AS and ATN units

AERSERVICE S.r.l.
Via Marconi, 1 – 35020 Legnaro (PD) ITALY – Tel.: +39 049 641 679 – Fax.: +39 049 790 674
www.aerequipments.it - info@aerservice.it

INTRODUCTION

In the context of a total quality regime, advanced companies pursue "quality" in all areas of the organisation. The finished product is no longer considered to be the only aspect on which to focus, but rather the result of a range of interactions between different company functions.

Among the factors having the biggest influence on the result, not merely in terms of the product, but also - and especially - in terms of the level of service, are the conditions in which each individual performs his or her work. Conditions are construed as a set of factors that can affect productivity: room temperature, humidity, lighting, air quality, etc.

The air quality is an essential precondition in order to perform one's work properly and efficiently. Air treatment, construed as the control of thermal hygrometric conditions, is usually performed by an air conditioning system, in which a series of intake vents draw in the air to be treated and a second series of vents return the air to the room after it has been treated by an air conditioning unit for temperature control, filtration, etc.

This type of plant is designed to maintain the quality of air, which tends to become stale due to the human occupancy levels.

If the air in the workplace is "contaminated" due to the emission of substances produced by industrial systems and/or mechanical equipment, the air treatment system to be installed will be different from the type of system described previously.

A further important aspect is the cleanliness of the workplace. Also in this case the presence of dust and particulate will degrade the quality of the environment.

A "clean" workplace is therefore necessary in order to perform work duties properly and is also a mandatory requirement prescribed by law.

For problems of this type, because of the absolute reliability of this type of system, the most popular solution is to use localised mobile extraction systems. These systems are mobile in that the intake vent can be moved around, and are localised because the intake point is clearly defined and circumscribed.

The extraction systems in the AS and ATN series made by AerService are specifically designed for the extraction and expulsion of vehicle exhaust gas, extraction of dust and fine particulate.

In the application for the expulsion of vehicle exhaust gas the systems proposed capture the gas in the precise point at which it is emitted into the atmosphere and, by means of an extractor fan system, the gas is returned to the atmosphere at a point where it cannot harm persons or objects.

In the application for extraction of dust and fine particulate, the system captures the contaminants and passes them through an extractor fan system, in a clearly defined environment.

The AS and ATN hose reels are extraction systems, supplied - in their various versions - coupled to crush-resistant hose of various lengths and diameters, with extraction connectors made of stainless steel or rubber and fans made of aluminium or powder-coated steel.

The hose reels are suitable for installation on either centralised or independent local systems, coupled with other components and accessories that vary time-by-time in relation to the requirements of the application (hose reels with manual spring recoil or motor-driven recoil, activated by a pendant panel or remote control handset).

AERSERVICE S.r.l.
Via Marconi, 1 – 35020 Legnaro (PD) ITALY – Tel.: +39 049 641 679 – Fax.: +39 049 790 674
www.aerequipments.it - info@aerservice.it

Conformity and Standards

AS and ATN hose reels are designed for installation in compliance with legislative and regulatory prescriptions concerning construction and safety.
The directives and laws governing units of this type or with which the units comply are as listed below.

EC Directives

- 98/37 EC Machinery directive and subsequent integrations
- 89/336 EC Electromagnetic compatibility directive and subsequent integrations
- 73/23 EC Low voltage directive

Italian Legislative Decrees

- D.L. 626/94 "Improvement of the safety and health of workers in the workplace"
- D.P.R. 303 19/03/1956 "Workplace hygiene general standards"
- D.P.R. 203/88 "Atmospheric emissions"
- D.P.R. 25/7/91 "Authorisations for atmospheric emissions"

In addition, the units comply with the following technical standards:

- EN 60204-1 Safety of machinery -Electrical equipment of machines -Part 1: General rules
- EN 50081 -2 Electromagnetic compatibility-Generic emission standard-Part 2: Environment
- EN 50082 -2 Electromagnetic compatibility-Generic immunity standard-Part 2: Industrial environment
- EN 292/2 Safety of machinery. Basic concepts: general principles for design.-Part 2. Technical principles and specifications.
- EN 294 Safety of machinery - Safety distances to prevent access to danger zones with the hands and arms.

EN 349 Safety of machinery - Minimum clearances to avoid danger of crushing

Technical specifications

General operating principles

The hose reels in the AS and ATN series are used for the suction and extraction of the exhaust gas produced by motor vehicles in general, when they are left with the engine running in an enclosed space for repair procedures, for positioning purposes, or for vehicle testing operations.
The function of the hose reels is therefore to withdraw a certain quantity of gases from an indoor environment and route them to the exterior of the building.
Gases are extracted by an electric fan, generally made of aluminium (non spark version), directly from the vehicle exhaust pipe, through a rubber crush-resistant hose and exhaust pipe adapter.
Once it is drawn into the system, the gas flows through the hose reel to the fan, which is connected to a discharge duct so that the gases can be expelled to the exterior.

General specifications

The following figure shows the two types of hose reels made by AerService. The models are designated AS and ATN. The system is essentially composed of the hose reel, a rubber hose, an exhaust pipe adapter, and an electric extractor fan or centralised extraction duct. The various parts of the system are personalised through the installation of optional accessories.

Model AS hose reel

Model ATN hose reel

The hose reel can be composed of :

- Hose drum
- Fixing supports
- Lateral retaining disks
- Drive system
- Hose
- Exhaust pipe adapter
- Fan unit
- Grease nipple
- Hose clamp

The accessories are:

- Special hosing
- Special adapters;
- Electrical cabinet;
- Trolley for installation on duct;
- Duct

Hose drum

The hose drum is made of painted steel (AS series) or galvanised steel (ATN series) and is complete with a specific flexible guide to facilitate correct winding of the hose about the rotary drum without damage during the rewinding phase. The length of the rotary drum depends on the type of use. Inside the drum is a connecting hose for fumes suction that serves to route the extracted fumes towards the intake side of the fan, whether installed on the hose reel or in a centralised location.

Lateral retaining disks

The disks are made of steel finished with an epoxy resin coating (for high corrosion resistance) and are designed to keep the hose in place during the unwinding and rewinding phases. They are also designed to protect the hose from possible lateral impact

Drive system

The available hose drive systems are of three types:

- mechanical spring-loaded, wherein the operator must physically pull the hose and then accompany it during normal use
- motorised with pendant panel control, wherein the operator controls unwinding and rewinding of the hose by means of a pendant panel with two pushbuttons
- motorised with remote control handset, wherein the operator controls unwinding and rewinding of the hose by means of a remote control handset

Extraction hose

Two different types of extraction hose are utilised depending on the application:

- TGA series flexible hose
  Lightweight hose made of rubber reinforced with a nylon spiral, crush-resistant, with maximum operating temperature of 130 °C. Special internal treatment makes the hose less resistant to the transit of fumes and/or particulate.

- TGE series flexible hose
  Hose made of black rubber with markedly corrugated substrate and corrugated outer fabric reinforcement.

Exhaust pipe adapter

Exhaust pipe adapters can be supplied in rubber or stainless steel. For each category different types of adapters can be supplied depending on the specific function requested.

Fan unit

The fan unit is composed of a single suction centrifugal fan, suitable for the extraction of fumes with maximum temperature 100 °C. The scroll housing and the impeller are made of steel or diecast in aluminium, or in sheet steel finished with a powder coating depending on the version.

Motors

Standard execution, asynchronous, three-phase motors, with squirrel cage rotor, in 400V/50Hz execution, B3 mounting position, IP55 protection rating, in compliance with UNELMEC standards .

Optional accessories are:
- special adapters;
- electrical cabinet;
- trolley for installation on duct;
- duct

The following table shows the differences between the AS and ATN models:

	AS	*ATN*
Rotary drum	Powder-coated steel	Galvanised steel
Lateral retaining disks	Powder-coated steel	Powder-coated steel
Drive systems	Mechanical Pendant panel control Remote control handset	Mechanical
Flexible hosing	TGA	TGA
Electric fan	Diecast aluminium body	Painted sheet steel body
Available hose diameters	75 – 100 – 125 - 150	75 – 100 - 125

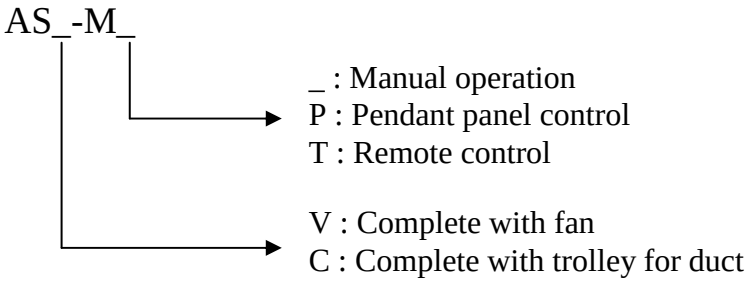
Description of the series

The AS and ATN series of hose reels feature modular design so that the units can be configured for virtually all types of application to create a tailored product that responds perfectly to specific customer requirements. The configurable variables are:

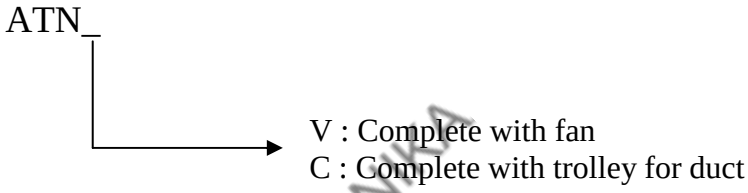
- Presence/absence of the fan section
- Hose drive system: mechanical, with pendant panel , with remote control handset
- Presence of the trolley for installation on duct
- Hose diameter
- Hose length

Series nomenclature

The complete nomenclature of the series in relation to the variables described above is given below:



AS	Hose reel with mechanical spring-loaded recoil
ASV	Hose reel with mechanical spring-loaded recoil complete with electric fan
AS-MP	Hose reel with motor drive system controlled by pendant panel
ASV-MP	Hose reel with motor drive system controlled by pendant panel complete with electric fan
AS-MT	Hose reel with motor drive system controlled by remote control handset
ASV-MT	Hose reel with motor drive system controlled by remote control handset complete with electric fan
ASC	Hose reel with mechanical spring recoil system complete with trolley for installation on aluminium duct
ASC-MP	Hose reel with motor drive controlled by pendant panel complete with trolley for installation on aluminium duct
ASC-MT	Hose reel with motor drive controlled by remote control handset complete with trolley for installation on aluminium duct



ATN	Hose reel with mechanical spring recoil system.
ATNV	Hose reel with mechanical spring recoil system complete with electric fan
ATNC	Hose reel with mechanical spring recoil system complete with trolley for installation on aluminium duct

AS technical data

The available diameters for the AS series (without fan unit) for centralised systems are as follows:

Model	Hose diameter (mm)	Hose reel air flow rate min/max (m^3/h)	Hose reel pressure drops min/max (Pa)	Weight kg
AS 75	75	300 - 450	900-1400	50-53
AS 100	100	500-700	700-1100	56-60
AS 125	125	800-1110	550-900	66-70
AS 150	150	1110-1400	450-650	78-84

Data were measured in respect of hose reels complete with 13 m "TGA" crush-resistant rubber hose.
As can be seen from the table, as the air flow rate increases the pressure drops of the hose must be mitigated by increasing the diameter in order to avoid the need to use a fan having installed power that is higher than strictly necessary.

The use of the hose reels in different conditions and/or conditions that are outside those indicated in the table can result in incorrect operation of the system and also cause permanent damage to the hose reel.
With regard to the ASV series (equipped with an integral fan) for single work station installations the characteristics are as follows:

Model	Ø Hose (mm)	Hose Length (m)	Fan unit	Power (kW)	rpm	Power supply	Flow rate (m^3/h)	Pressure (Pa)	Noise level (dBA)	Weight (kg)
ASV 75	75	7-10-13-15	VA 30	0.55	2840	230/400 50-60 Hz	400	350	74	67-70
ASV 100	100	7-10-13-15	VA 30	0.55	2840	230/400 50-60 Hz	650	450	74	68-77
ASV 125	125	7-10-13-15	VA 35	1.1	2840	230/400 50-60 Hz	1000	700	78	84-96
ASV 150	150	7-10-13-15	VA 35	1.1	2840	230/400 50-60 Hz	1200	850	78	95-111

Data were measured using suitable instrumentation in our laboratories

- Flow rate and available pressure; these values are referred to the use of fans coupled directly to hose reels with average lengths of TGA hose in standard working conditions
- Expulsion: expulsion lines must be created using rigid ducting avoiding cross-section reductions, cross-section changes, bends and branches, with a maximum length of approximately 10 m.
- Noise level: data were measured in free-field conditions in indoor installations

ATN technical data

The available diameters for ATN series (without fan unit) for centralised systems are follows:

Model	Hose diameter (mm)	Hose reel air flow rate min/max (m^3/h)	Hose reel pressure drops min/max (Pa)	Weight kg
ATN 75	75	300 - 450	900-1400	42-48
ATN 100	100	500-700	700-1100	44-50
ATN 125	125	800-1100	550-900	52-60

Data were measured in respect of hose reels complete with 13 m "TGA" crush-resistant rubber hose.
As can be seen from the table, as the air flow rate increases the pressure drops of the hose must be mitigated by increasing the diameter in order to avoid the need to use a fan having installed power that is higher than strictly necessary.
The use of the hose reels in different conditions or conditions that are outside those indicated in the table can result in incorrect operation of the system and also cause permanent damage to the hose reel.

With regard to the ASV series (equipped with an integral fan) for single work station installations the characteristics are as follows:

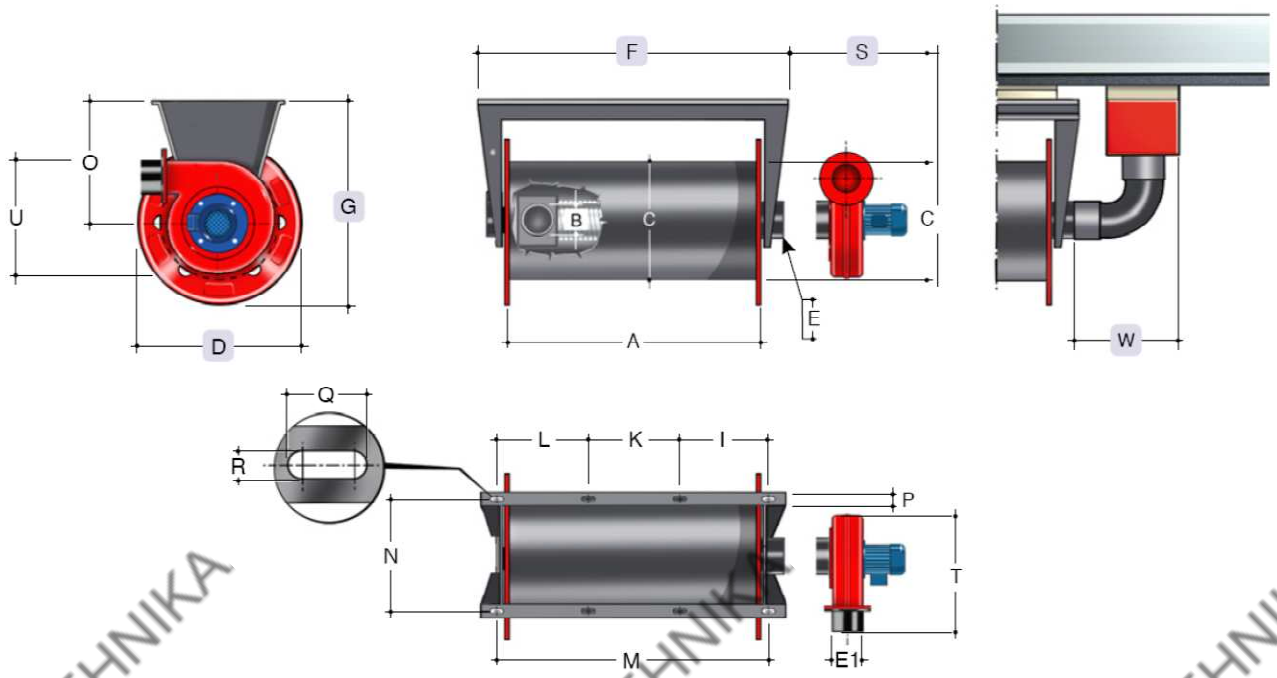
Model	Ø Hose (mm)	Hose Length (m)	Fan unit	Power (kW)	rpm	Power supply	Flow rate (m^3/h)	Pressure (Pa)	Noise level (dBA)	Weight (kg)
ATNV 75	75	7-10-13-15	EV 12	0.55	2840	230/400 50-60 Hz	350	150	68	53-58
ATNV 100	100	7-10-13-15	EV 15	1.1	2840	230/400 50-60 Hz	550	250	72	62-68
ATNV 125	125	7-10-13-15	EV 15	1.1	2840	230/400 50-60 Hz	900	300	72	70-78

Data were measured using suitable instrumentation in our laboratories

- Flow rate and available pressure; these values are referred to the use of fans coupled directly to hose reels with average lengths of TGA hose in standard working conditions
- Expulsion: expulsion lines must be created using rigid ducting avoiding cross-section reductions, cross-section changes, bends and branches, with a maximum length of approximately 5 m.
- Noise level: data were measured in free-field conditions in indoor installations.

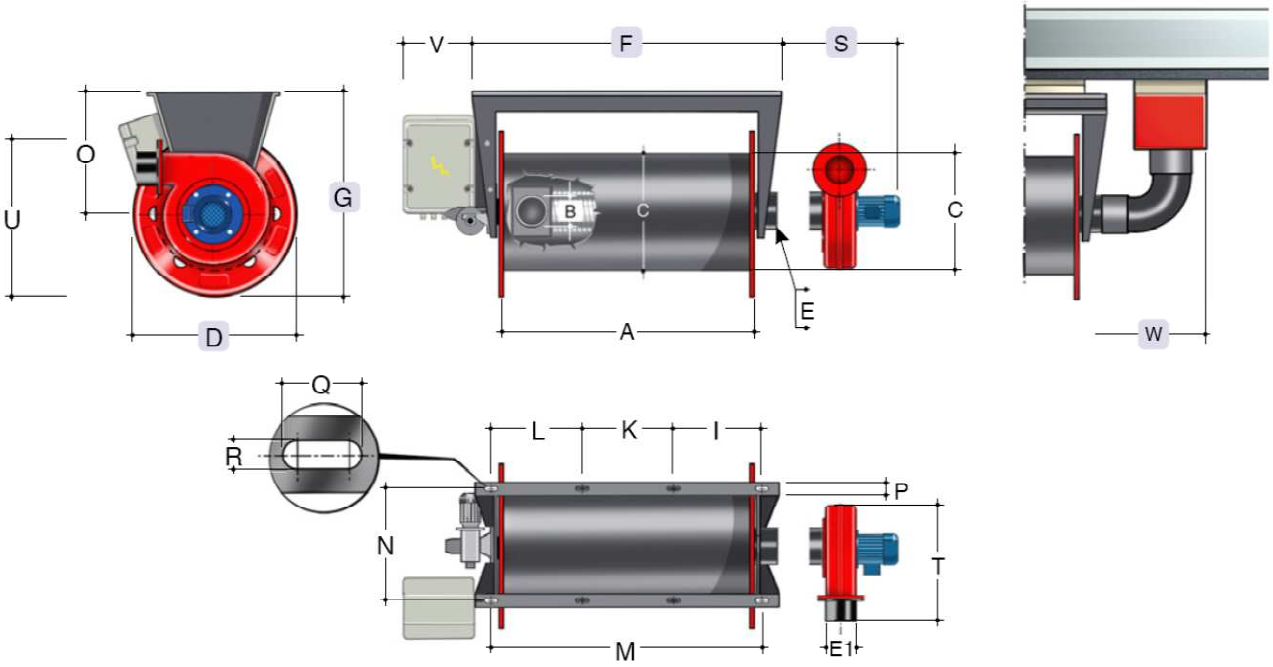
Description of AS geometry

The large number of available combinations concerning presence/absence of the fan section, hose diameter, duct installation, create a series of configurations of different sizes. These series are illustrated below in dimensional terms in accordance with the type.
AS series:



AS - ASV	Tipo Type	A	B	C	D	E	E1	F	G	I	K	L	M	N	O	P	Q	R	S	T	U	W
	75/7	560	75	450	650	150	120R	770	723	230	—	230	690	435	405	40	20	12	380	630	440	430
	75/10	560	75	450	650	150	120R	770	723	230	—	230	690	435	405	40	20	12	380	630	440	430
	75/13	720	75	450	650	150	120R	930	723	285	—	285	850	435	405	40	20	12	380	630	440	430
	75/15	960	75	450	650	150	120R	1170	723	—	273	273	1090	435	405	40	20	12	380	630	440	430
	100/7	560	100	450	650	150	120R	770	723	230	—	230	690	435	405	40	20	12	380	630	440	430
	100/10	720	100	450	650	150	120R	930	723	285	—	285	850	435	405	40	20	12	380	630	440	430
	100/13	960	100	450	650	150	120R	1170	723	—	273	273	1090	435	405	40	20	12	380	630	440	430
	100/15	1200	100	450	650	150	120R	1410	723	—	265	265	1330	435	405	40	20	12	380	630	440	430
	125/10	720	125	450	650	150	150R	930	760	285	—	285	850	445	430	40	20	12	420	680	490	730
	125/13	960	125	450	650	150	150R	1170	760	—	273	273	1090	445	430	40	20	12	420	680	490	730
	125/15	1200	125	450	650	150	120R	1410	760	—	265	265	1330	445	430	40	20	12	420	680	450	730
	150/10	960	150	450	650	150	150R	1170	775	—	273	273	1090	460	455	40	20	12	420	680	490	730
	150/13	1200	150	450	650	150	150R	1410	775	—	265	265	1330	460	455	40	20	12	420	680	490	730
	150/15	1200	150	450	650	150	150R	1410	775	—	265	265	1330	460	455	40	20	12	420	680	490	730

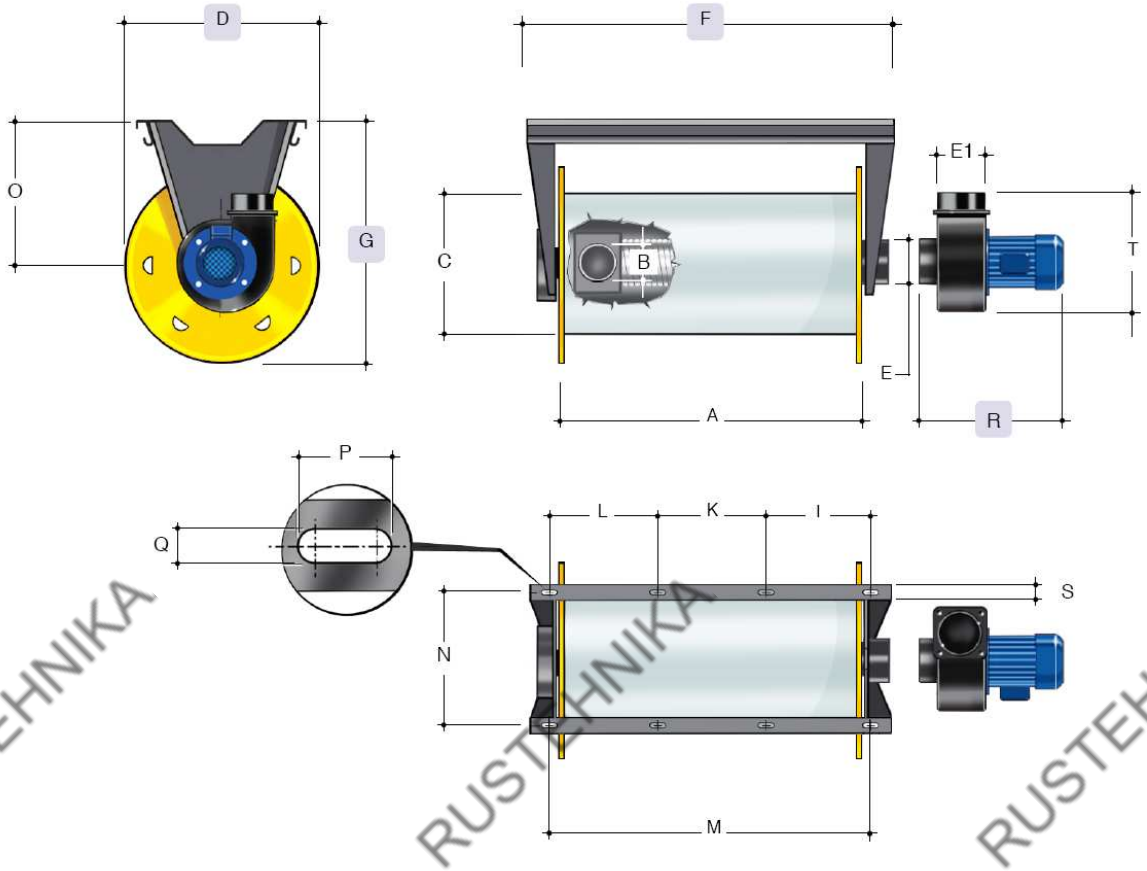
AERSERVICE S.r.l.
Via Marconi, 1 – 35020 Legnaro (PD) ITALY – Tel.: +39 049 641 679 – Fax.: +39 049 790 674
www.aerequipments.it - info@aerservice.it



AS MP-MT - ASV MP-MT

Tipo Type	A	B	C	D	E	E1	F	G	I	K	L	M	N	O	V	S	W
MP-MT 75/7	760	75	450	650	150	120R	930	723	285	—	285	850	435	405	380	380	430
MP-MT 75/10	760	75	450	650	150	120R	930	723	285	—	285	850	435	405	380	380	430
MP-MT 75/13	760	75	450	650	150	120R	930	723	285	—	285	850	435	405	380	380	430
MP-MT 75/15	1000	75	450	650	150	120R	1170	723	—	273	273	1090	435	405	380	380	430
MP-MT 100/7	760	100	450	650	150	120R	930	723	285	—	285	850	435	405	380	380	430
MP-MT 100/10	760	100	450	650	150	120R	930	723	285	—	285	850	435	405	380	380	430
MP-MT 100/13	1000	100	450	650	150	120R	1170	723	—	273	273	1090	435	405	380	380	430
MP-MT 100/15	1240	100	450	650	150	120R	1410	723	—	265	265	1330	435	405	380	380	430
MP-MT 125/10	760	125	450	650	150	150R	930	760	285	—	285	850	445	430	380	420	730
MP-MT 125/13	1000	125	450	650	150	150R	1170	760	—	273	273	1090	445	430	380	420	730
MP-MT125/15	1240	125	450	650	150	150R	1410	760	—	265	265	1330	445	430	380	420	730
MP-MT 150/10	1000	150	450	650	150	150R	1170	775	—	273	273	1090	460	455	380	420	730
MP-MT 150/13	1240	150	450	650	150	150R	1410	775	—	265	265	1330	460	455	380	420	730
MP-MT 150/15	1240	150	450	650	150	150R	1410	775	—	265	265	1330	460	455	380	420	730

Description of ATN geometry



ATN - ATNV - ATNC	Tipo Type	A	B	C	D	E	E1	F	G	I	K	L	M	N	O	P	Q	R	S	T
	ATN 75/7	630	75	400	600	140L	118L	780	685	300	—	200	700	344	385	40	13	430	45	350
	ATN 75/10	630	75	400	600	140L	118L	780	685	300	—	200	700	344	385	40	13	430	45	350
	ATN 75/13	830	75	400	600	140L	118L	980	685	300	—	200	900	344	385	40	13	430	45	350
	ATN 100/7	630	100	400	600	140L	148L	780	685	200	150	200	900	344	385	40	13	490	45	430
	ATN 100/10	830	100	400	600	140L	148L	980	685	200	150	200	900	344	385	40	13	490	45	430
	ATN 100/13	830	100	400	600	140L	148L	980	685	200	150	200	900	344	385	40	13	490	45	430
	ATN 125/10	1000	125	400	600	140L	148L	1150	710	370	150	200	1070	352	410	40	13	490	45	430
	ATN 125/13	1000	125	400	600	140L	148L	1150	710	370	150	200	1070	352	410	40	13	490	45	430

AERSERVICE S.r.l.
Via Marconi, 1 – 35020 Legnaro (PD) ITALY – Tel.: +39 049 641 679 – Fax.: +39 049 790 674
www.aerequipments.it - info@aerservice.it

Expulsion diameter

The hose reel outlet port is always 150 mm in diameter, while the outlet port of hose reels with integral fan depends on the model.

Fan model	Outlet diameter (mm)
VA 30	100
VA 35	150

It is recommended to install an expulsion duct of 120 mm diameter for models AS 75 and As 100 (ATN 75 and ATN 100) and of 150 mm diameter for models AS 125 (ATN 125) and AS 150. In the case of systems composed of more than one hose reel, refer to the following diagrams. The diagrams show the most common combinations for a concurrency coefficient of 100%. For different requirements with special types or utilisation below 100% concurrency, or for excessively long lines resulting in significant pressure drops, consult the AerService Engineering Department for a personalised solution to the problem.

Noise level

The "A" weighted continuous equivalent sound pressure level in the operator work station (in front of the machine) for ASV hose reels (equipped with electric fan) is given below.

Model	Noise level (dBA)
ASV 75	74
ASV 100	74
ASV 125	78
ASV 150	78
ATNV 75	68
ATNV 100	72
ATNV 125	72

Measurements were made a distance of 2.5 m from the machine and 1.60 m height above the ground.
For AS and ATN models to be installed in a centralised system the noise level value cannot be given because it depends strongly on the aeraulic characteristics of the installation.
Any difference in effective noise values may be caused by malfunctions and /or incorrect sizing.

Preliminary checks for correct selection of the system

In order to minimise installation problems and avoid calculation errors concerning the choice of extraction systems, several simple but important aspects must be taken into account.
The procedures to be performed are as follows:

The aspects to be considered when choosing an extraction system can be further divided into two basic types: internal aspects and external aspects.

INTERNAL ASPECTS

TYPE OF POLLUTANT TO BE EXTRACTED

It is essential to know the type of fumes that the system will be required to remove in order to propose the most suitable and safest solution. It is therefore of critical importance to dispose of full information concerning the pollutant, i.e.: exclusively gaseous, exclusively solid (dust, particulate), liquid, or mixed Another highly important factor is the temperature of the pollutant to be extracted because only a correctly sized line in relation to the specific temperature can ensure the safety and durability of the system.

CONCURRENCY

Concurrency refers to the number of work stations (e.g. utilising a single centralised extraction line) that can be utilised simultaneously. This value must be established in relation to the workload of the business, the number of persons usually engaged in vehicle testing activities, the potential for adding further work stations in the figure, and possible changes in the layout of the premises.

It is essential to know the concurrency value to avoid problems such as:

- Insufficient extraction flow rate if a system with four centralised extraction units has been sized for a concurrency value of 2 this means that the fan section has been designed and selected in order to generate an extraction flow for two work stations. In this case, the simultaneous use of three or four stations means that the suction flow is divided by three or four rather than just two, thus reducing the "extraction force".
- Possible damage of hoses: damage and malfunctions may be caused by overheating of hoses due to an excessively low flow rate of hot pollutant fumes. Flow rates lower than the design flow rate may result in layering of pollutants and lead to temperatures that are in excess of the temperature ratings of some parts of the hoses

POSSIBILITIES FOR ROUTING OF THE LINE

Once the capture points have been identified, i.e. the place from which the pollutant is to be removed, the next step is to decide where to install the hose reel. In this phase it is essential to consider how to connect the outlet port of the hose reel to the discharge flue. This connection must be as linear as possible in order to avoid pressure drops with the consequent reduction in extraction flow rate or need to install higher rated fans.

Therefore, once the position of the hose reel and flue have been decided, it is important to avoid:

- Excessively long duct lengths
- Bends and/or section restrictions
- Vertical elbows (could function as traps for solid or liquid pollutants)
-

ACCESSIBILITY TO THE WORK AREAS

The presence of the hose reel must not reduce accessibility to other work areas or machinery

POSSIBILITIES FOR FIXING BRACKETS

The choice of the position of the hose reel is followed by the choice of the method for mounting it (single bracket, centralised bracket system, duct-mounting). Note that the installation must be carried out in strict compliance with safety regulations

WINDOWS, WALL THICKNESS.

The presence of windows, skylights, etc. must be assessed to ensure that the hose reel is always protected from rainfall and the weather.

EXTERNAL ASPECTS

AREA TYPE

To complete the extraction system, a fan must be added (in the case of centralised systems) and an expulsion flue. It is therefore important to identify the type of area in which the business is located to avoid problems of noise or fumes discharge in relation to neighbouring premises. With regard to noise, since 1995 Italian municipalities are covered by a zoning plan that divides the territory into noise classes in which the noise level at source must be within clearly defined values. The noise zone classes are as follows:

CLASS I - high protection areas: this class includes areas in which low noise levels are an important factor of utilisation: hospitals, schools, areas for rest and recreation, rural residential areas, urban areas of special interest, public parks, etc.

CLASS II - areas for primarily residential use: this class includes urban areas subject mainly to local vehicular traffic, with low population density, reduced presence of commercial activities and absence of industrial activities and workshops

CLASS III- mixed areas: this class includes urban areas subject mainly to local vehicular traffic or vehicular traffic in transit, with medium population density, presence of commercial activities, offices, limited presence of workshops and absence of industrial activities;
rural areas accommodating businesses that utilise operating machinery

CLASS IV - areas of intensive human activity: this class includes urban areas subject to intense vehicular traffic, with high population density, significant presence of commercial activities and offices, presence of workshops; areas adjacent to major roads and railway lines; port areas, areas subject to limited presence of small industrial concerns.

CLASS V - primarily industrial areas: this class covers industrial areas with a limited presence of homes.
CLASS V - exclusively industrial areas: this class covers areas exclusively occupied by industrial concerns and with no residential areas

The noise emission limits for the various classes are as follows:

Class	Reference time	
	daytime (06.00-22.00)	night-time (22.00-06.00)
I High protection areas:	50	40
II Primarily residential areas	55	45
III Mixed areas	60	50
IV Areas of intensive human activity	65	55
V Primarily industrial areas	70	60
VI Exclusively industrial areas	70	70

POSITIONING OF THE COMPONENTS

The choice of where to position the various components of the plant, i.e. extraction system and flue, are very important in order to avoid problems with neighbouring premises. The following aspects should be taken into account when deciding on the position of the system.

EXTRACTION UNIT

The position of the centralised extraction unit must be such as to reduce the disturbance of the surrounding environment as far as possible. It is therefore necessary to evaluate the area surrounding the premises in order to identify the most suitable position in relation to noise pollution considerations. Evaluation of the noise levels that will be present at a certain distance from the extraction unit is possible by subtracting from the fan noise emission value 6dB each time the distance from the source doubles, starting from the initial value, which is calculated at a distance of 2.5 metres.

FLUE

The position of the flue must be chosen in such a way as to minimise any possible problems with adjoining premises. In the case of a simple flue with horizontal expulsion it is essential to ensure that the expulsion outlet does not deliver pollutants in the direction of surrounding houses.

ACCESSIBILITY

Accessibility, for inspection and maintenance purposes, to the flue and the extraction unit, must always be guaranteed. It is therefore important to install the flue and extraction unit in a site where they can be accessed safely and easily in the future.

Choice of Positioning

The installation site of the system depends largely on the physical location from which pollutant gases are to be extracted and it usually depends also on the general layout of the building. However, in order to avoid technical problems it may prove useful to bear the following aspects in mind:

- The installation height added to the distance between the vertical axis of the hose reel and the position of fumes intake must be less than the length of the hose on the reel. This check is necessary to ensure that the hose is not found to be too short at the time of use.
- In the case of AS systems (without fan) connections between the hose reel expulsion outlet and the extraction system ducting must be made with the minimum number of bends and/or section restrictions
- In the case of ASV systems (equipped with integral fan) the connection with the expulsion duct can be made minimising the number of bends and/or section restrictions
- The installation height should not be such as to constitute a hazard for users or personnel transiting in the area of the hose reel
- Check that the hose reel installation is such that it does not create any form of hazards for personnel
- Check that, once it has been unwound, the extraction hose does not come into contact with or rub against walls and/or pillars of the building
- The place of installation of the unit must be such as to allow easy inspection, servicing and replacement of components when necessary.
- Check that the wall or other supporting structure is sufficiently robust to support the weight of the machine with a generous margin of safety.
- The system can be mounted to a wall or a specific supporting structure.
- Before you start drilling the holes required to install the system, check whether or not the structures into which you intend to drill are load-bearing. If the structures are load-bearing structures (e.g. beams or pillars) consult a building engineer before drilling any holes.

AERSERVICE reserves the right to change specifications without notice. Moreover, since application conditions are outside the company's control, AERSERVICE cannot assume any liability in relation to risks potentially deriving from improper use of its products.

Installation: functional and logistic aspects

The installation and commissioning of the extraction system must be carried out by skilled personnel. Even though the installation operations are quite simple, they can give rise to hazards for unskilled personnel.
To avoid errors and/or wasted time, it is good practice to ensure that the designated installation personnel are present (electricians, builders, etc.) and that they have consulted the diagram of the plant and read the operating and maintenance manual of the units carefully beforehand.
The installation site must be the site agreed at the time of sale to avoid possible disservice or malfunctions. Any changes in the positioning and the project may be accepted only after prior authorisation from AerService personnel.
AerService cannot be held liable for malfunctions / disservice arising from installation procedures and/or positioning that deviate from the agreed and /or authorised procedures and/or positioning.
The installation of hose reels and wall-mounted extraction systems is performed as described below.

For AS and ATN systems:

- Carefully unpack the products supplied. The packaging materials must be disposed of in compliance with legislation in force in the place of installation;
- Identify the position and height at which the hose reel is to be installed
- In its standard version the hose reel must be installed with the fan section on the RIGHT HAND side. In order to install the hose reel with the fan section to the LEFT, consult the Procedures section.

It is anyway preferable to order the hose reel directly from AerService with the required direction of orientation.

- Drill the holes for the hose reel brackets at a height of approximately 3 m (different heights are possible provided the above-specified restrictions are taken into account).
- **CAUTION: the fixing holes of the hose reel must be aligned on a perfectly horizontal axis. To achieve this condition it is not sufficient to measure the distance from the floor (because the floor surface may not be horizontal). First draw a line on which to drill the holes and then use a spirit level to check that it is perfectly horizontal.**

NO

NO

YES

- **This operation is essential because if the hose reel is not perfectly horizontal the weight will be borne by just one of the two bearings with resulting accelerated wear of one of the bearings and deterioration. The final results of this situation will be as follows**:
    - For manual unwind type units it will be increasingly difficult to unwind the hose and it may occur that the reel is no longer able to retract the hose
    - For units with motorised hose movement, the relative gearmotor may no longer be able to unwind and rewind the hose so the hose reel will become unusable

- Mount the hose reel to the ceiling or wall by means of four screw anchors, taking care to check the correct direction of winding of the hose on the reel drum;
- In the case of several hose reels connected to a centralised system it is advisable to maintain a distance of less than 15 metres between adjacent units.
- Connect the hose reel expulsion outlet to the outlet duct by means of a suitable diameter rigid pipe or flexible hose;
- If present, connect the fan motor and gearmotor power supplies to an electrical switchboard. Check to ensure that the fan is rotating in the correct direction.

If the extraction hose must be removed in order to install the hose reel exert the utmost caution in relation to the recoil force of the rewind spring.

Aeraulic circuit selection tips

The choice of positioning of the hose reels, in the case of centralised circuits, must be assessed carefully both in consideration of the relative installation cost and to ensure correct operation of the system. Several examples of circuits are given below. The observations concerning each circuit layout must be taken into account when deciding on the positioning of the units.
The layouts are of a general nature and are designed to highlight installation problems the avoidance of which can produce significant benefits.

LAYOUT 1

YES

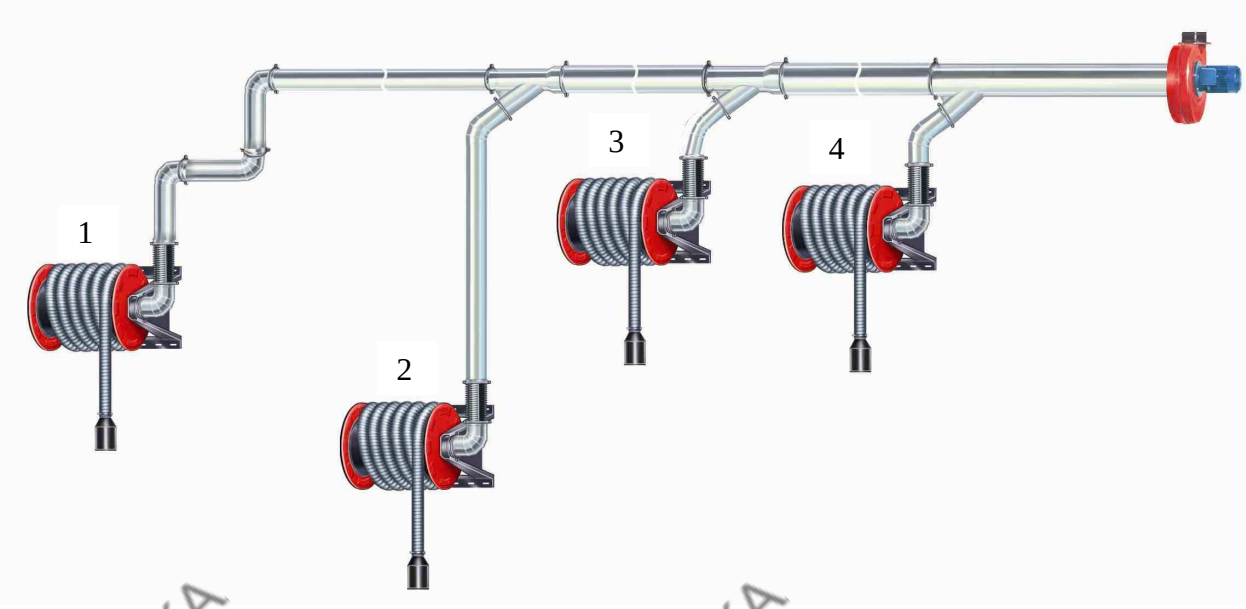
Th
Th
straight and without section reductions or bends.

LAYOUT 2

NO

This circuit has a serious installation error. It is not permissible to connect the outlet of the first fan to the intake of the second fan. An installation of this type would result in immediate breakdown of the system.

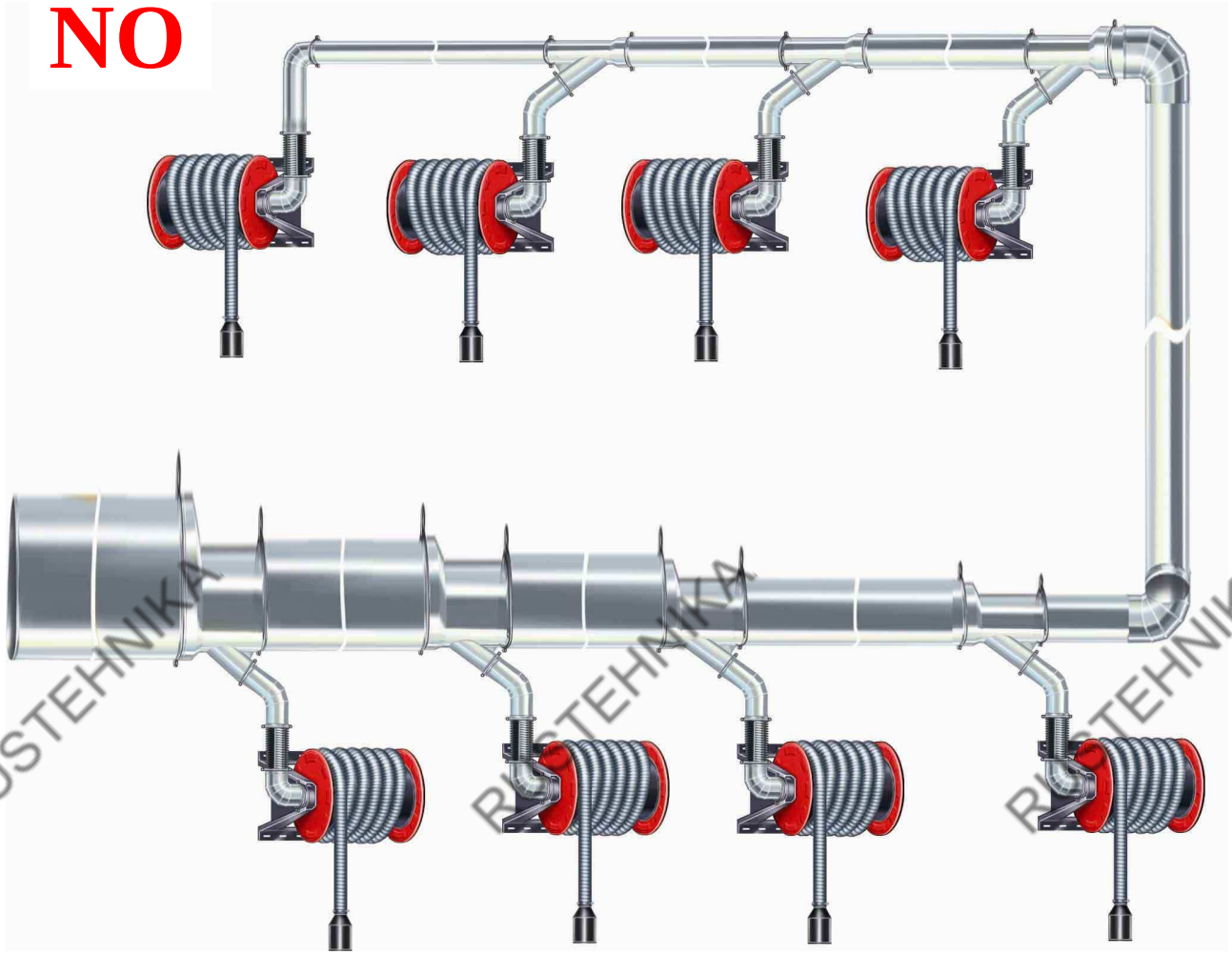
LAYOUT 3



This hypothetical circuit has 5 problems:

1. Hose reel no.1 is connected to the centralised suction line with an excessive number of bends. This circuit would generate several localised pressure drops such as to significantly impair the suction power of the hose reel. Insufficient suction results in possible layering of the gas in the hose with possible carbonisation of the hose itself.
2. Likewise, hose reel no.2, because of the excessively long distance with respect to the common circuit, can create problems similar to those described for hose reel no.1.
3. Hose reel no.3 has a section reduction of the duct cross-section at the point of connection with the main duct. This section reduction will cause pressure drops that will significantly impair the suction power of the hose reel.
4. When inserting the 4th hose reel the section of the main aeraulic circuit does not increase. This choice can cause excessive pressure drops due to an increased velocity of the air flow in the duct with the final consequence of a significant reduction of the suction power of all the hose reels.
5. The fan is too small for the flow rate required by the system. It should be taken into account that all forms of incorrect installation result in suction pressure drops that will cause malfunctions. To solve the problem, the only solution (other than to re-design the circuit and correct all the errors) is to install an oversized fan. However this solution will result in higher noise levels and higher electrical power consumption values.

LAYOUT 4

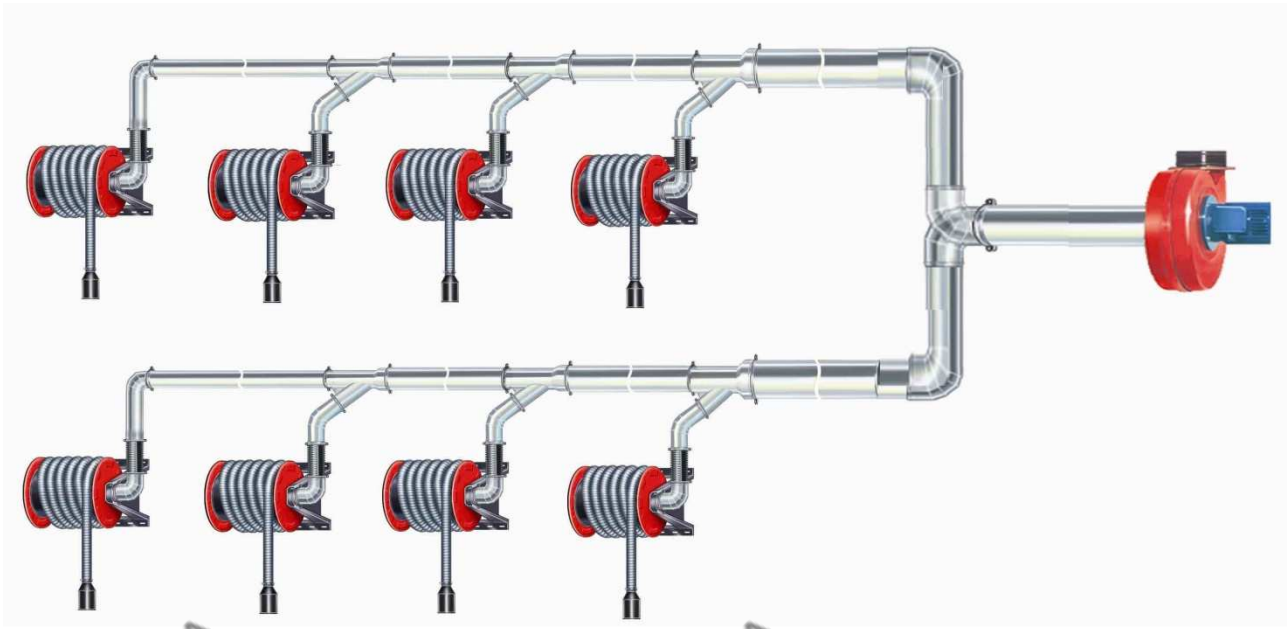


This circuit layout has been provided to give several indications concerning solutions that can be adopted to ensure correct installation.
There are multiple errors implicit in the layout shown in the figure.

1. The power of the fan to be installed in conjunction with a system of this type is extremely high.
2. The costs required to create an aeraulic circuit of this type are very high
3. In general, the more the system deviates from standard diameters and geometries, the more the cost tend to increase in an exponential manner
4. Scheduled maintenance of a system of this type is not possible without shutting down the entire system

AERSERVICE S.r.l.
Via Marconi, 1 – 35020 Legnaro (PD) ITALY – Tel.: +39 049 641 679 – Fax.: +39 049 790 674
www.aerequipments.it - info@aerservice.it

LAYOUT 5



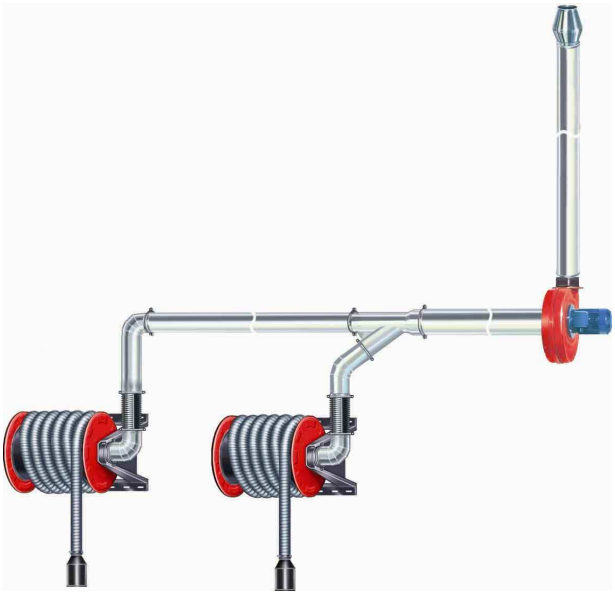
The above circuit layout differs from the previous one because the hose reels are arranged in parallel rather than in series. This solution is technically superior and will result in minimal technical problems and economic expenditure

LAYOUT 6

This final layout shows the best possible solution from a technical standpoint. By dividing the functional capacity of the system into two, this solution allows the user to choose the required branch of the circuit while excluding the other one.

LAYOUT 7

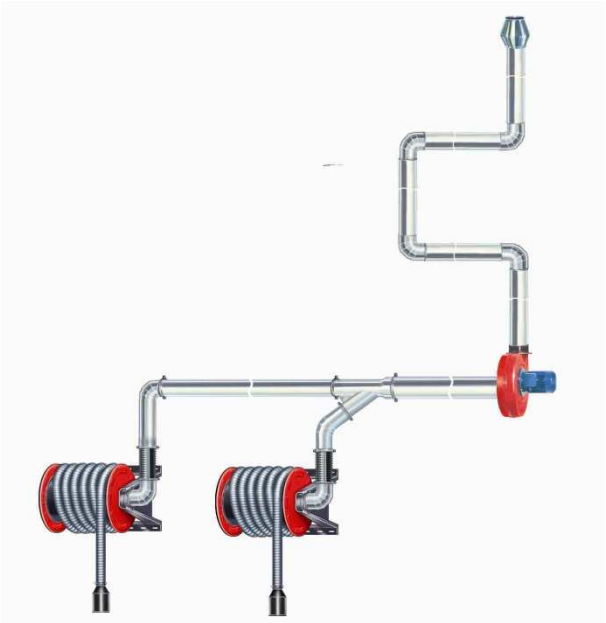
YES



The connection between the pressure port of the fan and the discharge flue must be as straight as possible. Section reductions, excessive lengths, and bends must be avoided as far as possible. The presence of these features in the circuit will impair the suction capacity of the fan.
This consideration must be applied at the beginning of the design project of the aeraulic circuit rather than at the end of the project.

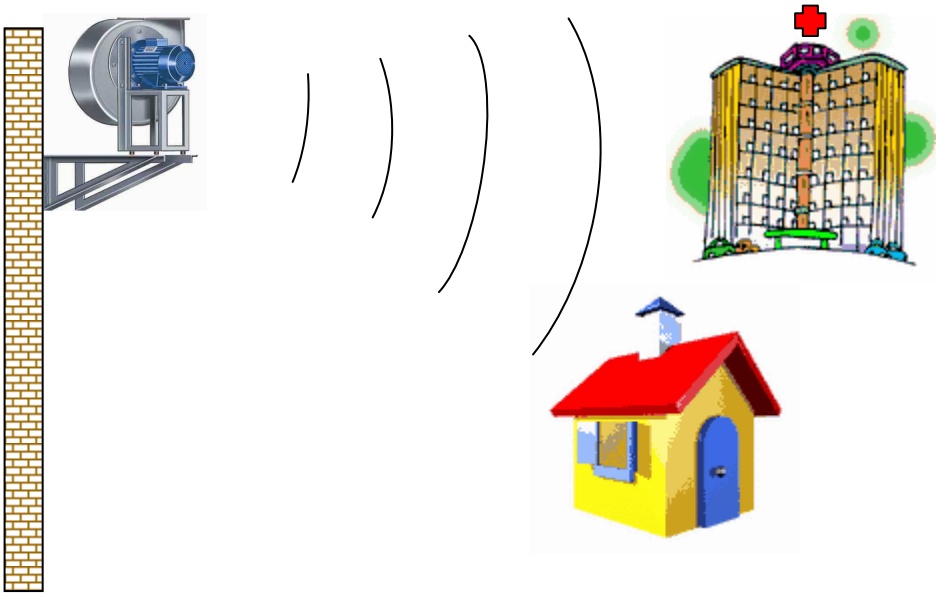
LAYOUT 8

NO



In this case the connection between the fan pressure port and the discharge flue has been created very poorly. Note that the expulsion circuit must be as straight as possible, i.e. without bends and/or section reductions.

LAYOUT 9



When installing the fan section outside the building pay attention to possible disturbance that it may cause: homes, offices, roads, stores, etc. Regulations concerning noise pollution are usually stringent and clearly worded. Therefore, take care to install the flue well away from possible receiving environments. Attention to noise emission levels must not be left until the end of the plant design phase. This aspect should be assessed initially before starting to design the system to avoid the risk of having to create excessively complex circuits or resort to sound insulation measures.

Concurrency

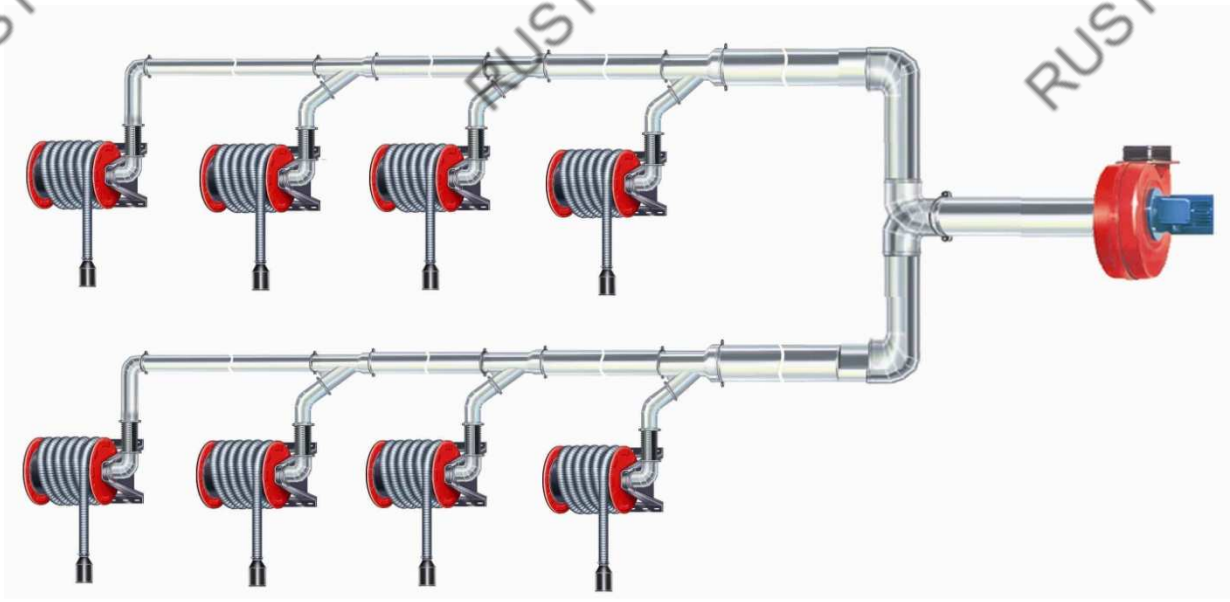
The meaning and correct evaluation of the concurrency parameter is extremely important in the context of centralised systems.
The meaning of the term concurrency can be simplified as "the percentage of units that can run simultaneously".
Example 1.
The example below can theoretically have two values for the concurrency coefficient: 50% or 100%, but it must be designed utilising only one of these values. The value must be selected by the designed in accordance with the customer's requirements.
The 50% concurrency value means that no more than one hose reel can operate at a time.
A 100% concurrency value means that all the hose reels can function simultaneously.

Example 2.
The circuit shown below can theoretically have three values for the concurrency coefficient: 33%, 66% or 100%, but it must be designed utilising only one of these values. The value must be selected by the designer in accordance with the customer's requirements.

The 33% concurrency value means that no more than one hose reel can operate at a time.
A concurrency value of 66% means that a maximum of two hose reels can function simultaneously.
A 100% concurrency value means that all the hose reels can function simultaneously.

Example 3.
The circuit shown below can theoretically have four values for the concurrency coefficient: 25%, 50%, 75% or 100%, but it must be designed utilising only one of these values. The value must be selected by the designer in accordance with the customer's requirements.
The 25% concurrency value means that no more than one hose reel can operate at a time.
A concurrency value of 50% means that a maximum of two hose reels can function simultaneously.
A concurrency value of 75% means that a maximum of three hose reels can function simultaneously.
A 100% concurrency value means that all the hose reels can function simultaneously.

Example 4.
In the case of the circuit shown below it is essential to be informed of the concurrency factor. This will probably be between 75% (facility to use 6 hose reels simultaneously) or 100% (facility to use all the hose reels simultaneously)



Why concurrency is important.

The correct operation of the system depends on the concurrency coefficient. Once the value is selected and the system installed, this parameter can no longer be changed and all operations must be performed in accordance with the chosen value.
It is essential to assess various aspects of the installation, including:

- The number of personnel (will this value increase or decrease in the future?)
- Facility to increase the number of work stations
- Facility to install additional lines

There may be three different cases:

Type	Problems	Notes
Use of the plant with concurrency factor > design value	In this case the system will be required to provide an air flow rate that is higher than the design value. Since it is not possible for the system to comply with this demand, it will respond by reducing the air flow rate in the various hose reels, and consequently: • Reduced extraction capacity • Possible irreversible damage to the hoses	The immediate solution is to comply with the concurrency factor selected at the time of system sizing: i.e. reduce the number of work stations operating simultaneously. A further step is to increase the power of the fan, although this action can cause problems related to pressure drops and noise levels. The best solution is therefore to redesign the system and adapt it to the new concurrency requirements
Use of the plant with concurrency factor = design value	The plant will function in accordance with demands without any operating problems	System functions perfectly
Use of the plant with concurrency factor < design value	In this case, as in the above situation, no problems will ensue since the system is effectively "oversized" with respect to requirements.	System functions perfectly. The use of additional hose reels will not cause any problems