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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 683/IX

HEAT-TREATED STEELS, ALLOY STEELS AND FREE-CUTTING STEELS

PART 9

WROUGHT FREE-CUTTING STEELS

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 683/IX, *Heat-treated steels, alloy steels and free-cutting steels – Part 9 : Wrought free-cutting steels,* was drawn up by Technical Committee ISO/TC 17, *Steel*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1364,which was circulated to all the ISO Member Bodies for enquiry in December 1967. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Hungary	South Africa, Rep. of
Austria	India	Spain
Belgium	Israel	Sweden
Canada	Italy	Switzerland
Colombia	Korea, Rep. of	Thailand
Czechoslovakia	Netherlands	Turkey
Denmark	New Zealand	U.A.R.
Finland	Norway	U.S.A.
France	Poland	U.S.S.R.
Germany	Romania	

The following Member Bodies opposed the approval of the Draft :

Brazil
United Kingdom

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 683/IX | October 1970

HEAT-TREATED STEELS, ALLOY STEELS AND FREE-CUTTING STEELS

PART 9

WROUGHT FREE-CUTTING STEELS

1. SCOPE

1.1 This ISO Recommendation covers three groups of wrought free-cutting steels for mechanical purposes as listed in Table 3, namely,

(*a*) not intended for heat treatment,

(*b*) suitable for case hardening,

(*c*) suitable for quenching and tempering.

1.2 This ISO Recommendation applies to semi-finished products, bars, wire rods, and bright steel.

2. DEFINITION

Free-cutting steels are characterized by good machinability, i.e. high metal removal rate, essentially obtained by higher than normal contents of sulphur, or sulphur and lead.

3. REQUIREMENTS

3.1 Production processes

Unless otherwise agreed in the order, the processes used in making the steel and the product are left to the discretion of the manufacturer. When he so requests, the user should be informed what steelmaking process is being used.

3.2 Chemical composition and mechanical properties

3.2.1 The steels covered by this ISO Recommendation should be ordered and delivered in accordance with Table 1.

TABLE 1 – **Types of condition of delivery**

Requirements	Types of condition of delivery*									
	1	1(b)	1(n)	1(q)	3	3(b)	4	4(b)	5	6
Chemical composition	X	X	X	X	X	X	X	X	X	X
Hardness (maximum value)										
– in the "as rolled" or "as peeled" condition	–	X	–	–	–	X	–	X	–	–
– in the normalized condition	–	–	X	–	–	–	–	–	–	–
Mechanical properties										
– in the normalized condition	–	–	X	–	–	–	–	–	–	–
– in the cold-drawn condition	–	–	–	X	–	–	–	–	–	–
– in the quenched and tempered condition										
– for a 16 mm diameter test bar	–	–	–	–	X	X	–	–	–	–
– for a ruling section	–	–	–	–	–	–	X	X	–	–
– for a product in final dimensions**	–	–	–	–	–	–	–	–	X	–
– in the quenched and tempered and subsequently cold-drawn condition	–	–	–	–	–	–	–	–	–	X
– in the simulated case-hardened condition***	–	–	–	–	–	–	–	–	X	–

* The numbers indicating the types of condition of delivery follow a co-ordinated series of numbers throughout all relevant ISO Recommendations.

** For the quenched and tempered steels 7, 8, 9 and 10.

*** For the case-hardening steels 4, 4Pb, 5 and 6.