Air Tooling Material Selection Sheet - Air Plugs, Air Rings and Special Tooling

	Std. Flash Chrome	*440C High Chrome Content Stainless Steel*	*D2 High Chrome Content Alloy*	*10V High Lubricity Alloy*	*Ferrotec*	*Hard Chrome*
Basic Description	Steel that is flash chromed, chrome adds brightness to finish, helps prevent rust, improves wear characteristics	Steel with the chrome built into it. Has bright finish when machined, looks like chromed, rust resistent, good wear characteristics, less operations since it does not require chroming	D-2 is an air-hardening ,high carbon-high chromium die steel well suited for long run tool and die applications.	Tough wear-resistant steel manufactured from powdered metal that is heated to solidify the contents	Metal bonded titanium carbide product. using the sintered metal technology	Hard Chrome
Simple material description	Flash Chromed Plug	440C Martensitic Stainless Steel which will achieve the highest hardness of available hardenable stainless steels.	High carbon-high chromium tool steel	CPM(Crucuble Particle Metallurgy) based steel	Sintered metal alloy hardened by heat treat only.	Hard Chromed Plug
Appearance	bright silver finish	silver	silver	light grey appearance	grey appearance	Bright and smooth
Hardness	48 – 55 Rockwell	57-60 Rockwell	60-63 Rockwell	60-65 Rockwell	65-70 Rockwell	48-55 Rockwell
Where used		Primarily for standard air plugs found in the configurator	Special applications requiring Engineering Design	Special applications requiring more wear resistance than D2	Special applications requiring highest degree of wear resistance	Specials-high magnification Air Rings and special air plugs
What application is it best for	Normal applications	Lower cost alternative to chromed plugs. Provides same performance but at a lower price	Applications requiring high abraision resistance qualities	Toughness is equal to M2 and D2 steels while wear resistance is significantly higher	Extreme conditions where there is high wear exposure to the tools.	Harsh corrosive environments with high wear exposure.
What does it do for delivery		Improves delivery by a week over flash chromed lugs	D2 on **special** plugs reduces lead-time by one week-eliminates hard chrome as compared to hard chrome delivery	For some applications this is a replcement for ferro-tic and reduces delivery lead-time as compared to ferrotic	Increases lead time due to acquisition cycle	Extends lead time up to one-two weeks over D2 or 440C
What does it do for cost	Price-List	Lower handling means selling price of plug is typically 10% less	Lower cost than oil hardened materials but still special.	Material is expensive-Price list plus $$$	Material is expensive-Price list plus $$$	Adds significant cost due to chrome time and grinding time-Price list plus $$$
Where not to use / why?	Heavy corrosive or abrasive	Heavy corrosive or abrasive	Heavy corrosive or abrasive	With Borozon abrasives	Soft parts such as aluminum, brass	None
Notes about machinability		In the annealed state this material can be machined using normal techniques. In the hardened state material can be ground, honed and lapped using conventional abraisives.	Consistent reponse of the steel during all machining and heat treat operations but slightly difficult to machine	Very hard to machine	Material machinable using conventional procedures in the annealed state. Must be machined dry. Fouls machines	Chrome can flake and tear requiring stripping and rechroming.