

So Let's assume this costrel should hold 3 gallons

A hogshead = 63 wine gallons, 63 US gallons, 52.5 Imperial gallons, or 238.5L

63 =	238.5
1 =	3.785714
3 =	11.35714

We know that the costrel is 16" wide

We know that it is ~13" tall = but not which point it's 13" tall at - we'll assume the tallest point - the neck

Convert to mm

16"	406.4	width	203.20
13"	330.2	height	
	73.1	height of neck	
	233.9	height at ends	96.30
3 gallons=	11.357	Liters	

Some other assumptions

The stitching at the ends is inset by	1/8"	to	3/16"
	3.2	mm	4.8 mm
The second line is spaced at about	1/2"	to	5/8"
	12.7	mm	15.875 mm
Assume the leather thickness is around	1/4"		
	6.35		

Assume that including the thickness of the leather - it takes at least an inch off each end - to be conservative use 1.25"

31.8 mm

There is a curve from the ends up to the base of the neck, but for simplicity we'll ignore the volume which could fit in this area

Therefore:

Width	406.4	(31.8)	(31.8)	342.90
Height	233.9			233.90
Depth	167.4			167.40

Volume of a vertical (oval) tank

$V(\text{tank}) = (\pi r^2 + 2ra)h$

1/2 of Depth	167.40 /2	83.70
x 1/2 of Depth	167.40 /2	83.70
x pi	7005.69	3.141593
		22,009.02
		A

Height	233.90	233.90
minus depth	167.40	66.50
		B

B x Depth	66.50	167.4	11,131.98	C
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A+C 33,141.00 Total Area of the end

Area of the end		33,141.00
x width	342.90	11364050.2 mm ³
Convert to Liters		11.36
Trying to =		11.36