



The Trusted Name in Nitriding & Nitrocarburizing





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ターボチャージャー部品のサプライヤー様には最適なパートナー

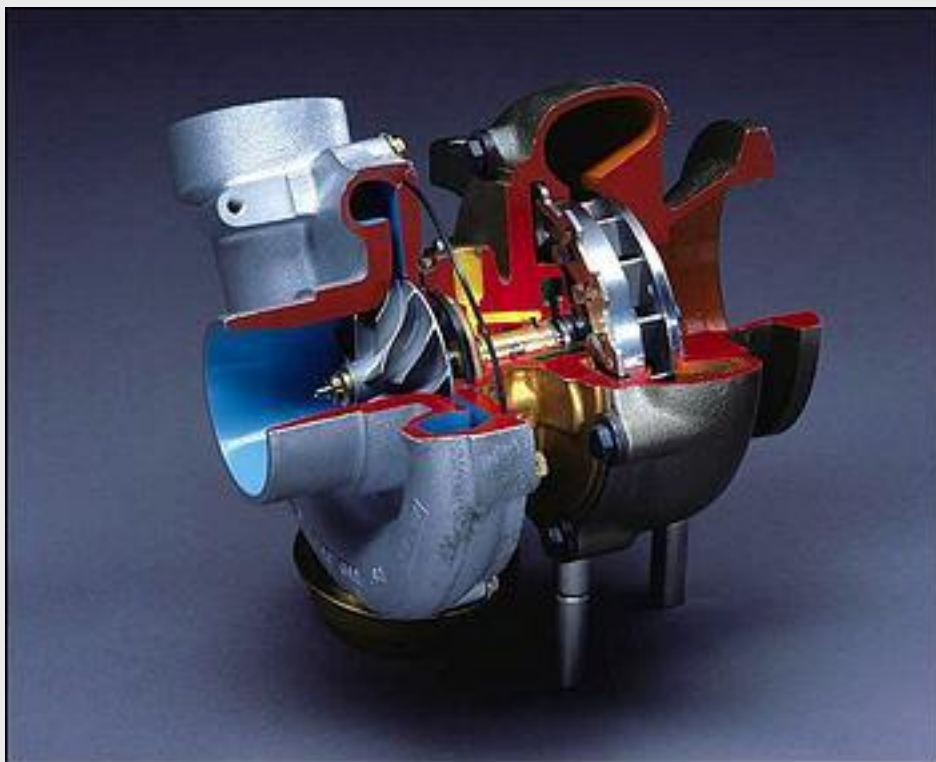




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ターボチャージャー



Garrett[®]
by Honeywell

HOLSET
TURBOCHARGERS

BorgWarner
Turbo Systems

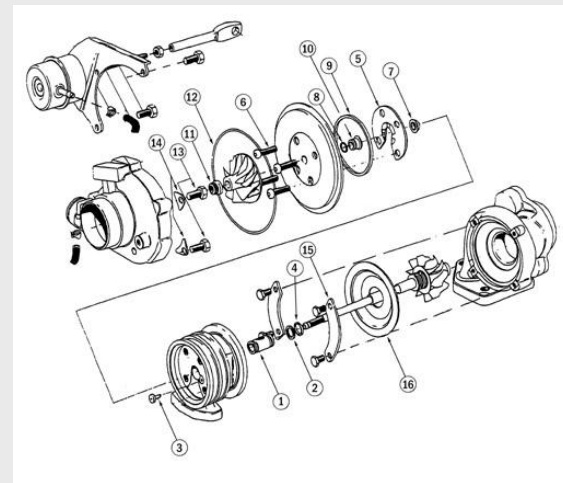
MITSUBISHI
TURBOCHARGERS

IHI Isikawajima-Harima

turboLader
Schwitzer



ターボチャージャー・アッシーのコンポーネント



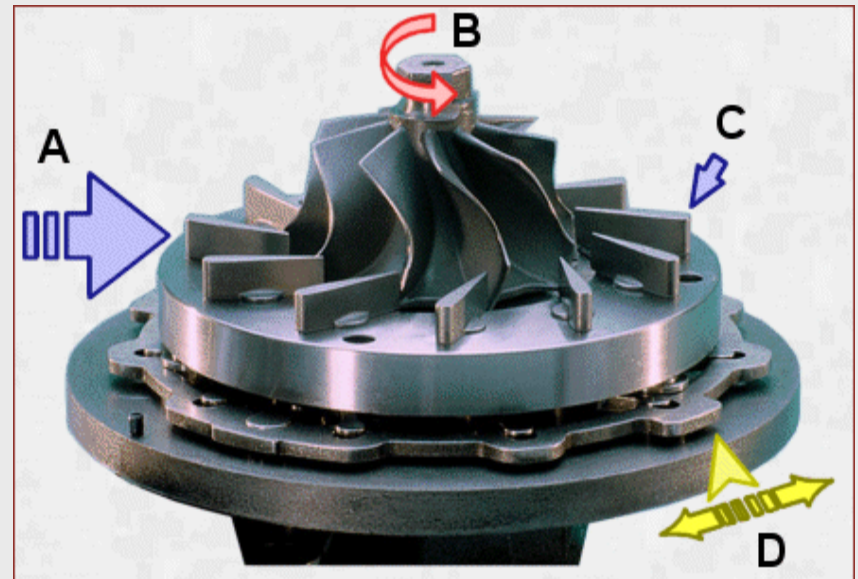
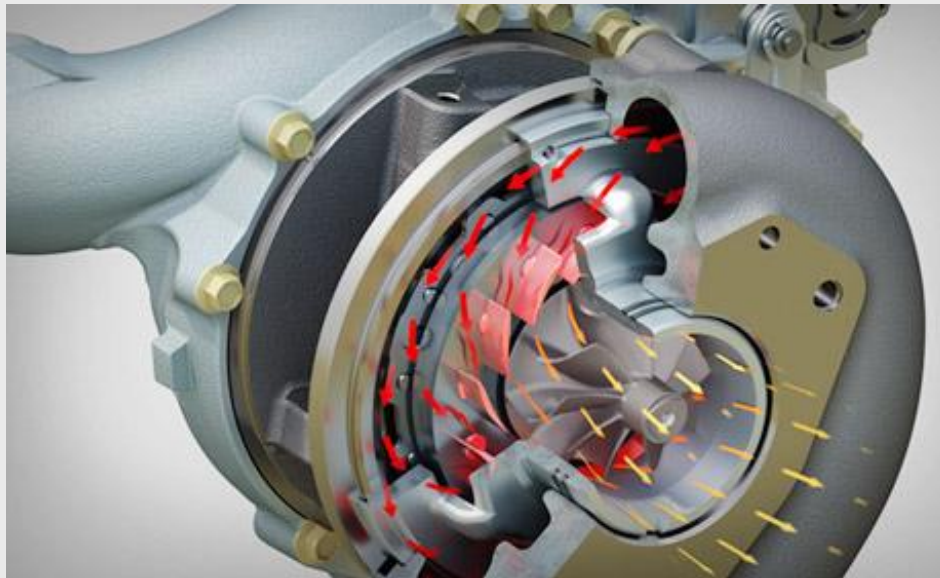
精密さを要求される
部品群



ステンレス鋼
と高合金



可変式ノズルリング



Nitreg®-S: ターボチャージャー・
コンポーネント用に
精密で信頼性が高く、且つ再現性の高い
窒化処理



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近年、Nitreg®-S で窒化された
ターボチャージャー
コンポーネント



ユニゾンリング

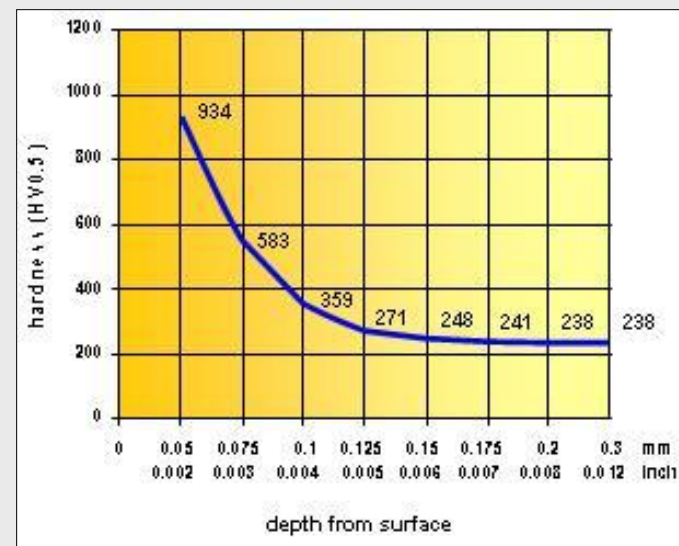
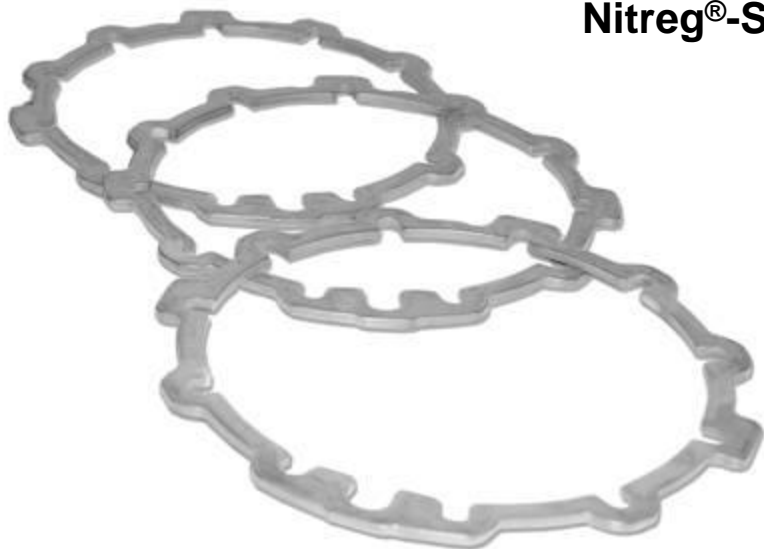
ベインアーム



Nitreg[®]-S

シャフト

Unison Rings for Auto Turbochargers Nitreg®-S



窒化仕様

Characteristics	要求	処理結果
白層 [μm / inch]	n/s	3 μm (.00012")
表面硬度	> 900 HV0.5	920 HV0.5
Eff. Case @ 600 HV0.05	> 70 μm (.00276")	72 μm (.00283")
拡散層 (ビジュアル)	N/S	60 μm (.00236")



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モデル: NXH-9818
(水平挿入型バッチ炉)
テクノロジー: Nitreg®-S
アプリケーション:
ユニゾンリング / ベインアーム



処理能力: 1500 kg



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モデル: NXK-812
テクノロジー: Nitreg®-S
アプリケーション:
ユニゾンリング / ベインアーム

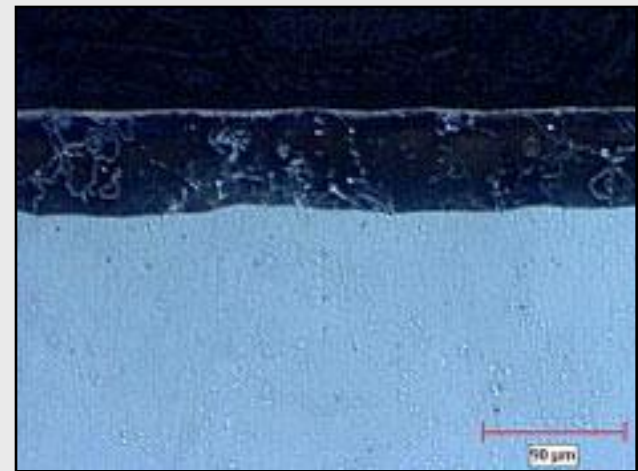
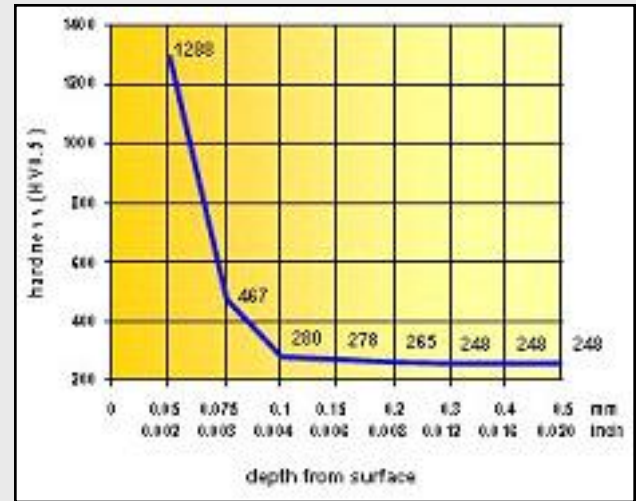


最大積載量: 1200 kg
処理能力: ~ 100,000/year

ターボチャージャー インサート



Cast Ferritic Stainless Steel



Characteristics	要求	処理結果
白層 [μm]	5-15	6
Effec. Case Depth [μm]	60-100 @ core+100	68
表面硬度 [HV0.1]	≧1000 HV.1	1300



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モデル: NXH-9818
(水平挿入型バッチ炉)
テクノロジー: Nitreg®-S
アプリケーション:
ターボチャージャー インサート

最大積載量: 1500 kg
処理量: ~ 500,000 pcs/year





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モデル: NX-811S
テクノロジー: Nitreg®-S
アプリケーション:
ターボチャージャー インサート



最大積載量: 1000 kg



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品質管理



EVALUATION GUIDELINES

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- Carry out microhardness profile measurements in areas designated as 1, 2 and 3
- Take measurements at each 0.01 mm interval starting at 0.03 mm from the edge of the mount. Spacing should reflect the pattern shown in Fig.3 and actual micro-hardness profile indentations shown in Fig.4

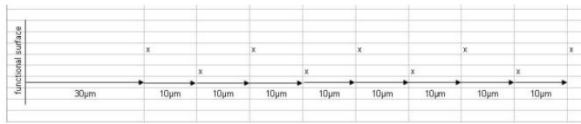


Fig.3 - Spacing pattern for microhardness profile

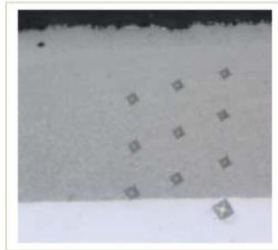


Fig.4 - Spacing pattern for microhardness profile, actual indentations.

The profiles should be carried out in places marked 1 and 2 on Section 1 and marked as 3 in Section 2.

The requested case depth is obtained by interpolation of hardness values from the points marked as 0.06 mm and 0.08 mm as shown in Fig.5.



EVALUATION GUIDELINES

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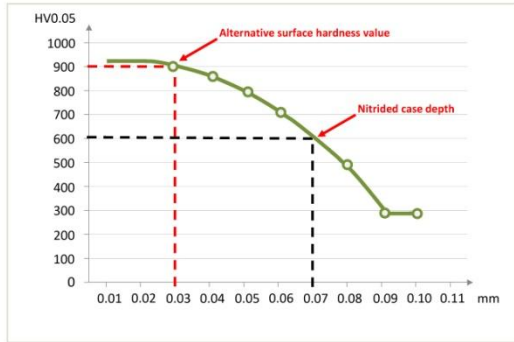


Fig.5 - Microhardness case depth evaluation method

4.0. Evaluation of Nitride Case Uniformity

For nitrided case uniformity the entire area of the mounted specimen should be viewed under magnification of 25x.



世界規模における近年の導入実績



NXH-9818 Nitreg-S

- 4 基 + 1 受注済
- インサート / ユニゾンリング / ベインアーム



NX-811 Nitreg-S

- 1 基
- ユニゾンリング / ベインアーム



NXK-812 Nitreg-S

- 1 基 (日本)
- ユニゾンリング / ベインアーム



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Nitreg-S テクノロジーにおける ステンレス鋼への窒化事例

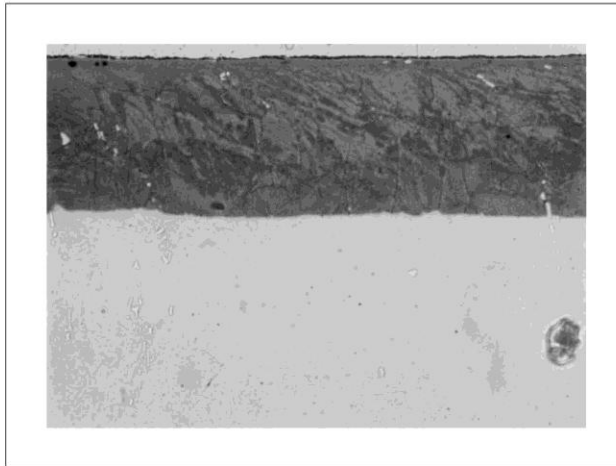


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オーステナイト系ステンレス鋼



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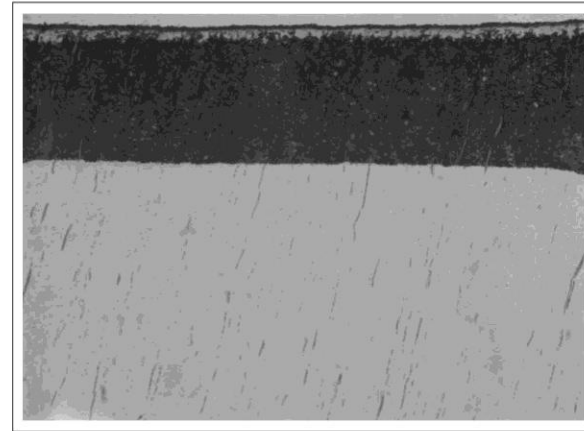
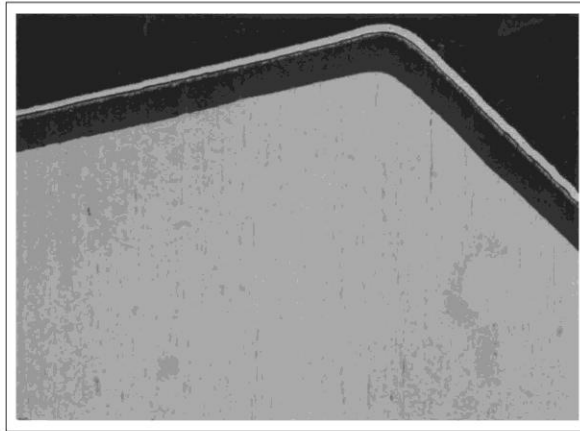
400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
O8-U	300 series	570	7	0	78	915



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100 X

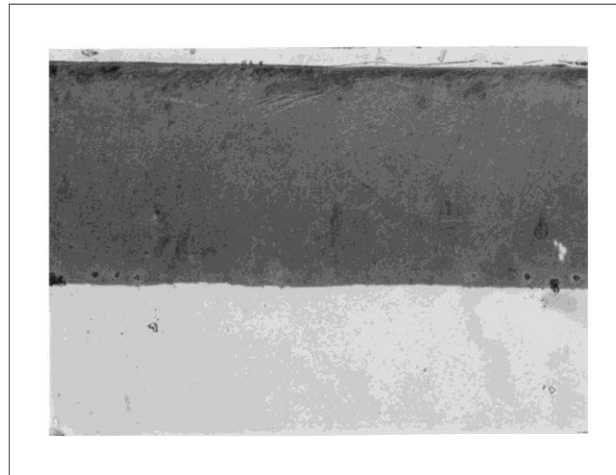
400 X

<i>Mount No.</i>	<i>Steel Grade</i>	<i>PROCESS</i>		<i>RESULTS</i>		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
28-U	305	570	5	5	68	915



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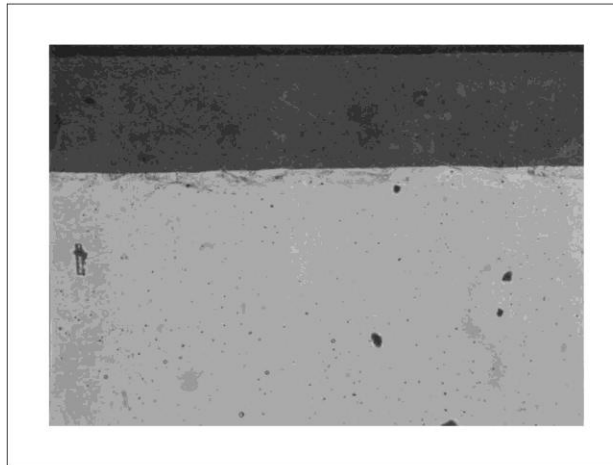
400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
31-U	300 series (Hitachi ASB125)	580	18	0	110	1066



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400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
43-R	304	570	7	0	65	1050



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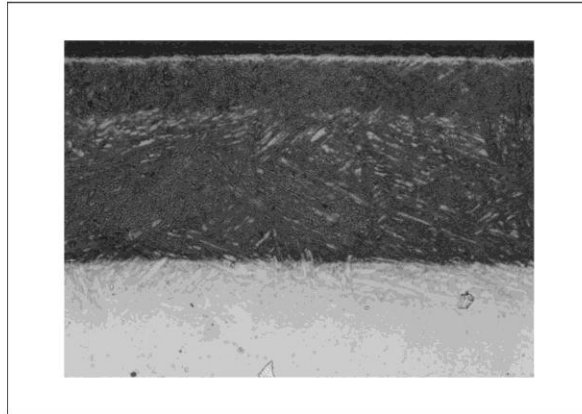
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マルテンサイト系ステンレス鋼



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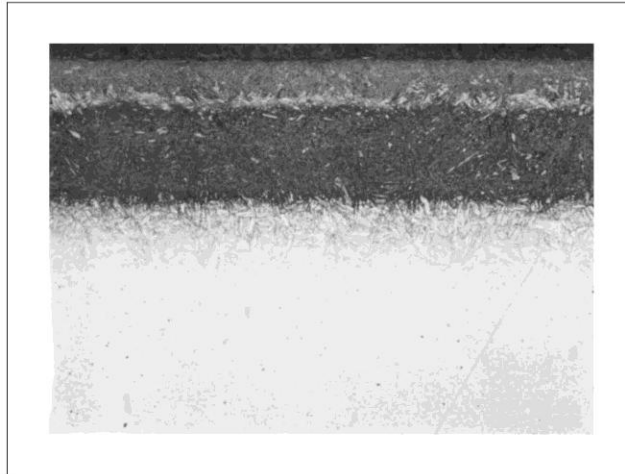
400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
51-R	410	570	7	4	120	950



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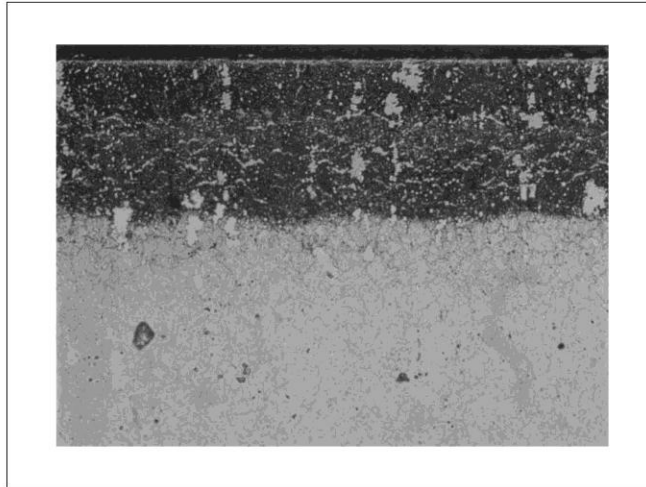
400 X

<i>Mount No.</i>	<i>Steel Grade</i>	<i>PROCESS</i>		<i>RESULTS</i>		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
88-O	422	570	13	0	75	1099



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400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time H	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
51-R	440-C	570	7	1.5	84	>1000



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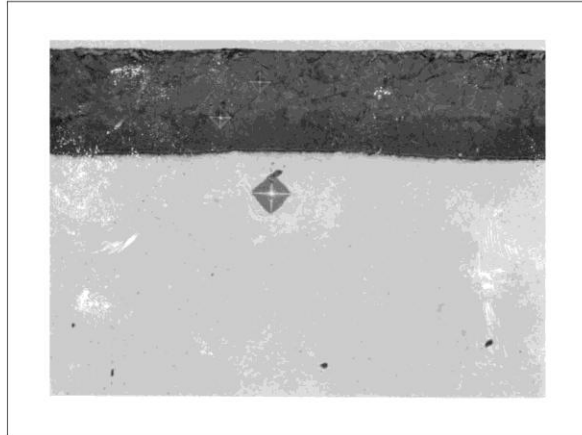
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析出硬化系ステンレス鋼



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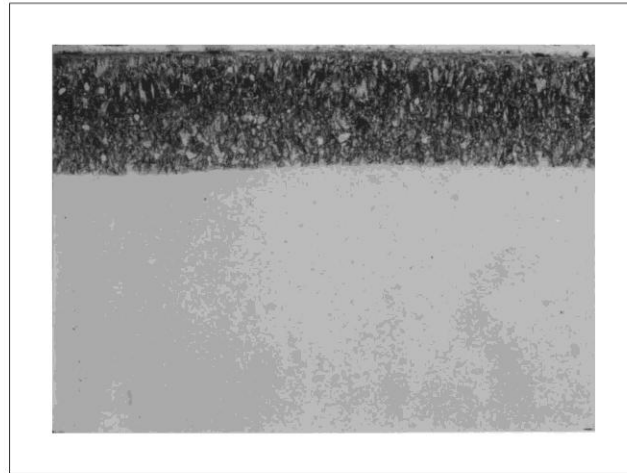
400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time H	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
10-V	17-4 PH	530	10	0	60	1100



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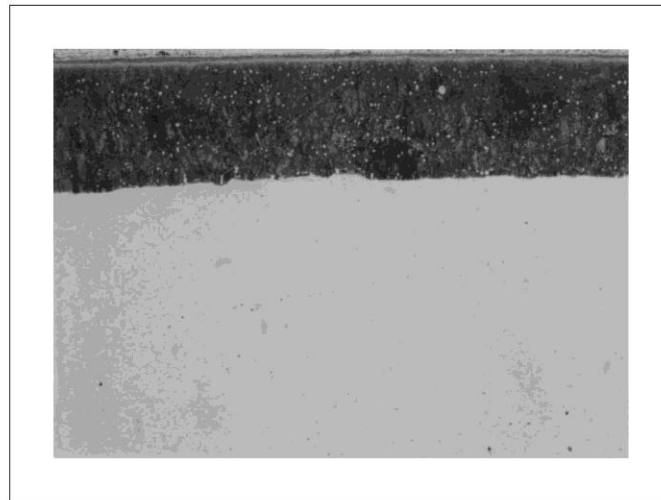
400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
57-F	21%Cr-2%Ni	530	12	2	60	1150



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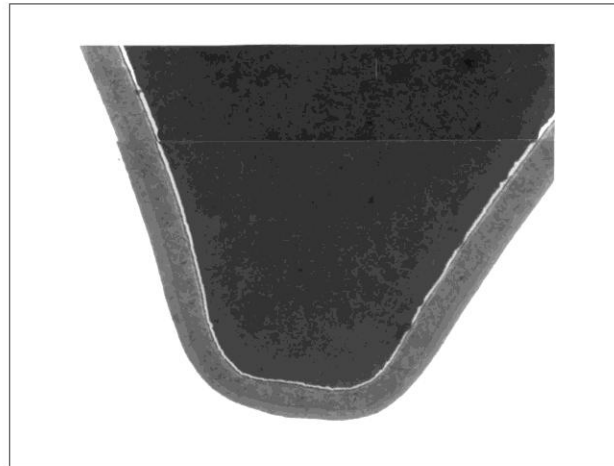
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400 X

<i>Mount No.</i>	<i>Steel Grade</i>	<i>PROCESS</i>		<i>RESULTS</i>		
		Temp. °C	Time H	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
57-F	23%Cr-8%Ni	530	12	4	60	1100



Uniformity of nitrided layer around flanks and root of gear

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400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time h	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
G-02	Custom 455	530	24	8	160	1280



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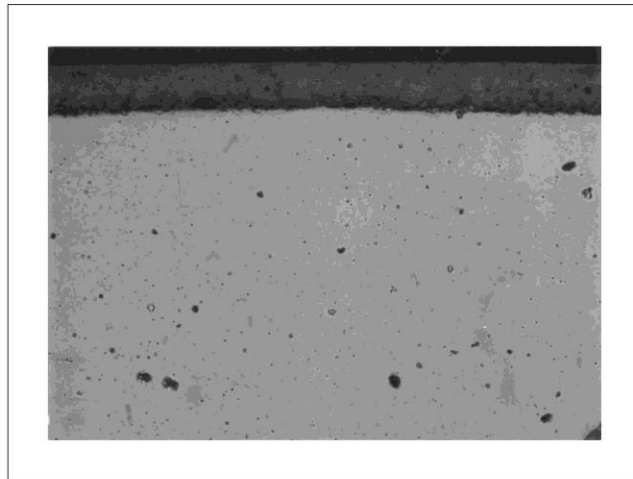
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特殊鋼合金系ステンレス鋼



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400 X

Mount No.	Steel Grade	PROCESS		RESULTS		
		Temp. °C	Time H	White Layer Thickness (µm)	Case Depth (µm)	Superficial Hardness (HV1)
42-R	A286	570	7	0	20	1011



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Nitreg®-S その他ターボチャージャー部品への適用



フラットバック
コンプレッサー
ホイール用
シールプレート



シール
プレート



スラスト
フィンガー
&
カラー



シャフトアッシー
コンポーネント



セントラルハウ
ジング回転部
アッシー
コンポーネント

Nitreg®, Nitreg®-S