



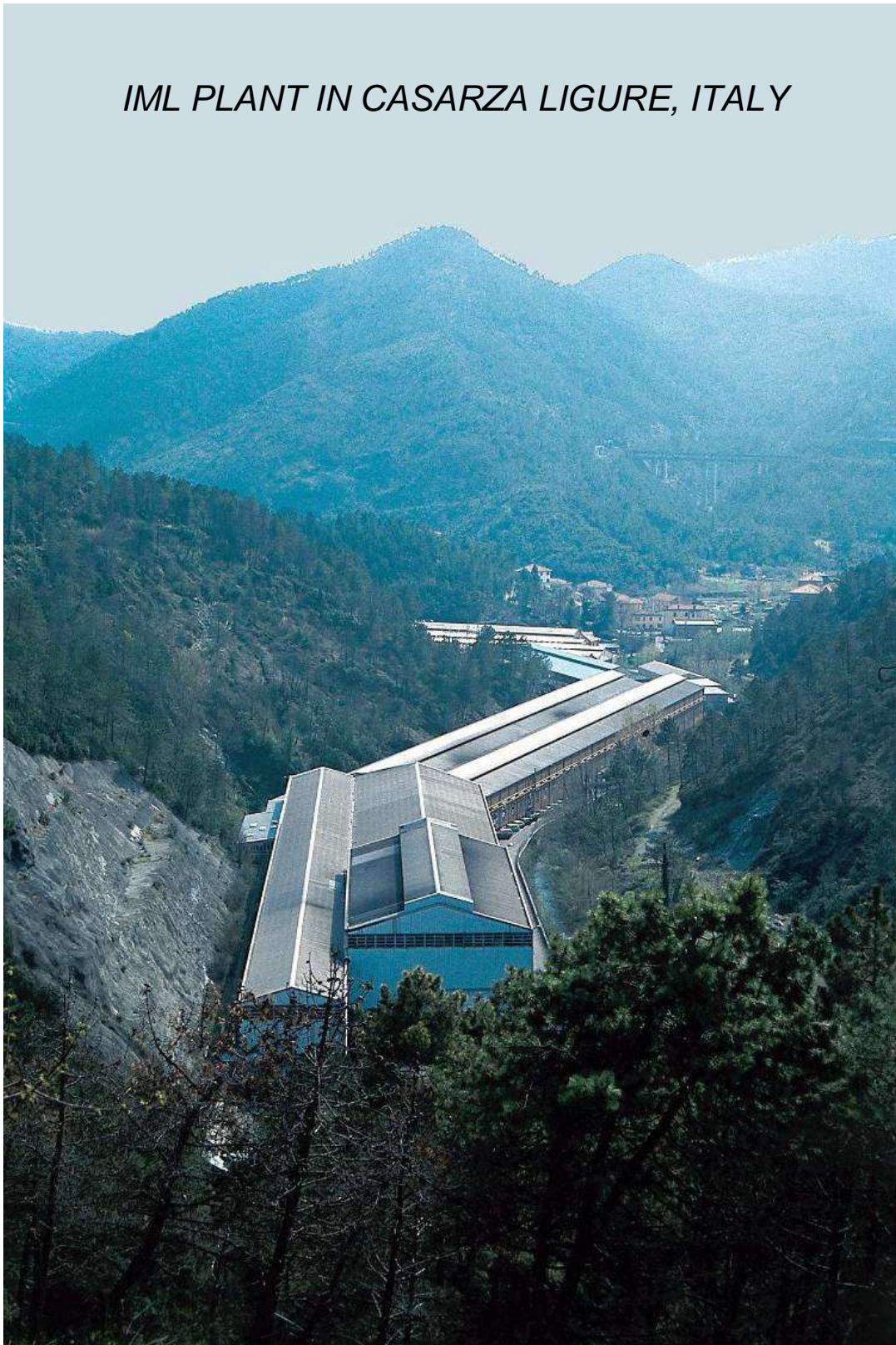
IML INDUSTRIA MECCANICA LIGURE SPA



GENERAL CATALOGUE



IML PLANT IN CASARZA LIGURE, ITALY



INDEX

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 - **01.THREADED TYPE**
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- **05.PIPE NIPPLES – CONCENTRIC AND ECCENTRIC SWAGES**
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INTRODUCTION AND HISTORY





IML was set up in Genoa in 1913, as a stockist and machinist of bolts for the shipping industry. IML extended and renewed its activities by moving its plant to a larger facility in Recco, starting manufacture of bolting material for the petrochemical industry.

After the Second World War, IML became one of the first manufacturers in Europe of forged steel fittings in carbon, alloy and stainless steel, and its range gradually became predominant within IML's activities together with studbolts and bolts, specifically for the petrochemical use.

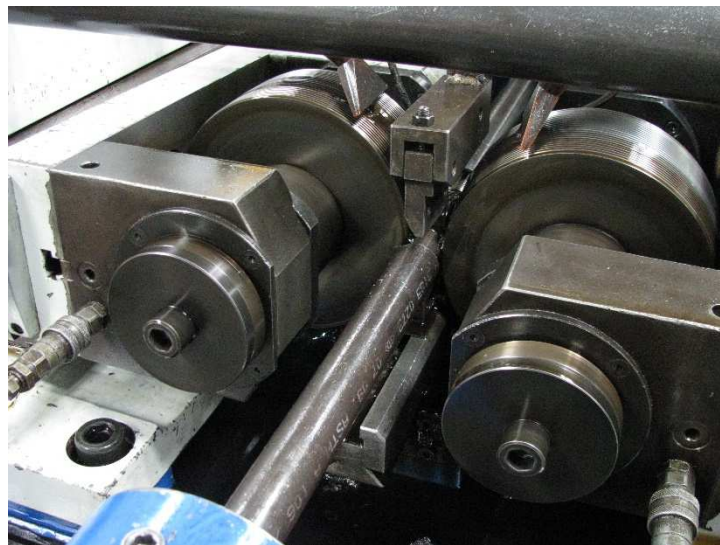


From its new facility in Casarza Ligure (40 Km. east of Genoa , extending over an area of 45,000 square meters of which 20,000 are covered) IML has increased its potential in terms of production and service, and can look forward to continued growth in the forthcoming years.



In year 2006 IML acquired a new building near the existing one that has been totally dedicated to studbolts production.

With this new 5000 square meter space, IML improved its capability and production flow, reaching better results in terms of tonnage and quality service.





A highlight of the company is the modern in-house forging plant (over 12,000 tons of production per year), which is provided with state of the art machining equipment at the highest levels in terms of capacity and quality. A total traceability, coupled with experienced quality personnel and a testing laboratory equipped with the most modern instrument and machines has assured IML approvals with all the major world-wide end-users.





An extensive stockrange of raw materials and finished products allows IML to service specific requirements that include some of the most sophisticated steels and products.





I.M.L. relies on European well known mills for its steel supply. We have been cooperating with such primary mills for many years and have developed a strong mutually beneficial relationship.



Production is in accordance with the ASTM and ASME/ANSI specifications. IML is recognized by all major inspecting authorities and is ISO 9001:2008 & PED approved.





CERTIFICATO N. 23/91/S
CERTIFICATE No.

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITÀ DI
 IT IS HEREBY CERTIFIED THAT THE QUALITY MANAGEMENT SYSTEM OF

I.M.L. S.p.A. INDUSTRIA MECCANICA LIGURE

VIA VOLONTARI DELLA LIBERTA' 1 22036 ERBA (CO) ITALIA

NELLE SEGUENTI UNITÀ OPERATIVE / IN THE FOLLOWING OPERATIONAL UNITS

VIA GIANCARLO FARINA 25 16030 CASARZA LIGURE (GE) ITALIA

È CONFORME ALLA NORMA / IS IN COMPLIANCE WITH THE STANDARD

ISO 9001:2008

PER I SEGUENTI CAMPI DI ATTIVITÀ / FOR THE FOLLOWING FIELD(S) OF ACTIVITIES

PRODUZIONE DI RACCORDI FORGIATI, BULLONERIA, TIRANTERIA IN ACCIAIO AL CARBONIO, INOX, LEGHE,
 LEGHE NON FERROSE

PRODUCTION OF FORGED FITTINGS, NIPPLES, SWAGES, BRANCH FITTINGS, STUD BOLTS/NUTS, BOLTING
 MATERIAL. MATERIAL GRADES: CARBON, ALLOY AND STAINLESS STEELS, NON-FERROUS ALLOYS

La validità del presente certificato è subordinata a sorveglianza periodica annuale / semestrale ed al riesame completo del sistema di gestione con periodicità triennale

The validity of this certificate is dependent on an annual / six monthly audit and on a complete review, every three years, of the management system

L'uso e la validità del presente certificato sono soggetti al rispetto del documento RINA: Regolamento per la Certificazione di Sistemi di Gestione per la Qualità

The use and validity of this certificate are subject to compliance with the RINA document : Rules for the certification of Quality Management Systems

Prima emissione First Issue	25.10.1991
Emissione corrente Current Issue	17.12.2015
Data scadenza Expiry Date	15.09.2018

Daniela Asaro
 Manager, Genova Certification



RINA Services S.p.A.
 Via Corsica 12 - 16128 Genova Italy



SGQ N° 002 A SSI N° 001 G
 SGA N° 002 D DAP N° 001 H
 PRD N° 002 B PRS N° 056 C
 SCR N° 003 F LAB N° 0832
 SGE N° 008 M ISP N° 096E

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC

Signatory of EA, IAF and ILAC Mutual Recognition Agreements



CISQ is a member of



THE INTERNATIONAL CERTIFICATION NETWORK
 www.iqnet-certification.com

IQNet, the association of the world's first class certification bodies, is the largest provider of management System Certification in the world.

IQNet is composed of more than 30 bodies and counts over 150 subsidiaries all over the globe.

Per informazioni sulla validità del certificato, visitare il sito www.rina.org

For information concerning validity of the certificate, you can visit the site www.rina.org

Riferirsi al Manuale della Qualità per i dettagli delle esclusioni ai requisiti della norma

Reference is to be made to the Quality Manual for details regarding the exemptions from the requirements of the standard

EA:17

CISQ è la Federazione Italiana di Organismi di Certificazione dei sistemi di gestione aziendale

CISQ is the Italian Federation of management system Certification Bodies



www.cisq.com

Form CERSISGE-08/2013





RINA

CERTIFICATO DI VALUTAZIONE SPECIFICA DEL SISTEMA GESTIONE QUALITA' PER PRODUZIONE MATERIALI

CERTIFICATE OF QUALITY SYSTEM ASSESSMENT FOR MATERIAL PRODUCTION

Documento nr. **2007 DG PP 21**
Document nr.

Rina Services S.p.A., quale Organismo Notificato n. 0474,
Rina Services S.p.A., as Notified Body nr. 0474,

CERTIFICA CHE CERTIFIES THAT

Produttore materiali <i>Material Manufacturer</i>	I.M.L. Industria Meccanica Ligure S.p.A.		
Indirizzo Sede Legale <i>Legal Office Address</i>	Via Volontari della Libertà, 1 – 22036 ERBA (CO)		
Indirizzo Sede Operativa <i>Operational Office Address</i>	Piazza Marco Cappelli, 4 - 16030 CASARZA LIGURE (GE)		
Sistema Qualità certificato da: <i>Quality System certified by:</i>	RINA S.p.A.	Norma di riferimento: <i>Reference standard:</i>	ISO 9001
Certificato nr: <i>Certificate nr:</i>	23/91/S	Data di scadenza: <i>Expiration Date:</i>	18/09/2018

è stato sottoposto ad una procedura di valutazione specifica dei materiali in accordo all' **Allegato I punto 4.3 della Direttiva 97/23/CE** per la produzione di **Raccordi forgiati, bulloneria, tiranteria in acciaio al carbonio, acciaio bassoalegato al Cr e CrMo, Acciaio inossidabile, leghe di Nickel** come specificato nelle tabelle allegate.
Has been submitted to a specific material assessment according to Annex I point 4.3 of 97/23/EC Directive for manufacture of Forged fittings, Bolts, Tie rods in carbon steel, low alloys Cr and CrMo, stainless steel, Nickel alloys as specified in the annexed tables.

Sulla base dei risultati della valutazione il Produttore dei materiali è autorizzato ad emettere certificati di controllo specifico del prodotto per i materiali elencati nell'allegato, in accordo alla Direttiva 97/23/CE ed alle specifiche tecniche applicabili.
On the basis of the results of the assessment, the material Manufacturer is authorized to issue certificates of specific product control for the materials listed in the attachment to this certificate, according to 97/23/CE Directive and the applicable technical specifications.

Questo certificato è valido solo in presenza di un certificato ISO9001 in corso di validità.
This certificate is valid only in presence of a valid ISO9001 certificate.

Rilasciato a **Genova** il **29 / 12 / 2006**
Issued in Genoa on

Valido fino al: **18 / 09 / 2018**
Valid until:

Emissione Corrente del 15/01/2016
Current Issue dated 15/01/2016

RINA Services S.p.A.

Questo Certificato è composto da 1 pagina + 2 di allegato
This Certificate consists of 1 page + 2 pages of attachment

RINA
Via Corsica, 12 – 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000
web site: www.rina.org



Allegato al Certificato nr. 2007 DG PP 21

FABBRICANTE:

Manufacturer:

Indirizzo sede legale:

Legal Office Address

Indirizzo sede operativa:

Operational Offices Address

I.M.L. - Industria Meccanica Ligure S.p.A.

Via Volontari della Libertà, 1 - 22036 Erba (CO)

Piazza Marco Cappelli, 4 - 16030 Casarza Ligure (GE)

Data visita: 28.10.2015

Survey date:



RINA

Nr.	Denominazione <i>Item</i>	Specifica del materiale <i>Material spec.</i>	Stato di fornitura <i>Supply status</i>	Tipo di prodotto <i>Type of product</i>	Dimensioni				Note
					Spess. (Thick.) (mm)		Diam. (mm)		
					da	a	da	a	
1	FORGED FITTINGS ASME B16.11 MSS SP 83 B.S.3799 ASME B31.1 ASME B31.3 MSS SP 79 MSS SP 95	ASME/ASTM SA/A105	Forging	Fittings	Series 3000, 6000, 9000		1/8"	4"	Filettatura: ANSI/ASME B1.20.1 Threaded: Tasca: ASME B16.11 Socket:
		ASME/ASTM SA/A350 LF1,LF2,LF3	"	"	"	"	"	"	
		ASME/ASTM SA/A182 F5,F9,F11,F12,F22	"	"	"	"	"	"	
		F304, F304L,F316,F316L,F321, F321H F44,F51,F347,F91	"	"	"	"	"	"	
		ASME/ASTM SA/A694 F52,F60	"	"	"	"	"	"	
		ASME/ASTM SB/B462 N08020,N08367	"	"	"	"	"	"	
		ASME/ASTM SB/B164 UNS N04400	"	"	"	"	"	"	
		ASME/ASTM SB/B612 UNS N10665	"	"	"	"	"	"	
2	PIPE NIPPLES/SWAGES ASME/ANSI B36.10M ASME/ANSI B36.19M MSS SP 95	ASTM A106 GR.A,B,C	Pipe	Fittings	All Schedules		"	6"	Filettatura: ANSI/ASME B1.20.1 Threaded ends: Estremità a saldare: ASME B16.9 Socket weld end:
		ASTM A333 GR.3,6	"	"	"	"	"	"	
		ASTM A312 TP304/304L/316/316L/321/321H	"	"	"	"	"	"	
		ASTM A335 P1,P5,P9,P11 P12,P22	"	"	"	"	"	"	
		ASTM A234 WPB,WP1/5/11 WP12/22	"	"	"	"	"	"	
		"	"	"	"	"	"	"	

Pagina 1/2

Allegato al Certificato nr. 2007 DG PP 21

FABBRICANTE:

Manufacturer:

Indirizzo sede legale:

Legal Office Address

Indirizzo sede operativa:

Operational Offices Address

I.M.L. - Industria Meccanica Ligure S.p.A.

Via Volontari della Libertà, 1 - 22036 Erba (CO)

Piazza Marco Cappelli, 4 - 16030 Casarza Ligure (GE)

Data visita: 28.10.2015

Survey date:



RINA

Nr.	Denominazione <i>Item</i>	Specifica del materiale <i>Material spec.</i>	Stato di fornitura <i>Supply status</i>	Tipo di prodotto <i>Type of product</i>	Dimensioni				Note
					Spess. (Thick.) (mm)		Diam. (mm)		
					da	a	da	a	
2	PIPE NIPPLES/SWAGES ASME B36.10M ASME B36.19M MSS SP 95	ASME/ASTM SA/A420 WPL3,WPL6	Pipe	Fittings	All Schedules		1/4"	4"	
		ASME/ASTM SA/A403 WP304/304L/316/316L/321/321H	"	"	"	"	"	"	
3	STUDBOLTS AND NUTS ASME B16.5 ANSI/ASME B18.2.2	ASME/ASTM SA/A193 B5,B6,B7,B16,B7M B8,B8M,B8T CL.1/2	Rolled	Studbolts	N.A.	N.A.	3/8"	5.1/2"	Filettatura ASME B1.1 Threaded ends:
		ASME/ASTM SA/A320 L7,L43,L7M	"	"	"	"	"	"	
		ASME/ASTM SA/A453 GR.660/A/B/C	"	"	"	"	"	"	
		ASME/ASTM SA/A194 2H,2HM,3,4,7,7M 8,8A,8M,8MA,8T,8TA	"	"	"	"	"	"	
		"	"	"	"	"	"	"	
4	STUDBOLTS AND NUTS UNI 6610 UNI 5542 UNI 5543	ASME/ASTM SA/A193 B5,B6,B7,B16,B7M B8,B8M,B8T CL.1/2	"	"	"	"	M8	M120	Filettatura UNI 5545 Threaded ends:
		ASME/ASTM SA/A320 L7,L43,L7M	"	"	"	"	"	"	
		ASME/ASTM SA/A453 GR.660/A/B/C	"	"	"	"	"	"	
		ASME/ASTM SA/A194 2H,2HM,3,4,7,7M 8,8A,8M,8MA,8T,8TA	"	"	"	"	"	"	

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CERTIFICATE

**Quality Assurance System
for Material Manufacturer
acc. to Pressure Equipment Directive 97/23/EC**

Certificate no.: 07-202-9080 WZ-1527/14 Rev. 01

**Name and address
of manufacturer:**

**I.M.L. – INDUSTRIA MECCANICA LIGURE
Via Giancarlo Farina, 25
I-16030 Casarza Ligure (GE)**

This is to certify that the manufacturer has implemented and applies a QA System.
This QA System has been subjected to a specific assessment for material acc. to Directive 97/23/EC, Annex I, Sec. 4.3, with regard to the materials mentioned within the scope of approval.

Approved:

**QA System acc. to AD2000-Merkblatt W0 and EN 764-5,
sec. 4.2**

Audit report no.:

9080AW_1527/13 / SAP No. 8111977601

Scope of approval:

**Fittings and fasteners of ferritic, ferritic-austenitic and
austenitic materials**
Details of the scope are mentioned in the annex of the
certificate AD2000-Merkblatt W0.

Production site:

I-16030 Casarza Ligure (GE)

The manufacturer disposes of the essential procedures and equipments as well as the required qualified personnel to ensure quality of manufacturing and testing the materials and products mentioned in the scope of approval.

Hamburg, 2015-01-13



Certification Body
for Pressure Equipment
of TÜV NORD Systems GmbH & Co. KG

Marrek

jNotified body, registration no. 0045

**Remark of validity:
Valid until 02.2017**

TÜV NORD Systems GmbH & Co. KG
Zertifizierungsstelle für Druckgeräte
Benannte Stelle 0045
Große Bahnstraße 31
D-22525 Hamburg/Germany

Tel. +49-(0) 40-8557-2368
Fax +49-(0) 40-8557-2710
e-mail: technikzentrum@tuev-nord.de

ZERTIFIKAT

**Qualitätssicherungs-System
für Werkstoffhersteller
nach Richtlinie 97/23/EG für Druckgeräte**

Zertifikat-Nr.: 07-202-9080 WZ-1527/14 Rev. 01

**Name und Anschrift des
Herstellers:** I.M.L. – INDUSTRIA MECCANICA LIGURE
Via Giancarlo Farina, 25
I-16030 Casarza Ligure (GE)

Hiermit wird bescheinigt, dass der Hersteller ein QS-System eingeführt hat und dies anwendet. Dieses QS-System wurde gemäß der Richtlinie 97/23/EG, Anhang I, Abschnitt 4.3 in Bezug auf die im Geltungsbereich genannten Werkstoffe einer spezifischen Überprüfung unterzogen.

Geprüft: QS-System nach AD 2000-Merkblatt W0 und
EN 764-5, Abschnitt 4.2

Prüfbericht-Nr.: 9080AW_1527/13 / SAP-Nr. 8111977601

Geltungsbereich: Formstücke und Verbindungselemente aus ferritischen,
ferritisch-austenitischen und austenitischen Werkstoffen

Einzelheiten zum Geltungsbereich sind der Anlage zum
Zertifikat AD2000-Merkblatt W0 zu entnehmen

Fertigungsstätte: I-16030 Casarza Ligure (GE)

Der Hersteller verfügt über die erforderlichen Verfahren und Einrichtungen zur qualitäts-
gesicherten Herstellung und Prüfung der im Geltungsbereich aufgeführten Erzeugnisse,
sowie über das erforderliche sachkundige Personal.

Hamburg, den 13.01.2015



Zertifizierungsstelle
für Druckgeräte
der TÜV NORD Systems GmbH & Co. KG

Marrek

Benannte Stelle (notified body), Kennnummer 0045

Gültigkeitsvermerk:

Gültig bis 02.2017

TÜV NORD Systems GmbH & Co. KG
Zertifizierungsstelle für Druckgeräte
Benannte Stelle 0045
Große Bahnstraße 31
D-22525 Hamburg/Germany

Tel. +49-(0) 40-8557-2368
Fax +49-(0) 40-8557-2710
e-mail technikzentrum@tuev-
nord.de

TÜV NORD Systems GmbH & Co. KG



Zertifizierungsstelle für Druckgeräte der TÜV NORD Systems GmbH & Co. KG (Reg.-Nr. 0045)
 Notified Body for Pressure Equipment Directive (PED), Reg. No. 0045

Geltungsbereich der Überprüfung von Werkstoffherstellern gemäß Druckgeräterichtlinie 97/23/EG, Anhang I, Abs. 4.3 und AD 2000-Merkblatt W 0
 Scope of approval for material manufacturer acc. to Pressure Equipment Directive 97/23/EC, annex I sec. 4.3 and AD 2000-Guideline W 0

Anlage zum Zertifikat / Annex to Certificate

Firma/firm: I.M.L. - Industria Meccanica Ligure S.p.A.
 Ort / place: I-16030 Casarza Ligure (GE)

DGRL-Nr.: 07-202-9080-WZ-1527/14
 AD 2000-W0-Nr.: 07-203-9080-WP-1527/14

Datum / Date : 13.01.2015
 Aktenz. / File: 9080AW_1527/15
 SAP-Nr./No. : 811977601

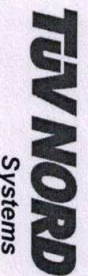
Idf.Nr No.	Werkstoffbezeichnung Material Designation	Spezifikation Specification	Lieferzustand Delivery Condition	Erzeugnisform Type of Product	Abmessung/Dimensions Dicke [mm] Thickness	Ø [mm] [kg/l]	Prüfrundlagen Anforderungen Requirements	Bemerkungen / Remarks
1	2	3	4	5	6	7	8	9
1.1	P265GH P355N, NH, NL1	EN 10253-2	N	Fittings	1)	1)		Doc.: STW-VNT-AD2000_W0_PED_Geltungsbereich-FB-320 (2014.06) Zertifiziert gemäß Druckgeräterichtlinie Anhang I, Abs. 4.3 durch die Zertifizierungsstelle der TÜV NORD Systems (Reg.-Nr. 0045) Certified acc. to PED annex I, sec. 4.3 by the notified body of TÜV NORD Systems (Reg. no. 0045). 1) According to specification in column 3.
1.2	X2CrNi19-11 (1.4306) X2CrNiMo17-12-2 (1.4404) X6CrNiTi18-10 (1.4541) X2CrNiMoN22-5-3 (1.4462) X2CrNiMoN25-7-4 (1.4410)	EN 10253-4	+AT	Fittings	1)	1)		
1.3	42CrMo4 (1.7225) 40CrMoV4-6 (1.7711) C45E (1.1191) X2CrNi18-9 (1.4307) X5CrNi18-10 (1.4301) X2CrNiMo17-12-2 (1.4404) X5CrNiMo17-12-2 (1.4401)	EN 10289	QT QT N,QT	Fasteners	1)	1)		
1.4	X2CrNi18-9 (1.4307) X5CrNi18-10 (1.4301) X2CrNiMo17-12-2 (1.4404) X5CrNiMo17-12-2 (1.4401)	EN 10272	AT AT AT AT	Fasteners	1)	1)		



Erklärungen / Explanation: +AT / AT = Lösungsgeglüht und abgeschreckt / solution heat treated and detemred; N = Normalgeglüht und normalisierend gewalzt oder umgeformt / normalized or normalizing rolled / formed;
 NT = Normalgeglüht und angelassen / normalized and annealed; +QT / V = vergütet / quenched and tempered; M = Thermo-mechanisch behandelt / thermo mechanical treated
 AR = Unbehandelt, wie gewalzt, / not treated; SR = Spannungsarmgeglüht / stress relieved; A = weichgeglüht / soft annealed; CR = Temperaturgeglüht umgeformt / controlled hot rolled
 Hinweis zu Werkstoff gem. Richtlinie 97/23/EG / Hints for materials use acc. to Directive 97/23/EC :
 Für die spezifischen Einsatzbedingungen ist die Zustimmung des Druckgerätheherstellers bzw. der zuständigen benannten Stelle erforderlich.
 The specific material operation conditions have to be approved by pressure equipment manufacturer and by the notified body in charge



TÜV NORD Systems GmbH & Co. KG



Zertifizierungsstelle für Druckgeräte der TÜV NORD Systems GmbH & Co. KG (Reg.-Nr. 0045)
 Notified Body for Pressure Equipment Directive (PED), Reg. No. 0045

Geltungsbereich der Überprüfung von Werkstoffherstellern gemäss Druckgeräterichtlinie 97/23/EG, Anhang I, Abs. 4.3 und AD 2000-Merkblatt W 0
 Scope of approval for material manufacturer acc. to Pressure Equipment Directive 97/23/EC, annex I sec. 4.3 and AD 2000-Guideline W 0

Anlage zum Zertifikat / Annex to Certificate

Firma/firm: I.M.L. - Industria Meccanica Ligure S.p.A.
 Ort / place: I-16030 Casarza Ligure (GE)

DGRL-Nr.: 07-202-9080-WZ-1527/14
 AD 2000-WO-Nr.: 07-203-9080-WP-1527/14

Datum / Date : 13.01.2015
 Aktenz. / File: 9080AW_1527/15
 SAP-Nr./No. : 8111977601

Id.Nr	Werkstoffbezeichnung Material Designation	Spezifikation Specification	Lieferzust. Delivery Condition	Erzeugnisform Type of Product	Abmessung/Dimensions Dicke [mm] Thickness	Ø[mm] [kg/t]	Prüfrundlagen Anforderungen Requirements	Bemerkungen / Remarks Dec.: STW-WT-AD2000_W0_PED_Geltungsbereich-FB-320 (2014-08)
1								9
2.1	P265GH P355N, NH, NL1	EN 10253-2	N	Fittings	2)	2)	AD 2000 Mbl HP/83	Zertifiziert gemäß Druckgeräterichtlinie Anhang I, Abs. 4.3 durch die Zertifizierungsstelle der TÜV NORD Systems (Reg.-Nr. 0045) Certified acc. to PED annex I, sec. 4.3 by the notified body of TÜV NORD Systems (Reg. no. 0045).
2.2	X2CrNi19-11 (1.4306) X2CrNiMo17-12-2 (1.4404) X6CrNiTi18-10 (1.4541) X2CrNiMoN22-5-3 (1.4462) X2CrNiMoN25-7-4 (1.4410)	EN 10253-4	+AT	Fittings	2)	2)	AD 2000 Mbl HP/83	
2.3	42CrMo4 (1.7225) X2CrNi18-9 (1.4307) X5CrNi18-10 (1.4301) X2CrNiMo17-12-2 (1.4404) X5CrNiMo17-12-2 (1.4401)	EN 10269	QT AT AT AT AT	Fasteners	2)	2)	AD 2000 Mbl W7 AD 2000 Mbl W2	2) According to specification in columns 3 and 8.
2.4	X2CrNi18-9 (1.4307) X5CrNi18-10 (1.4301) X2CrNiMo17-12-2 (1.4404) X5CrNiMo17-12-2 (1.4401)		AT AT AT AT	Fasteners	2)	2)	AD 2000 Mbl W2	



Erläuterungen / Explanation: *AT / AT = Lösungsgeglüht und abgeschreckt / solution heat treated and detemred; N = Normalgeglüht und normalisierend gewalzt oder umgeformt / normalized or normalizing rolled / formed;
 NT = Normalgeglüht und angelassen / normalized and annealed; *QT / V = vergütet / quenched and tempered; M = Thermo-mechanisch behandelt / thermo mechanical treated
 AR = Unbehandelt, wie gewalzt. / not treated; SR = Spannungsarmgeglüht / stress relieved; A = weichgeglüht / soft annealed; CR = Temperaturgeregelte umgeformt / controlled hot rolled





The challenge of constantly improving our reliability in both Service and quality is today the main goal for our Company.



OIL AND CHEMICAL COMPANIES

ADNOC
AGIP PETROLI
AMERADA HESS
ARAMCO
AVESTA SHEFFIELD
BAPCO
B.P.
CHEVRON
CHIYODA
CONOCO
DOW CHEMICAL
ENICHEM
ERG
EXXON
FINA
GULF
HYDRO
I.C.I.
K.N.P.C.
K.O.C.
MOBIL OIL
NESTE OY
N.I.O.C.
NORSOK
NOVA CANADA
PDO
PETROBRAS
PETROCANADA
PETRONAS
Q8 QATAR GAS
QGPC
REPSOL PETROLEO
SAUDI ARAMCO
SHELL
STATO IL
TEXACO
ZADCO

ENGINEERING COMPANIES

ABB-LUMMUS
ANSALDO
BECHTEL
BROWN & ROOT
CHIYODA
FLUOR
FOSTER WHEELER
HYUNDAI ENG.
J.G.C. CO.
JOHN BROWN ENG. & CONST.
KELLOGG
KVAERNER
LINDE
MANNESMAN
SAIPEM
SAMSUNG
SNAMPROGETTI
STONE & WEBSTER
TECHNIP
TECHNIPETROL
THE RALPH M. PARSON







CHAPTER 1

HIGH PRESSURE FORGED STEEL FITTINGS THREADED TYPE



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

A. TYPE

Forged fittings production includes the following range:

90° and 45° Elbows	Couplings	Hexagonal Nipples	Hex. Head Plugs
Female/Male Elbows	Red. Couplings	Red. Hex. Nipples	Square Head Plugs
Tees	Half Couplings	Hexagonal Bushings	Round Head Plugs
Crosses	Caps	Bosses	

B. DIMENSIONS

IML SPA produces forged threaded fittings according to **ASME B16.11 & BS 3799**.

Thread is in accordance with ANSI/ASME B1.20.1.

Threaded fittings are supplied according to classes 2000 - 3000 - 6000.

The relation between fitting class and the pipe schedule is as follows:

Class	2000	Schedule	80 / XS
Class	3000	Schedule	160
Class	6000	Schedule	XXS

IML standard production provides dimensions starting from 1/8" up to 4".

IML is in a position to supply fittings out of its standard range only upon request.

C. MATERIAL

IML produces forged fittings according to the following standards:

ASTM A105	Carbon Steel Forgings.
ASTM A182	Forged or Rolled Alloy-Steel Forged Fittings.
ASTM A350	Carbon and Low-Alloy Steel Forgings.
ASTM B564	Nickel Alloy Forgings.

D. MARKING

IML marks its production in accordance to the standards required:

ASME	B16.11	Forged Fittings Socket-Welding and Threaded.
BSI	BS 3799	Steel Pipe Fittings threaded and socket-welding.
MSS	SP25	Standard Marking System.
ASTM		A105-A182-A350-B564

IML standard marking provides:

Brand	Country of origin	Standard	Dimension	Class	Material	Heat n° / Code
e.g.:						
IML	ITALY	B16	1	3000	SA/A105N	Heat n° / Code
IML	ITALY	B16	1.1/2	3000	SA/A182 F316/F316L	Heat n° / Code

For hexagonal head plugs, round head plugs, square head plugs and bushing class stamping is not required.

They can be used up to class 6000.

IML is in a position to make different stamping only upon specific request during order.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings Alloy and low alloy fittings Stainless Steel fittings	Phosphatizing treatment - Oil treatment Oil treatment Pickling treatment
--	---

IML is able to supply upon request fittings with special protection such as:

ARC zinc-coated Hot dip Galvanizing Cadmium plated PTFE coating	According to ASTM B633 According to ASTM A153 According to ASTM B766 According to CUSTOMER'S INDICATIONS
--	---

G. PACKING

IML packing is made in **CARTONS** or **BAGS**.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N° 25
Type of product	90° ELBOWS
Dimension	1.1/2"
Class designation	3000
Threading normative and type	ANSI/ASME B1.20.1 - NPT
Material type and grade	ASTM A105N
Dimension normative	ASME B16.11
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	

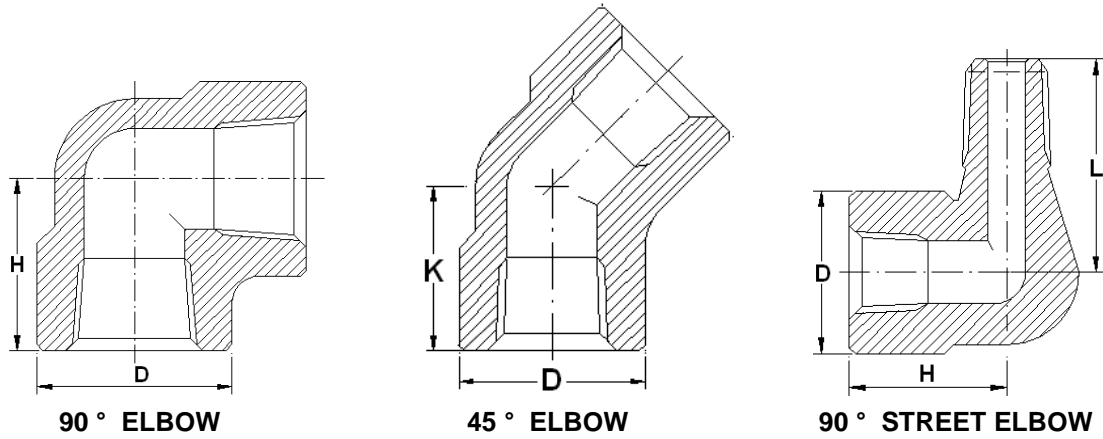
I. USEFUL INFORMATION

MAINTENANCE

- Keep supplied pieces in the IML original packing
- Do not store pieces in damp areas
- Do not store pieces in contact with water
- Handle all threaded parts with care



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



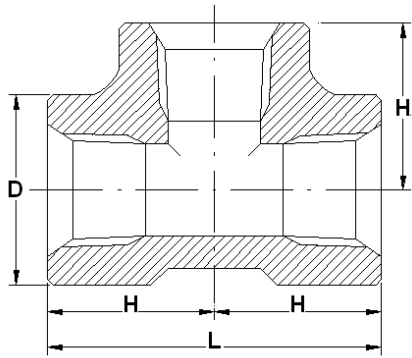
CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
2000	D	MM		26	26	33	38	46	56	62	76	92	110	146
		INCH		1.02	1.02	1.29	1.5	1.81	2.2	2.44	2.99	3.62	4.33	5.75
	H	MM		25	25	29	34	38	45	51	60	76	85	106
		INCH		0.98	0.98	1.14	1.34	1.5	1.77	2.01	2.36	2.99	3.35	4.17
	L	MM		20	20	23	26	29	33	37	43	52	62	76
		INCH		0.79	0.79	0.91	1.02	1.14	1.3	1.46	1.69	2.05	2.44	2.99
3000	D	MM	26	26	33	38	46	56	62	76	84	102	121	153
		INCH	1.02	1.02	1.3	1.5	1.81	2.2	2.44	2.99	3.31	4.02	4.76	6.02
	H	MM	25	25	29	34	38	45	51	60	63	82	95	114
		INCH	0.98	0.98	1.14	1.34	1.5	1.77	2.01	2.36	2.48	3.23	3.74	4.49
	K	MM	20	20	23	26	29	33	37	43	47	56	66	80
		INCH	0.79	0.79	0.91	1.02	1.14	1.3	1.46	1.69	1.85	2.2	2.6	3.15
L	MM	32	32	38	42	48	57	67	72	84				
	INCH	1.26	1.26	1.5	1.65	1.89	2.24	2.64	2.83	3.31				
6000	D	MM		33	38	46	56	62	76	84	102	121	146	153
		INCH		1.3	1.5	1.81	2.2	2.44	2.99	3.31	4.02	4.76	5.75	6.02
	H	MM		29	34	38	45	51	60	63	82	95	106	114
		INCH		1.14	1.34	1.5	1.77	2.01	2.36	2.48	3.23	3.74	4.17	4.49
	K	MM		23	26	29	33	37	43	47	56	66	76	80
		INCH		0.91	1.02	1.14	1.3	1.46	1.69	1.85	2.2	2.6	2.99	3.15

WEIGHTS:
SEE CHAPTER 9 PAGE 2

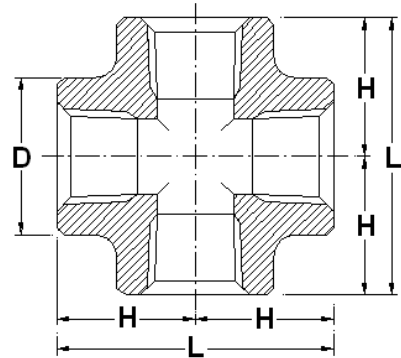
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
THREADS: ANSI-ASME B1.20.1



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



TEE



CROSS

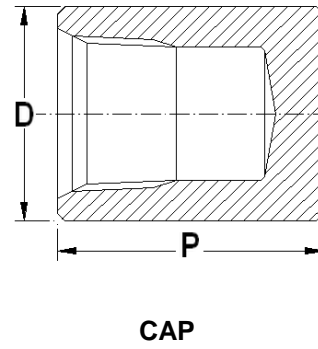
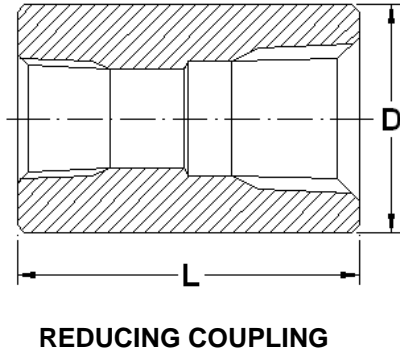
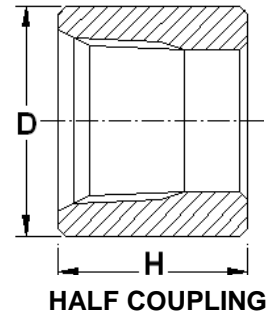
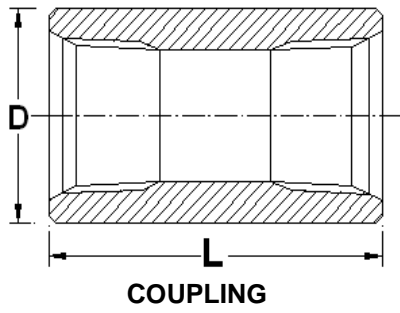
CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
2000	D	MM		26	26	33	38	46	56	62	76	92	110	146
		INCH		1.02	1.02	1.3	1.5	1.81	2.2	2.44	2.99	3.62	4.33	5.75
	H	MM		25	25	29	34	38	45	51	60	76	85	106
		INCH		0.98	0.98	1.14	1.34	1.5	1.77	2.01	2.36	2.99	3.35	4.173
	L	MM		50	50	58	68	76	90	102	120	152	170	212
		INCH		1.97	1.97	2.28	2.68	2.99	3.54	4.02	4.72	5.98	6.69	8.35
3000	D	MM	26	26	33	38	46	56	62	76	84	102	121	153
		INCH	1.02	1.02	1.3	1.5	1.81	2.2	2.44	2.99	3.31	4.02	4.76	6.02
	H	MM	25	25	29	34	38	45	51	60	63	82	95	114
		INCH	0.98	0.98	1.14	1.34	1.5	1.77	2.01	2.36	2.48	3.23	3.74	4.49
	L	MM	50	50	58	68	76	90	102	120	126	164	190	228
		INCH	1.97	1.97	2.28	2.68	2.99	3.54	4.02	4.72	4.96	6.46	7.48	8.98
6000	D	MM		33	38	46	56	62	76	84	102	121	146	153
		INCH		1.3	1.5	1.81	2.2	2.44	2.99	3.31	4.02	4.76	5.75	6.02
	H	MM		29	34	38	45	51	60	63	82	95	106	114
		INCH		1.14	1.34	1.50	1.77	2.01	2.36	2.48	3.23	3.74	4.17	4.49
	L	MM		58	68	76	90	102	120	152	164	190	212	228
		INCH		2.28	2.68	2.99	3.54	4.02	4.72	5.98	6.46	7.48	835	8.98

WEIGHTS:
SEE CHAPTER 9 PAGE 2

IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
THREADS: ANSI-ASME B1.20.1



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



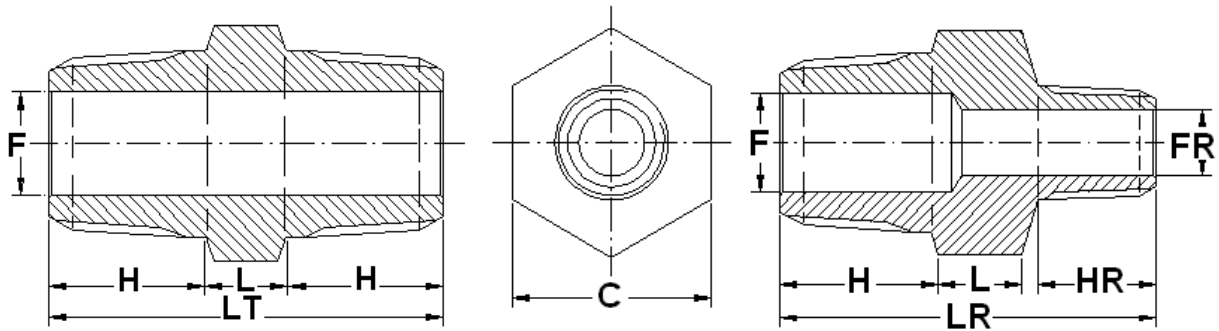
CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
3000	D	MM	19	19	22	29	35	45	57	64	76	92	108	140	
		INCH	0.75	0.75	0.87	1.14	1.38	1.77	2.24	2.52	2.99	3.62	4.25	5.51	
	L	MM	32	35	38	48	51	61	67	80	86	92	108	121	
		INCH	1.26	1.38	1.5	1.89	2.01	2.4	2.64	3.15	3.39	3.62	4.25	4.76	
	H	MM	16	18	19	24	26	31	34	40	43	46	54	61	
		INCH	0.63	0.71	0.75	0.94	1.02	1.22	1.34	1.57	1.69	1.81	2.13	2.4	
	P	MM	23	27	29	36	38	41	45	45	48	61	65	69	
		INCH	0.91	1.06	1.14	1.42	1.5	1.61	1.77	1.77	1.89	2.4	2.56	2.72	
	6000	D	MM		26	32	38	45	57	64	76	92	108	127	159
			INCH		1.02	1.26	1.5	1.77	2.24	2.52	2.99	3.62	4.25	5	6.26
		L	MM		35	38	48	51	60	67	80	86	92	108	121
			INCH		1.38	1.50	1.89	2.01	2.36	2.64	3.15	3.39	3.62	4.25	4.76
H		MM		18	19	24	26	31	34	40	43	46	54	61	
		INCH		0.71	0.75	0.94	1.02	1.22	1.34	1.57	1.69	1.81	2.13	2.40	
P		MM		28	28	34	38	43	46	48	51				
		INCH		1.10	1.10	1.34	1.50	1.69	1.81	1.89	2.01				

WEIGHTS:
SEE CHAPTER 9 PAGE 3

IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
THREADS: ANSI-ASME B1.20.1

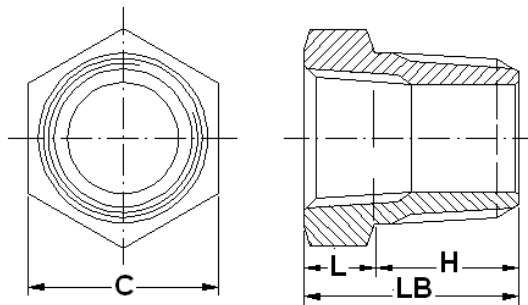


STEEL FITTINGS FOR HIGH PRESSURE SERVICE



HEXAGONAL NIPPLE

REDUCING HEXAGONAL NIPPLE



REDUCING BUSHING M/F

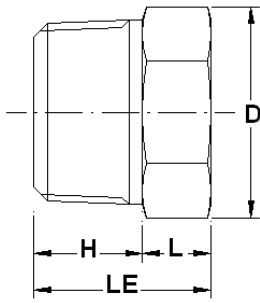
CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
3000	C	MM	11	17	19	22	27	36	46	51	64	76	92	118
		INCH	0.43	0.67	0.75	0.87	1.06	1.42	1.81	2.01	2.52	2.99	3.62	4.65
	H	MM	12	17	18	22	23	28	29	29	30	42	43	46
		INCH	0.47	0.67	0.71	0.87	0.91	1.10	1.14	1.14	1.18	1.65	1.69	1.81
	L	MM	7	8	9	10	11	12	15	16	18	19	20	32
		INCH	0.28	0.31	0.35	0.39	0.43	0.47	0.59	0.63	0.71	0.75	0.79	1.26
	FR	=F of the D.N. of reducing end												
	HR	=H of the D.N. of reducing end												
6000	LT	MM	31	42	45	54	57	68	73	74	78	103	106	124
		INCH	1.22	1.65	1.77	2.13	2.24	2.68	2.87	2.91	3.07	4.05	4.17	4.88
	LR	Variable length working the reduction												
	LB	MM		25	27	32	34	40	44	45	48	61	63	78
INCH			0.98	1.06	1.26	1.34	1.57	1.73	1.77	1.89	2.40	2.48	3.07	
3000	F	MM	5	7	10	11	15	20	29	33.5	42.5	53.5	66	87
		INCH	0.20	0.28	0.39	0.43	0.59	0.79	1.14	1.32	1.67	2.11	2.60	3.42
6000	F	MM	3	4	5	6	11	15	22.5	27.5	38	45	58	80
		INCH	0.12	0.16	0.20	0.24	0.43	0.59	0.89	1.08	1.50	1.77	2.28	3.15

WEIGHTS:
SEE CHAPTER 9 PAGE 3,5,6

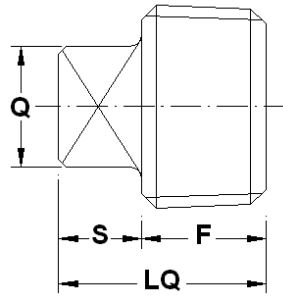
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
THREADS: ANSI-ASME B1.20.1
BUSHINGS ARE NOT IDENTIFIED BY CLASS,
THEY MAY BE USED FOR RATINGS UP TO CLASS 6000.



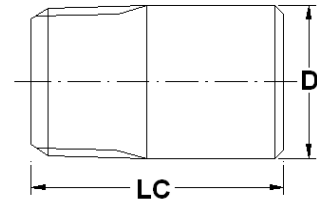
STEEL FITTINGS FOR HIGH PRESSURE SERVICE



**HEXAGONAL
HEAD PLUG**



**SQUARE
HEAD PLUG**



**ROUND
HEAD PLUG**

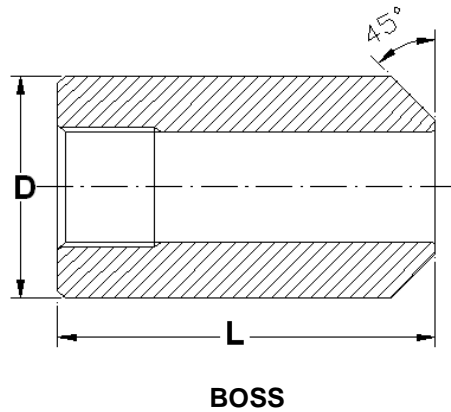
NOMINAL SIZE													
		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
D	MM	11	16	19	22	27	36	46	51	64	76	92	118
	INCH	0.43	0.63	0.75	0.87	1.06	1.42	1.81	2.01	2.52	2.99	3.62	4.65
H	MM	12	17	18	22	22	28	28	29	30	44	45	48
	INCH	0.47	0.67	0.71	0.87	0.87	1.1	1.1	1.14	1.18	1.73	1.77	1.89
L	MM	7	8	9	10	11	12	15	16	18	19	20	32
	INCH	0.28	0.31	0.35	0.39	0.43	0.47	0.59	0.63	0.71	0.75	0.79	1.26
LE	MM	19	25	27	32	33	40	43	45	48	63	65	80
	INCH	0.75	0.98	1.06	1.26	1.3	1.57	1.69	1.77	1.89	2.48	2.56	3.15
Q	MM	7	10	12	14	16	24	28	30	36	38	52	65
	INCH	0.28	0.39	0.47	0.55	0.63	0.94	1.1	1.18	1.42	1.5	2.05	2.56
F	MM	10	15	16	20	20	25	26	26	27	30	32	35
	INCH	0.39	0.59	0.63	0.79	0.79	0.98	1.02	1.02	1.06	1.18	1.26	1.38
S	MM	7	7	8	10	11	13	15	16	18	19	22	32
	INCH	0.28	0.28	0.31	0.39	0.43	0.51	0.59	0.63	0.71	0.75	0.87	1.26
LQ	MM	17	22	24	30	31	38	41	42	45	49	54	67
	INCH	0.67	0.87	0.94	1.18	1.22	1.5	1.61	1.65	1.77	1.93	2.13	2.64
D	MM	10.3	13.8	17.2	21.4	26.7	33.4	42.2	48.3	60.4	73	89	114.3
	INCH	0.41	0.54	0.68	0.84	1.05	1.31	1.66	1.9	2.38	2.87	3.5	4.5
LC	MM	35	42	42	45	45	51	51	51	64	70	70	76
	INCH	1.38	1.65	1.65	1.77	1.77	2.01	2.01	2.01	2.52	2.76	2.76	2.99

WEIGHTS:
SEE CHAPTER 9 PAGE 3

IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
THREADS: ANSI-ASME B1.20.1
PLUGS ARE NOT IDENTIFIED BY CLASS,
THEY MAY BE USED FOR RATINGS UP TO CLASS 6000.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



CLASS DESIGN.	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/2"	2"
			3000	D	MM	19	22	29	35
INCH	0.75	0.87			1.14	1.38	1.77	2.52	2.99
L	MM	41		45	51	51	51	51	51
	INCH	1.61		1.77	2.01	2.01	2.01	2.01	2.01
6000	D	MM			38	45	60	76	95
		INCH			1.50	1.77	2.36	2.99	3.74
	L	MM			51	51	51	51	51
		INCH			2.01	2.01	2.01	2.01	2.01

WEIGHTS:
SEE CHAPTER 9 PAGE 3

IN ACCORDANCE WITH BS 3799
THREADS: ANSI-ASME B1.20.1





CHAPTER 2

HIGH PRESSURE FORGED STEEL FITTINGS SOCKET WELD TYPE



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

A. TYPE

Forged fittings production includes the following range:

90° and 45 ° Elbows	Couplings	Bosses
Tees	Red. Couplings	Caps
Crosses	Half Couplings	

B. DIMENSIONS

Sockets dimensions are in accordance with **ASME B16.11 e BS 3799**.
Socket weld fittings are supplied in accordance with classes 3000 - 6000 - 9000.
The relation between fitting class and the pipe schedule is as follows:

Class	3000	Schedule	80 / XS
Class	6000	Schedule	160
Class	9000	Schedule	XXS

IML standard production provides dimensions starting from 1/8" up to 4".
IML is in a position to supply fittings out of its standard range only upon request.

C. MATERIAL

IML produces forged fittings according to the following standards:

ASTM A105	Carbon Steel Forgings.
ASTM A182	Forged or Rolled Alloy-Steel Forged Fittings.
ASTM A350	Carbon and Low-Alloy Steel Forgings.
ASTM B564	Nickel Alloy Forgings.

D. MARKING

IML marks its production in accordance to the standards required:

ASME	B16.11	Forged Fittings Socket-Welding and Threaded.
BSI	BS 3799	Steel Pipe Fittings threaded and socket-welding.
MSS	SP25	Standard Marking System.
ASTM		A105-A182-A350-B564

IML **standard** marking provides:

Brand	Country of origin	Standards	Dimension	Class	Material	Heat n°/ Code
e.g.:						
IML	ITALY	B16	1	3000	SA/A105N	Heat n°/ Code
IML	ITALY	B16	1.1/2	3000	SA/A182 F316/F316L	Heat n°/ Code

IML is in a position to make different stamping only upon specific request during order.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings	Phosphatizing treatment - Oil treatment
Alloy and low alloy fittings	Oil treatment
Stainless Steel fittings	Pickling treatment

IML is able to supply upon request fittings with special protection such as:

ARC zinc-coated	According to ASTM B633
Cadmium plated	According to ASTM B766
Hot dip Galvanizing	According to ASTM A153
PTFE coating	According to CUSTOMER'S INDICATIONS

G. PACKING

IML packing is made in CARTONS or BAGS.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N°25
Type of product	90° ELBOWS
Dimension	1.1/2"
Class designation	3000
Threading normative and type	Socket weld (SW)
Material type and grade	ASTM A105N
Dimension normative	ASME B16.11
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
request for specific certification by external Bodies	

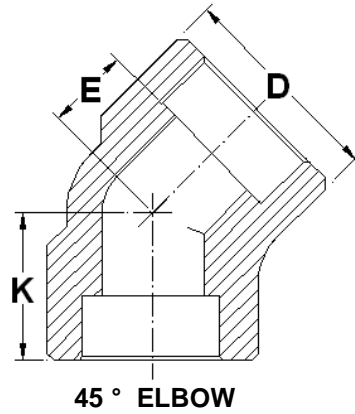
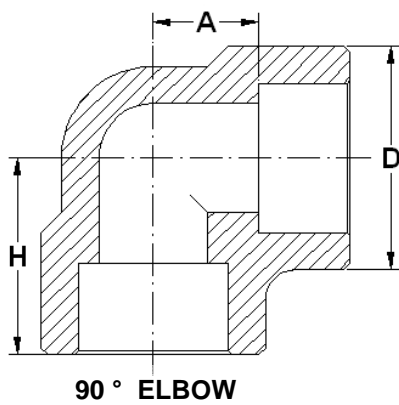
I. USEFUL INFORMATION

MAINTENANCE

- Keep supplied pieces in the IML original packing
- Do not store pieces in damp areas
- Do not store pieces in contact with water



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



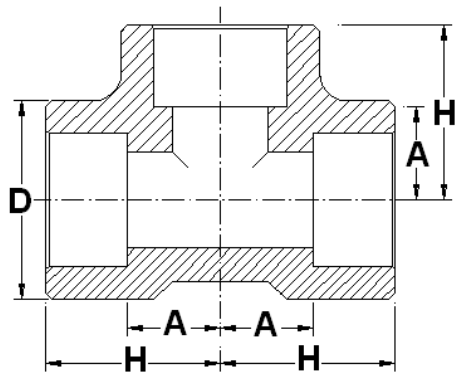
CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
3000	D	MM	26	26	33	38	46	56	62	76	92	110	146	
		INCH	1.02	1.02	1.30	1.50	1.81	2.20	2.44	2.99	3.62	4.33	5.75	
	H	MM	25	25	29	34	38	45	51	60	63	85	106	
		INCH	0.98	0.98	1.14	1.34	1.50	1.77	2.01	2.36	2.48	3.35	4.17	
	A	MM	11	14	16	19	22	27	32	38	54	57	67	
		INCH	0.43	0.55	0.63	0.75	0.87	1.06	1.26	1.50	2.12	2.24	2.64	
	K	MM	18	20	23	26	29	33	37	43	52	62	76	
		INCH	0.71	0.79	0.91	1.02	1.14	1.30	1.46	1.69	2.05	2.44	2.99	
	E	MM	8	9	11	13	15	17	21	26	29	32	41	
		INCH	0.31	0.35	0.43	0.51	0.59	0.67	0.83	1.02	1.14	1.26	1.51	
	6000	D	MM	26	33	38	46	56	62	76	84	102	121	
			INCH	1.02	1.30	1.50	1.81	2.20	2.44	2.99	3.31	4.02	4.76	
H		MM	25	29	34	38	45	51	60	63	82	95		
		INCH	0.98	1.14	1.34	1.50	1.77	2.01	2.362	2.48	3.23	3.74		
A		MM	14	16	19	22	27	32	38	41	57	64		
		INCH	0.55	0.63	0.75	0.87	1.06	1.26	1.50	1.61	2.24	2.52		
K		MM	20	23	26	29	33	37	43	47	56	66		
		INCH	0.79	0.91	1.02	1.14	1.30	1.46	1.69	1.85	2.20	2.60		
E		MM	8	11	13	15	17	21	26	29	32	41		
		INCH	0.31	0.43	0.51	0.59	0.67	0.83	1.02	1.14	1.26	1.61		

WEIGHTS:
SEE CHAPTER 9 PAGE 4

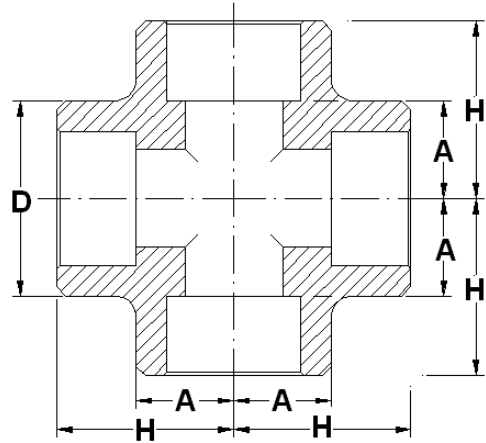
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
CLASS 9000 FITTINGS WILL BE SUPPLIED ON REQUEST



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



TEE



CROSS

WEIGHTS:
SEE CHAPTER 9 PAGE 4

IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
CLASS 9000 FITTINGS WILL BE SUPPLIED ON REQUEST

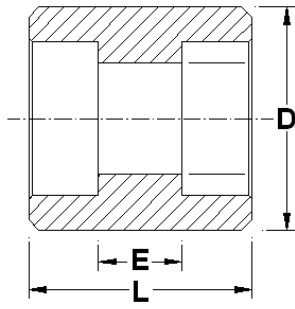
CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
3000	D	MM	26	26	33	38	46	56	62	76	92	110	146
		INCH	1.02	1.02	1.30	1.50	1.81	2.20	2.44	2.99	3.62	4.33	5.75
	H	MM	25	25	29	34	38	45	51	60	63	85	106
		INCH	0.98	0.98	1.14	1.34	1.50	1.77	2.01	2.36	2.48	3.35	4.17
	A	MM	11	14	16	19	22	27	32	38	54	57	67
		INCH	0.43	0.55	0.63	0.75	0.87	1.06	1.26	1.50	2.12	2.24	2.64
6000	D	MM	26	33	38	46	56	62	76	84	102	121	
		INCH	1.02	1.30	1.50	1.81	2.20	2.44	2.99	3.30	4.02	4.76	
	H	MM	25	29	34	38	45	51	60	63	82	95	
		INCH	0.98	1.14	1.34	1.50	1.77	2.01	2.36	2.48	3.23	3.74	
	A	MM	14	16	19	22	27	32	38	41	57	64	
		INCH	0.55	0.63	0.75	0.87	1.06	1.26	1.50	1.61	2.24	2.52	

WEIGHTS:
SEE CHAPTER 9 PAGE 4,5

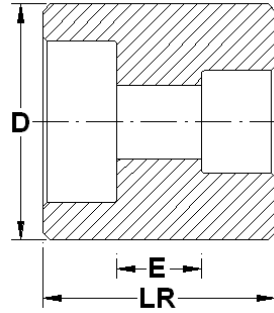
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
CLASS 9000 FITTINGS WILL BE SUPPLIED ON REQUEST



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



COUPLING



REDUCING COUPLING

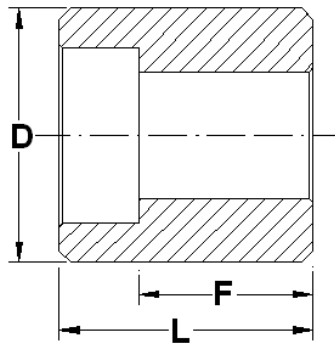
CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
3000	D	mm	18	22	26	32	38	46	55	62	76	92	110	138
		INCH	0.71	0.87	1.02	1.26	1.5	1.81	2.16	2.44	2.99	3.62	4.33	5.43
6000	D	mm				35	42	51	60	68	84	95	115	
		INCH				1.38	1.65	2.01	2.36	2.68	3.31	3.74	4.53	
3000 / 6000	E	mm	6.5	6.5	6.5	11	11	15	16	17	19	19	19	19
		INCH	0.26	0.26	0.26	0.43	0.43	0.59	0.63	0.67	0.75	0.75	0.75	0.75
	L	mm	26.5	26.5	26.5	31	37	41	42	43	51	51	51	57
		INCH	1.04	1.04	1.04	1.22	1.46	1.61	1.65	1.69	2.01	2.01	2.01	2.24
	1/8"	mm		26.5	26.5									
		INCH		1.04	1.04									
	1/4"	mm			26.5	30	34							
		INCH			1.04	1.18	1.34							
	3/8"	mm				30	34	38						
		INCH				1.18	1.34	1.5						
	1/2"	mm					34	41	39	36	48			
		INCH					1.34	1.61	1.53	1.42	1.89			
	3/4"	mm						41	42	39	48			
		INCH						1.61	1.65	1.53	1.89			
	1"	mm							42	39	48			
		INCH							1.65	1.53	1.89			
	1.1/4"	mm								39	48			
		INCH								1.53	1.89			
	1.1/2"	mm									48			
		INCH									1.89			
2"	mm													
	INCH													

WEIGHTS:
SEE CHAPTER 9 PAGE 4

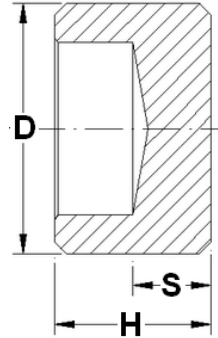
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
CLASS 9000 FITTINGS WILL BE SUPPLIED ON REQUEST



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



HALF COUPLING



CAP

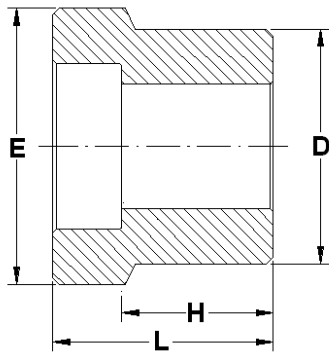
CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
3000	D	mm	22	26	32	38	46	55	62	76	92	110	138	
		INCH	0.87	1.02	1.26	1.5	1.81	2.16	2.44	2.99	3.62	4.33	5.43	
	F	mm	16	17.5	21	24	28	29	30	41	43	44.5	48	
		INCH	0.63	0.69	0.83	0.94	1.1	1.14	1.18	1.61	1.69	1.75	1.89	
	L	mm	26	27.5	31	37	41	42	43	57	59	60.5	67	
		INCH	1.02	1.08	1.22	1.46	1.61	1.65	1.69	2.24	2.32	2.38	2.64	
	S	mm	7	7	8	10	12	13	15	18	21	24		
		INCH	0.28	0.28	0.31	0.39	0.47	0.51	0.59	0.71	0.83	0.94		
	H	mm	17.5	17.5	20	25	27	28	30	36	37	40		
		INCH	0.69	0.69	0.79	0.98	1.06	1.1	1.18	1.42	1.46	1.57		
	6000	D	mm			35	42	51	60	68	84	95	115	
			INCH			1.38	1.65	2.01	2.36	2.68	3.31	3.74	4.53	
F		mm			21	24	28	29	30	41	43	44.5		
		INCH			0.83	0.94	1.1	1.14	1.18	1.61	1.69	1.75		
L		mm			31	37	41	42	43	57	59	60.5		
		INCH			1.22	1.46	1.61	1.65	1.69	2.24	2.32	2.38		
S		mm			12	13	15	18	20	24	29	34		
		INCH			0.47	0.51	0.59	0.71	0.79	0.94	1.14	1.34		
H		mm			23.5	26	28	33	35	40	45	50		
		INCH			0.92	1.02	1.1	1.3	1.38	1.57	1.77	1.97		

WEIGHTS:
SEE CHAPTER 9 PAGE 4

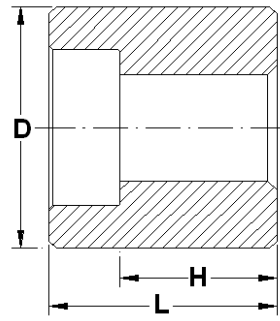
IN ACCORDANCE WITH ANSI-ASME B16.11 / BS 3799
CLASS 9000 FITTINGS WILL BE SUPPLIED ON REQUEST



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



REDUCING INSERT TYPE 1



REDUCING INSERT TYPE 2

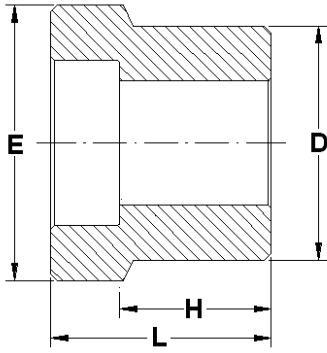
NOMINAL SIZE	RED. SIZE	CLASS DESIGNATION												
		3000						6000						
		TYPE		D	H	L	E	TYPE		D	H	L	E	
3/8"	1/4"	1	MM	17.1	19	29	18	1	MM	17.1	21.3	31.5	19	
			INCH	0.675	0.75	1.13	0.714		INCH	0.675	0.84	1.22	0.746	
1/2"	1/4"	1	MM	21.3	20.5	31	18	1	MM	21.3	20.5	30.5	19	
			INCH	0.84	0.81	1.19	0.746		INCH	0.84	0.81	1.19	0.746	
	3/8"	1	MM	21.3	20.5	31	22	1	MM	21.3	23.1	33.5	22	
			INCH	0.84	0.81	1.19	0.858		INCH	0.84	0.91	1.29	0.898	
3/4"	1/4"	2	MM	26.7	17.5	27		2	MM	26.7	22.3	33		
			INCH	1.05	0.69	1.06			INCH	1.050	0.88	1.26		
	3/8"	2	MM	26.7	15.7	27		1	MM	26.7	22.4	32.5	23	
			INCH	1.050	0.62	1.06			INCH	1.050	0.88	1.26	0.898	
	1/2"	1	MM	26.7	22.4	32.5	27	1	MM	26.7	25.4	35.5	28	
			INCH	1.050	.88	1.26	1.049		INCH	1.050	1.00	1.38	1.10	
1"	1/4"	2	MM	33.4	19	28.5		2	MM	33.4	23.9	34		
			INCH	1.315	0.75	1.12			INCH	1.315	0.94	1.31		
	3/8"	2	MM	33.4	17.5	28.5		2	MM	33.4	22.3	33		
			INCH	1.315	0.69	1.12			INCH	1.315	0.88	1.31		
	1/2"	2	MM	33.4	15.7	28.5		1	MM	33.4	28.4	28.038.5	28.0	
			INCH	1.315	0.62	1.12			INCH	1.315	1.12	1.50	1.10	
	3/4"	1	MM	33.4	23.9	37.00	32.5	1	MM	33.4	28.4	41.5	34.5	
			INCH	1.315	0.94	1.44	1.268		INCH	1.315	1.12	1.62	1.349	
	1.1/4"	1/4"	2	MM	42,1	22,4	32		2	MM	42,1	25,4	35	
				INCH	1,66	0,88	1,25			INCH	1,66	1	1,37	
		3/8"	2	MM	42,1	20,5	32		2	MM	42,1	23,9	35	
				INCH	1,66	0,81	1,25			INCH	1,66	0,94	1,37	
1/2"		2	MM	42,1	19	32		2	MM	42,1	22,3	35		
			INCH	1,66	0,75	1,25			INCH	1,66	0,88	1,37		
3/4"		2	MM	42,1	17,5	32		2	MM	42,1	20,5	35		
			INCH	1,66	0,69	1,25			INCH	1,66	0,81	1,37		
1"		1	MM	42,1	25,4	38,5	40	1	MM	42,1	30,2	43,5	42	
			INCH	1,66	1	1,5	1,564		INCH	1,66	1,19	1,69	1,652	
1.1/2"	3/8"	2	MM	48,2	22,4	33,5		2	MM	48,2	28,5	40		
			INCH	1,9	0,88	1,31			INCH	1,9	1,12	1,56		
	1/2"	2	MM	48,2	20,5	33,5		2	MM	48,2	26,9	40		
			INCH	1,9	0,81	1,31			INCH	1,9	1,06	1,56		
	3/4"	2	MM	48,2	19	33,5		2	MM	48,2	25,4	40		
			INCH	1,9	0,75	1,31			INCH	1,9	1	1,56		
	1"	2	MM	48,2	17,5	33,5		1	MM	48,2	29,2	42,5	42	
			INCH	1,9	0,69	1,31			INCH	1,9	1,15	1,65	1,652	
	1.1/4"	1	MM	48,2	28,5	41,5	49	1	MM	48,2	35	48	51	
			INCH	1,9	1,12	1,62	1,924		INCH	1,9	1,38	1,88	1,997	

WEIGHTS:
SEE CHAPTER 9 PAGE 7

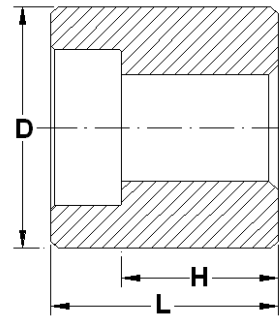
IN ACCORDANCE WITH MSS SP79



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



REDUCING INSERT TYPE 1



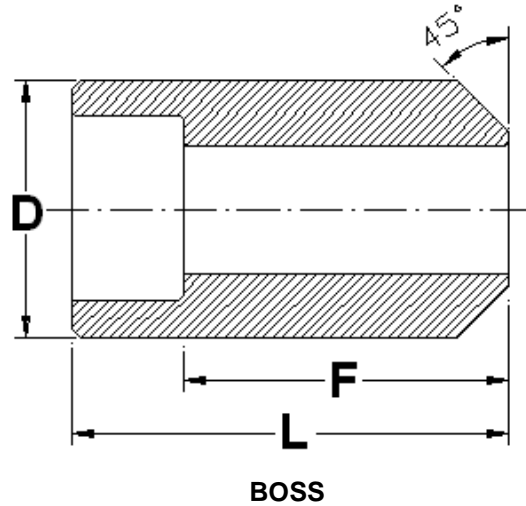
REDUCING INSERT TYPE 2

NOMINAL SIZE	RED. SIZE	CLASS DESIGNATION													
		3000						6000							
		TYPE		D	H	L	E	TYPE		D	H	L	E		
2"	1/2"	2	MM	60,3	25,4	38		2	MM	60,3	28,5	41			
			INCH	2,375	1	1,5			INCH	2,375	1,12	1,62			
	3/4"	2	MM	60,3	23,9	38		2	MM	60,3	26,9	41			
			INCH	2,375	0,94	1,5			INCH	2,375	1,06	1,62			
	1"	2	MM	60,3	22,4	38		2	MM	60,3	25,4	41			
			INCH	2,375	0,88	1,5			INCH	2,375	1	1,62			
	1.1/4"	2	MM	60,3	20,5	38		2	MM	60,3	23,9	41			
	INCH		2,375	0,81	1,5		INCH		2,375	0,94	1,62				
	1.1/2"	1	MM	60,3	31,8	45	55	1	MM	60,3	38,9	52	58		
	INCH		2,375	1,25	1,75	2,175	INCH		2,375	1,53	2,03	2,276			
2.1/2"	3/4"	2	MM	73	39,6	54		2	MM	73	28,5	41			
			INCH	2,875	1,56	2,12			INCH	2,875	1,12	1,62			
	1"	2	MM	73	38,1	54		2	MM	73	26,9	41			
			INCH	2,875	1,5	2,12			INCH	2,875	1,06	1,62			
	1.1/4"	2	MM	73	36,5	54		2	MM	73	25,4	41			
	INCH		2,875	1,44	2,12		INCH		2,875	1	1,62				
	1.1/2"	2	MM	73	35	54		2	MM	73	23,9	41			
	INCH		2,875	1,38	2,12		INCH		2,875	0,94	1,62				
	2"	1	MM	73	46	62	68,5	1	MM	73	38,9	52	58		
			INCH	2,875	1,81	2,43	2,689		INCH	2,875	1,53	2,03	2,276		
3"	1"	2	MM	88,9	31,8	47,5		2	MM	88,9	31,8	54			
			INCH	3,5	1,25	1,87			INCH	3,5	1,25	2,12			
	1.1/4"	2	MM	88,9	30,2	47,5		2	MM	88,9	31,8	54			
			INCH	3,5	1,19	1,87			INCH	3,5	1,25	2,12			
	1.1/2"	2	MM	88,9	28,5	47,5		2	MM	88,9	31,8	54			
			INCH	3,5	1,12	1,87			INCH	3,5	1,25	2,12			
	2"	2	MM	88,9	25,4	47,5		2	MM	88,9	31,8	54			
			INCH	3,5	1	1,87			INCH	3,5	1,25	2,12			
	2.1/2"	1	MM	88,9	38	54	83	1	MM	88,9	57,1	73,5	86		
	INCH		3,5	1,5	2,12	3,261	INCH		3,5	2,25	2,87	3,385			
4"	1.1/4"	2	MM	114,3	42,9	60,5		2	MM	114,3	41,1	60,5			
			INCH	4,5	1,69	2,38			INCH	4,5	1,62	2,38			
	1.1/2"	2	MM	114,3	41,1	60,5		2	MM	114,3	38,1	60,5			
			INCH	4,5	1,62	2,38			INCH	4,5	1,5	2,38			
	2"	2	MM	114,3	38,1	60,5		2	MM	114,3	38,1	60,5			
			INCH	4,5	1,5	2,38			INCH	4,5	1,5	2,38			
	2.1/2"	2	MM	114,3	38,1	60,5		2	MM	114,3	38,1	60,5			
			INCH	4,5	1,5	2,38			INCH	4,5	1,5	2,38			
	3"	2	MM	114,3	33,3	60,5		2	MM	114,3	33,3	60,5			
			INCH	4,5	1,31	2,38			INCH	4,5	1,31	2,38			

WEIGHTS:
SEE CHAPTER 9 PAGE 8
IN ACCORDANCE WITH MSS SP79



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/2"	2"
3000	D	MM	21	25	30	36	45	61	74
		INCH	0.83	0.98	1.18	1.42	1.77	2.40	2.91
	L	MM	42	45	51	51	51	51	51
		INCH	1.65	1.77	2.01	2.01	2.01	2.01	2.01
	F	MM	32	34	38	36.5	35	32	29
		INCH	1.26	1.34	1.5	1.44	1.38	1.26	1.14
6000	D	MM			33	40	49	65	80
		INCH			1.30	1.57	1.93	2.56	3.15
	L	MM			51	51	51	51	51
		INCH			2.01	2.01	2.01	2.01	2.01
	F	MM			38	38	35	32	29
		INCH			1.5	1.5	1.38	1.26	1.14

WEIGHTS:
SEE CHAPTER 9 PAGE 4

IN ACCORDANCE WITH BS 3799





CHAPTER 3

HIGH PRESSURE FORGED STEEL FITTINGS THREADED TYPE



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

A. TYPE

Threaded union production includes the following range:

Threaded unions	BALL seat	and Male Nipple with Threaded Male connection
Threaded unions	BALL seat	

B. DIMENSIONS

IML SPA produces unions in accordance with standards **BS 3799 & MSS SP83**.

Thread is in accordance with standards ANSI/ASME B1.20.1.

IML standard production provides the following dimensions:

Class 3000 1/8" up to 3"

IML is in a position to supply unions with 4" diameter and in class designation 3000, only upon specific request and according to IML standard dimensional chart.

IML is in a position to supply unions with diameters from 1/8" to 4" and in class designation 6000, only upon specific request and according to IML standard dimensional chart.

The relation between threaded unions and the schedule is as follows:

Class	3000	Schedule	80
Class	6000	Schedule	XXS

Connection Thread dimension between Nut and Female Nipple is according to the standard ANSI B1.1.

Interchangeability among the union parts supplied from different Manufacturers is not advisable and not guaranteed.

C. MATERIAL

IML produces forged fittings according to the following standards:

ASTM A105	Carbon Steel Forgings.
ASTM A182	Forged or Rolled Alloy-Steel Forged Fittings.
ASTM A350	Carbon and Low-Alloy Steel Forgings.
ASTM B564	Nickel Alloy Forgings.

D. MARKING

IML marks its production in accordance to the standards required:

BSI	BS 3799	Steel Pipe Fittings threaded and socket-welding.
MSS	SP83	Steel pipe Unions socket-welding and threaded.
MSS	SP25	Standard Marking System.
ASTM		A105-A182-A350-B564

IML **standard** marking provides:

Brand	Country of origin	Dimension	Class	Material	Heat n°/ Code	Standard (*)
e.g.:						
IML	ITALY	1	3000	SA/A105N	Heat n°/ Code	SP83
IML	ITALY	1.1/2	3000	SA/A182 F316/F316L	Heat n°/ Code	SP83

Female & male nipples are stamped with material type and heat number.

IML is in a position to make other marking type only upon specific request during order.

(*) Where applicable



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard DIN 50049 e EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings Alloy and low alloy fittings Stainless Steel fittings	Phosphatizing treatment - Oil treatment Oil treatment Pickling treatment
--	---

IML is able to supply upon request fittings with special protection such as:

ARC zinc-coated Hot dip Galvanizing Cadmium plated PTFE coating	According to ASTM B633 according to ASTM A153 According to B766 according to CUSTOMER'S INDICATIONS
--	--

G. PACKING

IML packing is made in **CARTONS** or **BAGS**.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N ° 25
Type of product	UNIONS
Dimension	1.1/2"
Class designation	3000
Threading normative and type	ANSI/ASME B1.20.1 - NPT
Material type and grade	ASTM A105N
Dimension normative	MSS SP83
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

I. USEFUL INFORMATION

MAINTENANCE

- Keep supplied pieces in the IML original packing
- Do not store pieces in damp areas
- Do not store pieces in contact with water
- Keep unions assembled
- Handle threaded parts with care , especially connection seats.
- Do not make supplementary surface treatments that could prelude piece seal.
- Keep clean connection seats to guarantee the maximum seal

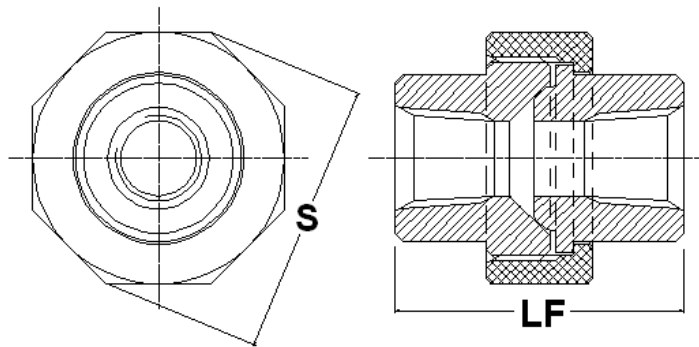
ASSEMBLING

- before starting assembling process, please check that connection seats have been kept clean and functional
- the minimum **screwing level recommended by MSS SP83 for unions is specified here below:**

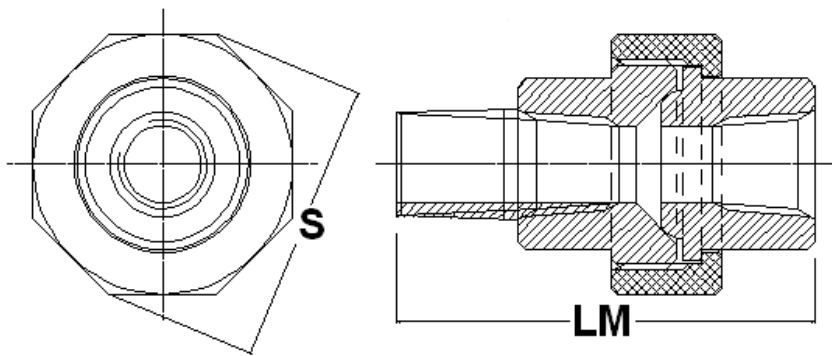
Nominal Pipe Size	Newton Meters minimum	Foot Pounds minimum
1/8"	115	85
1/4"	115	85
3/8"	135	100
1/2"	135	100
3/4"	160	120
1"	160	120
1.1/4"	175	130
1.1/2"	175	130
2"	175	130
2.1/2"	200	150
3"	200	150



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



F/F UNION THREADED



M/F UNION THREADED

CLASS	NOMINAL SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
3000	LF	MM	41	41	46	49	58	61	72	77	87	104	118	148
		INCH	1.61	1.61	1.81	1.93	2.28	2.40	2.83	3.03	3.42	4.09	4.65	5.83
	LM	MM		58	64	71	81	89	102	107	117			
		INCH		2.28	2.52	2.79	3.19	3.5	4.02	4.21	4.61			
	S	MM	31.5	38	46	50	61	70	84	93	110	137	158	196
		INCH	1.24	1.50	1.81	1.97	2.4	2.76	3.31	3.66	4.33	5.39	6.22	7.72
6000	LF	MM			54	59	64	70	78	86	96	108	123	133
		INCH		2.13	2.32	2.52	2.76	3.07	3.39	3.78	4.25	4.84	5.24	
	S	MM		53	61	70	80	95	108	127	148	171	188	
		INCH		2.09	2.40	2.76	3.15	3.74	4.25	5.00	5.83	6.73	7.40	

WEIGHTS:
SEE CHAPTER 9 PAGE 2

IN ACCORDANCE WITH BS 3799 / MSS SP83
THREADS: ANSI-ASME B1.20.1





CHAPTER 4

HIGH PRESSURE FORGED STEEL FITTINGS SOCKET WELD TYPE



STEEL FITTINGS FOT HIGH PRESSURE SERVICE

A. TYPE

Socket weld union production includes the following range:

SW unions	With BALL seat
SW unions	With FLAT seat

B. DIMENSIONS

IML SPA produces unions in accordance with standards **BS 3799** e **MSS SP83**.

IML standard production provides the following dimensions:

Class 3000 1/4" up to 3"

IML is in a position to supply unions with 4" diameter and in class designation 3000, only upon specific request and according to IML standard dimensional chart.

IML is in a position to supply unions with diameters from 1/8" to 4" and in class designation 6000, only upon specific request and according to IML standard dimensional chart.

The relation between SW unions and the schedule is as follows:

Class	3000	Schedule	80
Class	6000	Schedule	XXS

Connection Thread dimension between Nut and Female Nipple is according to the standard ANSI B1.1. Interchangeability among the union parts supplied from different Manufacturers is not advisable and not guaranteed.

C. MATERIAL

IML produces forged fittings according Lo the following standards:

ASTM A105	Carbon Steel Forgings.
ASTM A182	Forged or Rolled Alloy-Steel Forged Fittings.
ASTM A350	Carbon and Low-Alloy Steel Forgings.
ASTM B564	Nickel Alloy Forgings.

D. MARKING

IML marks its production in accordance to the standards required:

BSI	BS 3799	Steel Pipe Fittings threaded and socket-welding.
MSS	SP83	Steel pipe Unions socket-welding and threaded.
MSS	SP25	Standard Marking System.
ASTM		A105-A182-A350-B564

IML **standard** marking provides:

Brand	Country of origin	Dimension	Class	Material	Heat n°/ Code	Standard (*)
e.g.:						
IML	ITALY	1	3000	SA/A105N	Heat n°/ Code	SP83
IML	ITALY	1.1/2	3000	SA/A182 F316/F316L	Heat n°/ Code	SP83

Female & male nipples are stamped with material type and heat number.

IML is in a position to make other marking type only upon specific request during order.

(*) Where applicable.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings	Phosphatizing treatment - Oil treatment
Alloy and low alloy fittings	Oil treatment
Stainless Steel fittings	Pickling treatment

IML is able to supply upon request fittings with special protection such as:

ARC zinc-coated	According to ASTM B633
Hot dip Galvanizing	According to ASTM A153
PTFE coating	According to CUSTOMER'S INDICATIONS
Cadmium plated	According to B766

G. PACKING

IML packing is made in CARTONS or BAGS.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N° 25
Type of product	UNIONS
Dimension	1.1/2"
Class designation	3000
Type of ends	Socket Weld (SW)
Material type and grade	ASTM A105N
Dimension normative	MSS SP83
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

I. USEFUL INFORMATION

MAINTENANCE

- Keep supplied pieces in the IML original packing
- Do not store pieces in damp areas
- Do not store pieces in contact with water
- Keep unions assembled
- Handle threaded parts with care , especially connection seats.
- Do not make supplementary surface treatments that could prelude piece seal.
- Keep clean connection seats to guarantee the maximum seal

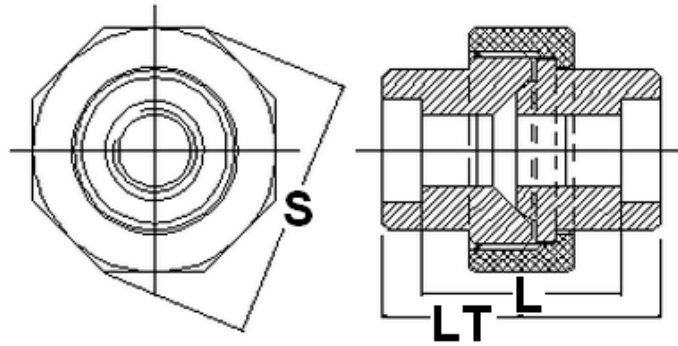
ASSEMBLING

- before starting assembling process, please check that connection seats have been kept clean and functional
- the minimum screwing level recommended by MSS SP83 for unions is specified here below:

Nominal Pipe Size	Newton Meters minimum	Foot Pounds minimum
1/8"	115	85
1/4"	115	85
3/8"	135	100
1/2"	135	100
3/4"	160	120
1"	160	120
1.1/4"	175	130
1.1/2"	175	130
2"	175	130
2.1/2"	200	150
3"	200	150



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



INTEGRAL SEAT SOCKET WELD

CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"
3000	LT	MM	41	45	46	57	59	66	68	77	94	108
		INCH	1.61	1.77	1.81	2.24	2.32	2.6	2.68	3.03	3.7	4.25
	L	MM	21	25	26	31	33	40	42	45	62	76
		INCH	0.83	0.98	1.02	1.22	1.30	1.57	1.65	1.77	2.44	2.99
	S	MM	40.5	46	50	61	70	84	93	110	137	158
		INCH	1.59	1.81	1.97	2.4	2.76	3.3	3.66	4.33	5.39	6.22
6000	LT	MM	44	51	56	62	70	78	86	96	120	127
		INCH	1.73	2.01	2.2	2.44	2.76	3.07	3.39	3.78	4.72	5
	L	MM	24	31	36	36	44	52	60	64	88	95
		INCH	0.94	1.22	1.42	1.42	1.73	2.05	2.36	2.52	3.46	3.74
	S	MM	43	52	61	70	80	95	108	127	168	198
		INCH	1.69	2.05	2.4	2.76	3.15	3.74	4.25	5	6.61	7.79

WEIGHTS:
SEE CHAPTER 9 PAGE 4

IN ACCORDANCE WITH BS 3799 / MSS SP83





CHAPTER 5

PIPE NIPPLES , CONCENTRIC AND ECCENTRIC SWAGES



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

A. TYPE

Forged fittings production includes the following range:

Pipe nipples	Plain ends	Threaded ends	Bevel ends
Concentric swages	Plain ends	Threaded ends	Bevel ends
Eccentric swages	Plain ends	Threaded ends	Bevel ends

B. DIMENSIONS

IML SPA produces threaded forged fittings in accordance with **BS 3799, MSS SP95, ASME B36.10M and ASME B36.19M.**

IML standard production provides for all schedules (40/STD+80/XS+160+XXS) a production starting from 1/8" up to 4".

C. MATERIAL

ASTM A106	Seamless Carbon Steel Pipe,
ASTM A234	Piping Fittings of Wrought Carbon Steel - Alloy Steel.
ASTM A312	Seamless and Welded Austenitic Stainless Steel Pipes.
ASTM A333	Seamless and Welded Steel Pipe for Low-Temperature.
ASTM A403	Wrought Austenitic Stainless Steel Piping Fittings.
ASTM A420	Piping Fittings of Wrought Carbon Steel - Alloy Steel.

D. MARKING

IML marks its production in accordance to the standards required:

BSI	BS 3799	Steel Pipe Fittings threaded and socket-welding.
MSS	SP95	Swage Nipples and Bull Plugs.
ASTM		A106- A234- A312- A333- A403- A420

IML **standard** marking provides:

Brand	Country of origin	Dimension	Schedule	Material	Heat n°/ Code	Standard (*)
e.g.:						
IML	ITALY	1	80	SA/A234 WPB	Heat n°/ Code	SP95
IML	ITALY	1.1/2	80	SA/403 WP316/WP316L	Heat n°/ Code	BS 3799

IML is in a position to make other marking type only upon specific request during order.

(*) where applicable.

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings	Phosphatizing treatment - Oil treatment
Alloy and low alloy fittings	Oil treatment
Stainless Steel fittings	Pickling treatment

IML is able to supply upon request fittings with special protection such as:

ARC zinc-coated	According to ASTM B633
Hot dip Galvanizing	According to ASTM A153
Cadmium plated	According to ASTM B766
PTFE coating	According to CUSTOMER'S INDICATIONS

G. PACKING

IML packing is made in **CARTONS** or **BAGS**.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N°25
Type of product	Conc. swage
Dimension	1.1/2" x1"
Pipe schedule	Sch.80
Applicable normative and type of ends	ANSI/ASME B1.20.1 - NPT
Material type and grade	ASTM A234 WPB
Dimension normative	MSS SP 95
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	

I. USEFUL INFORMATION

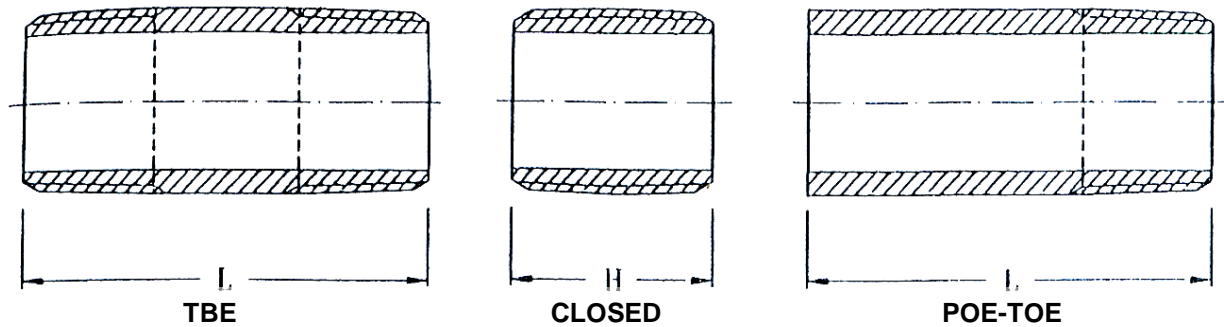
MAINTENANCE

- Keep supplied pieces in the IML original packing.
- Do not store pieces in damp areas.
- Do not store pieces in contact with water.
- Handle threaded parts with care.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

PIPE NIPPLES



NOMINAL SIZE			1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	3"	4"	
H			MM	22.2	25.4	28.6	35	38	41	44.5	50.8	63.5	73
			INCH	0.87	1	1.12	1.38	1.5	1.61	1.75	2	2.5	2.87
L	MM	INCH											
	38.1	1 1/2"	•	•	•	•							
	50.8	2"	•	•	•	•							
	63.5	2.1/2"	•	•	•	•							
	76.2	3"	•	•	•	•	•	•	•				
	101.6	4"	•	•	•	•	•	•	•	•			
	127.0	5"		•	•	•	•	•	•	•	•		
	152.4	6"		•	•	•	•	•	•	•	•	•	•
203.2	8"							•	•	•	•	•	
SCHEDULE	80-XS		•	•	•	•	•	•	•	•	•	•	•
	160				•	•	•	•	•	•	•	•	•

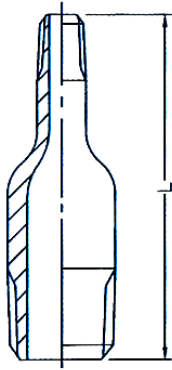
WEIGHTS:
SEE CHAPTER 9 PAGE 12,13
MADE FROM SEAMLESS PIPE

IN ACCORDANCE WITH : ASME B36.10M / B36.19M
THREADS :ANSI/ASME B1.20.1
ASTM A733 (Only for TBE nipples)

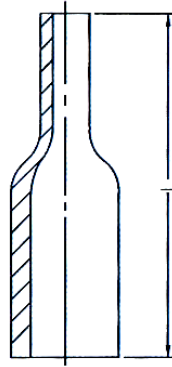


STEEL FITTINGS FOR HIGH PRESSURE SERVICE

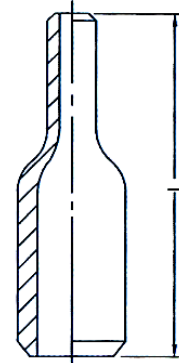
CONCENTRIC SWAGES



TBE



PBE



BBE

NOMINAL SIZE			1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
L	MSS SP 95	MM		64	70	76	89	102	114	165	178	203	229
		INCH		2.52	2.75	2.99	3.50	4.02	4.49	6.50	7.00	7.99	9.02
	BS 3799	MM		76	89	95	102	102	114	165	178	203	229
		INCH		2.99	3.50	3.74	4.02	4.02	4.49	6.50	7.00	7.99	9.02
REDUCING SIZE	1/8"		•	•	•								
	1/4"			•	•	•	•		•	•			
	3/8"				•	•	•		•	•			
	1/2"					•	•	•	•	•		•	•
	3/4"						•	•	•	•	•	•	•
	1"							•	•	•	•	•	•
	1.1/4"								•	•	•	•	•
	1.1/2"									•	•	•	•
	2"										•	•	•
	2.1/2"											•	•
	3"												•

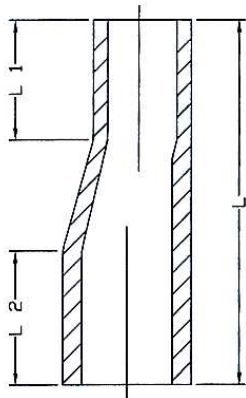
WEIGHTS:
SEE CHAPTER 9 PAGE 10,11

THE TABLE REFERS TO SCHEDULE XS/80
OTHER SCHEDULES WILL BE SUPPLIED ON REQUEST
IN ACCORDANCE WITH :BS 3799 / MSS SP95
THREADS :ANSI/ASME B1.20.1
Bevel : ANSI/ASME B16.25

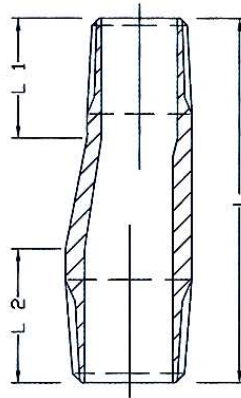


STEEL FITTINGS FOR HIGH PRESSURE SERVICE

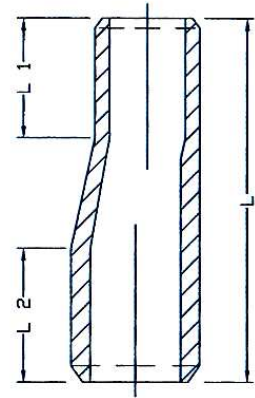
ECCENTRIC SWAGES



PBE



TBE



BBE

NOMINAL SIZE			1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"
D1/D2	MM		10.28	13.71	17.14	21.33	26.67	33.4	42.16	48.26	60.32	73.02	88.9
	INCH		0.4	0.54	0.67	0.84	1.05	1.31	1.66	1.9	2.37	2.87	3.5
L	MSS SP95	MM			64	70	76	89	102	114	165	178	203
		INCH			2.52	2.75	2.99	3.50	4.02	4.49	6.50	7.00	7.99
	BS 3799	MM			76	89	95	102	102	114	165	178	203
		INCH			2.99	3.50	3.74	4.02	4.02	4.49	6.50	7.00	7.99
L1/L2		MM	15	18	20	25	28	35	35	40	40	50	55
		INCH	0.59	0.71	0.79	0.98	1.1	1.38	1.38	1.57	1.57	1.97	2.16
SCH.40 STD	Thickness	MM	1.73	2.24	2.31	2.77	2.87	3.38	3.56	3.68	3.91	5.16	5.49
		INCH	0.07	0.09	0.09	0.11	0.11	0.13	0.14	0.14	0.15	0.2	0.22
SCH.80 - XS		MM	2.41	3.02	3.2	3.73	3.91	4.55	4.85	5.08	5.54	7.01	7.62
		INCH	0.09	0.11	0.13	0.15	0.15	0.18	0.19	0.2	0.22	0.28	0.3
SCH.160		MM				4.77	5.56	6.35	6.35	7.14	8.74	9.52	11.13
		INCH				0.19	0.22	0.25	0.25	0.28	0.34	0.37	0.44
SCH.XXS		MM				7.47	7.82	9.09	9.7	10.16	11.07	14.02	15.24
		INCH				0.29	0.31	0.36	0.38	0.4	0.44	0.55	0.6

WEIGHTS:
SEE CHAPTER 9 PAGE 10,11

IN ACCORDANCE WITH :BS 3799 / MSS SP95
THREADS :ANSI/ASME B1.20.1
Bevel : ANSI/ASME B16.25





CHAPTER 6

HIGH PRESSURE FORGED STEEL FITTINGS

REINFORCING FITTINGS OUTLETS



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

A. TYPE

IML reinforcing fittings production includes the following range:

WELD-OUTLETS	LATERAL OUTLETS	SWEEP-OUTLETS
SOCK-OUTLETS	ELBOW OUTLETS	NIPOFLANGES OUTLETS
THREAD-OUTLETS	NIPPLE OUTLETS	

B. DIMENSIONS

IML SPA produces reinforcing fittings in accordance with **ASME B31.1 and ASME B31.3**.

STANDARD PRODUCTION

TYPE	CLASS	SCHEDULE	BRANCH	
			FROM	TO
WELD-OUTLETS Reducing Size	-	STD	1/8"	20"
	-	XS	1/8"	20"
	-	160	1/8"	10"
	-	XXS	1/8"	10"
WELD-OUTLETS Full Size	-	STD	1/2"	4"
	-	XS	1/2"	4"
	-	160	1/2"	4"
	-	XXS	1/2"	4"
SOCK-OUTLETS Reducing Size	3000	-	1/8"	10"
	6000	-	1/2"	2"
	9000	-	1/2"	2"
SOCK-OUTLETS Full Size	3000	-	1/2"	4"
THREAD-OUTLETS Reducing Size	3000	-	1/8"	10"
	6000	-	1/4"	2"
THREAD-OUTLETS Full Size	3000	-	1/2"	4"
LATERAL OUTLETS Butt Weld-Screwed-Socket Weld	3000	-	1/4"	2"
	6000	-	1/4"	1.1/2"
ELBOW OUTLETS Butt Weld-Screwed-Socket Weld	3000	-	1/4"	2"
	6000	-	1/4"	1.1/2"
NIPPLE OUTLETS Screwed	3000	XS	1/2"	2"
	6000	XXS	1/2"	2"
NIPPLE OUTLETS Socket Weld	3000	XS	1/2"	2"
	6000	160	1/2"	2"
SWEEP-OUTLETS			1.1/4"	24"

C. MATERIAL

IML produces reinforced fittings according to the following standards:

ASTM A105	Carbon Steel Forgings.
ASTM A182	Forged or Rolled Alloy-Steel Forged Fittings.
ASTM A350	Carbon and Low-Alloy Steel Forgings.
ASTM B564	Nickel Alloy Forgings.



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

D. MARKING

IML marks its production in accordance to the standards required:

MSS	SP25	Standard marking system
ASTM		A105- A182- A350- B564

IML **standard** marking provides:

Brand	Country of origin	Dimension	Schedule/Class	Material	Heat n°/ Code	Standard (*)
e.g.:						
IML	ITALY	8-6 x 1	3000	A105N	Heat n°/ Code	SP97
IML	ITALY	1.1/2	XS	SA/A182 F316/F316L	Heat n°/ Code	SP97

Dimension: firstly it is indicated the Run dimension (8-6) and then the Branch (1).
IML is able to make other marking type only upon specific request during ordering.
(*) Where applicable.

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Carbon Steel fittings	Phosphatizing treatment - Oil treatment
Alloy and low alloy fittings	Oil treatment
Stainless Steel fittings	Pickling treatment

IML is able to supply upon request fittings with special protection such as:

Hot dip Galvanizing	according to ASTM A153
ARC zinc-coated	According to ASTM B633
Cadmium plated	According to B766
PTFE coating	according to CUSTOMER'S INDICATIONS

G. PACKING

IML packing is made in CARTONS or BAGS.



H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N°25
Type of product	WELD-OUTLETS
Dimension	8" – 6" X 1"
Class designation	40 x 40
Applicable normative and type of ends	ANSI B16.25 BW
Material type and grade	ASTM A105N
Dimension normative	ASME B31.1 – ASME B31.3 – MSS SP97
Normative for protective coating	ASTM A123 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	

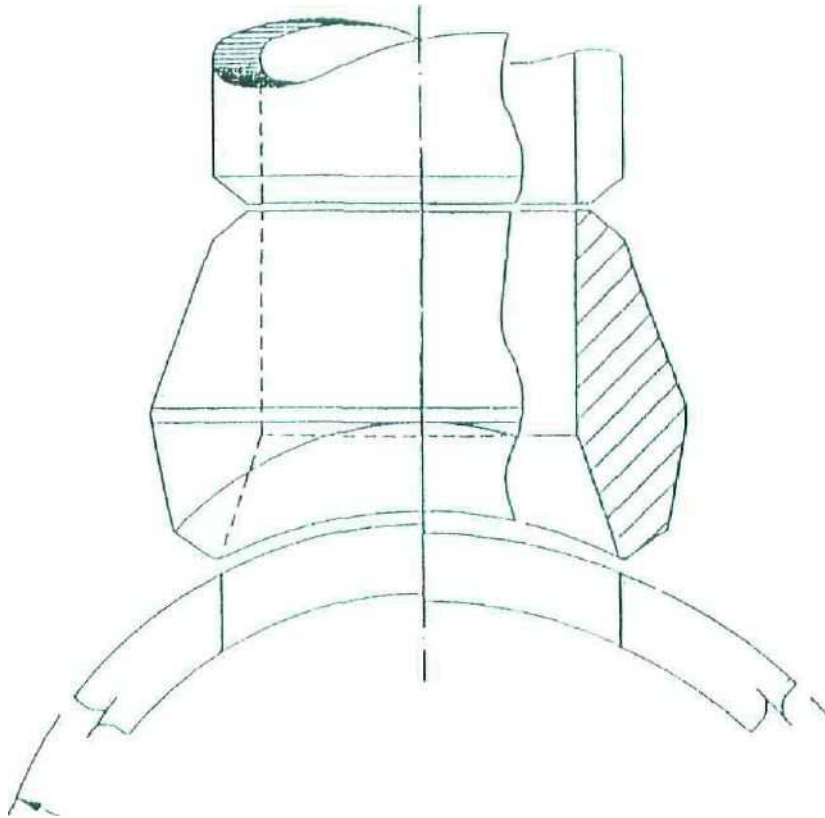
I. USEFUL INFORMATION

MAINTENANCE

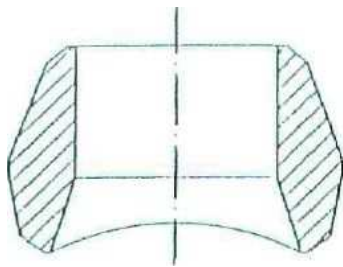
- Keep supplied pieces in the IML original packing.
- Do not store pieces in damp areas.
- Do not store pieces in contact with water.
- Handle threaded parts with care.



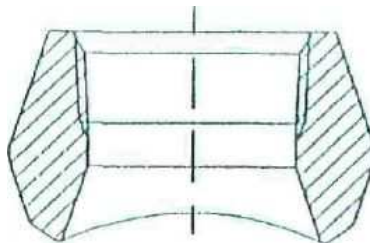
STEEL FITTINGS FOR HIGH PRESSURE SERVICE



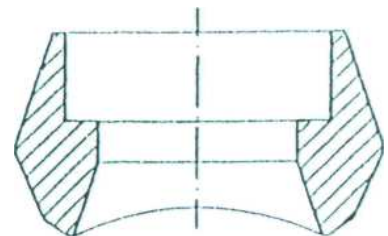
OUTLET TYPE



WELD-OUTLET



THREAD-OUTLET



SOCK-OUTLET



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

TYPE		SCHEDULE / CLASS DESIGNATION											
BUTT WELD		STD-XS											
THREADED		3000											
SOCKET WELD		3000											
BRANCH SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
	3/8"	1/2"÷1"	1/2"÷1"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
NOMINAL PIPE SIZE	1/2"	1.1/4"÷36"	1.1/4"÷36"	3/4"÷1"	1"	1.1/4"÷1.1/2"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"	5"
	3/4"÷1"	flat	flat	2"÷2.1/2"	1.1/4"÷1.1/2"	2"	2"÷2.1/2"	2.1/2"	3"	3.1/2"	4"	5"	6"
	1.1/4"÷2.1/2"			3"÷8"	3"÷5"	2.1/2"	3"÷3.1/2"	3"	3.1/2"÷4"	4"	5"	6"	8"
	3"÷36"			10"÷36"	6"÷12"	3"÷3.1/2"	4"÷5"	5"÷6"	5"÷6"	5"	6"	8"	10"
	flat			flat	14"÷36"	4"÷5"	6"÷8"	8"÷12"	8"÷10"	6"	8"	10"	12"÷14"
					flat	6"÷10"	10"÷18"	14"÷24"	12"÷18"	8"	10"	12"÷14"	16"÷20"
						12"÷36"	20"÷36"	26"÷36"	20"÷36"	10"÷12"	12"÷24"	16"÷20"	24"÷36"
						flat	Flat	flat	flat	14"÷18"	16"÷20"	24"÷36"	flat
									20"÷36"	24"÷36"	flat		
									flat	flat			

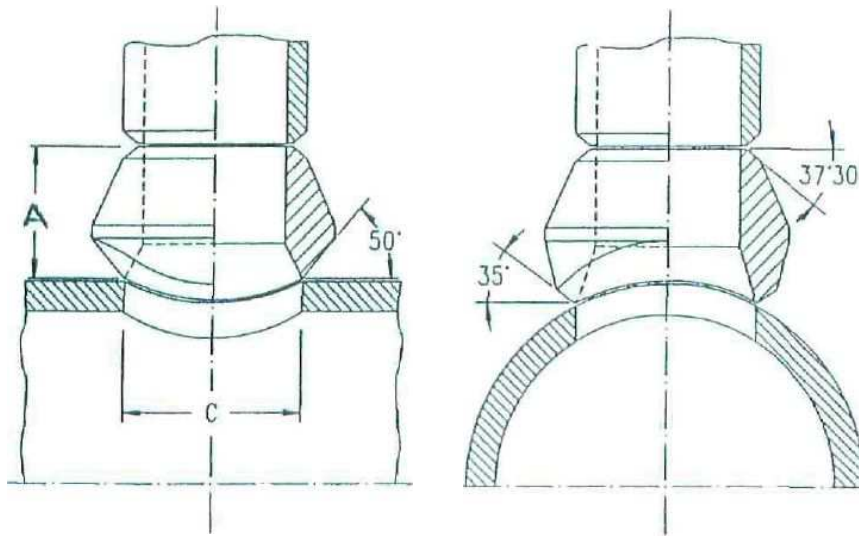
TYPE		CLASS DESIGNATION				
THREADED		6000				
SOCKET WELD		6000				
BRANCH SIZE	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
	3/4"÷1"	1"	1.1/4"÷1.1/2"	1.1/2"	2"	2.1/2"
NOMINAL PIPE SIZE	1.1/4"÷2"	1.1/4"÷2.1/2"	2"÷2.1/2"	2"÷2.1/2"	2.1/2"	3"
	2.1/2"÷6"	3"÷10"	3"÷10"	4"÷8"	4"÷5"	4"÷5"
	8"÷36"	12"÷36"	12"÷36"	10"÷20"	6"÷8"	6"
	flat	flat	flat	24"÷36"	10"÷18"	8"÷10"
				flat	20"÷36"	12"÷20"
					flat	24"÷36"
					flat	

TYPE		SCHEDULE				
BUTT WELD		160 -XXS				
BRANCH SIZE	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
	1/2"	3/4"÷1"	1.1/4"÷1.1/2"	1.1/4"÷1.1/2"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/2"÷36"	2.1/2"÷6"	2"÷2.1/2"	2"÷2.1/2"	3"÷3.1/2"	2.1/2"
	flat	8"÷36"	12"÷36"	12"÷36"	4"÷8"	4"÷5"
		flat	flat	flat	10"÷20"	6"÷8"
					24"÷36"	10"÷18"
					flat	20"÷36"
					flat	



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

WELD-OUTLET REDUCING SIZE



BRANCH SCHEDULE	BRANCH SIZE		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
STD XS	A	MM	17.5	17.5	20.6	25.5	27	33.5	33.5	36	38.1	41.3	44.5	47,6	50,8
		INCH	0.69	0.69	0.81	1	1.06	1.32	1.32	1.42	1.5	1.63	1.75	1.87	2.00
	C	MM	15.8	15.8	19	23.8	30	36.5	44.5	50.8	65	76.2	93.6	101.6	120.8
		INCH	0.62	0.62	0.75	0.94	1.18	1.44	1.75	2	2.56	3	3.68	4	4.76
160	A	MM				28.5	31.7	38.1	44.5	50.8	55.5	61.9	73		84.1
		INCH				1.12	1.25	1.5	1.75	2	2.18	2.44	2.87		3.31
XXS	C	MM				14.3	19	25.4	33.3	38.1	42.8	54	73		98.4
		INCH				0.56	0.75	1	1.31	1.5	1.68	2.13	2.87		3.87

WEIGHTS:
SEE CHAPTER 9 PAGE 9

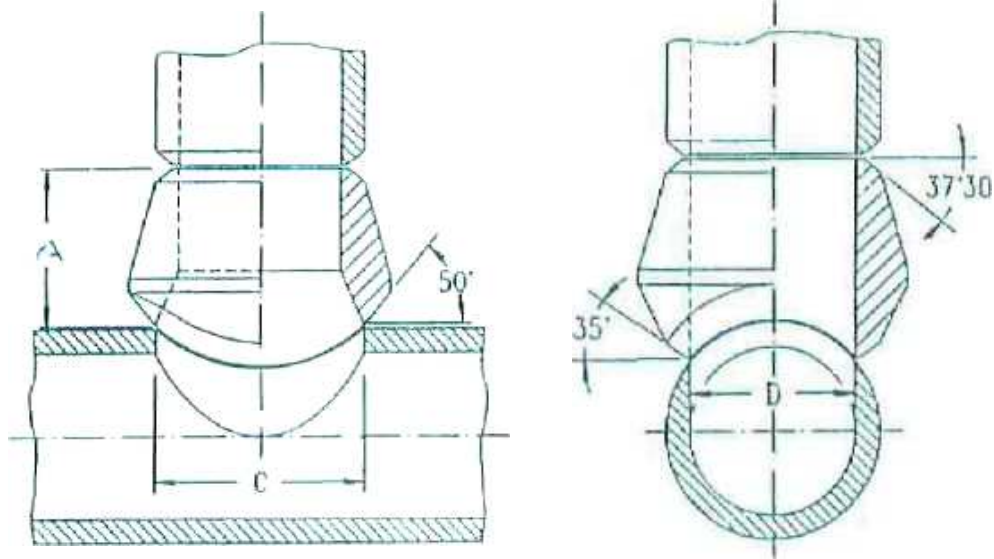
IN ACCORDANCE WITH ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97
BUTT WELD PARTS: ANSI-ASME B16.9



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

WELD-OUTLET

FULL SIZE



BRANCH SCHEDULE	BRANCH SIZE		1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
STD	A	MM	25.5	27	33.5	33.5	36	38.1	41.3	44.5	50.8	50.8
		INCH	1	1.06	1.32	1.32	1.42	1.5	1.63	1.75	2	2
	C	MM	23.8	30	36.5	44.5	50.8	65	76.2	93.6	101.6	120.6
		INCH	0.94	1.18	1.44	1.75	2	2.56	3	3.68	4	4.75
	D	MM	15.8	20.6	25.2	35	41.3	52.4	62	77.8	90.5	101.6
		INCH	0.62	0.81	1.03	1.38	1.63	2.06	2.44	3.06	3.56	4
XS	A	MM	25.5	27	33.5	33.5	36	38.1	41.3	44.5	47.63	50.8
		INCH	1	1.06	1.32	1.32	1.42	1.5	1.62	1.75	1.87	2
	C	MM	23.8	30.1	36.5	44.5	50.8	65	76.2	93.6	101.6	120.6
		INCH	0.94	1.18	1.44	1.75	2	2.56	3	3.68	4	4.75
	D	MM	15.8	20.6	26.2	35	41.3	52.4	62	77.8	90.5	101.6
		INCH	0.62	0.81	1.03	1.38	1.63	2.06	2.44	3.06	3.56	4
160 XXS	A	MM	28.6	31.7	38.1	44.5	50.8	55.5	61.9	73		84.1
		INCH	1.13	1.25	1.5	1.75	2	2.18	2.44	2.87		3.31
	C	MM	14.3	19	25.4	33.4	38.1	42.8	54	73		98.4
		INCH	0.56	0.75	1	1.31	1.5	1.68	2.12	2.87		3.87
	D	MM	14.3	19	25.4	33.4	38.1	42.6	54	73		98.4
		INCH	0.56	0.75	1	1.31	1.5	1.68	2.13	2.87		3.87

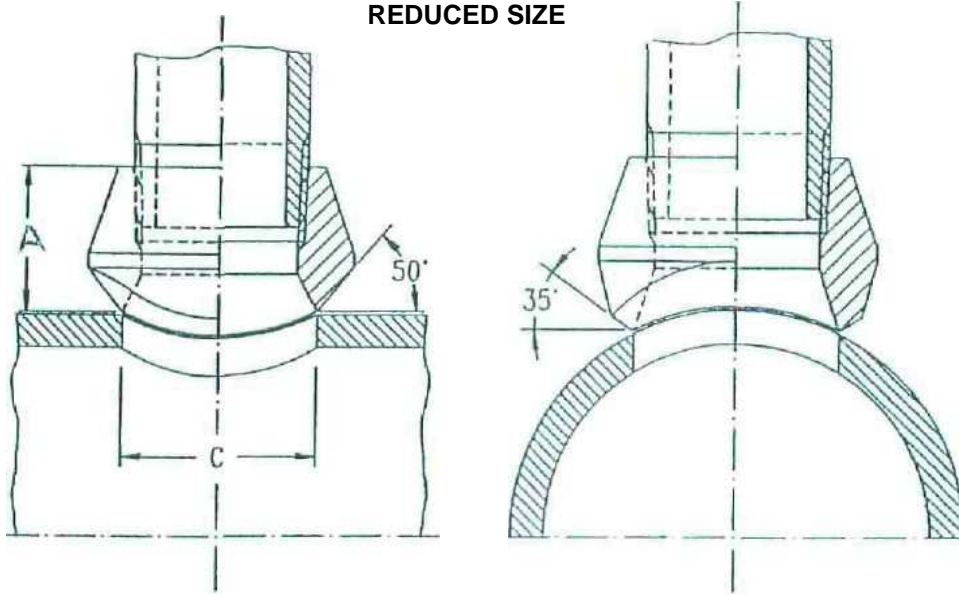
WEIGHTS:
SEE CHAPTER 9 PAGE 9

IN ACCORDANCE WITH ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97
BUTT WELD PARTS: ANSI-ASME B16.9



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

THREAD-OUTLET REDUCED SIZE



CLASS	BRANCH SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
3000	A	MM	17.5	20.6	25.4	27	33.5	33.5	36	38.1	46	51	54	57
		INCH	0.69	0.81	1	1.06	1.32	1.32	1.42	1.5	1.81	2.01	2.13	2.24
	C	MM	15.8	19	23.8	30.1	36	44	51	65	76	93	101	120
		INCH	0.62	0.75	0.94	1.18	1.42	1.73	2.01	2.56	2.99	3.66	3.98	4.72
6000	A	MM			32	37	40	42	43	59				
		INCH			1.26	1.46	1.57	1.65	1.69	2.32				
	C	MM			19	25	33	38	49	58.5				
		INCH			0.75	0.98	1.3	1.5	1.93	2.3				

WEIGHTS:
SEE CHAPTER 9 PAGE 9

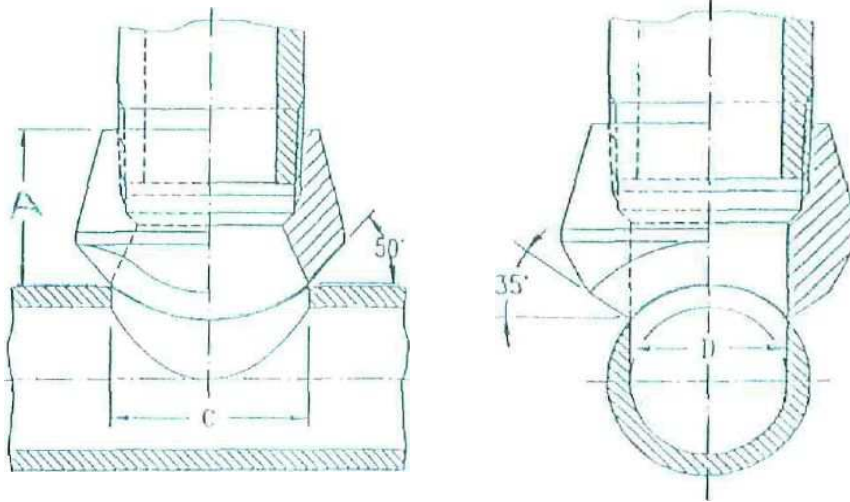
IN ACCORDANCE WITH ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97
THREADS: ANSI-ASME B1.20.1



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

THREAD-OUTLET

FULL SIZE



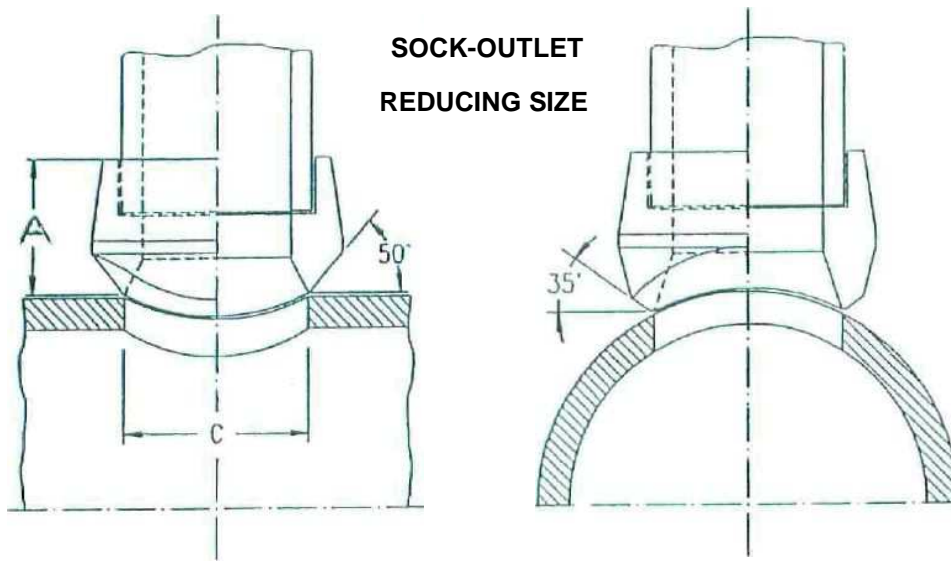
CLASS	BRANCH SIZE		1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
3000	A	MM	25.4	27	33.3	33.3	35	38.1	46	50.8	54	57.1
		INCH	1	1.05	1.31	1.31	1.38	1.5	1.81	2	2.13	2.25
	C	MM	23.8	30	36.5	44.5	50.8	65	76.2	93.6	112.7	120.6
		INCH	0.94	1.18	1.44	1.75	2	2.56	3	3.68	4.44	4.75
	D	MM	15.8	20.6	27	35	41.3	52.4	63.5	77.8	90.5	103.2
		INCH	0.62	0.81	1.06	1.38	1.63	2.06	2.5	3.06	3.56	4.06

WEIGHTS:
SEE CHAPTER 9 PAGE 9

IN ACCORDANCE WITH ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97
THREADS: ANSI-ASME B1.20.1



STEEL FITTINGS FOR HIGH PRESSURE SERVICE



CLASS	SCH.	BRANCH SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4"
3000	STD	A	MM	17.5	20.5	25.4	27	33.5	33.5	36	38	46	51	54	57
			INCH	0.69	0.81	1	1.06	1.32	1.32	1.42	1.5	1.81	2.01	2.13	2.24
		C	MM	15.8	19	23.8	30	36.5	44.5	51	65	76	96	101	120
			INCH	0.62	0.75	0.94	1.18	1.44	1.75	2.01	2.56	2.99	3.66	3.98	4.72
6000	160	A	MM			32	36.5	40	42	43	59				
			INCH			1.26	1.44	1.57	1.65	1.69	2.32				
		C	MM			19	25	33	38	43	58.5				
			INCH			0.75	0.98	1.3	1.5	1.69	2.3				
9000	XXS	A	MM			38	44	45		58	59				
			INCH			1.5	1.73	1.77		2.28	2.32				
		C	MM			12	19	25		38	58				
			INCH			0.47	0.75	0.98		1.5	2.28				

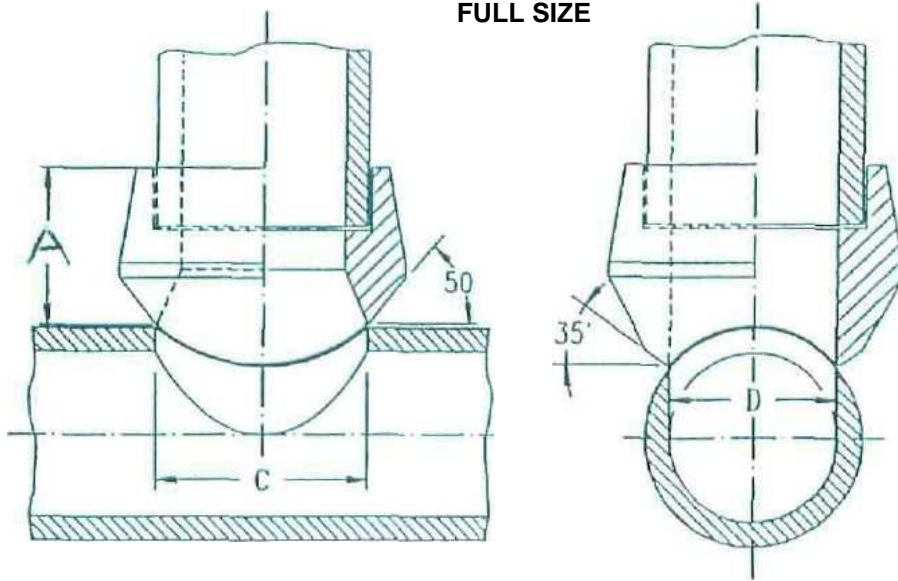
WEIGHTS:
SEE CHAPTER 9 PAGE 9

IN ACCORDANCE WITH ANSI-ASME B16.11
ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

SOCK-OUTLET FULL SIZE



BRANCH SCHEDULE	BRANCH SIZE		1/2"	3/4"	1	1.1/4"	1.1/2"	2"	2.1/2"	3"	3.1/2"	4
3000		MM	25.4	27	33.3	33.3	35	38.1	46	50.8	54	57.2
		INCH	1	1.06	1.31	1.31	1.38	1.5	1.81	2	2.13	2.25
		MM	23.8	30.1	36.5	44.5	50.8	65.1	76.2	93.7	101.6	120.6
		INCH	0.94	1.18	1.44	1.75	2	2.56	3	3.69	4	4.75
		MM	15.8	21	27	35	41.3	52.5	62.7	78	90.1	102.3
		INCH	0.62	0.83	1.06	1.38	1.63	2.07	2.47	3.07	3.56	4.03

WEIGHTS:
SEE CHAPTER 9 PAGE 9

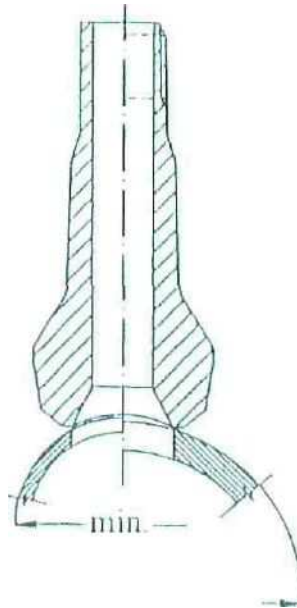
IN ACCORDANCE WITH ASME B16.11
ANSI-ASME B31.1
ANSI-ASME B31.3 / MSS SP97



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

NIPPLE-OUTLET

DETERMINING OF OUTLET AND PIPELINE CONNECTIONS



TYPE		SCHEDULE / CLASS DESIGNATION				
BUTT WELD END		XS				
THREADED END		3000				
PLAIN END		3000				
BRANCH SIZE	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/2"÷6"	1.1/2"÷3"	1.1/2"	2"	2"	3"
	8"÷36"	4"÷36"	2"÷2.1/2"	3"÷3.1/2"	3"÷3.1/2"	3.1/2"÷4"
	flat	flat	3"÷5"	4"÷5"	4"÷5"	5"÷6"
			6"÷36"	6"÷10"	6"÷12"	8"÷12"
			flat	12"÷36"	14"÷36"	14"÷36"
			flat	flat	flat	

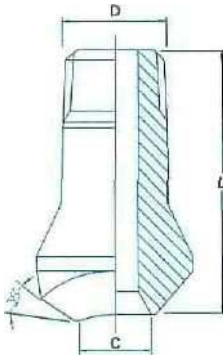
TYPE		SCHEDULE / CLASS DESIGNATION				
BUTT WELD END		160-XXS				
THREADED END		6000				
PLAIN END		6000				
BRANCH SIZE	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/2"÷36"	1.1/2"÷36"	1.1/2"÷4"	2"÷4"	2"÷4"	3"÷4"
	flat	flat	6"÷36"	6"÷36"	6"÷36"	5"÷8"
			flat	flat	flat	10"÷36"
						flat



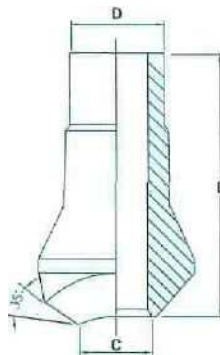
STEEL FITTINGS FOR HIGH PRESSURE SERVICE

NIPPLE-OUTLET

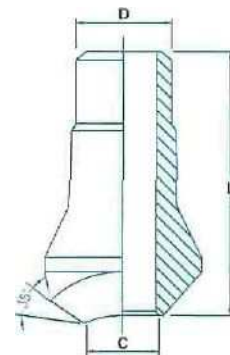
THREADED END



PLAIN END



BUTT WELD



CLASS	SCH.	BRANCH SIZE		1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
3000	XS	D	MM	21.33	26.67	33.4		48.26	60.32
			INCH	0.84	1.05	1.31	1.66	1.9	2.37
		L	MM			89			
			INCH			3.5			
		C	MM	23.8	30	36.5	44.5	50.8	65
			INCH	0.94	1.18	1.44	1.75	2	2.56
6000	160	D	MM	21.33	26.67	33.4	42.16	48.26	60.32
			INCH	0.84	1.05	1.31	1.66	1.9	2.37
		L	MM			89			
			INCH			3.5			
		C	MM	14.2	19	25.4	33.3	38.1	42.8
			INCH	0.56	0.75	1	1.31	1.5	1.68

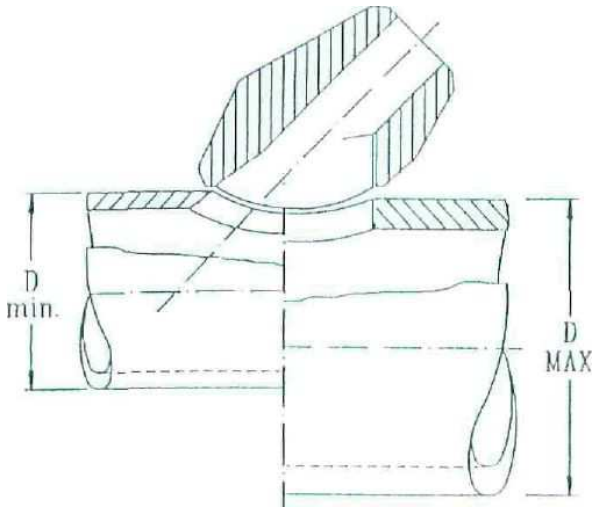
WEIGHTS:
SEE CHAPTER 9 PAGE 9

THREADS :ANSI-ASME B1.20.1
BEVEL : ASME B16.25

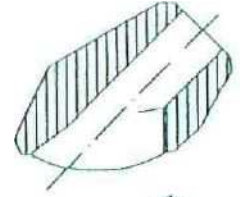


STEEL FITTINGS FOR HIGH PRESSURE SERVICE

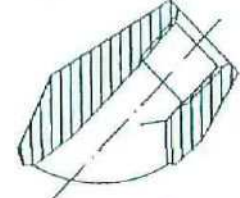
LATERAL OUTLET



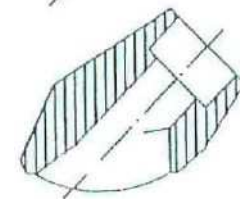
BUTT WELD



THREADED



SOCKET WELD



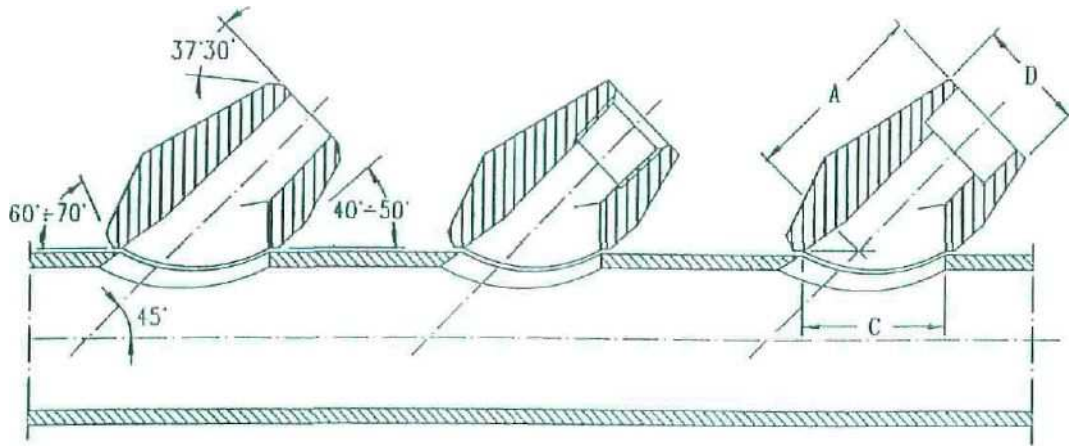
REINFORCING LATERAL-OUTLET

TYPE		SCHEDULE / CLASS DESIGNATION						
BUTT WELD		STD-XS						
THREADED		3000						
SOCKET WELD		3000						
BRANCH SIZE	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/4"÷2.1/2" 3"÷12"	1.1/4"÷2.1/2" 3"÷12"	1.1/4"÷2.1/2" 3"÷12"	1.1/4"÷1.1/2" 2"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	4"÷5" 6"÷8" 10"÷12"
TYPE		SCHEDULE / CLASS DESIGNATION						
BUTT WELD END		160-XXS						
THREADED END		6000						
PLANE END		6000						
BRANCH SIZE	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/4"÷2.1/2" 3"÷12"	1.1/4"÷2.1/2" 3"÷12"	1.1/4"÷1.1/2" 2"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	2"÷2.1/2" 3"÷5" 6"÷12"	4"÷5" 6"÷8" 10"÷12"	



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

LATERAL OUTLET



CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
3000	A	MM	39.7	39.7	41	47	56	67	67	81
		INCH	1.56	1.56	1.61	1.85	2.2	2.64	2.64	3.19
	C	MM	36.5	36.5	34	43	53	76	76	102
		INCH	1.44	1.44	1.34	1.69	2.09	2.99	2.99	4.01
	D	MM	31.8	31.8	31.8	35.7	45.2	57.1	63.5	82.6
		INCH	1.25	1.25	1.25	1.41	1.78	2.25	2.5	3.25
6000	A	MM	39.7	39.7	47	56	67	67	81	
		INCH	1.56	1.56	1.85	2.2	2.64	2.64	3.19	
	C	MM	36.5	36.5	43	53	76	76	102	
		INCH	1.44	1.44	1.69	2.09	2.99	2.99	4.02	
	D	MM	31.8	31.8	38.1	45.2	57.1	63.5	82.6	
		INCH	1.25	1.25	1.5	1.78	2.25	2.5	3.25	

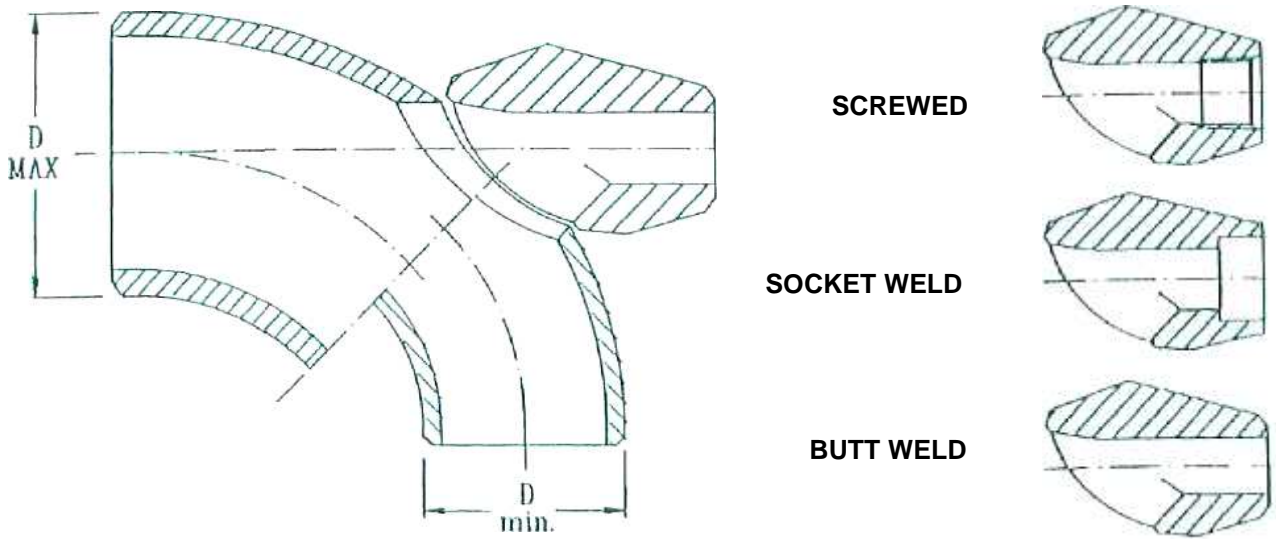
WEIGHTS:
SEE CHAPTER 9 PAGE 9

THREADS : ANSI-ASME B1.20.1
BEVEL : ASME B16.25
SOCKET: ASME B16.11



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

ELBOW OUTLET



DETERMINING OF OUTLET AND PIPELINE CONNECTIONS

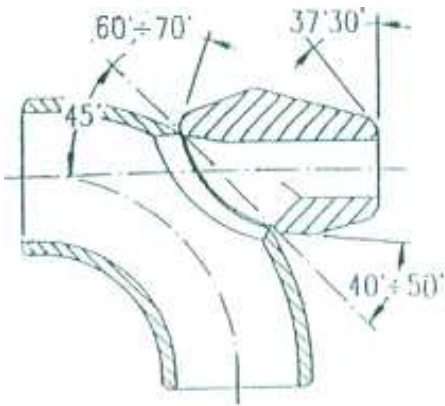
TYPE		SCHEDULE /CLASS DESIGNATION						
BUTT WELD		STD-XS						
THREADED		3000						
SOCKET WELD		3000						
BRANCH SIZE	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/4"÷36"	1.1/4"÷36"	1.1/4"÷36"	1.1/4"÷36"	2"÷36"	2"÷36"	2"-36"	2"÷36"

TYPE		SCHEDULE /CLASS DESIGNATION						
BUTT WELD		160 -XXS						
THREADED		6000						
SOCKET WELD		6000						
BRANCH SIZE	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
NOMINAL PIPE SIZE	1.1/4"÷36"	1.1/4"÷36"	1.1/4"÷36"	2"÷36"	2"÷36"	2"÷36"	3"÷36"	

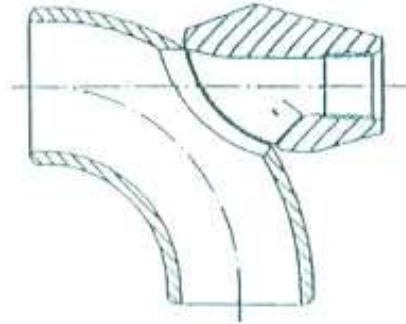


STEEL FITTINGS FOR HIGH PRESSURE SERVICE

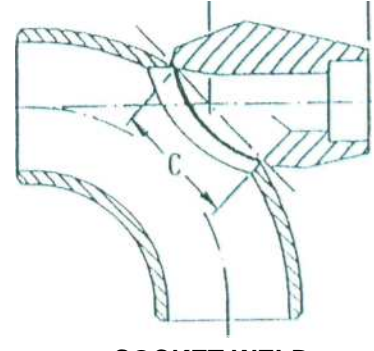
ELBOW OUTLET



BUTT WELD



SCREWED



SOCKET WELD

CLASS	NOMINAL SIZE		1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"
3000	A	MM	38.1	38.41	47	56	67	67	81	
		INCH	1.5	1.5	1.61	1.85	2.2	2.63	2.63	3.18
	C	MM	38.1	38.1	34	43	53	76	76	102
		INCH	1.5	1.5	1.33	1.69	2.08	2.99	2.99	4.01
	D	MM	31.8	31.8	31.8	35.7	45.2	57.1	63.5	82.6
		INCH	1.25	1.25	1.25	1.4	1.78	2.24	2.5	3.25
6000	A	MM	38.1	38.1	47	56	67	67	81	
		INCH	1.5	1.5	1.85	2.2	2.64	2.64	3.19	
	C	MM	38.1	38.1	43	53	76	76	102	
		INCH	1.5	1.5	1.69	2.09	2.99	2.99	4.02	
	D	MM	31.8	31.8	38.1	45.2	57.1	63.5	82.6	
		INCH	1.25	1.25	1.5	1.78	2.25	2.5	3.25	

WEIGHTS:
SEE CHAPTER 9 PAGE 9

THREADS : ANSI-ASME B1.20.1
BEVEL : ASME B16.25
SOCKET: ASME B16.11





CHAPTER 7

PACKING SYSTEM



PACKING SYSTEM

IML packages in cartons as per set out in following pages; in any case unless prior agreement with customer has been made, IML will be free to ship in cartons, bags or loose.

LABEL COLOUR CODE

LEFT SIDE: MATERIAL COLOUR CODE

MATERIAL	COLOUR CODE
A105	BLACK
A105 Hot-dip galvanized	BLACK WHITE
A305-LF2	BLACK YELLOW
A182-F316L	SILVER BLACK
A182-F304L	SILVER BLUE
Other materials	GREEN

RIGHT SIDE: ENDS

END	COLOUR CODE
THREADED	RED
SOCKET WELD	BLUE

ATTENTION: Studbolts have no color code



PACKING SYSTEM

CARBON STEEL FITTINGS - THREADED CLASS 2000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	50	50	30	25	15	10	6	2	2	1	
	WEIGHT BOX	EACH Kg	0.11	0.1	0.11	0.26	0.1	0.43	0.82	1.08	1.37	2.46	4.33	11.2
		Kg	1.7	1.5	5.4	13	9.6	10.8	12.3	10.8	8.2	4.9	8.7	11.2
		LBS	3.6	3.3	11.8	28.6	21.1	23.7	27.1	23.8	18.1	10.8	19.1	24.6
ELBOW 45°	BOX QTY	15	15	50	50	50	25	15	10	6	4	2	1	
	WEIGHT BOX	EACH Kg	0.09	0.08	0.1	0.19	0.36	0.4	0.67	0.86	1.25	2.35	3.86	8.9
		Kg	1.4	1.1	5	9.5	18	10	10.1	8.6	7.5	9.4	7.7	8.9
		LBS	3	2.5	11	20.9	39.6	22	22.1	18.9	16.5	20.7	17	19.6
TEE	BOX QTY	15	15	50	40	25	15	10	10	6	2	2	1	
	WEIGHT BOX	EACH Kg	0.13	0.12	0.19	0.28	0.41	0.6	0.92	1	1.7	3.5	5.45	13.5
		Kg	2	1.8	9.3	13.5	11.04	9	9.2	10	10.2	7	10.9	13.5
		LBS	4.3	4	20.4	39.7	25.1	19.8	20.2	22	22.4	15.4	24	29.7
CROSS	BOX QTY	10	10	25	25	20	15	8	5	4	4	1	1	
	WEIGHT BOX	EACH Kg	0.2	0.2	0.3	0.4	0.5	0.8	1.0	1.8	2.4	3.6	6.9	17.6
		Kg	2.0	2.0	7.5	10	13.4	11.3	8	8.8	9.4	14.4	6.9	17.6
		LBS	4.4	4.4	16.5	22	29.5	24.8	17.6	19.3	20.7	31.7	15.1	38.8

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)

BOX TYPE D (DIM. 235x235x140 mm)

BOX TYPE C (DIM. 300x180x140 mm)



PACKING SYSTEM

CARBON STEEL FITTINGS - THREADED CLASS 3000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	50	50	50	25	20	12	10	6	5	2	1	1	
	WEIGHT	EACH Kg	0.11	0.18	0.3	0.42	0.62	1.07	1.33	2.52	2.71	6.3	7.9	11.2
		BOX Kg	5.5	9	15	10.5	12.4	16.1	13.3	15.1	13.6	12.6	7.9	11.2
		BOX LBS	12.1	19.8	33	23.1	27.28	35.31	29.3	33.3	29.8	27.7	17.4	24.6
ELBOW 45°	BOX QTY	50	50	50	40	25	15	10	6	6	2	2	1	
	WEIGHT	EACH Kg	0.09	0.135	0.25	0.345	0.51	0.96	1.05	1.87	2.1	4.95	6.8	10.3
		BOX Kg	4.5	6.8	12.5	13.8	12.8	14.4	10.5	11.2	12.6	9.9	13.6	10.3
		BOX LBS	9.9	14.9	27.5	30.4	28.1	31.7	23.1	24.7	27.7	21.8	29.9	22.7
TEE	BOX QTY	50	50	30	25	15	10	8	4	4	2	1	1	
	WEIGHT	EACH Kg	0.15	0.225	0.43	0.5	0.87	1.38	1.52	3.1	3.53	8.35	11.1	16.5
		BOX Kg	7.5	11.3	12.9	12.5	13.1	13.8	12.2	12.4	14.1	16.7	11.1	16.5
		BOX LBS	16.5	24.8	28.38	27.5	28.7	30.4	26.8	27.3	31.1	36.7	24.4	36.3
UNION	BOX QTY	50	50	50	30	25	15	10	8	5	2	1	1	
	WEIGHT	EACH Kg	0.22	0.2	0.27	0.32	0.51	0.73	1.26	1.66	2.22	7.2	7.7	15.5
		BOX Kg	11	10	13.5	9.6	12.8	11	12.6	13.3	11.1	14.4	7.7	15.5
		BOX LBS	24.2	22	29.7	21.1	28.1	24.1	27.7	29.2	24.4	31.7	16.9	34.1
COUPLING	BOX QTY	100	100	100	50	50	25	15	15	10	4	2	2	
	WEIGHT	EACH Kg	0.04	0.07	0.09	0.15	0.2	0.4	0.79	0.96	1.37	2.15	3.15	5.92
		BOX Kg	4	7	9	7.5	10	10	11.9	14.4	13.7	8.6	6.3	11.8
		BOX LBS	8.8	15.4	19.8	16.5	22	22	26.1	31.7	30.1	18.9	13.9	26
HALF COUPLING	BOX QTY	50	50	50	100	100	50	25	25	15	8	4	4	
	WEIGHT	EACH Kg	0.025	0.04	0.05	0.07	0.11	0.19	0.4	0.5	0.77	1.3	1.65	2.97
		BOX Kg	1.3	2	2.5	7	11	9.5	10	12.5	11.6	10.4	6.6	11.9
		BOX LBS	2.8	4.4	5.5	15.4	24.2	20.9	22	27.5	25.4	22.9	14.5	26.1
CAP	BOX QTY	50	50	50	100	50	40	15	15	10	8	4	2	
	WEIGHT	EACH Kg	0.04	0.05	0.07	0.17	0.13	0.37	0.67	0.85	1.25	1.74	3.2	4.13
		BOX Kg	2	2.5	3.5	17	6.5	14.8	10.1	12.8	12.5	13.9	12.8	8.3
		BOX LBS	4.4	5.5	7.7	37.4	14.3	42.6	22.1	28.1	27.5	30.6	28.2	28.2
BOSSES	BOX QTY	15	15	50	50	25	15	10	10	4				
	WEIGHT	EACH Kg	0.05	0.065	0.1	0.175	0.29	0.53	0.9	1.2	1.8			
		BOX Kg	0.8	1	5	8.8	7.3	8	9	12	7.2			
		BOX LBS	1.7	2.1	11	19.3	16	17.5	19.8	26.4	15.8			
HEX BUSHUNG	BOX QTY		50	50	50	100	50	25	25	15	6	4	2	
	WEIGHT	EACH Kg		0.04	0.05	0.06	0.09	0.12	0.22	0.21	0.4	0.61	1	1.8
		BOX Kg		2	2.5	3	9	6	5.5	5.3	6	3.7	4	3.6
		BOX LBS		4.4	5.5	6.6	19.8	13.2	12.1	11.6	13.2	8.1	8.8	7.9
HEX NIPPLE	BOX QTY	50	50	100	100	100	50	25	15	10	5	3	2	
	WEIGHT	EACH Kg	0.01	0.03	0.03	0.09	0.13	0.26	0.39	0.57	0.92	1.1	2.25	4.2
		BOX Kg	0.5	1.5	3	9	13	13	9.8	8.6	9.2	5.5	6.8	8.4
		BOX LBS	1.1	3.3	6.6	19.8	28.6	28.6	21.5	18.8	20.2	12.1	14.9	18.5
CROSS	BOX QTY	10	10	25	20	15	8	5	4	4	1	1	1	
	WEIGHT	EACH Kg	0.2	0.21	0.48	0.7	1.05	1.62	2.25	3.82	5.3	11.25	11.87	23.75
		BOX Kg	2	2.1	12	14	15.8	13	11.3	15.3	21.2	11.3	11.9	23.8
		BOX LBS	4.4	4.6	26.4	30.8	34.7	28.5	24.8	33.6	46.6	24.8	26.1	52.3
90° STR. ELBOW	BOX QTY	50	50	50	40	25	15	10	5	5	2			
	WEIGHT	EACH Kg	0.09	0.105	0.25	0.37	0.57	0.7	1	2.07	2.1	3.9		
		BOX Kg	4.5	5.3	12.5	14.8	14.3	10.5	10	10.4	10.5	7.8		
		BOX LBS	9.9	11.6	27.5	32.6	31.4	23.1	22	22.8	23.1	17.2		

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)

BOX TYPE D

BOX TYPE C (DIM. 300x180x140 mm)



PACKING SYSTEM

CARBON STEEL FITTINGS - THREADED CLASS 6000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	25	15	10	8	4	4	2	1	1	1	
	WEIGHT BOX	EACH Kg	0.11	0.33	0.44	0.75	1.225	1.7	2.8	3.1	7.9	7.3	15.3	24
		Kg	1.7	5.0	11.0	11.3	12.3	13.6	11.2	15.8	15.8	7.3	15.3	24.0
		LBS	3.6	10.9	24.2	24.8	27	29.9	24.6	34.8	34.8	16.1	33.7	52.8
ELBOW 45°	BOX QTY	10	10	25	25	15	10	6	6	2	2	1	1	
	WEIGHT BOX	EACH Kg	0.15	0.3	0.34	0.6	1	1.34	2.15	2.92	5.93	6.6	12.7	13.5
		Kg	1.5	3.0	8.5	15.0	15.0	13.4	12.9	17.5	11.9	13.2	12.7	13.5
		LBS	3.3	6.6	18.7	33.0	33.0	29.5	28.4	38.5	26.1	29.0	27.9	29.7
TEE	BOX QTY	15	5	25	15	8	6	4	2	2	1	1	1	
	WEIGHT BOX	EACH Kg	0.15	0.48	0.6	1.01	1.55	2.19	4.05	4.6	10.2	11.8	18.6	19.3
		Kg	2.3	2.4	15.0	15.2	12.4	13.1	16.2	9.2	20.4	11.8	18.6	19.3
		LBS	5.0	5.3	33.0	33.3	27.3	28.9	35.6	20.2	44.9	26.0	40.9	42.5
UNION	BOX QTY	10	10	15	15	10	8	4	4	2	2	1	1	
	WEIGHT BOX	EACH Kg	0.2	0.49	0.69	1.05	1.53	1.85	2.7	4.6	8	9.2	13	19.5
		Kg	2.0	4.9	10.4	15.8	15.3	14.8	10.8	18.4	16.0	18.4	13.0	19.5
		LBS	4.4	10.8	22.8	34.7	33.7	32.6	23.8	40.5	35.2	40.5	28.6	42.9
COUPLING	BOX QTY	15	15	50	50	25	15	10	6	4	2	2	1	
	WEIGHT BOX	EACH Kg	0.07	0.15	0.225	0.36	0.46	0.9	1.13	1.93	3.9	3.9	6.13	9.95
		Kg	1.1	2.3	11.3	18.0	11.5	13.5	11.3	11.6	15.6	7.8	12.3	10.0
		LBS	2.3	5.0	24.8	39.6	25.3	29.7	24.8	25.5	34.3	17.2	27.0	21.9
HALF COUPLING	BOX QTY	25	25	50	50	50	25	25	10	10	4	4	2	
	WEIGHT BOX	EACH Kg	0.04	0.08	0.1	0.2	0.26	0.47	0.52	0.98	1.45	2.1	3.05	5.5
		Kg	1.0	2.0	5.0	10.0	13.0	11.8	13.0	9.8	14.5	8.4	12.2	11.0
		LBS	2.2	4.4	11.0	22.0	28.6	25.9	28.6	21.6	31.9	18.5	26.8	24.2
CAP	BOX QTY	15	15	50	50	25	15	10	10	5	4	2	1	
	WEIGHT BOX	EACH Kg	0.05	0.13	0.14	0.28	0.4	0.74	0.86	1.3	2.05	3.35	5.25	7.5
		Kg	0.8	2.0	7.0	14.0	10.0	11.1	8.6	13.0	10.3	13.4	10.5	7.5
		LBS	1.7	4.3	15.4	30.8	22.0	24.4	18.9	28.6	22.6	29.5	23.1	16.5
HEX NIPPLE	BOX QTY	15	15	50	50	50	40	25	15	10	5	3	2	
	WEIGHT BOX	EACH Kg	0.015	0.03	0.055	0.12	0.17	0.33	0.53	0.7	1.06	2.4	2.86	5.25
		Kg	0.2	0.5	2.8	6.0	8.5	13.2	13.3	10.5	10.6	12.0	8.6	10.5
		LBS	0.5	1.0	6.1	13.2	18.7	29.0	29.2	23.1	23.3	26.4	18.9	23.1

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

CARBON STEEL FITTINGS - SOCKET WELD CLASS 3000															
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"		
ELBOW 90°	BOX QTY	15	15	50	50	30	25	15	10	6	2	2	1		
	WEIGHT	EACH Kg	0.125	0.12	0.15	0.23	0.33	0.5	0.78	1.01	1.53	2.45	4.54	10.2	
		BOX	Kg	1.9	1.8	7.5	11.5	9.9	12.5	11.7	10.1	9.2	4.9	9.1	10.2
			LBS	4.1	4.0	16.5	25.3	21.8	27.5	25.7	22.2	20.2	10.8	20.0	22.4
ELBOW 45°	BOX QTY	15	15	50	50	50	25	15	10	6	4	2	1		
	WEIGHT	EACH Kg	0.12	0.1	0.105	0.18	0.25	0.39	0.67	0.75	1.17	2.24	3.15	9	
		BOX	Kg	1.8	1.5	5.3	9.0	12.5	9.8	10.1	7.5	7.0	9.0	6.3	9.0
			LBS	4.0	3.3	11.6	19.8	27.5	21.5	22.1	16.5	15.4	19.7	13.9	19.8
TEE	BOX QTY	15	15	50	40	25	15	10	10	6	2	2	1		
	WEIGHT	EACH Kg	0.18	0.125	0.17	0.31	0.4	0.57	0.92	1.31	1.83	2.65	5.4	14.1	
		BOX	Kg	2.7	1.9	8.5	12.4	10.0	8.6	9.2	13.1	11.0	5.3	10.8	14.1
			LBS	5.9	4.1	18.7	27.3	22.0	18.8	20.2	28.8	24.2	11.7	23.8	31.0
UNION	BOX QTY	10	10	50	40	25	15	10	10	5	2	1	1		
	WEIGHT	EACH Kg	0.18	0.26	0.325	0.37	0.55	0.09	1.25	1.55	2.5	5	8	16	
		BOX	Kg	1.8	2.6	16.3	14.8	13.8	1.4	12.5	15.5	12.5	10.0	8.0	16.0
			LBS	4.0	5.7	35.8	32.6	30.3	3.0	27.5	34.1	27.5	22.0	17.6	35.2
COUPLING	BOX QTY	25	25	100	100	50	30	25	25	15	8	4	2		
	WEIGHT	EACH Kg	0.04	0.05	0.08	0.13	0.17	0.28	0.5	0.53	0.95	1.45	1.8	2.25	
		BOX	Kg	1.0	1.3	8.0	13.0	8.5	8.4	12.5	13.3	14.3	11.6	7.2	4.5
			LBS	2.2	2.8	17.6	28.6	18.7	18.5	27.5	29.2	31.4	25.5	15.8	9.9
HALF COUPLING	BOX QTY	15	15	100	100	50	30	25	15	10	8	4	2		
	WEIGHT	EACH Kg	0.04	0.05	0.09	0.14	0.19	0.33	0.54	0.67	1.12	1.65	2.5	3.67	
		BOX	Kg	0.6	0.8	9.0	14.0	9.5	9.9	13.5	10.1	11.2	13.2	10.0	7.3
			LBS	1.3	1.7	19.8	30.8	20.9	21.8	29.7	22.1	24.6	29.0	22.0	16.1
CAP	BOX QTY	15	15	100	100	100	50	25	15	15	8	5	3		
	WEIGHT	EACH Kg	0.025	0.04	0.06	0.1	0.17	0.29	0.52	0.74	0.97	1.72	2.09	3.86	
		BOX	Kg	0.4	0.6	6.0	10.0	17.0	14.5	13.0	11.1	14.6	13.8	10.5	11.6
			LBS	0.8	1.3	13.2	22.0	37.4	31.9	28.6	24.4	32.0	30.3	23.0	25.5
CROSS	BOX QTY	15	15	50	25	25	15	5	5	4	1	1	1		
	WEIGHT	EACH Kg	0.1	0.15	0.15	0.35	0.48	0.8	1.27	1.7	2.1	8.17	10.9	19.5	
		BOX	Kg	1.5	2.3	7.5	8.8	12.0	12.0	6.4	8.5	8.4	8.2	10.9	19.5
			LBS	3.3	5.0	16.5	19.3	26.4	26.4	14.0	18.7	18.5	18.0	24.0	42.9
BOSSES	BOX QTY	15	15	50	50	25	15	10	10	4					
	WEIGHT	EACH Kg	0.05	0.065	0.25	0.14	0.22	0.35	0.45	0.55	0.1				
		BOX	Kg	0.8	1.0	12.5	7.0	5.5	5.3	4.5	5.5	0.4			
			LBS	1.7	2.1	27.5	15.4	12.1	11.6	9.9	12.1	0.9			
RED INSERT	BOX QTY		15	50	50	50	50	50	25	15	8	8	4		
	WEIGHT	EACH Kg		0.04	0.07	0.11	0.13	0.21	0.32	0.42	0.1	1.71	1.65	3.85	
		BOX	Kg		0.6	3.5	5.5	6.5	10.5	16.0	10.5	1.5	13.7	13.2	15.4
			LBS		1.3	7.7	12.1	14.3	23.1	35.2	23.1	3.3	30.1	29.0	33.9

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

CARBON STEEL FITTINGS - SOCKET WELD CLASS 6000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	25	30	15	10	10	6	5	2	1	1	
	WEIGHT BOX	EACH Kg	0.12	0.15	0.325	0.4	0.68	1.2	1.43	2.58	3.18	7.3	9.1	15
		Kg	1.8	2.3	8.1	12.0	10.2	12.0	14.3	15.5	15.9	14.6	9.1	15.0
		LBS	4.0	5.0	17.9	26.4	22.4	26.4	31.5	34.1	135	32.1	20.0	33.0
ELBOW 45°	BOX QTY	15	15	50	30	25	10	10	6	4	2	2	1	
	WEIGHT BOX	EACH Kg	0.125	0.125	0.235	0.4	0.55	0.98	1.15	2.05	2.35	6.8	6.95	10
		Kg	1.9	1.9	11.8	12	13.8	9.8	11.5	12.3	9.4	13.6	13.9	10.0
		LBS	4.1	4.1	25.9	26.4	30.3	21.6	25.3	27.1	20.7	29.9	30.6	22.0
TEE	BOX QTY	15	15	50	25	15	10	8	4	4	2	1	1	
	WEIGHT BOX	EACH Kg	0.15	0.21	0.39	0.55	0.93	1.4	1.8	3.17	3.86	7.5	11.3	18
		Kg	2.3	3.2	19.5	13.8	14.0	14.0	14.4	12.7	15.4	15.0	11.3	18.0
		LBS	5.0	6.9	43.0	30.0	30.8	30.9	31.7	27.9	34.0	33.1	24.9	39.7
UNION	BOX QTY	10	10	15	20	15	10	5	4	2	1	1	1	
	WEIGHT BOX	EACH Kg	0.26	0.4	0.43	0.68	1.20	1.7	2.35	3.5	7.24	9.65	19	25
		Kg	2.6	4.0	6.5	13.6	17.9	17.0	11.8	14.0	14.5	9.7	19.0	25.0
		LBS	5.7	8.8	14.2	29.9	39.4	37.4	25.9	30.8	31.9	21.2	41.8	55.0
COUPLING	BOX QTY	25	25	50	50	50	25	15	15	10	5	4	2	
	WEIGHT BOX	EACH Kg	0.05	0.06	0.1	0.26	0.32	0.41	0.45	0.58	1.19	3.05	4.1	6.5
		Kg	1.3	1.5	5.0	13.0	16.0	10.3	6.8	8.7	11.9	15.3	16.4	13.0
		LBS	2.8	3.3	11.0	28.6	35.2	22.6	14.9	19.1	26.2	33.6	36.1	28.6
HALF COUPLING	BOX QTY	15	15	50	50	30	25	20	15	10	5	4	2	
	WEIGHT BOX	EACH Kg	0.05	0.07	0.1	0.3	0.365	0.51	0.8	1.33	2.15	3.32	4.5	6
		Kg	0.8	1.1	5.0	15.0	11.0	12.8	16.0	20.0	21.5	16.6	18.0	12.0
		LBS	1.7	2.3	11.0	33.0	24.1	28.1	35.2	43.9	47.3	36.5	39.6	26.4
CAP	BOX QTY	15	15	100	50	50	25	25	15	10	5	4	2	
	WEIGHT BOX	EACH Kg	0.1	0.125	0.125	0.225	0.33	0.45	0.64	0.98	1.53	2.91	3.63	5
		Kg	1.5	1.9	12.5	11.3	16.5	11.3	16.0	14.7	15.3	14.6	14.5	10.0
		LBS	3.3	4.1	27.5	24.8	36.3	24.8	35.2	32.3	33.7	32.0	31.9	22.0

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

CARBON STEEL PLUGS														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
HEX HEAD PLUG	BOX QTY	50	50	100	100	100	50	25	20	15	6	4	2	
	WEIGHT BOX	EACH Kg	0.03	0.03	0.05	0.1	0.18	0.2	0.41	0.68	1.15	2	2.98	6.95
		Kg	1.5	1.5	4.5	10	18	10	10.3	13.6	17.3	12	11.9	13.9
		LBS	3.3	3.3	9.9	22	39.6	22	22.6	29.9	38	26.4	26.2	30.6
SQUARE HEAD PLUG	BOX QTY	50	50	100	100	100	50	25	25	20	10	8	4	
	WEIGHT BOX	EACH Kg	0.02	0.03	0.06	0.07	0.09	0.15	0.29	0.39	0.68	1.2	1.68	3.7
		Kg	0.9	1.25	6	7	8.5	7.5	7.25	9.8	13.6	12	13.4	14.8
		LBS	1.98	2.75	13.2	15.4	18.7	16.5	16	21.5	29.9	26.4	29.6	32.6
ROUND HEAD PLUG	BOX QTY	50	50	100	100	50	40	25	15	10	6	4	2	
	WEIGHT BOX	EACH Kg	0.05	0.07	0.1	0.15	0.2	0.39	0.57	0.73	1.42	2.21	3.4	6.19
		Kg	2.5	3.5	10	15	10	15.6	14.3	10.9	14.2	13.3	13.6	12.4
		LBS	5.5	7.7	22	33	22	34.3	31.4	23.9	31.2	29.2	29.9	27.2

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

Note : Plugs are not identified by class. They maybe used for ratings up to class 6000.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

STAINLESS STEEL FITTINGS - THREADED CLASS 2000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	50	50	50	25	15	10	6	2	2	1	
	WEIGHT BOX	EACH Kg	0.11	0.1	0.11	0.26	0.1	0.43	0.82	1.08	1.37	2.46	4.33	11.2
		Kg	1.65	1.5	5.35	13	5	10.8	12.3	10.8	8.22	4.92	8.66	11.2
		LBS	3.63	3.3	11.8	28.6	11	23.7	27.1	23.8	18.1	10.8	19.1	24.6
ELBOW 45°	BOX QTY	15	15	50	50	50	25	15	10	6	4	2	1	
	WEIGHT BOX	EACH Kg	0.09	0.08	0.1	0.19	0.26	0.4	0.67	0.36	1.25	2.35	3.86	8.9
		Kg	1.35	1.13	5	9.5	13	10	10.1	3.6	7.5	9.4	7.72	8.9
		LBS	2.97	2.48	11	20.9	28.6	22	22.1	7.92	16.5	20.7	17	19.6
TEE	BOX QTY	15	15	50	50	25	15	10	10	6	2	2	1	
	WEIGHT BOX	EACH Kg	0.13	0.12	0.19	0.28	0.41	0.6	0.92	1	1.7	3.5	5.45	13.5
		Kg	1.95	1.8	9.25	14	10.3	9	9.2	10	10.2	7	10.9	13.5
		LBS	4.29	3.96	20.4	30.8	22.6	19.8	20.2	22	22.4	15.4	24	29.7

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

STAINLESS STEEL FITTINGS - THREADED CLASS 3000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	50	25	25	15	10	6	5	2	1	1	
	WEIGHT BOX	EACH Kg	0.11	0.18	0.3	0.42	0.62	1.07	1.33	2.52	2.71	6.3	7.9	11.2
		Kg	1.7	2.7	15.0	10.5	15.5	16.1	13.3	15.1	13.6	12.6	7.9	11.2
		LBS	3.6	5.9	33.0	23.1	34.1	35.3	29.3	33.3	29.8	27.7	17.4	24.6
ELBOW 45°	BOX QTY	15	15	50	50	25	15	10	6	6	2	2	1	
	WEIGHT BOX	EACH Kg	0.09	0.135	0.25	0.345	0.51	0.96	1.05	1.87	2.1	4.95	6.8	10.3
		Kg	1.4	2.0	12.5	17.3	12.8	14.4	10.5	11.2	12.6	9.9	13.6	10.3
		LBS	3.0	4.5	27.5	38.0	28.1	31.7	23.1	24.7	27.7	21.8	29.9	22.7
TEE	BOX QTY	15	15	50	25	15	10	10	6	4	2	1	1	
	WEIGHT BOX	EACH Kg	0.15	0.225	0.43	0.5	0.87	1.38	1.52	3.1	3.53	8.35	11.1	16.5
		Kg	2.3	3.4	21.5	12.5	13.1	13.8	15.2	18.6	14.1	16.7	11.1	16.5
		LBS	5.0	7.4	47.3	27.5	28.7	30.4	33.4	40.9	31.1	36.7	24.4	36.3
UNION	BOX QTY	10	10	50	30	25	15	10	8	5	2	1	1	
	WEIGHT BOX	EACH Kg	0.22	0.2	0.27	0.32	0.51	0.73	1.26	1.66	2.22	7.2	7.7	15.5
		Kg	2.2	2.0	13.5	9.6	12.8	11.0	12.6	13.3	11.1	14.4	7.7	15.5
		LBS	4.8	4.4	29.7	21.1	28.1	24.1	27.7	29.2	24.4	31.7	16.9	34.1
COUPLING	BOX QTY	20	20	50	50	50	25	15	15	10	4	2	2	
	WEIGHT BOX	EACH Kg	0.04	0.07	0.09	0.15	0.2	0.4	0.79	0.36	1.37	2.15	3.15	5.92
		Kg	0.8	1.4	4.5	7.5	10.0	10.0	11.9	5.4	13.7	8.6	6.3	11.8
		LBS	1.8	3.1	9.9	16.5	22.0	22.0	26.1	11.9	30.1	18.9	13.9	26.0
HALF COUPLING	BOX QTY	15	15	50	50	50	50	25	25	15	8	4	4	
	WEIGHT BOX	EACH Kg	0.025	0.04	0.05	0.07	0.11	0.19	0.4	0.5	0.77	1.3	1.65	2.97
		Kg	0.4	0.6	2.5	3.5	5.5	9.5	10.0	12.5	11.6	10.4	6.6	11.9
		LBS	0.8	1.3	5.5	7.7	12.1	20.9	22.0	27.5	25.4	22.9	14.5	26.1
CAP	BOX QTY	15	15	50	50	50	50	15	15	15	8	4	4	
	WEIGHT BOX	EACH Kg	0.04	0.05	0.07	0.17	0.19	0.37	0.67	0.85	1.25	1.74	3.2	4.13
		Kg	0.6	0.8	3.5	8.5	9.5	18.5	10.1	12.8	18.8	13.9	12.8	16.5
		LBS	1.3	1.7	7.7	18.7	20.9	40.7	22.1	28.1	41.3	30.6	28.2	36.3
BOSSES	BOX QTY	15	15	50	50	25	15	10	10	4				
	WEIGHT BOX	EACH Kg	0.05	0.065	0.1	0.175	0.29	0.53	0.9	1.2	1.8			
		Kg	0.8	1.0	5.0	8.8	7.3	8.0	9.0	12.0	7.2			
		LBS	1.7	2.1	11.0	19.3	16.0	17.5	19.8	26.4	15.8			
HEX BUSHINGS	BOX QTY		15	50	50	50	50	25	25	15	6	4	2	
	WEIGHT BOX	EACH Kg		0.04	0.05	0.06	0.09	0.12	0.22	0.21	0.4	0.61	1	1.8
		Kg		0.6	2.5	3.0	4.5	6.0	5.5	5.3	6.0	3.7	4.0	3.6
		LBS		1.3	5.5	6.6	9.9	13.2	12.1	11.6	13.2	8.1	8.8	7.9
HEX NIPPLE	BOX QTY	15	15	50	50	50	50	25	15	10	5	3	2	
	WEIGHT BOX	EACH Kg	0.01	0.03	0.04	0.09	0.13	0.26	0.39	0.54	0.92	1.1	2.25	4.2
		Kg	0.2	0.5	2.0	4.5	6.5	13.0	9.8	8.1	9.2	5.5	6.8	8.4
		LBS	0.3	1.0	4.4	9.9	14.3	28.6	21.5	17.8	20.2	12.1	14.9	18.5
CROSS	BOX QTY	10	10	15	15	15	8	5	4	4	1	1	1	
	WEIGHT BOX	EACH Kg	0.2	0.21	0.48	0.7	1.05	1.62	2.25	3.82	5.3	11.25	11.87	23.75
		Kg	2.0	2.1	7.2	10.5	15.8	13.0	11.3	15.3	21.2	11.3	11.9	23.8
		LBS	4.4	4.6	15.8	23.1	34.7	28.5	24.8	33.6	46.6	24.8	26.1	52.3
90° STREET ELBOW	BOX QTY	15	15	50	50	25	15	10	5	5	2			
	WEIGHT BOX	EACH Kg	0.09	0.105	0.25	0.37	0.57	0.7	1	2.07	2.1	3.9		
		Kg	1.4	1.6	12.5	18.5	14.3	10.5	10.0	10.4	10.5	7.8		
		LBS	3.0	3.5	27.5	40.7	31.4	23.1	22.0	22.8	23.1	17.2		

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

STAINLESS STEEL FITTINGS - THREADED CLASS 6000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	25	25	15	10	6	5	2	1	1	1	
	WEIGHT BOX	EACH Kg	0,11	0,37	0,44	0,75	1,22	1,7	2,8	3,1	7,9	7,3	15,3	24
		Kg	1,7	5,6	11,0	18,8	18,4	17,0	16,8	15,5	15,8	7,3	15,3	24,0
		LBS	3,6	12,2	24,2	41,3	40,4	37,4	37,0	34,1	34,8	16,1	33,7	52,8
ELBOW 45°	BOX QTY	10	10	25	25	15	10	6	6	2	2	1	1	
	WEIGHT BOX	EACH Kg	0,15	0,3	0,34	0,6	1	1,34	2,15	2,92	5,93	6,6	12,7	3,5
		Kg	1,5	3,0	8,5	15,0	15,0	13,4	12,9	17,5	11,9	13,2	12,7	3,5
		LBS	3,3	6,6	18,7	33,0	33,0	29,5	28,4	38,5	26,1	29,0	27,9	7,7
TEE	BOX QTY	15	5	25	15	10	10	6	4	2	1	1	1	
	WEIGHT BOX	EACH Kg	0,15	0,48	0,6	1,01	1,55	2,19	4,05	4,6	10,2	11,8	18,6	19,3
		Kg	2,3	2,4	15,0	15,2	15,5	21,9	24,3	18,4	20,4	11,8	18,6	19,3
		LBS	5,0	5,3	33,0	33,3	34,1	48,2	53,5	40,5	44,9	26,0	40,9	42,5
UNION	BOX QTY	10	10	25	15	15	8	4	4	2	2	1	1	
	WEIGHT BOX	EACH Kg	0,2	0,43	0,69	1,05	1,53	1,85	2,7	4,6	8	9,2	13	19,5
		Kg	2,0	4,3	17,3	15,8	23,0	14,8	10,8	18,4	16,0	18,4	13,0	19,5
		LBS	4,4	9,5	38,0	34,7	50,5	32,6	23,8	40,5	35,2	40,5	28,6	42,9
COUPLING	BOX QTY	15	15	50	50	25	15	10	4	4	2	2	1	
	WEIGHT BOX	EACH Kg	0,07	0,15	0,225	0,36	0,46	0,9	1,125	1,93	3,9	3,9	6,13	9,95
		Kg	1,1	2,3	11,3	18,0	11,5	13,5	11,3	7,7	15,6	7,8	12,3	10,0
		LBS	2,3	5,0	24,8	39,6	25,3	29,7	24,8	17,0	34,3	17,2	27,0	21,9
HALF COUPLING	BOX QTY	15	15	50	50	50	25	25	10	10	4	4	2	
	WEIGHT BOX	EACH Kg	0,04	0,08	0,1	0,2	0,26	0,47	0,52	0,98	1,45	2,1	3,05	5,5
		Kg	0,6	1,2	5,0	10,0	13,0	11,8	13,0	9,8	14,5	8,4	12,2	11,0
		LBS	1,3	2,6	11,0	22,0	28,6	25,9	28,6	21,6	31,9	18,5	26,8	24,2
CAP	BOX QTY	15	15	50	50	25	15	10	10	5	4	4	1	
	WEIGHT BOX	EACH Kg	0,05	0,13	0,14	0,28	0,4	0,74	0,86	1,3	2,05	3,35	5,25	7,5
		Kg	0,8	2,0	7,0	14,0	10,0	11,1	8,6	13,0	10,3	13,4	21,0	7,5
		LBS	1,7	4,3	15,4	30,8	22,0	24,4	18,9	28,6	22,6	29,5	46,2	16,5
HEX NIPPLE	BOX QTY	15	15	50	50	50	50	25	15	10	5	3	2	
	WEIGHT BOX	EACH Kg	0,015	0,03	0,055	0,12	0,17	0,33	0,53	0,7	1,06	2,4	2,86	5,25
		Kg	0,2	0,5	2,8	6,0	8,5	16,5	13,3	10,5	10,6	12,0	8,6	10,5
		LBS	0,5	1,0	6,1	13,2	18,7	36,3	29,2	23,1	23,3	26,4	18,9	23,1

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)

BOX TYPE D

BOX TYPE C (DIM. 300x180x140 mm)



PACKING SYSTEM

STAINLESS STEEL FITTINGS - SOCKET WELD CLASS 3000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	50	50	25	25	15	10	6	2	2	1	
	WEIGHT BOX	EACH Kg	0,125	0,12	0,15	0,23	0,33	0,5	0,78	1,01	1,53	2,45	4,54	10,2
		Kg	1,9	1,8	7,5	11,5	8,3	12,5	11,7	10,1	9,2	4,9	9,1	10,2
		LBS	4,1	4,0	16,5	25,3	18,2	27,5	25,7	22,2	20,2	10,8	20,0	22,4
ELBOW 45°	BOX QTY	15	15	50	50	50	25	15	10	6	4	2	1	
	WEIGHT BOX	EACH Kg	0,12	0,1	0,105	0,18	0,25	0,39	0,67	0,75	1,17	2,24	3,15	9
		Kg	1,8	1,5	5,3	0,6	12,5	9,8	10,1	7,5	7,0	9,0	6,3	9,0
		LBS	4,0	3,3	11,6	1,4	27,5	21,5	22,1	16,5	15,4	19,7	13,9	19,8
TEE	BOX QTY	15	15	50	50	25	15	10	10	6	2	1	1	
	WEIGHT BOX	EACH Kg	0,18	0,125	0,17	0,31	0,4	0,57	0,92	1,31	1,83	2,65	5,4	14,1
		Kg	2,7	1,9	8,5	15,5	10,0	8,6	9,2	13,1	11,0	5,3	5,4	14,1
		LBS	5,9	4,1	18,7	34,1	22,0	18,8	20,2	28,8	24,2	11,7	11,9	31,0
UNION	BOX QTY	10	10	50	50	25	15	10	10	5	2	1	1	
	WEIGHT BOX	EACH Kg	0,18	0,26	0,325	0,42	0,55	0,9	1,25	1,55	2,5	5	8	16
		Kg	1,8	2,6	16,3	21,0	13,8	13,5	12,5	15,5	12,5	10,0	8,0	16,0
		LBS	4,0	5,7	35,8	46,2	30,3	29,7	27,5	34,1	27,5	22,0	17,6	35,2
COUPLING	BOX QTY	15	15	50	50	50	50	25	25	15	8	4	2	
	WEIGHT BOX	EACH Kg	0,04	0,05	0,08	0,13	0,17	0,28	0,5	0,53	0,95	1,45	1,8	2,25
		Kg	0,6	0,8	4,0	6,5	8,5	14,0	12,5	13,3	14,3	11,6	7,2	4,5
		LBS	1,3	1,7	8,8	14,3	18,7	30,8	27,5	29,2	31,4	25,5	15,8	9,9
HALF COUPLING	BOX QTY	15	15	50	50	50	50	25	15	15	8	4	2	
	WEIGHT BOX	EACH Kg	0,04	0,05	0,09	0,14	0,19	0,33	0,54	0,67	1,12	1,65	2,5	3,67
		Kg	0,6	0,8	4,5	7,0	9,5	1,1	13,5	10,1	16,8	13,2	10,0	7,3
		LBS	1,3	1,7	9,9	15,4	20,9	2,5	29,7	22,1	37,0	29,0	22,0	16,1
CAP	BOX QTY	15	15	50	50	50	50	25	15	15	10	5	3	
	WEIGHT BOX	EACH Kg	0,025	0,04	0,06	0,1	0,17	0,29	0,52	0,74	0,97	1,72	2,09	3,86
		Kg	0,4	0,6	3,0	5,0	0,6	14,5	13,0	11,1	14,6	17,2	10,5	11,6
		LBS	0,8	1,3	6,6	11,0	1,3	31,9	28,6	24,4	32,0	37,8	23,0	25,5
CROSS	BOX QTY	15	15	25	25	25	15	5	5	4	1	1	1	
	WEIGHT BOX	EACH Kg	0,1	0,15	0,15	0,35	0,48	0,8	1,27	1,7	2,1	8,17	10,9	19,5
		Kg	1,5	2,3	0,3	8,8	12,0	12,0	6,4	8,5	8,4	8,2	10,9	19,5
		LBS	3,3	5,0	0,6	19,3	26,4	26,4	14,0	18,7	18,5	18,0	24,0	42,9
BOSSES	BOX QTY	15	15	50	50	25	15	10	10	4				
	WEIGHT BOX	EACH Kg	0,05	0,065	0,25	0,14	0,22	0,35	0,45	0,55	0,1			
		Kg	0,8	1,0	12,5	7,0	5,5	5,3	4,5	5,5	0,4			
		LBS	1,7	2,1	27,5	15,4	12,1	11,6	9,9	12,1	0,9			
RED. INSERT	BOX QTY		15	50	50	50	50	50	25	25	10	10	4	
	WEIGHT BOX	EACH Kg		0,04	0,07	0,11	0,13	0,21	0,32	0,42	0,1	1,71	1,65	3,85
		Kg		0,6	3,5	5,5	6,5	10,5	16,0	10,5	2,5	17,1	16,5	15,4
		LBS		1,3	7,7	12,1	14,3	23,1	35,2	23,1	5,5	37,6	36,3	33,9

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

STAINLESS STEEL FITTINGS - SOCKET WELD CLASS 6000														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
ELBOW 90°	BOX QTY	15	15	25	25	25	15	10	6	5	2	1	1	
	WEIGHT	EACH	0,12	0,15	0,325	0,4	0,68	1,2	1,43	2,58	3,18	7,3	9,1	15
		Kg	1,8	2,3	8,1	10,0	17,0	18,0	14,3	15,5	15,9	14,6	9,1	15,0
		BOX	LB	4,0	5,0	17,9	22,0	37,4	39,6	31,5	34,1	35,0	32,1	20,0
ELBOW 45°	BOX QTY	15	15	50	50	25	15	10	6	4	2	2	1	
	WEIGHT	EACH	0,125	0,125	0,235	0,4	0,55	0,98	1,15	2,05	2,35	6,8	6,95	10
		Kg	1,9	1,9	11,8	20,0	13,8	14,7	11,5	12,3	9,4	13,6	13,9	10,0
		BOX	LB	4,1	4,1	25,9	44,0	30,3	32,3	25,3	27,1	20,7	29,9	30,6
TEE	BOX QTY	15	15	50	25	15	10	10	6	4	2	1	1	
	WEIGHT	EACH	0,15	0,21	0,39	0,55	0,93	1,4	1,8	3,17	3,86	7,5	11,3	18
		Kg	2,3	3,2	19,5	13,8	14,0	14,0	18,0	19,0	15,4	15,0	11,3	18,0
		BOX	LB	5,0	6,9	42,9	30,3	30,7	30,8	39,6	41,8	34,0	33,0	24,9
UNION	BOX QTY	10	10	25	25	15	10	5	5	2	2	1	1	
	WEIGHT	EACH	0,26	0,4	0,43	0,68	1,195	1,7	2,35	3,5	7,24	9,65	19	25
		Kg	2,6	4,0	10,8	17,0	17,9	17,0	11,8	17,5	14,5	19,3	19,0	25,0
		BOX	LB	5,7	8,8	23,7	37,4	39,4	37,4	25,9	38,5	31,9	42,5	41,8
COUPLING	BOX QTY	15	15	50	25	50	25	15	15	10	5	4	2	
	WEIGHT	EACH	0,05	0,06	0,1	0,26	0,32	0,41	0,45	0,58	1,19	3,05	4,1	6,5
		Kg	0,8	0,9	5,0	6,5	16,0	10,3	6,8	8,7	11,9	15,3	16,4	13,0
		BOX	LB	1,7	2,0	11,0	14,3	35,2	22,6	14,9	19,1	26,2	33,6	36,1
HALF COUPLING	BOX QTY	15	15	50	25	50	25	25	15	10	5	4	2	
	WEIGHT	EACH	0,05	0,07	0,1	0,3	0,365	0,51	0,8	1,33	2,15	3,32	4,5	6
		Kg	0,8	1,1	5,0	7,5	18,3	12,8	20,0	20,0	21,5	16,6	18,0	12,0
		BOX	LB	1,7	2,3	11,0	16,5	40,2	28,1	44,0	43,9	47,3	36,5	39,6
CAP	BOX QTY	15	15	50	25	25	25	25	15	10	5	4	2	
	WEIGHT	EACH	0,1	0,125	0,125	0,225	0,33	0,45	0,54	0,98	1,53	2,91	3,63	5
		Kg	1,5	1,9	6,3	5,6	8,3	11,3	13,5	14,7	15,3	14,6	14,5	10,0
		BOX	LB	3,3	4,1	13,8	12,4	18,2	24,8	29,7	32,3	33,7	32,0	31,9

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	



PACKING SYSTEM

STAINLESS STEEL PLUGS														
PRODUCT	SIZE	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	
HEX. HEAD PLUG	BOX QTY	15	15	50	50	50	50	25	25	15	10	6	2	
	WEIGHT	EACH Kg	0,03	0,03	0,05	0,1	0,18	0,2	0,41	0,68	1,15	2	2,98	6,95
		Kg	0,5	0,5	2,3	5,0	9,0	10,0	10,3	17,0	17,3	20,0	17,9	13,9
		BOX LB S	1,0	1,0	5,0	11,0	19,8	22,0	22,6	37,4	38,0	44,0	39,3	30,6
SQUARE HEAD PLUG	BOX QTY	15	15	50	50	50	50	25	25	25	10	8	6	
	WEIGHT	EACH Kg	0,02	0,03	0,06	0,07	0,09	0,15	0,29	0,39	0,68	1,2	1,68	3,7
		Kg	0,3	0,4	3,0	3,5	4,3	7,5	7,3	9,8	17,0	12,0	13,4	22,2
		BOX LB S	0,6	0,8	6,6	7,7	9,4	16,5	16,0	21,5	37,4	26,4	29,6	48,8
ROUND HEAD PLUG	BOX QTY	15	15	50	50	50	50	25	15	10	10	6	4	
	WEIGHT	EACH Kg	0,05	0,07	0,1	0,15	0,2	0,39	0,57	0,73	1,42	2,21	3,4	6,19
		Kg	0,8	1,1	5,0	7,5	10,0	19,5	14,3	10,9	14,2	22,1	20,4	24,8
		BOX LB S	1,7	2,3	11,0	16,5	22,0	42,9	31,4	23,9	31,2	48,6	44,9	54,5

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX TYPE A (DIM. 120x100x110 mm)	BOX TYPE D
BOX TYPE C (DIM. 300x180x140 mm)	

Note : Plugs are not identified by class. They maybe used for ratings up to class 6000.



PACKING SYSTEM

STUDBOLTS + 2 HEX NUTS																						
SIZE		1/2"			5/8"			3/4"			7/8"			1"			1.1/8"			1.1/4"		
LENGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT		BOX QTY	WEIGHT	
mm	Inch		Kg	LBS		Kg	LBS		Kg	LBS		Kg	LBS		Kg	LBS		Kg	LBS		Kg	LBS
60	2.3/8	100	10,8	23,8	75	13,8	30,4	50	14,3	31,5	25	10,6	23,3	15	8,8	19,4						
65	2.1/2	100	11,2	24,7	75	14,3	31,4	50	14,8	32,6	25	10,9	24	15	9,0	19,9						
70	2.3/4	100	11,6	25,6	75	14,7	32,4	50	15,3	33,6	25	11,2	24,7	15	9,3	20,5						
75	3	100	12,0	26,5	75	15,2	33,6	50	15,7	34,6	25	11,5	25,4	15	3,5	21,0						
80	3.1/8	100	12,4	27,3	50	10,2	22,5	40	12,9	28,5	25	11,8	26,1	15	9,8	21,6						
85	3.1/4	100	12,8	28,2	50	10,7	23,6	40	13,3	29,3	25	12,2	26,8	15	10,0	22,1						
90	3.1/2	100	13,2	29,1	50	11,3	24,9	40	13,7	30,2	25	12,5	27,5	15	10,3	22,7						
95	3.3/4	100	13,6	30,0	50	11,4	25,1	40	14,0	31	25	12,8	28,2	15	10,5	23,2						
100	4	100	14,0	30,9	50	11,7	25,8	40	14,4	31,7	25	13,1	28,9	15	10,8	23,8	10	9,7	21,3	10	12,5	27,6
105	4.1/8	100	14,4	31,7	50	12,0	26,5	40	14,8	32,5	25	13,4	29,6	15	11	24,3	10	9,9	21,8	10	12,8	28,2
110	4.1/4	100	14,8	32,6	50	12,4	27,2	40	15,1	33,3	25	13,7	30,3	15	11,3	24,9	10	10,1	22,3	10	13,1	28,8
115	4.1/2	100	15,2	33,5	50	12,7	27,9	40	15,5	34,2	25	14,1	31,0	15	11,5	25,4	10	10,3	22,8	10	13,4	29,4
120	4.3/4	100	15,6	34,4	50	13,0	28,5	25	15,8	35,0	25	14,4	31,7	15	11,8	26,0	10	10,5	23,2	10	13,6	30,0
125	5	100	16,0	35,3	50	13,3	29,3	25	10,2	22,4	25	14,7	32,4	15	12,0	26,5	10	10,8	23,7	10	13,9	30,6
130	5.1/8	100	16,4	36,2	40	10,9	24,0	25	10,4	22,9	25	15,0	33,1	15	12,3	27,1	10	11,0	24,2	10	14,2	31,2
135	5.1/4	75	12,6	27,8	40	11,1	24,5	25	10,6	23,4	25	15,3	33,8	15	12,5	27,6	10	11,2	24,7	10	14,4	31,8
140	5.1/2	75	12,9	28,4	40	11,4	25,0	25	10,9	23,9	15	9,4	20,7	15	12,8	28,2	10	11,4	25,1	10	14,7	32,4
145	5.3/4	75	13,2	29,1	40	11,6	25,7	25	11,1	24,4	15	9,6	21,1	15	13,0	28,7	10	11,6	25,6	10	15,0	33,0
150	6	75	13,5	29,8	40	11,9	26,2	25	11,3	24,9	15	9,8	21,5	15	13,3	29,3	10	11,8	26,1	10	15,2	33,6
160	6.1/4	75	14,1	31,1	40	12,4	27,3	25	11,8	25,9	15	10,1	22,4	15	13,8	30,4	10	12,3	27,0	8	12,4	27,3
170	6.3/4	75	14,7	32,4	40	12,9	28,4	25	12,2	27,0	15	10,5	23,2	15	14,3	31,5	10	12,7	28,0	8	12,7	28
180	7	75	15,3	33,7	40	13,4	29,5	25	12,7	27,9	15	10,9	24,0	15	14,8	32,6	10	13,1	28,9	8	13,0	28,6
190	7.1/2	75	15,9	35,1	40	13,3	30,6	25	13,2	29,0	15	11,3	24,9	15	15,3	33,7	10	13,6	29,9	8	13,4	29,5
200	7.7/8	50	11,2	24,6	40	14,4	31,7	25	13,6	30,0	15	11,7	25,7	15	15,8	34,3	10	14,0	30,8	8	13,8	30,4
210	8.1/4	50	11,6	25,5	40	14,9	32,9	25	14,1	31,0	15	12,0	26,6	10	11,2	24,6	10	14,4	31,8	8	14,8	32,6
220	8.3/4	50	12,0	26,4	30	11,8	26,0	25	14,5	32,0	15	12,4	27,4	10	11,5	25,3	10	14,8	32,7	8	15,2	32,6
230	9	50	12,3	27,1	30	12,3	27,1	25	15,0	33,0	15	12,8	28,2	10	12,0	26,46	10	15,3	33,7	8	15,6	34,5
240	9.3/8	50	12,7	28,0	30	12,6	27,7	25	15,5	34,1	15	13,2	29,1	10	12,2	26,9	8	12,5	27,5	6	12,0	26,4
250	9.3/4	50	13,0	28,6	30	12,9	28,4	25	15,9	35,1	15	13,6	29,9	10	12,5	27,5	8	13,0	28,6	6	12,5	27,5
260	10.1/4	50	13,2	29,1	30	13,3	29,3	20	13,1	28,9	15	14,0	30,8	10	12,7	28,0	8	13,4	29,5	6	12,9	28,4

ATTENTION: QUANTITIES PER BOX ARE SUBJECT TO CHANGES WITHOUT ANY NOTICE.

BOX DIM. 300 x 180 x 140 mm





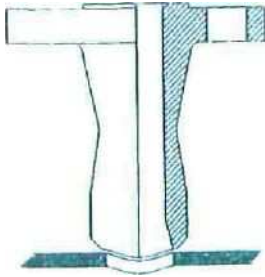
CHAPTER 8

SPECIAL ON REQUEST

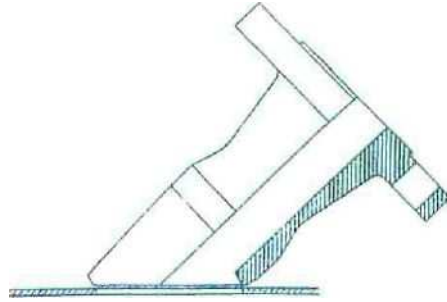


STEEL FITTINGS FOR HIGH PRESSURE SERVICE

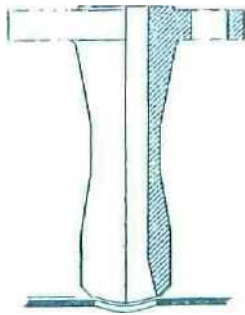
SPECIAL PIECES MADE ON REQUEST



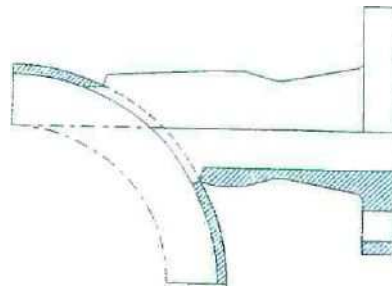
IML FORGED LIGHT TYPE FLANGED OUTLET -
WELDOFLANGE TYPE



IML FORGED LIGHT TYPE FLANGED
LATERAL-OUTLET - LATROFLANGE TYPE



IML FORGED LIGHT TYPE FLANGED
NIPPLE-OUTLET - NIPOFLANGE TYPE



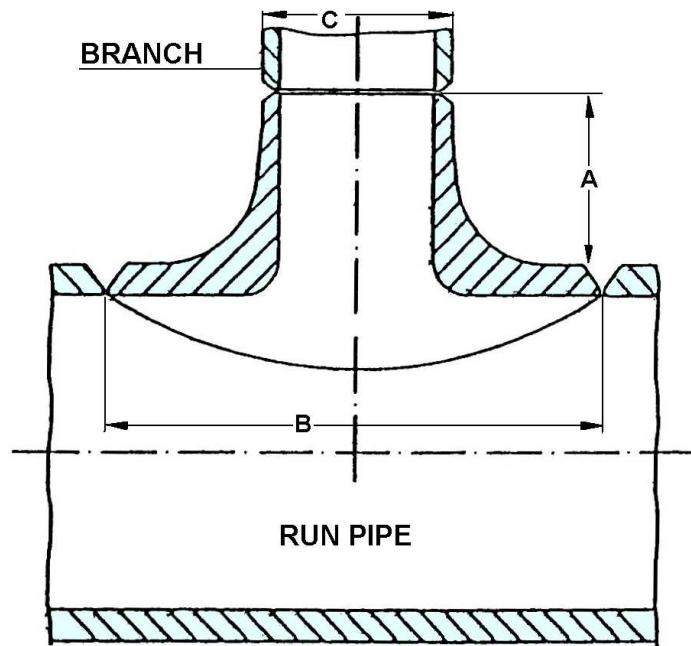
IML FORGED LIGHT TYPE FLANGED
ELBOW-OUTLETLET - ELBOFLANGE TYPE

IN ACCORDANCE WITH: AMSI-ASME B16.9/ANSI-ASME B16.5
ANSI-ASME B31.1/ANSI-ASME B31.3



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

SWEEP-OUTLETS



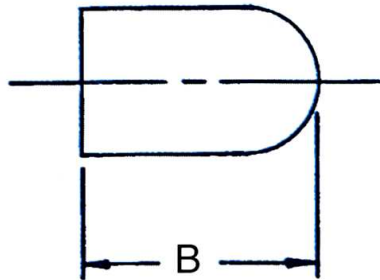
RUN PIPE Inch	C		A		B	
	Inch	mm	Inch	mm	Inch	mm
6 to 36	1.1/4"	42.2	1.1/4"	31.8	4"	101.6
6 to 36	1.1/2"	48.3	1.1/2"	38.1	5.1/2"	139.7
6 to 36	2"	60.3	1.1/2"	38.1	5.1/2"	139.7
6 to 36	3"	88.9	1.21/32"	42	7"	177.8
6 to 36	4"	114.3	2.1/32"	51.6	8.3/4"	222.2
10 to 36	6"	168.3	2.11/16"	68.2	13"	330.2
12 to 36	8"	219.1	3"	76.2	15"	381.0
16 to 36	10"	273	3.1/8"	79.3	18.1/2"	469.9
16 to 36	12"	323.9	3.1/4"	82.5	20.1/2"	520.7
20 to 36	14"	355.6	3.1/2"	88.9	24"	609.6
24 to 36	16"	406.4	3.5/8"	92	28"	711.2
24 to 36	18"	457.2	4.1/2"	114.3	31"	787.4
24 to 36	20"	508	5"	127	33"	838.2
30 to 36	24"	609.6	5.1/2"	139.7	38"	965.2

IN ACCORDANCE WITH : ANSI B31.1 & B31.3



STEEL FITTINGS FOR HIGH PRESSURE SERVICE

BULL PLUGS



Nominal Pipe Size (NPS)	Outside Diameter	End to End "B"	Nominal Pipe Size (NPS)	Outside Diameter	End to End "B"
1/8"	0.4	2	2.1/2"	2.87	5
1/4"	0.54	2	3"	3.5	6
3/8"	0.67	2.25	3.1/2"	4	6.5
1/2"	0.67	2.5	4"	4.5	7
3/4"	1.05	2.75	5"	5.56	8.5
1"	1.31	3	6"	6.62	10
1.1/4"	1.66	3.25	8"	8.62	11
1.1/2"	1.9	3.50	10"	10.75	13
2"	2.37	4.00	12"	12.75	14

IN ACCORDANCE WITH : MSS SP95
 THREADS : ANSI / ASTM B1.20.1

TOLERANCES

Nominal Pipe Size (NPS)	Overall Length (inches)	Outside Diameter at End		Wall Thickness (PRIOR TO THREADING OR GROOVING)
		Square Cut Ends (inches)	Other End Connections (inches)	
1/8" - 3/8"	±0.06	+0.01 -0.03	±0.03	Not less than 87.5% of Nominal Wall Thickness
1/2"-1.1/2"	±0.06	+0.01 -0.03	+0.06 -0.03	
2"-2.1/2"	±0.12	±0.03	+0.06 -0.03	
3"-4"	±0.12	±0.03	±0.06	
5"-6"	±0.19	+0.09 -0.06	+0.09 -0.06	
8"-12"	±0.25	+0.16 -0.12	+0.16 -0.12	





CHAPTER 9

WEIGHTS



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N FITTINGS THREADED ANSI B 1.20.1 NPT														
Product	Rating		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
90° Elbow Thd	2000	KG	11	10	13	23	32	48	75	89	151	246	448	1100
		LBS	24.3	22.1	28.7	54.0	65.0	100.3	157.6	189.6	299.80	542.3	1097.9	2425.0
	3000	KG	18	17	13	39	68	107	123	230	257	494	820	1435
		LBS	39.7	36.4	28.7	84.9	149.9	234.8	270.0	506.0	566.6	1088.0	1807.8	3163.6
	6000	KG	11	32	44	78	126	158	281	331	620	1050	1280	1340
		LBS	24.3	70.6	97.0	172.0	276.7	348.3	619.5	729.7	1366.8	2314.8	2821.9	2954.1
Street Elbow	3000	KG	9	13	25	33	55	81	106	194	230			
		LBS	19.8	28.7	55.1	72.8	120.2	178.6	233.7	427.7	507.0			
45° Elbow Thd	2000	KG	9	8.5	12	21	26	41	60	85	118	235	386	900
		LBS	19.8	18.7	25.4	45.2	57.3	90.4	131.2	188.1	259.0	518.1	851.0	1984.1
	3000	KG	15	14	25	32	50	92	103	182	227	495	563	1030
		LBS	32.0	29.8	54.0	70.6	110.2	202.8	226.0	401.2	500.4	1091.3	1241.2	2270.7
	6000	KG	15	25	28	61	100	134	215	288	593	730	1030	1150
		LBS	32	54.0	61.7	133.4	219.4	294.3	474.0	634.9	1307.3	1609.4	2270.7	2535.3
Tee Thd	2000	KG	13	21	17	29	40	60	96	118	206	350	545	1344
		LBS	28.7	45.2	38.4	64.0	88.2	132.3	211.6	260.1	453.0	771.6	1201.5	2963.0
	3000	KG	19	31	41	50	85	140	159	312	336	725	1036	1775
		LBS	41.9	67.2	89.3	110.5	187.4	308.6	349.4	687.8	740.7	1597.2	2282.9	3913.1
	6000	KG	15	43	57	99	164	215	346	417	822	1180	1860	1920
		LBS	33.1	93.7	126.3	218.3	361.6	474.0	761.7	919.3	1812.2	2601.4	4100.5	4232.9
Cross Thd	2000	KG	20	16	30	41	47	74	110	149	235	430	640	2000
		LBS	44.1	35.3	66.1	90.4	102.5	162.0	242.5	328.5	518.1	948	1410.9	4409.2
	3000	KG	20	22	49	61	100	170	198	368	460	820	1300	2260
		LBS	44.1	48.5	106.9	133.4	219.4	374.8	436.5	811.3	1014.1	1807.8	2866.0	4982.4
	6000	KG	20	50	71	115	202	257	400	560	1100	1500	2250	2280
		LBS	44.1	110.2	156.5	252.4	445.3	566.6	881.8	1234.6	2425.0	3306.9	4960.3	5026.5
Union Thd	3000	KG	11	17	24	30	49	75	116	157	232	652	730	1550
		LBS	23.2	36.4	51.8	66.1	108.0	164.2	254.6	345.0	510.4	1436.3	1609.4	3417.1
	6000	KG		42	69	50	91	221	281	334	699	923	1300	
		LBS		91.5	152.1	109.1	199.5	487.2	419.5	736.3	1541.0	2034.9	2866.0	
Union Bronze Seat	3000	KG	11	17	24	30	49	75	116	157	232	652	730	1550
		LBS	23.2	36.4	51.8	66.1	108.0	164.2	254.6	345.0	510.4	1436.3	1609.4	3417.1
Union M/F Thd	3000	KG		20	28	39	60	89	144	179	272			
		LBS		44.1	60.6	86.0	131.2	196.2	317.5	394.6	598.5			



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N FITTINGS THREADED ANSI B 1.20.1 NPT AND API														
Product	Rating		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
Coupling Thd	3000	KG	4	6	6	16	20	41	73	107	141	216	309	553
		LBS	7.7	12.1	13.2	34.2	43.0	89.3	159.8	235.9	310.9	476.2	681.2	1219.1
	6000	KG	4	13	19	32	45	90	110	219	309	445	690	1000
		LBS	8.8	27.6	41.9	70.6	99.2	197.3	242.5	481.7	680.1	981	1521.2	2204.6
Half Coupling.Thd	3000	KG	3	3	3	9	10	21	39	56	77	130	157	288
		LBS	5.5	6.6	6.6	18.7	22.1	46.3	85.1	122.4	168.7	286.6	346.1	634.9
	6000	KG	4	8	10	17	24	46	52	109	137	210	284	305
		LBS	7.7	16.5	20.9	36.4	51.8	101.4	114.6	239.2	300.9	463.0	625.0	672.4
Cap Thd	3000	KG	4	6	7	15	18	33	66	80	115	196	298	470
		LBS	8.8	13.2	15.4	32.0	38.6	72.8	145.5	176.4	253.5	432.1	655.9	1036.2
	6000	KG		10	16	25	38	75	90	159	218	335	525	750
		LBS		20.9	34.2	55.1	83.8	164.2	198.4	350.5	479.5	738.5	1157.4	1653.4
Hex. Head plug	3/6000	KG	2	3	5	7	13	24	53	67	115	196	325	684
		LBS	4.4	6.6	11.0	15.4	28.7	51.8	115.7	147.7	252.4	431.0	716.5	1507.9
Round.Head plug	3/6000	KG	3	5	9	12	19	37	57	80	142	221	344	623
		LBS	5.5	9.9	19.8	26.5	40.8	81.6	124.6	176.4	313.1	487.2	757.3	1372.4
Square. Head plug	3/6000	KG	2	5	6	7	9	19	31	43	72	145	201	386
		LBS	4.4	11.0	13.2	15.4	19.4	40.8	68.3	93.7	159.2	319.7	443.6	851.0
Hex. Nipple	3000	KG	2	4	5	9	14	16	32	54	77	153	229	387
		LBS	3.3	7.7	9.9	19.8	29.8	35.3	70.6	119.5	169.8	337.3	504.9	852.1
	6000	KG	2	5	7	12	18	35	57	71	107	240	280	512
		LBS	4.2	9.9	15.4	25.4	38.6	77.2	125.0	156.5	235.9	529.1	617.3	1128.8
Weld Boss Thd	3000	KG		7	10	32	43	49	69	77	111			
		LBS		14.3	22.1	69.7	93.9	107.6	152.1	170.4	243.6			



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N FITTINGS SOCKET WELD ENDS														
Product	Rating		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
90° Elbow SW	3000	KG	10	13	17	23	31	51	74	89	155	246	457	1020
		LBS	22.1	28.7	37.5	50.7	67.2	111.3	163.1	196.2	340.6	542.3	1006.4	2248.7
	6000	KG		17	30	46	70	114	136	251	322	730	910	1500
		LBS		37.5	65.0	100.3	154.3	250.2	299.8	552.3	708.8	1609.4	2006.2	3306.9
45° Elbow SW	3000	KG	11	12	13	20	25	38	58	80	120	224	429	806
		LBS	24.3	26.5	28.7	43.0	55.1	82.7	126.8	175.3	263.5	493.8	944.7	1776.9
	6000	KG		13	25	38	52	88	118	211	249	603	695	
		LBS		28.7	55.1	83.8	114.6	192.9	260.1	464.1	547.8	1328.3	1532.2	
Tee SW	3000	KG	15	17	19	29	40	63	93	119	188	265	575	1276
		LBS	33.1	37.5	41.9	63.9	87.1	138.9	205.0	261.2	413.4	584.2	1267.6	2812.0
	6000	KG	18	21	37	55	92	150	180	323	358	750	1130	
		LBS	39.7	45.6	82.2	121.3	201.7	330.7	396.8	712.1	789.2	1653.4	2491.2	
Cross SW	3000	KG		13	19	41	50	74	114	148	221	817	1090	1950
		LBS		28.7	40.8	89.3	110.2	163.1	251.3	325.2	487.2	1801.2	2403.0	4298.9
	6000	KG		50	60	69	109	171	300	555	720	1200	1600	2320
		LBS		110.2	132.3	152.1	240.3	377.0	661.4	1223.5	1587.3	2645.5	3527.3	5114.6
Coupling SW	3000	KG	4	5	11	13	17	29	35	44	77	103	121	373
		LBS	7.7	11.0	23.2	27.6	36.4	62.8	77.2	97.0	168.7	226.0	266.8	821.2
	6000	KG		7	12	17	33	42	64	72	127	204	275	560
		LBS		15.0	25.4	36.4	72.8	91.5	140.0	158.3	280.0	449.7	606.3	1234.6
Half coupling SW	3000	KG	4	6	10	14	19	36	50	69	98	143	250	367
		LBS	8.8	13.2	20.9	30.9	40.8	79.4	110.2	152.1	216.1	315.3	551.2	809.1
	6000	KG		7	10	24	32	47	80	105	168	390	335	660
		LBS		15.4	22.1	53.4	69.4	103.6	176.4	231.5	370.4	859.8	738.5	1455.0
Cap SW	3000	KG	3	4	7	12	14	30	54	63	71	154	237	420
		LBS	6.6	8.8	15.4	25.4	30.9	66.1	117.9	138.9	156.5	339.5	522.5	925.9
	6000	KG		9	15	20	24	36	62	89	153	235	345	580
		LBS		19.8	33.1	43.0	51.8	79.4	136.7	196.2	337.3	518.1	760.6	1278.7
Union SW	3000	KG		18	24	33	52	78	118	144	245	636	756	1600
		LBS		39.7	52.9	71.7	114.6	170.9	260.1	316.4	540.1	1402.1	1666.7	3527.3
	6000	KG		34	67	69	93	149	235	452	652	923	1350	
		LBS		73.9	147.7	151.0	205.0	327.4	518.1	996.5	1437.4	2034.8	2976.2	
Weld Boss SW	3000	KG		7	10	32	42	48	69	80	102			
		LBS		15.4	22.1	71.4	92.8	106.0	152.1	175.3	223.8			



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N REDUCING FITTINGS THREADED ANSI B 1.20.1 NPT AND API								
Product		Reducing Tees		Red. Hex. Nipple		Hex. Bushing	Reducing Coupling	
		3000	6000	3000	6000	3/6000	3000	6000
3/8x1/8	KG	18		4		6	9	19
	LBS	39.7		8.8		13.2	19.8	41.9
3/8 x 1/4	KG	17		3	6	5	7	19
	LBS	37.5		6.6	12.1	11.0	14.3	41.9
1/2 x 1/8	KG	34	55	9		8	19	35
	LBS	75.0	121.3	19.8		17.6	41.9	77.2
1/2 x 1/4	KG	32	53	8	12	6	18	30
	LBS	70.6	116.8	17.6	11.0	13.2	39.7	66.1
1/2 x 3/8	KG	29	50	7	11	5	17	25
	LBS	63.9	110.2	15.4	24.3	11.0	37.5	55.1
3/4 x 1/4	KG	94	203	14	17	14	30	50
	LBS	207.2	447.5	30.9	37.5	30.9	66.1	110.2
3/4 x 3/8	KG	93	202	12	14	9	28	43
	LBS	205.0	445.3	26.5	30.9	18.7	61.7	94.8
3/4 x 1/2	KG	90	195	10	12	7	22	41
	LBS	198.4	429.9	22.1	26.5	14.3	48.5	90.4
1x1/4	KG	158	274	29	53	24	55	107
	LBS	348.3	604.1	63.9	116.8	52.9	121.3	235.9
1x3/8	KG	151	265	26	45	21	53	103
	LBS	332.9	584.2	57.3	99.2	46.3	116.8	227.1
1x1/2	KG	149	260	16	33	20	50	92
	LBS	328.5	573.2	35.3	72.8	44.1	110.2	202.8
1 x 3/4	KG	142	241	14	28	15	46	85
	LBS	313.1	531.3	30.9	61.7	32.0	101.4	187.4
1.1/4 x 1/2	KG	185	403	39	75	43	95	111
	LBS	407.9	888.5	86.0	165.3	94.8	208.3	244.7
1.1/4x3/4	KG	181	394	32	61	37	89	105
	LBS	399.0	868.6	70.6	134.5	80.5	196.2	231.5
1.1/4 x 1	KG	175	381	26	49	27	82	100
	LBS	385.8	840.0	57.3	108.0	59.5	180.8	220.5
1.1/2 x 1/8	KG	380	570	120	220	58	165	210
	LBS	837.7	1256.6	264.6	485.0	127.9	363.8	463.0
1.1/2x1/4	KG	360	540	99	181	55	161	205
	LBS	793.7	1190.5	218.3	399.0	121.3	354.9	451.9
1.1/2 x 3/8	KG	340	510	82	150	53	146	186
	LBS	749.6	1124.3	180.8	330.7	116.8	321.9	410.1
1.1/2x1/2	KG	335	506	68	124	49	144	184
	LBS	738.5	1115.5	149.9	273.4	108.0	316.4	404.5
1.1/2x3/4	KG	330	506	56	102	45	143	180
	LBS	727.5	1115.5	123.5	224.9	99.2	314.2	396.8
1.1/2x1	KG	324	490	46	84	35	134	175
	LBS	714.3	1079.1	101.4	185.2	77.2	294.3	386.2
1.1/2 x 1.1/4	KG	320	481	38	70	30	124	170
	LBS	705.5	1060.4	83.77	154.3	66.1	273.4	374.8



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N REDUCING FITTINGS THREADED ANSI B 1.20.1 NPT AND API								
Product		Reducing Tees		Red. Hex. Nipple		Hex. Bushing	Reducing Coupling	
		3000	6000	3000	6000	3/6000	3000	6000
2 x 1/2	KG	410	936	98	136	104	203	310
	LBS	903.9	2062.5	216.1	299.8	228.2	447.5	683.4
2 x 3/4	KG	400	930	87	123	96	197	280
	LBS	881.8	2050.3	191.8	271.2	211.6	434.3	617.3
2 x 1	KG	395	925	82	117	89	190	270
	LBS	870.8	2039.2	179.7	257.9	196.2	418.9	595.2
2 x 1.1/4	KG	378	918	78	111	70	185	260
	LBS	832.2	2023.8	172.0	244.7	154.3	407.9	573.2
2 x 1.1/2	KG	361	911	74	106	58	125	195
	LBS	794.8	2008.4	163.1	233.7	126.8	275.6	429.9
2.1/2 x 1	KG	1090	1574	110	147	110	315	469
	LBS	2403.0	3470.0	242.5	324.1	242.5	694.4	1034.0
2.1/2 x 1.1/2	KG	1075	1545	104	139	90	290	432
	LBS	2369.9	3406.1	229.3	306.4	198.4	639.4	952.4
2.1/2 x 2	KG	1050	1530	97	106	61	258	384
	LBS	2314.8	3373.0	213.8	233.6	134.5	568.8	846.6
3 x 1	KG	1140	1660	249	334	246	662	986
	LBS	2513.2	3659.6	548.9	736.3	542.3	1459.4	2173.7
3 x 1.1/2	KG	1108	1614	237	318	225	526	783
	LBS	2442.7	3558.2	522.5	701.1	496.0	1158.5	1726.2
3 x 2	KG	1077	1569	225	302	191	415	618
	LBS	2374.3	3459.0	496.0	665.8	421.1	914.9	1362.4
3 x 2.1/2	KG	1047	1525	213	286	130	375	558
	LBS	2308.2	3362.0	469.6	630.5	286.6	826.7	1230.2
4 x 1	KG	2280	3321	437	586	680	919	1369
	LBS	5026.5	7321.4	463.4	1291.9	1499.1	2024.9	3018.1
4 x 1.1/2	KG	2216	3228	413	554	645	876	1305
	LBS	4885.4	7116.4	910.5	1221.3	1422.0	1931.2	2877.0
4 x 2	KG	2155	3139	390	523	650	833	1241
	LBS	4750.9	6920.2	859.8	1153.0	1433.0	1836.4	2735.9
4 x 2.1/2	KG	2095	3052	369	495	450	790	1177
	LBS	4618.6	6728.4	813.5	1091.3	992.1	1741.6	2594.8
4 x 3	KG	2037	2967	345	463	350	744	1108
	LBS	4490.7	6541.0	760.6	1020.7	771.6	1640.2	2442.7



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N REDUCING FITTINGS SOCKET WELD ENDS						
Product		Reducing Tees		Reducing	Reducing Coupling	
		Socket weld		Inserts	Socket weld	
		3000	6000	3000	3000	6000
3/8x1/8	KG	16		6	10	14
	LBS	35.3		13.2	22.1	30.9
3/8x1/4	KG	17		5	9	12
	LBS	37.5		11.0	19.8	26.5
1/2 x 1/8	KG	40	69	8	18	20
	LBS	88.2	152.1	17.6	39.7	44.1
1/2x1/4	KG	38	66	7	16	18
	LBS	82.7	145.5	15.4	35.3	38.6
1/2x3/8	KG	36	62	6	14	17
	LBS	79.4	136.7	13.2	30.9	37.5
3/4x1/4	KG	53	108	13	28	40
	LBS	116.8	238.1	28.7	61.7	88.2
3/4x3/8	KG	48	98	10	21	31
	LBS	105.8	216.1	22.1	46.3	68.3
3/4x1/2	KG	45	92	8	20	29
	LBS	99.2	202.8	17.6	43.0	62.8
1x1/4	KG	80	165	21	48	60
	LBS	176.4	363.8	46.3	105.8	132.3
1x3/8	KG	77	159	18	45	56
	LBS	169.8	350.5	39.7	99.2	123.5
1x1/2	KG	75	155	16	40	50
	LBS	165.3	341.7	35.3	88.2	110.2
1x3/4	KG	71	150	14	36	47
	LBS	156.5	329.6	30.9	79.4	103.6
1.1/4x1/2	KG	115	220	32	52	78
	LBS	253.5	485.0	70.6	113.5	172.0
1.1/4x3/4	KG	110	210	26	51	76
	LBS	241.4	463.0	57.3	112.4	167.6
1.1/4x1	KG	103	197	24	49	73
	LBS	227.1	434.3	52.9	106.9	160.9
1.1/2x1/2	KG	167	319	42	68	73
	LBS	367.1	703.3	92.6	149.9	160.9
1.1/2x3/4	KG	153	292	37	66	69
	LBS	337.3	643.7	81.6	144.4	152.1
1.1/2x1	KG	143	273	35	61	65
	LBS	315.3	601.9	77.2	133.4	142.2
1.1/2x1.1/4	KG	127	242	32	52	56
	LBS	278.0	533.5	70.6	113.5	123.5



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

CARBON STEEL ASTM A105N REDUCING FITTINGS SOCKET WELD ENDS						
Product		Reducing Tees		Reducing	Reducing Coupling	
		Socket weld		Inserts	Socket weld	
		3000	6000	3000	3000	6000
2x1/2	KG	295	460	64	124	135
	LBS	650.4	1014.1	141.1	272.3	298.1
2x3/4	KG	264	411	61	121	134
	LBS	582.0	906.1	134.5	265.7	294.8
2x1	KG	256	399	59	117	127
	LBS	564.4	879.6	130.1	257.9	278.9
2x1.1/4	KG	244	380	53	106	205
	LBS	537.9	837.7	116.8	233.7	451.9
2x1.1/2	KG	233	363	40	97	111
	LBS	513.7	800.3	88.2	213.8	244.7
2.1/2x1	KG	452	704	125	206	316
	LBS	996.5	1552.0	275.6	454.1	696.7
2.1/2x1.1/2	KG	404	629	100	187	287
	LBS	890.7	1386.7	220.5	412.3	632.7
2.1/2x2	KG	390	607	90	171	262
	LBS	859.8	1338.2	198.4	377.0	577.6
3x1	KG	761	1185	200	338	490
	LBS	1677.7	2612.4	440.9	745.2	1080.3
3x1.1/2	KG	730	1137	186	313	455
	LBS	1609.4	2506.6	410.1	688.9	1003.1
3x2	KG	700	1090	177	250	390
	LBS	1543.2	2403.0	390.2	551.2	859.8
3x2.1/2	KG	671	1044	165	186	285
	LBS	1479.3	2301.6	363.8	410.1	628.3
4x1	KG	1700	2647	460	355	491
	LBS	3747.8	5835.5	1014.1	782.6	1082.5
4x1.1/2	KG	1690	2632	437	340	470
	LBS	3725.8	5802.5	963.4	749.6	1036.2
4x2	KG	1621	2524	420	320	440
	LBS	3573.6	5564.4	925.9	705.5	970.0
4x2.1/2	KG	1555	2421	400	300	410
	LBS	3428.1	5337.3	881.8	661.4	903.9
4x3	KG	1491	2322	385	255	391
	LBS	3287.0	5119.1	848.8	562.2	862.0



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

ASTM A105N SELF REINFORCING BRANCH FITTING														
PRODUCT	RATING		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
Thread - Outlet	3000	KG		6	9	11	17	29	41	46	80	140	200	335
		LBS		13.2	19.8	24.3	37.5	63.9	90.4	101.4	176.4	308.6	440.9	738.5
	6000	KG				20	50	80	115	145	275			
		LBS				44.1	110.2	176.4	253.5	319.7	606.3			
Socket - Outlet	3000	KG			9	11	17	29	41	46	80	140	200	335
		LBS			19.8	24.3	37.5	63.9	90.4	101.4	176.4	308.6	440.9	738.5
	6000	KG				30	50	80	115	145	275			
		LBS				66.1	110.2	176.4	253.5	319.7	606.3			
Weld - Outlet	STD / XS	KG		7	10	15	20	32	50	60	90	140	200	300
		LBS		15.4	22.1	33.1	44.1	70.6	110.2	132.3	198.4	308.6	440.9	661.4
	160 / XXS	KG				15	25	42	85	100	170		380	580
		LBS				33.1	55.1	92.6	187.4	220.5	374.8		837.7	1278.7
Elbow - Outlet	STD / XS	KG				35	50	80	110	140	300			
		LBS				77.2	110.2	176.4	242.5	308.6	661.4			
	160 / XXS	KG				50	80	125	140	300	450			
		LBS				110.2	176.4	275.6	308.6	661.4	992.1			
Lateral - Outlet	STD / XS	KG				35	50	80	110	140	300			
		LBS				77.2	110.2	176.4	242.5	308.6	661.4			
	160 / XXS	KG				50	80	125	140	300	450			
		LBS				110.2	176.4	275.6	308.6	661.4	992.1			
Nipple - Outlet	3000	KG				20	37	55	70	95	135			
		LBS				44.1	81.6	121.3	154.3	209.4	297.6			
	6000	KG				30	60	65	107	120	160			
		LBS				66.1	132.3	143.3	235.9	264.5	352.7			



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

SWAGE NIPPLE ASTM A234 PRODUCED FROM SEAMLESS A 106 GR. B PIPE DIMENSIONS AS PER MSS SP95					
PRODUCT					
	Length			PBE+TBE SCH. 80	PBE+TBE SCH.160
	INCH	MM			
3/8x1/4	2.1/2"	63,50	KG	6	9
			LBS	13.2	19.8
1/2x1/4	2.3/4"	69,85	KG	8	13
			LBS	17.9	27.6
1/2x3/8	2.3/4"	69,85	KG	9	8
			LBS	19.4	16.5
3/4x1/4	3"	76,20	KG	13	14
			LBS	28.7	30.9
3/4x3/8	3"	76,20	KG	14	15
			LBS	29.8	33.0
3/4x1/2	3"	76,20	KG	15	18
			LBS	32,0	39.7
1x1/4	3.1/2"	88,90	KG	23	19
			LBS	49.6	41.9
1x3/8	3.1/2"	88,90	KG	24	24
			LBS	51.8	52.9
1x1/2	3.1/2"	88,90	KG	28	30
			LBS	60.6	66.1
1x3/4	3.1/2"	88,90	KG	25	37
			LBS	54.0	81.6
1.1/4x1/2	4"	101,60	KG	39	43
			LBS	84.9	94.4
1.1/4x3/4	4"	101,60	KG	39	48
			LBS	86,0	105.2
1.1/4x1	4"	101,60	KG	36	55
			LBS	80.0	121.7
1.1/2x1/2	4.1/2"	114,30	KG	61	65
			LBS	134.5	143.3
1.1/2x3/4	4.1/2"	114,30	KG	57	61
			LBS	125.7	134.5
1.1/2x1	4.1/2"	114,30	KG	48	69
			LBS	105.2	151.0
1.1/2x1.1/4	4.1/2"	114,30	KG	51	72
			LBS	112.4	158.7



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

SWAGE NIPPLE ASTM A234 PRODUCED FROM SEAMLESS A 106 GR. B PIPE DIMENSIONS AS PER MSS SP95					
PRODUCT					
	Length			PBE +TBE SCH. 80	PBE +TBE SCH.160
	INCH	MM			
2x1/2	6.1/2"	165.1	KG	105	136
			LBS	230.4	299.8
2x3/4	6.1/2"	165.1	KG	114	148
			LBS	251.3	326.3
2x1	6.1/2"	165.1	KG	117	145
			LBS	257.9	318.6
2x1.1/4	6.1/2"	165.1	KG	127	158
			LBS	280.0	347.9
2x1.1/2	6.1/2"	165.1	KG	108	160
			LBS	238.1	351.6
2.1/2x1	7"	177.8	KG	203	290
			LBS	447.5	639.3
2.1/2x1.1/2	7"	177.8	KG	203	290
			LBS	447.5	639.3
2.1/2 x 2	7"	177.8	KG	203	290
			LBS	447.5	639.3
3x1	8"	203.2	KG	309	435
			LBS	681.2	959.0
3x1.1/2	8"	203.2	KG	309	435
			LBS	681.2	959.0
3x2	8"	203.2	KG	315	445
			LBS	694.4	981.0
3x2.1/2	8"	203.2	KG	330	455
			LBS	727.5	1003.1
4x1	9"	228.6	KG	510	730
			LBS	1124.3	1609.4
4x1.1/2	9"	228.6	KG	510	730
			LBS	1124.3	1609.4
4x2	9"	228.6	KG	510	730
			LBS	1124.3	1609.4
4 x 2.1/2	9"	228.6	KG	510	730
			LBS	1124.3	1609.4
4x3	9"	228.6	KG	510	710
			LBS	1124.3	1565.3



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

SEAMLESS PIPE NIPPLES TO ASTM A106 GR.B										
SCH.80										
Product		mm	close	1.1/2"	2"	2.1/2"	3"	4"	5"	6"
				38	50	65	75	100	125	150
Barrel Nipple	1/8"	KG		1	2	3	3	4	6	7
		LBS		2.2	4.2	6.2	7.3	9.5	13.2	15.4
	1/4"	KG	1	3	4	4	6	7	10	12
		LBS	2.7	5.5	7.7	9.5	12.1	15.4	22.1	25.4
	3/8"	KG	3	4	5	6	7	11	14	16
		LBS	6.6	8.8	9.9	13.2	15.4	23.2	30.9	34.2
TBE. TOE/POE, PBE	1/2"	KG	4	5	9	9	11	15	19	20
		LBS	8.8	11	18.7	18.7	23.2	32,0	40.8	44.1
	3/4"	KG	7	8	9	14	15	20	27	30
		LBS	15.4	17.6	19.8	30.9	32,0	43,0	59.5	66.2
	1"	KG	12		13	17	21	29	39	46
		LBS	26.5		28.7	36.4	46.3	62.8	86,0	101.4
SCH.80	1.1/4"	KG	18		22	28	33	44	54	58
		LBS	39.7		48.5	61.7	72.8	97	119.1	127.9
	1.1/2"	KG	22		23	32	34	50	60	79
		LBS	48.5		50.7	70.6	75,0	109.1	132.3	173.1
	2"	KG	28			43	46	70	85	108,5
		LBS	61.7			93.7	100.3	154.3	187.4	239.2

SEAMLESS PIPE NIPPLES TO ASTM A106 GR.B										
SCH.160										
Product		mm	close	1.1/2"	2"	2.1/2"	3"	4"	5"	6"
				38	50	65	75	100	125	150
Barrel Nipple	1/2"	KG	6		8	11	14	18	23	27
		LBS	13.2		17.6	23.6	30.9	39.7	50.7	59.5
	3/4"	KG	10		14	16	21	27	34	41
		LBS	22.1		30.9	34.2	45.2	59.5	75.6	90.4
TBE, TOE /POE, PBE	1"	KG	12		18	24	30	39	49	61
		LBS	26.5		39.9	51.8	66.1	86,0	108.7	134.5
	1.1/4"	KG	21		23	34	43	56	70	84
		LBS	46.3		50.7	75,0	94.8	123.5	154.3	185.2
SCH.160	1.1/2"	KG	29		31	40	46	66	84	110
		LBS	63.9		69.0	88.2	101.4	144.4	185.2	242.5
	2"	KG	56			70	76	104	140	156
		LBS	123.5			154.3	168.2	228.2	308.6	342.8



THEORETICAL WEIGHTS KG/LBS PER 100 PIECES

SEAMLESS PIPE NIPPLES TO ASTM A106 GR.B										
SCH.XXS										
Product		close		1.1/2"	2"	2.1/2"	3"	4"	5"	6"
		mm	38	50	65	75	100	125	150	
Barrel Nipple	1/2"	KG	7	10	13	16	19	26	32	39
		LBS	15.4	22.1	28.7	35.3	41.9	57.3	70.6	86.0
	3/4"	KG	13	14	18	23	28	37	46	55
		LBS	28.7	30.9	39.7	50.7	61.7	81.6	101.4	121.3
TBE, TOE /POE, PBE	1"	KG	21		28	35	41	55	69	83
		LBS	46.3		61.7	77.2	90.4	121.3	152.1	183.0
	1.1/4"	KG	32		39	49	59	79	99	118
		LBS	70.6		86.0	108.0	130.1	174.2	218.3	260.1
SCH.XXS	1.1/2"	KG	42		48	60	73	97	121	145
		LBS	92.6		105.8	132.3	160.9	213.8	266.8	319.7
	2"	KG	68			85	102	136	170	205
		LBS	149.9			187.4	224.9	299.8	374.8	451.9





CHAPTER 10

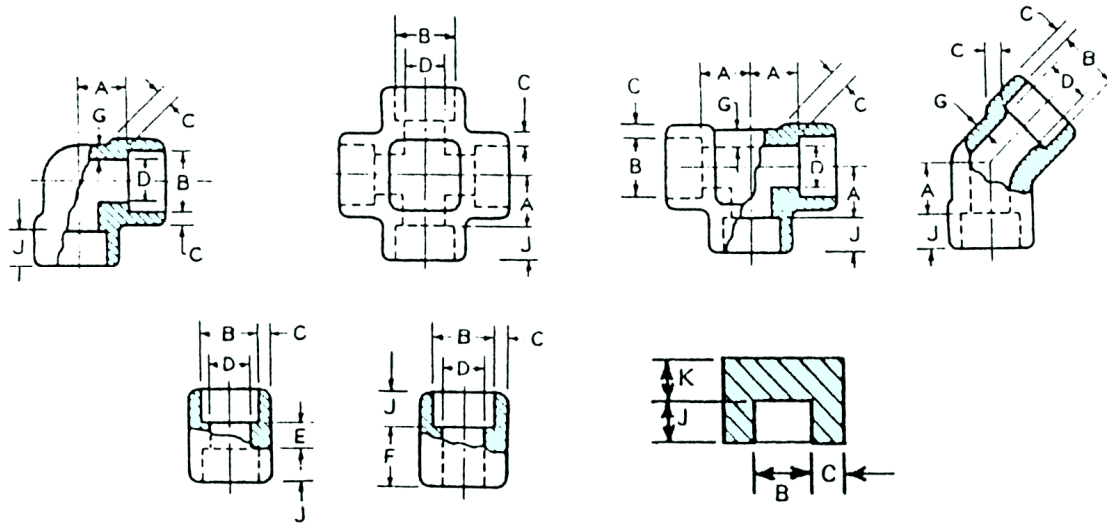
TECHNICAL SHEETS



TECHNICAL SHEETS

FORGED FITTINGS , SOCKET-WELDING TYPE

ASME B16.11

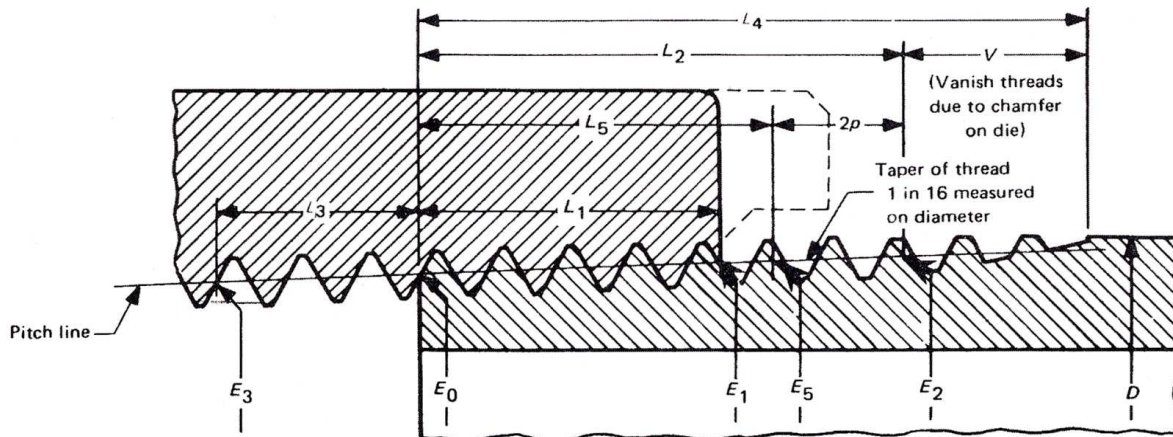


(1) Average of Socket Wall Thickness around periphery shall not be less than listed values. The minimum values are permitted in localized areas.

DN		6	8	10	15	20	25	32	40	50	65	80	100		
Norm. Pipe Size		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/4"	1.1/4"	2"	2.1/2"	3"	4"		
Socket Bore \varnothing B		Max.	11.2	14.6	18	22.2	27.6	34.3	43.1	49.2	61.7	74.4	90.3	115.7	
		Min.	10.8	14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2	73.9	89.8		
Bore Diameter of Fittings D	3000	Max.	7.6	10	13.3	16.6	21.7	27.4	35.8	41.6	53.3	64.2	79.4	103.8	
		Min.	6.1	8.5	11.8	15	20.2	25.9	34.3	40.1	51.7	61.2	76.4		
	6000	Max.	4.8	7.1	9.9	12.5	16.3	21.5	30.2	34.7	43.6				
		Min.	3.2	5.6	8.4	11	14.8	19.9	28.7	33.2	42.1				
	9000	Max.				7.2	11.8	16	23.5	28.7	38.9				
		Min.				5.6	10.3	14.4	22	27.2	37.4				
Socket Wall Thickness (1) C	3000	Ave.	3.18	3.78	4.01	4.67	4.9	5.69	6.07	6.35	6.93	8.76	9.52	10.69	
		Min.	3.18	3.3	3.5	4.09	4.27	4.98	5.28	5.54	6.04	7.67	8.3	9.35	
	6000	Ave.	3.96	4.6	5.03	5.97	6.96	7.92	7.92	8.92	10.92				
		Min.	3.43	4.01	4.37	5.18	6.04	6.93	6.93	7.8	9.5				
	9000	Ave.				9.35	9.78	11.38	12.14	12.7	13.84				
		Min.				8.18	8.56	9.96	10.62	11.12	12.12				
Body Wall G	Class Design.	3000	Min.	2.41	3.02	3.2	3.73	3.91	4.55	4.85	5.08	5.54	7.01	7.62	8.56
		6000	Min.	3.15	3.68	4.01	4.78	5.56	6.35	6.35	7.14	8.74			
		9000	Min.				7.47	7.82	9.09	9.7	10.15	11.07			
Depth of Socket J		Min.	9.5	9.5	9.5	9.5	12.5	12.5	12.5	12.5	16	16	16	19	
Center to bottom of socket A	90° Elbows, Tees, Crosses	Class Designation	3000	11	11	13.5	15.5	19	22.5	27	32	38	41	57	66.5
			6000	11	13.5	15.5	19	22.5	27	32	38	41			
			9000				25.5	28.5	32	35	38	54			
	45° Elbows	3000	8	8	8	11	13	14	17.5	20.5	25.5	28.5	32	41	
		6000	8	8	11	12.5	14	17.5	20.5	25.5	28.5				
		9000				15.5	19	20.5	22.5	25.5	28.5				
Laying lengths	Couplings	E	6.5	6.5	6.5	9.5	9.5	12.5	12.5	12.5	19	19	19	19	
	Half Couplings	F	16	16	17.5	22.5	24	28.5	30	32	41	43	44.5	48	
Tolerance \pm		A	1	1	1.5	1.5	1.5	2	2	2	2	2.5	2.5	2.5	
		E	1.5	1.5	3	3	3	4	4	4	4	5	5	5	
		F	1	1	1.5	1.5	1.5	2	2	2	2	2.5	2.5	2.5	
End wall Thickness K.min	Class Designation	3000	4.8	4.8	4.8	6.4	6.4	9.6	9.6	11.2	12.7	15.7	19	22.4	
		6000	6.4	6.4	6.4	7.9	7.9	11.2	11.2	12.7	15.7	19	22.4	28.4	
		9000				11.2	12.7	14.2	14.2	15.7	19				



ANSI / ASME B1.20.1



BASIC DIMENSIONS OF AMERICAN NATIONAL STANDARD TAPER PIPE THREAD , NPT

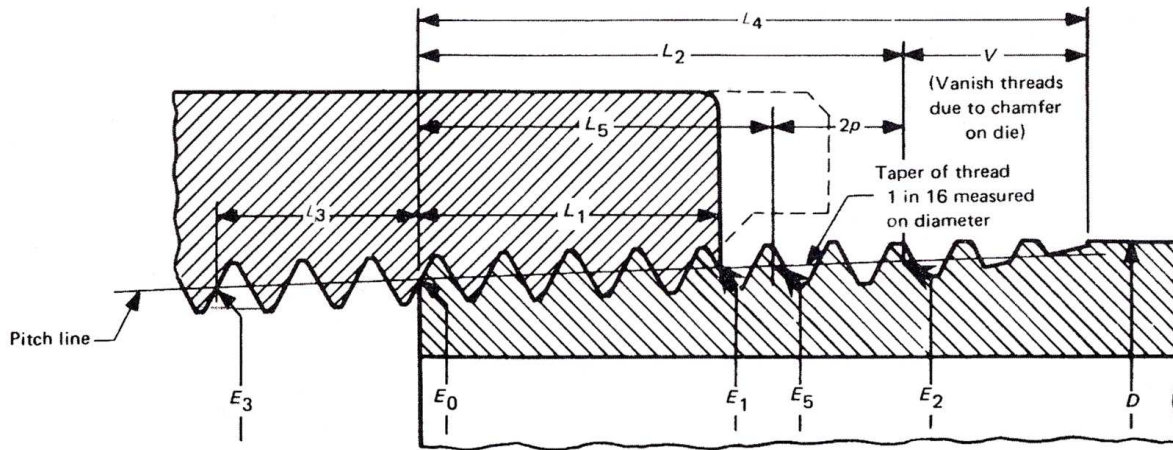
Normal Pipe Size		1/16"	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.1/2"	1.1/4"	2"	2.1/2"	3"	
O.D. of Pipe (D)		0.32	0.4	0.54	0.67	0.84	1.05	1.31	1.66	1.9	2.37	2.87	3.5	
Threads/inch (n)		27	27	18	18	14	14	11.5	11.5	11.5	11.5	8	8	
Pitch Thread (P)		0.04	0.04	0.06	0.06	0.07	0.07	0.09	0.09	0.09	0.09	0.12	0.12	
Pitch Diameter of External Thread (En)		0.03	0.36	0.48	0.61	0.76	0.97	1.21	1.56	1.8	2.27	111	3.34	
Handtight Engagement	Length (L ₁) ⁽²⁾	Inches	0.16	0.16	0.23	0.24	0.32	0.34	0.4	0.42	0.42	0.43	0.68	0.77
		Thread	4.32	4.36	4.1	4.32	4.48	4.75	4.6	4.83	4.83	5.01	5.46	6.13
Ø (E ₁) ⁽³⁾		Inches	0.28	0.38	0.49	0.63	0.78	0.99	1.24	1.58	1.82	2.3	2.76	3.39
Effective Thread. External	Length (L ₂) ⁽⁴⁾	Inches	0.26	0.26	0.4	0.4	0.53	0.55	0.68	0.71	0.72	0.76	1.14	1.2
		Thread	7.05	7.12	7.23	7.34	7.47	7.64	7.85	8.13	8.32	8.7	9.1	9.6
Ø (E ₂)		Inches	0.29	0.38	0.5	0.64	0.79	1	1.26	1.6	1.84	2.31	2.79	3.41
Length L ₁ Plane to L ₂ Plane External Thread (L ₂ -L ₁)		Inches	0.1	0.1	0.17	0.17	0.21	0.21	0.28	0.29	0.3	0.32	0.45	0.43
		Thread	2.73	2.76	3.13	3.02	2.99	2.89	3.25	3.3	3.49	3.69	3.64	3.47
Wrench Makeup Length for internal Thread ⁽⁵⁾	Length (L ₃)	Inches	0.11	0.11	0.17	0.17	0.21	0.21	0.26	0.26	0.26	0.26	0.25	0.25
		Thread	3	3	3	3	3	3	3	3	3	3	2	2
Ø (E ₃)		Inches	0.26	0.36	0.47	0.6	0.74	0.95	1.2	1.54	1.78	2.25	2.7	3.32
Vanish Thread		Inches	0.13	0.13	0.19	0.19	0.25	0.25	0.3	0.3	0.3	0.3	0.43	0.43
		Thread	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47
Overall Length External Thread (L ₄)		Inches	0.39	0.39	0.59	0.6	0.78	0.79	0.98	1	1.02	1.06	1.57	1.63
Nominal Complete External Threads ⁽⁵⁾		Length (L ₅)	0.19	0.19	0.29	0.3	0.39	0.4	0.51	0.53	0.55	0.58	0.89	0.95
		Ø (E ₅)	0.28	0.37	0.49	0.63	0.78	0.99	1.24	1.59	1.83	2.3	111	3.4
Height of Thread (h)		Inches	0.03	0.03	0.04	0.04	0.06	0.06	0.07	0.07	0.07	0.07	0.1	0.1
Increase in Ø / Thread (0.0625/n)		Inches	0	0	0	0	0	0	0	0	0	0	0.01	0.01
Basic Minor Ø At Small End of Pipe (K ₀)		Inches	0.24	0.33	0.43	0.57	0.7	0.91	1.14	1.49	1.72	2.19	2.62	3.24

NOTES:

- (1) The basic dimensions of the American National Standard Taper Pipe Thread are given in inches to four or five decimal places. While this implies a greater degree of precision than is ordinarily attained, these dimensions are the basis of gauge dimensions and are so expressed for the purpose of eliminating errors in computations.
- (2) Also length of thin ring gauge and length from gauging notch to small end of plug gauge.
- (3) Also pitch diameter at gauging notch (handtight plane).
- (4) Also length of plug gauge.
- (5) The length L₅ from the end of the pipe determines the plane beyond which the thread form is incomplete at the crest. The next two threads are complete at the root. At this plane the cone formed by the crests of the thread intersects the cylinder forming the external surface of the pipe. L₅ = L₂ - 2p.
- (6) Given as information for use in selecting tap drills. (See Appendix).
- (7) Military Specification MIL-P-7105 gives the wrench makeup as three threads for sizes 3 and smaller. The E₃ dimensions are as follows: Nominal pipe size 2.1/2 = 2.69609 and size 3 = 3.31719; size 2 and smaller same as above, col. 16.
- (8) Reference dimension



ANSI / ASME B1.20.1



BASIC DIMENSIONS OF AMERICAN NATIONAL STANDARD TAPER PIPE THREAD , NPT

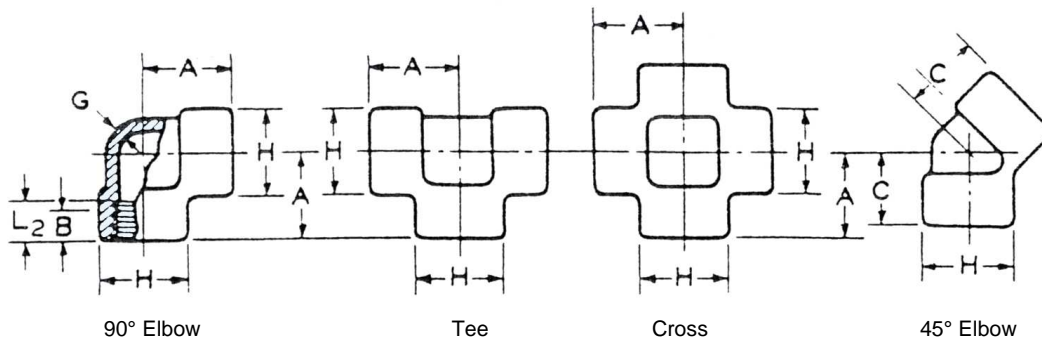
Normal Pipe Size		3.1/2"	4"	5"	6"	8"	10"	12"	14" O.D.	16" O.D.	18" O.D.	20" O.D.	24" O.D.	
O.D. of Pipe (D)		4	4.5	5.56	6.62	8.62	10.75	12.75	14	16	18	20	24	
Threads/inch (n)		8	8	8	8	8	8	8	8	8	8	8	8	
Pitch Thread (P)		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	
Pitch Diameter of External Thread (E _n)		3.84	4.33	5.39	6.45	8.43	10.54	12.53	13.77	15.76	17.75	19.74	23.71	
Handtight Engagement	Length (L ₁) ⁽²⁾	Inches	0.82	0.84	0.94	0.96	1.06	1.21	1.36	1.56	1.81	2	2.12	2.37
		Thread	6.57	6.75	7.5	7.66	8.5	9.68	10.88	12.5	14.5	16	17	19
		Ø (E ₁) ⁽³⁾	3.89	4.39	5.45	6.5	8.5	10.62	12.62	13.87	15.87	17.87	19.87	23.86
Effective Thread. External	Length (L ₂) ⁽⁴⁾	Inches	1.25	1.3	1.41	1.51	1.71	1.92	2.12	2.25	2.45	2.65	2.85	3.25
		Thread	10	10.4	11.25	12.1	13.7	15.4	17	18	19.6	21.2	22.8	26
		Ø (E ₂)	3.91	4.41	6.47	6.54	8.54	10.66	12.66	13.91	15.91	17.91	19.91	23.91
Length L ₁ Plane to L ₂ Plane External Thread (L ₂ -L ₁)		Inches	0.43	0.46	0.47	0.55	0.65	0.71	0.76	0.69	0.64	0.65	0.72	0.87
		Thread	3.43	3.65	3.75	4.44	5.2	5.72	6.12	5.5	5.1	5.2	5.8	7
Wrench Makeup Length for internal Thread ⁽⁵⁾	Length (L ₃)	Inches	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
		Thread	2	2	2	2	2	2	2	2	2	2	2	
		Ø (E ₃)	3.82	4.32	5.37	6.43	8.42	10.53	12.52	13.76	15.75	17.34	19.72	23.7
Vanish Thread		Inches	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	
		Thread	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47	
Overall Length External Thread (L ₄)			1.69	1.73	1.84	1.95	2.15	2.36	2.56	2.68	2.88	3.08	3.28	3.68
Nominal Complete External Threads ⁽⁵⁾	Length (L ₅)		1	1.05	1.16	1.26	1.46	1.67	1.87	2	2.2	2.4	2.6	3
		Ø (E ₅)	3.9	4.4	5.46	6.52	8.52	10.65	12.65	13.9	15.9	17.9	19.90	23.9
Height of Thread (h)			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Increase in Ø / Thread (0.0625/n)			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Basic Minor Ø At Small End of Pipe (K ₀)			3.73	4.23	5.29	6.35	8.33	10.44	12.43	13.67	15.66	17.65	19.64	23.61

NOTES:

- (1) The basic dimensions of the American National Standard Taper Pipe Thread are given in inches to four or five decimal places. While this implies a greater degree of precision than is ordinarily attained, these dimensions are the basis of gauge dimensions and are so expressed for the purpose of eliminating errors in computations.
- (2) Also length of thin ring gauge and length from gauging notch to small end of plug gauge.
- (3) Also pitch diameter at gauging notch (handtight plane).
- (4) Also length of plug gauge.
- (5) The length L₅ from the end of the pipe determines the plane beyond which the thread form is incomplete at the crest. The next two threads are complete at the root. At this plane the cone formed by the crests of the thread intersects the cylinder forming the external surface of the pipe. L₅ = L₂ - 2p.
- (6) Given as information for use in selecting tap drills. (See Appendix).
- (7) Military Specification MIL-P-7105 gives the wrench makeup as three threads for sizes 3 and smaller. The E₃ dimensions are as follows: Nominal pipe size 2.1/2 = 2.69609 and size 3 = 3.31719; size 2 and smaller same as above, col. 16.
- (8) Reference dimension.



FORGED FITTINGS , THREADED TYPE ASME B16.11



DN	Nom. Pipe Size	Center to end Elbows, Tees, Crosses A			Center to end 45° Elbows C			Outside Diameter of band H			Minimum Wall Thickness G			Length of Thread Min.(1)	
		2000	3000	6000	2000	3000	6000	2000	3000	6000	2000	3000	6000	B	L
6	1/8"	21	21	25	17	17	19	22	22	25	3.18	3.18	6.35	6.4	6.7
8	1/4"	21	25	28	17	19	22	22	25	33	3.18	3.3	6.6	8.1	10.2
10	3/8"	25	28	33	19	22	25	25	33	38	3.18	3.51	6.98	9.1	10.4
15	1/2"	28	33	38	22	25	28	33	38	46	3.18	4.09	8.15	10.9	13.6
20	3/4"	33	38	44	25	28	33	38	46	56	3.18	4.32	8.53	12.7	13.9
25	1"	38	44	51	28	33	35	46	56	62	3.68	4.98	9.93	14.7	17.3
32	1.1/2"	44	51	60	33	35	43	56	62	75	3.89	5.28	10.59	17	18.0
40	1.1/4"	51	60	64	35	43	44	62	75	84	4.01	5.56	11.07	17.8	18.4
50	2"	60	64	83	43	44	52	75	84	102	4.27	7.14	12.09	19	19.2
65	2.1/2"	76	83	95	52	52	64	92	102	121	5.61	7.65	15.29	23.6	28.9
80	3"	86	95	106	64	64	79	109	121	146	5.99	8.84	16.64	25.9	30.5
100	4"	106	114	114	79	79	79	146	152	152	6.55	11.18	18.67	211	33.0

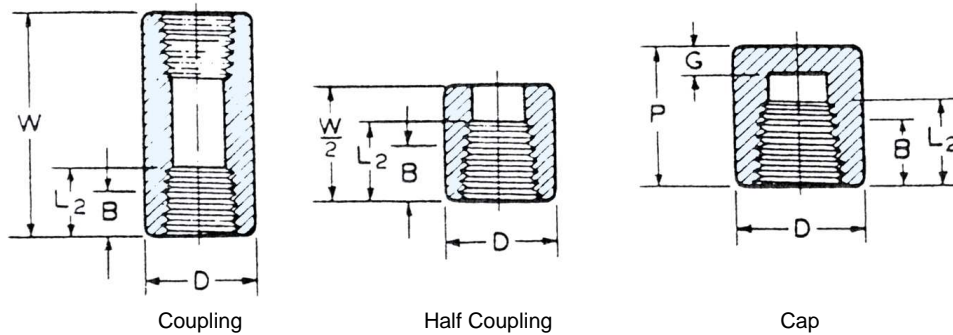
GENERAL NOTE: Dimensions are in millimeters.

NOTES:

(1) Dimensions B is minimum length of perfect thread. The length of usefull thread (B plus threads with fully formed roots and flat crests) shall not be less than L₂ (effective length of external thread) required by American National Standard for Pipe Threads (ANSI/ASME B1.20.1). See Section 6.3.



FORGED FITTINGS , THREADED TYPE ASME B16.11



DN	Nom. Pipe Size	End to End Couplings W	End to End Caps P		Outside Diameter D		End Wall Thickness Min. G		Length of Thread Min.	
		3000 and 6000	3000	6000	3000	6000	3000	6000	B	L
6	1/8"	32	19		16	22	4.8		6.4	6.7
8	1/4"	35	25	27	19	25	4.8	6.4	8.1	10.2
10	3/8"	38	25	27	22	32	4.8	6.4	9.1	10.4
15	1/2"	48	32	33	28	38	6.4	7.9	10.9	13.6
20	3/4"	51	37	38	35	44	6.4	7.9	12.7	13.9
25	1"	60	41	43	44	57	9.7	11.2	14.7	17.3
32	1.1/2"	67	44	46	57	64	9.7	11.2	17	18
40	1.1/4"	79	44	48	64	76	11.2	12.7	17.8	18.4
50	2"	86	48	51	76	92	12.7	15.7	19	19.2
65	2.1/2"	92	60	64	92	108	15.7	19	23.6	28.9
80	3"	108	65	68	108	127	19	22.4	25.9	30.5
100	4"	121	68	75	140	159	22.4	28.4	27.7	33

GENERAL NOTE: Dimensions are in millimeters.

NOTES:

(1) Class 2000 and DN6 Class 6000 couplings, half couplings, and caps are not included in this Standard.

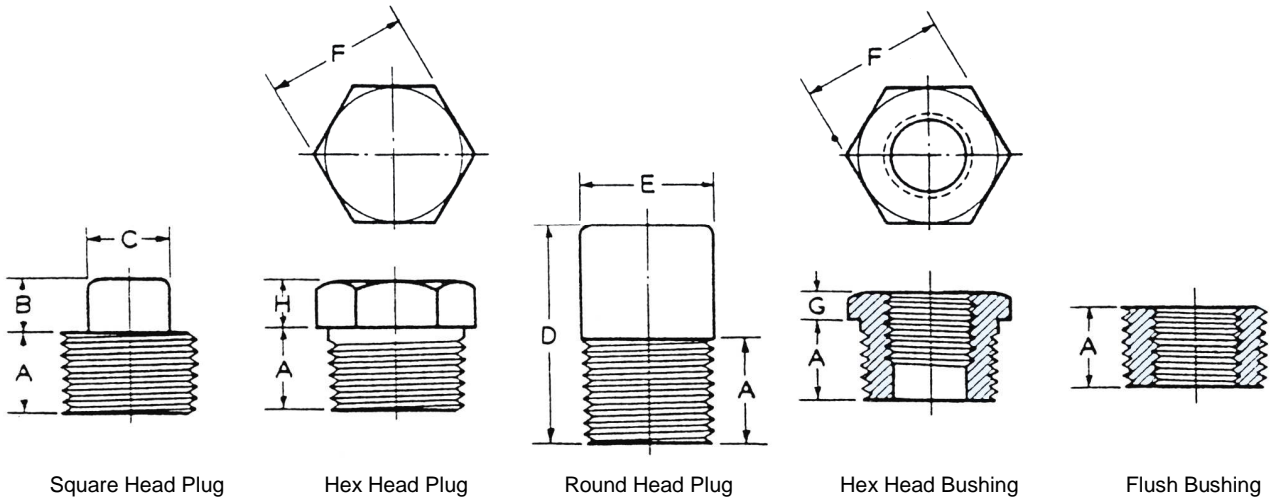
(2) Dimensions B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L 2 (effective length of external thread) required by

American National Standard for Pipe Threads (ANSI/ASME B1.20.1). See Section 6.3.



TECHNICAL SHEETS

FORGED FITTINGS , SOCKET WELDING AND THREADED TYPE ASME B16.11



Square Head Plug

Hex Head Plug

Round Head Plug

Hex Head Bushing

Flush Bushing

DN	Nominal Pipe Size	Length (Minimum) A	Plugs Square Head		Plugs Round Head		Hex Plugs and Bushings		
			Height of Square	Width Flats	Nominal Diameter	Length	Width Flats	Hex Height (Min.)	
			(Minimum)	(Minimum)	of Head	(Minimum)	(Nominal)	Bushing	Plug
			B	C	E	D	F	G	H
6	1/8"	10	6	7	10	35	11		6
8	1/4"	11	6	10	14	41	16	3	6
10	3/8"	13	8	11	18	41	18	4	8
15	1/2"	14	10	14	21	44	22	5	8
20	3/4"	16	11	16	27	44	27	6	10
25	1"	19	13	21	33	51	36	6	10
32	1.1/2"	21	14	24	43	51	46	7	14
40	1.1/4"	21	16	28	48	51	50	8	16
50	2"	22	18	32	60	64	65	9	18
65	2.1/2"	27	19	36	73	70	75	10	19
80	3"	28	21	41	89	70	90	10	21
100	4"	32	25	65	114	76	115	13	25

GENERAL NOTE: Dimensions are in millimeters.

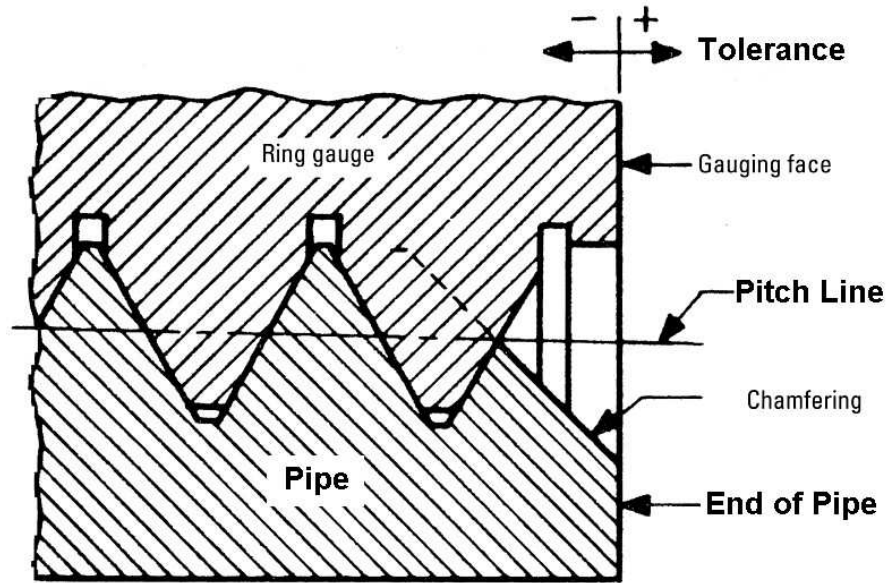
NOTES:

(1) Cautionary Note Regarding Hex Bushings. Hex Head Bushings of one-size reduction should not be used in services wherein they might be subject to harmful loads and forces other than internal pressures.

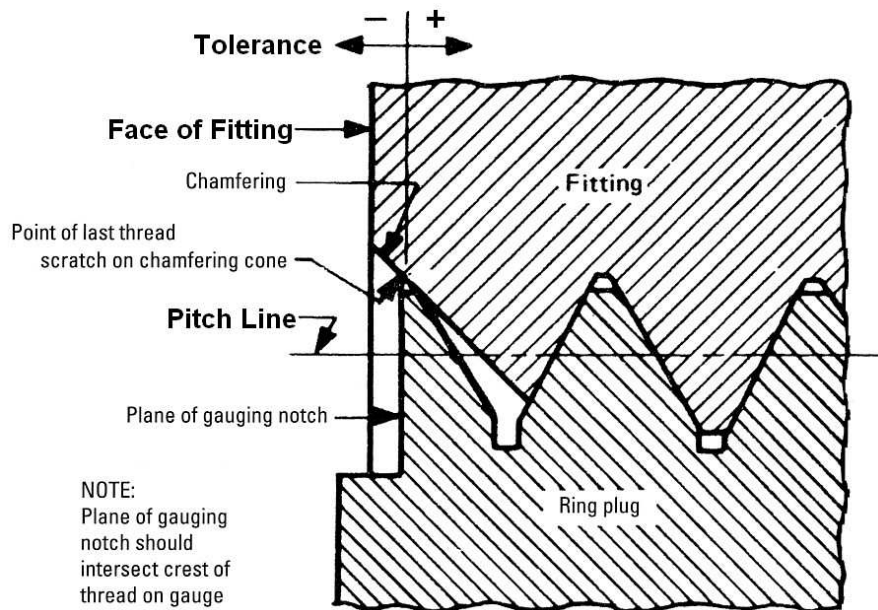


TECHNICAL SHEETS

IML PERFORMS REGULAR CHECKING OF THE THREAD IN ACCORDANCE WITH ITS PROCEDURE AND WITH ANSI/ASME B1.20.1 NORMATIVE



Enlarged view showing chamfered external thread of basic size



NOTE:
Plane of gauging notch should intersect crest of thread on gauge

Enlarged view showing chamfered internal thread of basic size with chamfering exceeding the major diameter

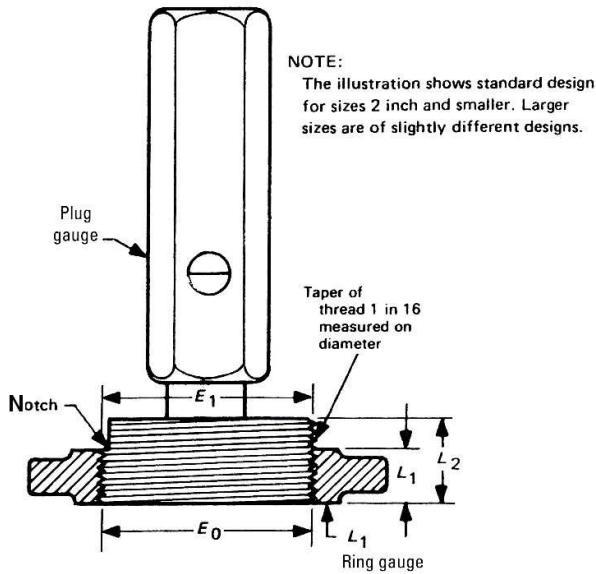
GENERAL NOTE:

The chamfering illustrated is at 45 deg. angle and is approximately 1/2 pitch in depth. However, these details are not requirements and are given only for information on the illustration shown. The chamfered portion of thread and the full chamfering cone are indicated by dotted lines.

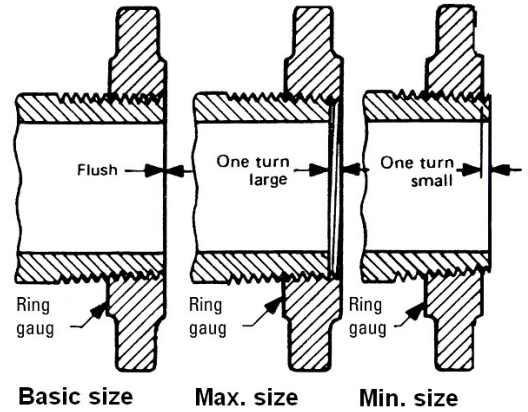
The reference point for the internal product thread is the starting end of the fitting, providing the chamfering does not exceed the major diameter of the internal thread. When a chamfering on the product thread exceeds this limit, the reference point becomes the last thread scratch on the chamfering cone, as illustrated. Allowance must be made for depth of counterbore on counterbored fittings.



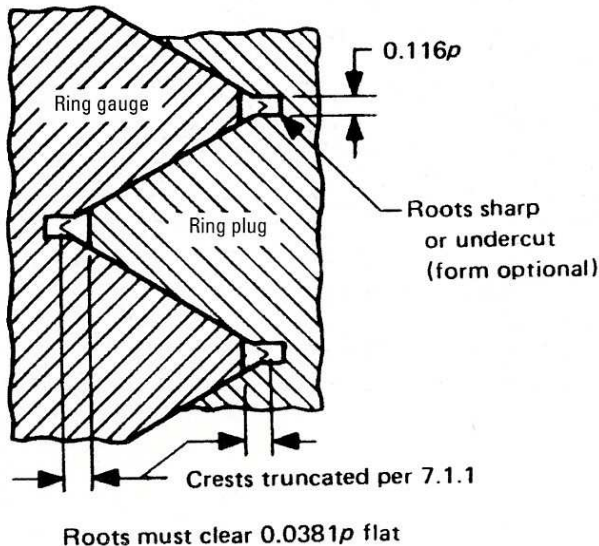
IML PERFORMS REGULAR CHECKING OF THE THREAD IN ACCORDANCE WITH ITS PROCEDURE AND WITH ANSI/ASME B1.20.1 NORMATIVE



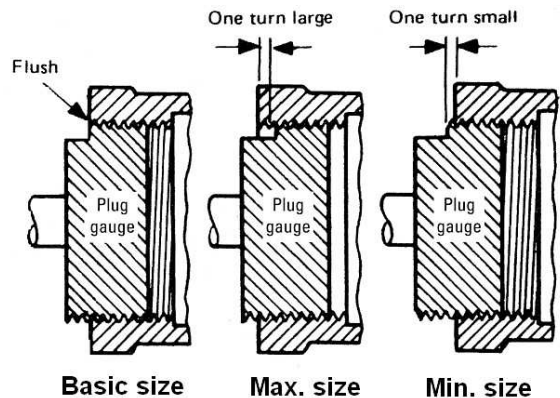
NPT STANDARD TAPER PIPE THREAD
PLUG AND RING GAUGES



GAUGING EXTERNAL TAPER THREADS
WITH RING GAUGE



SUGGESTED FORM OF GAUGE THREAD



GAUGING INTERNAL TAPER THREADS



TECHNICAL SHEETS

TYPE OF MATERIALS																			
SPEC.ASTM		A106				A182													
GRADE		A105	A	B	C	F5	F9	F91	F11 (Cl.1)	F11 (Cl.2)	F11 (Cl.3)	F12 (Cl.1)	F12 (Cl.2)	F22 (Cl.1)	F22 (Cl.3)	F304	F304H	F304L	F316
C	min							0.08	0.05	0.1	0.1	0.05	0.1	0.05	0.05	0.08	0.04	0.035	0.08
	max	0.35	0.25	0.3	0.35	0.15	0.15	0.12	0.15	0.2	0.2	0.15	0.2	0.15	0.15		0.1		
Mn	min	0.6	0.27	0.29	0.29	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3				
	max	1.05	0.93	1.06	1.06	0.6	0.6	0.6	0.6	0.8	0.8	0.6	0.8	0.6	0.6	2	2	2	2
P	max	0.035	0.035	0.035	0.035	0.03	0.03	0.02	0.03	0.04	0.04	0.045	0.04	0.04	0.04	0.045	0.045	0.045	0.045
S	max	0.04	0.035	0.035	0.035	0.03	0.03	0.01	0.03	0.04	0.04	0.045	0.04	0.04	0.04	0.03	0.03	0.03	0.03
Si	min	0.1	0.1	0.1	0.1	0	0.5	0.2	0.5	0.5	0.5	0	0.1						
	max	0.35				0.5	1	0.5	1	1	1	0.5	0.6	0.5	0.5	1	1	1	1
Cu	max	0.4 _A	0.4	0.4	0.4														
Ni	min															8	8	8	10
	max	0.4 _A	0.4	0.4	0.4	0.5										11	11	13	14
Cr	min					4	8	8	1	1	1	0.8	0.8	2	2	18	18	18	16
	max	0.3 _{AB}	0.4	0.4	0.4	6	10	9.5	1.5	1.5	1.5	1.25	1.25	2.5	2.5	20	20	20	18
Mo	min					0.44	0.9	0.85	0.44	0.44	0.44	0.44	0.44	0.87	0.87				2
	max	0.12 _{AB}	0.15	0.15	0.15	0.65	1.1	1.05	0.65	0.65	0.65	0.65	0.65	1.13	1.13				3
Nb	max	0.02																	
AL																			
Ti																			
Bo																			
V	max	0.05	0.08	0.08	0.08														
Tensile strength min.	PSI x 1k	70	48	60	70	90	85	85	60	70	75	60	70	60	75	75	75	70	75
	MPA	485	330	415	485	620	585	585	415	485	515	415	485	415	515	515	515	485	515
Yield strength min.	PSI x 1k	36	30	35	40	65	55	60	30	40	45	32	40	30	45	30	30	25	30
	MPA	250	205	240	275	450	380	415	205	275	310	220	275	205	310	205	205	170	205
Elongation in 2 in. Min. 2%		22				22	20	20	20	20	20	20	20	20	20	30	30	30	30
Reduction of area Min. 2%		30				50	40	40	45	30	30	45	30	35	30	50	50	50	50
Hardness test HB.	min	137				187	179	0	121	143	156	121	143		156				
	max	187				248	217	248	174	207	207	174	207	170	207				

(A): the sum of copper, nickel, chromium and molybdenum shall not exceed 1.00% -

(B): the sum of chromium and molybdenum shall not exceed 0.32%.



TECHNICAL SHEETS

TYPE OF MATERIALS														
SPEC.ASTM		A182								A234				
GRADE		F316H	F316L	F321	F321H	F347	F347H	F44	F51	WPB	WP11 CL2	WP22 Cl.3	WP5	WP9
C	min	0.04	0.035	0.08	0.04	0.08	0.04	0.02	0.03	0.3	0.05	0.05	0.15	0.15
	max	0.1			0.1		0.1				0.2	0.15		
Mn	min									0.29	0.3	0.3	0.3	0.3
	max	2	2	2	2	2	2	1	2	1.06	0.8	0.6	0.6	0.6
P	max	0.045	0.045	0.045	0.045	0.045	0.045	0.03	0.03	0.05	0.04	0.04	0.04	0.03
S	max	0.03	0.03	0.03	0.03	0.03	0.03	0.01	0.02	0.058	0.04	0.04	0.03	0.03
Si	min									0.1	0.5			
	max	1	1	1	1	1	1	0.8	1		1	0.5	0.5	0.5
Cu	max									0.4				
NI	min	10	10	9	9	9	9	17.5	4.5	0.4				
	max	14	15	12	12	13	13	18.5	6.5					
Cr	min	16	16	17	17	17	17	19.5	21	0.4	1	1.9	4	4
	max	18	18			20	20	20.5	23		1.5	2.6	6	6
Mo	min	2	2					6	2.5	0.15	0.44	0.87	0.44	0.9
	max	3	3					6.5	3.5		0.65	1.13	0.65	1.1
Nb	max													
AL														
Ti														
Bo														
V	max									0.08				
Tensile strength min.	PSI x 1k	75	70	75	75	75	75	94	90	60-85	70-95	75-100	60-85	60-85
	MPA	515	485	515	515	515	515	650	620	415-585	485-655	520-690	415-585	415-585
Yeld strength min.	PSI x 1k	30	25	30	30	30	30	44	65	35	40	45	30	30
	MPA	205	170	205	205	205	205	300	450	240	275	310	205	205
Elongation in 2 in. Min. 2%		30	30	30	30	30	30	35	25	22	22	22	22	22
Reduction of area Min. 2%		50	50	50	50	50	50	50	45					
Hardness test HB.	min													
	max													



TECHNICAL SHEETS

TYPE OF MATERIALS																	
SPEC.ASTM		A312										A335				A350	
GRADE		TP304	TP304H	TP304L	TP316	TP316H	TP316L	TP321	TP321H	TP347	TP347H	P5	P9	P11	P22	LF2	LF3
C	min	0.08	0.04	0.035	0.08	0.04	0.035	0.08	0.04	0.08	0.04	0.15	0.15	0.05	0.05	0.35	0.2
	max		0.1			0.1			0.1		0.1			0.15	0.15		
Mn	min	2	2	2	2	2	2	2	2	2	2	0.3	0.3	0.3	0.3	0.6	
	max											0.6	0.6	0.6	0.6	1.35	0.9
P	max	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.025	0.025	0.025	0.025	0.035	0.035
S	max	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.025	0.025	0.025	0.025	0.04	0.04
Si	min												0.25	0.5		0.15	0.2
	max	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.5	1	1	0.5	0.3	0.3
Cu	max															0.40 _B	0.40 _C
Ni	min	8	8	8	11	11	10	9	9	9	9					0.40 _B	3.3
	max	11	11	13	14	14	15	13	13	13	13						3.7
Cr	min	18	18	18	16	16	16	17	17	17	17	4	8	1	1.9		
	max	20	20	20	18	18	18	20	20	20	20	6	10	1.5	2.6	0.3 _{Bc}	0.3 _C
Mo	min				2	2	2					0.45	0.9	0.44	0.87		
	max				3	3	3					0.5	1.1	0.65	1.13	0.12 _{Bc}	0.12 _C
Nb	max															0.02	0.02
AL																	
Ti																	
Bo																	
V	max															0.05	0.03
Tensile strength min.	PSI x 1k	75	75	70	75	75	70	75	75	75	75	60	60	60	60	70-95	70-95
	MPA	515	515	485	515	515	485	515	515	515	515	415	415	415	415	485-655	485-655
Yeld strength min.	PSI x 1k	30	30	25	30	30	25	30	30	30	30	30	30	30	30	36	37.5
	MPA	205	205	170	205	205	170	205	205	205	205	205	205	205	205	250	260
Elongation in 2 in. Min. 2%		35	35	35	35	35	35	35	35	35	35	22	22	22	22	22	22
Reduction of area Min. 2%																30	35
Hardness test HB.	min																
	max																

(b):the sum of copper, nickel, chromium and molybdenum shall not exceed 1.00% on heat analysis

(c): the sum of chromium and molybdenum shall not exceed 0.32% on heat analysis.



TECHNICAL SHEETS

TYPE OF MATERIALS													
SPEC.ASTM		A403										A420	
GRADE		WP304	WP304H	WP304L	WP316	WP316H	WP316L	WP321	WP321H	WP347	WP347H	WPL6	WPL3
C	min	0.08	0.04	0.035	0.08	0.04	0.035	0.08	0.04	0.08	0.04	0.3	0.2
	max		0.10			0.1			0.10		0.10		
Mn	min											0.6	0.31
	max	2	2	2	2	2	2	2	2	2	2	1.35	0.64
P	max	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.035	0.05
S	max	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.05
Si	min											0.15	0.13
	max	1	1	1	1	1	1	1	1	1	1	0.3	0.37
Cu	max											0.4	
Ni	min	8	8	8	10	10	10	9	9	9	9		3.2
	max	11	11	13	14	14	16	13	13	13	13	0.4	3.8
Cr	min	18	18	18	16	16	16	17	17	17	17	0.3	
	max	20	20	20	18	18	18	20	20	20	20		
Mo	min				2	2	2						
	max				3	3	3					0.12	
Nb	max											0.02	
AL													
Ti													
Bo													
V	max											0.05	
Tensile strength min.	PSI x 1k	75	75	70	75	75	70	75	75	75	75	60-85	65-90
	MPA	515	515	485	515	515	485	515	515	515	515	415-585	450-620
Yeld strength min.	PSI x 1k	30	30	25	30	30	25	30	30	30	30	35	35
	MPA	205	205	170	205	205	170	205	205	205	205	240	240
Elongation in 2 in. Min. 2%		28	28	28	28	28	28	28	28	28	28	22	22
Reduction of area Min. 2%													
Hardness test HB.	min												
	max												



TECHNICAL SHEETS

TYPE OF MATERIALS							
SPEC.ASTM	A333	A453	B462	B564	B564	B564	
GRADE	GRADE 6 (A)	GRADE 660	UNS N08020	NICKEL COPPER ALLOY UNS N04400	NICKEL CHROMIUM MOLYBDENUM COLUMBIUM ALLOY UNS N06625	NICKEL -IRON - CHROMIUM - MOLYBDENUM - COPPER ALLOY UNS N08825	
C	min						
	max	0.3	0.08	0.07	0.3	0.1	0.05
Mn	min	0.29					
	max	1.06	2	2	2	0.5	1
P	max	0.025	0.04	0.045		0.015	
S	max	0.025	0.03	0.035	0.024	0.015	0.03
Si	min	0.1					
	max		1	1	0.5	0.5	0.5
Cu	min			3	28		1.5
	max			4	34		3
NI	min		24	32	63	58	38
	max		27	38			46
Cr	min		13.5	19		20	19.5
	max		16	21		23	23.5
Mo	min		1-1.5	2		8	2.5
	max		1.5	3		10	3.5
Nb	min			8x carb.		3.15	
	max			1		4.15	
Al	min						
	max		0.35			0.4	0.2
Ti	min		1.9				0.6
	max		2.35			0.4	1.2
Bo	min		0.001				
	max		0.01				
V	min		0.1				
	max		0.5				
Tensile strength min.	PSI x 1k	60	130	80	70	120	85
	MPA	415	895	551	483	827	586
Yeld strength min.	PSI x 1k	35	85	35	25	60	35
	MPA	240	585	241	172	414	241
Elongation in 2 in. Min. 2%			15	30	35	30	30
Reduction of area Min. 2%			18	50			
Hardness test HB.	min						
	max						

(A): for each reduction of 0.01% carbon below 0.30% increase of 0.05% manganese above 1.06% would be permitted to a maximum of 1.35% manganese.



TECHNICAL SHEETS

Temperature & Pressure Limits

Material	A105N		A182 - Gr.F11		A182 - Gr.F22		A182 - Gr.F5		
	LBS	3000 LBS	6000 LBS	3000 LBS	6000 LBS	3000 LBS	6000 LBS	3000 LBS	6000 LBS
Temp. C°	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar
-30/+40	207	414	207	414	207	414	207	414	
50	206	411	207	414	207	414	207	414	
75	203	406	203	406	203	406	203	406	
100	200	401	200	401	200	401	200	401	
125	198	396	198	396	198	396	198	396	
150	196	392	196	392	196	392	196	392	
175	194	388	194	388	194	388	194	388	
200	192	384	192	384	192	384	192	384	
225	188	377	188	377	188	377	188	377	
250	183	366	183	366	183	366	183	366	
275	174	349	174	349	174	349	174	349	
300	165	331	165	331	165	331	165	331	
325	155	311	155	311	155	311	155	311	
350	145	290	146	292	146	292	146	292	
375			137	275	137	275	137	275	
400			128	257	128	257	128	257	
425			120	241	120	241	120	241	
450			111	223	111	223	111	223	
475			103	206	103	206	103	206	
500			94.5	189	94.5	189	94.5	189	
525			86	172	86	172	86	172	
550			67	134	68.5	137	63	126	
575			49.2	98.4	51.5	103	44.8	89.6	
600			35.8	71.4	38.8	77.6	30	60	
625			22.8	45.6	28	56	20.8	41.7	
650			11.4	22.8	19.4	38.8	14.4	28.8	

$^{\circ}\text{F} = 1.8^{\circ}\text{C} + 32$



TECHNICAL SHEETS

Temperature & Pressure Limits

ASTM	A182															
Material	F304		F304H		F304L		F316		F316H		F316L		F321		F321H	
LBS	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000
Temp. C°	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar	Bar
-100/-50	177	354			147	295	207	414			147	295	207	414		
-50/-30	177	354			147	295	207	414			147	295	207	414		
-30/+40	177	354	177	354	147	295	207	414	207	414	147	295	207	414	207	414
50	172	345	172	345	147	294	206	411	206	411	147	295	206	411	206	411
75	165	330	165	330	146	292	203	406	203	406	147	295	203	406	203	406
100	155	311	155	311	142	285	200	401	200	401	147	294	200	401	200	401
125	148	297	148	297	133	266	198	396	198	396	142	284	198	396	198	396
150	142	284	142	284	123	247	196	392	196	392	137	274	196	392	196	392
175	136	272	136	272	114	229	194	388	194	388	126	252	194	388	194	388
200	130	260	130	260	105	211	192	384	192	384	115	230	192	384	192	384
225	125	250	125	250	99.5	199	188	377	188	377	110	220	188	377	188	377
250	120	240	120	240	94	188	183	366	183	366	106	212	183	366	183	366
275	116	231	116	231	90	180	174	349	174	349	102	204	174	349	174	349
300	112	224	112	224	87.5	175	165	331	165	331	98.5	197	165	331	165	331
325	108	217	108	217	85	170	155	311	155	311	95	190	155	311	155	311
350	105	210	105	210	82.5	165	147	294	147	294	92	184	147	294	147	294
375	101	203	101	203	80.5	161	141	282	141	282	89	178	141	282	141	282
400	98	196	98	196	78.5	157	135	270	135	270	86	172	135	270	135	270
425	95	190	95	190	76.5	153	129	258	129	258	83.5	167	129	258	129	258
450	92	184	92	184			123	246	123	246	81	162	123	246	123	246
475	89.5	179	89.5	179			117	234	117	234			117	234	117	234
500	88	176	88	176			111	223	111	223			111	223	111	223
525	87	174	87	174			105	211	105	211			105	211	105	211
550	85.5	171	85.5	171			99.5	199	99.5	199			99.5	199	99.5	199
575	80.5	161	80.5	161			94	188	94	188			94	188	94	188
600	69.5	139	69.5	139			89	178	89	178			88	176	88	176
625	55	110	55	110			79	158	79	158			71	142	71	142
650	43.8	87.7	43.8	87.7			66.5	133	66.5	133			48.7	97.4	48.7	97.4
675	32.9	65.8	32.9	65.8			53	106	53	106			33.8	67.6	33.8	67.6
700	25.2	50.5	25.2	50.5			41.3	82.7	41.3	82.7			23.3	46.6	23.3	46.6
725	19.3	38.7	19.3	38.7			29.8	59.6	29.8	59.6			16.6	33.2	16.6	33.2
750	15.1	30.2	15.1	30.2			22	44.1	22	44.1			12.8	25.7	12.8	25.7
775	11.7	23.5	11.7	23.5			17	34	17	34			10.2	20.5	10.2	20.5
800	8.7	17.5	8.7	17.5			12.5	25.1	12.5	25.1			8.2	16.4	8.2	16.4

° F = 1.8 ° C + 32



TECHNICAL SHEETS

SEAMLESS PIPE – ASME B36.10 – ASME B36.19 DIAMETER, THICKNESS AND WEIGHTS

Ø Nominal Inches	Ø External mm	Schedule					STD e 40S	Schedule		XS e 80S	Schedule					XXS
		5S	10S	10	20	30		40	60		80	100	120	140	160	
1/8"	10.3		1.24							2.41						
			0.28							0.46						
1/4"	13.71		1.65				2.24			3.02						
			0.49				0.63			0.80						
3/8"	17.14		1.65				2.31			3.2						
			0.63				0.85			1.10						
1/2"	21.34	1.65	2.11				2.77			3.73					4.78	7.47
		0.80	1.00				1.27			1.62					1.94	2.55
3/4"	26.67	1.65	2.11				2.87			3.91					5.56	7.82
		1.03	1.28				1.68			2.19					2.90	3.63
1"	33.40	1.65	2.77				3.38			4.55					6.35	9.09
		1.29	2.08				2.50			3.23					4.18	5.45
1.1/4"	42.16	1.65	2.77				3.56			4.85					6.35	9.70
		1.65	2.69				3.38			4.46					5.58	7.76
1.1/2"	48.26	1.65	2.77				3.68			5.08					7.14	10.16
		1.90	3.12				4.05			5.41					7.22	9.55
2"	60.32	1.65	2.77				3.91			5.54					8.74	11.07
		2.38	3.94				5.44			7.49					11.08	13.45
2.1/2"	73.02	2.11	3.05				5.16			7.01					9.52	14.02
		3.70	5.26				8.68			11.42					14.88	20.41
3"	88.90	2.11	3.05				5.49			7.62					11.13	15.24
		4.50	6.45				11.29			15.27					20.98	27.67
3.1/2"	101.60	2.11	3.05				5.74	5.74		8.08						
		5.20	7.40				13.37	13.37		18.63						
4"	114.30	2.11	3.05				6.02			8.56			11.13		13.49	17.11
		5.81	8.34				16.07			22.31			28.25		33.48	41.02
5"	141.30	2.77	3.40				6.55			9.52			12.7		15.88	19.05
		9.45	11.56				21.78			30.95			40.24		49.11	57.42
6"	168.30	2.77	3.40				7.11			10.97			14.27		18.26	21.95
		11.31	13.82				28.26			42.56			54.20		67.22	79.18
8"	219.10	2.77	3.76		6.35	7.04	8.18	10.31		12.70	15.09	18.26	20.62	23.01	22.22	
		14.78	19.94		33.03	36.72	42.53	52.88		64.63	75.80	90.32	101.04	111.32	107.87	
10"	273.00	3.40	4.19		6.35	7.8	9.27	12.7	12.7	15.09	18.26	21.44	25.40	28.58	25.40	
		22.62	27.83		41.70	51.00	60.29	81.46	81.46	95.95	114.59	132.74	154.94	172.14	154.94	
12"	323.85	3.96	4.57		6.35	8.38	9.52	10.31	14.27	12.7	17.47	21.44	25.40	28.58	33.34	25.40
		33.00	36.00		49.81	65.07	73.82	79.67	108.97	97.36	131.70	159.52	186.77	206.96	238.11	186.77
14"	355.60	3.96	4.78	6.35	7.92	9.52	9.52	11.13	15.09	12.7	19.05	23.82	27.79	31.75	35.71	
		34.23	41.18	54.63	67.95	81.28	81.28	94.31	126.49	107.28	157.94	194.82	224.42	253.14	281.38	
16"	406.40	4.19	4.78	6.35	7.92	9.52	9.52	12.7	16.64	12.7	21.4	26.19	30.96	36.52	40.49	
		41.60	47.33	62.58	77.88	93.21	93.21	123.18	159.98	123.18	203.16	245.32	286.44	332.62	364.85	
18"	457.20	4.19	4.78	6.35	7.92	11.13	9.52	14.27	19.05	12.7	23.82	29.36	34.92	39.69	45.24	
		46.83	53.18	70.53	87.81	122.12	105.14	155.90	205.62	139.07	254.19	309.44	363.19	408.01	459.18	
20"	508.00	4.78	5.54	6.35	9.52	12.7	9.52	15.09	20.62	12.7	26.19	32.54	38.10	44.45	50.01	
		59.22	68.50	78.47	117.07	154.97	117.07	183.12	247.79	154.97	310.90	381.04	440.93	587.54	564.14	
22"	558.80			6.35	9.52	12.7	9.52		22.22	12.7	28.6	34.92	41.28	47.62	53.98	
				86.49	129.01	171.01	129.01		294.06	171.01	373.58	451.14	526.70	600.27	671.85	
24"	609.60	5.54	6.35	6.35	9.52	14.27	9.52	17.48	24.61	12.7	30.96	38.89	46.02	52.3	59.54	
		82.60	94.37	94.37	140.94	209.54	140.94	254.74	354.64	186.75	441.10	546.92	639.18	718.94	806.61	
26"	660.40			7.92	12.7		9.52			12.7						
				127.58	202.65		152.87			202.55						
28"	711.20			7.92	12.7	15.88	9.52			12.7						
				137.50	218.51	271.90	164.63			218.51						
30"	762.00			7.92	12.7	15.88	9.52			12.7						
				147.33	234.44	291.81	176.73			234.44						
32"	812.80			7.92	12.7	15.88	9.52	17.48		12.7						
				156.58	250.33	311.67	188.66	352.28		250.33						
34"	863.60			7.92	12.7	15.88	9.52	17.48		12.7						
				166.82	266.35	331.54	200.59	363.91		266.35						
36"	914.40			7.92	12.7	15.88	9.52	19.05		12.7						
				177.12	282.12	351.41	212.52	420.17		282.12						
38"	965.2						9.52			12.7						
							224.42			255.23						
40"	1016.0						9.52			12.7						
							235.35			3/4. /4						
42"	1066.8						9.52			12.7						
							245.34			330.00						
44"	1117.6						9.52			12.7						
							260.21			345.95						

Bold: thickness in mm - Current: weights in kg/m



CONVERSION TABLE INCHES/MM

INCHES	+0	+1/16"	+1/8"	+3/16"	+1/4"	+5/16"	+3/8"	+7/16"	+1/2"	+9/16"	+5/8"	+11/16"	+3/4"	+13/16"	+7/8"	+15/16"
0	0.0	1.6	3.2	4.8	6.4	7.9	9.5	11.1	12.7	14.3	15.9	17.5	19.1	20.6	22.2	23.8
1	25.4	27.0	28.6	30.2	31.8	33.3	34.9	36.5	38.1	39.7	41.3	42.9	44.5	46.0	47.6	49.2
2	50.8	52.4	54.0	55.6	57.2	58.7	60.3	61.9	63.5	65.1	66.7	68.3	69.9	71.4	73.0	74.6
3	76.2	77.8	79.4	81.0	82.6	84.1	85.7	87.3	88.9	90.5	92.1	93.7	95.3	96.8	98.4	100.0
4	101.6	103.2	104.8	106.4	108.0	109.5	111.1	112.7	114.3	115.9	117.5	119.1	120.7	122.2	123.8	125.4
5	127.0	128.6	130.2	131.8	133.4	134.9	136.5	138.1	139.7	141.3	142.9	144.5	146.1	147.6	149.2	150.8
6	152.4	154.0	155.6	157.2	158.8	160.3	161.9	163.5	165.1	166.7	168.3	169.9	171.5	173.0	174.6	176.2
7	177.8	179.4	181.0	182.6	184.2	185.7	187.3	188.9	190.5	192.1	193.7	195.3	196.9	198.4	200.0	201.6
8	203.2	204.8	206.4	208.0	209.6	211.1	212.7	214.3	215.9	217.5	219.1	220.7	222.3	223.8	225.4	227.0
9	228.6	230.2	231.8	233.4	235.0	236.5	238.1	239.7	241.3	242.9	244.5	246.1	247.7	249.2	250.8	252.4
10	254.0	255.6	257.2	258.8	260.4	261.9	263.5	265.1	266.7	268.3	269.9	271.5	273.1	274.6	276.2	277.8
11	279.4	281.0	282.6	284.2	285.8	287.3	288.9	290.5	292.1	293.7	295.3	296.9	298.5	300.0	301.6	303.2
12	304.8	306.4	308.0	309.6	311.2	312.7	314.3	315.9	317.5	319.1	320.7	322.3	323.9	325.4	327.0	328.6
13	330.2	331.8	333.4	335.0	336.6	338.1	339.7	341.3	342.9	344.5	346.1	347.7	349.3	350.8	352.4	354.0
14	355.6	357.2	358.8	360.4	362.0	363.5	365.1	366.7	368.3	369.9	371.5	373.1	374.7	376.2	377.8	379.4
15	381.0	382.6	384.2	385.8	387.4	388.9	390.5	392.1	393.7	395.3	396.9	398.5	400.1	401.6	403.2	404.8
16	406.4	408.0	409.6	411.2	412.8	414.3	415.9	417.5	419.1	420.7	422.3	423.9	425.5	427.0	428.6	430.2
17	431.8	433.4	435.0	436.6	438.2	439.7	441.3	442.9	444.5	446.1	447.7	449.3	450.9	452.4	454.0	455.6
18	457.2	458.8	460.4	462.0	463.6	465.1	466.7	468.3	469.9	471.5	473.1	474.7	476.3	477.8	479.4	481.0
19	482.6	484.2	485.8	487.4	489.0	490.5	492.1	493.7	495.3	496.9	498.5	500.1	501.7	503.2	504.8	506.4
20	508.0	509.6	511.2	512.8	514.4	515.9	517.5	519.1	520.7	522.3	523.9	525.5	527.1	528.6	530.2	531.8
21	533.4	535.0	536.6	538.2	539.8	541.3	542.9	544.5	546.1	547.7	549.3	550.9	552.5	554.0	555.6	557.2
22	558.8	560.4	562.0	563.6	565.2	566.7	568.3	569.9	571.5	573.1	574.7	576.3	577.9	579.4	581.0	582.6
23	584.2	585.8	587.4	589.0	590.6	592.1	593.7	595.3	596.9	598.5	600.1	601.7	603.3	604.8	606.4	608.0
24	609.6	611.2	612.8	614.4	616.0	617.5	619.1	620.7	622.3	623.9	625.5	627.1	628.7	630.2	631.8	633.4
25	635.0	636.6	638.2	639.8	641.4	642.9	644.5	646.1	647.7	649.3	650.9	652.5	654.1	655.6	657.2	658.8
26	660.4	662.0	663.6	665.2	666.8	668.3	669.9	671.5	673.1	674.7	676.3	677.9	679.5	681.0	682.6	684.2
27	685.8	687.4	689.0	690.6	692.2	693.7	695.3	696.9	698.5	700.1	701.7	703.3	704.9	706.4	708.0	709.6
28	711.2	712.8	714.4	716.0	717.6	719.1	720.7	722.3	723.9	725.5	727.1	728.7	730.3	731.8	733.4	735.0
29	736.6	738.2	739.8	741.4	743.0	744.5	746.1	747.7	749.3	750.9	752.5	754.1	755.7	757.2	758.8	760.4
30	762.0	763.6	765.2	766.8	768.4	769.9	771.5	773.1	774.7	776.3	777.9	779.5	781.1	782.6	784.2	785.8
31	787.4	789.0	790.6	792.2	793.8	795.3	796.9	798.5	800.1	801.7	803.3	804.9	806.5	808.0	809.6	811.2
32	812.8	814.4	816.0	817.6	819.2	820.7	822.3	823.9	825.5	827.1	828.7	830.3	831.9	833.4	835.0	836.6
33	838.2	839.8	841.4	843.0	844.6	846.1	847.7	849.3	850.9	852.5	854.1	855.7	857.3	858.8	860.4	862.0
34	863.6	865.2	866.8	868.4	870.0	871.5	873.1	874.7	876.3	877.9	879.5	881.1	882.7	884.2	885.8	887.4
35	889.0	890.6	892.2	893.8	895.4	896.9	898.5	900.1	901.7	903.3	904.9	906.5	908.0	909.6	911.2	912.8
36	914.4	916.0	917.6	919.2	920.8	922.3	923.9	925.5	927.1	928.7	930.3	931.9	933.4	935.0	936.6	938.2
37	939.8	941.4	943.0	944.6	946.2	947.7	949.3	950.9	952.5	954.1	955.7	957.3	958.8	960.4	962.0	963.6
38	965.2	966.8	968.4	970.0	971.5	973.1	974.7	976.3	977.9	979.5	981.1	982.7	984.2	985.8	987.4	989.0
39	990.6	992.2	993.8	995.4	996.9	998.5	1000.1	1001.7	1003.3	1004.9	1006.5	1008.1	1009.7	1011.2	1012.8	1014.4
40	1016.0	1017.6	1019.2	1020.8	1022.4	1023.9	1025.5	1027.1	1028.7	1030.3	1031.9	1033.5	1035.1	1036.6	1038.2	1039.8
41	1041.4	1043.0	1044.6	1046.2	1047.8	1049.3	1050.9	1052.5	1054.1	1055.7	1057.3	1058.9	1060.5	1062.0	1063.6	1065.2
42	1066.8	1068.4	1070.0	1071.6	1073.2	1074.7	1076.3	1077.9	1079.5	1081.1	1082.7	1084.3	1085.9	1087.4	1089.0	1090.6
43	1092.2	1093.8	1095.4	1097.0	1098.6	1100.1	1101.7	1103.3	1104.9	1106.5	1108.1	1109.7	1111.3	1112.8	1114.4	1116.0
44	1117.6	1119.2	1120.8	1122.4	1124.0	1125.5	1127.1	1128.7	1130.3	1131.9	1133.5	1135.1	1136.7	1138.2	1139.8	1141.4
45	1143.0	1144.6	1146.2	1147.8	1149.4	1150.9	1152.5	1154.1	1155.7	1157.3	1158.9	1160.5	1162.1	1163.6	1165.2	1166.8
46	1168.4	1170.0	1171.6	1173.2	1174.8	1176.3	1177.9	1179.5	1181.1	1182.7	1184.3	1185.9	1187.5	1189.0	1190.6	1192.2
47	1193.8	1195.4	1197.0	1198.6	1200.2	1201.7	1203.3	1204.9	1206.5	1208.1	1209.7	1211.3	1212.9	1214.4	1216.0	1217.6
48	1219.2	1220.8	1222.4	1224.0	1225.6	1227.1	1228.7	1230.3	1231.9	1233.5	1235.1	1236.7	1238.3	1239.8	1241.4	1243.0
49	1244.6	1246.2	1247.8	1249.4	1251.0	1252.5	1254.1	1255.7	1257.3	1258.9	1260.5	1262.1	1263.7	1265.2	1266.8	1268.4
50	1270.0	1271.6	1273.2	1274.8	1276.4	1277.9	1279.5	1281.1	1282.7	1284.3	1285.9	1287.5	1289.1	1290.6	1292.2	1293.8





CHAPTER 11

STUDBOLTS



STUDBOLTS

A. TYPE

IML stud-bolts production includes the following range:

Completely Threaded Stud-Bolts	with 2 nuts
Completely Threaded Bars	without nuts
Stud-Bolts	with 1 nut

B. DIMENSIONS

IML SPA produces stud-bolts in accordance with the following standards:

- Stud Bolts **ASME B16.5, API Spec. 6A, BS 4882 and UNI 6610**
- Nuts **ASME B18.2.2 and UNI 5587 – 5591, Dim. DIN 934 H=D**

Thread is in accordance with:

ANSI/ASME B1.1

Inch Thread

- Stud-Bolts up to 1 " included UNC - 2A - over 1 " 8UN - 2A
- Nuts up to 1 " included UNC - 2B - over 1 " 8 UN - 2B

ANSI B1.13.M, UNI 5542 and UNI 5543

Meter Thread

IML standard production provides the following dimensional fields:

- from 1/2" to 5.1/2" .
- from M10 to M120

C. MATERIAL

ASTM A193	Gr.B5-B7-B7M-B8-B8A-B8M-B8MA-B8T-B8TA-B16
ASTM A194	Gr.2H-2HM-3-4-7-7M-8-8A-8M-8MA-8T-8TA
ASTM A320	Gr.L7-L7M-L43-B8-B8A-B8M-B8MA-B8T-B8TA
ASTM B453	Gr.660 CL. A-B-C-D

D. MARKING

IML marks its stud-bolts production in accordance to the standards required:

ASTM	A193-A194-A320-A453
BSI	BS 4882

IML standard marking provides:

IML + Grade material

IML is in a position to make other marking type only upon specific request during order.



STUDBOLTS

E. DOCUMENTS & CERTIFICATES

Standard certificates issued by IML are in accordance with:

EN 10204:3.1

IML has an Internal Testing Room, equipped with material testing machines yearly checked by External Specialized Bodies, able to issue check documents indicated in the standard EN 10204.

F. SURFACE AND PROTECTIVE TREATMENTS

IML protects its products in the following ways:

Alloy stud-bolts	Oil treatment
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IML is able to supply, upon request, fittings with protection such as:

ARC zinc-coated	According to ASTM B633
Hot dip Galvanizing	According to ASTM A153
Cadmium plated	According to ASTM B766
PTFE coating	According to customers' indications

G. PACKING

IML packing is made in **CARTONS** or **BAGS**.

H. ORDER INSTRUCTIONS

In order to achieve a better service, customers are kindly requested to clearly indicate the following information in the order as per set below:

Parameter name	Value (examples)
Quantity	N°25
Type of product	FULLY THREADED STUD-BOLTS
Number of nuts	N° 2 nuts
Dimension	1.1/2" x 450 mm
Threading normative and type	ANSI/ASME B1.1 – 8UN –2A/2B
Material type and grade	ASTM A193 - Gr. B7 – A194 –Gr.2H
Dimension normative	ASME B16.5 – ASMA B18.2.2
Normative for protective coating	ASTM A153 - Hot dip Galvanizing
Type of certification	EN 10204:3.1
Request for specific certification by external Bodies	

I. USEFUL INFORMATION

MAINTENANCE

- Keep supplied pieces in the IML original packing
- Do not store pieces in damp areas
- Do not store pieces in contact with water
- Handle all threaded parts with care



RECOMMENDED FLANGE BOLT TORQUE

40,000 PSI Stress		52,000 PSI Stress		Bolt Size	28 Kg/mm ²		37 Kg/mm ²	
Bolt Tension	Make-Up Torque	Bolt Tension	Make-Up Torque		Bolt Tension	Make-Up Torque	Bolt Tension	Make-Up Torque
lbf	ft-lbs	lbf	ft-lbs		Kg/m	N-m	Kg/m	N-m
5,674	45	7,448	59	1/2"-13UNC	8,451	61	11,093	79
9,026	86	11,846	113	5/8"-11UNC	13,444	116	17,644	153
13,355	150	17,528	196	3/4"-10UNC	19,892	203	26,107	265
18,482	239	24,257	313	7/8"-9UNC	27,528	324	36,130	424
24,229	361	31,800	474	1"-8UN	36,089	489	47,366	642
31,617	522	41,497	686	1.1/8"-8 UN	47,093	707	61,809	930
39,987	726	52,483	953	1.1/4"-8 UN	59,560	984	78,173	1,292
49,339	976	64,757	1,281	1.3/8"-8 UN	73,490	1,323	96,455	1,736
59,672	1,277	78,320	1,676	1.1/2"-8 UN	88,881	1,731	116,657	2,272
70,988	1,635	93,171	2,146	1.5/8"-8 UN	105,736	2,216	138,778	2,909
83,284	2,054	109,311	2,695	1.3/4"-8 UN	124,051	2,784	162,818	3,653
96,563	2,538	126,739	3,331	1.7/8"-8 UN	143,830	3,441	188,777	4,516
110,824	3,093	145,456	4,060	2"-8 UN	165,072	4,193	216,656	5,504
142,290	4,435	186,755	5,821	2.1/4"-8 UN	211,940	6,012	278,171	7,892
177,683	6,116	233,209	8,028	2.1/2"-8 UN	264,658	8,292	347,364	10,884
196,852	7,097	258,368	9,314	2.5/8"-8 UN	293,211	9,622	384,839	12,627
217,003	8,176	284,817	10,731	2.3/4" - 8 UN	323,225	11,085	424,234	14,549
260,280	10,653	641,578	13,982	3"-8 UN	387,642	14,443	508,780	18,956
307,424	13,585	403,495	17,830	3.1/4"-8 UN	457,908	18,418	601,005	24,173
413,554	20,967	542,790	27,519	3.3/4"-8 UN	615,988	28,427	808,485	37,310
442,541	23,157	580,834	30,393	3.7/8"-8 UN	659,164	31,396	865,152	41,206
472,509	25,494	620,168	33,461	4"-8 UN	703,802	34,564	923,740	45,366
602,200	36,412	790,388	47,790	4.1/2"-8 UN	896,976	49,367	1,177,282	64,793
672,936	42,879	883,229	56,289	4.3/4"-8 UN	1,002,338	58,135	1,315,569	76,316

Note:

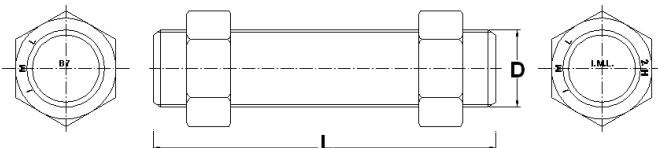
- Approximate figures have been drawn from the standard API Spec. 6A.
- 1 ft-lb = 1.3558 N-m
- 1 lb/ft = 1.4895 Kg/m
- 1 psi = 0.0703 Kg/cm²



STUDBOLTS

STUD - BOLTS THREADED FULL LENGTH WITH TWO HEXAGONAL HEAVY NUTS

LENGHT-L		WEIGHTS 1,000 PCS							
INCH	MM	D	1/2"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"
2.3/8"	60	KG	111	186					
		LBS	245	410					
2.1/2"	65	KG	115	192					
		LBS	254	423					
2.3/4"	70	KG	119	198					
		LBS	262	437					
3"	75	KG	123	205	317				
		LBS	271	452	699				
3.1/8"	80	KG	127	211	327				
		LBS	280	465	721				
3.1/4"	85	KG	131	217	336				
		LBS	289	478	741				
3.1/2"	90	KG	135	224	345	504			
		LBS	298	494	761	1,111			
3.3/4"	95	KG	139	230	354	516			
		LBS	306	507	780	1,138			
4"	100	KG	143	236	364	529			
		LBS	315	520	802	1,166			
4.1/8"	105	KG	147	243	343	542			
		LBS	324	536	822	1,195			
4.1/4"	110	KG	151	249	382	554			
		LBS	333	549	842	1,221			
4.1/2"	115	KG	155	255	391	567	794		
		LBS	342	562	862	1,250	1,750		
4.3/4"	120	KG	159	261	400	580	811		
		LBS	351	575	882	1,279	1,788		
5"	125	KG		268	410	593	828		
		LBS		591	904	1,307	1,825		
5.1/8"	130	KG		274	419	605	844	1,129	
		LBS		604	924	1,334	1,861	2,489	
5.1/4"	135	KG		280	428	618	861	1,151	
		LBS		617	944	1,362	1,898	2,537	
5.1/2"	140	KG		287	437	631	877	1,172	1,463
		LBS		633	963	1,391	1,933	1,584	3,225
5.3/4"	145	KG		293	447	643	894	1,194	1,490
		LBS		646	985	1,418	1,971	2,632	3,285
6"	150	KG		299	456	656	911	1,215	1,517
		LBS		659	1,005	1,446	2,008	2,679	3,344
FOR EACH 10MM		KG	8	13	18	25	33	43	54
FOR EACH 10MM		LBS	18	29	40	55	73	95	119



NUTS MATERIAL: - CARBON STEEL ASTM A194 GRADE 2H.

THREAD: ASME B 1.1 – UNC UP TO 1" -8UN 1.1/8" AND OVER.

LENGHT: INCHES/MM

WEIGHT: LBS/1000 PIECES.

DIMENSIONS: ASME B16.5

These stud-bolts are manufactured also in steel ASTM A320 GR. L7, ASTM A193 GR. B16 and stainless steel ASTM A193 GR. B8 (AISI 304), GR. 8T (AISI 321), GR. 8M (AISI 316) and any other type of alloy or stainless steel.



STUDBOLTS

STUD - BOLTS THREADED FULL LENGTH WITH TWO HEXAGONAL HEAVY NUTS

LENGHT-L		D	WEIGHTS 1000 PCS														
INCH	MM		5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	1.3/8"	1.1/2"	1.5/8"	1.3/4"	1.7/8"	2"			
6.1/4"	160	KG	312	474	681	944	1,258	1,571	2,003								
		LBS	688	1,045	1,501	2,081	2,773	3,453	4,416								
6.3/4"	170	KG	324	493	707	977	1,301	1,625	2,069								
		LBS	714	1,087	1,559	2,154	2,868	3,582	4,561								
7"	180	KG	337	511	732	1,011	1,344	1,679	2,136	2,586							
		LBS	743	1,127	1,614	2,229	2,963	3,702	4,709	5,701							
7.1/2"	190	KG		530	758	1,044	1,387	1,733	2,202	2,666							
		LBS		1,168	1,671	2,302	3,058	3,821	4,855	5,877							
7.7/8"	200	KG		548	783	1,077	1,430	1,768	2,268	2,745							
		LBS		1,208	1,726	2,374	3,153	3,937	5,000	6,052							
8.1/8"	210	KG		566	808	1,111	1,473	1,840	2,334	2,825	3,472						
		LBS		1,248	1,781	2,449	3,247	4,056	5,146	6,228	7,654						
8.3/4"	220	KG			834	1,144	1,516	1,894	2,400	2,904	3,566						
		LBS			1,839	2,522	3,342	4,175	5,291	6,402	7,862						
9"	230	KG			859	1,177	1,599	1,948	2,466	2,984	3,660						
		LBS			1,894	2,595	3,525	4,295	5,437	6,578	8,069						
9.1/2"	240	KG			884	1,210	1,602	2,002	2,532	3,063	3,754	4,496					
		LBS			1,949	2,668	3,532	4,414	5,582	6,753	8,276	9,912					
9.3/4"	250	KG			910	1,244	1,645	2,056	2,598	3,143	3,848	4,606					
		LBS			2,006	2,743	3,627	4,533	5,728	6,929	8,483	10,154					
10.1/4"	260	KG			935	1,277	1,688	2,110	2,664	3,222	3,942	4,716	5,535				
		LBS			2,061	2,815	3,721	4,652	5,873	7,103	8,690	10,397	12,202				
10.5/8"	270	KG				1,310	1,731	2,164	2,730	3,302	4,036	4,826	5,662	6,615			
		LBS				2,888	3,816	4,771	6,019	7,280	8,898	10,639	12,482	14,583			
11"	280	KG				1,344	1,774	2,218	2,796	3,381	4,130	4,936	5,789	6,760			
		LBS				2,963	3,911	4,890	6,164	7,454	9,105	10,882	12,762	14,903			
11.1/2"	290	KG				1,377	1,817	2,272	2,962	3,461	4,224	5,046	5,916	6,906			
		LBS				3,036	4,006	5,009	6,530	7,630	9,312	11,124	13,042	15,225			
11.3/4"	300	KG				1,410	1,860	2,236	2,928	3,540	4,318	5,156	6,043	7,051			
		LBS				3,108	4,101	5,128	6,455	7,804	9,519	11,367	13,322	15,545			
12.3/4"	325	KG					1,968	2,461	3,094	3,739	4,553	5,431	6,361	7,415			
		LBS					4,339	5,425	6,821	8,243	10,037	11,973	14,023	16,347			
13.3/4"	350	KG					2,075	2,595	3,259	3,937	4,789	5,706	6,679	7,779			
		LBS					4,575	5,721	7,185	8,679	10,558	12,579	14,724	17,149			
14.3/4"	375	KG								4,136	5,024	5,980	6,997	8,143			
		LBS								9,118	11,076	13,183	15,425	17,952			
15.3/4"	400	KG								4,135	5,259	6,255	7,314	8,506			
		LBS								9,116	11,594	13,790	16,124	18,752			
16.3/4"	425	KG											7,632	8,870			
		LBS												16,825	19,555		
17.3/4"	450	KG												7,950	9,234		
		LBS													17,526	20,357	
18.3/4"	475	KG													8,268	9,597	
		LBS														18,228	21,157
19.3/4"	500	KG														8,580	9,961
		LBS															18,915
FOR EACH 10 MM		KG	13	18	25	33	43	54	66	79	94	110	127	145			
FOR EACH 10 MM		LBS	28.66	39.68	55.11	72.75	94.8	119.05	145.5	174.16	207.23	242.5	279.98	319.66			

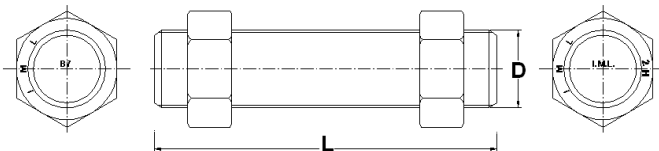
NUTS MATERIAL: - CARBON STEEL ASTM A194 GRADE 2H.

THREAD: ASME B 1.1 – UNC UP TO 1" -8UN 1.1/8" AND OVER.

LENGHT: INCHES/MM

WEIGHT: LBS/1000 PIECES.

DIMENSIONS: ASME B16.5

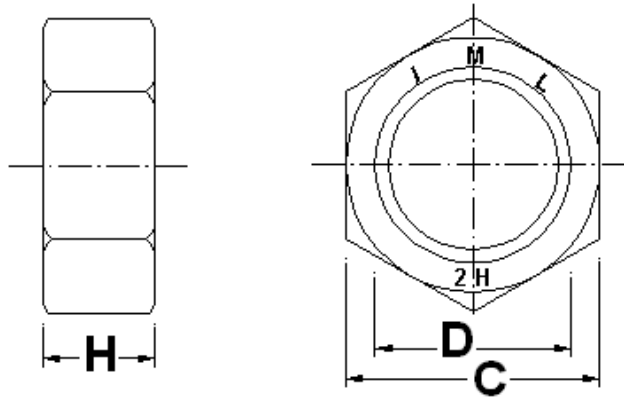


These stud-bolts are manufactured also in steel ASTM A320 GR. L7, ASTM A193 GR. B16 and stainless steel ASTM A193 GR. B8 (AISI 304), GR. 8T (AISI 321), GR. 8M (AISI 316) and any other type of alloy or stainless steel.



STUDBOLTS

HEAVY HEXAGONAL NUTS



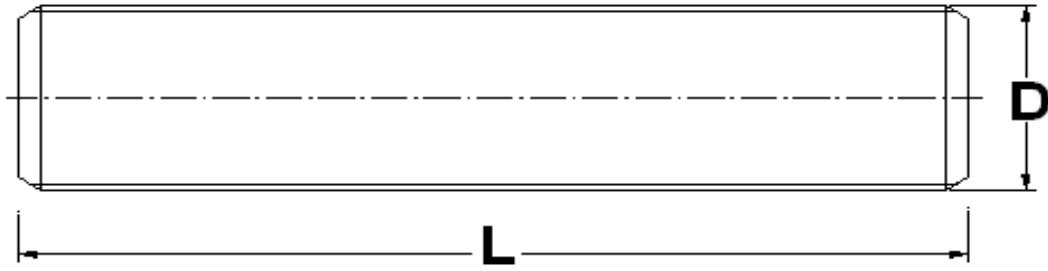
D	C		H		PITCH	WEIGHTS 1000 PCS	
	MM	INCH	MM	INCH		KG	LBS
1/2"	22	0.87	12.5	0.49	13	30	66
5/8"	27	1.06	16	0.63	11	52	114
3/4"	32	1.26	19	0.75	10	85	187
7/8"	36	1.42	22	0.87	9	130	286
1"	41	1.61	25	0.98	8	194	427
1.1/8"	46	1.81	28	1.1	8	270	595
1.1/4"	50	1.97	31.5	1.26	8	335	738
1.3/8"	55	2.16	35	1.38	8	450	992
1.1/2"	60	2.36	38	1.5	8	550	1,212
1.5/8"	65	2.56	41	1.65	8	715	1,576
1.3/4"	70	2.76	44	1.77	8	890	1,962
1.7/8"	74	2.91	47.5	1.89	8	1,070	2,358
2"	79	3.11	50	1.97	8	1,285	2,832
2.1/4"	89	3.50	56	2.2	8	1,800	3,968
2.1/2"	98	3.86	62	2.44	8	2,425	5,346
2.3/4"	108	4.25	68	2.68	8	3,300	7,275
3"	117	4.61	75	2.95	8	4,140	9,126
3.1/4"	127	5.00	82	3.22	8	4,900	10,802
3.1/2"	136	5.35	88	3.46	8	6,400	14,109
3.3/4"	146	5.75	95	3.74	8	8,000	17,636
4"	155	6.10	102	4.01	8	9,550	21,054

MATERIAL: CARBON STEEL ASTM A194 GRADE 2H, ASTM A194 GR. 3-4-7 and in stainless steel GR. 8 (AISI 304), GR. 8T (AISI 321) and GR. 8M (AISI 316) AND ANY OTHER MATERIAL.

THREAD: ASME B1.1 - UNC UP TO 1" - 8 UN 1.1/8" AND OVER.



SCREWED RODS FULL LENGTH



D	PITCH	WEIGHTS x MT	
		KG	LBS
1/2"	13	0.79	1.74
5/8"	11	1.26	2.78
3/4"	10	1.84	4.06
7/8"	9	2.54	5.6
1"	8	3.33	7.34
1.1/8"	8	4.3	9.48
1.1/4"	8	5.39	11.88
1.3/8"	8	6.61	14.57
1.1/2"	8	7.95	17.53
1.5/8"	8	9.41	20.74
1.3/4"	8	11	24.25
1.7/8"	8	12.72	28.04
2"	8	14.56	32.1
2.1/4"	8	18.61	41.01
2.1/2"	8	23.16	50.95
2.3/4"	8	28.2	62.04
3"	8	33.74	74.39
3.1/4"	8	39.78	87.7
3.1/2"	8	46.32	102.12
3.3/4"	8	53.35	117.61
4"	8	60.89	134.24

MATERIAL: ALLOY STEEL ASTM A193 GRADE B7 / B16 AND ANY OTHER TYPE

THREAD: ASME B 1.1 – UNC UP TO 1" – 8 UN 1.1/8" AND OVER.

DIMENSIONS: INCHES

WEIGHT: LBS/1 mt

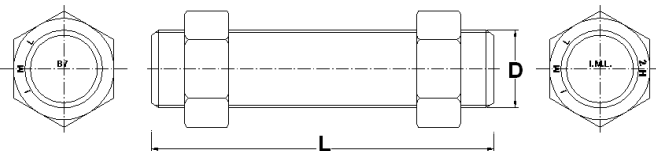
On request we can supply these bars with length of 2-3 meters or commercial length.



STUDBOLTS

STUDBOLTS THREADED FULL LENGTH WITH TWO HEXAGONAL HEAVY NUTS

		Ø	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33
WEIGHTS X 1000 PCS	60	KG	87	126	167	233						
		LBS	192	278	368	514						
	65	KG	90	131	173	231						
		LBS	188	289	381	509						
	70	KG	94	136	180	239						
		LBS	207	300	397	527						
	75	KG	97	141	186	247	323					
		LBS	214	311	410	545	712					
	80	KG	101	146	193	256	334					
		LBS	223	322	425	564	736					
	85	KG	105	150	200	264	344	421	544			
		LBS	232	331	441	582	758	928	1,199			
	90	KG	108	155	206	272	354	433	559			
		LBS	238	342	454	600	760	955	1,232			
	95	KG	112	160	213	280	364	446	574			
		LBS	247	353	470	617	803	983	1,285			
	100	KG	115	165	219	288	375	459	589			
		LBS	254	364	483	635	827	1,012	1,299			
	105	KG	119	170	226	296	385	472	603			
		LBS	262	375	498	653	849	1,041	1,329			
	110	KG	123	175	233	305	395	484	618			
		LBS	271	386	514	672	871	1,067	1,362			
	115	KG	126	180	239	313	406	497	633	868		
		LBS	278	397	527	690	895	1,096	1,396	1,914		
120	KG	130	185	246	321	416	510	648	887			
	LBS	287	408	542	708	917	1,124	1,429	1,956			
125	KG			252	329	426	522	683	906			
	LBS			556	725	939	1,151	1,462	1,997			
130	KG			259	337	437	535	678	925	1,211		
	LBS			571	743	963	1,180	1,495	2,039	2,870		
135	KG			266	346	447	548	692	945	1,234		
	LBS			586	763	986	1,208	1,526	2,063	2,721		
140	KG			272	354	457	560	707	964	1,258	1,570	
	LBS			600	780	1,008	1,235	1,559	2,125	2,773	3,461	
145	KG			279	362	468	573	722	983	1,281	1,599	
	LBS			615	798	1,032	1,283	1,592	2,167	2,824	3,525	
150	KG			285	370	478	586	737	1,200	1,305	1,628	
	LBS			628	816	1,054	1,292	1,625	2,209	2,877	3,569	
FOR EACH 10 MM MORE		KG	7	10	13	16	21	25	30	38	47	58
FOR EACH 10 MM MORE		LBS	15	22	30	35	46	55	66	84	104	128



NUTS MATERIAL: - CARBON STEEL ASTM A194 GRADE 2H AND ANY OTHER TYPE.

THREAD: UNI 5542 - 5543 - M36 ->M52M FINE PITCH.

LENGTH: MM

WEIGHT: LBS/1000 PIECES.

DIMENSIONS: UNI 6610

These stud-bolts are manufactured also in steel ASTM A320 GR. L7, ASTM A193 GR. B16 and stainless steel ASTM A193 GR. B8 (AISI 304), GR. 8T (AISI 321), GR. 8M (AISI 316) and any other type of alloy or stainless steel.



STUDBOLTS

STUDBOLTS THREADED FULL LENGTH WITH TWO HEXAGONAL HEAVY NUTS

D		M16	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	
MM	160	KG	299	386	499	611	767	1,040	1,352	1,685	2,132					
		LBS	659	551	1,100	1,347	1,691	2,293	2,981	3,715	4,700					
MM	170	KG	312	403	519	637	796	1,079	1,399	1,743	2,203					
		LBS	688	889	1,144	1,404	1,755	2,379	3,084	3,843	4,857					
MM	180	KG	325	419	540	662	826	1,117	1,445	1,801	2,274	2,792				
		LBS	717	924	1,190	1,549	1,821	2,463	3,186	3,970	5,013	6,155				
MM	190	KG			560	687	856	1,155	1,482	1,858	2,345	2,876				
		LBS			1,235	1,515	1,887	2,546	3,289	4,096	5,101	6,340				
MM	200	KG			581	713	885	1,194	1,539	1,916	2,416	2,960				
		LBS			1,281	1,572	1,951	2,632	3,393	4,224	5,328	6,526				
MM	210	KG			602	738	915	1,232	1,586	1,974	2,487	3,044	3,680			
		LBS			1,327	1,627	2,017	2,716	3,496	4,352	5,483	6,711	8,113			
MM	220	KG			763	945	1,270	1,833	2,031	2,558	3,128	3,378				
		LBS			1,682	2,083	2,800	3,800	4,478	5,639	6,896	7,447				
MM	230	KG			789	974	1,309	1,680	2,089	2,629	3,212	3,876				
		LBS			1,739	2,147	2,886	3,704	4,805	5,796	7,081	8,545				
MM	240	KG			814	1,004	1,347	1,727	2,147	2,700	3,296	3,974	4,732			
		LBS			1,795	2,213	2,970	3,807	4,733	5,952	7,266	8,761	10,432			
MM	250	KG			840	1,034	1,385	1,774	2,204	2,771	3,380	4,072	4,846			
		LBS			1,852	2,279	3,053	3,911	4,859	6,109	7,451	9,977	10,683			
MM	260	KG			865	1,063	1,424	1,821	2,262	2,841	3,463	4,170	4,959	5,825	6,954	
		LBS			1,907	2,343	3,139	4,015	4,987	6,263	7,634	9,193	10,933	12,842	15,331	
MM	270	KG					1,462	1,868	2,320	2,912	3,547	4,268	5,072	5,955	7,107	
		LBS					3,223	4,118	5,115	6,420	7,820	9,409	11,182	13,128	15,668	
MM	280	KG					1,501	1,915	2,377	2,983	3,631	4,367	5,186	6,085	7,260	
		LBS					3,309	4,222	5,240	6,576	8,005	9,627	11,433	13,415	16,005	
MM	290	KG					1,539	1,982	2,435	3,054	3,715	4,465	5,289	6,214	7,413	
		LBS					3,393	4,325	5,368	6,733	8,190	9,843	11,682	13,590	16,343	
MM	300	KG					1,577	2,009	2,493	3,125	3,799	4,563	5,412	6,344	7,585	
		LBS					3,477	4,429	5,496	6,889	8,375	10,060	11,931	13,986	16,678	
MM	325	KG						2,126	2,637	3,302	4,009	4,808	5,696	6,889	7,947	
		LBS						4,687	5,813	7,280	8,838	10,600	12,557	14,702	17,520	
MM	350	KG						2,243	2,781	3,480	4,218	5,053	5,979	6,993	8,329	
		LBS						4,945	6,131	7,672	9,299	11,140	13,161	15,417	18,362	
MM	375	KG									4,428	5,298	6,263	7,318	8,711	
		LBS									9,762	11,680	13,807	16,133	19,204	
MM	400	KG									4,638	5,543	6,546	7,642	9,093	
		LBS									10,225	12,220	14,431	16,847	20,046	
MM	425	KG										6,830	7,966	9,475		
		LBS										15,057	17,562	20,883		
MM	450	KG										7,113	8,291	9,857		
		LBS										16,278	21,731			
MM	475	KG											8,615	10,239		
		LBS											18,993	22,573		
MM	500	KG											8,940	10,621		
		LBS											19,709	23,415		
FOR EACH 10		KG	13	16	21	25	30	38	47	58	71	84	98	113	130	153
FOR EACH 10		LBS	29.68	35.27	46.3	55.11	66.14	83.77	103.6	127.9	156.5	185.2	217	249.1	286.6	337.3

NUTS MATERIAL: - CARBON STEEL ASTM A194 GRADE 2H AND ANY OTHER TYPE.

THREAD: UNI 5542 - 5543 - M36 -> M52M FINE PITCH.

LENGTH: MM

WEIGHT: LBS/ 1000 PIECES.

DIMENSIONS: UNI 6610

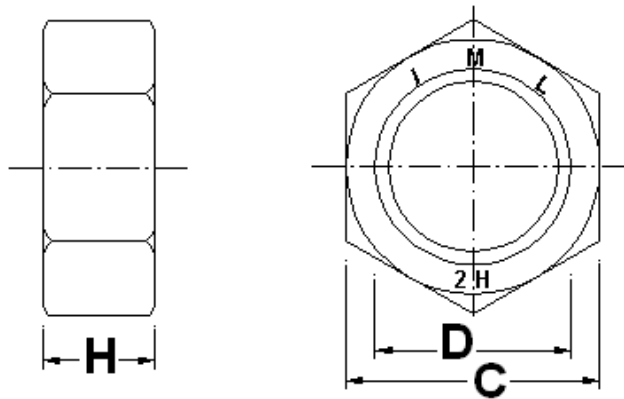


These stud-bolts are manufactured also in steel ASTM A320 GR. L7, ASTM A193 GR. B16 and stainless steel ASTM A193 GR. B8 (AISI 304), GR. 8T (AISI 321), GR. 8M (AISI 316) and any other type of alloy or stainless steel.



STUDBOLTS

HEAVY HEXAGONAL NUTS H=D



D	C	H	PITCH	WEIGHTS x1000 PCS	
	MM	MM		KG	LBS
M10	17	10	1.5	12	26.4
M12	19	12	1.75	20	45
M14	22	14	2	32	69
M16	24	16	2	41	89
M18	27	18	2.5	58	128
M20	30	20	2.5	49	108
M22	32	22	2.5	95	209
M24	36	24	3	137	302
M27	41	27	3	200	441
M30	46	30	3.5	284	626
M33	50	33	3.5	361	796
M36	55	36	3	474	1,045
M39	60	39	3	612	1,349
M42	65	42	3	776	1,711
M45	70	45	3	966	2,130
M48	75	48	3	1,180	2,601
M52	80	52	3	1,430	3,153
M56	85	56	4	1,600	3,577
M60	90	60	4	2,115	4,662
M64	95	64	4	2,475	5,456
M68	100	68	4	3,100	6,834

MATERIAL: CARBON STEEL ASTM A194 GRADE 2H, ASTM A194 GR. 3-4-7 and in stainless steel GR. 8 (AISI 304),GR. 8T (AISI 321) and GR. 8M (AISI 316) AND ANY OTHER TYPE

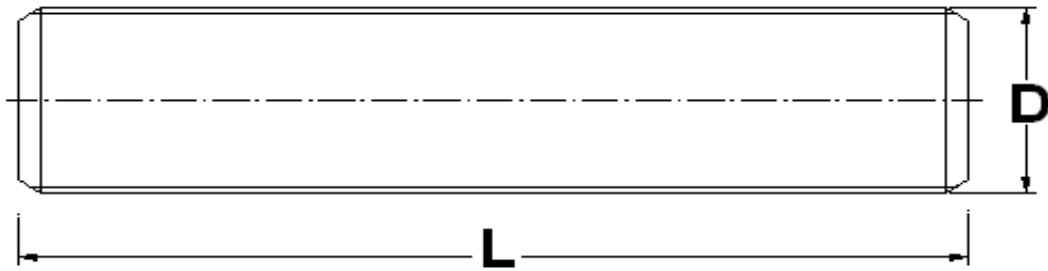
THREAD: UNI 5542 – 5543

DIMENSIONS: MM

WEIGHT: KG OR LBS /1000 PIECES



SCREWED RODS FULL LENGTH



D	PITCH	WEIGHTS x MT	
		KG	LBS
M10	1.5	0.44	0.97
M12	1.75	0.72	1.59
M14	2	0.98	2.16
M16	2	1.32	2.91
M18	2.5	1.65	3.64
M20	2.5	2.07	4.56
M22	2.5	2.5	5.51
M24	3	2.98	6.57
M27	3	3.86	8.51
M30	3.5	4.72	10.41
M33	3.5	5.81	12.81
M36	3	7.15	15.76
M39	3	8.45	18.63
M42	3	4.87	10.74
M45	3	11.42	25.18
M48	3	13.07	28.81
M52	3	15.4	33.95
M56	4	20.96	46.11

MATERIAL: ALLOY STEEL ASTM A193 GRADE B7 B16 B8 B8M B8T AND ANY OTHER TYPE

THREAD: UNI 5542 - 5543.

DIMENSIONS: MM

On request we can supply these bars with length of 2-3 meters or commercial length.



RECOMMENDED MATERIALS DEPENDING ON SERVICE CONDITIONS



Service	SERVICE CONDITIONS		RECOMMENDED MATERIAL	
	°F(°C)	Stress and impact values	Stud bolt	Nut
High pressure and high temperature	32 ~1148(0~ 620)	See next sheets	ASTM A193 B5	ASTM A194 Gr.3
	-58 ~842 (-50 ~450)		A193 B7	A194Gr.2H
	-58~ 1022 (-50 ~550)		A193 B16	A194 Gr. 4 or 7
	~1292 (~700)		A 453 660	A194Gr.8Tor8C
High corrosive and high temperature	1104~ 1472 (540 ~800)	ditto	A193 B 8	A194 Gr. 8
	1104~ 1472 (540 ~800)		A193 B8M	A194 Gr.8M
	1104 ~1472 (540 ~800)		A193 B8T	A194 Gr.8T
High pressure and low temperature	-148 ~-58 (-100 ~-50)	ditto	A320 L7	A194 Gr. 4 or 7
	-148 ~-58 (-100~-50)		A320 L43	A194 Gr. 7
Low temperature	-418~-148(-250~-100)	ditto	A320 B 8	A194 Gr. 8
	-328~-148(-200~-100)		A320 B 8M	A194 Gr.8M
	-328~-148(-200~-100)		A320 B 8T	A194 Gr.8T



ALLOY AND STAINLESS STEEL BOLTING MATERIALS FOR HIGH TEMPERATURE SERVICE ASTM A193

GRADE		B7	B16	B8 Class 1	B8 Class 2	B8T Class 1	B8M Class 1	B8M Class 2
CHEMICAL ANALYSIS	C	0.37-0.49	0.36-0.47	≤ 0.08	≤ 0.08	≤ 0.08	≤ 0.08	≤ 0.08
	Mn	0.65-1.10	0.45-0.70	≤ 2.00	≤ 2.00	≤ 2.00	≤ 2.00	≤ 2.00
	P.	0.03	0.03	0.04	0.04	0.04	0.04	0.04
	S	0.04	0.04	0.03	0.03	0.03	0.03	0.03
	Si	0.15-0.35	0.15-0.35	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00
	Ni			8-10.5	8-10.5	9-12	10-14	10-14
	Cr	0.75-1.20	0.80-1.15	18-20	18-20	17-19	16-18	16-18
	Mo	0.15-0.25	0.50-0.65				2-3	2-3
	Nb + Ta							
	Ti					Min.5x(C+N) Max. 0.70		
V		0.25-0.35						
Mini tensile strength N/mmsq	Min. tensile strength N/mmsq	180 > D > 100	690	690				
		100 > D			515		515	515
		100 > D > 65	790	760				
		65 ≥ D	860	860				
		40 ≥ D > 32				690		620
		31.6 ≥ D > 25.4				720		655
		25 ≥ D > 20				790		690
	20 ≥ D				860		760	
	Min. yield strength N/mmsq	180 > D > 100	515	585				
		100 ≥ D			205		205	205
		100 > D > 65	655	655				
		65 ≥ D	720	720				
		40 ≥ D > 32				345		345
		31.6 ≥ D > 25.4				450		450
		25 ≥ D > 20				550		550
	20 ≥ D				690		665	
	Elongation in 2 inches min. per cent	180 > D > 100	18	16				
		100 ≥ D			30		30	30
		100 > D > 65	16	17				
		65 ≥ D	16	18				
		40 ≥ D > 32				28		30
		31.6 ≥ D > 25.4				20		25
		25 ≥ D > 20				15		20
	20 ≥ D				12		15	
	Reduction of area min. per cent	180 > D > 100	50	45				
		100 ≥ D			50		50	50
		100 > D > 65	50	45				
		65 ≥ D	50	50				
40 ≥ D > 32					45		45	
31.6 ≥ D > 25.4					35		45	
25 ≥ D > 20					35		45	
20 ≥ D				35		45		



CARBON AND ALLOY STEELS FOR NUTS ASTM A194

	GRADE	2H	2HM	3	4	7	8		8M	8C
CHEMICAL ANALYSIS	C	>0.40	>0.40	>0.10	0.40-0.50	0.37-0.49	≤0.08	≤0.08	≤0.08	≤0.08
	Mn	≤1.00	≤1.00	≤1.00	0.70-0.90	0.65-1.10	≤2.00	≤2.00	≤2.00	≤2.00
	P.	0.04	0.04	0.04	0.035	0.04	0.045	0.045	0.045	0.045
	S	≤0.05	≤0.05	≤0.03	≤0.04	≤0.04	≤0.03	≤0.03	≤0.03	≤0.03
	Si	<0.40	<0.40	<1.00	0.15-0.35	0.15-0.35	<1.00	<1.00	<1.00	<1.00
	Ni						8-10.5	9-12	10-14	9-12
	Cr			38872		0.75-1.20	18-20	17-19	16-18	17-19
	Mo			0.40-0.65	0.20-0.30	0.15-0.25			2-3	
	Ti							Min.5x(C+N) Max. 0.70		
	Ta									Min.10xC
MECHANICAL PROPERTIES	BRINELL HARDNESS	248	159	248	248	248	126	126	126	126
		352	237	352	352	352	300	300	300	300
EQUIVALENTS	AISI	-	-	501		4142	304	321	316	347
	AFNOR	CC45	CC45	Z12CD5	45 D2	42 CD 4	Z6CN 18.09	Z6CNT 18.10	Z6CND 17.11	
	DIN	C45	C45	12CrMo 19.5		42CrMo4	X5CrNi 18.09	XIOCrNffi 18.09	X5CrNiMo 18.10	XIOCrNiNb 18.09
	BS	1506-162	1506-162	1506-625	1506-240	1506-621 GrA	1506-801 GrB	1506-821 GrTi	1506-845	1506-821 Nb

Note: the above equivalents are to be heat-threaded in line with mechanical characteristics shown.



LOW TEMPERATURE SERVICE BOLTING ALLOY STEELS
ASTM A320

GRADE		L7	L43	B8 Class 1	B8 Class 2	B8T Class 1	B8M Class 1	B8M Class 2	B8C Class 1	
CHEMICAL ANALYSIS	C	038-0.48	0.38-0.43	≤ 0.08	≤ 0.08	≤ 0.08	≤ 0.08	≤ 0.08	≤ 0.08	
	Mn	0.75-1.00	0.60-0.85	≤ 2.00	≤ 2.00	≤ 2.00	≤ 2.00	≤ 2.00	≤ 2.00	
	P.	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	
	S	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	
	Si	0.15-0.35	0.15-0.35	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00	
	Ni		1.65-2.00	8-10.5	8-10.5	9-12	10-14	10-14	9-13	
	Cr	0.80-1.10	0.70-0.90	18-20	18-20	17-19	16-18	16-18	17-19	
	Mo	0.15-0.25	0.20-0.30				2-3	2-3		
	Ti					Min.5x(C+N) Max. 0.70				
Nb + Ta								Min. (10xC) Max. 1.10		
Min. Tensile Strength	V	All diameters		515	690	515	515		515	
		100 > D		860						
		65 > D	860							
		40 > D > 32				690		620		
		32 > D > 25				725		655		
		25 > D > 20				795		690		
		20 > D				860		760		
	Min. yield strength N/mm ²	All diameters			205		205	205		205
		100 > D		725						
		65 > D	725							
		40 > D > 32				345		345		
		32 > D > 25				450		450		
		25 > D > 20				550		550		
		20 > D				690		655		
	Elongation in 2 inches min. %	All diameters			35		35	35		35
		100 > D		16						
		65 > D	16							
		40 > D > 32				28		30		
		32 > D > 25				20		25		
		25 > D > 20				15		20		
		20 > D				12		15		
	Reduction of area min. %	All diameters			50		50	50		50
		100 > D		50						
		65 > D	50							
40 > D > 32					45		45			
32 > D > 25					35		45			
25 > D > 20					30		45			
20 > D					35		45			
Resilience	Test temperature	-101°C	-101°C							
	KCV Joules	27	27	See note 2	See note 2	See note 1	See note 1	See note 1	See note 2	
Equivalents	AISI	4142	4340	304	304	321	316	316	347	
	AFNOR	42 CD 4	40 NCD 7.03	Z6 CN 18.09	Z6 CN 18.10	Z6 CNT 18.10	Z6 CND 17.11	Z6 CND 17.11		
	DIN	42 Cr Mo 4		X5 CrNi 18.09	X5 CrNi 18.09	X10 CrNiTi 18.09	X5 CrNiMo 18.10	X5 CrNiMo 18.10	X10 CrNiNb 18.09	
	BS	1506.62 Gr A		1506.80 GrB	1506.80 GrB	1506.82 Gr Ti	1506-845	1506-845	1506-821Nb	

Note 1 : Impact value not required for use at temperatures above -200°C.



STUDBOLTS

Note 2 : above -255°C.

STUDBOLTS DIMENSIONS FOR ASA-RF FLANGES

Nominal Diameter of Flange	125-150 LBS			250-300 LBS			600 BS			900 BS			1500 LBS			
	Quantity	Ø of rod	length	Quantity	Ø of rod	Length	Quantity	Ø of rod	length	Quantity	Ø of rod	Length	Quantity	Ø of rod	length	
	Pieces	Inches mm	Inches mm	Pieces	Inches mm	Inches mm	Pieces	Inches mm	Inches mm	Pieces	Inches mm	Inches mm	Pieces	Inches mm	Inches mm	
1/2"	4	1/2	2.1/2	4	1/2	2.3/4	4	1/2	14	3.1/4	4	3/4	4"1/2	4	3/4	4.1/2
		14	65		14	70		16	85	20		115	20		115	
3/4"	4	1/2	2.3/4	4	5/8	3.1/4	4	5/8	16	3.3/4	4	3/4	4.3/4	4	3/4	4.3/4
		14	70		16	85		16	95	20		120	20		120	
1"	4	1/2	2.3/4	4	5/8	3.1/4	4	5/8	16	3.3/4	4	7/8	5.1/4	4	7/8	5.1/4
		14	70		16	85		16	95	22		135	22		135	
1.1/4"	4	1/2	3	4	5/8	3.1/2	4	5/8	16	4	4	7/8	5.1/4	4	7/8	5.1/4
		14	75		16	90		16	100	22		135	22		135	
1.1/2"	4	1/2	3	4	3/4	3.3/4	4	3/4	20	4.1/2	4	1	6	4	1	6
		14	75		20	95		20	145	27		150	27		150	
2"	8	5/8	3.1/2	8	5/8	3.3/4	8	5/8	16	4.1/2	8	7/8	6	8	7/8	6
		16	90		16	95		16	115	22		150	22		150	
2.1/2"	8	5/8	3.3/4	8	3/4	4.1/4	8	3/4	20	5	8	1	6.3/4	8	1	6.3/4
		16	95		20	110		20	125	27		170	27		170	
3"	8	5/8	3.3/4	8	3/4	4.1/2	8	3/4	20	5.1/4	8	7/8	6	8	1.1/8	7.1/2
		16	95		20	115		20	135	22		150	30		190	
3.1/2"	8	5/8	3.3/4	8	3/4	4.1/2	8	7/8	22	5.3/4	8			8		
		16	95		20	115		22	145							
4"	8	5/8	3.3/4	8	3/4	4.3/4	8	7/8	22	6	8	1.1/8	7.1/4	8	1.1/4	8.1/4
		16	95		20	120		22	150	30		185	33		210	
5"	8	3/4	4	8	3/4	5	8	1	27	7	8	1.1/4	8	8	1.1/2	10.1/4
		20	100		20	125		27	180	33		205	39		260	
6"	12	3/4	4.1/4	12	3/4	5	12	1	27	7.1/4	12	1.1/8	8	12	1.3/8	10.3/4
		20	110		20	125		27	185	30		205	36		275	
8"	12	3/4	4.1/2	12	7/8	5.3/4	12	1.1/8	30	8	12	1.3/8	9.1/4	12	1.5/8	12
		20	115		22	145		30	205	36		235	42		305	
10"	16	7/8	5	16	1	6.3/4	16	1.1/4	33	9	16	1.3/8	9.3/4	16	1.7/8	14
		22	125		27	170		33	230	36		250	48		355	
12"	12	7/8	5	16	1.1/8	7.1/4	20	1.1/4	33	9.1/4	20	1.3/8	10.1/2	16	2	15.1/2
		22	125		30	185		36	250	39		285	52		395	
14"	16	1	5.3/4	20	1.1/8	7.1/2	20	1.3/8	36	9.3/4	20	1.1/2	11.1/4	16	2.1/4	16.3/4
		27	145		30	190		36	250	39		285	56		425	
16"	16	1	5.3/4	20	1.1/4	8	20	1.1/2	39	10.1/2	20	1.5/8	11.3/4	16	2.1/2	18.1/2
		27	145		33	205		39	265	42		300	64		470	
18"	16	1.1/8	6.1/4	24	1.1/4	8.1/4	24	1.5/8	42	11.1/4	20	1.7/8	13.1/2	16	2.3/4	20.1/4
		30	160		33	210		42	285	48		345	68		515	
20"	20	1.1/8	6.3/4	24	1.1/4	8.3/4	24	1.5/8	42	12	20	2	14.1/2	16	3	22.1/4
		30	170		33	220		42	305	52		370	76		565	
22"	20	1.1/4	7.1/4	24	1.1/2	9.1/2	24	1.3/4	39	12.3/4	24			16		
		33	185		39	240		45	325							
24"	20	1.1/4	7.1/2	24	1.1/2	9.3/4	24	1.7/8	39	13.1/2	24	2.1/2	18	16	3.1/2	25.1/4
		33	190		39	250		48	345	64		455	90		640	
26"	24	1.1/4	7.3/4	28	1.5/8	10.3/4	28	1.7/8	42	14	28			16		
		33	195		42	275		48	355							
30"	28	1.1/4	8	28	1.3/4	12	28	2	52	15	28			16		
		33	205		45	305		52	380							
34"	32	1.1/2	8.3/4	32	1.7/8	13	32	2.1/4	56	16	32			16		
		39	220		48	330		56	405							
36"	32	1.1/2	9	32	2	13.3/4	32	2.1/2	64	16.3/4	32			16		
		39	230		52	350		64	425							
42"	36	1.1/2	9.1/2	36	2	14.3/4	36	2.3/4	68	18.1/2	36			16		
		39	240		52	375		68	470							



STUDBOLTS

NB. The above lengths are total lengths, including bevels

CONVERSION TABLE INCHES/MM FOR

inch	mm	inch	mm	inch	mm	inch	mm
2	50	9.1/4	235	16.1/4	415	23.1/2	595
2.1/4	55	9.1/2	240	16.1/2	420	23.5/8	600
2.3/8	60	9.5/8	245	16.3/4	415	23.3/4	605
2.1/2	65	9.3/4	250	17	430	24	610
2.3/4	70	10	255	17.1/8	435	24.1/4	615
3	75	10.1/4	260	17.1/4	440	24.1/2	620
3.1/8	80	10.1/2	265	17.1/2	445	24.5/8	625
3.1/4	85	10.5/8	270	17.3/4	450	24.3/4	630
3.1/2	90	10.3/4	275	17.7/8	455	25	635
3.3/4	95	11	280	18	455	25.1/4	640
4	100	11.1/4	285	18.1/8	460	25.3/8	645
4.1/8	105	11.1/2	290	18.1/4	465	25.1/2	650
4.1/4	110	11.5/8	295	18.1/2	470	25.3/4	655
4.1/2	115	11.3/4	300	18.3/4	475	26	660
4.3/4	120	12	305	18.7/8	480	26.1/4	665
5	125	12.1/4	310	19	485	26.3/8	670
5.1/8	130	12.3/8	315	19.1/4	490	26.1/2	675
5.1/4	135	12.1/2	320	19.1/2	495	26.3/4	680
5.1/2	140	12.3/4	325	19.3/4	500		
5.3/4	145	12.7/8	325	19.7/8	505		
6	150	13	330	20	510		
6.1/8	155	13.1/4	335	20.1/4	515		
6.1/4	160	13.5/8	340	20.1/2	520		
6.1/2	165	13.1/2	345	20.3/4	525		
6.3/4	170	13.3/4	350	20.7/8	530		
6.7/8	175	14	355	21	535		
7	180	14.1/4	360	21.1/4	540		
7.1/4	185	14.3/8	365	21.1/2	545		
7.1/2	190	14.1/2	370	21.3/4	550		
7.3/4	195	14.3/4	375	21.7/8	555		
7.7/8	200	15	380	22	560		
8	205	15.1/4	385	22.1/4	565		
8.1/4	210	15.3/8	390	22.1/2	570		
8.1/2	215	15.1/2	395	22.5/8	575		
8.3/4	220	15.3/4	400	22.3/4	580		
8.7/8	225	16	405	23	585		
9	230	16.1/8	410	23.1/4	590		





CHAPTER 12

STANDARD REFERENCES



STANDARD REFERENCES



STANDARD REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS

- **ASTM A105:** Specification for Carbon Steel Forgings for Piping Applications.
- **ASTM A106:** Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
- **ASTM A182:** Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
- **ASTM A193:** Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
- **ASTM A194:** Specification for Carbon and alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
- **ASTM A234:** Specification for Piping Fittings or Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- **ASTM A312:** Specification for Seamless and Welded Austenitic Stainless Pipes.
- **ASTM A320:** Specification for Alloy Steel Bolting Materials for Low-Temperature Service.
- **ASTM A333:** Specification for Seamless and Welded Steel Pipe for Low-Temperature Service.
- **ASTM A335:** Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service.
- **ASTM A350:** Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components.
- **ASTM A403:** Specification for Wrought Austenitic Stainless Steel Piping Fittings.
- **ASTM A420:** Specification for Piping Fittings or Wrought Carbon Steel and Alloy Steel for Low-Temperature Service.
- **ASTM A453:** Specification for High-Temperature Bolting Materials, with Expansion Coefficients Comparable to Austenitic Stainless Steels.
- **ASTM B381 :** Specification for Titanium and Titanium Alloy Forgings.
- **ASTM B462:** Specification for Forged or rolled UNS N08020, UNS N08024, UNS N08026 and UNS N08367 Alloy Pipe, Flanges, Forged Fittings, and Valves and Parts for Corrosive High-Temperature Service.
- **ASTM B564:** Specification for Nickel Alloy Forgings.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- **ASME SEC. II A :** Ferrous Materials.
- **ASME SEC. II B:** Non-ferrous Materials.
- **ASME B1.1 :** Unified Inch Screw Threads (UN and UNR Thread form).
- **ASME B1.2:** Screw Threads – Gauges and Gauging for Unified Inch Screw Threads.
- **ASME B1.20.1 :** Pipe Threads, General Purpose (Inch).
- **ASME B16.5** Pipe Flanges and Flanged Fittings.
- **ASME B16.9:** Factory-Made Wrought Steel Butt welding Fittings.
- **ASME B16.11:** Forged Steel Fittings, Socket-Welding and Threaded.
- **ASME B16.25:** Butt welding Ends.
- **ASME B18.2.1:** Square and Hex Bolts and Screws (Inch Series).
- **ASME B18.2.2:** Square and Hex Nuts (Inch Series).
- **ASME B31.1 :** Power Piping.
- **ASME B31.3:** Process Piping.
- **ASME B36.10M :** Welded and Seamless Wrought Steel Pipe.
- **ASME B36.19M :** Stainless Steel Pipe.



STANDARD REFERENCES

MANUFACTURERS STANDARDIZATION SOCIETY

- **MSS SP 25:** Standard Marking System for Valves, Fittings, Flanges and Unions.
- **MSS SP 79:** Socket-Welding Reducer Inserts.
- **MSS SP 83:** Steel Pipe Unions, Socket-Welding and Threaded.
- **MSS SP 95:** Swage Nipples and Bull Plugs.
- **MSS SP 97:** Forged Carbon Steel Branch Outlet Fittings – Socket Welding, Threaded and Butt welding Ends.

BRITISH STANDARDS INSTITUTION

- **BS 3799:** Steel Pipe Fittings, Screwed and Socket Welding for the Petroleum Industry.
- **BS 4282:** Bolting for Flanges and Pressure Containing Purposes.

NACE INTERNATIONAL STANDARD

- **NACE MR0175**
ISO/15156: Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment.
- **NACE MR0103:** Material resistant to sulfide stress cracking in corrosive petroleum refining environments.

AMERICAN PETROLEUM INSTITUTE

- **API 5L:** Line Pipe.

ITALIAN STANDARDS

- **UNI 4534:** ISO Metric Threads with Triangular Profile.
- **UNI 5542:** ISO Metric Threads with Triangular Profile - Limits of Size for Threads with diameter from 1.6 up to 39 mm.
- **UNI 5543:** ISO Metric Threads with Triangular Profile - Limits of Size for Threads with diameter from 40 up to 100 mm.

