

# Details of Technology

Name of Technology	Friction pressure joining technology for spheroidal graphite cast iron pipes	Metal
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Key words	cast iron, heterogeneous material, friction pressure joining	

## What kind of technology is this?

### Outline

**Joining of two nodular graphite cast iron pipes, which can not be welded easily, becomes possible by friction pressure joining method. The features are as follows:**

- \*No graphite deformation layer**
- \*No formation of chill structure**
- \*Joining between fractured part and base material becomes possible.**

The cut length of spheroidal graphite cast iron pipes commonly used for water supply and sewerage systems is 4 - 6 meters. Their application for an installation site whose length was 4 meters or less was difficult because their standard cut lengths do not match such site. To process those spheroidal graphite cast iron pipes for water supply and sewerage systems to have a desired length or shape, a joining technology for two cast iron pipes having different lengths or shapes was needed to be developed newly.

In this study, using the friction pressure joining method among solid-phase joining methods, the development of a joining method for spheroidal graphite cast iron pipes, in which no brittle chill structure was formed, was attempted. In general, when spheroidal graphite cast iron is joined by friction pressure joining, a graphite deformation layer that is formed by the deformation of spheroidal graphite by friction force is built up and remains near the center of joined section, significantly lowering the strength of the joined section. To avoid this from occurring, in this friction pressure joining method, the shape of spheroidal graphite cast iron pipes and pressure joining conditions were carefully adjusted. As a result, joining was achieved without developing any graphite deformation layer.



## What are its applications?

By joining cast iron pipes having different lengths or shapes together, composite components can be manufactured. For example, this technology is applicable to pipeline laying for water supply and sewerage systems using jacking method, lowering the workload for their installation.

Related patents	Japanese patent laid-open No. 2002-356736 Japanese patent laid-open No. 2003-277877
Related materials	Journal of Japan Foundry Engineering Society. Vol. 73, No. 3, 167-172 (2001) Journal of Japan Foundry Engineering Society. Vol. 72, No. 8, 535-540 (2000) Journal of Japan Friction Joining Association. Vol. 6, No. 3, 57-63 (2000)