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CONTENTS

Developed in PWI

EBW INSTALLATIONS FOR GRANULAR METALLURGY

Installations for granular metallurgy are designed for degassing, filling and vibration compaction of granules in capsules with a subsequent sealing applying electron beam welding.

In the installations the following technological operations are performed:

- heating and degassing of products (capsules) to remove adsorbed moisture and gases from the inner and outer surfaces;
- degassing of granules when filling a product;
- vibrocompaction of granules in a product during filling process;
- electron beam welding of the plug, installed in the neck of a product;
- cooling of a filled and sealed product in vacuum.

The E.O. Paton Electric Welding Institute produces three standard sizes of installations for granular metallurgy: KL168, KL114 and KL139.

Basic characteristics of installation KL139

	Description of parameter	Value
1	Overall dimensions of installation, mm:	
	length	7980
	width	4470
	height	3140
2	Weight of installation, t	10
3	Inner dimensions of vacuum chamber, mm:	
	length	1500
	width	1300
	height	1854
4	Maximum dimensions of product to be welded, mm of a cylinder type	
	diameter	600
	height	650
	of a disc type (vertical position)	
	diameter	800
	width	400
5	Weight of product to be welded, kg, max	1000
6	Depth of weld, mm, not less than	6
7	Working vacuum in the vacuum chamber, Pa, not worse than	$2{,}66\cdot10^{-3}$
8	Working vacuum in the gun, Pa, not worse than	$6{,}67\cdot10^{-3}$
9	Leakage into an empty and clean chamber, Pa·l/s (mm Hg·l/s), not more than	5 (0,0375)
10	Time for evacuation of the vacuum chamber (up to $2.66\cdot10^{-3}$ Pa), min, not more than	30
11	Temperature of product heating, °C, max	600
12	Amplitude of product vibration, mm, max	2
13	Range of product vibration frequency, Hz	5–30
14	Power unit with high-voltage power source of 6 kW/60 kV:	
	accelerating voltage, kV	60
	range of welding current control, mA	1–100
15	Cycle of preparation, heating, filling and welding of one product, working shifts	1–2
16	Technical parameters provided by the Customer:	
	• power supply — in accordance with the standard of Germany DIN EN 60 204, item 4.3	380 В, 50/60 Гц
	• power consumption, kV·A, not more than	120
	• consumption of cooling water, l/h	5340
	• temperature of cooling water at the inlet, °C	15–20
	• pressure of cooling water, kg/cm^2, not less than	3
	• pressure of compressed air, kg/cm^2, not less than	5
	• room temperature, °C, not more than	30
	• humidity, %, not more than	70
	• presence of air conditioning	+
	• presence of crane with a load-carrying capacity of at least 1.5 t	+