

SMOKE EXHAUST DAMPER 400°/2H

TRS - Certified BS476/Part 20

Complying with BS476/Part 20, the **TRS** damper is used either as a smoke exhaust damper inside the tunnel or as a smoke exhaust and shut-off damper for fans within the ventilation system. Dampers are **400°C/2h** classified.



CHARACTERISTICS

		TRS
Airtightness		Class 3A according to EN 1751
Acceptable pressure for 1250 mm blades	Accidental	10 000 Pa
	Continuous	6 000 Pa
Certification		British Standard 476/20 - 4h vertical and horizontal
Resistance and manoeuvrability tested at		250°C / 3h 400°C / 2h
Dimensions		Height W from 250 to 2500 mm with a 250 mm pitch Length H from 400 to 2500 mm with a 250 mm pitch
Free airflow section		up to 88% when fully open
Options		Fireproof enclosure for actuators
Air velocity		up to 25 m/s

CONSTRUCTION

		TRS
Frame	Thickness	3 mm
	Depth	280 mm
	Drilling	70 mm
	Drilling	with a 250 mm pitch - others depending on application
	Seals	Stainless steel foil AISI 304 — 1.4301 Flame retardant silicone gasket on top and bottom of the frame
Blades	Thickness	2 x 1.5 mm
	Width	250 mm Variable for top and bottom blades
	Bearings	165 mm
	Shafts	Ø 20 mm
	Seals	Flame retardant and easily replaceable silicone gasket
Linkage		Opposed or parallel blade operation

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MATERIALS

	Frame	Blades
Materials	Standard : galvanized steel Z275 according to EN 10346	
	Options : - Stainless steel AISI 304L – 1.4307 according to EN 10088 - Stainless steel AISI 316L – 1.4404 according to EN 10088	
	Other materials according to customer's specifications	

ACTUATION

Different motorization options

- Pneumatic: Single acting with return spring, or double acting
- Electric : On/Off or modulating 0-10V / 4-20 mA
Option: failsafe return spring or safety battery



Options :

- Thermal enclosure
- Mechanical limit switch 400°C/2h



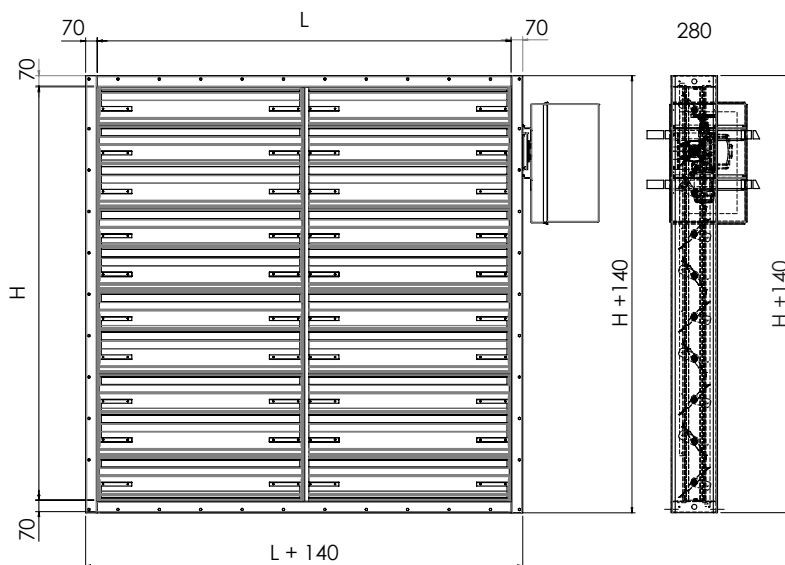
DIMENSIONS

Height H from 250 to 2500 mm with a pitch of 250 mm

Length L from 400 to 2500 mm with a pitch of 100 mm

Intermediate dimensions on request
Small width intermediate reinforcement
from L=1250 mm

Larger dimensions with coupling of several modules



Above plan with thermal enclosure

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WEIGHT (kg)

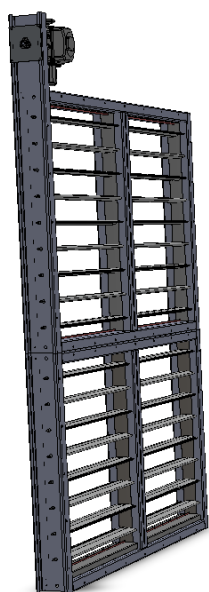
H \ L	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2500
250	27	33	39	45	51	59	65	71	76	82	88	91
500	38	46	53	60	67	79	86	93	100	107	115	118
750	50	58	66	74	83	99	108	116	124	133	141	145
1000	61	70	80	89	99	120	129	139	148	158	167	172
1500	83	95	107	119	131	160	172	184	196	208	220	227
1750	94	107	120	134	147	180	193	207	220	234	247	254
2000	105	119	134	149	164	200	215	229	244	259	273	281
2250	116	132	148	163	180	220	236	252	268	284	300	308
2500	127	144	161	178	196	240	258	275	292	309	326	335

Approximate weight of the damper alone, excluding accessories and actuator

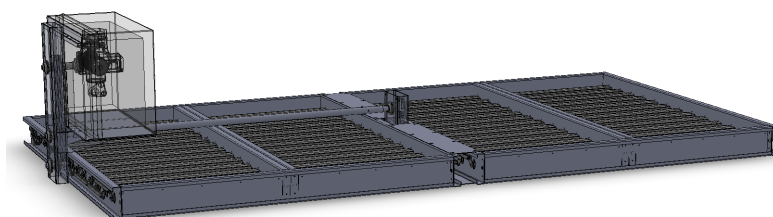
APPLICATION EXAMPLES

For large dimensions dampers or in order to comply with site constraints and to reduce the number of actuators, several dampers can be linked together with different actuator's position (one unit dimension up to 2500 x 2500 mm maxi) :

- Horizontal coupling of dampers
- Vertical coupling of dampers
- Actuator outside the air stream
- Actuator inside the air stream



Vertical coupling with motorization outside the air flow



Horizontal coupling with motorization inside the air flow

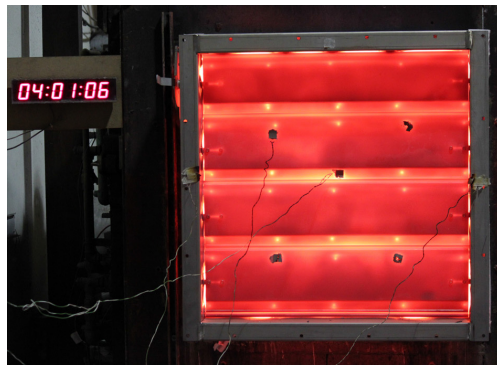
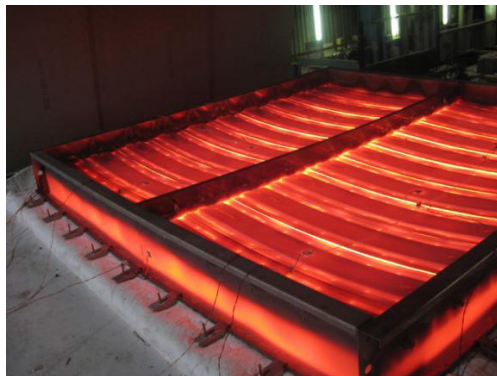
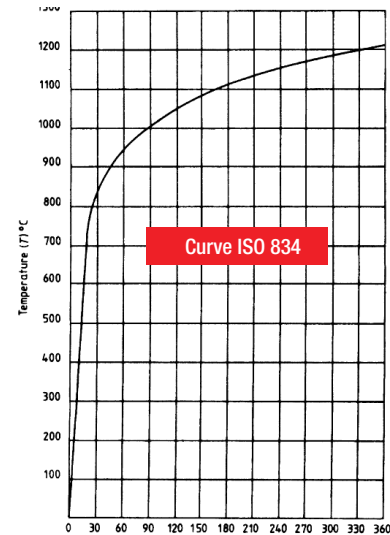
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FIRE RESISTANCE

Qualification according to BS476-20 standard - 4 hours in vertical and horizontal position for a 2500 x 2500 mm damper

Integrity and fire integrity during 4h according to the ISO834 temperature curve up to more than 1150°C



TRS damper has been tested 250°C/3h, 400°C/2h & 600°C/1h in vertical and horizontal position for a 2500 x 2500 mm damper according to the following protocol :

- 10 opening and closing operations at ambient temperature
- 1 operation every 30 minutes during temperature tests

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REGENERATED NOISE

The acoustic performances of our dampers with opposed blade operation have been tested in an independent laboratory (CTTM) according to ISO 7235:2009 standard.

Air flow noise L_w in dB (blades opening angle 90°)



Air velocity (m/s)	Frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	Global
2	33.9	31.0	27.7	22	23.7	26.6	34.3	38.8	41.9
4	36.8	36.4	35.0	30.8	27.2	27.0	34.2	38.8	43.9
6	40.5	44.9	44.0	42.6	38.7	33.6	34.5	39.0	50.2
8	44.9	50.8	50.3	49.7	51.5	43.0	38.2	39.5	57.2
10	48.5	55.2	55.2	55.4	56.7	50.3	45.4	41.1	62.3
12	51.7	58.5	59.2	60.0	60.7	56.2	51.9	45.0	66.5
15	57.2	63.3	64.0	65.5	64.6	63.5	59.9	52.9	71.7

Datas are given for a damper 500 x 500 mm.

From these data, the regenerated noise of a damper of different dimensions can be calculated by applying the formula below for every frequency band :

$$L_{w_{63}} = X_{63} + 10 \log \left(\frac{S}{0.25} \right)$$

X_{63} = Air flow noise for a damper 500 x 500 mm at 63 Hz (in dB) for a given air velocity => read the data in the table.

S = dampers section (in m^2).

$L_{w_{63}}$ = Air flow noise required at 63 Hz (in dB) for a given air velocity.

Example – Calculation of regenerated noise for a damper TRS 1000 x 1000 mm

- Damper section : $S = 1 \times 1 = 1 m^2$

Calculation of the regenerated noise at 63Hz for an air velocity of 4 m/s :

$$L_{w_{63}} = 36.8 + 10 \log \left(\frac{1}{0.25} \right) = 42.8 \text{ dB}$$

Value in the table at a frequency of 63Hz
and for an air velocity of 4 m/s.

Repeat this calculation rules to get the regenerated noise for all frequencies (63Hz - 8kHz).

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TEXTE DE PRESCRIPTION

Registre tunnels

- **Frame**
The frame shall be stiff, welded (welder qualification according to EN 287-1 standard) and of a minimum thickness of 3 mm. The frame's depth shall be 280 mm and the flange's width shall be 70 mm. A vertical intermediate stiffener is required when length is above 1250 mm. Width of vertical stiffener shall be 30 mm maximum.
- **Blades**
Blades shall be made of two 1.5 mm thick aerodynamic profiles in galvanized or stainless steel. Blades shall have a 250 mm width and shaft's diameter shall be 20 mm minimum.
- **Airtightness**
Lateral airtightness between blades and frame shall be made with stainless steel foil seals. Blade's gasket shall be of flame retardant silicone and easily replaceable without removing the blades. Airtightness shall be class 3 according to EN1751.
- **Linkage**
The double linkage is made of connecting rods whose minimum section shall be of 20 mm x 4 mm. Linkage is located outside the air flow.
- **Bearings** : bearings are in bronze, inserted in the frame.
- The damper will be installed in vertical or horizontal position.

INSTALLATION

Installation of the damper on its support must be made as follow:

- If mounting on concrete slab: use clamps with stainless steel threaded rods \varnothing 8 mm.
- If duct mounting: use M8 bolts.

A mineral fiber gasket (in **option by F2A, cf p8**) will have to be placed between the damper and its support to ensure fire integrity.

For proper operation of the damper, check the flatness and squaring of the frame.

Also make sure that no obstacle will prevent the movements of the blades and linkage.

Manual tests under atmospheric pressure are recommended before tests under pressure.



Example of fixation

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BLANKET OPTION

The blanket provide thermal properties improvement and the handleability is also improved. It is needed from both sides and possess high strength before and after heating. It do not contains binder or lubricant and do not emits any fumes or smell during the first firing.

		High Temperature blanket
Width		100 mm
Thickness		3 mm
Length		to define
Classification Temperature		1300 °C
Color		White
Density		128 kg/m ³
Thermal Conductivity, ASTM C-201	200° C	0.04 W/m K
	400° C	0.08 W/m K
	600° C	0.14 W/m K
	800° C	0.23 W/m K
	1000° C	0.34 W/m K
	1200° C	0.48 W/m K
Tensile strength, EN 1094-1		75 kPa
Chemical Analysis	SiO ₂	70-80 %
	CaO + MgO	18-25 %
	Autres oxydes	< 3 %

MAINTENANCE

On a regular basis defined by the company in charge of maintenance and depending on the environmental conditions where the damper is installed, perform the following operations :

- Check that there is no deposit of sand or dust on the moving parts of the damper.
- Lubricate the moving parts of the damper : linkage and blade's bearings. To do so, use a lubricant spray «WD40» type or equivalent.
- Lubricate the lateral stainless steel gaskets of the damper. Use a PTFE dry lubricant spray.
- Perform a full opening and closing of the damper using the actuator's handwheel. Check that the damper reaches full opened and closed position smoothly.

Before carrying maintenance operations, make sure that the actuators have been switched off.

Refer to the documentation of the actuator for its maintenance