

# Green manufacturing practices at Ador Welding



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## Q. What are your comments on Green manufacturing?

Green manufacturing (GM) is a term used to describe manufacturing practices that do not harm the environment during any part of the manufacturing process. Green Manufacturing stresses on reducing parts, rationalizing materials, replacing materials with non/less-hazardous one and reusing components and to help build products more efficiently. It emphasizes on the use of processes that do not pollute the environment or harm consumers, employees or other members of the community. Green manufacturing addresses several manufacturing matters, including 4R's (Reduce, Reuse, Recycle and Remanufacturing), conservation, waste management, water supply, environmental protection, regulatory compliance, pollution control and a variety of related issues.

## Q. How can you and how do you apply green production practices in your company? What are the various 'Green Practices' you follow?

Ador Welding Limited (AWL), a Complete Welding & Cutting Solutions Provider, has been catering to the needs of the industry with a pan-India setup of manufacturing plants for Welding Consumables & Welding Equipment. It has the highest capacities for a welding

manufacturer in the country. AWL has been a firm believer in environment conservation through green production practices that have been implemented across all its plants.

Manufacturing process of Copper coated MIG welding wire involves harmful chemicals like Sulphuric acid & copper sulphate solution. Enormous amount of hazardous sludge gets generated as by-product. This sludge is non-biodegradable. Around 10 trucks of sludge is generated from each consumable plant equalling 60 metric tonnes of sludge per month. This amounts to approx. 720 metric tonnes of sludge generation from each plant annually.

In a bid to turn Ador Welding Limited, GREEN, Team-Technical Development Centre, Consumables has developed Copper-free MIG wire. The resultant wire showed excellent welding capability with minimal smoke and fume as compared to conventional copper coated MIG wires. This has the potential to reduce hazardous waste generation by less than half of the present levels...astounding 360 tonnes per plant. i.e; around 720 tonnes for both plants combined per annum.!

The non-copper coated MIG wire will also reduce dangerous copper fume generation to a quarter of the present levels!

As an ongoing process towards reducing process loss due to potentially hazardous chemicals and mineral has dropped down to 3.4% from 11% in the last five years. Some of the actions taken to achieve this are as mentioned below:

- Old technology equipment replaced with latest technology equipment. E.g. – Fly cutters to stop and out type that are more efficient and generate negligible waste.
- Extruders – Replaced from lowered generation of unusable waste flux to the tune from 5% to 0.25%.
- Dust generation reduced drastically

due to which suspended particulate matter has reduced from 1.3% to 0.3% by the use of advanced dust collection systems.

- Fine powder of flux is recycled through the advanced dust recovery system, instead of being released into the environment through conventional bag filters.
- Scrubbers have been installed for neutralisation of acid fumes generated during various copper coating processes.
- Conventional flux, chemical and raw material conveying system upgraded to closed trolley type.
- Acid spillage and dust generation on shop floor lowered to a large extent, thereby creating a healthy environment for the workers.

Besides these, a number of other measures have been taken to ensure an all-round green environment.

1. Rain water harvesting system installed in all plants.
2. Digitalisation to the highest extent possible has ensured a paper-free working environment.
3. Canteen waste accumulated, decomposed and converted to naturally generated organic manure
4. Open/dry places converted into green places by planting flora and fauna.

## Shifting from non-Renewable energy to Renewable energy

Renewable energy refers to the type of energy derived from imperishable resources of nature. Examples of potential sources of renewable power include biomass, solar, wind, geothermal, and water. Renewable power is considered a green and clean form of energy. Take any of the inexhaustible power sources - sunlight, wind, water, biomass; they generate zero harmful emissions or pollutants in the environment. Compare them with fossil fuels that contribute a high percentage of air and water pollut-

ants (e.g. carbon monoxide and carbon dioxide). Thus, sustainable power is also advantageous in terms of reducing greenhouse gases and global warming. The initial configuration and machine setup for obtaining renewable energy is costly. Consider it for long-term use, and you will find them less expensive than fossil fuels. They operate by means of natural processes (water flow, wind, sunlight, etc.) that do not require external feeding of fuels. Consequently, minimal maintenance is sufficient for efficient working of the power plants.

AWL is installing 450KW solar panel in its Raipur plant with an Initial investment of Rs. 2 Cr. This investment has long term benefits directly and indirectly for the environment as well as to the Organization. In future, all the other plants will also be installed with similar solar energy panels. This move will eliminate the burning of fossil fuel to the tune of 75,00,000 kg (7500 MT) every year!

This green energy generation is one of the biggest green production practices adopted by Ador Welding Limited.

### Q. How do you define 'Green Engineering Technology'?

Green Engineering Technology highlights state-of-the-art research in engineering for sustainability. A little modification and a changed approach help match science and technology and ensure that we move towards our goal of sustainability. While we absolutely must have an understanding of our environment; this can only be accomplished through monitoring, measurement, analysis, and characterization. This understanding alone is not enough. Solutions are needed. There are numerous examples of green engineering in industry, academia, and government, but the approaches used have not been applied either systematically or comprehensively across all disciplines and all scales. For this reason, a framework, the 12 Principles of Green Engineering, was constructed for engineers seeking

to incorporate sustainability goals as design criteria. The 12 Principles of Green Engineering. Principle 1 - Designers need to strive to ensure that all material and energy inputs and outputs are as inherently non-hazardous as possible. Principle 2 - It is better to prevent waste than to treat or clean up waste after it is formed. Principle 3 - Separation and purification operations should be designed to minimize energy consumption and materials use. Principle 4 - Products, processes, and systems should be designed to maximize mass, energy, space, and time efficiency. Principle 5 - Products, processes, and systems should be "output pulled" rather than "input pushed" through the use of energy and materials. Principle 6 - Embedded entropy and complexity must be viewed as an investment when making design choices on recycle, reuse, or beneficial disposition. Principle 7 - Targeted durability, not immortality, should be a design goal. Principle 8- Design for unnecessary capacity or capability (e.g., "one size fits all") solutions should be considered a design flaw. Principle 9 - Material diversity in multi-component products should be minimized to promote disassembly and value retention. Principle 10 Design of products, processes, and systems must include integration and interconnectivity with available energy and materials flows. Principle 11- Products, processes, and systems should be designed for performance in a commercial "after-life". Principle 12- Material and energy inputs should be renewable rather than depleting.

### Q. Are you already in the 'Sustainable Manufacturing' mode?

Yes, we are as elaborated in some of my previous answers. As the pioneer company in welding, Ador is always focused on sustainable manufacturing practices. We are an ISO 9001, ISO 14000, ISO 18000 certified organisation. Our products meet stringent national and international standards. This is

clearly an indication of the 'Sustainable Manufacturing' model. However, we firmly believe that Sustainable manufacturing is a continual process. The world is currently experiencing increasing levels of industrial contamination. Hence the demand for sustainable product and raw materials aligned with the ecological pollution is the need of the hour. Copper-free MIG wire manufacture is one of the many steps taken by Ador Welding limited.

### Q. Do you also extend the same to your supply chain?

Yes. We have extended the 'Sustainable Manufacturing' model to our supply chain. Raw Material Purchase Specifications Sheet which contains desired specifications / raw material mix has been created since we deal with quantum of minerals and chemical. We have identified hazardous pollutant in the raw materials and restricted its content accordingly. We are also having a full-fledged testing laboratory to analyse the raw material received from the supplier. In case of any non-conformity, we immediately reject the lot. In addition to this, we issue the Material Safety Data Sheet (MSDS) certificate along with our finished product. This is a proof that our product doesn't deal with any hazardous content during storage, handling and usage. Our Quality Assurance teams regularly conduct audit of our supplier's units to ensure their conformance to our standards.

**Conclusions :** In order to achieve sustainable living on this planet, conventional technologies may no longer be able to tackle emerging environmental issues arising from wasteful energy policies, overuse of resources, water supply shortages, climate change, global warming and deforestation. Advancement in science and technology has contributed to the development of emerging green technologies that might help to solve some, if not all, of the environmental issues that we are facing. ■