

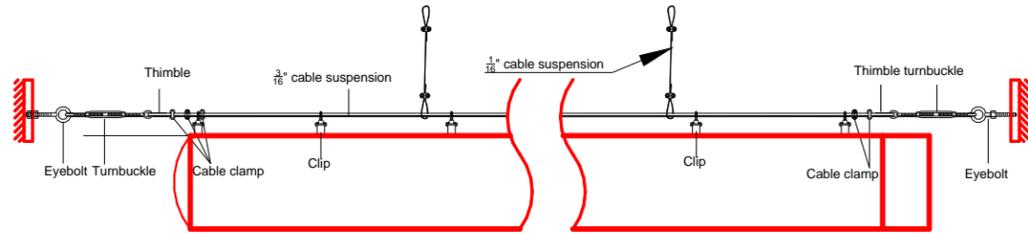
INSTALLATION MANUAL

CABLE SUSPENSION SYSTEM



PREFACE OF INSTALLATION

The material required to install DurkeeSox air dispersion system includes: DurkeeSox duct segment and its fittings (inlet, endcap, T-connector, elbow, transition, etc.), components (FAF-Fabric air filter, Fabric static plenum box, etc.) and accessories (cable, eyebolt, turnbuckle, thimble, cable clamp, rubber jacket, etc.), which are supplied by the manufacturer (shipped with the consignment, including installation drawing, installation manual and assembly drawing, etc.) Other installation auxiliaries required on the jobsite, such as fixing brackets and fastening screws shall be purchased by the installation contractor.



Schematic Drawing of Cable Installation System



Installation Fittings

Although the whole installation of DurkeeSox system is quite easy, attention must be paid to the details: locating dimensions and straightness of cable installation, inlet installation angle, etc. Otherwise, they would affect the appearance of DurkeeSox system despite of no influence on ventilation.

Installation Manual of Cable Suspension System

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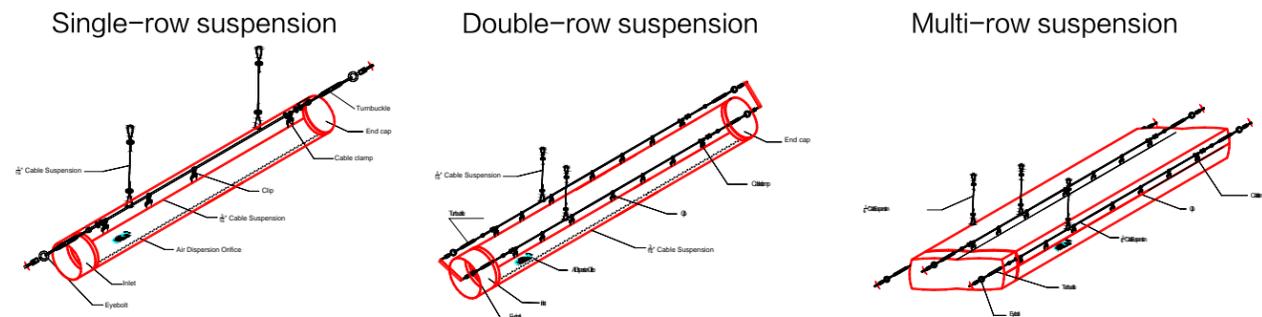
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1 BASIC INTRODUCTION OF INSTALLATION STYLE

1.1 Type of cable suspension system

Cable suspension system can be classified according to the number of suspension rows and suspension direction.

1.1.1 According to number of suspension rows, there are three types of suspension.

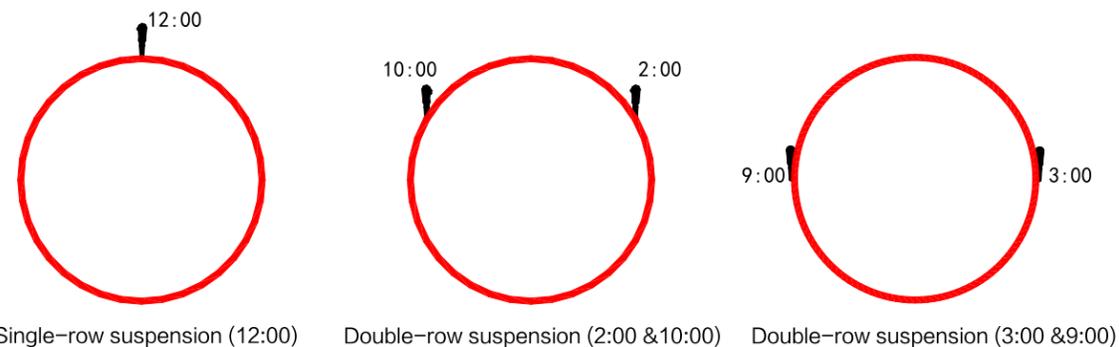


Single-row cable suspension is recommended for smaller diameter, or without strict requirement on shape change during inflation and deflation. The direction of suspension clips is at 12 o'clock.

Double-row cable suspension system is suggested for larger diameter duct. It's also recommended for ducts used in limited space or with asymmetrical orifices.

Multi-row cable suspension is recommended for rectangle system at the occasion with large airflow but smaller installation space. The number of suspension row is determined by the rectangle width. Usually, the spacing between tension cables is not more than 20", which can be distributed uniformly.

1.1.2 According to the suspension direction, there are three types



The strap length is $3\frac{1}{2}$ "(90mm). In special cases, the suspension direction can be defined by the user.

Note: if no direction is defined in the construction specification, the direction is 12:00 for single-row, 2:00 and 10:00 for double-row. Other directions will be specified.

1.2 Types of Brackets

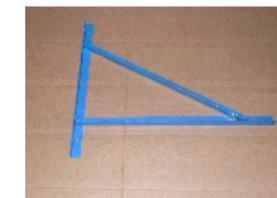
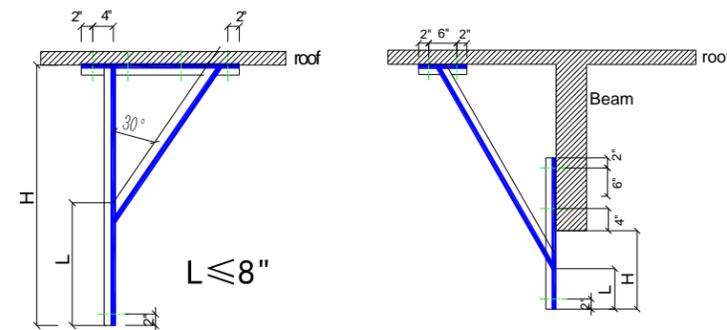
The bracket in cable suspension system is used to straighten cable and mounted onto the architectural structure (roof, beam, steel structure girder and wall).



The bracket of the DurkeeSox cable suspension system shall be as firm & simple as possible. According to the bracket height on the jobsite and the length of the tension cable, the bracket is usually made of angle iron, channel steel or square steel.

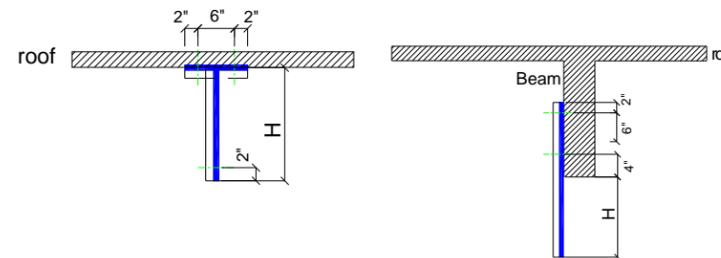
According to the installation position on the jobsite, there are three kinds of supporting: triangle, direct rod and special form, which shall be determined by the actual condition.

1.2.1 Triangle bracket



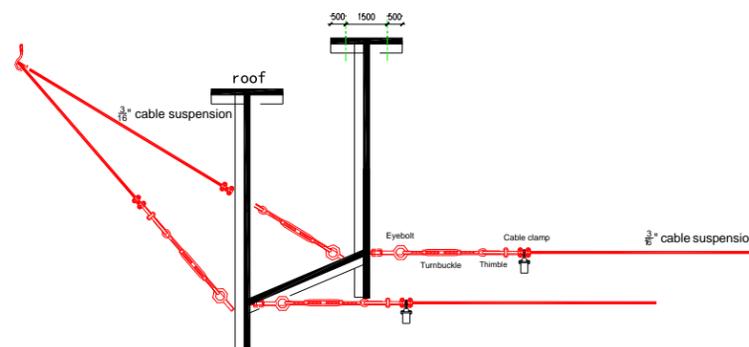
Triangle bracket is usually made of angle iron. Channel steel or square steel may also be used as triangle bracket when it is long in height direction.

1.2.2 Direct-rod bracket



Direct-rod bracket is usually used when the height is very limited. We suggest this bracket be made of channel steel or square steel.

Wire cables for buffering pressure



The cable for buffering pressure adopts the same types of wire cables and component with the hanging-cable-wire. Two wire cables are demanded to buffer the pressure and connected with two bracket arm respectively. One end of the cable is connected with components being fixed on the arm of bracket where undertake the pressure; another end is connected with the fixed point on the building structure like the surface of wall or top, beam, steel beam and piling bar. Therefore, a cant triangle is created.

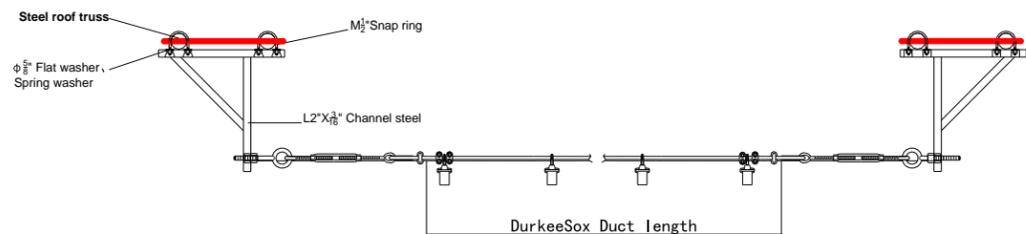
1.2.3 Wall bracket



Pictures of channel steel bracket

Usually made of angle iron or channel steel, wall bracket is the most suitable and economized method of bracket when applicable.

1.2.4 Tripod fixed on girder of steel frame



When bracket is fixed on girder of steel frame, there are some connection modes, such as hoop connection, bolt connection and welding, etc., and the bracket is generally quite long in direction, so we suggest the bracket be made of channel steel.

1.2.5

Durkeesox is developing new types of bracket with new materials positively. Thus, Brackets will be standard products which can be installed more efficiently and accurately.

1.3 Inlet

According to installation position, there are two kinds of inlets: single-layer and double-layer.



Single-layer: installed where do not need to removal and wash.



Double-layer: nice looking design, allow removal and washing.

1.4 Type of inlet connection

According to the shape of reserved outlet of metal duct, inlet connection mode consists of round connection and square-to-round connection



Round Connection

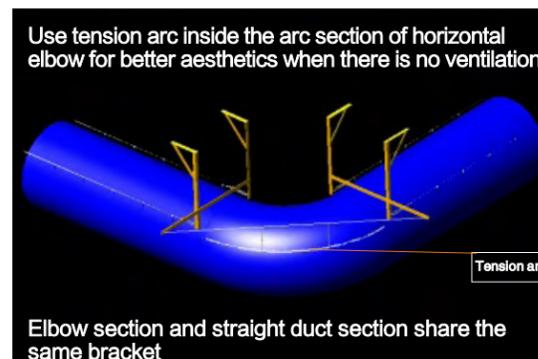


Square-to-round Connection

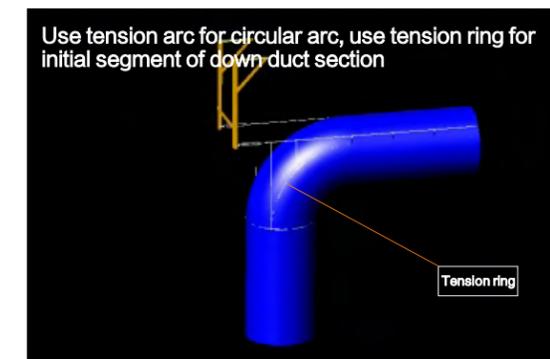
1.5 Irregular fittings and installation

1.5.1 General irregular fittings

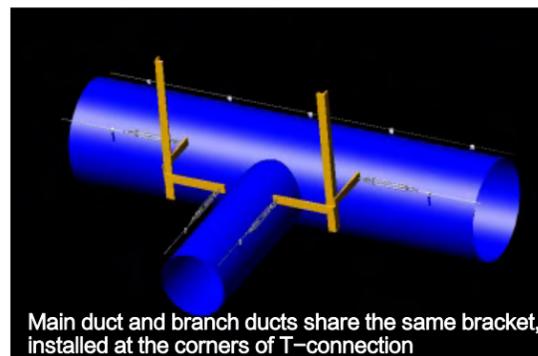
Horizontal elbow



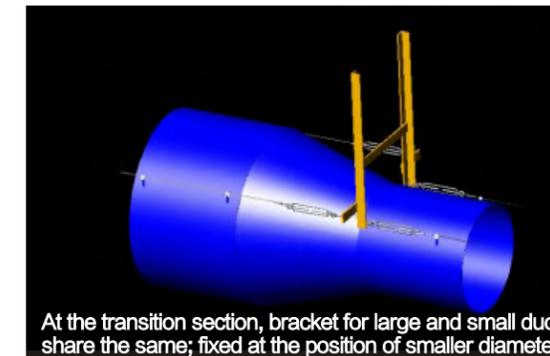
Upright elbow



Horizontal T-connection

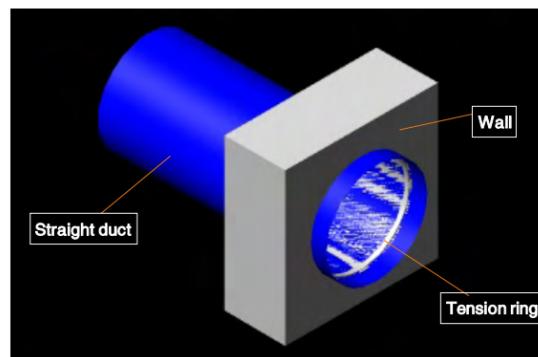


Transition



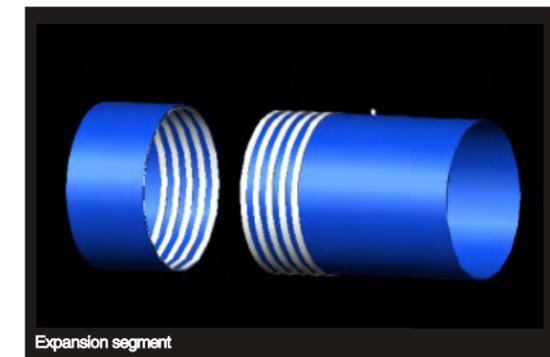
1.5.2 Functional irregular fittings

1.5.2.1 Wall Pass Through



Without cooperation of ducts made of other material (such as metal duct), the wall pass through can pass through the wall and keep aesthetic appearance under no ventilation.

1.5.2.2 Expansion Segment



Employing specially-combined hasp design, they can avoid various performance and aesthetic problems caused by the error between the actual size and the designed size of project.

2 PREPARATION AND CALCULATION BEFORE INSTALLATION

2.1 Preparation of installation tools

Common tools for DurkeeSox installation



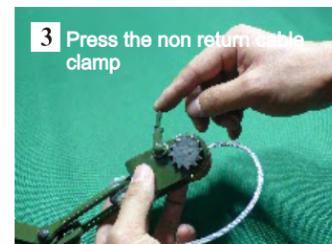
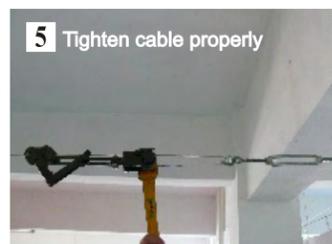
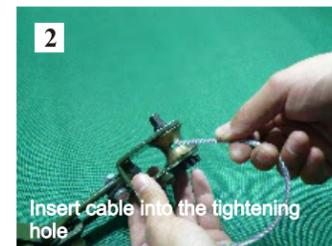
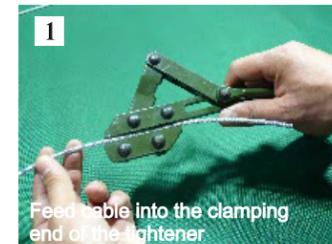
Function of different tools:

- A Electric drill: Used for drill on brackets, and drill at inlet joint for DurkeeSox and metal duct.
- B Percussion drill: Drill in the wall and use expansion bolt to fix bracket to wall.
- C Power switchboard: Convenient electric tool for a long distance working.
- D Hammer: Fix bracket.
- E Plier: Fix cable clamp.
- F Spanner: Fix bracket and tighten cable clamp.
- G Tape measure: Measure size and for locating.
- H Mark pen: Mark and record for data.
- I Safety harness: Provide protection for aloft work.
- J Chalk line bag: Locate track suspension on the ceiling.
- K Plumb bob: Locate the suspension point along the upright direction.
- L Manual rivetting gun: Used to connect DurkeeSox system and metal duct outlet.
- M Scaffold: Used for aloft work.

Special tool: cable tightener

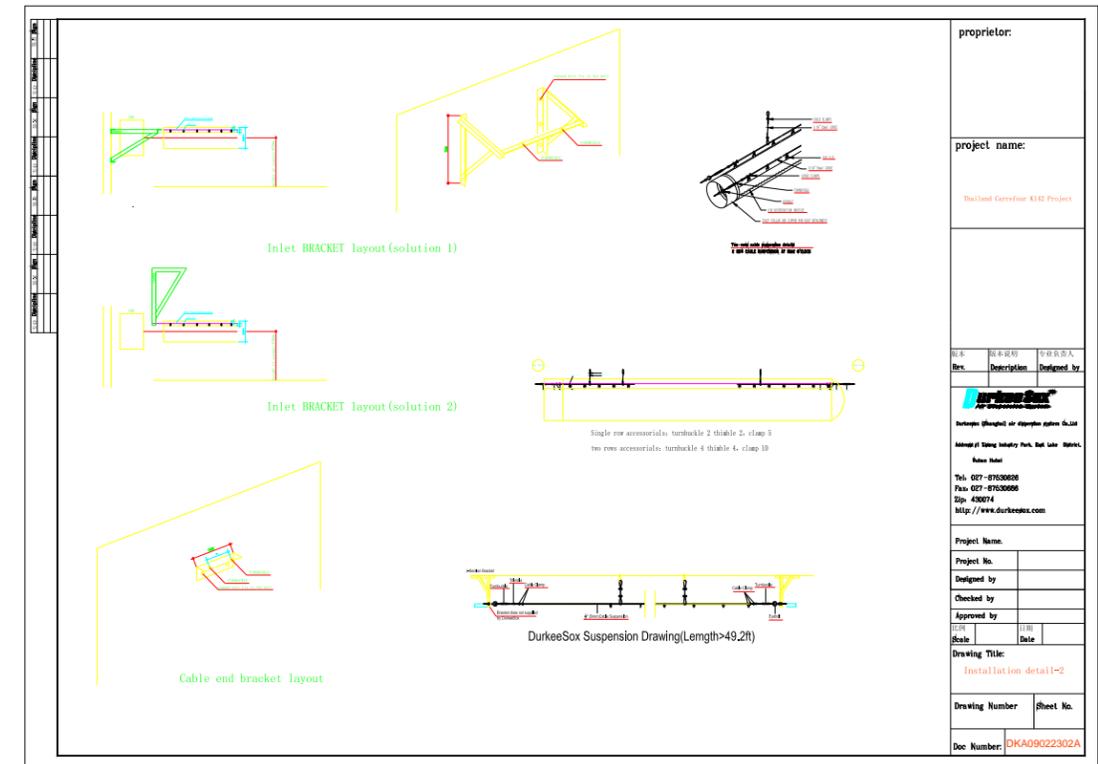


How to use tightener



2.2 Construction drawing and accessories calculation

2.2.1 Make detailed construction drawing according to the design layout of DurkeeSox system



Note: installation drawing can be made faster and better by using our special isox-design software.

Make construction drawing: it shall be able to indicate how and where to install the bracket of each duct length as well as the installation height of and spacing between tension cables. Accessories calculation shall be based on precise length, installation height and position.

Example Of Installation Material Table

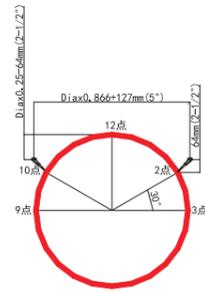
| Duct ID number | Dia (tech)(mm) | L (Ft) | L (m) | Suspension Rows | Eyebolt (PCS) | Turnbuckle (PCS) | Thimble (PCS) | Cable clamp (PCS) | 3/16" 5mm cable (Ft) | 3/16" 5mm cable (m) | 1/16" 2mm cable (Ft) | 1/16" 2mm cable (m) | Qty of hanging point | |
|-------------------------------|----------------|--------|-------|-----------------|---------------|------------------|---------------|-------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---|
| 1 | 20 | 508 | 96.5 | 29.4 | 2 | 4 | 4 | 4 | 22 | 221.9 | 67.6 | 39.4 | 12 | 6 |
| 2 | 20 | 508 | 96.5 | 29.4 | 2 | 4 | 4 | 4 | 22 | 221.9 | 67.6 | 39.4 | 12 | 6 |
| 3 | 20 | 508 | 87.9 | 26.8 | 2 | 4 | 4 | 4 | 22 | 202.2 | 61.6 | 39.4 | 12 | 6 |
| Total | | | | | 12 | 12 | 12 | 66 | 646 | 197 | 118 | 36 | | |
| Project total quantity | | | | | 12 | 12 | 12 | 70 | 656 | 200 | 131 | 40 | | |

- A Determine the quantity of DurkeeSox system and the length of each system according to the installation drawing.
- B Figure out the accessories for installation of each duct and sum up.
- C How to calculate accessories: The company has designed the accessory calculation table, the diameter and length of each duct can be inputted into this table directly and it can generate automatically the quantity of accessories required by each system and the total quantity required by project.

How to calculate each kind of accessory in the table:

- Eyebolt.....2 for each row of tension cable in each duct.
- Turnbuckle.....2 for each row of tension cable in each duct.
- Cable clamp.....5 for each row of tension cable in each duct (excluding cable clamps for hanging point. 2 more for every hanging point)
- 3/16"(5mm) tension cableLength of tension cable of each row is 1.15 times the duct length, If the actual length of installation on the jobsite is determined, the actual one shall prevail.
- 1/16"(2mm) suspension cableEvery 26.2ft set up one suspension point, the total length is calculated by the quantity of suspension cable x suspension height.
- Rubber jacket.....For ventilation only, since the metal duct outlet does not need insulated. Rubber jacket shall be installed there to protect the DurkeeSox system. The length of rubber jacket is determined as follows: perimeter of each inlet x 1.05.

2.2.3 Calculate suspension height and spacing of tension cable per duct diameter



Use 90mm (3 1/2") snap clip for duct diameter

Spacing and height table of tension cable per duct diameter

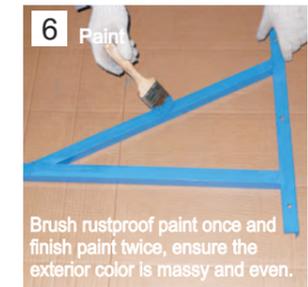
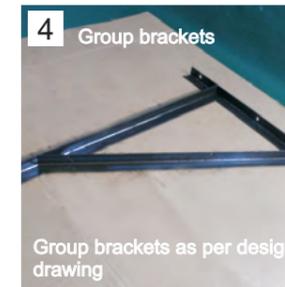
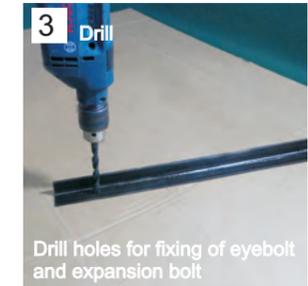
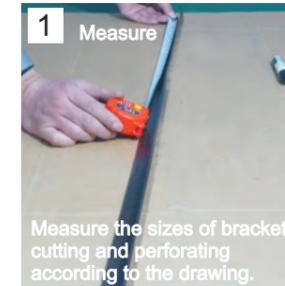
| Dia (inch mm) | 2: 00 & 10: 00 | | | | 3:00 & 9:00 | | | | |
|------------------|----------------------------|----------|--|----------|----------------------------|----|--|---------|-----|
| | cable spacing (inch mm) | | height from cable to top of duct (inch mm) | | cable spacing (inch mm) | | height from cable to top of duct (inch mm) | | |
| 6 | 152 | 5 | 131 | -2 | -52 | 6 | 152 | -1/2 | -14 |
| 8 | 203 | 6 3/4 | 175 | -1 5/8 | -40 | 8 | 203 | 7/16 | 12 |
| 10 | 254 | 8 5/8 | 219 | -1 | -27 | 10 | 254 | 1 1/2 | 37 |
| 12 | 305 | 10 3/8 | 264 | -1/2 | -14 | 12 | 305 | 1 7/16 | 63 |
| 14 | 356 | 12 | 308 | -1/16 | -1 | 14 | 356 | 3 7/16 | 88 |
| 16 | 406 | 13 3/4 | 351 | 7/16 | 11 | 16 | 406 | 4 1/2 | 113 |
| 18 | 457 | 15 5/8 | 395 | 1 | 24 | 18 | 457 | 5 1/2 | 139 |
| 20 | 508 | 17 1/4 | 439 | 1 1/2 | 37 | 20 | 508 | 6 1/2 | 164 |
| 22 | 559 | 19 | 484 | 2 | 50 | 22 | 559 | 7 1/2 | 190 |
| 24 | 610 | 20 3/4 | 528 | 1 7/16 | 62 | 24 | 610 | 8 1/2 | 215 |
| 26 | 660 | 22 1/2 | 571 | 3 | 75 | 26 | 660 | 9 1/2 | 240 |
| 28 | 711 | 24 1/4 | 615 | 3 7/16 | 88 | 28 | 711 | 10 1/2 | 266 |
| 30 | 762 | 25 5/8 | 659 | 4 | 100 | 30 | 762 | 11 1/2 | 291 |
| 32 | 813 | 27 1/2 | 704 | 4 3/8 | 113 | 32 | 813 | 12 1/2 | 317 |
| 34 | 864 | 29 3/8 | 748 | 5 | 126 | 34 | 864 | 13 7/16 | 342 |
| 36 | 914 | 31 1/8 | 791 | 5 3/8 | 138 | 36 | 914 | 14 7/16 | 367 |
| 38 | 965 | 32 7/8 | 835 | 5 15/16 | 151 | 38 | 965 | 15 1/2 | 393 |
| 40 | 1016 | 34 9/16 | 879 | 6 1/2 | 164 | 40 | 1016 | 16 7/16 | 418 |
| 42 | 1067 | 36 7/16 | 924 | 7 | 177 | 42 | 1067 | 17 1/2 | 444 |
| 44 | 1118 | 38 1/8 | 968 | 7 3/8 | 189 | 44 | 1118 | 18 7/16 | 469 |
| 46 | 1168 | 39 13/16 | 1011 | 8 | 202 | 46 | 1168 | 19 7/16 | 494 |
| 48 | 1219 | 41 1/2 | 1055 | 8 1/2 | 215 | 48 | 1219 | 20 7/16 | 520 |
| 50 | 1270 | 43 5/16 | 1099 | 8 15/16 | 227 | 50 | 1270 | 21 7/16 | 545 |
| 52 | 1321 | 45 | 1143 | 9 1/2 | 240 | 52 | 1321 | 22 1/2 | 571 |
| 54 | 1372 | 46 13/16 | 1188 | 10 | 253 | 54 | 1372 | 23 7/16 | 596 |
| 56 | 1422 | 48 1/2 | 1231 | 10 3/8 | 265 | 56 | 1422 | 24 7/16 | 621 |
| 58 | 1473 | 50 3/16 | 1275 | 10 15/16 | 278 | 58 | 1473 | 25 1/2 | 647 |
| 60 | 1524 | 51 15/16 | 1319 | 11 3/8 | 291 | 60 | 1524 | 26 7/16 | 672 |
| 62 | 1575 | 53 11/16 | 1363 | 12 | 304 | 62 | 1575 | 27 1/2 | 698 |
| 64 | 1626 | 55 7/16 | 1408 | 12 3/8 | 316 | 64 | 1626 | 28 7/16 | 723 |
| 66 | 1676 | 57 1/8 | 1451 | 13 | 329 | 66 | 1676 | 29 7/16 | 748 |
| 68 | 1727 | 58 15/16 | 1495 | 13 1/2 | 342 | 68 | 1727 | 30 1/2 | 774 |
| 70 | 1778 | 60 5/8 | 1539 | 14 | 354 | 70 | 1778 | 31 7/16 | 799 |
| 72 | 1829 | 62 5/16 | 1583 | 14 3/8 | 367 | 72 | 1829 | 32 1/2 | 825 |

2.3 Engineering Solution

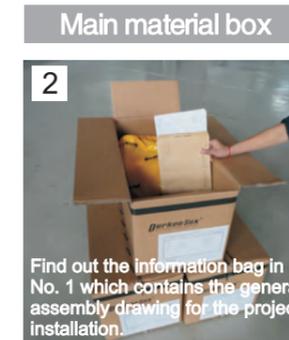
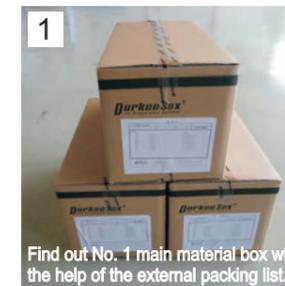
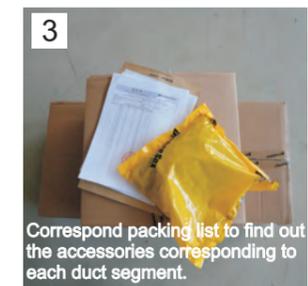
According to jobsite condition and progress of each type of work , figure out the installation time, determine the type and size of bracket and materials needed for installation. Make construction plan, including workers, model, size, quantity of materials, installation tools and period, etc.

3 INSTALLATION PROCEDURE AND IMPLEMENTATION

3.1 Make bracket



3.2 Unpacking



Each duct segment of standard length has been put into a plastic bag containing a product installation and assembly drawing, which has the information on the corresponding duct diameter, length, orifices orientation and the specific position for installation. Furthermore, there is a label at the inlet or near the zip of each duct segment, The label indicates the diameter, length, duct code and segment number of the duct.

3.3 Installation of cable suspension system

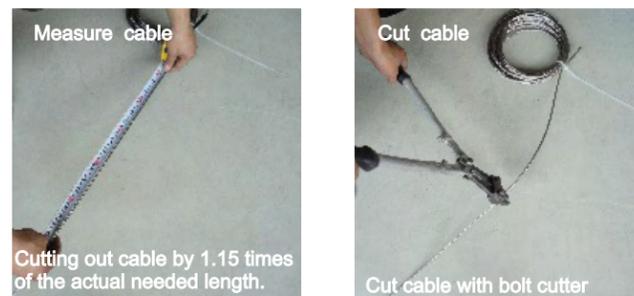
3.3.1 Locating and mounting of bracket



Determine the spacing and height of tension cable according to height and diameter of each metal duct outlet. Determination of bracket spacing requires that the front and the rear brackets of the same DurkeeSox system should be mounted parallel and symmetrically without any deflection.

3.3.2 Installation of cable suspension and mounting accessories

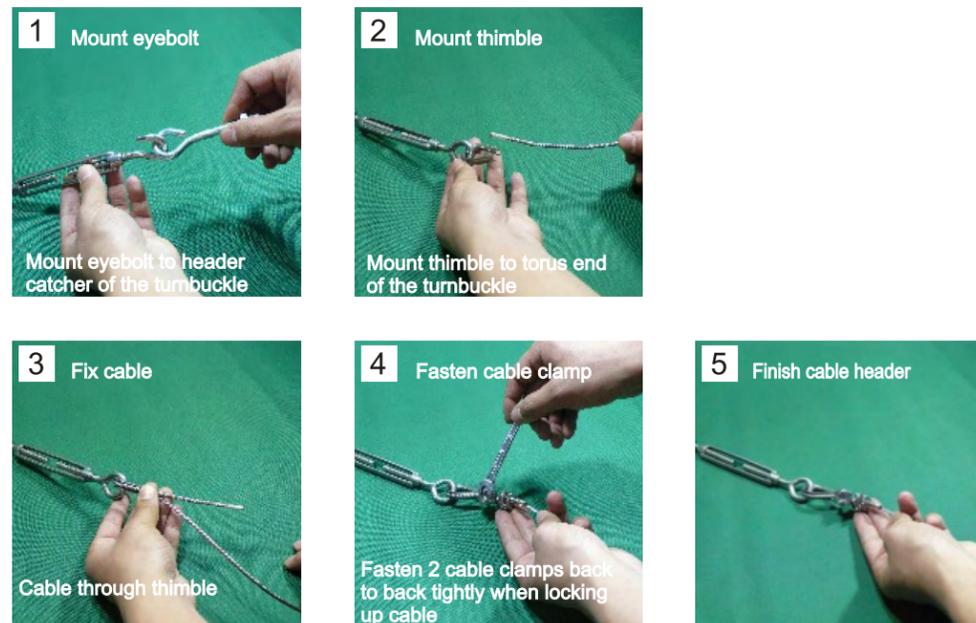
3.3.2.1 Measurement and cutting



Cutting out cable by 1.15 times of the actual needed length.

Cut cable with bolt cutter

3.3.2.2 Cable header making



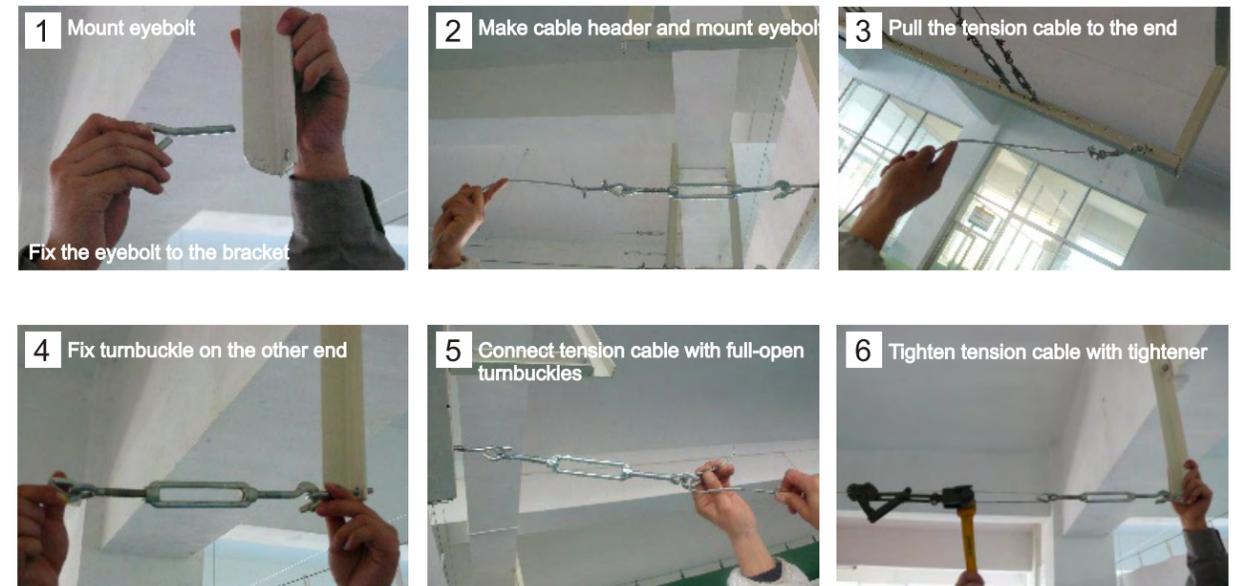
Mount eyebolt to header catcher of the turnbuckle

Mount thimble to torus end of the turnbuckle

Cable through thimble

Fasten 2 cable clamps back to back tightly when locking up cable

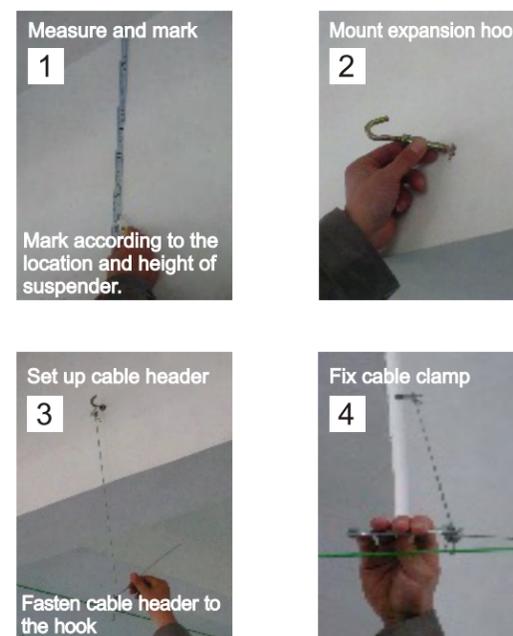
3.3.2.3 Connection between tension cable and bracket



Note: Loose turnbuckle to the maximal when mounting cable suspension system to adjust the straightness of tension cable when under heavy load after installation of DurkeeSox system.

3.3.3 Fabrication and installation of hanging points

Determination of the quantity of hanging points and location for installation: make suspender with 1/16" (2mm) cable. 1 hanging point every 23-33ft (7-10m) along tension cable.



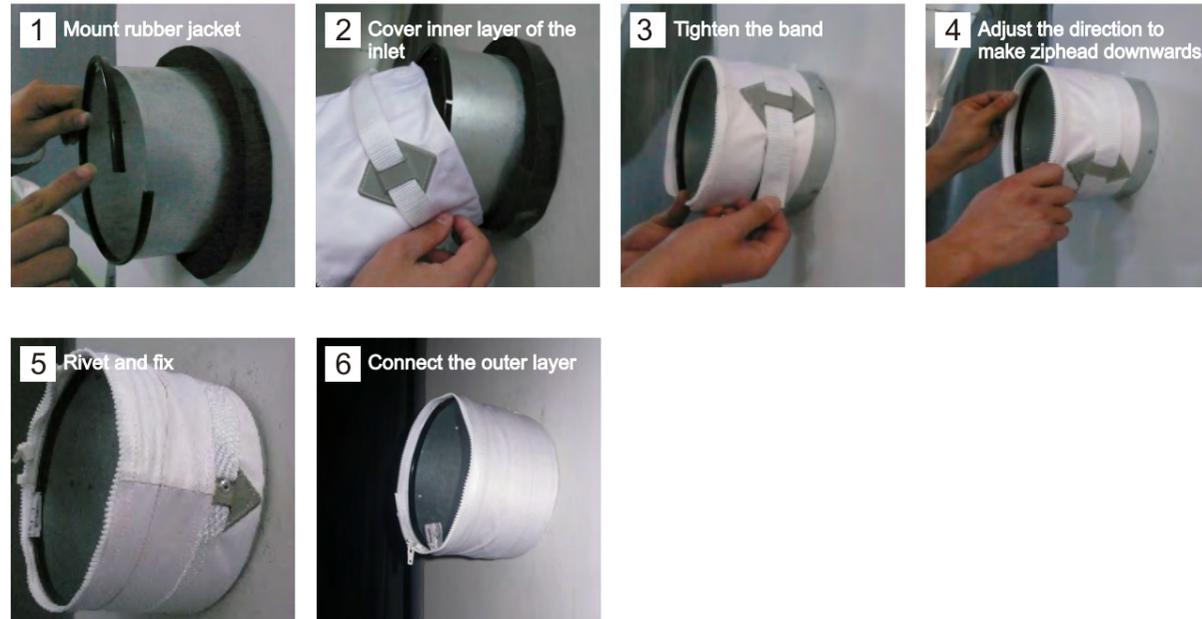
Mark according to the location and height of suspender.

Fasten cable header to the hook

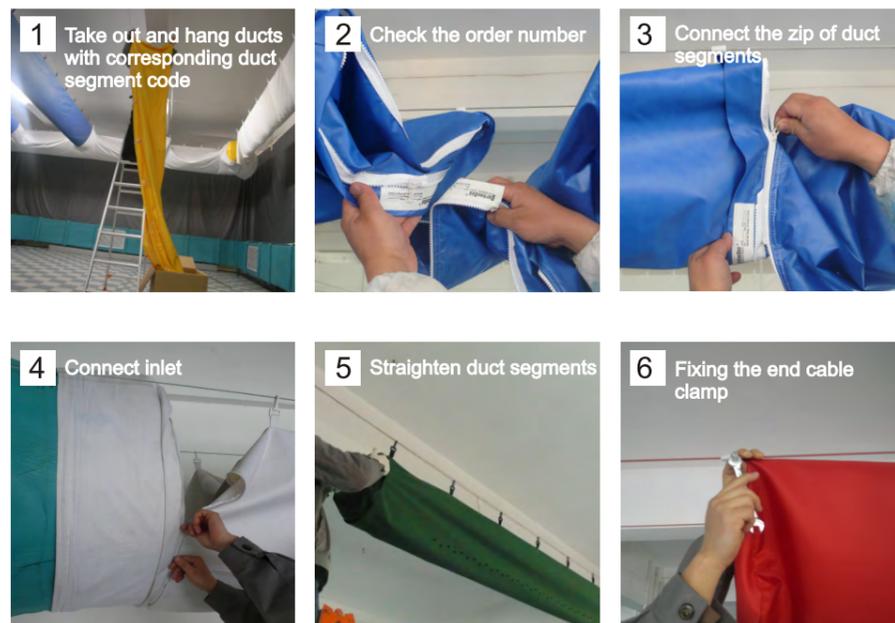
The fixed point on structure shall be on the same vertical surface as the suspension cable. Make 1/16" (2mm) cable suspender on jobsite, cut 1/16" (2mm) cable at a proper length, and fasten each end with a cable clamp.

3.4 Inlet installation

If planned to extend insulation to outlet of metal duct (usually 1/4" or 5mm), rubber jacket can be exempted. Rivetting is made as per the spacing of about 6" or 152mm. Upon inlet installation, the zip connecting inlet and the duct can be closed up to align with the installation angle of the inlet (if the inlet angle is wrong, it may wrinkle the DurkeeSox duct).



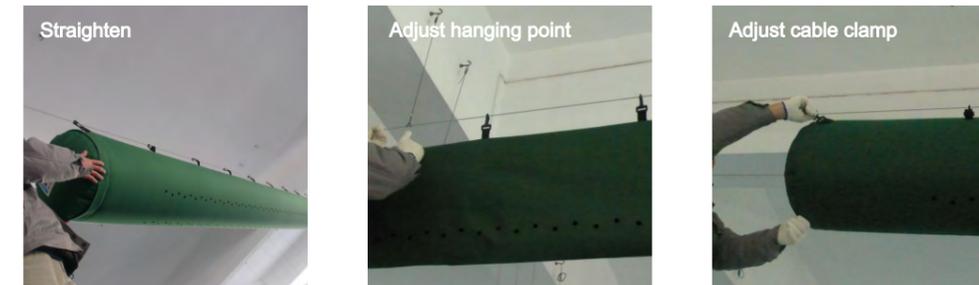
3.5 Hanging duct



Attention:
 1. When hanging a duct, the duct shall be put in the main material box all the time to avoid contamination to duct.
 2. Make sure the duct segment number is correct during installation.
 3. Straighten DurkeeSox duct, using cable clamp to fix the last clip of the duct onto the cable suspension to avoid duct drawing back.

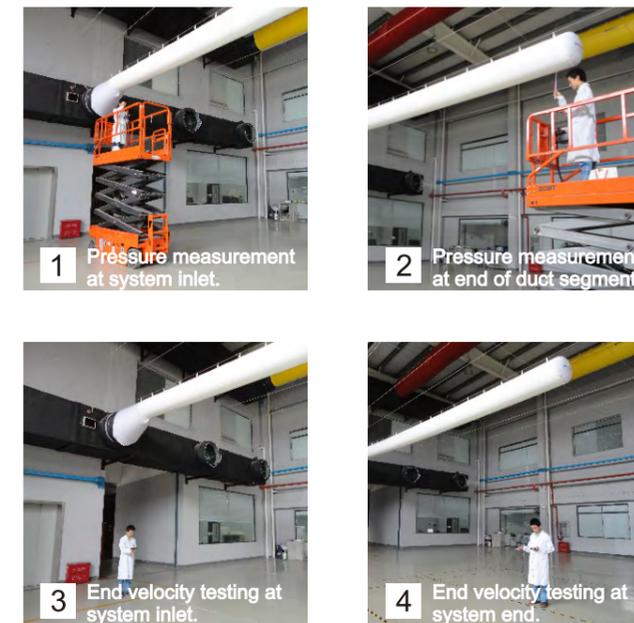
3.6 Ventilation and suspension adjustment

3.6.1 Duct segment adjustment



Attention:
 1. Release the zip at the inlet and start the equipment for ventilation to blow away the dirt existing in the original air-conditioning system.
 2. Stop the equipment and close the zip connecting the inlet and duct. Start and run the equipment (Start it with different revs and increase the pressure gradually to avoid damage to the end).

3.6.2 Pressure measurement and air velocity testing



Note:
 For testing & commissioning, maintenance, system cleaning, please refer to the Maintenance Manual.

NanoSox[®]
Air dispersion system

———— The experts in the air dispersion industry world wide ————



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