

STANDARD SHAFT SEALS

VC



DESCRIPTION

The VC profile is a shaft seal composed of a single metal cage with a rubber coating and a primary sealing lip without a spring.

ADVANTAGES

- Very good static sealing
- Very good thermal expansion compensation
- Greater roughness is allowed in the housing
- Reduced risk of corrosion
- Sealing for high viscosity fluids
- Primary sealing lip generating low levels of friction and heat

APPLICATIONS

- All types of rotative applications
- Machine tools
- Agriculture
- Construction
- Transmissions
- Gear boxes
- Motors
- Pumps

MATERIALS

Rubber

- ACM 70 - 75 Shore A
- EPDM 70 - 75 Shore A
- FKM 70 - 75 Shore A
- HNBR 70 - 75 Shore A
- NBR 70 - 75 Shore A

Metal cage

- Steel - AISI 1010

SEAL DESIGN

Tolerance for the outside diameter of the seal ($\varnothing D$)

Bore diameter $\varnothing D1$ (mm)	Apparent metal cage	Rubber coating	Coating with grooves
$\varnothing D1 \leq 50.0$	+0.10 / +0.20	+0.15 / +0.30	+0.20 / +0.40
$50.0 < \varnothing D1 \leq 80.0$	+0.13 / +0.23	+0.20 / +0.35	+0.25 / +0.45
$80.0 < \varnothing D1 \leq 120.0$	+0.15 / +0.25	+0.20 / +0.35	+0.25 / +0.45
$120.0 < \varnothing D1 \leq 180.0$	+0.18 / +0.28	+0.25 / +0.45	+0.30 / +0.55
$180.0 < \varnothing D1 \leq 300.0$	+0.20 / +0.30	+0.25 / +0.45	+0.30 / +0.55
$300.0 < \varnothing D1 \leq 500.0$	+0.23 / +0.35	+0.30 / +0.55	+0.35 / +0.65
$500.0 < \varnothing D1 \leq 630.0$	+0.23 / +0.35	+0.35 / +0.65	+0.40 / +0.75

Roundness tolerance

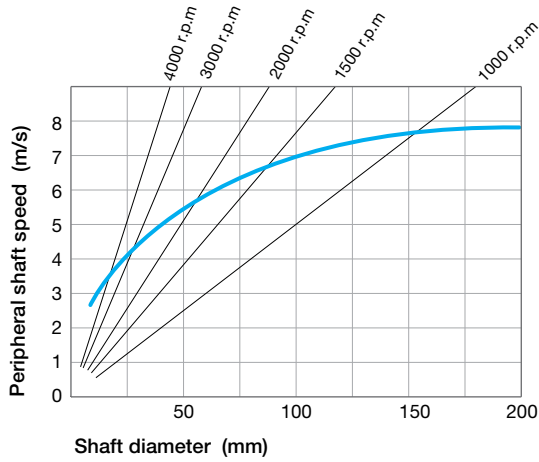
Bore diameter $\varnothing D1$ (mm)	Apparent metal cage	Rubber coating
$\varnothing D1 \leq 50.0$	0.18	0.25
$50.0 < \varnothing D1 \leq 80.0$	0.25	0.35
$80.0 < \varnothing D1 \leq 120.0$	0.30	0.50
$120.0 < \varnothing D1 \leq 180.0$	0.40	0.65
$180.0 < \varnothing D1 \leq 300.0$	0.25% of the outside diameter	0.80
$300.0 < \varnothing D1 \leq 500.0$	0.25% of the outside diameter	1.00
$500.0 < \varnothing D1 \leq 630.0$	-	-

Tolerance for the inside diameter of the seal ($\varnothing d$)

Free and without constraint, the inside diameter of the sealing lip is always smaller than the diameter of the shaft. The pre-tightening or interference denotes the difference between these two values. Depending on the shaft diameter, the diameter of the sealing lip is generally considered to be less, between 0.8 and 3.5 mm.

TECHNICAL DATA

Speed



Linear speed calculation:

$$s \text{ (m/s)} = \frac{[\text{shaft } \varnothing \text{ (mm)} \times \text{speed (rpm)} \times \pi]}{60,000}$$

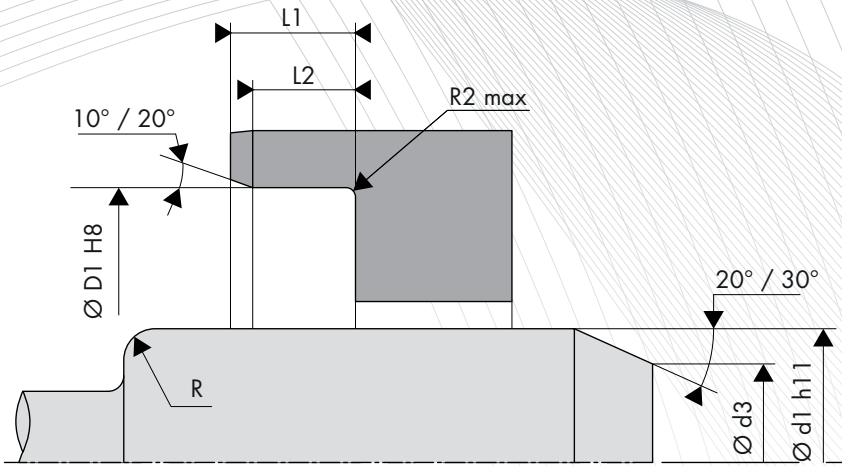
Pressure

Standard shaft seals with a primary sealing lip and no spring are used only in pressurised environments.

We recommend using shaft seals with springs for use in pressurised environments between 0.02 and 0.05 MPa (max).

Temperature / Media

Media		Maximum temperature depending on the materials						
		ACM	AEM	EPDM	FKM	HNBR	NBR	VMQ
Mineral oils	Oils for motors	+130°C	+130°C	-	+170°C	+130°C	+100°C	+150°C
	Oils for gearboxes	+120°C	+130°C	-	+150°C	+110°C	+80°C	+130°C
	Oils for hypoid gears	+120°C	+130°C	-	+150°C	+110°C	+80°C	-
	ATF oils	+120°C	+130°C	-	+170°C	+130°C	+100°C	-
	Hydraulic oils	+120°C	+130°C	-	+150°C	+130°C	+90°C	-
	Greases	-	+130°C	-	-	+100°C	+90°C	-
Fire-resistant fluids	HFA group - Emulsion with more than 80% water	-	-	-	-	+70°C	+70°C	+60°C
	HFB group - Opposite solution (water in oil)	-	-	-	-	+70°C	+70°C	+60°C
	HFC group - Polymer aqueous solution	-	-	+60°C	-	+70°C	+70°C	-
	HFD group - Water-free synthetic fluids	-	-	-	+150°C	-	-	-
Other fluids	EL + L heating oil	-	-	-	-	+100°C	+90°C	-
	Air	+150°C	+150°C	+150°C	+200°C	+130°C	+100°C	+200°C
	Water	-	-	+150°C	+100°C	+100°C	+90°C	-
	Water for washing	-	-	+130°C	+100°C	+100°C	+90°C	-
Temperature range	Min.	-25°C	-40°C	-45°C	-20°C	-30°C	-30°C	-60°C
	Max.	+150°C	+150°C	+150°C	+200°C	+150°C	+100°C	+200°C



SHAFT DESIGN

Shaft hardness

Rotation speed	Hardness in HRC
$s \leq 4.0$ m/sec	45 HRC
$4.0 < s \leq 10.0$ m/s	55 HRC
$s > 10.0$ m/sec	60 HRC

Surface roughness

Ra	0.2 to 0.8 μm
Rz	1.0 to 4.0 μm
Rmax	≤ 6.3 μm

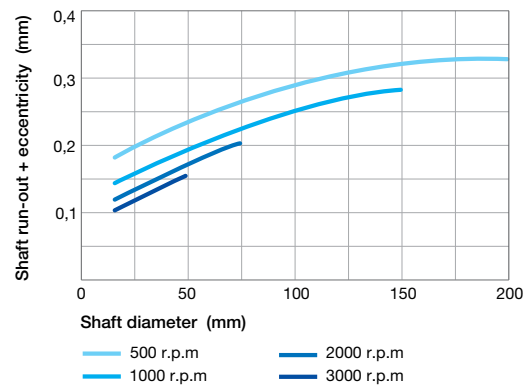
Chamfer and radius

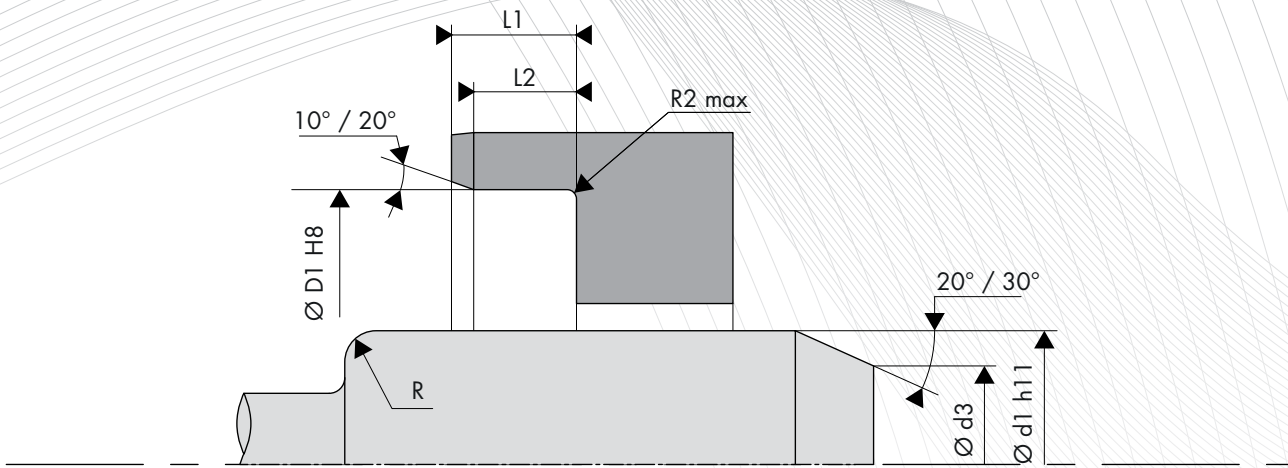
Shaft diameter Ød1 (mm)	Chamfer diameter Ød3 (mm)	Radius R (mm)
$\text{Ød1} \leq 10.0$	$\text{Ød1} - 1.50$	2.00
$10.0 < \text{Ød1} \leq 20.0$	$\text{Ød1} - 2.00$	2.00
$20.0 < \text{Ød1} \leq 30.0$	$\text{Ød1} - 2.50$	3.00
$30.0 < \text{Ød1} \leq 40.0$	$\text{Ød1} - 3.00$	3.00
$40.0 < \text{Ød1} \leq 50.0$	$\text{Ød1} - 3.50$	4.00
$50.0 < \text{Ød1} \leq 70.0$	$\text{Ød1} - 4.00$	4.00
$70.0 < \text{Ød1} \leq 95.0$	$\text{Ød1} - 4.50$	5.00
$95.0 < \text{Ød1} \leq 130.0$	$\text{Ød1} - 5.50$	6.00
$130.0 < \text{Ød1} \leq 240.0$	$\text{Ød1} - 7.00$	8.00
$240.0 < \text{Ød1} \leq 500.0$	$\text{Ød1} - 11.00$	12.00

Shaft tolerance

Shaft diameter Ød1 (mm)	Tolerance h11 (mm)
$\text{Ød1} \leq 3.0$	-0.060 / 0
$3.0 < \text{Ød1} \leq 6.0$	-0.075 / 0
$6.0 < \text{Ød1} \leq 10.0$	-0.090 / 0
$10.0 < \text{Ød1} \leq 18.0$	-0.110 / 0
$18.0 < \text{Ød1} \leq 30.0$	-0.130 / 0
$30.0 < \text{Ød1} \leq 50.0$	-0.160 / 0
$50.0 < \text{Ød1} \leq 80.0$	-0.190 / 0
$80.0 < \text{Ød1} \leq 120.0$	-0.220 / 0
$120.0 < \text{Ød1} \leq 180.0$	-0.250 / 0
$180.0 < \text{Ød1} \leq 250.0$	-0.290 / 0
$250.0 < \text{Ød1} \leq 315.0$	-0.320 / 0
$315.0 < \text{Ød1} \leq 400.0$	-0.360 / 0
$400.0 < \text{Ød1} \leq 500.0$	-0.400 / 0

Shaft run out and eccentricity





HOUSING DESIGN

Surface roughness

Ra	1.6 to 6.3 μm
Rz	10.0 to 25.0 μm
Rmax	$\leq 25.0 \mu\text{m}$

Housing tolerance

Bore diameter $\varnothing D1$ (mm)	Tolerance H8 (mm)
$3.0 < \varnothing D1 \leq 6.0$	0 / +0.018
$6.0 < \varnothing D1 \leq 10.0$	0 / +0.022
$10.0 < \varnothing D1 \leq 18.0$	0 / +0.027
$18.0 < \varnothing D1 \leq 30.0$	0 / +0.033
$30.0 < \varnothing D1 \leq 50.0$	0 / +0.039
$50.0 < \varnothing D1 \leq 80.0$	0 / +0.046
$80.0 < \varnothing D1 \leq 120.0$	0 / +0.054
$120.0 < \varnothing D1 \leq 180.0$	0 / +0.063
$180.0 < \varnothing D1 \leq 250.0$	0 / +0.072
$250.0 < \varnothing D1 \leq 315.0$	0 / +0.081
$315.0 < \varnothing D1 \leq 400.0$	0 / +0.089
$400.0 < \varnothing D1 \leq 500.0$	0 / +0.097
$500.0 < \varnothing D1 \leq 630.0$	0 / +0.110

Housing radius and width

Height H1 (mm)	Width		Radius R2 max (mm)
	L2min (H1 x 0.85)	L1min (H1 x +0.3)	
7.00	5.95	7.30	0.50
8.00	6.80	8.30	
10.00	8.50	10.30	
12.00	10.30	12.30	
15.00	12.75	15.30	0.70
20.00	17.00	20.30	

DIMENSIONS

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
VC 4 x 9 x 3	4.00	9.00	3.00
VC 4 x 18 x 4	4.00	18.00	4.00
VC 5 x 10 x 4	5.00	10.00	4.00
VC 5 x 11 x 3	5.00	11.00	3.00
VC 5 x 14 x 4	5.00	14.00	4.00
VC 5 x 15 x 6	5.00	15.00	6.00
VC 6 x 10 x 2.5	6.00	10.00	2.50
VC 6 x 10 x 4	6.00	10.00	4.00
VC 6 x 11 x 4	6.00	11.00	4.00
VC 6 x 11 x 4.5	6.00	11.00	4.50
VC 6 x 12 x 5	6.00	12.00	5.00
VC 6 x 14 x 4	6.00	14.00	4.00
VC 6 x 18 x 4.5	6.00	18.00	4.50
VC 6 x 19 x 5	6.00	19.00	5.00
VC 6 x 19 x 7	6.00	19.00	7.00
VC 6 x 22 x 7	6.00	22.00	7.00
VC 7 x 13 x 4	7.00	13.00	4.00
VC 7 x 14 x 4	7.00	14.00	4.00
VC 7 x 20 x 5	7.00	20.00	5.00
VC 8 x 12 x 3	8.00	12.00	3.00
VC 8 x 12 x 4	8.00	12.00	4.00
VC 8 x 14 x 4	8.00	14.00	4.00
VC 8 x 15 x 5	8.00	15.00	5.00
VC 8 x 16 x 4	8.00	16.00	4.00
VC 8 x 18 x 3.5	8.00	18.00	3.50
VC 9 x 18 x 5	9.00	18.00	5.00
VC 10 x 15 x 3	10.00	15.00	3.00
VC 10 x 15 x 4	10.00	15.00	4.00
VC 10 x 17 x 3.5	10.00	17.00	3.50
VC 10 x 17 x 5	10.00	17.00	5.00
VC 10 x 19 x 4	10.00	19.00	4.00
VC 10 x 20 x 5	10.00	20.00	5.00
VC 10 x 22 x 3	10.00	22.00	3.00
VC 10 x 24 x 4	10.00	24.00	4.00
VC 11 x 17 x 3	11.00	17.00	3.00
VC 11 x 17 x 6	11.00	17.00	6.00
VC 12 x 16 x 2.5	12.00	16.00	2.50
VC 12 x 17 x 2.5	12.00	17.00	2.50
VC 12 x 17 x 5	12.00	17.00	5.00
VC 12 x 17 x 6	12.00	17.00	6.00
VC 12 x 18 x 3	12.00	18.00	3.00
VC 12 x 18 x 4	12.00	18.00	4.00
VC 12 x 18 x 5	12.00	18.00	5.00
VC 12 x 19 x 3	12.00	19.00	3.00
VC 12 x 20 x 4	12.00	20.00	4.00
VC 12 x 22 x 3	12.00	22.00	3.00
VC 12 x 22 x 4	12.00	22.00	4.00
VC 12 x 24 x 4	12.00	24.00	4.00
VC 12 x 25 x 4.5	12.00	25.00	4.50
VC 13 x 19 x 3	13.00	19.00	3.00
VC 13 x 26 x 4	13.00	26.00	4.00
VC 13 x 31 x 8.5	13.00	31.00	8.50
VC 13 x 32 x 9	13.00	32.00	9.00
VC 14 x 20 x 4	14.00	20.00	4.00
VC 14 x 22 x 4	14.00	22.00	4.00
VC 14 x 24 x 4	14.00	24.00	4.00
VC 14 x 25 x 5	14.00	25.00	5.00
VC 14 x 31 x 8.5	14.00	31.00	8.50
VC 15 x 19 x 6	15.00	19.00	6.00
VC 15 x 21 x 3	15.00	21.00	3.00
VC 15 x 21 x 5	15.00	21.00	5.00

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
VC 15 x 22 x 5	15.00	22.00	5.00
VC 15 x 23 x 3	15.00	23.00	3.00
VC 15 x 23 x 4	15.00	23.00	4.00
VC 15 x 25 x 4	15.00	25.00	4.00
VC 15 x 26 x 3.5	15.00	26.00	3.50
VC 15 x 30 x 5	15.00	30.00	5.00
VC 16 x 20 x 2.5	16.00	20.00	2.50
VC 16 x 22 x 3	16.00	22.00	3.00
VC 16 x 23 x 3	16.00	23.00	3.00
VC 16 x 23 x 5	16.00	23.00	5.00
VC 16 x 24 x 4	16.00	24.00	4.00
VC 16 x 25 x 5	16.00	25.00	5.00
VC 16 x 26 x 3	16.00	26.00	3.00
VC 16 x 30 x 3	16.00	30.00	3.00
VC 16 x 30 x 5	16.00	30.00	5.00
VC 17 x 21 x 3.2	17.00	21.00	3.20
VC 17 x 22 x 5	17.00	22.00	5.00
VC 17 x 22 x 6	17.00	22.00	6.00
VC 17 x 23 x 3	17.00	23.00	3.00
VC 17 x 26 x 2	17.00	26.00	2.00
VC 17 x 26 x 3	17.00	26.00	3.00
VC 17 x 30 x 5	17.00	30.00	5.00
VC 17 x 35 x 4.8	17.00	35.00	4.80
VC 18 x 22 x 7	18.00	22.00	7.00
VC 18 x 24 x 4	18.00	24.00	4.00
VC 19 x 26 x 4	19.00	26.00	4.00
VC 20 x 25 x 2.5	20.00	25.00	2.50
VC 20 x 26 x 4	20.00	26.00	4.00
VC 20 x 28 x 5	20.00	28.00	5.00
VC 20 x 30 x 4	20.00	30.00	4.00
VC 20 x 30 x 7	20.00	30.00	7.00
VC 20 x 32 x 5	20.00	32.00	5.00
VC 20 x 35 x 7	20.00	35.00	7.00
VC 20 x 40 x 5	20.00	40.00	5.00
VC 20 x 52 x 4	20.00	52.00	4.00
VC 21 x 37 x 7	21.00	37.00	7.00
VC 22 x 26 x 6	22.00	26.00	6.00
VC 22 x 29 x 4	22.00	29.00	4.00
VC 22 x 29 x 5	22.00	29.00	5.00
VC 22 x 30 x 4	22.00	30.00	4.00
VC 22 x 31 x 5	22.00	31.00	5.00
VC 23 x 30 x 4	23.00	30.00	4.00
VC 24 x 31 x 4	24.00	31.00	4.00
VC 24 x 33 x 4	24.00	33.00	4.00
VC 24 x 36 x 4	24.00	36.00	4.00
VC 24 x 38 x 5	24.00	38.00	5.00
VC 25 x 30 x 4	25.00	30.00	4.00
VC 25 x 31 x 5	25.00	31.00	5.00
VC 25 x 32 x 4	25.00	32.00	4.00
VC 25 x 33 x 4	25.00	33.00	4.00
VC 25 x 35 x 7	25.00	35.00	7.00
VC 25 x 38 x 5	25.00	38.00	5.00
VC 25 x 42 x 5	25.00	42.00	5.00
VC 26 x 35 x 4	26.00	35.00	4.00
VC 26 x 40 x 5	26.00	40.00	5.00
VC 28 x 32 x 7	28.00	32.00	7.00
VC 28 x 35 x 5	28.00	35.00	5.00
VC 28 x 37 x 4	28.00	37.00	4.00
VC 28 x 37 x 6	28.00	37.00	6.00
VC 28 x 38 x 5	28.00	38.00	5.00
VC 28 x 40 x 5	28.00	40.00	5.00

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
VC 28 x 42 x 4	28.00	42.00	4.00
VC 28 x 47 x 4	28.00	47.00	4.00
VC 30 x 37 x 4	30.00	37.00	4.00
VC 30 x 40 x 7	30.00	40.00	7.00
VC 30 x 42 x 5	30.00	42.00	5.00
VC 30 x 42 x 6.4	30.00	42.00	6.40
VC 30 x 52 x 5	30.00	52.00	5.00
VC 30 x 62 x 6	30.00	62.00	6.00
VC 32 x 39 x 4	32.00	39.00	4.00
VC 32 x 40 x 4	32.00	40.00	4.00
VC 32 x 40 x 5	32.00	40.00	5.00
VC 32 x 42 x 4	32.00	42.00	4.00
VC 32 x 44 x 4	32.00	44.00	4.00
VC 32 x 52 x 5	32.00	52.00	5.00
VC 34 x 39 x 3	34.00	39.00	3.00
VC 34 x 41 x 4	34.00	41.00	4.00
VC 35 x 55 x 5	35.00	55.00	5.00
VC 35 x 62 x 5	35.00	62.00	5.00
VC 38 x 42 x 6.4	38.00	42.00	6.40
VC 40 x 45 x 2	40.00	45.00	2.00
VC 40 x 47 x 4	40.00	47.00	4.00
VC 40 x 48 x 4	40.00	48.00	4.00
VC 40 x 50 x 4	40.00	50.00	4.00
VC 40 x 52 x 5	40.00	52.00	5.00
VC 40 x 52 x 6	40.00	52.00	6.00
VC 40 x 54 x 7	40.00	54.00	7.00
VC 40 x 60 x 5	40.00	60.00	5.00

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
VC 40 x 62 x 5	40.00	62.00	5.00
VC 42 x 52 x 4	42.00	52.00	4.00
VC 44 x 50 x 4	44.00	50.00	4.00
VC 44 x 55 x 5	44.00	55.00	5.00
VC 45 x 50 x 2	45.00	50.00	2.00
VC 45 x 50 x 8	45.00	50.00	8.00
VC 45 x 55 x 4	45.00	55.00	4.00
VC 45 x 62 x 5	45.00	62.00	5.00
VC 45 x 62 x 7	45.00	62.00	7.00
VC 45 x 65 x 8	45.00	65.00	8.00
VC 45 x 68 x 6	45.00	68.00	6.00
VC 45 x 70 x 5	45.00	70.00	5.00
VC 48 x 58 x 4	48.00	58.00	4.00
VC 50 x 68 x 7	50.00	68.00	7.00
VC 50 x 72 x 5	50.00	72.00	5.00
VC 55 x 72 x 8	55.00	72.00	8.00
VC 60 x 72 x 6	60.00	72.00	6.00
VC 60 x 75 x 6	60.00	75.00	6.00
VC 70 x 92 x 7	70.00	92.00	7.00
VC 74 x 95 x 7	74.00	95.00	7.00
VC 80 x 90 x 3.4	80.00	90.00	3.40
VC 80 x 90 x 5	80.00	90.00	5.00
VC 80 x 100 x 7	80.00	100.00	7.00
VC 90 x 105 x 6	90.00	105.00	6.00
VC 90 x 105 x 10	90.00	105.00	10.00
VC 95 x 135 x 13	95.00	135.00	13.00