■ 国家级职业教育培训规划教材

■ 劳动保障部培训就业司推荐

GUOJIAJI ZHIYE JIAOYU PEIXUN GUIHUA JIAOCAI

JINLANLING

金蓝领技师教育培训教材

JISHI JIAOYU PEIXUN JIAOCAI

数控技术/模具设计与制造

机电专业英语

劳动和社会保障部教材办公室组织编写

LAODONG HE SHEHUI BAOZHANGBU JIAOCAI BANGONGSHI ZUZHI BIANXIE

JISHI JIAOYU

中国劳动社会保障出版社

国家级职业教育培训规划教材

劳动保障部培训就业司推荐

GUOJIAJI ZHIYE JIAOYU PEIXUN GUIHUA JIAOCAI

金蓝领技师教育培训教材

JINLANLING JISHI JIAOYU PEIXUN JIAOCAI

数控技术/模具设计与制造

机电专业英语

主编 朱德云

主审 王芳

AODONG HE SHISHUI BAOZHANGBU JIAOCAI BANGONGSHI ZUZHI BIANXIE

中国劳动社会保障出版社

图书在版编目(CIP)数据

机电专业英语/朱德云主编. —北京：中国劳动社会保障出版社，2007
金蓝领技师教育培训教材
ISBN 978-7-5045-6609-6

Ⅰ.机… Ⅱ.朱… Ⅲ.机电工程-英语-技术培训-教材 Ⅳ.H31

中国版本图书馆 CIP 数据核字(2007)第 141485 号

中国劳动社会保障出版社出版发行
(北京市惠新东街 1 号 邮政编码：100029)
出 版 人：张梦欣
*
北京隆昌伟业印刷有限公司印刷装订 新华书店经销
787 毫米×1092 毫米 16 开本 10 印张 219 千字
2007 年 9 月第 1 版 2007 年 9 月第 1 次印刷
定价：18.00 元
读者服务部电话：010-64929211
发行部电话：010-64927085
出版社网址：http://www.class.com.cn

前　言

为贯彻落实《中共中央办公厅国务院办公厅关于进一步加强高技能人才工作的意见》（中办发［2006］15号）和《高技能人才培养体系建设“十一五”规划纲要（2006—2010年）》（劳社部发［2007］10号），满足技师学院的教学要求，劳动和社会保障部教材办公室组织一批学术水平高，教学经验丰富、实践能力强的双师型教师与行业、企业一线专家，在充分调研的基础上，共同研究、开发技师学院数控技术、模具设计与制造、电气自动化专业课程，并编写了23门主干课程的教材。

在教材的编写过程中，我们努力做到以下几点：

1．从企业生产实际中选取针对性强的课题，在对课题进行统筹安排的前提下，采用任务驱动编写思路组织课题训练内容与相关知识，模拟展现企业的生产过程。

2．分别参照国家职业标准数控车工（技师）、数控铣工（技师）、加工中心操作工（技师）、维修电工（技师）、二级模具设计师的要求，确定相关教材内容的广度和深度，便于鉴定考核工作的顺利开展。

3．根据企业、行业发展需要，较多编入新技术、新工艺、新设备、新材料的内容，以适应现代行业、企业发展的需要，保证教材的先进性。

4．采用以图代文的表现形式，精彩展现教材内容，降低学生的学习难度，激发学习兴趣。

在上述教材的编写过程中，得到有关省市教育部门、劳动和社会保障部门、技师学院、高职院校以及相关行业、企业的大力支持，教材的诸位主编、参编、主审等做了大量的工作，在此我们表示衷心的感谢！同时，恳切希望广大读者对教材提出宝贵的意见和建议，以便修订时加以完善。

劳动和社会保障部教材办公室

2007年6月

简　介

本书为国家级职业教育培训规划教材，由劳动保障部培训就业司推荐。

本书根据劳动和社会保障部颁发的金蓝领技师教育培训教学计划和教学大纲，由劳动和社会保障部教材办公室组织编写。主要内容包括英文识图和英文说明书两部分。具体分为机械制图、电气控制图、通用机床、数控机床及编程、模具技术、金属切削、可编程逻辑控制器、电工仪表测量、数控机床诊断与维修、电子技术。附录部分收录了工程图中常用的专业术语、热处理和工程材料常用的专业词汇、电子信息技术术语。为了便于学习，书后还附有参考译文及练习答案。

本书为金蓝领技师教育培训公共课程教材，也可作为企业技师培训教材和自学用书。

本书由朱德云主编，姚琦、杜强、袁德宏参编，王芳主审。

Contents

Unit 1 Mechanical Engineering Drawing

Section 1 Reading

1. Detail Drawings

Based on the function and *requirements*, a detail drawing should include the following contents as shown in Fig 1. 1.

requirement 要求

(1) A group of views (general, sectional, cut, etc.);

(2) Integrated dimensions;

(3) Technical requirements;

(4) Title block.

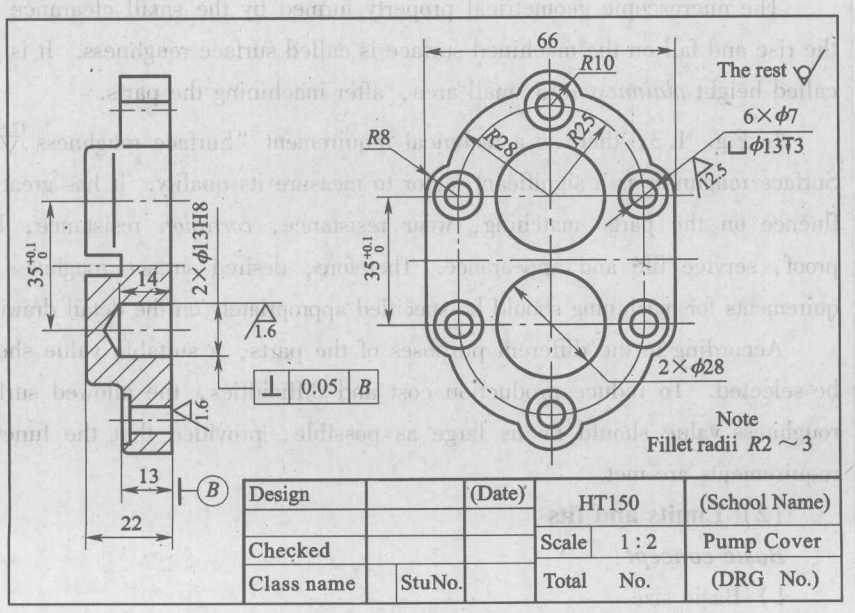


Fig. 1. 1 Detail Drawing of a Pump Cover

1.1 Requirements for manufacturing process

fillet 铸造圆角
draft 起模斜度
boss 凸台
recess 凹口
chamfer 倒角
escape 退刀槽
undercut 越程槽

In Fig. 1.1, there is a manufacturing process, i. e. "*Fillet* radii *R*2 ~ 3". Fillet is one of the casting structures. The common requirements for manufacturing processes are as following:

Fillet in casting, *draft*, wall thickness, *boss* club and *recessed* surface, *chamfer* and round (Fig. 1.2), *escape* and grinding *undercut*.

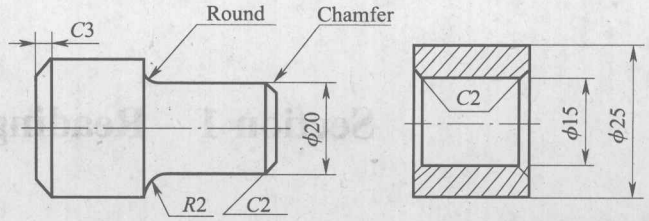


Fig. 1.2 Chamfer and Round

1.2 Technical requirements in detail drawings

roughness 粗糙度
tolerance 公差

Technical requirements in a detail drawing include surface *roughness*, dimension tolerance, form and position *tolerance*, heat treatment and surface treatment, machining and inspection requirements, and other special requirements or *remarks*.

remarks 说明

(1) Surface roughness

plainness 平直度

The microscopic geometrical property formed by the small clearance and the rise and fall on the machined surface is called surface roughness. It is also called height *plainness* in a small area, after machining the parts.

In Fig. 1.3, there is a technical requirement "Surface roughness $\overset{12.5}{\nabla}$". Surface roughness is a significant factor to measure its quality. It has great influence on the parts' matching, wear resistance, *corrosion* resistance, leak proof, service life and appearance. Therefore, desired surface roughness requirements for machining should be specified appropriately on the detail drawing.

corrosion 腐蚀

According to the different purposes of the parts, a suitable value should be selected. To reduce production cost and difficulties, the allowed surface roughness value should be as large as possible, provided that the function requirements are met.

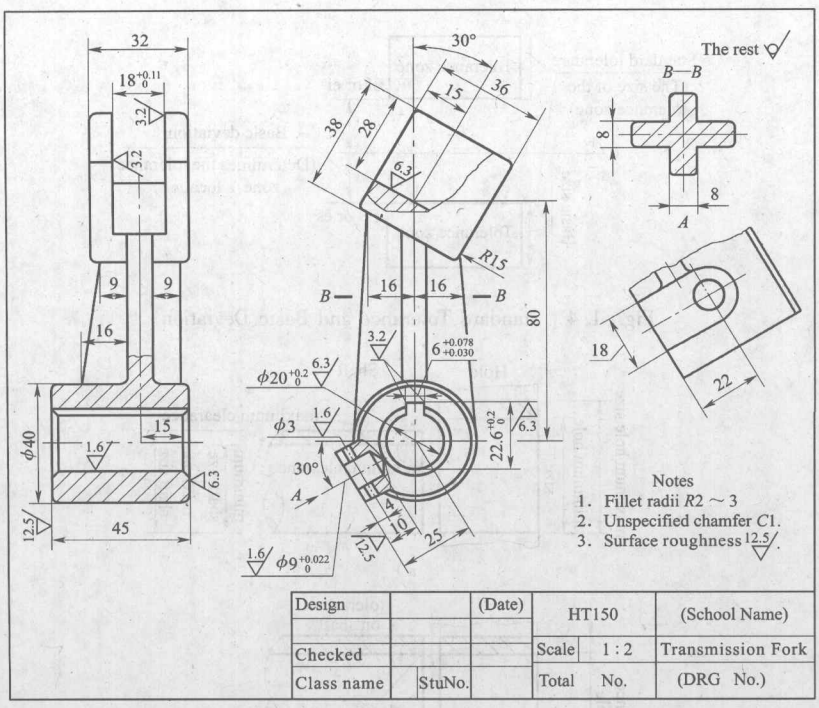
(2) Limits and fits

Basic concept

1) Basic size

2) Actual size

3) Limits of size (Maximum limit size, minimum limit size)



Design		(Date)	HT150	(School Name)
Checked			Scale 1 : 2	Transmission Fork
Class name	StuNo.		Total No.	(DRG No.)

Fig. 1.3 Detail Drawing of a Transmission Fork

4) Size *deviation* (Upper deviation, lower deviation)

5) Size tolerance

6) Zero line

7) Size tolerance zone

8) *Shaft*

9) Hole

Standard tolerance and basic deviation (see Fig. 1.4):

Standard tolerance It is any tolerance specified in the limit standards and system of fits in GB/T 1800 series. Standard tolerance is represented with the symbol "IT". The grade code of the tolerance is represented with numbers and there are 20 grade codes in total: IT01, IT0, IT1, …, IT18.

Basic deviation It is the limit deviation that determines the tolerance zone's location relative to the zero line in the GB/T 1800 series' standard limit and system of fits. It can be the upper deviation or lower deviation.

Fit The fit between two *mating* parts is the relationship which results from the clearance or interference obtained. There are three types of fits, namely, clearance fit, transition fit and interference fit. These conditions of the fit are shown in Fig. 1.5.

deviation 偏差

shaft 轴

standard 标准

mate 配合

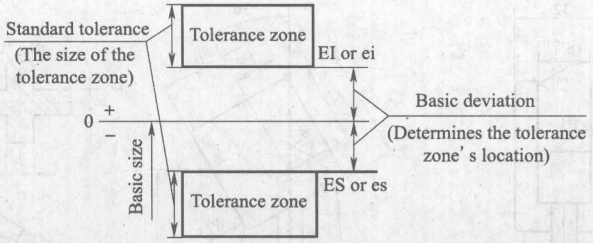


Fig. 1.4 Standard Tolerance and Basic Deviation

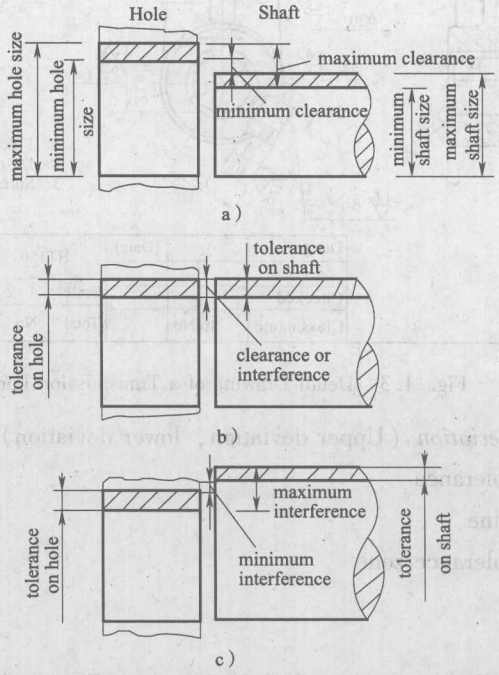


Fig. 1.5 Conditions of Fit Between a Hole and a Shaft

Note

1) Clearance fit (The shaft is always smaller than the hole.)

2) Transition fit (The limits are such that the condition may be of clearance fit or interference fit.)

3) Interference fit (The shaft is always larger than the hole.)

(3) Form and position tolerance

Permitted variation between actual *geometry* and *nominal* geometry is called form and position tolerance.

Form tolerance It includes straightness, flatness, roundness, cylindricity, profile of line and profile of surface.

Position tolerance It includes *parallelism*, *perpendicularity*, *angularity*, *coaxiality*, *symmetry*, true position, circular *runout*, total runout.

geometry 几何
nominal 公称

parallelism 平行度
perpendicularity 垂直度
angularity 倾斜度
coaxiality 同轴度
symmetry 对称度
runout 跳动

(4) Heat treatment and surface treatment

Fig. 1.6 is a drawing of the valve cover. In Fig. 1.6, there are two technical requirements, i. e. "1. The casting should be subjected to *aging* treatment to remove stress" "2. Fillet radii *R*1 ~3". The aging treatment is one of the heat treating processes. Heat treatment and surface treatment are important machining processes of metal. The main processes of them are as following:

Heat treatment It is a method of altering metal characteristics. The principal heat treating processes are *normalizing*, *annealing*, *quenching* (include direct quenching, fog quenching, hot quenching, interrupted quenching, selective quenching, spray quenching, and time quenching), *tempering*, hardening & tempering, *carburizing*, *nitriding*, aging, blueing, darkening and *stress* relieving.

Surface treatment It mainly includes plating, painting, chemical coating and so on.

aging 时效

normalize 正火
anneal 退火
quench 淬火
temper 回火
carburize 渗碳
nitride 渗氮
stress 应力

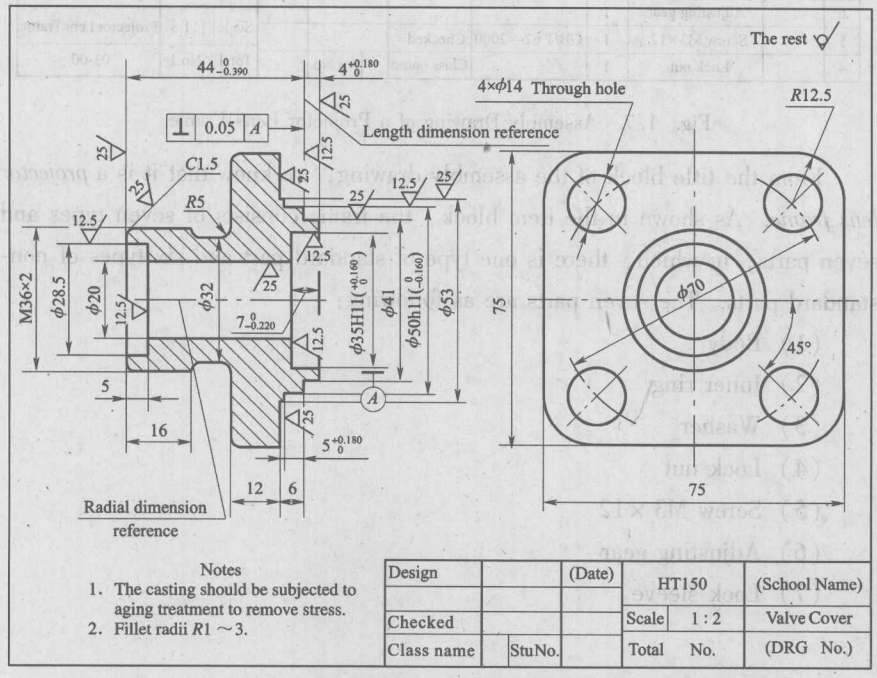
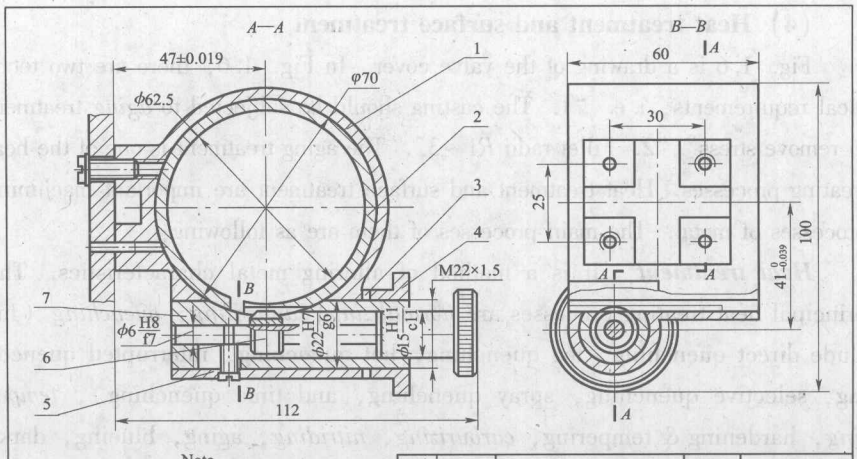


Fig. 1.6 Drawing of the Valve Cover

2. Assembly Drawings

A standard assembly drawing consists of five aspects (a group of views; necessary dimensions; technical requirements; title block and item block), which is shown in Fig. 1.7.



Note
Transmission smoothly,no blocking and creeping.

No.	Code	Description	No. off	Remark
3		Washer	1	
2		Inner ring	1	
1		Body	1	
7		Lock sleeve	1	
6		Adjusting gear	1	
5		Screw M3×12	1	GB/T 67—2000
4		Lock nut	1	

Design		(Date)	(MATL)	(School Name)
			Scale 1:1.5	Projector Lens Frame
Checked				
Class name	Stu No.		Total No.1	03-00

Fig. 1.7 Assembly Drawing of a Projector Lens Frame

projector 投影仪
lens 镜头
frame 机架

From the title block of the assembly drawing, we know that it is a *projector lens frame*. As shown in the item block, the frame consists of seven types and seven parts, in which, there is one type of standard part and six types of non-standard parts. The seven parts are as following:

(1) Body
(2) Inner ring
(3) Washer
(4) Lock nut
(5) Screw M3 × 12
(6) Adjusting gear
(7) Lock sleeve

Section 2 Have a Try

1. Match A with B.

A	B
a 装配图	detail drawing
b 公差	temper
c 零件图	roughness

d 回火　　assembly drawing
e 粗糙度　　interference fit
f 热处理　　clearance fit
g 间隙配合　　tolerance
h 过盈配合　　heat treatment

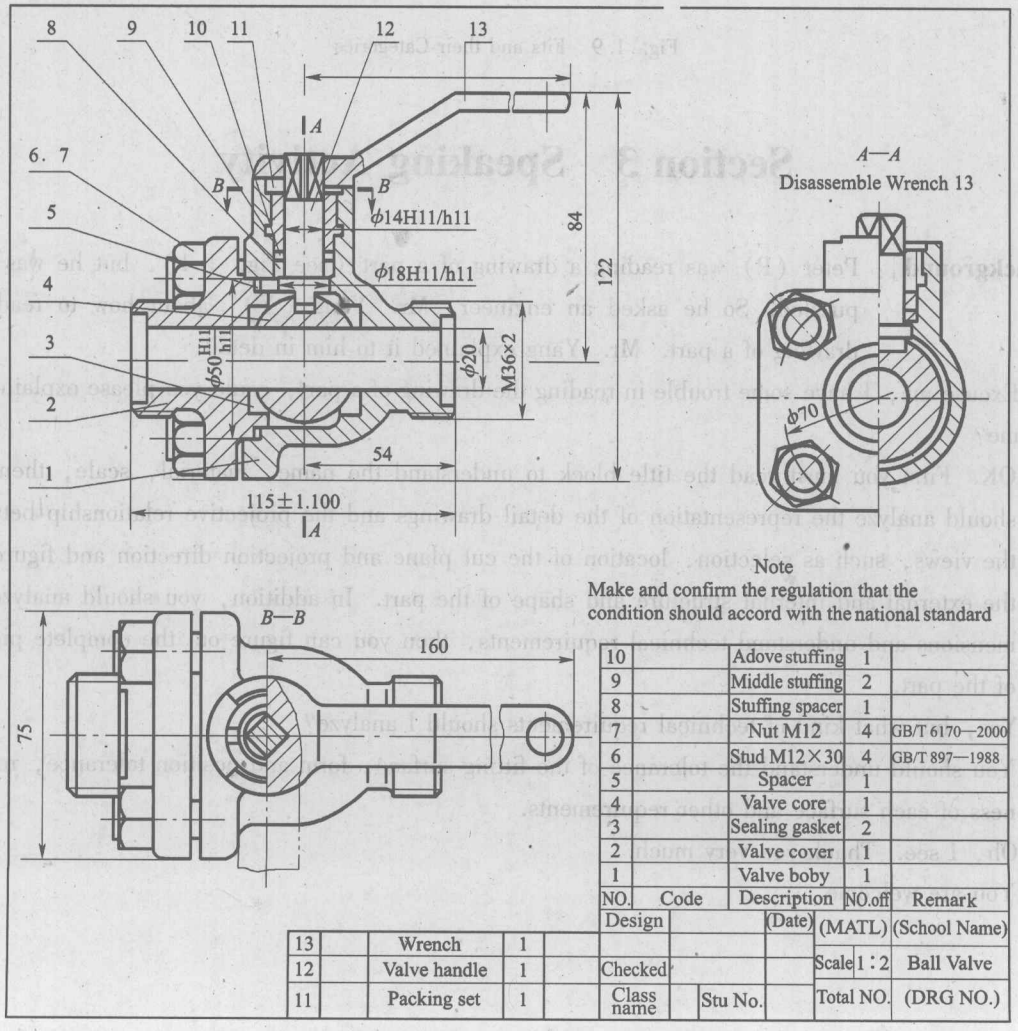
2. Fill in the blanks with proper words according to the text.

(1) The principal heat treating processes are normalizing, _____, _____, tempering, hardening & tempering, _____, nitriding, _____, blueing, darkening and _____.

(2) Technical requirements in a detail drawing include _____, dimension tolerance, _____, _____, machining and inspection requirements, and other special requirements or remarks.

(3) There are three types of fits, namely, _____, _____, and interference fit.

3. Recognize the following drawing.



NO.	Code	Description	NO.off	Remark
10		Adove stuffing	1	
9		Middle stuffing	2	
8		Stuffing spacer	1	
7		Nut M12	4	GB/T 6170—2000
6		Stud M12×30	4	GB/T 897—1988
5		Spacer	1	
4		Valve core	1	
3		Sealing gasket	2	
2		Valve cover	1	
1		Valve boby	1	

13		Wrench	1		Design		(Date)	(MATL)	(School Name)
12		Valve handle	1		Checked			Scale 1:2	Ball Valve
11		Packing set	1		Class name	Stu No.		Total NO.	(DRG NO.)

Fig. 1.8 Assembly Drawing of a Ball Valve

4. Match the pictures with the English words.

A. Interference fit　　B. Transition fit　　C. Clearance fit

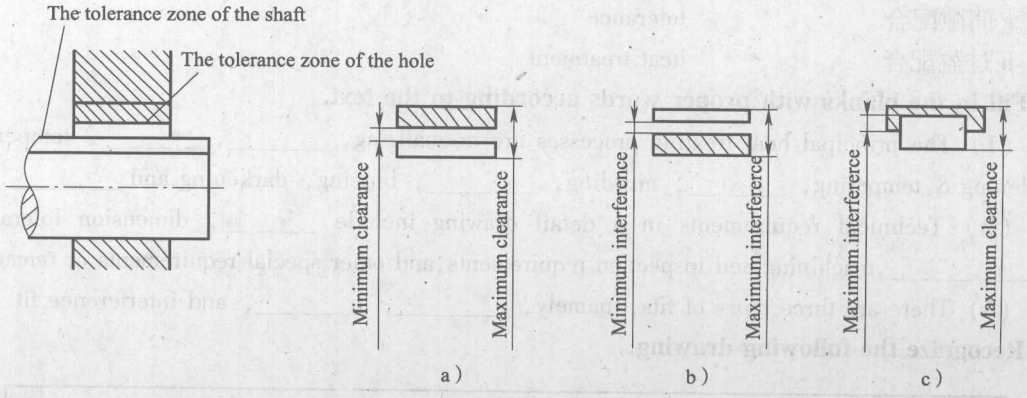


Fig. 1.9　Fits and their Categories

Section 3　Speaking Activity

[**Background**]: Peter (P) was reading a drawing of a part (see Fig. 1.1), but he was very puzzled. So he asked an engineer, Mr. Yang (Y), about how to read the drawing of a part. Mr. Yang explained it to him in detail.

P: Excuse me, I have some trouble in reading the drawing of a part, could you please explain it to me?

Y: OK. First you must read the title block to understand the name, material, scale, then you should analyze the representation of the detail drawings and the projective relationship between the views, such as selection, location of the cut plane and projection direction and figure out the external and internal structure and shape of the part. In addition, you should analyze dimensions and understand technical requirements, then you can figure out the complete picture of the part.

P: Yes, but what kind of technical requirements should I analyze?

Y: You should understand the tolerance of the fitting surface, form and position tolerance, roughness of each surface and other requirements.

P: Oh, I see. Thank you very much.

Y: You are welcome.