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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

MANGO

UPOV Code: MANGI_IND

Mangifera indica L.

[*]

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from South Africa

to be considered by the Technical Working Party for Fruit Crops at its thirty-sixth session, to be held in Kôfu, Japan, from September 5 to 9, 2005

Alternative Names:[*]

Botanical name	*English*	*French*	*German*	*Spanish*
Mangifera indica L.	Mango	Manguier	Mango	Mango

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with 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 *Mangifera indica* L.

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 budsticks.

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

12 budsticks, sufficient to propagate 5 trees.

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 Number of Growing Cycles

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

The growing cycle is considered to be the period ranging from the beginning of active vegetative growth or flowering, continuing through active vegetative growth or flowering and fruit development and concluding with the harvesting of fruit.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

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 the trees produce a satisfactory crop of fruit in each of the two growing cycles.

3.4 Test Design

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 plants or parts taken from each of 5 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2.

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 differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

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 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.

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 are 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) Mature fruit: ratio length/width (characteristic 23 (old 45));

(b) Mature fruit: shape of ventral shoulder (characteristic 33 (old 58));

(c) Seed: embryony (characteristic 55 (old 93));

(d) Time of fruit maturity (characteristic 57 (old 95)).

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 Chapter 6.1.2

QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-Qualitative characteristic – see Chapter 6.3

(a)–(e) See Explanations on the Table of Characteristics in Chapter 8.1

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

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. **(*)**		**Tree: attitude of main branches**	**Arbre: port des rameaux principaux**	**Baum: Haltung der Hauptzweige**			
PQ		erect	dressé	aufrecht		Kent	1
		spreading	horizontal	waagerecht		Irwin, Peach, Tommy Atkins, Zill	2
		drooping	retombant	hängend		Sensation	3
2. **(*)** **(+)**		**Young leaf: intensity of anthocyanin coloration**	**Jeune feuille: pigmentation anthocyanique**	**Junges Blatt: Anthocyanfärbung**	**Changed**		
PQ		absent or very weak				Palmer	1
		weak				Early Gold, Irwin	3
		medium					5
		strong					7
		very strong				Osteen	9
3. **(old 9)**		**Leaf blade: length**	**Feuille à complet développement: longueur**	**Vollentwickeltes Blatt: Länge**			
QN	**(a)**	short	courte	kurz		Adams, Heidi	3
		medium	moyenne	mittel		Kent, Peach, Tommy Atkins	5
		long	longue	lang		Florigon, Hood, Keitt	7
4. **(old 10)**		**Leaf blade: width**	**Feuille à complet développement: largeur**	**Vollentwickeltes Blatt: Breite**			
QN	**(a)**	narrow	étroite	schmal		Heidi, Long Green, Peach	3
		medium	moyenne	mittel		Kent, Tommy Atkins	5
		broad	large	breit		Hood, Keitt, Nimrod, Osteen, Palmer	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. **(old 11)** **(*)**		**Leaf blade: ratio length/width**	**Feuille à complet développement: rapport longueur/ largeur**	**Vollentwickeltes Blatt: Verhältnis Länge/Breite**			
QN	**(a)**	very small	très petit	sehr klein			1
		small	petit	klein		Hood, Nimrod	3
		medium	moyen	mittel		Adams, Irwin, Sensation	5
		large	grand	groß		Florigon	7
		very large	très grand	sehr groß		Chene′, Peach	9
6. **(old 12)** **(+)**		**Leaf blade: shape**	**Feuille à complet développement: forme prédominante**	**Vollentwickeltes Blatt: vorwiegende Form**			
PQ	**(a)**	linear					1
		oblong	lancéolée à ovale	lanzettförmig bis eiförmig		Hood	2
		elliptic	elliptique	elliptisch			3
		ovate				Van Dyke	4
		obovate					5
7. **(old 13)**		**Leaf blade: color**	**Feuille à complet développement: couleur**	**Vollentwickeltes Blatt: Farbe**			
PQ	**(a)**	yellow green	vert jaune	gelbgrün		Carrie, Zill	1
		light green	vert clair	hellgrün			2
		medium green	verte	grün			3
		dark green	vert foncé	dunkelgrün		Fascell, Long Green, Nimrod	4
8. **(old 14)** **(+)**		**Leaf blade: twisting**	**Feuille à complet développement: torsion du limbe**	**Vollentwickeltes Blatt: Drehung der Blattspreite**			
QL	**(a)**	absent	absente	fehlend		Heidi, Hood, Keitt	1
		present	présente	vorhanden		Florigon, Peach, Zill	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9. **(old 15)** **(+)**		**Leaf blade: shape in cross section**	**Feuille à complet développement: forme de la section transversale**	**Vollentwickeltes Blatt: Form im Querschnitt**	**changed**		
QN	**(a)**	straight or slightly concave	droite	gerade		Hood, Keitt, Kent, Palmer	1
		moderately concave	concave	konkav		Tommy Atkins	2
		strongly concave				Long Green, Peach, Zill	3
10. **(old 20)**		**Leaf blade: spacing of secondary veins**	**Feuille à complet développement: espacement entre les nervures secondaires**	**Vollentwickeltes Blatt: Abstand zwischen den sekundären Adern**			
QN	**(a)**	very close	très faible	sehr gering		Early Gold	1
		close	faible	gering		Sensation	3
		medium	moyen	mittel		Adams	5
		wide	grand	groß		Nimrod	7
		very wide	très grand	sehr groß		Hood	9
11. **(old 22)**		**Leaf blade: undulation of margin**	**Feuille à complet développement: ondulation du bord**	**Vollentwickeltes Blatt: Wellung des Randes**			
QN	**(a)**	absent or weak	faible	gering		Keitt, Kent, Tommy Atkins, Van Dyke	1
		medium	moyenne	mittel		Long Green, Zill	2
		strong	forte	stark		Chene, Early Gold, Florigon	3
12. **(old 24)** **(+)**		**Leaf blade: shape of base**	**Feuille à complet développement: forme de la base**	**Vollentwickeltes Blatt: Form der Basis**			
PQ	**(a)**	acute	aiguë	spitz		Florigon, Sabre	1
		obtuse	obtuse	stumpf			2
		rounded	arrondie	abgerundet		Fascell, Kent	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. (old 23) (+)		**Leaf blade: shape of apex**	**Feuille à complet développement: forme du sommet**	**Vollentwickeltes Blatt: Form der Spitze**			
PQ	**(a)**	attenuate	pointu	mit lang ausgezogener Spitze		Florigon	1
		acuminate	acuminé	mit aufgesetzter Spitze		Gouveia, Nimrod	2
		acute	aigu	spitz		Hood	3
14. (old 26)		**Petiole: attitude in relation to shoot**	**Feuille à complet développement: port du pétiole (par rapport à la tige)**	**Vollentwickeltes Blatt: Haltung des Stieles (im Verhältnis zum Stengel)**			
QN	**(a)**	erect	dressé	aufrecht		Sensation	1
		semi erect	demi-dressé	halb aufrecht		Peach	3
		perpendicular	perpendiculaire	senkrecht		Haden, Zill	5
		moderately recurved	retombant	zurückgebogen			7
		strongly recurved	très retombant	stark zurückgebogen			9
15. (old 27)		**Petiole: length**	**Feuille à complet développement: longueur du pétiole**	**Voll entwickeltes Blatt: Länge des Stieles**			
QN	**(a)**	short	court	kurz		Adams	3
		medium	moyen	mittel			5
		long	long	lang		Kensington	7
16. (old 29) (*) (+)		**Inflorescence: length**	**Inflorescence: longueur**	**Blütenstand: Länge changed**			
QN	**(b)**	short	courte	kurz		Carrie, Long Green, Peach, Sabre	3
		medium	moyenne	mittel		Osteen, Zill	5
		long	longue	lang		Haden, Keitt, Kent	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17. (old 30) (+)		**Inflorescence: diameter**	**Inflorescence: largeur**	**Blütenstand: Breite**	**Changed**		
QN	**(b)**	small	etroite	schmal		Peach, Sabre	3
		medium	moyenne	mittel		Sensation, Zill	5
		large	large	breit		Haden, Keitt	7
18. (old 31) (+)		**Inflorescence: ratio length/diameter**	**Inflorescence: rapport longueur/ largeur**	**Blütenstand: Verhältnis Länge/Breite**	**Changed**		
QN	**(b)**	small	petit	klein		Kensington	3
		medium	moyen	mittel		Haden, Tommy Atkins, Zill	5
		large	grand	gross		Irwin	7
19. (old 32) (+)		**Inflorescence: number of primary branches**	**Inflorescence: nombre de rameaux**	**Blütenstand: Anzahl Zweige**			
QN	**(b)**	few	petit	gering		Sensation, Smith	3
		medium	moyen	mittel			5
		many	grand	gross		Haden, Keitt, Osteen	7
20. (old 33) (*)		**Inflorescence: intensity of anthocyanin coloration of axis and branches**	**Inflorescence: couleur de l'axe et des rameaux**	**Blütenstand: Farbe der Achse und der Zweige**	**changed**		
QN	**(b)**	absent or very weak					1
		weak				Early gold, Kensington, Long Green	3
		medium				Haden, Peach, Sensation	5
		strong				Heidi, Hood, Irwin, Kent, Palmer, Smith, Van Dyke, Zill	7
		very strong				Osteen, Tommy Atkins	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. (old 43) (*) (+)		**Mature fruit: length**	**Fruit prêt à cueillir: longueur**	**Erntereife Frucht: Länge**			
QN	**(c)**	very short	très court	sehr kurz			1
		short	court	kurz		Adams	3
		medium	moyen	mittel		Irwin	5
		long	long	lang		Sabre, Tommy Atkins	7
		very long	très long	sehr lang		Anderson	9
22. (old 44) (*) (+)		**Mature fruit: width**	**Fruit prêt à cueillir: largeur**	**Erntereife Frucht: Breite**			
QN	**(c)**	very narrow	très étroit	sehr schmal			1
		narrow	etroit	schmal		Adams	3
		medium	moyen	mittel		Irwin, Zill	5
		broad	large	breit		Keitt, Nimrod	7
		very broad	très large	sehr breit		Extrema	9
23. (old 45) (*) (+)		**Mature fruit: ratio length/width**	**Fruit prêt à cueillir: rapport longueur/ largeur**	**Erntereife Frucht: Verhältnis Länge/Breite**			
QN	**(c)**	very small	très petit	sehr klein		Extrema, Santa Alexandrina	1
		small	petit	klein		Fascell, Sheil	3
		medium	moyen	mittel		Sensation, Tommy Atkins	5
		large	grand	gross		Carrie, Gouveia	7
		very large	très grand	sehr groß		Anderson, Sabre	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24. (old 46) (*) (+)		**Mature fruit: shape in cross section**	**Fruit prêt à cueillir: forme de la section transversale**	**Erntereife Frucht: Form im Querschnitt**			
PQ	**(c)**	narrow elliptic	elliptique étroite	schmal elliptisch		Gouveia	1
		broad elliptic	elliptique large	breit elliptisch		Sabre, Tommy Atkins	2
		circular	arrondie	abgerundet		Extrema, Santa Alexandrina	3
25. (old 47) (*)		**Mature fruit: color of skin**	**Fruit prêt à cueillir: couleur de l'épiderme**	**Erntereife Frucht: Farbe der Schale**			
PQ	**(c)**	only yellow					1
		only green	seulement vert	nur grün		Carrie	2
		green and yellow					3
		green and orange	vert et orange	grün und orange		Gouveia	4
		green and pink	vert et rose	grün und rosa		Kensington	5
		green and red	vert et rouge	grün und rot		Fascell	6
		green and purple	vert et violet	grün und purpur		Sensation, Zill	7
26. (old 50)		**Mature fruit: density of lenticels**	**Fruit prêt à cueillir: densité des lenticelles**	**Erntereife Frucht: Dichte der Lentizellen**			
QN	**(c)**	sparse	faible	locker		Carrie, Fascell, Kensington	3
	(e)	medium	moyenne	mittel		Sabre, Tommy Atkins	5
		dense	forte	dicht		Haden, Hood, Kent, Sensation	7
27. (old 51)		**Mature fruit: color contrast between lenticels and skin**	**Fruit prêt à cueillir: netteté des lenticelles**	**Erntereife Frucht: Ausprägung der Lentizellen**	**changed**		
QN	**(c)**	weak	faible	gering		Kensington, Peach, Sandersha	3
	(e)	medium	moyenne	mittel		Sheil	5
		strong	forte	stark		Haden, Kensington, Ruby	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28. (old 52)		**Mature fruit: size of lenticels**	**Fruit prêt à cueillir: taille des lenticelles**	**Erntereife Frucht: Größe der Lentizellen**			
QN	**(c)**	small	petites	klein		Sandersha, Sensation	3
	(e)	medium	moyennes	mittel			5
		large	grandes	groß		Haden, Sheil	7
29. (old 53)		**Mature fruit: roughness of surface (corkiness) caused by lenticels**	**Fruit prêt à cueillir: rugosité de la surface causée par des lenticelles**	**Erntereife Frucht: durch Lentizellen bedingte Rauheit der Oberfläche**	**Changed**		
QL	**(c)**	absent	absente	fehlend		Hood, Peach, Zill	1
		present	présente	vorhanden		Haden, Kensington	9
30. (old 54) (+)		**Mature fruit: stalk cavity**	**Fruit prêt à cueillir: cavité pédonculaire**	**Erntereife Frucht: Stielhöhle**	**Changed**		
QN	**(c)**	absent or shallow	absente	fehlend		Adams, Ruby	1
		medium				Haden	2
		deep	présente	vorhanden		Nimrod	3
31. (old 56) (+)		**Mature fruit: presence of neck**	**Fruit prêt à cueillir: collet**	**Erntereife Frucht: Hals**			
QL	**(c)**	absent	absent	fehlend		Fascell, Zill	1
		present	présent	vorhanden		Long Green, Ruby	9
32. (old 57)		**Mature fruit: length of neck**	**Fruit prêt à cueillir: netteté du collet**	**Erntereife Frucht: Ausprägung des Halses**			
QN	**(c)**	short	faible	gering		Peach, Sandersha	3
		medium	moyenne	mittel			5
		long	forte	stark		Ruby	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33. (old 58) (*) (+)		**Mature fruit: shape of ventral shoulder**	**Fruit prêt à cueillir: forme de l'épaule gauche**	**Erntereife Frucht: Form der linken Schulter**	**Changed notes**		
PQ	**(c)**	rounded upward	arrondie vers le haut	abgerundet nach oben		Tommy Atkins	1
		rounded outward	arrondie horizontale	abgerundet abstehend		Florigon, Irwin, Palmer, Zill	2
		rounded downward	arrondie vers le bas	abgerundet nach unten		Keitt, Ruby, Sandersha	3
		sloping downward	inclinée vers le bas	nach unten geneigt		Long Green	4
		falling abruptly	rupture brusque	abrupt abfallend			5
34. (old 59) (*) (+)		**Mature fruit: shape of dorsal shoulder**	**Fruit prêt à cueillir: forme de l'épaule droite**	**Erntereife Frucht: Form der rechten Schulter**	**Changed notes**		
PQ	**(c)**	rounded upward	arrondie vers le haut	abgerundet nach oben			1
		rounded outward	arrondie horizontale	abgerundet abstehend		Fascell	2
		rounded downward	arrondie vers le bas	abgerundet nach unten		Irwin, Ruby, Zill	3
		sloping downward	inclinée vers le bas	nach unten geneigt		Keitt	4
		falling abruptly	rupture brusque	abrupt abfallend		Long Green, Palmer, Sandersha	5
35. (old 61) (+)		**Mature fruit: length of groove in ventral shoulder**	**Fruit prêt à cueillir: longueur du sillon dans l'épaule gauche**	**Erntereife Frucht: Länge der Furche in der linken Schulter**	**Changed**		
QN	**(c)**	absent or short	court	kurz		Fascell, Sheil	1
		medium	moyenne	mittel		Kensington	2
		long	long	lang			3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
36. **(old 62)** **(+)**		**Mature fruit: depth of groove in ventral shoulder**	**Fruit prêt à cueillir: profondeur du sillon dans l'épaule gauche**	**Erntereife Frucht: Tiefe der Furche in der linken Schulter**	**Changed**		
QN	**(c)**	absent or shallow	peu profond	flach		Fascell	1
		medium	moyen	mittel		Sheil	2
		deep	profond	tief		Kensington	3
37. **(old 63)** **(+)**		**Mature fruit: bulging on ventral shoulder**	**Fruit prêt à cueillir: excroissance sur l'épaule gauche**	**Erntereife Frucht: Auswuchs auf der linken Schulter**	**Changed**		
QL	**(c)**	absent	absente	fehlend		Peach, Ruby	1
		present	présente	vorhanden		Fascell, Zill	9
38. **(old 64)** **(*)** **(+)**		**Mature fruit: presence of sinus**	**Fruit prêt à cueillir: sinus proximal de la cicatrice stylaire**	**Erntereife Frucht: Sinus proximal von der Griffelnarbe**			
QL	**(c)**	absent	absent	fehlend		Fascell, Hood, Kent	1
		present	présent	vorhanden		Gouveia, Sabre, Sandersha	9
39. **(old 65)** **(*)**		**Mature fruit: depth of sinus**	**Fruit prêt à cueillir: netteté du sinus proximal de la cicatrice stylaire**	**Erntereife Frucht: Ausprägung des Sinus proximal von der Griffelnarbe**			
QN	**(c)**	shallow	faible	gering		Florigon, Peach	3
		medium	moyenne	mittel		Kensington	5
		deep	forte	stark		Anderson, Sabre	7
40. **(old 66)** **(*)** **(+)**		**Mature fruit: bulging proximal of stylar scar**	**Fruit prêt à cueillir: excrois-sance proximale de la cicatrice stylaire**	**Erntereife Frucht: Auswuchs proximal von der Griffelnarbe**	**Changed**		
QN	**(c)**	absent or weak	absente	fehlend		Adams, Anderson	1
		medium					2
		strong	présente	vorhanden		Nimrod, Sheil	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41. (old 68)		**Mature fruit: point at stylar scar**			**changed**		
QN	**(c)**	absent or small				Kent, Sheil	1
		medium					2
		large				Kensington, Long Green, Sandersha	3
42. (old 69)		**Mature fruit: diameter of stalk attachment**	**Fruit prêt à cueillir: diamètre du pédoncule**	**Erntereife Frucht: Durchmesser des Stieles**			
QN	**(c)**	small	petit	klein		Irwin, Sensation	3
		medium	moyen	mittel		Adams	5
		large	grand	groß		Tommy Atkins	7
43. (old 71) (*)		**Ripe fruit: predominant color of skin**	**Fruit mûr: couleur prédominante de l'épiderme**	**Essreife Frucht: überwiegende Farbe der Schale**			
PQ	**(d)**	green	vert	grün		Long Green	1
		yellow green	vert jaune	gelbgrün		Carrie, Sandersha	2
		green and yellow	vert et jaune	grün und gelb		Early Gold	3
		yellow	jaune	gelb			4
		yellow orange				Kensington	5
		yellow and orange	jaune et orange	gelb und orange		Peach	6
		orange	orange	orange			7
		yellow and red	jaune et rouge	gelb und rot		Adams, Haden, Ruby, Sensation, Zill	8
		orange and red	orange et rouge	orange und rot			9
		red	rouge	rot		Van Dyke	10
		orange and purple	orange et violet	orange und purpur		Tommy Atkins	11
		red and purple	rouge et violet	rot und purpur			12
		purple	violet	purpur			13

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
44. (old 73)		**Ripe fruit: speckling of skin**	**Fruit mûr: répartition de la couleur de l'épiderme**	**Essreife Frucht: Verteilung der Farbe der Schale**	**Changed**		
QN	**(d)**	absent or very weak	uniforme	einheitlich			1
		weak	tachetée	gefleckt		Kensington	3
		medium					5
		strong				Sheil	7
45. (old 75)		**Ripe fruit: thickness of skin**	**Fruit mûr: épaisseur de l'épiderme**	**Essreife Frucht: Dicke der Schale**			
QN	**(d)**	thin	fin	dünn		Adams, Carrie, Florigon	3
		medium	moyen	mittel		Sabre, Sheil	5
		thick	epais	dick		Haden	7
46. (old 76)		**Ripe fruit: adherence of skin to flesh**	**Fruit mûr: adhérence de l'épiderme à la chair**	**Essreife Frucht: Anhaften der Schale am Fleisch**			
QN	**(d)**	weak	faible	gering		Peach	3
		medium	moyenne	mittel			5
		strong	forte	stark		Fascell, Sheil, Zill	7
47. (old 77) (*)		**Ripe fruit: main color of flesh**	**Fruit mûr: couleur principale de la chair**	**Essreife Frucht: Hauptfarbe des Fleisches**			
PQ	**(d)**	greenish yellow	jaune verdâtre	grünlichgelb			1
		light yellow	jaune pâle	hellgelb			2
		medium yellow	jaune	gelb			3
		light orange	orange pâle	hellorange		Extrema	4
		medium orange	orange	orange			5
		dark orange	orange foncé	dunkelorange			6

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
48. (old 78)		**Ripe fruit: firmness of flesh**	**Fruit mûr: fermeté de la chair**	**Essreife Frucht: Festigkeit des Fleisches**			
QN	**(d)**	soft	molle	weich		Carrie, Sheil	3
		medium	moyenne	mittel		Haden, Zill	5
		firm	ferme	fest		Peach, Sensation, Tommy Atkins	7
49. (old 79)		**Ripe fruit: juiciness**	**Fruit mûr: succulence**	**Essreife Frucht: Saftigkeit**			
QN	**(d)**	dry	sec	trocken			3
		medium	moyen	mittel		Tommy Atkins	5
		juicy	juteux	saftig		Carrie	7
50. (old 80)		**Ripe fruit: texture of flesh**	**Fruit mûr: texture de la chair**	**Essreife Frucht: Textur des Fleisches**			
QN	**(d)**	fine	fine	fein		Adams, Fascell	3
		medium	moyenne	mittel		Tommy Atkins	5
		coarse	grossière	grob		Sheil	7
51. (old 81) (*)		**Ripe fruit: amount of fiber**	**Fruit mûr: importance de la fibre non charnue de la chair attachée au noyau**	**Essreife Frucht: Anteil der am Kern anliegenden nicht-fleischigen Fasern des Fleisches**	**Changed**		
QN	**(d)**	very low	très faible	sehr klein		Haden, Heidi, Irwin, Keitt, Kensington, Kent, Zill	1
		low	faible	klein		Tommy Atkins	3
		medium	moyenne	mittel		Sabre	5
		high	forte	groß			7
		very high	très forte	sehr groß		Kidney, Peach	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
52. (old 83) (*)		**Ripe fruit: turpentine flavor**	**Fruit mûr: saveur térébenthine**	**Essreife Frucht: Terpentin-geschmack**			
QL	**(d)**	absent	absente	fehlend		Kent, Sensation	1
		present	présente	vorhanden		Extrema, Kensington, Sandersha	9
53. (old 85)		**Stone: relief of surface**	**Noyau: relief de la surface**	**Kern: Relief der Oberfläche**			
PQ		grooved	cannelé	gefurcht		Extrema, Keitt, Kensington, Long Green, Peach, Sabre, Zill	1
		smooth	lisse	glatt		Ruby	2
		ridged	annelé	geringelt		Heidi, Irwin, Kent, Tommy Atkins	3
54. (old 92)		**Seed: shape**	**Semence: forme**	**Samen: Form**			
QL		oblong	rectangulaire	rechteckig		Sabre	1
		reniform	faiblement réniforme	leicht nierenförmig			2
55. (old 93) (*)		**Seed: embryony**	**Semence: polyembryonnie**	**Samen: Polyembryonie**			
QL		monoembryonic	absente	fehlend		Sensation, Tommy Atkins	1
		polyembryonic	présente	vorhanden		Peach, Sabre	2
56. (old 94)		**Time of beginning of flowering**	**Époque de début de floraison**	**Zeitpunkt des Blühbeginns**			
QN		early	précoce	früh		Early Gold	3
		medium	moyenne	mittel		Fascell	5
		late	tardive	spät		Sensation	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
57. (old 95) (*)	**Time of fruit maturity**	**Époque de maturité des fruits**	**Zeitpunkt der Fruchtreife**			
QN	very early	très précoce	sehr früh		Early Gold, Florigon, Long Green	1
	early	précoce	früh		Zill	3
	medium	moyenne	mittel		Fascell, Nimrod, Tommy Atkins	5
	late	tardive	spät		Sensation	7
	very late	très tardive	sehr spät		Keitt	9

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) Observations on the leaf which should be on mature leaves in the middle third of the youngest shoots not showing signs of active growth. The attitude of the petiole should be observed on upward growing shoots.

(b) Inflorescences should be selected from terminal panicles of typical shoots from the exposed regions of the tree. Observations should be made at the time of full flowering. **(changed)**

(c) The mature fruit is the fruit at the stage ready for harvesting. This stage is reached when the flesh is still quite firm and has not become juicy but has started coloring around the stone. All fruits for observation should be harvested from the periphery of the tree and ripened at room temperature without any artificial ripening agents.

(d) The ripe fruit is the fruit at the stage ready for consumption. This stage is reached when the flesh is juicy and has become colored from the stone to the skin.

(e) All observations on the lenticels should be made on the lateral side of the fruit.

8.2 Explanations for individual characteristics

Ad. 2: Young leaf: intensity of anthocyanin coloration

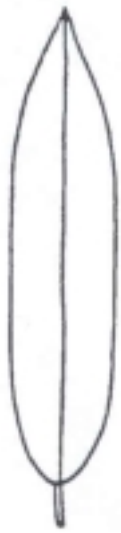
Observations should be made on active growth (flush) on the youngest leaves at the tip of the shoot. **(changed)**

Ad. 6 (old 12): Leaf blade: shape

TO BE UPDATED

1
trullate to ovate

2
elliptic



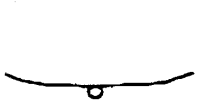
3
oblong

Ad. 8 (old 14): Leaf blade: twisting

1
absent

9
present

Ad. 9 (old 15): Leaf blade: shape in cross section



1
straight or slightly concave

2
moderately concave

3
strongly concave

Ad. 12 (old 24): Leaf blade: shape of base

1
acute

2
obtuse

3
rounded

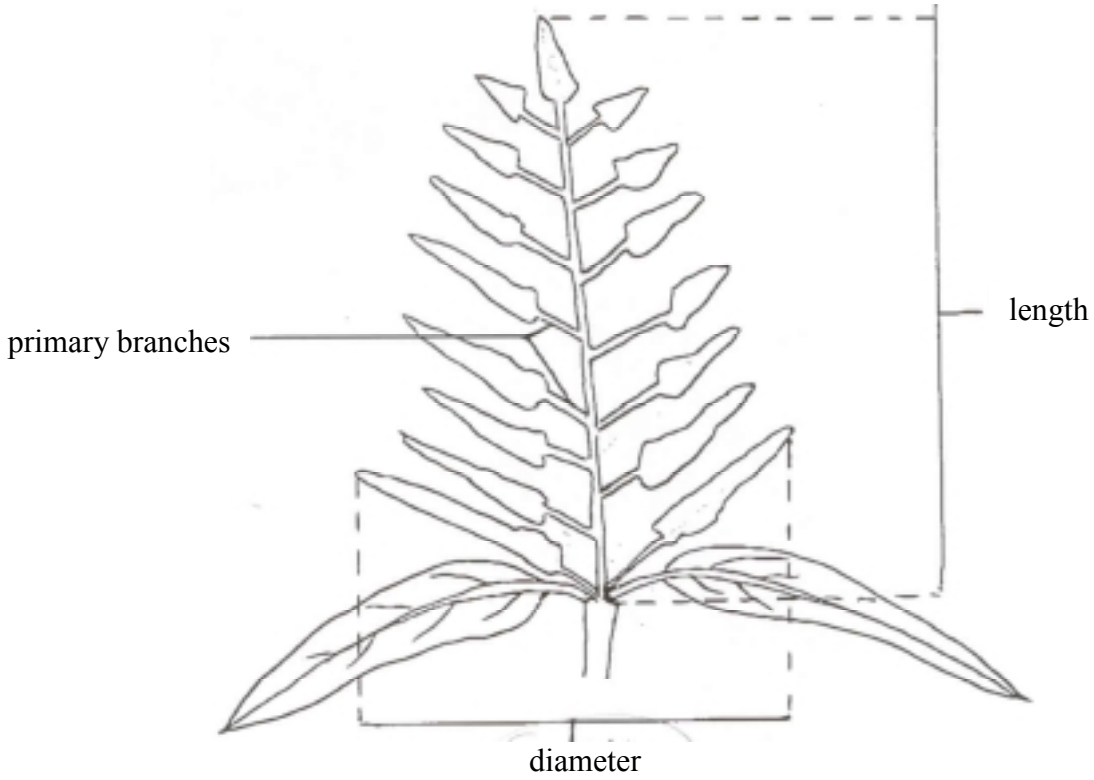
Ad. 13 (old 23): Leaf blade: shape of apex

1
attenuate

2
acuminate

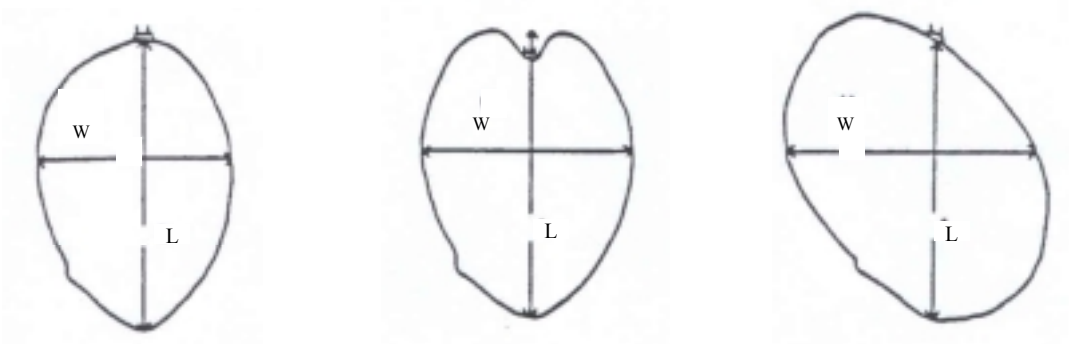
3
acute

Ad. 16 (old 29): Inflorescence: length
Ad. 17 (old 30): Inflorescence: diameter
Ad. 18 (old 31): Inflorescence: ratio length/diameter
Ad. 19 (old 32): Inflorescence: number of primary branches



Ad. 21 (old 43): Mature fruit: length (= L)
Ad. 22 (old 44): Mature fruit: width (= W)
Ad. 23 (old 45): Mature fruit: ratio length/width

For observations on the length and width of the fruit, the fruit should be sawed lengthwise, through the stalk attachment and the stylar scar. The outline may be traced and measurements made on paper. The length of the fruit is taken along the axis through the stalk attachment and the furthest point. The width is taken at the broadest part perpendicular to the length.



Ad. 24 (old 46): Mature fruit: shape in cross section

To determine the shape in cross section, the fruit should be sawed through the broadest part, at a right angle (perpendicular) to the length.

1
narrow elliptic

2
broad elliptic

3
circular

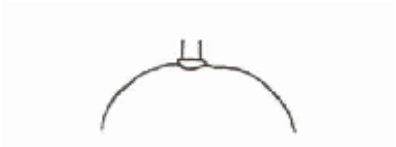
Ad. 30 (old 54): Mature fruit: stalk cavity

1
absent or shallow

2
medium

3
deep

Ad. 31 (old 56): Mature fruit: presence of neck **(changed)**



1
absent

9
present

Ad. 33 (old 58): Mature fruit: shape of ventral shoulder
Ad. 34 (old 59): Mature fruit: shape of dorsal shoulder

1
rounded upward

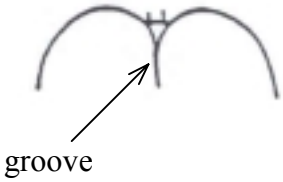
2
rounded outward

3
rounded downward

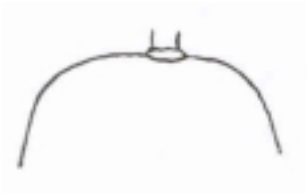
4
sloping downward

5
falling abruptly

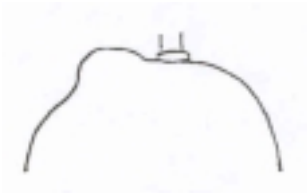
Ad. 35 (old 61): Mature fruit: length of groove in ventral shoulder
Ad. 36 (old 62): Mature fruit: depth of groove in ventral shoulder



Ad. 37 (old 63): Mature fruit: bulging on ventral shoulder



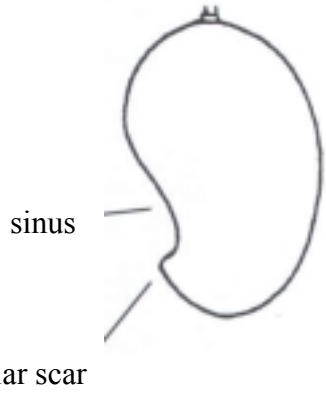
1
absent



9
present

Ad. 38 (old 64): Mature fruit: presence of sinus

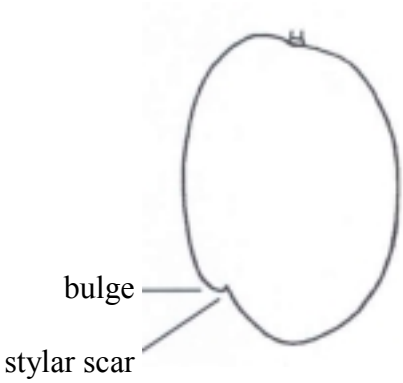
1
absent



9
present

Ad. 40 (old 66): Mature fruit: bulging proximal of stylar scar

1
absent



9
present

9. Literature

ARTM 2003: Relevant literature to be added.
TWF 2003: 'Mango Number' reference to be completed.
ARTM 2004: Experts from India, Philippines and TFNet to provide further literature.
ZA 2004: Books by Campbell? And IPGRI Descriptors?

TWF 2003: 'Mango Number' reference to be completed.

Gangolly, S.R., Singh, R., Katyal, S.L., Singh, D., 1957: "The Mango," Indian Council of Agricultural Research, New Delhi, India, pp. 19-459

Kurup, C.G.R. (Chief Editor), 1967: "The Mango: A Handbook," Indian Council of Agricultural Research, New Delhi, India, pp. 14-31

"Mango Number," Punjab Fruit Journal, nn. 82-83, 1960

Naik, K.C., Gangolly, S.R., 1950: "A Monograph on Classification and Nomenclature of South Indian Mangoes", Superintendent, Government Press, Madras, India, pp. 36-273

Singh, L.B., 1960: "The Mango: Botany, Cultivation and Utilization," Interscience Publishers, Leonard Hill, London, GB, New York, US, pp. 91-142

Singh, L.B., 1969: "Mango, Outlines of Perennial Crop Breeding in the Tropics," Misc. Papers, 4. Landbouwhogeschool Edit., Wageningen, NL

Valmayor, R., 1962: "The Mango: Its Botany and Production," University of the Philippines, College, Laguna

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name	*Mangifera indica* L.
1.2 Common name	MANGO

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]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) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered
and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

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 (23)	**Mature fruit: ratio length/width**		
(old 45)	very small	Extrema, Santa Alexandrina	1[ ]
	small	Fascell, Sheil	3[ ]
	medium	Sensation, Tommy Atkins	5[ ]
	large	Carrie, Gouveia	7[ ]
	very large	Anderson, Sabre	9[ ]
5.2 (33)	**Mature fruit: shape of ventral shoulder**		
(old 58)	rounded upward	Tommy Atkins	1[ ]
	rounded outward	Florigon, Irwin, Palmer, Zill	2[ ]
	rounded downward	Keitt, Ruby, Sandersha	3[ ]
	sloping downward	Long Green	4[ ]
	falling abruptly		5[ ]
5.3 (34)	**Mature fruit: shape of dorsal shoulder**		
(old 59)	rounded upward		1[ ]
	rounded outward	Fascell	2[ ]
	rounded downward	Irwin, Ruby, Zill	3[ ]
	sloping downward	Keitt	4[ ]
	falling abruptly	Long Green, Palmer, Sandersha	5[ ]
5.4 (38)	**Mature fruit: presence of sinus**		
(old 64)	absent	Fascell, Hood, Kent	1[ ]
	present	Gouveia, Sabre, Sandersha	9[ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.5 (40)	**Mature fruit: bulging proximal of stylar scar**		
(old 66)	absent or weak	Adams, Anderson	1[ ]
	medium		2[ ]
	strong	Nimrod, Sheil	3[ ]
5.6 (55)	**Seed: embryony**		
(old 93)	monoembryonic	Sensation, Tommy Atkins	1[ ]
	polyembryonic	Peach, Sabre	2[ ]
5.7 (57)	**Time of fruit maturity**		
(old 95)	very early	Early Gold, Florigon, Long Green	1[ ]
	early	Zill	3[ ]
	medium	Fascell, Nimrod, Tommy Atkins	5[ ]
	late	Sensation	7[ ]
	very late	Keitt	9[ ]

6. Similar varieties and differences from these varieties

Please use the following table and box for comments 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
(Example)			

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]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 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide 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.

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

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]