

DEFINITION OF FLUE

Flue is the structural component that ensures the burnt waste gases (flue gas) leaving heat generator to be exhausted in a manner that does not harm the environment, and that provides the natural draught required for hot gases to circulate in the boiler at a desired speed. It is a hollow part of the building constructed from brick, concrete, ferroconcrete or steel material; built cylindrically, in the shape of a square, or as a rectangular prism within or adjacent to the building.

CLASSIFICATION OF FLUES

- Ordinary Flues
- Common (Shunt) Flues
- Separate (Individual) Flues

ORDINARY FLUES

Flues that ascend from the ground to the roof as a single column, which are designed for utilization by multiple units, are called ordinary flues. Gas burner devices cannot be connected to this type of flue.

COMMON (SHUNT) FLUES

Flues that ascend from the ground to the roof and that comprise branch ducts belonging to each unit are called shunt flues. This type of flue ascends as a separate flue on the top floor. The effective flue height of this floor should be minimum 4 meters. Devices with blown burners cannot be connected to these flues. If natural gas devices will be connected to a shunt flues solid and liquid fuel burning devices cannot be connected to other units. If there are two apartments on every floor and funneled devices in the apartments are connected to the same main flue by means of a branch duct, this flue is called a double shunt flue. Gas burner devices cannot be connected to this type of flue.

SEPARATE FLUES

Flues that ascend from the relevant unit to the roof as a single column, which are designed only according to the utilization of such unit, are called separate flues.

This is the most suitable type of flue for connecting gas burner devices. The most suitable section types are those with circular sections.

FLUE OPERATING PRINCIPLE

The flue can perform its function in a healthy manner; in other words, evacuate waste gases if the air density inside the flue is less than the density of the exterior. This becomes possible when the interior of the flue is hotter than the exterior. Hot air carries waste gases along when it shows a tendency to leave the flue.

CHARACTERISTICS THAT A GOOD FLUE SHOULD POSSESS

- The most important factor of flue draught is the temperature difference between exterior air and interior air.
- Interior surface of the flue should be smooth.
- The flue should be gas-tight and flues of boilers that use natural gas should not leak out condensed water.
- They should not be built on exterior walls to the highest possible extent.
- Flue section calculation should be correctly made and its height should be suitable for the type of boiler.
- The flue should be enduring against factors such as earthquake, precipitation, etc.
- It should be easy to clean. It must have a cleanout port and it should be sealed.
- The flue should be at 50 cm above the ridge of the roof.
- Flue cover should prevent rain water from leaking in.
- Necessary atmospheric air should be provided for burning.

- Flues should be built in a manner that their direction will not change to the highest extent possible, and, if it is obligatory to change the direction, the angle with horizontal plane should not be less than 60°.
- A suitable orifice should be left for flue gas analyses.

FLUE MAINTENANCE AND CLEANING

Flues must be cleaned in order to function in a horizontal plane should not be less than 60°. accumulation of soot in the flue will cause flue blockage, insufficient draught, and flue fires.

Cleaning personnel should receive necessary training and be fully-equipped.

Cleaning periods;

- Twice a year for solid fuel system flues
- Once a year for liquid fuel system flues
- Twice a year for gas fired system flues
- Four times a year for continuously operated system flues

Matters to be taken into consideration at the time of cleaning;

- It should be checked whether the burner device connected the flue to be cleaned is deactivated. If it is operational, it should be deactivated.
- Work tarpaulin should be laid around the cleanout port where the brush will be inserted.
- Dust mask should be used in accordance with the principles of occupational health.
- Soot removed from the flue should be filled in a container and discarded without harming the environment.
- If the cleaning will be made from the outlet of the flue, maximum safety precautions should be taken.
- When the flue outlet is cleaned, cleanout port should be kept closed in order to prevent falling soot from polluting the environment.

BURNING REACTION IN FLUES

In case full combustion does not take place or flame temperature is low, hydrocarbons are formed.

- Many of these are toxic, while some are carcinogenic.
- They reduce the burning efficiency.
- They pollute the environment.

If carbon bonds with oxygen and creates full combustion, carbondioxide (CO₂) is formed.

- Average CO₂ discharge causes changes in climate up to 50%.
- In order to reduce CO₂ emission, burning process should be improved and the use of petroleum-derived fuels should be avoided.

If carbon bonds with oxygen and creates poor combustion, carbonmonoxide (CO) is formed. Carbonmonoxide (CO) is a odorless and toxic gas.

- CO is formed as a result of poor combustion or when flame temperature drops too early
- Other undesired combustion products (such as soot and hydrocarbons) are formed along with CO.
- CO causes a reduction in device efficiency

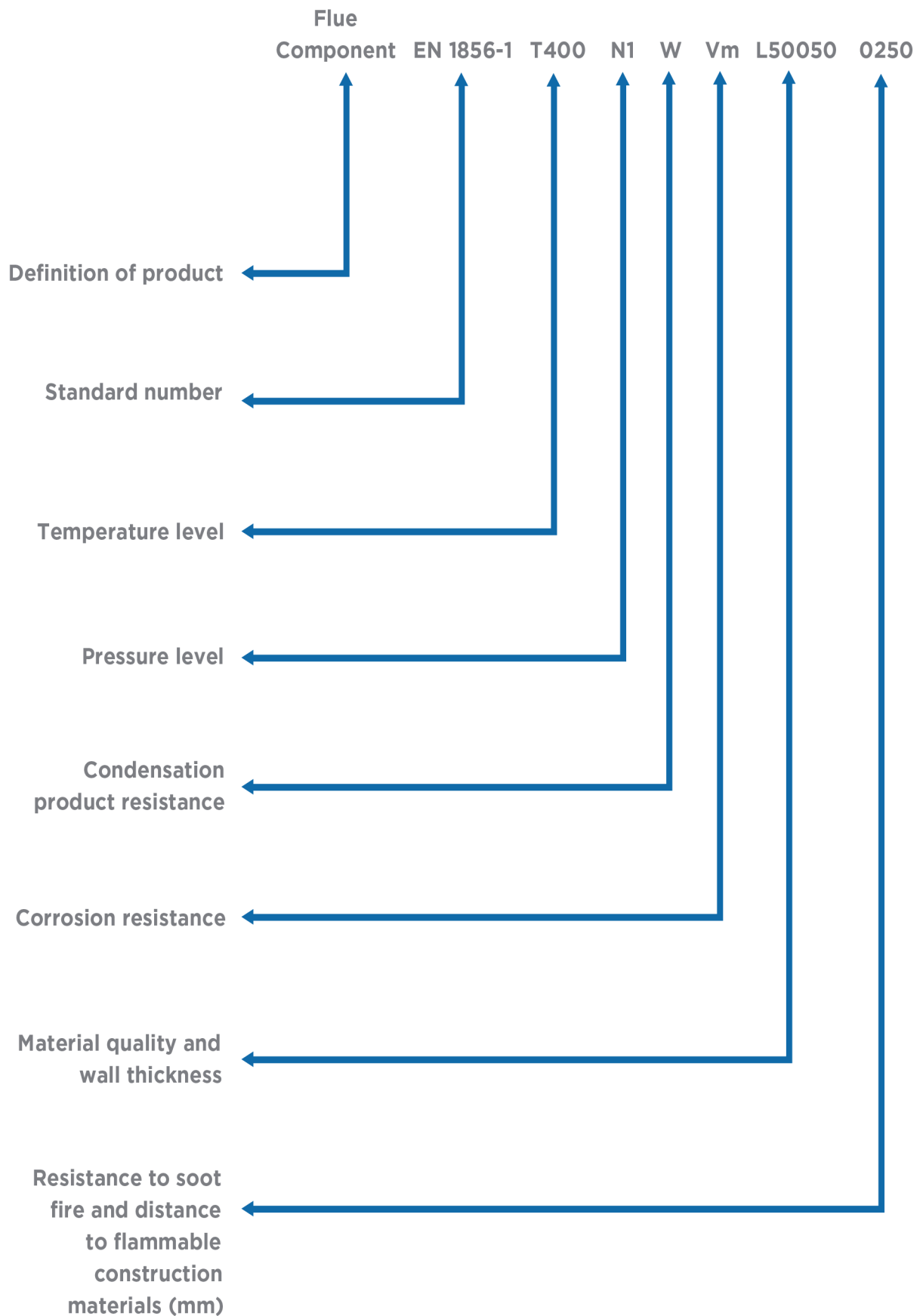
BURNING THEORY

Complete burning reaction of natural gas with oxygen is:



1 m³ natural gas burns with, 2 m³ oxygen and forms 1 m³ carbondioxide and 2 m³ water vapor.

FLUE COMPONENT



SINGLE-WALLED FLUE SYSTEMS

PRODUCT SPECIFICATIONS

- Special CNC Welding (Tig & Laser),
- 0.40 mm and 1.50 mm sheet thickness,
- Ease of installation,
- Full sealing,
- 50 mm muff connection
- Special gasket used on joints,
- Production in any desired diameter (80 mm-1200 mm).

1. It is manufactured from AISI316 L or 304 grade stainless steel, which is the grade of stainless steel that is most resistant to acids formed by flue gases. It is reliably used for many years.
2. Linear connections of the elements of Turinox Flue Systems are made by means of (Continuous Tig&Laser) welding technology. This ensures a perfect connection and maximum resistance against corrosion that might occur at welding points.
3. Elements forming the flue are seamlessly joined due to the muff structure that is prepared in a versatile manner. Tightness of waste gas and condensate is guaranteed.
4. Tightness is guaranteed in high pressure systems up to 200 Pa by means of gasket slots.

SINGLE-WALLED FLUE SYSTEMS

It is a system which is manufactured from AISI 316 L or AISI 304 stainless steel.

Production is made by means of modern machinery and production technologies.

Complete tightness is ensured by special CNC welding and fittings

Special gasket used in connection systems provide the most convenient solution in high pressure boilers.

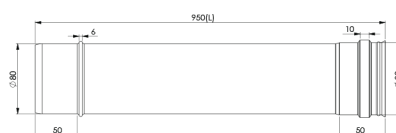
It provides an ideal solution for liquid and gas fueled combi-boilers and boilers.

Thin wall thickness was implemented for the first time in the industry and it promotes fuel efficiency.

SINGLE-WALLED FLUE SYSTEMS

Straight Modules

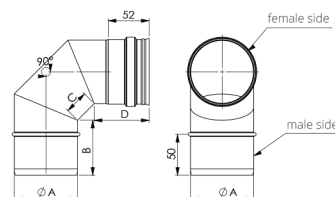
Diameters	ØA	C
80	80	1000
100	100	1000
130	130	1000
150	150	1000
180	180	1000
200	200	1000
230	230	1000
250	250	1000
300	300	1000
350	350	1000
400	400	1000
450	450	1000
500	500	1000
550	550	1000
600	600	1000
650	650	1000
700	700	1000
750	750	1000
800	800	1000



These are the main components of flues. They are generally produced at a length of 1000 mm. Straight modules are made in different dimensions. Materials vary according to burner devices to be used with flues. 500mm and 250mm lengths are also made available to customers. They are produced in the range of Ø80mm to Ø1200mm.

90° Elbow

Diameters	ØA	B	C	D
80	80	70	30	70
100	100	70	30	70
130	130	70	30	70
150	150	70	30	70
180	180	70	30	70
200	200	70	30	70
230	230	70	30	70
250	250	80	40	70
300	300	80	40	80
350	350	80	40	80
400	400	80	40	80
450	450	80	40	80
500	500	80	40	80
550	550	90	50	90
600	600	90	50	90
650	650	90	50	90
700	700	90	50	90
750	750	90	50	90
800	800	90	50	90



It ensures the connection of each module to one another during installation of the flue.
It provides structural strength and durability to the system. Its material grade is 304 or 430.

SINGLE-WALLED FLUE SYSTEMS

45° 30° 15° Elbow

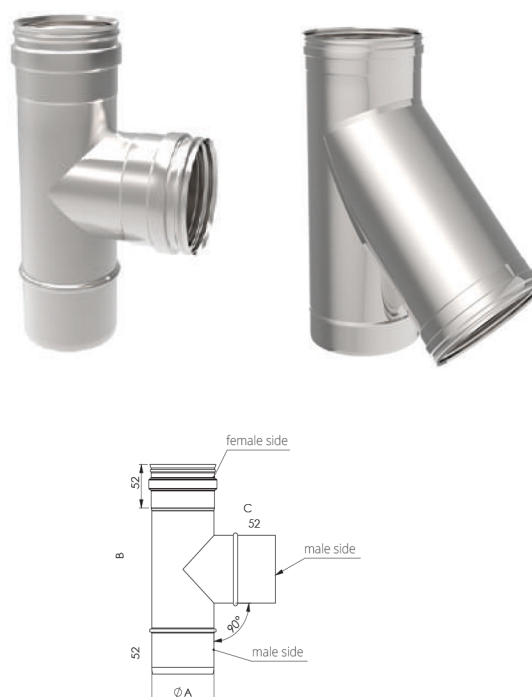
Diameters	ØA	B	C
80	80	70	70
100	100	70	70
130	130	70	70
150	150	70	70
180	180	70	70
200	200	70	70
230	230	80	80
250	250	80	80
300	300	80	80
350	350	80	80
400	400	80	80
450	450	80	80
500	500	80	80
550	550	90	90
600	600	90	90
650	650	90	90
700	700	90	90
750	750	90	90
800	800	90	90



Elbows are used on horizontal and vertical lines. They are used for bypassing deviations on the route determined for flue assembly. It is produced with 45-30-15 degree angles. Its material grade is 304 or 316.

T Connection Parts

Diameters	ØA	B	C
80	80	250	80
100	100	250	80
130	130	300	80
150	150	300	80
180	180	333	80
200	200	360	80
230	230	400	80
250	250	450	80
300	300	500	80
350	350	500	80
400	400	600	100
450	450	650	100
500	500	700	100
550	550	750	100
600	600	800	100
650	650	850	100
700	700	900	100
750	750	950	100
800	800	1000	100

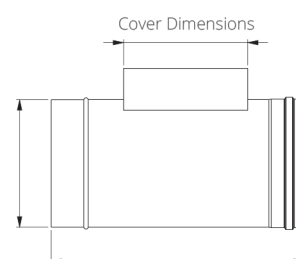


They are used to connect flues to smoke ducts. They are most commonly used as 90° and 87°. They are also produced as 60° or 45° in order to reduce flue resistance. It can be used at a grade of 304 and 430, particularly 316 L material grade for single-walled products, in consideration of customer request and burner device.

SINGLE-WALLED FLUE SYSTEMS

Cleaning Modules

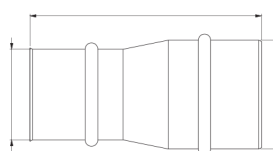
Diameters	ØA	L
80	80	400
100	100	400
130	130	400
150	150	400
180	180	400
200	200	400
230	230	400
250	250	400
300	300	450
350	350	450
400	400	450
450	450	450
500	500	450
550	550	450
600	600	450
650	650	450
700	700	450
750	750	450
800	800	450



They are used at the bottom parts of flue systems. They are used for checking and cleaning flues. One unit is used on each system. They are also horizontally used on flues where horizontal lines are long. Cleaning modules are produced with square or round ports according to the type of pressure.

Adaptor Modules

Diameters	ØA	L
80	80	250
100	100	250
130	130	250
150	150	250
180	180	250
200	200	250
230	230	250
250	250	250
300	300	250
350	350	250
400	400	250
450	450	250
500	500	250
550	550	250
600	600	250
650	650	250
700	700	250
750	750	250
800	800	250

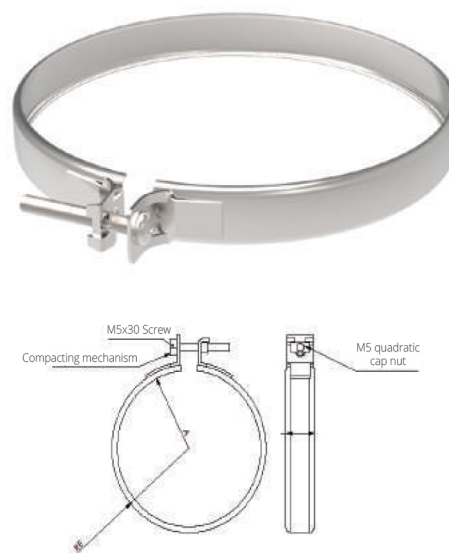


These are products intended for eliminating diameter differences of products. They can be produced from 304 or 430 stainless material.

SINGLE-WALLED FLUE SYSTEMS

Module Clamp

	ØA	B	E
80	80	20	90
100	100	20	110
130	130	20	140
150	150	20	160
180	180	20	190
200	200	20	210
230	230	40	240
250	250	40	260
300	300	40	310
350	350	40	360
400	400	40	370
450	450	40	380
500	500	40	390
550	550	40	400
600	600	40	410
650	650	40	420
700	700	40	430
750	750	40	440
800	800	40	450



It ensures the connection of each module to one another during installation of the flue. It provides structural strength and durability to the system. Its material grade is 304 or 430.

Cap Modules

	ØA	B
80	80	280
100	100	300
130	130	330
150	150	350
180	180	380
200	200	400
230	230	430
250	250	450
300	300	500
350	350	550
400	400	600
450	450	650
500	500	700
550	550	750
600	600	800
650	650	850
700	700	900
750	750	950
800	800	1000

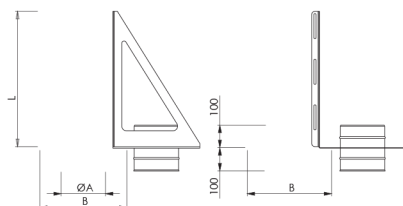


These are used for the purpose of terminating flues and preventing inlet of rainwater inside flues.

SINGLE-WALLED FLUE SYSTEMS

Bearing Platforms

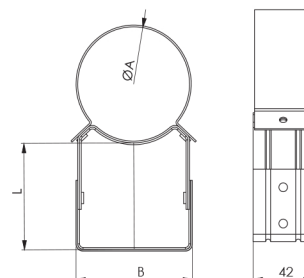
ØA	B	L
80	350	400
100	350	400
130	350	400
150	400	450
180	400	450
200	400	450
230	450	500
250	450	500
300	450	500
350	500	550



These are the base points of flues. They are used for anchoring the system and construction of products. They are manufactured from stainless material. Wall mounted and free-standing types are produced.

Wall Clamp

ØA	B	L
80	90	50 -190
100	110	50 -190
130	140	50 -190
150	160	50 -190
180	190	50 -190
200	210	50 -190
230	240	50 -190
250	260	50 -190
300	310	50 -190
350	360	50 -190

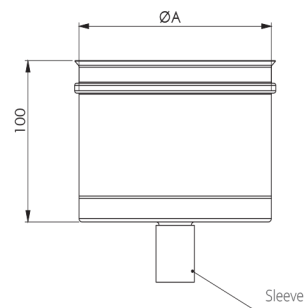


It is the supporting element that fixes flues on vertical and horizontal lines and prevents them from separating. It is installed every three meters. It is produced from stainless products.

SINGLE-WALLED FLUE SYSTEMS

Condensation Tank

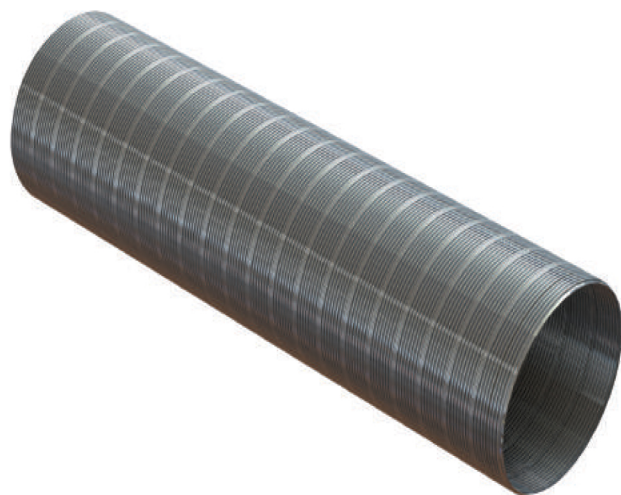
ØA	B
80	80
100	80
130	80
150	80
180	80
200	80
230	80
250	80
300	80
350	80
400	100
450	150
500	150
550	150
600	150
650	150
700	150
750	150
800	150



It is used for collection and transfer of condensate in flues. It is installed vertically below the inspection cover. It can be used horizontally on cascade systems.

Single Walled Flex

80
100
130
150
180
200
230
250
300
350



DOUBLE-WALLED FLUE SYSTEMS

PRODUCT SPECIFICATIONS

- Special CNC Welding (Tig & Laser),
- 0.40 mm and 1.50 mm sheet thickness,
- Ease of installation,
- Full sealing,
- 50 mm muff connection,
- Special gasket used on joints,
- Production in any desired diameter (80 mm-1200 mm).

1. It is manufactured from AISI316 L or 304 grade stainless steel, which is the grade of stainless steel that is most resistant to acids formed by flue gases. It is reliably used for many years.

2. Linear connections of the elements of Turinox Flue Systems are made by means of (Continuous Tig&Laser) welding technology. This ensures a perfect connection and maximum resistance against corrosion that might occur at welding points.

3. Elements forming the flue are seamlessly joined due to the muff structure that is prepared in a versatile manner. Tightness of waste gas joined due to the muff structure that is prepared and condensate is guaranteed.

4. Tightness is guaranteed in high pressure systems up to 160 Pa by means of gasket slots.

5. 340-430 stainless materials are used as exterior wall. Wall thicknesses vary between 0.40 mm and 0.60 mm according to the diameter.

6. Isolation material can be pressurized in the gap between walls by means of a machine breaking rock wool into pieces, and reach a density of 180 kg/m^3 ; thus it provides high levels of heat and sound insulation. Insulation is covered with stainless collars so that it will not cause a thermal bridge.

DOUBLE-WALLED FLUE SYSTEMS

It is a system which is manufactured from AISI 316 L or AISI 304 stainless steel.

Production is made by means of modern machinery and production technologies.

Complete tightness is ensured by special CNC welding and fittings

Special gasket used in connection systems provide the most convenient solution in high pressure boilers.

It provides an ideal solution for liquid and gas fueled combi-boilers and boilers.

Wall thickness varies between 0.40 mm and 1 mm. Standard rock wool is used as insulation material.

Ceramic wool can also be used upon request of the customer.

Straight Modules

	ØA	ØB	C	D
80	80	130	1000	25
100	100	150	1000	25
130	130	180	1000	25
150	150	200	1000	25
180	180	230	1000	25
200	200	250	1000	25
250	250	300	1000	25
300	300	350	1000	25
350	350	400	1000	25
400	400	450	1000	25
450	450	500	1000	25
500	500	550	1000	25
550	550	600	1000	25
600	600	650	1000	25
650	650	700	1000	25
700	700	750	1000	25
750	750	800	1000	25
800	800	850	1000	25



These are the main components of flues. They are generally produced at a length of 1000 mm. Straight modules are produced at a length of 1000 mm. Straight modules are designed in an interlocking manner. Special productions can be made in different dimensions. Materials vary according to burner devices to be used with flues. 500 mm and 250 mm lengths are also made available to customers. They are produced in the range of Ø80 mm to Ø1200 mm. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

90° Elbow

	ØA	ØB	C	D	E
80	80	130	100	60	100
100	100	150	100	60	100
130	130	180	100	60	100
150	150	200	100	60	100
180	180	230	100	60	100
200	200	250	110	70	110
250	250	300	110	70	110
300	300	350	110	70	110
350	350	400	110	70	110
400	400	450	110	70	110
450	450	500	110	70	110
500	500	550	120	80	120
550	550	600	120	80	120
600	600	650	120	80	120
650	650	700	120	80	120
700	700	750	120	80	120
750	750	800	120	80	120
800	800	850	120	80	120

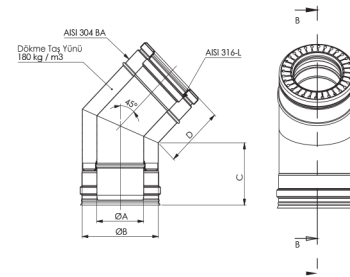


Elbows are used on horizontal and vertical lines. They are used for bypassing deviations on the route determined for flue assembly. It is produced with 90-87 degree angles. Its material grade is 304 or 316. 304 and 430 material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

DOUBLE-WALLED FLUE SYSTEMS

45° 30° 15° Elbow

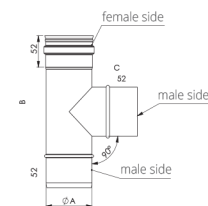
	ØA	ØB	C	D
80	80	130	100	100
100	100	150	100	100
130	130	180	100	100
150	150	200	100	100
180	180	230	100	100
200	200	250	110	110
250	250	300	110	110
300	300	350	110	110
350	350	400	110	110
400	400	450	110	110
450	450	500	110	110
500	500	550	120	120
550	550	600	120	120
600	600	650	120	120
650	650	700	120	120
700	700	750	120	120
750	750	800	120	120
800	800	850	120	120



Elbows are used on horizontal and vertical lines. They are used for bypassing deviations on the route determined for flue assembly. It is produced with 45-30-15 degree angles. Its material grade is 304 or 316. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

T Connection Parts

ØA	B	C	D
80	130	330	100
100	150	350	100
130	180	360	100
150	200	400	100
180	230	450	100
200	250	450	100
250	300	500	100
300	350	650	100
350	400	600	100
400	450	650	100
450	500	700	100
500	550	750	100
550	600	800	100
600	650	850	100
650	700	900	100
700	750	950	100
750	800	1000	100
800	850	1050	100

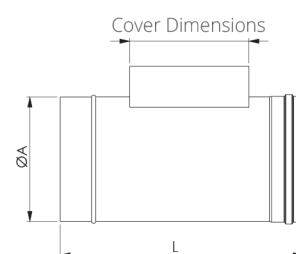


They are used to connect flues to smoke ducts. They are most commonly used as 90° and 87°. They are also produced as 60° or 45° in order to reduce flue resistance. It can be used at a grade of 304 and 430, particularly 316 L material grade for single-walled products, in consideration of customer request and burner device. 304 and 430 grade material request and burner device. 304 and 430 grade material Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

DOUBLE-WALLED FLUE SYSTEMS

Cleaning Modules

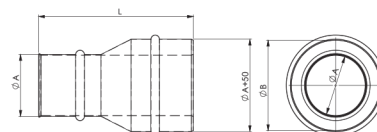
ØA	ØB	L
80	130	400
100	150	400
130	180	400
150	200	400
180	230	400
200	250	400
250	300	450
300	350	500
350	400	500
400	450	500
450	500	500
500	550	500
550	600	500
600	650	500
650	700	500
700	750	500
750	800	500
800	850	500



They are used at the bottom parts of flue systems. They are used for checking and cleaning flues. One unit is used on each system. They are also horizontally used on flues where horizontal lines are long. Cleaning modules are produced with square or round ports according to the type of pressure. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

Adaptor Modules

ØA	B	L
80	130	200
100	150	200
130	180	200
150	200	200
180	230	200
200	250	200
230	300	200
250	350	200
300	400	200
350	450	200
400	500	200
450	550	200
500	600	200
550	650	200
600	700	200
650	750	200
700	800	200
750	850	200
800	900	200

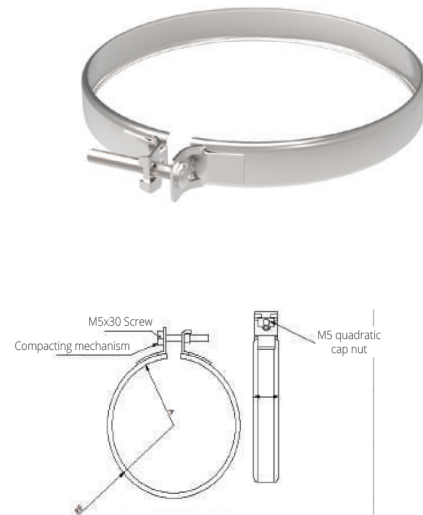


These are products intended for eliminating diameter differences of products. They can be produced from 304 or 430 stainless material. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

DOUBLE-WALLED FLUE SYSTEMS

Module Clamp

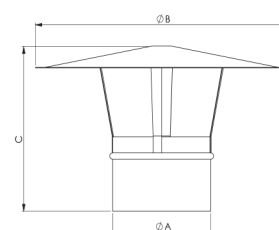
	ØA	B	ØE
130	130	20	140
150	150	20	160
180	180	20	190
200	200	20	210
230	230	20	240
250	250	20	260
300	300	40	310
350	350	40	360
400	400	40	410
450	450	40	460
500	500	40	510
550	550	40	560
600	600	40	610
650	650	40	660
700	700	40	710
750	750	40	760
800	800	40	810



It ensures the connection of each module to one another during installation of the flue. It provides structural strength and durability to the system. Its material grade is 304 or 430. There is no wall option. It is adjusted according to the outer diameter.

Cap Modules

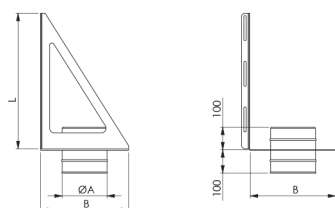
	ØA	B	C
130	130	330	120
150	150	350	150
180	180	380	180
200	200	400	200
230	230	430	230
250	250	450	250
300	300	500	300
350	350	550	350
400	400	600	400
450	450	650	450
500	500	700	500
550	550	750	550
600	600	800	600
650	650	850	650
700	700	900	700
750	750	950	750
800	800	1000	800



These are used for the purpose of terminating flues and preventing inlet of rainwater inside flues.

Bearing Platforms

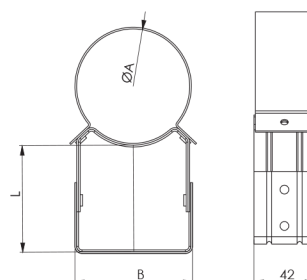
ØA	B	L
80	350	400
100	350	400
130	350	400
150	400	450
180	400	450
200	400	450
230	450	500
250	450	500
300	450	500
350	500	550



These are the base points of flues. They are used for anchoring the system and construction of products. They are manufactured from stainless material. Wall mounted and free-standing types are produced. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

Wall Clamp

ØA	B	L
130	90	50 - 190
150	110	50 - 190
180	140	50 - 190
200	160	50 - 190
230	190	50 - 190
250	210	50 - 190
300	260	50 - 190
350	310	50 - 190
400	360	50 - 190
450	410	50 - 190
500	460	50 - 190
550	510	50 - 190
600	560	50 - 190
650	610	50 - 190
700	660	50 - 190
750	710	50 - 190
800	760	50 - 190

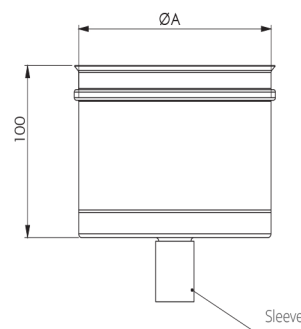


It is the supporting element that fixes flues on vertical and horizontal lines and prevents them from separating. It is installed every three meters. It is produced from stainless products. There is no wall option. It is produced according to exterior wall measurement.

DOUBLE-WALLED FLUE SYSTEMS

Condensation Tank

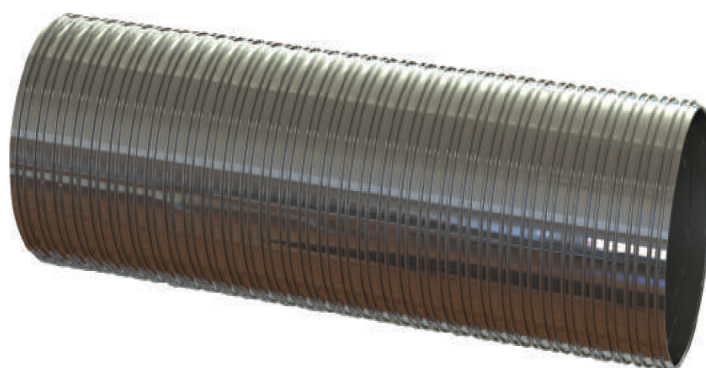
ØA	B
130	80
150	80
180	80
200	80
230	80
250	80
300	80
350	80
400	100
450	150
500	150
550	150
600	150
650	150
700	150
750	150
800	150



It is used for collection and transfer of condensate in flues. It is installed vertically below the inspection cover. It can be used horizontally on cascade systems. 304 and 430 grade material can be used as coating sheet on double walled systems. Insulation thickness is 25 mm as standard. However, it is also produced with special dimensions.

Double Walled Flex

80
100
130
150
180
200
230
250
300
350



ACCESSORY MODULES

Flex adaptor

ØA	B
80	80
100	100
130	130
150	150
180	180
200	200
230	230
250	250
300	300
350	350



Reduction

ØA	B
80	130
100	150
130	180
150	200
180	230
200	250
230	280
250	300
300	350
350	400



ACCESSORY MODULES

Connector

ØA	B
80	80
100	100
130	130
150	150
180	180
200	200
230	230
250	250
300	300
350	350



Roset

	L	D
80	110	180
100	110	200
130	110	230
150	110	250
180	110	280
200	110	300
230	110	330
250	110	350
300	110	400
350	110	450



ACCESSORY MODULES

Guy Braket

	L	P
80	30	5
100	30	5
130	30	5
150	30	5
180	30	5
200	30	5
230	30	5
250	30	5
300	30	5
350	30	5

