

ROTEX System 70: The floor heating with individual temperature design.



ROTEX System 70: Energy-saving cosiness with floor heating and radiators.



ROTEX

Floor heating or radiators?

A contemporary building needs both.

A fundamental decision

Radiators, floor heating or both? This question needs to be asked relatively early on when planning your house, apartment or building.

A fundamental decision which in effect, can not be changed at a later date.

The choice of the heating surface fundamentally affects the room, window and wall layout of your new home. Rooms bathed in light with large windows, space for creative ideas for living and a pleasant room climate make you feel good in your home.

ROTEX System 70

- Free choice of heating surface
- A common water distributor i.e. a single riser, one pump, one distributor
- Heating and cooling
- Ideal for renovation applications

Today, the trend in living area heating is clearly towards combined systems containing both floor heating and radiators. Specific allocation of heating surfaces to meet the needs of different rooms, thus achieving the

highest levels of living comfort and room climate.

Until now, the combination of radiators and floor heating was a costly matter.

Not an expensive luxury

Using the ROTEX developed heat distribution system, ROTEX System 70, the floor heating and radiators are operated at the same flow temperature. The surface temperatures of the floor and the radiators correspond to current normal values.

All the costs and expenditures which were previously required for the combination of floor heating and radiators are no longer needed.

New possibilities when choosing the heating surfaces

In single family and two-family houses radiators are primarily desirable in bedrooms and children's rooms, attic rooms and cellar areas. In living rooms and dining rooms, in the kitchen and in the bathroom a combination of floor heating and radiators is preferred.

Heating and cooling

ROTEX System 70 not only provides cosy heat, but also provides gentle cooling in the summer. Just a few additional components make a floor cooling system out of the floor heating system.

ROTEX System 70 – good heat!

- Free choice of heating surface in every room - just floor heating, radiators or both
- Individual room layout
- Maximum safety because of the double-walled heating pipe
- Healthy, cosy heat
- Gentle cooling
- Simple, variable temperature control
- Energy-saving operation
- Good value when purchasing

This is how it works

ROTEX System 70 offers the combination of radiators and floor heating with just one water distribution, one riser, just one distributor and, above all, just one circulation pump. ROTEX System 70 is a low temperature heating system. The maximum flow temperature can be up to 80 °C, i.e. floor heating and radiators can always be operated at the same water temperature. Instead of 80/70 °C, the System 70 is generally designed to have a maximum temperature 70/50 °C or 55/35 °C. The water temperature of the floor heating depends entirely on the design temperatures selected for the radiator.





Comfortable climate by individual temperature design.

Individual temperature design – what is that?

In floor heating the floor becomes the heating surface. Since the floor temperature is slightly higher than the room temperature, heat is transferred from the floor to the room. This means that the room is heated through the floor.

The distribution of the floor surface temperature is very important in this case.

An optimum room climate is achieved by using a lower temperature in the areas where you spend your time and a slightly higher temperature at the edges and next to the outside walls. This targeted temperature distribution can only be implemented using standard floor heating in a limited fashion.

ROTEX System 70 offers a significant speciality in this regard:

The surface temperature of the floor can be increased by laying the heating pipes closer together. The higher feed temperature of the ROTEX System 70 means that this effect is considerably more pronounced than with a normal floor heating system, which normally operates at 35 to 50 °C. This allows the distribution of the surface temperature to be matched to the individual requirements.

We call this: "Individual temperature design" (ITD)

In this way a room with a heat requirement of e.g. 65 W/m² can be heated, instead of a uniform floor temperature of 25.6 °C. It can be heated to 24 °C in the living areas and 29 °C in the area of the external walls using individual temperature design using System 70. The room climate created in this way is sensed in a particularly pleasant way especially since the radiation to colder outside surfaces is compensated for by the slightly higher floor temperatures. The individual temperature design offers comfort which you will not want to miss.

Free choice of floor covering

The floor needs to fulfil the same functions as an unheated floor as well as providing the heating surface function: it needs to carry loads and gives the room its own character.

The chosen floor covering has an influence of the heat emitted by the by the floor. If the floor covering is changed after a few years or e.g. a carpet is laid, this has an effect on the room temperature with normal standard systems.

The special function of the ROTEX DUO pipe means that the effects of the individual measures are considerably less pronounced than with standard floor heating. This means that, if you change the floor covering or if you add a carpet at a later date, with the System 70, the influence on heat emission is generally so low that it can be disregarded.



The room temperature control automatically provides for the minimum temperature adjustment needed for the floor heating.



System 70 – the rapid floor heating system

Floor heating is always considered to be slightly slow to react. This is prejudice that arose from when floor heating was frequently operated without single room control systems.

But the ROTEX System 70 can be regarded as a particularly quick-reacting floor heating system. There are two reasons for this:

1. The slightly higher water temperature in the System 70 permits the transmission of higher heat outputs which then heat the floor and the room more quickly.
2. The considerably lower water content means that the mass to be heated is reduced and the reaction is therefore quicker

A room which is heated with the System 70 can be heated in a relatively short period of time. The high radiation constituent of the System 70 means that the room temperature is considered to be very comfortable even though it may be under the target temperature.

For the case where immediate heat gains reach the room to be heated by e.g. sunshine, by persons or by lighting, the System 70 reacts practically without delay by the so-called self-regulating effect: as soon as the room temperature rises, the heat emission from the floor heating falls as a result of the reduced temperature difference between the floor and the room.

This self-regulating effect prevents excessively high room temperatures.

In addition, the room temperature control system ensures that the heat supply to the floor is reduced or stopped, thus effectively saving heating energy.

This self-regulating effect heats the room up again immediately if the temperature falls too much.

Persons with house dust allergy can breathe deeply

Around six percent of all people suffer from house dust allergy.

When building a new house you should make the living areas as allergen-free as possible from the outset.

The ROTEX floor heating helps keep allergens to a minimum. The environment is not heated by the circulation of air, but rather by radiated heat. This method of operation means that virtually no dust circulation is created by the floor heating, which is of considerable benefit to all of us with house-dust allergies. In carpets, floor heating reduces dampness and thus removes the fundamental elements for life for the house-dust mites.



Cosiness in the whole house.

This sample house makes clear how simple it is to combine floor heating and radiators with the System 70.

Attic floor:

Radiators in the bedrooms and children's rooms.
In the bathroom we combine floor heating with a towel rail.



Ground level:

floor heating in all rooms.
There is an additional radiator in the dining area.



Basement:

Hobby and storage rooms and workroom are equipped with radiators.
This permits rapid heating of the room temperature even if the room is required at short notice.



ROTEX System 70:

Best rating by the Energy Saving Regulation (EnEV).

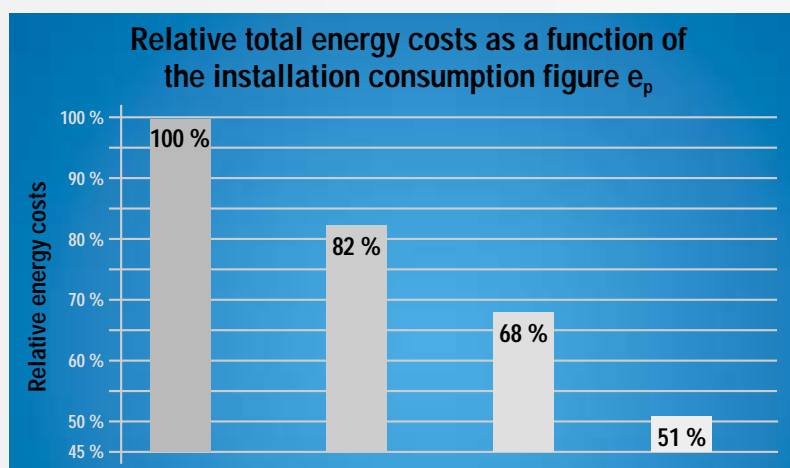
The energy saving regulation - EnEV - is a European legal directive from the Federal Government. It determines the maximum heat consumption of a house. This directive calls for an energy requirement level for new construction of around 25 - 35 % less than the heat protection directive of 1995.

In future, the background of this directive will be based on the normal design temperature at 55/45 °C. The low water temperatures and the lack of an additional circulation pump mean that the ROTEX System 70 gets an optimum rating from the EnEV. This applies both for new construction and for plant replacement.

Floor heating and condensing technology

System 70 is a low-temperature heating system with freely selectable design temperatures. It is intrinsically energy-saving and economical because only one water distribution system is required. The energy consumption is even more economical when combined with condensing technology:

If the System 70 operates with a condensing boiler (oil or gas), you will save energy and you will protect both the environment and your wallet. The high levels of efficiency of the condensing technology are produced by the low return temperatures, the heat from the flue gases and above all the condensate heat which is used for the heating.



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|---|--|--|--|
| | | | |
| Low temperature heating boiler, heating radiators 55/45 °C and floor heating 35/28 °C (two separate circuits, two circulation pumps) $e_p = 1,88$ | Condensing heating boiler, heating radiators 55/45 °C and floor heating 35/28 °C (two separate circuits, two circulation pumps) $e_p = 1,54$ | Condensing heating boiler, ROTEX System 70 floor heating and heating radiators 55/45 °C (one common heating circuit, just one circulation pump) $e_p = 1,28$ | Condensing heating boiler, ROTEX System 70 floor heating and heating radiators 55/45 °C (one common heating circuit, just one circulation pump) and solar energy utilisation for hot water and heating $e_p = 0,96$ |

That is to say, the System 70 operates e.g. at a temperature pairing of 55/45° C all year round in the condensate range and thus ensure optimum utilisation of the heating energy.

Heat pump – renewable energy

The advantages of the ROTEX System 70 can also be utilised in an unlimited fashion in combination with a heat pump. The type of heat pump is irrelevant.

Irrespective of whether it is an air/water, water/water or ground source heat pump, System 70 can be combined with any type of heat pump if it is capable of providing the required system flow temperature under design conditions.

The structure of the system.

The system plates

The ROTEX System 70 floor heating is created using system plates.

The advantages:

- Even temperature profile by precise pipe direction
- Complete enclosure of the heating pipe with screed
- Good levels of heat insulation to the substrate
- Excellent impact sound damping properties
- Easy to lay
- Environmentally friendly - PCB free and completely recyclable

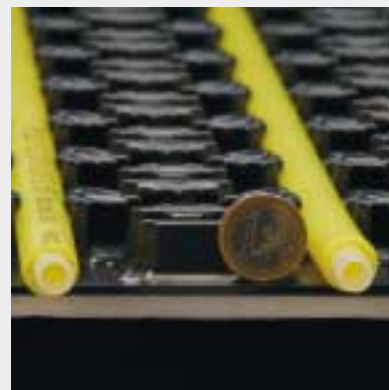
The system plates are available in two different versions:

1. Protect
2. Protect mini



System plate Protect

The Protect system plates are formed in two layers. The heat and impact sound insulation is provided by polystyrene as are the bubble cores. The upper cover layer is made from deep-drawn grey polystyrene. This polystyrene cover layer extends in the longitudinal and lateral directions so that it overlaps the adjoining system plate. This produces a tight seal which is maintained even if free flowing screeds are used.



System plate Protect Mini

The entire surface is capable of extreme loading. It can be walked on many times without damaging the plate.

For apartment separation ceilings, the Protect-Integral 33-3 with integrated heat and impact sound insulation is used. Where low thickness levels are required or if the building already has insulation, Protect 10 without impact sound insulation is used.



Screed

DUO 17 heating pipe

Protect system plate



The heating pipe

The heart of the System 70 is its specially developed DUO-17 pipe. It consists of a water carrying PE-X internal pipe which is surrounded by a webbed sleeve. The special feature of the DUO 17 heating pipe is its structure. The air gap surrounding the water carrying pipe serves as an exactly defined heat insulation which allows the System 70 floor heating to operate with considerably higher feed temperatures than in normal systems. This means that the floor heating and radiators can be operated at the same water temperature.

Thus, just one heating circuit is required in the ROTEX System 70 whilst other systems need an additional water distribution system.

The DUO 17 heating pipe is used in the System 70 both for the floor heating and for the connection of heating radiators.

In addition, the webbed sleeve of the DUO 17 heating pipe provides additional safety during installation and operation.

The DUO pipe programme

4 versions of the DUO pipe were developed for the various applications.

1. DUO 17

Dimensions:
 Inner pipe: PEX 12x2.0 mm oxygen non-permeable, webbed sleeve pipe: PE 17 mm
 Application: floor heating and radiator connection
 Use: floor heating and surface cooling of all types

2. DUO 17 AL

Dimensions:
 Inner pipe: PEX/Al 12x2.0 mm oxygen non-permeable, webbed sleeve pipe: PE 17 mm
 Application: Primarily for connection of heating radiators and as heating pipe on System70 Secco.

On the DUO 17 AL pipe, the inner pipe is surrounded by an additional aluminium covering layer. The dimensions and thermal technology properties are identical with the DUO 17 pipe.

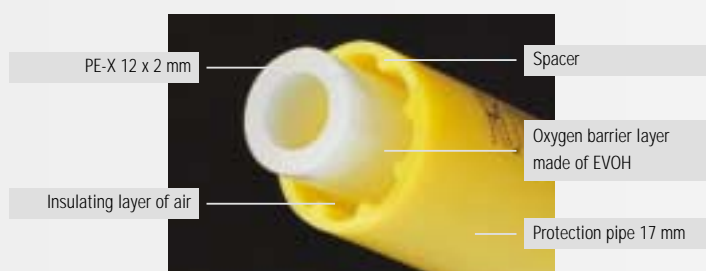
The aluminium layer allows the DUO 17 AL pipe to be permanently shaped to the desired shape by hand. It is therefore ideal for the connection of heating radiators and for the ROTEX System 70 secco.

3. DUO 13

Dimensions:
 Inner pipe: PEX 9.5x2.1 mm oxygen non-permeable, webbed sleeve pipe: PE 13.5 mm
 Application: Floor heating and wall heating
 Use: specially low fitting height, ideal in renovation and extensions in existing buildings

4. DUO 25

Dimensions:
 Inner pipe: PEX 18x2.0 mm oxygen non-permeable, webbed sleeve pipe: PE 25 mm
 Application: Floor heating
 Use: Large areas, such as e.g. industrial and storage halls, open areas, lawn heating



ROTEX System 70:

Simple integration of heating radiators.

Heating radiator connection

The System 70 allows all types of radiators to be connected.

A continuous length of pipe from manifold to radiator dispenses with joints in the wall or floor.

The ROTEX DUO 17 AL heating pipe is connected directly to the radiator valve. In the visible area, the water-carrying pipe is protected from light and mechanical damage by a metal pipe. This connection technology allows the connection of all types of radiators. Both connections from the wall and from the floor. The use of radiators with integrated valves is no problem at all.

Heating radiator connection with DUO 17 AL

It is preferable to connect radiators using the DUO 17 AL since this pipe does not need pipe brackets for securing in position.

The radiators are either connected individually to the manifold distributor or via a central supply pipe (Ø 16 or Ø 20 mm), which is laid in the proximity of the radiators.

The radiators are connected using the installation system VA®. ROTEX VA® this is a push-sleeve installation system made entirely of plastic. Fittings and push-sleeve are made of

high efficiency plastic.

This type of connection saves on distribution connections and reduces the space and piping requirement.

The DUO 17 AL pipe is used again for direct connection of radiators.



Bending the pipe by hand



Radiator connection to VA® system

Valve radiator connection from the wall.



Valve radiator connection from the floor.



Classic connection from the wall.



Valve radiator connection from the wall.



Individual control and distribution of heat and cold.

Electronic room temperature control

In rooms which are heated only using floor heating the room temperature is controlled by an electronic single room controller.

In rooms which are equipped with floor heating and radiators, all heating surfaces are controlled together by a room temperature controller. This provides maximum comfort at minimum energy consumption.



Made-to-measure for you

In order to adapt the special properties of System 70 to your wishes and requirements we need a few basic details. Using this information we would be pleased to carry out a System 70 design for you. This will provide you with the optimum arrangement of floor heating and radiators, if required, for each room.

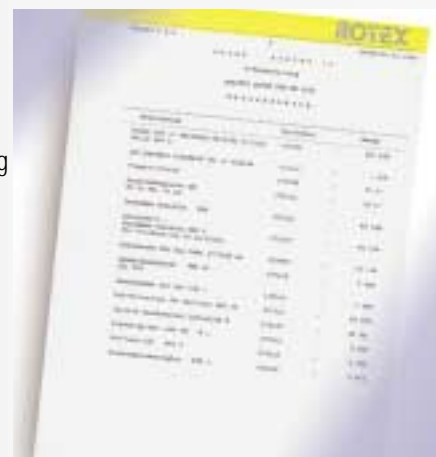
The project design of the ROTEX System 70 installation needs a few fundamental details which are shown in the following checklist with bullet points:

- Type of building (residential house office building etc.)
- Location drawing
- Building drawing (outline plan with side sectional views)
- Wall structures (materials, layer thickness levels)
- Design temperatures for the individual rooms
- Floor cover proposed (possibly heat conductivity)
- Location of the manifold distribution cabinet
- Location of the room temperature controller

Using this information the heat requirement of the building will be calculated in accordance with DIN EN 12831.

On the basis of this, the heating circuits for each room are laid out and, at the same time, the hydraulic balancing of the individual heating circuits with respect to each other is carried out.

The computer printout provides, in addition to the spacing of the pipes, the number of system plates and all other parts required, such as manifolds with clamping ring sets and edge insulation strips.



Materials list for the floor heating



Floor heating balance



NEW: System 70 mini – the ideal floor heating system for modernisation.

Retrofitting floor heating – simple and quick

When modernising existing buildings, one often wishes to incorporate floor heating.

The raising of the floor level involved and the heating water temperature of the existing heating system often make it very extensive, expensive and even impossible in certain cases.

The ROTEX System 70 mini provides the solution: The DUO 13 pipe which was developed specially for this application permits the implementation of floor heating areas with very shallow depths.



The System 70 mini incorporates all the advantages of the System 70. This means that the floor heating can be connected directly into the existing heating network without the floor being over-heated.

Additional mixer devices are not required. It is a proper floor heating system with no technical compromises which, in contrast to systems with return temperature limitation, provides balanced surface temperatures in the whole room.

Small and flexible – the Combi-Box

A combination distributor, developed specially for this application, allows up to two floor heating circuits to be directly connected with a radiator.

This means that the combi-distributor for the floor heating can be integrated directly in the connection area of the radiator, i.e. behind the radiator, in the wall. This allows practically invisible retrofitting of floor heating without a great deal of expenditure, primarily where there are existing radiators.

The radiators and floor heating are then controlled by a common controller, thus providing optimum room temperature control.

Minimum height – 29 mm

The ROTEX Protect mini solo carrier element can be fixed with special adhesive on exposed screed or even directly onto tiles or other stone flooring.

The DUO 13 pipe is then laid onto the carrier element. The special screed can then be laid with a very thin layer of screed coverage.

The minimum depth of the System 70 mini is 29 mm on top of the insulated plate.



ROTEX System 70 - on the floor and on the wall.

ROTEX System 70 secco – the drying system

ROTEX System 70 secco is a floor heating system which is produced entirely in a dry manner. The DUO pipe is laid in heat conducting elements which distribute the heat evenly.

Instead of the usual wet screed, dry screed elements are added. These are then glued and screwed at the joints.

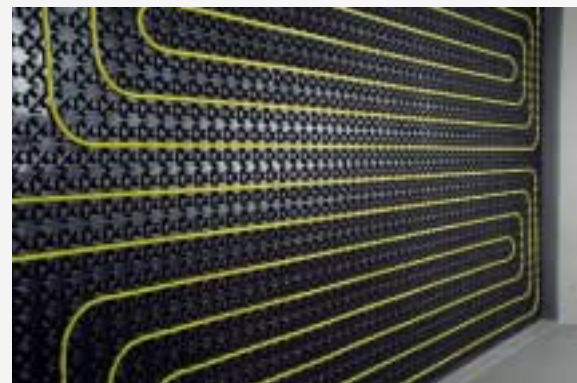
The great advantage of this system is that the final floor covering can be applied after 24 hours.



Wall heating

ROTEX System 70 mini can also be used as wall heating. The DUO 13 pipe has the advantage that the wall heating can be directly connected into the existing heating network, without the danger that excessive surface temperatures are produced on the wall to be heated. The DUO pipe effect, as a result of the insulating effect of the webbed jacket pipe, ensures that the higher water temperatures are reduced accordingly. This produces very pleasant wall heating surface effects with a large proportion of heat radiation.

Wall heating is often used where floor heating is not possible for building reasons, or where the floor area is not large enough to provide adequate room heating. Partial wall heating sections e.g. in a bathroom can provide especially cosy heated areas, and this means that additional radiators can be omitted.



ROTEX System 70 secco: Dry structural system



ROTEX System 70 - floor heating that also provides cooling.

ROTEX System 70 – surface cooling

The ROTEX System 70 floor heating is particularly suitable for surface cooling in the summer.



In this application, the ROTEX System 70 provides the same advantages as it does in heating mode.

The use of the ROTEX DUO pipe means that the surface cooling can be operated at a slightly lower water temperature than when using a normal floor heating pipe.

At this 6 to 8 K lower water temperature, the room air conditioner of the room air can be operated directly.

This means that the required air cooler can be directly connected to the same heating circuit distributor as the floor heating or cooling. This involves the omission of the otherwise required second water circuit, the second circulation pump and the second water temperature control.

Gentle cooling

Because of the slightly lower water inlet temperature, the System 70 allows a larger spread between flow and return to be selected. This reduces the water flow and thus the pump output required.

The water transition resistance in the DUO pipe markedly reduces the influence of different floor coverings on the surface temperature and thus on the cooling capacity. This means that the danger of a interstitial drop below the dew point is extremely small.

This system controlled speciality causes the ROTEX System 70 surface cooling system to react in a relatively insensitive manner to control-governed temperature variations in the cold water temperature.



Two in one

The double use of System 70 as a heating surface in the winter and as a cooling surface in the summer mean that the necessary additional investment is kept to a minimum.

This involves the use of a central cooling water set which e.g. can be installed directly in the boiler room. In the individual rooms to be cooled, additional room air conditioning units must be used for air dehumidification with condensate drain.

In heating mode, these can also be used as a heating surface so that additional radiators are not required.

It is also important to use the RTK 1 room controller. This provides the facility of switching rapidly between heating and cooling simply by the use of a selector switch.

ROTEX System 70: Optimum heating - optimum cooling.

ROTEX System 70 – good heat!

Extremely versatile

The free choice of heating surface opens up new possibilities in room planning:

- Only floor heating
- Combination of floor heating and radiators
- Only radiators
- Surface cooling

Also suitable for large areas

For large areas, e.g. industrial or storage halls, foyers, sports halls etc. the System 70 Industry with DUO 25 heating pipe (25/18 x 2) is used. Both types of pipe can be combined in an installation.



Simple consumption evaluation

System 70 needs only one heat volume meter per living unit in order to determine and record the total heat consumption of all heating surfaces - both floor heating and radiators. The System 70 can also be used for floor heating in houses with multiple occupancy and in blocks of apartments without any problems and without large costs.

Economical

The direct combination of radiators and floor heating provides particularly favourable room temperature control properties and thus gives good remote heat utilisation.

In addition, you will save valuable electrical power and hard cash since only one circulation pump is required.



Safe

System 70 is conceived so that the number of connection points is minimised and so that connections in the wall or in the screed are completely avoided. The pipe is extremely sturdy by virtue of the favourable diameter-wall thickness ratio of the water-carrying inner pipe.

Tested

The heat capacity of the floor heating of the System 70 were tested in accordance with DIN EN 1264 at the University of Stuttgart, IKE Dept. HLK.



The heating pipe used is tested to DIN EN ISO 15875 and meets the requirements of DIN 4726.

The system plates of expanded polystyrene are tested to DIN EN 13163. The impact sound insulating properties have been tested at the

Fraunhofer-Institute for Constructional Physics in Stuttgart. The values stipulated in DIN 4109 were exceeded in the tests.



Enjoy energy savings: ROTEX - The heating system with a future.

Cosy heating and hygienic hot water make a house a home.

Energy is becoming more and more precious and expensive. An energy saving heating system can increase personal comfort and save energy at the same time.

You are therefore investing in the future today. The potential for energy saving in heating systems is enormous and has an effect for decades.

ROTEX, the heating system of the future, incorporates energy components which are perfectly matched to each other.

- Condensing boilers for oil and gas
- Hygienic high-efficiency hot water storage tank
- Pressure-free and environmentally friendly solar installations
- Floor heating and radiators using just one water distribution system
- Odour-blocked safety storage tank
- An interconnecting plastic installation system for sanitary and heating applications

Further information can be obtained from www.rotex.de

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