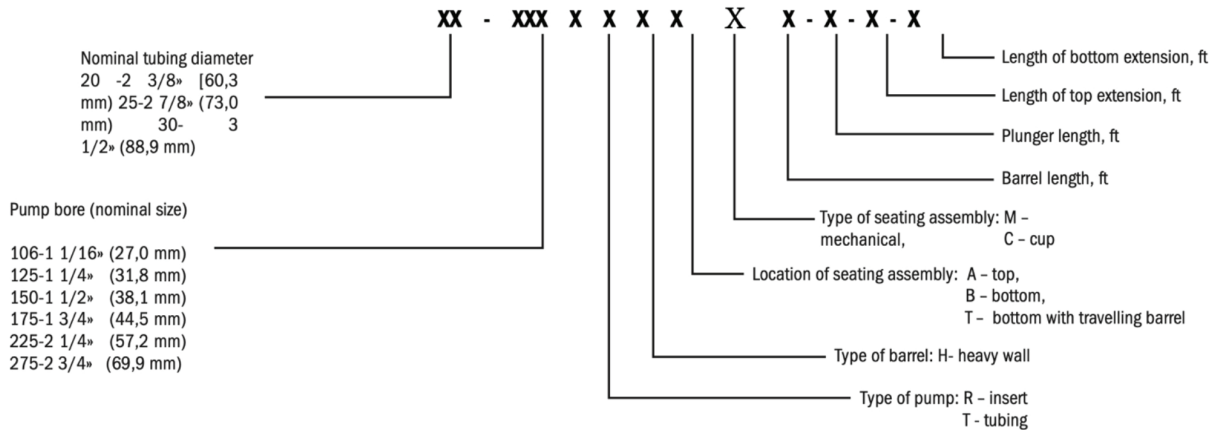


Full API pump designation:



Versions of pump components:

Barrel:

- Alloy steel, nitride-plated (HN);
- Carbon steel, chrome-plated (CR);
- Length of barrel – up to 14 feet, nitride-plated – up to 14 feet, chrome-plated – up to 16 feet, compound barrels (for long-stroke pumps) – up to 28 feet.

Plunger (nipple type):

- Carbon steel, chromium-nickel hard ally powder Plunger (nipple type):
- Carbon steel, chromium-nickel hard ally powder sprayed (T);
- Grooved, smooth;
- Length – up to 5 feet, compound – up to 10 feet.

Valves:

- Standard and special designs, including double travelling and standing valves.

Valve cage:

- Alloy steel;
- Stainless steel.

Ball and seat:

- Stainless steel (SS);
- Cobalt alloy (ST);
- Tungsten carbide (TC1).



Plunger clearance is defined as a difference between nominal diameters of a plunger and a barrel plus sum of tolerances for plunger and barrel diameters.

Plunger clearance (range):

- Fit-1 – 0,025 ... 0,088 mm
- Fit-2 – 0,050 ... 0,113 mm
- Fit-3 – 0,075 ... 0,138 mm
- Fit-4 – 0,100 ... 0,163 mm

When making a request/order for pumps Customer should specify:

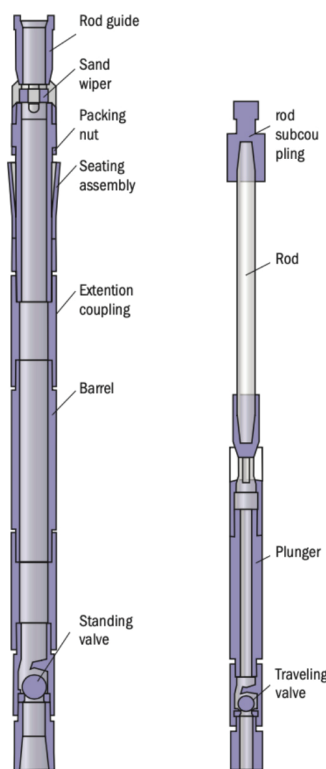
- denomination, full designation of a pump including tubing diameter; diameter and type of a pump; length of a barrel, plunger and extensions (or required plunger stroke);
- type of top seating arrangement of insert pumps: standard (according to API),
- Type of seating arrangement of standing valve of tubing pumps: standard (according to API), non-removalbe;
- plunger clearance (Fit 1,2,3,...);
- depth of pump installation (discharge);
- material of barrel, plunger, valves, valve cages;
- additional requirements to pump versions.

If no any requirements to material, clearance and discharge of pumps are specified, then pumps are delivered in the following type and version: barrel HN, plunger T, valves SS, alloy steel valve cages, Fit2, discharge up to 1500 m.

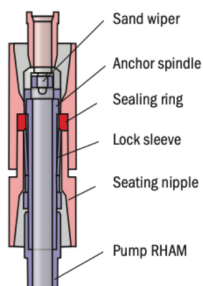
Seating nipples (anchors) of insert pumps, as well as filters, overflow valves, automatic tractive connections and other tools for SRP are not included in delivery set and should be ordered optionally.

Rod (insert) pumps are delivered with sand wiper (sand valve). It is installed in rod guide to prevent sanding up of a pump during its idle time. To provide better sealing of pump anchoring unit in corrosion environment, an anchor spindle of top mechanical seating arrangement as per API assembled with stainless steel packing nut is available.

Scheme of top (mechanical) anchored rod pump acc. to API



Scheme of seating arrangement



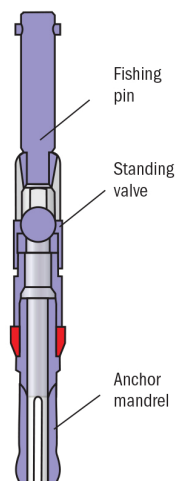
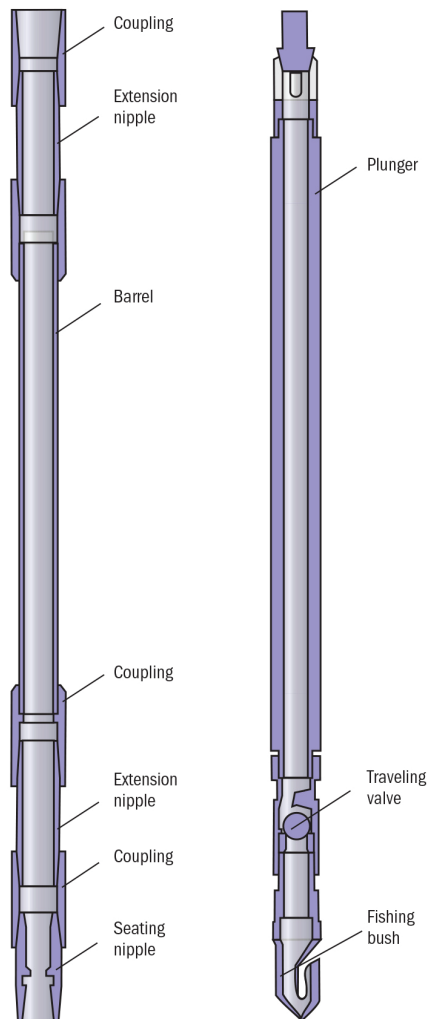
*Pump designation is given without lengths of a barrel, a plunger and extensions, which are selected for each pump type and version according to required plunger stroke.

Version of the pump:

Seating arrangement	Pump bore, mm	Tubing size, mm	Pump designation*	Designation of seating nipple (anchor)
Top mechanical acc. to API	27,0	60,3	20-106 RHAM	N14-20
		73,0		
	31,8	60,3	20-125 RHAM	N14-25
		73,0		
	38,1	73,0	25-150 RHAM	N14-25
	44,5	73,0	25-175 RHAM	
Top cup acc. to API	27,0	60,3	20-106 RHAC	N11-20
		73,0	25-106 RHAC	N11-25
	31,8	60,3	20-125 RHAC	N11-25
		73,0	25-125 RHAC	
	38,1	73,0	25-150 RHAC	N11-20
			25-175 RHAC	
	44,5	73,0	25-175 RHAC	N11-20
Bottom mechanical acc. to API	27,0	60,3	20-106 RHBM	N12-20
		73,0	25-106 RHBM	N12-25
	31,8	60,3	20-125 RHBM	N12-25
		73,0	25-125 RHBM	
	38,1	73,0	25-150 RHBM	N12-25
	44,5	73,0	25-175 RHBM	
Bottom mechanical, double-stage pump	57,2	88,9	30-225 RHBM	N12-30
	38,1	88,9	30-225/150 RHBM 12-4-2-2	N12-30
Bottom cup acc. to API	27,0	60,3	20-106 RHBC	N11-20
	31,8		20-125 RHBC	
	38,1	73,0	25-125 RHBC	N11-25
			25-150 RHBC	
	44,5	73,0	25-175 RHBC	N11-25

Tubing pump versions

THM tubing pump with mechanical seating arrangement acc. to API, schematically



Seating arrangement of standing valve	Pump bore, mm	Tubing size, mm	Pump designation
Acc. to API Spec. 11AX with bayonet fishing tool (THM) or with cup seating arrangement (THC)	31,8	60,3	20-125 THM
		73,0	25-125 THM
	44,5	60,3	20-175 THM (THC)
		73,0	25-175 THM (THC)
	57,2	73,0	25-225 THM (THC)
Special (taper)	69,9	88,9	30-275 THM
	31,8	73,0	25-125 THM-K
	44,5	73,0	25-175 THM-K
Non-removable valve (additional drain valve of SKOK type is used)	57,2	73,0	25-225 THM-K
	31,8	73,0	25-125 THM-T
	44,5	73,0	25-175 THM-T
	57,2	73,0	25-225 THM-T
Non-removable valve, long plunger (10 feet), barrel with side hole	69,9	88,9	30-275 THM-T
	31,8	73,0	25-125 THM-T 11-10-2-2
	44,5	73,0	25-175 THM-T 11-10-2-2
	57,2	73,0	25-225 THM-T 11-10-2-2
Non-removable single (C) or doubled (CC) valve with built-in drain beating device	69,9	88,9	30-275 THM-T 11-10-2-2
	31,8	73,0	25-125 THM-C(CC)
	38,1	73,0	25-150 THM-C(CC)
	44,5	73,0	25-175 THM-C(CC)
	57,2	73,0	25-225 THM-C(CC)
	69,9	88,9	30-275 THM-C

Designation of pumps (except THM-T 11-10-2-2) is given without lengths of barrel, plunger and extensions which shall be selected for each size of pump, depending on required plunger stroke.

Plunger stroke of standard tubing pumps (THM) depending on combination of barrel-plunger-extension lengths

Combination of barrel-plunger-extension lengths	Max length of plunger stroke (from end to end), m
7-4-2-2	1,5
9-4-2-2	2,1
11 -4-2-2	2,7
11-4-2-3	3,0
14-4-2-2	3,6
11 -10-2-2	3,0
22-4-2-2	6,0
14-5-1,5-1,5	3,2
22-4-2-2	6,2

Example of tubing pump designation

Diameter 44,5 mm, standard seating arrangement of standing valve (acc. to API), length of barrel - 11 feet, length of plunger - 4 feet, length of extensions - 2 feet each, for installation in tubing with diameter 73 mm: 25-175 THM 11-4-2-2.

BORONIZED PUMP BARRELS

Boronized Pump Barrels - Diamond plating

Diamond plating is a unique technical solution that it offered by White Star Pump Company.

Parameters of Boronized Pump Barrel	
Thickness	Min 0.08 mm
Microstructure	FeB & Fe2B
Hardness	1200 H.V.100-2200HV100
Hardness of Base Material	Max 23 HRc
Yield Strength of Base Material	Min. 355 Mpa
Basic Material Available	C1026/AISI1045

The boronizing layer is comprised of boron and iron, a harden surface FeB or Fe2B, and it provides excellent corrosion resistance because it is inert and non-reactive to most of the corrosive elements found in oil and gas production, it has been approved for high corrosion resistance to H2S, CO2, Chlorides, produced water.

The boronizing layer is an alloyed surface created by diffusing boron into substrate of steel. As this process is not merely adding a coating, eliminating the problems associated with "coatings" such as shedding, pits, separation, collapse, flaking, etc.



Significantly increase run time of sucker rod pump by 2-3 times



Succeeds in deviated sections of the well-bore where excessive and repetitive wear occurs



Reduces expenses by eliminating workovers and lost production



High performance in severe environments



Reduces operating costs



Excellent return on investment