

About the CDR Direct Drive Airflow Measurement Charts

The charts are derived from the Airflow Performance tables for direct drive 3 through 5 ton units found in the Technical Guide and Installation Instructions. The charts are only valid for the range of data listed in the Airflow Performance tables:

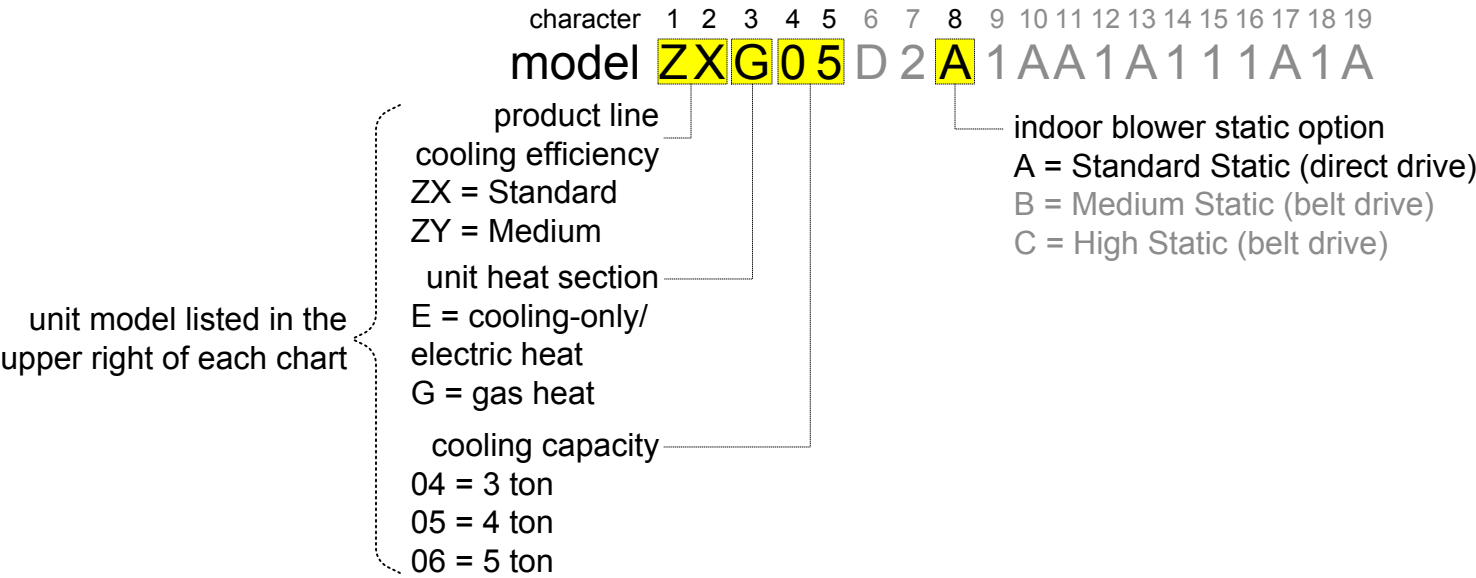
- External static pressure ranging from 0.2 inches water column to 1.0 inches water column

Use of the CDR Direct Drive Airflow Measurement Charts

The airflow measured through use of these charts should also be confirmed through another method of airflow measurement such as:

- Heat section temperature rise
- Proper leaving air temperature for cooling
- Duct traverse
- Balometer measurement of supply duct outlets

The 1st through 5th and 8th characters of the unit model nomenclature and the duct connection used in application determine the specific chart to be used.



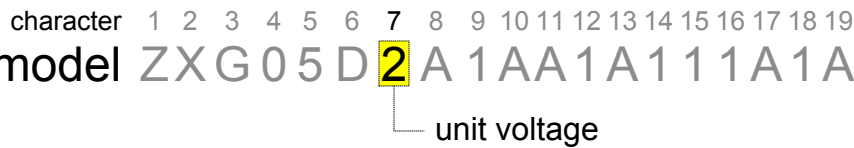
Each chart lists the duct connection used in application in the upper right below the unit model:

- Side (horizontal) Duct Connection
- Bottom (thru-the-curb) Duct Connection

Upper right heading of the chart used in the example that follows:

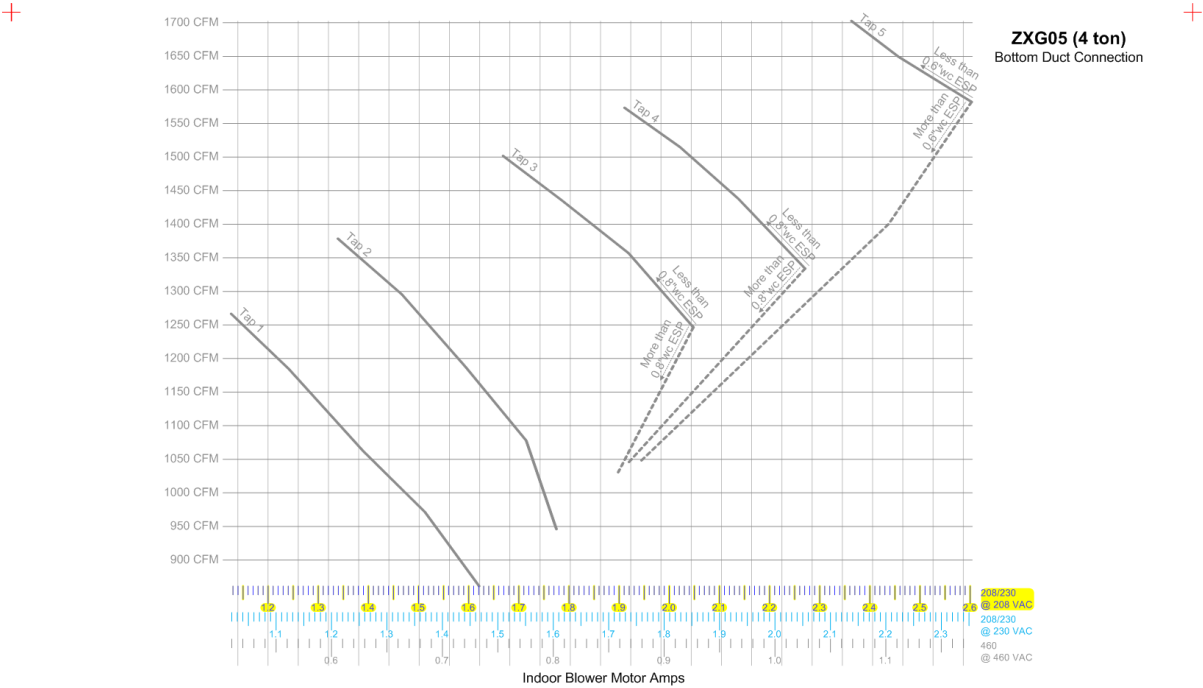
ZXG05 (4 ton)
Bottom Duct Connection

Along with field observation of the applied voltage, the 7th character of the unit model nomenclature determines the amperage scale of the specific chart to be used:



- 1 = 208/230-1Ø: depending on voltage applied, use the @ 208 VAC or @ 230 VAC amperage scale
- 2 = 208/230-3Ø: depending on voltage applied, use the @ 208 VAC or @ 230 VAC amperage scale
- 4 = 460-3Ø: use the @ 460 VAC amperage scale
- 5 = 575-3Ø: use the @ 230 VAC amperage scale (a transformer supplies blower motor power)

The example uses the blue lines and text of the 208/230-3Ø amperage scales of the chart.



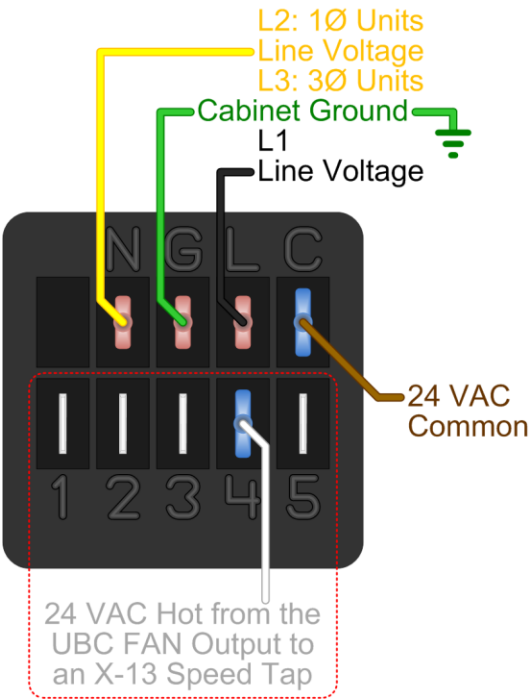
User Guide ZXG05 bottom a

Particularly for 208/230 VAC units, field observation of the applied voltage determines the specific amperage scale of the chart to be used. Highlighted in yellow, 208 VAC is the applied voltage for the example so the @ 208 VAC scale is used.

Accuracy in measurement of the blower motor line voltage amperage is crucial to the accuracy of the chart. An in-line ammeter can produce the most accurate measurement in cases where the blower motor amperage is toward the lower end of the scale. When using an amp-clamp, centering the wire in the amp-clamp and keeping the amp-clamp away from energized contactor coils or other induction sources aids in the accuracy of amperage measurement.

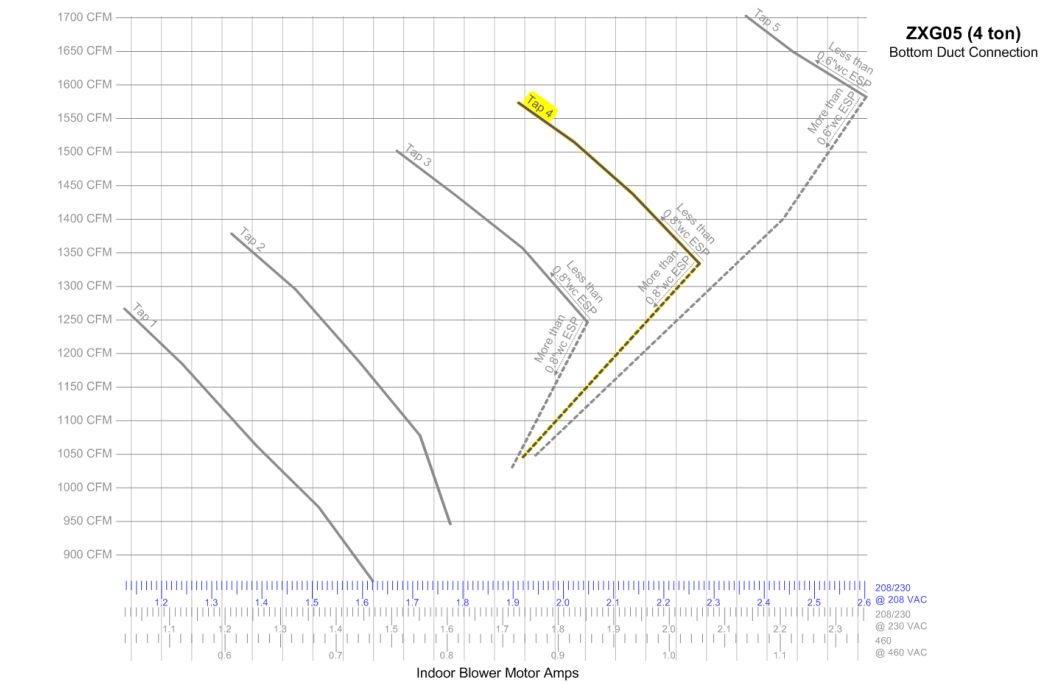
Note that the amperage scales of the charts are set at a nominal applied voltage. Actual applied voltage variances of up to +/-10% from nominal can be expected under field conditions. For each 1% applied voltage is above nominal voltage, amperage decreases 1% (close approximation). For each 1% applied voltage is below nominal voltage, amperage increases 1% (close approximation). Compensation of the amperage measured to the scales of the chart will be needed when applied voltage is above or below nominal voltage. Examples:

- Applied voltage is 5% above nominal; indoor blower motor amps are 2.0A – on the chart, 1.9A (95% of the measured 2.0 A) is used in compensation
- Applied voltage is 5% below nominal; indoor blower motor amps are 2.0A – on the chart, 2.1A (105% of the measured 2.0 A) is used in compensation



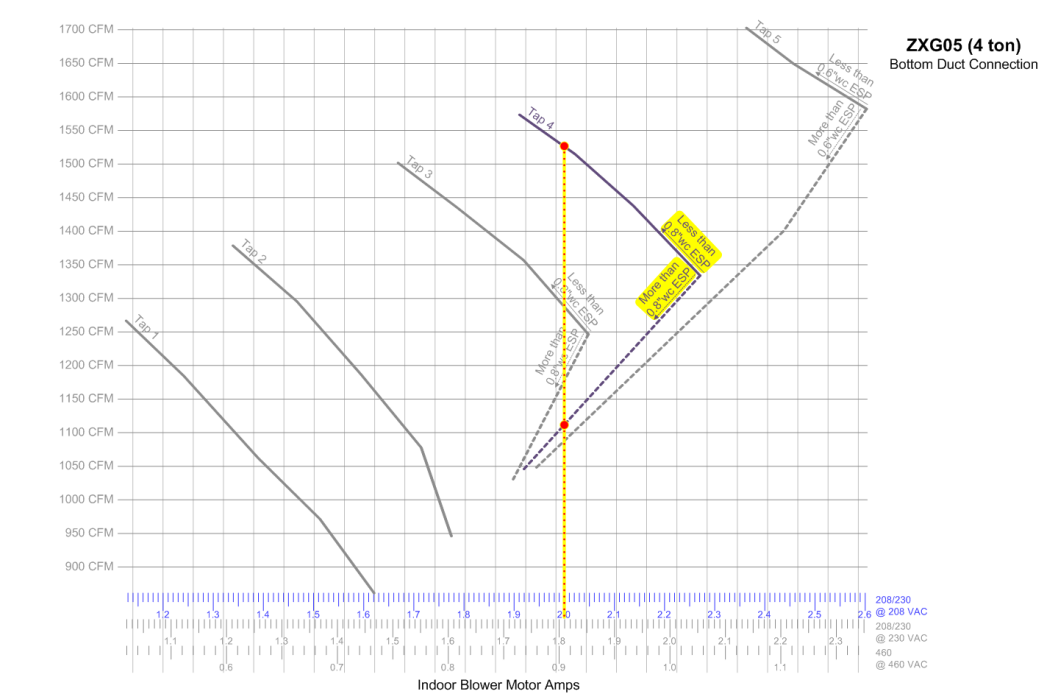
User Guide X13 taps

Field observation of the X-13 indoor blower motor “speed” tap connected to the 24 VAC UCB FAN output determines the specific angled/curved Tap line of the chart to be used. As shown in the illustration above and highlighted in yellow in the chart that follows, Tap 4 is used in the example.



User Guide ZXG05 bottom b

A vertical line is draw from the indoor blower motor amps location on the amperage scale to intersect with the angled/curved Tap line. 2.0 amps is used in the example.

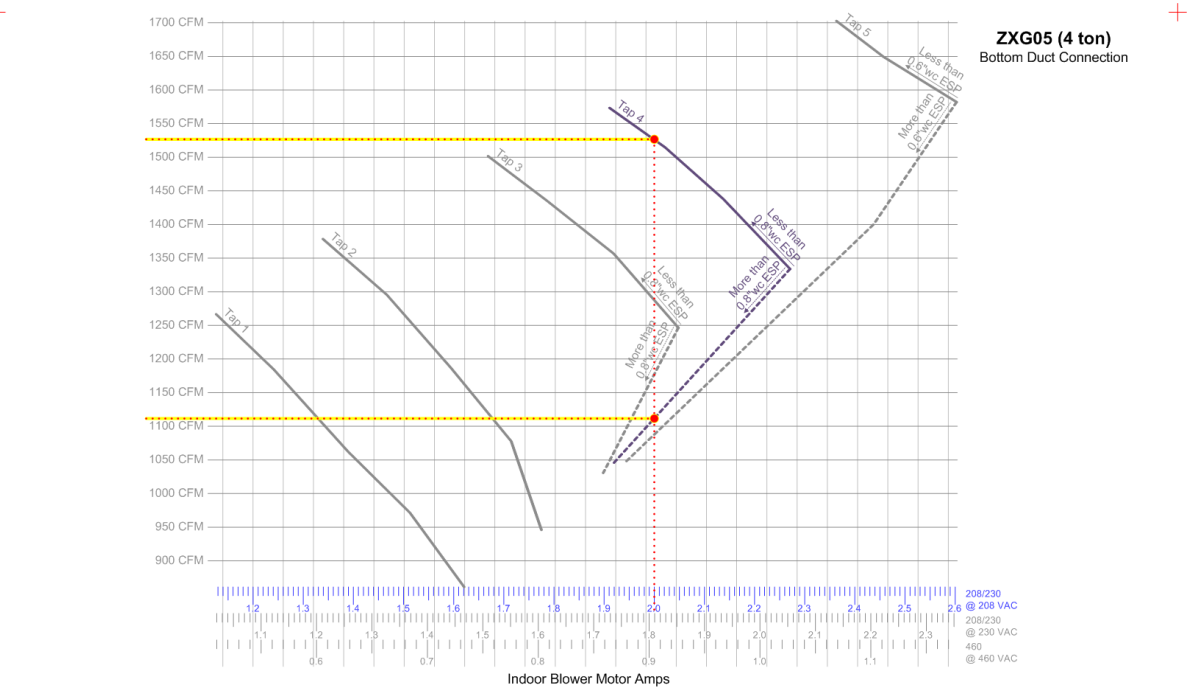


User Guide ZXG05 bottom c

Going diagonally from top-left to bottom-right on the chart, the solid sections of the Tap lines indicate unit external static pressure (ESP) conditions where the X-13 motor operates with normal programming. Going diagonally from top-right to bottom-left on the chart, the dashed sections of the Tap lines indicate unit external static pressure (ESP) conditions where the X-13 motor operates with speed limiting programming. Highlighted in yellow on the example chart, text labels on the tap lines indicate the ESP where each Tap line section applies.

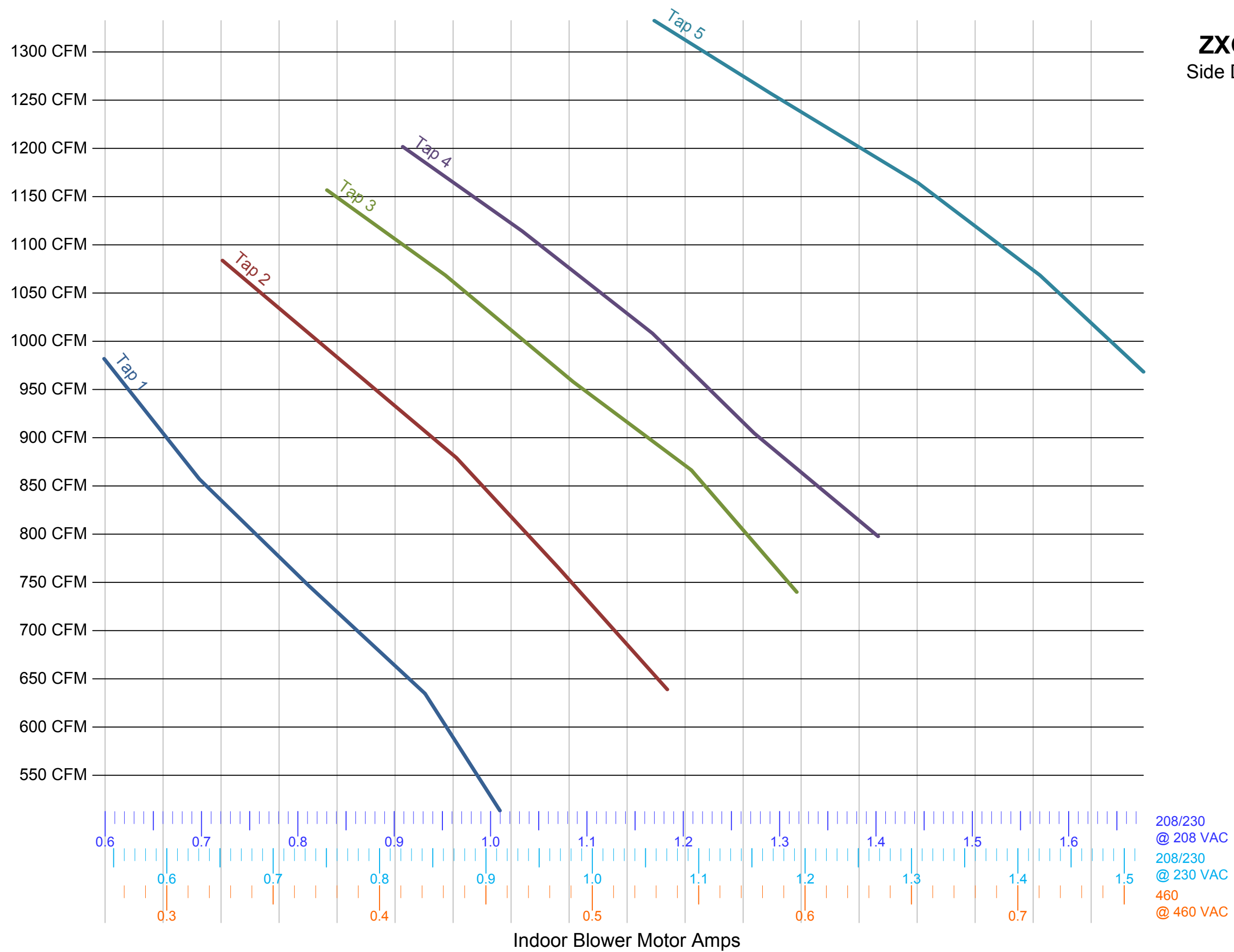
Note that unit external static pressure (ESP) conditions where the X-13 motor operates with speed limiting programming may produce inconsistent motor amperage that affects field measurement and influences chart accuracy.

A line drawn horizontally from the intersection(s) of the vertical amperage line on the Tap line indicates the unit indoor airflow volume in CFM. Slightly more than 1100 CFM and 1525 CFM are indicated in the example.

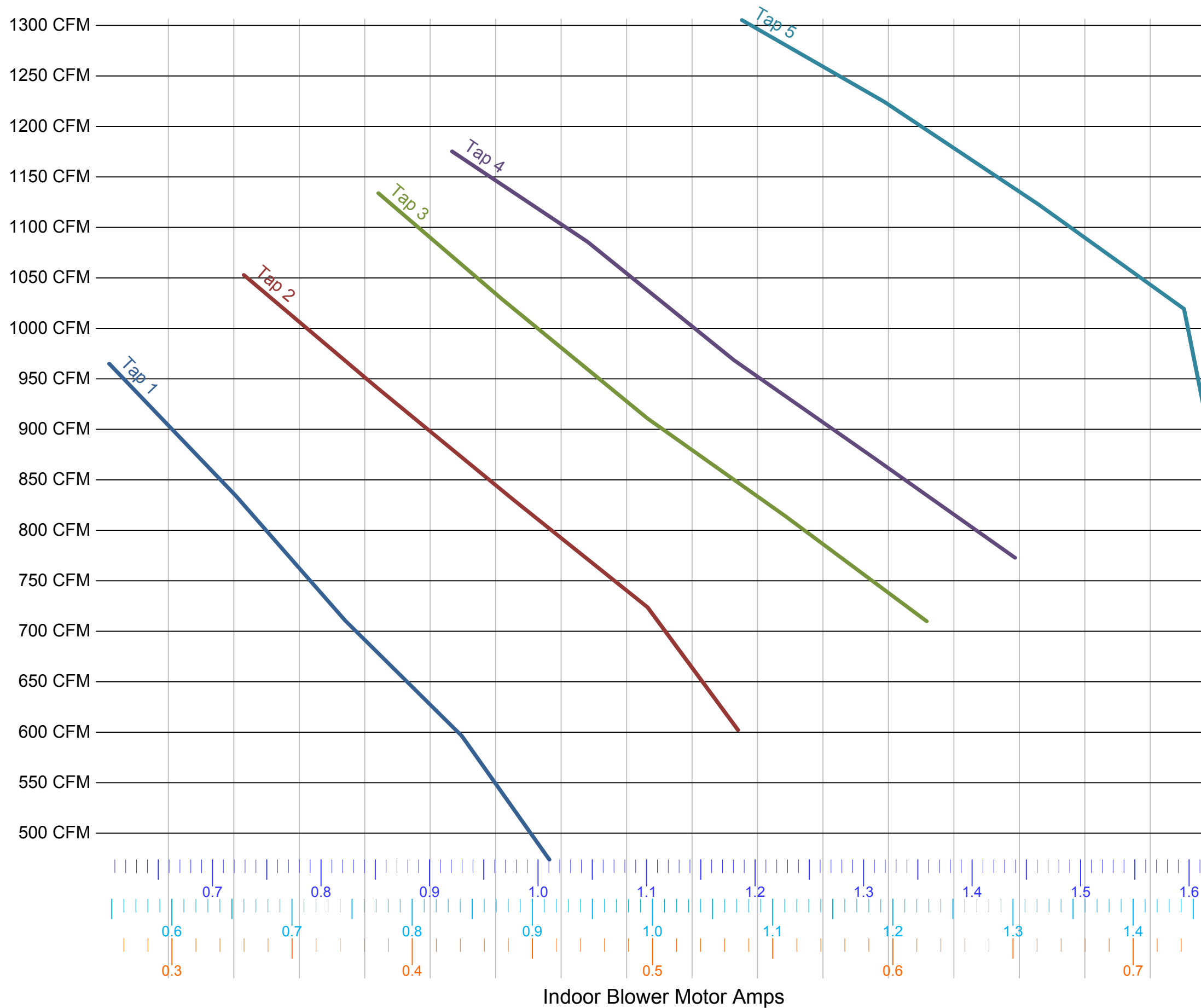


User Guide ZXG05 bottom d

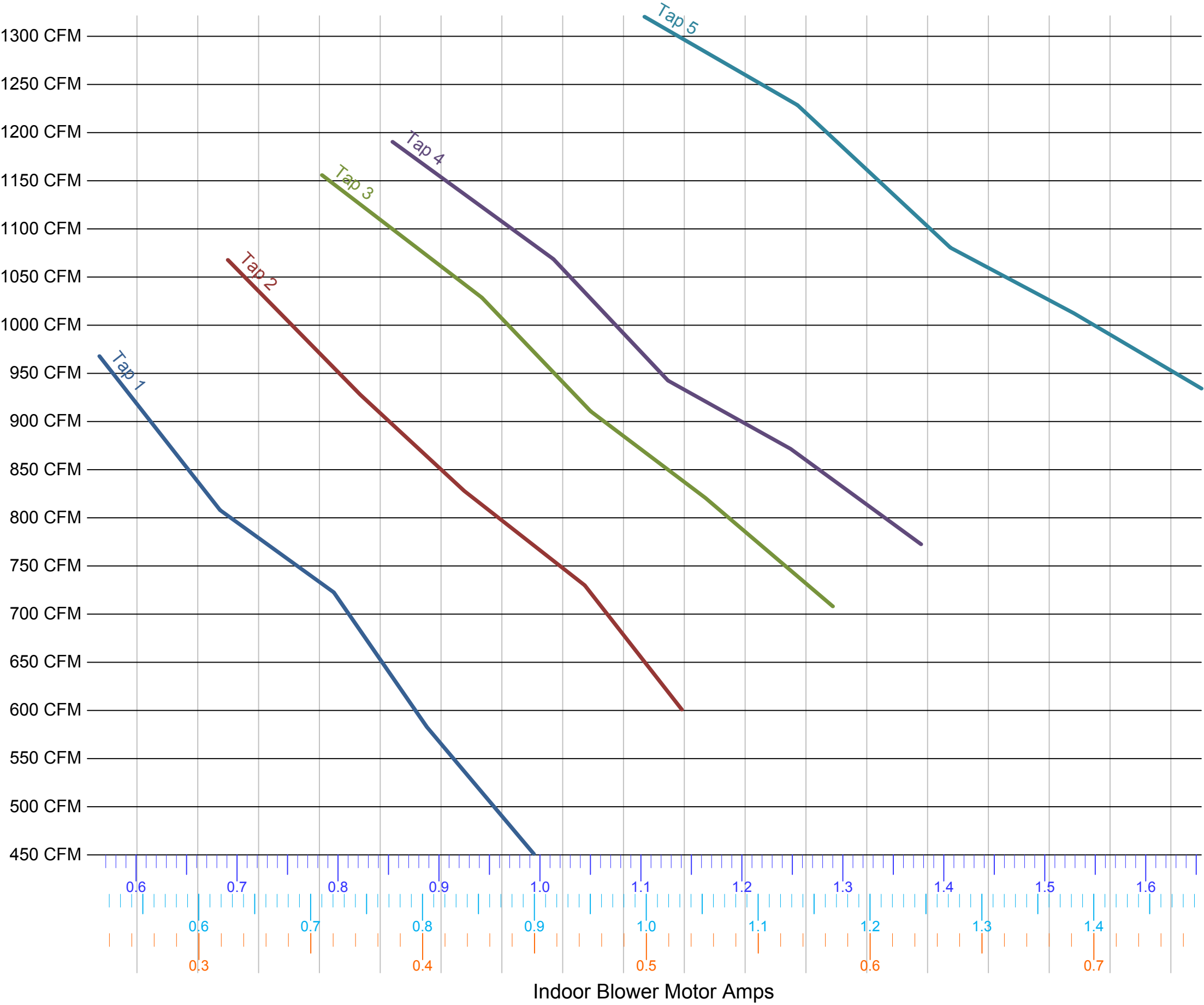
Two CFM indications are present in cases, like the example, where the vertical amperage line intersects both the solid, normal programming and dashed, speed limiting programming sections of the Tap line. Either direct measurement of unit ESP or another method of airflow measurement, such as heat section temperature rise, is then needed to determine which CFM indication is valid.



ZXG04 (3 ton)
Bottom Duct Connection

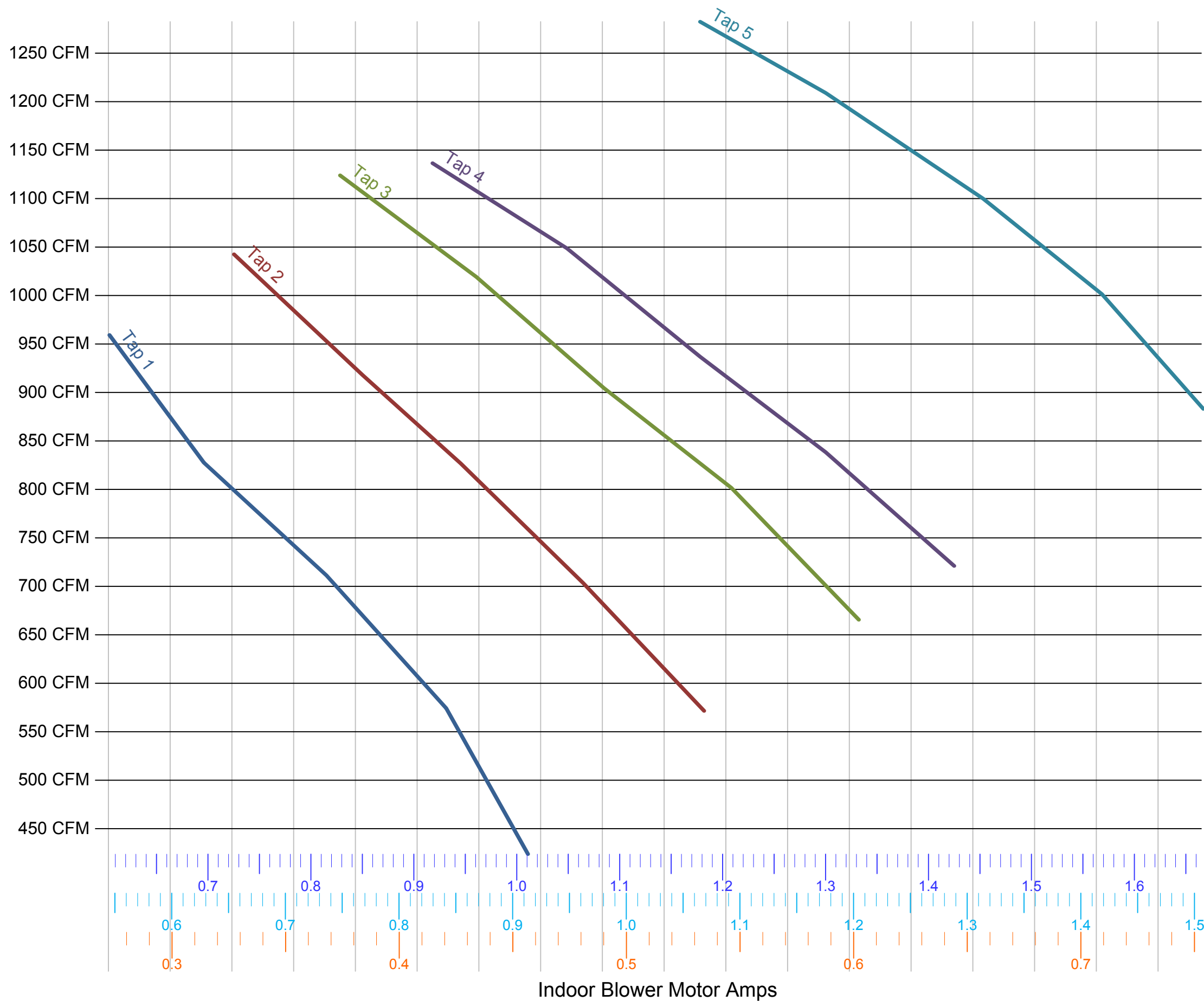


ZXE04 (3 ton)
Side Duct Connection

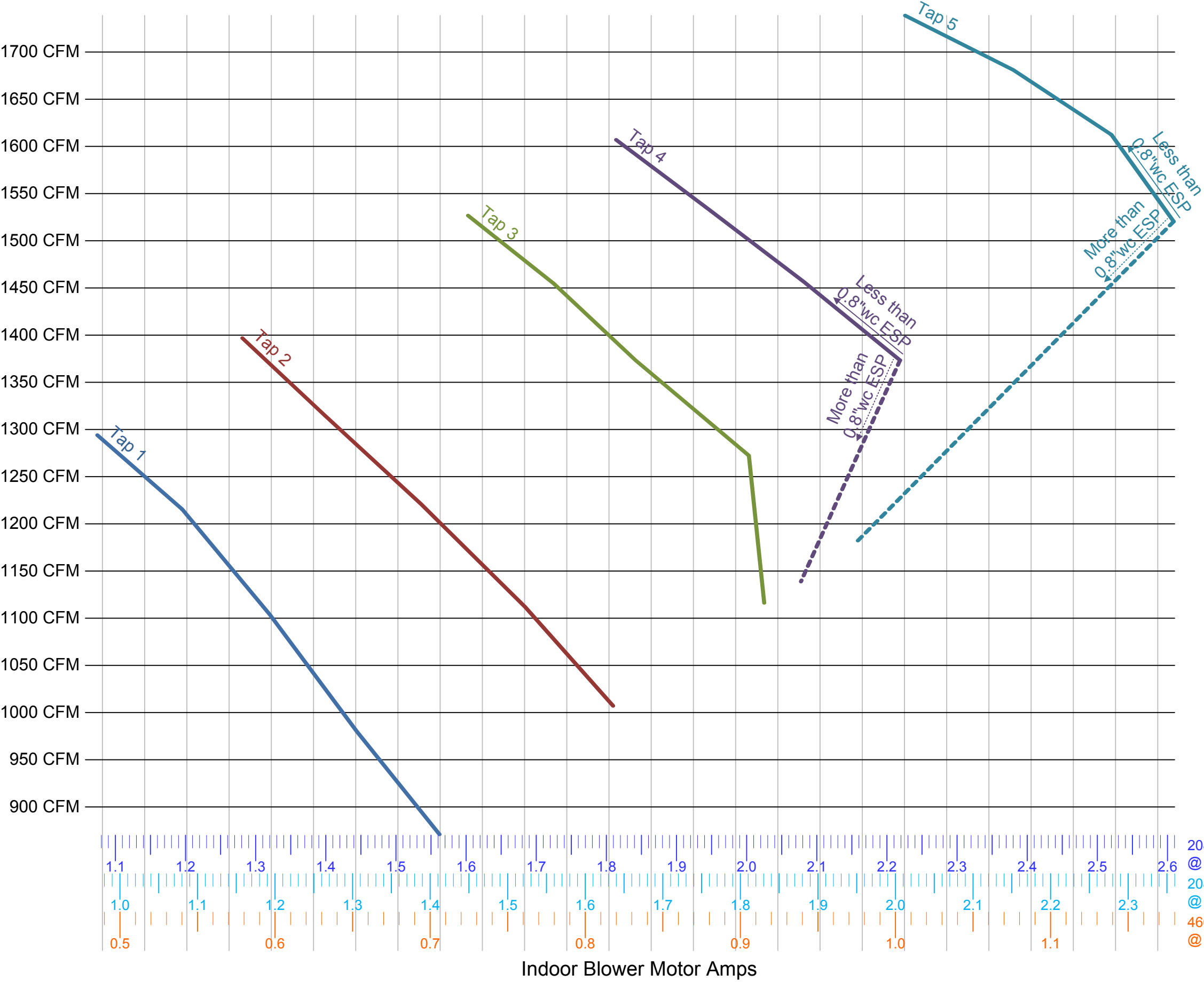


208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC

ZXE04 (3 ton)
Bottom Duct Connection



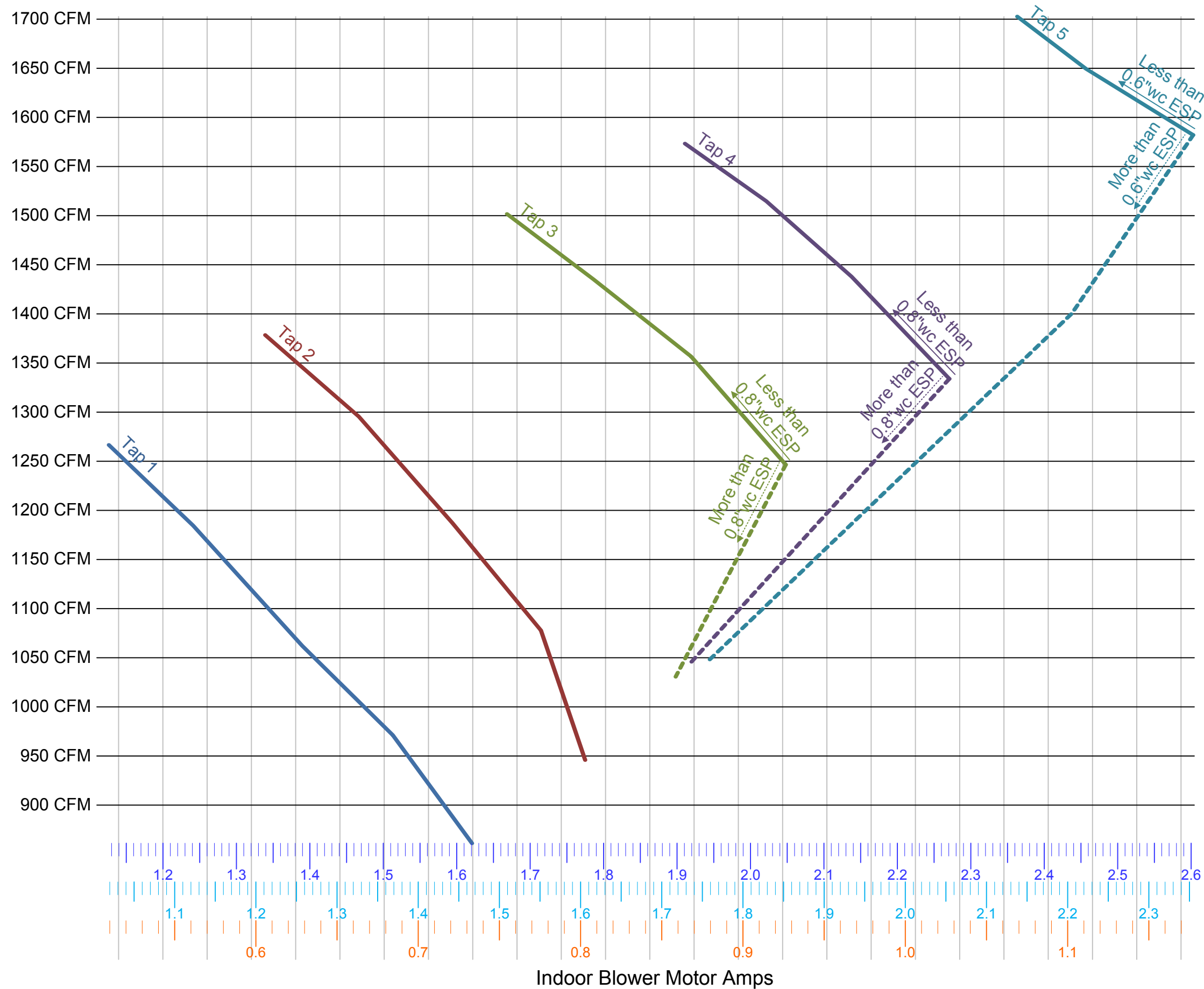
ZXG05 (4 ton)
Side Duct Connection



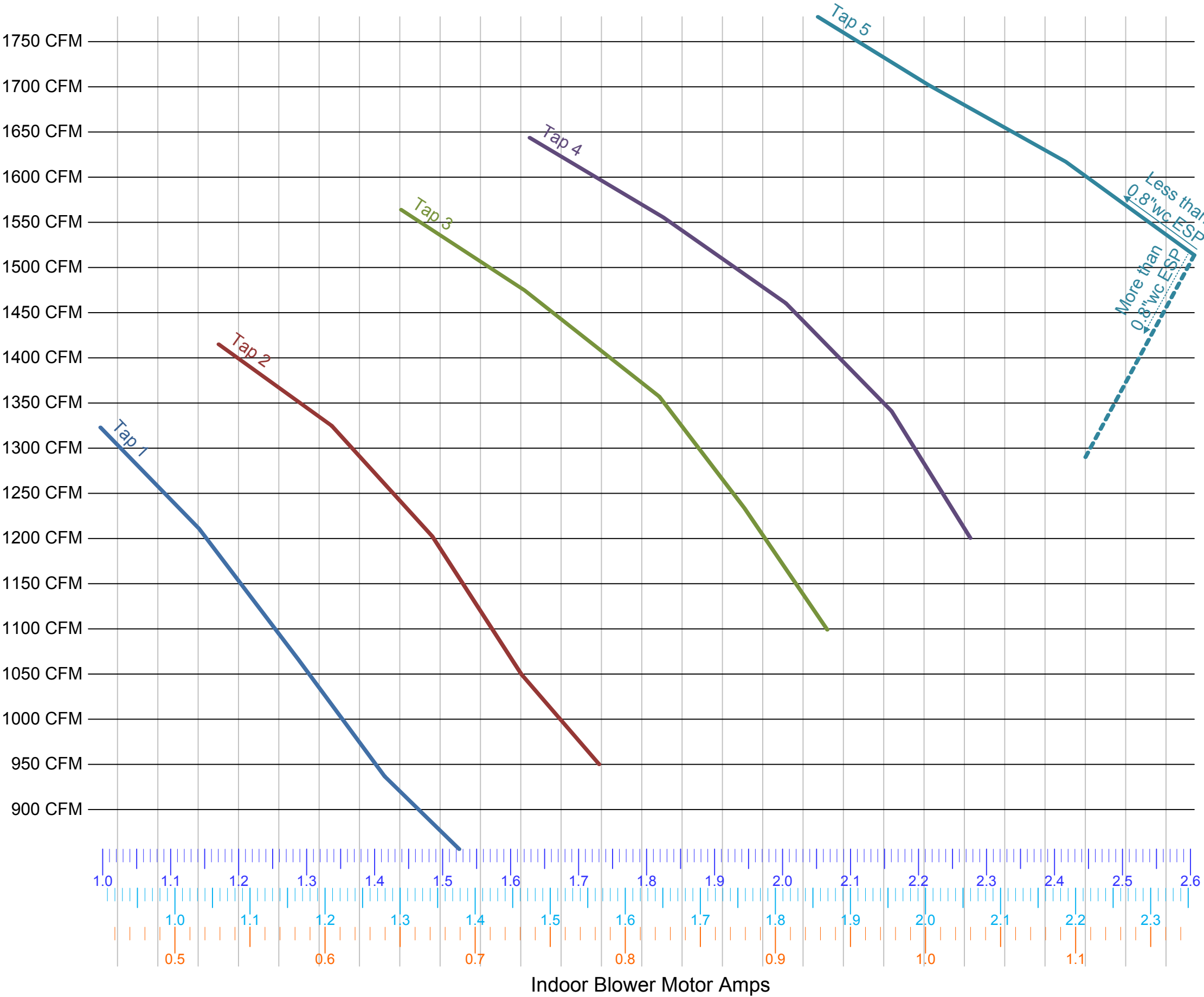
Indoor Blower Motor Amps

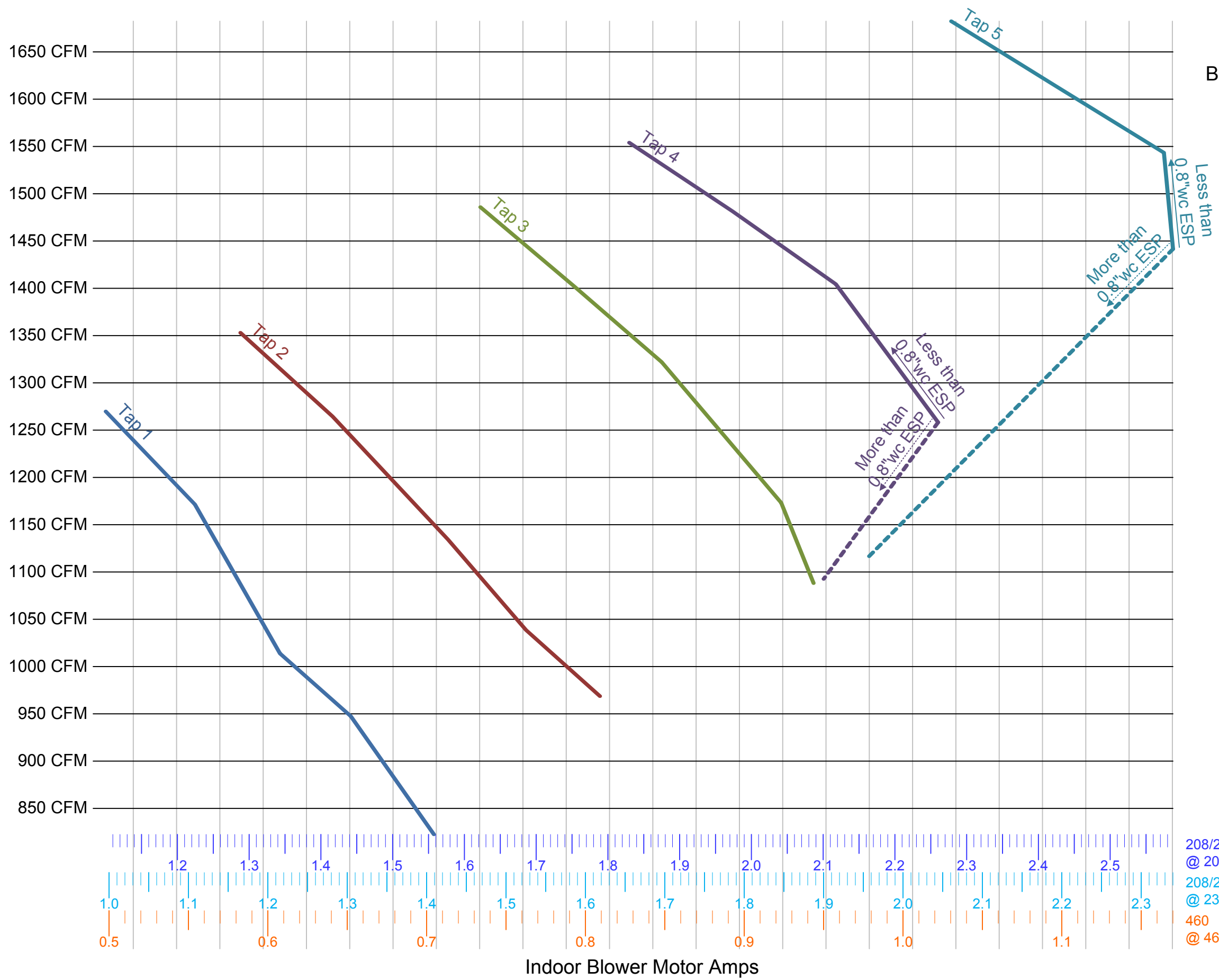
208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC

ZXG05 (4 ton)
Bottom Duct Connection



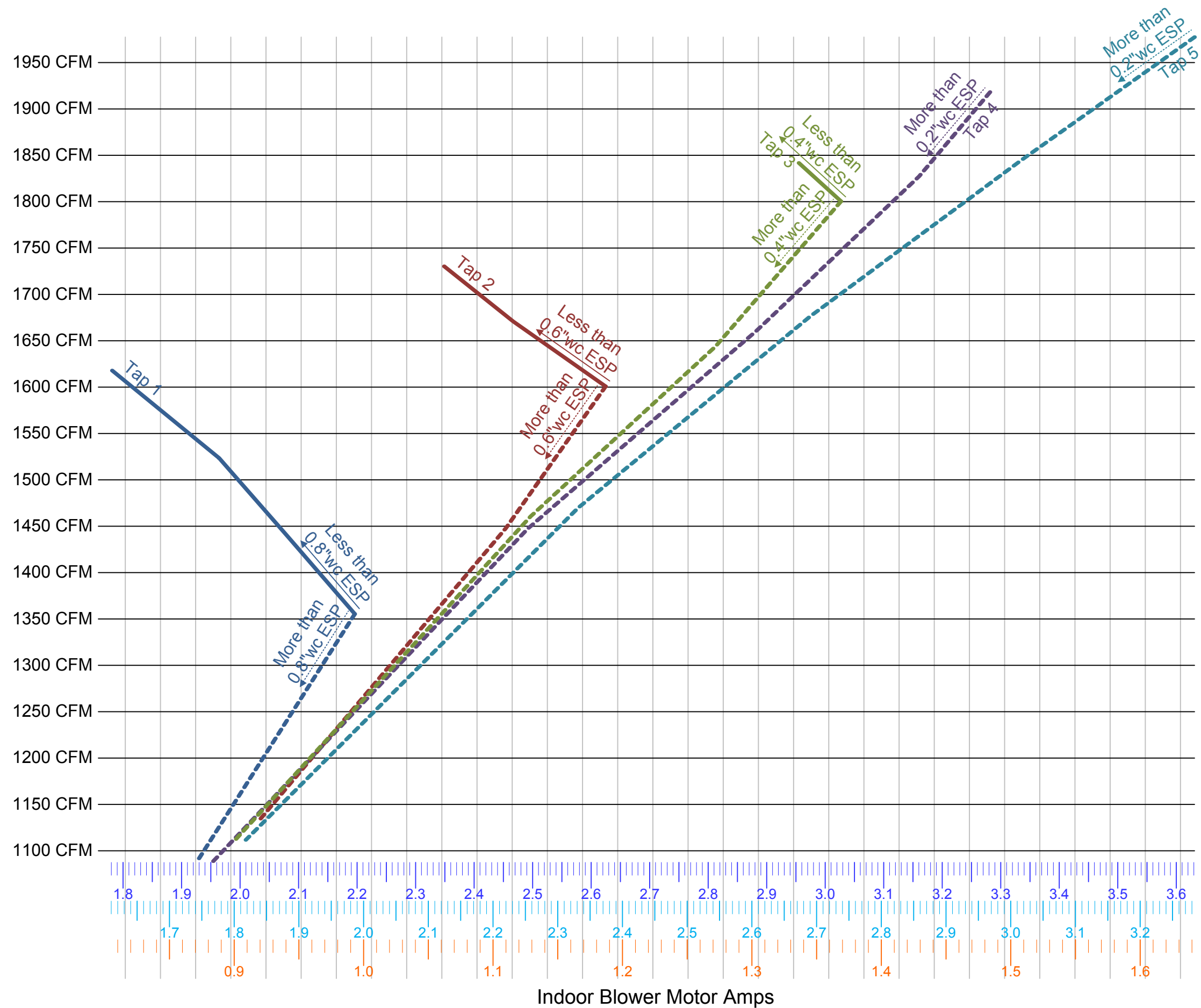
ZXE05 (4 ton)
Side Duct Connection





ZXE05 (4 ton)
Bottom Duct Connection

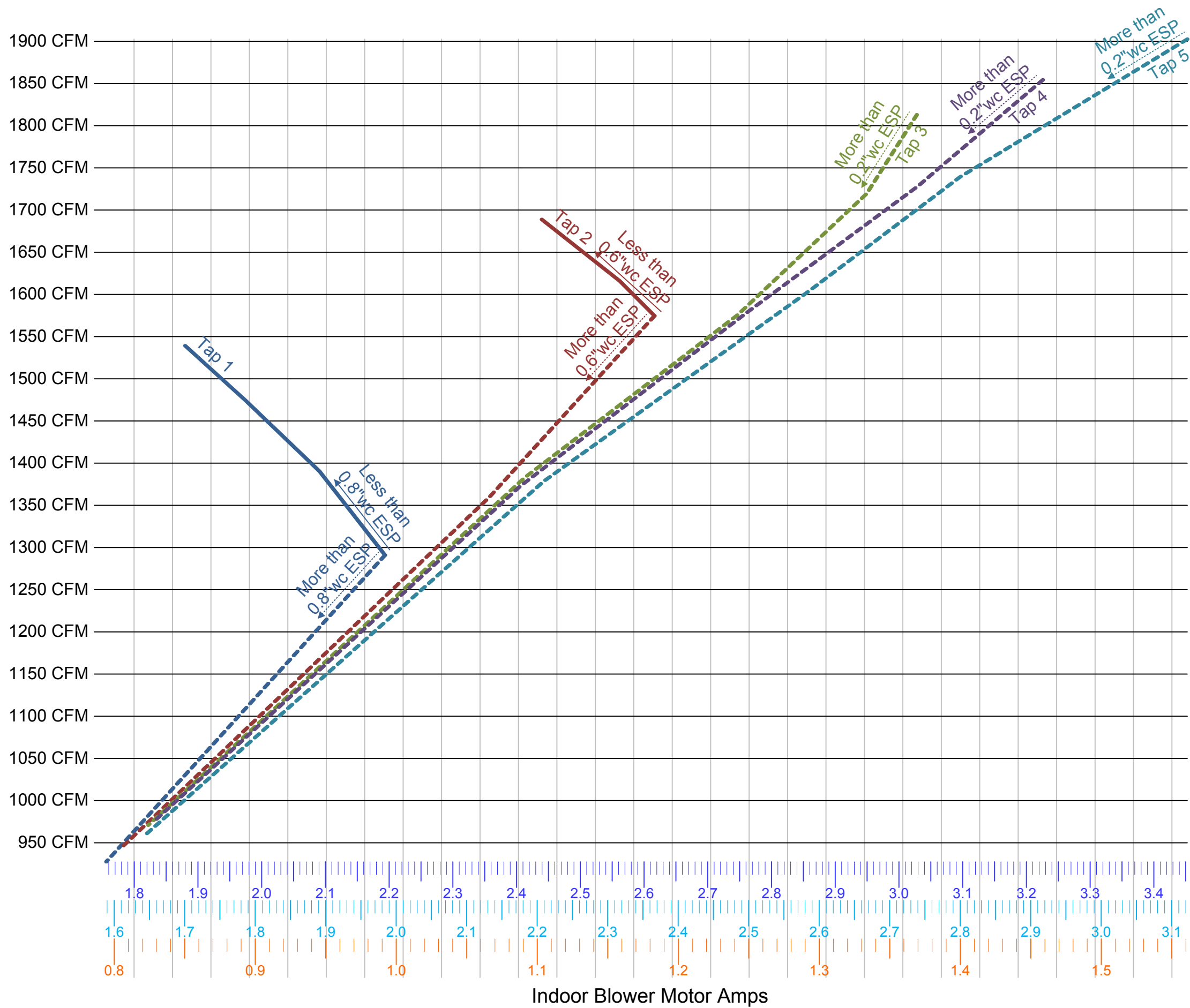
208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC



ZYG06 (5 ton)

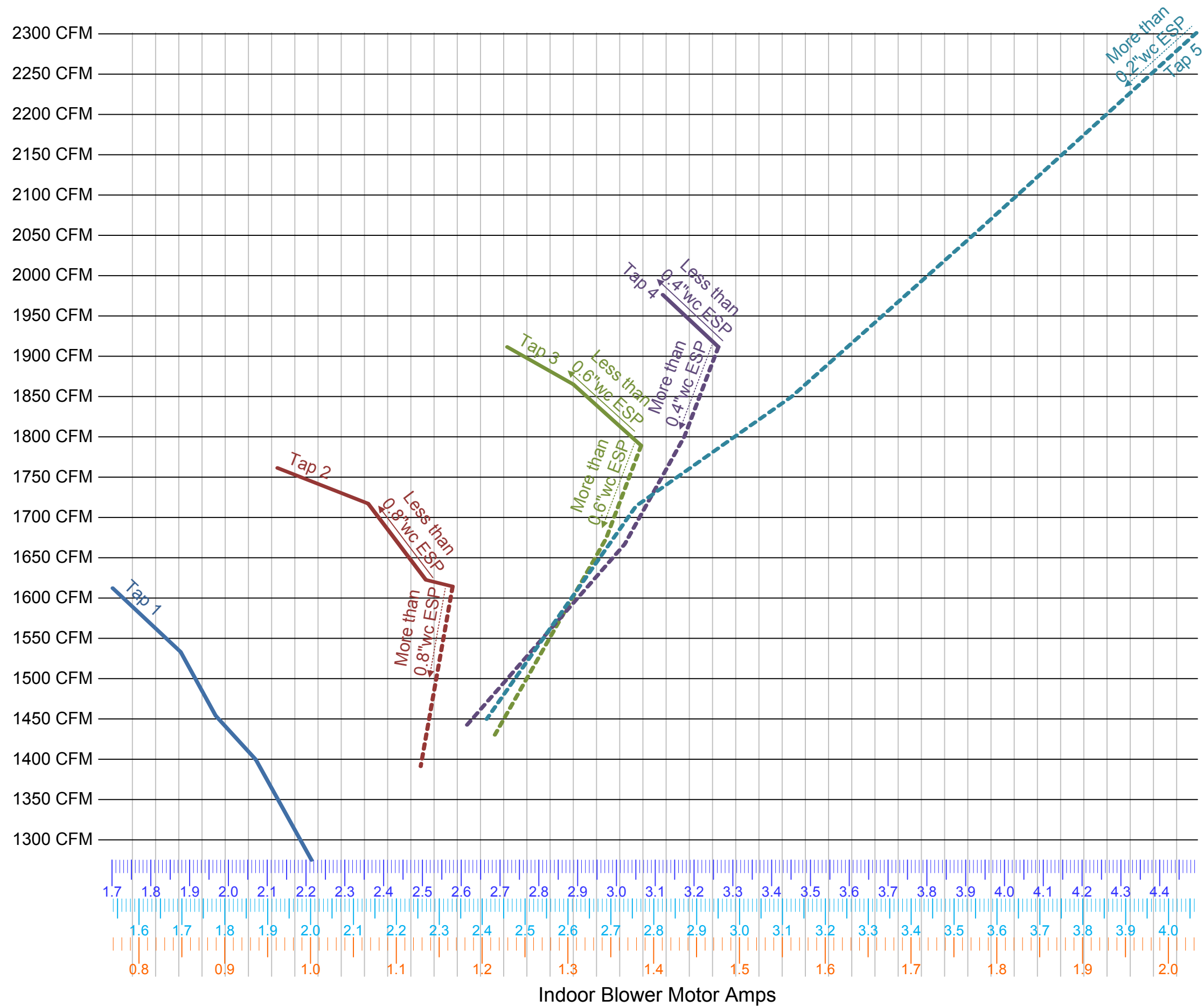
Side Duct Connection

208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC

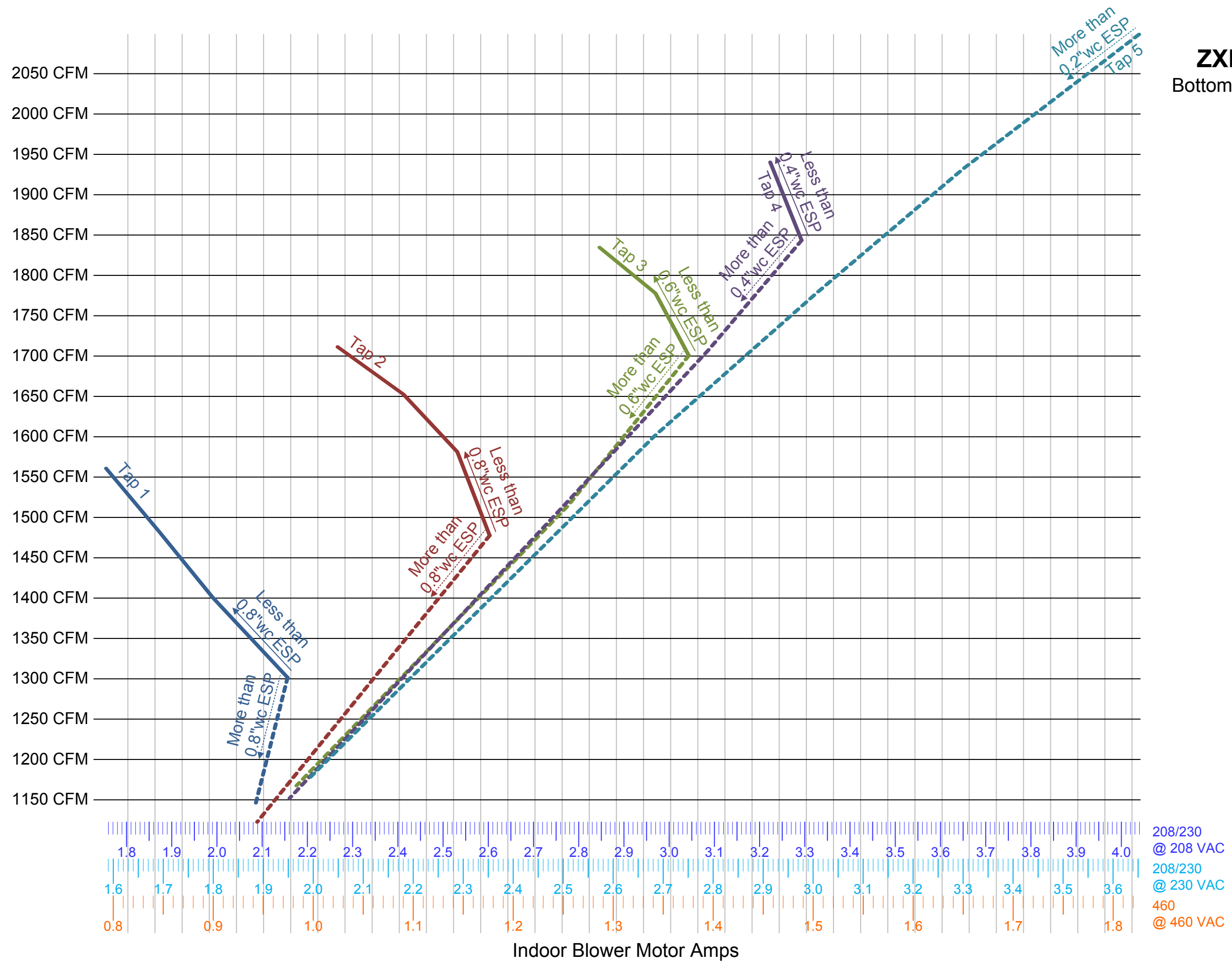


ZXG06 (5 ton)
Bottom Duct Connection

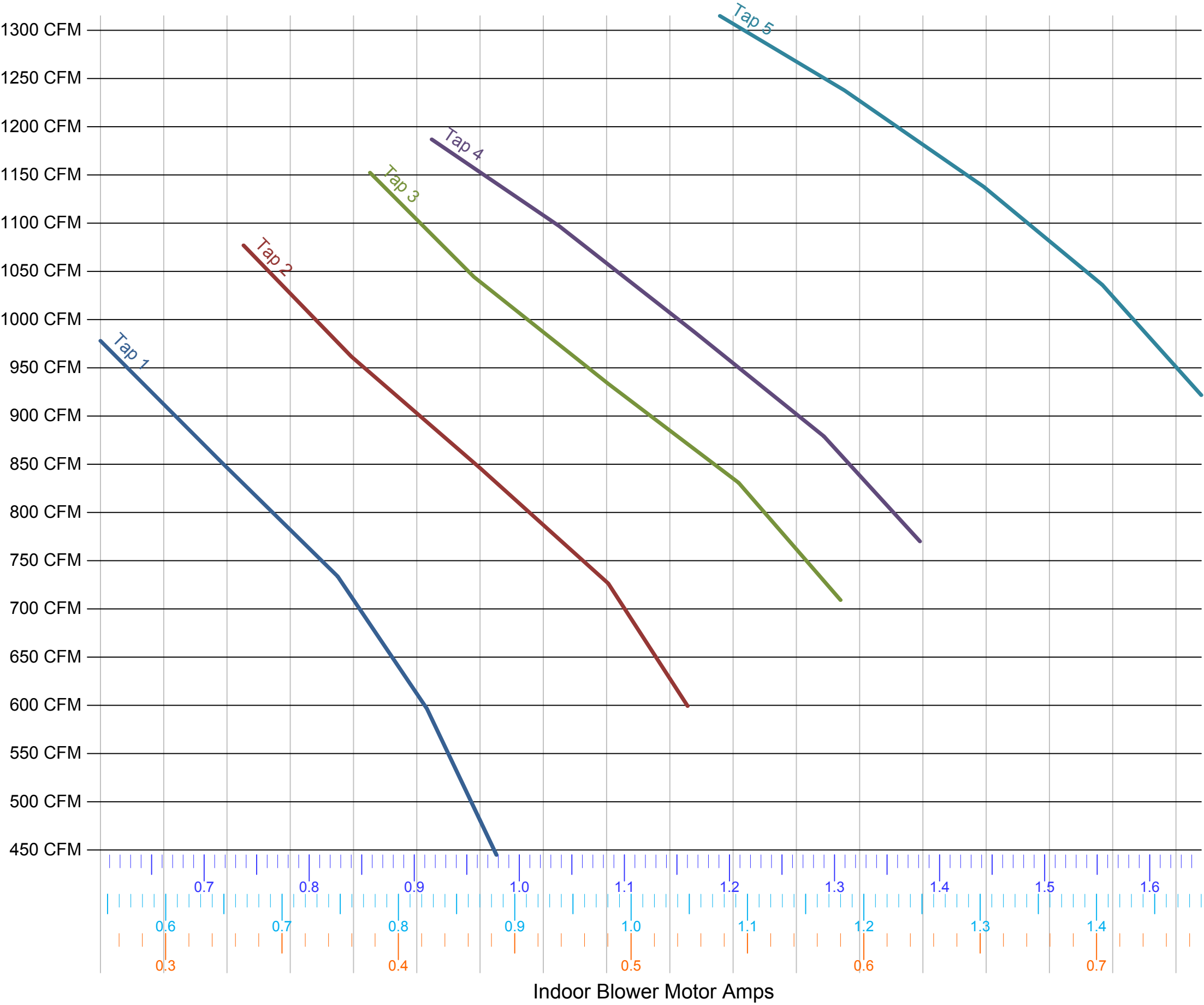
208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC



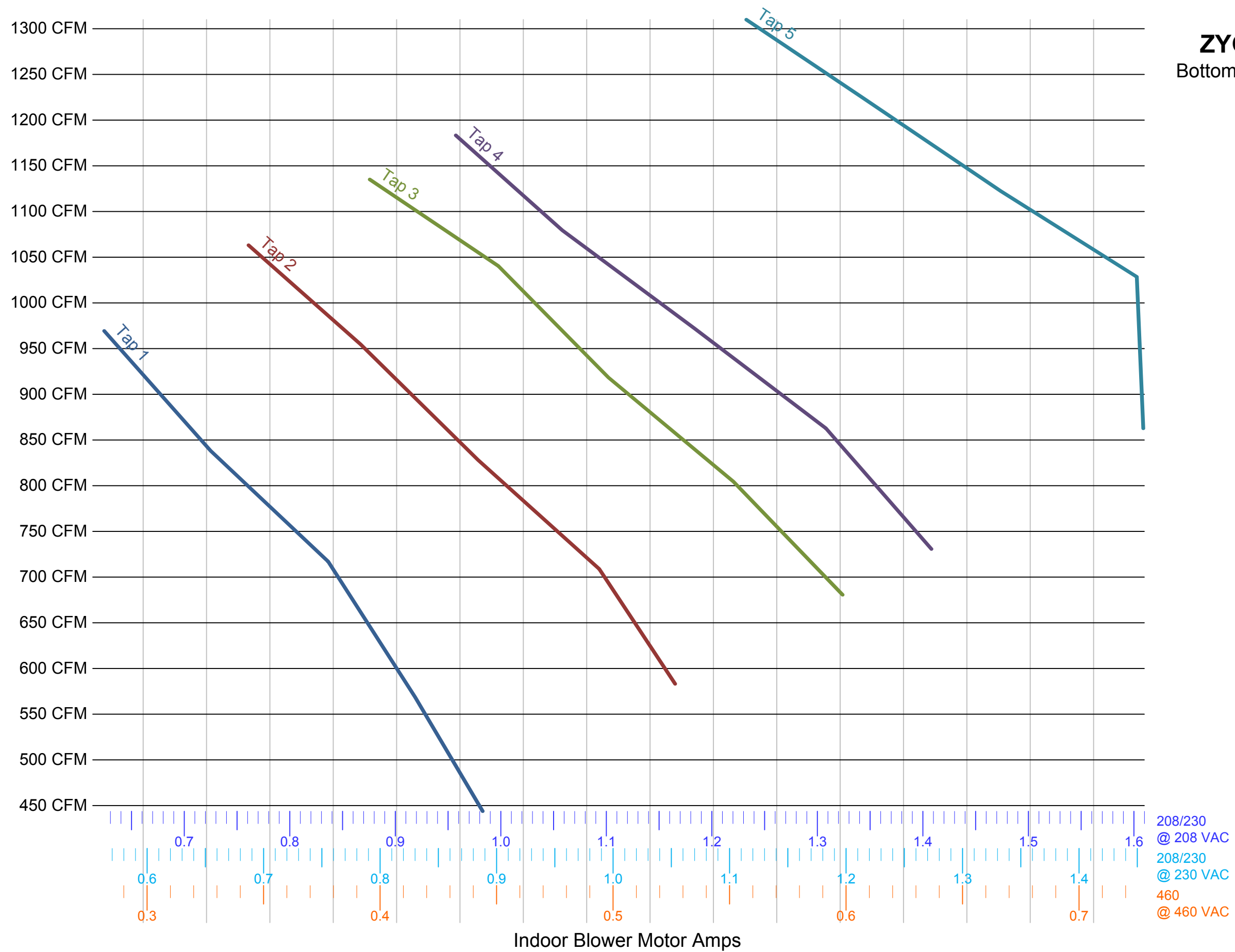
ZXE06 (5 ton)
Side Duct Connection



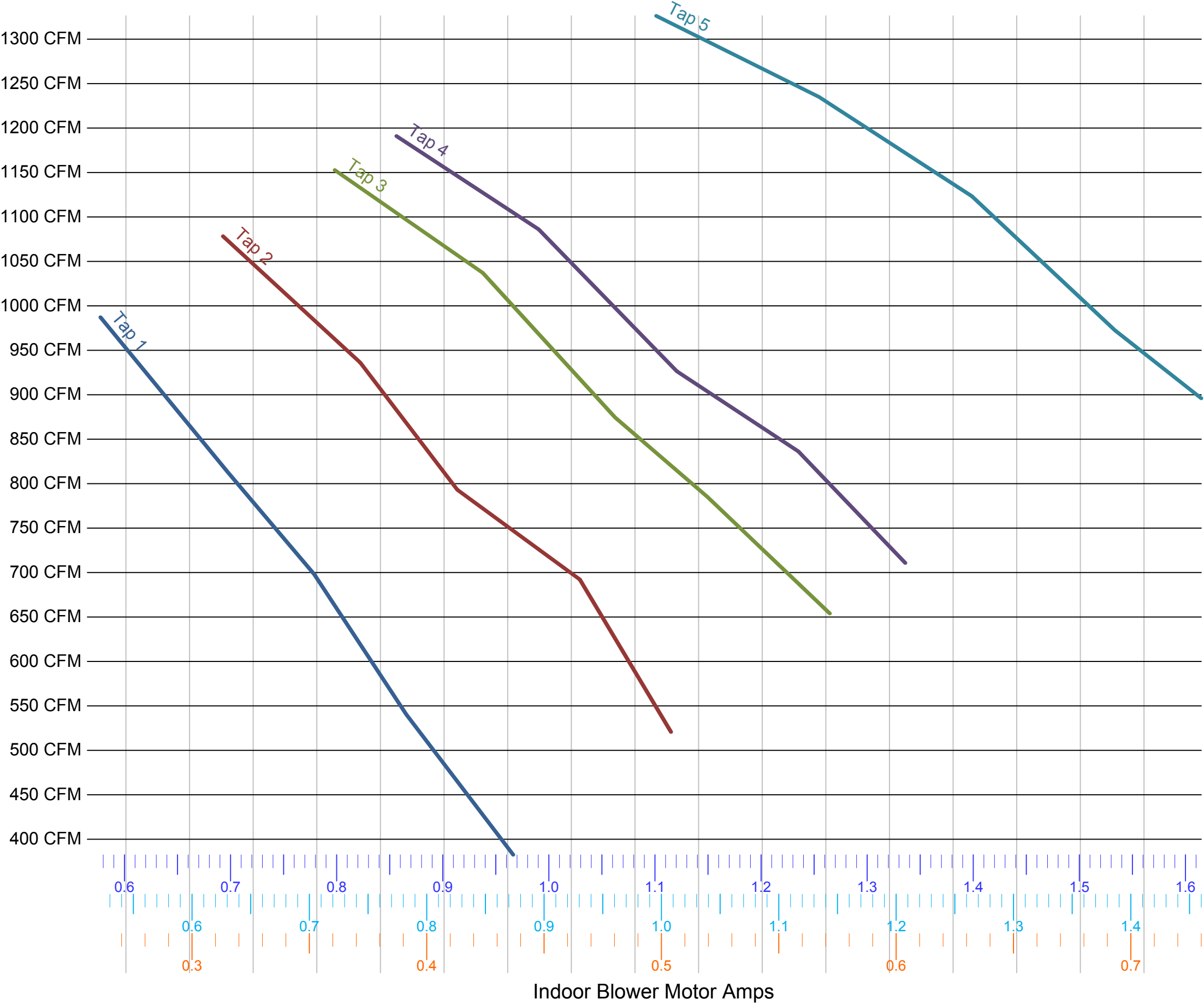
ZYG04 (3 ton)
Side Duct Connection



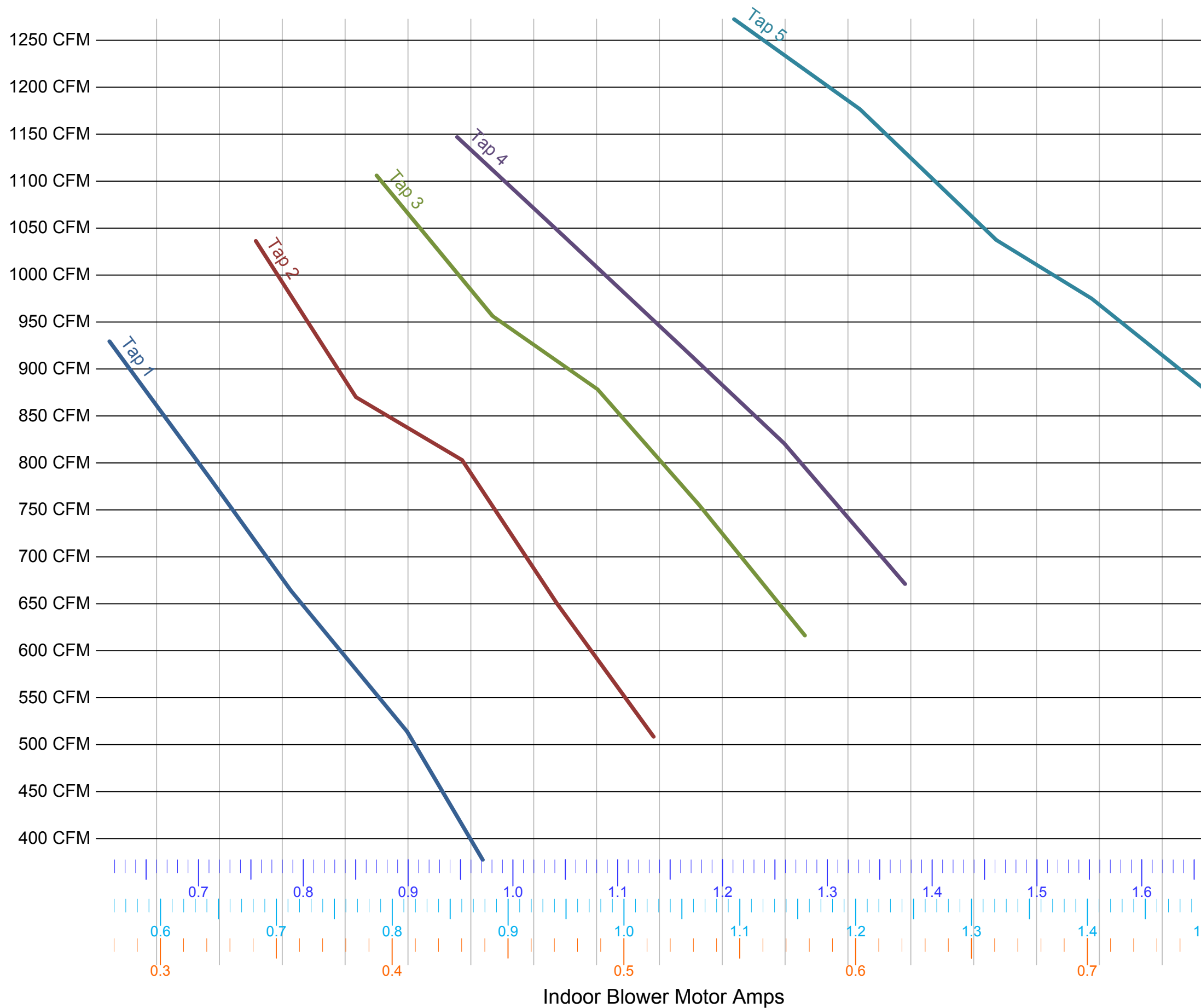
208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC



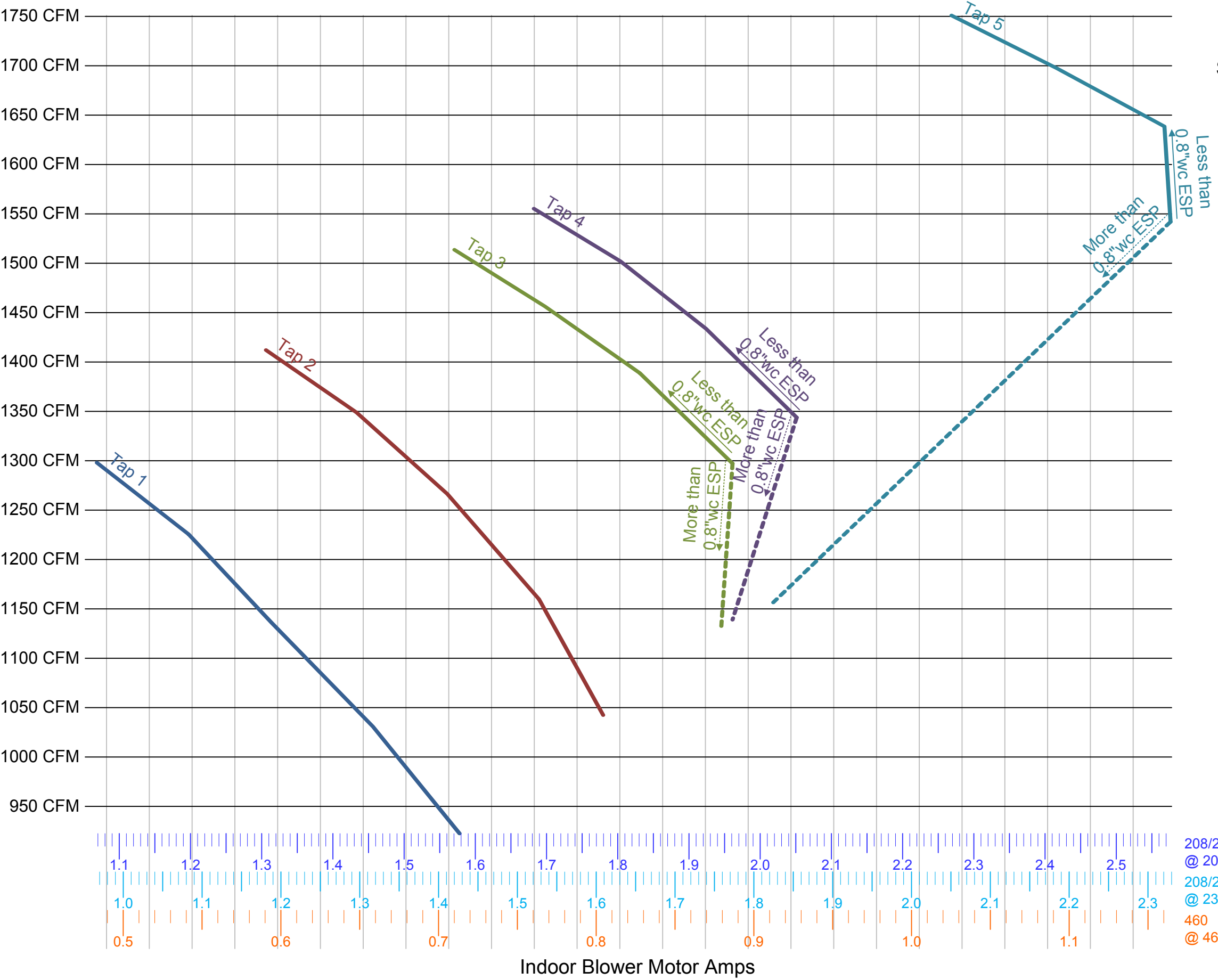
ZYE04 (3 ton)
Side Duct Connection



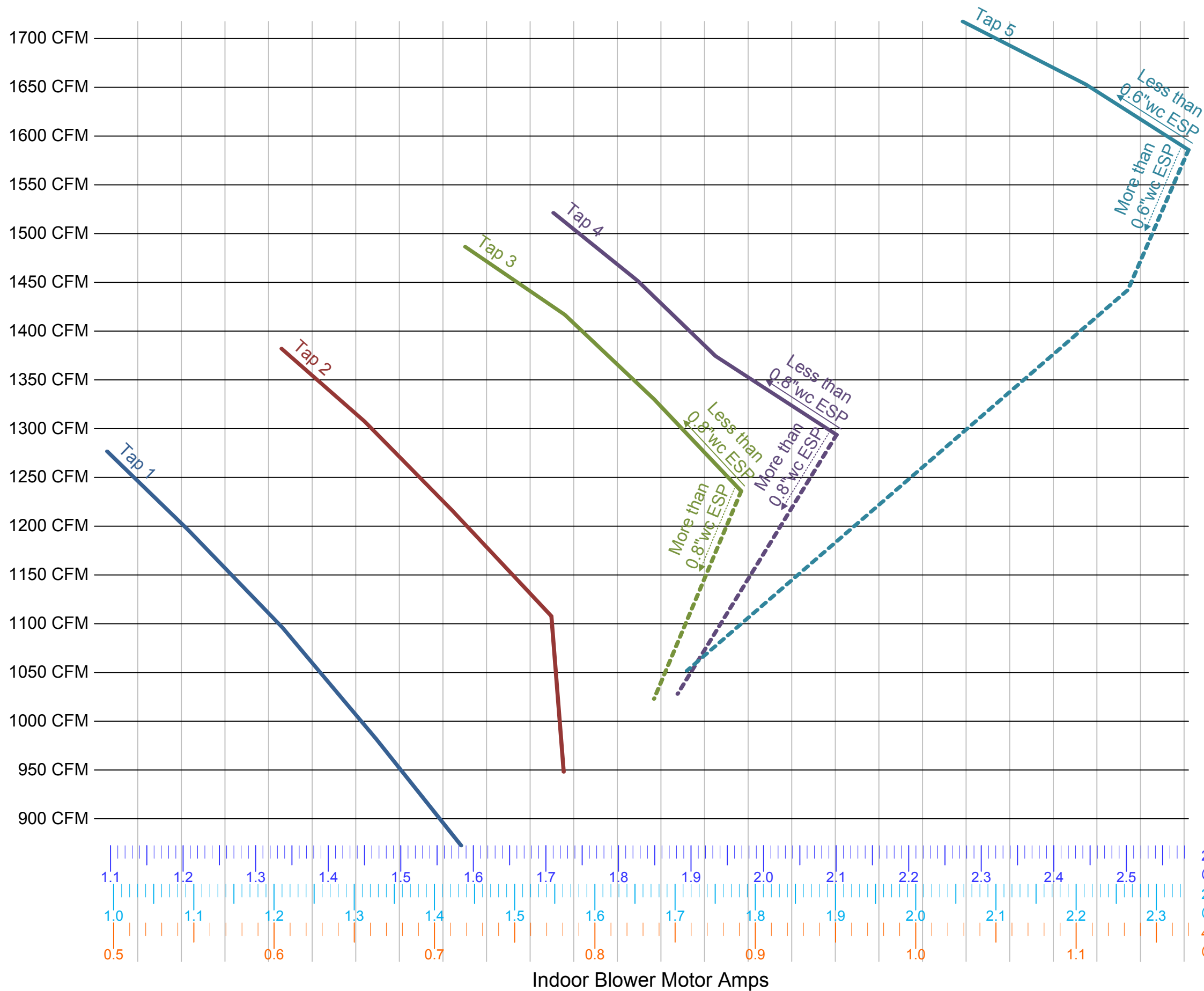
ZYE04 (3 ton)
Bottom Duct Connection



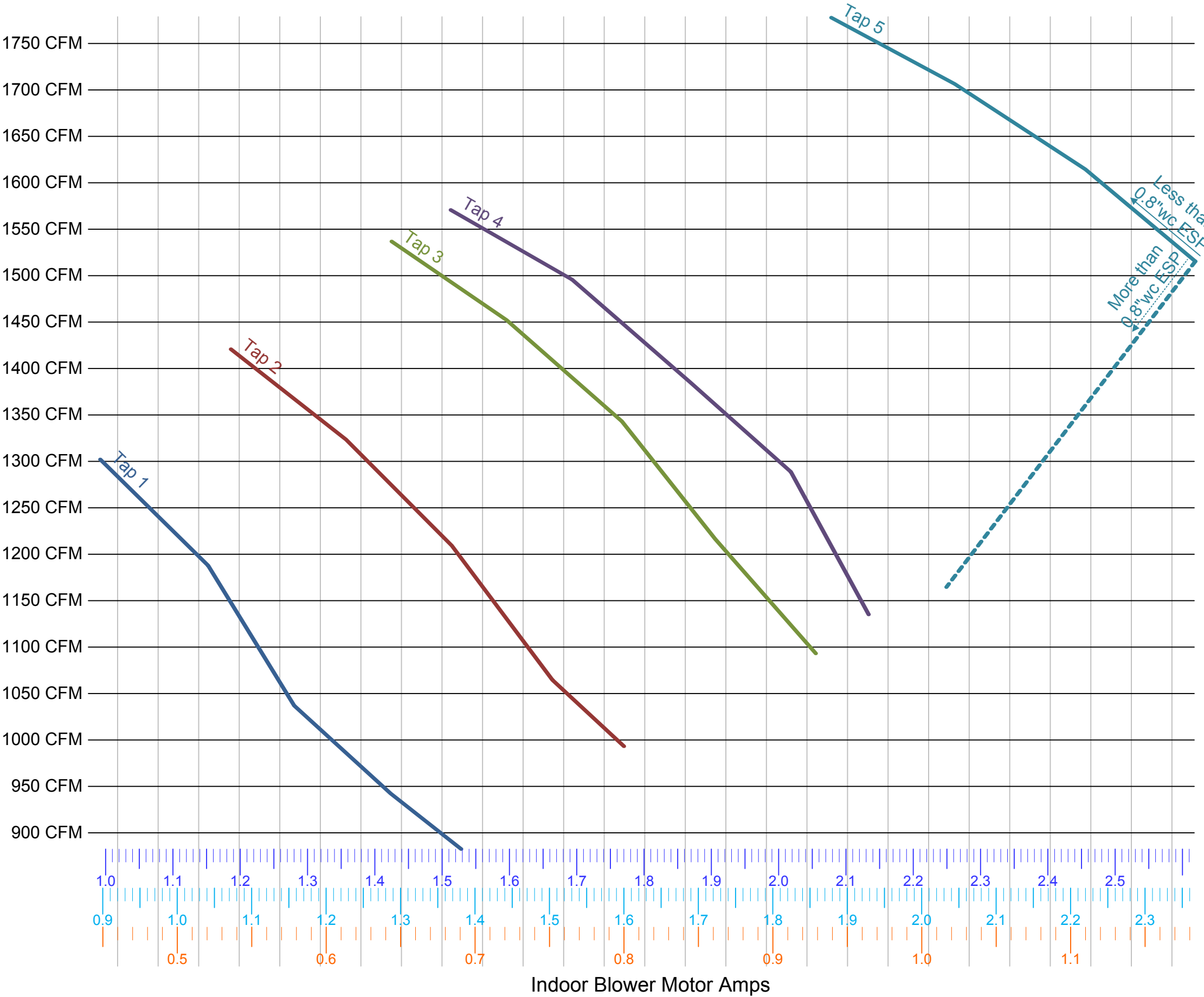
ZYG05 (4 ton)
Side Duct Connection



ZYG05 (4 ton)
Bottom Duct Connection

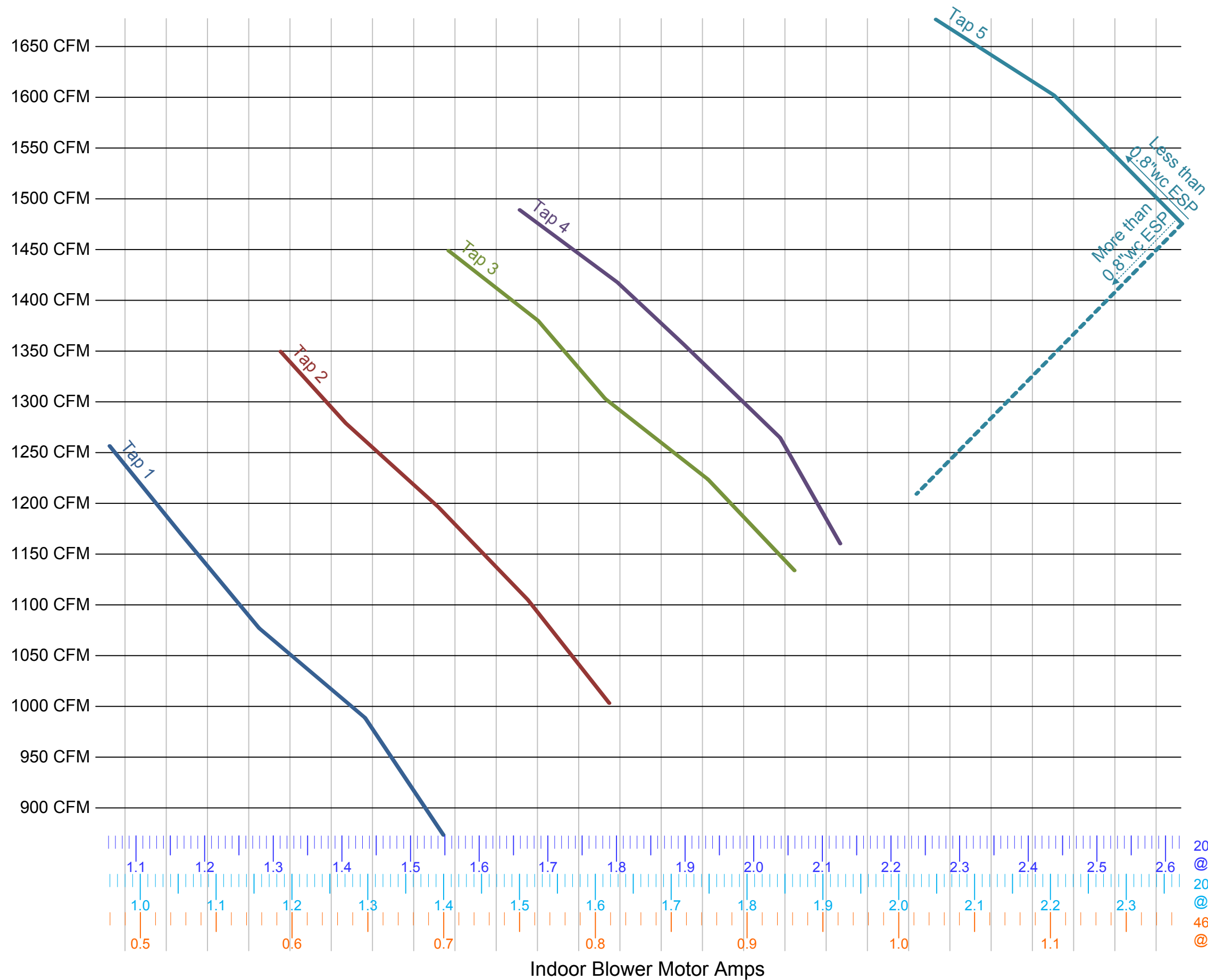


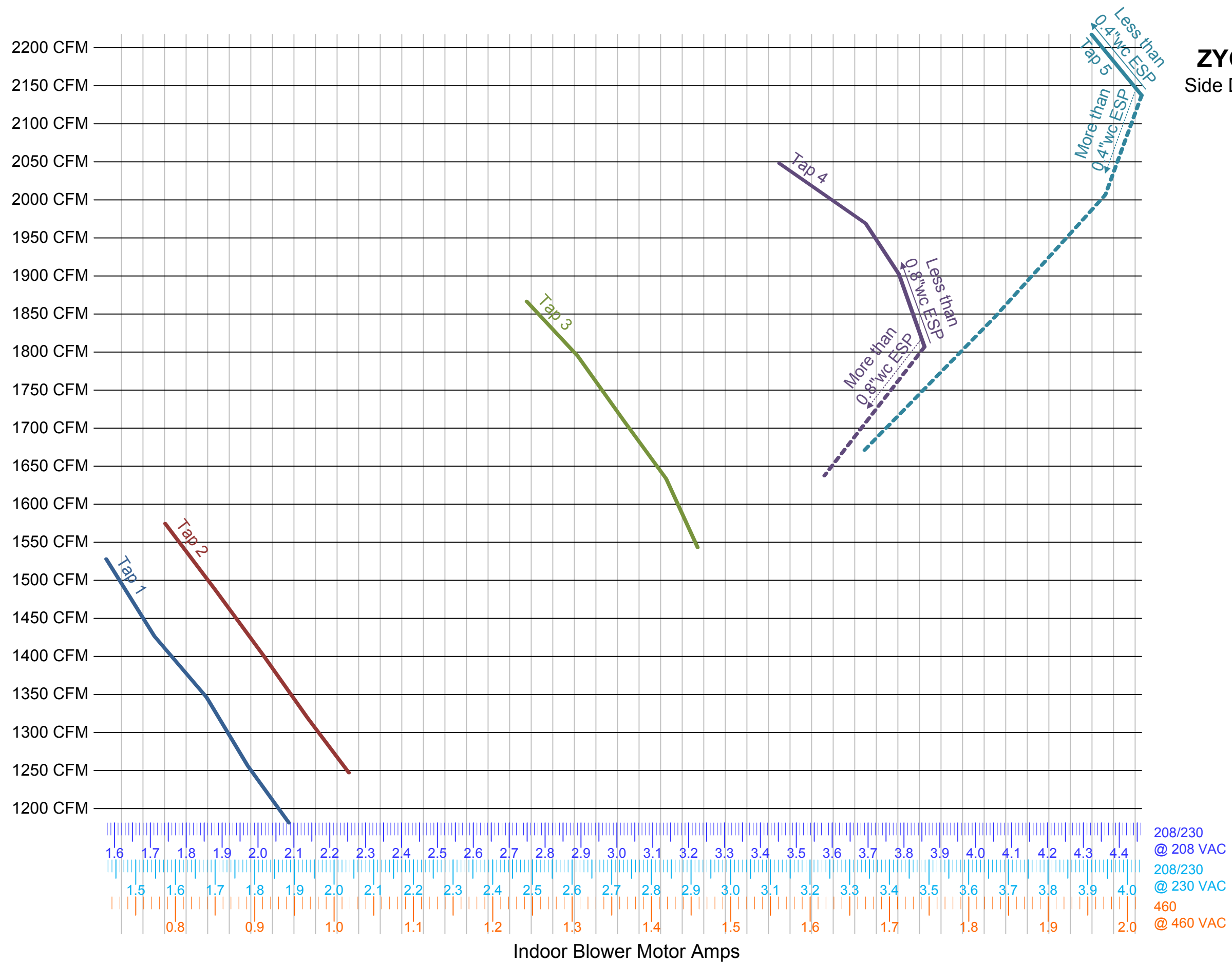
ZYE05 (4 ton)
Side Duct Connection

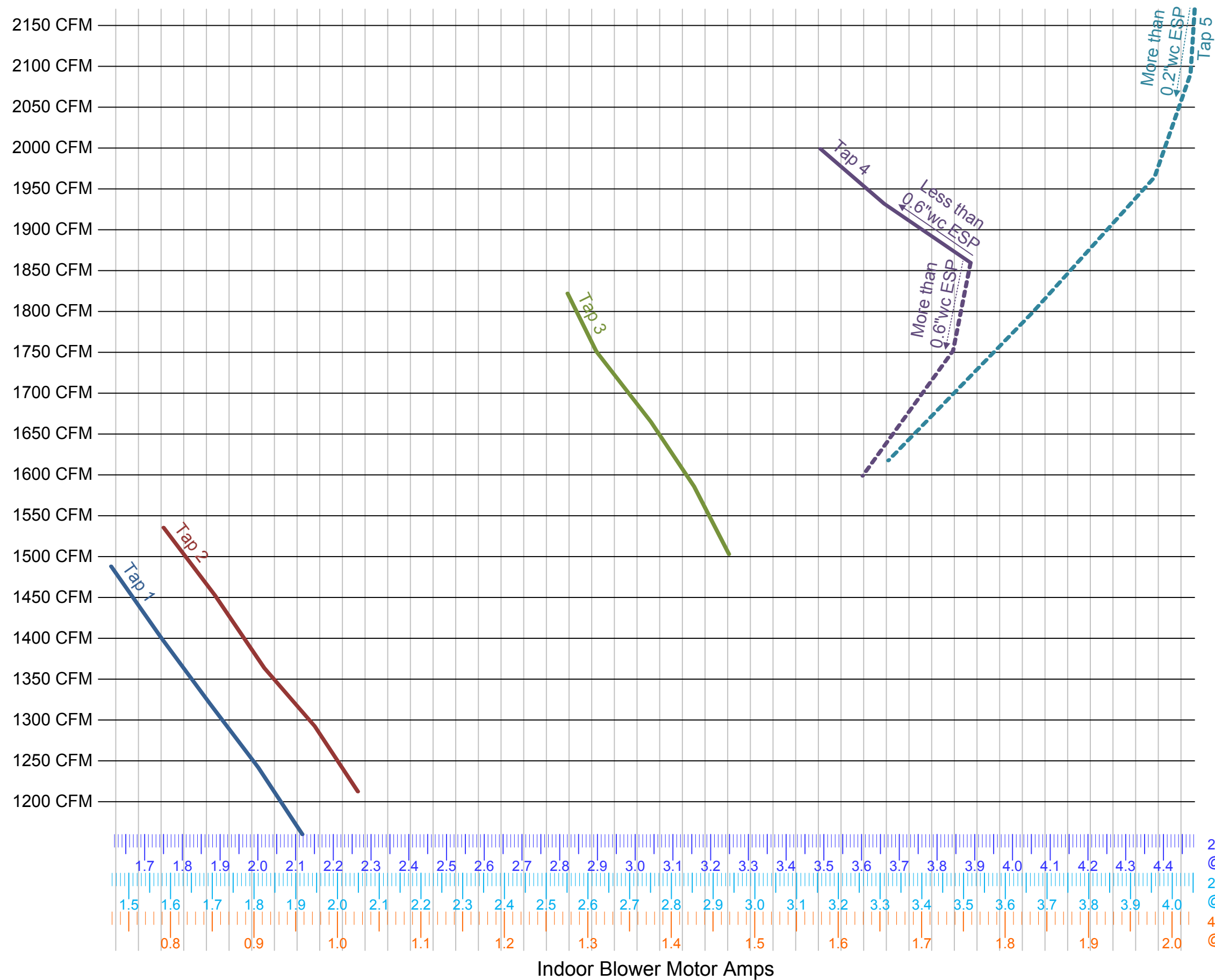


208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC

ZYE05 (4 ton)
Bottom Duct Connection

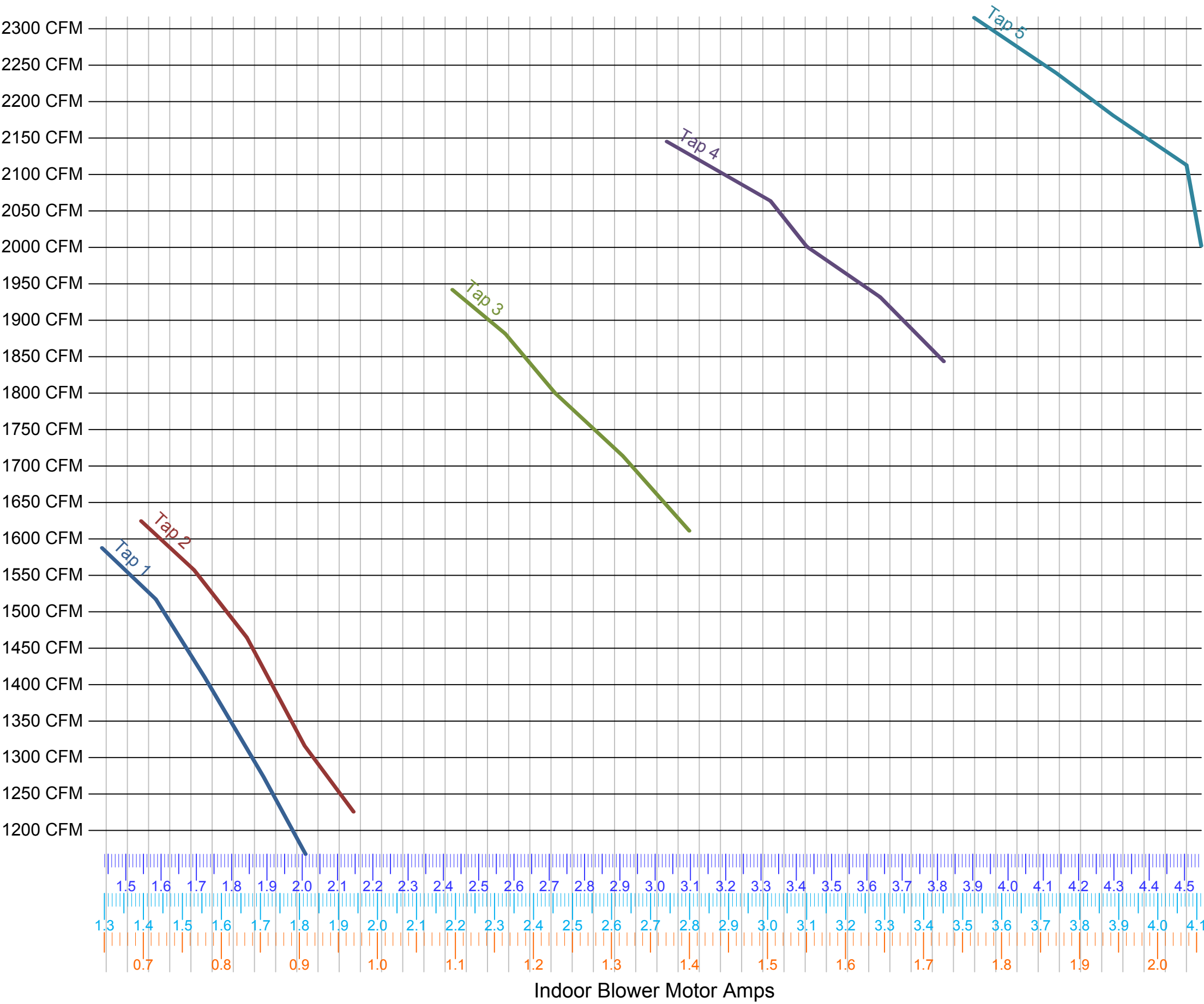


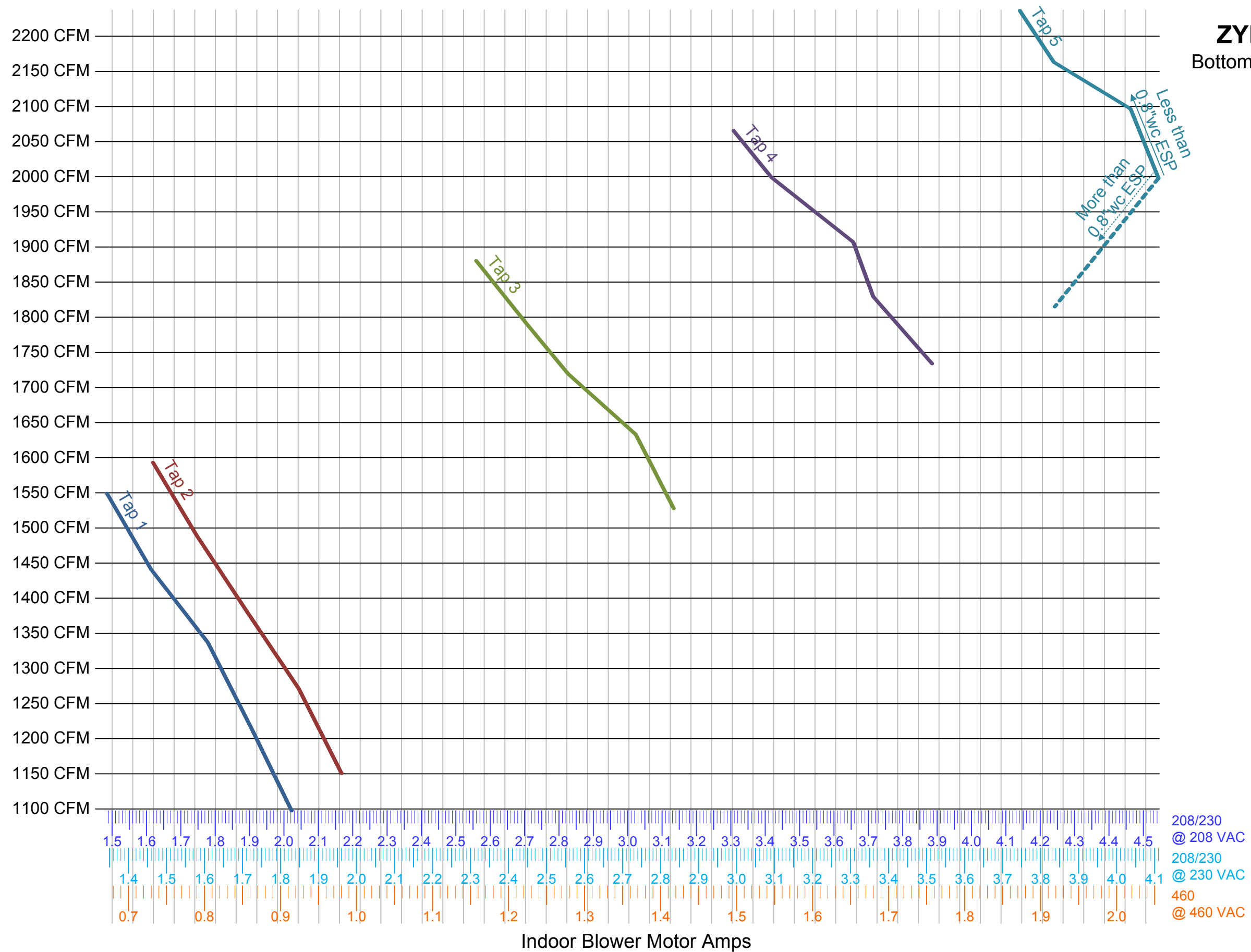




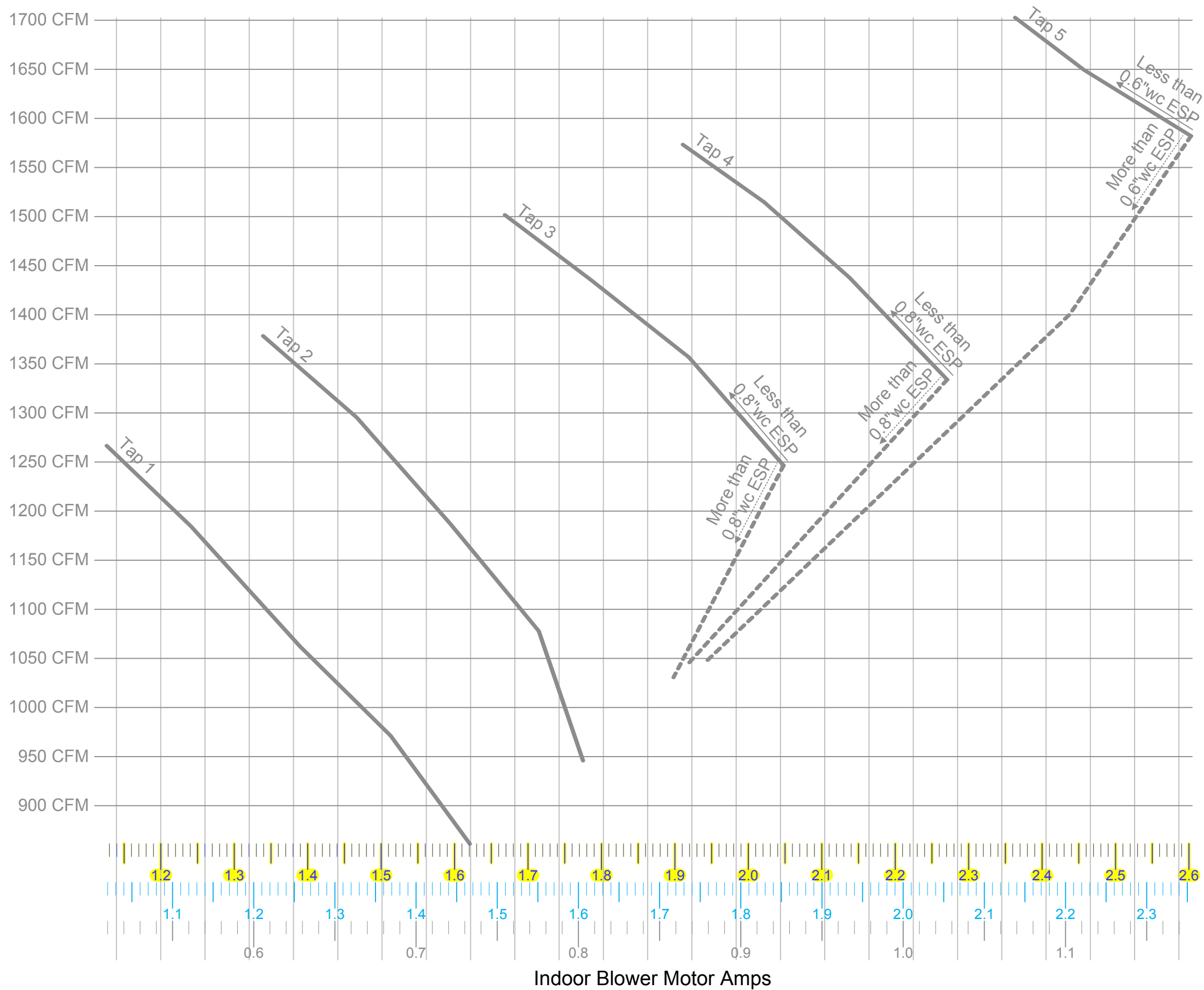
ZYG06 (5 ton)
Bottom Duct Connection

ZYE06 (5 ton)
Side Duct Connection

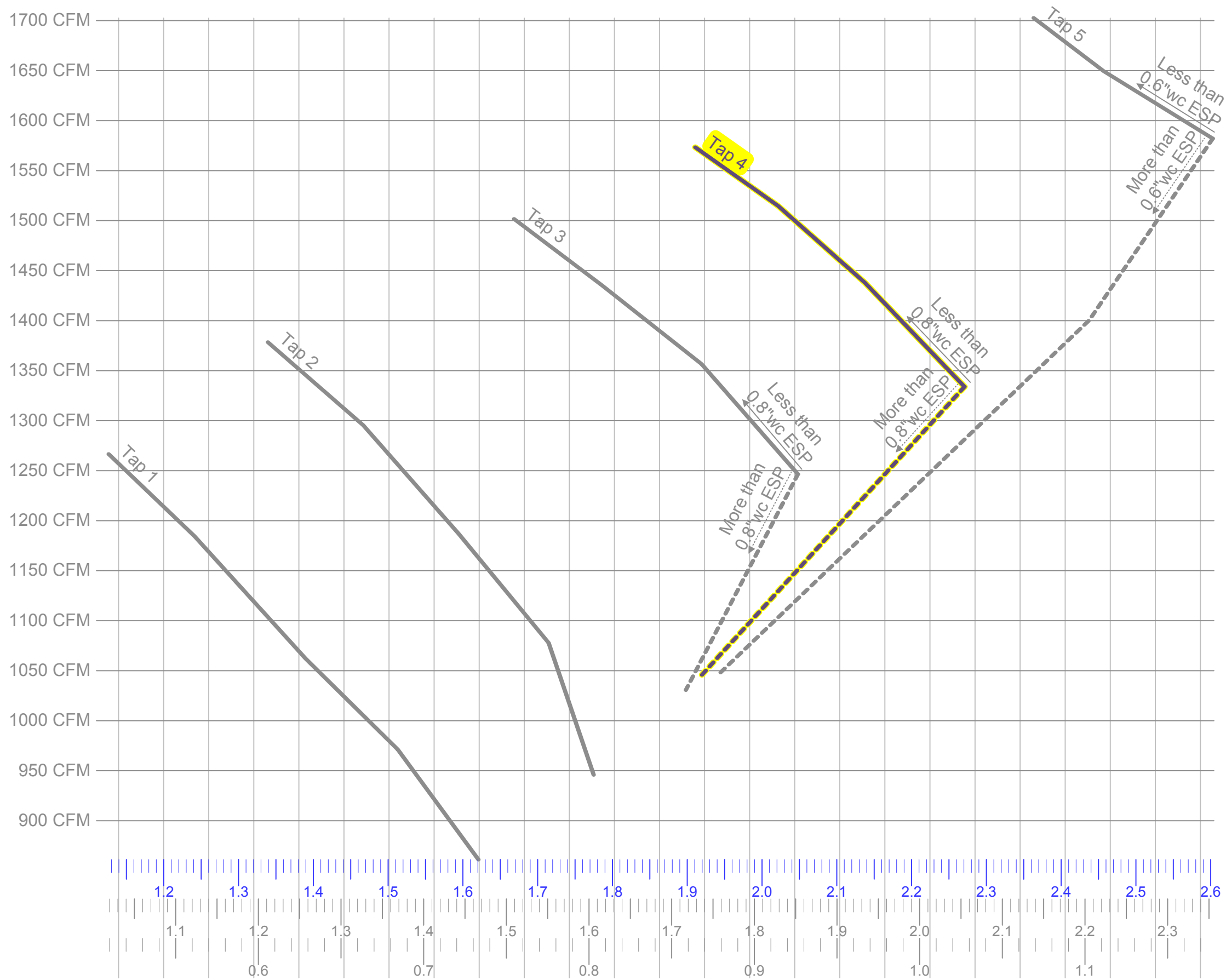




Indoor Blower Motor Amps

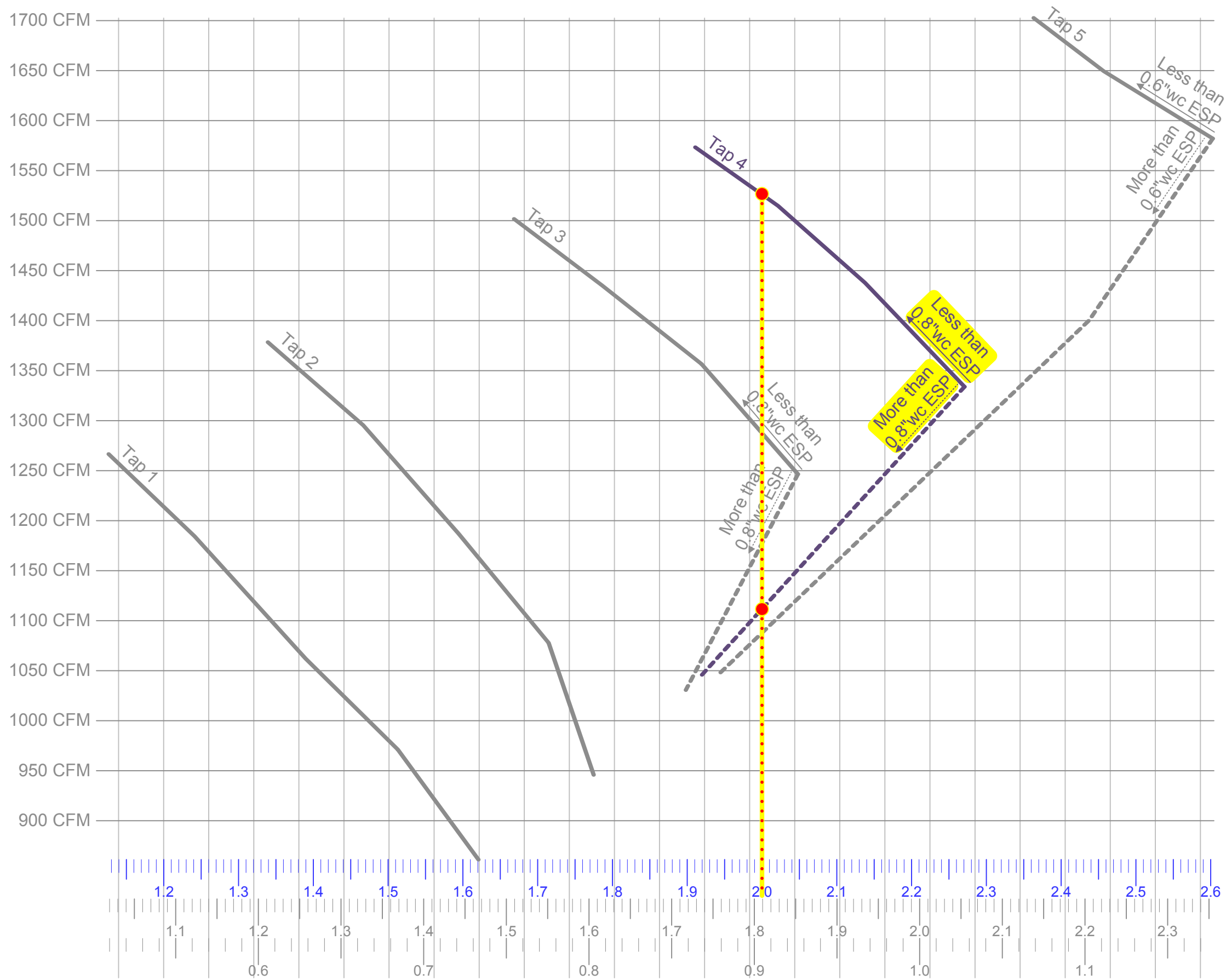


ZXG05 (4 ton)
Bottom Duct Connection



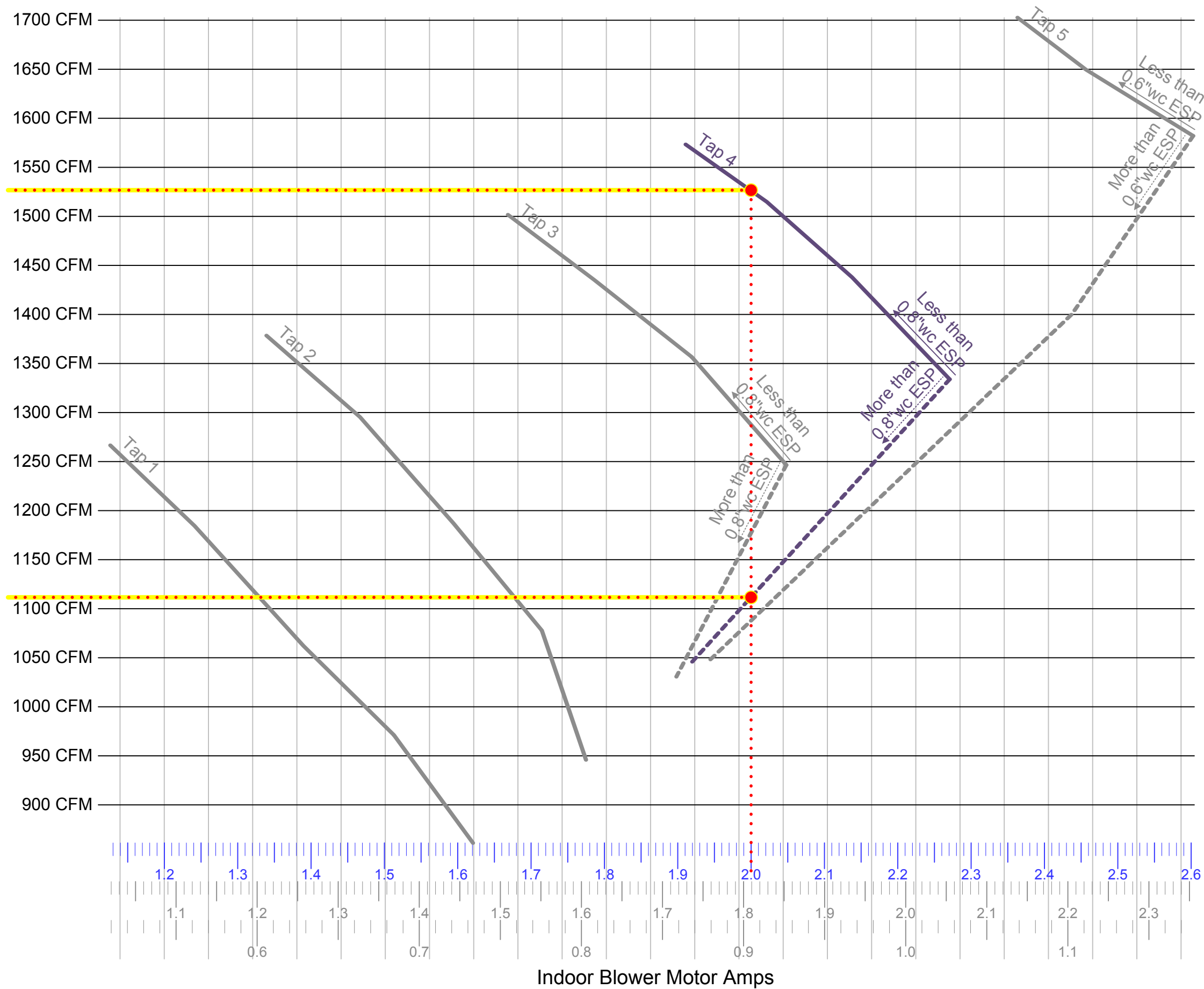
ZXG05 (4 ton)
Bottom Duct Connection

208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC



ZXG05 (4 ton)

Bottom Duct Connection



ZXG05 (4 ton)

Bottom Duct Connection

208/230
@ 208 VAC
208/230
@ 230 VAC
460
@ 460 VAC

