

**About  
EQC  
India**

**Équipe Qualité Consultants (EQC India)** comprises of a team of quality professionals engaged in providing quality management and welding services for the infrastructure sector and manufacturing units.

**EQC's areas of Operation of are:**

- Supplier assessment, audits and development
- Review and approval of Quality Plans and Field Quality Plans
- Field Quality Audits
- Consultancy for PED certification/ CE Marking
- Welding Qualifications as per ASME and EN/ISO
- ISO: 9001-2015, ISO: 14001-2015 and ISO-45001
- Quality Improvement Studies
- Documentation & Implementation of ISO: 3834 Series for Quality requirements for fusion welding of metallic materials, EN: 15085-2/ BS EN 1090
- **Responsible Welding Coordinator (RWC Services)**
- Technical Support and Training on Codes and standards on Steels including Chinese, Russian, Indian, EN and ASME codes.
- Technical Support, Consultancy & Training on Welding Technology, NDT, Industrial Painting, Dynamic Balancing & Engineering Materials.

**EQC India was started in 2009 to provide value added to Industry.**



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**In the present issue of Qualité Endeavour, we cover briefly the basics of welding Aluminium alloys.**

**Aluminium and its alloys have gained increasing importance in structural engineering due to advantageous properties such as light weight, ease of machining and corrosion resistance. The article presents a guide to welding and fabrication of Aluminium alloys.**

**We also cover in this issue, a brief note about the recently released ISO: 45001 standard. ISO 45001 is an International Standard that specifies requirements for an occupational health and safety (OH&S) management system, with guidance for its use, to enable an organisation to proactively improve its OH&S performance in preventing injury and ill-health. ISO 45001 is intended to be applicable to any organisation regardless of its size, type and nature. ISO 45001 enables an organisation, through its OH&S management system, to integrate aspects of health and safety, such as worker wellness/ wellbeing.**

**There is a three-year migration period from the publication date of ISO 45001:2018.**

**Happy Reading!**

**Please do send in your comments & suggestions for improvement of the newsletter.**

**Editor, 2<sup>nd</sup> April 2018**

**NEW CLIENTS/ CONTRACTS/ PARTNERS DURING THE LAST QUARTER**

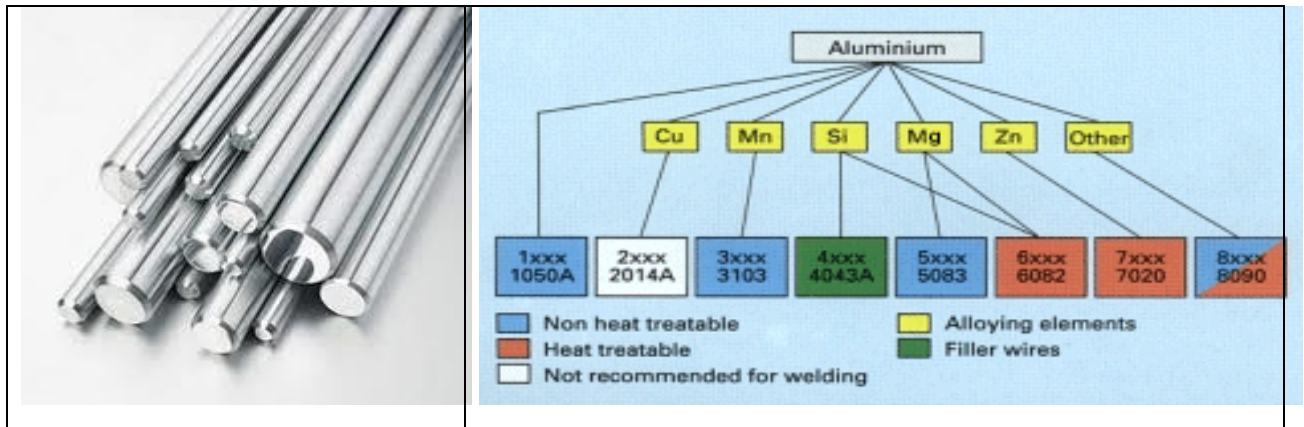


# Welding of Aluminium Alloys

## Welding of Aluminium Alloys

Aluminium and its alloys are used in fabrications because of their low weight, good corrosion resistance and weldability. The various types of aluminium alloy are identified and guidance is given on fabricating components without impairing corrosion and mechanical properties of the material or introducing imperfections into the weld.

## Aluminium Alloy Types

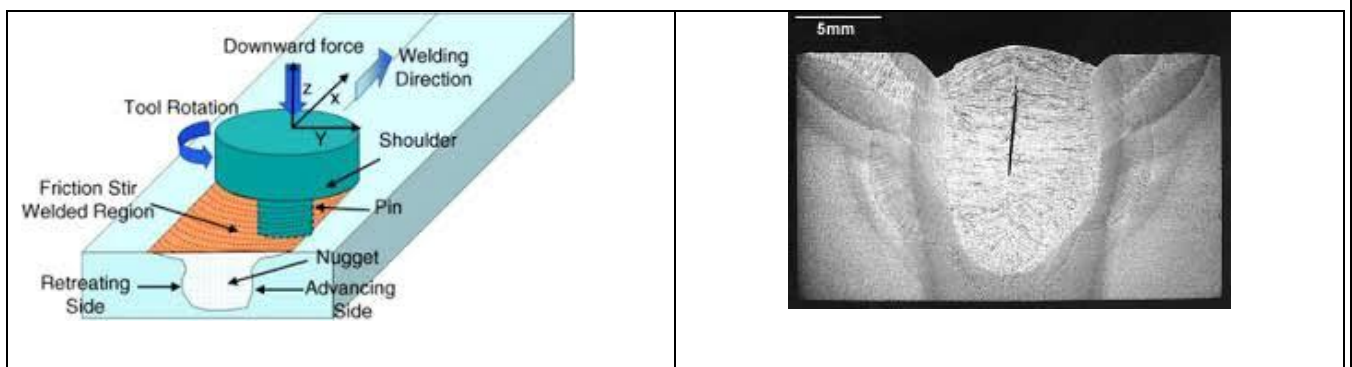


As pure aluminium does not have required strength, small amounts of alloying elements are added to produce a range of mechanical properties. The alloys are grouped according to the principal alloying elements; specific commercial alloys have a four-digit designation.

## Welding Processes

Most of the wrought grades in the 1xxx, 3xxx, 5xxx, 6xxx and medium strength 7xxx (e.g. 7020) series can be fusion welded using TIG, and MIG. The 5xxx series alloys, in particular, have excellent weldability. High strength alloys (e.g. 7010 and 7050) and most of the 2xxx series are not recommended for fusion welding because they are prone to liquation and solidification cracking.

The technique of Friction Stir Welding is particularly suited to aluminium alloys. It is capable of producing sound welds in many alloys, including those heat treatable alloys which are prone to hot cracking during fusion welding.



## Selection of Filler Metals

Filler metal composition for welding aluminium alloys is determined by:

1. weldability of the parent metal
2. minimum mechanical properties of the weld metal
3. corrosion resistance
4. anodic coating requirements

Nominally matching filler metals are often employed for non-heat-treatable alloys. However, for alloy-lean materials and heat-treatable alloys, non-matching fillers are used to prevent solidification cracking.

Recommended filler metal compositions for the commonly used Aluminium alloys are given below:

| Alloy Designation | Classification | Filler            | Application                 |
|-------------------|----------------|-------------------|-----------------------------|
| EN AW-1080A       | NHT            | R-1080A           | Chemical plant              |
| EN AW-3103        | NHT            | R-3103            | Buildings, heat exchangers  |
| EN AW-4043A       | -              | -                 | Filler wire/rod             |
| EN AW-5083        | NHT            | R-5556A           | Ships, rail wagons, bridges |
| EN AW-5251        | NHT            | R-5356            | Road vehicles, marine       |
| EN AW-5356        | -              | -                 | Filler wire/rod             |
| EN AW-5556A       | -              | -                 | Filer wire/rod              |
| EN AW-6061        | HT             | R-4043A<br>R-5356 | Structural, pipes           |
| EN AW-7020        | HT             | R-5556A           | Structural, transport       |

## Imperfections in welds

Aluminium and its alloys can be readily welded providing appropriate precautions are taken. The most likely imperfections in fusion welds are:

1. porosity
2. Cracking
3. poor weld bead profile

## Problems in Welding Aluminium:

1. High affinity for oxygen.
2. High thermal conductivity.
3. Softening in HAZ of age hardened alloys.
4. Susceptibility to cracking

**EQC provides consultancy, training and welder certification for welding of aluminium and its alloys. EQC can also help improve quality of welded products to the level required to enter new markets.**

## STANDARDS/ MANAGEMENT SYSTEMS UPDATE

| TITLE  |   | Update  |
|--|---|---|
| <p><b>ISO : 45001</b></p> <p>Occupational health and safety management systems -- Requirements with guidance for use</p> |  | <p>ISO 45001:2018, Occupational health and safety management systems- Requirements with guidance for use is now published. The new International Standard for occupational health and safety provides a robust and effective set of processes for improving work safety in global supply chains. It is designed to help organisations and is expected to reduce workplace injuries and illnesses the world.</p> |

EQC India is pleased to share that, after five years in the making and collaboration by over 75 countries, the [ISO 45001 standard](#) has been published.

ISO 45001:2018, Occupational health and safety management systems – Requirements with guidance for use, is the first global standard for occupational health and safety management systems. It gives organizations around the world a structure to plan, support, implement and evaluate their efforts to eliminate or reduce risks to workers.



The standard is expected to have a significant effect on workplace safety and today's businesses. "The ISO 45001 standard is potentially one of the most significant occupational safety and health voluntary national consensus to ever be promulgated. This standard has the potential to move safety and health management forward on both a global level and in a country-by-country basis.

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***Équipe Qualité Consultants also provides consultancy and customized training for QA, QC/ Inspection/ Welding/ Engineering / Power Professionals/ Fabricators in the following areas:***

|  |  |
|--|--|
| <b>1. Welding Coordination Personnel</b>         | <b>2. Welding Qualifications as per ASME IX</b>    |
| <b>3. Welding Qualifications as per EN/ISO</b>   | <b>4. Engineering Materials - Steels</b>           |
| <b>5. Welding Certification as per ISO: 3834</b> | <b>6. Railway Certification as per EN: 15085-2</b> |
| <b>7. ISO:9001, ISO: 14001 &amp; ISO: 45001</b>  | <b>8. Factory Production Control (FPC) for CE</b>  |
| <b>9. QA/QC for Chinese Power Equipment</b>      | <b>10. Industrial Painting Systems</b>             |

***For further details, please contact:***

***Équipe Qualité Consultants,***

***Project Quality & Welding Consultants***

***304, V4 Mayur Plaza IV, Mayur Vihar Phase One, Delhi 110091***

***www.eqcindia.co.in, info@eqcindia.co.in, 011-40195119, 09350258683***

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