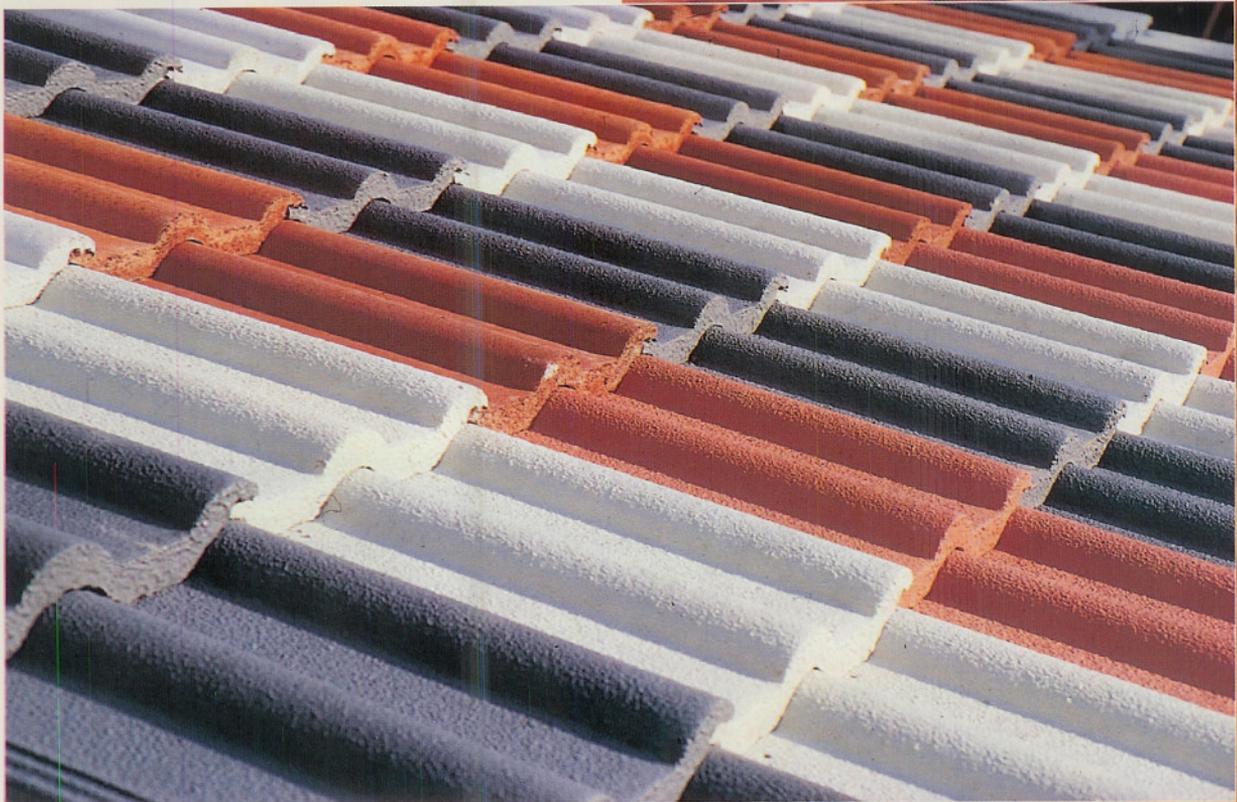




*Colours Can Touch On Your Head*



*SERAPER Coloured Natural Perlite Building Coverings*

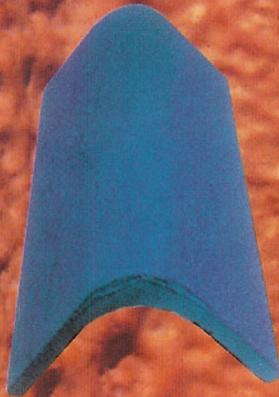
- \* SERAPER Roof Covering*
- \* SERAPER Wall Covering*
- \* SERAPER Floor Covering*



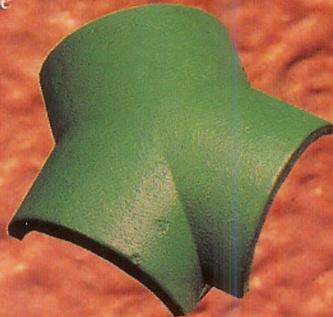
Roof Covering



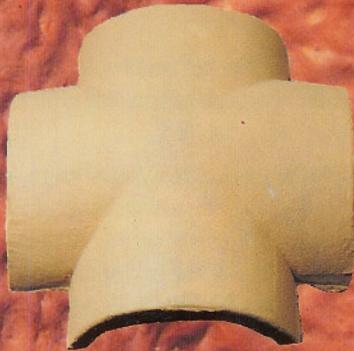
Wide-Angle Ridge



Acute-Angle Ridge



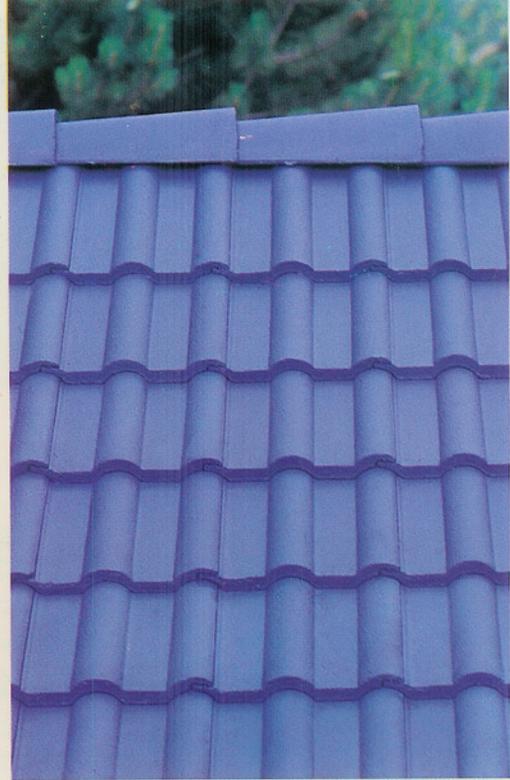
Special Three-Piece Combination Element



Special Four-Piece Combination Element



Special Corner Combination Element



# SERAPER

Concrete roof covering elements have been used successfully in Europe since 1920. SERAPERs, which are produced by Doğusan Inc. in Erzincan, constitute a very special type of concrete roof covering element since natural perlite is used instead of sand.

The paste used in the production of SERAPER is composed of "natural perlite" aggregate, that is to say, volcanic glass. The SERAPER mortar substantially included 75-80% silica. This makes SERAPER distinguished among others.

It functions in isolation against heat and cold satisfactorily. All the performance tests have resulted positive even below 48 C degree.

According to the results of the experiments made by the Ministry of Public Works and Settlements-Structure Laboratory, the value of the heat conductivity of alumnious SERAPER is 0,55 Kcal/Mh °c.

On the other hand, the value of the heat conductivity of the soil tile is accepted to be 0,85 Kcal/mh °c. SERAPER is 54% less conductive than the earthen tile. The average pressure resistance is 260 Kgf/Each The breaking resistance after frost goes up by 280 Kgf/Each.

SERAPERs are not similar to one another but totally the same. They are not deformed and are in exact form and measures having international standards.

They can be used in the roof slope from 10 to 75 degree.

In one square meter roof covering, they are average 5 kilograms lighter than the earthen tile, and they achieve 0.022 cubic meter economy. When installed onto the lathes of 30 mm dimensions, no support is needed at the bottom wood and the cover underneath the skeleton of the roof cover. 8 SERAPER Roof Cover elements are tied with a hoop. Furthermore, they are hooped and packed in 6 piles.

Later, these packages are packed in large parcels with the latest model pallet unit.

TYPE OF COVER MATERIAL	UNIT VOLUME MASS (kg/m <sup>3</sup> )	CALCULATION VALUE OF HEAT CONDUCTIVITY (Kcal/mh°C)
Earthen Tile	1800	0.85
Copper	8900	327
Aluminium	2700	172
Seraper With Alum	1724	0.55



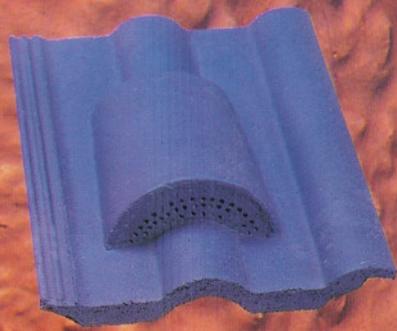
# SERAPER

- \* No maintenance
- \* No dust, no dirt
- \* Easy and rapid application
- \* Heat and water-proof
- \* 50 years life long

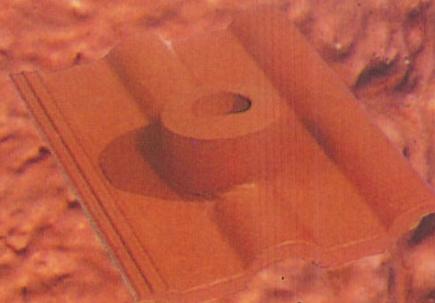


" White to black, all the colours of light have been produced in SERAPERs in DOĞUSAN plants... "

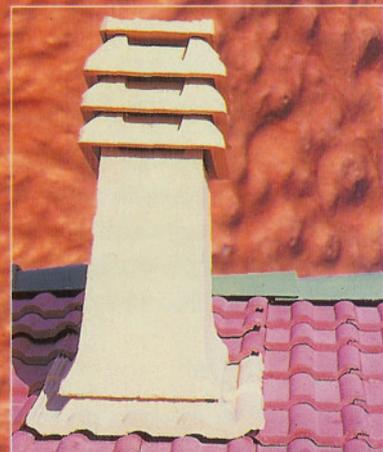
<b>SERAPER ROOF COVER</b>	1 sq.m. Cover Area	10 each/sq.m.
	1 sq.m. Cover Weight	42 kg/sq.m.
	Roof Slope	10-75 degrees
	Overlapping Space Lengthwise	105 mm.
	Length	420 mm
	Width	330 mm
	Thickness	13 mm
	Unit Weight	4.2 kg/each



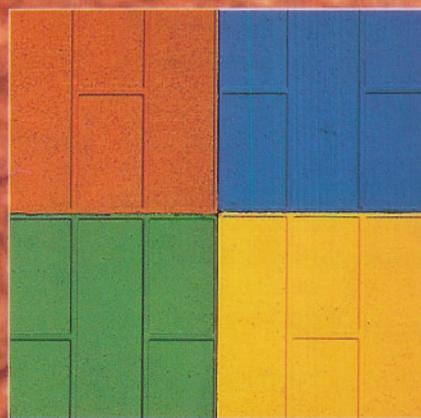
Ventilation Element



Television Antenna Pedestal



Chimney



Wall Covering



Floor Covering

## Wooden Roof Construction

Getting the best result with SERAPER roof covering depends on a well arranged construction of roof carcass. The following should be done in order to place the SERAPERs in a correct way and to achieve the desired quality of the roof construction:

- \* Vertical-square timbers should be cut at the same level and fixed onto the floor.
  - \* Purlins should be placed onto the columns in such a way to prevent bending.
  - \* Beams should be fixed strongly to the purlins in equal distance.
  - \* If the roof surface will not be coated with wood completely but will be arranged with lathes; the distance between lathes should be determined after deciding the length of overlapping portions of SERAPERs as illustrated in the tables and lathes should be nailed to the beams at equal spaces.
  - \* Ends of the beams corresponding to the eaves should be cut vertically so as to let water flow into the grooves and cornices should be nailed.
  - \* Since the SERAPERs will be lined up starting from the eaves, the first row of SERAPERs should be placed in a way to pass the roof eaves by 7 cm.
  - \* Last lath to be installed nearest the roof ridge should be placed 3 cm. lower than the beam ends.
- The positive result will be obtained for a roof which is built in accordance with the conditions specified here.

During the application of SERAPERs onto the roof, trained personnel can be asked from the agencies to assist.

## Placing the SERAPERs onto the Roof

\*To place the SERAPERs in regular vertical lines, it is necessary to start this work from the right-hand bottom corner. They are placed to the left-hand side as far as possible so that the next row can be put over the other.

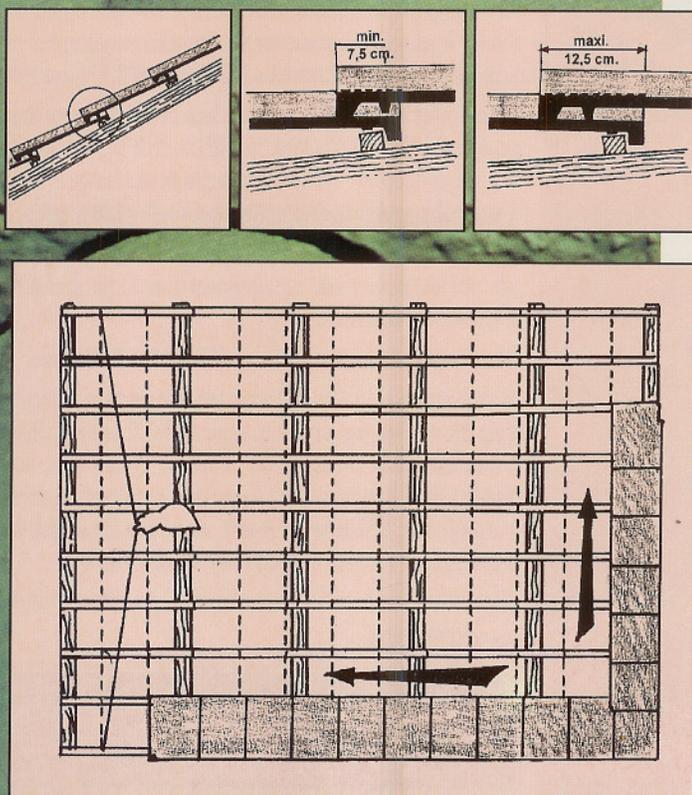
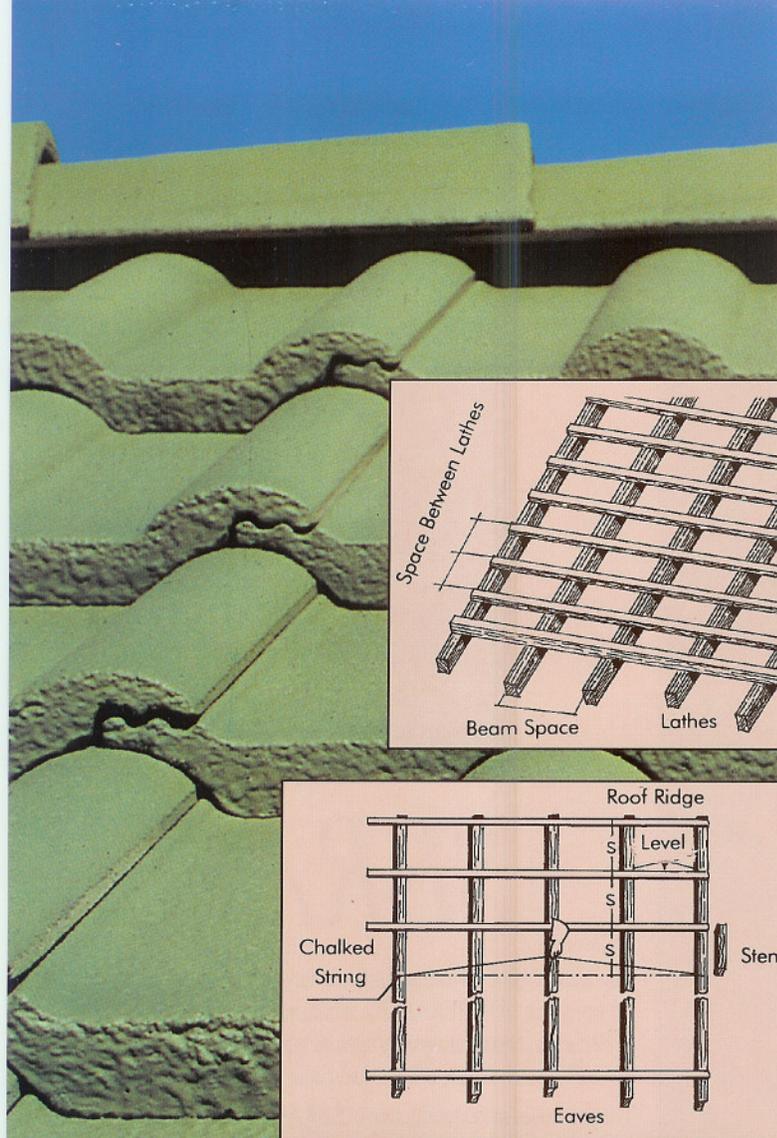
\*Each SERAPER is placed from the each vertical row up to the bottom of the skirts and to the top end to cover the previous one.

\*To achieve a proper placement, the first horizontal row is completed when reached to the end of left-hand side and this process of placement is ended by rowing from the farthest right to the farthest left-hand side. Thus, the SERAPERs to be placed onto the other sections of the skirts are controlled and the overall work is completed.

\* In order to determine the horizontal lines perfectly, a track is produced with a chalked string considering the points to be marked. The far edges of the SERAPERs are brought to the same level with these lines.

\* If desired, all the SERAPERs can be nailed onto the roof separately. This is important for the safety of the roof.

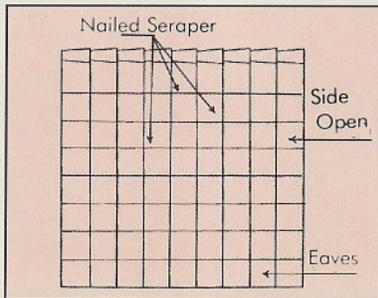
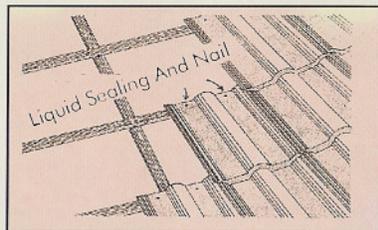
\* The characteristic of the SERAPERs to be clamped with one another provides efficient protection against adverse weather conditions such as strong winds, rain and snow.



# Nailing SERAPERs

In order to be able to nail SERAPERs onto the roof, two nailing holes are made on each SERAPER.

With a light blow onto the nail with a hammer, 2 mm mortar at the bottom base of the hole is broken and the nailing hole is opened completely. In this way, depending on preference, by feeding liquid sealing to the galvanized bottom part of the nail, SERAPERs are nailed one by one. The conditions under which SERAPERs can be nailed, are shown in the Table depending on the slope, configuration and rain.

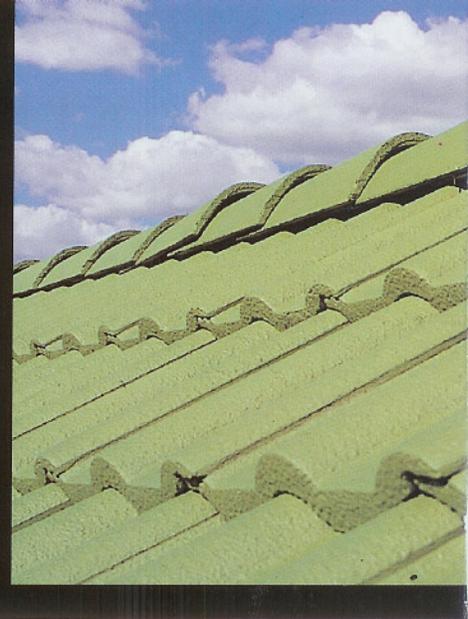


## Number of SERAPERs

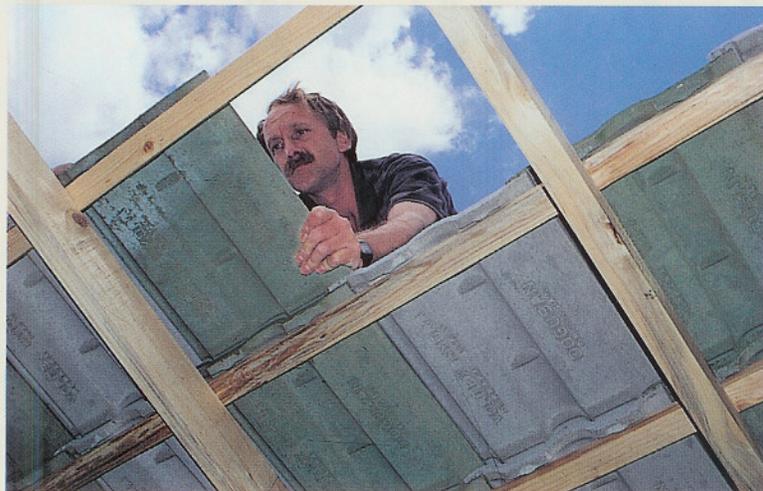
In accordance with the features of the surface to be covered, the amount of SERAPERs is determined on the basis of the slope and size of the roof as shown in Table 2.

For the calculation of the amount of the roof ridges, a minimum of 8 cm overlapping space is to be taken into account. In general, for a one meter square, 2,5 ridges are used.

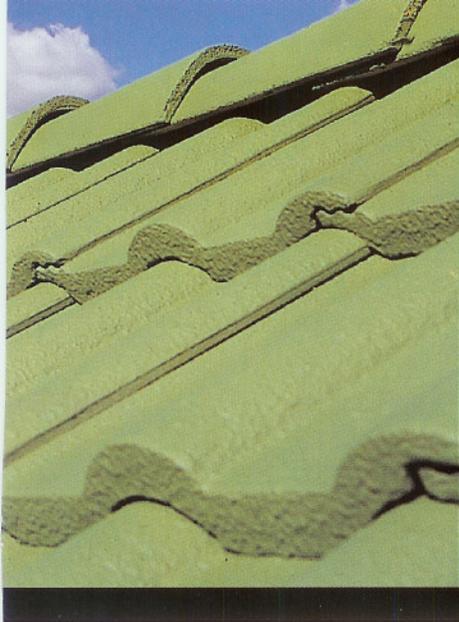
# How SERAPER is Applied?



SLOPE %	1. REGION: CHANGING RAINFALL		2. REGION: STRONG RAINFALL	
	Seraper Line is High, With eaves or Sides are Open	Seraper Part Fluid	Seraper Line is High, With eaves or Sides are Open	Seraper Part Fluid
29 a-100	All	None	All	1/5
100 a-75	All	1/5	All	All
175	All	All	All	All



SLOPE %	MIN. OVERLAPPING SPACE (cm)	SPACE BETWEEN LATHES (cm)	LENGTH OF ROOF TO BE COATED											NO. OF SERAPERs PER Sq.m.
			9	10	11	12	13	14	15	16	17	18	19	
Between 29-31	12.5	29.5	2.65	2.95	3.24	3.14	3.54	3.83	4.42	4.72	5.01	5.31	5.60	11.3
Between 31-33	11.5	30.5	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79	10.9
Between 33-35	10.5	31.5	2.83	3.15	3.46	3.78	4.09	4.41	4.72	5.04	5.35	5.67	5.98	10.6
Between 35-37	10	32	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	5.42	5.76	6.08	10.4
Between 37-39	9.5	32.5	2.92	3.25	3.57	3.90	4.22	4.55	4.87	5.20	5.52	5.85	6.17	10.3
Between 39-41	9	33	2.97	3.30	3.63	3.96	4.29	4.62	4.95	5.28	5.61	5.94	6.27	10.1
Between 41-45	8.5	33.5	3.01	3.35	3.68	4.02	4.35	4.69	5.02	5.36	5.69	6.03	6.36	9.9
Between 45-50	8	34	3.06	3.40	3.74	4.08	4.42	4.76	5.10	5.44	5.78	6.12	6.46	9.8
Over 50	7.5	34.5	3.10	3.45	3.79	4.14	4.48	4.83	5.17	5.52	5.86	6.21	6.55	9.7
Seraper Row No			9	10	11	12	13	14	15	16	17	18	19	
Between 29-31	12.5	29.5	5.90	6.19	6.49	6.78	7.08	7.37	7.67	7.96	8.26	8.55	8.85	11.3
Between 31-33	11.5	30.5	6.10	6.40	6.71	7.01	7.32	7.62	7.93	8.23	8.54	8.84	9.15	10.9
Between 33-35	10.5	31.5	6.30	6.61	6.93	7.24	7.56	7.87	8.19	8.50	8.82	9.13	9.45	10.6
Between 35-37	10	32	6.40	6.72	7.04	7.36	7.68	8.00	8.32	8.64	8.96	9.28	9.60	10.4
Between 37-39	9.5	32.5	6.50	6.82	7.15	7.47	7.80	8.12	8.45	8.77	9.10	9.42	9.75	10.3
Between 39-41	9	33	6.60	6.93	7.26	7.59	7.92	8.25	8.58	8.91	9.24	9.57	9.90	10.1
Between 41-45	8.5	33.5	6.70	7.03	7.37	7.70	8.04	8.37	8.71	9.04	9.38	9.71	10.05	9.9
Between 45-50	8	34	6.80	7.14	7.48	7.82	8.16	8.50	8.84	9.18	9.52	9.86	10.20	9.8
Over 50	7.5	34.5	6.90	7.24	7.59	7.93	8.28	8.62	8.97	9.31	9.66	10	10.35	9.7
Seraper Row No			20	21	22	23	24	25	26	27	28	29	30	



*SERAPER  
does not drip,  
does not let leaking  
and is not broken  
and fallen apart*

### Overlapping SERAPERs

The overlapping space between SERAPERs have to be determined according to the slope and length of the roof.

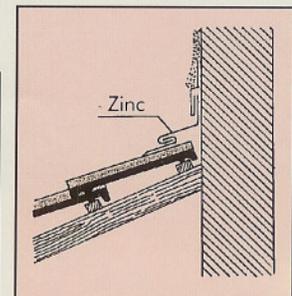
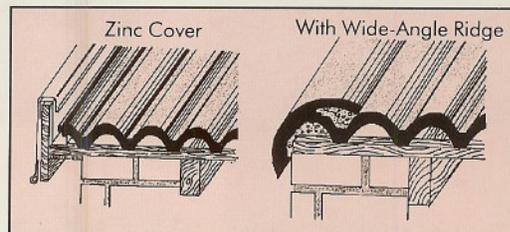
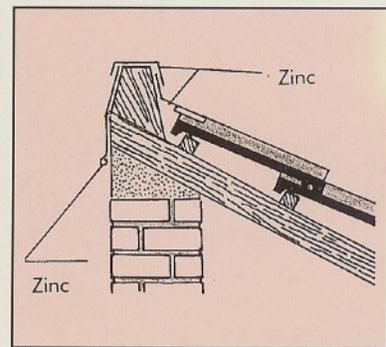
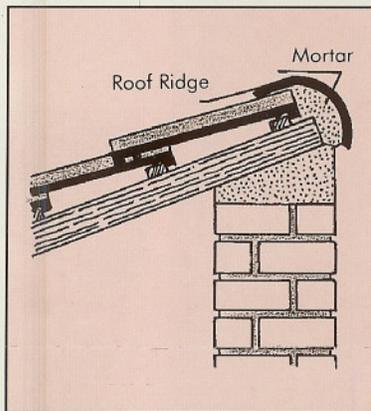
After deciding the minimum overlapping space according to the slope of the roof, the distance between the lathes on which SERAPERs will be placed is fixed accordingly.

SLOPE %		Between 29-31	Between 31-33	Between 33-35	Between 35-37	Between 37-39	Between 39-41	Between 41-45	Between 45-50	Larger Than 50
Minimum Overlapping Space (cm)	1st Region Changing rainfalls	10.5	10.5	10.5	10	9.5	9	8.5	8	7.5
	2nd Region Strong rainfalls	-	-	-	-	-	12.5	11.5	11	10.5
Distance between the lathes	1st Region	31.5	31.5	31.5	32	32.5	33	33.5	34	34.5
	2nd Region	-	-	-	-	-	29.5	30.5	31	31.5

### Wall Sides

A skirt should be produced, as illustrated in the graphic, with a 0.6 mm thick zinc on the last SERAPER which has been placed near the edges of the wall and the chimney and care should be given so as not SERAPERs touch the wall.

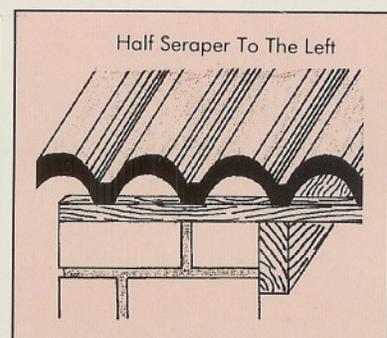
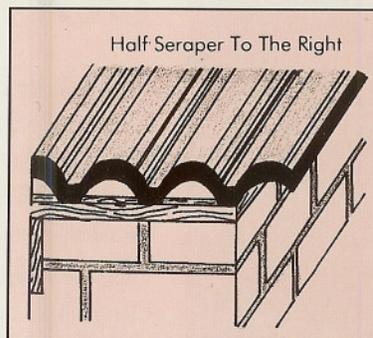
In case the end of cover comes onto a wall, a fixing is applied on the last SERAPER by using a wide angle ridge and mortar or the wall has to be covered with a zinc covering.



### Roof Sides

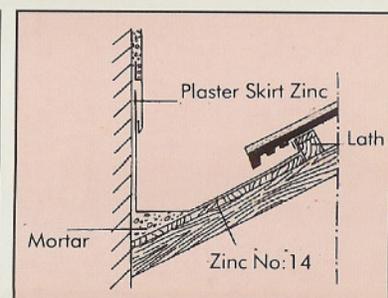
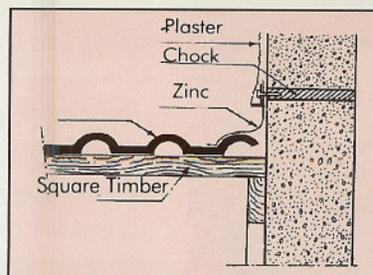
The roof sides can be covered in two ways:

- 1) The side is covered with zinc,
- 2) The side is covered with a wide angle ridge and mortar.



### Chimney and Wall Sides

If SERAPERs are to be placed next to a wall or chimney edges, they should be installed in such a way so as not to touch the wall and a zinc plaster skirt is put from the wall edge up to the first groove of the SERAPER.



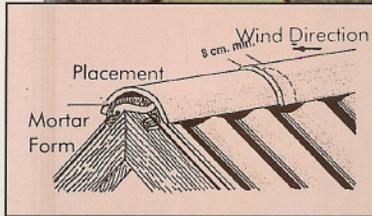
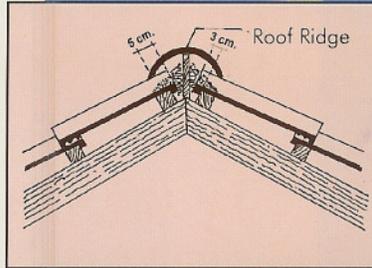
## Ridge Covering

The top lines where the roof slopes join are covered with specially designed parts (ridges).

Placement is realized by taking into account the general direction of the wind against the blowing direction of the wind.

SERAPERs and ridges are united with one another with coloured mortar suitable to their own colours.

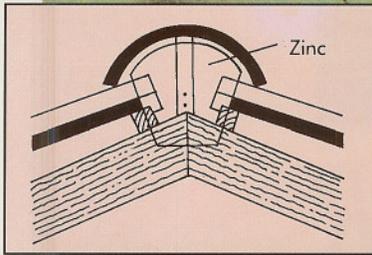
Overlapping space of ridges have to be 8 cm. The overlapping space of the ridge onto the last SERAPER should not be less than 5 cm.



## Ridge Heads

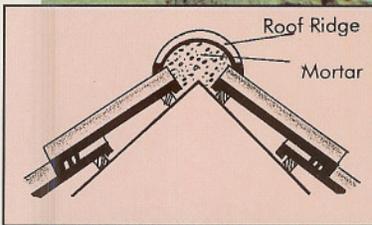
The gaps in the ridge heads at the points where the roof ends are to be filled with zinc.

If it is not possible to fill them with zinc, the ridge heads are to be covered with mortar used to unite the ridge in such a way so as not to allow the wind enter.



## Connecting with Mortar

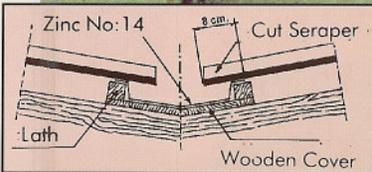
Connections of the ridges and the parts of the right and left-hand side skirts have to be fulfilled carefully with 400 dosage mortar composed of pigment mixture which is suitable to the colour of the SERAPER and the cement and sand used.



## Roof Slope

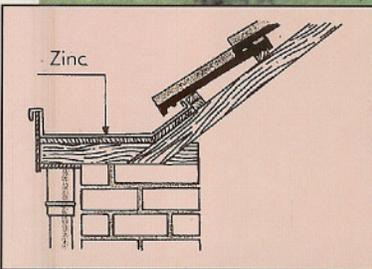
In the eaves and the roof slopes, zinc no: 14, in general, is used. Galvanized sheet is not recommended since it is affected from erosion in a short time.

The roof slope is measured to get the dimensions in line with the plaster skirt, angle of the slope and the water to accumulate.



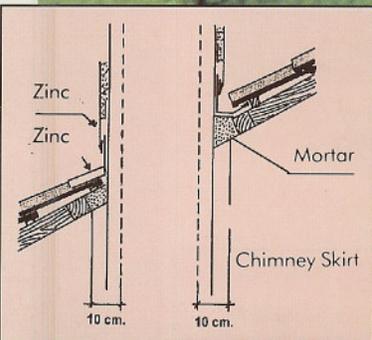
## The Groove

The roof slope or groove is built by covering the carcass system prepared beforehand with zinc.



## The Chimney Skirt

Zinc should be placed on SERAPERs at the bottom and underneath the SERAPERs at the top.



## SERAPERs Can Be Cut

During the placement of SERAPERs on the roof, it may be necessary to cut them for the purpose of fitting them into the slope and shape of the roof. The cutting work is to be done with disc saws.

The cutting work with the aim of using at the skirts or eaves, or for other purposes, is done in line with the measures taken at the very location, diagonally, by length and slope.

