



## Krantz Components

Displacement ventilation  
for indoor firing ranges

Air distribution systems

*Krantz*



# Low-turbulence displacement ventilation protects the breathing zone of the shooter

When shooting with firearms, pollutants in the form of gases, dusts and fumes (e.g. lead, copper, sulphur, saltpetre) are released; this may endanger the health of the shooters. Especially in closed shooting ranges (indoor firing ranges), where no natural air movements cause the removal of the pollutants, an artificially generated air flow must ensure that the shooters' breathing zone remains free of such pollutants.

The most effective way to remove the pollutants is a ventilation and air conditioning system that discharges supply air through the entire back wall face into the indoor firing range according to the piston principle. Like this, the supply air enters through displacement outlets as a low-turbulence, horizontal flow into the room and displaces the airborne pollutants towards the extraction system at the bullet trap area.



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## Displacement outlets for indoor firing ranges

We design and deliver air distribution walls for supply air discharge in indoor firing ranges, tailored to the individual architecture.

The performance was proved by corresponding tests in our Research & Development Centre in Aachen. All displacement outlets for indoor firing ranges that have been delivered by us are tested and released by authorised experts.

Thanks to this special type of air distribution, the airborne pollutants that are released when shooting with firearms are effectively displaced towards the extraction system at the bullet trap by using the piston principle. Thus, the accumulation of gun powder rests as well as health hazard of the shooters are avoided effectively. High air quality is generated in the area around the shooter.

The supply air is discharged through the entire wall surface behind the shooters. The integration of windows into the air distribution wall with a special design of the window embrasures allows an unobstructed view for the supervisor.

Thermal influences in the room (e.g. because of different surface temperatures of the room enclosing surfaces) or differences between supply air and indoor air temperatures can be balanced by adjustable linear slot diffusers.



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Krantz Components delivers all the necessary parts for installation (e.g. post-and-beam structure, air discharge panels, brackets etc.) for connection to sidewalls, floor and ceiling as well as fastening material). All parts are prepared to enable the customer to assemble the entire air distribution wall on site without great effort.

All visible elements will be delivered with a robust powder coating in the required colour. By request our experts will provide technical support for the design of the air distribution wall for your indoor firing range.

After the completion of the indoor firing range the performance can be proved by visualization with smoke (artificial fog) as well as by measurements of indoor air velocities and air flow direction.

- 1 Indoor firing range with air distribution wall
- 2 Displacement outlet VA-RSA with adjustable linear slot diffuser
- 3 Shooting with a firearm – piston principle





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## Functioning and structure

### Functioning

The displacement outlets are positioned in a certain distance behind the firing point, to direct the supply air with low velocity (between 0.25 and 0.35 m/s) and low turbulence towards the targets.

Thus, the shooters are permanently surrounded by a flow of fresh air. The airborne pollutants that accumulate in the supply air while shooting are displaced by this air flow towards the opposite end of the room where the polluted air will be extracted.

Further to this the low supply air velocity generates a comfortable, draught-free thermal environment.

The ballistics of the projectile will not be influenced by the air flow.

The displacement outlets are delivered in separate parts along with the necessary post-and-beam structure and connection elements for easy installation of the air distribution wall on site.

### Technical data

<b>Volume flow rate range:</b>	depending on the room cross section and the appearance of pollutants <sup>1)</sup>
<b>Discharge velocity:</b>	0.25 – 0.35 m/s
<b>Size:</b>	adapted to the room cross section
<b>Coverage:</b>	total room cross section / room length
<b>Type:</b>	VA-RSA
<b>Make:</b>	Krantz Components

<sup>1)</sup> according to the type of firearm/gun and shot rate

- 1 Schematic representation of the air flow
- 2 Air distribution wall with air discharge panels made of perforated sheet metal
- 3 Details

## Individually customised solutions

Our displacement outlets for indoor firing ranges are tailored to the individual indoor firing range architecture.

Our experts will gladly support you in the layout and concept of your individual indoor firing range.

### Necessary data for system design

- Dimensions of the back wall of the indoor firing range (width/height)
- Supply air volume flow rate
- Desired colour of the visible face
- If windows and/or doors exist, indicate dimensions and position (width/height)

### Replacement of an air distribution wall in an existing indoor firing range

#### Former design (other manufacturer)

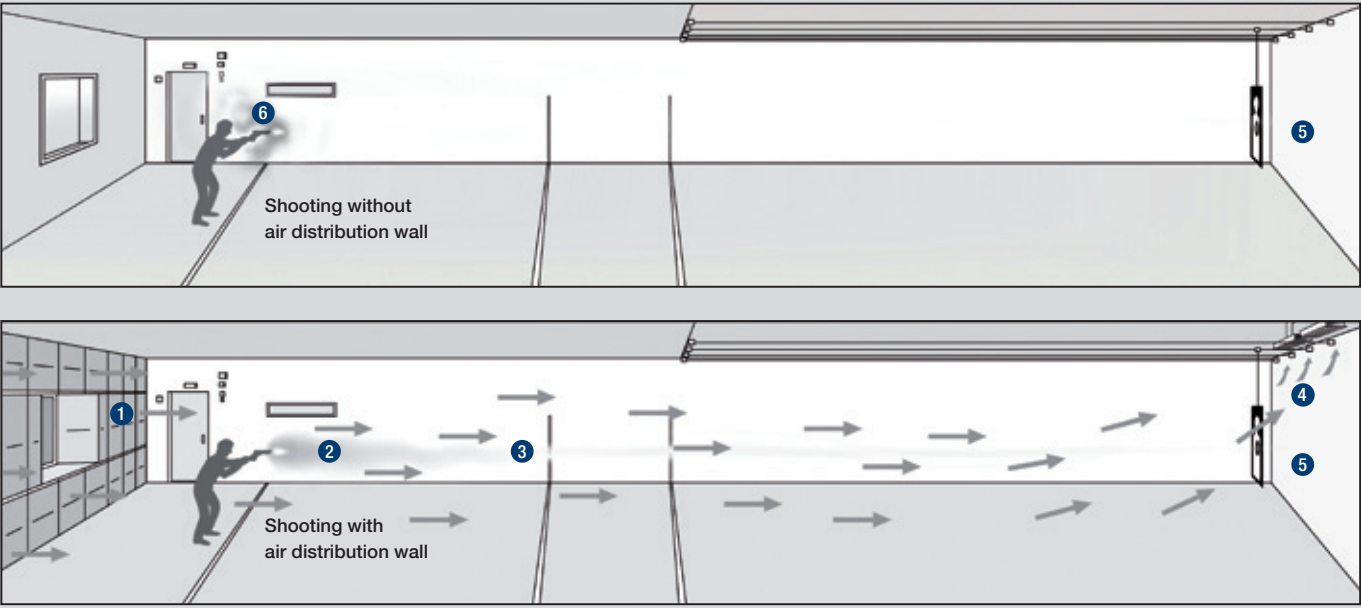


#### New design

Optimised indoor air velocity and flow direction because of window embrasures with air supply







Advantages

- Breathing zone of the shooter is free of hazardous substances
- High thermal comfort because of draught-free air supply
- Air distribution without influence on ballistics
- Easy and quick assembly (modular system)
- Integration of windows and doors for the supervision of the shooters
- Stable piston flow, even at temperature differences of up to  $\pm 4$  K between supply air and indoor air
- Individual design, tailored to the architecture
- Robust powder coating with free choice of colour
- Support in layout and concept by our experts
- Proof of function during commissioning if desired

- 1 Air distribution wall
- 2 Displacement of airborne pollutants
- 3 Displacement ventilation (piston principle)
- 4 Exhaust air collector
- 5 Bullet trap
- 6 Airborne pollutants

Excerpt of our reference list

National		Supply air volume flow rate
Meiningen AFTP Police Force		2 861 l/s [10 300 m³/h]
Lübeck Local Authority Centre		2 861 l/s [10 300 m³/h]
Delmenhorst Police Force		4 583 l/s [16 500 m³/h]
Hamburg Police Force, 9 indoor firing ranges		up to 9 444 l/s [34 000 m³/h]
Hattingen Police Force		4 070 l/s [14 650 m³/h]
Selm Police Force		5 944 l/s [21 400 m³/h]
Nürthingen Police Station		3 375 l/s [12 150 m³/h]
RSA Nagold		4 250 l/s [15 300 m³/h]
Indoor Firing Range SG Tell, Uttenreuth		3 500 l/s [12 600 m³/h]
Schloss & Gut Liebenberg (castle & estate) (4 indoor firing ranges: 25 m, 50 m and 100 m and shooting cinema)		7 625 l/s [27 450 m³/h]
International		Supply air volume flow rate
Victoria Police Academy	Australia	11 111 l/s [40 000 m³/h]
Paris 12th district, Police Station	France	4 167 l/s [15 000 m³/h]
Auchel Indoor Firing Range	France	3 375 l/s [12 150 m³/h]
Monterau Indoor Firing Range	France	9 722 l/s [35 000 m³/h]
Pyretherm Indoor Firing Range	France	8 333 l/s [30 000 m³/h]
A7 Gebouwenkomplex	Netherlands	6 500 l/s [23 400 m³/h]
Borne Police Force	Netherlands	6 639 l/s [23 900 m³/h]
Aargau Gun Firing Range	Switzerland	3 167 l/s [11 400 m³/h]
Teufen Indoor Firing Range	Switzerland	8 333 l/s [30 000 m³/h]

**For more than 40 years Krantz Components, a business unit of Caverion, has been developing and manufacturing products for air distribution systems for commercial and industrial applications.**

**The involvement of our own Research & Development Centre enables the development of special designs adapted to the special demands of the client.**

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