

JIS

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 1043 : 1993

(ISO 6157-3 : 1988)

(Reaffirmed in 1998)

**Fasteners—
Surface discontinuities—
Part 3 : Bolts, screws and studs
for special requirements**

ICS 21.060.10

Descriptors : threads, bolts, studs (fasteners), surface defects

Reference number : JIS B 1043 : 1993 (E)

B 1043 : 1993 (ISO 6157-3 : 1988)

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:

Date of Establishment: 1993-07-01

Date of Reaffirmation: 1998-03-20

Date of Public Notice in Official Gazette: 1998-03-20

Investigated by: Japanese Industrial Standards Committee
Divisional Council on Machine Elements

JIS B 1043:1993, First English edition published in 2000-06

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2000

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

Fasteners—Surface discontinuities— Part 3 : Bolts, screws and studs for special requirements

Foreword for Japanese Industrial Standard

This Japanese Industrial Standard has been prepared based on **ISO 6157-3** (*Fasteners—Surface discontinuities—Part 3 : Bolts, screws and studs for special requirements*) issued in 1988 as the first edition without changing the technical contents.

The “Informative references” underlined with dots in this Standard show the matters not specified in the original International Standard.

1 Scope

1.1 This Standard establishes limits for various types of surface discontinuities on bolts, screws and studs for special requirements.

It applies to bolts, screws and studs with

- nominal thread diameters 5 mm and larger;
- product grades A and B;
- nominal lengths $l \leq 10d$ (or longer if specified)
- property class 12.9;
- property classes 8.8, 9.8 and 10.9 when specified in product standards or agreed between supplier and purchaser.

1.2 Where the permissible limits for surface discontinuities indicated in clause 3 occur, the minimum values for the mechanical and functional properties specified in **ISO 898-1** should still be met.

When fatigue strength requirements are specified, the fatigue strength should not be lower than that obtained on bolts without defects taken from the same lot.

Informative reference : **ISO 898-1** is equivalent to **JIS B 1051** *Mechanical properties of steel bolts and screws*.

Notes 1 The figures in clause 3 are examples only. They apply correspondingly also to other types of bolts, screws and studs.

2 The individual figures show the surface discontinuities exaggerated in some cases for clarity.

2 References

ISO 468 *Surface roughness—Parameters, their values and general rules for specifying requirements*

ISO 898-1 *Mechanical properties of fasteners—Part 1 : Bolts, screws and studs*

ISO 3269 *Fasteners—Acceptance inspection*

Remarks : **JIS B 1091** *Fasteners—Acceptance inspection* is identical with the said International Standard.

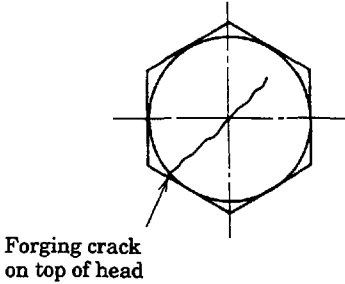
3 Types, causes, appearance and limits of surface discontinuities

3.1 Cracks A crack is a clean (crystalline) fracture passing through or across the grain boundaries and may possibly follow inclusions of foreign elements. Cracks are normally caused by overstressing the metal during forging or other forming operations, or during heat treatment. Where parts are subjected to significant re-heating, cracks usually are discoloured by scale.

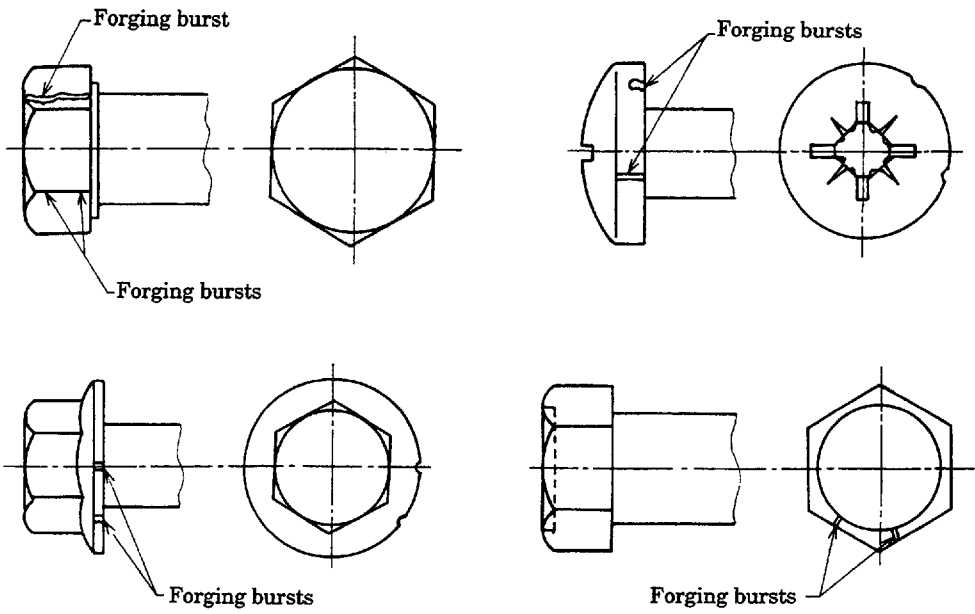
3.1.1 Quench cracks

Cause	Quench cracks may occur during hardening due to excessively high thermal and transformation stresses. Quench cracks usually follow an irregular and erratic course on the surface of the fastener.
Appearance	Quench crack circumferential and adjacent to fillet Quench crack at corner of head Transverse quench crack Quench crack at root Quench crack, section at crest of thread missing Quench crack across top of head. Usually an extension of crack in shank or side of head Quench crack across washer face and to depth of washer face thickness Quench crack extending radially into fillet Quench crack at root Quench crack
Limits	Quench cracks of any depth, any length, or in any location are not permitted.

3.1.2 Forging cracks

Cause	Forging cracks may occur during the cut-off of forging operations and are located on the top of the head of screws and bolts.
Appearance	 Forging crack on top of head
Limits	Length, l, of forging cracks: $l \leq d^{1)}$ Depth or width, b, of forging cracks: $b \leq 0.04d$ Note : The limits for forging cracks do not apply to socket head screws (see 3.1.5). ¹⁾ d = nominal thread diameter

3.1.3 Forging bursts

Cause	Forging bursts may occur for example during forging on the flats or corners of the heads of bolts and screws, at the periphery of flanged or circular head products or on the raised periphery of indented head bolts and screws.
Appearance	 The diagrams show four examples of forging bursts on different bolt and screw head types. Each example consists of a side view and a top view. Top-left: A bolt with a hexagonal head. The side view shows bursts on the flats and corners, labeled 'Forging burst' and 'Forging bursts'. The top view shows a hexagon with bursts on the corners. Top-right: A bolt with a circular head. The side view shows bursts around the periphery, labeled 'Forging bursts'. The top view shows a circle with bursts around the edge. Bottom-left: A bolt with a hexagonal head. The side view shows bursts on the flats, labeled 'Forging bursts'. The top view shows a hexagon with bursts on the flats. Bottom-right: A bolt with a hexagonal head. The side view shows bursts on the corners, labeled 'Forging bursts'. The top view shows a hexagon with bursts on the corners.
Limits	Hexagon head screws No forging burst in the flats of hexagon bolts and screws shall extend into the crown circle on the top of the head surface (chamfer circle) or into the underhead bearing surface. Forging bursts occurring at the intersection of two wrenching flats shall not reduce the width across corners below the specified minimum. Forging bursts in the raised periphery of indented head bolts and screws shall not exceed a width of $0.06d^{1)}$ or have a depth extending below the indented portion. Circular head screws Flanges of bolts and screws and peripheries of circular head screws may have forging bursts, but they shall not exceed the following limits: Width of forging bursts: $0.08d_c^{2)}$ (with only one forging burst); $0.04d_c$ (with two or more forging bursts, one of which may extend to $0.08d_c$). Depth of forging bursts: $0.04d^{1)}$ ¹⁾ d = nominal thread diameter ²⁾ d_c = head or flange diameter