



**Eric J. Holcomb**  
Governor

**Kristina Box, MD, FACOG**  
State Health Commissioner

October 19, 2017

MB3-99-RLP-#390  
Mr. Jeff Fritz, Superintendent  
Clay Community Schools  
1013 S. Forest Ave.  
Brazil, IN 47834

Dear Mr. Fritz:

The purpose of this letter is to report the result of our indoor air quality evaluation at East Side Elementary School on October 10, 2017. This evaluation was conducted at Mr. Howard's request to address the health concerns of the occupants that may be related to indoor air quality of the school.

The Indiana State Department of Health's Microbiological Laboratory incubated and counted the fungal and bacterial units. The total colony forming units per cubic meter of air (CFU/M<sup>3</sup>) were computed by adding the fungal and bacterial counts, and dividing the sum by the total volume of the sampled air. Please refer to Table 1 for further details.

Both fungal and bacterial counts outdoors were higher than any areas inside the building. There are no limits established as an acceptable concentration of fungal counts indoors. There are guidelines that recommend fewer counts indoors than outdoors.

The Carbon dioxide (CO<sub>2</sub>) level was measured inside the classrooms. The highest carbon dioxide level measured was 1860 parts CO<sub>2</sub> per million parts of air (ppm). The School Indoor Air Quality rule, 410 IAC 33-4-2 states "carbon dioxide concentrations in the breathing zone shall never exceed 700 ppm over the outdoor concentration", in this case giving a limit of 1167 ppm. ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommends 15 cfm (cubic feet per minute) of outdoor air per person for classrooms.

The outdoor relative humidity was measured at 87 percent (%). The indoor relative humidity had a range of 70% to 78%. The American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) recommend the relative humidity in habitable spaces preferably should be maintained between 30% and 60% to minimize growth of allergenic and pathogenic organisms. Humidity levels above 50% have been found to increase the population size of molds, fungi and mites that may cause allergies.



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The evidence suggests that humidity levels should be maintained between 40% and 50% to reduce the incidence of upper respiratory infections and to minimize the adverse effect on people suffering from asthma or allergies. Such a range would be hard to maintain, however, exposure to higher or lower levels are unlikely to affect the health of most people.

Based on sample results and our visual inspection we note the following:

- 1) **410 IAC 33-4-2 (b): states “carbon dioxide concentrations in the breathing zone shall never exceed 700 ppm over the outdoor concentration”.** Classrooms A-108, A-118, A-119, and A-120 exceeded the carbon dioxide concentration limit of 1167 ppm. Please ensure there is a sufficient amount of outdoor air being supplied into the classrooms.
  
- 2) **410 IAC 33-4-4 Sec. 4 (b) states: “where provided air-conditioning systems shall be capable of providing and shall be operated to maintain a temperature not to exceed seventy-eight (78) degrees Fahrenheit and sixty-five percent (65%) relative humidity during periods of student’s occupancy”.** As shown in Table 1, relative humidity in the classrooms exceeded the allowed limit. Humidity at the levels measured can promote mold growth. The outdoor relative humidity was 87% and likely impacted the humidity levels inside the classrooms. We urge the school to take the necessary steps in lowering the humidity levels when they exceed 65%. Please ensure the HVAC system is operating within its specifications.

Individuals experiencing any health problems should seek medical advice from a physician.

Please respond within 60 days of any actions you take based upon this report.

The School Indoor Air Quality rule 410 IAC 33-6-2 requires this report, and your response to this report, to be posted for 14 days at the location of the school building stated in the report so they are accessible to all students, parents, and employees.

If you have questions, please contact me at 317/351-7190 ext. 264

Sincerely,



RICK PLEW  
Industrial Hygienist  
Indoor Air Section, Environmental Public Health Division  
Enclosure

**TABLE 1**  
**East Side Elementary School**  
 936 E. National Avenue  
 Brazil, IN 47834

Computed Microbiological Air Sample Results  
 Taken October 10, 2017

SAMPLE ID	LOCATION	NO. OF OCCUPANTS	RELATIVE HUMIDITY (%)	CARBON DIOXIDE (ppm)	AIR SAMPLED (liters)	FUNGAL COUNT (CFU/M <sup>3</sup> )	BACTERIAL COUNT (CFU/M <sup>3</sup> )	TOTAL COUNT (CFU/M <sup>3</sup> )
1	Rm. A-108	19	75	1515	50	200	0	200
2	Computer Lab	19	70	818	50	140	60	200
3	Rm. A-120	21	74	1372	50	120	40	160
4	Rm. A-119	17	78	1269	50	320	60	380
5	Rm. A-118	25	74	1860	50	120	20	140
6	Rm. B-133	3	70	711	50	400	140	540
7	Outdoor	-	87	467	50	2620	840	3460

**Notes:**

**% -----percent**

**Ppm-----parts per million**

**CFU/M<sup>3</sup>—colony forming units per cubic meter of air**