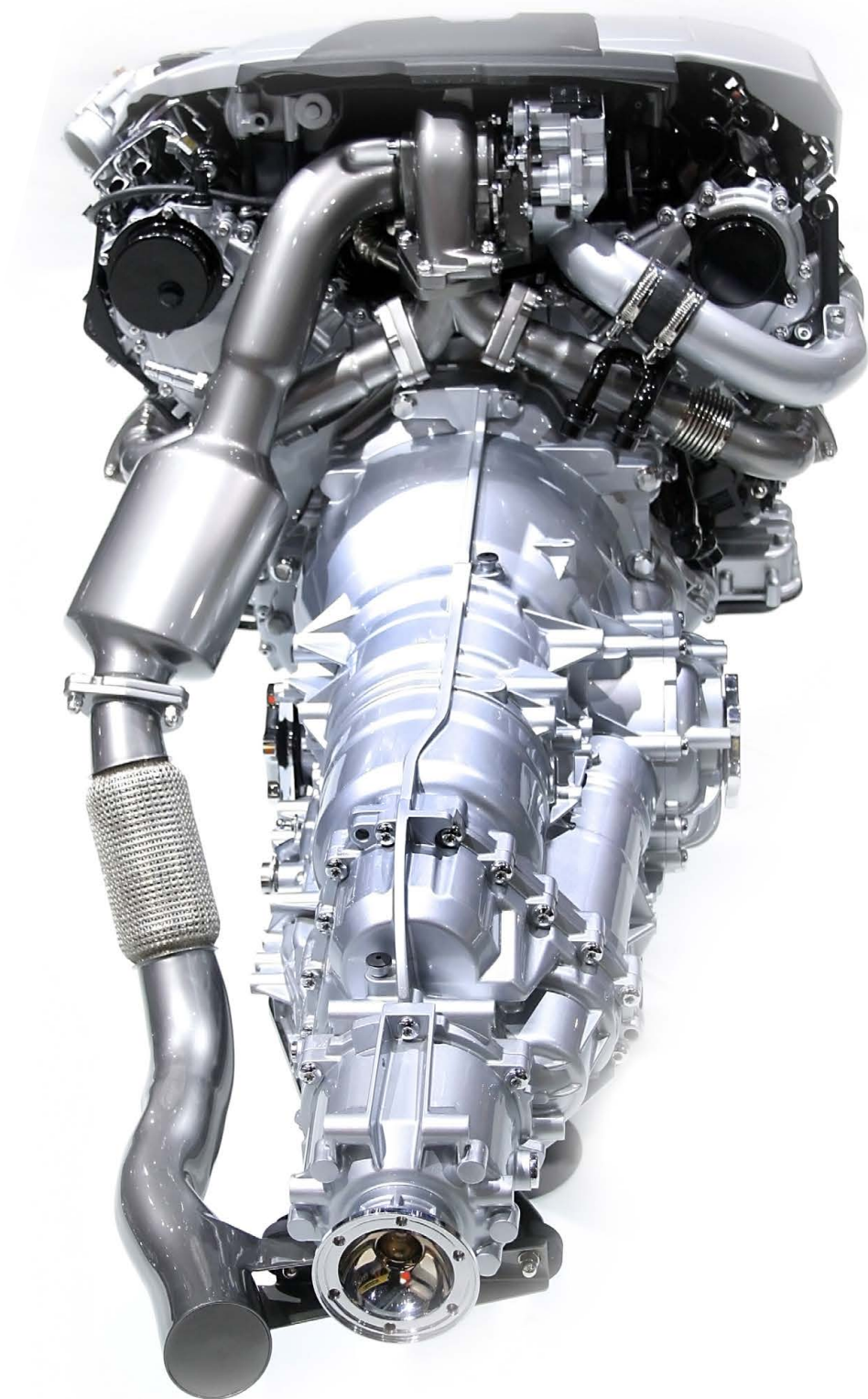


S+D METALS

A BIBUS GROUP COMPANY



**MOTORSPORT
EXHAUST SYSTEMS**

Material Solutions

High performance nickel alloys are used widely in a range of automotive applications where their high temperature strength and resistance to hot combustion gases can offer performance improvements. Oxidation resistance and creep strength are becoming increasingly important since exhaust temperatures reach 750°C in modern diesel engines and even 950°C in advance gasoline engines. From manifolds and exhaust pipes to high temperature fasteners nickel alloys can offer optimum performance. In the case of titanium with its high strength-to-weight ratio valuable weight savings can be made and it is readily formed into the complex geometries found in exhaust systems. Here we look at just some of these grades and their application.

Flexible couplings and bellows must resist high temperatures and fatigue – a combination of factors that is beyond stainless steels. **Alloy 625** is used for its high strength, fabricability and outstanding resistance to high temperature corrosion such as oxidation and carburisation and is widely used in exhaust systems. Thanks to the high nickel content the alloy has excellent resistance to hot salt stress corrosion cracking and the chromium and molybdenum additions provide a high level of pitting and crevice corrosion resistance. **Alloy 625LCF/625HP** offers benefits to the exhaust system manufacturer as while the alloy has the same basic chemistry as alloy 625 alloying, melting and processing are very closely controlled to obtain a sheet product with optimum resistance to low-cycle and thermal fatigue at temperatures up to 650°C. The alloy's high formability and deep drawing capability makes it the premier material for use in flexible couplings in the automotive industry.

Ti grades 1 and 2 are lighter than the steel alloys and are frequently used for exhaust manifolds where the high strength to weight of titanium, combined with its heat and corrosion resistance allows for significant weight savings to be made. The commercially pure Grades 1 and 2 are widely used due to their high formability, weldability and mechanical properties. For regions of the exhaust system that will be exposed to temperatures above 400°C and where weight savings are critical to performance Titanium Alloy KSTI-1,2 ASNEX can be utilised.

KSTI-1,2 ASNEX is based on commercially pure titanium with stabilising additions of aluminium, silicon and niobium which act to improve high temperature oxidation resistance up to 700-800°C and excellent fatigue properties while retaining good formability. Combined this makes KSTI-1,2 ASNEX ideal for exhaust manufacture.

For more information please contact us via

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Alloy Properties

	Composition (%)	Key attributes
Alloy 625 N06625 2.4856	61Ni – 21Cr – 2Fe – 9Mo – 3Nb	Excellent resistance to oxidation and corrosion in a range of environments. Highly formable and readily welded.
Alloy 625LCF/HP N06626	61Ni – 21.5Cr – 2.5Fe – 9.0 Mo – 3.6Nb	Excellent resistance to oxidation combined with good low-cycle and thermal fatigue. Highly formable and readily welded
Ti Gr1 R50250 3.7025	Commercially pure Ti	Commercially pure titanium has moderate strength and a lower density than steels resulting in a high strength-to-weight ratio. This combined with titanium's excellent corrosion resistance, good ductility, formability and weldability make CP titanium grades ideally suited to automotive applications.
Ti Gr2 R50400 3.7035	Commercially pure Ti	Ti Gr 2 has higher strength in comparison to Ti Gr1 due to its slightly higher oxygen content.
KSTI-1.2 ASNEX	CP Ti – 0.5Al – 0.4Si – 0.2Nb	Exceptional high temperature oxidation resistance and excellent fatigue properties combined with good formability

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