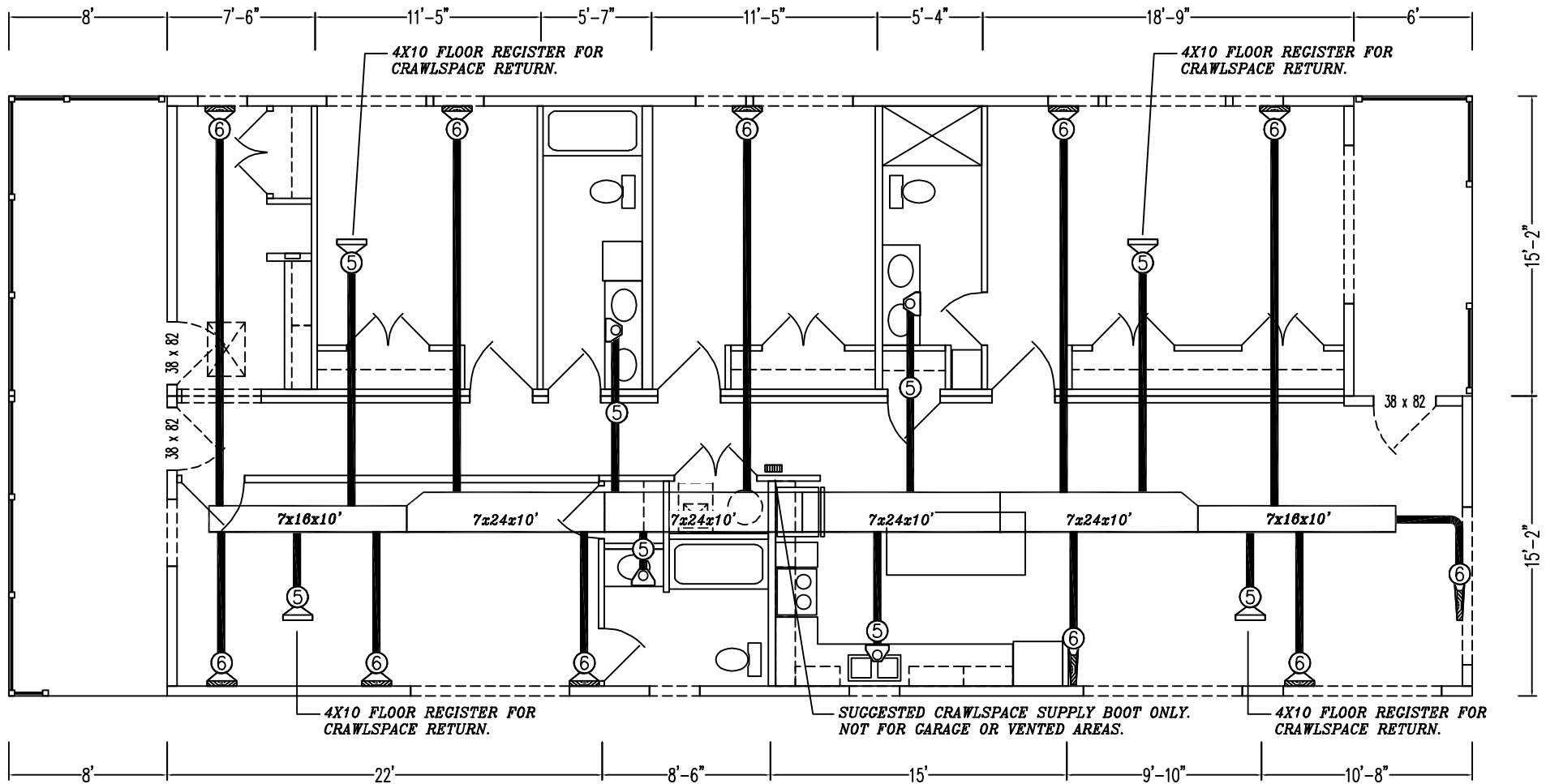




R-6 MINIMUM

REF

LENGTHS SHOWN ARE MAXIMUM
EXTERIOR DOORS MAX. 38" x 82"
SLIDING GLASS DOORS MAX. 72 x 80

LaSalleBristol
Manufacturing
ENGINEERED SYSTEM USING SINGLE
GRAD D.B. MAIN DUCT WITH PER.
BASEBOARD DIFFUSERS

DIVISIONS

	231 SUGARCREEK
X	233 ARKANSAS CITY
	235 SAN JACINTO
	237 WOODLAND
	239 OCALA
	241 LEOLA
	243 LANCASTER
	245 McMINNVILLE

REVISIONS

BOX LENGTH

74'-0"

DESCRIPTION

7432-4CIK-3B

SKYLINE

DRAWN BY: KS WIND ZONE 130 M.P.H.

DATE: 06/10/2026 ROOF ZONE 60#

SHEET OF

DRAWING NUMBER

S32-02841-008

APPLICATION ENGINEERING FOR HEATING AND COOLING

233-SKYLINE HOMES
315 W. Skyline Rd.
Arkansas City, KS 67005

Manufacturer's Model #: S-8999-M8-S32-02841-008
HVAC System Type: INFLOOR D.B. GRAD PER

CARRIER EQUIPMENT

Prepared By LaSalle Air Systems 7/8/2026 {Method & Output © 2026}
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Calculations on this page are based on design standards set forth in ASHRAE and ACCA Manuals J Rev 8.2 and D Rev 1.1. System registers are located for best distribution based on Manual T. Design calculations are based on worst case orientation. Room loads may vary based on actual conditions.

ENTIRE HOUSE VALUES - DESIGN ZONE: CO, Region 5B (2021) 37N Latitude

COOLING LOAD: 29,369 Btuh for Outside Temp/Humidity of 98 °F (36 C)/ 12% and Inside reduced to 75 °F (23 C)/ 50%

HEATING LOAD: 42,131 Btuh based on outside temp of 0 °F (-18 C) with inside temp raised to 72 °F (22 C)

Crawlspace is heated by the primary air handler to 47 F (8 C). Actual UA = 269 Max UA (Table R402.1.2) = 280.9
Use net wall area, not gross wall

CONSTRUCTION DETAILS & U / SHGC VALUES: (7.5+Non-ins Rim - 21 - 49)

Total Cond. Floor Area:	3822.00 s.f.	TRUE Outside Perimeter:	192.67	ft	
Level 1 Ceiling:	30 to 30 in.	Level 2 Ceiling:	108 to 108 in.	Level 3 Ceiling:	0 to 0 in.
Primary Wall Area:	1264.44 s.f. (Net)	Dark Roof(U):	0.023	FLOOR DUCTS (U):	n/a
Secondary Wall Area:	466.67 s.f. (Net)	Prim Wall (U):	0.056	ATTIC DUCTS (U):	0.125
TOTAL Low-E window	191.00 s.f.	Sec Wall (U):	0.081	EXT. DUCTS (U):	0.125
TOTAL S.G.D.	128.00 s.f.	Exp Floor(U):	0.127	INFLOOR DUCT AREA:	0 S.F. @ 45 TD/ 31.4 TD
TOTAL Shaded Low-E wi	0.00 s.f.	Low-E wi 0.250 / 0.29		ATTIC DUCT AREA:	0 S.F.(return) @ 112 TD/ 97 TD
TOTAL Shaded S.G.D.	64.00 s.f.	S.G.D. 0.250 / 0.36		EXT. DUCT AREA:	0 S.F. @ 112 TD/ 51 TD
TOTAL Door1 Area:	86.56 s.f.	Shaded L 0.250 / 0.04		PEOPLE:	4
TOTAL Door2 Area:	0.00 s.f.	Shaded S 0.250 / 0.04		FIREPLACES:	0
All Glass % of Floor:	10.02 %	Door 1: 0.250		DUCT GAIN: @ Tight	0 Btuh
All Glass % of Wall:	17.40 %	Door 2: 0.250		DUCT LOSS:	0 Btuh
LATENT GAIN:	0 Btuh			Summer Infiltr (10 mph):	63.5 cfm
Mech. Ventilation :	84.72 cfm (40 L/s)	Altitude: 4500 ft		Winter Infiltration (20 mph):	119.7 cfm @ Semi-Tight

ROOM BY ROOM VALUES:

1276.4 FPM, max velocity in trunk #: 4

Heat Exiting Furnace: 92 deg A/C Exiting : 51 deg

0.19 Max pressure at A/H

NOTICE: Due to glass area variations, the hourly cooling loads may not be balanced by a single-zone system

ROOM NAME		HEATING		COOLING		CFM		Cooling Air Values for 4 ton unit		Heating Air Values for 60 95 % Gas/Oil		15.0 kW Elec	Maximum A/C capacity Calibrated Blower Test	
		LOSS (Btu)		GAIN (Btu)		DIST		CFM	Btuh	CFM	Btuh	E	Btuh	Btuh (alt adj)
Utility	h	3,591		1,946		156		117	2,690	109	3,284		2,948	3,700
Bedroom #2	h	2,480		1,884		108		123	2,819	114	3,441		3,090	3,878
Bath #2	h	869		371		38		66	1,518	61	1,853		1,664	2,090
Bedroom #3	h	2,480		1,884		108		96	2,197	89	2,682		2,409	2,917
Bath #3	h	830		354		36		58	1,324	54	1,616		1,451	1,758
Bedroom #4	h	6,342		4,673		276		211	4,826	195	5,891		5,290	6,392
Living Room	h	4,916		4,371		214		239	5,462	221	6,668		5,988	7,219
Dining Room	c	3,081		4,037		140		112	2,573	104	3,141		2,820	3,416
Kitchen	h	2,779		1,438		121		57	1,308	53	1,597		1,434	1,737
M. Bath	h	1,615		927		70		66	1,504	61	1,836		1,648	2,070
M. Bedroom	h	6,759		6,320		295		360	8,233	333	10,051		9,025	11,327
Crawlspace	h	6,392		1,163		279		224	5,136	208	6,270		5,629	6,938
TOTALS		42,131		29,369		1,841		1,729	39,589	1,603	48,331		43,396	53,442

APPLICATION ENGINEERING

DUCT AIR FLOW AND SIZING WORKSHEET (MANUAL D)

Manufacturer: **233-SKYLINE HOMES**
315 W. Skyline Rd.
Arkansas City, KS 67005

Model #: **S-8999-M8-S32-02841-008**
HVAC System Type: **INFLOOR D.B. GRAD PER**
Design Zone: **CO, Region 5B (2021)**

Prepared by LaSalle Air Systems 7/8/2026 All rights reserved. This information proprietary to LaSalle Bristol Co. and 233-SKYLINE HOMES
Calculations include factors for duct air temperature change and pressure drops through ducts. All joints are tightly fitted or sealed.

Blower CFM	1925	@	0.8 E.S.P.	TEL=	400.3056	FR=	0.1224	(A/C Coil included)							User Input		
				Altitude =	4,500 ft												
BRANCH DUCT LISTING ANALYSIS																	
BR #	Trunk #	Metal (ft)	F. G. (ft)	Flex (ft)	Bends/ Fittings(ft)	Total Eq. Length	Heat Btuh	Cool Btuh	Elec Heat cfm	(Altitude Adj.) Cool cfm	Design cfm	Round Size	Rectangle Size (i.d.) x (i.d.)	Round Size	Final Velocity fpm		
1 Utility	2	0	25	16	231.1	272.1	3,591	1,946	160	87	160	5.95		6.0	816.9		
2 M. Bedroom	2	0	25	7	228.4	260.4	2,283	2,135	102	96	102	5.03		6.0	519.3		
3 Crawlspace	2	0	25	4	329.6	358.6	1,659	302	74	14	74	4.93		5.0	543.4		
4 Crawlspace	2	0	25	13	342.3	380.3	1,571	286	70	13	70	4.93		5.0	514.7		
5 M. Bedroom	2	0	25	19	242	286.0	2,126	1,988	95	89	95	5.03		6.0	483.5		
6 Bedroom #2	3	1	15	19	220.7	255.7	2,480	1,884	111	84	111	5.13		6.0	564.0		
7 M. Bedroom	3	1	15	7	227.1	250.1	2,350	2,198	105	98	105	5.03		6.0	534.6		
8 Bath #2	3	1	15	8	286.3	310.3	869	371	39	17	39	3.50		5.0	284.6		
9 M. Bath	3	1	15	3	294.8	313.8	1,615	927	72	42	72	4.62		5.0	528.9		
10 Bedroom #3	4	1	25	19	270.7	315.7	2,480	1,884	111	84	111	5.43		6.0	564.0		
11 Kitchen	4	1	25	6	302.7	334.7	2,779	1,438	124	64	124	5.78		5.0	910.3		
12 Bath #3	4	1	25	10	293.9	329.9	830	354	37	16	37	3.50		5.0	271.8		
13 Bedroom #4	4	1	25	19	240.7	285.7	3,137	2,311	140	103	140	5.73		6.0	713.5		
14 Dining Room	4	1	25	6	226.8	258.8	3,081	4,037	138	181	181	6.15		6.0	920.4		
15 Crawlspace	4	1	25	12	310.4	348.4	1,570	286	70	13	70	4.75		5.0	514.3		
16 Crawlspace	5	0	35	4	335	374.0	1,591	290	71	13	71	4.92		5.0	521.2		
17 Bedroom #4	5	0	35	20	251.4	306.4	3,205	2,362	143	106	143	5.92		6.0	729.1		
18 Living Room	5	0	35	7	237.5	279.5	2,365	2,103	106	94	106	5.16		6.0	538.0		
19 Living Room	5	0	35	6	211.5	252.5	2,551	2,268	114	102	114	5.16		6.0	580.2		
N/A Other Rooms							-	-									
							42,131	29,369	1,882	1,315	1,925						

TRUNK DUCT LISTING ANALYSIS																	
TRUNK # 1	1				90	91.0	42,131	29,369		1925	12.90	14	14	15.3	1414.2		
TRUNK # 2			10		126.374	136.4	11,230	6,656		502	8.11	5.5	14.5	9.5	905.7		
TRUNK # 3			15		91	106.0	18,543	12,036		828	9.51	5.5	22.5	11.5	963.7		
TRUNK # 4			25		91	116.0	23,588	17,333		1097	10.65	5.5	22.5	11.5	1276.1		
TRUNK # 5			10		135.476	145.5	9,712	7,023		434	7.74	5.5	14.5	9.5	783.3		
TRUNK # 6							-	-		0		0	0				
TRUNK # 7							-	-		0		0	0				
TRUNK # 8							-	-		0		0	0				
TRUNK # 9							-	-		0		0	0				
TRUNK # 10							-	-		0		0	0				
TRUNK # 11							-	-		0		0	0				
TRUNK # 12							-	-		0		0	0				
TRUNK # 13							-	-		0		0	0				
TRUNK # 14							-	-		0		0	0				
TRUNK # 15							-	-		0		0	0				
LONGEST RETURN DUCT					20	20				1925	12.06	18	24	22.7	641.6		

APPLICATION ENGINEERING EQUIPMENT SELECTION AND SIZING WORKSHEET (MANUAL S)

Manufacturer: **233-SKYLINE HOMES**
315 W. Skyline Rd.
Arkansas City, KS 67005

Model #: **S-8999-M8-S32-02841-008**
 HVAC System Type: **INFLOOR D.B. GRAD PER**
 Design Zone: **CO, Region 5B (2021)**

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RESULTS FROM MANUAL-J CALCULATIONS: Worst Case Orientation

HEATING LOAD:	42,131 Btuh at 0 °F	REQ'D BLOWER CFM:	1,729 cfm at altitude of 4,500 ft
SENSIBLE CLG LOAD:	29,369 Btuh at 98 °F	Entering Air DRY Bulb:	76.0 °F Mech. Ventilation : 85
LATENT CLG LOAD:	- Btuh at 98 °F	Entering Air WET Bulb:	60.1 °F Entering Air RH: 49 %
GRAINS DIFFERENCE:	(33)	Outside wet bulb:	60.8 °F outside RH: 11.8 %

FILL IN BLANKS IN EACH SECTION FROM THE H.V.A.C. EQUIPMENT DATA CHARTS: (Do not use ARI Ratings!)

Air handler model #: _____ Condenser model #: _____

☐ **Blower Data** Select blower speed in COOLING mode: _____
 Blower CFM is between 1636 > _____ < 2214 for Total (External) Static Pressure between 0.7 > _____ < 0.9

☐ **Electric, Gas or Oil Furnace** Select blower speed in HEATING mode: _____ Output Btuh is between 44237 > _____ < 58983
 Blower CFM is between 868 > _____ < 1026 for Temp. rise of 55-65
 Blower CFM is between 1026 > _____ < 1254 for Temp. rise of 45-55
 Blower CFM is between 1254 > _____ < 1613 for Temp. rise of 35-45

☐ **Cooling Equipment** S/T Ratio = 1 Leaving Temp = 50.4 °F TD = 24.6 °F
 At 98F outside, Total A/C output from 29956 btuh _____ to 33774 btuh is GOOD.
 At 98F outside, Total A/C output from 33774 btuh _____ to 35243 btuh is MARGINAL.

Sensible Capacity is from 29369 btuh _____ to 29369 btuh
 Latent Capacity is from 0 btuh _____ to 0 btuh

Mechanical Ventilation is 4.4 % of blower cfm. Dry bulb increases by: 1 °F Wet bulb increases by: -0.4 °F

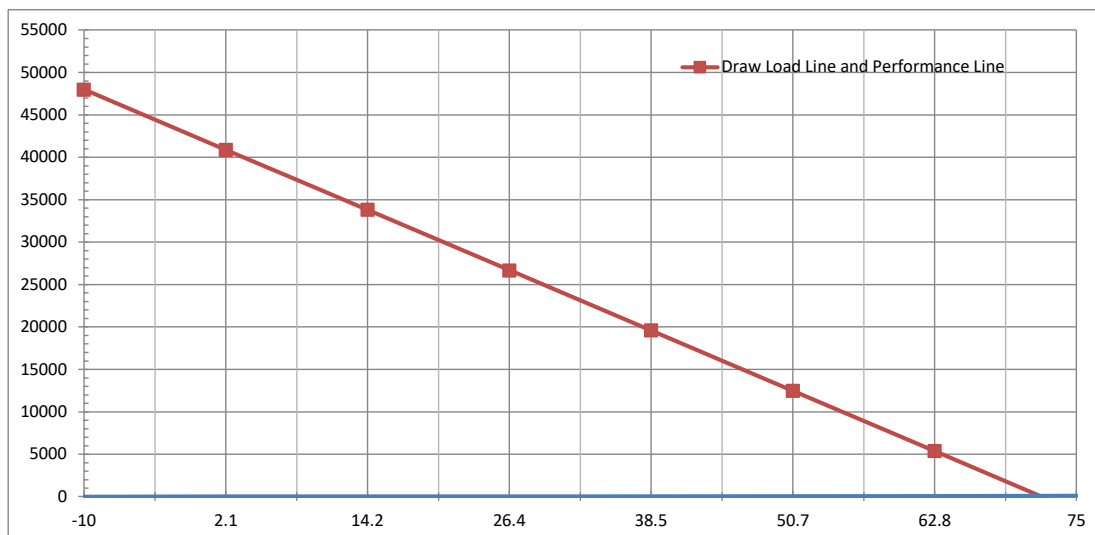
☐ **Heat Pump with Supplemental Heating Coils**

Data from performance charts

_____ btuh at _____ F outside
 _____ btuh at _____ F outside

Data from load calculation

0 btuh at 72 F outside
 42,131 btuh at 0 F outside



At winter design temperature of _____ 0 F outside, the distance between the lines is _____ btuh
 which is the Supplemental Heat divided by 3400 = _____ KW.

APPLICATION ENGINEERING

INTERNATIONAL MECHANICAL CODE - Chapter 4 Ventilation Worsheel

Manufacturer: **233-SKYLINE HOMES**
315 W. Skyline Rd.
Arkansas City, KS 67005

Model #: **S-8999-M8-S32-02841-008**
HVAC System Type: **INFLOOR D.B. GRAD PER**
Design Zone: **CO, Region 5B (2021)**

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RESULTS FROM MANUAL-J CALCULATIONS: Worst Case Orientation

HEATING LOAD:	42,131 Btuh at	0 °F	REQ'D BLOWER CFM:	1,729 cfm at altitude of 4500 ft
SENSIBLE CLG LOAD:	29,369 Btuh at	98 °F	Entering Air DRY Bulb:	76.0 °F Mech. Ventilation : 85
LATENT CLG LOAD:	- Btuh at	98 °F	Entering Air WET Bulb:	60.1 °F Entering Air RH: 49 %
GRAINS DIFFERENCE:	(33)		Outside wet bulb:	60.8 °F outside RH: 12 %

Natural or Mechanical: Test the infiltration at 50 Pa should result in 731.9 CFM infiltration being 1.998 ACH (to be confirmed by testing)

(5 ACH = 1831 CFM) (3 ACH = 1098 CFM)

Mechanical ventilation is required

To Meet Natural Ventilation: Increase Openable Area by 150 %

ROOM NAME	Room Area	Openable Area		ROOM NAME	Room Area	Openable Area	
		Required	Built			Require	Built
Utility	113.8	4.5	6.25	M. Bath	128.9	5.1	3.13
Bedroom #2	173.2	6.9	11.25	M. Bedroom	333.7	13.3	42.00
Bath #2	84.7	3.3	0.00	Crawlspace	1911.0	12.7	0.00
Bedroom #3	173.2	6.9	11.25		0.0	0.0	0.00
Bath #3	80.9	3.2	0.00		0.0	0.0	0.00
Bedroom #4	284.4	11.3	18.50		0.0	0.0	0.00
Living Room	161.8	6.4	32.00		0.0	0.0	0.00
Dining Room	149.1	5.9	32.00		0.0	0.0	0.00
Kitchen	227.5	9.1	3.13		0.0	0.0	0.00
TOTAL					3822.0	88.6	159.50

Mechanical Ventilation Is Required In These Areas To Meet IMC 2012/2015 Per Table 403.3.1.1:

SPACE CLASSIFICATIONS	Occupancy	Area	Outdoor Exhaust		ZONE AIR DISTRIBUTION	Air Flow
			Air	Air		
Private Living Area	4.0	1389.0	84.7	0.0	Floor Supply of Warm Air/Floor Return	1482
Private Kitchen	0.0	227.5	0.0	25.0	Floor Supply of Warm Air/Floor Return	57.13
Private Baths	0.0	294.5	0.0	60.0	Floor Supply of Warm Air/Floor Return	189.8
	0.0	0.0	0.0	0.0		0
	0.0	0.0	0.0	0.0		0
	0.0	0.0	0.0	0.0		0
Total	4.0	1,911.0	84.7	85.0		1,729
System Ventilation Efficiency:						1

Prepared by LaSalle Air Systems

Duct System Materials and Costing Worksheet

CUSTOMER: SKYLINE

MODEL: S-8999-M8-S32-02841-008

DATE: 7/8/2026

SYSTEM: Graduated Single Trunk Per with Baseboard Diffusers
Modular W/R-6 Ducts

CAT #	DESCRIPTION	QTY	
1140W	MFR# 18" EURO STYLE WHITE Baseboard Diffuser (12/CT)	11	ea
1100B	MFR# 4 X 10 BROWN Floor Register (30/CT)	1	ea
1121W	MFR# 2 X 12 WHITE Residential Register (20/CT)	0	ea
1160B	MFR# 2 X 12 BROWN Toe Space Register (20/CT)	4	ea
2005	MFR# STS05 5" Start Collar (20/CT)	8	ea
2006	MFR# STS06 6" Start Collar (20/CT)	11	ea
2105	MFR# SPC05 5" Splicing Collar (20/CT)	4	ea
2106	MFR# SPC06 6" Splicing Collar (20/CT)	5	ea
2203	MFR# 2 1/4" X 12" X 5" 90 Degree Register Boot(24/CT)	4	ea
2303	MFR# 2 1/4" X 12" X 5" Center End Boot (45/ct)	0	ea
2204	MFR# 2 1/4" X 12" X 6" 90 Degree Register Boot(24/CT)	9	ea
2304	MFR# 2 1/4" X 12" X 6" Center End Boot (20/CT)	2	ea
2612	MFR# ET/STS/C 12" Crossover Collar (10/CT)	0	ea
2614	MFR# ET/STS/C 14" Crossover Collar (10/CT)	0	ea
2448	MFR# MHO ASSEMBLED 2 5/8"x12 1/8"x8" w/Tabs	4	ea
2946-AL	MFR# TTOB-L 2 1/4" X 12" X 5" Toe Space Boot LT/5" Collar	2	ea
2946-AR	MFR# TTOB-R 2 1/4" X 12" X 5" Toe Space Boot RT/5" Collar	2	ea
2932	MFR# 5" 90 DEGREE ADJ ELBOW Elbow (12/CT)	4	ea
050121212	MMF 12 X 12 X 12 30 GA WYE TYG121212 10/Cartron	0	ea
2929	MFR# 265 14" TO 12" Reducer (12/ct)	0	ea
2983	MFR# 14" X 14" TO 14" Rect. To Round Trans. (10/CT)	0	ea
3305	MFR# 086 5" X 25' R6 Interior Flexduct (1/CT)	60	ft
3306	MFR# 086 6" X 25' R6 Interior Flexduct (1/CT)	145	ft
3512	MFR# UPC 048 12" X 25' R8 Exterior Flexduct (1/CT)	0	ft
3514	MFR# UPC 048 14" X 25' R8 Exterior Flexduct (1/CT)	0	ft
4341	MFR# 7" X 13" X 120" Duct Board Trunk (1867/PL)	0	ft
4342	MFR# 7" X 16" X 120" Duct Board Trunk (2240/PL)	20	ft
4343	MFR# 7" X 24" X 120" Duct Board Trunk (2100/PL)	40	ft
5236UL	MFR# CT32-175K9-B 32" Nylon Strap UL (500/CT)	47	ea
5407	MFR# 2.5"X 60' UL 181 FOIL UL 181 A-P Foil Tape (20/CT)	0.9	roll
TOTAL:		\$462.19	