



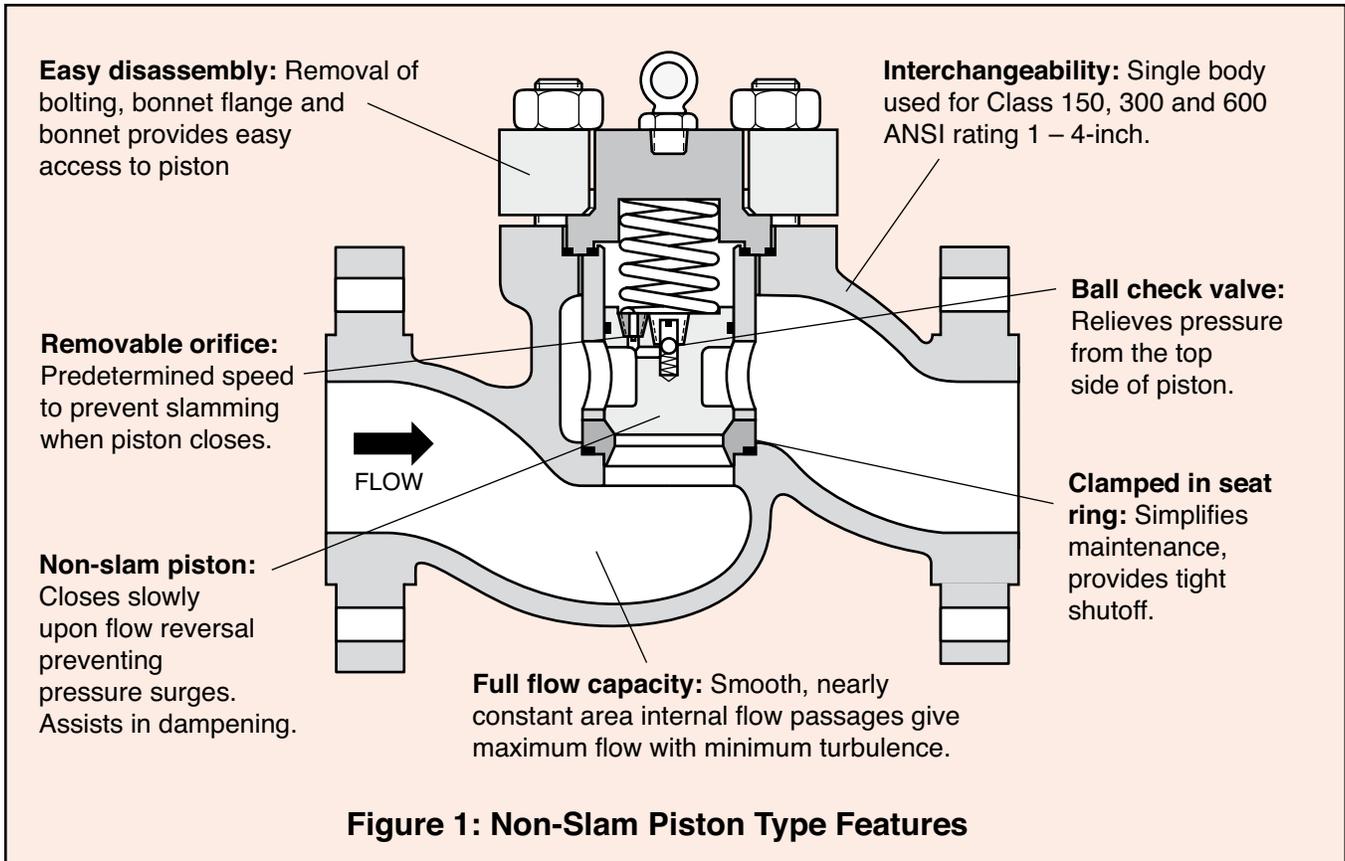
Mark Four Tek-Check Valves



Experience In Motion

Valtek Tek-Check Valves

Non-Slam Piston Type



The Valtek Tek-Check™, non-slammng piston check valve, provides rugged performance and reliable service in corrosive and non-corrosive, gas and liquid applications. The smooth, nearly-constant area internal passages allow for high capacity flow with minimum turbulence. When the flow ceases or is reversed, the piston closes slowly, preventing pressure surges. The non-slam design is also effective in dampening pulsating flow.

Tek-Check valves are used extensively in the oil and gas industry or where check valves are normally required. They are especially effective in reciprocating and centrifugal pump and compressor applications.

Maintenance is simplified due to Tek-Check's top entry. Removal of the bonnet bolting provides easy, quick access to the trim. A clamped-in seat ring avoids the maintenance difficulties associated with screwed-in seats.

Since Tek-Check valves use many standard Valtek control valve parts, there is maximum parts interchangeability within the line and with other Valtek control products.

Principle of Operation

Tek-Check valves are always installed in the line with the flow under the plug. Whenever the upstream pressure is at a higher pressure than the downstream pressure (usually by five psi or more), the piston is forced to open upward. A ball check valve in the piston relieves the fluid above the piston, allowing the piston to open quickly. Continued high upstream pressure keeps the valve open.

If the flow ceases or reverses direction, the spring force and weight of the piston cause the piston to drop and close the valve. As the piston closes, the ball check valve closes, forcing flow to the upper side of the piston through the limiting orifice which prevents any tendency to slam. The size of the limiting orifice determines the speed at which the piston closes. Once the piston is seated, the higher downstream pressure above the piston keeps the valve closed.

A lightweight spring is placed above the piston to assist in closing, unless low cracking pressures are required that preclude the use of a spring.

Valtek Tek-Check Valves

Non-Slam Type Features and Specifications

Features include:

- **Non-slamming piston** avoids pressure surges upon closing, assists in dampening pulsating flow, opens quickly.
- **High parts interchangeability** with Valtek control valves for minimum spare parts inventories.
- **Rugged, streamlined, minimum-weight body** with separable end and bonnet flanges for low cost construction.
- **Top-entry** for easy in and out-of-line servicing.
- **Clamped-in seat ring** for easy removal.
- **Single seat** for tight shutoff.

Table I: Body Specifications

Sizes	1 to 36-inch through Class 600 1 to 12-inch, Class 900, 1500, and 2500
Styles	Globe, Angle
End Type	NPT and Socketweld – 1/2 to 2-inch; Butt weld – all sizes Separable flange – 1 to 4-inch Class 150, 300 and 600, 6 to 8-inch Class 300 and 600; Integral flange-all sizes; Grayloc – all sizes



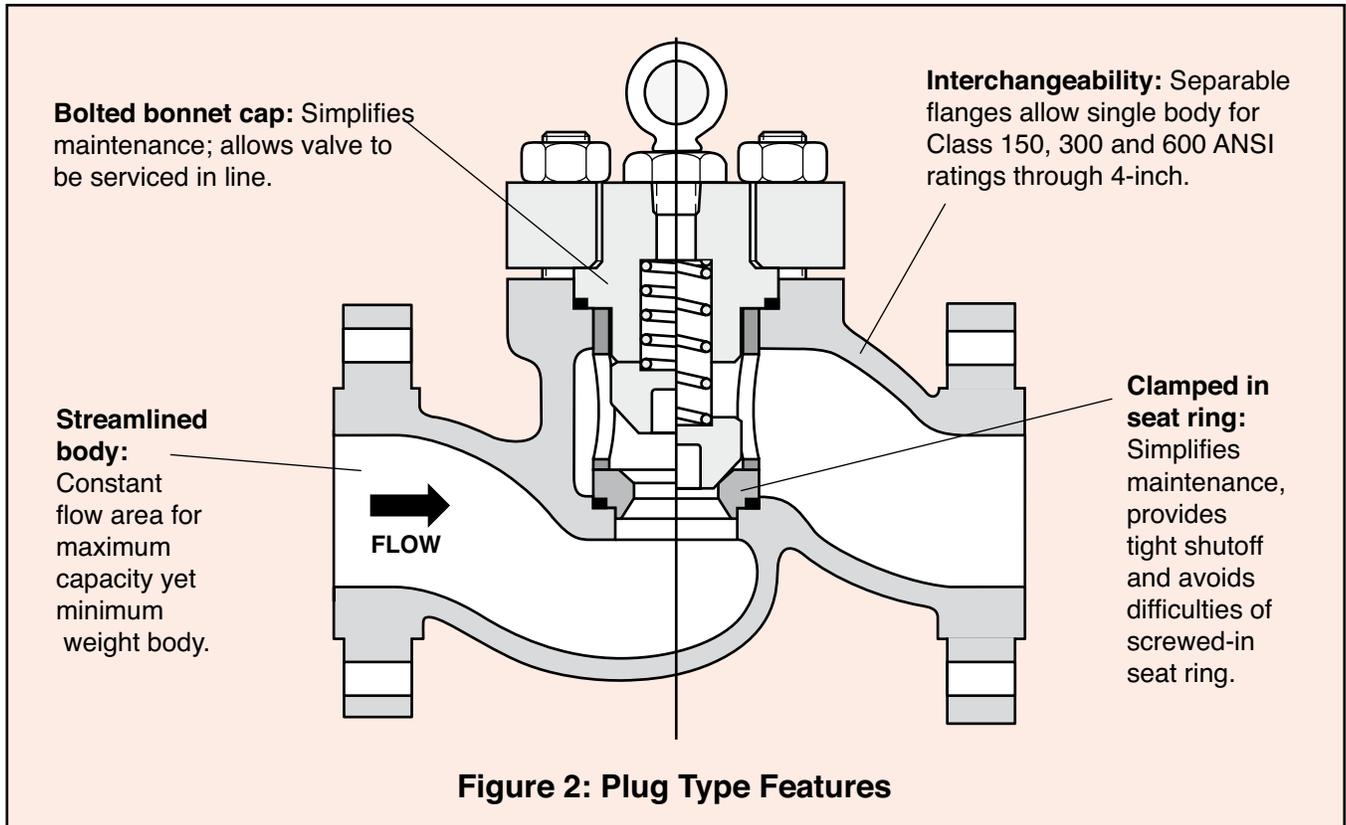
Shown above are the individual parts of the Tek-Check non-slam check valve: (from left to right) bonnet, seat-ring, retainer, piston, and bonnet flange. The interchangeable Valtek globe body is shown in the background.

Table II: Standard Materials of Construction

Part	Standard Material	Sour Service Material	Optional Material
Body and Bonnet	A216 WCB carbon steel	A216 WCB carbon steel*	A352 LCB/LCC carbon steel; 304, 304L, 316, 316L, 347 stainless steel; bronze, alloy 20, Hastelloy B, Hastelloy C, nickel, Monel, Inconel, chrome-moly, titanium, other cast-able alloys
Seat Ring	316 stainless steel	316 stainless steel	Same as alloy body
Piston	316 stainless steel	316 stainless steel	Same as alloy body
Seat Retainer	TFE impregnated carbon steel	316 stainless steel	Same as alloy body
Piston Seals	Glass-loaded Teflon	Glass-loaded Teflon	Cast iron
Bonnet Flange	A516 GR 70 steel	A516 GR 70 steel*	Stainless steel, same as alloy body
Piston Check Spring	302 stainless steel	302 stainless steel	
Piston Check Seat	316 stainless steel	316 stainless steel	
Piston Check Seat Gasket	TFE Teflon	TFE Teflon	
Piston Check Orifice	316 stainless steel	316 stainless steel	
Bonnet/Bonnet Cap	Carbon steel	Carbon steel	Same as alloy body
Bonnet Flange Studs	B7 carbon steel	B7M carbon steel	304 stainless steel
Bonnet Flange Nuts	2H carbon steel	2M carbon steel	304 stainless steel
End Flanges	A515/A516 GR70 carbon steel	A515/A516 GR70 carbon steel*	Stainless steel, same as alloy body
Half Rings	Carbon steel	Carbon steel	Stainless steel
Check Valve Ball	300 series stainless steel	300 series stainless steel	300 series stainless steel
		(*Maximum HRC 22)	

Valtek Tek-Check Valves

Plug Type



Similar in some respects to the non-slam design, the Tek-Check, plug-type check valve is designed for applications requiring quick shutoff. Due to its simple design, the plug-type check valve costs less and has fewer parts than the non-slam check valves.

The Tek-Check, plug-type check valve utilizes Flowserve's streamlined, minimum weight body with top-entry for easy maintenance. As with the non-slam design, many parts (such as the body, end flanges, seat ring, and gaskets) are standard Flowserve parts for maximum interchangeability and for smaller spare parts inventories.

Plug-type check valves are generally designed to operate in horizontal piping and open with as little as five psi pressure difference across the plug. It is available in the same materials and body specifications as the non-slam check valve (refer to Table II.)

Principle of Operation

Tek-Check piston check valves are installed with the flow entering under the piston. With upstream fluid at a higher pressure than the downstream (five psi or more), the plug is forced up to open. Fluid above the plug is displaced through

the clearance between the plug and sleeve. Continued higher upstream pressure keeps the valve open.

If the flow ceases or changes direction, the spring force and weight of the plug cause the piston to drop and to close the valve. Once the plug is seated, the higher downstream pressure keeps the valve closed. A lightweight spring above the plug assists closing, unless low, cracking pressure requirements preclude the use of a spring.

End Connections, Flanges and Bolting

Flange Faces

Raised face flanges are standard on both separable and integral flanges (except for Class 125 flat faced cast iron). The flange face is machined with circular serrations for better sealing (125 - 250 R_a standard). Other optional flanges include flat face, ring joint, large and small tongue, large and small groove.

Valtek Tek-Check Valves

Table III: End Connections, Flanges and Bolting

End Connection	Valve Size (inches)	Rating Class	Standard Face-to-Face	Optional Face-to-Face
Separable Flange	½ - 4 6 - 8	150 - 600 300 - 600	ANSI (a) ISA (b)	ISA
Integral Flange, Steel & Alloys	½ - 12 6 - 24 10 - 24 1 - 12	125 - 250 150 300 - 600 1500 - 2500	ISA ISA ISA VS(d)	
Screwed	½ - 2 ½ - 2	150 - 600 900 - 2500	ANSI VS (c)	
Socketweld	½ - 2 ½ - 2	150 - 600 900 - 2500	ANSI VS (c)	ISA
Buttweld	½ - 4 6 - 24 1 - 12	150 - 600 150 - 600 900 - 2500	ANSI ISA VS (d)	ISA

Table IV: Seat Area

Valve Size (inches)	Seat Area (sq.in.)	
	Class 150-1500	Class 2500
1	.518	.307
1½	1.23	.785
2	2.07	1.76
3	5.41	3.14
4	9.62	7.07
6	19.63	12.57
8	30.68	19.63
10	50.22	—
12	74.66	—
14	95.03	—

(a) ANSI B16.10 Class 600 Globe Valves b) ANSI/ISA S75.03 - 1985
 (c) Valtek Standard (d) Valtek Standard to 6-inch, above 6-inch per ANSI B16.10 - 1986

Separable End Flanges

Interchangeable separable end flanges are standard on valve bodies through 4-inch Class 150, 300 and 600 and 6-inch and 8-inch in Class 300 and 600.

Separable flange material is normally carbon steel for cost savings, but can be stainless steel or alloy where required by process atmospheres or extreme temperatures.

Bonnet Bolting

Standard bonnet bolting consists of studs and nuts. Studs (grade B7) and nuts (grade 2H) are suitable for -20° F to 1000° F / -29° C to 538° C. These temperature limits are subject to pressure and material limitations per ANSI B16.34 - 1988.

Bonnet Flange

Bonnet flanges are normally furnished in carbon steel. They can be other materials where required by process or extreme temperatures.

Table V: Estimated Shipping Weights: Globe and Angle Flanged Valves (lbs / kg)

Body Size (in.)	Rating											
	Class 150		Class 300		Class 600		Class 900		Class 1500		Class 2500	
½ - ¾	25	11	25	11	25	11						
1	35	16	35	16	35	16	85	39	105	48	130	59
1½	50	23	50	23	50	23	125	57	135	61	165	75
2	60	27	60	27	60	27	150	68	170	77	250	113
3	115	52	125	57	135	61	250	113	280	127	350	159
4	195	88	210	95	220	100	440	200	460	209	790	358
6	315	143	420	191	450	204	850	386	1020	463	1250	567
8	440	200	640	290	680	308	1250	567	1700	771	2500	1134
10	900	408	1255	569	1450	658	1900	862				
12	1050	476	1600	726	2200	998						
14	1300	590	2350	1066	2700	1225						

Valtek Tek-Check Valves

Gaskets, Trim Materials

Gaskets

Bonnet, retainer and seat ring gaskets are fully retained. Since the bonnet bottoms metal to metal in the body, bonnet gasket compression is determined by the depth of the gasket step on the bonnet which is machined to provide the compression required by the gasket manufacturer.

The seat ring is clamped in place by the seat retainer. The body, seat retainer and seat ring are machined to close tolerances to provide the exact gasket compression required. The seat ring does not bottom in the body, and the resulting small clearance is designed to allow for manufacturing tolerances and thermal expansion.

Severe Service Trim Materials

Standard plug and seat ring material is 316 stainless steel except for special alloy bodies where trim are often furnished in the same material as the body. For abrasive service, Stellite facing on the plug and seat ring is available. Flowserve stocks #6 Stellite for many valve trim parts. This material offers a good combination of hardness and corrosion resistance.

Hard materials used for valve trim parts are shown in Table VII. A more in-depth discussion of trim materials is contained in the Flowserve Control Valve Sizing & Selection Manual, Section 10.

Table VI: Gasket Materials

	Type	Gasket Material	Maximum Gasket Temperature (degrees F)	Minimum Gasket Temperature (degrees F)	Maximum Pressure (psi)
Standard Gaskets	Flat	Teflon (TFE)	350	-200	– (1)
Alternate Gaskets	Spiral	316 SS/Teflon	350	-200	– (1)
	Flat	Kel-F	200	-423	– (1)
	Flat	Teflon (FEP)	400	-320	– (1)
	Spiral	316 SS/Grafoil	1500	-423	6,250
	Hollow O-ring	Inconel X -750	1500	20	15,000

(1) Refer to Valtek Control Valve Sizing and Selection Manual, Section 7

Table VII: Trim Material Characteristics

Trim Material	Hardness Rockwell C	Impact Strength	Recommended Max. Temp.	Erosion Resistance	Abrasion Resistance	Availability
316 S.S.	8	Excellent	600 °F	Fair	Fair	In stock
Stellite No. 6	44	Excellent	1500 °F	Good	Good	In stock
416 S.S.	40	Good	800 °F	Good	Good	Good
17-4 PH H900	44	Good	800 °F	Good	Good	Fair
440C S.S.	55-60	Fair	800 °F	Excellent	Excellent	Fair
K Monel	32	Good	600 °F	Fair - Good	Good	Fair
Tungsten carbide	72	Fair	1200 °F	Excellent	Excellent	Poor
Colmonoy No.5	45-50	Good	1200 °F	Good	Good	In stock

Valtek Tek-Check Valves

Dimensions

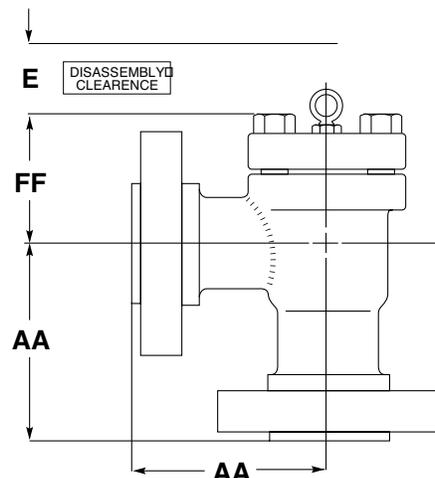
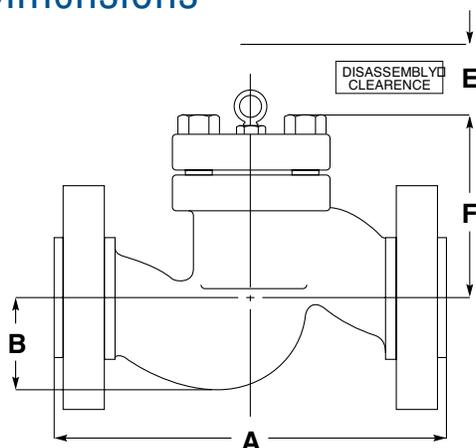


Table VIII: Dimensions Class 150, 300 and 600

Body Size	ANSI Globe Class 150,300,600		ANSI / ISA						B	E Disassembly Clearance	F	AA				FF				
			Class 150		Class 300		Class 600					Class 150		Class 300,600						
½, ¾	8.5	216	7.3	184	7.6	194	8.1	206	1.5	38	2.5	64	3.8	97	4.3	108	4.3	108	3.0	76
1	8.5	216	7.3	184	7.8	197	8.3	210	1.8	44	2.5	64	3.8	97	4.3	108	4.3	108	3.0	76
1½	9.5	241	8.8	222	9.3	235	9.9	251	2.3	58	4.3	108	5.0	127	4.8	121	4.8	121	4.0	102
2	11.5	292	10.0	254	10.5	267	11.3	286	2.3	58	4.8	121	5.3	135	5.8	146	5.8	146	4.0	102
3	14.0	356	11.8	298	12.5	318	13.3	337	3.5	89	6.0	152	7.1	180	7.0	178	7.0	178	5.0	127
4	17.0	432	13.9	353	14.5	368	15.5	394	5.2	133	8.0	203	7.1	180	8.8	222	8.8	222	6.5	165
6			17.8	451					5.5	139	9.5	241	10.0	254	8.9	226			7.3	184
6					18.6	473	20.0	508	5.8	146	10.0	254	11.5	292			11.0	279	8.8	222
8			21.4	543					7.1	180	10.0	254	12.3	312	13.0	330			7.8	197
8					22.4	568	24.0	610	7.5	190	12.0	305	12.3	312			13.0	330	9.3	235
10			26.5	673					8.4	214	14.0	356	13.0	330	13.3	337			8.4	214
10					27.9	708	29.6	752	8.9	227	14.0	356	14.5	368			14.8	376	10.3	262
12			29.0	737					9.6	243	14.5	368	14.5	368	14.5	368			7.8	197
12					30.5	775	32.3	819	10.0	254	14.5	368	15.8	400			16.1	409	9.8	248
14			35.0	889					10.5	267	15.0	381	15.3	389	17.5	445			7.8	197
14					36.5	927	38.3	973	11.3	286	15.0	381	17.0	432			19.1	486	10.6	268

Table IX: Dimensions Class 900, 1500, 2500

Body Size	A		B		E		F			AA		FF														
	Class 900,1500	Class 2500	Class 900,1500	Class 2500	Class 900,1500	Class 2500	Class 900	Class 1500	Class 2500	Class 900,1500	Class 2500	Class 900,1500	Class 2500													
1	11.0	279	12.0	305	1.8	44	1.8	44	2.5	64	2.5	64	4.5	114	4.5	114	5.3	133	*Standard Mark Two Dimensions							
1½	13.0	330	15.0	381	2.7	68	2.4	60	4.8	121	4.8	121	7.0	178	7.0	178	7.3	184								
2	14.8	375	15.8	400	2.8	71	3.0	77	5.0	127	5.0	127	7.5	191	7.5	191	7.5	191								
3	18.1	460	26.0	660	4.2	106	3.7	94	8.0	203	8.0	203	9.9	251	9.9	251	10.3	260	9.3	235	13.0	330	7.6	194	9.1	232
4	20.9	531	29.0	737	4.4	113	5.4	138	8.8	222	8.8	222	9.8	248	9.8	248	12.4	314	12.5	318	14.5	368	9.0	229	9.8	249
6	30.0	762	34.0	864	7.2	183	7.3	184	10.5	267	11.3	288	13.0	330	14.6	372	15.8	400	13.9	353	17.0	432	11.2	284	12.3	313
8	32.8	832	40.3	1022	9.4	240	10.3	262	13.8	349	14.0	356	16.9	429	17.4	441	21.3	540	16.4	416	20.1	511	12.6	319	18.1	459
10	39.0	991	50.0	1270	11.2	284			15.0	381	15.5	394	22.0	559	22.0	559			19.5	495	25.0	635	16.4	416	19.6	498
12	44.5	1130	56.0	1422	14.0	356			15.0	381	15.5	394	22.3	565	23.3	591	25.5	648	22.3	565	28.0	711	16.3	414	19.6	498
14	49.5	1257			12.2	309			18.0	457	19.0	483	25.0	635	25.0	635			24.8	629	31.0	787	18.4	468		

All dimensions are in inches/mm and are to be used for estimation only. Certified drawings will be supplied upon request.

* Available in standard Mark Two body only.



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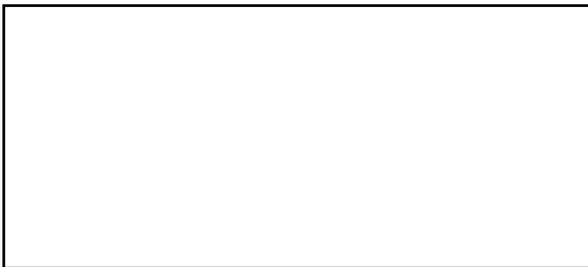
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