GENERAL FACTSHEET

Management of equipment joints

Correct assembly of flanged joints is essential to ensure safe and consistent leak-tight performance of pressurised equipment. ABB has a wealth of experience of the analysis of flange problems and the calculation of optimum torque and load values for many hundreds of vessel, heat exchanger and pipe flanges.

There have been numerous incidents involving the release of flammable and toxic substances into the atmosphere as a direct result of poorly assembled joints. The Health and Safety Executive (HSE) have recently reported two incidents on offshore installations, one involving a release from a gas system and the other from an oil system.

The HSE has also issued a safety notice; ‘bolting of flanged joints for pressurised systems’, which amongst its many conclusions states that ‘flogging and impacting are highly inaccurate and should not be used’. Owners are required to ensure that there are clear instructions and procedures for making flanged joints, the correct tools are used and used properly, personnel involved are competent and that appropriate records are kept.

Equipment suppliers of pressure vessels and heat exchangers will rarely specify bolt loads for new equipment - they will tend to supplied with sufficient bolt load to seal against initial shop hydraulic test pressures which could be at least 1.3 times design pressure and often higher, hence the joint components could be loaded well above their normal design limits. This can result in leakage in service or even permanent distortion of joint components.

What we offer

Thoroughly documented flange management procedures are becoming increasingly important in order to control and limit emissions. Leakage problems in service can be prevented by the application of correct and appropriate initial bolt loads and controlled assembly procedures.

ABB engineers apply their knowledge and experience to select the correct joint materials (type of flange, gasket material and the type and grade of bolts). Once selected ABB uses the method of analysis of flange assemblies contained within part 1 of ‘BS EN1591, Flanges and their joints - design rules for gasketed circular flange connections’.

It is possible using this method to determine the extent of loading of the flanges, bolts and gasket, the degree of flange rotation and whether the initially applied bolt load will be sufficient to ensure an effective seal under all expected operating temperature and pressure conditions. The method is effective for both new equipment and when investigating issues with in-service equipment.
Benefits
Leakage problems in service can be prevented by the application of correct and appropriate initial bolt loads and controlled assembly procedures.

- Reducing potential exposure to leaks - improved personnel protection
- Reducing waste and improved plant efficiency
- Improved environmental performance
- Increase in personnel competence

“After years of suffering from leaking joints on a heat exchanger and after many failed attempts at tackling the issue, ABB has solved this for us.”

Why ABB?
ABB has a wealth of experience of the analysis of flange problems and the calculation of optimum torque and load values for many hundreds of vessel, heat exchanger and pipe flanges.

ABB has also developed joint calculation tools and has a wealth of experience in the application of the BS EN1591 method since the standard was published in draft form in 1994. Experience has proven it to be an extremely reliable and accurate method of analysing flange problems and for the calculation of optimum assembly bolt loads and torque values.