NEWSLETTER

SEPTEMBER-2026

ISSUE 04

UNIVERSAL ORBITAL SYSTEMS PVT. LTD.

All About Orbital Welding

ORBITAL WELDING: THE BUILDING BLOCK OF DATA CENTERS

YOU ARE CORDIALLY INVITED

PMEC India

STALL NO.: 10L45, HALL NO.: 10,
PMEC INDIA 2026
24TH NOV – 26TH NOV 2026 AT THE
INDIA EXPO MART (IEML),
GREATER NOIDA – DELHI NCR.

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INDIA

HALL NO.4, STALL NO.F47
INDIAN ESSEN WELDING & CUTTING
30TH NOV - 2ND DEC. 2026
AT BOMBAY EXHIBITION CENTER, GOREGAON (EAST),
MUMBAI,

NEWSLETTER FOR SEPTEMBER-2026

All About orbital welding

Issue 04

UNIVERSAL ORBITAL SYSTEMS PVT. LTD.

ORBITAL WELDING PREREQUISITES

Edge Preparation

The Tube/pipe Should Be Either Cut Using An Orbital Pipe Cutting Machine Or A Faced Tubing Tube Facing Machine. This Will Help To Achieve A 90-degree Square Edge That Will Be Useful To Prepare A Square Butt Joint With No Burr.

There Should Be No Gap Between The Joint For Orbital Welding Of Pipe/tube Thickness Below 3mm.

Shielding Gas And Purging Gas

The Gas Used For Shielding And Purging Is Argon And Purity Of 99.9995% To Achieve Clean, White And Contamination Free Weld Joints As Shown In Image.

Tacking

3-4 Tacks Should Be Made On The Joint

It Should Not Penetrate The Tube/pipe

Tacking Should Be Done Without Filler Wire In Case Of Tube/pipes Below 3.2mm

EDITORIAL NOTES

This Issue Focuses On Orbital Welding Application For Data Center Cooling Pipelines, Ethanol Pipeline Orbital Welding Heads Developments,

The Objective Of Starting This Newsletter Is To Provide Insights About Latest Developments At Universal Orbital Systems Pvt Ltd. At Universal Orbital, Innovation And Development Goes Hand In Hand To Cater To Customer And Industrial Requirements. Through This Newsletter, We Aim To Reach To The Readers, Share Our Orbital Welding Knowledge.

We Are Very Grateful About The Response We Have Got For Our First And Second Edition. We Believe Such Connect With Our Clientele Will Aid In Exchanging Technological Discussions On Welding And Present Our Work In The Field Of Orbital Welding

Ms Rucha Kanade

Msc Welding Engineering

Technical Director at universal Orbital Systems Pvt Ltd

ORBITAL WELDING: THE BUILDING BLOCK OF DATA CENTERS

Orbital Welding Advantages

Data Centers Are A Necessity Operating On Industrial Plants. The Cooling Systems And Utility Pipelines Is An Integral Part Of The Data Center Industries. Data Centers Include Cdus (cooling Distribution Units), Fire Suppression, Chillers, Cooling Towers. They Are Built Using The Ss Pipelines That Should Be Leak Proof, Higher Strength Joints, Contamination Free Joints And Manufactured With Tight Tolerances. In A Surrounding Where Downtime Can Cause Capital Losses, Joints Need To Be Made With Utmost Precision; Orbital Welding System Becomes The Most Reliable Solution.

Orbital Welding Comes Into Picture Where Accurate Welds, Complex Joint Geometry, Documentation And Data Acquisition Requirements, Repeatability, Weld Joints With 100% Radiographic Test Results Is A Necessity. Orbital Welding Solution Is Applicable Where The Pipe Rotation Is Not Possible. Orbital Welding Solution Can Easily Cover Pipe To Pipe, Pipe To End Fittings,pipe To Short Bend-long Bend And Pipe To Tee.

KEY FEATURES OF ORBITAL WELDING USEFUL FOR DATA CENTERS

1. Consistent And Repeatable Weld Joints
2. Clean, Contamination Free Weld Joints Internally And Externally
3. Compliance With Weld Joint Specifications Can Be Met
4. Weld Joint Traceability Is Possible
5. Less Chance Of Joint Failures

UNIVERSAL ORBITAL SYSTEMS SOLUTION FOR DATA CENTRE PIPELINES:

Universal Orbital Systems Have A Solution Suitable For Data Center Pipelines. We Have Closed Arc Weld Heads CA-114 (range 1 Inch Nb To 4 Inch Nb) And CA-168 (range 2 Inch Nb To 6 Inch Nb) For Nb Pipes With Thickness Up To 3.5mm. The Weld Heads Are Specifically Designed To Accommodate The Nb Size Pipes And End-fittings. The Power Source Orbitron 7k300 Is Provided With The Weld Heads. The Programs Are Specifically Designed And Pre-set To Accommodate Nb Sized Pipelines.

This Product Range Is Dedicated For Nb Based Pipelines. The Weld Heads Are Compatible With Step Programming Used To Achieve 100% Penetration With Fusion Orbital Welding (single Non-filler Pass) For Thickness From 3.00mm To 3.50mm. The Addition Of Step Programming Facilitates The Precise Control Of Welding Parameters And Improves Penetration For Higher Thickness Tubes (in Case Of Nb Pipes).

The Pipes Can Also Be Welded Using Certain Gas Mixtures That Can Improve The Weld Bead Geometry And Aid To Achieve Uniform Penetration With Less Heat Input Compared When Used On 99.9995% Argon Gas.

Along With Orbital Welding, Edge Preparation Plays A Crucial Role In The Success Of An Error Free Orbital Weld Joint. We Have Orbital Pipe Cutting Machine That Can Cut Pipes/ Tubes From 1 Inch To 6 Inch. The Orbital Pipe Cutting Machine Ensures A 90-degree Squared Tube/pipe With No Heat Marks Due To Cutting And Hence Misalignment Inthe Joint Can Be Avoided. We Also Have Tube Facing Machines To Achieve The 90-degree Squared Tube/pipe And Burr Free Edge.

EVOLVING INDIAN MARKET FOR DATA CENTRES

India's Rapid Data Centre Growth, Driven By Cloud Adoption, Digital Transformation And Government Investment, Is Reshaping Expectations For Welding And Fabrication. Projects Are Expected To Have High Skilled Welding Techniques With Lowered Downtime And Repeatable Joints. With A Higher Demand And Continuous New Development, Automation In Manufacturing Is A Necessity. The Current Indian Market Is Under A Reform In Manufacturing Sector Hence The Standards Are Maintained At The Utmost High Level To Ensure Advanced Technology Development For Data Centre, Global Export Of Technology From India. Orbital Welding Is A Promising Solution For Data Centre Industries Which Rely On Consistency And Clean Internal-external Surfaces.

WE ARE VERY HAPPY TO ANNOUNCE

LAUNCH OF TWO NEW WELD HEAD'S SPECIALLY FOR DATA CENTER SFN FOR NB PIPING

CA-114 CA-168

SEPTEMBER MONTH DEVELOPMENTS

WELDING TRIALS USING VARIOUS GAS MIXTURES ON SS AND TITANIUM TUBES

Usually, For Orbital Gtaw Process Argon With 99.9995% Purity Is Used As Shielding And Purging Gas. In Case Of Thin Walled Tubes/pipes (up To 3.2mm), Argon Gas Is Capable Of Giving Excellent Weld Joints For Ss Tubes.
However, For Certain Grades Of Ss As Well As Titanium, Argon May Not Be The Right Shielding Gas. In Such Cases, To AcquireA Desired Weld Joint Geometry, We Suggest Use Of Various Gas Mixtures.

Ar-hydrogen (2-5%): For Ss Tubes And Certain Ss Grades, This Mixture Can Give Better Results In The Welding Joint Quality. The Hydrogen Gas Helps In Achieving Weld Penetration With A Controlled Weld Bead For Tube/pipe Wall From 3.00 Mm Up To 3.8mm. The Weld Bead Width Is Approximately 2.5 Times Of The Tube/pipe Thickness. If The Tube Thickness Is 2.5mm The Weld Bead Width Will Be In The Range Of 6.5mm To 7.mm. However, The Weld Bead Width To Penetration Ratio Can Be Signi cantly Controlled Using The Argon-hydrogen Gas Mixture.
We Have Achieved A Weld Bead Of 4.4mmfor Ø60.3mm Pipe With Thickness 3.8mm In Closed Arc (autogenous) Orbital Weld Head. The Welding Parameters Were Designed To Achieve 100% Penetration For A Single Autogenous Pass While Controlling The Heat Input. Controlling The Heat Input Is Done By Sectorial Welding Parameter Setting, A Facility Available In Our Power Sources.
The Welding Travel Speed And Current Are Adjusted In 9 Sectors (a Tube/ Circle Is Divided In 9 Sectors).

What Does Hydrogen Do To Get Such Results?

Hydrogen Has A Higher Thermal Conductivity Which Increases The Arc Energy And Achieves Weld Penetration. Hydrogen Causes The Arc Column To Pinch Or Contract Into A Narrower, More Focused Stream. This Higher Energy Density Creates A Deeper, Narrower Penetration Pro le And A Smaller Heat-affected Zone.

ARGON-HELIUM MIXTURE:

Titanium, Low Alloyed Steels Are The Materials Cannot Be Welded Using Argon-hydrogen Shielding Gas Mixture. The Use Of Gas Mixture Of Argon-helium Can Aid In Achieving Desired Output. Introduction Of Helium Gas In The Mixture Increases Thermal Conductivity Thus Helping To Achieve Faster Welding Speed And Better Penetration. The Ionization Energy Required For Helium Is Higher Than Argon, Which Means The Arc Voltage Is Increased. However, While Using Argon-helium Mixtures Shielding Gas Flow Should Not Be Kept Above 12 Lpm To Avoid Arc Wandering.

PURE HELIUM GAS FOR TITANIUM WELDING:

Some Titanium Grades Are Challenging To Weld Using A Pure Argon Shielding Gas. The Same Applies To A Gas Mixture Of Argon-helium. However, Pure Helium Has A Good Impact On Achieving 100% Uniform Penetration For Higher Thickness Titanium Tubes.

We Have Worked On Welding Titanium Tubes Of Thickness 2.5mm With Autogenous Orbital Gtaw Process And 100% Penetration. The Welding Parameter Setting Is Critical, Hence The Sectorial Parameter Setting Changes From An Advantage To Necessity. It Was Observed That The Welding Speed Control Was Required In Every Degree (from 0 To 360). Initial Lower Speed Followed By Increased Speed Resulted In A 100% Penetration. This Was Also Balanced By The Changes In The Current In Every Sector.

Although Shielding Gas And Welding Parameter Control Contributes To A 100% Penetration Joint Of Titanium, The Purging Gas Flow-pressure Decides The Success Of The Weld Joint For Uniform Penetration. The Pressure Control Of Purging Gas Regulates The Molten Material Flow, Uniformity In The Penetrationand Clean Internal Weld Joint. The Power Source Controls The Pressure With An Accuracy Of 2% ± In Mm Of Water.

A Major Factor That Contributes To The Penetration And Weld Bead Of Titanium Tube With 2.5mm Thickness Is The Included Tungsten Electrode Angle. The Included Angle Should Be 30-degree. The Tungsten Electrode Should Be Grounded Using A Tungsten Grinder And Parallel To The Tungsten Electrode Axis.

CRITICAL JOINTS THAT CAN BE WELDED USING OUR WELD HEAD SERIES

CRITICAL WELD JOINTS

UNIVERSAL ORBITAL SYSTEMS PVT. LTD.

MADE IN INDIA

CE

TÜV AUSTRIA
CERTIFIED
EN ISO 9001
Certificate No. 20100183004002
TÜV AUSTRIA CERT GMBH

G.S PARKHE AWARD

CII AWARD

MSME AWARD

S.No.29/8,29/9, Near Shree Control Chowk,Beside Anant Industrial Estate Phase-3,
Narhe Dhayari Road,Pune,Maharashtra- 411041
T:+918793089870 M: +918080288688 / +919022602946
Email: sales@universalorbital.com / www.universalorbital.com