Science of Joining Metals â€“ Welding and Welding Accessories

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Article published on March 22nd 2012 | Business

The science (and art) of joining metals is generally referred as welding. Other than welding, there are other processes of joining metals â€“ brazing and soldering â€“ with a difference in techniques of each. In Brazing two pieces of metal are joined by applying heat and adding a filler metal of lower melting point than the pieces to be joined. The temperature of the molten filler is above 800ÂºF (430ÂºC). Most metals can be brazed and brazed joints are generally stronger than soldered joints and are highly reliable. Applications of brazing include aircraft engines, rockets and their parts. Soldering is a similar process like brazing. The only difference is that the temperature of filler metal is below 800ÂºF.

Since welding is a highly used process we shall focus more on it. Welding involves joining metals, usually through the application of heat and using various welding accessories. The technique of welding has been around from the 1st Millennium AD, used mainly to produce swords and other weapons and tools. In the early days, MIG welding involved interlaying relatively soft and hard iron with high carbon metal, followed by hammering.

Modern welding process is known as Gas Metal Arc Welding (GMAW) or generally as Metal Inert Gas or MIG Welding. In this process, a wire electrode and gas are fed through a welding gun. In the early 1940s, welding was limited to joining aluminium and other non-ferrous metals. Today, many types of metal can be joined, including steels.

You might have seen a welder holding or wearing a glass shield in front of his eyes and using either a gas flame or powerful electric sparks to melt and join metals. However, welding involves much more than that. Dozens of welding accessories are needed to fulfil a job. MIG Welding accessories include:

â€¢ Gouging Torch: for scraping the metal surfaces

â€¢ Tool Balancer: capacity 0.4 kg to 14 kg/cable length 1350mm to 2500 mm for holding welding guns and tools

â€¢ Chipping Hammer: for removing extra chips on welded surfaces

â€¢ Earth Clamps: includes alligator and magnetic clamps for holding metal pieces to be joined

â€¢ Electrode Holders: alligator style, twist lock style, 200 to 600 Amp

â€¢ Welderâ€™s Tools: magnetic welding holder, flat welding pliers, adjustable angle welding magnet with 360Âº swivel arm, wire brushes

Other welding accessories include hose clamps, lugs, cables, connectors, gauging carbons, engineers chalk (for marking), and many other. The welding process may look simple from the outside but it requires various preparations and many welding accessories.

Article Source:
http://www.articleside.com/business-articles/science-of-joining-metals-welding-and-welding-

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Article Keywords:
Welding Accessories, Welding Supplies

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