

## Advantages of Push-fit over welded connection of ACO pipe systems

### 1. General advantages

#### 1.1. Dilatation

The innovative push-fit system is designed to accommodate minor pipe movements and effectively absorb material dilatation caused by temperature fluctuations. This feature ensures optimal performance and longevity of the system, even under varying environmental conditions.



Figure 1: Expansion socket, Installation each 8-10 m

#### 1.2. Durability

The pipe system has been successfully implemented across a diverse range of industrial sectors, including the Marine industry, Food & Beverage sector, Industrial Kitchens, and Pharmaceutical & Healthcare facilities. With the correct selection and installation of materials and seals, our system promises efficient operation and durability, potentially lasting for decades.

#### 1.3. Tightness

Every pipe undergoes rigorous testing during the manufacturing process. We ensure the integrity of all welds on straight pipes through advanced eddy current inspections. Prior to packaging, all fittings are subjected to vacuum tests to guarantee their quality. Our seals are meticulously tested for both overpressure and underpressure conditions, undergoing both static and dynamic rotational tests. This comprehensive testing protocol underscores our commitment to delivering a reliable, high-performance system.

# ACO Building Drainage

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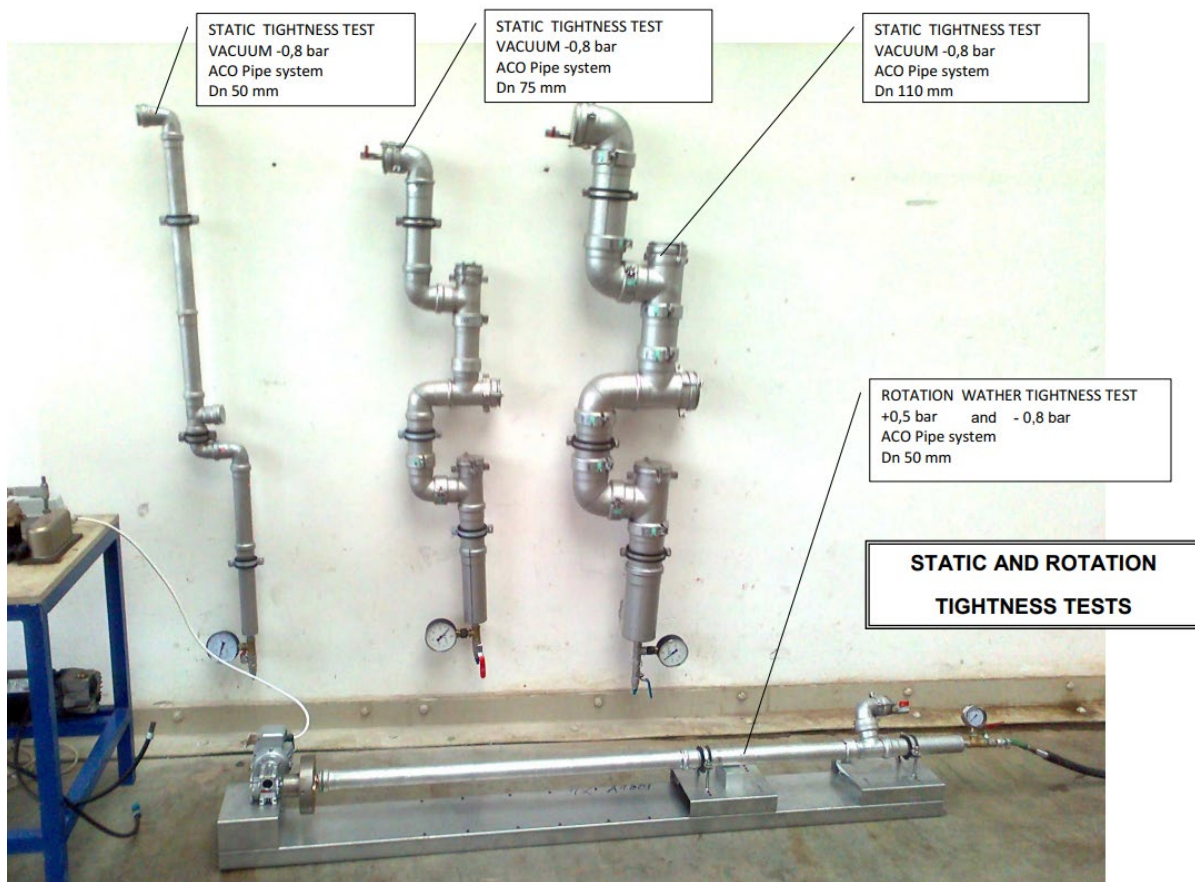


Figure 2: Static and rotation tightness test

Welds on construction site can be hardly controlled. Our system is tested and certified. Installations we did in past 30 years work without problem or tightness issue.

## 1.4. Installation

The simplicity and speed of push-fit system's connection process not only facilitates a swift installation but also contributes to cost-effectiveness. This efficiency in installation translates into significant savings in time and resources, making the ACO pipe system an optimal choice.

## 2. Welded pipes vs. socketed pipes in case of an earthquake

Earthquakes represent a significant risk to pipeline systems, having caused extensive damage, including ruptures and leaks in pipelines and distribution systems across kitchen and food processing environments. This damage leads to substantial repair costs and poses hygienic risks, resulting in profound economic and environmental impacts on businesses.

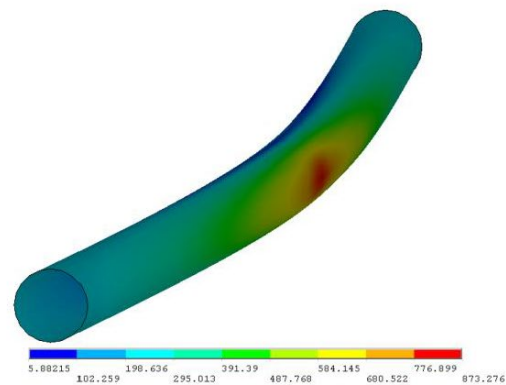
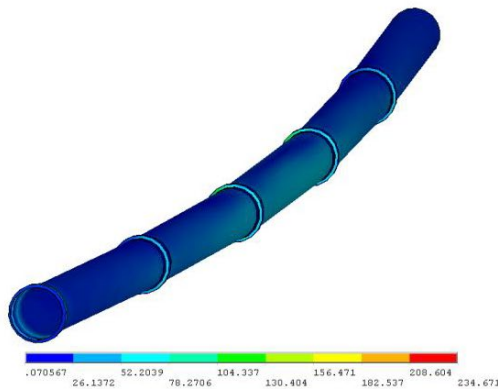
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In many regions worldwide, standard industrial stainless-steel pipework is connected via welding. While this method may initially appear cost-effective, it carries considerable risks, particularly in areas prone to any level of tectonic activity.

In 2015, ACO conducted a series of tests aimed at demonstrating the suitability of push-fitted pipes in such regions. The results unequivocally showed that our push-fit system offers superior resilience to ground disturbances compared to pipework connected by welded joints. Longitudinal movements are compensated by the pipe's movement within the socket, and tension during transverse movements is mitigated by slight pipe movements within the socket, as illustrated in the graph below.



| ACO pipe         |               |
|------------------|---------------|
| Deformation (mm) | Stress* (MPa) |
| 50               | 56            |
| 60               | 77            |
| 70               | 106           |
| 80               | 142           |
| 90               | 186           |
| 100              | 235           |

| Welded stainless steel pipe |               |
|-----------------------------|---------------|
| Deformation (mm)            | Stress* (MPa) |
| 50                          | 341           |
| 60                          | 431           |
| 70                          | 528           |
| 80                          | 634           |
| 90                          | 749           |
| 100                         | 873           |

\* Risk of deterioration - Stress > 600 MPa

Test results clearly demonstrate the superior resilience of socketed pipe system, particularly in response to underground movements triggered by tectonic activity or other forces. The system is designed to withstand high levels of tension. Laboratory tests have shown that our long pipelines, connected via the push-fit method, can endure greater forces compared to pipelines with welded joints. This robust performance under pressure underscores the reliability and durability of our system.