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In the event of any doubts arising as to the contents,
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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Writing Instruments Manufacturers Association (JWIMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS S 6005:2013** is replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Leads for mechanical pencils

Introduction

This Japanese Industrial Standard has been prepared based on **ISO/FDIS 20318-2** registered in 2018 without any modifications of its technical contents, but also incorporating requirements that are unique to **JIS**, namely, those regarding colour leads and harmful substances.

The vertical lines on both sides and dotted underlines indicate additions to the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies requirements for black leads and colour leads used for mechanical pencils as specified in **JIS S 6013** (hereafter referred to as black leads and colour leads, respectively).

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO/FDIS 20318-2:2018 *Mechanical pencils and leads for general use—Classification, dimensions, quality and test methods—Part 2: Black leads (MOD)*

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7502	<i>Micrometers</i>
JIS B 7507	<i>Vernier, dial and digital callipers</i>
JIS B 7516	<i>Metal rules</i>
JIS K 0050	<i>General rules for chemical analysis</i>
JIS K 0116	<i>General rules for atomic emission spectrometry</i>
JIS K 0121	<i>General rules for atomic absorption spectrometry</i>
JIS K 8180	<i>Hydrochloric acid (Reagent)</i>
JIS L 0801	<i>General principles of testing methods for colour fastness</i>
JIS L 0804	<i>Grey scale for assessing change in colour</i>
JIS L 0841	<i>Test methods for colour fastness to daylight</i>
JIS L 0842	<i>Test methods for colour fastness to enclosed carbon arc lamp light</i>

- JIS L 0843 *Test methods for colour fastness to xenon arc lamp light*
- JIS P 8124 *Paper and board—Determination of grammage*
- JIS P 8148 *Paper, board and pulps—Measurement of diffuse blue reflectance factor—Indoor daylight conditions (ISO brightness)*
- JIS S 6013 *Mechanical pencils*
- JIS Z 8102 *Names of non-luminous object colours*
- JIS Z 8401 *Guide to the rounding of numbers*
- JIS Z 8703 *Standard atmospheric conditions for testing*
- JIS Z 8722 *Methods of colour measurement—Reflecting and transmitting objects*
- JIS Z 8802 *Methods for determination of pH of aqueous solutions*
- ISO 5-3 *Photography and graphic technology—Density measurements—Part 3: Spectral conditions*
- ISO 12757-1 *Ball point pens and refills—Part 1: General use*
- ISO 14145-1 *Roller ball pens and refills—Part 1: General use*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

black lead

solid writing material for mechanical pencil, which consists of black colour materials (e.g. graphite) and a binding agent (e.g. organic polymer, clay) generating lines which are erasable

3.2

colour lead

solid writing material for mechanical pencil, which consists of pigment and dyestuff, fat and oil, wax, extender, binding agent, etc.

3.3

hardness degree

combination of two alphanumeric or alphabetical symbols used to indicate the hardness and density (darkness) of the lead when used in writing

Hardness increases from 6B to 9H, and density of line increases from 9H to 6B, with HB representing the median hardness degree.

NOTE A scientific definition of hardness degree is not yet available.

3.4

marking diameter

numerical symbol used to classify leads by thickness (diameter) of lead

These are used to label or mark lead boxes to indicate a corresponding mechanical pencil.

4 Classification

Leads for mechanical pencils are classified into black leads and colour leads, and further according to marking diameter and hardness degree for black leads and according to marking diameter for colour leads as shown in Table 1.

Table 1 Classification of black leads and colour leads

Marking diameter (mm)	Hardness degree (Only applicable to black leads and not applicable to colour leads)	Informative
		Nominal diameter (mm) specified in ISO 9177-2
0.2	F, HB, B, 2B	—
0.3	4H, 3H, 2H, H, F, HB, B, 2B	0.35
0.4		—
0.5	4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B	0.5
0.7	4H, 3H, 2H, H, F, HB, B, 2B	0.7
0.9	4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B	1
1.3	2H, H, F, HB, B, 2B	—
1.4	2H, H, F, HB, B, 2B	— ^{a)}
2	9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B	2

Note ^{a)} Marking diameter “1.4” represents the line width specified in ISO 128-20; no corresponding diameter is specified in ISO 9177-2.

5 Colour names of colour leads

For colour leads, the colour names shown in Table 2, and other colour names specified in JIS Z 8102 shall be used.

Table 2 Colour names

Colour name			Colour name		
Hiragana characters	Chinese characters	English	Hiragana characters	Chinese characters	English
あか	赤	Red	みずいろ	水色	Light blue
ちゃいろ	茶色	Brown	あお	青	Blue
だいだいいろ	だいだい色	Orange	むらさき	紫	Purple
きいろ	黄色	Yellow	ももいろ	桃色	Pink
きみどり	黄緑	Yellow green	しろ	白	White
みどり	緑	Green	くろ	黒	Black

6 Quality

6.1 Bending strength

The bending strength of black leads and colour leads shall conform to the specifications in Table 3, when tested according to 8.3.

Table 3 Bending strength of black lead and colour lead

Unit: MPa

Hardness degree		Bending strength (minimum value)								
		Marking diameter (mm)								
		0.2	0.3	0.4	0.5	0.7	0.9	1.3	1.4	2
Black lead	9H, 8H, 7H	—	—	—	—	—	—	—	—	80
	6H, 5H	—	—	—	—	—	—	—	—	75
	4H, 3H	—	265	230	200	180	105	—	—	
	2H, H	—	—	—	—	—	—	95	90	
	F, HB	300	240	215	190	160	95	85	80	70
	B, 2B	230	220	185	150	140	90	80	70	40
	3B, 4B	—	—	—	130	—	80	—	—	30
	5B, 6B	—	—	—	—	—	—	—	—	20
Colour lead		200	150	125	100	70	60	40	35	25

6.2 Hardness degree of black leads

The hardness degree of black leads shall be evaluated quantitatively and qualitatively, because its scientific definition is not yet available (see **3.3**). It shall be specified quantitatively as the writing density of HB by using a line-drawing device. Furthermore, it shall be confirmed qualitatively for the leads of the same brand in the order of the density and the hardness by handwriting (visual/sensory evaluation).

The writing density of HB, when tested according to **8.4**, shall conform to the specification of Table 4. For the leads of the same brand, the order of writing density shall not reverse or alter in the order of the hardness degree.

Table 4 Writing density of HB

Marking diameter (mm)	Type of line-drawing device	
	A: Recording type	B: Spiral type
0.2	0.15 to 0.30	0.25 to 0.45
0.3		
0.4	0.25 to 0.45	
0.5		
0.7		
0.9		
1.3		
1.4		
2		
		0.30 to 0.50

6.3 Harmful substances

The migration²⁾ of certain elements³⁾ from black leads and colour leads for children¹⁾ or black leads and colour leads for mechanical pencils for children shall not exceed the limits specified in Table 5 when tested according to **8.5**.