Bounds on $K_3(n, R)$
(lower and upper bounds on the size of ternary optimal covering codes)

n	$R=1$	$R=2$	$R=3$
1	$\mathbf{1}^{1}$		
2	$\mathbf{3}^{3}$	$\mathbf{1}^{1}$	
3	b $\mathbf{5}^{1}$ b	$\mathbf{3}^{7}$	$\mathbf{1}^{1}$
4	h $\mathbf{9}^{1}$ h	$\mathbf{3}^{1}$	$\mathbf{3}^{14}$
5	c $\mathbf{27}^{17}$	w $\mathbf{8}^{1}$ u	$\mathbf{3}^{3}$
6	t 71–73 v	i 15–17 u	d $\mathbf{6}^{28}$ u
7	j 156–186 v	y 26–34 w	u 11–12 u
8	j 402–486 v	z 54–81 u	z 14–27 u
9	e 1060–1269 t	e 130–219 m	x 27–54 m
10	k 2854–3645 s	y 323–555 i	y 57–105 x
11	r 7832–9477 n	h $\mathbf{729}^{1}$ h	x 117–243 u
12	e 21531–27702 n	y 1919–2187	y 282–657 y
13	h 59049 h	y 5062–6561	x 612–1215 m
14	r 166610–177147	e 12204–19683	y 1553–2187 m

n	$R=4$	$R=5$	$R=6$	$R=7$	$R=8$
4	$\mathbf{1}^{1}$				
5	$\mathbf{3}^{25}$	$\mathbf{1}^{1}$			
6	$\mathbf{3}^{7}$	$\mathbf{3}^{41}$	$\mathbf{1}^{1}$		
7	$\mathbf{3}^{1}$	$\mathbf{3}^{14}$	$\mathbf{3}^{64}$	$\mathbf{1}^{1}$	
8	q 9	$\mathbf{3}^{3}$	$\mathbf{3}^{25}$	$\mathbf{3}^{95}$	$\mathbf{1}^{1}$
9	u 11–18 m	p 6 m	$\mathbf{3}^{7}$	$\mathbf{3}^{41}$	$\mathbf{3}^{136}$
10	m 17–36 m	q 9–12 m	$\mathbf{3}^{1}$	$\mathbf{3}^{14}$	$\mathbf{3}^{64}$
11	m 30–81 m	m 11–27 m	q 9	$\mathbf{3}^{3}$	$\mathbf{3}^{25}$
12	y 62–175 x	y 18–54 m	u 10–18 m	d 6 m	$\mathbf{3}^{7}$
13	y 123–335 z	m 33–108 o	m 13–36 q	q 9–12 m	$\mathbf{3}^{1}$
14	e 255–729 m	y 59–243 o	y 21–81 d	u 11–27 m	q 9

Key to the tables for $K_3(n, R)$

	Lower bounds
unmarked	trivial
b	(Taussky–Todd, 1948)
c	(Kamps–van Lint, 1967)
d	(Bhandari–Durairajan, 1996)
e	(Habsieger, 1996)
h	perfect code
i	(Bertolo–Östergård–Weakly, 2004)
j	(Haas, 2006)
k	(Haas, 2002)
m	(Haas–Halupczok–Schlage-Puchta, 2009)
p	(Kéri–Östergård, 2003)
q	(Kéri–Östergård, 2003–2006)
r	(Habsieger–Plagne, 2000)
t	(Linderoth–Margot–Thain, 2007)
u	(Kéri, 2008–2009)
w	(Östergård–Hämäläinen, 1993)
x	(Lang–Quistorff–Schneider, 2006)
y	improved sphere-covering bound
z	(Blass–Litsyn, 1998)

	Upper bounds
unmarked	trivial
b	(Taussky–Todd, 1948)
d	(Bhandari–Durairajan, 1996)
h	perfect code
i	(Bertolo–Östergård–Weakly, 2004)
m	(Östergård, 1991 and 1992)
n	(Östergård, 1994)
o	(Östergård, 1999)
q	(Kéri–Östergård, 2003–2006)
s	(Blokhuis–Lam, 1984)
t	(Di Pasquale–Östergård, 2003)
u	(Hämäläinen–Rankinen, 1991)
v	(Laarhoven–Aarts–van Lint–Wille, 1989)
w	(Östergård–Hämäläinen, 1993)
x	(Bertolo–Di Pasquale–Santisi, 2005–2006)
y	(Rivas Soriano, 2005,2006,2009)
z	(Rivas Soriano, 2011)