

Often when building structures it is necessary to combine rods so that a certain length is achieved. Whilst this is straightforward enough for short lengths, it can involve a lot of trial and error for longer ones.

Rods can be combined in a straight line by using connectors. Each connector adds 20mm to the overall length. If  $n$  rods are to be joined together, then  $n-1$  connectors will be required and the overall length will be increased by  $20(n-1)$  millimetres.

The quick way to work out the overall length is to assume that each rod is 20mm longer than it actually is, add together these lengths, and then deduct 20.

Remember that:

- Two green rods joined together are the same length as a blue rod
- Two white rods joined together are the same length as a yellow rod
- Two blue rods joined together are the same length as a red rod
- Two yellow rods joined together are the same length as a grey rod

In the following table, which shows target lengths up to 1000mm, a maximum of one green, white, blue or yellow rod appears for a length because if there were more than one then longer rods could be used instead.

Length (mm)	What Rods to Use to Achieve the Length
17½	Green
33	White
55	Blue
70½	Green + White
86	Yellow
92½	Green + Blue
108	White + Blue
123½	Green + Yellow
130	Red
139	White + Yellow
145½	Green + White + Blue
161	Blue + Yellow
167½	Green + Red
176½	Green + White + Yellow
183	White + Red

Length (mm)	What Rods to Use to Achieve the Length
192	Grey
198½	Green + Blue + Yellow
205	Blue + Red
214	White + Blue + Yellow
220½	Green + White + Red
229½	Green + Grey
236	Yellow + Red
242½	Green + Blue + Red
245	White + Grey
251½	Green + White + Blue + Yellow
258	White + Blue + Red
267	Blue + Grey
273½	Green + Yellow + Red
280	2 Reds
282½	Green + White + Grey
289	White + Yellow + Red
295½	Green + White + Blue + Red
298	Yellow + Grey
304½	Green + Blue + Grey
311	Blue + Yellow + Red
317½	Green + 2 Reds
320	White + Blue + Grey
326½	Green + White + Yellow + Red
333	White + 2 Reds
335½	Green + Yellow + Grey
342	Red + Grey
348½	Green + Blue + Yellow + Red

Length (mm)	What Rods to Use to Achieve the Length
351	White + Yellow + Grey
355	Blue + 2 Reds
357½	Green + White + Blue + Grey
364	White + Blue + Yellow + Red
370½	Green + White + 2 Reds
373	Blue + Yellow + Grey
379½	Green + Red + Grey
386	Yellow + 2 Reds
388½	Green + White + Yellow + Grey
392½	Green + Blue + 2 Reds
395	White + Red + Grey
401½	Green + White + Blue + Yellow + Red
404	2 Greys
408	White + Blue + 2 Reds
410½	Green + Blue + Yellow + Grey
417	Blue + Red + Grey
423½	Green + Yellow + 2 Reds
426	White + Blue + Yellow + Grey
430	3 Reds
432½	Green + White + Red + Grey
439	White + Yellow + 2 Reds
441½	Green + 2 Greys
445½	Green + White + Blue + 2 Reds
448	Yellow + Red + Grey
454½	Green + Blue + Red + Grey
457	White + 2 Greys
461	Blue + Yellow + 2 Reds

Length (mm)	What Rods to Use to Achieve the Length
463½	Green + White + Blue + Yellow + Grey
467½	Green + 3 Reds
470	White + Blue + Red + Grey
476½	Green + White + Yellow + 2 Reds
479	Blue + 2 Greys
483	White + 3 Reds
485½	Green + Yellow + Red + Grey
492	2 Reds + Grey
494½	Green + White + 2 Greys
498½	Green + Blue + Yellow + 2 Reds
501	White + Yellow + Red + Grey
505	Blue + 3 Reds
507½	Green + White + Blue + Red + Grey
510	Yellow + 2 Greys
514	White + Blue + Yellow + 2 Reds
516½	Green + Blue + 2 Greys
520½	Green + White + 3 Reds
523	Blue + Yellow + Red + Grey
529½	Green + 2 Reds + Grey
532	White + Blue + 2 Greys
536	Yellow + 3 Reds
538½	Green + White + Yellow + Red + Grey
542½	Green + Blue + 3 Reds
545	White + 2 Reds + Grey
547½	Green + Yellow + 2 Greys
551½	Green + White + Blue + Yellow + 2 Reds
554	Red + 2 Greys

Length (mm)	What Rods to Use to Achieve the Length
558	White + Blue + 3 Reds
560½	Green + Blue + Yellow + Red + Grey
563	White + Yellow + 2 Greys
567	Blue + 2 Reds + Grey
569½	Green + White + Blue + 2 Greys
573½	Green + Yellow + 3 Reds
576	White + Blue + Yellow + Red + Grey
580	4 Reds
582½	Green + White + 2 Reds + Grey
585	Blue + Yellow + 2 Greys
589	White + Yellow + 3 Reds
591½	Green + Red + 2 Greys
595½	Green + White + Blue + 3 Reds
598	Yellow + 2 Reds + Grey
600½	Green + White + Yellow + 2 Greys
604½	Green + Blue + 2 Reds + Grey
607	White + Red + 2 Greys
611	Blue + Yellow + 3 Reds
613½	Green + White + Blue + Yellow + Red + Grey
616	3 Greys
617½	Green + 4 Reds
620	White + Blue + 2 Reds + Grey
622½	Green + Blue + Yellow + 2 Greys
626½	Green + White + Yellow + 3 Reds
629	Blue + Red + 2 Greys
633	White + 4 Reds
635½	Green + Yellow + 2 Reds + Grey

Length (mm)	What Rods to Use to Achieve the Length
638	White + Blue + Yellow + 2 Greys
642	3 Reds + Grey
644½	Green + White + Red + 2 Greys
648½	Green + Blue + Yellow + 3 Reds
651	White + Yellow + 2 Reds + Grey
653½	Green + 3 Greys
655	Blue + 4 Reds
657½	Green + White + Blue + 2 Reds + Grey
660	Yellow + Red + 2 Greys
664	White + Blue + Yellow + 3 Reds
666½	Green + Blue + Red + 2 Greys
669	White + 3 Greys
670½	Green + White + 4 Reds
673	Blue + Yellow + 2 Reds + Grey
675½	Green + White + Blue + Yellow + 2 Greys
679½	Green + 3 Reds + Grey
682	White + Blue + Red + 2 Greys
686	Yellow + 4 Reds
688½	Green + White + Yellow + 2 Reds + Grey
691	Blue + 3 Greys
692½	Green + Blue + 4 Reds
695	White + 3 Reds + Grey
697½	Green + Yellow + Red + 2 Greys
701½	Green + White + Blue + Yellow + 3 Reds
704	2 Reds + 2 Greys
706½	Green + White + 3 Greys
708	White + Blue + 4 Reds

Length (mm)	What Rods to Use to Achieve the Length
710½	Green + Blue + Yellow + 2 Reds + Grey
713	White + Yellow + Red + 2 Greys
717	Blue + 3 Reds + Grey
719½	Green + White + Blue + Red + 2 Greys
722	Yellow + 3 Greys
723½	Green + Yellow + 4 Reds
726	White + Blue + Yellow + 2 Reds + Grey
728½	Green + Blue + 3 Greys
730	5 Reds
732½	Green + White + 3 Reds + Grey
735	Blue + Yellow + Red + 2 Greys
739	White + Yellow + 4 Reds
741½	Green + 2 Reds + 2 Greys
744	White + Blue + 3 Greys
745½	Green + White + Blue + 4 Reds
748	Yellow + 3 Reds + Grey
750½	Green + White + Yellow + Red + 2 Greys
754½	Green + Blue + 3 Reds + Grey
757	White + 2 Reds + 2 Greys
759½	Green + Yellow + 3 Greys
761	Blue + Yellow + 4 Reds
763½	Green + White + Blue + Yellow + 2 Reds + Grey
766	Red + 3 Greys
767½	Green + 5 Reds
770	White + Blue + 3 Reds + Grey
772½	Green + Blue + Yellow + Red + 2 Greys
775	White + Yellow + 3 Greys

Length (mm)	What Rods to Use to Achieve the Length
776½	Green + White + Yellow + 4 Reds
779	Blue + 2 Reds + 2 Greys
781½	Green + White + Blue + 3 Greys
783	White + 5 Reds
785½	Green + Yellow + 3 Reds + Grey
788	White + Blue + Yellow + Red + 2 Greys
792	4 Reds + Grey
794½	Green + White + 2 Reds + 2 Greys
797	Blue + Yellow + 3 Greys
798½	Green + Blue + Yellow + 4 Reds
801	White + Yellow + 3 Reds + Grey
803½	Green + Red + 3 Greys
805	Blue + 5 Reds
807½	Green + White + Blue + 3 Reds + Grey
810	Yellow + 2 Reds + 2 Greys
812½	Green + White + Yellow + 3 Greys
814	White + Blue + Yellow + 4 Reds
816½	Green + Blue + 2 Reds + 2 Greys
819	White + Red + 3 Greys
820½	Green + White + 5 Reds
823	Blue + Yellow + 3 Reds + Grey
825½	Green + White + Blue + Yellow + Red + 2 Greys
828	4 Greys
829½	Green + 4 Reds + Grey
832	White + Blue + 2 Reds + 2 Greys
834½	Green + Blue + Yellow + 3 Greys
836	Yellow + 5 Reds



Length (mm)	What Rods to Use to Achieve the Length
838½	Green + White + Yellow + 3 Reds + Grey
841	Blue + Red + 3 Greys
842½	Green + Blue + 5 Reds
845	White + 4 Reds + Grey
847½	Green + Yellow + 2 Reds + 2 Greys
850	White + Blue + Yellow + 3 Greys
851½	Green + White + Blue + Yellow + 4 Reds
854	3 Reds + 2 Greys
856½	Green + White + Red + 3 Greys
858	White + Blue + 5 Reds
860½	Green + Blue + Yellow + 3 Reds + Grey
863	White + Yellow + 2 Reds + 2 Greys
865½	Green + 4 Greys
867	Blue + 4 Reds + Grey
869½	Green + White + Blue + 2 Reds + 2 Greys
872	Yellow + Red + 3 Greys
873½	Green + Yellow + 5 Reds
876	White + Blue + Yellow + 3 Reds + Grey
878½	Green + Blue + Red + 3 Greys
880	6 Reds
881	White + 4 Greys
882½	Green + White + 4 Reds + Grey
885	Blue + Yellow + 2 Reds + 2 Greys
887½	Green + White + Blue + Yellow + 3 Greys
889	White + Yellow + 5 Reds
891½	Green + 3 Reds + 2 Greys
894	White + Blue + Red + 3 Greys

Length (mm)	What Rods to Use to Achieve the Length
895½	Green + White + Blue + 5 Reds
898	Yellow + 4 Reds + Grey
900½	Green + White + Yellow + 2 Reds + 2 Greys
903	Blue + 4 Greys
904½	Green + Blue + 4 Reds + Grey
907	White + 3 Reds + 2 Greys
909½	Green + Yellow + Red + 3 Greys
911	Blue + Yellow + 5 Reds
913½	Green + White + Blue + Yellow + 3 Reds + Grey
916	2 Reds + 3 Greys
917½	Green + 6 Reds
918½	Green + White + 4 Greys
920	White + Blue + 4 Reds + Grey
922½	Green + Blue + Yellow + 2 Reds + 2 Greys
925	White + Yellow + Red + 3 Greys
926½	Green + White + Yellow + 5 Reds
929	Blue + 3 Reds + 2 Greys
931½	Green + White + Blue + Red + 3 Greys
933	White + 6 Reds
934	Yellow + 4 Greys
935½	Green + Yellow + 4 Reds + Grey
938	White + Blue + Yellow + 2 Reds + 2 Greys
940½	Green + Blue + 4 Greys
942	5 Reds + Grey
944½	Green + White + 3 Reds + 2 Greys
947	Blue + Yellow + Red + 3 Greys
948½	Green + Blue + Yellow + 5 Reds

Length (mm)	What Rods to Use to Achieve the Length
951	White + Yellow + 4 Reds + Grey
953½	Green + 2 Reds + 3 Greys
955	Blue + 6 Reds
956	White + Blue + 4 Greys
957½	Green + White + Blue + 4 Reds + Grey
960	Yellow + 3 Reds + 2 Greys
962½	Green + White + Yellow + Red + 3 Greys
964	White + Blue + Yellow + 5 Reds
966½	Green + Blue + 3 Reds + 2 Greys
969	White + 2 Reds + 3 Greys
970½	Green + White + 6 Reds
971½	Green + Yellow + 4 Greys
973	Blue + Yellow + 4 Reds + Grey
975½	Green + White + Blue + Yellow + 2 Reds + 2 Greys
978	Red + 4 Greys
979½	Green + 5 Reds + Grey
982	White + Blue + 3 Reds + 2 Greys
984½	Green + Blue + Yellow + Red + 3 Greys
986	Yellow + 6 Reds
987	White + Yellow + 4 Greys
988½	Green + White + Yellow + 4 Reds + Grey
991	Blue + 2 Reds + 3 Greys
992½	Green + Blue + 6 Reds
993½	Green + White + Blue + 4 Greys
995	White + 5 Reds + Grey
997½	Green + Yellow + 3 Reds + 2 Greys
1000	White + Blue + Yellow + Red + 3 Greys