BBR VT Plastic Duct & Accessories

For CONA CMX Strand Post-tensioning Systems

Strong and Versatile

A Global Network of Experts

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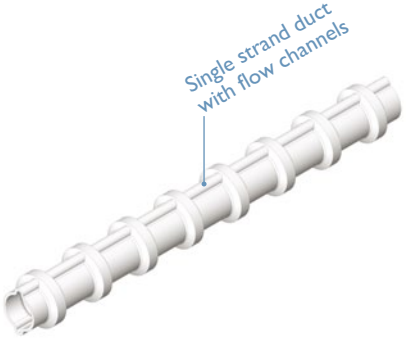
BBR VT Round Plastic Duct

The BBR VT Round Plastic Duct has a toroidal corrugated profile particularly suited for bonded post-tensioning applications complying with *fib* Bulletin 7, PTI/ASBI M50.3-12 and the Florida Department of Transport (FDOT). This duct has European Technical Approval (ETA) along with CE marking and is typically used in combination with the BBR VT CONA CMI (internal), CONA CMF (flat) and CONA CMM (single strand) post-tensioning systems. These ducts are available with nominal internal diameters (d_i) of 23, 48, 59, 76, 85, 100, 115 and 130mm*. In addition, they are also available with and without longitudinal flow channel profiles. The flow channel profile helps to ensure the complete and uniform grout filling of these ducts. The BBR VT Plastic Duct also uses a unique material melt which permits its use in a wide range of temperatures, from -20°C to +50°C, making it highly versatile for any environmental condition and avoiding stock of different ducts for winter and summer seasons.

*other sizes available upon request



Additional benefits

BBR VT Plastic Duct vs. traditional light-gauge metal ducts:

- Enhanced corrosion protection against aggressive chloride environments
- Lower and more reliable friction coefficient, beneficial for longer tendons and circular tank construction
- Reduced risk of fretting fatigue of tendons
- Excellent for marine conditions
- Only solution for electrically isolated applications

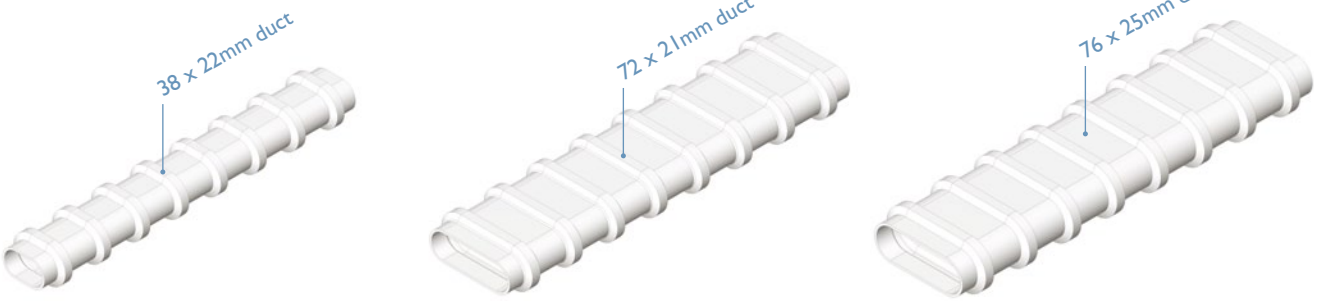
See our European Technical Approvals

BBR VT Flat Plastic Duct

The BBR VT Flat Plastic Duct has a toroidal corrugated profile particularly suited for bonded post-tensioning applications complying with *fib* Bulletin 7, PTI/ASBI M50.3-12 and the Florida Department of Transport (FDOT). This duct complies with ETAG 013 and is typically used in combination with the BBR VT CONA CMI (internal) and CONA CMF (flat) post-tensioning systems. These ducts are available with nominal inner dimensions of 38 x 22mm, 72 x 21mm and 76 x 25mm*.

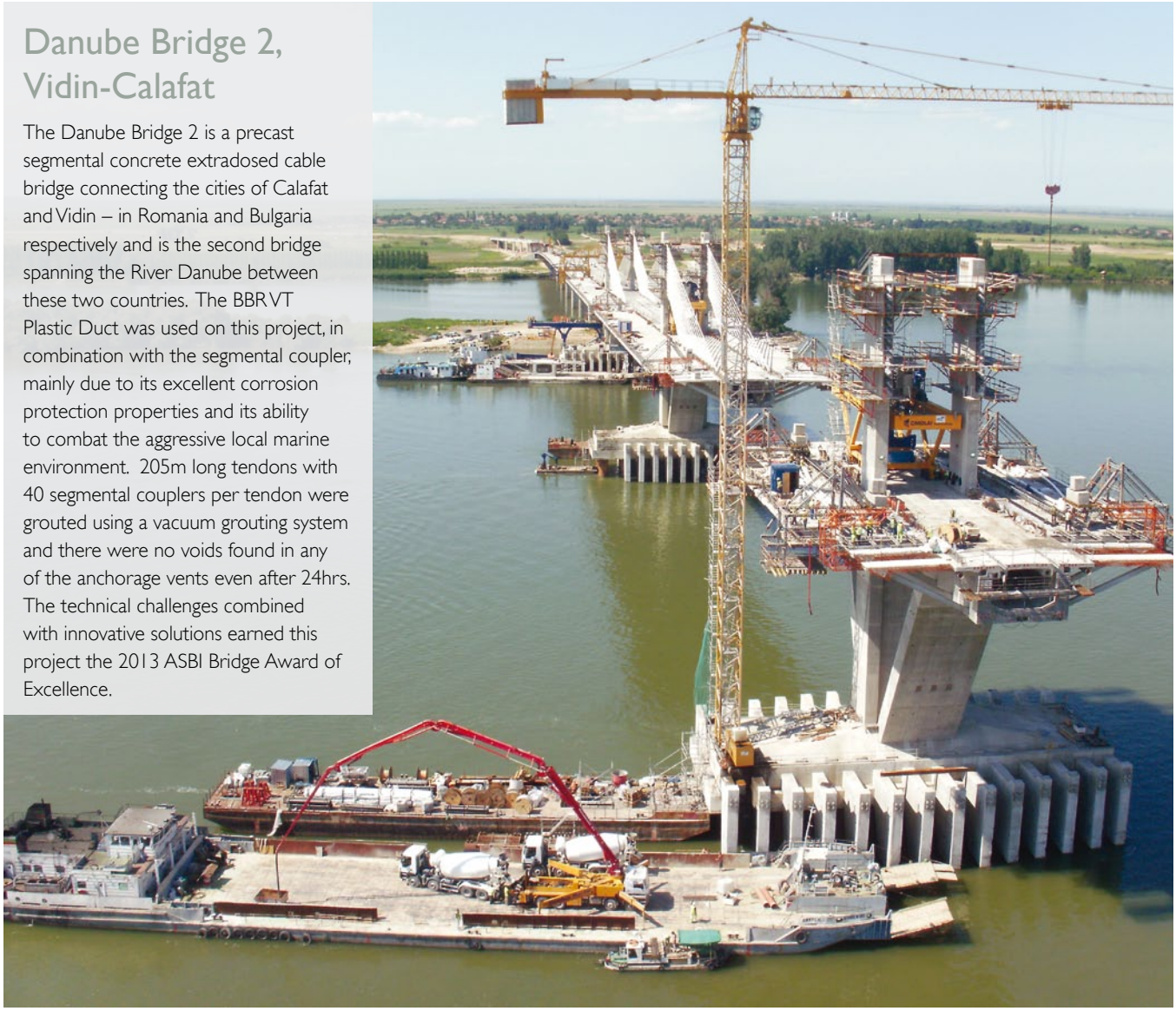
Similar to our round ducts, the BBR VT Flat Plastic Duct also uses a unique material melt which permits its use in a wide range of temperatures, from -20°C to +50°C.

*other sizes available upon request



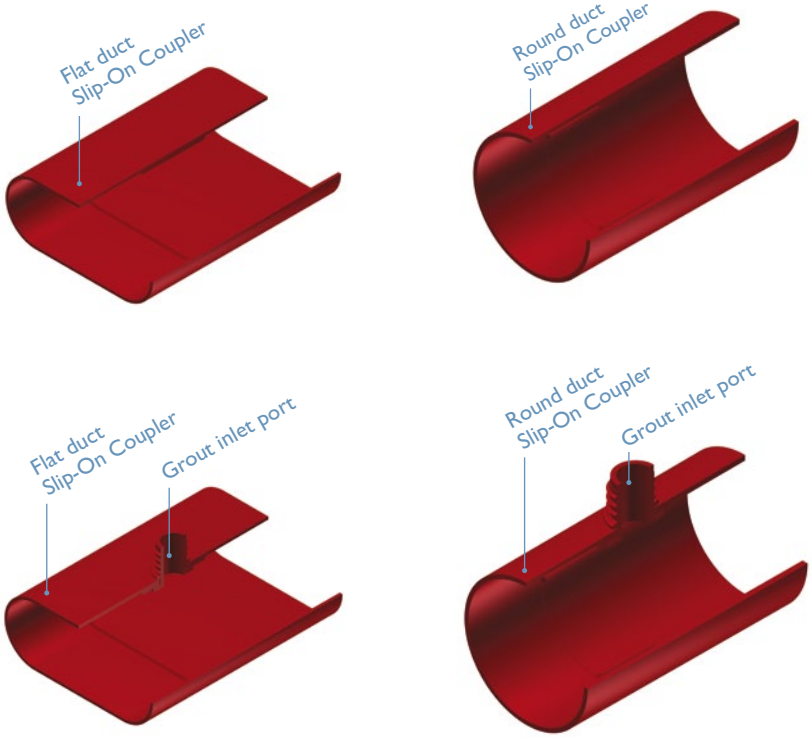
Danube Bridge 2, Vidin-Calafat

The Danube Bridge 2 is a precast segmental concrete extradosed cable bridge connecting the cities of Calafat and Vidin – in Romania and Bulgaria respectively and is the second bridge spanning the River Danube between these two countries. The BBR VT Plastic Duct was used on this project, in combination with the segmental coupler, mainly due to its excellent corrosion protection properties and its ability to combat the aggressive local marine environment. 205m long tendons with 40 segmental couplers per tendon were grouted using a vacuum grouting system and there were no voids found in any of the anchorage vents even after 24hrs. The technical challenges combined with innovative solutions earned this project the 2013 ASBI Bridge Award of Excellence.



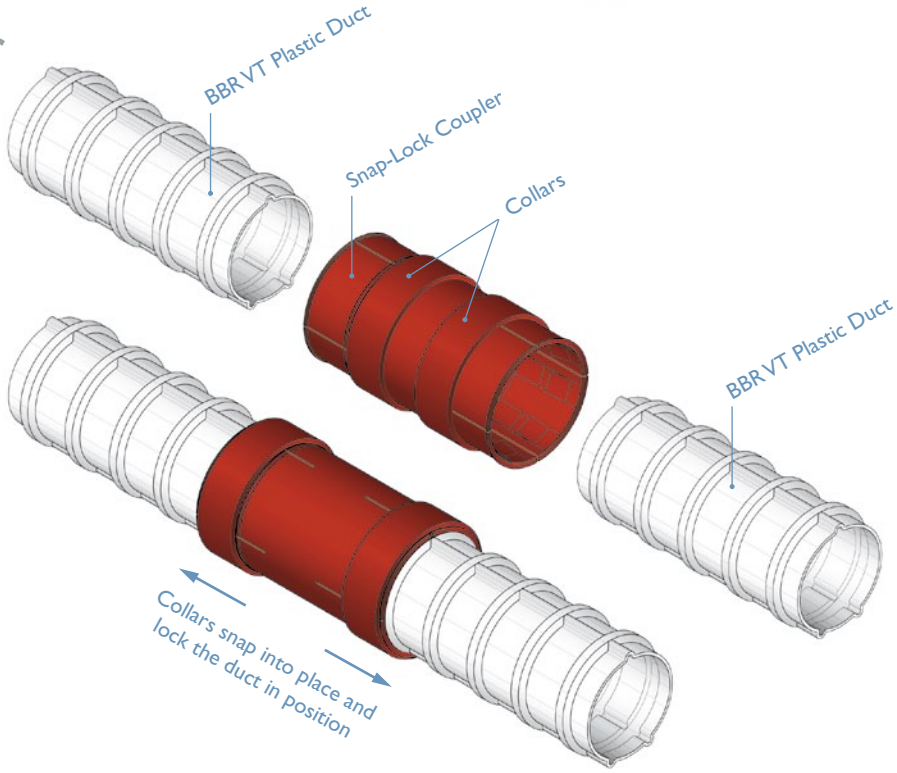
Slip-On Couplers

A full range of slip-on couplers with heat shrink sleeves are available to join the BBR VT Plastic Ducts together. These couplers come in two varieties – with and without grout inlet ports – depending upon where along the tendon they are used. It is also possible to use these couplers to join both types of plastic ducts – with and without flow channels. Similar to the BBR VT Plastic Ducts, these couplers have undergone the same rigorous testing to comply with *fib* Bulletin 7, PTI/ASBI M50.3-12 and the Florida Department of Transport (FDOT). They also have European Technical Approval (ETA) along with CE marking.



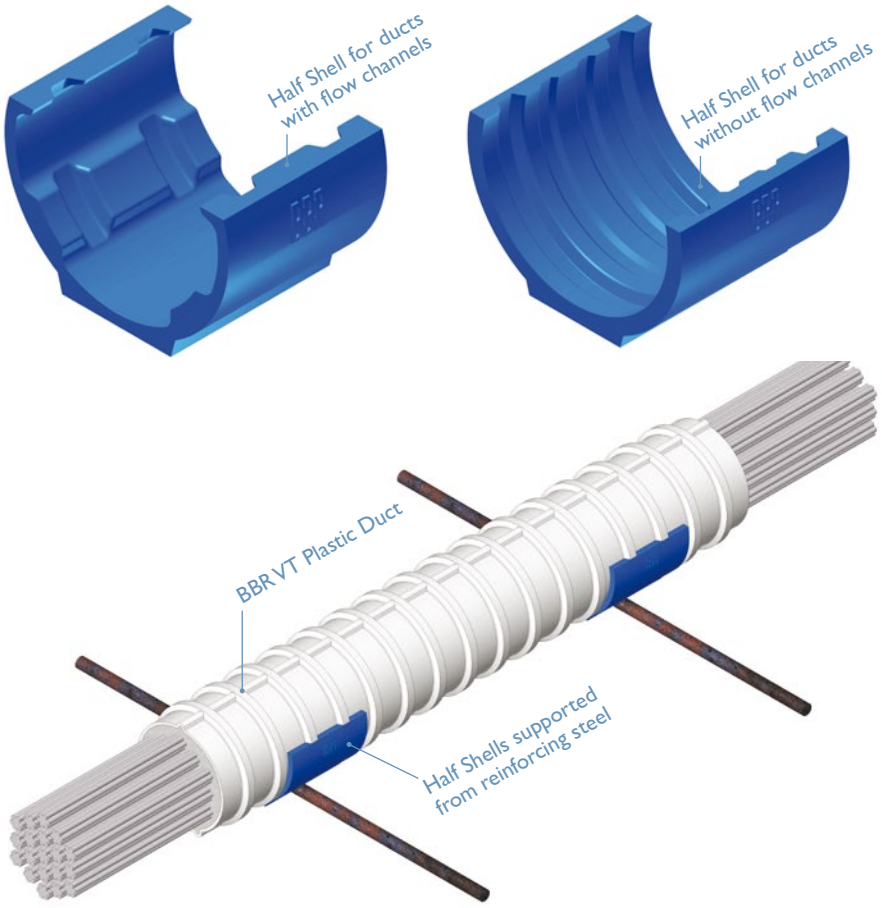
Snap-Lock Coupler

A new generation of duct-to-duct joiners can be found in the Snap-Lock Coupler specifically designed to achieve an air and water tight connection without the need for heat shrink sleeves. This coupler maintains the alignment of the flow channels and permits a quick, user-friendly leak-tight connection in the field. Installation procedures are easily followed and are graphically shown below. The Snap-Lock Coupler has undergone rigorous testing to validate that the coupler remains watertight when the duct tendon is bent to the minimum radius or curvature and fully complies with *fib* Bulletin 7.



Duct Protective Half Shell

BBR VT Plastic Ducts have successfully passed all the performance testing requirements for *fib* Bulletin 7, FDOT and European Technical Approval without employing any additional half shell protection. However, in some countries the local code requirements necessitate an additional protective layer to the low and high points of a profiled plastic tendon. This can be achieved through the use of specially designed plastic half shells that snap-lock around the duct at these locations and effectively provide an additional highly durable wearing surface to resist the high wearing forces during the strand stressing operation. This half shell also fulfills the Swiss Approval requirements for category B (PL2) and C (PL3).



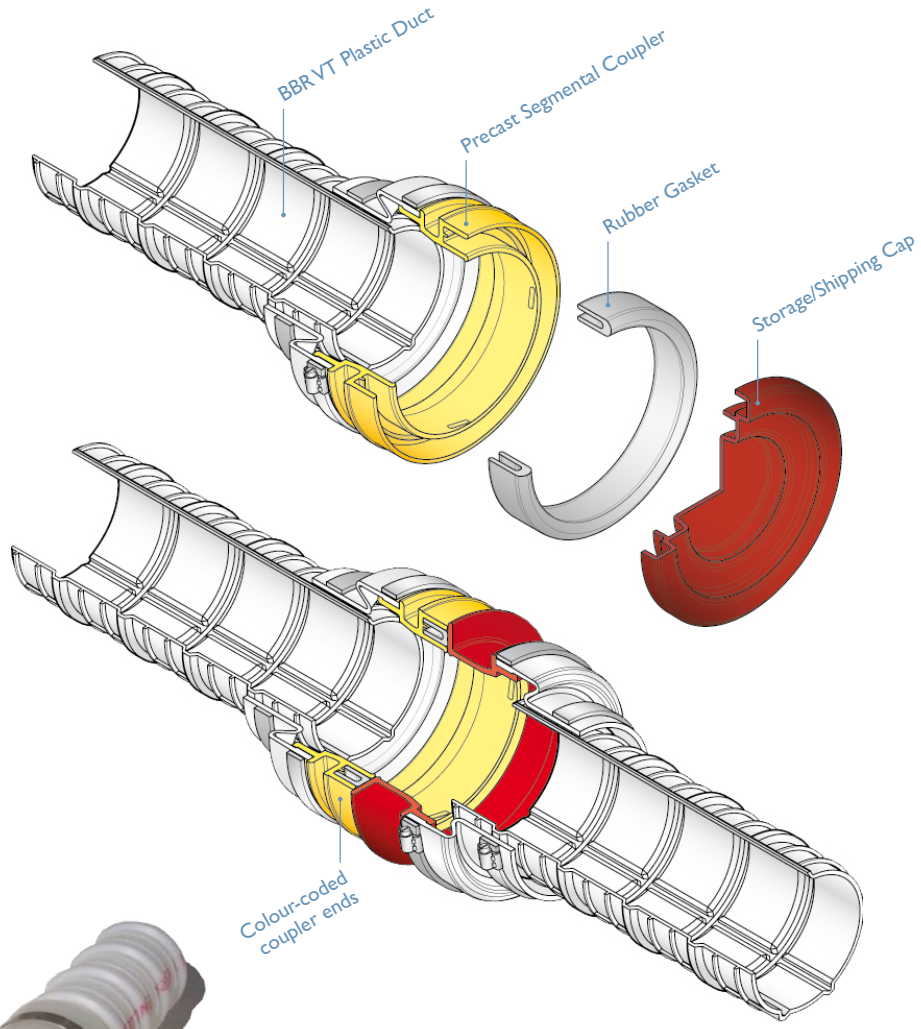
Prefabricated PT tendons

The off-site prefabrication of post-tensioning tendons can offer many great benefits for certain construction projects. The BBR VT Plastic Duct is ideal for this application and inner duct diameters of up to 130mm can be easily coiled onto reels for more efficient handling. Whilst not suited to every application, the advantages of prefabrication for the client are:

- greater program / time flexibility for both fabrication and installation on site
- clean and efficient fabrication
- speedy installation on site
- smooth, problem-free strand-pushing operation
- smaller ducting diameter and hence a greater effective design depth is achievable

Precast Segmental Coupler

This is a state-of-the-art coupler for post-tensioned ducts at precast segment connections. It is designed specifically with the segmental bridge construction industry in mind therefore it incorporates strong, rugged, high performance materials together with user-friendliness and easy colour-coded installation in the field. The Precast Segmental Coupler complies with *fib* and the Florida Department of Transportation (FDOT).



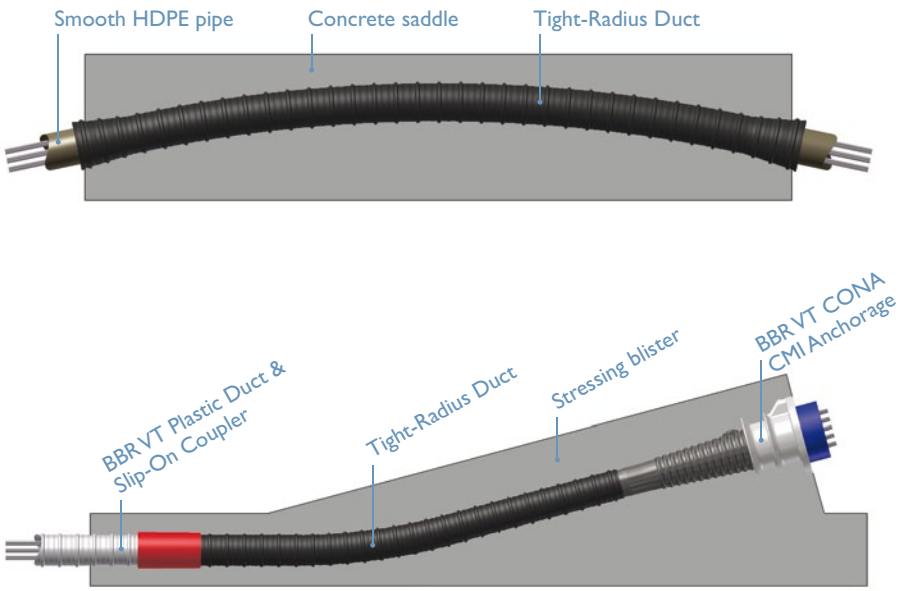
Advantages of the Precast Segmental Coupler

- Creates an air and water tight connection at the most vulnerable location in the tendon – the segment joint – providing the best corrosion protection available
- Maintains the integrity of the post-tensioning tendon duct for grouting purposes – there are no crossovers and epoxy does not leak through the segmental couplers or attachments
- Accepts angles up to 15° in any direction at the segment joint to maintain tendon alignment – which is far greater than required on most projects
- Allows for misalignment of the segments by up to 6mm in any axis meaning field tolerances are achievable
- The boot design provides tolerance permitting prefabrication of duct lengths and enhancing field productivity
- Robust and user friendly components which eases installation and improves overall project efficiency and quality

Tight-Radius Corrugated Plastic Duct

The BBR VT Plastic Duct is used in a wide variety of post-tensioning applications around the world protecting post-tensioning strands and preventing concrete spalling and deterioration for example from the expansion of corroding elements, such as metal or galvanized metal ducts. The Tight-Radius Corrugated Plastic Duct provides the same corrosion protection where post-tensioning tendons require extremely tight-radii profiles.

Specially formulated, high-performance materials are used to manufacture this unique duct. Testing to show its ability to achieve tight-radii conforming to the requirements of *fib* and the Florida Department of Transportation (FDOT) is confirmed by an independent testing agency. The Tight-Radius Corrugated Plastic Duct is particularly suited for tight-radii stressing blisters and saddle/deviator points in tight-radii tendon profiles.



Number of strands*	[-]	0406	0506	0706	0906	1206	1506	1906	2206	2406	2706	3106	3706
Duct internal diameter	[mm]	50	60	60	75	75	85	100	115	115	115	130	130
R_{min} of BBR VT Plastic Duct #	[m]	4.6	4.7†	6.5	6.5	7.4	8.2	7.4	7.4	7.4	8.1	8.1	9.7†
R_{min} of Tight-Radius Plastic Duct #	[m]	4.5†	4.6	6.4	3.7†	4.9	5.1	4.8	5.2†	5.6†	6.3	5.6	6.6

* Strand area 150mm^2, tensile strength 1,860 MPa.

\# Values of minimum radius of curvature given in the above table are for normal temperatures. If the temperature of the concrete next to the plastic duct is expected to be at or exceed 37°C at the time of stressing operations, please contact your nearest BBR representative for alternative values of minimum radius of curvature.

† Values interpolated from testing

Advantages of the Tight-Radius Corrugated Plastic Duct

- Allows the use of light-weight, corrosion resistant materials with superior bonding at external tendon deviators
- Eliminates the corrosion potential between highly stressed post-tensioning strand and galvanized metal pipe
- Provides material cost savings versus galvanized pipe
- Permits light-weight material that is easy to transport, handle and install
- Allows a smaller radius for tendons at stressing blisters increasing construction flexibility
- Provides positive connections to HDPE duct of external post-tensioning tendons

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