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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

APPLE

(*Malus Mill.*)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*to be considered by the
Technical Working Party for Fruits at its thirty-fourth session,
to be held in Niagara Falls, Canada, from September 29 to October 3, 2003*

Alternative Names:*

<i>Latin</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Malus Mill.</i>	Apple	Pommier	Apfel	Manzano

ASSOCIATED DOCUMENTS

These guidelines should be read in conjunction with document TG/1/3, “General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants” (hereinafter referred to as the “General Introduction”) and its associated “TGP” documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Malus* Mill.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of trees, on a rootstock specified by the competent authority, budwood or graftwood.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

- (a) Varieties resulting from crossing: 5 trees; 3 budsticks; or 5 dormant shoots for grafting;
- (b) Varieties obtained from mutation: 10 trees; 6 budsticks; or 10 dormant shoots for grafting.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 *Duration of Tests*

The minimum duration of tests should normally be two independent growing cycles.

3.2 *Testing Place*

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be observed at that place, the variety may be tested at an additional place.

3.3 *Conditions for Conducting the Examination*

The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination. In particular, it is essential that there is a satisfactory crop of fruit in both of the two growing cycles.

3.3.1 Stage of development for the assessment

The optimum stage of development for the assessment of each characteristic is indicated by a number in the second column of the Table of Characteristics. The stages of development denoted by each number are described at the end of Chapter 8.]

3.3.2 Type of observation – visual or measurement

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics:

MG: single measurement of a group of plants or parts of plants

VG: visual assessment by a single observation of a group of plants or parts of plants

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 5 or 10 trees.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 *Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations should be made on 5 or 10 plants or parts taken from each of 5 or 10 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2 from each of 5 plants or 1 from each of 10 plants.

3.6 *Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 *Distinctness*

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The minimum duration of tests recommended in section 3.1 reflects, in general, the need to ensure that any differences in a characteristic are sufficiently consistent.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.2 *Uniformity*

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 The assessment of uniformity for cross-pollinated varieties should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.2.3 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 5 plants, no off-types are allowed. In the case of a sample size of 10 plants, 1 off-type is allowed.

4.3 *Stability*

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness is aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

- (a) Fruit: general shape of whole fruit (characteristic 29)
- (b) Fruit: hue of over color, bloom (if any) removed (characteristic 38)
- (c) Fruit: pattern of over color of skin (characteristic 40)
- (d) Fruit: striped mutation varieties only – number of stripes (characteristic 41)
- (e) Time of beginning of flowering (characteristic 60)
- (f) Time of maturity for harvest (characteristic 59)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

6. Introduction to the Table of Characteristics

6.1 *Categories of Characteristics*

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 *States of Expression and Corresponding Notes*

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.3 *Types of Expression*

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 *Example Varieties*

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 *Legend*

(*) Asterisked characteristic – see Section 6.1.2

(QL) Qualitative characteristic – see Section 6.3

(QN) Quantitative characteristic – see Section 6.3

(PQ) Pseudo-qualitative characteristic – see Section 6.3

(a) – (f) See Explanations on the Table of Characteristics in Chapter 8, Section 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8, Section 8.2

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

MoE ^o	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	Tree: vigor	Arbre: vigueur	Baum: Wuchsstärke	Árbol: vigor		
(+)						
QN	(a) very weak				Nield's Drooper	1
	VG weak	faible	gering	débil	Akane	3
	medium	moyenne	mittel	medio	Golden Delicious	5
	strong	forte	stark	fuerte	Bramley's Seedling Schoner van Boskoop	7
	very strong	très forte	sehr stark		Gloster	9
2.	Tree: type	Arbre: type	Baum: Typ	Árbol:		
(*)						
PQ	(a) columnar	columnaire	säulenförmig	columnar	Wjczik	1
	VG ramified	ramifié	verzweigt	ramificado	Elstar	2
3.	Tree: habit	Arbre: port	Baum: Wuchsform	Árbol: porte		
(*)	(columnar types					
(+)	excluded)					
PQ	(a) fastigate	très dressé	sehr aufrecht	fastigiado	Benoni	1
	VG upright	dressé	aufrecht	erguido	Gloster	2
	spreading	divergent	auseinander fallend	abierto	Bramley's Seedling, Jonagold	3
	drooping	retombant	überhängend	colgante	Jonathan	4
	weeping	pleureur	lang überhängend	llorón	Neild's Drooper, Rome Beauty	5
4.	Tree: type of		Baum: Fruchtansatz			
(+)	bearing					
PQ	(e) on spurs		am Kurztrieb		Starkrimson Delicious	1
	VG on spurs and long shoots		am Kurz und Langtrieb		Jonagold	2
	on long shoots		am Langtrieb		Rome Beauty	3

^o MoE = Method of Examination

^o MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. (+)	One-year-old shoot: thickness	Rameau d'un an:	Einjähriger Trieb:	Rama de un año:		
QN	(b) thin	mince	dünn		Laxton's Fortune, Remo	3
	MG medium	moyenne	mittel		Jonagold	5
	thick	épaisse	dick		Bramley's seedling	7
	very thick	très épaisse	sehr dick		Charlotte, Wjczik	9
6. (* (+)	One-year-old shoot: length of internode	Rameau d'un an: longueur des entrenœuds	Einjähriger Trieb: Internodienlänge	Rama de un año: longitud del entrenudo		
QN	(b) very short	très courts	sehr kurz	muy corta	Wjczik	1
	MG short	courts	kurz	corta	Alkmene, Florina	3
	medium	moyens	mittel	media	Jonagold, Redaphough	5
	long	longs	lang	larga	Tumanga	7
	very long	très longs	sehr lang	muy larga		9
7.	One-year-old shoot: colour on sunny side				.	
PQ	(b) greenish brown		grünlichbraun		Granny Smith	1
	VG reddish brown		rötlichbraun		Vicking	2
	light brown				Arkcharm	3
	medium brown		mittel braun		Golden Delicious	4
	dark brown				Ingrid Marie	5

	MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8.		One-year-old shoot: pubescence (on upper half of shoot)					
QN	(b)	absent or very weak	absente ou tres faible	fehlend oder sehr gering		Laxton's Fortune, Rewena	1
	VG	weak	faible	gering		Golden Delicious	3
		medium	moyenne	mittel		Cox's Orange Pippin	5
		strong	forte	stark		Bramley's Seedling	7
		very strong	tres forte	sehr stark		Rambour d'Hiver	9
9.		One-year-old shoot: number of lenticels	Rameau d'un an: nombre de lenticelles	Einjähriger Trieb: Anzahl der Lenticellen	Rama de un año: número de lenticelas		
QN	(b)	few	petit	wenig	escaso	Alkmene, Bramley's Seedling	3
	VG	medium	moyen	mittel	medio	Cox's Orange Pippin	5
		many	grand	viele	muchos	Mutsu	7
10.		Leaf blade: attitude in relation to shoot	Limbe: port	Blattspreite: Haltung	Limbo: porte		
	(c)	upwards	dressé	aufwärts gerichtet	ascendente	Katja, Redsleeves	1
QN	VG	horizontal	horizontal	horizontal	horizontal	Bramley's Seedling	2
		downwards	retombant	abwärts gerichtet	descendente	Schoner van Boskoop, Granny Smith	3
11.		Leaf blade: length	Limbe: longueur	Blattspreite: Länge	Limbo: longitud		
	(c)	very short				Reanda	
QN	MG	short	court	kurz	corta	Court Pendu Plat	3
		medium	moyen	mittel	media	Florina	5
		long	long	lang	larga	Bramley's Seedling	7

	MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12.		Leaf blade: width	Limbe: largeur	Blattspreite: Breite	Limbo: anchura		
(*)							
QN	(c)	narrow	étroit	schmal	estrecha	Cox's Orange Pippin	3
	MG	medium	moyen	mittel	media	Jonagold	5
		broad	large	breit	ancha	Bramley's Seedling	7
13.		Leaf blade: ratio length/width	Limbe: rapport longueur/largeur	Blattspreite: Verhältnis Länge/Breite	Limbo: relación entre la longitud y la anchura		
(*)							
QN	(c)	small	faible	klein	pequeña	Bramley's Seedling	3
		medium	moyen	mittel	media	Jonagold	5
		large	élevé	groß	grande	Granny Smith	7
14.		Leaf blade: green color		Blattspreite: Grünfärbung	Limbo: color verde		
QN	(c)	light		hell	claro	Golden Delicious, Sansa	3
	VG	medium		mittel	medio	James Grieve	5
		dark		dunkel	oscuro	Mutsu	7
15.		Leaf blade: incisions of margin (upper half)	Limbe: incisions du bord (moitié supérieure)	Blattspreite: Randeinschnitte (obere Hälfte)	Limbo: incisiones del borde (mitad superior)		
(+)							
	(c)	crenate	crénelées	gekerbt	crenadas	Summerred	1
PQ	VG	bicrenate		doppelt gekerbt		Jim Brian, Alkmene	2
		serrate		stumpf		Elstar, Gala, Sirprize	3
		biserrate		doppelt gesägt		Mutsu, Freedom, Schoner van Boskoop	4

Comment: bluntly serrate has been deleted as this is shape not form. If the shape of the serrations is thought necessary we should have a second characteristic – serrate margins only: serrations - apex acute or rounded.

	MoE° English	français	deutsch	español	Example Varieties Exemples Beispielsorten Variedades ejemplo	Note/ Nota
16.	Leaf blade: pubescence on lower side	Limbe: pilosité de la face inférieure	Blattspreite: Behaarung der Unterseite			
QN	(c) absent or weak		fehlend oder sehr gering		Golden Delicious	1
	VG intermediate				Cox's Orange Pippin, Elstar	2
	strong	forte	stark		James Grieve, Jonathan	3
17. (*)	Petiole: length	Pétiole: longueur	Blattstiel: Länge	Peciolo: longitud		
	(c) short	courte	kurz	corta	Jonagold	3
QN	MG medium	moyenne	mittel	media	Granny Smith	5
	long	longue	lang	larga	Falstaff	7
18.	Petiole base: intensity of anthocyanin coloration		Blattsteilansatz: Anthozyanfärbung			
QN	(c) weak		gering		Golden Delicious, Jonagold	3
	VG medium		mittel		Cox's Orange Pippin, Gala	5
	strong		hoch		Discovery, Richard Delicious	7
19. (*) (+)	Unopened flower: predominant color (balloon stage)	Fleur non épanouie: couleur (stade balloon)	UngeöffneteBlüte: Farbe (Ballonstadium)			
PQ	(d) white	blanche	weiss		Norhey	1
	VG yellowish pink	jaunatre rose	gelblich rosa		Schoner aus Herrenhut	2
	light pink	rose pale	hellrosa		Gravensteiner, Jonathan	3
	dark pink	rose fonce	dunkelrosa		Sylvia, Elstar	4
	red	rouge	rot		Kidd's Orange red	5
	dark red	rouge fonce	dunkelrot		Weirouge	6
	purple	pourpre	purpur		Rafzubin	7

MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
Changed: NZ suggests an additional state ‘ pink and white’. At balloon stage most of the pink buds are showing some white (if they are not yellowish and pink.						
20. (* (*)	Flower : diameter of flower with petals pressed into horizontal position	Fleur: diamètre de la fleur avec les pétales étalés dans un plan horizontal	Blüte: Durchmesser bei in waagrechte Position gedrückten Blütenblättern			
QN	(d) very small	très petite	sehr klein		Spatblühender Taffettapfel	1
	MG small	petite	klein		Jonafree	3
	medium	moyenne	mittel		Cox’s Orange Pippin	5
	large	grande	groß		Schoner van Boskoop	7
21. (* (*) (+)	Flower: arrangement of petals	Fleur	Blüte:	Flor:		
	(d) free				Worcester Pearmain	1
	VG touching				Golden Delicious	2
	overlapping				Schoner van Boskoop	3
	irregular				Topas, Jonagold	4
21 :CHANGED						
22. (+)	Flower: position of stigmas relative to anthers		Blüte: Stellung der Narbe im Verhältnis zu den Staubfäden			
QN	(d) below		unterhalb		Alkmene	1
	VG same level		auf gleicher Höhe		Cox’s Orange Pippin	2
	above		oberhalb		Golden Delicious	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
MoE						
23.	Young fruit: amount of anthocyanin overcolor					
	(e) absent or very low				Grenadier, Norhey	1
QN	VG low				Fuji	3
	medium				Idared	5
	high				Elise	7
	very high				Weirouge	9
24. (*)	Fruit: height	Fruit: hauteur	Frucht: Höhe	Fruto:		
QN	(f) short	court	kurz	corto	Auralia	3
	MG medium	moyen	mittel	medio	James Grieve	5
	long	long	lang	largo	Cadel, Iduna	7
25. (*)	Fruit: width	Fruit: largeur	Frucht: Breite	Fruto: anchura		
QN	(f) narrow		schmal		Orei	3
	MG medium	moyen	mittel	medio	Golden Delicious	5
	broad		breit		Melrose	7
26. (*)	Fruit: ratio height/ width	Fruit: rapport hauteur/largeur	Frucht: Verhältnis Höhe/Breite	Fruto: relación		
QN	(f) very small	très petit	sehr klein	muy pequeña	Court Pendu Plat, Ingol	1
	small	petit	klein	pequeña	Ontario, Idared	3
	medium	moyen	mittel	mediana	Jonagold	5
	large	grand	groß	grande	Golden Delicious	7
	very large	très grand	sehr groß	muy grande	Iduna, Priam	9

MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27.	Fruit: position of maximum width	Fruit: position de la largeur maximale	Frucht: Position des maximalen Breite			
QN	(f) towards calyx	vers le calice	zum Kelch hin			1
	VG in middle	au milieu	in der Mitte		Idared	2
	towards stalk	vers le pedoncule	zum Stiel hin		Jonagold	3
28. (*)	Fruit: size	Fruit: taille	Frucht: Größe			
	(f) very small	très petit	sehr klein		Api Noir	1
QN	VG very small to small	très petit à petit	sehr klein bis klein		Golden Harvey	2
	small	petit	klein		Miller's Seedling, Akane	3
	small to medium	petit a moyen	klein bis mittel		Alkmene	4
	medium	moyen	mittel		Cox's Orange Pippin	5
	medium to large	moyen à gros	mittel bis groß		Gravensteiner	6
	large	gros	groß		Mutsu	7
	large to very large	gros à très gros	groß bis sehr groß		Bramley's Seedling	8
	very large	très gros	sehr groß		Howgate Wonder	9

MoE°	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29. (* (+)	Fruit: general shape of whole fruit		Frucht:			
PQ	(f) globose	globuleuse	kugelförmig		Golden Noble, Resi	1
	VG globose conical	conique globuleuse	kugel-kegelförmig		Cox's Orange Pippin, Jonagold	2
			breit kegelförmig		Regia	3
			querelliptisch		Court Pendu Plat, Discovery	4
			breitrund		Bramley's Seedling, Idared	5
		conique	kegelförmig		Adam's Pearmain, Pinova	6
	narrow conical	conique étroite	schmal kegelförmig		Kent, Saturn	7
	truncate conical	conique tronquée	stumpf kegelförmig		Kidd's Orange Red, Melodie	8
	ellipsoid	ellipsoïde	ellipsoid		Spencer	9
	ovoid	ovale	eiförmig		Summerred	10
	oblong	oblongue	länglich		Gravensteiner, Mutsu	11
	oblong conical	conique oblongue	rechteckig kegelförmig		Catshead, Close	12
	oblong waisted		länglich tailliert		Gloster	13

Proposal – change to ‘in lateral view’. The shapes then become two dimensional and impossible to describe. A second solution is proposed below

29A (+)	Fruit: profile in lateral view					
PQ	(f) concave				Gloster	1
	VG straight				Mutsu	2
					Adams Pearmain, Close	3
					Golden Noble	4
					Jonagold, Cox's Orange Pippin	5

MoE ^o	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
Proposal for consideration: Hungary - We do not need 13 states for shape. The height, width and ratio together with profile would give the same information.						
30.	Fruit: ribbing	Fruit: côtes	Frucht: Rippung			
	(f) absent or weak	absent ou faible	fehlend oder gering		Charles Ross, Discovery	1
QN	VG moderate	moyenne	mittel		Golden Delicious	2
	strong	forte	stark		Red Delicious	3
31.	Fruit: Crowning at calyx end	Fruit: couronnement au sommet du calice	Frucht: Wülste oder Höcker am Kelchende			
	(f) absent or weak	absent ou faible	fehlend oder gering		Charles Ross, Discovery, Granny Smith	1
QN	VG moderate	moyen			Cox's Orange Pippin, Jonagold	2
	strong	forte	stark		Red Delicious	3
32. (*)	Fruit: size of eye	Fruit: grandeur de l'œil	Frucht: Größe des Kelches			
	(f) small	petit	klein		McIntosh	3
QN	VG medium	moyen	mittel		Cox's Orange Pippin	5
	large	grand	gross		Ingol, Monarch	7
33.	Fruit: length of sepal	Fruit longueur du sépale	Frucht: Länge des Kelchblattes			
QN	(f) short	court	kurz		McIntosh	3
	VG medium	moyen	mittel		Alkmene	5
	long	long	lang		Gala	7
34. (*)	Fruit: bloom of skin	Fruit: pruine de l'épiderme	Frucht: Bereifung der Schale			
	(f) absent or weak	absent ou faible	fehlend oder gering		Golden Delicious	1
QN	VG moderate	moyen	mittel		James Grieve, Jonathan	2
	strong	fort	stark		Vicking, Vista Bella	3

MoE ^o	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35.	Fruit: greasiness of skin	Fruit: état cireux de l'épiderme	Frucht: Fettigkeit der Schale			
	(f) absent or weak	absent ou faible	fehlend oder gering		Schoner van Boskoop	
QN	VG moderate	moyen	mittel		James Grieve	
	strong	fort	stark		Arlet, Jonagold	
36. (*)	Fruit: ground color of skin	Fruit: couleur du fond de l'épiderme	Frucht: Grundfarbe der Schale	Fruto: color de fondo de la epidermis		
	(f) not visible	non visible	nicht sichtbar	no visible	Red Jonaprince	1
PQ	VG whitish yellow		weißlichgelb			2
	yellow	jaune	gelb	amarillo	Delorgue, Gala Transparent de Croncels	3
	whitish green		weißlichgrün		Angold, Lodi, Lena White Transparent	4
	yellow green	vert-jaune	gelbgrün	verde amarillento	Cox's Orange Pippin	5
	green	vert	grün	verde	Granny Smith	6
37. (*)	Fruit: relative area of over color of skin	Fruit: proportion de lavis de l'épiderme	Frucht: Deckfarbenanteil der Schale	Fruto: zona relativa de color superficial de la epidermis		
	(f) absent or very small	nulle ou très petite	fehlend oder sehr klein	ausente o muy pequeña	Granny Smith	1
QN	VG small	petite	klein	pequeña	Cox's Orange Pippin, Tumanga	3
	medium	moyenne	mittel	media	Gala	5
	large	grande	groß	grande	Spartan	7
	very large	très grande	sehr groß	muy grande	Red Jonaprince	9

MoE°	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38.	Fruit: hue of over color –bloom (if any) removed	Fruit: teinte du lavis	Frucht: Ton der Deckfarbe-Bereifung(soweit vorhanden) entfernt	Fruto: tono del color superficial		
PQ	(f) orange red	rouge orangé	orangerot	rojo anaranjado	Cox's Orange Pippin, Egremont Russet	1
	VG pink red	rouge-rose	rosarot	rojo rosado	Cripps Pink, Delorgue	2
	red	rouge	rot	rojo	Akane, Red Elstar, Galaxy, Regal Prince	3
	purple red				Red Jonaprince, Spartan	4
	brown red				Fiesta, Lord Burghley	5
39.	Fruit: intensity of over color		Frucht: Intensität der Deckfarbe			
QN	(f) light		hell			3
	VG medium		mittel			5
	dark		dunkel			7
40. (*)	Fruit: pattern of over color of skin					
	(e) only solid flush				Red Jonaprince, Richared Delicious	1
PQ	VG only striped (no flush)				Helios	2
	solid flush with indistinct stripes				Galaxy	3
	solid flush with strong stripes				Jonagored	4
	strong stripes with indistinct flush				Gravensteiner	5
	flushed and mottled				Elstar	6
	flushed, striped and mottled				Crowngold	

MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41.	Fruit: striped mutation varieties only – number of stripes					
NEW (e)	few					3
QN VG	medium					5
	many					7
42.	Fruit: striped mutation varieties only – width of stripes					
NEW (e)	narrow					3
QN VG	medium					5
	broad					7
Proposal: to limit 41 and 42 to mutation varieties only.						
43. (*)	Fruit: russet					
QL (f)	absent				Granny Smith	1
	VG present				Schoner van Boskoop	9
44. (*)	Fruit: relative area of russet around stalk attachment (if present)	Fruit: proportion de liège autour du pédoncule	Frucht: anteilige Fläche der Berostung im Bereich des Stielansatzes	Fruto: zona relativa de russeting en torno a la base peduncular		
QN (f)	very small	très petite	sehr klein	muy pequeña	Piros	1
VG	small	petite	klein	pequeña	Elstar	3
	medium	moyenne	mittel	media	Alkmene	5
	large				Kaiser Wilhelm	7
	very large				Egremont Russet	9

	MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
45.		Fruit: relative area of russet on cheeks (if present)	Fruit: proportion de liège sur les joues	Frucht: anteilige Fläche der Berostung auf den Wangen	Fruto: zona relativa de russeting en las caras		
QN	(f)	very small	très petite	sehr klein	muy pequeña	Golden Noble	1
	VG	small	petite	klein	pequeña		3
		medium	moyenne	mittel	media	Karmijn de Sonnaville	5
		large	grande	groß	grande	Zabergau Reinette	7
		very large	très grande	sehr groß	muy grande	Egremont Russet, Princesse	9
46.	(*)	Fruit: relative area of russet around eye basin (if present)	Fruit: proportion de liège autour de la cuvette de l'œil	Frucht: anteilige Fläche der Berostung im Bereich der Kelchgrube	Fruto: zona relativa de russeting en la cavidad del ojo		
QN	(f)	very small	très petite	sehr klein	muy pequeña	Golden Noble	1
	VG	small	petite	klein	pequeña	...	3
		medium	moyenne	mittel	media	Cox's Orange Pippin	5
		large	grande	groß	grande	Arlet	7
		very large	très grande	sehr groß	muy grande	...	9
Comment: 44,45,46. Russet can be variable and time consuming to record. Would the states 'absent or very small, intermediate and large provide the same information.							
47.		Fruit: number of lenticels		Frucht: Größe der Lentizellen			
QN	(f)	few		wenig		James Grieve	3
	VG	medium		mittel		Golden Delicious	5
		many		viele		Granny Smith	7
48.	(*)	Fruit: size of lenticels	Fruit: taille des lenticelles	Frucht: Größe der Lentizellen			
QN	(f)	small	petites	klein		Jonathan, Idared	3
	VG	medium	moyanne	mittel		Elstar	5
		large	grandes	groß		Reine de Reinettes, Florina	7

MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
49. (* (*)	Fruit: length of stalk	Fruit: longueur du pédoncule	Frucht: Länge des Stiels	Fruto: longitud del pedúnculo		
	(f) very short	tres court	sehr kurz	muy corta	Egremont Russet	1
QN	MG short	court	kurz	corta	Cox's Orange Pippin	3
	medium	moyen	mittel	media	Worcester Pearmain	5
	long	long	lang	larga	Richared Delicious	7
	very long	tres long	sehr lang	muy larga	Rewena	9
50. (* (*)	Fruit: thickness of stalk	Fruit: grosseur du pédoncule	Frucht: Dicke des Stiels	Fruto: grosor del pedúnculo		
	(f) thin	fin	dünn	fino	Golden Delicious	3
QN	VG medium	moyen	mittel	medio	Cox's Orange Pippin	5
	thick	gros	dick	grueso	Schoner van Boskoop	7
51. (* (*) (+)	Fruit: depth of stalk cavity	Fruit: profondeur de la cavité du pédoncule	Frucht: Tiefe der Stielgrube	Fruto: profundidad de la cavidad peduncular		
	(f) shallow	peu profonde	flach	poco profunda	Edward VII	3
QN	MG medium	moyenne	mittel	media	Golden Delicious	5
	deep	profonde	tief	profunda	Schoner van Boskoop, Jonagold	7
52. (* (*) (+)	Fruit: width of stalk cavity		Frucht: Breite der Stielgrube			
	(f) narrow	Petite	schmal		Beauty of Bath, Gala	3
QN	MG medium	moyenne	mittel		Golden Delicious	5
	broad	grande	breit		Jonagold	7
53. (* (*) (+)	Fruit: depth of eye basin	Fruit: profondeur de la cuvette de l'œil	Frucht: Tiefe der Kelchgrube	Fruto: profundidad de la cavidad del ojo		
	(f) shallow	peu profonde	flach	poco profunda	Worcester Pearmain	3
QN	MG medium	moyenne	mittel	media	Golden Delicious	5
	deep	profonde	tief	profunda	Bramley's Seedling, Delcorf	7

	MoE ^o	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
54.	(*) (+)	Fruit: width of eye basin	Fruit: largeur de la cuvette de l'œil	Frucht: Breite der Kelchgrube	Fruto: anchura de la cavidad del ojo		
	(f)	narrow	étroite	schmal	estrecho	Worcester Pearmain Pinova	3
QN	MG	medium	moyenne	mittel	medio	Golden Delicious	5
		broad	large	breit	ancho	Bramley's Seedling	7
55.	(*) (+)	Fruit: firmness of flesh	Fruit: fermeté de la chair	Frucht: Festigkeit des Fruchtfleisches	Fruto: firmeza de la pulpa		
	(f)	very soft	tres molle	sehr weich	muy blanda	Astrachan	1
QN	MG	soft	molle	weich	blanda	Jonagold	3
		medium	moyenne	mittel	media	Cox's Orange Pippin	5
		firm	ferme	fest	firme	Kent	7
		very firm	tres ferme	sehr fest	muy firme	Pilot	9
56.	(*)	Fruit: color of flesh	Fruit: couleur de la chair	Frucht: Farbe des Fruchtfleisches			
	(f)	white	blanche	weiss		Akane, Spartan	1
PQ	VG	cream		crenefarben		Jonagold	2
		yellowish	jaunatre	gelblich		Delorina, Topaz	3
		pink	rose	rosa		Pomfit	4
		red	rouge	rot		Weirouge	5
		greenish	verdatre	grünlich		Gloster, Granny Smith	6
57.	(*) (+)	Fruit in transverse section: aperture of locules	Fruit en section transversale: ouverture des loges carpellaires	Frucht im Querschnitt: Öffnung der Kernkammern			
	(f)	closed	fermees	geschlossen		Worcester Pearmain, Idared	1
QN	VG	partly open	partiellement ouvertes	teilweise offen		Reine de Reinettes, Šampion	2
		fully open	completement ouvertes	vollkommen offen		McIntosh	3

	MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
58. (*) (+)		Time of beginning of flowering	Époque de début de floraison	Zeitpunkt des Blüh- beginns	Época del inicio de la floración		
		very early	très précoce	sehr früh	muy precoz	Ein-Shemer	1
QN	VG	early	précoce	früh	precoz	Idared	3
		medium	moyenne	mittel	media	Cox's Orange Pippin, Jonagold	5
		late	tardive	spät	tardía	Court Pendu Plat	7
		very late	très tardive	sehr spät	muy tardía	Feuilmorte, Spatbluhender Taffetapfel	9
59. (*)		Time of maturity for harvest		Zeitpunkt der Pflückreife			
QN		very early		sehr früh		Vista Bella	1
	VG	very early to early				White Transparent	2
		early		früh		Discovery, Jersey mac	3
		early to medium				James Grieve	
		medium		mittel		Cox's Orange Pippin	5
		medium to late				Elstar, Gala	
		late		spät		Jonagold,	7
						Golden Delicious	
		late to very late				Braeburn, Fuji	
		very late		sehr spät		Granny Smith, Cripps Pink	9

Proposal : to delete Time of maturity for consumption and change grouping characteristic and TQ to Time of maturity for harvest.

MoE ^o	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
60. (*)	Time of maturity for consumption	Époque de maturité pour la consommation	Zeitpunkt der Genussreife	Época de madurez para el consumo		
	(f) very early	très précoce	sehr früh	muy precoz	Vista Bella	1
QN	early	précoce	früh	precoz	Discovery, Jersey mac	3
	medium	moyenne	mittel	media	Elstar	5
	late	tardive	spät	tardia	Golden Delicious	7
	very late	très tardive	sehr spät	muy tardía	Cripps Pink, Granny Smith,	9

Proposal : to delete Time of maturity for consumption and change grouping characteristic and TQ to Time of maturity for harvest.

8. Explanations on the Table of Characteristics

8.1 *Explanations covering several characteristics*

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

- (a) Tree: vigor, type and habit: All observations should be made on bare trees in winter.
- (b) One-year-old shoot: All observations on one-year-old shoots should be made on lateral dormant shoots in winter, on trees that have completed at least one growing season at the testing centre.
- (c) Leaf blade, Petiole: All observations on the leaf blade and petiole should be made in summer on mature leaves from the middle third of vigorous current season shoots from the outside of the tree.
- (d) Flower: All observations on the flower should be made on the second or subsequent flowers, at the start of anther dehiscence.
- (e) Type of bearing, Young fruit: All observations on the type of bearing and on the young fruit should be made forty days after flowering.
- (f) Fruit: All observations on the fruit should be made on 10 typical fruits taken from a minimum sample of 20 fruits, at the time of maturity for consumption. The terminal (king) fruit should be excluded from the sample.

8.2 *Explanations for individual characteristics*

Ad. 1: Tree: vigor

The vigor of the tree should be considered as the overall abundance of vegetative growth.

Ad. 3: Tree: habit



1
fastigate



2
upright



3
spreading

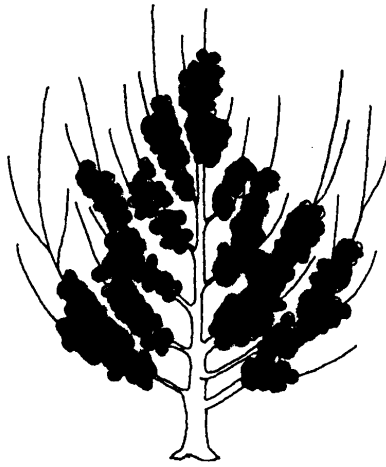


4
drooping

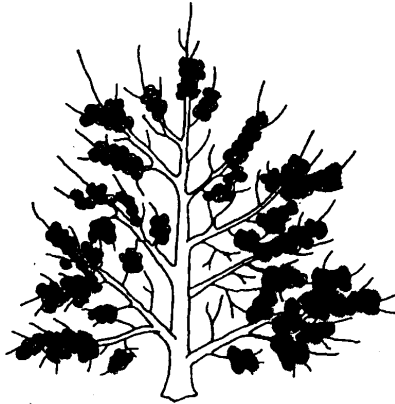


5
weeping

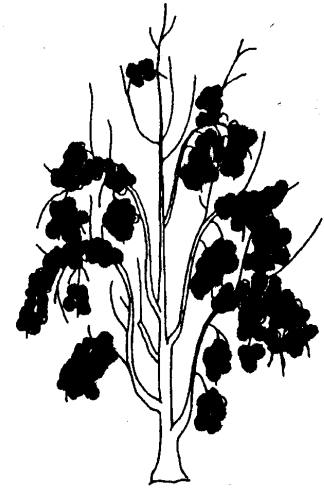
Ad. 4: Tree: type of bearing



1
on spurs



2
on spurs and long shoots



3
on long shoots

Ad. 5: One-year-old shoot: thickness

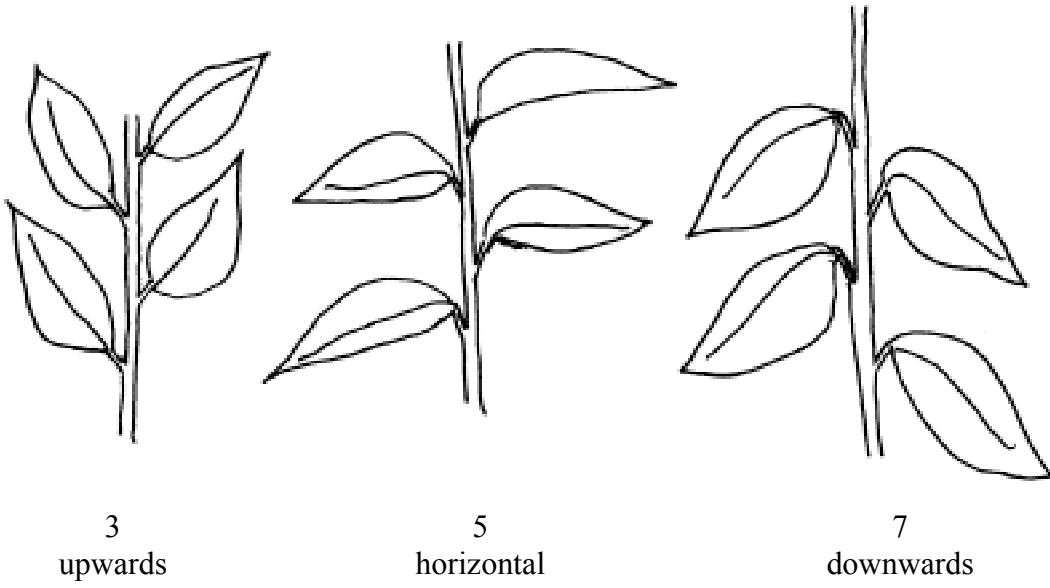
The thickness of the one-year-old shoot should be observed in the centre of the middle internode. Measurements can be made using a vernier calliper gauge.

Ad. 6: One-year-old shoot: length of internode

The length of the internode should be observed in the middle third of the shoot. Measurements can be made using a vernier calliper gauge.

Ad. 10: Leaf blade: attitude in relation to shoot

The attitude of the leaf blade is observed on erect shoots.



Ad. 15: Leaf blade: incisions of margin (upper half)



1
crenate



2
bicrenate



3
serrate



3
serrate

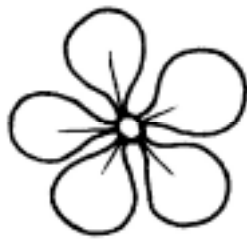


4
biserrate

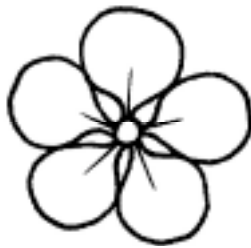
Ad. 19: Unopened flower: balloon stage

‘Balloon stage’ is the phenological stage in the course of flower development when the calyx is fully expanded and the petals are recognizable, having partially expanded and inflated but are closed, covering the internal flower organs. Balloon stage is usually 1-2 days before the petals unfold. All observations on the unopened flower are made when the flower buds are at balloon stage.

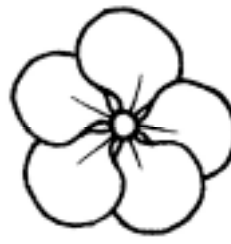
Ad. 21: Flower: Arrangement of petals



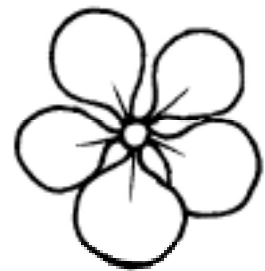
1
free



2
touching

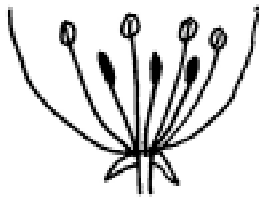


3
overlapping

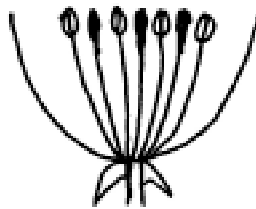


4
irregular

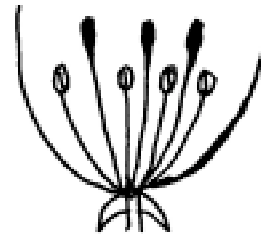
Ad. 22: Flower: Position of stigmas relative to anthers



1
below

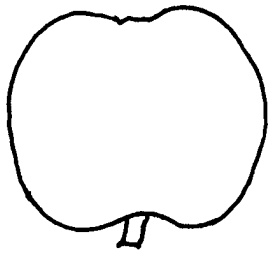


2
same level

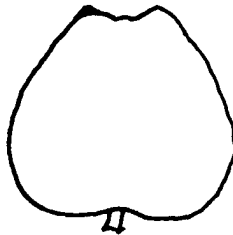


3
above

Ad. 29: Fruit: general shape of whole fruit



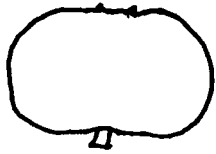
1
globose



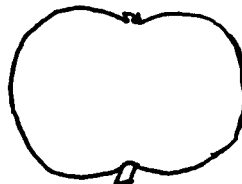
2
globose conical



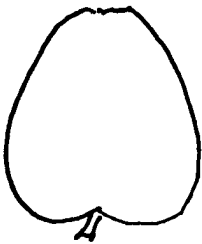
3
obloid conical



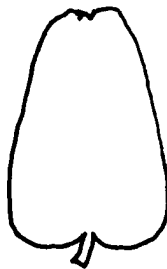
4
transverse ellipsoid



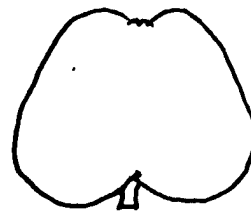
5
obloid



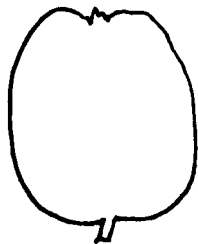
6
conical



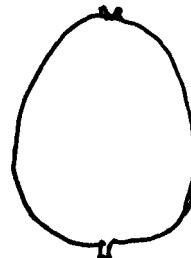
7
narrow conical



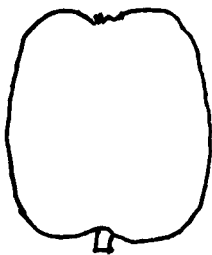
8
truncate conical



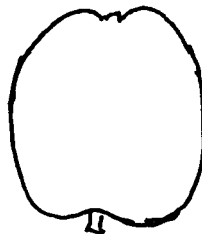
9
ellipsoid



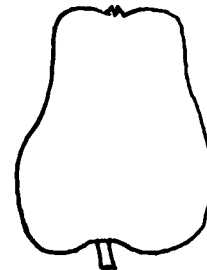
10
ovoid



11
oblong

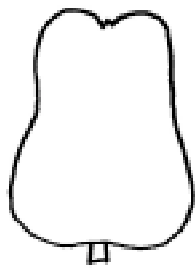


12
oblong conical

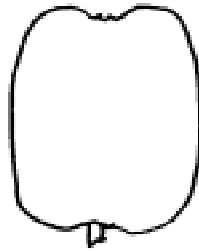


13
oblong waisted

Ad. 29A: Fruit: profile in lateral view



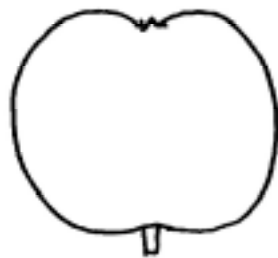
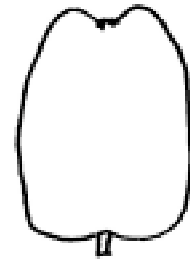
1
concave



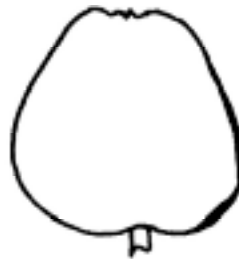
2
straight



3
straight, tapering to apex



4
convex



5
convex, tapering to apex

Ad. 51–54: Fruit: Depth and width of stalk cavity; depth and width of eye basin.

Fruits should be cut through the central axis as accurately as possible. Stalk cavity and eye basin depth and width should be measured from the sectioned fruits. The following diagram indicates the position of lines scored, using a knife or scalpel, on the fruit prior to measuring these characteristics.

The lines a-b and e-f must be at right angles to the axis of the fruit. (A plastic protractor can be used to ensure accuracy.)

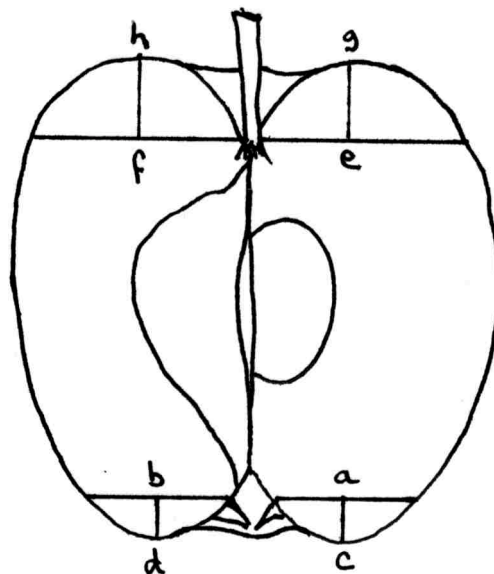
The line a-b is marked at the base of the sepals.

The line e-f is marked at the insertion of the stalk.

The lines a-c and b-d indicate the eye basin depth. They are drawn at right angles to the line a-b to the point where the basin curve levels out.

The lines e-g and f-h indicate the stalk cavity depth. They are drawn at right angles to the line e-f to the point where the stalk cavity curve levels out.

In the case of asymmetric or irregular sections, the larger side should be considered.



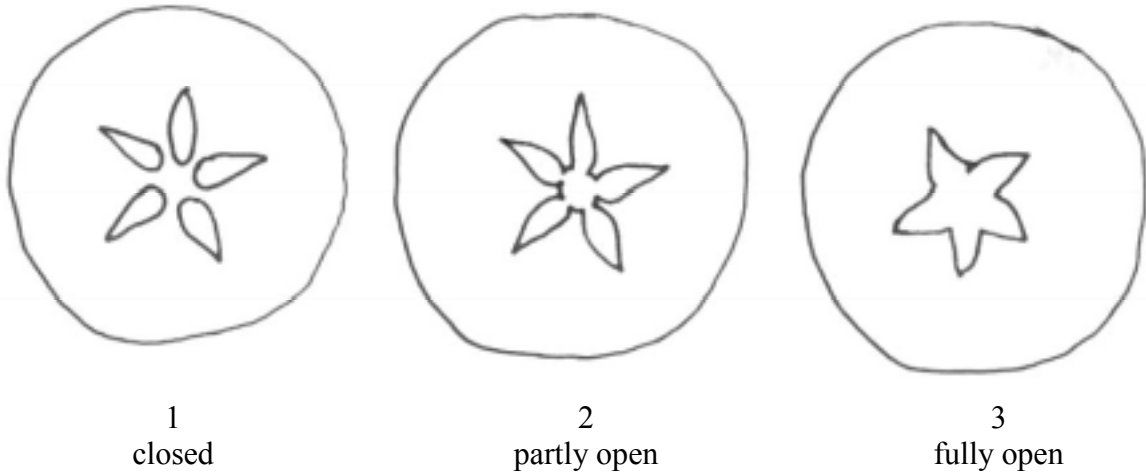
ab = width of eye basin (characteristic 54) ef = width of stalk cavity (characteristic 52)

ac = depth of eye basin (characteristic 53) fh = depth of stalk cavity (characteristic 51)

Ad. 55: Fruit: firmness of flesh

The firmness of flesh may be measured using a penetrometer.

Ad. 57: Fruit in transverse section: aperture of locules



Ad. 58: Time of beginning of flowering

Time of beginning of flowering is recorded as the time at which an estimated 10% of flowers are fully open.

SYNONYMS OF THE EXAMPLE VARIETIES

EXAMPLE VARIETIES	SYNONYM(S)
Akane	Primrouge ®
Alkmene	Early Windsor
Schoner van Boskoop	Belle de Boskoop, Schöner aus Boskoop
Cox's Orange Pippin	Cox Orangenrenette
Cripp's Pink	Pink Lady ®
Delorina	Harmonie ®
Florina	Querina ®
Gloster	Gloster 69
Mutsu	Crispin ®
Nouvelle Europe	New Europe
Pinova	Corail ®
Rafzubin	RubINETTE ®
Regal Prince	Prince Gala, Gala Must ®
Reine de Reinettes	King of the Pippins, Goldparmäne
Šampion	Shampion
Tumanga	Auralia
White Transparent	Weißer Klarapfel, Transparente Jaune

9. Literature

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10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
		Application date: (not to be filled in by the applicant)
<p>TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>		
1. Subject of the Technical Questionnaire		
1.1 <i>Latin Name</i>	<input type="text" value="Malus Mill."/>	
1.2 Common Name	<input type="text" value="Apple"/>	
	<input type="text"/>	
	<input type="text"/>	
	<input type="text"/>	
	<input type="text"/>	
2. Applicant		
Name	<input type="text"/>	
Address	<input type="text"/>	
Telephone No.	<input type="text"/>	
Fax No.	<input type="text"/>	
E-mail address	<input type="text"/>	
Breeder (if different from applicant)	<input type="text"/>	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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3. Proposed denomination and breeder's reference

Proposed denomination
(if available)

Breeder's reference

4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

- (a) controlled cross
(please state parent varieties)
- (b) partially known cross
(please state known parent variety(ies))
- (c) totally unknown cross

4.1.2 Mutation
(please state parent variety)

4.1.3 Discovery
(please state where, when and how developed)

4.1.4 Other
(please provide details)

4.2 Method of propagating the variety

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

Characteristics	Example Varieties	Note
5.1 Fruit: general shape of whole fruit (29)		
globose	Golden Noble, Resi	1
globose conical	Cox's Orange Pippin, Jonagold	2
obloid conical	Regia	3
transverse ellipsoid	Court Pendu Plat, Discovery	4
obloid	Bramley's Seedling, Idared	5
conical	Adam's Pearmain, Pinova	6
narrow conical	Kent, Saturn	7
truncate conical	Kidd's Orange Red, Melodie	8
ellipsoid	Spencer	9
ovoid	Summerred	10
oblong	Gravensteiner, Mutsu	11
oblong conical	Close, Catshead	12
oblong waisted	Gloster	13
5.2 Fruit: hue of over color – bloom (if any) removed (38)		
orange red	Egremont Russet, Cox's Orange Pippin	1
pink red	Cripps Pink, Delorgue	2
red	Akane, Red Elstar, Galaxy, Regal Prince	3
purple red	Spartan, Red Jonaprince	4
brown red	Lord Burghley, Fiesta	5

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
5.3 Fruit: pattern of over color of skin (40)		
only solid flush	Richared Delicious, Red Jonaprince	1
only striped (no flush)	Helios	2
solid flush with indistinct stripes	Galaxy	3
solid flush with strong stripes	Jonagored	4
strong stripes with indistinct flush	Gravensteiner	5
flushed and mottled	Elstar	6
flushed, striped and mottled	Crowngold	7
5.4 Fruit: striped mutation varieties only – number of stripes (41)		
few		3
medium		5
many		7
5.5 Time of beginning of flowering (58)		
very early	Ein-Shemer	1
early	Idared	3
medium	Cox's Orange Pippin, Jonagold	5
late	Court Pendu Plat,	7
very late	Feuilmorte, Spatbluhender Taffetapfel	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
5.6 Time of maturity for harvest (59)		
very early	Vista Bella	1
very early to early	White Transparent	2
early	Jerseymac, Discovery	3
early to medium	James Grieve	4
medium	Cox's Orange Pippin	5
medium to late	Elstar, Gala	6
late	Jonagold, Golden Delicious	7
late to very late	Braeburn, Fuji	8
very late	Granny Smith, Cripps Pink	9

6. Similar varieties and differences from these varieties

Please use the table, and space provided for comments, below to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the similar variety(ies)	Describe the expression of the characteristic(s) for your candidate variety
<i>(Example)</i>	<i>Plant: height</i>	<i>e.g. note 3</i>	<i>note 7</i>
		<i>e.g. short</i>	<i>tall</i>
		<i>e.g. 90 cm</i>	<i>130 cm</i>

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [] No []

(If yes, please provide details)

7.2 Special conditions for the examination of the variety

7.2.1 Are there any special conditions for growing the variety or conducting the examination?

Yes [] No []

7.2.2 If yes, please give details:

7.3 Other information

A representative color photograph of the variety should accompany the Technical Questionnaire.

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [] No []

(b) Has such authorization been obtained?

Yes [] No []

If the answer to (b) is yes, please attach a copy of the authorization.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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9. Information on plant material to be examined.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

- | | | |
|-------------------------------------------------------------|---------|--------|
| (a) Microorganisms (e.g. virus, bacteria, phytoplasma) | Yes [] | No [] |
| (b) Chemical treatment (e.g. growth retardant or pesticide) | Yes [] | No [] |
| (c) Tissue culture | Yes [] | No [] |
| (d) Other factors | Yes [] | No [] |

Please provide details of where you have indicated "yes".

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature

Date

[End of document]