

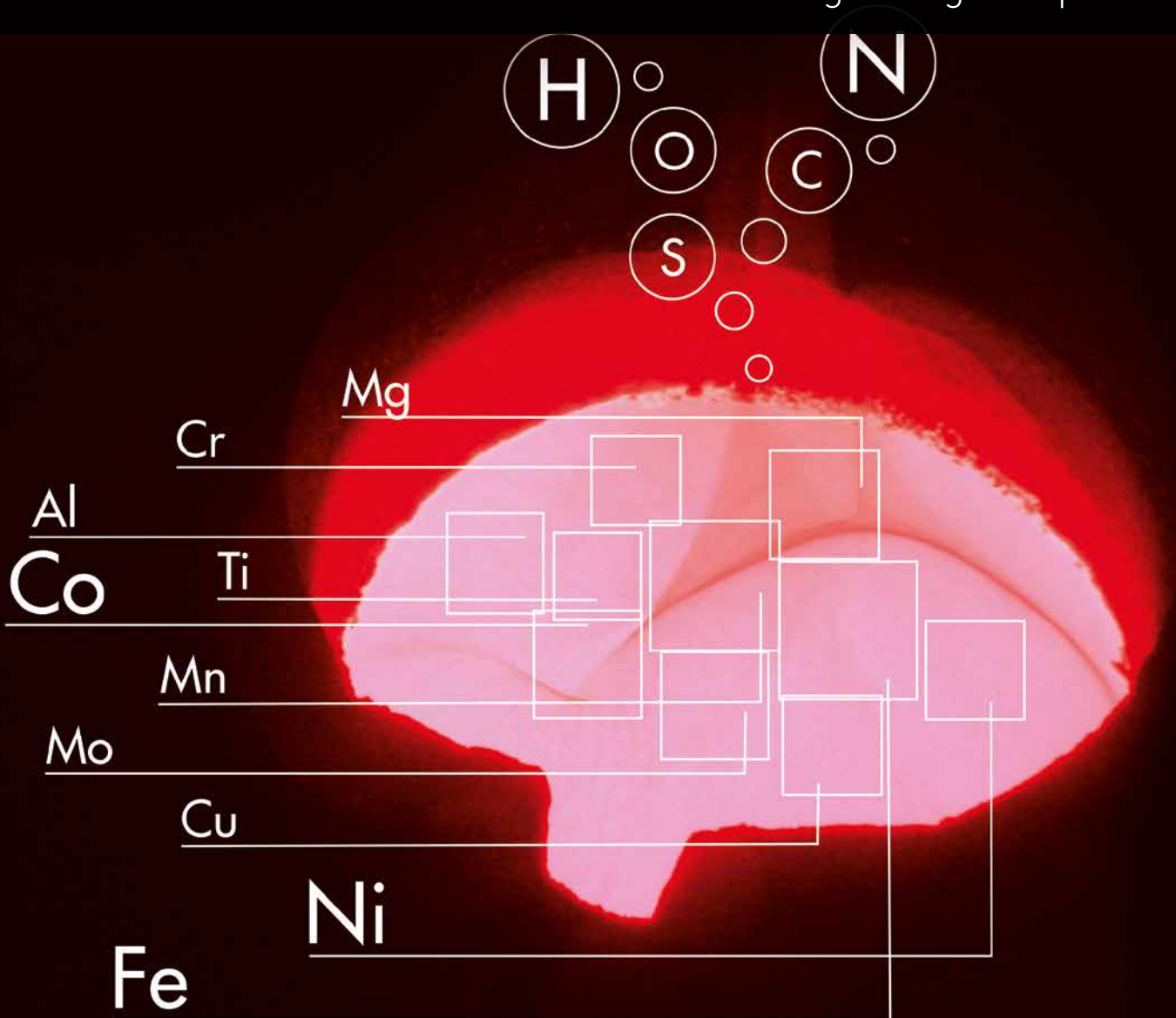


ALD Vacuum Technologies

High Tech is our Business

Vacuum Induction Degassing VID 400 – VID 3000

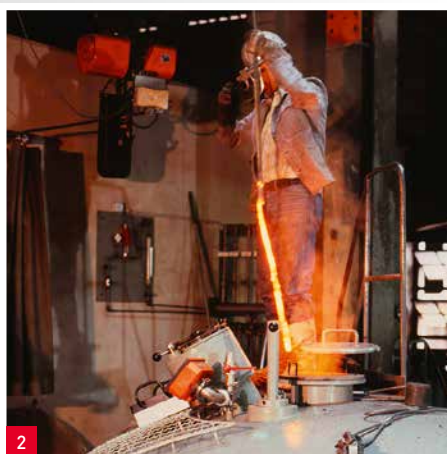
Vacuum Treatment of Melts with Charge Weights up to 30 tons



Vacuum Induction Degassing (VID)

The optimal link between conventional Steel Degassing (Secondary Metallurgy) and Vacuum Induction Melting (VIM)

- a. **VID: Pouring at air**
- b. **VID-Pro: Pouring under protective gas**
- c. **VID-Oxy: Oxygen blowing and slag treatment**



Melting under vacuum
Vacuum degassing/
Deoxidation
Precise temperature adjustment
Decarburization/
Desulphurization
Alloying and Pouring



Pouring VID: Pouring at air [3]

Basic design
Vacuum tight, tiltable, charge weights up to 30 tons

VID

The Vacuum Induction Degassing (VID) furnace concept has been developed for special applications in the ferrous and non-ferrous metals industry for charge weights up to 30 tons. Whenever pouring under vacuum is not specified or not required for metallurgical reasons, this bell type furnace with open-air teeming is recommended for its favourable economics.

Smaller steel shops and foundries will be able to produce with the VID furnace, within one step, high quality vacuum treated steels, whereas larger shops have to realize these qualities employing

a conventional LF/VD/VOD production line. The temperature losses during degassing treatment are compensated by induction heating.

VID: Pouring at air

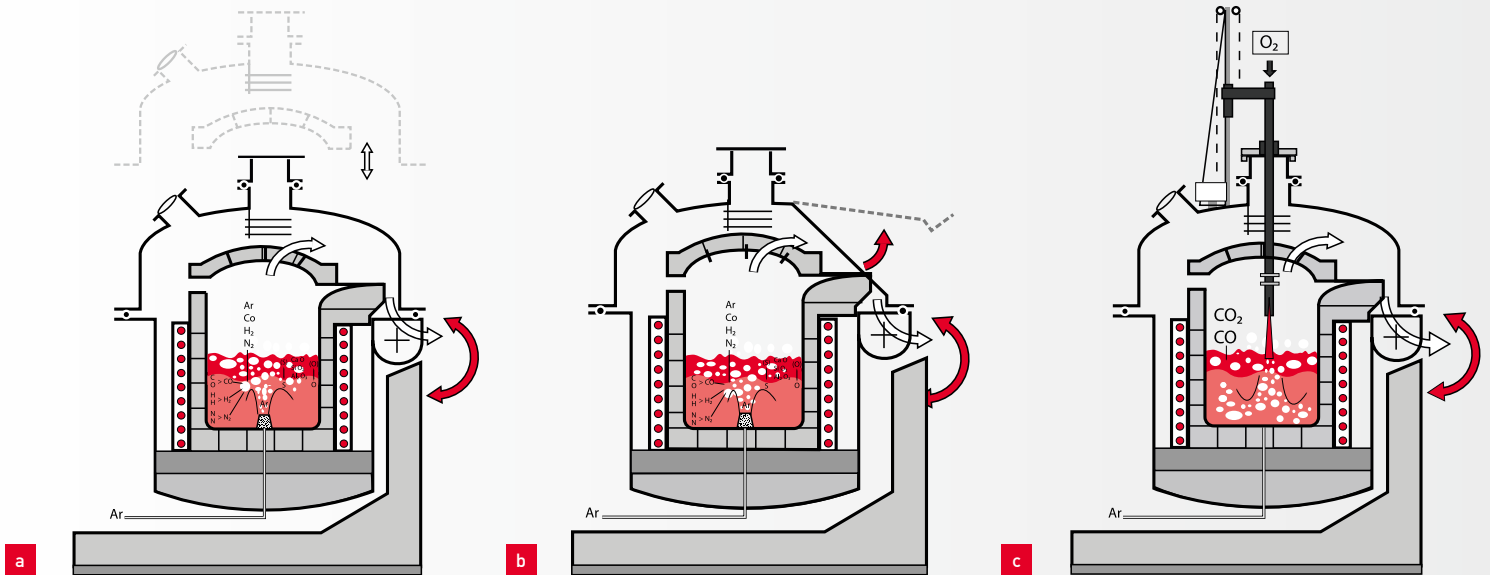
All important secondary metallurgy treatment steps – melting under vacuum, refining such as decarburization, desulphurization, deoxidation, removal of undesired gases like hydrogen and nitrogen, exact adjustment of chemical analysis, cleaning, alloying, heating – are done in one single unit. The melt will be cast at air.

VID-Pro: Pouring under protective gas

The modified VID-Pro furnace allows not only meltdown and vacuum-refining, but also pouring under protective inert gas. The vacuum lid stays in closed position during melting, refining and casting. Gas-pick-up during tapping can be minimized.

VID-Oxy: Oxygen blowing and slag treatment

The VID-Oxy furnace is dedicated to economical production of high-chromium steel grades, accomplished by using low-cost raw materials. Soft oxygen top blowing by means of a gas lance allows additional removal of carbon. With the



Pouring VID-Pro
Pouring under protective gas [4]



Pouring VID-Oxy
Decarburization with dissolved oxygen and slag treatment [5]

VID-Oxy furnace concept it is possible to carry out metallurgical work such as degassing, deoxidation, desulphurization and removal of oxide-inclusions with a reactive basic slag and chemistry adjustment under vacuum. The results are very low carbon and nitrogen contents and high chromium yield. The VID-Oxy furnace is the ideal alternative to conventional steel degassing with EAF/VD/VOD at charge weights up to 30 tons.

Product Application and Quality Improvement in Different Processes

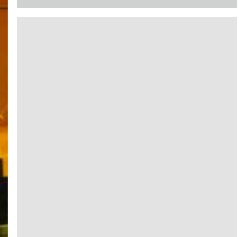
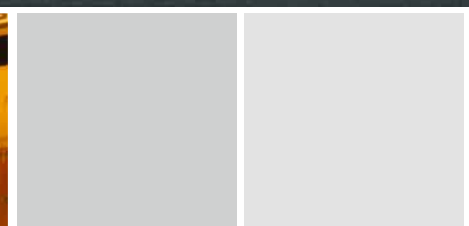
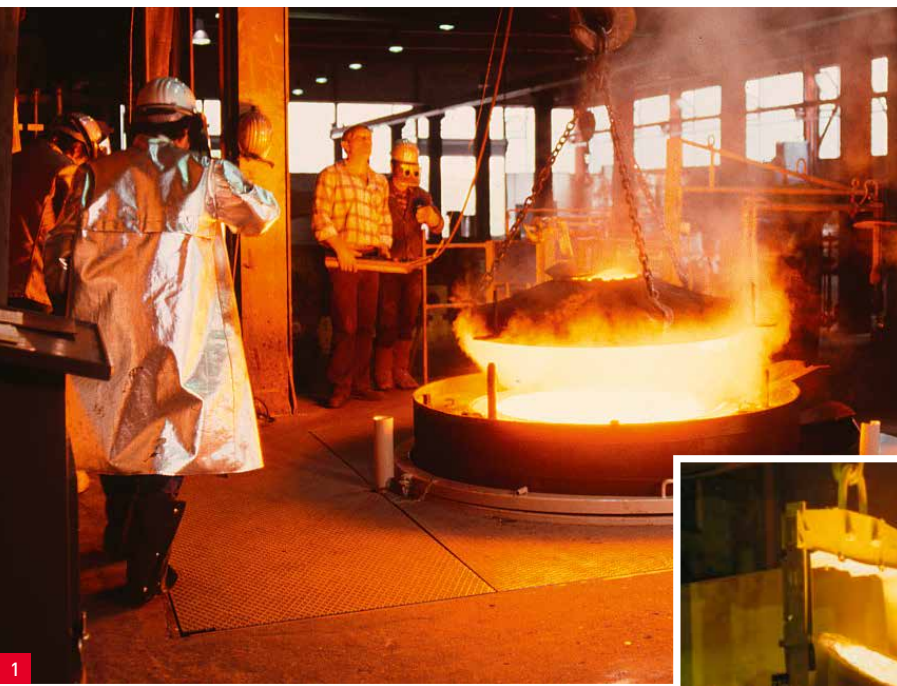
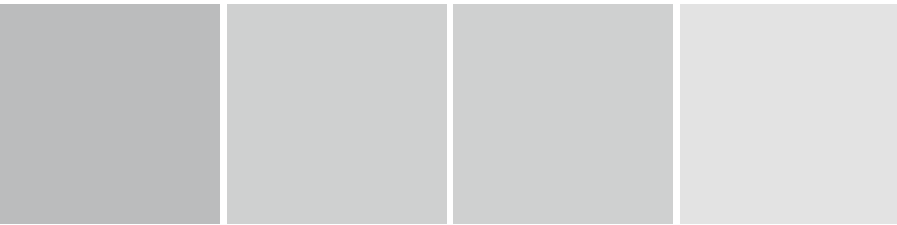
	VD	LF/VD	VOD	VODC	VID	VID
Low carbon steels	✓	✓	✓	✓	✓	-
High carbon steels	✓	✓	-	-	✓	-
Tool and die steels	✓	✓	-	-	✓	✓
Stainless steels	-	-	✓	✓	✓	✓
Fe-Ni-Alloys	-	-	-	-	✓	✓
Superalloys	-	-	-	-	✓	✓
Non-ferrous alloys	✓	✓	-	-	✓	✓

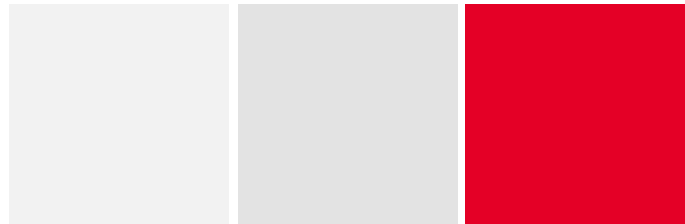
Hydrogen removal	✓	✓	•	•	✓	✓
Nitrogen removal	✓	✓	✓	✓	✓	✓
Decarburization	•	•	✓	✓	✓	•
Vacuum carbon deoxidation	✓	✓	✓	✓	✓	✓
Desulphurization	✓	✓	✓	✓	✓	-
Inclusion removal	✓	✓	✓	-	✓	✓
Extra low carbon	-	-	✓	✓	✓	✓
Fine trimming	✓	✓	✓	✓	✓	✓
Temperature control	-	✓	✓	-	✓	✓

✓ good - not suitable • secondary effect

VID

Systems and References





1 2 VID 1000 – 5t
Kind & Co, Germany
Producer of tool-steels
Pouring at air

3 VID-Oxy – 6t
Shagang, China
Decarburization by oxygen blowing
Production of special steels and low carbon steels

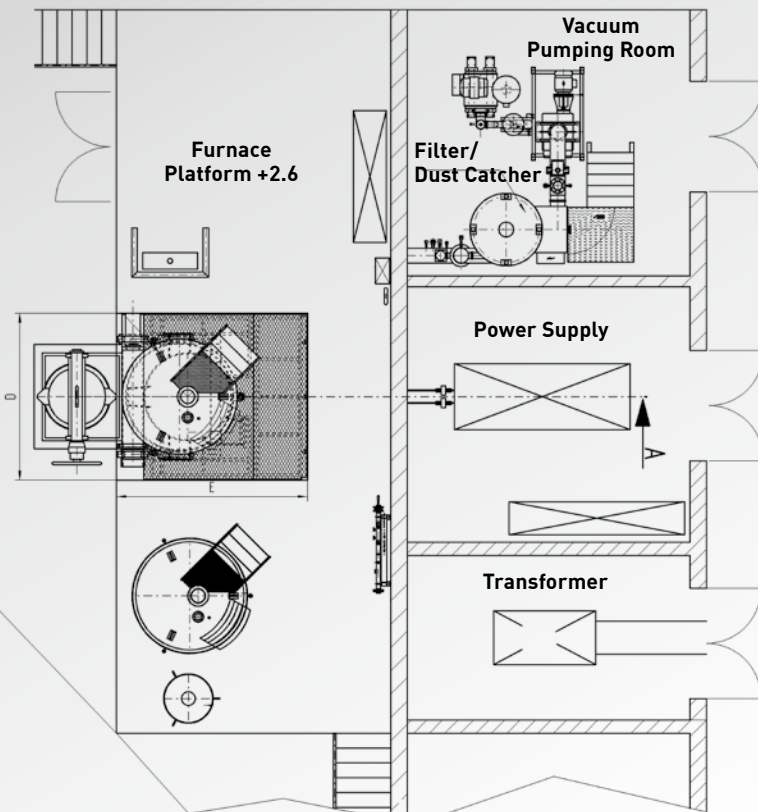
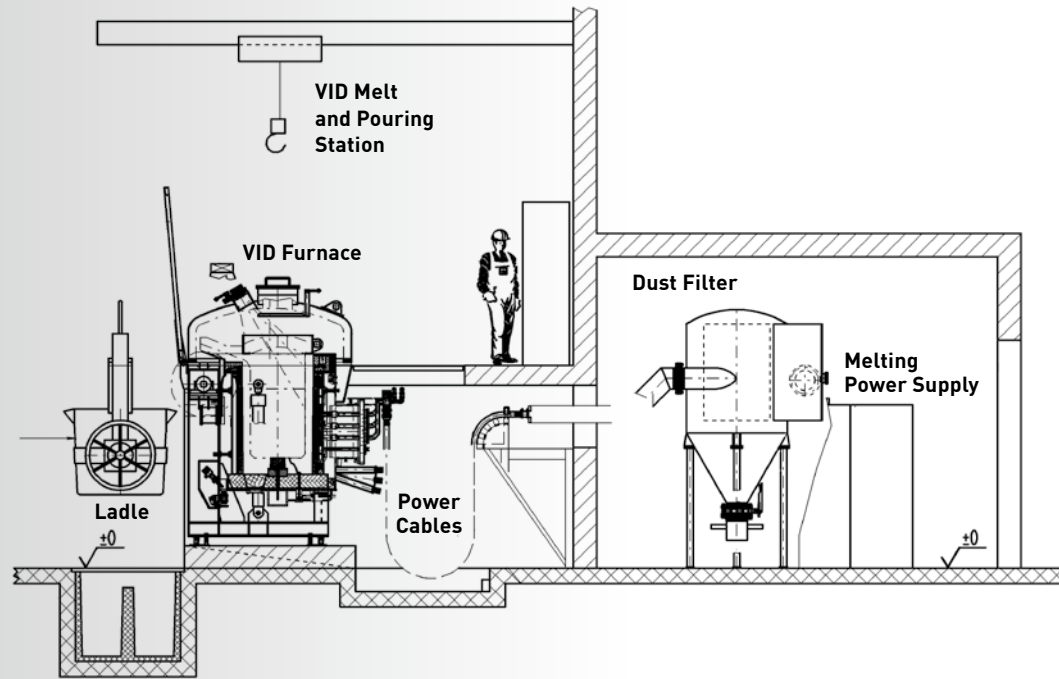
4 VID-Pro 2000 – 16t
KM-Kabelmetall, Osnabrück, Germany
Pouring of copper alloys under protective inert gas atmosphere into slab caster

5 VID-Pro 400 – 3t
Vacuumschmelze Hanau, Germany
Pouring of Fe-base alloys under protective inert gas atmosphere

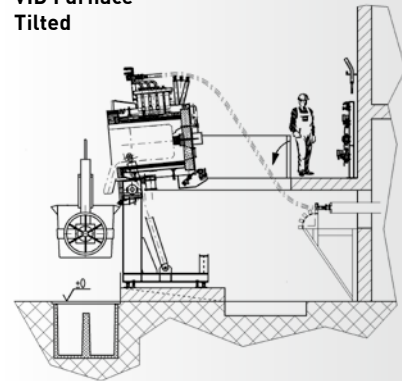


VID

Typical System Configuration



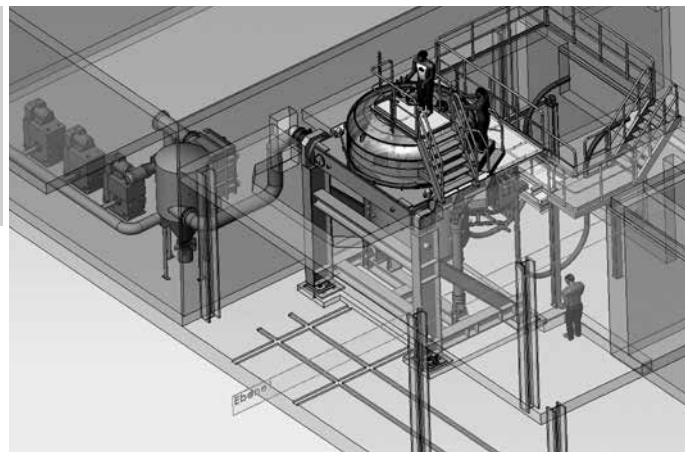
VID Furnace Tilted



Furnace Size (metric ton)	Type	Space Requirement (in m)		
		L	W	H
1 - 3	VID 400	10	10	8.5
4 - 8	VID 1000	12	10	9.5
9 - 16	VID 2000	14	14	10
17 - 30	VID 3000	25	16	12



**VID 2000 – 14t
Böhler Edel-
stahl, Kapfen-
berg, Austria**
Production of
special steels





Technical Data

Technical Data		VID 400	VID 1000	VID 2000	VID 3000
Crucible size Capacity (based on Ni)	[metric tons]	1 - 3	4 - 8	9 - 16	17 - 30
Typical cycle times Fe-Cr base alloy/ Fe-Ni base alloys/ special steels	[h]	3 - 6	3 - 6	3 - 6	3 - 6
Typical operating pressure with mechanical pump set	[mbar]	0.5 - 5	0.5 - 5	0.5 - 5	0.5 - 5
Electrical layout Output, melting power supply	[kW]	600 - 1,500	1,500 - 2,500	2,500 - 3,500	3,500 - 5,000
Connected power vacuum pump set and auxiliary equipment (depending on scope of supply)	[kVA]	80	100	130	150
Cooling water Total consumption ($\Delta t=10\text{ }^{\circ}\text{C}$)	[m ³ x h ⁻¹]	80	100	130	150
Floor area length (L) x width (W)	[m]	10 x 10	12 x 10	14 x 14	25 x 16
Height	[m]	8.5	9.5	10	12
Recommended Crane Capacity	[m]	15	30	50	70

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Otto-von-Guericke-Platz 1

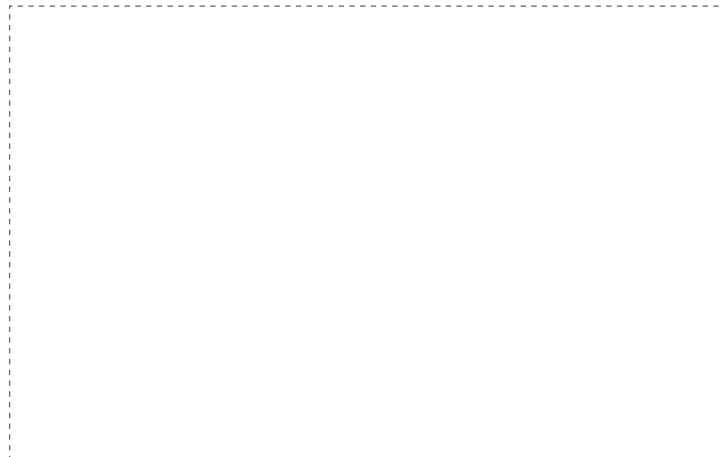
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