

Black Mountain Mining

BMM-HSE-VOH-SOP-022 Fan & Ducting Installation

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BMM-HSE-VOH-S OP-0006	BMM-HSE-VOH-S OP-022	Standard Operating Procedure	Approved
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❖ **Change History**

Modified Date	Version	Modified by	Description of change
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❖ Definitions and Abbreviations

Word / Phrase / Abbreviation	Definition
PEME	PEME is an acronym used in Black Mountain Mining and has the following meaning: - People, - Equipment, - Materials, - Environment, The use of this in written documentation helps to comply with Resources Clause 7 – ISO 9001, ISO 14001 and ISO 45001. It is advisable to include in all written documentation.
Auxiliary Fan	Fan to provide ventilation to a specific section of a mine
Ventilation ducting	Disposable fabric or steel ducting used to deliver air as part of the auxiliary fan/ducting system
VOH	Ventilation & Occupational Hygiene

1. PURPOSE

The purpose and objectives of the standard is to:

- Provide the standard on installation and maintenance of auxiliary ventilation fans and ducting.

2. SCOPE AND USERS

This standard applies to all mining areas of Black Mountain.

3. PROCEDURE

3.1 Introduction

Black Mountain is committed to creating and maintaining a safe working environment for all employees. This SOP provide the standard required for ducting, the installation standard and maintenance.

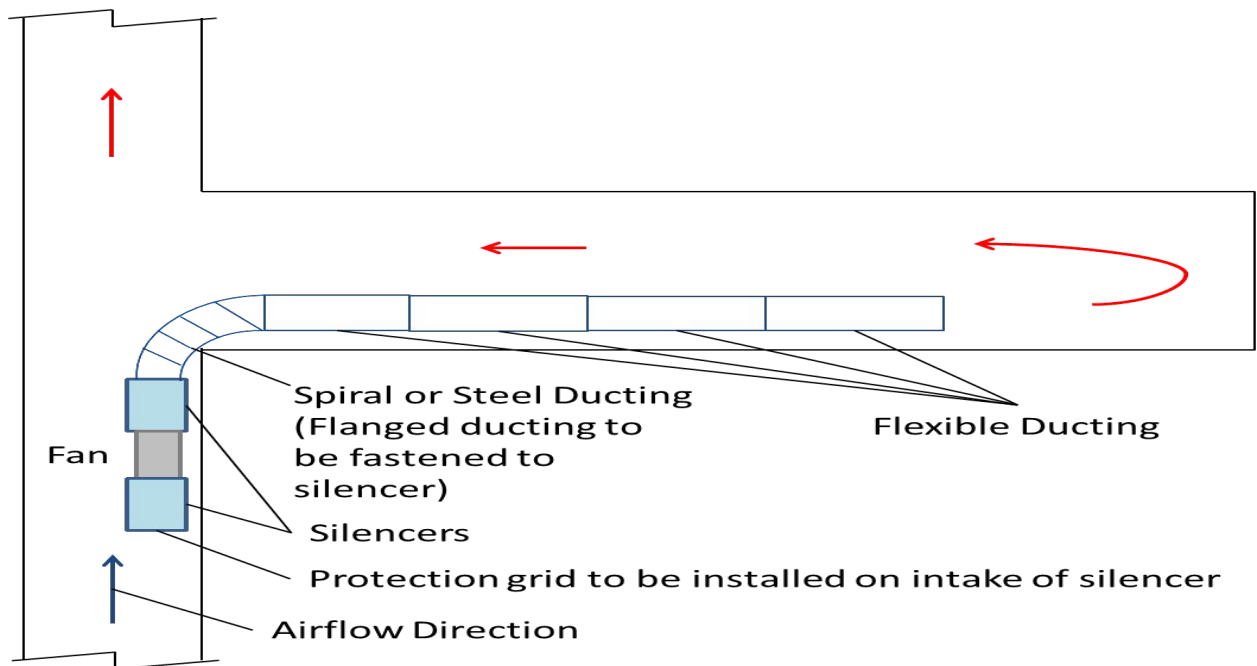
3.2 Installation Method – Auxiliary Fans, Silencers & Ducting

Installation of auxiliary fans and ducting will be as follows:

- a) Auxiliary fans must be suspended with chains from five anchor points (eyebolts) as a minimum
- b) Two silencers must be installed: 1 x intake side & 1 by delivery side of the auxiliary fan. Each silencer shall be suspended with chains from two anchor points (eyebolts)
- c) Intake of the fan must be extended to a minimum of 10 meters in through ventilation
- d) Flexible ducting will be suspended from a specifically installed straining wire
- e) Delivery distance for ducting to face must not exceed 30 meters
- f) Spiral ducting must be used around sharp bends to minimise ducting being partially closed, thus reducing airflow
- g) Installation must be as near as possible to the side wall to prevent damage to the fan and ducting installation
- h) A protection grid must be installed on the intake side to prevent loose items entering the fan installation
- i) A direction test must be conducted by the electrician after connecting the fan
- j) Refer to SS 0052 Ventilation Standards for additional specifications on installation

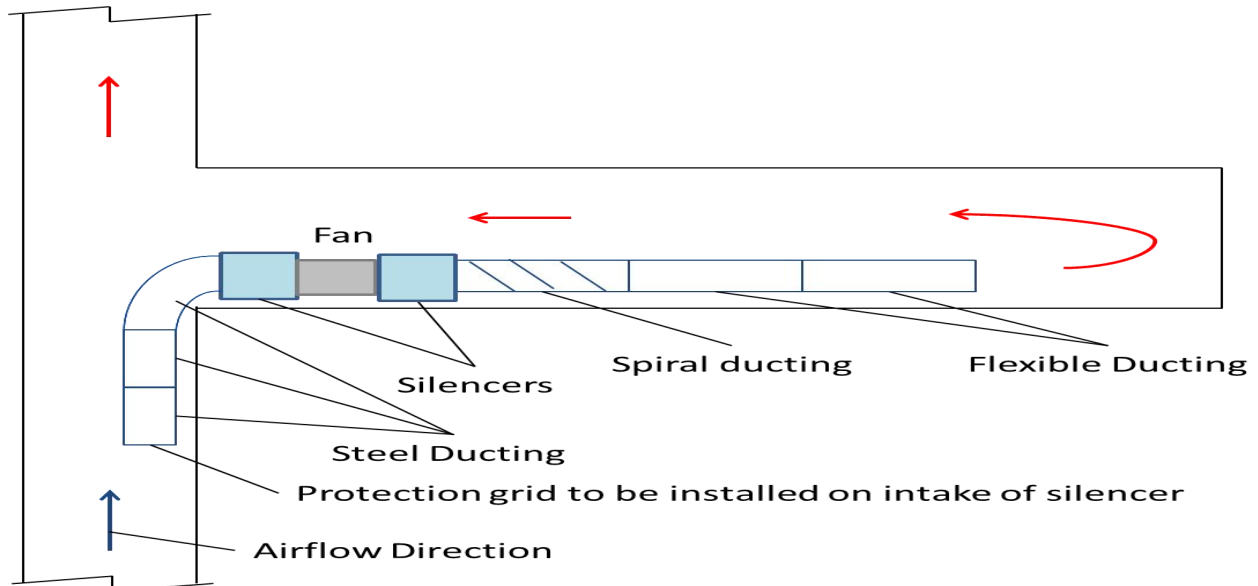
3.2.1 Option 1

Installation of the auxiliary fan, silencers, spiral or steel ducting and flexible ducting – the sketch depict the general installation method: The first spiral ducting installation after the silencer must be a flange installation



3.2.2 Option 2

Installation of galvanized steel ducting on inlet side, auxiliary fan & silencers and flexible ducting – the sketch depict the general installation method:



3.3 Exhaust Fan Installation

- The Exhaust fans, installed onto ventilation raises / boreholes, must be installed on top of a steel structure, strong enough to withstand concussion from blasting
- The steel structure must be pinned into the ground and conveyor belt strips installed on the edges of the structure

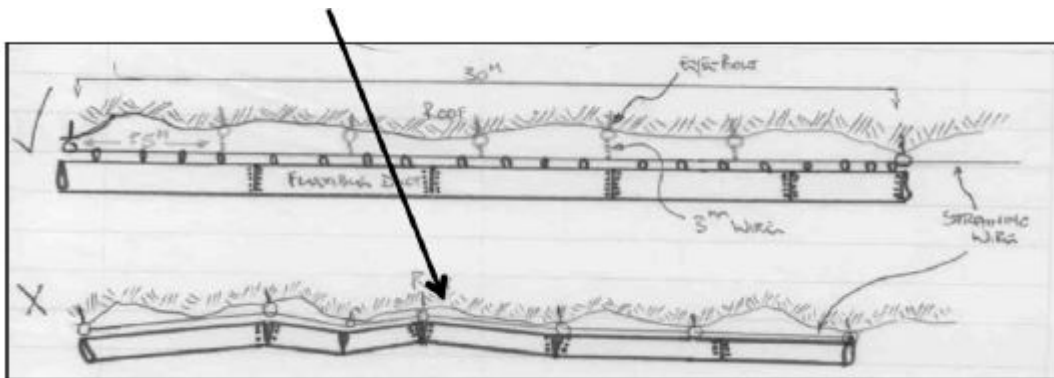
- c) The steel structure must also have sufficient release flaps to release concussion from the Stope below

In the event the Exhaust Fan is installed near a working, the following apply:

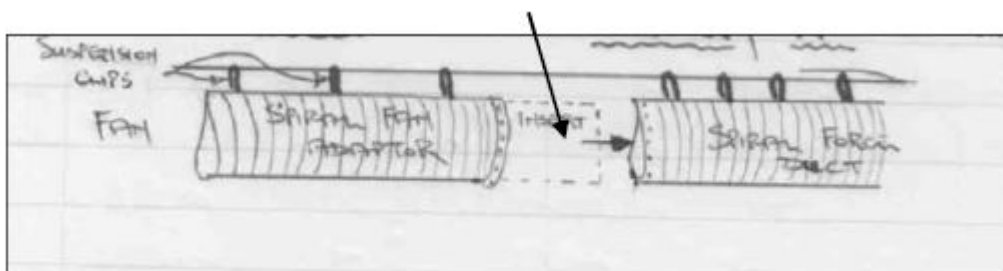
- a) Install as per above requirement
- b) Install a silencer on the fan to reduce noise in the area

3.4 Repair, Removing and replacing vent ducting

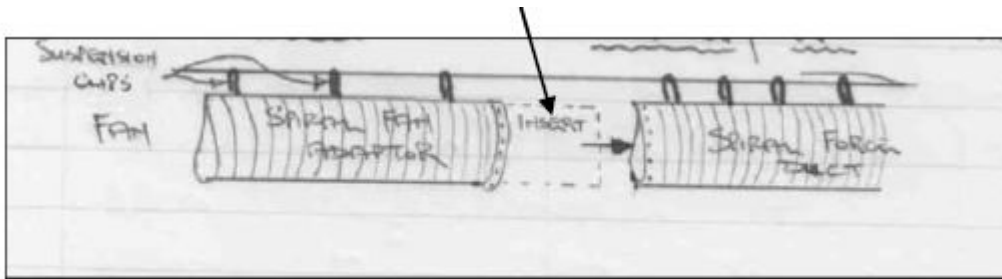
- a) Wear your Personal Protective Equipment (PPE)
- b) Conduct a Risk Assessment
- c) Ensure that all the items necessary to complete the installation of the Flexible Ducting are available (e.g. straining wire, tools, fan adaptor, force ducting and end piece)
- d) Install straining wire between the fan and the working face, ensuring that the straining wire is kept horizontal with no sagging (See below)



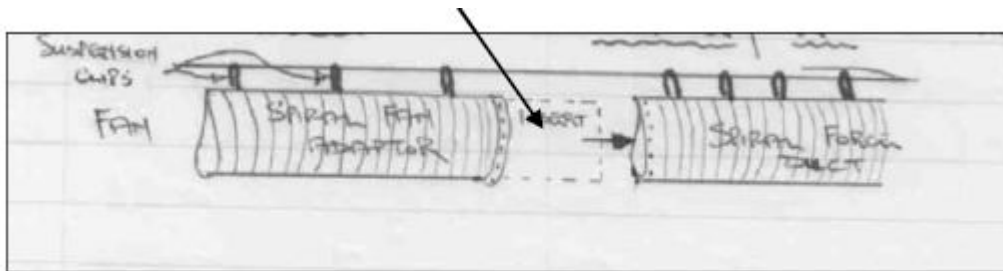
- e) Attach the spiral fan adaptor to the fan by means of the steel flange, ensuring that the Hanging Pods (with the snap hooks) are situated so as to be able to attach to the straining wire.
- f) Connect a minimum of one length of spiral force ducting to the spiral fan adaptor by inserting the “tongue” or “male-piece of the spiral fan adaptor, into the opening of the spiral force duct and complete the connection by joining the yellow clips to the eyelets on the opposite duct. (See Sketch 2 below)



- g) Suspend this spiral force duct from the straining wire by means of the snap hooks attached the top of the duct.
- h) NOTE: The RED hanging pod indicates the delivery side of the ducting, which should be facing into the development end.
- i) Connect another spiral force duct to the existing duct by inserting the “tongue” or “male-piece” into the opening of the next duct and joining the yellow clips to each opposite eyelet. Repeat Step Seven to suspend from the straining wire.



- j) Repeat Step Eight until the required number of ducting has been installed.



- k) To complete the installation, the end piece must now be installed to the last duct in the column, in the same manner as before, by inserting the “male piece” of the last duct into the opening of the end piece and joining the yellow clips with the eyelets. The ring at the delivery side of the ventilation column can be “strained” against the side wall of the tunnel by using either of the “D” rings tied off to an anchor point.
- l) When adding or replacing vent ducting in a development end without through ventilation care must be taken not to switch off the fan which could result in the work being carried out in an unventilated end. Install straining wire between the last ventilation ducting and the working face, ensuring that the straining wire is kept horizontal with no sagging. The ventilation ducting to be added, must first be installed (added) to the advancing face and must be put into position under the current ventilation supply conditions.
- m) When the ventilation ducting is in position for connection to the existing installed vent ducting on the ventilation system the fan can be switched off for a short period of time (If the pressure does not allow safe coupling) to allow for the quick connect the vent ducting to be added.

- n) During the time of the connection and the ventilation fan being off all diesel equipment must be switched off to prevent the build-up of fumes and heat in the workplace.
- o) Gas and Temperature readings must be taken to ensure that the levels are below the limits.

4. LEGISLATIVE REQUIREMENTS

In compiling this standard every effort has been made to ensure that the practices and principles contained herein comply with the relevant laws and constitutional codes, which governs the workplace.

5. TRAINING

Training required will depend on the occupation and responsibility of the Construction Crew and the Production team members; training could thus include:

- Manual Material Handling
- Basic Rigging and slinging
- Working at heights
- Operating of lifting and scissor lift machines (This has two sections, namely: driving of the machine and operating controls for lifting)
- Installation & removal of auxiliary fans and ducting

6. RESPONSIBILITY & AUTHORIZATION

It is the responsibility of the Custodian of this policy to maintain and implement this procedure. This procedure will be reviewed and updated after significant changes are introduced to procedures, plant, equipment or work method. The periodic review will not exceed a period of three years.

6.1 Mining Department

- Allocate resources for the installation and maintenance of auxiliary ventilation systems.
- Conduct over-inspections to verify installation and maintenance
- Report any incident of damage to ventilation ducting, auxiliary fans or silencers to the VOH department

6.2 Ventilation & Occupational Hygiene Department

- Provide ventilation layouts to mining section on the ventilation infrastructure installation
- Monitor (survey) the ventilation conditions after installation
- Conduct an initial survey, as per the "Start-up Risk Assessment" procedure, followed by VOH surveys as per the VOH Annual Planning Schedule

7. VALIDITY AND DOCUMENT MANAGEMENT

7.1 Document Validity

This SOP is effective from 2015/08/01 and was last reviewed on 17-07-2024.
This SOP will be reviewed every 2 Years.

7.2 Document Management

- 7.2.1 This SOP replaces any other SOP issued earlier by BMM to the extent specifically covered here. This SOP should be followed in letter and spirit.
- 7.2.2 BMM is committed to continuously reviewing and updating policies and procedures, based on the Entity's risk assessment and shall incorporate for any regulatory requirement which is required to do so.
- 7.2.3 Any amendment to this SOP or issue of any guidance or circular etc. under this procedure must be approved in writing by the approving authority as listed in this document.
- 7.2.4 BMM reserves the right to withdraw, modify or revise the SOP as a whole / partial without providing any justification for the same. On revision, it should be duly communicated to the personnel involved.
- 7.2.5 If compliance with this SOP ever conflicts with the applicable law, regulation, directives issued by the statutory and or regulatory authority, then compliance must be ensured with the law.
- 7.2.6 In order to ensure compliance or to address any known conflicts with the law or to address any specific local requirements, BMM may adopt local sub-procedures which shall be by way of addendum to this SOP and which shall be approved by the approver of this SOP. Proposing of such addendum shall be the responsibility of the respective Entity's competent authority who is at an equivalent level with the SOP owner as set out in this document.

7.3 Violation of Sop

- 7.3.1 BMM follow a "Zero Tolerance Policy" with respect to non-compliance with this SOP and/or any other SOP / guidance issued by BMM and its constituent Entities.
- 7.3.2 Violation of this SOP is subject to appropriate disciplinary actions which may include but not limited to termination of employment. This determination will be based on the facts and circumstances of each situation. Any accused of violation of this SOP will be given an opportunity to present their case prior to any determination of appropriate disciplinary actions. Violation of this SOP may also be subject to substantial civil damages, criminal fines and prison terms.
- 7.3.3 Each employee is responsible for ensuring that their conduct and the conduct of anyone reporting to them shall fully comply with this SOP.

Compliances, both personal and by subordinates, will be a factor in periodic performance appraisals.

7.4 Disclaimer

- 7.4.1 This SOP issued by BMM is for internal compliance and does not create, nor shall it be construed to create, directly or implicitly, any rights, duties or obligations of BMM to any person, body or legal Entity.
- 7.4.2 This document and its contents are the copyright property of BMM. The release of this document to any third party outside BMM is strictly prohibited without prior consent.

8. REVIEW AND APPROVAL

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This document was approved (in sequence) by the individuals above using electronic approval in our Document Control System.

Final approval status: **Approved**

Approvals were done electronically.

❖ Annexures / Appendix



TERRAVENT® Y Piece for Ducting (FRAS)



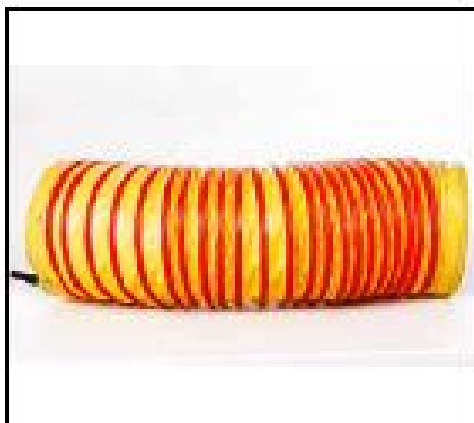
TERRAVENT® Force Ducting (FRAS)



TERRAVENT® Spiral Force Ducting (FRAS)



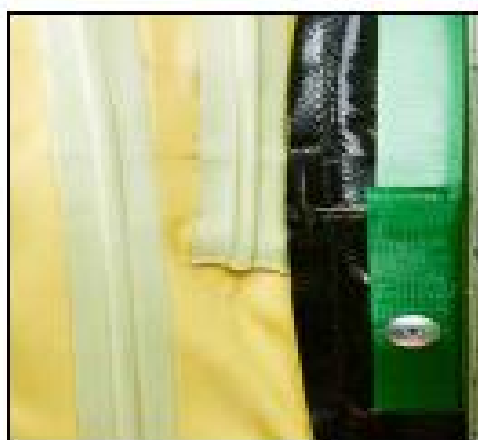
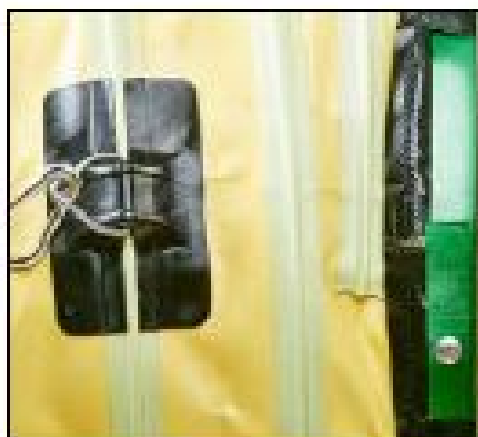
*TERRAVENT® Spiral Force Ducting
NOTE: Differentiation between Pitch of
Helix for either Force or Exhaust Appli-
cations*



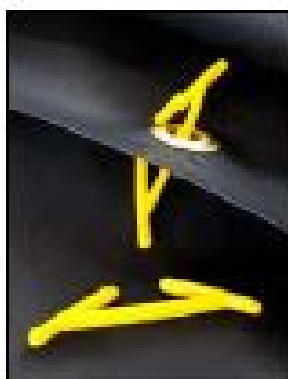
TERRAVENT® Spiral Exhaust Ducting



*Yellow Flame Retardant Anti-Static
(FRAS) Force Ducting*



Accessories: Flange Fan Adaptor application



INSERT 'N' CLIP:
2010/07901
*Simple technology
to attach lengths
of ducting easily*



TERRAPOD®: 20/09/07960
*Patented TERRAPOD® Hang-
ing Device*



STEEL INTAKE PROTECTOR
*Steel intake protector assists
in limiting intake of airborne
foreign objects and internal
damage to ducting material*



TERRAVENT® Spiral Exhaust Ducting



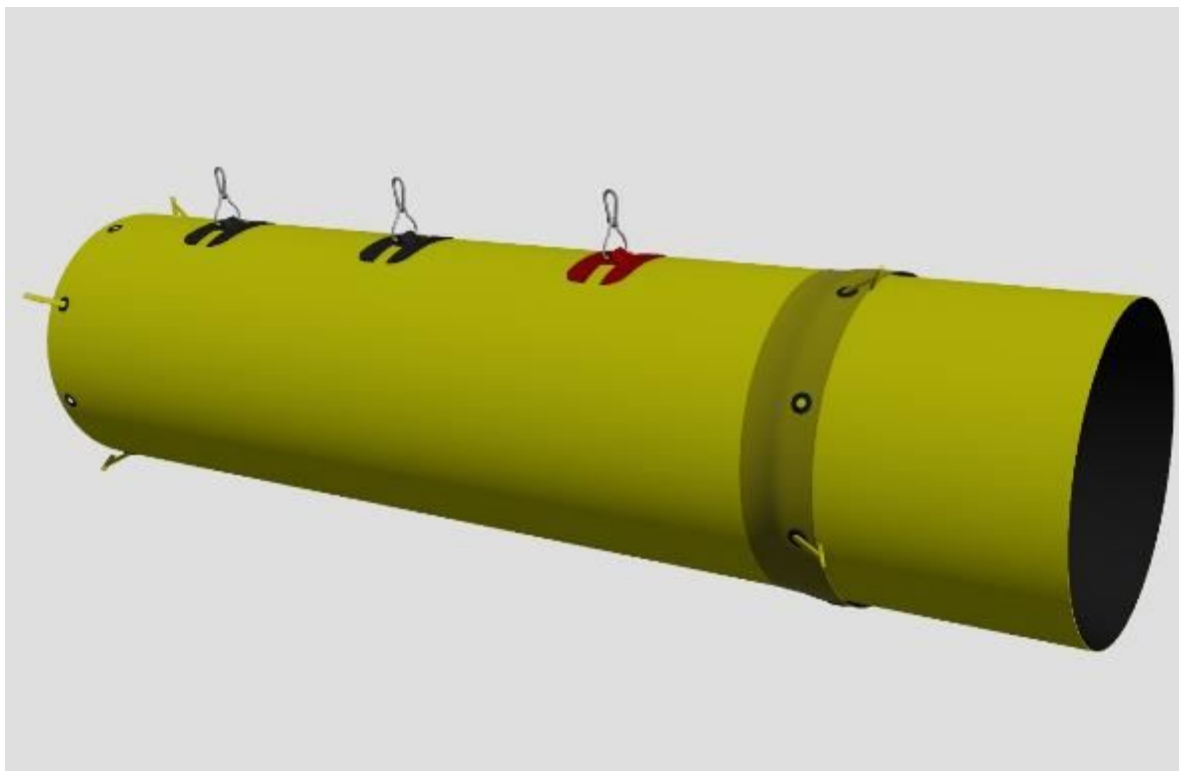
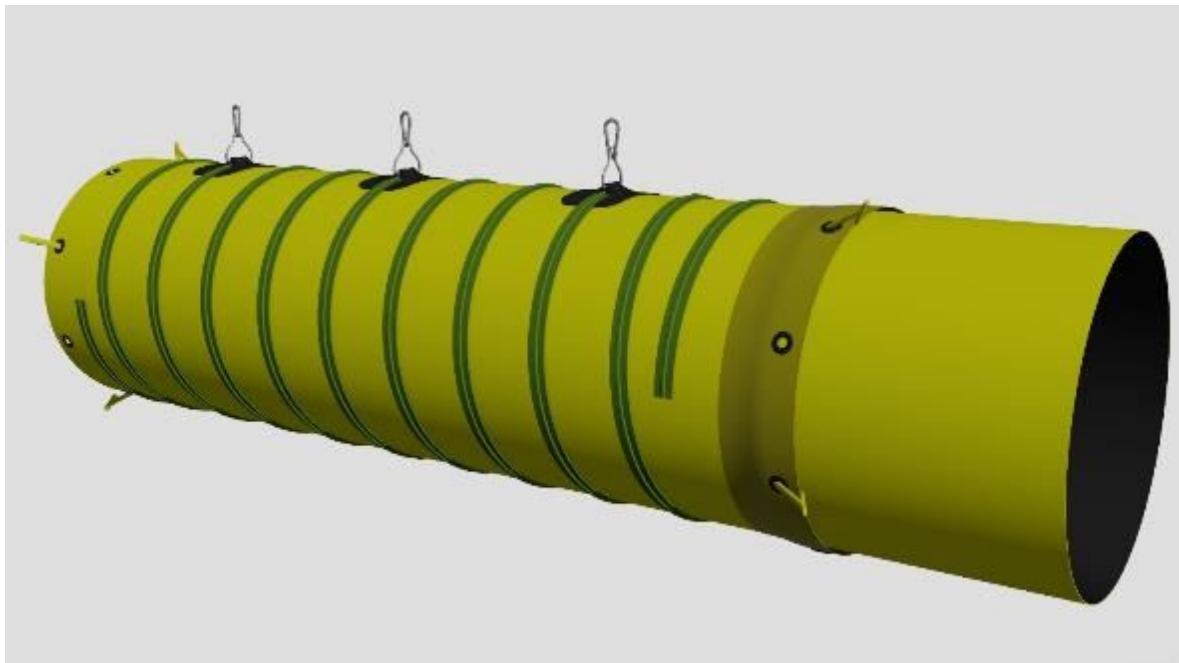
TERRAVENT® Spiral Force Ducting



TERRAVENT® Layflat Force Ducting



Fan Adaptors with TERRAVENT® Spiral Exhaust Ducting



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