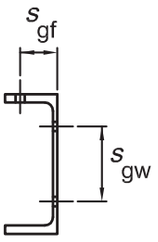
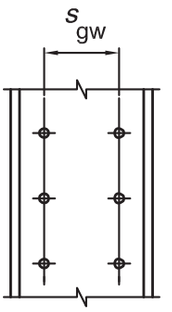


TABLE 7

GAUGE LINES FOR PARALLEL FLANGE CHANNELS



Section	Flange s_{gf}			Web s_{gw}								
	M16	M20	M24	M16			M20			M24		
Parallel flange channels												
380x100	55	55	55	140	90	70	140	90	70	140	90	70
300x 90	55	55	b	140	90	70	140	90	70	140	90	70
250x 90	55	55	b	140	90	70	140	90	70	140	90	70
230x 75	45	45	b	140	90	70	90	70		90	70	
200x 75	45	45	b	90	70		90	70		90	70	
180x 75	45	45	b	70	90		70	90		70		
150x 75	45	45	b	70			65			55		
Preference	1	1	1	1	2	3	1	2	3	1	2	3

NOTES:

b—Indicates that the flange will not accommodate this size of bolt.

c—Indicates that the web will not accommodate two lines of bolts with a gauge of 50 mm or more.

All dimensions are in mm.

Web Coping

The connections in the series are detailed from the top flange of the beam with the dimension ‘a’ between the top of the steel beam and the centre of the first hole in the connection controlling the location of all holes. Dimension ‘a’ has been standardised at 100mm, which allows sufficient clearance for all beam-to-beam connections except where the supported member depth is less than 240mm for which a = 70mm has been adopted.

A standard method of coping beams in beam-to-beam connections has been adopted. This is necessary since the cope detail affects the design capacity of some connections and may also influence the torsional end restraint provided by the connection.

The layouts of beam-to-beam connections involving web copes are shown in Figure 9 for single web copes (SWC) and in Figure 10 for double web copes (DWC). Standard lengths of web copes (length = dimension ‘c’) in beam-to-beam connections for universal sections are given in Tables 8 and 9.

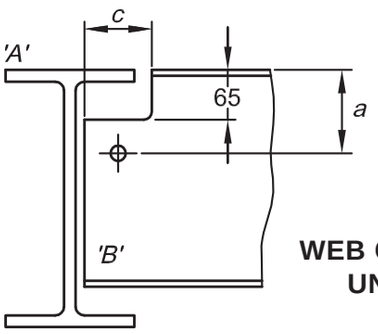


TABLE 8

WEB COPES—BEAM-TO-BEAM CONNECTIONS UNIVERSAL SECTIONS AS SUPPORTED MEMBERS

a = 100 except *
Bolt diameter = M20

Member 'B' (supported)	Member 'A' (supporting member)											
	610UB	530UB	460UB	410UB	360UB	310UB	250UB	200UB	310UC	250UC	200UC
610UB	DWC120	DWC110	DWC100	DWC90							
530UB					DWC90	DWC90	DWC80	DWC80	DWC160	DWC130	DWC110
460UB											
410UB											
360UB	SWC120	SWC110									
310UB			SWC100	SWC90							
250UB					SWC90				SWC160		
200UB*						SWC90	SWC80				
310UC						DWC90	DWC80	DWC80	DWC160	DWC130	DWC110
250UC	SWC120	SWC110	SWC100	SWC90	SWC90	SWC90			SWC160		
200UC*							SWC80			SWC130	

NOTE: No recommendation on web coping is made in respect of 100UC or 150UC, as either supported or supporting members.

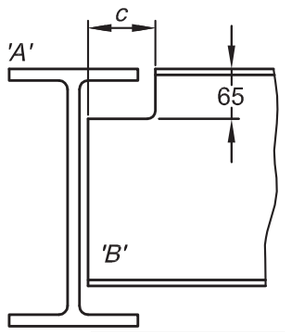


TABLE 9

WEB COPES—BEAM-TO-BEAM CONNECTIONS CHANNELS AS SUPPORTED MEMBERS

a = 100 except *
Bolt diameter = M20

Member 'B' (supported)	Member 'A' (supporting member)														
	460UB	410UB	360UB	310UB	250UB	200UB	310UC	250UC	200UC	150UC	380 x 100	300 x 90	250 x 90	230 x 75	200 x 75
380 x 100			DWC90	DWC90			DWC160				DWC100	DWC90			
300 x 90					DWC80	DWC80		DWC130	DWC110	DWC80			DWC90	DWC80	DWC80
250 x 90	SWC100	SWC90													
230 x 75			SWC90	SWC90			SWC160				SWC100	SWC90			
200 x 75*					SWC80			SWC130					SWC90		

NOTE: No recommendation on web coping is made in respect of 100UC as supporting member.

The dimension ‘c’ is controlled by the flange width of the supporting member (member A), and it normally varies between 80 and 160mm (increments of 10mm have been adopted). For example, a 250UB supported member (member B) connection to a 460UB (member A) requires a SWC100 web cope - the dimension ‘c’ = 100 provides clearance for the coped 250UB from the flange of the 460UB which has a flange width of 191mm.

In addition to adopting the dimension ‘a’, the edge distance from the first hole of the web holing pattern to the edge of the cope has been standardised at 35mm to allow hand flame cutting of the cope (Figures 9 and 10).

Web copes have always presented a difficult and costly fabrication stage and have traditionally been hand flame cut. In this series, it is recommended that the re-entrant corner of the cope be radiused (radius = r) and that:

r = 10mm minimum

The techniques of beam fabrication currently available offer the possibility of drilling or punching a hole at the re-entrant corner of the cope during the normal holing of beam webs. The cope is then obtained by cutting to this hole (Figure 11). Since 22mm diameter holes for M20 bolts would normally be punched or drilled in the beam web, a 22mm diameter hole can readily be punched or drilled at the re-entrant corner at the same time, giving:

r = 11mm which exceeds the above minimum

If drilling this cope hole, it is desirable that the centre-line of the hole so drilled lie outside the root radius line of the beam (Figure 11) - thus $(x - 11) > k$.

An ‘a’ dimension of 100mm will accommodate this requirement and thus allow drilling of the re-entrant corner cope hole for all UB and channel sections and all UC sections except 310UC283.

Punching of the cope hole requires slightly more clearance from the inside face of the beam flange depending upon the equipment used. This cope hole should generally be able to be punched on 610UB101 sections and smaller, on 310UC97 sections and smaller and on all hot rolled channel sections.

For double web coped beams, the same minimum dimensional requirements have been adopted. Using the length of the remaining web as a multiple of the bolt pitch, the dimensions at the bottom cope are sufficient to always enable the same drilling and punching arrangements as for the top cope.

Standard web copes assume that tops of beam flanges are level. Where this is not the case, special consideration will have to be given to detailing of the connection.

Since all bolting layouts assume that the top of beam flanges are level, the determination of n_{max} in any beam-to-beam connection will be the value in Table 3 for member ‘A’ (supporting member) when DA < DB. However, when DA > DB, the value of n_{max} will be that in Table 3 for member ‘B’ (supported member).

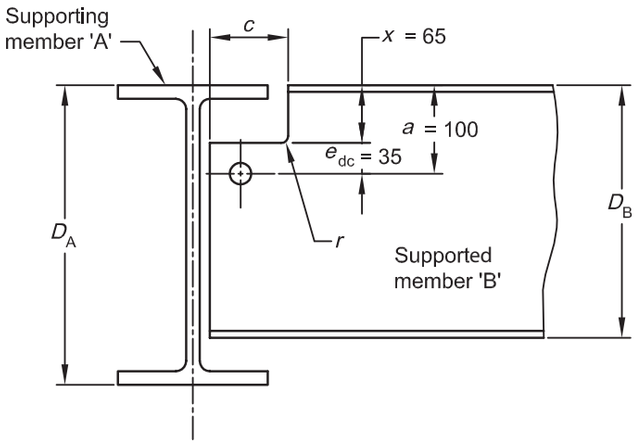


FIGURE 9. SINGLE WEB COPE

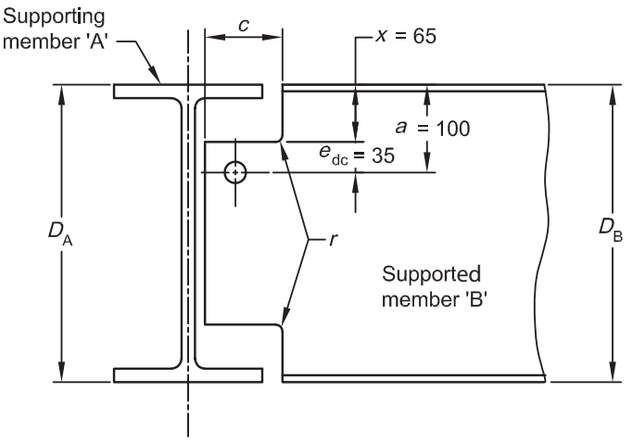


FIGURE 10. DOUBLE WEB COPE

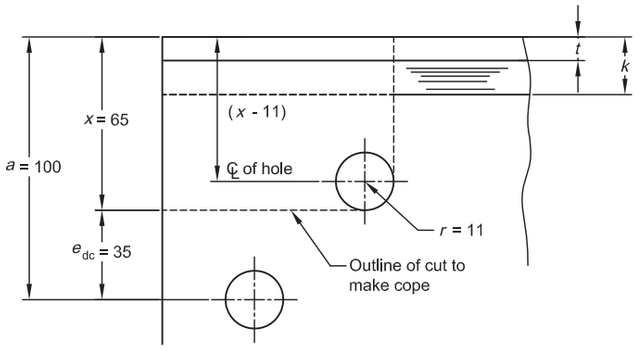


FIGURE 11. HOLE AT RE-ENTRANT CORNER

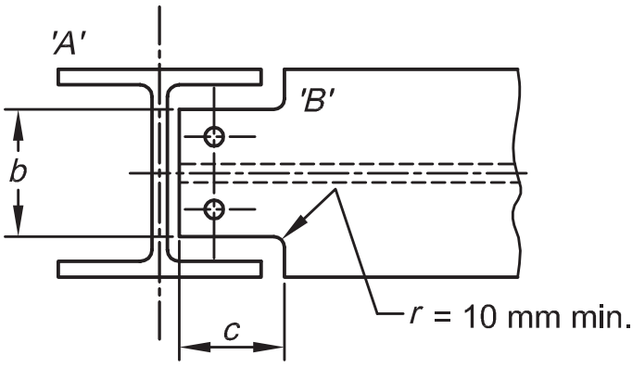


FIGURE 12. FLANGE COPE DFC.c.b.

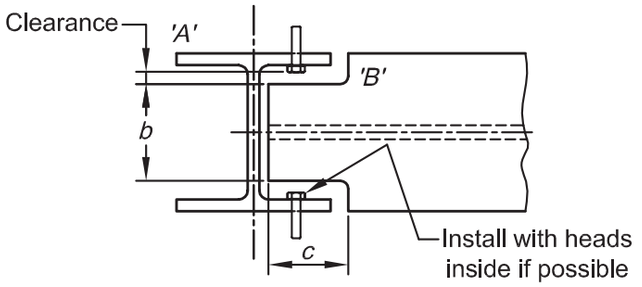


FIGURE 13. BOLT CLEARANCE FOR FLANGE COPING

Flange Coping

The most common type of flange cope is shown in Figure 12. A suitable designation is:

DFC.c.b.

where ‘c’ and ‘b’ are the dimensions shown in Figure 12. and DFC stands for double flange cope.

Standard double flange copes required for beam-column connections involving universal sections are given in Ref 4.

Detailing Note

Where member ‘A’ is either a 250UB or 250UC or smaller and flange bolts protrude within the profile of the member (see Figure 13.), care must be taken to ensure sufficient clearance is present to allow erection and tightening of flange connection bolts.

5. DESIGN CAPACITY TABLES FOR STRUCTURAL STEEL, V3: SIMPLE CONNECTIONS, OPEN SECTIONS (SIMPLE CONNECTIONS DCTS, V3) – REF. 4.

This publication is intended as a replacement for Reference 3. It contains no information on the design model used for an individual connection - leaving that to the individual design guide for that connection - but contains extracts of the typical details and design capacity tables from Design Guides 3, 4, and 5. Hence, it serves as a ready source of typical details and load capacity tables for those users not interested in the detailed treatment contained in each Design Guide.

DESIGN BASIS

Design Models

For the three connections included in Simple