

WIRELINE AND PERFORATING SERVICES

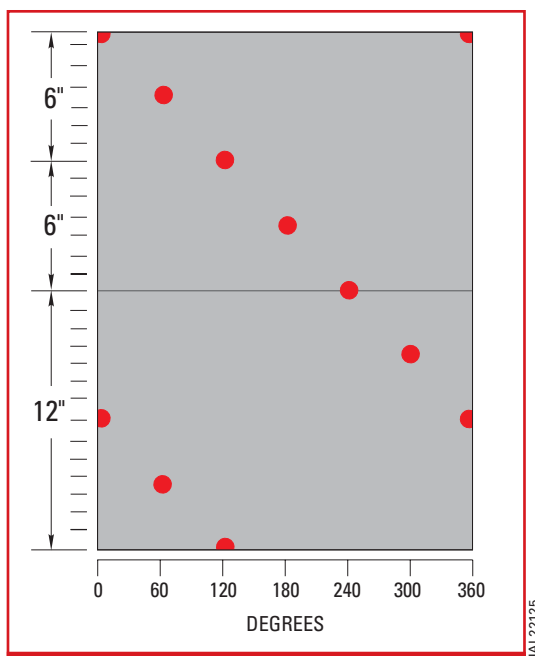
VannGun® Assembly

3.375 in., 4 spf

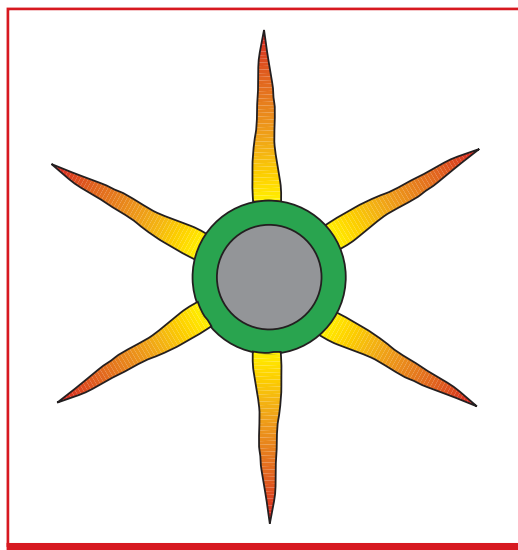
The heart of Halliburton's VannSystem® service is the VannGun assembly. The VannGun assembly uses bi-directional boosters, nonlead azide explosives, specialized connectors and inserts, and high velocity-low shrink detonating cord. All these, as well as premium quality gun material, are manufactured to Halliburton's proprietary specifications. The primary design factors for these components are safety and reliability.

All VannGuns incorporate machined scallops. This helps to optimize charge performance and prevents casing damage from perforating exit hole burrs. Additionally, shot phasing is designed to maintain the integrity and collapse resistance of the casing after perforating.

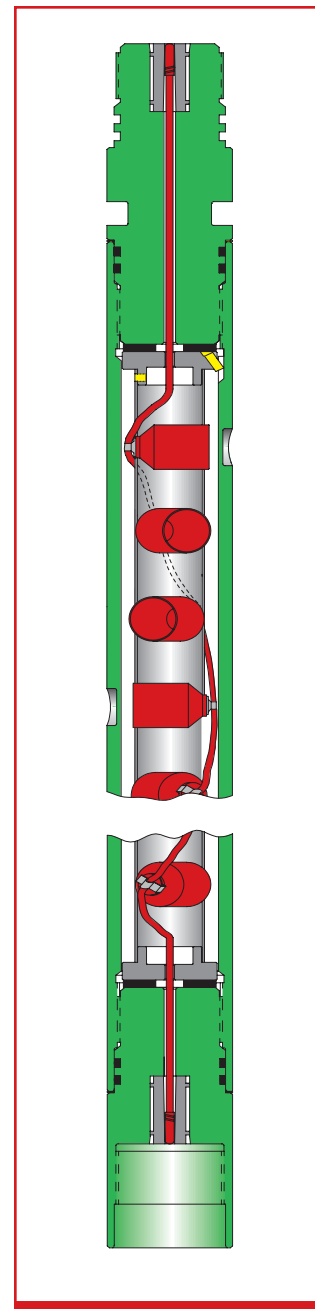
- 3.375 in., 4 shots per foot
- 1 shot per 3 vertical inches
- Shot pattern in 4-1/2 in. casing



*Cold Drawn Assembly
Method No. 993.96045*



*60° Phasing
6 Perforation Planes*



3.375 in., 4 spf VannGun® Charge Performance

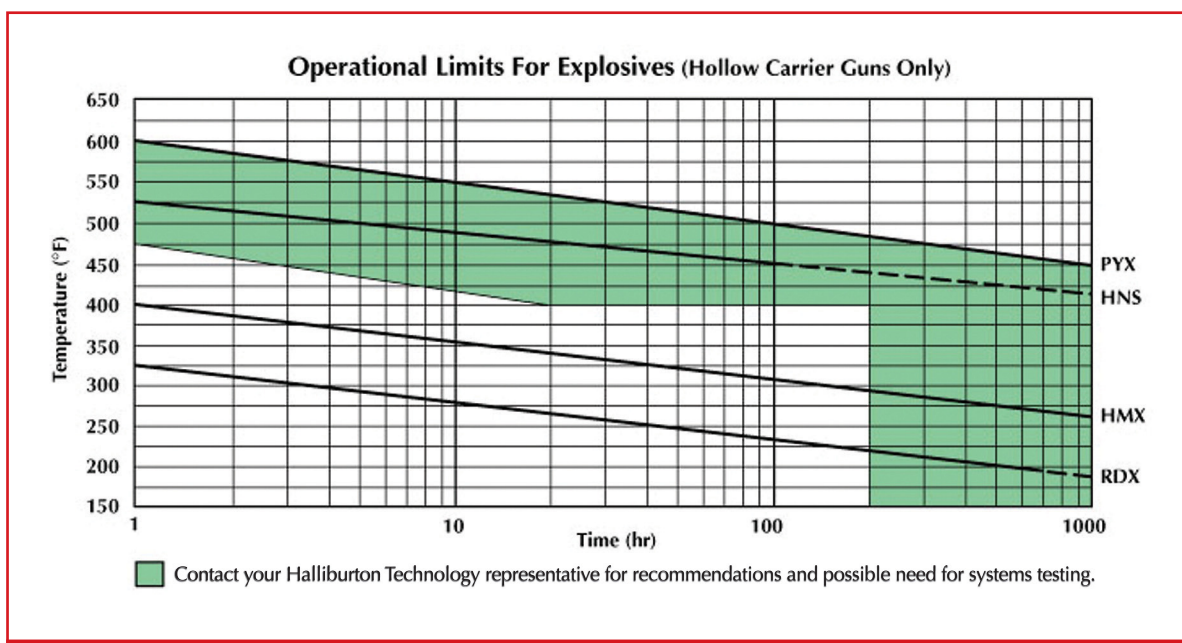
Charge Part No.	Explosive Type	Charge Type	Explosive Weight (g)	API Section 1 Data - 5th Edition			
				Casing	Target Strength (psi)	Hole Size (in.)	Penetration (in.)
993.53118	PYX	SDP	21.0	4-1/2 in., 11.6 ppf	6590	0.31	19.16
993.53094	HMX	SDP	25.0	4-1/2 in., 11.6 ppf	6127	0.42	27.87
993.53094	HMX	SDP	25.0	5 in., 15 ppf	6097	0.40	28.70
993.53130	PYX	SDP	21.0	4-1/2 in., 11.6 ppf	6590	0.31	19.16
993.53205	RDX	DP	32.0	4-1/2 in., 11.6 ppf	6750	0.45	22.32

VannGun Specifications

Collapse Pressure	25,000 psi (1,725 bar)
Tensile Strength	246,000 lb (111,500 kg)

VannGun Weights

Length	4 ft	8 ft	11 ft	16 ft	22 ft
Loaded	95 lb (43 kg)	129 lb (59 kg)	187 lb (85 kg)	245 lb (111 kg)	310 lb (141 kg)
Spacer	55 lb (25 kg)	82 lb (37 kg)	129 lb (59 kg)	176 lb (80 kg)	195 lb (88 kg)



www.halliburton.com/wireline

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