

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه



چندراهه كلاستر بينك

شماره پیمان:

053 - 073 - 9184

CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSIION
CALCOLATION BOOK FOR (CV), CV, CMM GENTE CIEMCO, EXTENDION
OF BINAK B/C MANIFOLD
OF BINAN BIO MANIFOLD

	OF BINAR BIO MARIN CEB										
ه تسهیلات صادر کننده بسته کاری پروژه					نوع مدرک	سريال	نسخه				
BK	W007S	PEDCO	110	PR	CN	0001	D03				

شماره صفحه: 1 از 16

## طرح نگهداشت و افزایش تولید 27 مخزن

## CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSION OF BINAK B/C MANIFOLD

نگهداشت و افزایش تولید میدان نفتی بینک

1104.	Date	CLIENT Doc Number:	F07-707918	Officered by.	Approved by.	OLILITI Approvai
Rev.	Date	Purpose of Issue/Status	Prepared by:	Checked by:	Approved by:	CLIENT Approval
D00	FEB. 2022	IFC	M.Aryafar	M.Fakharian	M.Mehrshad	
D01	AUG.2022	IFA	M.Aryafar	M.Fakharian	M.Mehrshad	
D02	OCT.2022	IFA	M.Aryafar	M.Fakharian	M.Mehrshad	
D03	OCT.2023	IFA	M.Aryafar	M.Fakharian	S.Faramarzpour	

Class: 2

CLIENT Doc. Number: F0Z-707918

### Status:

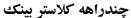
IDC: Inter-Discipline Check
IFC: Issued For Comment
IFA: Issued For Approval
AFD: Approved For Design
AFC: Approved For Construction
AFP: Approved For Purchase
AFQ: Approved For Quotation
IFI: Issued For Information
AB-R: As-Built for CLIENT Review
AB-A: As-Built —Approved

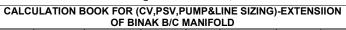


شماره پیمان:

## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه





نسخه سريال نوع مدرک رشته تسهیلات صادر کننده بسته کاری W007S PEDCO 110 PR CN 0001 D03



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#### **REVISION RECORD SHEET**

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14	X	Х	Χ		
15	X	Х	X		
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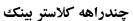
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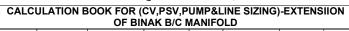


شماره پیمان:

## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه





نوع مدر ک رشته تسهیلات صادر کننده نسخه بسته کاری W007S PEDCO 110 PR 0001 D03



شماره صفحه: 3 از 16

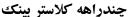
### **CONTENTS**

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## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه





CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSIION شماره پیمان: OF BINAK B/C MANIFOLD

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پروژه	بسته کاری	صادر کننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه				
BK	W007S	PEDCO	110	PR	CN	0001	D03				



شماره صفحه: 4 از 16

#### 1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

As a part of the Project, construction of well location, access road, wellhead facilities (with electric power supply) for W007S shall be done. In addition, construction of new flowline from aforementioned well location to Binak B/C unit (with extension of relevant manifold) are in the Project scope of work.

#### **GENERAL DEFINITION**

The following terms shall be used in this document.

CLIENT: National Iranian South Oilfields Company (NISOC)

PROJECT: Binak Oilfield Development - Construction of Well

> Location, Wellhead Facilities, Electrification Facilities, Flowlines for W007S and Extension of Binak B/C

Manifold

EPD/EPC CONTRACTOR (GC): Petro Iran Development Company (PEDCO)

**EPC CONTRACTOR:** Joint Venture of : Hirgan Energy - Design &

Inspection(D&I) Companies

The firm or person who will fabricate the equipment or VENDOR:

material.

**EXECUTOR:** Executor is the party which carries out all or part of

construction and/or commissioning for the project.

THIRD PARTY INSPECTOR (TPI): The firm appointed by EPD/EPC CONTRACTOR (GC)

and approved by CLIENT (in writing) for the inspection

of goods.

SHALL: Is used where a provision is mandatory. SHOULD: Is used where a provision is advisory only.

WILL: Is normally used in connection with the action by

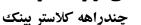
CLIENT rather than by an EPC/EPD CONTRACTOR,

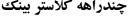
supplier or VENDOR.

MAY: Is used where a provision is completely discretionary.



## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه







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CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSIION OF BINAK B/C MANIFOLD										
پروژه	بسته کاری	صادر كننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه			
BK	W007S	PEDCO	110	PR	CN	0001	D03			



شماره صفحه: 5 از 16

#### 2.0 SCOPE

This document covers calculation report such as Pump Calculation, PSV Sizing and Control Valve Calculation for Extension of Binak Manifold.

#### 3.0 NORMATIVE REFERENCES

#### 3.1 **LOCAL CODES AND STANDARDS**

•	IPS-E-IN-160	Engineering Standard for Control Valves
•	IPS-M-IN-160	Material Standard for Control Valves
•	IPS-E-PR-830	Process design of valves and control valves
•	IPS-E-PR-450	Process Design Of Pressure Relieving systems inclusive safety relief valves
•	IPS-E-PR-460	Process Design Of Flare And Blowdown Systems

#### 3.2 INTERNATIONAL CODES AND STANDARDS

•	API RP 553	Safety Instrumented Systems
•	API-STD-520	Sizing, Selection and Installation of Pressure Relieving Devices in Refineries, Part 1-Sizing and Selection
•	API-STD-521	Pressure Relieving and Depressuring Systems
•	API-STD-526	Flanged Steel Pressure Relief Valves

#### 3.3 THE PROJECT DOCUMENTS

BK-GNRAL-PEDCO-000-PR-DB-0001 Process Basis of Design BK-GNRAL-PEDCO-000-PR-DC-0001 Process Design Criteria

#### 3.4 **ENVIRONMENTAL DATA**

Refer to "Process Basis of Design; Doc. No. BK-GNRAL-PEDCO-000-PR-DB-0001"

#### 3.5 ORDER OF PRECEDENCE

In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT.



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چندراهه کلاستر بینک

شماره پیمان:

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CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSIION OF BINAK B/C MANIFOLD										
پروژه	بسته کاری	صادر کننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه			
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شماره صفحه: 6 از 16

#### 4.0 CONTROL VALVE SIZING

#### 4.1 SOFTWARE

The software using for sizing Control Valves is Fisher.

#### 4.2 CASE STUDY

Three cases have been considered for control valve sizing:

- Case 1: Maximum operating flow is equal to 110% of normal operating flow.
- Case 2: Normal operating flow.
- Case 3: Minimum operating flow is equal to min operating flow
   Note: It should be noted that the special conditions, related to each control valve is taken into account.



#### 4.3 SIZING

The below table contains the details sizing for the control vales that installed in Manifold.

NO	LINE SIZE	Valve No.	Normal Liquid Flow Rate (kg/h)	Normal Gas Flow Rate (kg/h)	Normal Upstream Pressure (Barg)	Normal Downstream Pressure (Barg)	CV Calculated Min/Nor/Max	Size	P&ID
1	4	W018S-1701A	11169.0	178.1	12.78	11.28	7.214/21.659/23.825	3	BK-W007S-PEDCO-110-PR-PI-0001(3/6)
2	4	W046S-1701B	16774.4	647.5	12.78	11.28	4.29/6.444/7.089	3	BK-W007S-PEDCO-110-PR-PI-0001(5/6)
3	4	W008N-1701C	11148.0	199.0	12.78	11.28	7.450/22.366/24.603	3	BK-W007S-PEDCO-110-PR-PI-0001(4/6)
4	4	W028-1701D	27839.6	1196.9	12.78	11.28	47.215/46.603/86.463	3	BK-W007S-PEDCO-110-PR-PI-0001(4/6)
5	4	W035-1701E	27874.5	1162.0	12.78	11.28	46.666/77.663/85.429	3	BK-W007S-PEDCO-110-PR-PI-0001(3/6)
6	4	W007S-1701 F	11145.8	468.8	12.78	11.28	15.575/31.197 /34.316	3	BK-W007S-PEDCO-110-PR-PI-0001(5/6)

#### 4.4 DETAILS OF CALCULATION RESULT

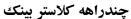
## <u>ATTACHMENT 1</u>

(SOFTWARE RESULT)



## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه



CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSIION OF BINAK B/C MANIFOLD

پروژه	بسته کاری	صادر کننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه
BK	W007S	PEDCO	110	PR	CN	0001	D03



شماره صفحه: 7 از 16

#### **PSV SIZING CALCULATION REPORT** 5.0

#### 5.1 **SOFTWARE**

شماره پیمان:

The software using for sizing Pressure safety valve is valve star. Pressure safety valve sizing report have been reported as following attachment.

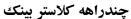
PSV No.	PRV-1701A	PRV-1701A		
Service	D03 CRUDE OIL	CRUDE OIL		
Fire	YES	-		
Block outlet	-	YES		
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE		
Operating Pressure (Barg)	12.78	12.78		
Normal Temperature (°C)	46.19	46.19		
P set, Barg	93	93		
Required massflow (kg/hr)	2094	11347.034		
Specific Heat Ratio (Cp/Cv)	1.005	1.005		
Molecular Weight (kg/Kmol)	77.41	77.41		
Compressibility Factor	-	-		
Total Back Pressure ( Bar )	1.5	1.5		
Allowable Over Pressure (%)	21	10		
Discharge area, cm²	1.53	1.539		
Orifice Designation	D	E		
Body size	1" × 2"	1" × 2"		
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (3/6,4/6)	BK-W007S-PEDCO-110-PR-PI-0001 (3/6,4/6)		



شماره پیمان:

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OF BINAK B/C MANIFOLD

 نسخه
 سریال
 نوع مدر ک
 رشته
 تسهیلات
 صادر کننده
 بسته کاری
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شماره صفحه: 8 از 16

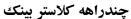
PSV No.	PRV-1701B	PRV-1701B	
Service	CRUDE OIL	CRUDE OIL	
Fire	YES	-	
Block outlet	-	YES	
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE	
Operating Pressure (Barg)	12.78	12.78	
Normal Temperature (°C)	31.6	31.6	
P set, Barg	93	93	
Required massflow (kg/hr)	2161	17421.909	
Specific Heat Ratio (Cp/Cv)	1.007	1.007	
Molecular Weight (kg/Kmol)	39.09	39.09	
Compressibility Factor	-	-	
Total Back Pressure ( Bar )	1.5	1.5	
Allowable Over Pressure (%)	21	10	
Discharge area, cm2	1.53	2.54	
Orifice Designation	D	F	
Body size	1 " × 2"	1 1/2" × 2"	
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (4/6)	BK-W007S-PEDCO-110-PR-PI-0001 (4/6)	



شماره پیمان:

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OF BINAK B/C MANIFOLD

 نسخه
 سریال
 نوع مدر ک
 رشته
 تسهیلات
 صادر کننده
 بسته کاری
 پروژه

 BK
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شماره صفحه: 9 از 16

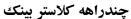
PSV No.	PRV-1701 C	PRV-1701C	
Service Do	3 CRUDE OIL	CRUDE OIL	
Fire	YES	-	
Block outlet	-	YES	
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE	
Operating Pressure (Barg)	12.78	12.78	
Normal Temperature (°C)	46.19	46.19	
P set, Barg	93	93	
Required massflow (kg/hr)	2081	11347.034	
Specific Heat Ratio (Cp/Cv)	1.005	1.005	
Molecular Weight (kg/Kmol)	77.41	77.41	
Compressibility Factor	-	-	
Total Back Pressure ( Bar )	1.5	1.5	
Allowable Over Pressure (%)	21	10	
Discharge area, cm²	1.53	1.539	
Orifice Designation	D	E	
Body size	1" × 2"	1" × 2"	
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (3/6,4/6)	BK-W007S-PEDCO-110-PR-PI-0001 (3/6,4/6)	



شماره پیمان:

## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

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CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSION
OF BINAK B/C MANIFOLD

 نسخه
 سریال
 نوع مدر ک
 رشته
 تسهیلات
 صادر کننده
 بسته کاری
 پروژه

 BK
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شماره صفحه: 10 از 16

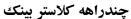
PSV No.	PRV-1701D	PRV-1701D	
Service	CRUDE OIL	CRUDE OIL	
Fire	YES	-	
Block outlet	-	YES	
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE	
Operating Pressure (Barg)	12.78	12.78	
Normal Temperature (°C)	44.41	44.41	
P set, Barg	93	93	
Required massflow (kg/hr)	2130	29036.515	
Specific Heat Ratio (Cp/Cv)	1.007	1.007	
Molecular Weight (kg/Kmol)	39.09	39.09	
Compressibility Factor	-	-	
Total Back Pressure ( Bar )	1.5	1.5	
Allowable Over Pressure (%)	21	10	
Discharge area, cm²	1.53	3.97	
Orifice Designation	D	G	
Body size	1" × 2"	1 1/2" × 3"	
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (4/6,5/6)	BK-W007S-PEDCO-110-PR-PI-0001 (4/6,5/6)	



شماره پیمان:

## نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض

## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه



CALCULATION BOOK FOR (CV,PSV,PUMP&LINE SIZING)-EXTENSION OF BINAK B/C MANIFOLD

 نسخه
 سریال
 نوع مدر ک
 رشته
 تسهیلات
 صادر کننده
 بسته کاری
 پروژه

 BK
 W007S
 PEDCO
 110
 PR
 CN
 0001
 D03



شماره صفحه: 11 از 16

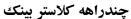
PSV No.	PRV-1701E	PRV-1701E	
Service <u></u> [	CRUDE OIL	CRUDE OIL	
Fire	YES	-	
Block outlet	-	YES	
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE	
Operating Pressure (Barg)	12.78	12.78	
Normal Temperature (°C)	44.41	44.41	
P set, Barg	93	93	
Required massflow (kg/hr)	2140	29036.515	
Specific Heat Ratio (Cp/Cv)	1.007	1.007	
Molecular Weight (kg/Kmol)	39.09	39.09	
Compressibility Factor	-	-	
Total Back Pressure ( Bar )	1.5	1.5	
Allowable Over Pressure (%)	21	10	
Discharge area, cm²	1.53	3.97	
Orifice Designation	D	G	
Body size	1" × 2"	1 1/2" × 3"	
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (4/6,5/6)	BK-W007S-PEDCO-110-PR-PI-0001 (4/6,5/6)	



شماره پیمان:

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## ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه



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PSV No.	PRV-1701F	PRV-1701F	
Service /[	CRUDE OIL	CRUDE OIL	
Fire	YES	-	
Block outlet	-	YES	
Fluid & State	GAS & OIL / 2 PHASE	GAS & OIL / 2 PHASE	
Operating Pressure (Barg)	12.78	12.78	
Normal Temperature (°C)	41.77	41.77	
P set, Barg	93	93	
Required massflow (kg/hr)	2137	11614.606	
Specific Heat Ratio (Cp/Cv)	1.007	1.007	
Molecular Weight (kg/Kmol)	39.09	39.09	
Compressibility Factor	-	-	
Total Back Pressure ( Bar )	1.5	1.5	
Allowable Over Pressure (%)	21	10	
Discharge area, cm²	1.53	1.539	
Orifice Designation	D	E	
Body size	1" × 2"	1" × 2"	
P&ID Number	BK-W007S-PEDCO-110-PR-PI-0001 (5/6)	BK-W007S-PEDCO-110-PR-PI-0001 (5/6)	



ساخت موقعیت چاه، تاسیسات سرچاهی، خطوط جریانی، تسهیلات برق رسانی مربوط به موقعیت W007S و توسعه



چندراهه كلاستر بينك

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OF BINAK B/C MANIFOLD								
ننده بسته کاری پروژه		صادر کننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه	
BK	W007S	PEDCO	110	PR	CN	0001	D03	l

شماره صفحه: 13 از 16

# ATTACHMENT 2 (SOFTWARE RESULT)

#### 6.0 PUMP CALCULATION REPORT

Normal Flow Rate (m³/hr)	Min/Max Suction Pressure (barg)	Total Discharge Pressure (barg)	NPSHA (m)	Differential Pressure (barg)	Pump Efficiency (EP)	Brake Power (BHP)	Vapor Pressure (barg)	Viscosity (CP)	Density (Kg/m³)	Shut Off Pressure	Head at Rated Capacity (m)
15	0/0.3	12	2.4	12	30%	18.33	0.8	9.5	970	14.7 (Note 1)	126.2

Note1 : According to item 141 at HAZAP Study Report, piping class downstream of sump pump to header A/B should be 300#.

Detail of pump calculation are given in the attached file:

## **ATTACHMENT 3**

## (SOFTWARE RESULT)

#### 7.0 LINE SIZING

Since most multiphase pipelines operate at high-pressure conditions, pressure drop is usually not a governing criterion in selecting a diameter. However, pressure drop may have to be considered for some long flow lines from wells and in most multiphase pipelines. If the available pressure drop allows, the flow velocity shall in general be sufficiently high to prevent liquid accumulation in the pipelines. It is recommended that a minimum flow velocity shall be maintained to keep liquids moving in the line and thus minimize terrain induced slugging of separator or other process equipment. Also, the flow velocity shall in general be kept low enough to prevent problems with erosion, corrosion, noise, vibration, etc. However, in some cases the maximum allowable velocity would be calculated by corrosion/erosion criteria.



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	OF BINAK B/C MANIFOLD									
پروژه	بسته کاری	صادر کننده	تسهيلات	رشته	نوع مدرك	سريال	نسخه			
BK	W007S	PEDCO	110	PR	CN	0001	D03			

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#### Corrosion

For corrosion resistant material (SS, Special alloys ...), no limitation of flowing velocity up to 100 m/s and no requirement for corrosion allowance.

For non-corrosion resistant material, in corrosive fluid service, corrosion allowance for a design service life and corrosion inhibitor injection is required. The flowing velocity is limited by the inhibitor film integrity.

Note that it is not often economical to use corrosion resistant alloys, thus, corrosion inhibitors are widely used as an alternative to protect the lines by formation of a protective layer inside the internal surface. However product and inhibitor layers will not protect the pipe by turbulence and shear stress. Therefore the flow velocity will be limited by the inhibitor film integrity. Where at velocities more than 6 m/sec the integrity of the inhibitor film may be broken by turbulence and result in no protection. In addition corrosion allowance will be added to pipe thickness for assurance. Determination of corrosion allowance for deep-water pipelines should be made using the corrosion inhibitor availability model reflecting actual performance and realistic inhibitor availability, rather than arbitrary inhibitor effectiveness criteria.

#### > Erosion

For Duplex, SS or alloy material, the flowing velocity must be limited to:

- 100 m/s in single phase vapor lines and multiphase lines in stratified flow regimes (65m/s for 13% Cr material),
- 20 m/s in single phase liquid lines and multiphase lines in annular, bubble or hydrodynamic slug flow regime,
- 70 m/s in multiphase lines in mist flow regimes.

#### For Carbon Steel material:

- In case of continuous injection of corrosion inhibitor, the inhibitor film ensures a lubricating effect which drifts the erosion velocity limit. The corrosion inhibitor erosion velocity limit will be calculated taking into account the inhibitor film wall shear stress.
- In case of uninhibited fluid, the API RP 14 E recommendation should apply:

The flowing velocity must be maintained below the erosional limit:

$$Ve = \frac{1.22C}{\sqrt{\rho_m}}$$



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#### چندراهه کلاستر بینک FOR (CV PSV PLIMP&LINE SIZING) EXTENSIION

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OF BINAK B/C MANIFOLD									
پروژه	بسته کاری	صادر کننده	تسهيلات	رشته	نوع مدرک	سريال	نسخه		
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V<sub>e</sub>: erosional velocity in m/s

 $P_m$ : Gas/liquid mixture density at flowing conditions in kg/m<sup>3</sup>

The multiphase mixture density  $\rho_m$  can be determined by the following equation:

$$\rho_m = \frac{m_{\rm m}}{\frac{m_{\rm L}}{\rho_{\rm L}} + \frac{m_{\rm G}}{\rho_{\rm G}}}$$

Where:

 $m_{m}$ :total mass flow rate, kg/sec ( $m_{m} = m_{L} + m_{G}$ )

m Liliquid mass flow rate, kg/sec

m G:Gas mass flow rate, kg/sec

C: empirical constant equal to 122.045 to 152.556 for continuous flow. "C" value up to 244 can be considered on peak flow rate only in case of absence of abrasive (solid) particles such as sand.

It is widely accepted in the industry that above simple criterion is inadequate, where it is for clean service (non-corrosive and sand free) and the limits should be reduced if sand and the limits should be reduced if sand or corrosive conditions are present.

Note:

If solids production is anticipated, fluid velocities should be significantly reduced.

Tag . No	Line Description	Tempreture	Pressure	<b>Erosional Velocity</b>	Line Size	P&ID No
W007	CRD-110-171F-FN05-4"-PT	41.77	12.78	0.862	4	BK-W007S-PEDCO-110-PR-PI-0001 (5/6)
W008	CRD-110-171C-FN05-4"-PT	46.19	12.78	0.451	4	BK-W007S-PEDCO-110-PR-PI-0001 (4/6)
W018	CRD-110-171A-FN05-4"-PT	36.31	12.78	0.425	4	BK-W007S-PEDCO-110-PR-PI-0001 (3/6)
W028	CRD-110-171D-FN05-4"-PT	44.16	12.78	0.876	4	BK-W007S-PEDCO-110-PR-PI-0001 (4/6)
W035	CRD-110-171E-FN05-4"-PT	40.71	12.78	0.735	4	BK-W007S-PEDCO-110-PR-PI-0001 (3/6)
W046	CRD-110-171B-FN05-4"-PT	31.36	12.78	0.695	4	BK-W007S-PEDCO-110-PR-PI-0001 (5/6)

Detail of line sizing are given in the attached file:



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# ATTACHMENT 4 (SOFTWARE RESULT)