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## THE METAL MATCHING MYTH

Somewhere around 1200 B.C., the Iron Age of Man began, characterized by the widespread use of iron or steel in the developing world. Some things haven't changed since the basic chemistry of iron and steel was discovered and shared. But, some things haven't improved either.

Across the globe, metallurgy matured in different cultures at different times, each one taking on their own unique identity or cultural personality to serve the industries within their borders, which was both understandable and reasonable in the 20th century. The result of this can be seen in the evolution of organizations that issue specification standards (see chart below). There are 58 specification systems across 36 countries that address metal (there are thousands of other standards relating to other materials, such as rubber and glass, and processes, such as bonding or heat treating). However, for the most part, everyone did their own thing, meaning the chemistry for a metal in the U.S. may not exactly match the metal called out on a print originating in Germany.


**Table 1: COUNTRIES and their associated system STANDARDS Acronyms**

COUNTRY	STANDARD(S)	COUNTRY	STANDARD(S)
Australia	ADC, AS	Netherlands (Holland)	NEN
Austria	ONORM	Norway	MSF, NS
Belgium	NBN	Pan American	COPANT
Brazil	ABNT	Poland	PN
Bulgaria	BDS	Portugal	DGQ
Canada	Alcan, CSA	PRC (China)	GB, YB
Czechoslovakia	CSN	Romania	STAS
Denmark	DS	South Africa	SABS
Europe	AECMA, <del>EURONORM</del>	Spain	LINE
Finland	SFS	Sweden	SS
France	AFNOR, AIR, NF	Switzerland	VSM
Germany, Dem R.	TGL	Turkey	TS
Germany, Fed R.	DIN, <del>Stoff Nr</del> <del>(Werkstoffnummern)</del>	United Kingdom	B.S., BS-L, DTD
Hungary	MSZ	USA	UNS
India	IS	USA Government	<del>DoD</del> , FEDERAL, MILITARY: Old MIL
International	ISO	USA Society	AA, AISI, AMS, ASME, ASTM, AWS, CDA, SAE
Israel	SI	USSR (Russia)	GOST
Italy	UNI	Yugoslavia	JUS
Japan	JIS		
Luxembourg	NBN		
Mexico	DGN		

In our global economy, it is quite common for someone in a U.S. metalworking shop to seek out a resource for identifying a material in one standard, in DIN for example, and then asking what the material equivalent

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would be in ASTM or AMS. Well, it isn't quite that easy. The following chart lists the Standards Organizations and Issuing Agencies that write, update, catalog, and provide standards across the globe. Usually, compilations of the standards are sold and may cost thousands of dollars to purchase as a catalog, or hundreds of dollars for just one.

Table 2: STANDARDS ORGANIZATIONS and ISSUING AGENCIES - Alphabetical by Designation

AA	Aluminum Association (USA)	FEDERAL	USA Government
ABNT	Brazil	GB	PRC (China)
ADC	Australia	GOST	USSR (Russia)
AECMA	Europe	IS	India
AFNOR	France	ISO	International
AIR	France	JIS	Japan
AISI	American Iron and Steel Institute (USA)	JUS	Yugoslavia
Alcan	Canada	MIL	USA Government
AMS	Aerospace Material Specifications (USA)	MSF	Norway
AS	Australia	MSZ	Hungary
ASME	American Society of Mechanical Engineers (USA)	NBN	Belgium, Luxembourg
ASTM	American Society for Testing and Materials (USA)	NEN	Netherlands (Holland)
AWS	American Welding Society (USA)	NF	France
BDS	Bulgaria	NS	Norway
B.S.	United Kingdom	ONORM	Austria
BS-L	United Kingdom	PN	Poland
CDA	Copper Development Association (USA)	SABS	South Africa
COPANT	Pan American	SAE	Society of Automotive Engineers (USA)
		SFS	Finland
		SI	Israel
		SS	Sweden

## EQUIVALENT OR NEAR EQUIVALENT?


Anyone who works with metal knows that an alteration in chemistry can produce very different results in the end product properties, such as tensile, yield, elongation and reduction of area. These can differ even more after the material is passed through various processes to intentionally alter those properties, such as heat treating, normalizing or quench and tempering. Consequently, selecting a metal in the U.S. under a U.S. specification standard to fulfill the requirements of a product made from a print that calls out an unfamiliar specification from another country is a bit too close to Russian Roulette. The result you get may be drastically different than the one you wanted.

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