NO	DATE	SHEET	MODIFICATION	BY

OWNER JASA ARMADA INDONESIA	PROJECT NAME ASD HARBOUR TUG 2x2200 HP	ISSUED DATE 17/08/2018
CLASS BKI	PROJECT NO ABH18048 HULL NO. TB101/TB102/TB103/TB105	DRAWN BY —
SHIPYARD PT. CITRA SHIPYARD	DRAWING TITLE WELDNG DETAIL AND PROCEDURE	DESIGNED BY USA
		CHECKED BY IMR
SCALE NTS		APPROVED BY TRI
SIZE A4	DRAWING NO : H - 22 - 004	SHEET 1 OF 13 REVISION 0 1 2 3 4 5

CITRA SHIPYARD
SHIP BUILDING & REPAIR

REGISTERED WQA COMPANY ISO 9001:2008 134 UKAS QUALITY MANAGEMENT
CERTIFICATE NUMBER : QS 2905

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WELDING DETAIL AND PROCEDURE

I. GENERAL NOTES

(1) All welding to be carried out in accordance with the classification sociaty's requirement

(2) Welding to be carried out in flat position as far as practicable.

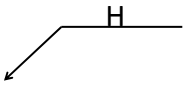
(3) Closing bead to be laid on only after sufficient back chipping or arc - air gouging except where it is approved to omit this operation.

(4) Electrodes to be of the listed types satisfying the requirement of the classification sociaty's rules and all welding to be done by the welding operators specifically qualified by classification society

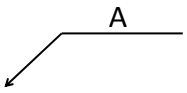
(5) Welding symbols to be given as below

(i) Joint Notation

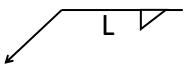
SYMBOLS



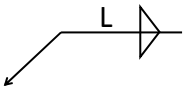
..... manual butt welding



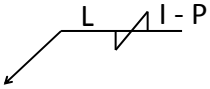
..... automatic butt welding



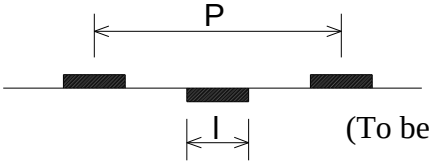
..... single continuous fillet welding



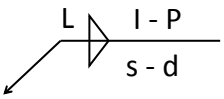
..... double continuous fillet or lap welding



..... stagered intermittent manual fillet welding

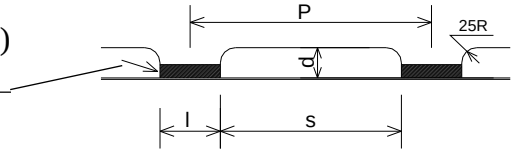


(To be doubled at ends



..... scalloped intermittent manual fillet welding

(welding to be carried round the ends of all lugs)



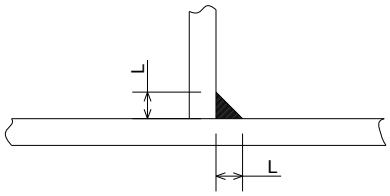
Notes :

* Denotes fillet welds are max. permissable
Min. filled weld to have leg length not less than 5.0 mm

Refference line with arrow means

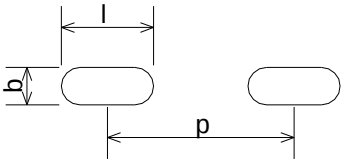
other side
arrow side

"L" means "legt length"



"S" means "Scalloped"

SLOT WELD . . . . . slot weld (oval hole type)
l x b x p



(ii) Supplementary notation

SYMBOL	SIGNIFICANCE	EXAMPLE
○	Weld all around	6.5
●	Ship weld	8
◉	Ship weld all around	7.5
(L1)	Corner joint without "heel" (single "L" connection)	5 (L1)
		5 (L1)
(L2)	Corner joint with "heel" (double "L" connection)	4.5 (L2)
(L2)		
(L3)		4.5 (L3)

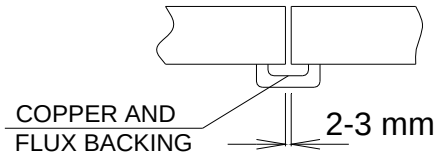
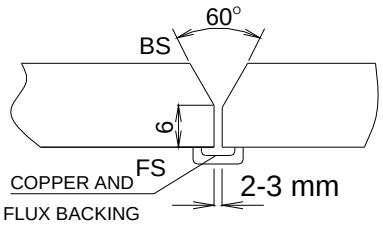
II. WELD JOINT DETAILS

(1) Butt Weld Joint

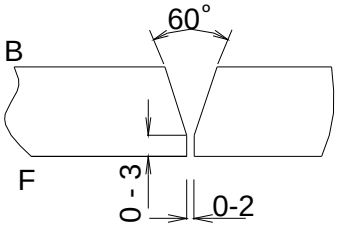
Described here under are our standard practices and specially shaped other grooves, if any, to be submited for the classification society's approval.

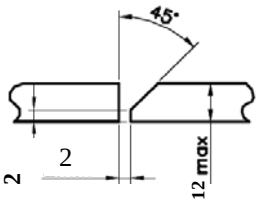
i.) Automatic Weld

SUBMERGED ARC WELDING (ONE SIDE WELDING)

Pl. thick. " t " mm	t ≤ 6	t > 6
POSITION FLAT		

GMAW (ONE SIDE WELDING)

Pl. thick.	10 < t ≤ 25
POSITION VERTICAL - UP	

Eriction Butt Joint


Notes :

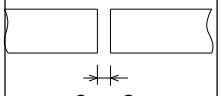
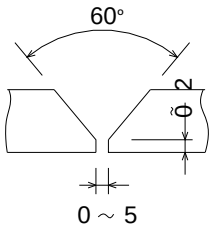
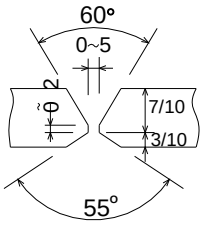
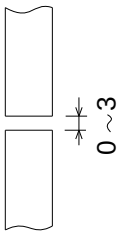
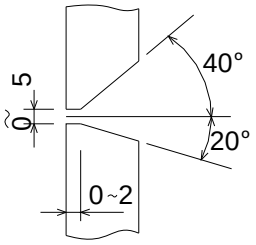
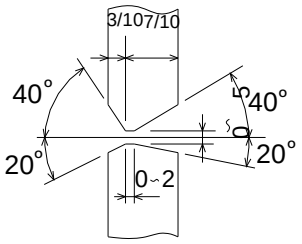
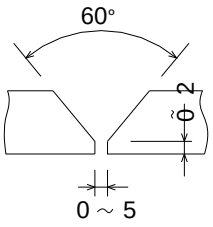
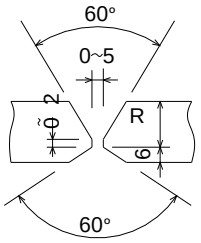
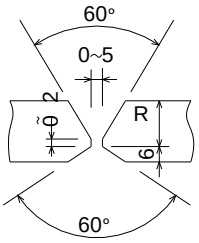
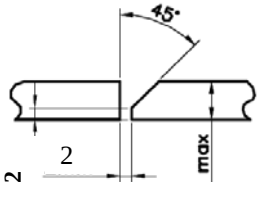
(a) Bevel angle of curved plates to be suitably modified so as to make up for the different deformation in outer and inner surfaces caused by bending operation

i i) Manual l CASE OF ONSIDE WELDING

GAP TO BE 0 ~ 2 mm

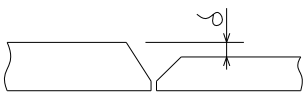
(a) GENERAL

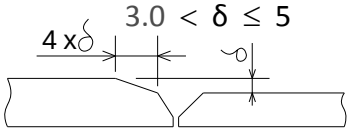
t : plate thickness (mm)

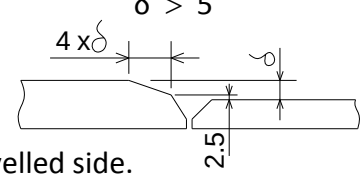
POSITION		t ≤ 4.5	4.5 < t ≤ 20	20 < t	TREATMENT
	FLAT AND VERTICAL				Application of one side lnee o ntioned in ii) (c) to be specially considered.
	HORIZOAL	t ≤ 4.5	4.5 < t ≤ 20	20 < t	
					
	ON SIDE FLAT & ONE SIDE OVER HEAD	t ≤ 4.5	4.5 < t ≤ 20	20 < t	
					
	ALL POSITION	Eriction Butt Joint 			

(b) Where Butting Edge of two plates difference in thickness.

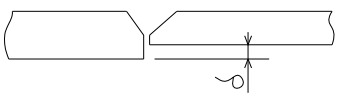
1) Difference of thickness exist at Bevelled side.

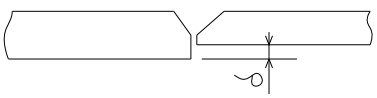
δ < 3.0 

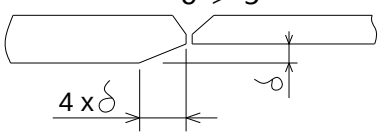
3.0 < δ ≤ 5 

δ > 5 

2) Difference of thickness exist at anti Bevelled side.

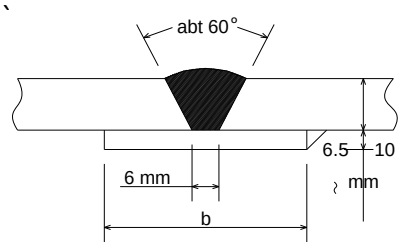
δ < 3.0 

3.0 < δ ≤ 5 

δ > 5 

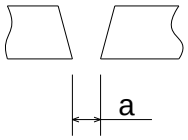
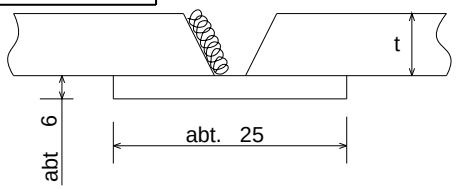
3) Large Taper of X - Groove is similar to No. (1) or (2)

(c) Where laying of closing bead is not practicable , chill plate to be provided as shown below



b = abt.3t
(specially narrow strips used in rudder ets. to be shown in plans for approval).

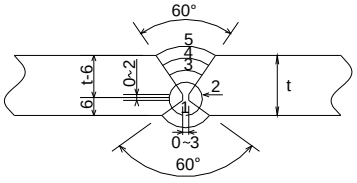
(d)According to the amount of root gap , treatment to be applied as shown below.

Butt weld	a ≤ 5	5 < a ≤ either 16 or t (whichever smaller)	16 < a ≤ 25 or t (whichever smaller)	25 or t < a (whichever smaller)
	Tolerance limits			Partially renew
				
a : gap	After welding with backing strip, remove it and finishing weld after back chipping		Welding up with edge preparation or partially renew	

i i i) Combined weld (Automatic weld with manual Backing Pas)

(1) BOTH SIDE

(a) X – Groove (t ≥ 12)

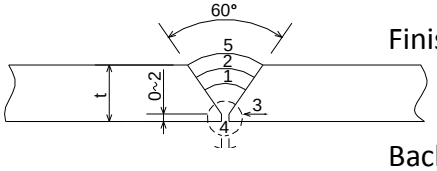


Finishing side

Backing side

Welding sequence (Example)
1. Manual weld
2. Arch air gouging
3. Manual weld
4. Automatic weld

(b) X – Groove (t ≤ 12)



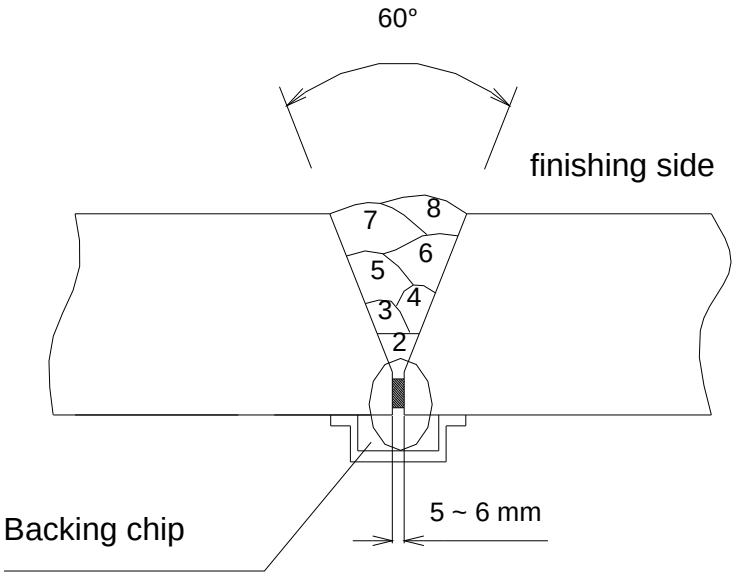
Finishing side

Backing side

Welding sequence (Example)
1. Manual weld
2. Arch air gouging
3. Manual weld
4. Automatic weld

(2) ONE SIDE

– V – Groove ($12 < t \leq 25$)

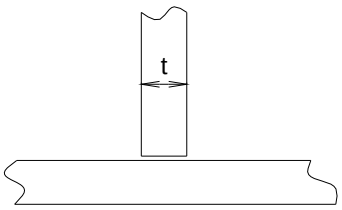


1. Manual weld
2. Automatic weld

(1) Tee Weld Joint

i.) Automatic Weld

(a) GMAW (Fillet Welding Gantry)

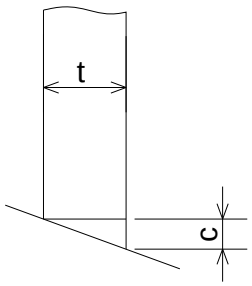
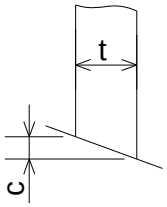
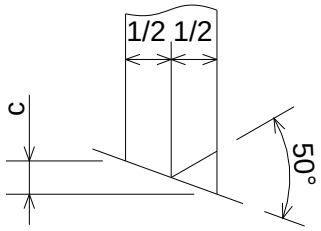


(a) GMAW (Carry Boy)
(b) SAW (Fillet Machine)

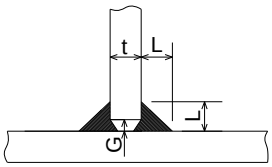
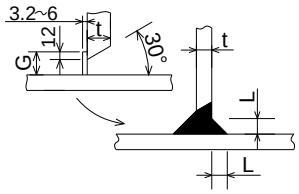
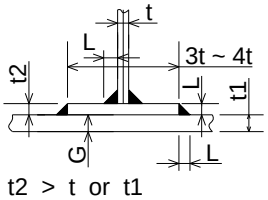
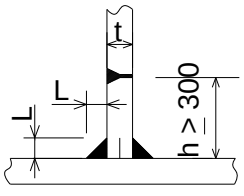
ii.) Manual Weld

(a) Oblique fillet weld joint
Where stem is not right - angled to the plate
to which it is joined , joint to be as shown below.

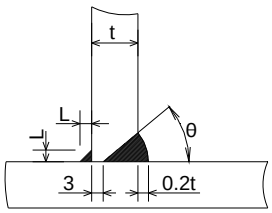
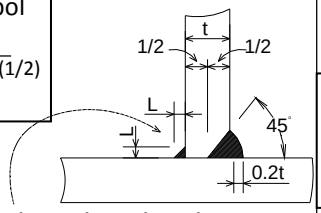
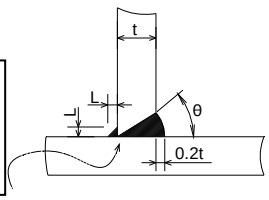
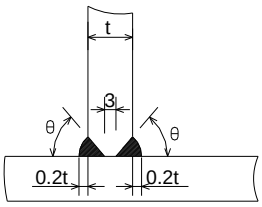
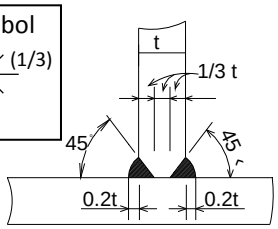
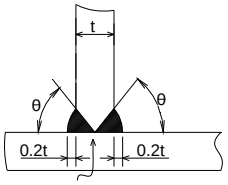
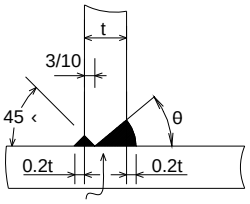
(1) PLATE

c ≤ 3	t > 3	
	t ≤ 16	t > 16
	3 < c ≤ 6	6 < c	c > 16
		

(a) According to the amount of root gap,treatments to be applied as shown below

ROOT GAP	G ≤ 3	3 < G ≤ 5	5 < G ≤ Either 16 or whichever smaller		16 or t < G (whichever smaller)
TEATMENT	1 = L	LEG LENGTH TO BE INCREASED 1 = L + G – 2	WELD TO PAD OR LINER TO BE USED FILLET WELD		INSERTED PL TO BE USED AFTER CUTTING AWAY STEM
DETAIL			 t2 ≥ t or t1		
NOTE : L = Fillet leg length required for the tee (T) Conection					

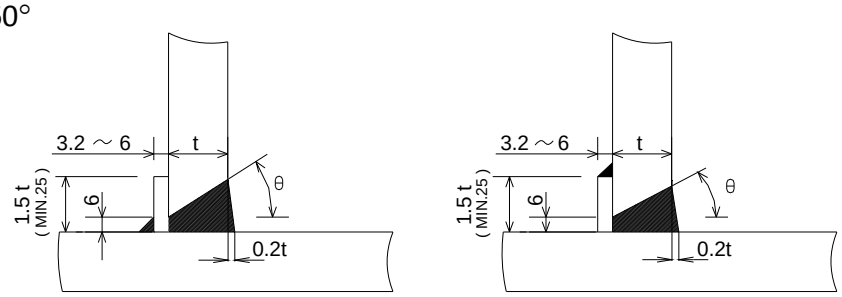
(b) Steem Bevelled Tee Weld joint

	Where full Penetration weld is not required (Deep Penetration)		Where full Penetration Weld is required
(a) Single Bevel	45°≤θ ≤ 60° Symbol L 3 	Symbol L (1/2)  Leg length to be shown In plan case by case	45°≤θ ≤ 60° Symbol L (F) O  Back arc air gouging
(b) Partial Penetration	45°≤θ ≤ 60° Symbol 	Symbol (1/3) 	45°≤θ ≤ 60° Symbol (F) O  Back arc air gouging 45°≤θ ≤ 60° Symbol (F) O  Back arc air gouging

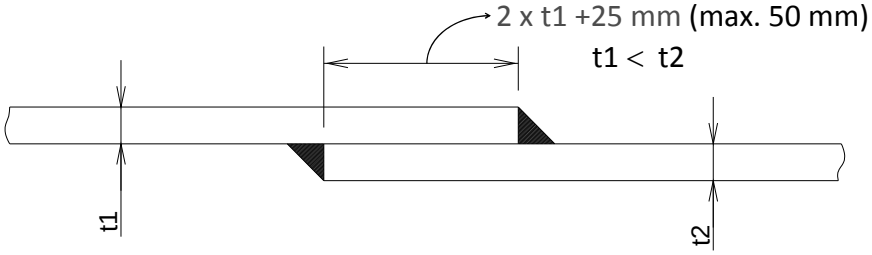
(c) Bevelled joint with chill plate

Where double fillet weld is not practicable, bevelled joint with chill plate to be useda as below

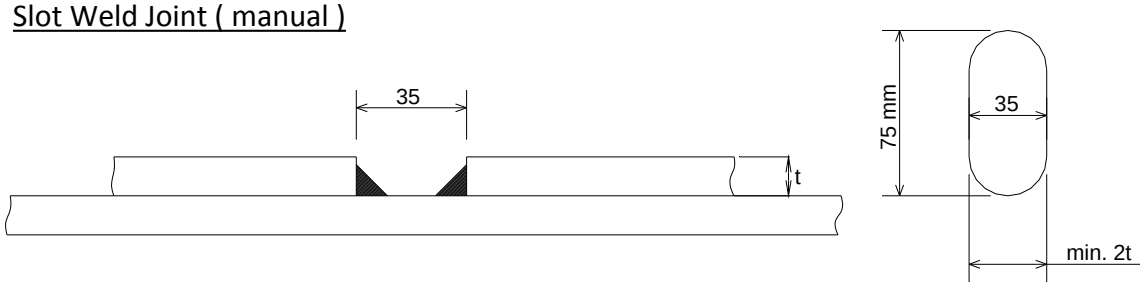
45°≤θ ≤ 60°



(1) Lapped Weld Joint (manual)



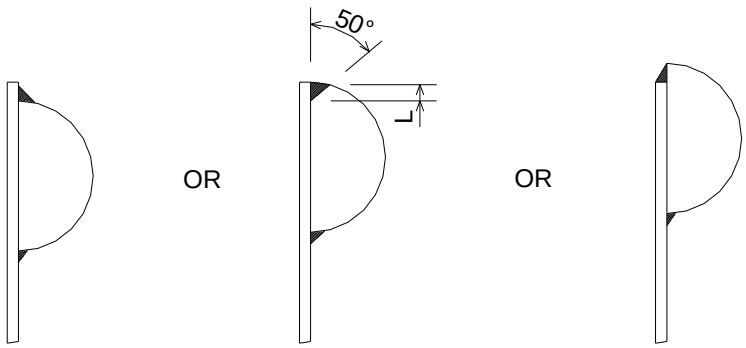
(2) Slot Weld Joint (manual)



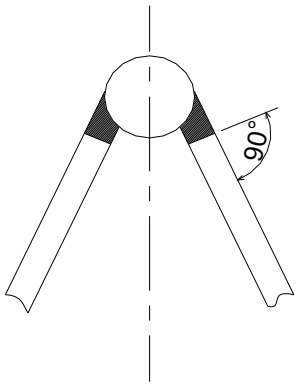
Slot welding to be based on a weld factor 0.44					
Thickness(t)	Leg length	Thickness(t)	Leg length	Thickness(t)	Leg length
4	4.0	17	10.5	30	19
5	4.5	18	11.5	31	19.5
6	5.0	19	12	32	20
7	5.0	20	12.5	33	21
8	5.5	21	13.5	34	21.5
9	6.0	22	14	35	22
10	6.5	23	14.5	36	22.5
11	7.0	24	15	37	23.5
12	7.5	25	16	38	24
13	8.0	26	16.5	39	24.5
14	9.0	27	17	40	25
15	9.5	28	17.5	41	26
16	10.0	29	18.5	42	26.5

(3) Miscaellaneous Weld (manual)

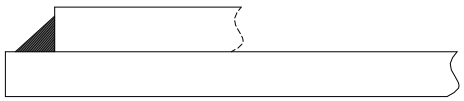
i.) Half Round Bar



ii.) Round Bar

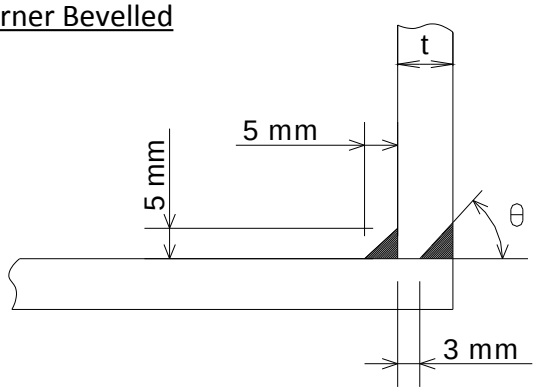


iii.) Flush – Lapped Edge



Details to be shown on the drawing in each case

iv.) L1 Corner Bevelled



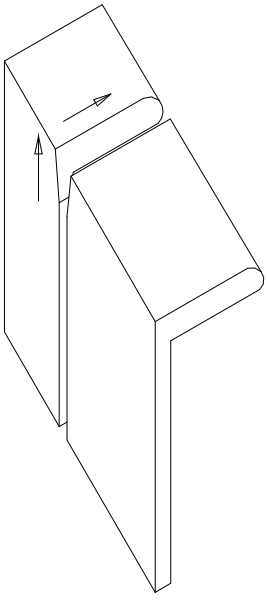
$t \leq 25$, $\theta = 45$

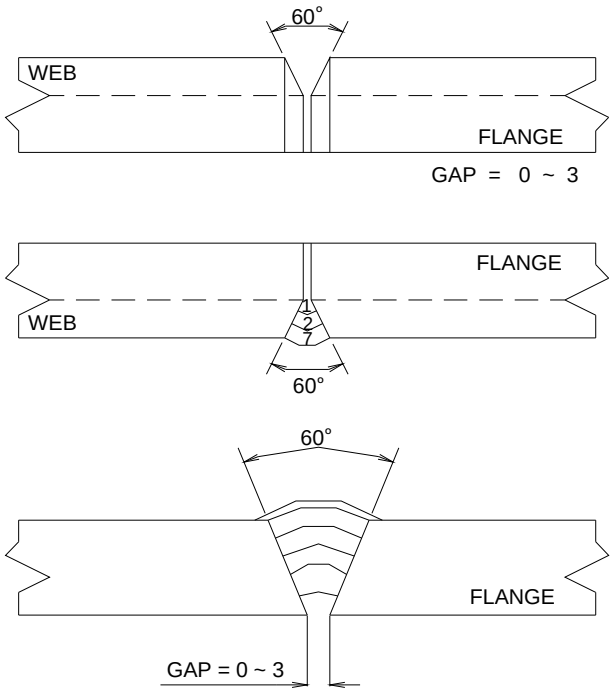
$t > 25$, $\theta \leq 45$

v.) L2 Corer

Similar to fillet weld

vi.) Profile Angle Joint





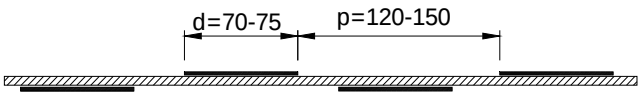
III. MISCELLANY

(1) In making sub assemblies, either run off tabs to be tack-welded in extention of weld joint or the free edge of plates to be partially extended so as to ride the termination of weld there in.
These protrusions to be of enough length that the weld may continue past the edge of the plates and to be cut off clear of the crater

(2) Slot weld to be applied to miscellaneous minor doubling plates and rudder.

I. INTERMITTENT WELDING LENGTHS AND SPACINGS FOR STEEL

1. INTERMITTENT STAGGERED WELDING



2. INTERMITTENT CHAIN WELDING

3. INTERMITTENT SCALLOP WELDING