

X:\165-0000\165-4 (KPD-TAY)\CIVIL\AS BUILT\FINAL AS BUILT\26-04-2018\DWG\CIVIL\STD DWG\165-4-CSTD-003_RFD.dwg Apr 26, 2018 - 5:50pm ZEL-COMP103

- 5.12- NO CONCRETE SHALL BE POURED UNTIL STEEL PLACEMENT HAS BEEN APPROVED BY THE ENGINEER/OWNER.
- 5.13- POTABLE WATER SHALL BE USED FOR MIXING AND CURING OF CONCRETE.
- 5.14- ANCHOR BOLTS TO BE FIXED IN POSITION BY MEANS OF TEMPLATE TO ENSURE THEIR LOCATION DURING CONCRETING.
- 5.15- CUTTING, PLACING & OVER LAPPING OF STEEL REINFORCEMENT SHALL BE AS PER ACI CODE LATEST EDITION.
- 5.16- BAR BENDING DETAILS SHALL COMPLY WITH ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT".

6. STANDARD HOOKS FOR UNCOATED REBARS:

6.1- DETAILS AND DIMENSIONS OF STANDARD HOOKS ARE AS FOLLOWS

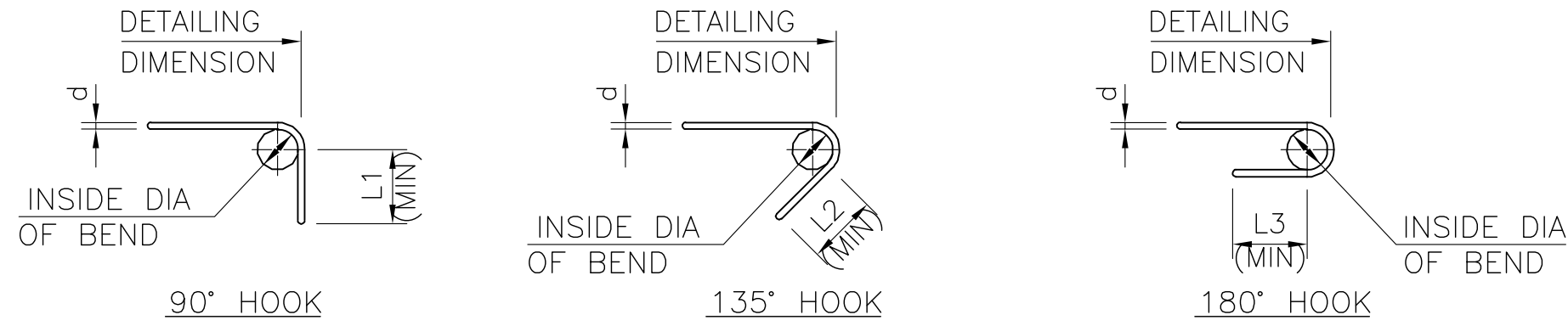


TABLE 1A. STIRRUPS AND TIE HOOKS (UNIT:mm)

NOMINAL SIZE		#3	#4
MIN INSIDE DIA OF BEND		40	48
90° HOOK	L1	60	75
135° HOOK	L2	60	75

TABLE 1B. STANDARD HOOKS FOR DEVELOPMENT (UNIT:mm)

NOMINAL SIZE		#4	#5	#6	#8	#9	#10
MIN INSIDE DIA OF BEND		72	96	120	150	224	256
90° HOOK	L1	145	195	240	300	340	390
180° HOOK	L3	65	65	80	100	115	130

7. STANDARD DEVELOPMENT LENGTH FOR REBARS

- 7.1- THE MINIMUM EMBEDMENT OR ANCHORAGE LENGTH FOR INDIVIDUAL BAR SHALL BE IN ACCORDANCE WITH TABLE 2, 3, 4, 5, 6 UNLESS OTHERWISE NOTED ON EACH DESIGN DRAWING. WORKS, AND DOWELS FOR STRUCTURAL MEMBERS AND ARE PROPERLY LOCATED IN PLACE.
- 7.2- THE VALUES IN TABLE 2, 3, 4, 5, 6 ARE CALCULATED BASED ON THE FOLLOWING CONDITIONS:
a: SPECIFIED YIELD STRENGTH OF REBAR : $F_y = 60000$ psi
b: UNCOATED DEFORMED BARS.

TABLE 2. TENSION DEVELOPMENT LENGTH WITHOUT STANDARD HOOK (UNIT:mm) (FOR $f_c' = 2400$ psi)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
Ld	TOP BAR (NOTE a)	790	1055	1315	1580	2300	2630	2960	3290	3710	CONC. COVER BELOW BARS ≥ 300
	OTHERS	610	815	1015	1220	1770	2030	2280	2530	2860	CONC. COVER BELOW BARS < 300

TABLE 3. TENSION DEVELOPMENT LENGTH WITHOUT STANDARD HOOK (UNIT:mm) (FOR $f_c' = 3000$ psi)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
Ld	TOP BAR (NOTE a)	560	740	915	1095	1600	1830	2055	231	2565	CONC. COVER BELOW BARS ≥ 300
	OTHERS	435	560	710	840	1220	1400	1575	1780	1980	CONC. COVER BELOW BARS < 300

TABLE 4. TENSION DEVELOPMENT LENGTH WITHOUT STANDARD HOOK (UNIT:mm) (FOR $f_c' = 4000$ psi)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
Ld	TOP BAR (NOTE a)	480	635	785	940	1370	1575	1780	2010	2210	CONC. COVER BELOW BARS ≥ 300
	OTHERS	380	480	610	735	1065	1220	1370	1550	1700	CONC. COVER BELOW BARS < 300

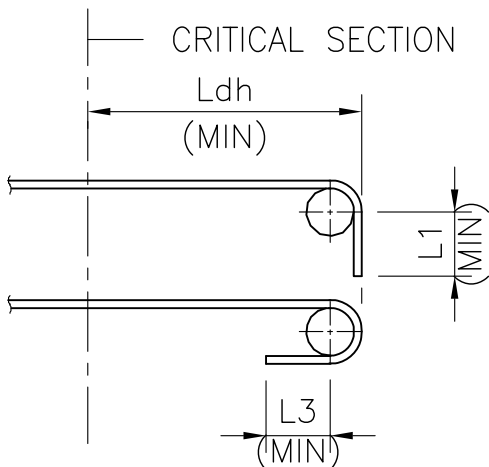
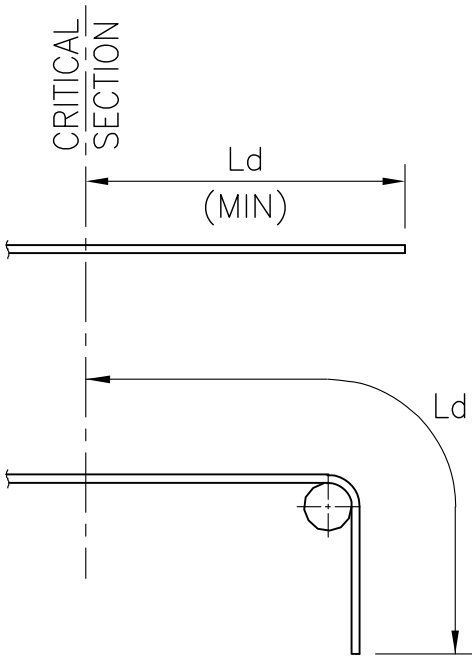
TABLE 5. COMPRESSION DEVELOPMENT LENGTH WITHOUT STANDARD HOOK (UNIT: mm)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
Ld	$f_c' = 2400$	235	315	390	470	545	625	705	795	880	
	$f_c' = 3000$	230	280	355	430	480	560	635	710	785	-
	$f_c' = 4000$	200	255	305	380	430	480	560	610	685	-

7.3- MINIMUM DEVELOPMENT OF REBAR (L_{dh}) WITH STANDARD HOOK SHALL BE IN ACCORDANCE WITH TABLE 5, UNLESS OTHERWISE NOTED ON EACH DESIGN DRAWING.

TABLE 6. MINIMUM DEVELOPMENT LENGTH WITH STANDARD HOOK (UNIT:mm) (FOR $f_c' = 3000$)

NOMINAL SIZE	#3	#4	#5	#6	#8	#9	#10
L_{dh}	185	220	295	370	460	515	590
L1	120	145	195	240	300	340	390
L3	65	65	65	80	100	115	130



8. LAP SPLICE LENGTH FOR REBARS:

- 8.1- MINIMUM LAP LENGTH AT SPLICE (DESIGNATED AS L_s) SHALL BE IN ACCORDANCE WITH TABLE 7, 8, 9, 10 UNLESS OTHERWISE NOTED ON EACH DESIGN DRAWING.
- 8.2- THE VALUES IN TABLE 7, 8, 9, 10 ARE CALCULATED BASED ON THE FOLLOWING CONDITIONS:
a: SPECIFIED YIELD STRENGTH OF REBAR: $F_y = 60000$ psi.
b: UNCOATED DEFORMED BARS.
- 8.3- LAP SPLICES SHALL BE COMPLETELY STAGGERED IN BEAM, FOUNDATION AND PREFERABLY STAGGERED IN SLAB OR WALL UNO.
- 8.4- THE LAP LENGTH FOR BARS OF UNEQUAL SIZES SHALL BE BASED UPON THE SMALLER ONE.

TABLE 7. MINIMUM TENSION LAP LENGTH (UNIT: mm) (FOR $f_c' = 2400$ psi)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
L_s	TOP BAR (NOTE a)	1030	1375	1710	2055	2990	3420	3850	4280	4830	CONC. COVER BELOW BARS ≥ 300
	OTHERS	790	1055	1315	1580	2300	2630	2960	3290	3710	CONC. COVER BELOW BARS < 300

TABLE 8. MINIMUM TENSION LAP LENGTH (UNIT: mm) (FOR $f_c' = 3000$ psi)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
L_s	TOP BAR (NOTE a)	710	940	1195	1420	2055	2360	2665	2300	3330	CONC. COVER BELOW BARS ≥ 300
	OTHERS	560	740	915	1090	1600	1830	2055	2310	2565	CONC. COVER BELOW BARS < 300

TABLE 9. MINIMUM TENSION LAP LENGTH (UNIT: mm) (FOR $f_c' = 4000$ psi)

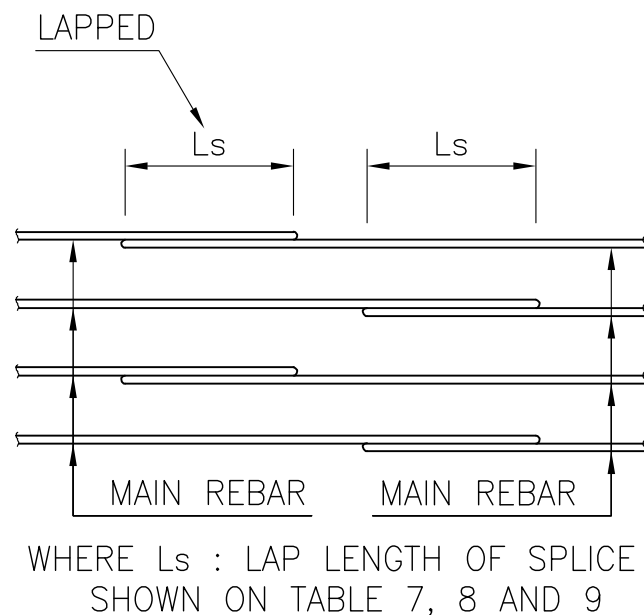
NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11	REMARKS
L_s	TOP BAR (NOTE a)	610	815	1015	1220	1780	2035	2310	2590	2870	CONC. COVER BELOW BARS ≥ 300
	OTHERS	485	635	785	940	1370	1575	1780	1550	2210	CONC. COVER BELOW BARS < 300

TABLE 10. MINIMUM COMPRESSION LAP LENGTH (UNIT: mm)

NOMINAL SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11
L_s	For $f_c' = 2400$ psi $f_c' = 3000$ psi & $f_c' = 4000$ psi	305	380	485	585	690	760	865	965	1090

CLEAR SPACING OF REBAR

MINIMUM CLEAR SPACING BETWEEN PARALLEL REBAR IN SLAB/WALL AND BETWEEN LONGITUDINAL REBAR IN BEAM/COLUMN SHALL CONFORM TO PARA 7.6 OF ACI-318



WHERE L_s : LAP LENGTH OF SPLICE SHOWN ON TABLE 7, 8 AND 9

NOTES:-

- A. WHEN HORIZONTAL REINFORCEMENT IS SO PLACED THAT MORE THAN 300 MM OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE. OTHERWISE IT SHALL BE CATEGORIZED AS "OTHER".

AS BUILT

FO REV.	26-04-2018 DATE	AS BUILT DESCRIPTION OF REVISION	MSL DRAWN	MSH CHECKED	SMM APPR.
CLIENT:	OIL & GAS DEVELOPMENT COMPANY LTD. OGDCL HOUSE TOWER-B, FIRST FLOOR FRI-6, BLUE AREA, JINNAH AVENUE ISLAMABAD PAKISTAN Fax: +92 051 2623033, PHONE: +92 051 9209859				
CONSULTANT:	Zishan Engineers (Pvt.) Ltd. An ISO 9001-2008 certified company 47/F Block 6, PECHS, Karachi-Pakistan Tel: (92-21) 34393045-46 & 34310151-54, Fax: (92-21) 34533430 & 34510156 E-Mail: contact@zishanengineers.com Website: www.zishanengineers.com			DWG. NO. 165-4-CSTD-003 REV. F0	
PROJECT :	KPD-TAY INTEGRATED DEVELOPMENT PROJECT PHASE-II			JOB NO. 165-4	
TITLE :	STANDARD DRAWING FOR GENERAL NOTES FOR CIVIL WORKS AND BAR ARRANGEMENT			SIZE A1	SCALE N.T.S
			SHEET 1		