



Detail Actuator

# Nozzles

## DUK



Connection to circular ducts



DUK-V

### For installation into walls and onto rectangular and circular ducts, adjustable and fixed – made of aluminium

Adjustable and fixed jet nozzles achieve long throw distances under optimal acoustic conditions

- Nominal sizes: 100, 125, 160, 200, 250, 315 and 400 mm
- Volume flow rate range: 15 – 400 l/s or 54 – 1440 m<sup>3</sup>/h
- Visible parts made of aluminium
- For constant and variable volume flows
- Low sound power levels due to aerodynamically optimised nozzle contours
- Discharge angle can be adjusted manually or with an actuator
- Quick, easy and concealed fixing



DUK-F

Optional equipment and accessories

- Exposed surface in RAL CLASSIC colours
- Circular spigot
- Connection pieces for circular and rectangular ducts
- Internal or external actuators for adjusting the discharge angle

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## General information

### Application

- Type DUK jet nozzles for supply air discharge, with a long throw distance
- For production halls, gymnasiums, theatres and conference rooms as well as for large internal spaces in airports, railway stations and shopping centres
- Attractive design element for building owners and architects with demanding aesthetic requirements
- For supply air to room air temperature differences from –12 to +20 K
- Adjustable discharge angle, from –30 to +30°, for switching between heating and cooling mode
- For push fitting directly onto circular ducts or as a branch off circular or rectangular ducts; also for installation into walls and bulkheads

### Special characteristics

- High discharge momentum, hence large penetration depth in heating mode
- Optimised nozzle contours
- Fixed and adjustable variants
- Discharge angle can be adjusted from –30° to +30°, either manually or with an actuator
- Electric actuator as an option

### Nominal sizes

- 100, 125, 160, 200, 250, 315, 400 mm

From nominal size 160 with actuator

### Variants

- F: Fixed jet nozzle
- V: Adjustable jet nozzle

### Connection

- V-A: For circular ducts (direct connection)
- V-K: For rectangular ducts
- V-R: For circular ducts

### Actuator

- Manual adjustment
- E\*: External electric actuator

### Parts and characteristics

- Nozzle with acoustically optimised contours

### Useful additions

- TDC temperature difference control module

### Technical data

- Nominal sizes: 100, 125, 160, 200, 250, 315, 400 mm
- Volume flow rate range: 15 to 400 l/s or 54 to 1440 m<sup>3</sup>/h
- Adjustable discharge angle: –30 to +30°
- Supply air to room air temperature difference: –12 to +20 K

### Useful additions

- TDC temperature difference control module

### Standards and guidelines

- Sound power level of the air-regenerated noise measured according to EN ISO 5135

### Maintenance

- Maintenance-free, as construction and materials are not subject to wear and tear
- Inspection and cleaning according to VDI 6022

## Function

### DUK

#### Functional description

Jet nozzles are the preferred solution wherever the supply air has to travel large distances from the point of discharge to the occupied zone. It is possible to adapt the discharge angle, and consequently the direction of the airflow to heating or cooling mode. The supply air to room air temperature difference may range from  $-12$  to  $+20$  K.

#### Cooling mode

Cooling mode is possible with a positive discharge angle of up to  $30^\circ$ . The supply air jet is directed towards the ceiling, but the higher density of cold air results in an increasing deflection of the air jet towards the floor as the distance from the jet nozzle increases. When the supply air jet reaches the occupied zone, both the supply air to room air temperature difference and the airflow velocity have been reduced to comfortable levels.

This principle of operation allows for long throw distances.

#### Heating mode

Heating mode is possible with a negative discharge angle of  $-30^\circ$  or less. The supply air jet is directed towards the occupied zone. Due to the lower density of warm air the jet becomes buoyant. When the supply air jet reaches the occupied zone, both the supply air to room air temperature difference and the airflow velocity should ideally have been reduced.

The discharge angle can be changed manually or with an electric actuator.

### DUK-F

#### Functional description

Jet nozzles are the preferred solution wherever the supply air has to travel large distances from the point of discharge to the occupied zone. Fixed jet nozzles can be used for heating and cooling. The supply air to room air temperature difference can range from  $-12$  to  $+20$  K.

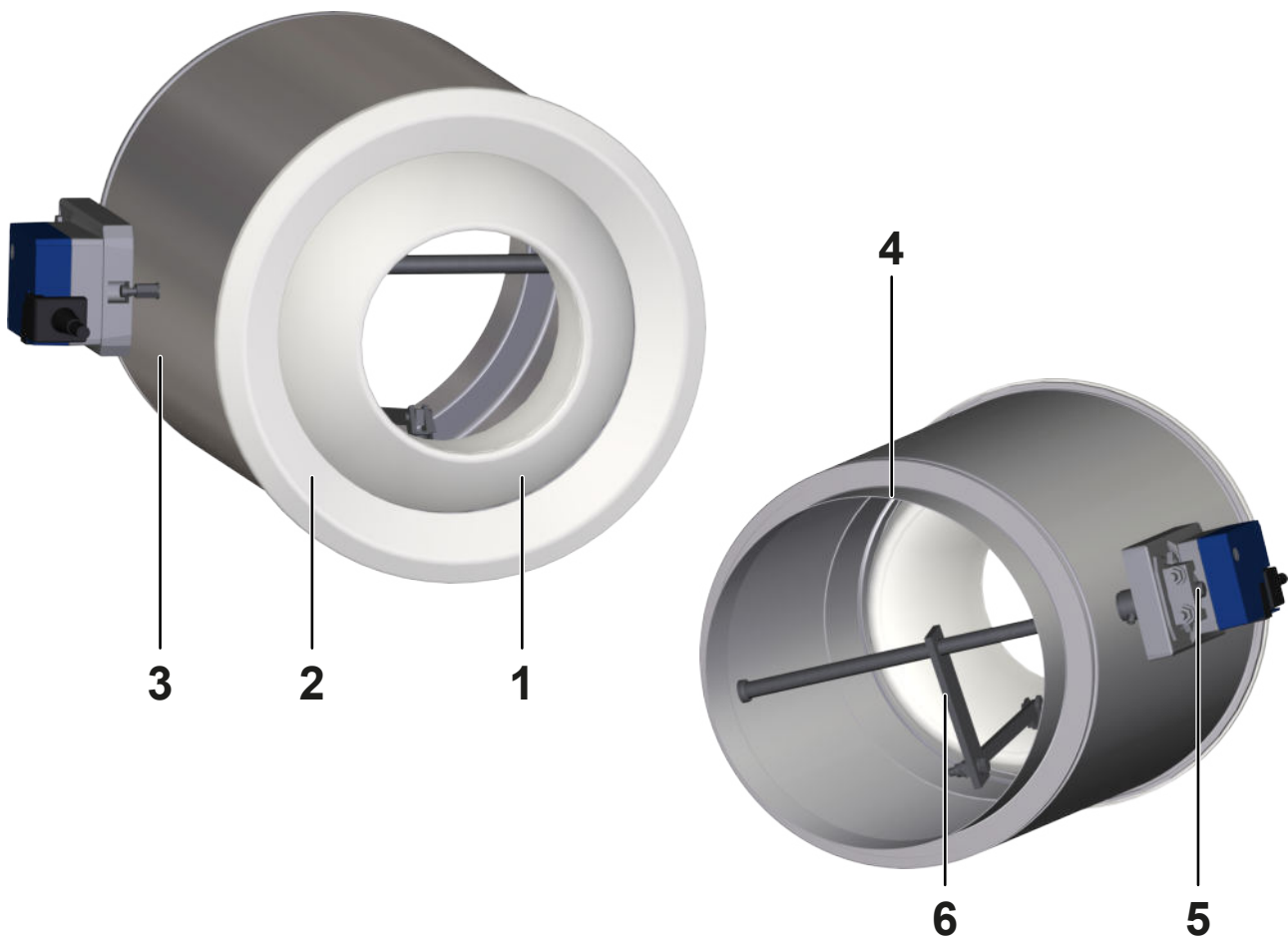
#### Cooling mode

The supply air is discharged horizontally, but the higher density of cold air results in an increasing deflection of the air jet towards the floor as the distance from the jet nozzle increases. When the supply air jet reaches the occupied zone, both the supply air to room air temperature difference and the airflow velocity have been reduced to comfortable levels.

#### Heating mode

The supply air is discharged horizontally, but due to the lower density of warm air the jet becomes buoyant. When the supply air jet reaches the occupied zone, both the supply air to room air temperature difference and the airflow velocity should ideally have been reduced.

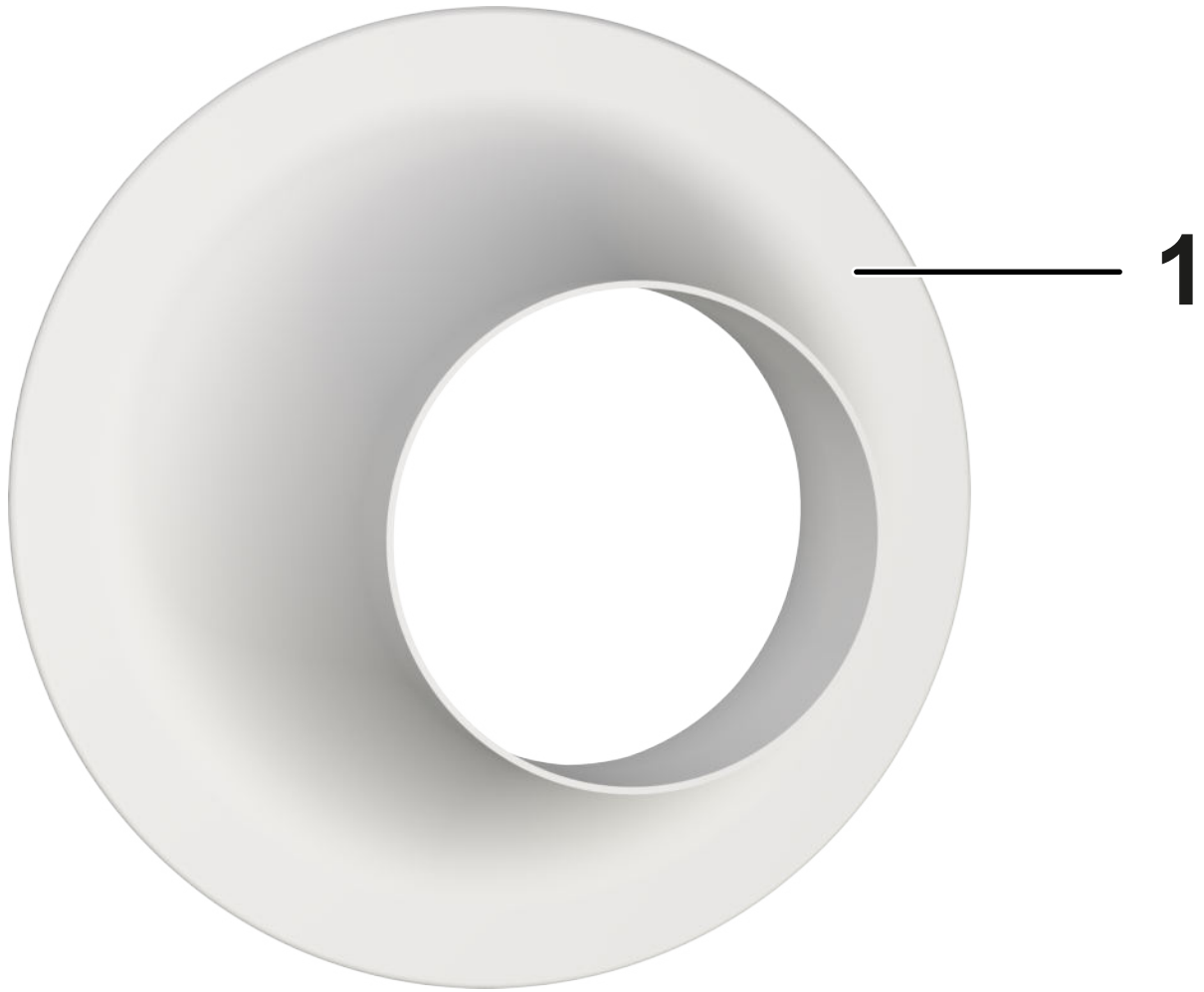
## Schematic illustration of DUK-V for push fitting directly onto circular ducts



- 1 Nozzle
- 2 Face cover ring
- 3 Casing
- 4 Spigot

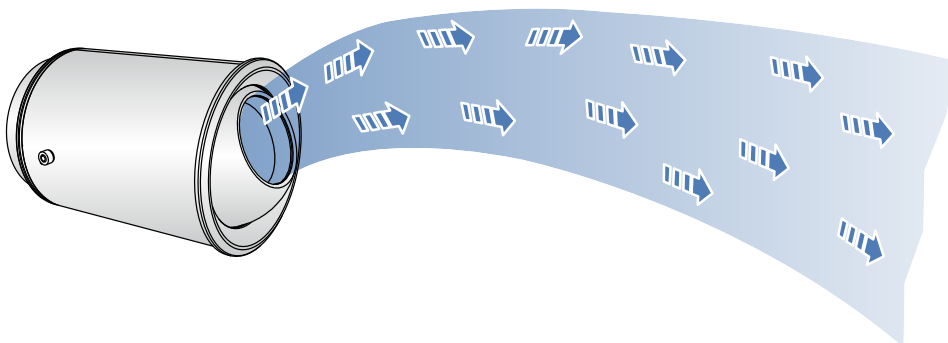
- Optional
- 5 Actuator
  - 6 driving linkage

Schematic illustration of DUK-F

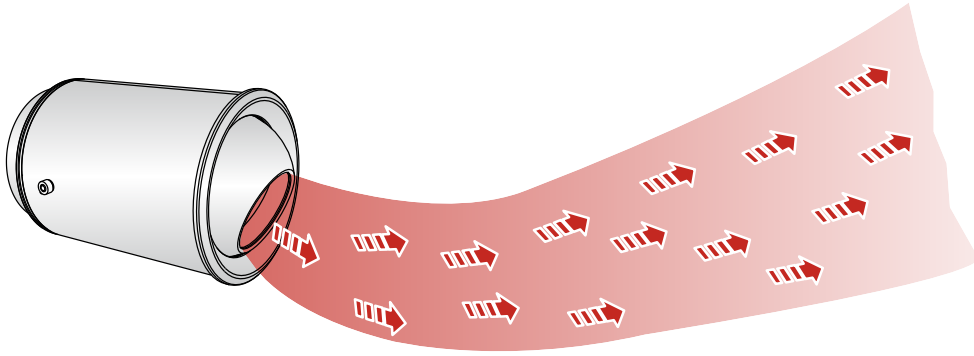


1 Nozzle

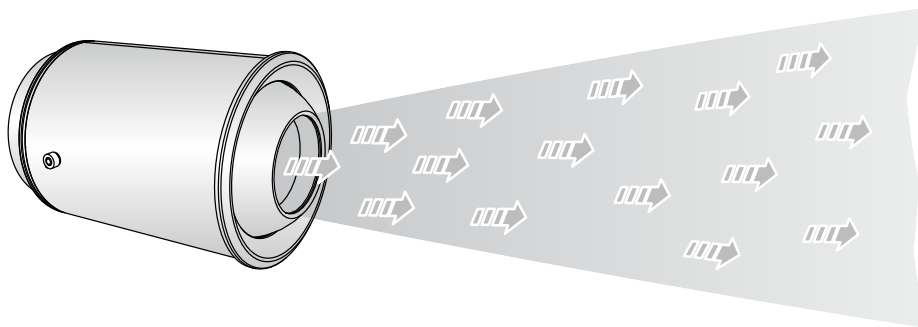
DUK-V air pattern in cooling mode



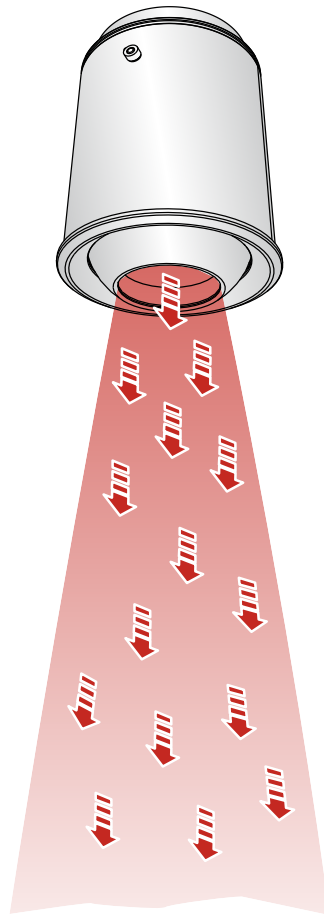
**DUK-V air pattern in heating mode**



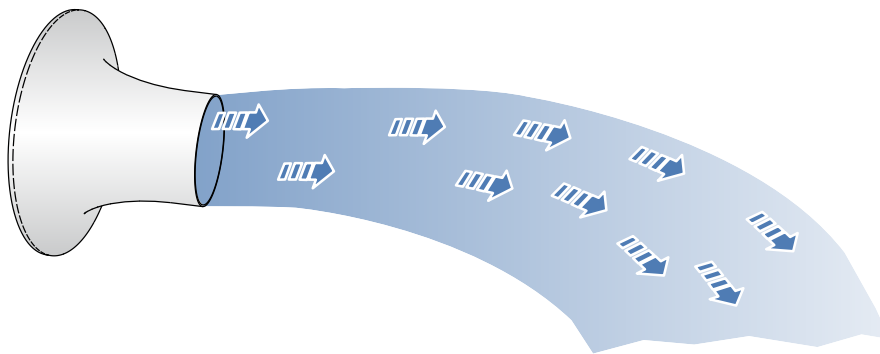
**DUK-V air pattern with isothermal ventilation**



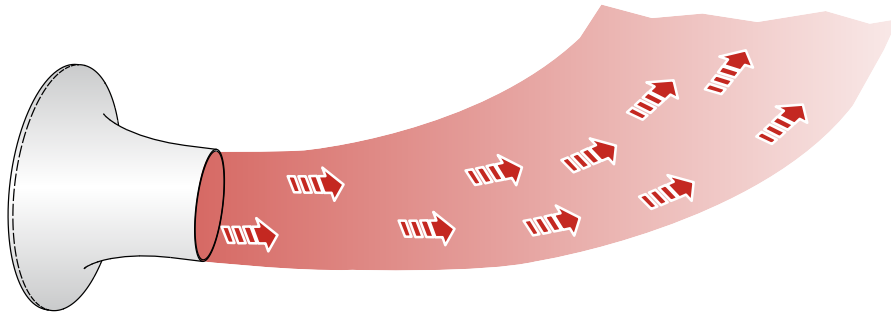
DUK-V air pattern with vertical discharge, heating mode



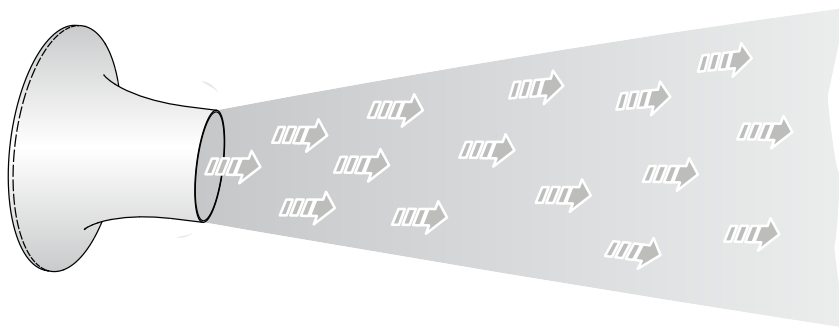
DUK-F air pattern in cooling mode



**DUK-F air pattern in heating mode**

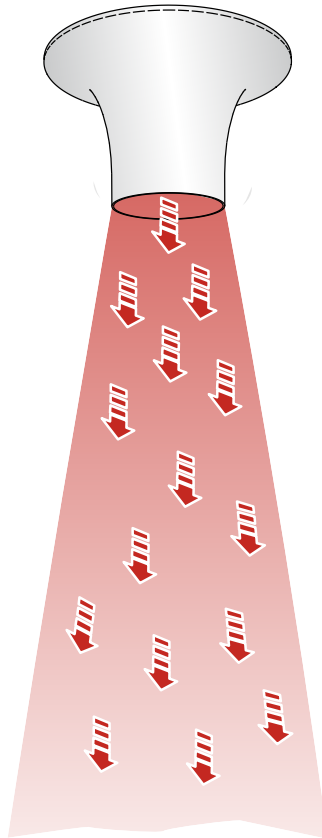


**DUK-F air pattern with isothermal ventilation**





DUK-F air pattern with vertical discharge, heating mode



### Technical data

Nominal sizes	100, 125, 160, 200, 250, 315, 400 mm
Volume flow rate range	15 – 400 l/s or 54 – 1440 m³/h
adjustable discharge angle	-30 to +30°
Supply air to room air temperature difference	-12 to +20 K

### Quick sizing

Quick sizing tables provide a good overview of the volume flow rates and corresponding sound power levels and differential pressures.

Exact values for all parameters can be determined with our Easy Product Finder design program.

#### DUK-V, DUK-V-A, DUK-V-A-(E1, E2, E3), DUK-V-K, DUK-V-K-(E1, E2, E3), DUK-V-R, DUK-V-R-(E1, E2, E3), sound power level and total differential pressure

NS	Volume flow rate [l/s]	Volume flow rate [m³/h]	$\Delta p_t$ [Pa]	$L_{WA}$ [dB(A)]	$v_L$	
					0.5 m/s	1.0 m/s
					L [m]	
100	8	28	11	<15	<5	<5
100	15	54	38	<15	5	<5
100	20	72	68	<15	7	<5
100	30	108	152	30	10	5
125	15	54	13	<15	<5	<5
125	30	108	49	<15	8	<5
125	45	162	110	31	12	6
125	60	216	196	42	16	8
160	20	72	9	<15	<5	<5
160	40	144	36	<15	8	<5
160	60	216	81	19	13	6
160	80	288	144	30	17	8
200	35	126	10	<15	6	<5
200	70	252	37	<15	11	6
200	105	378	82	23	17	9
200	140	504	145	35	23	11
250	55	198	9	<15	7	<5
250	110	396	35	<15	14	7
250	165	594	77	22	21	11
250	220	792	137	34	28	14
315	90	324	9	<15	9	<5
315	185	666	37	<15	18	9
315	265	954	75	23	26	13
315	360	1296	137	35	>30	18
400	155	558	6	<15	12	6
400	310	1116	34	<15	24	12
400	465	1674	75	29	>30	18
400	620	2232	133	40	>30	24

All values apply to discharge angle 0°

L: Throw distance with isothermal operation

#### DUK-V-A-(E4, E5, E6), DUK-V-K-(E4, E5, E6), DUK-V-R-(E4, E5, E6), sound power level and total differential pressure



NS	Volume flow rate [l/s]	Volume flow rate [m³/h]	$\Delta p_t$ [Pa]	$L_{WA}$ [dB(A)]	$v_L$	
					0.5 m/s	1.0 m/s
					L [m]	
160	20	72	9	<15	<5	<5
160	40	144	36	18	8	<5
160	60	216	81	31	13	6
160	80	288	144	41	17	8
200	35	126	10	<15	6	<5
200	70	252	37	22	11	6
200	105	378	82	35	17	9
200	140	504	145	44	23	11
250	55	198	9	<15	7	<5
250	110	396	35	20	14	7
250	165	594	77	33	21	11
250	220	792	137	43	28	14
315	90	324	9	<15	9	<5
315	185	666	37	22	18	9
315	265	954	75	33	26	13
315	360	1296	137	43	>30	18
400	155	558	6	<15	12	6
400	310	1116	34	22	24	12
400	465	1674	75	35	>30	18
400	620	2232	133	44	>30	24

All values apply to discharge angle 0°

L: Throw distance with isothermal operation



## DUK-F, sound power level and total differential pressure

NS	Volume flow rate [l/s]	Volume flow rate [m³/h]	$\Delta p_t$ [Pa]	$L_{WA}$ [dB(A)]	$v_L$	
					0.5 m/s	1.0 m/s
					L [m]	
100	8	28	6	<15	3	<5
100	15	54	33	<15	5	<5
100	20	72	61	<15	7	4
100	30	108	142	19	11	5
125	15	54	10	<15	4	<5
125	30	108	52	<15	9	<5
125	45	162	122	16	13	6
125	60	216	220	26	17	9
160	20	72	5	<15	4	<5
160	40	144	31	<15	9	<5
160	60	216	74	<15	13	7
160	80	288	134	20	17	9
200	35	126	6	<15	6	<5
200	70	252	33	<15	12	6
200	105	378	79	<15	17	9
200	140	504	143	24	23	12
250	55	198	6	<15	7	<5
250	110	396	34	<15	14	<5
250	165	594	80	18	22	11
250	220	792	145	28	29	14
315	90	324	6	<15	9	5
315	185	666	36	<15	19	10
315	265	954	77	22	27	14
315	360	1296	145	33	37	19
400	155	558	6	<15	12	6
400	310	1116	34	17	24	12
400	465	1674	81	30	35	18
400	620	2232	148	40	>30	24

L: Throw distance with isothermal operation

## Specification text

This specification text describes the general characteristics of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Fixed and adjustable jet nozzles for the ventilation of large internal spaces such as halls and assembly rooms. Air discharge with long throw distance under optimal acoustic conditions. For horizontal air discharge; variants with fixed discharge angle, adjustable air discharge (360°), or air discharge with nozzle that tilts between -30 and +30°.

Fixed nozzles with acoustically optimised contours and countersunk holes for screw-fixing to a plane surface

Adjustable jet nozzles include a spherical nozzle casing and a casing with a spigot, raised edge or saddle connector.

For push fitting directly onto circular ducts or as a junction off circular or rectangular ducts; also for installation on plane surfaces.

### Special characteristics

- High discharge momentum, hence large penetration depth in heating mode
- Optimised nozzle contours
- Fixed and adjustable variants

- Discharge angle can be adjusted from -30° to +30°, either manually or with an actuator
- Electric actuator as an option

### Useful additions

- TDC temperature difference control module

### Technical data

- Nominal sizes: 100, 125, 160, 200, 250, 315, 400 mm
- Volume flow rate range: 15 – 400 l/s or 54 – 1440 m<sup>3</sup>/h
- Adjustable discharge angle: -30 to +30°
- Supply air to room air temperature difference: -12 to +20 K

### Sizing data

- $q_v$  [m<sup>3</sup>/h]
- $\Delta p_t$  [Pa]

air-regenerated noise

- $L_{WA}$  [dB(A)]

## Order code

DUK-V-R-E1/250×630/P1-RAL9016

1	2	3	4	5	6	7

**1 Type**

DUK Jet nozzle

**2 Discharge direction**

F fixed

V adjustable

**3 Connection**

Applies to discharge direction V only

No entry: without spigot

A Pipe connection spigot (axial)

K Duct connection spigot

R Saddle connector

**4 Adjustment**

No entry: manual adjustment

From nominal size 160

External electric actuator

E1 230 V AC, 3-point

E2 24 V AC/DC, 3-point

E3 24 V AC/DC, modulating, 2 – 10 V DC

**5 Nominal size [mm]**

100, 125, 160, 200, 250, 315, 400

**6 Circular duct diameter [mm]**

Only for connection R

200 (nominal size 100)

250 (nominal size 125)

315 (nominal size 160)

500 (nominal sizes 160 – 315)

630 (from nominal size 160)

800 (from nominal size 160)

**7 Exposed surface**

No entry: without surface finish

P0 powder-coated, RAL 9010 (pure white)

P1 powder-coated, specify RAL CLASSIC colour

Gloss level

RAL 9010 GU 50

RAL 9006 GU 30

All other RAL colours GU 70

**Order example: DUK-V-R-E1/250×630/P1-RAL9016**

Type	DUK
Air discharge direction	adjustable
Connection	saddle connector
Adjustment	230 V AC, 3-point
Nominal size [mm]	250
Circular duct diameter [mm]	630
Exposed surface	Powder-coated, RAL 9016 (traffic white)

## Variants

### DUK-F



Fixed jet nozzle

### DUK-F

#### Variant

- Fixed jet nozzle

#### Nominal sizes

- 100, 125, 160, 200, 250, 315, 400

#### Parts and characteristics

- Nozzle with acoustically optimised contours
- Countersunk holes for screw-fixing the nozzle to a plane surface

### DUK-V



Adjustable jet nozzle

### DUK-V

#### Variant

- Adjustable jet nozzle for wall and bulkhead installation

**Nominal sizes**

- 100, 125, 160, 200, 250, 315, 400

**Parts and characteristics**

- Nozzle with acoustically optimised contours
- Nozzle can be manually rotated inside the spherical nozzle casing by 360°
- Screw fixing concealed by face cover ring

**DUK-V-A-E1**

DUK for the direct connection onto circular ducts

**DUK-V-A****Designed for high comfort**

Together with renowned designers and architects we have developed ceiling, wall, staircase and floor diffusers and grilles that are not only aesthetic design elements, but also meet demanding ventilation and acoustic requirements.

**Variant**

- Adjustable jet nozzle for the connection to circular ducts

**Nominal sizes**

- 100, 125, 160, 200, 250, 315, 400 mm

From nominal size 160 with actuator

**Parts and characteristics**

- Nozzle with acoustically optimised contours
- Nozzle can be manually rotated inside the spherical nozzle casing by 360°
- Screw fixing concealed by face cover ring
- Casing and spigot
- The discharge angle can be adjusted from  $-30^\circ$  to  $+30^\circ$  with an electric actuator (optional)
- E1, E2, E3: External actuator
- E4, E5, E6: Internal actuator with spindle

**Construction features**

- Spigot suitable for circular ducts to EN 1506 or EN 13180



**DUK-V-K-E1**

DUK for the connection to rectangular ducts

**DUK-V-K****Variant**

- Adjustable jet nozzle for the connection to rectangular ducts

**Nominal sizes**

- 100, 125, 160, 200, 250, 315, 400 mm

From nominal size 160 with actuator

**Parts and characteristics**

- Nozzle with acoustically optimised contours
- Nozzle can be manually rotated inside the spherical nozzle casing by 360°
- Screw fixing concealed by face cover ring
- Casing with raised edges
- The discharge angle can be adjusted from  $-30^\circ$  to  $+30^\circ$  with an electric actuator (optional)
- E1, E2, E3: External actuator
- E4, E5, E6: Internal actuator with spindle

**DUK-V-R-E1**

DUK for the connection to circular ducts

**DUK-V-R**

**Variant**

- Adjustable jet nozzle for the connection to circular ducts

**Nominal sizes**

- 100, 125, 160, 200, 250, 315, 400 mm

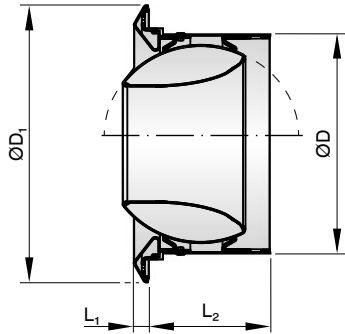
From nominal size 160 with actuator

**Parts and characteristics**

- Nozzle with acoustically optimised contours
- Nozzle can be manually rotated inside the spherical nozzle casing by 360°
- Screw fixing concealed by face cover ring
- Casing and saddle connector
- The discharge angle can be adjusted from  $-30^\circ$  to  $+30^\circ$  with an electric actuator (optional)
- E1, E2, E3: External actuator
- E4, E5, E6: Internal actuator with spindle

## Dimensions and weight

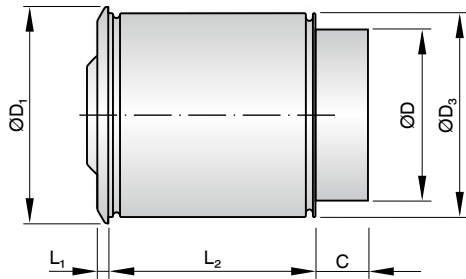
## DUK-V



## DUK-V

NS	$\text{ØD}_1$	$L_1$	$L_2$	$\text{ØD}$	m [kg]
100	146	11	76	98	0.4
125	169	11	85	123	0.5
160	200	11	94	158	0.8
200	257	16	110	198	1.4
250	302	16	146	248	2.5
315	384	23	153	313	4
400	467	24	177	398	6

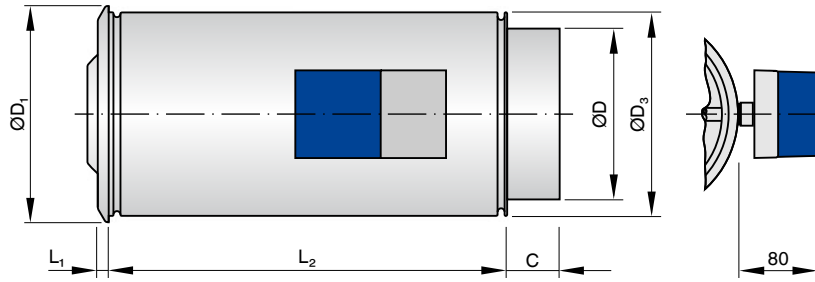
## DUK-V-A



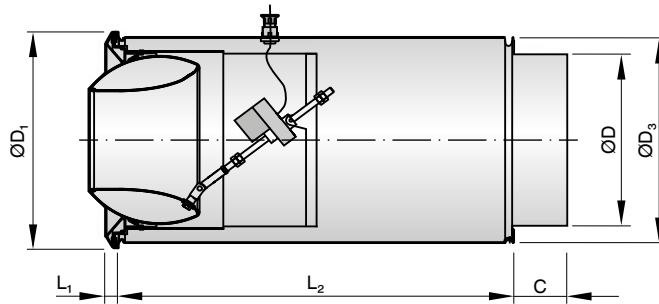
## DUK-V-A

NS	$\text{ØD}_1$	$L_1$	$L_2$	$\text{ØD}_3$	$\text{ØD}$	C	m [kg]
100	146	11	84	134	98	50	0.8
125	169	11	94	157	123	50	1
160	200	11	114	188	158	50	1.6
200	257	16	143	242	198	50	2.5
250	302	16	172	287	248	50	4
315	384	23	223	358	313	50	6
400	467	24	262	441	398	50	9

DUK-V-A-E1, DUK-V-A-E2, DUK-V-A-E3



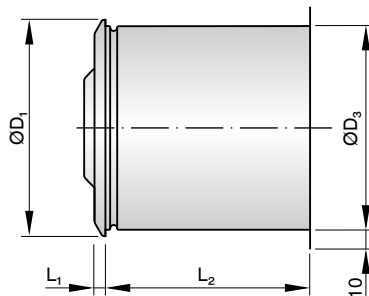
DUK-V-A-E4, DUK-V-A-E5, DUK-V-A-E6



DUK-V-A-E\*

NS	ØD <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	ØD <sub>3</sub>	ØD	C	m [kg]
160	200	11	365	188	158	50	3
200	257	16	365	242	198	50	4
250	302	16	365	287	248	50	5.5
315	384	23	365	358	313	50	7.5
400	467	24	365	441	398	50	10.2

DUK-V-K

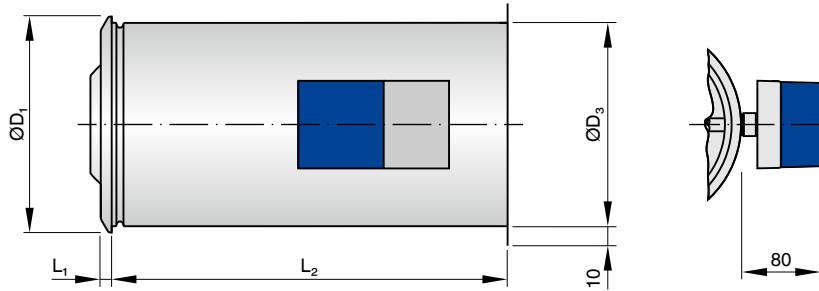


DUK-V-K

NS	ØD <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	ØD <sub>3</sub>	C	m [kg]
100	146	11	84	134	50	0.8
125	169	11	94	157	50	1
160	200	11	114	188	50	1.5

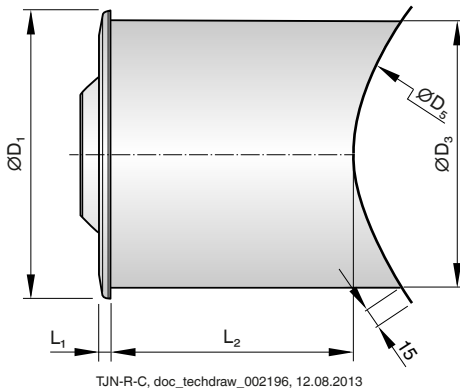
NS	$\varnothing D_1$	$L_1$	$L_2$	$\varnothing D_3$	C	m [kg]
200	257	16	143	242	50	2.3
250	302	16	172	287	50	4
315	384	23	223	358	50	6
400	467	24	262	441	50	9

**DUK-V-K-E1, DUK-V-K-E2, DUK-V-K-E3**



NS	$\varnothing D_1$	$L_1$	$L_2$	$\varnothing D_3$	C	m [kg]
160	200	11	365	188	50	3
200	257	16	365	242	50	4
250	302	16	365	287	50	5.5
315	384	23	365	358	50	7.5
400	467	24	365	441	50	10

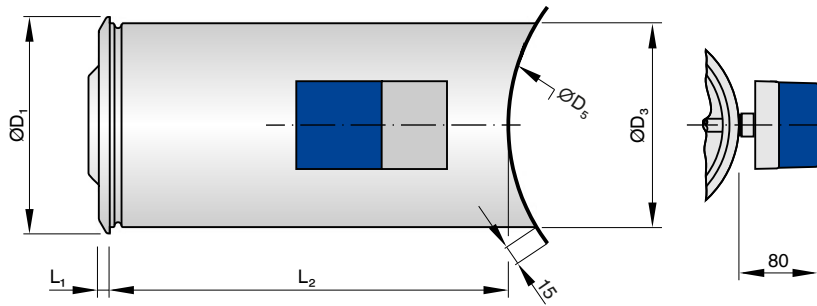
**DUK-V-R**



**DUK-V-R**

NS	$\varnothing D_1$	$L_1$	$L_2$	$\varnothing D_3$	C	m [kg]
100	146	11	84	134	50	0.7
125	169	11	94	157	50	0.9
160	200	11	114	188	50	1.3
200	257	16	143	242	50	2.2
250	302	16	172	287	50	3.7
315	384	23	223	358	50	5.9
400	467	24	262	441	50	8.7

DUK-V-R-E1, DUK-V-R-E2, DUK-V-R-E3



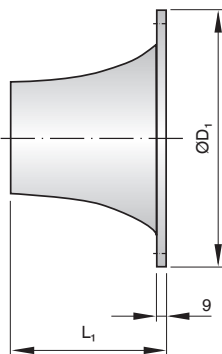
DUK-V-R-E\*

NS	ØD <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	ØD <sub>3</sub>	C	m [kg]
160	200	11	365	188	50	3.2
200	257	16	365	242	50	4.4
250	302	16	365	287	50	5.7
315	384	23	365	358	50	8
400	467	24	365	441	50	11.5

s [mm]

NS	200	250	315	500	630	800
100	+					
125		+				
160			+	+	+	+
200				+	+	+
250				+	+	+
315				+	+	+
400					+	+

DUK-F



DUK-F

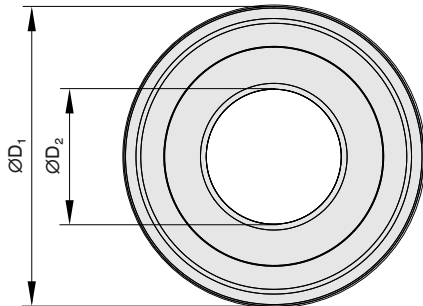
NS	ØD <sub>1</sub>	L <sub>1</sub>	m [kg]
100	138	94	0.1
125	161	112	0.1
160	225	122	0.2
200	265	153	0.3
250	315	187	0.4
315	400	224	0.6



NS	$\varnothing D_1$	$L_1$	m [kg]
400	485	287	0.9

## Product details

## DUK-V front view

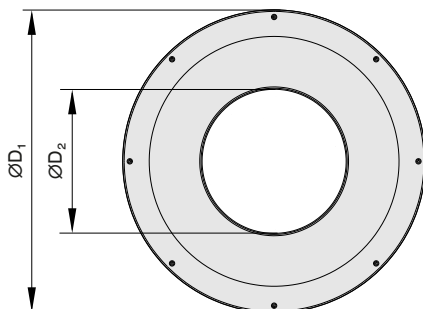


TDV / doc\_techdraw\_000856 / 15.05.2013

## DUK-V

NS	$\text{ØD}_1$	$\text{ØD}_2$	$A_{\text{eff}} [\text{m}^2]$
100	146	50	0.0019
125	169	64	0.0031
160	200	82	0.005
200	257	108	0.0085
250	302	136	0.0135
315	384	174	0.0225
400	467	230	0.0385

## DUK-F front view



TDV / doc\_techdraw\_000856 / 15.05.2013

## DUK-F

NS	$\text{ØD}_1$	$\text{ØD}_2$	$A_{\text{eff}} [\text{m}^2]$
100	138	50	0.00174
125	161	64	0.00277
160	225	82	0.00469
200	265	108	0.00813
250	315	136	0.01289
315	400	174	0.0211
400	485	230	0.03683

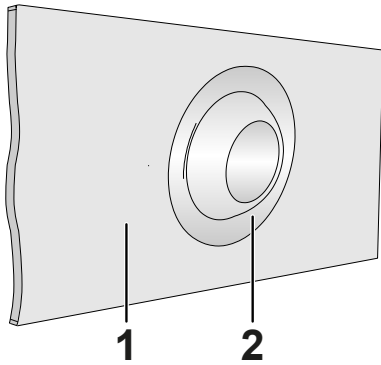


**Installation and commissioning**

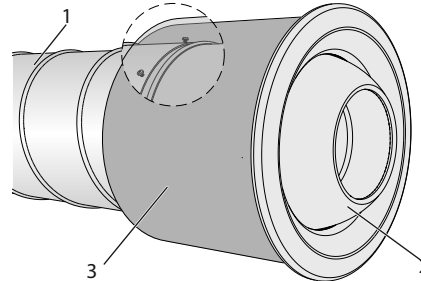
- Ensure correct installation orientation
- Installation directly onto circular ducts or as a junction off circular or rectangular ducts
- DUK-F and DUK-V can also be installed on the face of plane surfaces, e.g. walls and bulkheads

The schematic diagrams are provided to illustrate installation details.

**Installation on a plane surface**



**Installation in circular ducts, with outer casing**



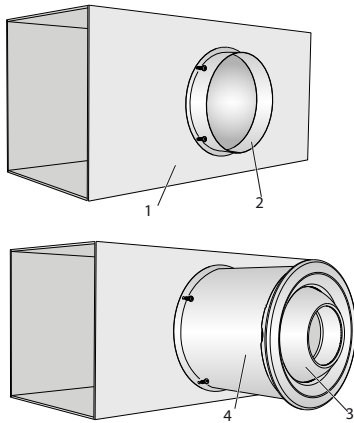
TJN, DUK-V

TJN/.../C

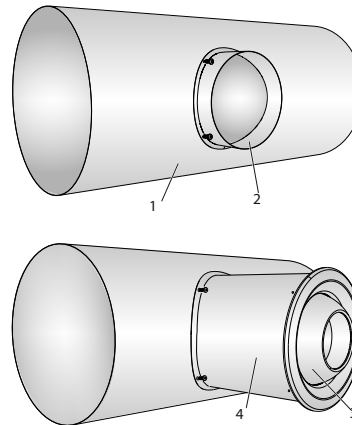
- 1 Plane surface
- 2 Jet nozzle

- 1 Circular duct
- 2 Jet nozzle
- 3 Outer casing

**Installation on rectangular ducts, with outer casing**



**Installation on circular ducts, with outer casing**



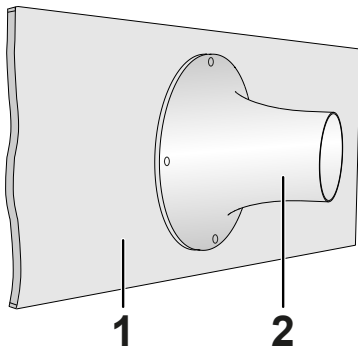
TJN-K/.../C

TJN-R/.../C

- 1 Rectangular duct
- 2 Spigot that fits onto rectangular ducts
- 3 Jet nozzle
- 4 Outer casing

- 1 Circular duct
- 2 Saddle connector
- 3 Jet nozzle
- 4 Outer casing

## Installation onto a plane surface



DUK-F

- ① Plane surface
- ② Jet nozzle

## Explanation

$\varnothing D_1$ [mm] Outer diameter of the face cover ring	$q_v$ [m <sup>3</sup> /h]; [l/s] Volume flow rate
$\varnothing D_2$ [mm] Smallest nozzle diameter (at the discharge opening)	$\Delta t_z$ [K] Supply air to room air temperature difference
$\varnothing D_3$ [mm] Diameter of the nozzle casing	$\Delta p_t$ [Pa] Total differential pressure
$\varnothing D_4$ [mm] Nominal width of the circular duct, for nozzles with saddle connector	$v_L$ [m/s] Air velocity at throw distance L (measured at the centre of the airflow)
$L_1$ [mm] Length of the face cover ring	$L$ [m] Throw distance with isothermal operation, no throw distance reduction
$L_2$ [mm] Casing length	$A_{eff}$ [m <sup>2</sup> ] Effective air discharge area
$m$ [kg] Weight	All sound power levels are based on 1 pW.
$L_{WA}$ [dB(A)] Sound power level of the air-regenerated noise	<b>Lengths</b> All lengths are given in millimetres [mm] unless stated otherwise.