

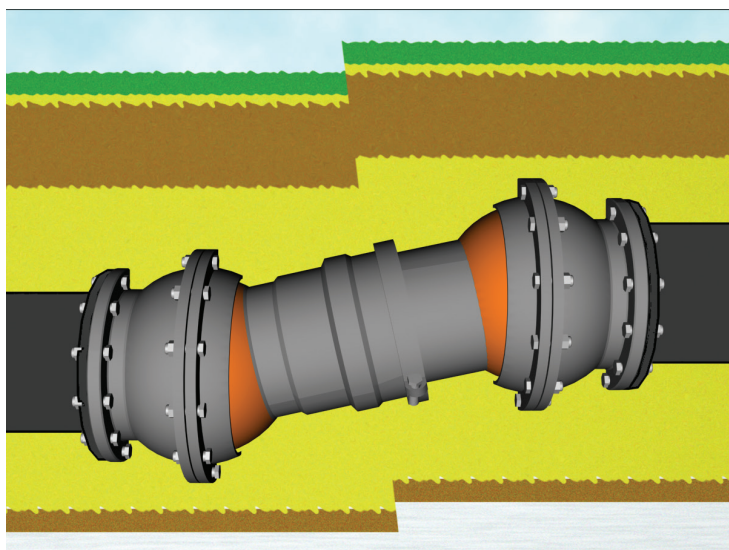
# EBAA IRON Connections™

TECHNICAL DATA FOR THE WATER & WASTEWATER PROFESSIONAL

FT - 4

## The Need for Flexible Expansion Joints

Shear forces, differential settlement, seismic activity, thermal expansion and contraction, all make pipeline design and construction challenging. For many years the EBAA Iron, Inc. Flex-Tend family of flexible expansion joints has been an integral part of the pipeline engineer's design protocol when conditions such as these exist.



### Considerations in Pipeline Design

As stated, the Flex-Tend solves the problem of protecting piping systems at various shear planes and in many different soil conditions. But, even the application of the Flex-Tend poses some engineering challenges. The challenges are especially predominant on above ground applications such as bridge crossings and other similar structures (See EBAA Iron Connections bulletin FT-03).

The internal pressure of fluids creates an internal force on the Flex-Tend unit as well as the piping joints. These forces of axial expansion must be accounted for and can, at times, require the use of thrust blocks to isolate the internal hydraulic forces that act on the piping.

There can also be a need for temporary rodding of the Flex-Tend unit during pressure testing of the piping system. Furthermore, above ground designs must not only accommodate thrust forces but do so with the use of pipe hangers, supports and guides, in order to alleviate lateral and vertical movement of the pipe joints as well as the Flex-Tend itself. All these design considerations must be implemented when needed but can not prevent nor hinder the Flex-Tend unit from performing its intended function.

### Forced Balanced Flex-Tend: An Engineered Solution

In order to make the pipeline design and construction process more simplified in various situations, EBAA Iron offers the Force Balanced Flex-Tend flexible expansion joint. The Force Balanced Flex-Tend eliminates the need for thrust blocks and/or rodding, and simplifies pipe hanger and support apparatuses and designs. And, it offers the same level of protection against shear forces, differential settlement, seismic activity and thermal expansion and

contraction.

What makes this product unique is the balance chamber. This chamber uses internal hydrostatic pressure by means of a piston to neutralize the expansion forces that would otherwise cause the unit to expand and deflect independent of any of the forces it was designed to alleviate, especially in applications above ground.

The EBAA Iron Force Balanced Flex-Tend gives designers a new option for absorbing the forces imparted on piping systems

resulting from seismic events, differential settlement, structural shear planes and various other conditions that impart shear forces on piping systems. But, by eliminating the force imparted by hydrostatic pressure on the flexible expansion joint, the designer and installers can focus on the issues that precipitate the need for the flexible expansion joint. Above ground piping applications are especially susceptible to hydrostatic pressures and thus the Force Balance Flex-Tend provides a new and effective option.



This is one in a series of Connections reports addressing design and application subjects. If you would like additional copies of other reports or a listing of available reports contact your EBAA Iron representative or call EBAA Iron Sales at 800.433.1716 or fax 254.629.8931. EBAA's engineering group can be reached at 800.633.9190 or fax 254.629.2079. Copyright© 1995 Ebaa Iron Sales, Inc.

ISSUE: 0108-B

P.O. BOX 857 • EASTLAND, TEXAS 76448 USA • PHONE 254.629.1731 • TELEFAX 254.629.8931 • TOLL-FREE 800.433.1716 • WWW.EBAA.COM • CONTACT@EBAA.COM