Qualité Endeavour

Quarterly Newsletter from Équipe Qualité Consultants, Issue No. 29, 1st January 2019

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.

Inspiring Quality Since 2009

New Year Greetings from Équipe Qualité Consultants!!

EQC India has completed nine (9) years of its journey last month and thanks all its clients & well wishers for their support and encouragement during this journey

In the present issue of Qualité Endeavour, we discuss Porosity, the most commonly found imperfection in Welds. Porosity is the presence of cavities in the weld metal caused by the freezing in of gas released from weld pool as it solidifies.

Also discussed is the 2018 version of ISO: 9004.

Happy Reading!

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

Editor, 1st January 2019

NEW CLIENTS/ CONTRACTS/ PARTNERS DURING THE LAST QUARTER

BENGAL

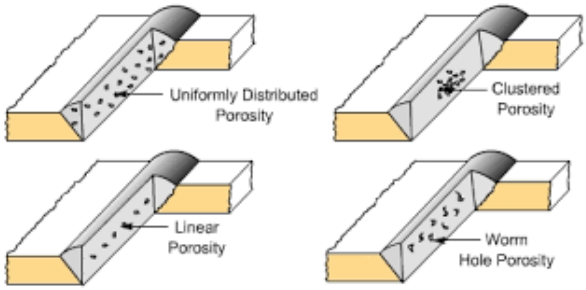
TÜV INDIA
TÜV NORD GROUP

RAJ HANS PRESSINGS PVT. LTD

Porosity in Welds

Porosity is the presence of cavities in the weld metal caused by the freezing in of gas released from the weld pool as it solidifies. The porosity can take several forms such as:

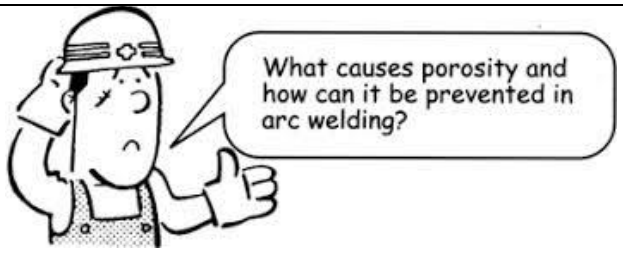
1. distributed
2. surface breaking pores
3. wormholes
4. crater pipes

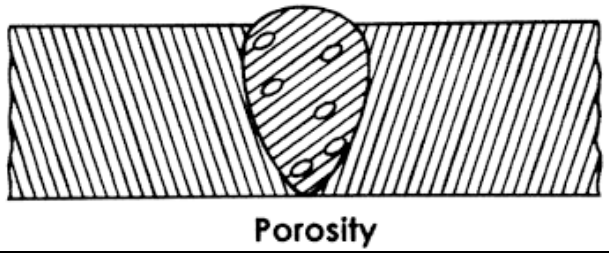


Cause

Porosity is caused by the absorption of nitrogen, oxygen and hydrogen in the molten weld pool which is then released on solidification to become trapped in the weld metal.
Nitrogen and oxygen absorption in the weld pool usually originates from poor gas shielding. Hydrogen can originate from a number of sources including moisture from inadequately dried electrodes, fluxes or the work piece surface. Grease and oil on the surface of the work piece or filler wire are also common sources of hydrogen. Surface coatings like primer paints and surface treatments such as zinc coatings, may generate copious amounts of fume during welding.

Twenty (20) likely causes of weld metal porosity





Take a look at gas flow, material conditions, and consumables to prevent this defect. From most common to least, let's look at 20 common causes of porosity in welds:

1. **The cylinder is out of gas.** This is a very common occurrence.
2. **Air or a draft** of some kind disturbs the delivery of the shielding gas during the welding process. Overhead or floor fans even as far as 25 feet away can wreak havoc on the gas delivery. Welders also need to be aware of open doors and air being discharged from machinery.
3. **The presence of moisture can lead to problems.** It might be simple water or morning dew, but also could be condensation from welding on heavy plate and lap joints, which might occur particularly when temperatures is low. The easy fix is to preheat the metal to evaporate the moisture.
4. **Plugged or restricted gas metal arc welding (GMAW) gun nozzles**—typically from weld spatter, impede the delivery of shielding gas. To rectify this obstacle, the welder needs to look at the nozzle opening before starting a weld. This double-check might prevent weld spatter from falling into the weld.
5. **The weld nozzle is held too far away** from the weld puddle. The volume of shielding gas reaching the weld is diminished, and dilution of the shielding gas with the atmosphere severely affects the weld.

6. **The GMAW gun is laid at an angle** that will spread the gas flow out and actually suck in the atmosphere from the back side, opposite the nozzle direction. A 5 to 15 degree angle, perpendicular to the joint, is an acceptable angle for forehand or backhand methods with GMAW or FCAW guns and SMAW electrodes.
7. **Paint, grease, oil, glue, and sweat** release large volumes of gas when exposed to arc welding temperatures. This is especially true with solid-wire GMAW and gas tungsten arc welding (GTAW), but FCAW and SMAW processes are vulnerable as well. The flux makeup was not designed to handle such contamination.
8. **When mill scale and rust are welded over**, decomposition gases are formed, and oxidation begins, which can involve the presence of moisture.
9. **Plating compounds with zinc**, such as in the galvanization process, can create a problem. Zinc melts at approximately 420 degrees C. At welding temperatures far in excess of 1100 degrees C, zinc changes from a solid to a gas in a fraction of a second. Also, zinc dust is a byproduct of the welding process.
10. **SMAW electrodes, FCAW electrodes, and submerged arc welding (SAW) flux absorb** moisture in an unprotected environment. To address moisture in the welding process, codes are pretty clear about the use of dryers and ovens to store these materials. SAW flux in particular is like a sponge. Once the container is opened, the welder should store/ condition the package according to the manufacturer's directions.
11. **The gas flow is too high.** Gas flow of 20-25 lpm at the GMAW nozzle and 10 to 15 lpm at the GTAW torch should be plenty. A higher flow is a terrible waste of gas and adds unnecessary cost to the fabrication.
12. **A pinched or smashed gas hose** doesn't deliver the shielding gas properly. If the gas hose is more than 6 m long, the possibility of it kinking is pretty good.
13. **Improper use of antispatter compounds, sprays, or gels** can be a major contributor to porosity. When used in excess, the antispatter material becomes a contaminant, boiling into a gas when exposed to the high temperatures of the welding arc. Also, jamming the GMAW gun into a container of antispatter gel can result in the gel dripping back into the weld puddle. An operator should use the anti- spatter material properly or not at all.
14. **Weld filler metals contaminated with paint, grease, oil, tape, and glue** can release gases when exposed to the very hot welding arc. Even dirty gloves used during GTAW can contaminate the consumables. Cleaning solid wire and flux-cored wire with wire wipes and GTAW fillers with steel wool is a good idea.
15. **Contaminated GMAW gun liners** can introduce unwanted elements to the weld pool. All the grease, oil, dust, and dirt found in the shop environment collects on the wire and ends up in the guns whip liner. Stainless steel and high-nickel-alloy wires are especially susceptible to attracting these contaminants.
16. **GMAW right on the edge of an outside corner joint** might create problems given the awkward position of the nozzle. The nozzle often does not cover the joint properly, causes turbulence, and draws in outside air into the weld joint.
17. **If the weld joint is open at the root,** it will suck in air from the back side. Unprotected liquid metal can absorb air easily.
18. **The welding gas itself could be contaminated**. If the welding gas is a suspect, the shop needs the gas supplier to certify that the gas has the correct dew point.
19. **A contaminated gas hose** could be a culprit, in particular, hoses that have been used for other activities prior to being used in a welding application.
20. **A defective gas solenoid** at the wire feeder or the GTAW machine is a possible contributor to conditions that create porosity.

ISO 9004:2018 Released this year

Identity of an Organization: ISO 9004:2018's Most Important Feature

World-class performance results when employees care about their organization.

ISO 9004:2018—"Quality of an organization—Guidance to achieve sustained success" expands considerably on the former (2009) revision. It introduces the important concept of "quality of an organization" (Clause 4.1), which makes excellent sense. If the organization's processes are of high quality, we can expect good outputs, or at least rapid corrective and preventive action (CAPA) in response to problems.

The standard consists mostly of common-sense practices, many of which also appear in ISO 9001:2015 (which the standard cites). Section 6: "Identity of an organization" deserves particular attention because it can convey an overwhelming competitive advantage. This section is tied closely to Clause 9.2 - "People," and its focus on competence, motivation, empowerment, and engagement of the organization's members. It also includes "unity of purpose," a phrase that appears twice in Section 7 - "Leadership."

The topic "strategy" is substantially extended as well. In addition to „the purpose of strategy" – as it was focused on in the 2009 version – now the Standard contains various recommendations on how to „develop the strategy and what should be considered when establishing strategy".


INTERNATIONAL STANDARD

ISO 9004

Fourth edition 2018-04

Quality management — Quality of an organization — Guidance to achieve sustained success

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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:

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

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