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TG/163/3

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

UNION INTERNATIONALE POUR LA PROTECTION DES OBTENTIONS VÉGÉTALES

INTERNATIONALER VERBAND ZUM SCHUTZ VON PFLANZEN-ZÜCHTUNGEN

UNIÓN INTERNACIONAL PARA LA PROTECCIÓN DE LAS OBTENCIONES VEGETALES

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

APPLE ROOTSTOCKS

(*Malus* Mill.)

GENEVA
1999

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TG/163/3
ORIGINAL: English
DATE: 1999-03-24

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(*Malus* Mill.)

These Guidelines should be read in conjunction with document TG/1/2, which contains explanatory notes on the general principles on which the Guidelines have been established.

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I. Subject of these Guidelines

These Test Guidelines apply to all vegetatively propagated rootstock varieties of *Malus* Mill. If characteristics of the flower, the fruit or the seed are necessary to establish distinctness, the Test Guidelines for Apple Fruit Varieties (TG/14/8) should be used for those characteristics, if applicable.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. As a minimum, the following quantity of plant material is recommended:

25 one-year-old rooted plants (virus free).

2. The plant material supplied should be visibly healthy, not lacking in vigor or affected by any important pests or diseases. It should preferably not be obtained from *in vitro* propagation.

3. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

1. The minimum duration of tests should normally be two similar growing periods.

2. From the submitted 25 plants 20 plants should be cut back annually in the stoolbed and 5 plants should be grown to produce trees, in case characteristics of the adult tree are needed for the establishment of distinctness.

3. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

4. The tests should be carried out under conditions ensuring normal growth. Each test should include a total of 20 plants. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.

5. Additional tests for special purposes may be established.

IV. Methods and Observations

1. All observations determined by measurements, weighing or counting should be made on 10 plants or parts taken from each of 10 plants.

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 20 plants, the maximum number of off-types allowed would be 1.

3. Unless otherwise stated, observations of vegetative characteristics should be made on plants which are cut back annually in the stoolbed.

4. Unless otherwise stated, all observations on the plant and on the shoot should be made on the middle third of the one-year-old shoot in the dormant season.

5. Unless otherwise stated, all observations on the leaf should be made on fully developed leaves from the middle third of a vigorous shoot in summer.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. It is recommended that the competent authorities use the following characteristics for grouping varieties:

(a) Plant: habit of shoot (characteristic 3)
(b) Plant: growth of shoot (characteristic 4)
(c) Expanding leaf: anthocyanin coloration of blade (characteristic 18)
(d) Time of beginning of bud burst (characteristic 32)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.

3. Legend

(*) Characteristics that should be used on all varieties in every growing period over which examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

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

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	**Plant: vigor**	**Plante: vigueur**	**Pflanze: Wuchs-stärke**	**Planta: vigor**		
	weak	faible	gering	débil	M 27	3
	medium	moyenne	mittel	media	M 7, M 26	5
	strong	forte	stark	fuerte	MM 106	7
2.	**Plant: number of shoots**	**Plante: nombre de rameaux**	**Pflanze: Anzahl Triebe**	**Planta: número de ramas**		
	very few	très petit	sehr gering	muy bajo	M 27	1
	few	petit	gering	bajo	M 9	3
	medium	moyen	mittel	medio	M 26	5
	many	grand	groß	alto	M 9, MM 106, MM 111	7
	very many	très grand	sehr groß	muy alto	M 25	9
3. (*)	**Plant: habit of shoot**	**Plante: port du rameau**	**Pflanze: Haltung der Triebe**	**Planta: porte de la rama**		
	upright	dressé	aufrecht	erecto	M 4	1
	spreading	étalé	breitwüchsig	rastrero	Cepiland	2
	drooping	retombant	hängend	colgante	Marubakaido	3
4. (*)	**Plant: growth of shoot**	**Plante: croissance du rameau**	**Pflanze: Wuchs der Triebe**	**Planta: crecimiento de las ramas**		
	straight	droite	gerade	recto	M 9	1
	wavy or zigzag	ondulée ou en zigzag	gewellt oder zick-zackförmig	ondulado o en zigzag	M 2, M 25	2

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. (*)	**Shoot: pubescence (on upper half of shoot)**	**Rameau: pubescence (moitié supérieure du rameau)**	**Trieb: Behaarung (obere Triebhälfte)**	**Rama: pubescencia (en la mitad superior de la rama)**		
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil		1
	weak	faible	gering	débil	B 9, M 26	3
	medium	moyenne	mittel	media	M 27	5
	strong	forte	stark	fuerte	M 9	7
	very strong	très forte	sehr stark	muy fuerte	Crab C	9
6. (*)	**Shoot: glossiness of bark**	**Rameau: brillance de l'écorce**	**Trieb: Glanz der Rinde**	**Rama: brillo de la corteza**		
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil		1
	weak	faible	gering	débil	M 26	3
	medium	moyenne	mittel	medio		5
	strong	forte	stark	fuerte	M 27	7
	very strong	très forte	sehr stark	muy fuerte		9
7. (*)	**Shoot: thickness (at midlength)**	**Rameau: épaisseur (à mi-longueur)**	**Trieb: Dicke (in der Mitte)**	**Rama: grosor (a media longitud)**		
	thin	mince	dünn	delgada	M 7, M 27	3
	medium	moyen	mittel	media	MM 111	5
	thick	épais	dick	gruesa	M 106	7
8. (*)	**Shoot: length of internodes (as for 7)**	**Rameau: longueur des entre-nœuds (comme pour 7)**	**Trieb: Länge der Internodien (wie unter 7)**	**Rama: longitud de los entrenudos (como en 7)**		
	short	courts	kurz	corta	M 25	3
	medium	moyens	mittel	media	M 26	5
	long	longs	lang	larga	M 7	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9. (*)	**Shoot: number of lenticels**	**Rameau: nombre de lenticelles**	**Trieb: Anzahl Lentizellen**	**Rama: número de lenticelas**		
	absent or very few	absent ou très petit	fehlend oder sehr gering	ausente o muy bajo		1
	few	petit	gering	bajo	M 9	3
	medium	moyen	mittel	medio	M 26	5
	many	grand	groß	alto	M 2, MM 111	7
	very many	très grand	sehr groß	muy alto	MM 104	9
10.	**Shoot: size of lenticels**	**Rameau: taille des lenticelles**	**Trieb: Größe der Lentizellen**	**Rama: tamaño de las lenticelas**		
	small	petites	klein	pequeñas		3
	medium	moyennes	mittel	medias	M 9, M 26	5
	large	grandes	groß	grandes	M 2	7
11.	**Shoot: shape of lenticels**	**Rameau: forme des lenticelles**	**Trieb: Form der Lentizellen**	**Rama: forma de las lenticelas**		
	elliptic	elliptiques	elliptisch	elípticas	M 25	1
	broad elliptic	elliptiques larges	breit elliptisch	elípticas anchas	M 26, M 111	2
	circular	rondes	rund	circulares	M 9, M 27	3
12. (*)	**Shoot: predominant color on sunny side**	**Rameau: couleur prédominante de la face ensoleillée**	**Trieb: vorherrschende Farbe auf der Sonnenseite**	**Rama: color predominante de la parte soleada**		
	greenish brown	brun verdâtre	grünlichbraun	marrón grisáceo		1
	reddish brown	brun rougeâtre	rötlichbraun	marrón rojizo	M 9	2
	medium brown	brun moyen	mittelbraun	marrón medio	M 25, M 27	3
	dark brown	brun foncé	dunkelbraun	marrón oscuro	B 9, M 2, M 26, MM 106	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. (*)	**Shoot: size of bud**	**Rameau: taille de l'œil**	**Trieb: Größe der Knospe**	**Rama: tamaño de la yema**		
	small	petit	klein	pequeño	M 25, MM 111	3
	medium	moyen	mittel	mediano	MM 106	5
	large	grand	groß	grande	M2, M 9, M 27	7
14. (+)	**Shoot: shape of tip of bud**	**Rameau: forme du sommet de l'œil**	**Trieb: Form der Spitze der Knospe**	**Rama: forma del extremo de la yema**		
	pointed	pointu	spitz	puntiagudo	M 9, M 27	1
	rounded	arrondi	abgerundet	redondeado	Bemali, MM 111	2
15. (+)	**Shoot: position of bud relative to axis**	**Rameau: position de l'œil par rapport à l'axe**	**Trieb: Stellung der Knospe im Verhältnis zur Achse**	**Rama: posición de la yema en relación con el eje**		
	adpressed	appliquée	anliegend	alineado	MM 106	1
	slightly held out	faiblement divergente	leicht abstehend	ligeramente divergente	M 9, M 26	2
	markedly held out	nettement divergente	deutlich abstehend	claramente divergente		3
16. (+)	**Shoot: size of bud support**	**Rameau: taille du support de l'œil**	**Trieb: Größe des Knospenwulstes**	**Rama: tamaño del soporte de la yema**		
	small	petit	klein	pequeño	M 9	3
	medium	moyen	mittel	medio	M 7, M 27	5
	large	grand	groß	grande	M 2	7
17. (*)	**Shoot: color of growing tip**	**Rameau: couleur du sommet en croissance**	**Trieb: Farbe der wachsenden Spitze**	**Rama: color del ápice de crecimiento**		
	whitish	blanchâtre	weißlich	blancuzco	M 25	1
	greenish	verdâtre	grünlich	verdoso	M 2, M 27, MM 106	2
	reddish	rougeâtre	rötlich	rojizo	M 9	3
	blackish	noirâtre	schwärzlich	negruzco	B 9, M 10, M 26	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. (*)	**Expanding leaf: anthocyanin coloration of blade**	**Feuille en cours de croissance: pigmentation anthocyanique du limbe**	**Sich entfaltendes Blatt: Anthocyanfärbung der Blattspreite**	**Hoja en crecimiento: pigmentación antociánica del limbo**		
	absent	absente	fehlend	ausente	M 27	1
	present	présente	vorhanden	presente	B 9	9
19. (*)	**Expanding leaf: hue of anthocyanin coloration of blade**	**Feuille en cours de croissance: teinte de pigmentation anthocyanique du limbe**	**Sich entfaltendes Blatt: Ton der Anthocyanfärbung der Blattspreite**	**Hoja en crecimiento: matiz de la pigmentación antociánica del limbo**		
	bronze	bronze	bronzefarben	bronce	P 22	1
	purple	pourpre	purpurn	púrpura	B 9	2
20. (+)	**Leaf blade: attitude in relation to shoot**	**Limbe: port par rapport au rameau**	**Blattspreite: Stellung im Verhältnis zum Trieb**	**Limbo: porte en relación con la rama**		
	semi-upwards	demi-dressé	halbaufrecht	semiascendente	M 111	3
	outwards	horizontal	waagerecht	horizontal	M 7, MM 106	5
	semi-downwards	demi-retombant	halbhängend	semidescendente		7
21. (*)	**Leaf blade: length**	**Limbe: longueur**	**Blattspreite: Länge**	**Limbo: longitud**		
	short	court	kurz	corto	M 26, M 27	3
	medium	moyen	mittel	medio	M 111	5
	long	long	lang	largo	M 9, P 16	7
22. (*)	**Leaf blade: width**	**Limbe: largeur**	**Blattspreite: Breite**	**Limbo: anchura**		
	narrow	étroit	schmal	estrecho	M 26	3
	medium	moyen	mittel	medio	M 9, M 27	5
	broad	large	breit	ancho	P 14	7

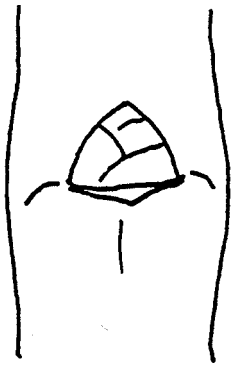
	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23. (*)	**Leaf blade: ratio length/width**	**Limbe: rapport longueur/largeur**	**Blattspreite: Verhältnis Länge/ Breite**	**Limbo: relación longitud/anchura**		
	small	petit	klein	pequeña	M 7	3
	medium	moyen	mittel	media	M 26	5
	large	grand	groß	grande	P 16	7
24. (*)	**Leaf blade: profile in cross section**	**Limbe: profil en section transversale**	**Blattspreite: Profil im Querschnitt**	**Limbo: perfil en sección transversal**		
	concave	concave	konkav	cóncava	M 27, M 111	1
	straight	droit	gerade	recta	M 9	2
	convex	convexe	konvex	convexa	M 25	3
25. (*)	**Leaf blade: length of pointed tip**	**Feuille: longueur de la pointe**	**Blatt: Länge der Spitze**	**Limbo: longitud del extremo**		
	short	courte	kurz	corto	M 27	3
	medium	moyenne	mittel	medio	M 9	5
	long	longue	lang	largo	P 16	7
26. (*)	**Leaf blade: incisions of margin**	**Limbe: incisions du bord**	**Blattspreite: Randeinschnitte**	**Limbo: incisiones del borde**		
	crenate	crénelé	gekerbt	crenadas	M 9	1
	serrate	denté	gesägt	serradas	M 26, M 27	2
27.	**Leaf blade: pubescence on lower side**	**Limbe: pilosité de la face inférieure**	**Blattspreite: Behaarung der Unterseite**	**Limbo: pubescencia del envés**		
	weak	faible	gering	débil	M 9	3
	medium	moyenne	mittel	media	M 27	5
	strong	forte	stark	fuerte	MM 106	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28. (*)	**Leaf blade: anthocyanin coloration of veins**	**Limbe: pigmentation anthocyanique des nervures**	**Blattspreite: Anthocyanfärbung der Adern**	**Limbo: pigmentación antociánica de las nervaduras**		
	weak	faible	gering	débil	M 9	3
	medium	moyenne	mittel	media	M 26	5
	strong	forte	stark	fuerte	MM 106, MM 109	7
29. (*)	**Petiole: length**	**Pétiole: longueur**	**Blattstiel: Länge**	**Peciolo: longitud**		
	short	court	kurz	corto	M 26, M 27	3
	medium	moyen	mittel	medio	M 9	5
	long	long	lang	largo	MM 106, MM 111	7
30. (*)	**Leaf: ratio length of blade/length of petiole**	**Feuille: rapport longueur du limbe/ longueur du pétiole**	**Blatt: Verhältnis Länge der Spreite/ Länge des Stieles**	**Hoja: relación longitud del limbo/longitud del peciolo**		
	small	petit	klein	pequeña		3
	medium	moyen	mittel	media	B 9, M 9	5
	large	grand	groß	grande	P 2, P 16	7
31. (*)	**Stipule: size**	**Stipule: taille**	**Nebenblatt: Größe**	**Estípula: tamaño**		
	small	petit	klein	pequeño	M 27	3
	medium	moyen	mittel	medio	M 9, M 26	5
	large	grand	groß	grande	MM 106	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
32. (*)	**Time of beginning of bud burst**	**Époque de début du débourrement**	**Zeitpunkt des Beginns des Knospenaufbruchs**	**Época de inicio de apertura de yemas**		
	very early	très précoce	sehr früh	muy temprano	P 16	1
	early	précoce	früh	temprano	M 9, MM 106	3
	medium	moyenne	mittel	media	M 25	5
	late	tardive	spät	tarde	MM 111	7
	very late	très tardive	sehr spät	muy tarde	M 26	9

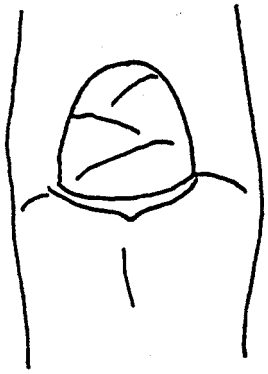
VIII. Explanation on the Table of Characteristics

Ad. 14: Shoot: shape of tip of bud



1

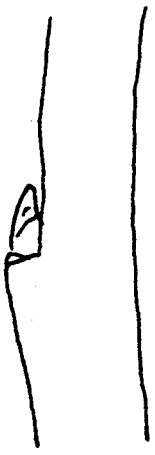
pointed



2

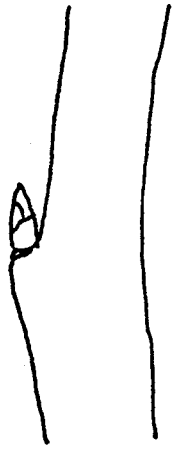
rounded

Ad. 15: Shoot: position of bud relative to axis



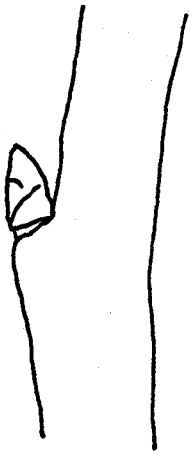
1

adpressed



2

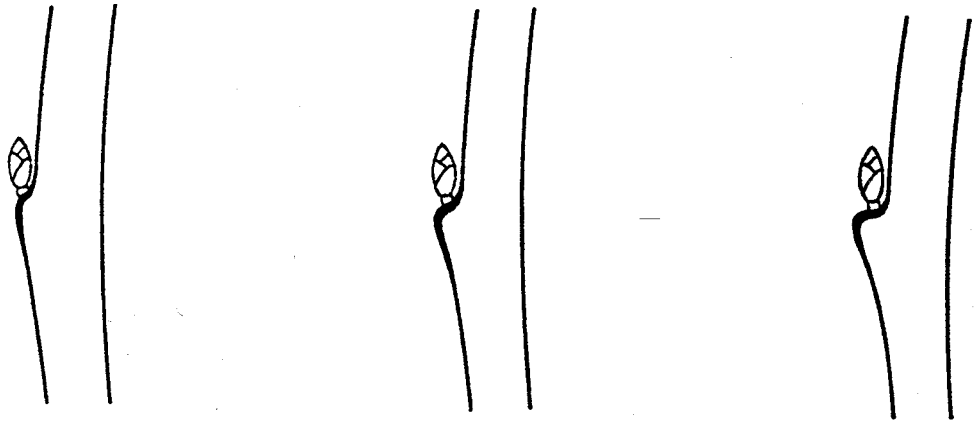
slightly held out



3

markedly held out

Ad. 16: Shoot: size of bud support



3	5	7
small	medium	large

Ad. 20: Leaf blade: attitude in relation to shoot

3	5	7
semi-upwards	outwards	semi-downwards

IX. Literature

Embree, C.G. 1995: "A Photographic Description of the Fruit of Certain Apple Rootstocks," Fruit Varieties Journal, 49 (1):59-64, USA

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Tydeman, H.M., 1953: "A Description of Classification of the Malling-Herton and Malling XXV Apple Rootstocks," Report East Malling Research Station for 1952, pp. 53-63, United Kingdom

Tydeman, H.M., 1954: "A Description of Certain MIX Crosses," Report East Malling Research Station for 1953, United Kingdom

Tydeman, H.M., 1955: "Descriptions of the Malling Apple Rootstocks," Report East Malling Research Station for 1954, pp. 64-66, United Kingdom

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)

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

1.1	Genus	*Malus* Mill. APPLE ROOTSTOCKS
1.2	Species	..... (indicate species)

2. Applicant (Name and address)

3. Proposed denomination or breeder's reference

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin

(a) Seedling of unknown parentage [ ]

(b) Produced by controlled pollination [ ]
(indicate parent varieties)

– Seed bearing parent (indicate parent)

.....

– Pollen parent (indicate parent)

.....

(c) Produced by open pollination of [ ]
(indicate seed bearing parent plant)

.....

(d) Mutation or sport from (indicate original parent variety)

..... [ ]

(e) Discovery (indicate where and when)

..... [ ]

4.2 *In vitro* propagation

The plant material of the candidate variety has been obtained by *in vitro* propagation yes [ ]
no [ ]

4.3 Virus status

(a) The variety is free from all known viruses as follows: [ ]
(indicate from which viruses)

.....

(b) The plant material is virus tested [ ]
(indicate against which viruses)

.....

(c) The virus status is unknown [ ]

4.4 Other information

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the state of expression which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (3)	**Plant: habit of shoot**		
	upright	M 4	3[ ]
	spreading	Cepiland	5[ ]
	drooping	Marubakaido	7[ ]
5.2 (4)	**Plant: growth of shoot**		
	straight	M 9	1[ ]
	wavy or zigzag	M 2, M 25	2[ ]
5.3 (18)	**Expanding leaf: anthocyanin coloration of blade**		
	absent	M 27	1[ ]
	present	B 9	9[ ]
5.4 (32)	**Time of beginning of bud burst**		
	very early	P 16	1[ ]
	early	M 9, MM 106	3[ ]
	medium	M 25	5[ ]
	late	MM 111	7[ ]
	very late	M 26	9[ ]

6. Similar varieties and differences from these varieties

Denomination of similar variety	Characteristic in which the similar variety is different [o)]	State of expression of similar variety	State of expression of candidate variety

[o)] In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Special conditions for the examination of the variety

7.3 Other information

A representative color photo of the variety should be added to 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 that question is yes, please attach a copy of such an authorization.

[End of document]