CAMPBELL UNIVERSITY - HOBSON PERFORMANCE CENTER
SMOKE MANAGEMENT CALCULATIONS FOR A STAGE FIRE

ROOF VENTS SIZED PER BUILDING CODE REQUIREMENTS
MARCH 19, 2020
LUKE RICHARDS, PE

NC BUILDING CODE - 2018 CHAPTER 4
HANDBOOK OF SMOKE CONTROL ENGINEERING (2012)

410.3.7 - STAGE VENTILATION

410.3.7.1 - ROOF VENTS

$A_{s,full}$	2,100	ft^2	Area of the stage
$A_{v,min}$	105	ft^2	Minimum area of roof vents (5% of stage area)

Existing Curb Dimensions

T_c		2	in	Curb Thickness	
	69	21	in	10 ft^2	
	53	21	in	8 ft^2	
			Ex. Area	18 ft^2	16.9% of required

Relief dampers would need to be removed and replaced with automated dampers tied to F/A system

New Automatic Smoke Vents - Full Stage

Consistent Automatic Smoke Vents

30	36	in	7.5 ft^2	14 Vents Required
48	48	in	16 ft^2	7 Vents Required
72	48	in	24 ft^2	5 Vents Required
60	60	in	25 ft^2	5 Vents Required
90	48	in	30 ft^2	4 Vents Required
72	60	in	30 ft^2	4 Vents Required
66	66	in	30.3 ft^2	4 Vents Required
96	48	in	32 ft^2	4 Vents Required
84	60	in	35 ft^2	3 Vents Required
96	60	in	40 ft^2	3 Vents Required
120	60	in	50 ft^2	3 Vents Required
144	66	in	66 ft^2	2 Vents Required

25.7% more than required

New Smoke Vents on Existing Skylight Curbs- Full Stage

Existing Skylight Dimensions

120	72 in	60 ft^2	2	Skylights Required

*Measurements taken by TA Loving

Ex. Area	120 ft^2	114.3%	of required