

## MOTORSPORT EXHAUST SYSTEMS



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. **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

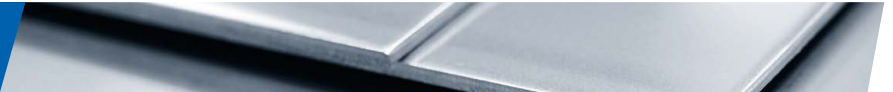
and thermal fatigue at temperatures up to 650°C. The alloys high formability and deep drawing capability makes it the premier material for use in flexible couplings in the automotive industry.

Where weight savings are critical to performance the new titanium grade **KS Ti-1.2ASN** can be considered. Based on commercially pure titanium with stabilising additions of aluminium, silicon and niobium the alloy retains good formability with high temperature oxidation resistance up to 700-800°C and excellent fatigue properties making it ideal for exhaust manufacture.

High temperature fasteners are required as part of the exhaust system and **Alloy 80A** is used in critical applications where high stress rupture strength is required. The alloy also finds application as exhaust valves in high performance diesel and petrol engines where material is exposed to high temperatures and high pressures thus alloys with excellent elevated temperature properties and good hot corrosion resistance are required.

For more information please contact us via [info@sd-metals.com](mailto:info@sd-metals.com)

## ALLOY PROPERTIES



	Composition (%)	Key attributes	Application
<b>Alloy 625LCF/HP</b> 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	Flexible couplings and bellows
<b>Alloy 80A</b> N07080 2.4952	76Ni – 19.5Cr – 1.4Al – 2.4Ti	Highly alloyed, age hardenable alloy with excellent high temperature strength	High temperature fasteners and exhaust valves
<b>KS Ti-1.2ASN</b>	CP Ti – 0.5Al – 0.4Si – 0.2Nb	Exceptional high temperature oxidation resistance and excellent fatigue properties combined with good formability	Exhaust systems