JIS

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(ISO/DIS 10471.2 : 1997)

Plastics piping systems—Glass-reinforced thermosetting plastics (GRP) pipes—Determination of the long-term ultimate bending strain and calculation of the long-term ultimate relative ring deflection, both under wet conditions

ICS 23.040.20

Descriptors : thermosetting polymers, plastics, reinforcing materials, glass, pipework systems, pipes, bending stress, deformation

Reference number : **JIS K 7039 : 1998 (E)**

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

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Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the long-term ultimate bending strain and calculation of the long-term ultimate relative ring deflection, both under wet conditions

Introduction This Japanese Industrial Standard has been prepared based on **ISO/DIS 10471.2**, *Plastics piping systems—Glass-reinforced thermosetting plastics (GRP) pipes—Determination of the long-term ultimate bending strain and calculation of the long-term ultimate relative ring deflection, both under wet conditions* issued in 1997 without changing its technical contents.

1 Scope

This Japanese Industrial Standard specifies a method for determining by extrapolation the long-term ultimate bending strain and the calculation of the long-term ultimate relative ring deflection of glass-reinforced thermosetting plastics (GRP) pipes under wet conditions.

Two methods of loading are given, depending upon the use of plates or beam bars.

NOTE Either method may be used for measurements of relative vertical deflection upto 28%. When it is expected that this level is going to be exceeded then the procedure is limited to the use of at least one beam bar.

2 Normative references

This Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

For dated references, subsequent amendments to, or revisions of, any of these publications apply to this Standard only when incorporated in it by amendment or revision.

For undated references the latest edition (including amendment) of the publication referred to applies.

ISO/DIS 7685.2, :Plastics piping systems - Determination of the initial specific ring stiffness of pipes

ISO 10928:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings -Methods for regression analysis and their use

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply.

3.1
vertical compressive force (F)
The vertical force applied to the horizontal pipe to cause a vertical deflection.

It is expressed in newtons (N).

3.2
mean diameter (d_m)
The diameter of the circle corresponding with the middle of the pipe wall cross section. It is given by either of the following equations:

$d_m = d_i + e$ ..... (1)

$d_m = d_e - e$ ..... (2)

where:

d_i is the internal diameter, in metres (m);

d_e is the external diameter, in metres (m);

e is the wall thickness of the pipe, in metres (m).

Mean diameter is expressed in metres (m).

3.3
vertical deflection (y)
The vertical change in diameter of a horizontal pipe in response to a vertical compressive force (see **3.1**).

It is expressed in metres (m).

3.4
relative vertical deflection (y/d_m)
The ratio of the vertical deflection of the pipe , y (see **3.3**), to the mean diameter of the pipe, d_m, (see **3.2**).

3.5
ultimate vertical deflection under wet conditions ($y_{u\,wet}$)
The vertical deflection of the pipe, y (see **3.3**) when failure occurs, under wet conditions (see **10.7** and clause **4**).

It is expressed in metres (m).

3.6 **ultimate relative vertical deflection under wet conditions** ($y_{u,wet}/d_m$)
The ratio of the ultimate vertical deflection under wet conditions, $y_{u\,wet}$ (see **3.5**) to the mean diameter of the pipe, d_m, (see **3.2**).

3.7
long-term ultimate ring deflection under wet conditions ($y_{u,wet,x}$)
The extrapolated value of the ultimate vertical deflection of the pipe under wet conditions, $y_{u,wet}$ (see **3.5**) when failure is expected to occur at a time, x, specified in the referring standard.

It is expressed in metres (m).

3.8
long-term ultimate relative vertical deflection under wet conditions ($y_{u\,wet,x}/d_m$)
The ratio of the long-term ultimate ring deflection under wet conditions $y_{u\,wet,x}$ (see **3.7**) to the mean diameter of the pipe, d_m, (see **3.2**).

3.9
failure
Loss of the structural integrity of the test piece by rupture of the pipe wall.

3.10
time to failure (t_u)
The time elapsed until failure (see **3.9**) occurs.

It is expressed in hours (h).

3.11
specific ring stiffness (S)
A physical characteristic of the pipe that is a measure of the resistance to ring deflection per metre length under external load.