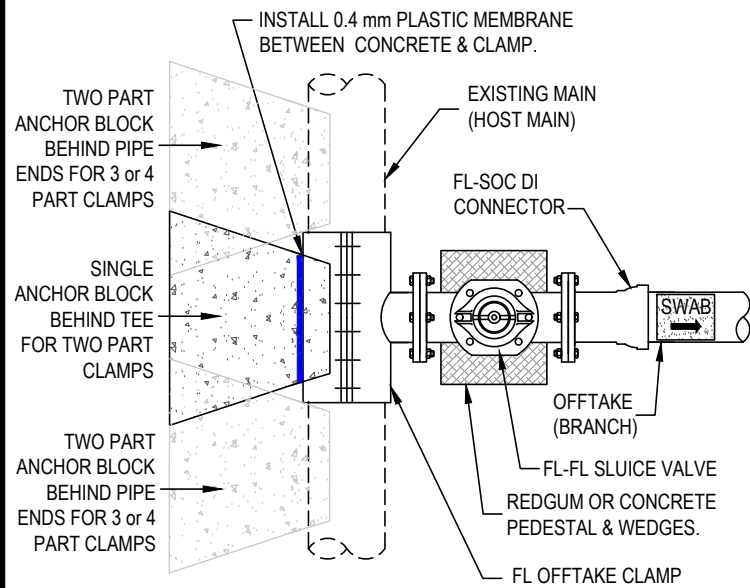


## UNDER PRESSURE CONNECTIONS



**FIGURE 106-A: DI, CAST IRON, A.C, PE, PVC-M OR PVC-U HOST MAIN UNDER PRESSURE CONNECTION**  
CONCRETE THRUST RESTRAINTS AS PER MRWA-W-205A & B

### Under Pressure Connections:

- A. Stainless Steel full wrapped clamps not guaranteed by the manufacturer as suitable for PVC-O / PE host mains shall not be used in such applications.
- B. Connections must be pressure tested at the operating pressure plus 400 kPa (to a max of 1600 kPa) for 3 minutes prior to cutting of the host main coupon.
- C. Do not use under pressure connections on GRP pipe.
- D. Under pressure connections are permitted on A.C and Cast Iron water mains provided the main's condition is satisfactory (no significant corrosion, cracking or shape distortion) and Water Agency approval is obtained.
- E. Under pressure connections on wrought iron, riveted or locked bar mains require prior inspection and approval from the Water Agency.
- F. All valves shall be left in state where they can be operated from above ground (unless stated otherwise).
- G. Offtake mains of the same size as the host main are permitted, but coupons shall be sized as per Table 106-B.
- H. When assembling SS off-take clamps on plastic pipes, ensure that lubricant is applied to the elastomeric mat of the clamp.
- I. Refer to Appendix C of WSA03- 2012 MRWA edition for further information on under pressure connections.
- J. Under pressure connections to rear dual water mains shall be undertaken in one of the following ways (control thrust where required as per MRW-W-104A & 104B):
  - the tee may "point backwards", join to a valve and then with a 90 degree downward bend and another 90 degree horizontal bend, pass under the front main (this is the preferred method);
  - the offtake may be constructed in a downwards direction, to a vertically aligned valve which is used for the under pressure connection and then buried in the open position.

**TABLE 106-A: CLAMP THRUST BLOCK REQUIREMENTS**

PARENT MAIN	THRUST ANCHOR REQUIREMENT
< DN300	NO THRUST ANCHOR REQUIRED
DN300	DN300 OFFTAKES REQUIRE ANCHORING
DN375	THRUST ANCHOR REQUIRED IF OFFTAKE IS DN300 OR DN375
> DN375	SAME SIZE, 1 OR 2 SIZE REDUCED OFFTAKES REQUIRE ANCHORING

### NOTES Regarding Clamp Connection Anchor Blocks:

- Example: for a DN600 parent main with DN450 branch, an anchor would be required.
- Thrust anchors are not required where the branch main is a restrained pipeline. Refer MRWA-W-104A.
- Anchor bearing areas for stainless steel full wrapped clamps shall be > 0.5 of the area calculated using MRWA-W-204.
- The branch can only be made live (connection valve opened) after the curing time of the concrete has lapsed (a rapid set concrete (ie: Fosroc or CTS Rapidset with a cure time of 1hr) may be required to hasten the mains return to service).

**TABLE 106-B: MAX DRILL / COUPON DIAMETERS**

HOST SIZE	MAX COUPON SIZE
DN100	70 mm
DN150	110 mm
DN225	180 mm
DN300	260 mm
DN375	320 mm
DN450	390 mm

### NOTES Regarding Coupon Sizing:

- Max coupon size occurs when host and offtake mains are the same size.
- For operating pressures below 400 Kpa, an increase in coupon size may be required. Contact the water agency for advice.
- For offtake sizes one or more sizes smaller than the host main, coupon size shall be equal to the internal diameter of the offtake minus 20mm, rounded down to the nearest multiple of 10;
  - eg1: DN100 PN35 DI (ID = 102) offtake, the coupon shall be 80mm.
  - eg2: DN150 PN16 PVC-M (ID = 161) offtake, the coupon shall be 140mm.
  - eg3: DN225 PN16 PVC-M (ID = 235) offtake, the coupon shall be 210mm.

### Under Pressure Connections to Steel Mains:

- a. All connections to live MS mains shall be under pressure connections.
- b. Coupons the same size as the host main may be cut, provided the host is adequately reinforced.
- c. Steel main branches do not require restraint.
- d. For smaller size offtakes, refer to MRWA-W-400.

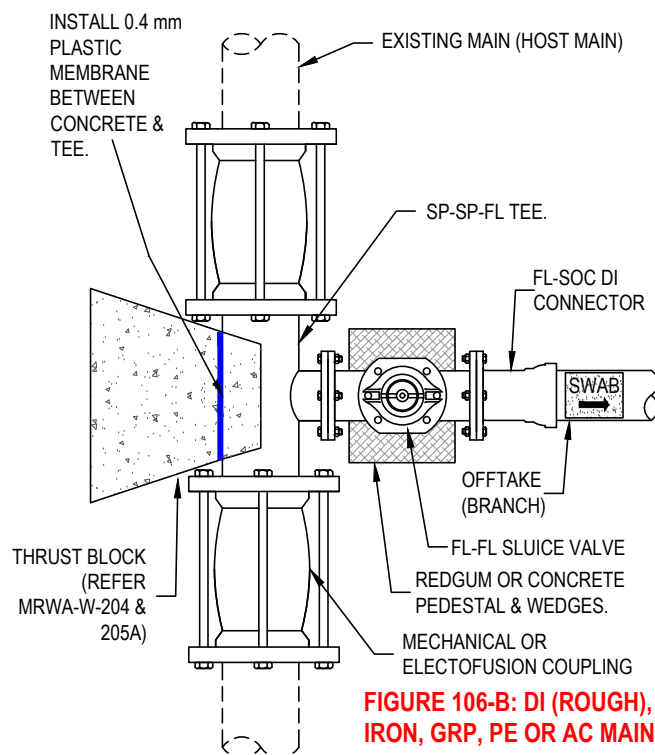
**TABLE 106-C: STEEL MAIN REINFORCEMENT**

OFFTAKE Ø	HOST MAIN DIAMETER & REINFORCEMENT		
	DN375	DN450	DN600
<DN150	NOT REQUIRED	NOT REQUIRED	NOT REQUIRED
DN225	50 x 6	50 x 6	75 x 6
DN300	50 x 6	50 x 6	75 x 6
DN375	COMP PLATE	50 x 6	75 x 6
DN450	NA	COMP PLATE	75 x 6
DN600	NA	NA	COMP PLATE

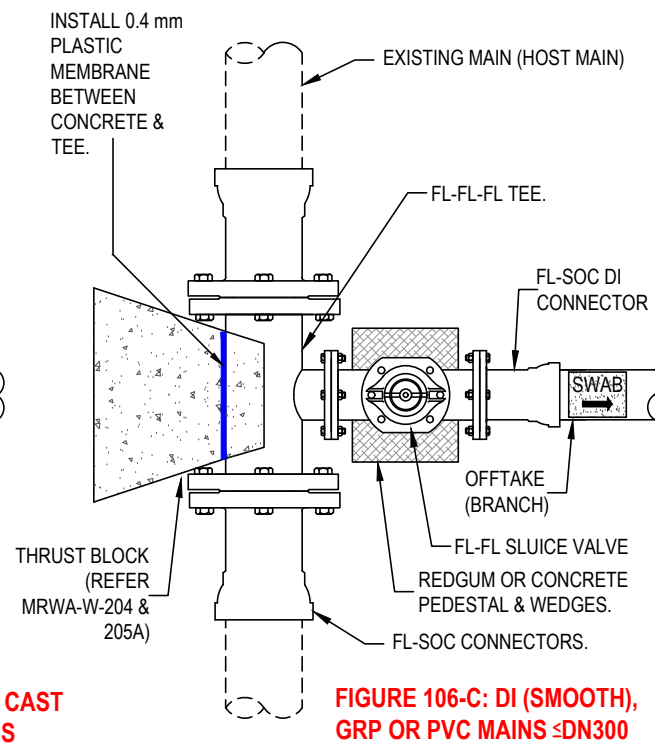
### Notes Regarding Table 106-A:

- a. Dimensions refer to width & thickness of compensating ring to be welded to the host MS main.
- b. Details relevant to a max design head 150m.
- c. Flanged MS pipe stub shall be welded onto the steel main.
- d. "Comp Plate" refers to compensation plate reinforcement (eg: "elephant ears" or fully wrapped welded sleeve).
- e. Consult 12 series MMBW Standard Drawings and specialist steel pipeline fitting fabricators for details.

## CUT-IN CONNECTION METHODS



**FIGURE 106-B: DI (ROUGH), CAST IRON, GRP, PE OR AC MAINS**



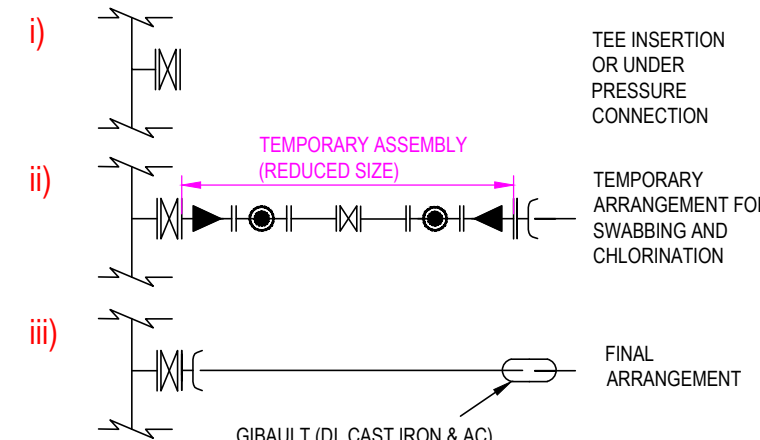
**FIGURE 106-C: DI (SMOOTH), GRP OR PVC MAINS <DN300**

### Cut-In Connections to PE Mains:

- PE tees shall be jointed into the host main as per the PE joining preferences indicated in Table 103-D.
- Butt fusion welding of a tee into an existing host main is considered impracticable.
- Thrust anchors are not required for PE host mains.

### FL-SOC Connections:

Only DI pipe which is Polyurethane coated or has been inspected and found to be in near new condition should be joined in this way.



**FIGURE 106-D: >=DN225 OFFTAKE ARRANGEMENTS**

**TABLE 106-D: TEMPORARY SWAB & CHLORINATION ASSEMBLY SIZING**

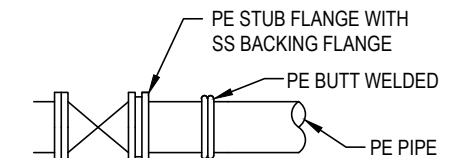
NEW PIPE SIZE	TEMPORARY ASSEMBLY SIZE
>=DN225 & <DN300	DN100
>DN300 & <DN450	DN150
>DN450 & <DN750	DN225
>DN750 & <DN1200	DN300

### NOTES Regarding Figure 106-D:

- This arrangement is only required for offtakes which require chlorination.
- Refer to MRWA-W-308 for swabbing and chlorination details.
- Temporary fittings shall be sized to enable sufficient swab velocity. Refer to Table 106-C.
- Swab shall be placed downstream of the temporary fittings.
- The small valve in the temporary assembly shall be pressure tested to the operating pressure + 400 kPa for 3 minutes prior to installation.

### Under Pressure Connections to PE Mains:

- Flange offtake clamps for PE mains are approved for some (typically smaller) sized host mains.
- Under pressure connections to larger PE host mains (typically >=DN355PE) requires offtake saddles (FL or SPIG) to be fused onto the host main.
- These larger fused connections to PE mains are considered high risk. Consult with the Water Agency on the risk controls that need to be put in place for such connections.
- These risk controls need to be specified in the design.



**FIGURE 106-E: PE BRANCH**

### GENERAL NOTES:

1. To minimise risk and disruption to customers, Tapping Under Pressure Connections are preferred, especially where shutting down the host main would be difficult, costly or would affect a large number of customers.
2. All valves fitted to existing mains shall be successfully pressure tested to the operating pressure plus 400 kPa for 3 minutes prior to being fitted.
3. Offtake valves shall only be opened once all acceptance testing of the offtake main have been successfully undertaken.
4. Fire service and industrial commercial connections >=DN100 shall be constructed in this way.
5. Where a tee is cut-in, a thrust block is required where the mechanical couplings (ie: gibaults) are unrestrained, even if the branch pipeline is restrained.
6. The piece of main removed (coupon in the case of under pressure connections or short length of main in the case of cut in connection) shall be forwarded to the Water Agency if there is any sign of significant corrosion, erosion or cracking.

### KEY REFERENCES:

- Pipeline and flange corrosion protection as per MRWA-W-306A and 400.
- Flanges in accordance with MRWA-W-306A & 306B.
- Restraints are to be designed and constructed according to MRWA-W-205A & 205B.
- In line thrust restraints may be used on branches instead of plain blocks (refer MRWA-W-104A).

DESIGNED:	R. JAGGER	DATE:	20/01/2011
DRAWN:	R. JAGGER	DATE:	20/01/2011
CHECKED:	NAME	DATE	APPROVED: NAME
3	ADD FL-SOC CONNECTORS & STEEL MAIN INFO	1/12/16	RJ / CP / JT
2	PUBLISHED FIRST ISSUE	21/03/12	R. JAGGER
1	PRE PUBLISHED DRAFT FOR COMMENT	12/07/11	R. JAGGER
REV	DESCRIPTION	DATE	APPROVED

MELBOURNE RETAIL WATER AGENCIES

City West Water

South East Water

Yarra Valley Water

## MRWA WATER SUPPLY STANDARDS

### INSTALLATION OF >= DN100 OFFTAKES TO EXISTING MAINS

## NOT TO SCALE

# MRWA-W-106

ISSUED 2012 REVISION NO. 3