
VESDA SAMPLING FROM EXTREME TEMPERATURE ENVIRONMENTS APPLICATION NOTE

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Preface

This Application Note outlines techniques to be followed when VESDA detectors are sampling from environments with extreme temperature.

Related Products

VESDA models.

Contents

1	Introduction.....	1
2	Sampled Air Warming	1
3	Sampled Air Cooling	3
4	Further Support	3
	Disclaimer on The Provision of General System Design Recommendations	4

1 Introduction

The VESDA detector can accommodate a wide range of sampled air temperatures (-20°C (-4°F) to 60°C (140°F)) making it an ideal fire detection solution for a wide range of industrial applications.

Where sampling is required from environments with extreme temperatures (i.e. outside the specified temperature range), Xtralis recommends the use of a simple, cost effective and proven technique to pre-condition (warm or cool) the sampled air prior to entering the VESDA detector.

2 Sampled Air Warming

Sampled air of extremely low temperature can be warmed up to an acceptable degree by allowing the pipe to “run” in a warmer environment (i.e. external to where sampling occurs). The length of this pipe “run” will be a function of the sampled air temperature, pipe material, pipe flow rate and external ambient temperature.

The figures below provide conservative estimates of the lengths of pipe “runs” required to raise the temperature of the sampled air for a number of commonly used pipe materials and range of flow rates. All calculations assume an external ambient temperature of 20°C (68°F) and a sampled air temperature entering the detector of 0°C (32°F).

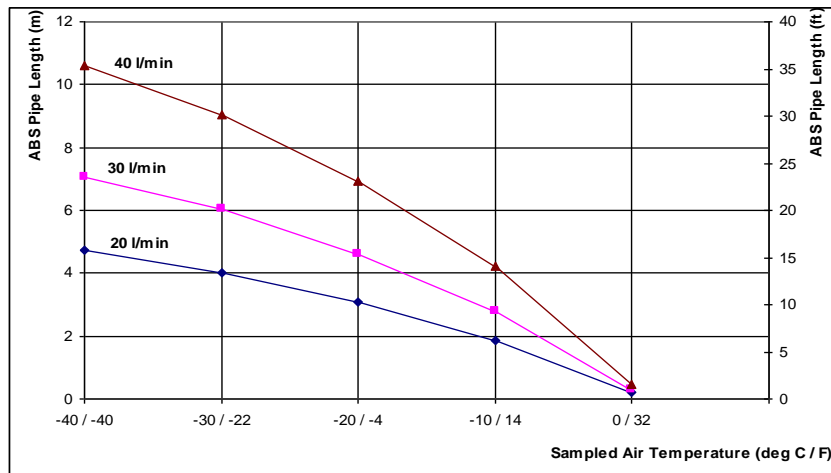


Figure 1: Estimated ABS pipe length “run” for sampled air warming

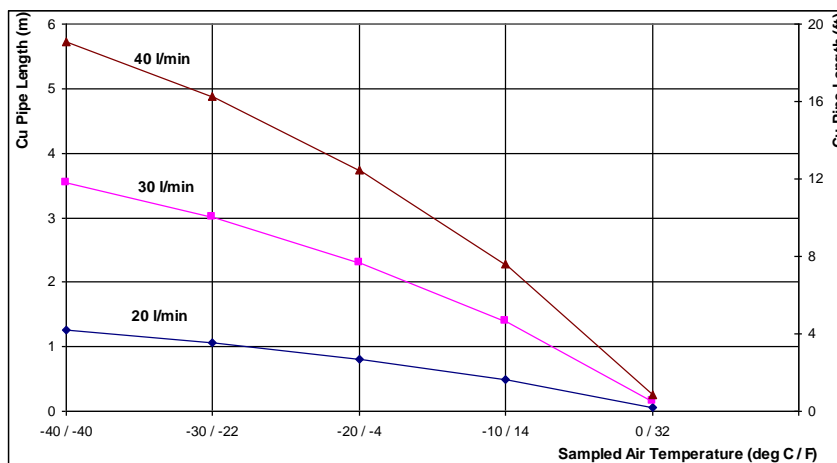


Figure 2: Estimated Copper pipe length “run” for sampled air warming

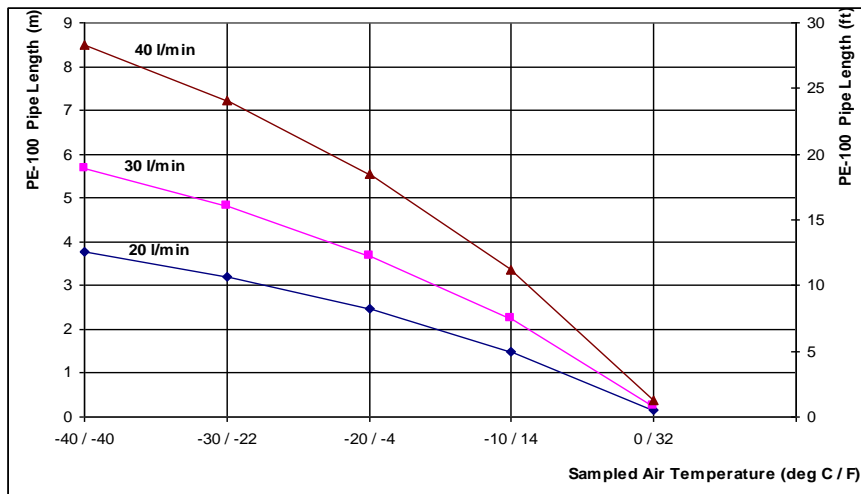


Figure 3: Estimated PE-80/PE-100 pipe length “run” for sampled air warming

Example

- Sampled air temperature leaving cold environment: -40°C (-40°F)
- Pipe airflow: 30 L/min
- Pipe Material: ABS
- Required length of ABS pipe “run” to increase the sampled air temperature to 0°C (32°F): 7m (23ft) - Figure 1

3 Sampled Air Cooling

Sampled air of extremely high temperature can be cooled down to an acceptable degree by allowing the pipe to “run” in a cooler environment (i.e. external to where sampling occurs). The length of this pipe “run” will be a function of the sampled air temperature, pipe material, pipe flow rate and external ambient temperature.

The figures below provide conservative estimates of the lengths of pipe “runs” required to lower the temperature of the sampled air for Copper and Stainless Steel pipes across a range of flow rates. All calculations assume an external ambient temperature of 20°C (68°F) and a sampled air temperature entering the detector of 60°C (140°F).

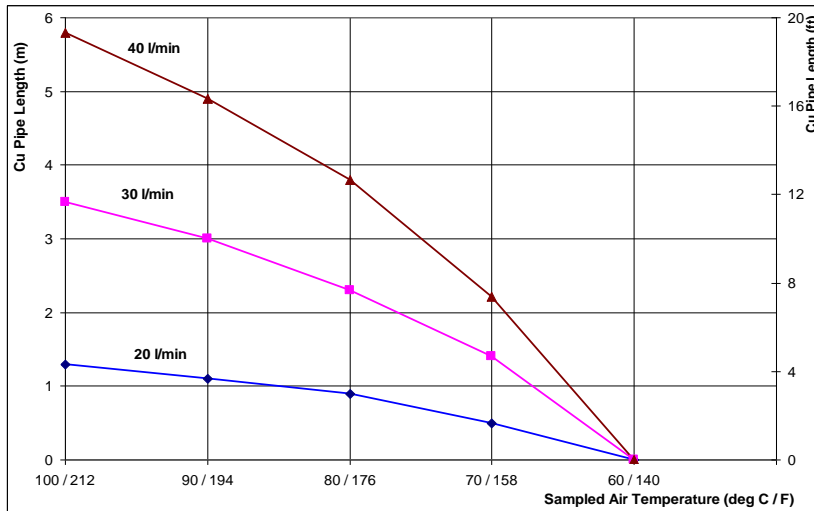


Figure 4: Estimated Copper pipe length “run” for sampled air cooling

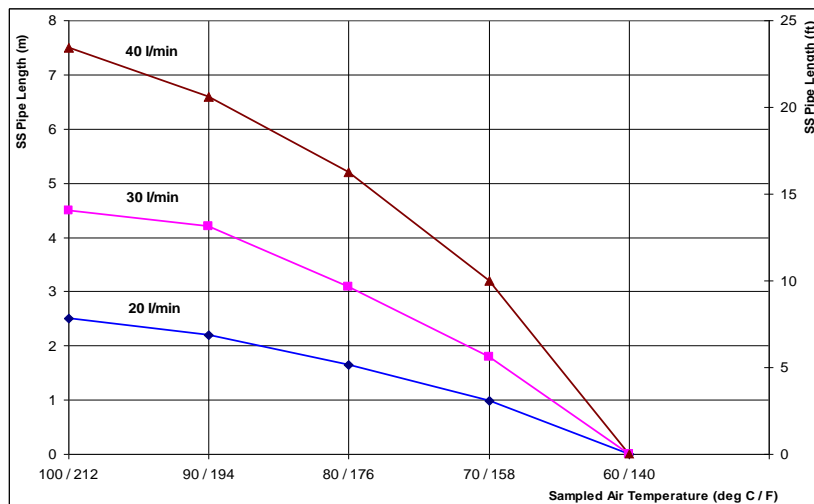


Figure 5: Estimated Stainless Steel pipe length “run” for sampled air cooling

Example

- Sampled air temperature leaving hot environment: 100°C (212°F)
- Pipe airflow: 30 L/min
- Pipe Material: Copper
- Required length of Copper pipe “run” to lower the sampled air temperature to 60°C (140°F): 3.5m (11.5ft) - Figure 4

4 Further Support

Contact an Xtralis office or distributor for further information.

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