



Flanged connections in pressurised equipment Construction recommendations

Introduction

This document gives recommendations regarding workmanship in making flanged connections in pressurised equipment. The recommendations comprise requirements for the surface preparation grade and maximum misalignment of the sealing surfaces and assembly of the flanged connection.

1 General

In order that a flanged connection under pressure should provide the greatest possible degree of tightness against leakage, requirements are specified concerning the surface preparation grade of the sealing surfaces and the maximum misalignment in and between the sealing surfaces. If the flanges are misaligned during assembly or if the flanges are not parallel, this error is added to any defects there may be in the flanges. The greatest possible accuracy should therefore be endeavoured in producing flanges.

2 Surface preparation grade

In order that the flange gasket should be able to bed into the tool marks in the surface and achieve sufficient friction against the flange, these tool marks must have a certain depth. On the other hand, if these marks are too deep, it is necessary to use a thicker gasket which is contrary to the wish to use the thinnest possible gasket. For most gasket materials of 1.5 mm thickness, a surface preparation grade of 3.2 - 12.5 Ra up to PN40, and 3.2 - 6.3 Ra for PN64 and above, is appropriate. Selection of **surface preparation grade 6.3 Ra** as a standard value would be an advantage from the standpoint of tightness, since this value is applicable for most gasket materials and also all pressure classes. The sealing surfaces shall be turned or machined so that the tool marks do not pass straight across the flange or sealing surface. Lathework tool marks that are so rough that the surface may be referred to as having 'gramophone record' grooves is not recommended since such deep tool marks may result in creep leakage.

3 Misalignment

One contributory cause of gasket failure are flanges that are misaligned and/or not parallel. The thin gaskets used today cannot accommodate excessive degrees of misalignment. Generally speaking, if the gasket thickness is increased, this means that a major degree of misalignment **cannot** be taken up since the gasket is already subjected to high loads (non-planar state of stress due to the high edge).

For the types of gasket described in SSG 1345, it is recommended that the misalignment of gaskets of 1.5 mm thickness should not generally exceed the values set out in the table below. The values presuppose that the flanges are mounted parallel.

General recommendations:

Type	Max misalignment, mm ¹⁾
Rubber bound fibre gasket	0,10
Filled PTFE with reinforcement	0,30
Fully expanded PTFE gasket in sheets	0,30
Expanded graphite with reinforcement	0,30
Spiral wound gasket	0,30

1) The above values may have to be adjusted depending on gasket dimensions. See SSG 1366 and 1368.

4 Assembly

The sealing surfaces must be checked prior to assembly.

When the flange is welded to the pipe, care must be taken to ensure that the flange surface is perpendicular to the longitudinal axis of the pipe. If possible, the flanges should be bolted together prior to welding, using an insert of sheeting of the same thickness as the gasket. See SSG 1345, Section 3 Assembly instructions.