KS / KC 인증업체

회사현황 및 자재승인원

KOREA FITTING

ANSI / JIS / DIN / AWWA / MSS / API









KFT KOREA FITTING CO.,LTD.

CEO 인사말

존경하는 고객사 여러분!

(주)코리아피팅을 소개하게 되어 영광으로 생각합니다.

저희 회사는 2009년 설립하여 단조 플랜지와 판플랜지, 그리고 비규격 제품을 생산하여 공급해오고 있으며, 주요 고객들로부터 가격과 품질, 납기 등 모든 부분에 걸쳐 우수한 공급처로 인정을 받고 있습니다.

고객사 여러분의 아낌없는 협조와 전폭적인 도움으로 저희 회사가 지속적인 성장을 해왔으며 이에 만족하지 않고 더욱 더 발전하기 위해 끊임없는 개선 활동을 펼쳐왔습니다.

저희 회사 임직원들은 고객사 여러분들께 더욱 만족스러운 제품을 생산하여 공급할 것을 약속 드리며 더불어 가장 건실한 사회적 기업으로 거듭 나도록 최선을 다하겠습니다.

감사합니다.

(주)코리아피팅 대표이사 김 윤 건



고객과의 신뢰로 시장 지배력 확보

1. 선택과 집중
2. 창조적 시장 진출
3. 사회적 기업 전환



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회사연혁

2009. 08 코리아피팅 개인 사업자 설립

2010. 12 품질경영시스템(ISO 9001:2008) 인증 취득

2012. 01 ㈜코리아피팅 법인 전환

2018. 06 KS B1506 강판재 스테인리스 강제용접식 플랜지

2019. 05 경영혁신형 중소기업 (Main-Biz) 인증

2020. 03 공장이전 (현, 화전산단 3,146m2)

2022. 12 한화오션(구, 대우조선해양) 협력회사 등록

2023. 04 KS B1506 단강품 스테인리스 강제용접식플랜지

2023. 09 KC (위생안전기준) 인증

회사현황

회 사 명	㈜코리아피팅	대표이사	김 윤 건
소 재 지	부산광역시 강서구 화전산단6로 90번길 28	전화번호	051)312-9941~2
E-mail.	kft@koreafitting.co.kr	팩 스	051)312-9943
주 생산품	KS B1506 강판, 단강품 스테인리스 강제용접식 플랜지 ANSI B16.5 A105, A182F304/L, 316/L , ALLOY STEEL		
취급 사양	KS & JIS, ANSI, AWWA, MSS, DIN 및 Special Flanges 등		
공장 규모	본사 / 대지 : 3,146.5m2 , 2공장 /대지 :1650m2		
인증 사항	ISO9001 :2015 인증 KS B1506 스테인리스 강제용접식 플랜지 (강판, 단강품) KC 위생안전기준인증 스테인리스 강제용접식 플랜지		
등록 및 주요 납품 현황	한화오션(구, 대우조선해양) 협력사 등록 SK케미칼, 현대건설, 대림산업, 현대엔지니어링 납품실적		

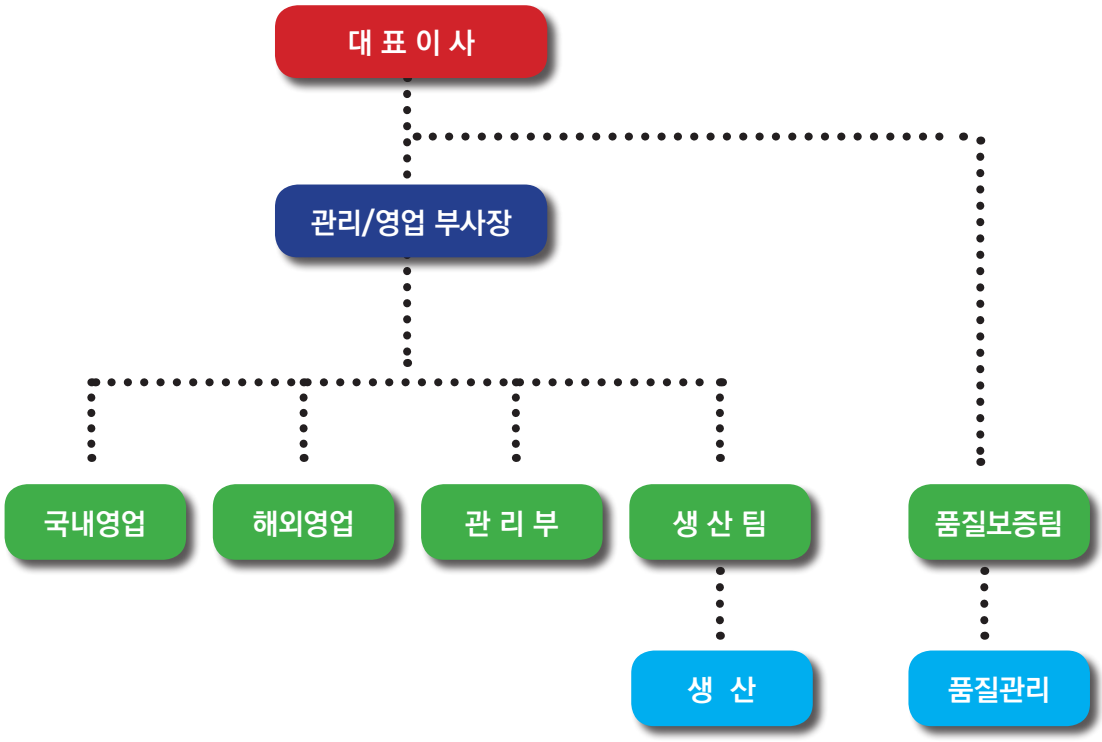
주요 납품 실적

고 객 사	공 사 명	거래 년도
현대엔지니어링	Plant Renuvenation &Revamp2	2013
대림산업	O MAN Sohar Refinery Project	2016
SK케미칼	SK케미칼 CP-3 PJT	2020
현대건설	대산바이오매스 발전소 현장	2020
SK넥실리스	SK NEXILIS 동박 6공장 저장 TANK 제작	2020
엘앤에프	L&F 구지 급기 배관 신설 공사	2021
LG화학	LG화학 구미 소성로 제작 공사	2022
SK넥실리스	SK NEXILES 동박 1공장 저장 TANK 제작	2022
LG BCM	LG BCM 구미 2차 전지 LG BCM 양극재 공장	2023
LG BCM	LG BCM 구미 KETTLE DRYER 제작 공사	2023
두산퓨어셀	하이에어코리아/두산퓨어셀 연료전지 제작 공사	2023
POSCO E&C	POSCO E&C 포스코퓨처엠 필터하우징 2종 63기	2023
윤성에프앤씨	윤성 MIXING & POWER SYSTEM F&C KY-1	2023
엘앤에프	L&F 구지 3공장 2차 전지 생산 라인	2023

검사측정장비 대장 목록

관리번호	장비명	시리얼 넘버	형식 및 규격	수량	제조사명
KFT-Q-01	버니어 캘리퍼스	B16194075	0 ~ 200 mm	1	Mitutoyo
KFT-Q-02	버니어 캘리퍼스	80092544	0 ~ 300 mm	1	Mitutoyo
KFT-Q-03	버니어 캘리퍼스	14119462	0 ~ 300 mm	1	Mitutoyo
KFT-Q-04	버니어 캘리퍼스	10270644	0 ~ 600 mm	1	Mitutoyo
KFT-Q-05	버니어 캘리퍼스	11003809	0 ~ 600 mm	1	Mitutoyo
KFT-Q-06	버니어 캘리퍼스	417723	0 ~ 600 mm	1	Mitutoyo
KFT-Q-07	버니어 캘리퍼스	16007961	0 ~ 1000 mm	1	Mitutoyo
KFT-Q-08	표면거칠기 시험편	S18010901	1.6 ~ 50 S	1	일본금속전주
KFT-Q-09	촉침식 표면거칠기 측정기	5004541803	Ra 2.95um, Rmax 11.3um	1	Mitutoyo

조직 현황



세부인원 현황

구 분		인 원 수	근무경력(년)
사 무 직	인사, 총무, 안전, 회계	3	10년
기 술 직	영업, 무역	6	8년
	자재, 구매, 생산관리	3	8년
	품 질	2	5년
생 산 직	생 산	11	10년
계		25	

장비 현황

설 비 명	가공범위	메이커	수 량
CNC 선반	Ø400	ACT	1
CNC 선반	Ø400	HWA CHON	1
CNC 선반	Ø400	HWA CHON	2
MCT	Ø800	HWA CHON	1
Lathe	Ø900	HWA CHON	1
Lathe	Ø710	Yoshida	2
CNC Turning	OD 1600	O-M	1
CNC Turning	OD 2500	SABQQ	1
CNC Turning	OD 2000	SEDIN	1
CNC Drilling	OD 3000	SHIN-IL	1
Radial Drilling	OD 2500	Jo Kwang	1

시험설비 현황

No.	시 험 설 비 명	수량
1	SPECTRO METER	1
2	UNIVERSAL TESTER	1
3	IMPACT TESTER	1
4	BRINELL HARDNESS TESTER	1
5	PMI(Positive Material Identification)	1
6	ROUGHNESS TESTER	1

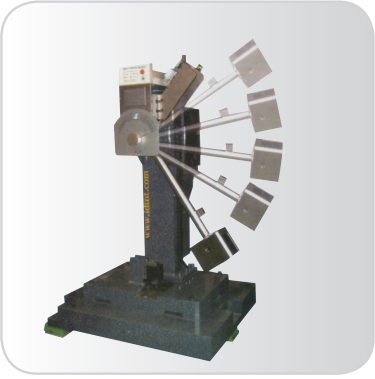
주요 검사 설비



Spectro meter



Universal Tester



Impact Tester



Brinell Hardness Tester



PMI(Positive
Material Identification



Roughness Tester

주요 생산품 현황



Welding Neck



Slip-on Flange



Threaded Flange



Blind Flange



Lap-joint Flange



Socket-Welding



ANSI / ASME
B16.47 SERIES A,B
(MSS SP44, API)



JIS & KS Flanges



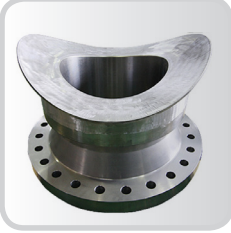
Long Welding Neck
Flanges



AWWA Flanges



Reinforced Nozzle



Nozzle Flange for
Heat Pressure



Tower Flange



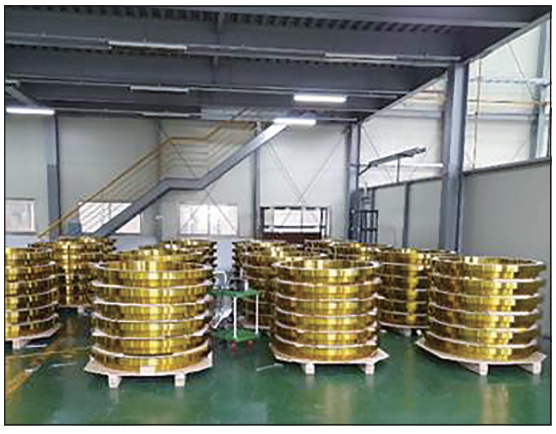
Orifice Flanges

제품 사진











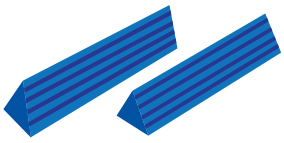






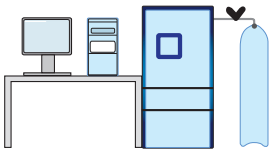
제조 공정

원재료



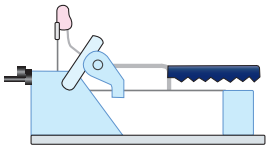
원재료 확인, 품질 검사
외관 및 치수 확인

재료분석



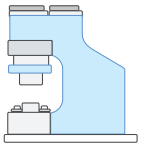
화학성분 분석
분석자료 보관

재료절단



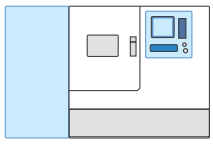
무게 측정
절단면 확인
마킹

단 조



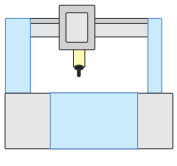
재질 Grade 확인
무게 측정, 온도 조절
기계적 성질 확인

가 공



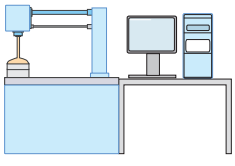
재질 Grade확인
무게 측정, 온도 조절
치수 확인

검 사



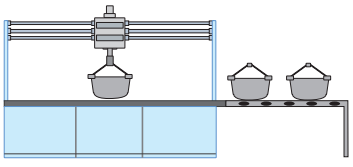
치수 검사
외관 검사
비파괴 검사

마 킹



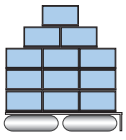
품명 마킹
Size 마킹
Lot No. 마킹

방 청



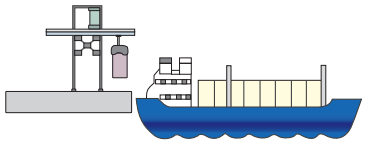
보관상태 확인
Tectyl 506 또는
기타 방청유 도포

포 장



포장 규격 확인
포장 검사

최종출하/납품



선적서류 발송

원자재 구매부터 재료분석 및 가공 · 검사, 포장 · 출하까지 원스톱 시스템!

국세청 nts.go.kr

사 업 자 등 록 증

(법인사업자)

등록번호 : 606-86-34165

법인명(단체명) : (주) 코리아피팅
대 표 자 : 김윤건

개 업 연 월 일 : 2012 년 01 월 01 일 법인등록번호 : 180111-0786971
사업장 소재지 : 부산광역시 강서구 화전산단6로90번길 28(화전동)

본 점 소 재 지 : 부산광역시 강서구 화전산단6로90번길 28(화전동)

사 업 의 종 류 : [업태] 제조 [종목] 플랜지피팅
도소매 플랜지피팅(수출)
도소매 플랜지피팅(수입)
부동산 임대

발 급 사 유 : .

사업자 단위 과세 적용사업자 여부 : 여( ) 부(∨)
전자세금계산서 전용 전자우편주소 : koreafitting@hometax.go.kr

2022 년 12 월 22 일

부산강서세무서장인

부 산 강 서 세 무 서 장

국세청 National Tax Service

■ 산업집적활성화 및 공장설립에 관한 법률 시행규칙 [별지 제8호의2서식] <개정 2012.10.5>

공장설립온라인지원시스템(www.femis.go.kr)에서도 신청할 수 있습니다.

공장등록증명(신청)서

※ 바탕색이 어두운 난은 신청인이 적지 않으며, [ ]에는 해당되는 곳에 √표를 합니다. (앞쪽)

접수번호		접수일		처리기간	즉시

신청인	회사명 (주)코리아피팅	전화번호 051) 312-9941
	대표자 성명 김윤건	생년월일(법인등록번호) 180111-0786971
	대표자주소(법인소재지) 부산광역시 강서구 화전산단6로90번길 28 (화전동)	

등록 내용	공장소재지 도로명 : 부산광역시 강서구 화전산단6로90번길 28 (화전동) 지번 : 부산광역시 강서구 화전동 587-6번지	지목 공장용지	보유구분 자가 [√] 임대 [ ]
	공장등록일 2020-04-06	사업시작일	종업원수 남:11 여:4
	공장의 업종(분류번호) 절삭가공 및 유사처리업 외 1 종 (25924,29199)		
	공장부지면적 3,146.500 ㎡	제조시설면적 3,004.440 ㎡	부대시설면적 541.530 ㎡
등록 조건	유효기간 : - - -		

등록변경 · 증설등 기재사항 변경내용(변경 날짜 및 내용)

공장관리번호 : 264402020467953

「산업집적활성화 및 공장설립에 관한 법률 시행규칙」 제12조의3에 따라 위와 같이 공장등록증명서를 신청합니다.

2020 년 4 월 6 일

신청인 (주)코리아피팅 (서명 또는 인)

부산경제진흥원 귀하

구비서류	없 음	수수료 원

처리절차

신청서작성	→	접수	→	등록 여부 확인	→	결제	→	공장등록 증명서 발급	→	통보
신청인		처리기관		처리기관		처리기관		처리기관		처리기관

「산업집적활성화 및 공장설립에 관한 법률」 제16조([ ] 제1항 · [ ] 제2항 · [ ] 제3항)에 따라 위와 같이 등록된 공장임을 증명합니다.

2020 년 4 월 6 일

부산경제진흥원

210㎜×297㎜[일반용지 70g/㎡(재활용품)]

김우혁 / 4월6일 13:33

KTC18-0146

[정기심사만료일 : 2026년 04월 26일]

제 품 인 증 서

1. 제조업체명 : (주)코리아피팅
2. 대표자성명 : 김윤건
3. 공장 소재지 : 부산광역시 강서구 화전산단6로90번길 28 (화전동)
4. 인증제품
   가. 표준명 : 스테인리스 강제 용접식 플랜지
   나. 표준번호 : KSB1506
   다. 종류·등급·호칭 또는 모델 :
      강판재를 사용하는 경우
      단조품을 사용하는경우

「산업표준화법」 제17조제1항에 따른 인증심사를 한 결과 한국산업표준(KS)과 인증심사기준에 적합하므로, 「산업표준화법」 제15조 및 같은 법 시행규칙 제10조 제1항에 따라 위와 같이 한국산업표준(KS)에 적합함을 인증합니다.

2023년 06월 07일

한국기계전기전자시험연구원장
Korea Testing Certification institute

한국기계전기전자시험연구원장인

* 변경내역 이면기재

(앞쪽)

위생안전기준 인증서

1. 인증번호 : KCW-2023-0242

2. 제조업체명 : (주)코리아피팅

3. 대표자 : 김윤건

4. 본사 주소 : (46738)부산광역시 강서구 화전산단6로90번길 28 화전동

5. 공장 소재지 : (46738)부산광역시 강서구 화전산단6로90번길 28 화전동

6. 제품명 : 플랜지

7. 용도 : [ ] 표층용재료 [ ] 말단급수설비
[ ] 급수설비 [✔] 일반수도용자재

「수도법」 제14조제1항 및 「수도용 자재와 제품의 위생안전기준 인증 등에 관한 규칙」 제8조제1항에 따라 위생안전기준 인증서를 발급합니다.

2023년 09월 27일

한국물기술인증원장

210mm×297mm[보존용지 120g/㎡]

제 R190201-01168 호

경영혁신형 중소기업(Main-Biz) 확인서

업 체 명 : (주)코리아피팅

대표자명 : 김윤건

주 소 : 부산 강서구 화전산단6로90번길 28 (화전동)

유효기간 : 2022.05.27 ~ 2025.05.26

위 업체는 경영혁신형 중소기업 육성사업에 의해 선정된 경영혁신형 중소기업(Main-Biz)임을 확인합니다.

2022 년 04 월 07 일

중소벤처기업부장관

중소벤처기업부 장관인

GERMAN CERT

GERMAN CERT

Quality Management System Certificate

㈜코리아피팅

부산광역시 강서구 화전산단6로90번길 28 (화전동)

저먼서트 주식회사는 위 회사의 심사규격과 인증범위가 아래의 품질경영시스템 요구사항을 모두 충족하고 있음을 검증하고 인증 등록을 승인하였습니다.

ISO 9001:2015

(적용 제외: 8.3 설계 및 개발)

인증범위

플랜지의 제조, 판매 및 부가서비스

IAF Code: 17, 29

인증번호 : **GQ-211158**

최초 인증일 : 2010년 12월 13일
인 증 일 : 2022년 12월 13일
만 료 일 : 2025년 12월 12일
발 행 일 : 2022년 11월 11일

GERMAN CERT
QUALITY MANAGEMENT SYSTEM

Daek Woo Ki

Scheme Manager

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

IAS ACCREDITED Management Systems Certification Body MSCB-252

GERMAN CERT GERMAN CERT ISO 9001 REGISTERED

10F, Jeongwoo Bldg. Yeouido-dong, Eunhaeng-ro 29, Yeongdeungpo-gu, Seoul, 07238, Korea
This certificate is a sole property of GERMAN CERT and therefore shall be returned to it upon its request. (Rev.1)

GERMAN CERT

Quality Management System Certificate

Korea Fitting Co., Ltd.

(Hwajeon-dong) #28 Hwajeonsandan 6-ro 90beon-gil, Gangseo-gu, Busan, Korea

German Cert Co., Ltd. Hereby certifies that the Quality Management System of the above organization has been evaluated and found to be in line with the requirements of the following standard:

ISO 9001:2015
(Excluding Clause: 8.3 Design & Development)

For the scope of

Manufacture, Sale and Service of FLANGE

IAF Code: 17, 29
Certificate Number : **GQ-211158**

Initial Certification Date :	13 December 2010
Certification Date :	13 December 2022
Expiry Date :	12 December 2025
Issue Date :	11 November 2022

GERMAN CERT
QUALITY MANAGEMENT SYSTEM

Daek Woo Ki
Scheme Manager

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF
IAS ACCREDITED Management Systems Certification Body MSCB-252

GERMAN CERT GERMAN CERT ISO 9001 REGISTERED

10F, Jeongwoo Bldg. Yeouido-dong, Eunhaeng-ro 29, Yeongdeungpo-gu, Seoul, 07238, Korea
This certificate is a sole property of GERMAN CERT and therefore shall be returned to it upon its request. (Rev.1)

KTC
Korea Testing Certification

시 험 성 적 서

성적서 번호 :	T2018-06793
회 사 명 :	(주)코리아피팅
대 표 자 :	김윤건
주 소 :	부산광역시 강서구 화전산단6로54번길 13 (화전동)

1. 시 료 명 : 금속시험편(STS 304)
· 규격 및 형식 : /
2. 성적서의 용도 : KS 현장시험용
3. 접수일자 : 2018.06.01
4. 시험일자 : 2018.06.01 - 2018.06.04
5. 시험방법 : 시험결과 참조
6. 시험결과 : 붙임

시험자 : 임계훈 임계훈 승인자 : 최병연 최병연

1. 이 성적서는 의뢰자가 제시한 시료 및 시료명으로 시험한 결과로서 전체 제품에 대한 품질을 보증하지는 않습니다
2. 이 성적서는 우리 시험연구원의 사전 동의 없이 홍보, 선전, 광고 및 소송용으로 사용될 수 없으며 용도 이외의 사용을 금합니다.
3. 이 성적서의 사본은 무효입니다.

2018 년 06 월 04 일

한국기계전기전자시험연구원장 한국기계전기전자시험연구원장인

www.ktc.re.kr 46519 부산광역시 북구 금곡대로 457, 1층 (금곡동)
TEL : 051-336-1566, FAX : 051-336-1567

서식P510-05(Rev.2) Page : 1 of 2

KTC
Korea Testing Certification

시 험 결 과

성적서 번호 : T2018-06793

시 험 항 목	단 위	시 험 결 과	시 험 방 법
인장강도	N/㎟	611	KS B 0802 : 2013

끝.

서식 P510-06 (Rev.2)

Page : 2 of 2

KTC
Korea Testing Certification

문서관리번호 : 40FU-ZCRN-9JSE

시 험 성 적 서

성적서 번호 : GT2023-01775

회 사 명 : (주) 코리아피팅
대 표 자 : 김윤건
주 소 : 부산광역시 강서구 화전산단6로90번길 28 (화전동)

1. 시 료 명 : 플랜지
 - 규격 및 형식 : KF-01
2. 성적서의 용도 : 품질관리용
3. 접수일자 : 2023년 02월 15일
4. 시험일자 : 2023년 02월 15일 ~ 2023년 03월 20일
5. 시험방법 : 수도용 자재 및 제품의 위생안전기준 공정시험방법 (환경부고시 제2022-247호)
6. 시험결과 : 2페이지 참조

시험자 : 이선휘 이선휘 승인자 : 한종숙 한종숙

1. 이 성적서의 결과는 KS Q ISO/IEC 17025 및 KOLAS 인정과 관련이 없으며, 의뢰자가 제시한 시료 및 시료명으로 시험한 결과로써 전체 제품에 대한 품질을 보증하지 않습니다.
2. 이 성적서는 우리 시험연구원의 사전 동의 없이 홍보, 선전, 광고 및 소송용으로 사용될 수 없으며 용도 이외의 사용을 금합니다.
3. 이 성적서의 진위여부는 홈페이지(www.ktc.re.kr)에서 확인할 수 있습니다.

2023년 03월 20일

한국기계전기전자시험연구원장

한국기계전기전자시험연구원장인

www.ktc.re.kr [15809] 경기도 군포시 엘에스로 115번길 74
TEL : 1899-7654 FAX : 070-7811-9147

서식P708-05(Rev.4) Page : 1 of 2



KTC
Korea Testing Certification

시 험 결 과

(성적서 번호 : GT2023-01775)

시 험 항 목	단 위	시 험 치	표 시 한 계
맛	-	이상없음	-
냄새		이상없음	-
색도	도	불검출	0.2
탁도	NTU	불검출	0.02
비소	mg/L	불검출	0.000 5
카드뮴		불검출	0.000 4
6가 크로뮴		불검출	0.005
구리		불검출	0.003
납		불검출	0.000 4
셀레늄		불검출	0.000 5
철		불검출	0.003
수은		불검출	0.000 1
니켈		불검출	0.000 7

※ 비 고 : 일반수도용 저제 (NF - 1) 중 밸브류 및 이음쇠류 (NF - 1/25)로 도장한 결과임. 끝.

서식P708-06 (Rev.7) Page : 2 of 2



시 험 성 적 서

(주)대호기계
주소 : (616-804) 부산 사상구 가야대로 12번길 42(감전동)
전화 : 051-326-2162, 2163
팩스 : 051-326-2165
http ://www.dh-lab.co.kr

성적서번호 :
C-18-0113
페이지 (1)/(총 2)

1. 의 뢰 자
- 기 관 명 : (주)코리아피팅
- 주 소 : (46741) 부산광역시 강서구 화전산단6로54번길 13

2. 시료 설명

재질	두께	Heat No.
STS316	25 mm	SD29314

3. 시험기간 : 2018년 1월 9 ~ 10일

4. 시험방법
- KS B 0802 : 2003 금속 재료 인장 시험 방법
- KS B 0806 : 2000 금속 재료의 로크웰 경도 시험 방법
- KS D 1652 : 2007 철 및 강의 스파크 방전 원자 방출 분광 분석 방법

5. 시험결과
- 다음 페이지

확 인	작성자	기술책임자
	성 명 : 주 은 호 (서명)	성 명 : 안 대 성 (서명)

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야에 대한 시험결과입니다.

※ 이 성적서의 시험결과는 시험의뢰인에 의해 제공된 시료에 한정됩니다.
※ 본 성적서 진위확인이 필요하신 경우, Tel.051-326-2162로 연락주시면 확인하여 드립니다.

2018. 1. 12.

한국인정기구 인정 (주)대호기계 대표이사 (인)

DH-TP-22-02(06)

시 험 결 과

(주)대호기계
주소 : (616-804) 부산 사상구 가야대로 12번길 42(감전동)
전화 : 051-326-2162, 2163
팩스 : 051-326-2165
http ://www.dh-lab.co.kr

성적서번호 :
C-18-0113
페이지 (2)/(총 2)

인장 시험

시험 시료	시험편 형태	시험편 지름 (mm)	인장 강도 (N/mm^2)	항복 강도 (N/mm^2)	연신율 (%)
STS316	14A호 시험편	14.00	623	275	53

경도 시험

시험 시료	로크웰 경도 (HRBW)
STS316	84

분석 시험

시험 시료	성분 함유량 (%)							
	C	Si	Mn	P	S	Ni	Cr	Mo
STS316	0.023	0.55	1.30	0.029	0.001 4	10.3	16.7	2.01

DH-TP-22-03(02)

시 험 성 적 서

(주)대호기계
주소 : (616-804) 부산 사상구 가야대로 12번길 42(감전동)
전화 : 051-326-2162, 2163
팩스 : 051-325-2165
http ://www.dh-lab.co.kr

성적서번호 :
C-18-0112
페이지 (1)/(총 2)

1. 의 뢰 자
 · 기 관 명 : (주)코리아피팅
 · 주 소 : (46741) 부산광역시 강서구 화전산단6로54번길 13

2. 시료 설명

재질	두께	Heat No.
STS304	25 mm	SD29278

3. 시험기간 : 2018년 1월 9 ~ 10일

4. 시험방법
 · KS B 0802 : 2003 금속 재료 인장 시험 방법
 · KS B 0806 : 2000 금속 재료의 로크웰 경도 시험 방법
 · KS D 1652 : 2007 철 및 강의 스파크 방전 원자 방출 분광 분석 방법

5. 시험결과
 - 다음 페이지

확 인	작성자	기술책임자
	성 명 : 주 은 호 (서명)	성 명 : 안 대 성 (서명)

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야에 대한 시험결과입니다.

※ 이 성적서의 시험결과는 시험의뢰인에 의해 제공된 시료에 한정됩니다.
※ 본 성적서 진위확인이 필요하신 경우, Tel.051-326-2162로 연락주시면 확인하여 드립니다.

2018. 1. 12.

한국인정기구 인정 (주)대호기계 대표이사 (인)

DH-TP-22-02(06)

시 험 결 과

(주)대호기계
주소 : (616-804) 부산 사상구 가야대로 12번길 42(감전동)
전화 : 051-326-2162, 2163
팩스 : 051-326-2165
http ://www.dh-lab.co.kr

성적서번호 :
C-18-0112

인장 시험

시험 시료	시험편 형태	시험편 지름 (mm)	인장 강도 (N/mm^2)	항복 강도 (N/mm^2)	연신율 (%)
STS304	14A호 시험편	14.00	616	263	60

경도 시험

시험 시료	로크웰 경도 (HRBW)
STS304	84

분석 시험

시험 시료	성분 함유량 (%)						
	C	Si	Mn	P	S	Ni	Cr
STS304	0.019	0.40	1.67	0.032	0.003 0	8.13	18.3

DH-TP-22-03(02)

KFT KOREA FITTING CO., LTD

㈜코리아피팅
부산광역시 강서구 화전산단6로 90번길 28
Tel 051-312-9941 Fax 051-312-9943
Home : www.koreafitting.co.kr

공인기관 의뢰시험 성적서 대비표

1) 제품규격
스테인리스 강제 용접식 플랜지 (KS B1506)

2) 시료명
STS304 : 열간압연 스테인리스 강판 (KS D 3705)

3) 시험결과

시험항목	단위	기준	결과치	판정	시험방법
인장강도	N / mm^2	520 이상	620	합격	KS B 0802 : 2003
항복강도	N / mm2	205 이상	222	합격	
연신율	%	40 이상	61	합격	
경도	HRBW	90 이하	85	합격	KS B 0806 : 2000
C	%	0.08 이하	0.012	합격	KS B 1652 : 2022
Si	%	1.0 이하	0.36	합격	
Mn	%	2.0 이하	1.3	합격	
P	%	0.045 이하	0.033	합격	
Si	%	0.030 이하	0.001	합격	
Ni	%	8.0 ~ 10.5	8.07	합격	
Cr	%	18.0 ~ 20.0	18.53	합격	

㈜코리아피팅 품질관리팀

FLANGE SPECIFICATIONS

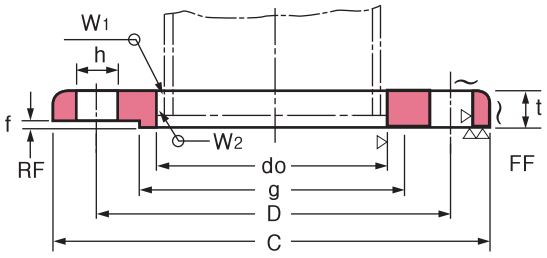
KS / JIS

5K	30P
10K	31P
16K	32P
20K	33P
30K	34P
TOLERANCES FOR PIPE FLANGES	35P
MATERIAL SPECIFICATIONS	36P

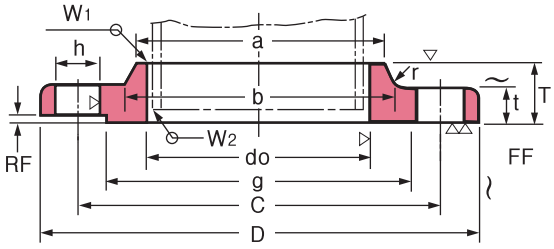
5 K

KS B 1503 / JIS B 2220

NOMINAL SIZE 10–400mm



NOMINAL SIZE 450–1000mm



Nominal Bore of Flange	Outside Dia. of Appli–Cable Pipe	Inside Dia. of Flange	Outside Dia. of Flange	Sectional Dimensions of Flange							Dia. of Bolt			Nomi–nal Bolt Size	Welding		Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad–ius	Raised Face	Dia.of Raised Face	Dia.of Bolt Circle	Number of Bolt Holes	Hole Dia.		W1	W2	
		do	D			a	b	r	f	g	c		h				
(10)	17.3	17.8	75	9	–	–	–	–	1	39	55	4	12	M10	5	2.5	0.27
15	21.7	22.2	80	9	–	–	–	–	1	44	60	4	12	M10	5	3	0.30
(20)	27.2	27.7	85	10	–	–	–	–	1	49	65	4	12	M10	5	3	0.37
25	34.0	34.5	95	10	–	–	–	–	1	59	75	4	12	M10	5	3	0.45
(32)	42.7	43.2	115	12	–	–	–	–	2	70	90	4	15	M12	6	3	0.78
40	48.6	49.1	120	12	–	–	–	–	2	75	95	4	15	M12	6	3	0.83
50	60.5	61.1	130	14	–	–	–	–	2	85	105	4	15	M12	6	3	1.07
65	76.3	77.1	155	14	–	–	–	–	2	110	130	4	15	M12	6	4	1.49
80	89.1	90.0	180	14	–	–	–	–	2	121	145	4	19	M16	6	4	1.99
(90)	101.6	102.6	190	14	–	–	–	–	2	131	155	4	19	M16	6	4	2.09
100	114.3	115.4	200	16	–	–	–	–	2	141	165	8	19	M16	7	4	2.39
125	139.8	141.2	235	16	–	–	–	–	2	176	200	8	19	M16	7	4	3.23
150	165.2	166.6	265	18	–	–	–	–	2	206	230	8	19	M16	7	5	4.41
(175)	190.7	192.1	300	18	–	–	–	–	2	232	260	8	23	M20	7.5	5	5.51
200	216.3	218.0	320	20	–	–	–	–	2	252	280	8	23	M20	8.5	6	6.33
(225)	241.8	243.7	345	20	–	–	–	–	2	277	305	12	23	M20	9	6	6.64
250	267.4	269.5	385	22	–	–	–	–	2	317	345	12	23	M20	10	6	9.45
300	318.5	321.0	430	22	–	–	–	–	3	360	390	12	23	M20	10	6	10.30
350	355.6	358.1	480	24	–	–	–	–	3	403	435	12	25	M22	12	7	14.00
400	406.4	409.0	540	24	–	–	–	–	3	463	495	16	25	M22	12	7	16.90
450	457.2	460.0	605	24	40	495	500	5	3	523	555	16	25	M22	12	7	24.80
500	508.0	511.0	655	24	40	546	552	5	3	573	605	20	25	M22	12	7	26.90
550	558.8	562.0	720	26	42	597	603	5	3	630	665	20	27	M24	12	7	34.10
600	609.6	613.0	770	26	44	648	654	5	3	680	715	20	27	M24	12	7	37.50
650	660.4	664.0	825	26	48	702	708	5	3	735	770	24	27	M24	12	7	42.80
700	711.2	715.0	875	26	48	751	758	5	3	785	820	24	27	M24	12	7	45.40
750	762.0	766.0	945	28	52	802	810	5	3	840	880	24	33	M30	12	7	57.40
800	812.8	817.0	995	28	52	854	862	5	3	890	930	24	33	M30	13	8	60.80
850	863.6	868.0	1045	28	54	904	912	5	3	940	980	24	33	M30	13	8	63.50
900	914.4	919.0	1095	30	56	956	964	5	3	990	1030	24	33	M30	13	8	75.30
1000	1016.0	1021.0	1195	32	60	1058	1066	5	3	1090	1130	28	33	M30	14	9	88.50
*(1100)	1117.6	1123	1305	32	–	–	–	–	3	1200	1240	28	33	M30	–	–	–
*1200	1219.2	1225	1420	34	–	–	–	–	3	1305	1350	32	33	M30	–	–	–
*1350	1371.6	–	1575	34	–	–	–	–	3	1460	1505	32	33	M30	–	–	–
*1500	1524.0	–	1730	36	–	–	–	–	3	1615	1660	36	33	M30	–	–	–

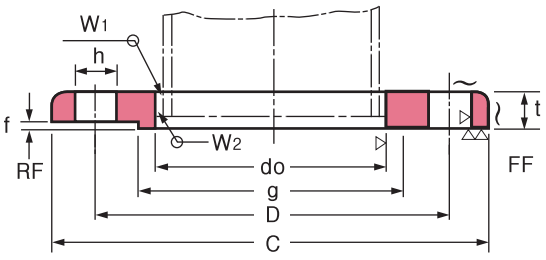
Notes:

(1) Flanges of parenthesized nominal diameter had letter not be used.
(2) The facing of flanges shall conform to KS B1519(JIS B2202) 1987.
(3) Nominal diameter over 1000 is manufacturer' s standard(*).

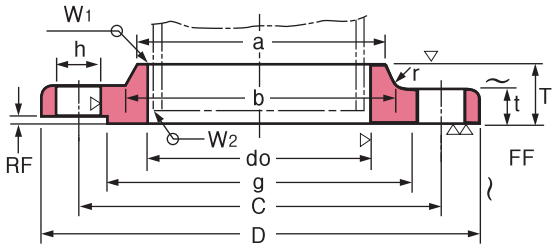
10K

KS B 1503 / JIS B 2220

NOMINAL SIZE 10–225mm



NOMINAL SIZE 250–1000mm



Nominal Bore of Flange	Outside Dia. of Appli–Cable Pipe	Inside Dia. of Flange	Outside Dia. of Flange	Sectional Dimensions of Flange							Dia. of Bolt			Nomi–nal Bolt Size	Welding		Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad–ius	Raised Face	Dia.of Raised Face	Dia.of Bolt Circle	Number of Bolt Holes	Hole Dia.		W1	W2	
		do	D			a	b	r	f	g	c		h				
10	17.3	17.8	90	12	–	–	–	–	1	46	65	4	15	M12	5	2.5	0.52
15	21.7	22.2	95	12	–	–	–	–	1	51	70	4	15	M12	5	3	0.57
20	27.2	27.7	100	14	–	–	–	–	1	56	75	4	15	M12	5	3	0.73
25	34.0	34.5	125	14	–	–	–	–	1	67	90	4	19	M16	5	3	1.13
32	42.7	43.2	135	16	–	–	–	–	2	76	100	4	19	M16	6	3	1.48
40	48.6	49.1	140	16	–	–	–	–	2	81	105	4	19	M16	6	3	1.56
50	60.5	61.1	155	16	–	–	–	–	2	96	120	4	19	M16	6	3	1.88
65	76.3	77.1	175	18	–	–	–	–	2	116	140	4	19	M16	6.5	4	2.6
80	89.1	90.0	185	18	–	–	–	–	2	126	150	8	19	M16	6.5	4	2.61
(90)	101.6	102.6	195	18	–	–	–	–	2	136	160	8	19	M16	6.5	4	2.76
100	114.3	115.4	210	18	–	–	–	–	2	151	175	8	19	M16	7	4	3.14
125	139.8	141.2	250	20	–	–	–	–	2	182	210	8	23	M20	7.5	4	4.77
150	165.2	166.6	280	22	–	–	–	–	2	212	240	8	23	M20	8	5	6.34
(175)	190.7	192.1	305	22	–	–	–	–	2	237	265	12	23	M20	9	5	6.82
200	216.3	218.0	330	22	–	–	–	–	2	262	290	12	23	M20	9	6	7.53
(225)	241.8	243.7	350	22	–	–	–	–	2	282	310	12	23	M20	9	6	7.74
250	267.4	269.5	400	24	36	288	292	6	2	324	355	12	25	M22	10	6	12.7
300	318.5	321.0	445	24	38	340	346	6	3	368	400	16	25	M22	10	6	13.8
350	355.6	358.1	490	26	42	380	386	6	3	413	445	16	25	M22	12	7	18.2
400	406.4	409	560	28	44	436	442	6	3	475	510	16	27	M24	12	7	25.2
450	457.2	460	620	30	48	496	502	6	3	530	565	20	27	M24	14	8	33
500	508.0	511	675	30	48	548	554	6	3	585	620	20	27	M24	14	8	37.6
550	558.8	562	745	32	52	604	610	6	3	640	680	20	33	M30	15	9	49.7
600	609.6	613	795	32	52	656	662	6	3	690	730	24	33	M30	16	10	52.6
650	660.4	664	845	34	56	706	712	6	3	740	780	24	33	M30	16	10	60.6
700	711.2	715	905	34	58	762	770	6	3	800	840	24	33	M30	17	10	70.6
750	762.0	766	970	36	62	816	824	6	3	855	900	24	33	M30	18	11	85.8
800	812.8	817	1020	36	64	868	876	6	3	905	950	28	33	M30	19	12	91.2
(850)	863.6	868	1070	36	66	920	928	6	3	955	1000	28	33	M30	19	12	98.6
900	914.4	919	1120	38	70	971	979	6	3	1005	1050	28	33	M30	22	14	109
1000	1016.0	1021	1235	40	74	1073	1081	6	3	1110	1160	28	39	M36	22	14	133
*(1100)	1117.6	1123	1345	42	76	–	–	–	3	1220	1270	28	39	M36	–	–	–
*1200	1219.2	1225	1465	44	78	–	–	–	3	1325	1380	32	39	M36	–	–	–
*1350	1371.6	–	1630	48	82	–	–	–	3	1480	1540	36	45	M42	–	–	–
*1500	1524.0	–	1795	50	90	–	–	–	3	1635	1700	40	45	M42	–	–	–

Notes:

(1) Flanges of parenthesized nominal diameter had letter not be used.

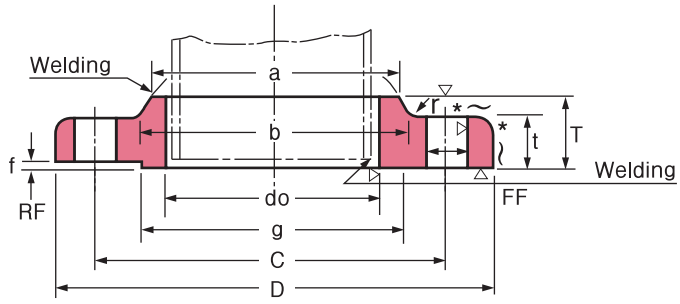
(2) The facing of flanges shall conform to KS B1519(JIS B2202) 1984.

(3) Nominal diameter over 1000 is manufacturer' s standard(*).

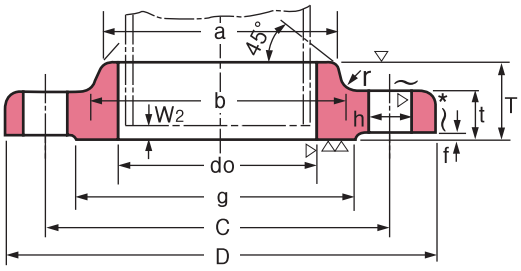
16 K

KS B 1503 / JIS B 2220

NOMINAL SIZE 10–600mm



NOMINAL SIZE 650–1200mm



*The surface finish(~)
is in the case of die forging.

Nominal Bore of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange	Outside Dia. of Flange	Sectional Dimensions of Flange							Bolt Hole			Nomi–nal Bolt Size	Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad–ius	Raised Face	Dia.of Raised Face	Bolt Circle dia.	Number of Bolt Holes	Hole Dia.		
		do	D			a	b	r	f	g	c		h		
10	17.3	17.8	90	12	16	26	28	4	1	46	65	4	15	M12	0.52
15	21.7	22.2	95	12	16	30	32	4	1	51	70	4	15	M12	0.58
20	27.2	27.7	100	14	20	38	42	4	1	56	75	4	15	M12	0.75
25	34.0	34.5	125	14	20	46	50	4	1	67	90	4	19	M16	1.16
32	42.7	43.2	135	16	22	56	60	5	2	76	100	4	19	M16	1.53
40	48.6	49.1	140	16	24	62	66	5	2	81	105	4	19	M16	1.64
50	60.5	61.1	155	16	24	76	80	5	2	96	120	8	19	M16	1.83
65	76.3	77.1	175	18	26	94	98	5	2	116	140	8	19	M16	2.58
80	89.1	90.0	200	20	28	108	112	6	2	132	160	8	23	M20	3.66
(90)	101.6	102.6	210	20	30	120	124	6	2	145	170	8	23	M20	3.95
100	114.3	115.4	225	22	34	134	138	6	2	160	185	8	23	M20	4.94
125	139.8	141.2	270	22	34	164	170	6	2	195	225	8	25	M22	7.00
150	165.2	166.6	305	24	38	196	202	6	2	230	260	12	25	M22	9.62
200	216.3	218.0	350	26	40	244	252	6	2	275	305	12	25	M22	12.1
250	267.4	269.5	430	28	44	304	312	6	2	345	380	12	27	M24	20.0
300	318.5	321.0	480	30	48	354	364	8	3	395	430	16	27	M24	24.4
350	355.6	358.1	540	34	52	398	408	8	3	440	480	16	33	M30×3	35.0
400	406.4	409.0	605	38	60	446	456	10	3	495	540	16	33	M30×3	46.2
450	457.2	460.0	675	40	64	504	514	10	3	560	605	20	33	M30×3	61.9
500	508.0	511.0	730	42	68	558	568	10	3	615	660	20	33	M30×3	73.25
(550)	558.8	562.0	795	44	70	612	622	10	3	670	720	20	39	M36×3	88.1
600	609.6	613.0	845	46	74	666	676	10	3	720	770	24	39	M36×3	98.8
(650)	660.4	664	895	48	77	704	726	10	5	770	820	24	39	M36×3	101
700	711.2	715	960	50	80	754	776	10	5	820	875	24	42	M39×3	120
(750)	762.0	766	1020	52	83	806	832	10	5	880	935	24	42	M39×3	141
800	812.8	817	1085	54	86	865	885	10	5	930	990	24	48	M45×3	161
(850)	863.6	868	1135	56	89	916	936	10	5	980	1040	24	48	M45×3	177
900	914.4	919	1185	58	93	968	986	10	5	1030	1090	28	48	M45×3	191
1000	1016.0	1021	1320	62	99	1070	1098	12	5	1140	1210	28	56	M52×3	230
(1100)	1117.6	1123	1420	66	105	1180	1200	12	5	1240	1310	32	56	M52×3	289
1200	1219.2	1225	1530	70	112	1282	1302	12	5	1350	1420	32	56	M52×3	348

Notes:

(1) Flanges of parethesized nominal diameter had better not be used.

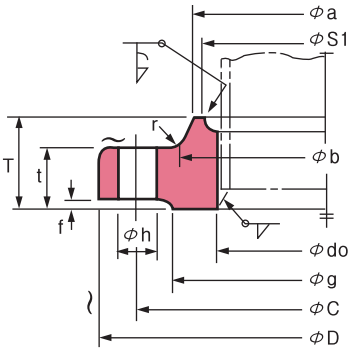
(2) The facing of flanges shall conform to KS B1519 (JIS B2202) 1984.

(3) The dimension of flange of 650A and larger in nominal sizes excluding 850A, are in accordance with the nominal pressure 25 BAR specified in ISO2084–1974.

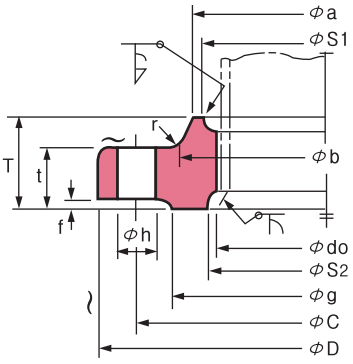
20K

KS B 1503 / JIS B 2220

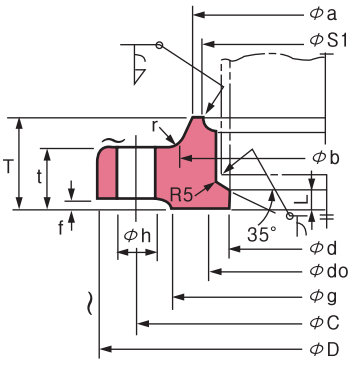
TYPE A
NOMINAL SIZE 10–50mm



TYPE B
NOMINAL SIZE 10–50mm



TYPE C
NOMINAL SIZE 65–600mm



*The surface finish(~) is in the case of die forging.

Nominal Bore of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange	Outside Dia. of Flange	Sectional Dimensions of Flange								Bolt Hole			Nomi–nal Bolt Size	Reference					Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad–ius	Raised Face	Dia.of Raised Face	Inside Dia. of Flange	Bolt Circle dia.	Number of Bolt Holes	Hole Dia.		S1	m	S2	n	l	
		do	D			a	b	r	f	g	d	c		h							
10	17.3	17.8	90	14	20	30	32	4	1	46	–	65	4	15	M12	27	4	27	4	–	0.59
15	21.7	22.2	95	14	20	34	36	4	1	51	–	70	4	15	M12	31	4	31	4	–	0.65
20	27.2	27.7	100	16	22	40	42	4	1	56	–	75	4	15	M12	37	4	37	4	–	0.81
25	34.0	34.5	125	16	24	48	50	4	1	67	–	90	4	19	M16	44	4	44	4.5	–	1.29
32	42.7	43.2	135	18	26	56	60	5	2	76	–	100	4	19	M16	52	4	53	5	–	1.60
40	48.6	49.1	140	18	26	62	66	5	2	81	–	105	4	19	M16	58	4	59	5.5	–	1.69
50	60.5	61.1	155	18	26	76	80	5	2	96	–	120	8	19	M16	70	4	72	5.5	–	1.89
65	76.3	77.1	175	20	30	100	104	5	2	116	65.9	140	8	19	M16	94	6	–	–	6	2.60
80	89.1	90.0	200	22	34	113	117	6	2	132	78.1	160	8	23	M20	107	6	–	–	6	3.93
(90)	101.6	102.6	210	24	36	126	130	6	2	145	90.2	170	8	23	M20	120	6	–	–	6	4.56
100	114.3	115.4	225	24	36	138	142	6	2	160	102.3	185	8	23	M20	132	6	–	–	6	5.13
125	139.8	141.2	270	26	40	166	172	6	2	195	126.6	225	8	25	M22	160	7	–	–	6	8.30
150	165.2	166.6	305	28	42	196	202	6	2	230	151.0	260	12	25	M22	186	8	–	–	6	10.6
200	216.3	218.0	350	30	46	244	252	6	2	275	199.9	305	12	25	M22	237	9	–	–	6	13.3
250	267.4	269.5	430	34	52	304	312	6	2	345	248.8	380	12	27	M24	290	10	–	–	6	23.4
300	318.5	321.0	480	36	56	354	364	8	3	395	297.9	430	16	27	M24	345	11	–	–	6	27.7
350	355.6	358.1	540	40	62	398	408	8	3	440	333.4	480	16	33	M30×3	384	12	–	–	6	39.2
400	406.4	409.0	605	46	70	446	456	10	3	495	381.0	540	16	33	M30×3	437	13	–	–	7	54.2
450	457.2	460.0	675	48	78	504	514	10	3	560	431.8	605	20	33	M30×3	490	15	–	–	7	71.7
500	508.0	511.0	730	50	84	558	568	10	3	615	482.6	660	20	33	M30×3	544	16	–	–	7	86.2
(550)	558.8	562.0	795	52	90	612	622	10	3	670	533.4	720	20	39	M36×3	595	16	–	–	7	105
600	609.6	613.0	845	54	96	666	676	10	3	720	584.2	770	24	39	M36×3	646	18	–	–	7	119
* 650	660.4	664	945	60					5	790		850	24	48	M45×3						
* 700	711.2	715	995	64					5	840		900	24	48	M45×3						
* 750	762.0	766	1080	68					5	900		970	24	56	M52×3						
* 800	812.8	817	1140	72					5	960		1030	24	56	M52×3						
* 850	863.6	868	1200	74					5	1020		1090	24	56	M52×3						
* 900	914.4	919	1250	76					5	1070		1140	28	56	M52×3						

Notes:

(1) Flanges of parenthesized nominal diameter had better not be used.

(2) "d" is an example of pipe thickness for schedule 40 for nominal diameter 400 and under, and for schedule 12.7mm for 450 through 600 of KS D3562 and KS D3507 (JIS G3454, JIS G3456).

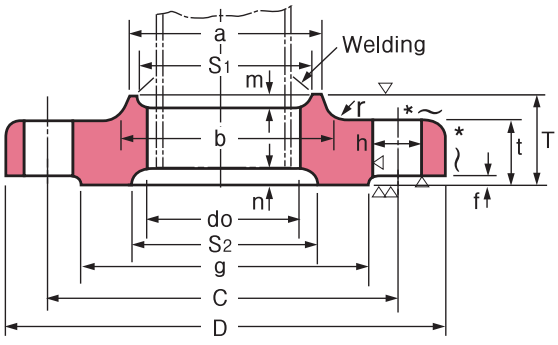
(3) The dimension of the notch (m, N, S1, S2) for welding can decided between concerned parties.

(4) Nominal diameter over 600 is manufacturer's standard.

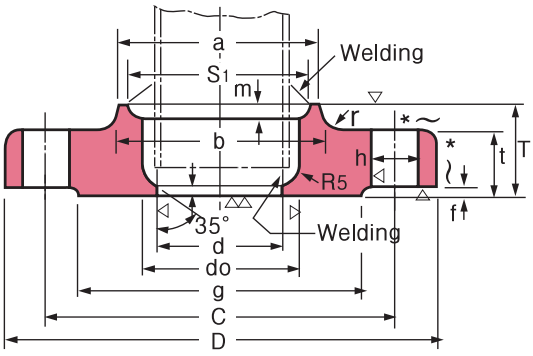
30 K

KS B 1503 / JIS B 2220 / SLIP-ON

TYPE B
NOMINAL SIZE 10-50mm



TYPE C
NOMINAL SIZE 65-400mm



Nominal Bore of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange	Outside Dia. of Flange	Sectional Dimensions of Flange								Bolt Hole			Nomi-nal Bolt Size	Reference					Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad-ius	Raised Face	Dia.of Raised Face	Inside Dia. of Flange	Bolt Circle dia.	Number of Bolt Holes	Hole Dia.		S1	m	S2	n	l	
		do	D			a	b	r	f	g	d	c		h							
10	17.3	17.8	110	16	24	30	34	4	1	52	–	75	4	19	M16	–	–	–	–	–	0.99
15	21.7	22.2	115	18	26	36	40	5	1	55	–	80	4	19	M16	31	4	40	5	–	1.23
20	27.2	27.7	120	18	28	42	46	5	1	60	–	85	4	19	M16	37	5	44	5	–	1.34
25	34.0	34.5	130	20	30	50	54	5	1	70	–	95	4	19	M16	44	6	52	5	–	1.76
32	42.7	43.2	140	22	32	60	64	6	2	80	–	105	4	19	M16	52	6	60	5	–	2.15
40	48.6	49.1	160	22	34	66	70	6	2	90	–	120	4	23	M20	58	6	66	5	–	2.82
50	60.5	61.1	165	22	36	82	86	6	2	105	–	130	8	19	M16	70	6.5	78	5	–	2.89
65	76.3	77.1	200	26	40	102	106	8	2	130	65.9	160	8	23	M20	96	9.5	94	5	6	4.70
80	89.1	90.0	210	28	44	115	121	8	2	140	78.1	170	8	23	M20	109	9.5	–	–	6	5.36
(90)	101.6	102.6	230	30	46	128	134	8	2	150	90.2	185	8	25	M22	122	9.5	–	–	6	6.85
100	114.3	115.4	240	32	48	141	147	8	2	160	102.3	195	8	25	M22	135	9.5	–	–	6	7.89
125	139.8	141.2	275	36	54	166	172	8	2	195	126.6	230	8	25	M22	160	9.5	–	–	6	11.4
150	165.2	166.6	325	38	58	196	204	8	2	235	151.0	275	12	27	M24	186	9.5	–	–	6	16.7
200	216.3	218.0	370	42	64	248	256	8	2	280	199.9	320	12	27	M24	237	9.5	–	–	6	20.6
250	267.4	269.5	450	48	72	306	314	10	2	345	248.8	390	12	33	M30	290	10	–	–	6	36.1
300	318.5	321.0	515	52	78	360	370	10	3	405	297.9	450	16	33	M30	345	12	–	–	6	49.9
350	355.6	358.1	560	54	84	402	412	12	3	450	333.4	495	16	33	M30	383	13	–	–	6	61.2
400	406.4	409.0	630	60	92	456	468	15	3	510	381.0	560	16	39	M36	435	14	–	–	7	85.2

Notes:

(1) Flanges of parenthesized nominal diameter had better not be used.

(2) "**d**" is an example of pipe thickness for schedule 40 of KS D3562 and KS D3507 (JIS G3454, JIS G3456). if required, purchaser can specify for other pipe wall thickness.

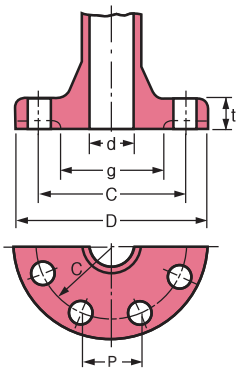
(3) This diameters of bolt holes(h) shall be in accordance with Class 3 of KS B1007 (Grade 3 of JIS B1001) where the nominal designation of screw thread of bolt is not more than M16, and in accordance with Class 2 of KS B1007 (Grade 2 of JIS B1001) where the nominal designation of screw thread of bolt is not less than M30×3.

(4) The dimension of the notch (m, n, S1, S2) for welding can decide between concerned parties agreement between parties concerned.

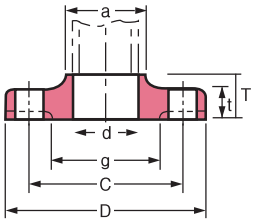
TOLERNACE FOR PIIPE FLANGES

KS B 1502 / JIS B 2203

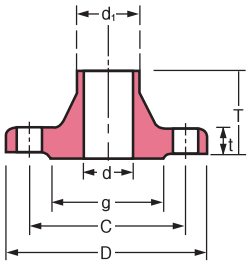
SOLID



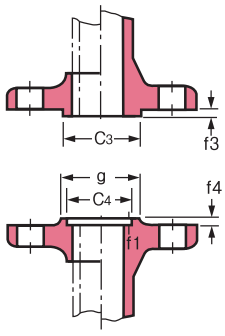
SLIP-ON



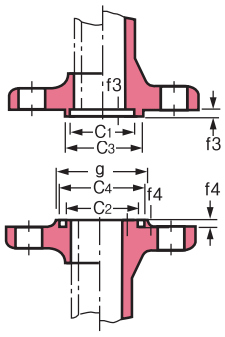
WELDING NECK



TYPE OF GASKET SURFACE



MALE & FEMALE TYPE



TONGUE & GROOVE TYPE

Flange Section		Surface Cendition	Basic Size	Demensional Tolerance
Outside Dia D		As Forged (1)	300 & below	+ Not Specified −2.0
			over 300 thru 600	
			over 600 thru 1000	
			over 1000 thru 1500	+ Not Specified −3.0
			over 1500	
		Finish	300 & below	± 1
			over 300 thru 600	± 1.5
			over 600 thru 1000	± 2
			over 1000 thru 1500	± 2.5
			over 1500	± 3
Inside Dia	Solid flange d(2)	As Forged (1)	16 & below	±1
			over 16 thru 63	± 1.5
			over 63 thru 125	± 2
			over 125 thru 150	± 2.5
			over 250 thru 500	± 3
			over 500 thru 1000	± 4
			over 1000	± 5
	Slip-on Flange do	Finish	100 & below	± 0.5, 0
			over 100 thru 400	+ 1, 0
			over 400 thru 600	+ 1.5, 0
			over 600 thru 800	+ 2, 0
			over 800 thru 1000	+ 2.5, 0
			over 1000	+ 3 , 0
	Welding Neck Flange d		100 & below	0, − 0.5
			over 100 thru 400	0, − 1
			over 400 thru 600	0, − 1.5
			over 600 thru 800	0, − 2
			over 800 thru 1000	0, − 2.5
			over 1000	0, − 3
Bolt Hole	Bolt Circle Dia c		250 & below	± 0.5
			over 250 thru 550	± 0.6
			over 550 thru 950	± 0.8
			over 950 thru 1350	± 1
			over 1350	± 1.5

Flange Section		Surface Cendition	Basic Size	Demensional Tolerance
Bolt Hole	Pitch of Hole p	Drilling Hole	−	± 0.5
Dia. of Hub	Slip-on Flange(a) and Welding Neck Flange (d1)	As Forged (1)	220 & below	+ 2, 0
			over 220 thru 450	+ 3, 0
			over 450 thru 650	+ 4, 0
			over 650 thru 850	+ 6, 0
			over 850 thru 1000	+ 7, 0
			over 1000	+ 8, 0
		Finish	220 & below	+ 1, 0
			over 220 thru 450	+ 1.5, 0
			over 450 thru 650	+ 2, 0
			over 650 thru 850	+ 2.5, 0
			over 850 thru 1000	+ 3, 0
			over 1000	+ 3.5, 0
Gasket Seat	C1, C2 C3, C4	Finish	500 & below	± 0.3
			over 500 thru 1000	± 0.35
			over 1000 thru 1500	± 0.4
			over 1500	± 0.5
	f4, f3	Finish	8 & below	± 0.2
			over 8	± 0.25
	g	Finish	200 & below	± 0.8
			over 200 thru 650	± 0.9
			over 650 thru 1000	± 1
			over 1000	± 1.2
Thickness t		One-side Finish	20 & below	+ 1.5, 0
			over 20 thru 50	+ 2, 0
			over 50 thru 100	+ 3, 0
		Both-side Finish	20 & below	+ 1, 0
			over 20 thru 50	+ 1.5, 0
			over 50 thru 100	+ 2, 0
Hub Height T	Flange with Pipe Inserted	Finish	50 & below	± 1
			over 50 thru 100	± 1.5
			over 100 thru 200	± 2
	Flange with But-welded Pipe	Finish	over 200 & below	+ 2, 0
			over 200 thru 300	+ 3, 0

Notes:

(1) This dimensional tolerance applies to the machined surface, as required.

(2) This dimension **d** has been specified only for the flange, of which the bore part is cylindrical in shape.

Remarks :

(1) The dimensions **d** of bore part of the solid flanges with surface, as forged of valves, pumps, etc. are allowed up to plus 100% of the above dimensional tolerance. Provided that the required thickness shall be free from its influence.

(2) The thickness of flange of valve and the like, of which the dimension between flange faces is limited to a fixed value, are allowed up to plus 100% of the above dimensional tolerance in the column of thickness.

(3) In the case of spot facing of the single surface finishing, the thickness of spot facing is allowed up to 70% of the dimensional tolerance in the above column of thickness in negative side.

(4) The chain double-dashed lines in the figures of solid flange and socket welding type flange illustrate the cases of large raised face flange.

MATERIAL SPECIFICATIONS (KS/JIS)

Code	Materal Spec		CHEMISTRY								MECHANICAL PROPERTIES				
			C%	Si%	Mn	P	S	Ni	Cr	Mo	Y · S% (N/㎟)	T · S% (N/㎟)	EL min%	RED min%	HB
KSB1503/JISB2220	KS D 3503 SS400 / JIS G 3101 SS400	16mm below	–	–	–	max 0.05	max 0.05	–	–	–	min 245	400–510	17	–	–
		16mm~40mm	–	–	–	max 0.05	max 0.05	–	–	–	min 235	400–510	21	–	–
		40mm over	–	–	–	max 0.05	max 0.05	–	–	–	min 215	400–510	23	–	–
	JIS G3106 SM400A	50mm below	max 0.23	–	min 2.5xc	max 0.035	max 0.035	–	–	–	min 235	400–510	22	–	–
		50mm over	max 0.25	–	min 2.5xc	max 0.035	max 0.035	–	–	–	min 215	400–510	24	–	–
	JIS G3106 SM400B	50mm below	max 0.20	max 0.35	0.60 –1.40	max 0.035	max 0.035	–	–	–	min 235	400–510	22	–	–
		50mm over	max 0.22	max 0.35	0.60 –1.40	max 0.035	max 0.035	–	–	–	min 215	400–510	24	–	–
	KS D 3752 SM20C JIS G 4051 S20C		0.18 ~0.23	0.15 ~0.35	0.30 ~0.60	max 0.030	max 0.035	–	–	–	min 245	402	28	–	114 ~153
	KS D 3752 SM25C JIS G 4051 S25C		0.22 ~0.28	0.15 ~0.35	0.30 ~0.60	max 0.030	max 0.035	–	–	–	min 265	441	27	–	121 ~183
	KS D 3710 SF440A JIS G 3201 SF440A		max 0.60	0.15 ~0.50	0.30 ~1.20	max 0.030	max 0.035	–	–	–	min 225	440–540	24	45	min 121
	KS D 4122 SF490A JIS G 3201 SF490A		max 0.60	0.15 ~0.50	0.30 ~1.20	max 0.030	max 0.035	–	–	–	mmin 245	490–590	22	40	min 134
	KS D 4122 SFVC1 JIS G 3202 SFVC1		max 0.30	max 0.35	0.40 ~1.35	max 0.030	max 0.030	–	–	–	min 205	410–560	21	38	–
	KS D 4122 SFVC2A JIS G 3201 SFVC2A		max 0.35	max 0.35	0.41 ~1.10	max 0.030	max 0.030	–	–	–	min 245	490–640	18	33	–
	KS D 4123 SFVA F1 JIS G 3203 SFVA F1		max 0.30	max 0.35	0.80 ~0.90	max 0.030	max 0.030	–	–	0.45 ~0.65	min 275	480–660	18	35	–
	KS D 4123 SFVA F11A JIS G 3203 SFVA F11A		max 0.20	0.50 ~1.0	0.30 ~0.80	max 0.030	max 0.030	–	1.0 ~1.15	0.45 ~0.65	min 275	480–660	18	35	–
KS B 1506 / JIS B 2220	KS D 3705 STS 304 JIS G 4304 SUS 304		max 0.08	max 1.0	max 2.0	max 0.045	max 0.03	8.0 ~10.5	18.0 ~20.0	–	min 205	min 520	40	–	max 187
	KS D 3705 STS 316 JIS G 4304 SUS 316		max 0.08	max 1.0	max 2.0	max 0.045	max 0.03	10.0 ~14.0	16.0 ~18.0	2.0 ~3.0	min 205	min 520	40	–	max 187
	KS D 3705 STS 304L JIS G 4304 SUS 304L		max 0.03	max 1.0	max 2.0	max 0.045	max 0.03	9.0 ~13.0	18.0 ~20.0	–	min 175	min 480	40	–	max 187
	KS D 3705 STS 316L JIS G 4304 SUS 316L		max 0.03	max 1.0	max 2.0	max 0.045	max 0.03	12. ~15.0	16.0 ~18.0	2.0 ~3.0	min 175	min 480	40	–	max 187

Type of Materials	KS B1503				JIS B2220(2001)				Remark
	Rolling Steel		Forging Steel		Rolling Steel		Forging Steel		
	Code	Material Code	Code	Material Code	Code	Material Code	Code	Material Code	
Carbon Steel	KS D 3503	SS400	KS D 3701	SF390A	JIS G 3101	SS400	JIS G 3201	SF390A	
	KS D 3752	SM20C	KS D 4122	SFVC1	JIS G 4051	S20C	JIS G 3202	SFVC1	
	KS D 3752	SM25C	KS D 3701	SF440A	JIS G 4051	S25C	JIS G 3201	SF440A	
			KS D 4122	SFVC2A			JIS G 3202	SFVC2A	
Molybdenum Steel			KS D 4123	SFVAF1			JIS G 3203	SFVAF1	
Crommolybdenum Steel			KS D 4123	SFVAF11A			JIS G 3203	SAVAF11A	
Stainless Steel	KS D 3705	STS304			JIS G 4304	SUS304	JIS G 3214	SUSF304	
	KS D 3698	STS304			JIS G 4305	SUS304			
	KS D 3705	STS316			JIS G 4304	SUS316	JIS G 3214	SUSF316	
	KS D 3698	STS316			JIS G 4305	SUS316			
	KS D 3705	STS304L			JIS G 4304	SUS304L	JIS G 3214	SUSF304L	
	KS D 3698	STS304L			JIS G 4305	SUS304L			
	KS D3705	STS316L			JIS G 4304	SUS316L	JIS G 3214	SUSF316L	
	KS D 3698	STS316L			JIS G 4305	SUS316L			

KS B1506(2000)				
Nominal Pressure	Type of Flange	Type of Materials	MATERIALS	
			Code	Material
10K 20K 30K	Slip–on Flange Blind Flange W/N Flange	Stainless Steel	KS D 3705 KS D 3698	STS 304 STS 316 STS 304L STS 316L

FLANGE SPECIFICATIONS

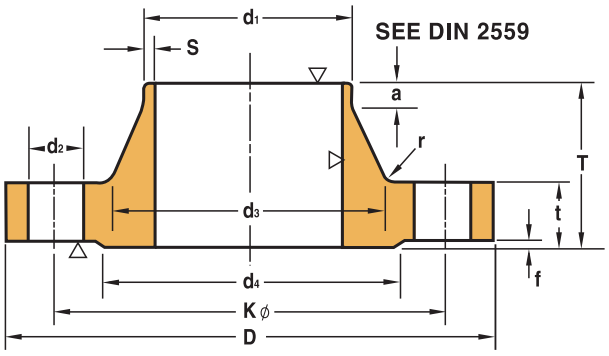
DIN

6Bar	38P
10Bar	39P
16Bar	40P
25Bar	41P
40Bar	42P

6 BAR

DIN 2573 SLIP–ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2631 WELDING NECK FLANGES

WELDING NECK



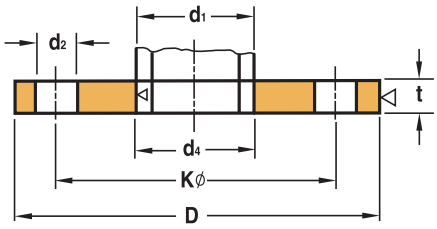
Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
Nominal Bore	d1	D	t Welding Neck	t Slip–on	t Blind	kØ	T	d3	s	r	a ≈	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
10	14 17.2 *)	75	12	12	12	50	28	22 26	1.8	4	6	35	2	4	M10	–	11.5	0.363	0.335
15	20 21.3 *)	80	12	12	12	55	30	28 30	2.0	4	6	40	2	4	M10	–	11.5	0.410	0.392
20	25 26.9 *)	90	14	14	14	65	32	35 38	2.3	4	6	50	2	4	M10	–	11.5	0.600	0.592
25	30 33.7 *)	100	14	14	14	75	35	40 42	2.6	4	6	60	2	4	M10	–	11.5	0.740	0.747
32	38 42.4 *)	120	14	16	14	90	35	50 55	2.6	6	6	70	2	4	M12	(1/2")	14	1.19	1.05
40	44.5 48.3 *)	130	14	16	14	100	38	58 62	2.6	6	7	80	3	4	M12	(1/2")	14	1.39	1.18
50	57 60.3 *)	140	14	16	14	110	38	70 74	2.9	6	8	90	3	4	M12	(1/2")	14	1.53	1.34
65	76.1 *)	160	14	16	14	130	38	88	2.9	6	9	110	3	4	M12	(1/2")	14	1.89	1.67
80	88.9 *)	190	16	18	16	150	42	102	3.2	8	10	128	3	4	M16	(5/8")	18	2.98	2.71
100	108 114.3 *)	210	16	18	16	170	45	122 130	3.6	8	10	148	3	4	M16	(5/8")	18	3.46	3.24
125	133 139.7 *)	240	18	20	18	200	48	148 155	4.0	8	10	178	3	8	M16	(5/8")	18	4.60	4.49
150	159 168.3 *)	265	18	20	18	225	48	172 184	4.5	10	12	202	3	8	M16	(5/8")	18	5.22	5.15
200	216 219.1 *)	320	20	22	20	280	55	230 236	5.9	10	15	258	3	8	M16	(5/8")	18	7.15	7.78
250	267 273 *)	375	22	24	22	335	60	282 290	6.2	12	15	312	3	12	M16	(5/8")	18	9.61	10.8
300	318 323.9 *)	440	22	24	22	395	62	335 342	7.1	12	15	365	4	12	M20	(3/4")	23	12.6	14.0
350	355.6 *) 368	490	22	26	22	445	62	385	7.1	12	15	415	4	12	M20	(3/4")	23	15.6	16.1
400	406.4 *) 419	540	22	28	22	495	65	438	7.1	12	15	455	4	16	M20	(3/4")	23	18.4	18.3
500	508 *) 521	645	24	30	24	600	68	538	7.1	12	15	570	4	20	M20	(3/4")	23	24.5	24.6
600	609.6 *) 622	755	24	–	–	705	70	640	7.1	12	16	670	5	20	M24	(7/8")	27	–	–
700	711.2 *) 720	860	24	–	–	810	70	740	7.1	12	16	775	5	24	M24	(7/8")	27	–	–
800	812.8 *) 820	975	24	–	–	920	70	842	7.1	12	16	880	5	24	M27	(1")	30	–	–
900	914.4 *) 920	1075	26	–	–	1020	70	942	7.1	12	16	980	5	24	M27	(1")	30	–	–
1000	1016 *) 1020	1175	26	–	–	1120	70	1045	7.1	16	16	1080	5	28	M27	(1")	30	–	–

Notes: *Out side diameter of pipe complies with ISO recommendation R64.

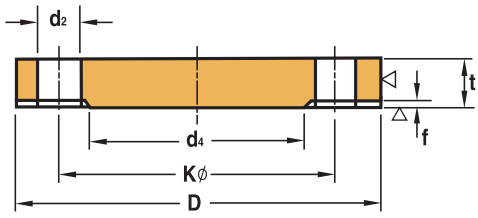
10 BAR

DIN 2576 SLIP-ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2632 WELDING NECK FLANGES

SLIP-ON



BLIND



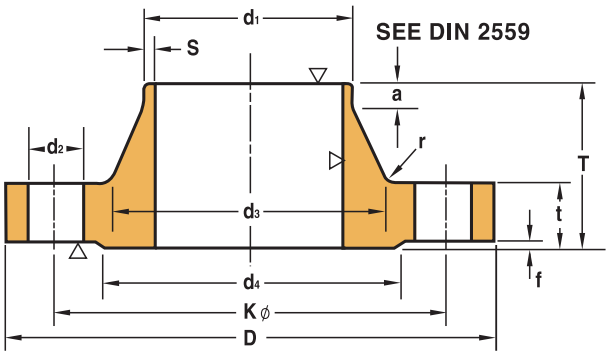
Bore		Common Dimension						Hub				Raised FaceFace		Drilling				Approx. Weight(kg)	
Nominal Bore	d1	D	t Welding Neck	t Slip-on	t Blind	kØ	T	d3	s	r	a ≈	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2576	DIN 2632
10	14 17.2 *)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.163	0.580
15	20 21.3 *)	95	14	14	14	65	35	30 32	2.0	4	6	45	2	4	M12	(1/2")	14	0.675	0.648
20	25 26.9 *)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	0.947	0.952
25	30 33.7 *)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12	(1/2")	14	1.14	1.14
32	38 42.4 *)	140	16	16	16	100	40	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	1.66	1.69
40	44.5 48.3 *)	150	16	16	18	110	42	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	1.89	1.86
50	57 60.3 *)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	2.51	2.53
65	76.1 *)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16	(5/8")	18	3.00	3.06
80	88.9 *)	200	20	20	20	160	50	105	3.2	8	10	138	3	8	M16	(5/8")	18	3.79	3.70
100	108 114.3 *)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16	(5/8")	18	4.20	4.62
125	133 139.7 *)	250	22	22	22	210	55	150 156	4.0	8	12	188	3	8	M16	(5/8")	18	5.71	6.30
150	159 168.3 *)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20	(3/4")	23	6.72	7.75
200	216 219.1 *)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	8	M20	(3/4")	23	9.50	11.3
250	267 273 *)	395	26	26	26	350	68	285 292	6.3	12	16	320	3	12	M20	(3/4")	23	12.5	14.7
300	318 323.9 *)	445	26	26	28	400	68	335 344	7.1	12	16	370	4	12	M20	(3/4")	23	14.4	17.6
350	355.6 *) 368	505	26	28	30	460	68	385	7.1	12	16	430	4	16	M20	(3/4")	23	20.6	21.4
400	406.4 *) 419	565	26	32	32	515	72	440	7.1	12	16	482	4	16	M24	(7/8")	27	27.9	26.1
500	508 *) 521	670	28	38	34	620	75	542	7.1	12	16	585	4	20	M24	(7/8")	27	41.1	34.7
600	609.6 *) 622	780	28	–	–	725	80	642	7.1	12	18	685	5	20	M27	(1")	30	–	–
700	711.2 *) 720	895	30	–	–	840	80	754	8.0	12	18	800	5	24	M27	(1")	30	–	–
800	812.8 *) 820	1015	32	–	–	950	90	850	8.0	12	18	905	5	24	M30	(1 1/8")	33	–	–
900	914.4 *) 920	1115	34	–	–	1050	95	950	10.0	12	20	1005	5	28	M30	(1 1/8")	33	–	–
1000	1016 *) 1020	1230	34	–	–	1160	95	1052	10.0	16	20	1110	5	28	M33	(1 1/4")	36	–	–

Notes: *Out side diameter of pipe complies with ISO recommendation R64.

16 BAR

DIN 2543 SLIP-ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2633 WELDING NECK FLANGES

WELDING NECK



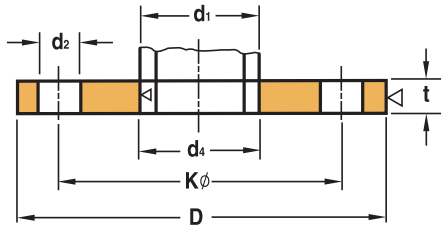
Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
Nomi-nal Bore	d1	D	t Weld-ing Neck	t Slip-on	t Blind	k∅	T	d3	s	r	a ≈	d4	f	Num-ber of Bolt	Dia. of Bolt		d_2	DIN 2543	DIN 2633
10	14 17.2 *)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.63	0.580
15	20 21.3 *)	95	14	14	14	65	35	30 32	2.0	4	6	45	2	4	M12	(1/2")	14	0.72	0.648
20	25 26.9 *)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.01	0.952
25	30 33.7 *)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12	(1/2")	14	1.23	1.14
32	38 42.4 *)	140	16	16	16	100	40	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	1.80	1.69
40	44.5 48.3 *)	150	16	16	16	110	42	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.09	1.86
50	57 60.3 *)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	2.88	2.53
65	76.1 *)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16	(5/8")	18	3.66	3.06
80	88.9 *)	200	20	20	20	160	50	105	2.2	8	10	138	3	8	M16	(5/8")	18	4.77	3.70
100	108 114.3 *)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16	(5/8")	18	5.65	4.62
125	133 139.7 *)	250	22	22	22	210	55	150 156	4.0	8	12	188	3	8	M16	(5/8")	18	8.42	6.30
150	159 168.3 *)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20	(3/4")	23	10.4	7.75
200	216 219.1 *)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	12	M20	(3/4")	23	16.1	11.0
250	267 273 *)	405	26	26	26	355	70	285 292	6.3	12	16	320	3	12	M24	(7/8")	27	24.9	15.6
300	318 323.9 *)	460	28	28	28	410	78	338 344	7.1	12	16	378	4	12	M24	(7/8")	27	35.1	22.0
350	355.6 *) 368	520	30	30	30	470	82	390	8.0	12	16	438	4	16	M24	(7/8")	27	47.8	28.7
400	406.4 *) 419	580	32	32	32	525	85	445	8.0	12	16	490	4	16	M27	(1")	30	63.5	36.3
500	508 *) 521	715	34	36	34	650	90	548	8.0	12	16	610	4	20	M30	(1 1/8")	33	102.0	59.3
600	609.6 *) 622	840	36	40	–	770	95	652	8.8	12	18	725	5	20	M33	(1 1/4")	36	–	–
700	711.2 *) 720	910	36	–	–	840	100	755	8.8	12	18	795	5	24	M33	(1 1/4")	36	–	–
800	812.8 *) 820	1025	38	–	–	950	105	855	10.0	12	20	900	5	24	M36	(1 3/8")	39	–	–
900	914.4 *) 920	1125	40	–	–	1050	110	955	10.0	12	20	1000	5	28	M36	(1 3/8")	39	–	–
1000	1016 *) 1020	1255	42	–	–	1170	120	1058	10.0	16	22	1115	5	28	M39	(1 1/2")	42	–	–

Notes: *Out side diameter of pipe complies with ISO recommendation R64.

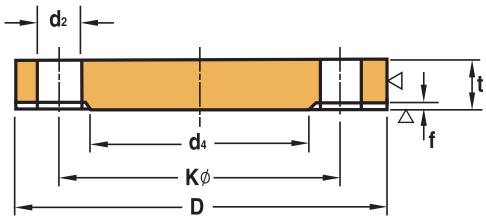
25 BAR

DIN 2544 SLIP-ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2634 WELDING NECK FLANGES

SLIP-ON



BLIND



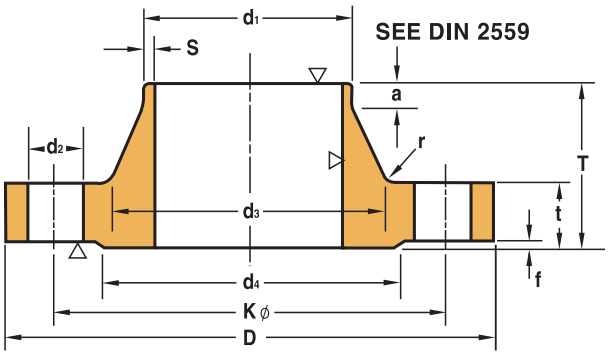
Bore		Common Dimension						Hub				Radised Face		Drilling				Approx. Weight	
Nomi–nal Bore	d1	D	t Weld–ing Neck	t Slip–on	t Blind	kØ	T	d3	s	r	a ≈	d4	f	Num–ber of Bolt	Dia. of Bolt		d2	DIN 2544	DIN 2634
10	14 17.2 *)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.72	0.661
15	20 21.3 *)	95	16	16	16	65	38	30 32	2.0	4	6	45	2	4	M12	(1/2")	14	0.81	0.746
20	25 26.9 *)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.24	1.06
25	30 33.7 *)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1/2")	14	1.38	1.29
32	38 42.4 *)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 48.3 *)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.34
50	57 60.3 *)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.20	2.82
65	76.1 *)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9 *)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 114.3 *)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 139.7 *)	270	26	26	26	220	68	155 162	4.0	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 168.3 *)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.8
200	216 219.1 *)	360	30	30	30	310	80	240 244	6.3	10	16	278	3	12	M24	(7/8")	27	22.3	17.0
250	267 273 *)	425	32	32	32	370	88	292 298	7.1	12	18	335	3	12	M27	(1")	30	33.5	24.4
300	318 323.9 *)	485	34	34	34	430	92	345 352	8.0	12	18	395	4	16	M27	(1")	30	46.3	31.2
350	355.6 *) 368	555	38	38	38	490	100	398	8.0	12	20	450	4	16	M30	(1 1/8")	33	68.0	45.0
400	406.4 *) 419	620	40	40	40	550	110	452	8.8	12	20	505	4	16	M33	(1 1/4")	36	89.7	58.7
500	508 *) 521	730	44	44	44	660	125	558	10.0	12	20	615	4	20	M33	(1 1/4")	36	138.0	86.1
600	609.6 *) 622	845	46	–	–	770	125	660	11.0	12	20	720	5	20	M36	(1 3/8")	39	–	101.0
700	721.2 *) 720	960	46	–	–	875	125	760	12.5	12	20	820	5	24	M39	(1 1/2")	42	–	134.0
800	812.8 *) 820	1085	50	–	–	990	135	865	14.2	12	22	930	5	24	M45	(1 3/4")	48	–	183.0
900	914.4 *) 930	1185	54	–	–	1090	145	968	16.0	12	24	1030	5	28	M45	(1 3/4")	48	–	232.0
1000	1016 *) 1020	1320	58	–	–	1210	155	1070	17.5	16	24	1140	5	28	M52	(2")	56	–	302.0

Notes: *Out side diameter of pipe complies with ISO recommendation R64.

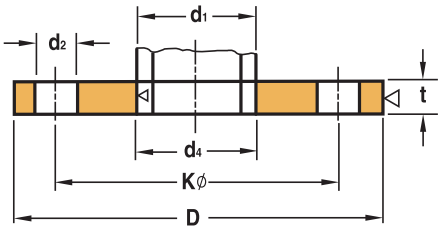
40 BAR

DIN 2545 SLIP-ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2635 WELDING NECK FLANGES

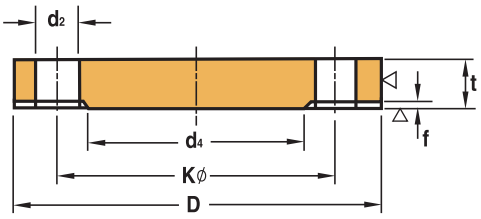
WELDING NECK



SLIP-ON



BLIND



SIZE		Common Dimension						Hub				Radised Face		Drilling				Approx. Weight	
Nomi–nal Bore	d1	D	t Weld–ing Neck	t Slip–on	t Blind	kØ	T	d3	s	r	a ≈	d4	f	Num–ber of Bolt	Dia. of Bolt		d2	DIN 2545	DIN 2635
10	14 17.2 *)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.72	0.661
15	20 21.3 *)	95	16	16	16	65	38	30 32	2.0	4	6	45	2	4	M12	(1/2")	14	0.81	0.746
20	25 26.9 *)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.24	1.06
25	30 33.7 *)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1/2")	14	1.38	1.29
32	38 42.4 *)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 48.3 *)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.33
50	57 60.3 *)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.2	2.82
65	76.1 *)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9 *)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 114.3 *)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 139.7 *)	270	26	26	26	220	68	155 162	4.0	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 168.3 *)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.8
(175)	(191) 193.7 *)	350	32	32	32	295	82	215 218	5.6	10	15	260	3	12	M27	(1")	30	22.1	18.2
200	216 219.1 *)	375	34	34	34	320	88	240 244	6.3	10	16	285	3	12	M27	(1")	30	27.2	21.5
250	267 273 *)	450	38	38	38	385	105	298 306	7.1	12	18	345	3	12	M30	(1 1/8")	33	43.8	34.9
300	318 *) 323.9	515	42	42	42	450	115	352 362	8.0	12	18	410	4	16	M30	(1 1/8")	33	63.3	49.7
350	355.6 *) 368	580	46	46	46	510	125	408	8.8	12	20	465	4	16	M33	(1 1/4")	36	89.5	68.1
400	406.4 *) 419	660	50	50	50	585	135	462	11.0	12	20	535	4	16	M36	(1 1/8")	39	127.0	96.5
500	508 *) 521	755	52	52	52	670	140	562	14.2	12	20	615	4	20	M39	(1 1/8")	42	172.0	117.0

Notes: *Out side diameter of pipe complies with ISO recommendation R64.

FLANGE SPECIFICATIONS

ANSI / JPI

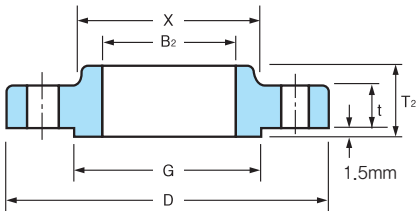
150Lbs/300Lbs	44/46P
400Lbs/600Lbs	48/50P
900Lbs	52P
1500Lbs/2500Lbs	54/56P
MATERIAL SPECIFICATIONS	58P
TOLERANCES (ANSI)	59P
TOLERANCES (JPI)	60P

CLASS 150 FLANGES

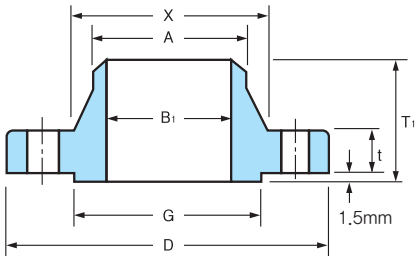




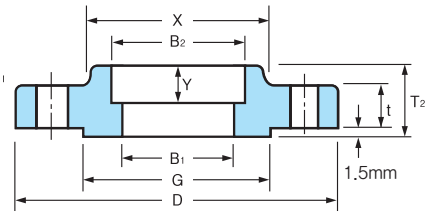




SLIP-ON



WELDING NECK



SOCKET WELDING

ASME B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	Thick-ness Lap Joint	BORE			LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
						Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	t	B_1	B_2	B_3	T_1	T_2	T_3	A	R	Q
1/2	89	30	35.1	9.7	11.2	15.8	22.4	22.9	47.5	15.5	16	21.3	3	16
3/4	99	38	42.9	11.2	12.7	21.0	27.7	28.2	52.5	15.5	16	26.7	3	16
1	108	49	50.8	12.7	14.2	26.6	34.5	35.1	55.5	17.5	18	33.5	3	18
1 1/4	117	59	63.5	14.2	15.7	35.1	43.2	43.7	57.5	20.5	21	42.2	5	21
1 1/2	127	65	73.0	15.9	17.5	40.9	49.5	50.0	61.5	22.5	22	48.3	6	22
2	152	78	91.9	17.5	19.0	52.5	61.9	62.5	63.5	25.5	25	60.5	8	25
2 1/2	178	90	104.6	20.6	22.4	62.7	74.7	75.4	69.5	28.5	28	73.2	8	28
3	190	108	127.0	22.4	23.9	77.9	90.7	91.4	69.5	29.5	30	88.9	10	30
3 1/2	216	122	139.7	22.4	23.9	90.1	103.4	104.1	71.5	31.5	32	101.6	10	32
4	229	135	157.2	22.4	23.9	102.3	116.1	116.8	76.5	33.5	33	114.3	11	33
5	254	164	185.7	22.4	23.9	128.2	143.8	144.5	88.5	36.5	37	141.2	11	37
6	279	192	215.9	23.9	25.4	154.1	170.7	171.4	88.5	39.5	40	168.4	13	40
8	343	246	269.7	26.9	28.4	202.7	221.5	222.2	101.5	44.5	44	219.2	13	44
10	406	305	323.8	28.4	30.2	254.5	276.4	277.4	101.5	49.5	49	273.0	13	49
12	483	365	381.0	30.2	31.8	304.7	327.2	328.2	114.5	55.5	56	323.8	13	56
14	533	400	412.8	33.3	35.1	336.5	359.2	360.2	126.5	57.5	79	355.6	13	57
16	597	457	469.9	35.1	36.6	387.3	410.5	411.2	126.5	63.5	87	406.4	13	64
18	635	505	533.4	38.1	39.6	437.9	461.8	462.3	139.5	68.5	97	457.2	13	68
20	698	559	584.2	41.1	42.9	488.9	513.1	514.4	144.5	72.5	103	508.0	13	73
22	749	610	641.4	44.4	46.0	539.9	564.4	565.2	149.5	79.5	108	558.8	13	–
24	813	663	692.2	46.0	47.8	590.9	616.0	616.0	152.5	82.5	111	609.6	13	83

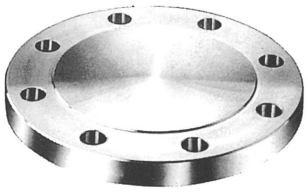
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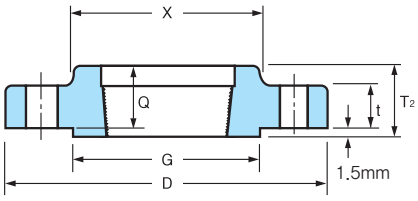
(1) For the 'Bore'(B1) other than Standard Wall Thickness, refer to page 62.

(2) For Slip-on, Threaded, Socket welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

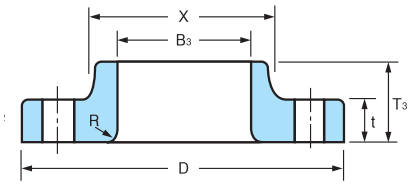




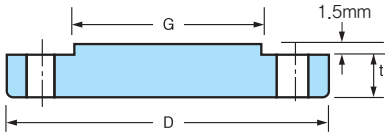




THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT				
		Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	Machine Bolt Length	Stud Bolt Length		Welding Neck	Slip-on and Threaded	Lap Joint	Blind	Socket Welding
	Y					Raised Face	Raised Face	Ring Joint	kg	kg	kg	kg	kg
1/2	10	60.5	4	15.9	1/2	50	55	–	0.50	0.40	0.39	0.42	0.41
3/4	11	69.8	4	15.9	1/2	50	65	–	0.75	0.58	0.56	0.62	0.58
1	13	79.2	4	15.9	1/2	55	65	75	1.06	0.78	0.76	0.86	0.79
1 1/4	14	88.9	4	15.9	1/2	55	70	85	1.39	1.01	0.99	1.15	1.04
1 1/2	16	98.6	4	15.9	1/2	65	70	85	1.79	1.32	1.28	1.53	1.35
2	18	120.6	4	19.1	5/8	70	85	95	2.67	2.05	1.99	2.41	2.10
2 1/2	19	139.7	4	19.1	5/8	75	90	100	4.22	3.28	3.20	3.94	3.37
3	21	152.4	4	19.1	5/8	75	90	100	5.08	3.84	3.75	4.93	3.95
3 1/2	–	177.8	8	19.1	5/8	75	90	100	6.34	4.84	4.74	6.22	–
4	–	190.5	8	19.1	5/8	75	90	100	7.20	5.36	5.21	7.06	–
5	–	215.9	8	22.2	3/4	85	95	110	9.04	6.12	5.96	8.68	–
6	–	241.3	8	22.2	3/4	85	100	115	11.04	7.42	7.23	11.31	–
8	–	298.4	8	22.2	3/4	90	110	120	18.27	12.07	11.74	19.52	–
10	–	362.0	12	25.4	7/8	100	115	125	24.91	16.39	15.89	28.46	–
12	–	431.8	12	25.4	7/8	100	120	135	38.54	26.24	25.73	43.32	–
14	–	476.2	12	28.6	1	115	135	145	50.52	34.52	37.84	57.86	–
16	–	539.8	16	28.6	1	115	135	145	62.97	44.98	50.04	76.30	–
18	–	577.8	16	31.8	1 1/8	125	145	160	71.50	48.90	55.30	93.50	–
20	–	635.0	20	31.8	1 1/8	140	160	170	87.72	61.38	68.98	121.43	–
22	–	692.2	20	34.9	1 1/4	150	170	185	100.54	71.62	79.54	150.63	–
24	–	749.3	20	34.9	1 1/4	150	170	185	119.19	86.78	96.30	184.88	–

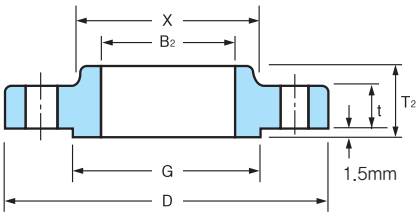
(3) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
(4) The gasket surface and backside(bearing surface for bolting)are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
(5) Depth of Socket(Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3inch is at the manufacturer's option.

CLASS 300 FLANGES

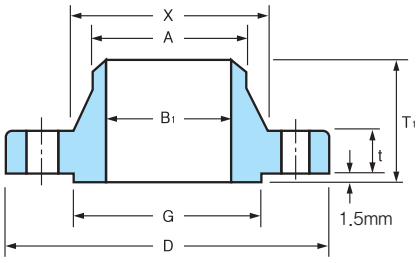




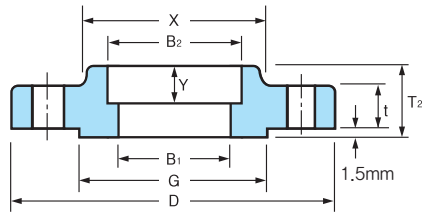




SLIP-ON



WELDING NECK



SOCKET WELDING

ASME B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	Thick-ness Lap Joint	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
						Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Min. Thread Counter Bore	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	t	B_1	B_2	B_3	B	T_1	T_2	T_3	A	R	Q
1/2	95	38	35.1	12.7	14.2	15.8	22.4	22.9	23.6	52.5	22.5	22	21.3	3	16
3/4	117	48	42.9	14.2	15.7	21.0	27.7	28.2	29.0	57.5	25.5	25	26.7	3	16
1	124	54	50.8	15.7	17.5	26.6	34.5	35.1	35.8	61.5	26.5	27	33.5	3	18
1 1/4	133	64	63.5	17.5	19.0	35.1	43.2	43.7	44.4	65.5	26.5	27	42.2	5	21
1 1/2	155	70	73.0	19.0	20.6	40.9	49.5	50.0	50.3	68.5	30.5	30	48.3	6	22
2	165	84	91.9	20.6	22.4	52.5	62.0	62.5	63.5	69.5	33.5	33	60.5	8	28
2 1/2	190	100	104.6	23.9	25.4	62.7	74.7	75.4	76.2	76.5	38.5	38	73.2	8	32
3	210	117	127.0	26.9	28.4	77.9	90.7	91.4	92.2	79.5	42.5	43	88.9	10	32
3 1/2	229	133	139.7	28.4	30.2	90.1	103.4	104.1	104.9	81.5	44.5	44	101.6	10	37
4	254	146	157.2	30.2	31.8	102.3	116.1	116.8	117.6	85.5	47.5	48	114.3	11	37
5	279	178	185.7	33.3	35.1	128.2	143.8	144.5	144.5	98.5	50.5	51	141.2	11	43
6	318	206	215.9	35.1	36.6	154.1	170.7	171.4	171.4	98.5	52.5	52	168.4	13	46
8	381	260	269.7	39.6	41.1	202.7	221.5	222.2	222.2	111.5	61.5	62	219.2	13	51
10	444	321	323.8	46.0	47.8	254.5	276.4	277.4	276.4	117.5	66.5	95	273.0	13	56
12	521	375	381.0	49.3	50.8	304.7	327.2	328.2	328.7	130.5	73.5	102	323.8	13	60
14	584	425	412.8	52.3	53.8	336.5	359.2	360.2	360.4	142.5	76.5	111	355.6	13	64
16	648	483	469.9	55.6	57.2	387.3	410.5	411.2	411.2	146.5	82.5	121	406.4	13	68
18	711	533	533.4	58.7	60.5	437.9	461.8	462.3	462.0	158.5	88.5	130	457.2	13	70
20	775	587	584.2	62.0	63.5	488.9	513.1	514.4	512.8	162.5	95.5	140	508.0	13	73
22	838	641	641.4	65.0	66.5	539.9	564.4	565.2	–	165.5	101.5	145	558.8	13	–
24	914	702	692.2	68.3	69.9	590.9	616.0	616.0	614.4	168.5	106.5	152	609.6	13	83

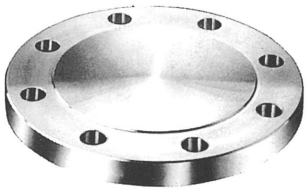
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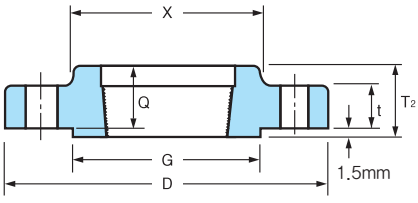
(1) For the 'Bore'(B1) other than Standard Wall Thickness, refer to page 62.

(2) For Slip-on, Threaded, Socket welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

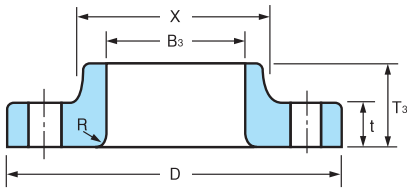




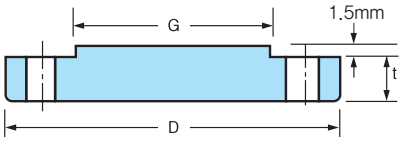




THREADED



LAP JOINT



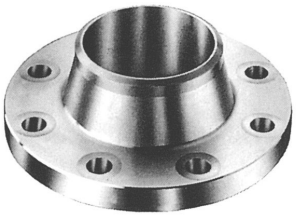
BLIND

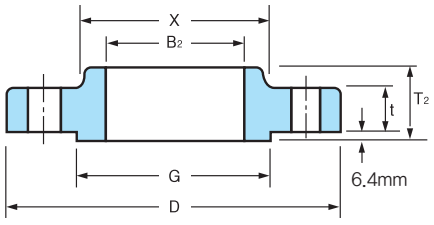
Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT				
		Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	Machine Bolt Length	Stud Bolt Length		Welding Neck	Slip–on and Threaded	Lap Joint	Blind	Socket Welding
	Y					Raised Face	Raised Face	Ring Joint	kg	kg	kg	kg	kg
1/2	10	66.5	4	15.9	1/2	55	65	75	0.78	0.64	0.63	0.64	0.66
3/4	11	82.6	4	19.1	5/8	65	75	90	1.32	1.11	1.09	1.09	1.13
1	13	88.9	4	19.1	5/8	65	75	90	1.65	1.34	1.33	1.37	1.38
1 1/4	14	98.6	4	19.1	5/8	70	85	95	2.13	1.67	1.65	1.79	1.72
1 1/2	16	114.3	4	22.2	3/4	75	90	100	2.99	2.47	2.43	2.63	2.54
2	17	127.0	8	19.1	5/8	75	90	100	3.55	2.87	2.80	3.16	2.98
2 1/2	19	149.4	8	22.2	3/4	85	100	115	5.40	4.32	4.23	4.84	4.52
3	21	168.1	8	22.2	3/4	90	110	120	7.23	5.84	5.75	6.81	6.13
3 1/2	–	184.2	8	22.2	3/4	95	110	125	9.04	7.33	7.17	8.67	–
4	–	200.2	8	22.2	3/4	95	115	125	11.69	9.63	9.50	11.50	–
5	–	235.0	8	22.2	3/4	110	120	135	15.64	12.11	11.94	15.48	–
6	–	269.7	12	22.2	3/4	110	120	140	20.11	15.76	15.48	21.02	–
8	–	330.2	12	25.4	7/8	120	140	150	31.06	24.11	23.83	34.21	–
10	–	387.4	16	28.6	1	140	160	170	44.54	33.90	37.95	53.14	–
12	–	450.8	16	31.8	1 1/8	145	170	185	64.51	50.07	55.21	78.89	–
14	–	514.4	20	31.8	1 1/8	160	180	190	89.47	69.42	79.52	104.97	–
16	–	571.5	20	34.9	1 1/4	165	190	205	111.90	88.41	102.83	137.56	–
18	–	628.6	24	34.9	1 1/4	170	195	210	136.98	108.15	125.11	174.91	–
20	–	685.8	24	34.9	1 1/4	185	205	220	165.93	134.47	154.91	221.46	–
22	–	743.0	24	41.3	1 1/2	205	230	255	191.99	158.06	181.16	268.69	–
24	–	812.8	24	41.3	1 1/2	205	230	255	239.13	201.22	232.01	338.80	–

(3) Blind Flanges may be made with the same hub as that used for Slip–on Flanges or without hub.
(4) The gasket surface and backside(bearing surface for bolting)are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP–9, without reducing thickness (t).
(5) Depth of Socket(Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3inch is at the manufacturer's option.

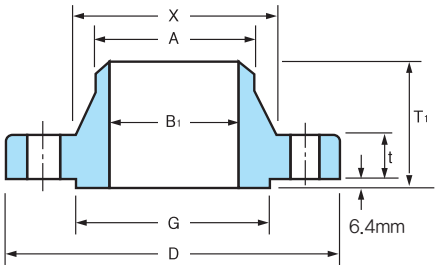
CLASS 400 FLANGES







SLIP–ON



WELDING NECK

ASME B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick–ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel
					Welding Neck Socket Welding	Slip–on	Lap Joint	Counter Bore Min. Thread Min.	Welding Neck	Slip–on Threaded Socket Welding	Lap Joint	
	D	X	G	t	B_1	B_2	B_3	B	T_1	T_2	T_3	A
1/2	95	38	35.1	14.2	15.8	22.4	22.9	23.6	58.4	28.4	22	21.3
3/4	117	48	42.9	15.7	21.0	27.7	28.2	29.0	63.4	31.4	25	26.7
1	124	54	50.8	17.5	26.6	34.5	35.1	35.8	68.4	33.4	27	33.5
1 1/4	133	64	63.5	20.6	35.1	43.2	43.7	44.4	73.4	34.4	28	42.2
1 1/2	155	70	73.0	22.4	40.9	49.5	50.0	50.5	76.4	38.4	32	48.3
2	165	84	91.9	25.4	52.5	62.0	62.5	63.5	79.4	43.4	37	60.5
2 1/2	190	100	104.6	28.4	62.7	74.7	75.4	76.2	85.4	47.4	41	73.2
3	210	117	127.0	31.8	77.9	90.7	91.4	92.2	89.4	52.4	46	88.9
3 1/2	229	133	139.7	35.1	90.1	103.4	104.1	104.9	92.4	55.4	49	101.6
4	254	146	157.2	35.1	102.3	116.1	116.8	117.6	95.4	57.4	51	114.3
5	279	178	185.7	38.1	128.2	143.8	144.5	144.5	108.4	60.4	54	141.2
6	318	206	215.9	41.1	154.1	170.7	171.4	171.4	109.4	63.4	57	168.4
8	381	260	269.7	47.8	202.7	221.5	222.2	222.2	123.4	74.4	68	219.2
10	444	321	323.8	53.8	254.5	276.4	277.4	276.4	130.4	79.4	102	273.0
12	521	375	381.0	57.2	304.7	327.2	328.2	328.7	143.4	85.4	108	323.8
14	584	425	412.8	60.5	336.5	359.2	360.2	360.4	155.4	90.4	117	355.6
16	648	483	469.9	63.5	387.3	410.5	411.2	411.2	158.4	100.4	127	406.4
18	711	533	533.4	66.5	437.9	461.8	462.3	462.0	171.4	105.4	137	457.2
20	775	587	584.2	69.8	488.9	513.1	514.4	512.8	174.4	108.4	146	508.0
22	838	641	641.4	73.2	539.9	564.4	565.2	–	177.4	114.4	152	558.8
24	914	702	692.2	76.2	590.9	616.0	616.0	614.4	181.4	120.4	159	609.6

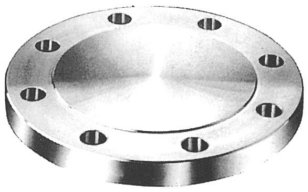
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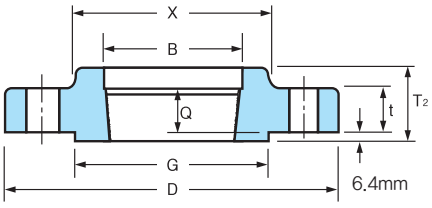
(1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 62.

(2) For Slip–on, Threaded and Lap Joint Flanges the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

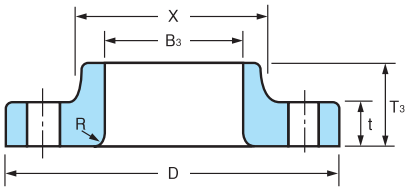




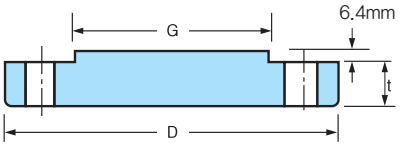




THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Radius of Fillet	Thread Length	DRILLING			BOLTING				APPROXIMATE WEIGHT			
						Stud Bolt Length							
			Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	0.25" Raised Face	Male–Female Tongue–Groove	Ring Joint	Welding Neck	Slip–on and Threaded	Lap Joint	Blind
	R	Q								kg	kg	kg	kg
1/2	3	16	66.5	4	15.9	1/2	75	70	75	0.88	0.73	0.70	0.75
3/4	3	16	82.6	4	19.1	5/8	90	85	90	1.47	1.24	1.19	1.26
1	3	18	88.9	4	19.1	5/8	90	85	90	1.86	1.53	1.47	1.60
1 1/4	5	21	98.6	4	19.1	5/8	95	90	95	2.50	2.01	1.92	2.22
1 1/2	6	22	114.3	4	22.2	3/4	110	100	110	3.53	2.96	2.84	3.25
2	8	28	127.0	8	19.1	5/8	110	100	110	4.36	3.61	3.42	4.14
2 1/2	8	32	149.4	8	22.2	3/4	120	115	120	6.38	5.21	4.97	6.06
3	10	35	168.1	8	22.2	3/4	125	120	125	8.57	7.05	6.70	8.51
3 1/2	10	40	184.2	8	25.4	7/8	140	135	140	10.77	8.86	8.47	11.00
4	11	37	200.2	8	25.4	7/8	140	135	140	13.37	11.13	10.64	13.81
5	11	43	235.0	8	25.4	7/8	145	135	145	17.61	13.83	13.22	18.42
6	13	46	269.7	12	25.4	7/8	150	145	150	22.98	18.26	17.49	25.49
8	13	51	330.2	12	28.6	1	170	165	170	36.15	28.66	27.59	42.74
10	13	56	387.4	16	31.8	1 1/8	190	185	190	50.49	38.94	42.23	64.13
12	13	60	450.8	16	34.9	1 1/4	205	195	205	72.85	57.08	61.14	94.53
14	13	64	514.4	20	34.9	1 1/4	210	205	210	100.09	79.07	87.41	124.79
16	13	68	571.5	20	38.1	1 3/8	220	215	220	123.89	101.25	111.91	161.66
18	13	70	628.6	24	38.1	1 3/8	230	220	230	151.22	122.48	135.87	204.10
20	13	73	685.8	24	41.3	1 1/2	240	235	250	179.66	146.70	164.47	254.20
22	13	–	743.0	24	44.5	1 5/8	255	250	260	210.80	175.10	195.63	311.55
24	13	83	812.8	24	47.6	1 3/4	265	260	280	258.47	218.89	246.39	385.63

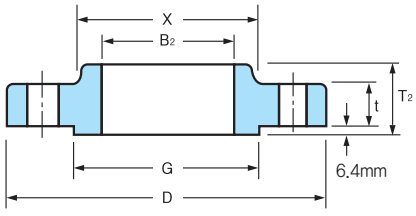
(3) Blind Flanges may be made with the same hub as that used for Slip–on Flanges or without hub.
(4) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP–9, without reducing thickness (t).
(5) Dimensions of sizes 1/2″ through 3 1/2″ are the same as for Class 600 Flanges

CLASS 600 FLANGES

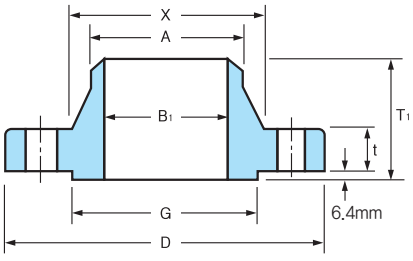




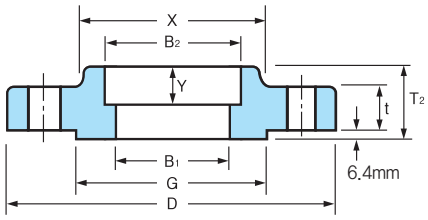




SLIP-ON



WELDING NECK



SOCKET WELDING

ASME B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Counter Bore Min. Thread Min.	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	B_1	B_2	B_3	B	T_1	T_2	T_3	A	R	Q
1/2	95	38	35.1	14.2	15.8	22.4	22.9	23.6	58.4	28.4	22	21.3	3	16
3/4	117	48	42.9	15.7	21.0	27.7	28.2	29.0	63.4	31.4	25	26.7	3	16
1	124	54	50.8	17.5	26.6	34.5	35.1	35.8	68.4	33.4	27	33.5	3	18
1 1/4	133	64	63.5	20.6	35.1	43.2	43.7	44.4	73.4	34.4	28	42.2	5	21
1 1/2	155	70	73.0	22.4	40.9	49.5	50.0	50.5	76.4	38.4	32	48.3	6	22
2	165	84	91.9	25.4	52.5	62.0	62.5	63.5	79.4	43.4	37	60.5	8	28
2 1/2	190	100	104.6	28.4	62.7	74.7	75.4	76.2	85.4	47.4	41	73.2	8	32
3	210	117	127.0	31.8	77.9	90.7	91.4	92.2	89.4	52.4	46	88.9	10	35
3 1/2	229	133	139.7	35.1	90.1	103.4	104.1	104.9	92.4	55.4	49	101.6	10	40
4	273	152	157.2	38.1	102.3	116.1	116.8	117.6	108.4	60.4	54	114.3	11	41
5	330	189	185.7	44.4	128.2	143.8	144.5	144.5	120.4	66.4	60	141.2	11	48
6	356	222	215.9	47.8	154.1	170.7	171.4	171.4	123.4	73.4	67	168.4	13	51
8	419	273	269.7	55.6	202.7	221.5	222.2	222.2	139.4	82.4	76	219.2	13	57
10	508	343	323.8	63.5	254.5	276.2	277.4	276.4	158.4	92.4	111	273.0	13	65
12	559	400	381.0	66.5	304.7	327.0	328.2	328.7	161.4	98.4	117	323.8	13	70
14	603	432	412.8	69.8	336.5	359.2	360.2	360.4	171.4	100.4	127	355.6	13	73
16	686	495	469.9	76.2	387.3	410.5	411.2	411.2	184.4	112.4	140	406.4	13	78
18	743	546	533.4	82.6	437.9	461.8	462.3	462.0	190.4	123.4	152	457.2	13	79
20	813	610	584.2	88.9	488.9	513.1	514.4	512.8	196.4	133.4	165	508.0	13	83
22	870	663	641.4	95.2	539.8	564.4	565.2	–	203.4	139.4	175	558.8	13	–
24	940	718	692.2	101.6	590.9	616.0	616.0	614.4	209.4	146.4	184	609.6	13	92

Notes:

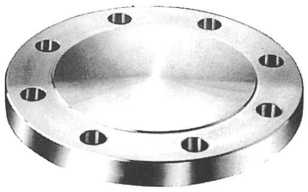
(1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 62.

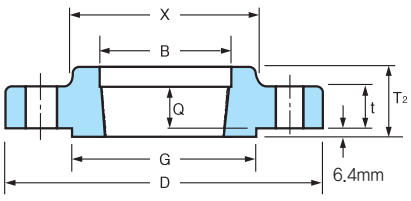
(2) For Slip-on, Threaded, and Lap Joint and Socket Welding Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

(3) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

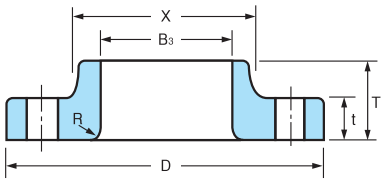




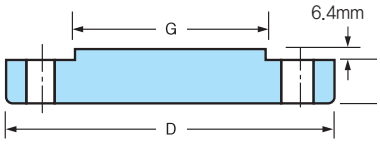




THREADED



LAP JOINT



BLIND

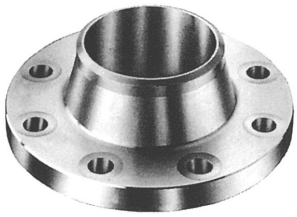
Unit : mm

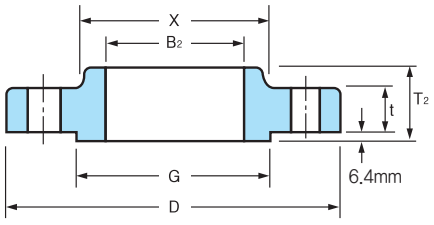
Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT				
					Diam of Bolts (inch)	Stud Bolt Length			Welding Neck	Slip–on and Threaded	Lap Joint	Blind	Socket Welding
		Bolt Circle Diam	Number of Holes	Diam of Holes		0.25" Raised Face	Male–Female Tongue–Groove	Ring Joint					
	Y								kg	kg	kg	kg	kg
1/2	10	66.5	4	15.9	1/2	75	70	75	0.88	0.73	0.70	0.75	0.76
3/4	11	82.6	4	19.1	5/8	90	85	90	1.47	1.24	1.19	1.26	1.28
1	13	88.9	4	19.1	5/8	90	85	90	1.86	1.53	1.47	1.60	1.59
1 1/4	14	98.6	4	19.1	5/8	95	90	95	2.50	2.01	1.92	2.22	2.09
1 1/2	16	114.3	4	22.2	3/4	110	100	110	3.53	2.96	2.84	3.25	3.07
2	18	127.0	8	19.1	5/8	110	100	110	4.36	3.61	3.42	4.14	3.78
2 1/2	19	149.4	8	22.2	3/4	120	115	120	6.38	5.21	4.97	6.06	5.49
3	21	168.1	8	22.2	3/4	125	120	125	8.57	7.05	6.70	8.51	7.46
3 1/2	–	184.2	8	25.4	7/8	140	135	140	10.77	8.86	8.47	11.00	–
4	–	215.9	8	25.4	7/8	145	140	145	17.39	14.51	14.01	17.26	–
5	–	266.7	8	28.6	1	165	160	165	29.11	24.34	23.72	29.37	–
6	–	292.1	12	28.6	1	170	165	170	34.77	28.93	28.14	36.28	–
8	–	349.2	12	31.8	1 1/8	190	185	195	52.80	43.32	42.24	58.86	–
10	–	431.8	16	34.9	1 1/4	215	210	215	86.67	70.37	75.16	97.49	–
12	–	489.0	20	34.9	1 1/4	220	215	220	103.67	84.10	90.20	123.79	–
14	–	527.0	20	38.1	1 3/8	235	230	235	122.87	98.63	108.15	150.63	–
16	–	603.2	20	41.3	1 1/2	255	250	255	171.87	141.94	155.42	213.66	–
18	–	654.0	20	44.5	1 5/8	275	265	275	205.52	173.08	188.14	272.06	–
20	–	723.9	24	44.5	1 5/8	285	280	290	256.53	220.46	241.51	349.52	–
22	–	777.7	24	47.6	1 3/4	305	–	310	298.95	257.11	283.79	428.36	–
24	–	838.2	24	50.8	1 7/8	330	325	335	359.94	312.99	345.95	533.33	–

(4) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP–9, without reducing thickness (t).
(5) Dimensions of sizes **1/2″** through **3 1/2″** are the same as for Class 400 Flanges
(6) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer' s option.

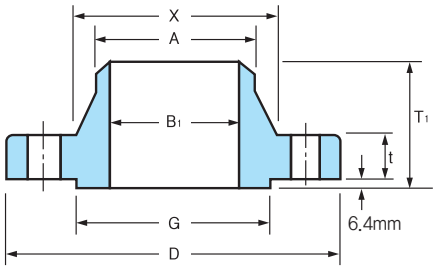
CLASS 900 FLANGES







SLIP–ON



WELDING NECK

ASME B16.5 FORGED FLANGES

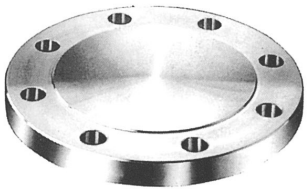
Unit : mm

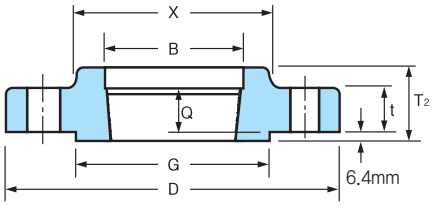
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick–ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel
					Welding Neck Socket Welding	Slip–on	Lap Joint	Counter Bore Min. Thread Min.	Welding Neck	Slip–on Threaded	Lap Joint	
	D	X	G	t	B_1	B_2	B_3	B	T_1	T_2	T_3	A
1/2	121	38	35.1	22.4	15.8	22.4	22.9	23.6	66.4	38.4	32	21.3
3/4	130	44	42.9	25.4	21.0	27.7	28.2	29.0	76.4	41.4	35	26.7
1	149	52	50.8	28.4	26.6	34.5	35.4	35.8	79.4	47.4	41	33.5
1 1/4	159	64	63.5	28.4	35.1	43.2	43.7	44.4	79.4	47.4	41	42.2
1 1/2	178	70	73.0	31.8	40.9	49.5	50.0	50.5	89.4	50.4	44	48.3
2	216	105	91.9	38.1	52.5	62.0	62.5	63.5	108.4	63.4	57	60.5
2 1/2	244	124	104.6	41.1	62.7	74.7	75.4	76.2	111.4	70.4	64	73.2
3	241	127	127.0	38.1	77.9	90.7	91.4	92.2	108.4	60.4	54	88.9
4	292	159	157.2	44.5	102.3	116.1	116.8	117.6	120.4	76.4	70	114.3
5	349	190	185.7	50.8	128.2	143.8	144.5	144.5	133.4	85.4	79	141.2
6	381	235	215.9	55.6	154.1	170.7	171.4	171.4	146.4	92.4	86	168.4
8	470	298	269.7	63.5	202.7	221.5	222.2	222.2	168.4	108.4	114	219.2
10	546	368	323.8	69.8	254.5	276.4	277.4	276.4	190.4	114.4	127	273.0
12	610	419	381.0	79.2	304.7	327.2	328.2	328.7	206.4	123.4	143	323.8
14	641	451	412.8	85.9	336.5	359.2	360.2	360.4	219.4	136.4	155	355.6
16	705	508	469.9	88.9	387.3	410.5	411.2	411.2	222.4	139.4	165	406.4
18	787	565	533.4	101.6	437.9	461.8	462.3	462.0	235.4	158.4	190	457.2
20	857	622	584.2	108.0	488.8	513.1	514.4	512.8	254.4	165.4	210	508.0
24	1041	749	692.2	139.7	590.9	616.0	616.0	614.4	298.4	209.4	267	609.6

Notes:
(1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 62.
(2) For Slip–on, Threaded, Lap Joint Flanges the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

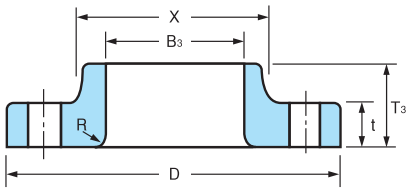




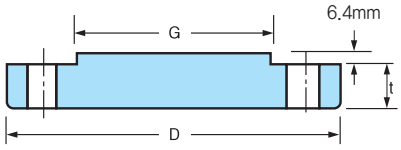




THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Radius of Fillet	Thread Length	DRILLING			BOLTING				APPROXIMATE WEIGHT			
			Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	Stud Bolt Length			Welding Neck	Slip-on and Threaded	Lap Joint	Blind
							0.25" Raised Face	Male-Female Tongue-Groove	Ring Joint				
	R	Q								kg	kg	kg	kg
1/2	3	22	82.6	4	22.2	3/4	110	100	110	1.92	1.76	1.73	1.80
3/4	3	25	88.9	4	22.2	3/4	115	110	115	2.57	2.33	2.28	2.41
1	3	28	101.6	4	25.4	7/8	125	120	125	3.72	3.40	3.33	3.54
1 1/4	5	30	111.1	4	25.4	7/8	125	120	125	4.34	3.90	3.81	4.13
1 1/2	6	32	124.0	4	28.6	1	140	135	140	6.00	5.39	5.26	5.78
2	8	38	165.1	8	25.4	7/8	145	140	145	11.13	9.86	9.65	10.08
2 1/2	8	48	190.5	8	28.6	1	160	150	160	15.24	13.60	13.39	13.85
3	10	41	190.5	8	25.4	7/8	145	140	145	13.74	11.58	11.23	13.06
4	11	48	235.0	8	31.8	1 1/8	170	165	170	22.58	19.76	19.25	22.14
5	11	54	279.4	8	34.9	1 1/4	190	185	190	36.08	31.83	31.19	36.44
6	13	57	317.5	12	31.8	1 1/8	190	185	195	47.73	41.17	40.35	47.42
8	13	64	393.7	12	38.1	1 3/8	220	215	220	81.39	70.79	72.57	82.49
10	13	71	469.9	16	38.1	1 3/8	235	230	235	120.25	100.39	105.75	122.37
12	13	76	533.4	20	38.1	1 3/8	255	250	255	159.44	132.64	141.54	173.16
14	13	83	558.8	20	41.3	1 1/2	275	265	280	182.24	152.98	162.12	206.16
16	13	86	616.0	20	44.5	1 5/8	285	280	290	219.46	184.67	199.68	259.29
18	13	89	685.8	20	50.8	1 7/8	325	320	335	295.88	257.67	279.13	366.68
20	13	92	749.3	20	54.0	2	350	345	360	367.08	316.69	350.73	463.44
24	13	102	901.7	20	66.7	2 1/2	440	430	455	670.79	604.39	672.06	875.20

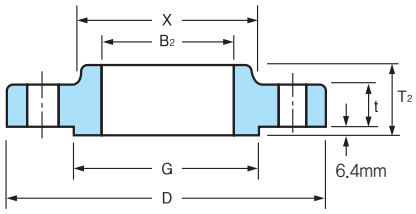
(3) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
(4) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
(5) Dimensions of sizes **1/2″** through **2 1/2″** are the same as for Class 1500 Flanges

CLASS 1500 FLANGES

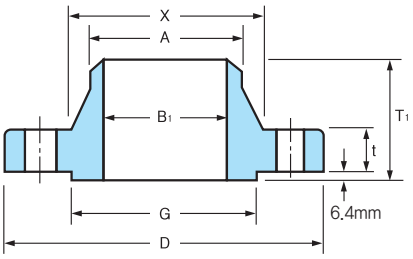




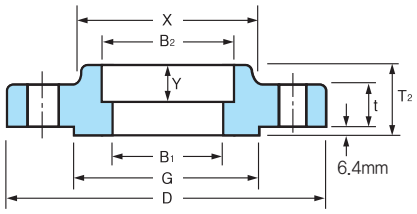




SLIP-ON



WELDING NECK



SOCKET WELDING

ASME B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Counter Bore Min. Thread Min.	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	B_1	B_2	B_3	B	T_1	T_2	T_3	A	R	Q
1/2	121	38	35.1	22.4	15.8	22.4	22.9	23.6	66.4	38.4	32	21.3	3	22
3/4	130	44	42.9	25.4	21.0	27.7	28.2	29.0	76.4	41.4	35	26.7	3	25
1	149	52	50.8	28.4	26.6	34.5	35.4	35.8	79.4	47.4	41	33.5	3	28
1 1/4	159	64	63.5	28.4	35.1	43.2	43.7	44.4	79.4	47.4	41	42.2	5	30
1 1/2	178	70	73.0	31.8	40.9	49.5	50.0	50.5	89.4	50.4	44	48.3	6	32
2	216	105	91.9	38.1	52.5	62.0	62.5	63.5	108.4	63.4	57	60.5	8	38
2 1/2	244	124	104.6	41.1	62.7	74.7	75.4	76.2	111.4	70.4	64	73.2	8	48
3	267	133	127.0	47.8	77.9	–	91.4	–	123.4	–	73	88.9	10	–
4	311	162	157.2	53.8	102.3	–	116.8	–	130.4	–	90	114.3	11	–
5	375	197	185.7	73.2	128.2	–	144.5	–	161.4	–	105	141.2	11	–
6	394	229	215.9	82.6	154.1	–	171.4	–	177.4	–	119	168.4	13	–
8	483	292	269.7	91.9	202.7	–	222.2	–	219.4	–	143	219.2	13	–
10	584	368	323.8	108.0	254.5	–	277.4	–	260.4	–	178	273.0	13	–
12	673	451	381.0	124.0	304.7	–	328.2	–	288.4	–	219	323.8	13	–
14	749	495	412.8	133.4	336.5	–	360.2	–	304.4	–	241	355.6	13	–
16	826	552	469.9	146.0	387.3	–	411.2	–	317.4	–	260	406.4	13	–
18	914	597	533.4	162.1	437.9	–	462.3	–	333.4	–	276	457.2	13	–
20	984	641	584.2	177.8	488.9	–	514.4	–	362.4	–	292	508.0	13	–
24	1168	762	692.2	203.2	590.9	–	616.0	–	412.4	–	330	609.6	13	–

Notes:

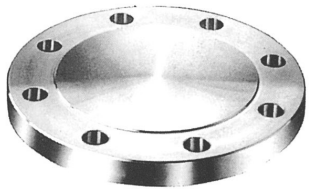
(1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 62.

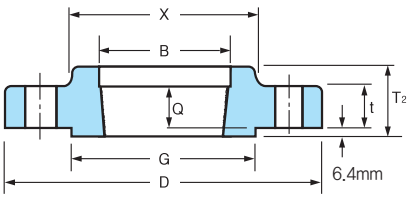
(2) For Slip-on, Threaded, and Lap Joint and Socket Welding Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

(3) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

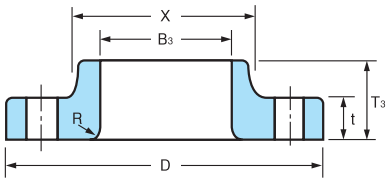




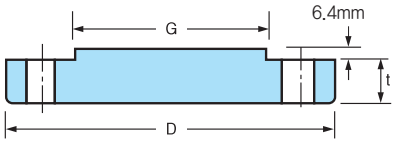




THREADED



LAP JOINT

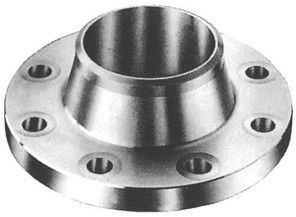


BLIND

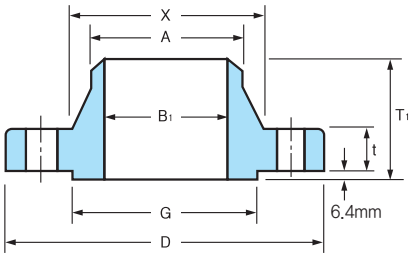
Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT				
						Stud Bolt Length							
		Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	0.25″ Raised Face	Male–Female Tongue–Groove	Ring Joint	Welding Neck	Slip–on and Threaded	Lap Joint	Blind	Socket Welding
	Y								kg	kg	kg	kg	kg
1/2	10	82.6	4	22.2	3/4	110	100	110	1.92	1.76	1.73	1.80	1.81
3/4	11	88.9	4	22.2	3/4	115	110	115	2.57	2.33	2.28	2.41	2.39
1	13	101.6	4	25.4	7/8	125	120	125	3.72	3.40	3.33	3.54	3.50
1 1/4	14	111.1	4	25.4	7/8	125	120	125	4.34	3.90	3.81	4.13	4.04
1 1/2	16	124.0	4	28.6	1	140	135	140	6.00	5.39	5.26	5.78	5.55
2	18	165.1	8	25.4	7/8	145	140	145	11.13	9.86	9.65	10.08	10.16
2 1/2	19	190.5	8	28.6	1	160	150	160	15.24	13.60	13.35	13.85	14.12
3	–	203.2	8	31.8	1 1/8	180	170	180	20.09	–	17.60	19.25	–
4	–	241.3	8	34.9	1 1/4	195	190	195	29.90	–	27.12	29.81	–
5	–	292.1	8	41.3	1 1/2	250	240	250	57.10	–	51.37	58.64	–
6	–	317.5	12	38.1	1 3/8	260	255	265	68.04	–	60.37	71.99	–
8	–	393.7	12	44.5	1 5/8	290	285	300	115.72	–	102.00	121.53	–
10	–	482.6	12	50.8	1 7/8	335	330	345	201.02	–	180.38	210.51	–
12	–	571.5	16	54.0	2	375	370	385	301.23	–	284.15	316.17	–
14	–	635.0	16	60.3	2 1/4	405	400	425	396.06	–	383.13	420.06	–
16	–	704.8	16	66.7	2 1/2	445	440	470	503.99	–	492.94	558.50	–
18	–	774.7	16	73.0	2 3/4	495	490	525	653.85	–	635.97	760.53	–
20	–	831.8	16	79.4	3	540	535	565	797.31	–	763.37	963.81	–
24	–	990.6	16	92.1	3 1/2	615	610	650	1,264.88	–	1,220.36	1,557.19	–

(4) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP–9, without reducing thickness (t).
(5) Dimensions of sizes **1/2**″ through 2**1/2**″ are the same as for Class 900 Flanges
(6) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 2**1/2**″ inch ,over 2**1/2**″ inch is at the manufacturer's option.

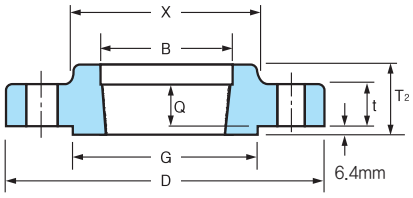
CLASS 2500 FLANGES







WELDING NECK



THREADED

ASME B16.5 FORGED FLANGES

Unit : mm

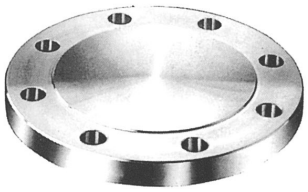
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE			LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Lap Joint	Counter Bore Min. Thread Min.	Welding Neck	Threaded	Lap Joint			
	D	X	G	t	B_1	B_3	B	T_1	T_2	T_3	A	R	Q
1/2	133	43	35.1	30.2	15.8	22.9	23.6	79.4	46.4	40	21.3	3	28
3/4	140	51	42.9	31.8	21.0	28.2	29.0	85.4	49.4	43	26.7	3	32
1	159	57	50.8	35.1	26.6	35.1	35.8	95.4	54.4	48	33.5	3	35
1 1/4	184	73	63.5	38.1	35.1	43.7	44.4	101.4	58.4	52	42.2	5	38
1 1/2	203	79	73.0	44.4	40.9	50.0	50.5	117.4	66.4	60	48.3	6	44
2	235	95	91.9	50.8	52.5	62.5	63.5	133.4	76.4	70	60.5	8	51
2 1/2	267	114	104.6	57.2	62.7	75.4	76.2	149.4	85.4	79	73.2	8	57
3	305	133	127.0	66.5	77.9	91.4	–	174.4	–	92	88.9	10	–
4	356	165	157.2	76.2	102.3	116.8	–	196.4	–	108	114.3	11	–
5	419	203	185.7	91.9	128.2	144.5	–	235.4	–	130	141.2	11	–
6	483	235	215.9	108.0	154.1	171.4	–	279.4	–	152	168.4	13	–
8	552	305	269.7	127.0	202.7	222.2	–	324.4	–	178	219.2	13	–
10	673	375	323.8	165.1	254.5	277.4	–	425.4	–	229	273.0	13	–
12	762	441	381.0	184.2	304.7	328.2	–	470.4	–	254	323.8	13	–

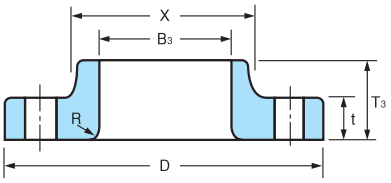
Notes:

(1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 62.

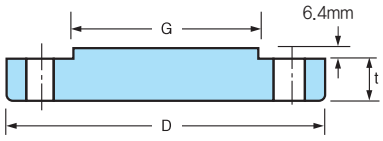
(2) For Slip-on, Threaded and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.







LAP JOINT



BLIND

Nominal Pipe Size	DRILLING			BOLTING				APPROXIMATE WEIGHT			
				Stud Bolt Length							
	Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	0.25˝ Raised Face	Male–Female Tongue–Groove	Ring Joint	Welding Neck	Slip–on and Threaded	Lap Joint	Blind
								kg	kg	kg	kg
1/2	88.9	4	22.2	3/4	120	115	120	3.16	2.94	2.90	2.97
3/4	95.2	4	22.2	3/4	125	120	125	3.78	3.46	3.41	3.53
1	108.0	4	25.4	7/8	140	135	140	5.32	4.86	4.79	5.01
1 1/4	130.0	4	28.6	1	150	145	150	7.82	7.11	7.01	7.34
1 1/2	146.0	4	31.8	1 1/8	170	165	170	10.93	9.96	9.83	10.38
2	171.4	8	28.6	1	180	170	180	16.28	14.80	14.57	15.57
2 1/2	196.8	8	31.8	1 1/8	195	190	205	23.94	21.46	21.20	22.71
3	228.6	8	34.9	1 1/4	220	215	230	36.25	–	–	34.76
4	273.0	8	41.3	1 1/2	255	250	260	55.54	–	–	54.08
5	323.8	8	47.6	1 3/4	300	290	310	92.51	–	–	90.52
6	368.3	8	54.0	2	345	335	355	143.18	–	–	141.57
8	438.2	12	54.0	2	380	375	395	214.83	–	–	213.95
10	539.8	12	66.7	2 1/2	490	485	510	409.15	–	–	410.62
12	619.3	12	73.0	2 3/4	540	535	560	581.15	–	–	592.22

(3) Blind Flanges may be made with the same hub as that used for Slip–on Flanges or without hub.
(4) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP–9, without reducing thickness (t).
(5) Class 2500 Slip–on Flanges are not covered by ASME B16.5, slip–on flanges are at the manufacturer's option.

MATERIAL SPECIFICATIONS

APPLICABLE ASTM SPECIFICATIONS

Nominal Group No.	GROUP 1 MATERIALS		PRODUCT FORMS	
	Nominal Designation Steel	Forgings	Castings	Plates
		Spec.–Gr. Notes	Spec.–Gr. Notes	Spec.–Gr. Notes
1.1	Carbon	A105 (1)(3)	A216–WCB (1)	A515.70 (1)
		A350–LF2		A516.70 (1)
	C–Min Si			A537. C1.1
1.2	Carbon		A216–WCC (1)	
			A352–LCC	
	2 1/2 Ni		A352–LC2	A203–B
	3 1/2 Ni	A350–LF3	A352–LC3	A302–E
1.3	Carbon		A352–LCB (1)	A203–A
				A203–D
				A515–65
				A516–65
1.4	Carbon			A515–60 (1)
		A350–LF1		A515–60
1.5	C–1/2 Mo	A182–F1 (2)	A217–WC1 (2)(4)	A204–A (2)
			A352–LC1	A204–B (2)
1.7	C–1/2 Mo			A204–C (2)
	1/2Cr–1/2 Mo	A182–F2		
	Ni–Cr–1/2 Mo		A217–WC4 (4)	
	Ni–Cr–1 Mo		A217–WC5 (4)	
1.9	1 Cr–1/2 Mo	A182–F12 (4)		
	1 1/4Cr–1/2 Mo	A182–F11 (4)	A217–WC6 (4)	A378–11 C1.2
1.10	2 1/4Cr–1 Mo	A182–F22	A217–WC9 (4)	A378–22 C1.2
1.13	5 Cr–1/2 Mo	A181–F5	A217–C5 (4)	
		A181–F5a		
1.14	9 Cr–1 Mo	A182–F9	A217–C12 (4)	

Nominal Group No.	GROUP 1 MATERIALS		PRODUCT FORMS	
2.1	18 Cr–8 Ni	A182–F304 (5)	A351–CF3	A240–304 (5)(6)
	18 Cr–8 Ni	A182–F304H	A351–CF8 (5)	A240–304H
2.2	16 Cr–12 Ni–2 Mo	A182–F316 (5)		A240–316 (5)(6)
		A182–F316H		A240–316H
	18 Cr–13 Ni–3 Mo		(1)	A240–317 (5)(6)
	18 Cr–9 Ni–2 Mo		A351–CF3M	
			A351–CF8M	
2.3	18Cr–8 Ni	A182–F304L		A240–304L
	16 Cr–12 Ni–2 Mo	A182–F316L		A240–316L
2.4	18 Cr–10 Ni–Ti	A182–F321 (5)		A240–321 (5)(6)
		A182–F321H		A240–321H
2.5	18 Cr–10 Ni–Cb	A182–F347 (5)	A351–CF8C	A240–347 (5)(6)
		A182–F347H		A240–347H
		A182–F348 (5)		A240–348 (5)(6)
		A182–F348H		A240–348H
2.6	25 Cr–12 Ni		A351–CH8 (5)	
			A351–CH20 (5)	
	23 Cr–12 Ni			A240–309S (5)(6)
2.7	25 Cr–12 Ni	A182–F310 (5)(9)	A351–CK20	A240–310S (5)(6)(7)

General Notes

a) For temperature limitations see footnotes in Tables 2 and in Annex G.
b) Plate materials are listed only for use as blind flanges(see 5.1). Additional plate materials listed in ANSI B16.34 may also be used, with corresponding B16.34 Standard Class ratings.
c) Material Groups not listed Table 1A are intended for use in valves. See ANSI B16.34

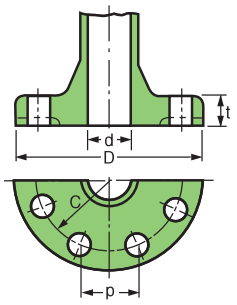
Notes

(1) Upon prolonged exposure to temperatures above about 800°F(425°C), the carbide phase of carbon steel may be converted to graphite.
(2) Upon prolonged exposure to temperatures above about 875°F(470°C), the carbide phase of carbon–molybdenum steel may be converted to graphite.
(3) Only killed steel shall be used above 850°F(455°C)
(4) Use normalized and tempered material only.
(5) At temperatures above 1000°F(540°C), use only when the carbon content is 0.04 percent or higher.
(6) For temperatures above 1000°F(540°C), use only if the material is heat treated by heating it to a temperature of at least 1900°F(1040°C)and equenching in water or rapidly cooling by other means.
(7) Service temperatures of 1050°F(565°C)and above should be used only when assurance is provided that grain size is not finer than ASTM No.6

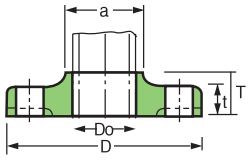
TOLERANCES

ASME B16.5-2020ED FORGED FLANGES

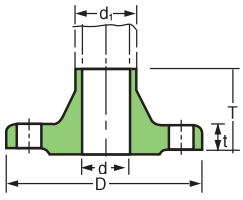
SOLID FLANGE



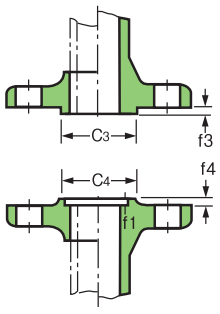
SLIP-ON FLANGE



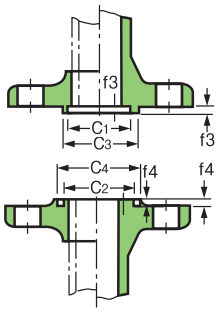
WELDING NECK FLANGE



TYPE OF GASKET SURFACE



MALE & FEMALE TYPE



TONGUE & GROOVE TYPE

THREAD, SOCKET-WELDING, SLIP-ON, LAP JOINT AND BLIND.

Place		Range	Tolerance (mm)
Outside Diameter		When O.D. is 24″ or Less	±1.6(±0.063in)
		When O.D. is Over 24″	±3.2*(±0.125in)
Inside Diameter	Counterbores Thread	When O.D. is 10" or Less	+1.0(+0.03in) −0.0(−0.0in)
		When O.D. is 12" and Over	+1.5(+0.06in) −0.09−0.0in)
	Counterbores Socket Welding	1/2≤NPS≤3	±0.25(±0.01in)
	Lap-Joint Slip-On Socket Welding	When O.D. is 10" or less	+1.0(+0.03in) −0.0(−0.0in)
		When O.D. is 12" and over	+1.5(+0.06in) −0.0(−0.0in)
Diameter of Contact Face		1.5mm Raised Face (Outside)	±1.0(0.03in)
		6.4mm Raised Face (Outside)	±0.5(±0.02in)
		Tongue, goove, female (Inside & Outside)	±0.5(±0.02in)
Diameter of Hub at Base		When Hub Base is 24"or Smaller	±1.6*(±0.063in)
		When Hub Base is Over 24"	±3.2*(±0.125in)
Drilling		Bolt Circle Diameter	±1.5(±0.06in)
		Bolt to Bolt Hole	±0.8(±0.03in)
		Diam. of Bolt Hole	±0.8*(±0.03in)
		Eccentricity of Bolt Circle with Respect to Facing	NPS≤2 1/2" ±0.8(0.03in) Max. NPS≤3" ±1.5(0.03in) Max
		Eccentricity of Bolt Circle with Respect to bore	0.8 Max.⋆ (0.03in)
		Eccentricity of Facing with Respect to Bore	0.8 Max.⋆ (0.03in)
Thickness		When O.D. is 18" or Less	+3.0(+0.12in) −0.0(−0.0in)
		When O.D. is 20" and Over	+5.0(+0.19in) −0.0(−0.0in)
Length Thru Hub		When O.D. is 4" or Less	±1.5(±0.06in)
		5" thru 10"	+1.5(+0.06in) −3.0(−0.12in)
		When O.D.is 12" and Over	+3.0(+0.12in) −5.0(−0.18in)

WELDING NECK

Place	Range	Tolerance (mm)
Outside Diameter	When O.D. is 24″ or Less	±1.6(±0.063in)
	When O.D. is Over 24″	±3.2*(±0.125in)
Inside Diameter	10″ and Smaller	±1.0(±0.03in)
	12″ thru 18″	±1.5(0.06in)
	20″ and Larger	+3.0(+0.12in) −1.5(−0.06in)
Diameter of Contact Face	1.5mm Raised Face (Outside)	±1.0(±0.03in)
	6.4mm Raised Face (Outside)	±0.5(±0.02in)
	Tongue, goove, femail (Inside & Outside)	±0.5(±0.02in)
Diameter of Hub at Base	When Hub Base is 24″ or Smaller	±1.6(0.063in)
	When Hub Base is Over 24″	±3.2*(0.125in)
Diameter of Hub at Point of Welding	When O.D. is 5″ or Less	+2.0(+0.09in) −1.0(−0.03in)
	When O.D. is 6″ and Over	+4.0(+0.16in) −1.0(0.03in)
Drilling	Bolt Circle Diameter	±1.5(±0.06in)
	Bolt to Bolt Hole	±0.8(±0.03in)
	Diam. of Bolt Hole	±0.8*(±0.03in)
	Eccentricity of Bolt Circle with Respect to Facing	NPS≤2 1/2" 0.8(0.03in) Max. NPS≤3" 1.5(0.06in) Max.
	Eccentricity of Bolt Circle with Respect to Bore	0.8 Max.*(0.03in)
	Eccentricity of Facing with Respect to Bore	0.8 Max.*(0.03in)
Thickness	When O.D. is 18" or Less	+3.0(+0.12in) −0.0(−0.0in)
	When O.D. is 20" and Over	+5.0(+0.19in) −0.0(−0.0in)
Length Thru Hub	When O.D. is 4" or Less	±1.5(±0.06in)
	When O.D. is 5" thru 10"	+1.5(0.06in) −3.0(−0.12in)
	When O.D.is 12" and Over	+3.0(+0.12in) −5.0(−0.18in)

Note: ⋆This tolerance is not covered in ANSI B16.5, but maker′s option.

TOLERANCES

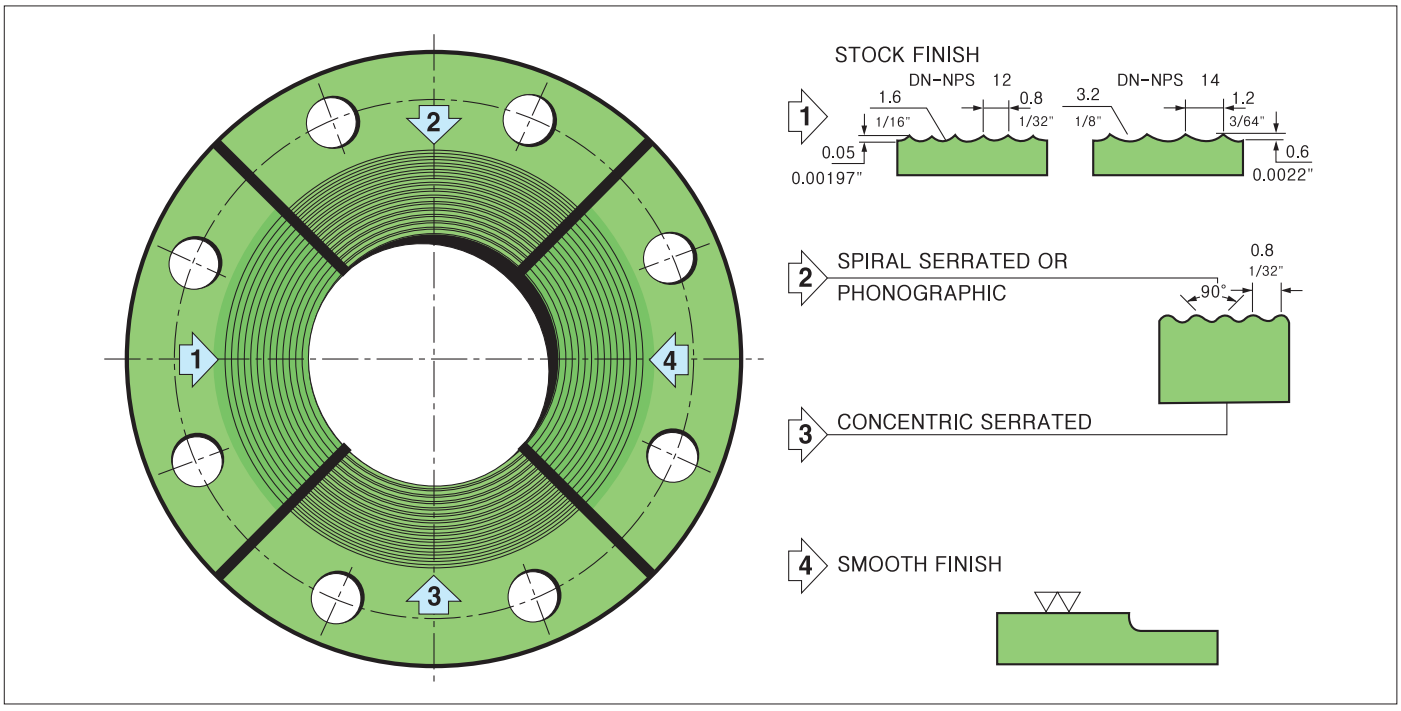
JPI-7S-15-84 FORGED FLANGES

Flange Section		Basic Size	Demensional Tolerance
Outside Diameter O		610mm & below over 610mm	±1.6 ±3.2
Inside Diameter	Slip-on & Lap Joint Bo	10B & below	+0.8, -0
		12B & over	±1.6, -0
	Socket-Welding Bo, B	½B ~ 2B 2½B ~3B	+0.3, -0 +0.4, -0
		½B ~ 2B 2½B ~3B	±0.4 ±0.8
	Welding-Neck B	10B & below	±0.8
		12B-18B	±1.6
		20B & over	±3.2 -0
Thickness O		18B & below	+3.2 -0
		20B & over	+4.8 -0
Bolt Circle Diameter C Bolt Hole Diameter		12B & below	±0.8
		14B & over	±1.0

Flange Section		Basic Size	Demensional Tolerance
Bolt Hole Pitch		24B & below	±0.5
Hub Diameter	Slip-on & Socket X1	12B & below	±1.6 -0.8
		14B & over	+3.2 -1.6
	Welding-Neck X	610B & below	±1.6
		610 & over	±3.2
	Welding-Neck H	5B & below	+2.4 -0.8
		6B & over	+4.0 -0.8
Hub Height Y	Slip-on & Socket Y1	18B & below	+3.2, -0.8
		20B & over	+4.8, -1.6
	Welding Neck Y	10B & below	±1.6
		12B & over	±3.2
Gasket Seat R		RFThickness 1.6mm RFThickness 0.4mm R	±0.8 ±0.5

STANDARD FINISH

STANDARD FINISHES for Face of Flange (ASME B16.5)



STOCK FINISH :
The most widely used of any gasket finish, because practically, is suitable for all ordinary service conditions. This is a continuous spiral groove. Flanges sizes 12″ (304.8mm) and smaller are produced with a 1/16″ round-nosed tool at a feed of 1/32″ per revolution. For sizes 14″ (355.6mm) and larger, the finish is made with 1/8″ round-nosed tool at a feed of 3/64″ per revolution.

SPIRAL SERRATED OR PHONOGRAPHIC :
This finish is produced by using a 90° round-nosed tool.

CONCENTRIC SERRATED :
This finish is produced by using a 90° round-nosed tool.

SMOOTH FINISH : T
he cutting tool employed shall have an approximate 0.06" radius.
The resultant surface finish shall have a 125μ inch to 250μ inch (ANSI B16.5 para 6.4.5)

COMPARISION FLANGE BORES OF WELDING NECK FLANGE FOR ANSI WITH JIS

NOMINAL PIPE SIZE	O.D		SCH10		SCH20		SCH30		STD	SCH40		SCH60		XS	SCH80		SCH100		SCH120		SCH140		SCH160		XXS
	JIS	ANSI	JIS	ANSI	JIS	ANSI	JIS	ANSI	ANSI	JIS	ANSI	JIS	ANSI	ANSI	JIS	ANSI	JIS	ANSI	JIS	ANSI	JIS	ANSI	JIS	ANSI	ANSI
1/2″	21.7	21.34	–	17.08	–	–	–	16.48	15.798	16.1	15.798	15.3	–	13.87	14.3	13.87	–	–	–	–	–	–	12.3	11.79	6.4
3/4″	27.2	26.67	–	22.48	–	–	–	21.88	20.929	21.4	20.929	20.4	–	18.85	19.4	18.85	–	–	–	–	–	–	16.2	15.54	11.02
1″	34.0	33.40	–	27.86	–	–	–	27.60	26.65	27.2	26.65	26.2	–	24.31	25.0	24.31	–	–	–	–	–	–	21.2	20.70	15.21
1 1/4″	42.7	42.16	–	36.66	–	–	–	36.26	35.05	35.5	35.05	33.7	–	32.46	32.9	32.46	–	–	–	–	–	–	29.9	29.46	22.76
1 1/2″	48.6	48.26	–	42.76	–	–	–	41.94	40.89	41.2	40.89	39.6	–	38.10	38.4	38.10	–	–	–	–	–	–	34.4	33.99	27.94
2″	60.5	60.33	–	54.76	54.1	–	–	53.94	52.5	52.7	52.50	50.7	–	49.25	49.5	49.25	–	–	–	–	–	–	43.1	42.85	38.18
2 1/2″	76.3	73.03	–	66.90	67.3	–	–	63.44	62.71	65.9	62.71	64.3	–	59.00	62.3	59.00	–	–	–	–	–	–	57.3	53.98	44.98
3″	89.1	88.90	–	82.80	80.1	–	–	79.34	77.93	78.1	77.93	75.9	–	73.66	73.9	73.66	–	–	–	–	–	–	66.9	66.65	58.42
3 1/2″	101.6	101.60	–	95.50	92.6	–	–	92.04	90.12	90.2	90.12	87.6	–	85.45	85.4	85.45	–	–	–	–	–	–	76.2	–	–
4″	114.3	114.30	–	108.20	104.5	–	–	104.74	102.26	102.3	102.26	100.1	–	97.18	97.1	97.18	–	–	92.1	92.05	–	–	87.3	87.33	80.10
5″	139.8	141.30	–	134.50	129.6	–	–	–	128.19	126.6	128.19	123.6	–	122.25	120.8	122.25	–	–	114.4	115.90	–	–	108.0	109.55	103.20
6″	165.2	168.28	–	161.50	154.2	–	–	–	154.1	151	154.1	146.6	–	146.33	143.2	146.33	–	–	136.6	139.73	–	–	128.8	131.7	124.38
8″	216.3	219.08	–	211.58	203.5	206.38	202.3	205.0	202.72	199.9	202.72	195.7	198.45	193.68	190.9	193.68	186.1	188.95	179.9	182.5	175.1	177.83	170.3	173.05	174.63
10″	267.4	273.05	–	264.62	254.5	260.35	251.7	257.45	254.51	248.7	254.51	242.0	247.65	247.65	237.2	242.93	230.9	236.58	224.5	230.23	216.6	222.25	210.2	215.90	222.20
12″	318.5	323.85	–	314.66	305.7	311.15	301.7	307.09	304.8	297.9	303.2	289.9	295.30	298.45	283.7	288.95	275.7	281.03	267.7	273.05	261.3	266.7	251.9	257.20	273.00
14″	355.6	355.60	342.8	342.9	339.8	339.80	336.6	336.6	336.6	333	333.35	325.4	325.48	330.2	317.6	317.50	308.0	308.0	300.0	300.08	292.0	292.1	284.2	284.18	–
16″	406.4	406.40	393.6	393.7	390.6	390.6	387.4	387.35	387.35	381.0	381.0	373.4	373.07	381.0	363.6	363.58	353.0	354.03	344.6	344.53	333.4	333.35	325.4	325.48	–
18″	457.2	457.20	444.4	444.3	441.4	441.2	435.0	434.7	437.9	428.6	428.5	419.2	418.9	431.6	409.6	409.3	398.4	398.3	387.4	387.1	377.8	377.7	366.8	366.5	–
20″	508.0	508.0	495.2	495.3	489.0	488.9	482.6	482.60	488.95	477.8	477.88	466.8	466.75	482.6	455.6	455.63	443.0	442.93	431.8	431.80	419.2	419.10	408.0	408.03	–
24″	–	609.6	–	597.30	–	590.9	–	581.5	590.9		575.0	574.6	560.8	584.6	547.6	548.1	–	532.2	517.6	518.0	–	505.3	490.6	490.9	–
30″	–	762.0	–	746.16	–	736.6	–	730.25	742.95	–	–	–	–	736.6	–	–	–	–	–	–	–	–	–	–	–

NOMINAL INSIDE DIAMETER AND WALL THICKNESS

NPS		OUTSIDE DIAMETER	ID / WT	CARBON AND ALLOY STEEL													STAINLESS STEEL					NPS
INCH	mm(DN)	ANSI		Sch. S5	**Sch. S10**	Sch. S20	**Sch. S30**	Sch. STD	**Sch. S40**	Sch. S60	**Sch. XS**	Sch. S80	**Sch. S100**	Sch. S120	**Sch. S140**	Sch. S160	**Sch. XXS**	Sch. S5S	**Sch. S10S**	Sch. S20S	**Sch. S40S**	Sch. S80S	INCH
14″	350	355.6	ID	347.7	**342.9**	339.8	**336.5**	336.5	**333.3**	325.4	**330.2**	317.5	**307.9**	300.0	**292.1**	284.2	–	347.7	**346.0**	339.6	**336.5**	330.2	14″
			WT	3.96	**6.35**	7.92	**9.53**	9.53	**11.13**	15.09	**12.70**	19.05	**23.83**	27.79	**31.75**	35.71	–	3.96	**4.78**	8.00	**9.53**	12.70	
16″	400	406.4	ID	398.0	**393.7**	390.6	**387.3**	387.3	**381.0**	373.1	**381.0**	363.5	**354.0**	344.5	**333.3**	325.4	–	398.0	**396.8**	390.4	**387.3**	381.0	16″
			WT	4.19	**6.35**	7.92	**9.53**	9.53	**12.70**	16.66	**12.70**	21.44	**26.19**	30.96	**36.53**	40.49	–	4.19	**4.78**	8.00	**9.53**	12.70	
18″	450	457.2	ID	448.8	**444.5**	441.4	**434.9**	438.1	**428.7**	419.1	**431.8**	409.5	**398.5**	387.3	**377.9**	366.7	–	448.8	**447.6**	441.2	**438.1**	431.8	18″
			WT	4.19	**6.35**	7.92	**11.13**	9.53	**14.27**	19.05	**12.70**	23.83	**29.36**	34.93	**39.67**	45.24	–	4.19	**4.78**	8.00	**9.53**	12.70	
20″	500	508.0	ID	498.4	**495.3**	488.9	**482.6**	488.9	**477.8**	466.8	**482.6**	455.6	**442.9**	431.8	**419.1**	408.0	–	498.4	**496.9**	489.0	**488.9**	482.6	20″
			WT	4.78	**6.35**	9.53	**12.70**	9.53	**15.09**	20.62	**12.70**	26.19	**32.54**	38.10	**44.45**	50.01	–	4.78	**5.54**	9.50	**9.53**	12.70	
22″	550	558.8	ID	549.2	**546.1**	539.7	**533.4**	539.7	–	514.3	**533.4**	501.6	**488.9**	476.2	**463.5**	450.8	–	549.2	**547.7**	–	**539.7**	533.4	22″
			WT	4.78	**6.35**	9.53	**12.70**	9.53	–	22.23	**12.70**	28.58	**34.93**	41.28	**47.63**	53.98	–	4.78	**5.54**	–	**9.53**	12.70	
24″	600	609.6	ID	598.5	**596.9**	590.5	**581.1**	590.5	**574.6**	560.4	**584.2**	547.7	**531.8**	517.6	**504.9**	490.5	–	598.5	**596.9**	–	**590.5**	584.2	24″
			WT	5.54	**6.35**	9.53	**14.27**	9.53	**17.48**	24.61	**12.70**	30.96	**38.89**	46.02	**52.37**	59.54	–	5.54	**6.35**	–	**9.53**	12.70	
26″	650	660.4	ID	–	**644.6**	635.0	–	641.3	–	–	**635.0**	–	–	–	–	–	–	–	**644.6**	–	**641.3**	635.0	26″
			WT	–	**7.92**	12.70	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
28″	700	711.2	ID	–	**695.4**	685.8	**679.4**	692.1	–	–	**685.8**	–	–	–	–	–	–	–	**695.4**	–	**692.1**	685.8	28″
			WT	–	**7.92**	12.70	**15.88**	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
30″	750	762.0	ID	749.3	**746.2**	736.6	**730.2**	742.9	–	–	**736.6**	–	–	–	–	–	–	749.3	**746.2**	–	**742.9**	736.6	30″
			WT	6.35	**7.92**	12.70	**15.88**	9.53	–	–	**12.70**	–	–	–	–	–	–	6.35	**7.92**	–	**9.53**	12.70	
32″	800	812.8	ID	–	**797.0**	787.4	**781.0**	793.7	**777.8**	–	**787.4**	–	–	–	–	–	–	–	**797.0**	–	**793.7**	787.4	32″
			WT	–	**7.92**	12.70	**15.88**	9.53	**17.48**	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
34″	850	863.6	ID	–	**847.8**	838.2	**831.8**	844.5	**828.6**	–	**838.2**	–	–	–	–	–	–	–	**847.8**	–	**844.5**	838.2	34″
			WT	–	**7.92**	12.70	**15.88**	9.53	**17.48**	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
36″	900	914.4	ID	–	**898.6**	889.0	**882.6**	895.3	**876.3**	–	**889.0**	–	–	–	–	–	–	–	**878.6**	–	**895.3**	889.0	36″
			WT	–	**7.92**	12.70	**15.88**	9.53	**19.05**	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
38″	950	965.2	ID	–	–	–	–	946.1	–	–	**939.8**	–	–	–	–	–	–	–	**949.4**	–	**946.1**	939.8	38″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
40″	1000	1016.0	ID	–	–	–	–	996.9	–	–	**990.6**	–	–	–	–	–	–	–	**1000.2**	–	**996.9**	990.6	40″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
42″	1050	1066.8	ID	–	–	–	–	1047.7	–	–	**1041.4**	–	–	–	–	–	–	–	**1051.0**	–	**1047.7**	1041.4	42″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
44″	1100	1117.6	ID	–	–	–	–	1098.5	–	–	**1092.2**	–	–	–	–	–	–	–	**1101.8**	–	**1098.5**	1092.2	44″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
46″	1500	1168.4	ID	–	–	–	–	1149.3	–	–	**1143.0**	–	–	–	–	–	–	–	**1152.6**	–	**1149.3**	1143.0	46″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	
48″	1200	1219.2	ID	–	–	–	–	1200.1	–	–	**1193.8**	–	–	–	–	–	–	–	**1203.4**	–	**1200.1**	1193.8	48″
			WT	–	–	–	–	9.53	–	–	**12.70**	–	–	–	–	–	–	–	**7.92**	–	**9.53**	12.70	

NOMINAL INSIDE DIAMETER AND WALL THICKNESS

NPS		OUTSIDE DIAMETER	ID / WT	CARBON AND ALLOY STEEL													STAINLESS STEEL					NPS
INCH	mm(DN)	ANSI		Sch. S5	**Sch. S10**	Sch. S20	**Sch. S30**	Sch. STD	**Sch. S40**	Sch. S60	**Sch. XS**	Sch. S80	**Sch. S100**	Sch. S120	**Sch. S140**	Sch. S160	**Sch. XXS**	Sch. S5S	**Sch. S10S**	Sch. S20S	**Sch. S40S**	Sch. S80S	INCH
1/8″	6	10.3	ID	–	**7.8**	–	**7.4**	6.8	**6.8**	5.9	**5.5**	5.5	**–**	–	**–**	4.0	**0.6**	–	**7.8**	7.3	**6.8**	5.5	1/8″
			WT	–	**1.24**	–	**1.45**	1.73	**1.73**	2.20	**2.41**	2.41	**–**	–	**–**	3.15	**4.83**	–	**1.24**	1.50	**1.73**	2.41	
1/4″	8	13.7	ID	–	**10.4**	–	**10.0**	9.2	**9.2**	8.9	**7.7**	7.7	**–**	–	**–**	6.3	**1.6**	–	**10.4**	9.7	**9.2**	7.7	1/4″
			WT	–	**1.65**	–	**1.85**	2.24	**2.24**	2.40	**3.02**	3.02	**–**	–	**–**	3.68	**6.05**	–	**1.65**	2.00	**2.24**	3.02	
3/8″	10	17.1	ID	–	**13.8**	–	**13.4**	12.5	**12.5**	11.5	**10.7**	10.7	**–**	–	**–**	9.1	**4.3**	–	**13.8**	13.1	**12.5**	10.7	3/8″
			WT	–	**1.65**	–	**1.85**	2.31	**2.31**	2.80	**3.20**	3.20	**–**	–	**–**	4.01	**6.40**	–	**1.65**	2.00	**2.31**	3.20	
1/2″	15	21.3	ID	18.0	**17.1**	–	**16.5**	15.8	**15.8**	14.9	**13.8**	13.8	**–**	–	**–**	11.7	**6.4**	18.0	**17.1**	16.3	**15.8**	13.8	1/2″
			WT	1.65	**2.11**	–	**2.41**	2.77	**2.77**	3.20	**3.73**	3.73	**–**	–	**–**	4.78	**7.47**	1.65	**2.11**	2.50	**2.77**	3.73	
3/4″	20	26.7	ID	23.4	**22.5**	–	**21.9**	21.0	**21.0**	19.9	**18.9**	18.9	**–**	–	**–**	15.6	**11.1**	23.4	**22.5**	21.7	**21.0**	18.9	3/4″
			WT	1.65	**2.11**	–	**2.41**	2.87	**2.87**	3.40	**3.91**	3.91	**–**	–	**–**	5.56	**7.82**	1.65	**2.11**	2.50	**2.87**	3.91	
1″	25	33.5	ID	30.2	**28.0**	–	**27.7**	26.7	**26.7**	25.7	**24.4**	24.4	**–**	–	**–**	20.8	**15.3**	30.2	**28.0**	27.5	**26.7**	24.4	1″
			WT	1.65	**2.77**	–	**2.90**	3.38	**3.38**	3.90	**4.55**	4.55	**–**	–	**–**	6.35	**9.09**	1.65	**2.77**	3.00	**3.38**	4.55	
11/4″	32	42.2	ID	38.9	**36.7**	–	**36.3**	35.1	**35.1**	33.2	**32.5**	32.5	**–**	–	**–**	29.5	**22.8**	38.9	**36.7**	36.2	**35.1**	32.5	11/4″
			WT	1.65	**2.77**	–	**2.97**	3.56	**3.56**	4.50	**4.85**	4.85	**–**	–	**–**	6.35	**9.70**	1.65	**2.77**	3.00	**3.56**	4.85	
11/2″	40	48.3	ID	45.0	**42.8**	–	**41.9**	40.9	**40.9**	39.3	**38.1**	38.1	**–**	–	**–**	34.0	**28.0**	45.0	**42.8**	42.3	**40.9**	38.1	11/2″
			WT	1.65	**2.77**	–	**3.18**	3.68	**3.68**	4.50	**5.08**	5.08	**–**	–	**–**	7.14	**10.16**	1.65	**2.77**	3.00	**3.68**	5.08	
2″	50	60.5	ID	57.2	**55.0**	54.1	**54.1**	52.7	**52.7**	50.7	**49.4**	49.4	**–**	–	**–**	43.0	**38.4**	57.2	**55.0**	53.5	**52.7**	49.4	2″
			WT	1.65	**2.77**	3.20	**3.18**	3.91	**3.91**	4.90	**5.54**	5.54	**–**	–	**–**	8.74	**11.07**	1.65	**2.77**	3.50	**3.91**	5.54	
21/2″	65	73.2	ID	69.0	**67.1**	64.2	**63.6**	62.9	**62.9**	61.2	**59.2**	59.2	**–**	–	**–**	54.1	**45.2**	69.0	**67.1**	66.2	**62.9**	59.2	21/2″
			WT	2.11	**3.05**	4.50	**4.78**	5.16	**5.16**	6.00	**7.01**	7.01	**–**	–	**–**	9.53	**14.02**	2.11	**3.05**	3.50	**5.16**	7.01	
3″	80	88.9	ID	84.7	**82.8**	79.9	**79.3**	77.9	**77.9**	75.7	**73.7**	73.7	**–**	–	**–**	66.6	**58.4**	84.7	**82.8**	80.9	**77.9**	73.7	3″
			WT	2.11	**3.05**	4.50	**4.78**	5.49	**5.49**	6.60	**7.62**	7.62	**–**	–	**–**	11.13	**15.24**	2.11	**3.05**	4.00	**5.49**	7.62	
31/2″	90	101.6	ID	97.4	**95.5**	92.6	**92.0**	90.1	**90.1**	87.6	**85.4**	85.4	**–**	–	**–**	–	**–**	97.4	**95.5**	93.6	**90.1**	85.4	31/2″
			WT	2.11	**3.05**	4.50	**4.78**	5.74	**5.74**	7.00	**8.08**	8.08	**–**	–	**–**	–	**–**	2.11	**3.05**	4.00	**5.74**	8.08	
4″	100	114.3	ID	110.1	**108.2**	104.5	**104.7**	102.3	**102.3**	100.1	**97.2**	97.2	**–**	92.0	**–**	87.3	**80.1**	110.1	**108.2**	106.3	**102.3**	97.2	4″
			WT	2.11	**3.05**	4.90	**4.78**	6.02	**6.02**	7.10	**8.56**	8.56	**–**	11.13	**–**	13.49	**17.12**	2.11	**3.05**	4.00	**6.02**	8.56	
5″	125	141.2	ID	135.7	**134.4**	131.0	**–**	128.1	**128.1**	125.0	**122.1**	122.1	**–**	115.8	**–**	109.4	**103.1**	135.7	**134.4**	131.2	**128.1**	122.1	5″
			WT	2.77	**3.40**	5.10	**–**	6.55	**6.55**	8.10	**9.53**	9.53	**–**	12.70	**–**	15.88	**19.05**	2.77	**3.40**	5.00	**6.55**	9.53	
6″	150	168.4	ID	162.9	**161.6**	157.4	**–**	154.2	**154.2**	149.8	**146.5**	146.5	**–**	139.9	**–**	131.9	**124.5**	162.9	**161.6**	158.4	**154.2**	146.5	6″
			WT	2.77	**3.40**	5.50	**–**	7.11	**7.11**	9.30	**10.97**	10.97	**–**	14.27	**–**	18.26	**21.95**	2.77	**3.40**	5.00	**7.11**	10.97	
8″	200	219.2	ID	213.7	**211.7**	206.5	**205.1**	202.8	**202.8**	198.6	**193.8**	193.8	**189.0**	182.7	**178.0**	173.2	**174.7**	213.7	**211.7**	206.2	**202.8**	193.8	8″
			WT	2.77	**3.76**	6.35	**7.04**	8.18	**8.18**	10.31	**12.70**	12.70	**15.09**	18.26	**20.62**	23.01	**22.23**	2.77	**3.76**	6.50	**8.18**	12.70	
10″	250	273	ID	266.2	**264.6**	260.3	**257.4**	254.5	**254.5**	247.6	**247.6**	242.8	**236.5**	230.1	**222.2**	215.8	**222.2**	266.2	**264.6**	260.0	**254.5**	247.6	10″
			WT	3.40	**4.19**	6.35	**7.80**	9.27	**9.27**	12.70	**12.70**	15.09	**18.26**	21.44	**25.40**	28.58	**25.40**	3.40	**4.19**	6.50	**9.27**	12.70	
12″	300	323.8	ID	315.9	**314.7**	311.1	**307.0**	304.7	**303.2**	295.3	**298.4**	288.8	**280.9**	273.0	**266.6**	257.2	**273.0**	315.9	**314.7**	310.8	**304.7**	298.4	12″
			WT	3.96	**4.57**	6.35	**8.38**	9.53	**10.31**	14.27	**12.70**	17.48	**21.44**	25.40	**28.58**	33.32	**25.40**	3.96	**4.57**	6.50	**9.53**	12.70	

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