

	SPECIFICATIONS FOR TRACK SHOE	PURCHASING STANDARD
		KPS - 02
		(1969)

1. General

- 1.1 This specification prescribes as to product and inspection specifications, acceptance inspection standard and delivery relating to hardened rolled track shoes to be delivered to KOMATSU Manufacturing Company (hereinafter called KOMATSU).
- 1.2 All rolled track shoes shall be manufactured in accordance with the drawings furnished by KOMATSU, and shall satisfy the requirements of this specification.
- 1.3 When desired to modify manufacturing method, concerned installation, quality control and inspection method which will affect the quality of products, the supplier shall obtain prior concurrence in writing from KOMATSU. (The above will include manufacturing method for material.)
- 1.4 When modification to this specification is desired, report shall be made to KOMATSU.
- 1.5 When question arises as to the content of this specification, report shall be made to KOMATSU for clarification.
- 1.6 In case the adherence to this specification is impracticable, prior approval shall be obtained.

2. Reference No. 150-011-5

3. Applicable Part No.

Part No.	Part No.	Part No.	Part No.
110-32-11520	135-32-11321	150-32-11313	141-32-11311
111-32-11110	140-32-11113	150-32-11311	170-32-11114
130-32-11113	140-32-11280	154-32-11110	175-32-11112
130-32-11280	141-32-11113	154-32-11310	170-32-11331
130-32-11111	144-32-11110	101-32-11350	175-32-11131
131-32-11113	150-32-21310	101-32-11341	102-32-11351
131-32-11111	150-32-11317	14905-32-110	102-32-11331
130-833-7112	150-32-11315	144-32-11111	195-32-11410
130-32-11270	150-32-11314	14905-32-111	195-32-11420
131-32-11330			

July 28, 1963

Established

KOMATSU MANUFACTURING CO., LTD.

April 23, 1969

Revised

100644 KES A 4-16

4. Specification for Products

4.1 Quality of Material and Chemical Composition -

Machine Model		D30 D50A	D50S	D60 D80	Remarks
Material		SMn34C			Steel shall be manufactured from a killed ingot produced by an electric furnace, and upper teeming as well as scalping shall be performed.
Chemical Composition Ladle Analysis	C	0.29	~ 0.36	Same as left	
	Si	0.15	~ 0.35		
	Mn	1.20	~ 1.50		
	P	0.035	max.		
	S	0.035	max.		
	Ni	0.25	max.		
	Cr	0.20	max.		
	Cu	0.30	max.		

Check analysis shall be performed in accordance with the supplement.

4.2 Surface Hardness and Mechanical Property -

Machine Model		D30 D50A	D50S	D60 D80	Remarks
Surface Hardness	Heat Treatment Surface Hardness HB	Water quenching and tempering 341 ~ 401	Same as left	Same as left	Measuring position for hardness in accordance with 2.4.
Impact Value	Impact value kg-M/cm ²	3 min.	Same as left	Same as left	Test shall be performed using the test piece extracted from products. The extracting position shall be in accordance with paragraph 2.4
Core Hardness	Core Hardness HB	302 min.	Same as left	Same as left	Measuring position shall be in accordance with 2.4 (Fig. 1).
Tensile Strength	Tensile Strength kg/mm ² Elongation %	100 min. 14 min.	Same as left	Same as left	Test shall be performed using the test piece extracted from products. The extracting position shall be in accordance with paragraph 2.4

Note 1 - Surface hardness of hardening shall be over HB 415.

Note 2 - Tempering shall be performed at 400°C and more by tempering furnace. (± 7.5°C)

4.3 Variation of Dimension

The variation of dimension which is not indicated on the drawing shall be determined as necessary.

July 28, 1963

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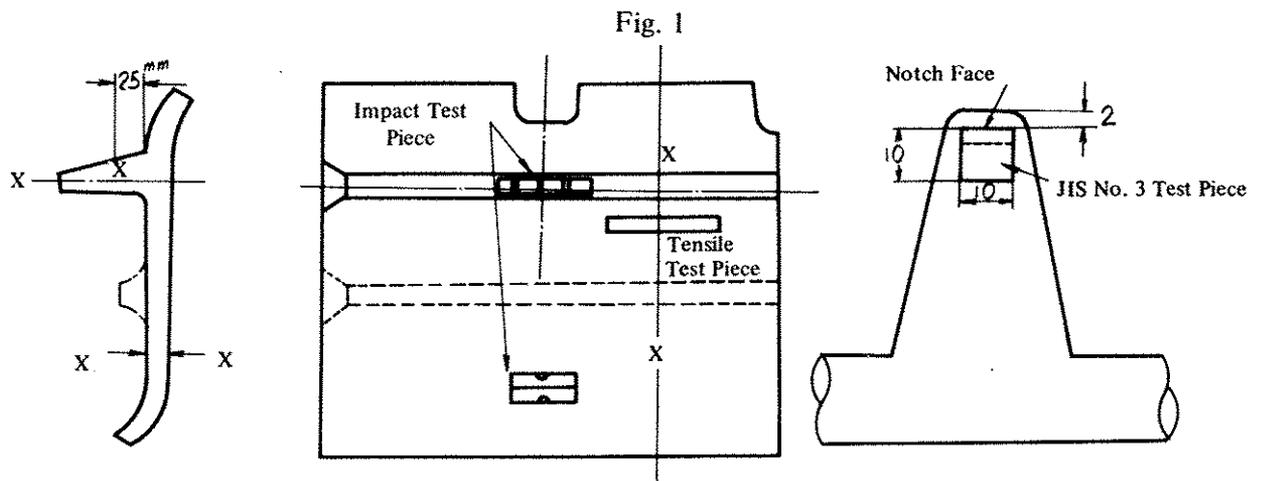
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April 23, 1969

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100644 KES A 4-18

4.4 Method for Extracting Test Piece -



X: Hardness measuring Position

4.5 Appearance, Scars and Others

- (1) Surface shall be free from cracks.
- (2) Product shall be free from non-metallic inclusions and scars which affect its serviceability.
- (3) Both ends cut with welder or press shall be free from cracks and all other defects that affect the serviceability.
- (4) Homogeneous material which is free from various kinds of segregation, porosity and all other defects that affect its serviceability shall be used.
- (5) Scars may be scraped within the variation of dimension, however, scraped areas shall be finished smoothly with a grinder.

5. Test and Inspection

Suppliers shall fully perform quality control in manufacturing the product and follow the inspection specification as follows:

- 5.1 As for the items with 0 mark in the table of inspection specification, result record shall be forwarded to KOMATSU, in four copies at the time of delivery. As for all other items, all concerned records shall be maintained.
- 5.2 Suppliers shall submit the document specifying methods for control and inspection in their manufacturing process, and shall obtain approval for it from KOMATSU.

5.3 Table of Tests and Inspections -

	Item	Method	Measuring Instrument	Remarks
Material	a. Chemical Composition	Ladle analysis shall be performed in accordance with JIS G 0303 (General Rules for Inspection of Steel).		When required, check analysis shall be performed in accordance with the supplement. ○
	b. Mechanical Property	Tensile hardness test shall be conducted by each heat in accordance with JIS G 0303 (General Rules for Test of Steel - Class 2).	Tension tester, Brinell hardness meter	
Heat Treatment	a. Quenched Hardness	1 sampling per dissolution number (for continuous furnace)	Brinell hardness meter	
	b. Tempered Hardness	Inspection of 0.25%AQL, Level II	Brinell hardness meter	Results shall be submitted by means of histogram or control chart ○
Product	a. Surface scars	All parts (inspection)	Visual Inspection	
	b. Thickness	Inspection of 0.4%AQL, Level II	Jig or slide calipers	
	c. Length	Inspection of 0.4%AQL, Level II	Jig or slide calipers	
	d. Warping	Inspection of 0.4%AQL, Level II	Jig or slide calipers	
	e. Magnetic flaw detecting	All parts (inspection)	Magnetic flaw detecting tester	
	f. Mechanical Property	When continuous furnace is used, extraction from product by each dissolution number shall be performed.	Tension tester Impact tester, Brinell hardness meter	Test piece extracting position shall be in accordance with paragraph 2.4. ○

Note (1) - Lot size for inspection shall be, as a rule, one heat of dissolution as a lot. However, when one heat of dissolution involves more than one heat treatment lots, sampling shall be performed by each heat treatment lot.

July 28, 1963

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KOMATSU MANUFACTURING CO., LTD.

April 23, 1969

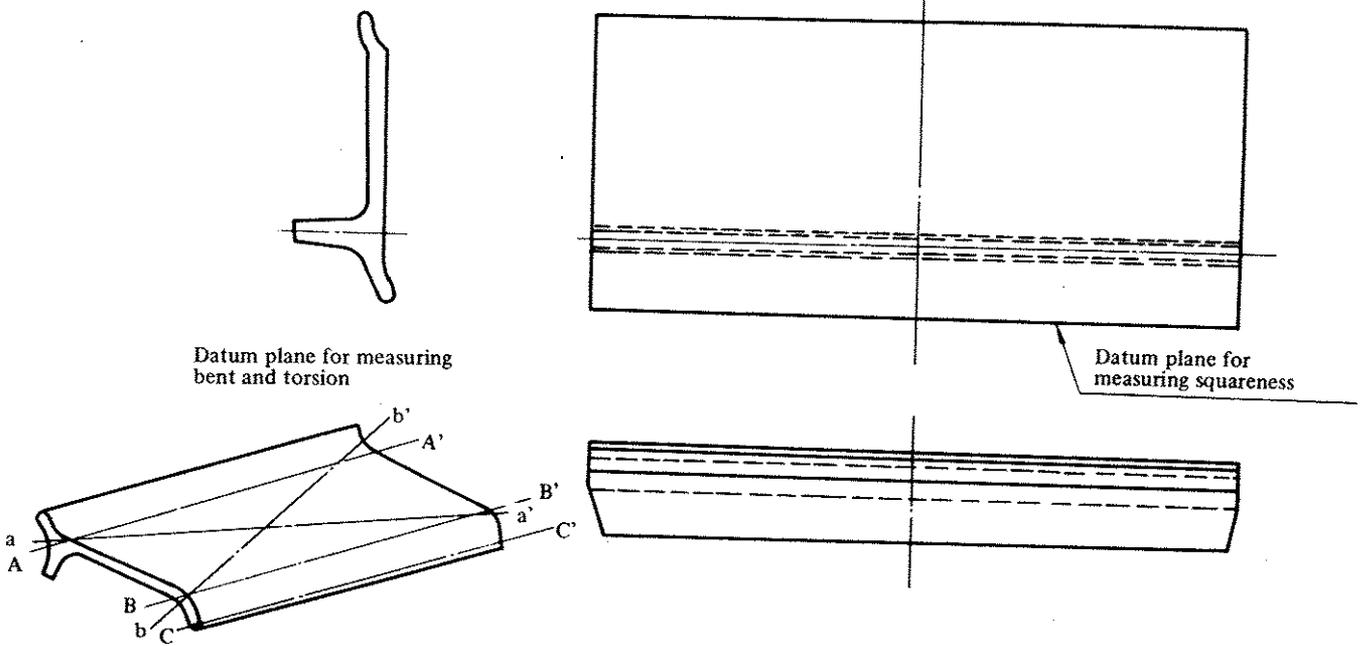
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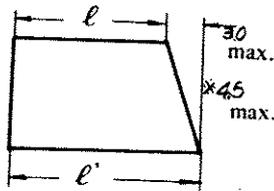
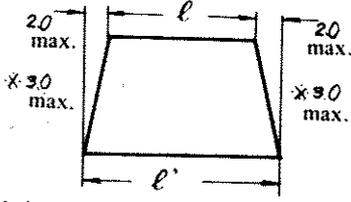
6. Standard for Acceptance Inspection

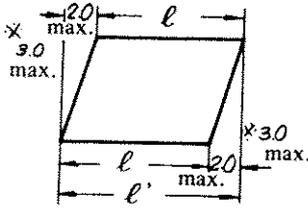
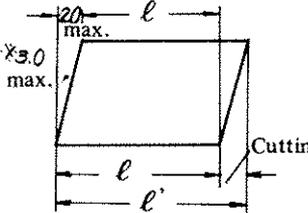
6.1 General Standard for Acceptance Inspection

Fig. 2

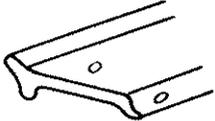
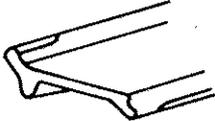
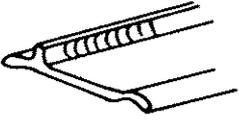
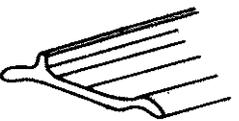


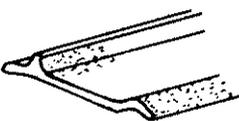
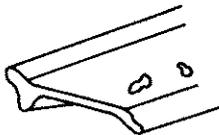
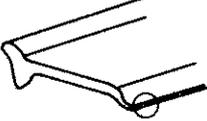
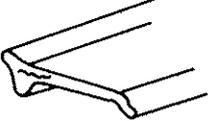
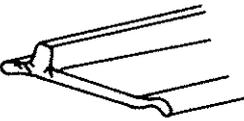
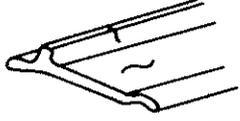
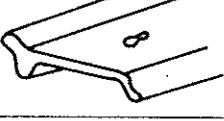
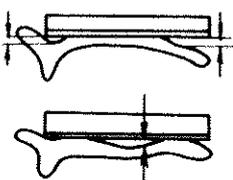
Dimension marked with * is applicable to machines larger than and including D60-6

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System	
				Notation	System
(Squareness) When one side only is square.	3.0mm maximum *4.5 mm max.	Square, taper gauge or slide calipers.		C	1/20
When both sides are not square.	2.0mm max. *3.0mm max.	Square, taper gauge or slide calipers.	$l \cdot l'$ shall be within the tolerance.  $l \cdot l'$ shall be within the tolerance.	C	1/20

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System	
				Notation	System
When both sides are not square, but are cut in parallel.	2.0 mm max. *3.0 mm max.	Square, taper gauge or slide calipers.	 <p>$l \cdot l'$ shall be within the tolerance.</p>	C	1/20
	2.0 mm max. *3.0 mm max.		 <p>Cut "l" within the tolerance, "l'" outside the tolerance.</p>	C	1/20

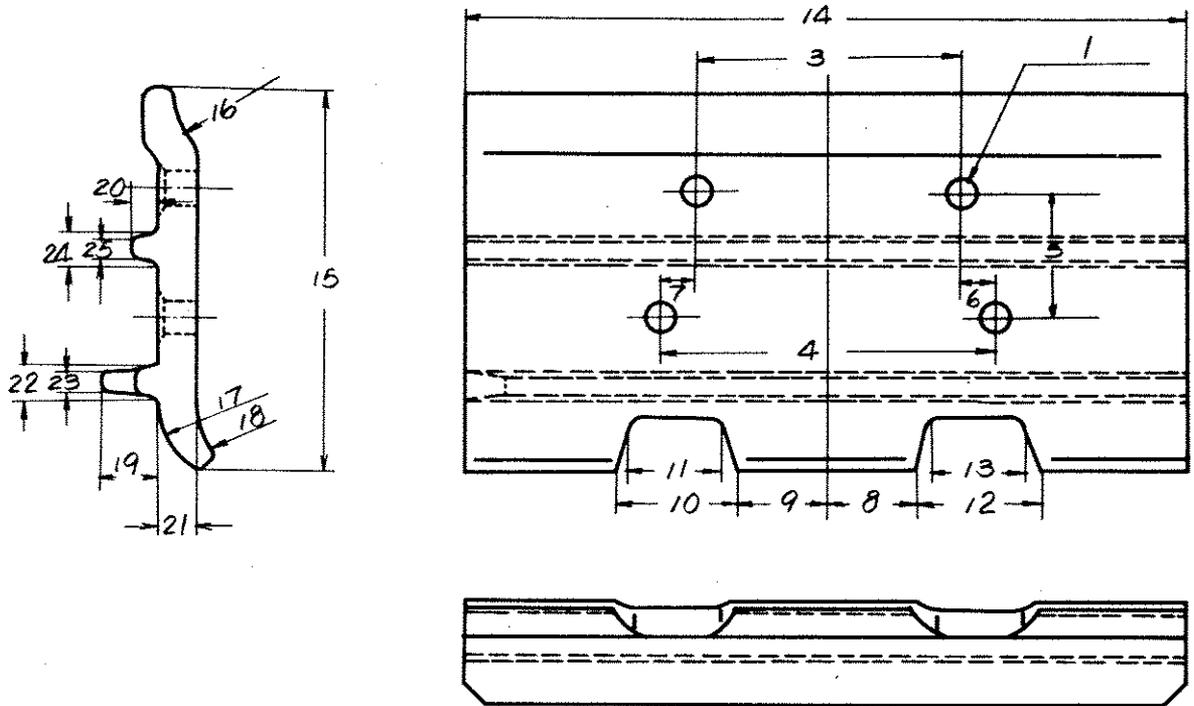
6.2 External Appearance Inspection -

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System	
				Notation	System
Linear Scars	Depth (mm) 0.5 > Unadjusted 1.0 > Adjusted 1.0 < Non-allowable	Magnetic Flaw Detecting or Visual Inspection		K	AQL 2.5
Exfoliation Scars	Same as above	Same as above		K	AQL 2.5
Insertion	Same as above	Same as above		K	AQL 2.5
Jaw Scars (wrinkle scars)	Same as above	Same as above		K	AQL 2.5
Attachment Scars (roll scars)	Same as above	Same as above		K	AQL 2.5

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System	
				Notation	System
Surface Roughness	Depth (mm) 0.5 > Unadjusted 1.0 > Adjusted 1.0 < Non-allowable	Magnetic Flaw Detecting or Visual Inspection		K	AQL 2.5
Scale Scars	Same as above	Same as above		K	AQL 2.5
Biting	0.5 Unadjusted 0.5 Adjusted by "G" Working	Visual Inspection		K	AQL 2.5
Pipe	Non-allowable	Magnetic Flaw Detecting or Visual Inspection		K	AQL 2.5
Hair Crack	R surface-non-allowable	Same as above		K	AQL 0.25
Hardening crack	Non-allowable	Same as above		K	AQL 0.25
Brick Scar	Non-allowable	Visual Inspection		K	AQL 0.25
Cutting Scar	When size is within 1.0mm for both depth and width, adjust by "G", 1.0 not allowed.	Same as above		K	AQL 2.5
Lamination	Within 50 mm may be allowed for one side only.			K	AQL 2.5
(Bent), bent of link fitting plane.	0.3 mm max.	Precision plate: thickness gauge.		C	1/20

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System	
				Notation	System
Overall bent A-A', B-B' C-C'	1.0 mm max.	Precision plate: thickness gauge		C	1/20
(Torsion) a-a' b-b'	1.0 mm max.		<p style="font-size: small; margin-top: 10px;">In case no clearance is caused as shown above in a-a' or (b-b') of Figure 2, when clearance is caused as shown below in (b-b') or (a-a').</p>	C	1/20

6.3 Acceptance Inspection Standard for D50S-P401b.



Mark	Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System		Remarks		
					Notation	System			
1	Hole diameter	4-162	Slide calipers	Chamfering note "1c"	K	AQL 4.0			
2	Hole diameter	2-16		Omitted					
3	Hole position	(122.4)				K		AQL 4.0	
4	Hole position	158.4		± 0.1					
5	Hole position	57		± 0.07					
6	Hole position	18		± 0.07					
7	Hole position	18		± 0.07					
8	Notch position	35		Inspect using gauge for simultaneous testing.					
9	Notch position	35							
10	Notch width	60							
11	Notch width	50							
12	Notch width	60							
13	Notch width	50							
14	Overall length	400			± 2.0	Note the arrangement for the center of fitting holes for links.			
15	Overall width	199.6			± 2.0	"		K	AQL 4.0

(to be continued)

Mark	Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System		Remarks
					Notation	System	
14'	Notch position	54.5					
16	R	58.5	± 0.3	R gauge	C	1/20	
17	R	57	± 0.3	R gauge	C	1/20	
18	R	46		R gauge	C	1/20	
19	Grouser height	45	± 1.0	Plate gauge	K	AQL 4.0	
20	Semi-grouser height	15	0 - 1.0	Plate gauge	C	1/20	
21	Thickness	13	+ 1.0 0	Slide calipers	C	1/20	
22	Thickness	26	0 - 1.0	Plate gauge	K	AQL 4.0	
23	Thickness	15	+ 0.5 - 1.0	Plate gauge	K	AQL 4.0	
24	Thickness	23	0 1.0	Plate gauge	C	1/20	
25	Thickness	12	0 - 1.5	Plate gauge	C	1/20	
26	Grouser Warping		+ 1.0 0	Plate gauge	C	1/20	
	Squareness of inspection items 14 and 15.						
		In accordance with 6.1, General Standard for Acceptance Inspection.					
	External appearance	In accordance with 6.2, External Appearance Inspection.					
	Bent, torsion	In accordance with 6.2, External Appearance Inspection.					
	Embossing mark	Shall be clean without mistake, and shall not cover link fitting plane.					

July 28, 1963

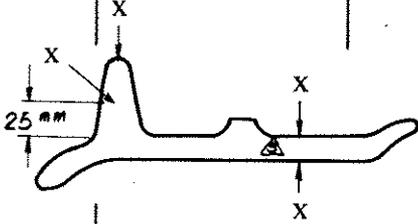
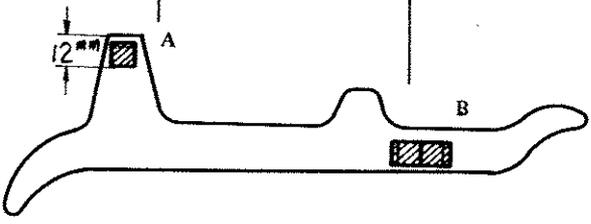
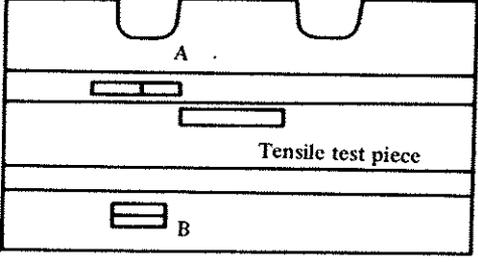
Established

KOMATSU MANUFACTURING CO., LTD.

April 23, 1969

Revised

64 Standard for Acceptance Inspection for Mechanical Property of Products -

Inspection Item	Standard	Measuring Instrument	Inspection Method	Inspection System		Remarks	
				Notation	System		
1 Chemical Composition	Page 2 , Specification			B	Page 2 , Specification and page 13, Supplement		
2 Surface Hardness HB	341 ~ 401	Brinell scale of hardness		K	AQL 0.25		
3 Core Hardness HB	302 min.						
4 Tensile Test T.S E.L	100 kg/mm ² min. 14 % min.					B	Sampling by L2
5 Impact Test	3.0 kg.m/cm ² min. JIS 3, Test piece at 20°C			B	Sampling by L2		
							

7. Delivery

- 7.1 Lots shall be classified and delivered by each dissolution number and heat treatment lot.
- 7.2 *The result records shall be attached by each dissolution number and heat treatment lot at the time of the delivery of products. When more than one manufacturing factories are involved, this indication shall also be clearly made on the records. In no case more than three charges shall be delivered at a time.*
- 7.3 The supplier may be able to select and re-deliver acceptable products out of the rejected lot as the result of total re-inspection.
- 7.4 Delivery shall be made with pallets without fail.
- 7.5 Quantity to be delivered shall be minimum of 100 sheet per lot.
- 7.6 Water tempered track shoes shall be segregated and delivered.
- 7.7 The supplier is, as a rule, responsible for the preparation and maintenance of pallets.
- 7.8 As a rule, pallets prepared for other machines shall not be used.

6. Others

6.1 Mark on Products -

The company emblem of KOMATSU shall be placed in embossing on the position as designated by the drawing.

Part Number shall be stamped on the position as designated by the drawing

Steel mill mark and dissolution number shall be stamped on the approved position. The notation for which concurrence has been obtained by KOMATSU shall be used, and its detail shall be reported to KOMATSU at the time of delivery.

SUPPLEMENT

CHECK ANALYSIS

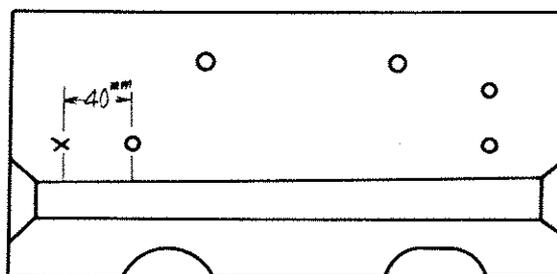
The method for check analysis and the allowable variation of chemical composition shall be in accordance with the following standard.

1. Number of Samples to be Extracted and Judgement -

A sample track shoe per dissolution number shall be extracted, and tested by check analysis. When the chemical composition of the sample is within the allowable variation as specified in paragraph 3, the lot with the same dissolution number shall be accepted. In case of failure an additional track shoe shall be extracted, and when the result for the shoe is within the allowable variation, it shall be accepted.

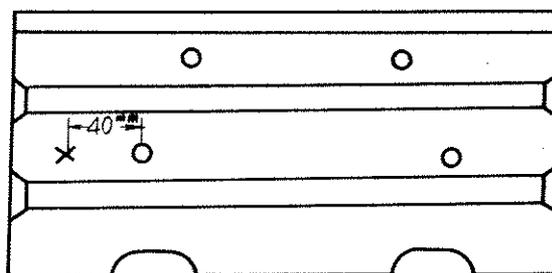
2. Position to Extract Sample for Analysis -

Sample shall be extracted with a drill from the position as indicated in the below figure.



D50A

D80A



D50S

3. Allowable Variation Limit of Chemical Composition (%) -

C	Si	Mn	P	S	Ni	Cr	Cu
0.01	0.02	0.04	0.005	0.005	0.03	0.03	0.02
Applicable to upper and lower limits of chemical composition standard.			Applicable to upper limit of chemical composition standard.				

4. Joint Analysis-

When a lot is rejected as the result of the re-test for the check analysis, joint analysis may be made only once, when requested by the supplier. In this case an additional track shoe shall be

extracted, and if the result of joint analysis is within the allowable variation as specified in paragraph 3, the lot shall be accepted.

5. The following anticorrosive composition shall be applied all over the product when delivery is made.

Rust prevention shall be treated completely and the rust shall not arise after 10 days storage at outdoor.

Nox-Rost 366-20K solvent

July 28, 1963

Established

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