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MODULE U

Oxygen cutting

Equipment for metal cutting oxygen



Equipment for metal cutting oxygen

- ▶ This separation is used to heat welding sets oxygen-acetylene.
- ▶ Difference against autogenous welding is to adjust the working pressure reducing valve for oxygen.
- ▶ Size working pressure of oxygen is derived according to the thickness of the material.
- ▶ Place welding nozzles used cutting torches and attachments.
- ▶ To cutting the first set and a neutral flame after ignition and prescribed heating up of the material opens the oxygen valve on top of the incisor material separation occurs as a result of blowing the molten metal out of the kerf.

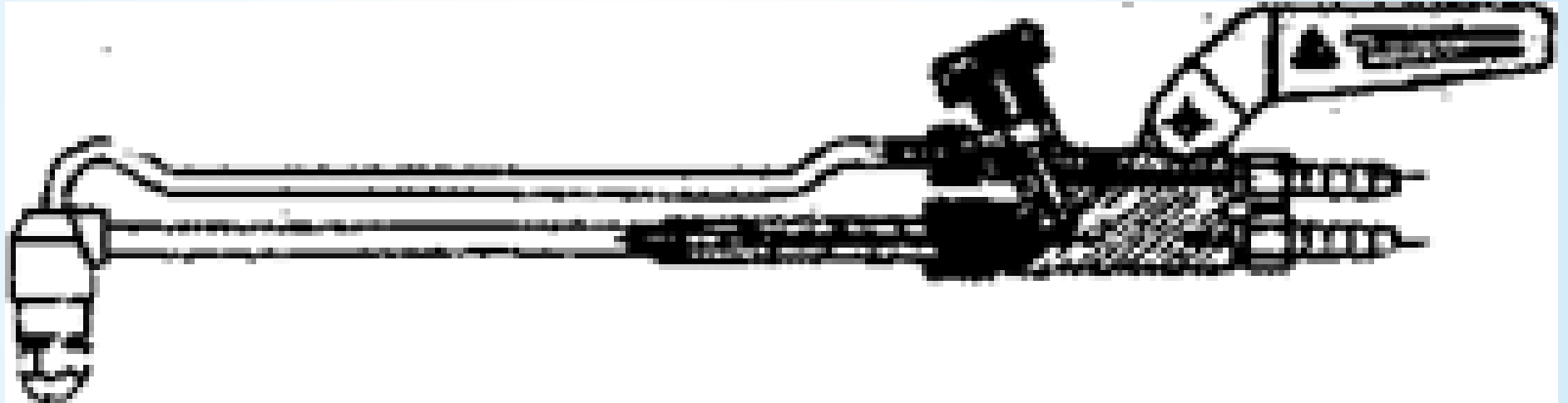


cutting burners

- ▶ Cutting torch consists of a torch body in which is threaded two-piece concentric heating and cutting die.
- ▶ Oxygen after entering the burner divided into two parts. One part of the oxygen flowing through the injector and creates a flame heating, the second part flows separately to the cutting head.
- ▶ Cutting the head has a set of removable heat-up and cutting attachments which are used according to the thickness of the cut material, or by a combustible gas used.
- ▶ Allow cutting steel in thicknesses ranging from 3 mm to 300 mm.
- ▶ Besides the classic cutting torches are used in cutting attachments which are part of the universal welding sets.
- ▶ easy Replacing welding attachments for cutting brings cutting torch, which allows cutting of steel in the thickness range from 3 mm to 80 mm.



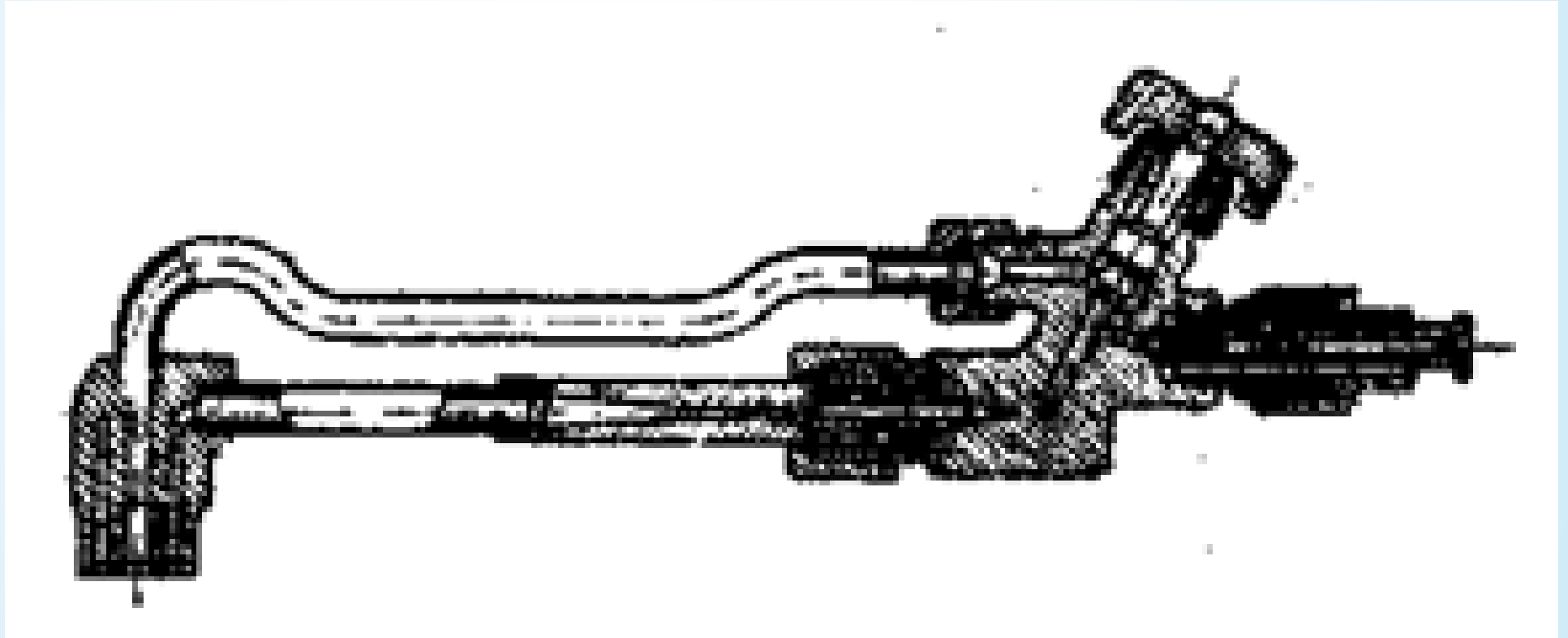
Cutting torch



KUBÍČEK, J. DANĚK, L. KANDUS, B. *Technologie svařování a zařízení. Učební texty pro kurzy svařovacích inženýrů a technologů.* Plzeň: ŠKODA WELDING, s. r. o., 2011. s. 181.



Cutting torches



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Cutting burner





Cutting burner





Parameters cutting

- ▶ The quality of the cutting surfaces, cutting edges and cutting economics are significantly influenced by cutting parameters.
- ▶ All cutting parameters are substantially a function of the thickness of the cut sheet.



Cutting oxygen pressure depending on the thickness of the cut material

The thickness of the cut material (mm)	Cutting oxygen pressure (MPa)
5	0.20
10	0.25
20	0.30
80	0.50
100	0.55
200	0.75
300	1.05

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Cutting of material is carried out in the following ranges

- Oxygen cutting from 3 mm to 300 mm
- Plasma cutting from 1 mm to 150 mm
- Laser cutting from 0.5 mm to 40 mm.



Causes of Defects cut areas

- ▶ The cause of defects are numerous variations and failure of the cutting parameters (purity cutting oxygen, cutting oxygen pressure, cutting speed).
- ▶ Mistakes defects and cuts defines CSN 05 3400, the conditions for determining the quality of the surface and measuring surface cutting surfaces provides standard CSN 05 3,401th



Quality cutting surface

- ▶ Squareness deviation (in vertical section) or the angular deflection (u oblique cut)
 - ▶ Mean roughness (arithmetic mean of the heights of the individual elements of the profile on five consecutive basic lengths)
 - ▶ A delay section,
 - ▶ Melting the upper edge.
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- ▶ Cutting edges in terms of the standard divided into two levels of quality (quality grade I and grade II quality).



Cutting under water

- ▶ Cutting under water is mainly used for demolition purposes where no matter the quality of the cut.
- ▶ Yippee important here that every 10 m is pressure 100 kPa, And this value must increase the working gas pressure required for cutting.
- ▶ Further when cutting underwater necessary to preheat flame had space for burning without water.
- ▶ Resolves either the special design of the cutting torch cutting head is provided with an additional protective toecap, or pressurized air creates around the mouths of heating the tip shroud.



Cutting the water

- ▶ On cutting under water is mainly used flame heating oxy-benzínový, wherein the combustible mixture formed after the exit orifice of the tip, to avoid the possibility of "backfire".
- ▶ At cutting under water an intensive cooling of the cut material surrounding water and therefore must be very intense preheat flame.
- ▶ It It brings with it a significant increase in gas consumption for preheating flame than when cutting in the air.



gouging oxygen

- ▶ Gouging is done with special grooving burners.
- ▶ Using firstly forming the grooves, but also for removing material defects possibly defects in welds.
- ▶ Gouging can only be performed on materials that are suitable for cutting.
- ▶ Consumption oxygen in the range of $2.61 \text{ m}^3/\text{Hr}$ to $13.1 \text{ m}^3/\text{throw}$.



Guide rollers for welding





Goggles for cutting oxygen





questions about reflection

1. What is the principle of metal cutting oxygen?
2. What are the conditions friabilityi metal?
3. How high is the ignition temperature of the steel?
4. What gases used in oxyfuel?
5. What are the main part of the cutting torch?
6. What is the cause of defects cuts?
7. What is the metal-cutting under water?



Recommended literature and information sources

- ▶ AMBROŽ, O. A KOL. *Technologie svařování a zařízení: učební texty pro kurzy svářečských inženýrů a technologů*. Ostrava: ZEROSS, 2001, 395 s. Svařování. ISBN 80-85771-81-0.
- ▶ KUBÍČEK, J. DANĚK, L. KANDUS, B. *Technologie svařování a zařízení. Učební texty pro kurzy svařovacích inženýrů a technologů*. Plzeň: ŠKODA WELDING, s. r. o., 2011, 242 s.