

Тема занятия: «Современное развитие. Новые методы сварки»

Цель занятия: выучить новый лексический материал по теме «Современное развитие. Новые методы сварки»; совершенствовать навыки чтения и перевода текста профессионального направления; систематизировать знания, ответив на контрольные вопросы по теме занятия.

Уважаемые студенты! Ознакомьтесь с материалами лекционного занятия на тему «Современное развитие. Новые методы сварки». Конспект занятия выполняйте **в рабочей тетради письменно, обязательно указывая дату занятия, тему занятия, номер упражнения.** Ответы предоставить преподавателю на проверку **до 26. 03. 2023 г.** в электронном виде (**фотоотчёт**) на e-mail mikagol2605@mail.ru. Телефон преподавателя для консультации и возникающих вопросов: 072-14-15-816.

С уважением, Голодюк Марина Викторовна.

- 1. Прочитайте и устно переведите текст «What Is Orbital Welding». Выпишите из текста незнакомые слова в словарь, выучите новую лексику.**
- 2. Выполните письменно упражнение к тексту.**
- 3. Повторите грамматический материал на тему «Сложное дополнение» («Complex Object»). Запишите краткий конспект грамматического материала.**
- 4. Выполните письменно грамматические упражнения на тему «Сложное дополнение» («Complex Object»).**

What Is Orbital Welding

The term Orbital-Welding is based on the Latin word ORBIS = circle. This has been adopted primarily by aerospace and used in terms of Orbit (noun) or Orbital (adjective) for the trajectory of a man-made or natural satellite or around a celestial body. The combination Orbital Welding specifies a process by which an arc travels circumferentially around a work piece (usually a tube or pipe). The concept Orbital Welding is basically a loosely defined term that is usually used for processes only, where the arc is travels at least 360 degrees around the work piece without interruption.

Consequently, processes, which interrupt the full 360-weld sequence such as for better puddle control (often used for MIG/MAG welding, using the down-hand welding sequence in 2 half-circles), cannot truly be called orbital welding.

Possibilities and Limitations

From welding terminology Orbital Welding belongs to the category semi-mechanized (TIG-) welding. Because of the need for good control of the weld puddle, the Orbital-Welding process is only practiced with the TIG process and relevant rules like selection of gases, cleanness, weldability of specific materials and consequential mechanical strength specifications such as tensile and bend loading, are very important.

Orbital-welding is presently used whenever the quality of the weld joint has the highest priority. These demands are not only limited to mechanical strength and X-ray qualification, but also to the important aspects of the aesthetics of the weld seam. For any users a uniform, flat and smooth root-pass is the main reason for using this process. Consequently, it is favored in the following areas: chemical industry, pharmaceutical industry, bio-technology, high-purity water systems, semiconductor industry, aircraft-and aerospace industry. Moreover, because of the weld joint's uniform outside shape and almost complete absence of need for any post-polishing. Orbital-welding is even used for bends on door-handles, hand-guards, or in dead foot-elements for champagne-glasses! Interested applicants for this technology should certainly note that they have to confirm a couple of indispensable premises.

The following presents the basic rules for this process, valid for all manufacturers and systems.

Even knowing that some competitors are announcing features, which would potentially violate the basic physical laws of nature and knowledge, moreover, making promises and statements which are at least detected as impossible to meet when the welding system must work under high duty-cycle production conditions. Indiscriminate and exactly defined dimensions with tolerances must be thorough and complete. The much liked standpoint, that the welded tubes and pipes are in accordance to DIN or ASME standards are not acceptable criteria. These qualifications only define tolerances in percentage to the wall thickness relating to pressure loading and not to weldability using the Orbital-Welding-Process.

For the Orbital-Welding-Process absolute tolerance values are necessary, and furthermore, the more complicated the application, the tighter the tolerances must be. This means, that for an easy application like welding a stainless steel tube of 53 x 1,5 mm, a tolerance in alignment of about 0,5 mm (about 30% of the wall thickness) can be compensated, but for much more critical applications like welding a carbon-steel pipe of 114,3 x 3,6 mm, the same percentage can result in unacceptable weld quality. Therefore, the question of acceptable tolerances should be researched and defined for each application individually.

That Orbital-Welding can be used successfully and economically is proven by the constantly increasing number of users. Field experience has shown that Orbital-welding can be justified based upon economic reasons alone, where the welds can be done in squared-butt no-gap preparation utilizing a single pass. With advanced digital

welding systems this is possible up to a wall-thickness of 4 mm, and with welding systems with lower performance capabilities (limited levels, no pulse-synchronized cold-wire-feeding), up to 3 mm.

Joint preparation is simple but requires high quality with an exact 90° angle to the tube/pipe axis; a high quality saw cut is usually enough. Of course, the joints should be deburred and cleaned out of corrosion, oil, tinder, etc. With appropriate quality-demands, this should be even obvious for manual welds! The tube joints will be then fit together without any visible gap. This can be done with small autogenous tack-welds or with internal or external clamping fixtures. For larger wall-thickness it is necessary to bevel the weld-joints, far as possible in a U-shape. Since a very precise and uniform root pass is important, a weld joint is prepared with an I.D. related and fixed bevelling-machine. Manual grinding or the use of bevelling saw blades is not precise enough for repeatable welding results. Because an Orbital-Welding job usually requires a lot in time and money, the Orbital- multi-pass-welding is not used very often and only where it is strictly recommended on quality reasons. A good qualified manual welder will, in most cases, be faster than an Orbital-welding-system. Additionally, an Orbital-system for multi-pass welds will be much more expensive and even more complicated than a system without this option.

Visual inspections of the weld-seam alone can never be sufficient as the sole criterion. Other quality controls, such as, corrosion, consistency, mechanical strength must also be considered. Also, allowed tolerances in contents of alloys on specific materials, such as sulphur content, can result in significantly different welding results, even when the material code is the same. Usually, you can expect that stainless steel materials up to 3 mm wall-thickness can be done without filler-wire. For higher wall-thickness applications, you have to decide on a case-by-case basis. In some eventualities even carbon steel can be done without filler-material, although it's even recommended on the thinner wall-thickness to use filler-wire in any way.

Выполните письменно упражнение к тексту.

Describe Orbital welding by completing the following sentences:

1. The term Orbital comes from the Latin word ORBIS and means
2. The Orbital Welding is a process in which an arc travels
3. By category it belongs to
4. It is practiced only with
5. Orbital-welding is presently used in such areas as
6. It is used to produce
7. The basic rules for this process are
8. Absolute tolerances in Orbital-Welding Process are important because
9. Wall-thickness of 4 mm is possible
10. Joint preparation includes
11. Orbital-multi-pass-welding is rather expensive and its use is only justified when
12. Filler-wire is necessary to use only

Повторите грамматический материал на тему «Сложное дополнение» («Complex Object»).

СЛОЖНОЕ ДОПОЛНЕНИЕ (COMPLEX OBJECT)

Данная конструкция часто употребляется в английском языке и не имеет полной аналогии в русском. На русский язык конструкция переводится, как правило, придаточным предложением.

ОБРАЗОВАНИЕ



I saw **him do** it. — Я видел, как он делал это.

УПОТРЕБЛЕНИЕ

Complex object употребляется:

- после глаголов *to ask* просить, *to want* хотеть:

I want you **to translate** the text. — Я хочу, чтобы вы перевели этот текст.

- после глаголов чувственного восприятия: *to hear* слышать, *to see* видеть, *to watch* наблюдать, смотреть, *to feel* чувствовать, *to observe* наблюдать, *to notice* замечать и др. После этих глаголов употребляется инфинитив без частицы *to* или причастие настоящего времени:

I **heard** him **speak**. — Я слышал, как он говорил.

They **watched** their children **playing** football. — Они наблюдали, как их дети играли в футбол.

- после глаголов, обозначающих умственную деятельность и желание: *to know* знать, *to think* думать, *to consider* думать, считать, *to believe* думать, полагать, *to suppose* думать, полагать, *to expect* ожидать, *to imagine* представлять, *to find* находить, узнавать, *to trust* верить, *to*

assume допускать, предполагать, *would like / to want* хотеть, *to desire* хотеть, желать и т. п.:

We **knew** him **to be busy**. — Мы знали, что он занят.

• после глаголов *to pronounce* произносить, говорить, *to declare* заявлять, *to report* докладывать:

The surgeon **pronounced** the wound **to be** a slight one. — Хирург сказал, что рана лёгкая.

• после глаголов, обозначающих чувства и эмоции: *to like* нравиться, *to dislike* не нравиться, *to love* любить, *to hate* ненавидеть и т. п.:

I **hate** you **to talk** in this way. — Я терпеть не могу, когда вы так говорите.

• после глаголов, обозначающих приказ или разрешение, принуждение: *to order* приказывать, *to let* позволять, разрешать, *to allow* позволять, *to permit* позволять, *to suffer* неохотно позволять, *to have* распоряжаться, *to make* заставлять, *to get* распоряжаться, заставлять, *to force* распоряжаться, приказывать, заставлять, *to cause* распоряжаться, приказывать, заставлять и т. п.:

Jane **caused** a telegram **to be sent** to him. — Джейн распорядилась, чтобы ему послали телеграмму.

The judge **ordered** Hill **to serve** five years in prison for the robbery. — Судья приговорил Хилла к пяти годам тюремного заключения за ограбление.

She only **allows** the children **to watch** television at weekends. — Она разрешает детям смотреть телевизор только по выходным.

She couldn't **get** them **to understand** what she was saying. — Она никак не могла заставить их понять, что она говорит.

После глаголов *to let*, *to make*, *to have* инфинитив употребляется без частицы *to*:

Don't **let** your children **make** noise. — Не разрешайте своим детям шуметь.

He **made** me **go** to the doctor. — Он заставил меня сходить к врачу.

I'll **have** the porter **bring** your luggage up. — Я распоряжусь, чтобы носильщик поднял ваш багаж.

Выполните письменно упражнения.

1. Раскройте скобки, используя сложное дополнение. Переведите.

1. I want (she) to be my wife.
2. My brother taught (I) to swim and dive.
3. They would like (we) to read aloud.
4. Bob advised (she) to stay for another week.
5. We expect (he) to arrive at noon.
6. I heard (you) open the door.

7. Dad always makes (I) go fishing with him every weekend.
8. Our parents expect (we) to stop quarreling.
9. Sara never lets (he) drive her car.
10. I saw (you) cross the street.

2. Перефразируйте предложения, используя сложное дополнение.

Н-р: I want that she will cook mushroom soup. (Я хочу, чтобы она приготовила грибной суп.) – I want her to cook mushroom soup.

1. The children were laughing and playing on the beach. Their parents saw them. – Their parents saw
2. They said: “He is an expert in our industry.” – They consider
3. The bike disappeared in the forest. The policeman noticed it. – The policeman noticed
4. Elvis said to his son: “Don’t watch horror films.” – Elvis doesn’t let
5. “Mummy, please, buy me that doll”, said the little girl. – The little girl would like
6. Dad says that I can travel to China with you. – Dad allows
7. He swears a lot. Many people heard that. – Many people heard
8. “Bring me some water from the well,” my grandmother said. – My grandmother wanted
9. Somebody was watching me. I felt that. – I felt
10. Daniel said: “Helen, you can go to a night club tonight.” – Daniel let

3. Запишите предложения, используя сложное дополнение.

1. The Smiths want _____ (we, visit) them next month.
2. Do you want _____ (she, post) the letter for you?
3. What does the teacher expect _____ (his pupils, do) during the lesson?
4. When do you expect _____ (they, arrive) ?
5. The man wouldn’t like _____ (his son, become) a dentist.
6. Alice didn’t expect _____ (the exams, start) in April.
7. Don’t make _____ (I, repeat that again).
8. The teacher let _____ (the class, go) home early.
9. She wanted _____ (her husband, borrow) some money to buy a car.
10. I know _____ (he, be) a very experienced driver.