

Technical Newsletter from
ADOR WELDING LIMITED
Formerly **Advani - Oerlikon Ltd.**

SELECTING FCAW WIRES FOR OPTIMUM PRODUCTIVITY

INTRODUCTION

Flux cored arc welding wires are being increasingly used today for many applications because of their inherent advantages, such as

- Higher deposition rate and hence higher productivity
- Wires can be used in both semi-automatic and fully automatic modes
- Ability to produce weld metals with specific chemistry and property requirements
- Excellent weld deposit quality

Many types of wires for depositing weld metals to suit different materials and applications are available today, giving the user many options. In order to select the correct wire one needs to have a good understanding on this subject. In this article we will highlight the important factors that



ADOR WELDING LIMITED (Formerly known as Advani-Oerlikon Ltd.) would like to commemorate our 60th year with an exclusive feature in the e-Weldone issues. Titled, "The WeldWeds" we feature interviews with eminent Welding professionals, who have dedicated the better part of their life to the cause of Welding. But for these great minds, the welding field in India would have remained impoverished and would not have progressed to the extent as it has progressed now. By show-casing such interviews, the e-Weldone journal hopes to stimulate greater interest and positive bias in this core discipline for successful infrastructure building of our nation.

Mr. Chandrakant L. Vaidya,
Manager – Welding :

Product Update

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MIG / MAG WELDING OUTFITS**



- Light weight, Compact design of Power source Wire feeder and Torch
- Flux cored or solid wire selection switch and Gas check Toggle switch on front panel
- LED Indications for Mains ON and Trip signal
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are to be considered while selecting an FCAW consumable.

Types of FCAW wires

FCAW wires are available in two types: self shielded types and gas shielded types. The grades like T1, T5, T9, T12 are gas shielded types and the types like T4, T6, T7, T8, T10, T11, T13, T14 are self shielded types. The gas shielded ones are very popular for shop floor applications and the self shielded ones are used for field applications and for hardfacing.

Apart from the type of shielding, these wires can also be grouped as rutile and basic types just like in electrodes. For example the T1 type is a rutile type and the T5 type is a basic type. However, it should be noted that in gas shielded (usually CO₂ gas) FCAW welding, the diffusible hydrogen levels are always low.

While most flux cored wires are designed for all positions, others are suitable for specific welding positions. Wires having classifications like EX1TX in the carbon steel group are suitable for all positions and wires having classification EX0TX are meant for flat and horizontal only. Apart from this, some wires are meant for single pass applications where as some classifications are suitable for multi-pass applications.

Synthetic FCAW wires (alloys are transferred through flux) and non-synthetic FCAW wires (wire itself is alloyed) are available, similar to availability of synthetic and non synthetic electrodes. While the carbon and low alloy steel wires are mostly synthetic with carbon steel strips, the



Thermax Limited (Boiler & Heater Division)

gracefully accepted our invitation for the inaugural issue. The reflection of his undiminished passion towards welding is evident in his interview with our web editor Mr. Nilesh Unarkat. Read on and get inspired!

Q. How many years have you been in the welding industry?

A. I started my career in the welding field in 1982, and it has been almost 29 years.

Q. What made you choose welding industry as your career? How did you start?

A. My native place is Walchandnagar, and many of us know that Walchandnagar is a very big industrial city where equipment for cement, sugar, space-aircrafts, defence, nuclear sectors are manufactured. So I used to see the output of heavy industrial equipment in which welding was a critical activity. After completing my education, I joined Walchandnagar Industries Ltd. Since then I have been a part of this wonderful industry.

Q. When did your alliance with Ador start?

A. I had previously worked for Ador and at that time it was known as Advani-Orelikon Ltd.

Q. In this computer age, what is it that

AUTOMIG FC 70-T2
AWS A/ SFA 5.20 : E70-T2C



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- Welding for structural, boilers and pressure vessel components parts made of steel with minimum UTS requirements up to 480 N/mm²

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stainless steel wires can be in both types.

Finally, the flux cored wires are available for a range of materials also. The AWS specification A5.20 (for carbon steels), AWS A 5.29 (for low alloy steels) and AWS A5.22 (for stainless steel) cover many grades of materials and applications.

So while making a selection all these aspects are to be kept in mind, though all of them may not always influence the choice of the wire.

Let us now understand the selection of wires for different materials. In general carbon steels, low alloy steels and stainless steels are commonly welded using FCAW process.

Selecting FCAW wire for carbon steels

AWS A5.20 lists a number of wires for this group. For fabrication work in the shop floor normally the choice is between the T1 type and the T5 type. Where dynamic loading, sub-zero properties, higher carbon content, higher plate thickness are involved, it is preferable to choose the T5 types. The T1 types also produce good impacts but they may not be like the T5 types. But the performance characteristics of the T1 types are excellent and they have very good operator appeal. Combining these two aspects, there is a specific type T1J which not only gives excellent performance but also good impact values down to minus 40°C. They can therefore be selected for sub zero applications. There is also a type T9 which gives impact values down to minus 30°C without compromising on the performance characteristics. Depending on

kept you in this field for such a long time?

A. As I answered one of your previous questions, wherein I said that I grew up watching the output of the welding activity, I made up my mind to be in the welding field at that time itself. During those days, computers were not that popular. But, I always wanted to be in the welding field. If I have to be precise, my passion towards the welding industry has never diminished since past three decades.

Q. Related to welding, can you narrate some of your interesting unforgettable experience?

A. It was during 1983/84, when I was in Walchandnagar, I did some of the jobs, wherein the first nuclear reactor's calandria was in need of repairs., Many organizations couldn't do it and finally Walchandnagar got the opportunity. I was part of the team and I got the opportunity to give my contribution. I made the most of that opportunity and gave in some of the ideas.

I did some of the hardware welding for PSLV which involved handling of critical material of steel; it needed total development i.e. right from the set up of the plant to the completion of the equipment.

After leaving Walchandnagar, one of the interesting welding fabrication organisations I worked with was Thermax. For some of the overseas customers we could provide total solutions for welding. I could do some good jobs for my organization that has



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the application requirements, a choice can be made among these wires.

Selecting FCAW wire for low alloy steels

The most common low alloy steels which are welded with FCAW are for high strength applications. In such applications it is essential to match the strength of the weld metal with that of the base metal. The wires are available at strength levels of 80-90-100-110 ksi and by suitably matching those with the strength of the base material a successful weld can be made.

Selecting FCAW wire for stainless steels

For all fabrication work, requiring good corrosion resistance and other critical properties, it is preferable to use a non-synthetic version of FCAW wire which will use a stainless steel strip. While selecting the wire for welding similar stainless steels, care should be exercised to ensure that the weld deposit chemistry more or less matches that of the base material. For dissimilar materials, a type like 309, 312 and their modified versions can be made use after analyzing the job requirements.

Other considerations in selection

Cast and helix: These two parameters influence the smooth feeding of the FCAW wire during welding. It should be ensured that they are as per the specification limits so that the weld metal is deposited without any interruptions due to problems in wire feeding.

Gas shielding: Some wires require 100%CO² while some others operate well on mixed gas with 80%Ar+20%CO². Choice of wire should be made to suit the gas available normally on the shop floor and if it

been and will always be a memorable experience for me.

Q. What do you consider as one of your best achievements?

A. There are many, but the best that I will rate is my work for GSLV welding when I was working for Walchandnagar Industries.

Q. What advice would you like give the younger generation if they want to take welding as their career?

A. First of all, I will expect them to be on the shop floor and be a part of the process. Then they will understand the difficulty and more importantly, the kind of activity that happens while working on the entire process. After experiencing the actual activities that happens on shop floors, they will be able reach a level where they can give complete solutions and grow along with the industry. They can learn best things about welding only if they become a part of the actual activity.

Q. Do you handle equipment, consumables business or both with Ador?

A. I handle equipment, consumables business and even training from ADOR Institute of Welding for my welders. Apart from that ADOR always helped us for almost all other areas of welding with Ador.

Q. Are you aware of Ador's Welding Automation business?

A. Yes.

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is not normally available provisions should be made in advance so that the welding progresses smoothly.

Shelf life: Normally the shelf life of rutile types is more than that of the basic types. However with the advances in packaging, it is ensured that these wires have a good shelf life. But it is always preferable to ensure that these wires are not stored for very long periods and not used after that on critical applications. Please remember that FCAW wires cannot be re-baked like low hydrogen electrodes to drive out the moisture.

Ador Welding Ltd. FCAW wires

Ador Welding Ltd. produces a wide range of FCAW gas shielded wires for many materials. The table given below gives some of the types available, for immediate reference. Many of them carry approvals and have been used in many applications across industries.

Material Group	AWS Classification	Our Brand Name
Carbon steels	E71T1C	Automig FC 71T1
	E71T5C	Automig FC 71T5
	E71T9C	Automig FC 71T9
	E71T12C	Automig FC 71T12
	E71T1JC	Automig FC 71T1J
Low alloy steels	E90T5K2C	Automig FC 90T5K2
	E110T5K4C	Automig FC 110T5K4
Stainless steels	E308LT1-1	Miginox FC 308L

Q. What are your expectations from Ador Welding in terms of products and services?

A. As far as Ador is concerned, I know their capabilities because I have worked for them for a year in the past, and I know how they have built their reputation over the years. Now, I think they should continue to address the requirements of customers in the most effective manner like they used to do in the earlier days; when we used to visit forums, share ideas and come up with best possible solutions for the customers. Now, I expect Ador to give the kind of solutions a customer wants. I am sure they will resolve customer's problem by giving latest technology solutions. That should be Ador's topmost priority.

E309L T1-1	Miginox FC 309L
E316LT1-1	Miginox FC 316L

Conclusion

FCAW process is fast gaining importance because of its productivity and good quality. Many materials can be welded today using this process, thanks to the wide range of wires available for this purpose. A good understanding of the wires will help one select the ideal wire most suited for the specified application.

Please contact cmo@adorians.com for assistance in selecting FCAW wires for optimum productivity.



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