

دفتر الشروط الخاصة

مناقصة عمومية رقم ٢٣٠٨١
لتوريد كابلات هاتفية نحاسية متنوعة
لزوم هيئة أوجيرو



المادة ١: النصوص القانونية التي ترعى المناقصة العمومية

بالإضافة الى الشروط المنصوص عنها في المواد أدناه، تطبق على الفريقين النصوص الواردة في قانون الشراء العام رقم ٢٤٤ تاريخ ٢٠٢١/٧/٢٩، لذلك يقتضي على العارض الاطلاع عليه والتقييد به على صفحة هيئة أوجيرو www.ogero.gov.lb، وعلى المنصة الالكترونية المركزية لدى هيئة الشراء العام www.ppa.gov.lb.

في حال تعارض مواد دفتر الشروط هذا مع شروط قانون الشراء العام، يتم تطبيق أحكام قانون الشراء العام.

المادة ٢: غاية التلزم

إن الغاية من هذا الشراء عبر المناقصة العمومية هي توريد كابلات نحاسية هاتفية متنوعة وذلك وفقاً للائحة الكميات وللمواصفات الفنية المرفقين بهذا الدفتر. تتألف هذه المناقصة من مجموعة واحدة. وذلك على أساس تقديم أسعار بواسطة الظرف المختوم، ويسند التلزم مؤقتاً الى العارض المقبول شكلاً من الناحية الإدارية والفنية والذي قدم السعر الأدنى الإجمالي للصفقة.

المادة ٣: مهلة التنفيذ

ان فترة الالتزام لتوريد الكابلات الهاتفية النحاسية هي ستة أشهر كحد أقصى تبدأ اعتباراً من تاريخ الإبلاغ عن توقيع العقد. وعلى الملزم بدء التنفيذ وفقاً للأولويات التي تحددها الهيئة.

المادة ٤: المحاسبة والدفع

تُدفع مستحقات الملزم، بعملة الدولار الاميركي او ما يعادلها بالليرة اللبنانية وفقاً للقيمة الفعلية للحصول على العملة الاجنبية عند الدفع، على النحو التالي:

- ٩٠% من قيمة الكابلات المسلمة بناءً على محضر إستلام مؤقت خاص بها صادر عن لجنة الإستلام المشكّلة لهذه الغاية.

- ١٠% المتبقية من قيمة الإلتزام بعد الإنتهاء من توريد كافة الكميات المطلوبة وبناءً على محضر الاستلام المؤقت الاخير الصادر عن اللجنة المشكّلة لهذه الغاية.

- يتم تسديد مستحقات الملزم على أساس احتساب الكمية المسلمة للكابلات والتي يجب ان لا تزيد أو تنقص عن نسبة ١%

المادة ٥: الإستلام

- يجري الاستلام على مرحلتين مؤقتاً ونهائياً، ويمكن أن يجري مرة واحدة أو على مراحل تتناول كل مرحلة منها جزءاً من التلزم. تستلم الاعمال لجنة الاستلام المحددة لهذه الغاية وتُقدّم تقريرها خلال مدة زمنية أقصاها ثلاثين يوماً تبدأ من تاريخ تقديم طلب الاستلام من قبل الملزم.

- في حال تطلّبت طبيعة المشروع وحجمه مدة تتجاوز الثلاثين يوماً، على اللجنة تبرير أسباب ذلك خطياً ووضع اقتراحاتها بهذا الشأن خلال مهلة الثلاثين يوماً، على ألا تتجاوز المهلة في جميع الأحوال الستين يوماً تبدأ من تاريخ تقديم طلب الاستلام من قبل الملزم.

- يتوجب على الملزم تقديم طلب خطي قبل موعد التسليم يُحدّد فيه مختلف البنود المطلوب استلامها:

- مرفقاً بكشف مصدق من المديرية المعنية اذا كانت عملية الشراء تتعلق بتنفيذ اعمال او اشغال.

- بموجب كشف مصدق من مستودعات اوجيرو عند وجوب تسليم مواد، على ان يتم توريدها الى مستودعات هيئة اوجيرو في بئر حسن او الدكوانة.

الإستلام المؤقت: يتم الاستلام المؤقت بعد أن يقوم الملزم بتوريد جزء من الكابلات المطلوبة، وتقوم لجنة الإستلام المكلفة لهذه الغاية بإصدار محضر بالاستلام المؤقت الخاص بها.

الإستلام النهائي: يتم الاستلام النهائي عند انتهاء فترة الضمان.

المادة ٦: معايير شروط العارضين

إضافة إلى ما نصت عليه المادتين ٧ و ٥٢ من قانون الشراء العام والمادة الخامسة من دفتر الشروط العامة،

على العارض تقديم ما يلي:

١ (المستندات الادارية والفنية):

يوقع، على العرض الشخص الذي لديه الصفة القانونية للتوقيع، على أن يكون مخولاً بذلك وفقاً للإذاعة

أوجيرو التجارية أو توكيل رسمي مصدق من كاتب عدل. ويجب أن تحتوي العروض على الملاحق التالية تحت

طائلة الرض: مو

1. عنوان العارض بحسب الملحق رقم (١).
2. طلب إشترك بالمناقصة العمومية بحسب الملحق رقم (٢).
3. إفادة شاملة صادرة عن السجل التجاري تبين: المؤسسين، الأعضاء، المساهمين، المفوضين بالتوقيع، المدير، رأس المال، نشاط العارض، الوقوعات الجارية.
4. إذاعة تجارية محدّد فيها صاحب الحق المفوض بالتوقيع عن العارض، تُبين توقيع المفوض قانوناً بالتوقيع على العرض.
5. سجل عدلي للمفوض بالتوقيع أو من يمثله قانوناً لا يتعدى تاريخه الثلاثة أشهر من تاريخ جلسة التلزم، خالٍ من أي حكم شائن.
6. شهادة تسجيل العارض لدى وزارة المالية.
7. إفادة براءة ذمة صادرة من وزارة المالية.
8. شهادة تسجيل العارض في مديرية الضريبة على القيمة المضافة.
9. إفادة براءة ذمة من البلدية التي تقع أعمال المناقصة ضمن نطاقها، تفيد تسديد الرسوم البلدية المتوجبة.
10. إفادة من غرفة التجارة والصناعة والزراعة تُثبت أن العارض يتعاطى تجارة أو صناعة المواد موضوع الصفقة، صالحة بتاريخ جلسة التلزم وصالحة للإشترك في المناقصات في العمومية.
11. براءة ذمة صادرة عن الصندوق الوطني للضمان الاجتماعي "شاملة أو صالحة للإشترك في الصفقات العمومية" صالحة بتاريخ جلسة التلزم تفيد بأن العارض قد سدد جميع اشتراكاته. يجب أن يكون العارض مسجلاً في الصندوق وترفض كل إفادة يُذكر عليها عبارة "مؤسسة غير مسجلة".
12. إفادة صادرة عن المحكمة المختصة (السجل التجاري) تُثبت أن العارض ليس في حالة إفلاس أو تصفية.
13. ضمان العرض المنظم وفقاً لأحكام المادة السابعة أدناه.
14. مستند تصريح النزاهة موقع من العارض وفقاً للأصول (الملحق رقم ٥).
15. تصريح من العارض يبيّن فيه صاحب الحق الاقتصادي حتى آخر درجة ملكية بحسب النموذج م ١٨ الصادر عن وزارة المالية. (كل شخص طبيعي يملك أو يسيطر فعلياً في المحصلة النهائية على النشاط الذي يمارسه العارض، بصورة مباشرة أو غير مباشرة، سواء كان هذا العارض شخص طبيعي أو معنوي).
16. شهادة إثبات أن العارض هو وكيل أو شريك معتمد في لبنان للشركة المصنّعة.
17. لائحة الزبائن الذين أتم العارض توريد كابلات مشابهة مع تاريخ التنفيذ والعنوان الكامل والأرقام الهاتفية لهؤلاء الزبائن.
18. تعهد من العارض أن جميع الكابلات مكفولة لمدة سنة على الأقل من تاريخ الإستلام النهائي.
19. تقديم نموذج عن عرض الاسعار يلحظ كافة البنود المطلوبة، المواصفات الفنية والكميات (دون وضع الاسعار).
20. نسخ عن شهادات الجودة المطلوبة والخاصة بالشركة المصنّعة على أن تكون صالحة بتاريخ التقديم.
21. كافة المستندات والكatalogات الفنية ولوائح مطابقة المواصفات Compliance List.
22. في حال إشترك عارض أجنبي يتوجب على هذا العارض أن يُراعي أحد الشروط التالية:
 - أن يكون من ضمن إنتلاف يضم شركة لبنانية على الأقل تتوفر فيها الشروط المطلوبة بموجب دفتر الشروط الخاص بالصفقة.
 - الحضور الشخصي للممثل القانوني عن الشركة للمشاركة في إجراءات الشراء.
 - أن يكون لها وكيل أو ممثل في لبنان مكلف توقيع العقد عنها.

إضافة إلى الشروط أعلاه، يتوجب على العارض الأجنبي تقديم ما يلي:

- شهادة تسجيل الشركة أو المؤسسة لدى المراجع المختصة في بلده.

إضافة من وزارة الاقتصاد والتجارة اللبنانية تُثبت انطباق أحكام قانون مقاطعة العدو الاسرائيلي على العارض.

الإفادات المطلوبة بموجب الفقرة (أولاً) أعلاه بحسب قوانين البلد الذي يوجد فيه العارض، على أن تكون هذه الإفادات مصدقة وفقاً للأصول من المراجع المختصة.



23. يُعتبر العارض فور تقديمه العرض مُلتزماً برفع السرية المصرفية عن الحساب المصرفي الذي يودع فيه أو ينتقل إليه أي مبلغ من المال العام المتعلق بهذا التلزم، سنداً للقرار رقم ١٧ تاريخ ٢٠٢٠/٥/١٢ الصادر عن مجلس الوزراء.

يجب أن تكون كافة المستندات المطلوبة أعلاه (أصلية أو صورة مع ابراز الاصل خلال الجلسة أو صورة مصدق عنها من المراجع المختصة) وذلك ضمن مهلة الستة أشهر التي تسبق موعد جلسة التلزم.

ضمن المغلف رقم ٢ (الاسعار):

يقدم العارض بياناً بالأسعار لكل صنف/بند على حدة ويوقع من قبل العارض، ويتضمن السعر الافراضي والاجمالي (بالدولار الاميركي) مدوناً بالأرقام والأحرف دون حك أو شطب أو تطريس أو زيادة كلمات غير موقع تجاهها.

في حال الاختلاف بين الأرقام والأحرف يؤخذ بالسعر الإفرادي المدون بالأحرف، ويرفض السعر غير المدون بالأحرف الكاملة والأرقام معاً.

يشمل السعر كافة الضرائب والرسوم والمصاريف مهما كان نوعها.

على العارض التقديم بعرض أسعار وفقاً لما يلي :

أ- السعر الإفرادي لكل بند (يتضمن جميع التكاليف المالية بما في ذلك ثمن المواد وكلفة النقل)
 X الكمية المطلوبة = إجمالي كلفة البند.

ب- مجموع أكلاف البنود.

ت- الضريبة على القيمة المضافة.

ث- القيمة الإجمالية = ب + ت

القيمة الإجمالية = المجموع + الضريبة على القيمة المضافة

وذلك وفقاً لنموذج عرض الأسعار لطلب المواد رقم QR 2023ND026 المرفق بهذا الدفتر.

تأكيدات حول العرض

ج- يُستلم من قطاع المناقصات والعقود في هيئة اوجيرو مغلف واحد معدّ لهذه الغاية، والذي يحمل موضوع التلزم فقط دون ذكر أي شيء آخر مميز لهوية صاحب العرض وذلك تحت طائلة رفض العرض.

ح- وضع المغلف الإداري/الفني ومغلف الأسعار ضمن الغلاف الموحد، ويدون على ظاهر كل غلاف اسم العارض وختمه، موضوع محتوياته، وموضوع التلزم وتاريخ جلسة التلزم.

خ- تقدّم العروض إلى أمانة السر في مركز هيئة اوجيرو الرئيسي الكائن في بئر حسن في الطابق الثاني- الغرفة رقم ٢١٩، على أن تصل قبل الوقت النهائي لتقديم العروض والمحدد في الاعلان عن عملية الشراء.

وكل عرض لا يقدم ضمن الغلاف الموحد، وفقاً لما هو مذكور أعلاه، أو يصل بعد التاريخ والوقت المحددين تعتبره اللجنة مرفوضاً ولا تقوم بفتحه بل يعاد مختوماً الى العارض الذي قدمه.

د- يجب أن تكون كافة المستندات المقدّمة صالحة بتاريخ جلسة فضّ العروض.

ذ- تحديد صلاحية العرض بإضافة ٣٠ يوماً من التاريخ النهائي لتقديم العروض.

ر- لا يحقّ للعارض أن يقدم أكثر من عرض تحت طائلة رفض كل عروضه.

المادة ٧: الضمانات

تكون الضمانات بحسب المواد ٣٤-٣٥-٣٦ وتراعى أحكام المادة ٣٩ (الإقتطاع من الضمان) من قانون الشراء العام، ولا يقبل الإستعاضة عن الضمانات بشيك مصرفي أو بإيصال عائد لضمان صفقة سابقة حتى لو كان قد تقرر رد قيمته.

يكون ضمان العرض كما ضمان حسن التنفيذ إما نقدياً يُدفع الى الصندوق المركزي لهيئة اوجيرو لقاء إيصال يضم الى مستندات العرض، وإما بموجب كتاب ضمان مصرفي غير قابل للرجوع عنه، صادر عن مصرف مقبول من مصرف لبنان يبين انه قابل للدفع غب الطلب.

ضمان العرض:

مدة صلاحية ضمان العرض بإضافة ٢٨/ يوماً على مدة صلاحية العرض.

حُدثت قيمة ضمان العرض بمبلغ وقدره: /٣,٠٠٠\$/ (فقط ثلاثة آلاف دولار أميركي لا غير).

يجب أن يكون ضمان العرض عائداً لهذا التلزم بالذات ولصالح هيئة اوجيرو.

يعاد ضمان العرض إلى الملتزم عند تقديمه ضمان حسن التنفيذ بعد إبلاغه بتصديق الالتزام، وإلى العارضين المديريين العاملين لم يرسل عليهم التلزم في مهلة أقصاها بدء نفاذ العقد. حذّر.

ب- ضمان حسن التنفيذ:

- يتقدم الملتزم عند توقيع العقد بكفالة مصرفية لضمان حسن التنفيذ بنسبة (١٠%) عشرة بالمائة من قيمة الالتزام الإجمالية، وذلك خلال مهلة أقصاها ١٥/ خمسة عشر يوماً من تاريخ نفاذ العقد. وفي حال التخلف عن تقديم ضمان حسن التنفيذ، يصادر ضمان العرض.
- يبقى ضمان حسن التنفيذ مجمداً طوال مدة التلزم، ويُحسم منه مباشرة وبدون سابق إنذار ما قد يترتب من غرامات أو مخالفات أو عطل أو ضرر يحدثه الملتزم إلى حين إيفائه بكامل الموجبات.
- يعاد ضمان حسن التنفيذ إلى الملتزم بعد انتهاء فترة الضمان وبناءً على إفادة حسن أداء صادرة عن مديرية الشبكات.

المادة ٨: فترة الضمان

حددت مدة الضمان بسنة واحدة ، تبدأ اعتباراً من تاريخ صدور محضر الاستلام المؤقت الأخير، وتشمل الأعطال الناتجة عن سوء في التصنيع. وعليه في هذه الحالة أن يقوم باستبدال الكابلات الشائبة خلال فترة اسبوع تحت طائلة تطبيق أحكام المادة ١٢.

المادة ٩: طلبات الاستيضاح – (المادة ٢١ من قانون الشراء العام)

يحق للعارض تقديم طلب استيضاح خطي حول ملفات التلزم خلال مهلة تنتهي قبل عشرة أيام من تاريخ تقديم العروض؛ على هيئة أوجيرو الإجابة خلال مهلة تنتهي قبل ستة أيام من الموعد النهائي لتقديم العروض.

المادة ١٠: فتح العروض

تُفتح العروض بحسب الآلية التالية:

- يتم فض الغلاف الخارجي الموحد لكل عارض على حدة وإعلان اسمه ضمن المشاركين في الصفقة، وذلك وفق ترتيب الأرقام التسلسلية المسجلة على الغلافات الخارجية والمسلمة للعارضين.
- يتم فض الغلاف رقم (١) (الوثائق والمستندات الإدارية والفنية المنصوص عنها في المادة السادسة اعلاه) وفرز المستندات المطلوبة والتدقيق فيها تمهيداً لتحديد وإعلان أسماء العارضين المقبولين شكلاً والمؤهلين للاشتراك في بيان مقارنة الأسعار.
- يجري فض الغلاف رقم (٢) (بيان الأسعار) للعارضين المقبولين شكلاً كل على حدة وإجراء العمليات الحسابية اللازمة، وتدوين السعر الإجمالي لكل عارض بما فيه الضريبة على القيمة المضافة، تمهيداً لإجراء مقارنة وإعلان اسم الملتزم المؤقت.
- تُصحح لجنة التلزم أي أخطاء حسابية محضة تكتشفها أثناء فحصها العروض المقدمة وفقاً لأحكام دفتر الشروط، وتبلغ التصحيحات إلى العارض المعني بشكل فوري.
- يمكن للجنة التلزم، في أي مرحلة من مراحل إجراءات التلزم، أن تطلب خطياً من العارض إيضاحات بشأن المعلومات المتعلقة بمؤهلاته أو بشأن عروضه، لمساعدتها في التأكد من المؤهلات أو فحص العروض المقدمة وتقييمها.
- تُسجل وقائع فتح العروض خطياً في محضر يوقع عليه رئيس وأعضاء لجنة التلزم، كما توضع لائحة بالحضور يوقع عليها المشاركون من ممثلي هيئة أوجيرو وهيئة الشراء العام، والعارضين وممثليهم على أن يشكل ذلك إثباتاً على حضورهم. تُدرج كل المعلومات والوثائق المتعلقة بوقائع الجلسة في سجل إجراءات الشراء.
- لا يمكن طلب إجراء أو السماح بإجراء أي تغيير جوهري في المعلومات المتعلقة بالمؤهلات أو بالعرض المقدم، بما في ذلك التغييرات الرامية إلى جعل من ليس مؤهلاً من العارضين مؤهلاً أو جعل عرض غير مستوفٍ للمتطلبات مستوفياً لها.

لا يمكن إجراء أي مفاوضات بين هيئة أوجيرو أو لجنة التلزم والعارض بخصوص المعلومات المتعلقة

بالمؤهلات أو بخصوص العروض المقدمة، ولا يجوز إجراء أي تغيير في السعر إثر طلب استيضاح من أي

عارض

تُدْرَج جميع المراسلات التي تجري بموجب هذه المادة في سجل إجراءات الشراء بحسب المادة ٩ من

قانون الشراء العام.



- في حال كانت المعلومات أو المستندات المقدّمة في العرض ناقصة أو خاطئة أو في حال غياب وثيقة معيّنة، يجوز للجنة التلزم الطلب خطياً من العارض المعني توضيحات حول عرضه، أو طلب تقديم أو استكمال المعلومات أو الوثائق ذات الصلة خلال فترة زمنية محدّدة، شرط أن تكون كافة المراسلات خطية واحترام مبادئ الشفافية والمساواة في المعاملة بين العارضين في طلبات التوضيح أو الاستكمال الخطية، ومع مراعاة أحكام الفقرة ٣ من البند الثاني من المادة ٢١ من قانون الشراء العام.

المادة ١١: قواعد قبول العرض الفائز (أو التلزم المؤقت) وبدء تنفيذ العقد

١. تقبل هيئة أوجيرو العرض المقدّم الفائز ما لم:
أ. تُسقط أهليّة العارض الذي قدّم العرض الفائز وذلك بمقتضى المادة ٧ من قانون الشراء العام؛ أو
ب. يُلغى الشراء بمقتضى الفقرة ١ من المادة ٢٥ من هذا قانون الشراء العام؛ أو
ت. يُرفض العرض الفائز عند اعتباره منخفضاً انخفاضاً غير عادي بمقتضى المادة ٢٧ من قانون الشراء العام؛ أو
ث. يُستبعد العارض الذي قدّم العرض الفائز من إجراءات التلزم للأسباب المبيّنة في المادة ٨ من قانون الشراء العام.
٢. بعد التأكد من العرض الفائز تُبلغ هيئة أوجيرو العارض الذي قدّم ذلك العرض، كما تنشر بالتزامن قرارها بشأن قبول العرض الفائز (التلزم المؤقت) والذي يدخل حيّز التنفيذ عند انتهاء فترة التجميد البالغة عشرة أيام عمل تبدأ من تاريخ النشر، الذي يجب أن يتضمّن على الأقلّ، المعلومات التالية:
أ. إسم وعنوان العارض الذي قدّم العرض الفائز (الملتزم المؤقت).
ب. قيمة العرض، ويمكن إضافة ملخص لسائر خصائص العرض الفائز ومزاياه النسبية إذا كان العرض الفائز قد تمّ تأكيده على أساس السعر ومعايير أخرى.
ت. مدّة فترة التجميد بحسب هذه الفقرة.
٣. فور انقضاء فترة التجميد، تقوم الجهة الشارية بإبلاغ الملتزم المؤقت بوجوب توقيع العقد خلال مهلة لا تتعدّى // ١٥ // خمسة عشر يوماً.
٤. يوقع المرجع الصالح لدى الجهة الشارية العقد خلال مهلة // ١٥ // خمسة عشر يوماً من تاريخ توقيع العقد من قبل الملتزم المؤقت. يمكن أن تُمدّد هذه المهلة إلى // ٣٠ // ثلاثين يوماً في حالات معيّنة تحدّد من قبل المرجع الصالح.
٥. يبدأ نفاذ العقد عندما يوقع الملتزم المؤقت والمرجع الصالح لدى سلطة التعاقد عليه.
٦. لا تتخذ سلطة التعاقد ولا الملتزم المؤقت أي إجراء يتعارض مع بدء نفاذ العقد أو مع تنفيذ الشراء خلال الفترة الزمنية الواقعة ما بين تبليغ العارض المعني بالتلزم المؤقت وتاريخ بدء نفاذ العقد.
٧. في حال تمّنع الملتزم المؤقت عن توقيع العقد، تُصادر هيئة أوجيرو ضمان عرضه. في هذه الحالة يمكن للجهة الشارية أن تلغي الشراء أو أن تختار العرض الأفضل من بين العروض الأخرى الفائزة وفقاً للمعايير والاجراءات المحدّدة في هذا القانون وفي ملفات التلزم، والتي لا تزال صلاحيتها سارية المفعول. تُطبّق أحكام هذه المادة على هذا العرض بعد إجراء التعديلات اللازمة.

المادة ١٢: الغرامات (المادة ٣٨ من قانون الشراء العام)

يتوجب على الملتزم التقيد بالاعمال المطلوبة وفقاً للشروط المنصوص عنها في دفتر الشروط هذا، وفي حال عدم التقيد بذلك، يتم حسم نسبة مئوية من قيمة الخدمات المطلوب تقديمها منه مساوية لنسبة عدم الالتزام التي تحددها المديرية المعنية و/أو لجان الاستلام وفقاً لما يلي:
في حال تقاعس الملتزم عن تنفيذ التزاماته، أو عدم تصحيح الوضع بعد توجيه انذار بذلك، يعرضه لتطبيق غرامة مالية تصل نسبتها لغاية ١٠% من قيمة الالتزام كحد أقصى ويحق للهيئة فسخ العقد بناء على ذلك إذا تمّنع الملتزم عن التنفيذ ودعوة المبلغ ضمن مدّة معيّنة، فإذا لم يفعل اعتبر ناكلاً وفقاً لأحكام الفقرة (أولاً) من المادة ٣٣ من قانون الشراء العام.



المادة ١٣: إجراءات الاعتراض (الفصل السابع من قانون الشراء):

يحق لكل ذي صفة ومصلحة ، بما في ذلك هيئة الشراء العام، الاعتراض على أي إجراء أو قرار صريح أو ضمني تتخذه أو تعتمد أو تطبقه أي من الجهات المعنية بالشراء في المرحلة السابقة لنفاذ العقد، وذلك خلال فترة التجميد البالغة عشرة أيام عمل، والتي تبدأ من تاريخ تبليغ العارض الفائز، وفي الفترة التي تسبق نفاذ العقد.

تعتبر المحاكم اللبنانية المرجع القضائي الوحيد للبت في كل خلاف يمكن أن يحصل من جراء تنفيذ هذا الالتزام.

المادة ١٤: دفع الطوابع والرسوم

إن كافة الطوابع والرسوم التي تتوجب وفقاً للأنظمة والقوانين المرعية الإجراء الناتجة عن هذا الالتزام هي على عاتق الملتزم، بما فيها قيمة الضريبة على القيمة المضافة.

المادة ١٥: مسؤولية العارض عن عرضه

إن العارض مسؤول عن عرضه بكافة التفاصيل والمندرجات.

المادة ١٦: الغاء الشراء

يحق لهيئة أوجيرو الغاء الشراء و/أو أي من إجراءاته وفقاً للمادة ٢٥ من قانون الشراء العام.

المادة ١٧: انتهاء العقد ونتائجه

يحق لهيئة أوجيرو إنهاء العقد ونتائجه وفقاً للمادة ٣٣ من قانون الشراء العام، وذلك في حالات النكول، الانهاء، الفسخ مع ما يترتب عن نتائج انتهاء العقد بحسب البند الرابع من المادة ٢٢ أدناه.

المادة ١٨: استبعاد العارض

تستبعد هيئة أوجيرو العارض من إجراءات التلزم بسبب عرضه منافع أو من جرّاء ميزة تنافسية غير منصفة أو بسبب تضارب المصالح وذلك في إحدى الحالتين المنصوص عنهما في المادة ٨ من قانون الشراء العام.

المادة ١٩: الانظمة التفضيلية

خلافاً لأي نص آخر، يمكن إعطاء العروض المتضمنة سلعاً أو خدمات ذات منشأ وطني أفضلية بنسبة ١٠/ عشرة بالمئة عن العروض المقدمة لسلع أو خدمات أجنبية. تُعطى الأفضلية لمكونات العرض ذات المنشأ الوطني.

المادة ٢٠: قواعد بشأن العروض المنخفضة الأسعار انخفاضاً غير عادياً

يجوز لهيئة أوجيرو أن ترفض أي عرض إذا قرّرت أنّ السعر، مُقترناً بسائر العناصر المكوّنة لذلك العرض المقدم، مُنخفض انخفاضاً غير عاديّ قياساً إلى موضوع الشراء وقيّمته التقديرية وتُطبق أحكام المادة ٢٧ من قانون الشراء العام في هذا الشأن.

المادة ٢١: قيمة العقد وشروط تعديلها

١. تكون البدلات المتفق عليها في العقد ثابتة ولا تقبل التعديل والمراجعة إلا عند إجازة ذلك أثناء تنفيذه ضمن ضوابط محدّدة وفقاً لشروط التعديل والمراجعة في الحالات الاستثنائية التالية، على أن يكون منصوص عليها صراحة في ملفات التلزم:

أ- تطبيقاً لمعادلات تستند إلى مؤشرات أسعار رسمية محلية وعند الإقتضاء دوليّة عندما لا تكون هذه المعادلات مغطاة ضمن قيمة العقد.

ب- تطبيقاً لتعديلات ضريبية تؤدي إلى زيادة تكلفة تنفيذ العقد.

ت- عندما تبرز الحاجة إلى كميات إضافية لأشغال أو سلع أو معدات أو تكنولوجيا أو خدمات من نفس المورد أو المقاول، لأسباب تتعلق بتوحيد المواصفات أو بسبب الحاجة إلى التوافق مع السلع أو المعدات أو التكنولوجيا أو الخدمات أو الأشغال الموجودة، مع الأخذ في الاعتبار فعالية عملية الشراء الأصلية في تلبية احتياجات هيئة أوجيرو، وعلى ألا تتخطى قيمة الإضافة ٢٠% من قيمة العقد الأساسي لعقود اللوازم والخدمات و ١٥% لعقود الأشغال.

الحالة المنصوص عليها في الفقرة ٣ من المادة ٤٦.

ج- عندما تبذل قوانين أو مراسيم من شأنها التأثير على قيمة العقد، وعلى أن يُعلّل ذلك بموجب تقرير من هيئة أوجيرو.

٢. تراعى شروط الإعلان المنصوص عليها في المادة ٢٦ من هذا القانون عند تعديل قيمة العقد.



3. يحق للإدارة خلال فترة الإلتزام تعديل برنامج الاعمال نقصاناً من قيمة الإلتزام العائد لكل مجموعة بأسعار وشروط التلزم نفسها على ضوء حاجة الإدارة، دون أن يحق للملتزم الإعتراض أو المطالبة بأي تعويض عنها.

المادة ٢٢: أسباب انتهاء العقد ونتائجه

أولاً: النكول

يُعتبر الملتزم ناكلاً إذا خالف شروط تنفيذ العقد أو أحكام دفتر الشروط هذا، وبعد إنذاره رسمياً بوجوب التقيد بكافة موجباته من قبل سلطة التعاقد، وذلك ضمن مهلة تتراوح بين خمسة أيام كحد أدنى وخمسة عشر يوماً كحد أقصى، وانقضاء المهلة هذه دون أن يقوم الملتزم بما طُلب إليه. وإذا اعتُبر الملتزم ناكلاً، يُفسخ العقد حكماً دون الحاجة إلى أي إنذار وتطبق الإجراءات المنصوص عليها في البند (أولاً) من الفقرة الرابعة من المادة ٣٣ من قانون الشراء العام.

ثانياً: الإنهاء

- 1- ينتهي العقد حكماً دون الحاجة إلى أي إنذار في الحالتين التاليتين:
أ- عند وفاة الملتزم إذا كان شخصاً طبيعياً، إلا إذا وافقت سلطة التعاقد على طلب مواصلة التنفيذ من قبل الورثة.
ب- إذا أصبح الملتزم مفلساً أو مُعسراً أو حُلَّت الشركة، وتُطبق عندئذ الإجراءات المنصوص عليها في الفقرة الثانية من البند الرابع من المادة ٣٣ من قانون الشراء العام.
- 2- يجوز لسلطة التعاقد إنهاء العقد إذا تعدّر على الملتزم القيام بأي من إلتزاماته التعاقدية بنتيجة القوة القاهرة.

ثالثاً: الفسخ

يُفسخ العقد حكماً دون الحاجة إلى أي إنذار في أي من الحالات التالية:

- إذا صدر بحق الملتزم حكمٌ نهائي بارتكاب أي جرم من جرائم الفساد أو التواطؤ أو الإحتيال أو الغش أو تبويض الأموال أو تمويل الإرهاب أو تضارب المصالح أو التزوير أو الإفلاس الإحتيالي، وفقاً للقوانين المرعية الاجراء؛
- إذا تحققت أي حالة من الحالات المذكورة في المادة ٨ من هذا القانون.
- في حال فقدان أهلية الملتزم.

إذا فُسخ العقد لأحد الأسباب المذكورة في الفقرة الأولى من هذا البند تُطبق الإجراءات المنصوص عليها في الفقرة الأولى من البند الرابع من هذه المادة.

رابعاً: نتائج انتهاء العقد:

1. في حال تطبيق إحدى حالات النكول أو الفسخ المحددة في المادة ٣٣ من قانون الشراء العام، أو في حال تحققت حالة إفلاس الملتزم أو إعساره، أو في حال وفاة الملتزم وعدم متابعة التنفيذ من قبل الورثة، تُتبع فوراً، خلافاً لأي نص آخر أحكام الفقرة رابعاً من المادة ٣٣ من قانون الشراء العام.
2. لا يترتب أي تعويض عن الخدمات المُقدّمة أو الأشغال المنفّذة من قبل من يثبت قيامه بأي من الجرائم المنصوص عليها في الفقرة الفرعية "أ" من الفقرة الأولى من «ثالثاً» من المادة ٣٣ من قانون الشراء العام. يُنشر قرار انتهاء العقد وأسبابه على الموقع الإلكتروني لهيئة أوجيرو إن وُجد وعلى المنصة الإلكترونية المركزية لدى هيئة الشراء العام.

المادة ٢٣: شروط خاصة

1. تعتبر المواصفات الفنية المرفقة بدفتر الشروط هذا، جزءاً لا يتجزأ من دفتر الشروط الخاصة، وعلى الملتزم الإلتزام بكافة الشروط والمتطلبات المحددة فيها.

2. لا يحق للمعارض تقديم أكثر من خيار واحد ضمن عرضه الفني وإلا اعتبر عرضه ملغياً.

3. على الملتزم التقيد بالتسليم في اسرع وقت ممكن وفقاً للأولويات التي تحددها هيئة أوجيرو.

المدير العام لهيئة أوجيرو

عماد كريدية

المرفقات:

- المستندات الواجب على المعارض تقديمها
- الغلاف الموحد.

ملحق رقم ١

عنوان العارض

إسم الشركة: _____

العنوان : _____

الهاتف : _____

الفاكس : _____

صندوق بريد : _____

البريد الالكتروني: _____

بيروت في

التوقيع والختم

تصريح / تعهد

طلب إشتراك بالمناقصة العمومية

أنا الموقع ادناه.....

الممثل بالتوقيع عن مؤسسة/شركة

رقم الهاتف.....، مكتب..... البريد الالكتروني:

اصرح انني وبعد الاطلاع على دفتر الشروط وهذه المستندات التي لا يمكن باي حال الادعاء بتجاهلها وعلى تفاصيل الاعمال المطلوبة وشروط تنفيذها، وانني اتعهد بقبول كافة الشروط المبينة فيها وبمدة صلاحية العرض المحددة في دفتر الشروط هذا وبالتقيد بها وتنفيذها كاملة دون اي نوع من انواع التحفظ او الاستدراك. كما اصرح بانني وضعت الاسعار وقبلت الاحكام المدرجة في دفتر الشروط هذا آخذاً بعين الاعتبار كل شروط التلزم ومصاعب تنفيذه في حال وجوده. كما أتعهد برفع السرية المصرفية عن الحساب المصرفي الذي يودع فيه أو ينتقل إليه أي مبلغ من المال العام، وذلك لمصلحة الإدارة في كل عقد من أي نوع كان، يتناول مالاَ عامًا.

ونؤكد ما يلي:

ليس لنا، أو لموظفينا، أو شركائنا، أو وكلائنا، أو المساهمين، أو المستشارين، أو أقاربهم، أي علاقات قد تؤدي إلى تضارب في المصالح بموضوع هذه الصفقة. وسنقوم بإبلاغ هيئة اوجيرو وهيئة الشراء العام في حال حصول أو اكتشاف تضارب في المصالح. لم ولن نقوم بممارسات احتيالية أو فاسدة، أو قسرية أو مُعرّقة في ما يخص عرضنا أو اقتراحنا. ولم نقدم على دفع أي مبالغ للعاملين، أو الشركاء، أو للموظفين المشاركين بعملية الشراء بالنيابة عن الجهة المتعاقدة، أو لأي كان. في حال مخالفتنا لهذا التصريح والتعهد، لن نكون مؤهلين للمشاركة في أي صفقة عمومية أيأ كان موضوعها ونقبل سلفاً بأي تدبير إقصاء يُؤخذ بحقنا ونتعهد بملء إرادتنا بعدم المنازعة بشأنه. إن أي معلومات كاذبة تُعرضنا للملاحقة القضائية من قبل المراجع المختصة.

التاريخ

ختم وتوقيع العارض

طوابع بقيمة
خمسون ألف ليرة

ضمان العرض

نحن الشركة : _____

نرفق طيه

☐ كتاب ضمان مصرفي غير قابل للرجوع عنه لكل مجموعة على حدة بقيمة /٣,٠٠٠\$ (فقط ثلاثة آلاف دولار أميركي لا غير)، صادر عن مصرف مقبول من مصرف لبنان يبين أنه قابل للدفع غب الطلب .

☐ دفع المبلغ نقدا إلى الصندوق المركزي لهيئة اوجيرو لقاء إيصال يضم الى مستندات العرض. كضمان عرض بحسب المادة السابعة من دفتر الشروط الخاصة العائد للمناقصة العمومية رقم ٢٣٠٨١.

بيروت في

التوقيع والختم

كتاب ضمان العرض

مصرف
لجانبة هيئة أوجيرو

الموضوع: كتاب ضمان العرض لصالحكم بقيمة / / فقط، بناء للأمر السيد.....
وذلك للإشتراك في (عنوان الصفقة)

ان مصرف مركزه.....، الممثل بالسيد الموقع
عنه أدناه وذلك بصفته، وبناء للأمر السيد (او السادة أو
الشركة)،

يتعهد بصورة شخصية غير قابلة للنقض او للرجوع عنها بأن يدفع نقداً وفوراً دون أي قيد أو شرط أي مبلغ تطالبونه به
حتى حدود (تحديد القيمة والعمل بالارقام والاحرف) نقداً وذلك عند اول طلب منكم بموجب كتاب صادر وموقع منكم
دون أي موجب لبيان اسباب هذه المطالبة.

وعليه يقر مصرفنا صراحة بأن كتاب الضمان هذا قائم بذاته ومستقل كلياً عن أي ارتباط أو عقد بينكم وبين الأمر السيد
..... (او السادة او الشركة) وبأنه لا يحق لمصرفنا في أي
حال من الاحوال ولا في أي وقت كان الامتناع او تأجيل تأدية أي مبلغ قد تطالبوننا به بالاستناد الى كتاب الضمان هذا .
كما يتنازل مصرفنا مسبقاً عن أي حق في المناقشة او في الاعتراض على طلب الدفع الذي يصدر عنكم او عن أي
مسؤول لديكم ، او حتى ان يقبل أي اعتراض قد يصدر عن السيد (او السادة
او الشركة) او عن غيره (او غيرهم او غيرها) بشأن دفع المبلغ اليكم بناء لطلبكم.
يبقى كتاب الضمان هذا معمولاً به لغاية وبنهاية هذه المهلة يتجدد مفعوله تلقائياً الى ان تعيدوه الينا او
الى ان تبلغونا اعفاءنا منه.

ان كل قيمة تدفع من مصرفنا بالاستناد الى كتاب الضمان هذا بناء لطلبكم، يخفض المبلغ الاقصى المحدد فيه بذات
المقدار.

يخضع كتاب الضمان هذا للقوانين اللبنانية ولصلاحيات المحاكم المختصة في لبنان.

وتنفيذاً منا لهذا الموجب نتخذ لنا محل اقامة في مركز مؤسستنا في

المكان :

الصفة :

الاسم :

التوقيع :

تصريح النزاهة^١

عنوان الصفقة: _____

الجهة المتعاقدة: _____

اسم العارض / المفوض بالتوقيع عن الشركة: _____

إسم الشركة: _____

نحن الموقعون أدناه نؤكد ما يلي:

1. ليس لنا، أو لموظفينا، أو شركائنا، أو وكلائنا، أو المساهمين، أو المستشارين، أو أقاربهم، أي علاقات قد تؤدي إلى تضارب في المصالح بموضوع هذه الصفقة.
 2. سنقوم بإبلاغ هيئة الشراء العام والجهة المتعاقدة في حال حصول أو اكتشاف تضارب في المصالح.
 3. لم ولن نقوم، ولا أي من موظفينا، أو شركائنا، أو وكلائنا، أو المساهمين، أو المستشارين، أو أقاربهم، بممارسات احتيالية أو فاسدة، أو قسرية أو مُعرقلة في ما يخص عرضنا أو اقتراحنا.
 4. لم نقدم، ولا أي من شركائنا، أو وكلائنا، أو المساهمين، أو المستشارين، أو أقاربهم، على دفع أي مبالغ للعاملين، أو الشركاء، أو للموظفين المشاركين بعملية الشراء بالنيابة عن الجهة المتعاقدة، أو لأي كان.
 5. في حال مخالفتنا لهذا التصريح والتعهد، لن نكون مؤهلين للمشاركة في أي صفقة عمومية أيّاً كان موضوعها ونقبل سلفاً بأي تدبير إقصاء يُؤخذ بحقنا ونتعهد بملء إرادتنا بعدم المنازعة بشأنه.
- إن أي معلومات كاذبة تُعرضنا للملاحقة القضائية من قبل المراجع المختصة.

التاريخ:

_____ الختم والتوقيع

^١ - يُرفق هذا التصريح بالعرض

لائحة الكميات

#	A- ITEM CODE B-ITEM DESCRIPTION	MATERIALS أ- رمز الصنف ب- التوصيف	UNIT	NB/U	Quantity	Unit Price	Total Price	Wording
1	CBA-0401 Aerial Cable Jelly Filled 10 Pairs D : 0.4mm Non armored Aerial Cable		M	1	120000.00			
2	CBA-0402 Aerial Cable Jelly Filled 20 Pairs D : 0.4mm Non armored Aerial Cable		M	1	50000.00			
3	CBA-0403 Aerial Cable Jelly Filled 30 Pairs D : 0.4mm Non armored Aerial Cable		M	1	10000.00			
4	CBA-0405 Aerial Cable Jelly Filled 50 Pairs D : 0.4mm Non armored Aerial Cable		M	1	20000.00			
5	CBA-0408 Aerial cable jelly filled 70 pairs diameter: 0.4mm Non armored Jelly Filled Aerial Cable		M	1	3000.00			
6	CBA-0501 Aerial Cable Jelly Filled 10 Pairs D : 0.5 mm Non armored Aerial Cable		M	1	35000.00			
7	CBA-0502 Aerial Cable Jelly Filled 20 Pairs D : 0.5 mm Non armored Aerial Cable		M	1	25000.00			
8	CBA-0505 Aerial Cable Jelly Filled 50 Pairs D : 0.5 mm Non armored Aerial Cable		M	1	10000.00			
9	CBDW0000 Drop Wire 2*0.8 Neoprene Regular Drop Wire.		M	1	1000000.00			
10	CBJW0000 Jumper wire 2*0.5, Jarretiere		M	1	1000000.00			
11	CBM-0400 Jelly Filled Cable 10 Pairs D : 0.4 mm Non Armored Jelly Filled Cable		M	1	45000.00			
12	CBM-0401 Jelly Filled Cable 20 Pairs D : 0.4mm Non Armored Jelly Filled Cable		M	1	15000.00			
13	CBM-0405 Jelly Filled Cable 100 Pairs D : 0.4mm Non Armored Jelly Filled Cable		M	1	10000.00			
14	CBM-0500 Jelly Filled Cable 10 Pairs D : 0.5mm Non Armored Jelly Filled Cable		M	1	6000.00			
15	CBM-0503 Jelly Filled Cable 50 Pairs D : 0.5 mm Non Armored Jelly Filled Cable		M	1	5000.00			
16	CBM-0504 Jelly Filled Cable 100 Pairs D : 0.5 mm Non Armored Jelly Filled Cable		M	1	5000.00			

#	A- ITEM CODE B-ITEM DESCRIPTION	MATERIALS أ- رمز الصنف ب- التوصيف	UNIT	NB/U	Quantity	Unit Price	Total Price	Wording
17	CBM-0505 Jelly Filled Cable 150 Pairs D : 0.5 mm Non Armored Jelly Filled Cable		M	1	2000.00			
18	CBM-0506 Jelly Filled Cable 200 Pairs D : 0.5 mm Non Armored Jelly Filled Cable		M	1	2000.00			
19	CBM-0507 Jelly Filled Cable 300 Pairs D : 0.5 mm Non Armored Jelly Filled Cable		M	1	1000.00			
20	CBM-0608 Jelly filled cable 50 pairs D.: 0.65mm Non armored Jelly Filled Cable		M	1	1000.00			
21	CBM-0905 Jelly Filled Cable 50 Pairs D. : 0.9mm Non armored Jelly Filled		M	1	1000.00			
						Grand Total		
						VAT		
						Grand Total With VAT		

المواصفات الفنية المطلوبة

CELLULAR POLYETHYLENE INSULATED FILLED CABLE

- CLAUSE 1 : GENERAL**
- CLAUSE 2 : ASSOCIATED SPECIFICATIONS**
- CLAUSE 3 : DEFINITION AND STANDARD CABLE CODES**
- CLAUSE 4 : DESIGN REQUIREMENTS**
- CLAUSE 5 : CONDUCTORS**
- CLAUSE 6 : INSULATION**
- CLAUSE 7 : CONDUCTOR IDENTIFICATION**
- CLAUSE 8 : ASSEMBLING**
- CLAUSE 9 : PROPERTIES AND TEST REQUIREMENTS**
- CLAUSE 10 : PHYSICAL REQUIREMENTS OF ASSEMBLED
CABLE**
- CLAUSE 11 : ELECTRICAL AND TRANSMISSION
REQUIREMENTS**
- CLAUSE 12 : QUALITY ASSURANCE**
- CLAUSE 13 : PACKING AND MARKING**
- CLAUSE 14 : COMPLIANCE STATEMENT**

CLAUSE 1. GENERAL

- 1.1 This specification covers the minimum standards and requirements for the construction, properties, testing and packing of outdoor, filled unit twin telecommunication cables in sizes ranging from 10 to 2400 pairs using 0.4, 0.5, 0.65 and 0.9mm diameter conductors, with cellular polyethylene insulation.
- 1.2 Cable purchased in compliance with this specification is to be used in the telecommunications network of Lebanon generally in the secondary network i.e. between cross connection cabinets and the subscribers' premises. This cable may also be installed in the primary network between the exchange and cross connection cabinets.
- 1.3 The cable shall be pulled into ducts of 100 mm outside diameter, shall have a single polyethylene sheath with a moisture barrier.
- 1.4 OGERO reserves the rights to make changes to the specification without further notice, before any tender or after any contract execution.

CLAUSE 2. ASSOCIATED SPECIFICATIONS

- 2.1 The following unattached international and or national standard shall be applied and deemed to be an integral part of this specification.

ASTMB 3	Standard specification for soft or annealed copper wire
ASTMB 736	Standard specification for aluminum, aluminum alloy and aluminum clad steel cable shielding stock
ASTMD 92	Standard Test method for flash and fire points by Cleveland open cup
ASTMD 566	Test method for dropping point of lubricating grease
ASTMD 924	Standard test Method for a c loss characteristics and relative permittivity (dielectric constant) of electrical insulating liquids
ASTMD 974	Standard test method for acid and base number by color indicator titration
ASTMD 1169	Standard test method for specific resistance (resistivity) of electrical insulating liquids
ASTMD 1248	Standard specification for polyethylene plastics molding and extrusion materials
ASTMD 2633	Standard method of testing thermoplastic insulations and jackets for wire and cable
ASTMD 4565	Standard test method for physical and environmental performance properties of insulations and jackets for telecommunications wire and cable
IEC 189-1	General test and measuring methods
EEC 304	Standard colours for low frequency cables and wires
IEC 708-1	General design details and requirements
ISO 9001 or 9002	Quality systems - Model for quality assurance in production and installation

FEDERAL TEST METHOD 321.1: Oil separation from Lubricating Grease
(Static Technique)

CLAUSE 3. DEFINITION AND STANDARD CABLE CODES**3.1 DEFINITIONS**

The following definitions shall apply throughout this specification:

Moisture Barrier

The aluminum tape which surrounds the cable core

Moisture Barrier Sheath

The first sheath bonded to the moisture barrier

LDPE

Low density polyethylene i.e. 0.910 to 0.925 grams/cm³

MDPE

Medium density polyethylene i.e. 0.926 to 0.940 grams/cm³

HDPE

High density polyethylene i.e. 0.941 to 0.959 grams/cm³

Cellular Insulation

Insulation which incorporates pockets of air within the polyethylene

Foam Insulation

Cellular insulation which consists of one layer extruded on to the conductor in a single operation Foam Skin Insulation which consists of two layers of polyethylene the inner cellular and the outer solid. The duplex is applied in a two-stage extrusion simultaneous process

Insulation Eccentricity

The difference between the maximum and minimum radial insulation thicknesses Pair.

Two insulated conductors twisted together and designated wire "a" and "b"

Sub Unit

Ten pairs assembled together and identified with a binder tape

Unit

Five or ten sub units assembled together and identified with a binder tape

Cable Core

The assembled cable components that are contained within the moisture barrier

Lay

The axial length of one complete turn of the helix formed around an imaginary line between the center of the conductors of a pair or around an imaginary longitudinal line at the center of a sub unit, unit or core.

3.2 STANDARD MPT COPPER CONDUCTOR CABLE DESIGNATIONS**FIRST LETTER = CONDUCTOR INSULATION TYPE**

- E Polyethylene - solid
- C Polyethylene - cellular
- P Paper
- V Polyvinylchloride

SECOND LETTER = FIRST SHEATH MATERIAL TYPE

- E Polyethylene
- V Polyvinylchloride (no longer used on new cable)
- R Halogen free flame retardant

SUBSEQUENT LETTERS = OTHER KEY CHARACTERISTICS

- H High-density polyethylene outer sheath (genetally no longer used on new cables)
- F Filled cables with metal moisture barrier
- S Unfilled cables with metal moisture barrier
- B Indoor (building) cable
- Z Shielded, filled for PCM
- M Self supporting (catenary) for aerial cable
- E Polyethylene second sheath
- D Double tape armouring and polyethylene second sheath

3.3 SIZE OF CABLE AND CONDUCTOR DIAMETER

Number of pairs x conductor diameter (0.4, 0.5, 0.65, 0.9) mm

3.4 EXAMPLES

CES 600x0.4 Cellular polyethylene insulation (C)
Polyethylene sheath (E)
Metallic moisture barrier unfilled (S) 600 pairs (600)
0.4 mm diameter conductors (0.4)

CEFE 300x0.5 Cellular polyethylene insulation (C)
polyethylene sheath (E)
Metallic moisture barrier
Filled (F)
Outer (second) polyethylene sheath (E) 300 pairs (300)
0.5 mm diameter conductors (0.5)

CLAUSE 4. DESIGN REQUIREMENTS**4.1 GENERAL**

This section describes the cable design.

4.1.1 COMPATIBILITY WITH MPT PRACTICES

All cables must be compatible with current MPT installation standards and operation and maintenance practices.

4.1.2 LONG TERM PERFORMANCE REQUIREMENTS

All cable supplied in compliance with this specification shall be capable of withstanding the typical service conditions of Lebanon for a period of forty years without detriment to the transmission or operation and maintenance characteristics of the cable.

Cable shall be designed manufactured and packaged so that exposure to the normal environmental conditions of Lebanon during storage, transport, installation and operation, and the environmental conditions to be expected during the storage and transport of cable outside Lebanon shall not degrade the physical transmission or operation and maintenance characteristics of the cable. The environmental conditions of Lebanon may

include ambient air temperature variations from -15°C to $+37^{\circ}\text{C}$. In addition direct solar radiation is known to increase the temperature of some outside plant to approximately $+52^{\circ}\text{C}$.

4.2 CABLE SIZES

4.2.1 The cables sizes required are shown in Table 1.

Conductor Diameter (mm)	Number of pairs
0.4	10,20,30,50,100,150,200,300,400,500,600, 800,1000,1200,1500,1800,2400
0.5	10,20,30,50,100,150,200,300,400,500,600, 800,1200
0.65	100,200,300,400,600
0.9	50,100,150,200,300

Table 1: Cable Sizes

CLAUSE 5. CONDUCTORS

5.1 The conductors shall comply with the requirements of clause 5.

5.2 The nominal conductor diameters shall be 0.4, 0.5, 0.65 and 0.9 mm.

5.3 Conductors shall meet the requirements of ASTM B3 with the exception that the "Dimensions and Permissible Variations" requirements are waived

5.4 CONDUCTOR JOINTS

5.4.1 Conductor joints shall be brazed using a silver solder alloy or welded by an electrical or cold welding technique

5.4.2 A conductor containing a joint made during manufacture shall have a tensile strength of not less than 90% of the tensile strength of the non-jointed conductor.

5.4.3 Joints shall be free of burrs undercuts or protrusions and be the same diameter as the conductor. The conductors shall be in line

5.4.4 Joints shall be reinsulated with a material such as heat shrink polyolefin

CLAUSE 6. INSULATION

6.1 Each conductor shall be covered with a continuous layer of Foam skin HDPE. The insulation shall conform to requirements of clause 6.

6.2 POLYETHYLENE RAW MATERIAL CLASSIFICATION

The insulation raw material shall conform to the following classification from ASTM D 1248

6.2.1 Type 3, i.e. high-density polyethylene with a density between 0.941 and 0.959 grams/cm^3 .

6.2.2 Category 4 or 5 i.e polyethylene with a maximum melt flow index not greater than 1.0.

6.2.3 The polyethylene shall have the properties described for Grade E8 or E9

6.3 DIMENSIONAL REQUIREMENTS

6.3.1 The nominal thicknesses of Foam Skin insulation shall be stated by the manufacturer. The maximum outside diameter of insulation shall not exceed the limits shown in Table 2

Conductor Diameter (mm)	Maximum Insulation Outside Diameter (mm)
0.4	1.22
0.5	1.42
0.65	1.65
0.9	2.03

Table 2: Maximum Insulation Outside Diameter

6.3.2 The insulation eccentricity at any cross section shall not exceed the limits of Table 3.

Conductor Diameter (mm)	0.4	0.5	0.65	0.9
Eccentricity (mm)	0.0508	0.0508	0.0762	0.106

Table 3: Insulation Eccentricity Limits

6.4 MECHANICAL AND CHEMICAL REQUIREMENTS

6.4.1 The tensile strength and percentage elongation shall be measured on insulation removed from completed cable according to the method specified in ASTM D 2633.

6.4.2 The minimum tensile strength shall exceed 10 Mpa.

6.4.3 The minimum percentage elongation shall exceed 300 percent.

6.4.4 SHRINKAGE

Insulation shrinkage shall not be greater than 5 percent. The test shall be performed according to the requirements of IEC708-1 clause.

6.4.5 CELL STRUCTURE OF CELLULAR INSULATION

The air cells in cellular insulation shall be uniformly distributed circumferentially and should be substantially non-interconnecting. The cell diameters shall not exceed 30 um (micrometers).

6.4.6 OXIDATION INDUCTION TIME

Oxidation Induction Time (OIT) shall be measured on at least 3 samples of each insulation colour according to ASTM D4565 using a copper pan. The insulation shall be removed from the cable after sheathing. The OIT shall exceed 20 minutes.

6.5 INSULATION INTEGRITY

All conductors shall be continuously insulated and shall be tested by suitable method of spark testing or bare wire detector. Tenderers shall state the voltages to be used. No bared conductors are allowed.

6.6 COMPATIBILITY AND THERMAL STABILITY TESTING OF INSULATION

6.6.1 The insulation shall be stabilized with suitable anti-oxidants and metal deactivators in sufficient quantities to withstand exposure for forty years to the conditions of Lebanon. In addition the filling compound shall be selected so that it does not degrade the properties of the insulation.

6.6.2 Manufacturers are free to choose any combination of stabilizers provided all requirements of this specification are satisfied.

6.6.3 Manufacturers may submit the result of alternative compatibility tests and other information to verify the suitability of the insulation to the conditions of Lebanon. However, OGERO shall determine whether the test procedures results etc. are acceptable.

6.6.4 **SAMPLE PREPARATION**
Cable samples shall be representative lengths of at least 200 mm removed from completed lengths of cable.

6.6.5 **INITIAL MEASUREMENT**
The following measurements shall be performed on insulation removed from cable prior to testing. Filling compound shall be wiped from the sample with dry cloth or paper no solvents shall be used.

6.6.5.1 **Oxidation Induction Time (OIT)**
OIT shall be measured on at least 3 samples of each insulation color according to ASTM D4565 using a copper pan.

6.6.5.2 **Mechanical Properties**
The tensile strength and percent elongation of 5 samples of each color shall be measured according to the method of clause 11.3

6.6.6 AGING IN FILLING COMPOUND

- 6.6.6.1 Cable samples shall be aged for 28 days at $70^{\circ}\pm 2^{\circ}\text{C}$ to ensure maximum uptake of filling compound. Precautions shall be taken to prevent filling compound from draining out of the cable.
- 6.6.6.2 Following aging in the filling compound insulated conductors shall be removed from the cable and the tests of sub-clause 6.6.5 repeated.

6.6.7 THERMO-OXIDATIVE AGING

- 6.6.7.1 Following the aging of sub clause 6.6.6, 10 samples of 200 mm lengths of each of the insulation colours shall be removed from the aged cable and wiped clean of filling compound without using solvents.
- 6.6.7.2 Without any further preparation 5 of the 10 samples of each colour shall be suspended in an oven and aged for 26 weeks at 80°C . At the completion of this aging period the measurements of sub-clause 6.6.5 shall be repeated.
- 6.6.7.3 The remaining 5 samples of each colour shall be twisted into coils of ten close tight turns around a mandrel of the same diameter as the outer diameter of the insulation. After 8 and 20 weeks exposure a further coil shall be wound onto each sample, approximately 30 mm below the previous coil. The samples shall be inspected every two weeks for cracks.

6.6.8 ACCEPTANCE CRITERIA

- 6.6.8.1 **Oxidation Induction Time**
The OIT following the aging tests of clause 6.6.6 and 6.6.7 shall not be less than 20 minutes.
- 6.6.8.2 **Mechanical Properties**
The minimum tensile strength and percent elongation of the aged straight samples i.e. clause 6.6.7.2 shall not be less than 80% of the values of unaged samples.
- 6.6.8.3 **Coiled Samples**
There shall be no more than 5% of the coils including coils formed after 8 and 20 weeks aging cracked after 26 weeks aging.

6.7 CORE FILLING COMPOUND

- 6.7.1 The filling compound shall be a synthetic cable-filling compound suitable for use in tropical climates. It shall be neutral in color.

- 6.7.2 The compound shall be capable of halting the ingress of water to the cable core and the transport of water along the cable core.
- 6.7.3 **DROP POINT**
The drop point shall be measured in accordance with the test method of ASTM D566. It shall be at least 80 °C.
- 6.7.4 **FLASH POINT**
The flash point when measured in accordance with the method of ASTM D92 shall be at least 200 °C.
- 6.7.5 **TOTAL ACID VALUE**
The permissible value of acid shall be tested in accordance with ASTM D974 and shall not exceed the equivalent of 0.1 mg of potassium hydroxide per gram of filling compound
- 6.7.6 **VOLUME RESISTIVITY**
The volume resistivity shall be measured according to the method specified in ASTM D1169 at 100 °C and shall not be less than 10 ohm. cm.
- 6.7.7 **DIELECTRIC CONSTANT**
The dielectric constant shall be measured in accordance with the method specified in ASTM D924 of a frequency of 1 Mhz and shall not exceed 2.3.
- 6.7.8 **OIL SEPARATION**
When tested according to Federal Test Method 321.3 for 7 days at 60°C ± 2°C the oil separation shall not exceed 6%. The loss by evaporation shall not exceed 0.1%. The values obtained shall be reported. Alternative test methods may be proposed for Type Approval by OGERO.
- 6.8 **CORE WRAPPING**
- 6.8.1 The wrapping shall be a dielectric material such as polyethylene or polypropylene.
- 6.8.2 The wrapping may be applied longitudinally or helically with an overlap of not less than 5 mm.
- 6.8.3 The wrapping shall act as a heat barrier to prevent deformation adhesion or damage to the components and material of the core.
- 6.8.4 The wrapping shall not adhere to the cable components.
- 6.9 **MOISTURE BARRIER**
- 6.9.1 The moisture barrier shall be an aluminium tape coated on both sides with a copolymer. It shall prevent the ingress of water to the cable core and prevent the migration of filling compound into the cable sheath.

- 6.9.2 The tape shall comply with the requirements for a Type 1, Class 1 tape as detailed in ASTM B736.
- 6.9.3 The tape shall be continuously bonded to the first sheath to prevent water penetration to the core and the transport of water between the sheath and the tape.
- 6.9.4 The tape shall be applied longitudinally with a minimum overlap of 6 mm. or 10% of the core circumference whichever is the greater. Manufacturers may use smaller overlaps on the larger sized cable if granted Type Approval.
- 6.9.5 The copolymer shall bond and effectively seal the overlap. Tenderers may use additional suitable adhesives to seal the overlap on small size cable, if granted Type Approval.
- 6.9.6 The tape shall be electrically continuous for the cable length.
- 6.9.7 All joints in the tape shall be welded. Any section of tape containing a joint shall have a breaking strength not less than 80% of non-jointed tape. The electrical resistance of a 1.0-meter tape section containing a joint shall not exceed 110% of the resistance of a joint free length.
- 6.9.8 The area of joints shall be recoated with polymer on both sides of the tape. No more than two joints are permitted per 500-meter length of cable. The joints shall have the same resistance to water penetration as non-jointed tape.
- 6.9.9 The tape shall be reasonably free of wrinkles, blisters, and creasing, unbounded areas in the overlap and other defects.

6.10 POLYETHYLENE FIRST SHEATH

- 6.10.1 **POLYETHYLENE CLASSIFICATION**
The first sheath shall consist of polyethylene conforming to the following classification from ASTM D1248.
- 6.10.2 Type 3 corresponding to high-density polyethylene.
- 6.10.3 Class C corresponding to black weather resistant polyethylene containing not less than $2.5 \pm 0.5\%$ of well-dispersed carbon black and other additives as agreed upon.
- 6.10.4 Category 4 or 5 i.e polyethylene with a melt flow index less than or equal to 1.0.
- 6.10.5 Grade J3 i.e polyethylene which has the physical properties of Grade J3 as detailed in Table 6 of ASTM D12483.

6.11 MECHANICAL PROPERTIES OF SHEATH

Sheath removed from cable shall be tensile tested according to the method of ASTM D2633 and shall satisfy the mechanical properties for the Type of polyethylene used i.e. HDPE.

6.12 SHEATH INTEGRITY

6.12.1 The sheath shall be free from holes splits blisters or other imperfections and shall be as smooth and concentric as is consistent with the best manufacturing practice.

6.12.2 The sheath shall be continuously tested to and shall comply with the sheath integrity requirements of IEC 708-1.

6.13 FIRST SHEATH THICKNESS

6.13.1 The thickness of the first sheath shall comply with the requirements of Table 4.

Cable core Diameter (mm)	Minimum Nominal Sheath Thickness (mm)
up to 19	1.5
19.1 to 28	1.8
28.1 to 37	2.0
37.1 to 46	2.5
46.1 to 55	2.8
55.1 to 65	3.2
above 65	3.5

Table 4: First sheath minimum thickness

6.13.2 The average thickness at any cross section shall be not less than 90% of the minimum nominal sheath thickness. The minimum spot thickness shall be not less than 75% of the specified thickness.

CLAUSE 7. CONDUCTOR IDENTIFICATION

7.1 Each insulated conductor shall be identifies by one colour as shown in Table 5

Pair Number	Color of Insulation	
	a-wire	b-wire
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown
5	White	Gray
6	Red	Blue
7	Red	Orange
8	Red	Green
9	Red	Brown
10	Red	Gray

Table 5

CLAUSE 8. ASSEMBLING**8.1 TWINNING**

Two insulated conductors conforming to the colour code of Table 5 shall be uniformly twisted together to form a pair.

The lay shall be different for each pair in a sub-unit and shall be within the following limits:

Minimum	30 mm
Maximum	200 mm

8.2 SUB-UNIT ASSEMBLING

Ten pairs shall be assembled together to form a sub-unit. Each sub-unit shall be bound with durably coloured binding tape conforming to the color code of Table 6.

Sub-Unit Number	Binder Color
1	Blue
2	Orange
3	Green
4	Brown
5	Gray
6	White
7	Red
8	Black
9	Yellow
10	Violet

Table 6

8.3 UNIT ASSEMBLING

- 8.3.1 Sub-Units shall be assembled to form units of either 50 or 100 pairs depending on the cable size as detailed in Table 7.
- 8.3.2 A 50 pair unit shall consist of five sub-units. A 100 pair unit shall consist of ten sub-units.
- 8.3.3 Each unit shall be identified by a durably numbered binding starting from the center of the cable.

8.4 CABLE CORE ASSEMBLING

- 8.4.1 Cables of 100 pairs or less shall be formed by assembling the required number of sub-units together.
- 8.4.2 Cables of more than 100 pairs shall be formed by assembling units together in concentric layers as shown in Table 7.

Nominal number of pairs	Number of pairs/unit	Unit number		
		Center	Layer1	Layer2
150	50	1-3		
200	50	1-4		
300	50	1	2-6	
400	50	1-2	3-8	
600	100	1	2-6	
900	100	1-2	3-9	
1200	100	1-4	5-12	
1500	100	1	2-6	7-15
1800	100	1	2-7	8-18
2400	100	1-3	4-11	12-24

Table 7

- 8.4.3 Cable cores shall include spare pairs as detailed in clause 8.5.

8.5 SPARE PAIRS

- 8.5.1 Cables of 50 pairs and above shall be manufactured with the number of Spare pairs being 2 % of the nominal number of pairs. The spare pairs shall be placed within the unit.
- 8.5.2 The spare pairs shall comply with all requirements of this specification

- 8.5.3 The insulation of each spare pair shall be coloured as follows
a wire..... white
b wire..... red
a wire..... orange
b wire..... blue

8.6 CORE FILLING COMPOUND

All interstices of cable core shall be completely covered with one or more continuous layers of a material conforming to the requirements of clause 11.7.

8.7 CORE WRAPPING

The assembled filled core shall be completely covered with one or more continuous layers of a material conforming to the requirements of clause 11.7.

8.8 INTERNAL IDENTIFICATION

8.8.1 Internal identification of the cable shall be repeated at maximum intervals of 300 mm. Two methods are allowed.

8.8.2 An identification tape placed longitudinally within the cable. It shall be durably marked with MPT/ OGERO the manufacturer's name of the trademark and the year of manufacture of the cable.

8.8.3 Alternatively the above details may be printed on the outer sheath of the cable.

8.9 MOISTURE BARRIER

8.9.1 All cable compliant with this specification shall be manufactured with a transversal moisture barrier.

8.9.2 The tape shall be aluminum of $0.15 \text{ mm} \pm 0.025$ thickness and shall comply with the requirements at clause 11.8.

8.9.3 The tape shall be bonded to the first sheath to form a moisture barrier sheath.

8.10 FIRST (INNER) SHEATH

8.10.1 The first or inner sheath shall be HDPE conforming to the requirements of clause 11.9

8.10.2 Duct cable shall have this sheath only.

8.11 CABLE SHEATHS FOR AGGRESSIVE ENVIRONMENTS

Various sheath constructions for aggressive environments in addition to the requirements already specified may be requested at the time of tender.

8.12 CABLE DIAMETER

The diameter of the duct cable including the attached pulling eye shall not exceed 85 mm.

CLAUSE 9. PROPERTIES AND TEST REQUIREMENTS**9.1 GENERAL**

- 9.1.1 This section specifies the cable and its material, physical, chemical, environmental and mechanical requirements and the tests to be applied for determination of these requirements.
- 9.1.2 The requirements of this section refer to completed cable or material removed from completed cable unless specifically identified otherwise
- 9.1.3 All materials used in the cable shall be non toxic and dermatologically safe
- 9.1.4 It's full right for OGERO to order Approval type and routine quality control test and reports when it's needed without any restriction and without further notice and at any time during the term of the contract.

CLAUSE 10. PHYSICAL REQUIREMENTS OF ASSEMBLED CABLE**10.1 CABLE DIAMETER**

The diameter of duct cable, including pulling eyes, shall not exceed 85 mm.
Cable ovality shall be such that the maximum diameter of duct cable at any point along the cable length shall not exceed 85 mm.

10.2 LONGITUDINAL WATER PENETRATION

Cable shall comply with the requirements of the water penetration test of IEC 708

10.3 CABLE BEND TEST

Cable shall be tested according to the following method. A length of cable shall be bent with the moisture barrier overlap on the outside of the bend in a 180° arc around a mandrel, straightened, bent 180° in the opposite direction and straightened again to complete one cycle. The diameter of the mandrel shall be 15 times the outer diameter of the sheath. The cable shall then be rotated 90° and a second cycle of bending performed. The bent area of the cable shall show no external signs of rippling. After removal of the sheath or sheaths there shall be no visible evidence of fracture of the moisture barrier undue deformation of the overlap region or delamination from the sheath.

CLAUSE 11. ELECTRICAL AND TRANSMISSION REQUIREMENTS

11.1 All electrical and transmission tests shall be performed according to the methods of IEC 189-1 unless stated otherwise.

The measurements shall be performed at, or corrected to 20 °C unless stated otherwise.

11.2 ELECTRICAL RESISTANCE

The electrical resistance of the conductors shall not exceed the values of Table 8.

Conductor Diameter (mm)	Maximum Resistance (ohms/Km)	
	Average	Individual
0.4	143	150
0.5	91	96
0.65	53	57
0.9	28	30

Table 8 Maximum Conductor Electrical Resistance

11.3 RESISTANCE UNBALANCE

The resistance unbalance between the two conductors of a pair shall not exceed the values shown in Table 9.

Conductor Diameter (mm)	Maximum Resistance Unbalance (%)	
	Average	Individual
0.4	1.0	3.25
0.5	0.75	2.5
0.65	0.75	2.0
0.9	0.75	2.0

Table 9 : Resistance Unbalance Limits.

The resistance unbalance shall be calculated according to the formula:

$$\frac{R1 - R2}{R1 + R2}$$

Where R1 is the resistance of the first wire of the pair and R2 is the resistance of the second wire of the pair.

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$$\frac{R1 - R2}{R1 + R2}$$

Where R1 is the resistance of the first wire of the pair and R2 is the resistance of the second wire of the pair.

11.4 DIELECTRIC WITHSTAND VOLTAGE

The voltages shown in table 10 shall be used for the dielectric strength test.

Type of Insulation	Conductor to Conductor				Conductor to Screen			
	Test Duration	Test Voltage	Test Duration	Test Voltage	Test Duration	Test Voltage	Test Duration	Test Voltage
Solid	3 s	2 KV	60 s	1 KV	3 s	6 KV	60 s	3 KV
Cellular or Foam Skin	3 s	1 KV	60 s	0.5 KV	3 s	3 KV	60 s	1 KV

Note 1 : An a.c. test voltage $V_{de}/1.5$ may be used.

Note 2 : Higher test voltages may be applicable when the installed cables may be subjected to high voltage stress.

Table 10

- 11.5** The insulation resistance shall be measured in accordance with IEC 189-1 clause 5.3. At least one of each colour of insulated conductors shall be tested. Several pairs may be tested at the same time. The insulation resistance shall not be less than 5000 megohm.Km.

11.6 MOISTURE BARRIER

The resistance per unit length shall be measured.

11.7 MUTUAL CAPACITANCE

The mutual capacitance shall be measured in accordance with IEC 189-1 clause 5.4 at 1000 ± 200 Hz.

The average mutual capacitance of all cables shall be 55 nF/Km and the mutual capacitance of any pair shall not exceed 64 nF/Km.

11.8 CAPACITANCE UNBALANCE**11.8.1 Pair to pair capacitance unbalance**

The tests shall be performed in accordance with IEC 189-1 clause 5.5 at a frequency of 1000 ± 200 Hz. The results shall be corrected to 500 m of cable

Where lengths other than 500 m are measured the value shall be corrected to 500 m.

The capacitance unbalance shall not exceed the values of Table 11

Maximum Capacitance Unbalance pF /500 m	
Pair to Pair	250
Side to Side	800

Table 11 : Pair to Pair Capacitance Unbalance Limits.

The capacitance unbalance measurements within a sub-unit may be performed between adjacent pairs if a type test proves that the other combinations do not influence the test.

11.8.2 Pair to earth capacitance unbalance

The pair to earth unbalances shall be measured using a frequency of 1000 ± 200 Hz. All pairs except the pair under test shall be connected to the aluminum tape and earth.

The pair to earth unbalances shall not exceed:

Maximum average 600 pF/Km

Maximum individual 2500 pF/Km

When lengths other than 1000 m are measured the value shall be corrected to 1000 m. Tenderers shall state their correction formula. Lengths less than 100m shall be considered as equal to 100m.

11.9 ATTENUATION

The attenuation shall be measured at 1kHz and 1MHz. The measured values when corrected to 20 °C shall not exceed the values of Table 12

Attenuation (dB/Km)		
Conductor Diameter	1KHz	1MHz
0.4	1.89	28.6
0.5	1.51	24.2
0.65	1.16	19.8
0.9	0.84	14.3

Table 12: Attenuation Limits

Measurement shall be made on one randomly selected unit per layer or per cable if less than 300 pairs

The maximum tolerance on individual values shall be ± 10 percent.

11.10 CROSS TALK

11.10.1 1% WORST-PAIR NEXT

The pair to pair near- end (NEXT) coupling loss of 99 percent of the pair combinations shall exceed the values shown in Table 13.

Frequency (KHz)	NEXT Limit (dB/lan)
1	85
12	80
80	67
1000	48

Table 13 : 1% Worst Pair Coupling Loss Limits

The measurement shall be performed on one randomly selected outer unit.

11.10.2 NEXT AND ELFEXT INDIVIDUAL POWER SUMS

The near end (NEXT) and equal level far end (ELFEXT) individual power sums shall exceed the values specified in Table 14.

Frequency (KHz)	Within Unit (db/Km)	
	NEXT	ELFEXT
1	70	74
12	67	71
80	55	58
1000	37	36

Table 14: Minimum Individual Power Sum Values

The minimum cable length for Cross-talk measurements shall be 300m. The values shall be corrected to 1 Km.

11.11 DEFECTIVE PAIRS

Defective pairs are pairs that have either a cross, short, or open circuit condition or an electrical deviation. The number of defective pairs shall not exceed the number of spare pairs in the cable. Grounded cable pairs are not acceptable.

CLAUSE 12. QUALITY ASSURANCE

Manufacturers of cable conforming to this specification must show evidence that the cable has been manufactured according to a Quality System conforming to ISO 9001 or ISO 9002.

OGERO may inspect the Manufacture's facilities at any time during the term of the contract. All cable manufactured to this specification may be inspected and tested by OGERO to check compliance at any time during the term of the contract.

In case of a dispute, testing shall be performed by an independent authority at the expense of the Contractor.

CLAUSE 13. PACKING AND MARKING

13.1 SHEATH MARKING

The method of marking shall not locally decrease the thickness of the sheath. The markings shall be durable, coloured white or embossed.

13.2 LENGTH MARKING

Continuous sequentially numbered length markers shall be placed at regular longitudinal intervals of one meter on outside sheath.

The numbers shall not be less than 3.0 millimeters in height and shall be spaced to produce good legibility.

The accuracy of the length marking shall be within 1 percent.

An occasional illegible marking is permissible if there is a legible marking on either side of it.

The high count length marker shall be on the outer end of the cable when drummed.

13.3 APPLICATION MARKINGS: OUTER SHEATH

Duct Cable: The word "DUCT" shall be marked at longitudinal intervals of not more than 1 meter.

13.4 CABLE DRUM LENGTHS

Lengths of cable shall be drummed in the lengths shown on Table 15.

However the supplier will be allowed to deliver 10% only of the quantity of each size in shorter lengths, the minimum short length acceptable being 200 meter. Each length of cable shall be wound on a separate drum unless otherwise specified or agreed to by OGERO.

Cable Size	Conductor Diameter				Remarks
	0.4	0.5	0.65	0.9	
10	500	500	500	500	For cables of 10 up to 50 pairs, reels carrying multiple of this length also acceptable up to a max. of 2 km/reel and up to 50 % of the itemized ordered quantity
20	500	500	500	500	
30	500	500	500	500	
50	500	500	500	500	
70	500	500	500	500	For cables of 70 up to 400 pairs, reels carrying multiple of this length also acceptable up to a max. of 1 km/reel and up to 50 % of the itemized ordered quantity.
100	500	500	500	500	
150	500	500	500	500	
200	500	500	500	500	
300	500	500	500	500	
400	500	500	500	500	
500	500	500	500		
600	500	500	300		
800	500	500			
1000	500	500			
1200	300	300			
1500	300				
1800	300				
2400	300				

Table 15: Cable Drum Lengths (m)

N.B : A length tolerance of minus zero, plus five percent will apply for all sizes and reels (including multiples).

13.5 CABLE DRUMS

The drums shall be substantial and constructed so as to prevent damage to the cables during shipment and handling.

The diameter of the drum barrel shall be large enough to prevent damage to the cables during reeling and unreeling. The diameter of the barrel shall not be less than 15 times the outside diameter of the cable.

Lags or other suitable means of protection shall be applied to the drums to prevent damage to the cables during shipping and storage.

Nails and staples used in the construction of the drums must not be placed in a position where they can damage the cables.

The drums shall be non-returnable unless agreed otherwise.

The weight of any drum including cable and lagging shall not exceed 5000 Kg.

The spindle hole shall allow the use of a 75-mm diameter spindle without binding.

The drum size including lags shall not exceed 2.72 meters in diameter.

The total drum width shall not exceed 1.5 meters.

For testing purposes, the inner end of the cable shall be recessed into a slot in the drum flange and protected by a metal cover firmly secured to the flange.

Alternatively, the inner end may protrude through the inside of the drum via a suitably constructed slot on the inside of the drum flange.

The cable ends shall be securely fastened to prevent the cable from becoming loose during transport and shall not protrude beyond any portion of the drum.

13.6 DRUM MARKINGS

13.6.1 FLANGE MARKINGS

Details given below shall be distinctly marked in a weather-proof material on both sides of the drum flanges :

- 1) MPT / OGERO Lebanon
- 2) Arrow showing which direction to roll the drum
- 3) Country of origin
- 4) The label "CAUTION-NOT TO BE LAID FLAT"
- 5) Manufacturer's name or trade mark
- 6) A mark indicating the location of the inner end of the cable if located internally. (see clause 14.3.9)

13.6.2 MARKING PLATES

Marking plates showing the following information in Arabic and English shall be securely attached to the outer side of both flanges on all drums.

- A: Material specification number i.e OGERO C01/00 - DUCT
- B: Number of conductor pairs
- C: Conductor diameter in millimeters
- D: Nominal Cable length in meters
- E: Gross weight in Kilograms
- F: Drum number
- G: Manufacturer's name
- H: Year of manufacture
- I: Order reference or adjudication date.

The plate shall be made of a corrosion-proof metal capable of maintaining the information in a legible format for a minimum of 5 years in the conditions of Lebanon.

The minimum size of the marking plate shall be 125 mm wide and 100 mm high.

The numerals in at least one of the languages shall be punched.

Appendix 1 shows the recommended dimensions and layout for the marking plate. The lower case letters indicate Arabic numerals and the upper case letters indicate English numerals.

13.7 IDENTIFICATION OF DEFECTIVE PAIRS

A cable that contains a defective pair or pairs shall have both ends colored red by using a suitable adhesive tape or permanent non water-soluble colouring.

The red marking shall completely encircle the cable sheath shall be at least 100 mm wide and shall be located within 400 mm of the end the cable.

A marking tag describing the position and type of defect shall be attached to the outer end of the cable.

In addition to this tag, a marking plate containing the same information as the tag shall be attached to the inside of the flange near the cable outer end.

13.8 CABLE END SEALS AND PULLING EYES

All cables shall be provided with end caps on both ends to prevent the leakage of filling compound and the ingress of moisture.

Cables shall be capped immediately after factory inspection and acceptance testing.

Duct cable above 75-mm outer diameter shall be fitted with a pulling eye. The pulling eye shall be optional on all other cable if agreed by OGERO.

The maximum outer diameter of the attached pulling eye shall not exceed 85mm.

The maximum length of any rigid section of the pulling eye assembly shall not exceed 300mm.

The pulling eye shall be capable of withstanding the pulling force calculated by multiplying the load per pair of table 16 by the number of cable pairs.

Conductor Diameter (mm)	Load per Pair (N)
0.9	115
0.65	57
0.5	34
0.4	23

Table 16: Pulling Eye Load per Cable Pair

The pulling eye shall transmit the pulling force to at least 50 percent of the conductors.

CLAUSE 14. COMPLIANCE STATEMENT

The Contractor must indicate his compliance or non-compliance with all clauses of this specification in a side by side format. There are two statements to describe compliance or non-compliance with each clause as detailed in sub clauses 14.1 and 14.2.

14.1 COMPLIANCE

The Contractor agrees to the stated requirements without any reservation.

14.2 NON-COMPLIANCE

If the Contractor does not meet any respective item or clause, the reason for non-compliance shall be stated. An alternative proposal can be documented with evidences.

AERIAL NON ARMORED JELLY FILLED CABLE

- CLAUSE 1 GENERAL**
- CLAUSE 2 ASSOCIATED SPECIFICATIONS**
- CLAUSE 3 DEFINITIONS AND STANDARD CABLE CODE**
- CLAUSE 4 DESIGN REQUIREMENTS**
- CLAUSE 5 CONDUCTORS**
- CLAUSE 6 INSULATION**
- CLAUSE 7 ASSEMBLING AND FILLING**
- CLAUSE 8 SHEATHING**
- CLAUSE 9 PROPERTIES AND TEST REQUIREMENT**
- CLAUSE 10 ELECTRICAL AND TRANSMISSION REQUIREMENT**
- CLAUSE 11 QUALITY ASSURANCE**
- CLAUSE 12 PACKING AND MARKING**
- CLAUSE 13 COMPLIANCE STATEMENT**

CLAUSE 1. GENERAL

- 1.1 This specification covers the standards and requirements for the construction, properties, testing and packing of self supporting polyethylene insulated, non armored, jelly filled unit type, moisture barrier sheathed aerial cable sizes ranging from 10 to 200 pairs using 0.4, 0.5, 0.65 and 0.9 diameter conductors with cellular polyethylene insulation.
- 1.2 Cable purchased in compliance with this specification is to be used in the telecommunications network of Lebanon on poles and walls.
- 1.3 OGERO reserves the rights to make changes to the specification without further notice, before any tender or after any contract execution.

CLAUSE 2. ASSOCIATED SPECIFICATIONS

- 2.1 The following unattached international and or national standard shall be applied and deemed to be an integral part of this specification.

ASTMB 3	Standard specification for soft or annealed copper wire
ASTMB 736	Standard specification for aluminum, aluminum alloy and aluminum clad steel cable shielding stock
ASTMA 90	Standard test method for flash and fire points by Cleveland open cup.
ASTMD 92	Standard Test method for flash and fire points by Cleveland open cup
ASTMD 566	Test method for dropping point of lubricating grease
ASTMD 924	Standard test Method for a c loss characteristics and relative permittivity (dielectric constant) of electrical insulating liquids
ASTMD 974	Standard test method for acid and base number by color indicator titration
ASTMD 1169	Standard test method for specific resistance (resistivity) of electrical insulating liquids
ASTMD 1248	Standard specification for polyethylene plastics molding and extrusion materials
ASTMD 2633	Standard method of testing thermoplastic insulation and jackets for wire and cable
ASTMD 4565	Standard test method for physical and environmental performance properties of insulation and jackets for telecommunications wire and cable
IEC 189-1	General test and measuring methods
EEC 304	Standard colors for low frequency cables and wires
IEC 708-1	General design details and requirements
ISO 9001 or 9002	Quality systems - Model for quality assurance in production and installation
ISO R89	Steel wire, tensile strength
BTCW 1179	Polyethylene sheath for telephone cables appendix 4 : Water permeation text
FEDERAL TEST METHOD 321.1	Oil separation from Lubricating Grease (Static Technique)

CLAUSE 3. DEFINITIONS AND STANDARD CABLE CODE**3.1 DEFINITIONS**

The following definitions shall apply throughout this specification

Moisture Barrier

The aluminum tape which surrounds the cable core

Moisture Barrier Sheath

The first sheath bonded to the moisture barrier

LDPE

Low density polyethylene i.e. 0.910 to 0.925 grams/cm³

HDPE

High density polyethylene i.e. 0.941 to 0.959 grams/cm³

Pair

Two insulated conductors twisted together and designated wire "a" and "b"

Sub Unit

Ten pairs assembled together and identified with a binder tape

Unit

Five or ten sub units assembled together and identified with a binder tape

Cable Core

The assembled cable components that are contained within the moisture barrier

Lay

The axial length of one complete turn of the helix formed around an imaginary line between the center of the conductors of a pair or around an imaginary longitudinal line at the center of a sub unit, unit or core.

Next

Near end cross talk

ELFEXT

Equal level far end cross talk

3.2 STANDARD MPT COPPER CONDUCTOR CABLE DESIGNATIONS**FIRST LETTER = CONDUCTOR INSULATION TYPE**

E	Polyethylene - solid
C	Polyethylene - cellular
P	Paper
V	Polyvinylchloride

SECOND LETTER = FIRST SHEATH MATERIAL TYPE

- E** Polyethylene
- V** Polyvinylchloride (no longer used on new cable)
- R** Halogen free flame retardant

SUBSEQUENT LETTERS = OTHER KEY CHARACTERISTICS

- H** High-density polyethylene outer sheath (generally no longer used on new cables)
- F** Filled cables with metal moisture barrier
- S** Unfilled cables with metal moisture barrier
- B** Indoor (building) cable
- Z** Shielded, filled for PCM
- M** Self supporting (catenary) for aerial cable
- E** Polyethylene second sheath
- D** Double tape armoring and polyethylene second sheath

3.3 SIZE OF CABLE AND CONDUCTOR DIAMETER

Number of pairs x conductor diameter (0.4, 0.5, 0.65, 0.9) mm

3.4 EXAMPLES

CES 600x0.4:

Cellular polyethylene insulation (C)

Polyethylene sheath (E)

Metallic moisture barrier unfilled (S)

600 pairs (600)

0.4 mm diameter conductors (0.4)

CEFE 300x0.5:

Cellular polyethylene insulation (C)

Polyethylene sheath (E)

Metallic moisture barrier

Filled (F)

Outer (second) polyethylene sheath (E)

300 pairs (300)

0.5 mm diameter conductors (0.5)

CLAUSE 4. DESIGN REQUIREMENTS**4.1 GENERAL**

This section describes the cable design

4.1.1 COMPATIBILITY WITH MPT PRACTICES

All cables must be compatible with current MPT installation standards and operation and maintenance practices

4.1.2 LONG TERM PERFORMANCE REQUIREMENTS

All cable supplied in compliance with this specification shall be capable of withstanding the typical service conditions of Lebanon for a period of forty

years without detriment to the transmission or operation and maintenance characteristics of the cable.

Cable shall be designed manufactured and packaged so that exposure to the environmental conditions of Lebanon during storage transport installation and operation and the environmental conditions to be expected during the storage and transport of cable outside Lebanon shall not degrade the physical transmission or operation and maintenance characteristics of the cable.

The environmental conditions of Lebanon may include ambient air temperature variations from -15°C to $+37^{\circ}\text{C}$. In addition direct solar radiation is known to increase the temperature of some outside plan to approximately $+52^{\circ}\text{C}$

4.2 CABLE SIZES.

4.2.1 The aerial cable sizes required are shown in Table 1.

Conductor Diameter (mm)	Number of Pairs
0.4	10,20,30,50,70,100,150,200
0.5	10,20,30,50,70,100,150,200
0.65	10,20,30,50,70,100,150,200
0.9	10,20,30,50,70,100,150

Table 1: Cable size

CLAUSE 5. CONDUCTORS

5.1 The conductors shall comply with the requirements of clause 5

5.2 The nominal conductor diameters shall be 0.5 mm

5.3 Conductors shall meet the requirements of ASTM B3 with the exception that the "Dimensions and Permissible Variations" requirements are waived.

5.4 CONDUCTOR JOINTS

5.4.1 Conductor joints shall be brazed using a silver solder alloy or welded by an electrical or cold welding technique.

5.4.2 A conductor containing a joint made during manufacture shall have a tensile strength of not less than 90% of the tensile strength of the non-jointed conductor.

5.4.3 Joints shall be free of burrs undercuts or protrusions and be the same diameter as the conductor. The conductors shall be in line.

5.4.4 Joints shall be reinsulated with a material such as heat shrink polyolefin.

CLAUSE 6. INSULATION

Each conductor shall be covered with a continuous layer of Foam skin HDPE. The insulation shall conform to requirements of clause 6.

6.1 POLYETHYLENE RAW MATERIAL CLASSIFICATION

The insulation raw material shall conform to the following classification from ASTM D 1248:

- 6.1.1 Type 3, i.e. high-density polyethylene with a density between 0.941 and 0.959 grams/cm³.
- 6.1.2 Category 4 or 5 i.e. polyethylene with a maximum melt flow index not greater than 1.0.
- 6.1.3 The polyethylene shall have the properties described for Grade E8 or E9.

6.2. DIMENSIONAL REQUIREMENTS

- 6.2.1 The nominal thicknesses of Foam Skin insulation shall be stated by the manufacturer. The maximum outside diameter of insulation shall not exceed the limits shown in Table 5

Conductor Diameter (mm)	Maximum Insulation Outside Diameter (mm)
0.4	1.22
0.5	1.42
0.65	1.65
0.9	2.2

Table 5 Maximum Insulation Outside Diameter

- 6.2.2 The insulation eccentricity at any cross section shall not exceed the limits of Table 6.

Conductor Diameter (mm)	0.4	0.5	0.65	0.9
Eccentricity (mm)	0.051	0.051	0.076	0.106

Table 6 Insulation Eccentricity Limits

6.3 MECHANICAL AND CHEMICAL REQUIREMENTS

- 6.3.1 The tensile strength and percentage elongation shall be measured on insulation removed from completed cable according to the method specified in ASTM D 2633.
- 6.3.2 The minimum tensile strength shall exceed 10 Mpa.
- 6.3.3 The minimum percentage elongation shall exceed 300 percent.
- 6.3.4 **SHRINKAGE**
Insulation shrinkage shall not be greater than 5 percent. The test shall be performed according to the requirements of IEC 708-1 clause 21.4.

6.3.5 CELL STRUCTURE OF CELLULAR INSULATION

The air cells in cellular insulation shall be uniformly distributed circumferentially and should be substantially non-interconnecting. The cell diameters shall not exceed 30 um (micrometers).

6.3.6 OXIDATION INDUCTION TIME

Oxidation Induction Time (OIT) shall be measured on at least 3 samples of each insulation color according to ASTM D4565 using a copper pan. The insulation shall be removed from the cable after sheathing. The OIT shall exceed 20 minutes.

6.4 INSULATION INTEGRITY

All conductors shall be continuously insulated and shall be tested by suitable method of spark testing or bare wire detector. Tenderers shall state the voltages to be used. No bared conductors are allowed.

6.5 COMPATIBILITY AND THERMAL STABILITY TESTING OF INSULATION**6.5.1 GENERAL**

The insulation shall be stabilized with suitable anti-oxidants and metal deactivators in sufficient quantities to withstand exposure for forty years to the conditions of Lebanon. In addition the filling compound shall be selected so that it does not degrade the properties of the insulation.

Manufacturers are free to choose any combination of stabilizers provided all requirements of this specification are satisfied.

Manufacturers may submit the result of alternative compatibility tests and other information to verify the suitability of the insulation to the conditions of Lebanon. However, OGERO shall determine whether the test procedures results etc. are acceptable.

6.5.2 SAMPLE PREPARATION

Cable samples shall be representative lengths of at least 200mm removed from completed lengths of cable.

6.5.3 INITIAL MEASUREMENT

The following measurements shall be performed on insulation removed from cable prior to testing. Filling compound shall be wiped from the sample with dry cloth or paper no solvents shall be used.

6.5.3.1 Oxidation Induction Time (OIT)

OIT shall be measured on at least 3 samples of each insulation color according to ASTM D4565 using a copper pan

6.5.3.2 Mechanical Properties

The tensile strength and percent elongation of 5 samples of each color shall be measured according to the method of sub-clause 6.3.1

6.5.4 AGING IN FILLING COMPOUND

Cable samples shall be aged for 28 days at $70^{\circ} \pm 2^{\circ}\text{C}$ to ensure maximum uptake of filling compound. Precautions shall be taken to prevent filling compound from draining out of the cable.

Following aging in the filling compound insulated conductors shall be removed from the cable and the tests of sub-clause 6.5.3 repeated.

6.5.5 THERMO - OXIDATIVE AGING

Following the aging of clause 6.5.4, 10 samples of 200 mm lengths of each of the insulation colors shall be removed from the aged cable and wiped clean of filling compound without using solvents.

Without any further preparation 5 of the 10 samples of each color shall be suspended in an oven and aged for 26 weeks at 80°C . At the completion of this aging period the measurements of clause 11.5.3 shall be repeated.

The remaining 5 samples of each color shall be twisted into coils of ten close tight turns around a mandrel of the same diameter as the outer diameter of the insulation. After 8 and 20 weeks exposure a further coil shall be wound onto each sample, approximately 30 mm below the previous coil. The samples shall be inspected every two weeks for cracks.

6.5.6 ACCEPTANCE CRITERIA**6.5.6.1 Oxidation Induction Time**

The OIT following the aging tests of sub-clause 6.5.4 and 6.5.5 shall not be less than 20 minutes.

6.5.6.2 Mechanical Properties

The minimum tensile strength and percent elongation of the aged straight samples i.e. sub clause 6.5.5 shall not be less than 80% of the values of non-aged samples.

6.5.6.3 Coiled Samples

There shall be no more than 5% of the coils including coils formed after 8 and 20 weeks aging cracked after 26 weeks aging.

6.6 CONDUCTOR IDENTIFICATION

6.6.1 Each insulated conductor shall be identified by one color as shown in Table 2.

Pair Number	Color of Insulation	
	a-wire	b-wire
1	white	Blue
2	white	Orange
3	white	Green
4	white	Brown
5	white	Gray
6	red	Blue
7	red	Orange
8	red	Green
9	red	Brown
10	red	Gray

Table 2: Conductor color code

CLAUSE 7. ASSEMBLING**7.1 TWINNING**

Two insulated conductors conforming to the color code of Table 2 shall be uniformly twisted together to form a pair.

The lay shall be different for each pair in a sub-unit and shall be within the following limits:

Minimum	30mm
Maximum	200mm

7.2 SUB-UNIT ASSEMBLING

Ten pairs shall be assembled together to form a sub-unit Each sub-unit shall be bound with durably colored binding tape conforming to the color code of Table 3.

Sub-Unit Number	Binder Color
1	Blue
2	Orange
3	Green
4	Brown
5	Gray
6	White
7	Red
8	Black
9	Yellow
10	Violet

Table 3: Binder color code

7.3 CABLE CORE ASSEMBLING

7.3.1 Cables of 100 pairs or less shall be formed by assembling the required number of sub-units together.

7.3.2 Cables of more than 100 pairs shall be formed by assembling units together.

- 7.3.3 Cable cores shall include spare pairs as detailed in clause 8.5

7.4 SPARE PAIRS

- 7.4.1 Cables of 50 pairs and above shall be manufactured with the number of spare pairs being 2% of the nominal number of pairs.
The spare pairs shall be placed within the unit.
- 7.4.2 The spare pairs shall comply with all requirements of this specification.
- 7.4.3 The insulation of each spare pair shall be colored as follows
- a wire white
 - b wire red
 - a wire orange
 - b wire blue

7.5 CORE FILLING COMPOUND

All interstices of cable core shall be completely filled with a cable-filling compound having the following characteristics:

7.5.1 TYPE

The filling compound shall be a synthetic cable-filling compound suitable for use in tropical climates. It shall be neutral in color.

The compound shall be capable of halting the ingress of water to the cable core and the transport of water along the cable core.

7.5.2 DROP POINT

The drop point shall be measured in accordance with the test method of ASTM D566. It shall be at least 80° C.

7.5.3 FLASH POINT

The flash point when measured in accordance with the method of ASTM D92 shall be at least 200 °C.

7.5.4 TOTAL ACID VALUE

The permissible value of acid shall be tested in accordance with ASTM D974 and shall not exceed the equivalent of 0.1 mg. of potassium hydroxide per gram of filling compound.

7.5.5 VOLUME RESISTIVITY

The volume resistivity shall be measured according to the method specified in ASTM D1169 at 100 °C and shall not be less than 10 ohm.cm.

7.5.6 DIELECTRIC CONSTANT

The dielectric constant shall be measured in accordance with the method specified in ASTM D924 of a frequency of 1 MHz and shall not exceed 2.3.

7.5.7 OIL SEPARATION

When tested according to Federal Test Method 321.3 for 7 days at 60° +/- 2°C the oil separation shall not exceed 6%. The loss by evaporation shall not

exceed 0.1%. The values obtained shall be reported. Alternative test methods may be proposed for Type Approval by OGERO.

7.6 CORE WRAPPING

The assembled filled core shall be completely covered with one or more continuous layers of a material conforming to the requirements of clause 6.7.

- 7.6.1 The wrapping shall be a dielectric material such as polyethylene or polypropylene.
- 7.6.2 The wrapping may be applied longitudinally or helically with an overlap of not less than 5 mm.
- 7.6.3 The wrapping shall act as a heat barrier to prevent deformation adhesion or damage to the components and material of the core.
- 7.6.4 The wrapping shall not adhere to the cable components.

7.7 INTERNAL IDENTIFICATION

- 7.7.1 Internal identification of the cable shall be repeated at maximum intervals of 300 mm. Two methods are allowed.
- 7.7.2 An identification tape placed longitudinally within the cable. It shall be durably marked with MPT/OGERO the manufacturer's name or trademark and the year of manufacture of the cable.
- 7.7.3 Alternatively the above details may be printed on the outer sheath of the cable.

CLAUSE 8. SHEATHING

8.1 MOISTURE BARRIER

All cable compliant with this specification shall be manufactured with a moisture barrier.

- 8.1.1 The moisture barrier shall be an aluminum tape of $0.15 \text{ mm} \pm 0.025 \text{ mm}$ coated on both sides with a copolymer. It shall prevent the ingress of water to the cable core and prevent the migration of filling compound into the cable sheath.
- 8.1.2 The tape shall comply with the requirements for a Type 1 Class 1 tape as detailed in ASTM B736.
- 8.1.3 The tape shall be continuously bonded to the first sheath to prevent water penetration to the core and the transport of water between the sheath and the tape.
- 8.1.4 The tape shall be applied longitudinally with a minimum overlap of 6mm or 10% of the core circumference whichever is the greater. Manufacturers may use smaller overlaps on the larger sized cable if granted Type Approval.
- 8.1.5 The copolymer shall bond and effectively seal the overlap. Tenderers may use additional suitable adhesives to seal the overlap on small size cable, if granted Type Approval.
- 8.1.6 The tape shall be electrically continuous for the cable length.
- 8.1.7 All joints in the tape shall be welded. Any section of tape containing a joint shall have a breaking strength not less than 80% of non-jointed tape. The

electrical resistance of a 1.0 meter tape section containing a joint shall not exceed 110% of the resistance of a joint free length.

- 8.1.8 The area of joints shall be recoated with polymer on both sides of the tape. No more than two joints are permitted per 500 meter length of cable. The joints shall have the same resistance to water penetration as non-jointed tape.
- 8.1.9 The tape shall be reasonably free of wrinkles, blisters, creasing, non-bonded areas in the overlap and other defects.
- 8.1.10 The tape shall be bonded to the sheath to form a moisture barrier. Median Peel strength between the moisture barrier and the sheath shall exceed 1.5 N/mm when tested according to IEC 708-1

8.2 SUSPENSION STRAND

- 8.2.1 The suspension strand shall consist of 7 zinc coated steel wires in drawn condition, formed with a left hand lay. The length of lay shall not exceed 20 times the diameter of the strand.
- 8.2.2 The minimum diameter of each wire in the suspension strand shall be as shown in table 4.

Number of Pairs	Suspension strand wire (diameter in mm) Conduction diameter			
	0.4mm	0.5mm	0.65mm	0.9mm
10	0.9	0.9	1.2	1.2
20	0.9	0.9	1.2	1.2
30	1.2	1.2	1.2	1.2
50	1.2	1.2	1.2	1.6
70	1.2	1.2	1.6	1.6
100	1.2	1.6	1.6	1.6
150	1.6	1.6	1.6	2.0
200	1.6	1.6	1.6	--

Table 4 Suspension strand wire diameter (mm)

8.2.3 SUSPENSION WIRE

The wire shall conform to the text requirement of ISO R89 and shall have a minimum tensile strength of 1600 Mpa. The minimum breaking load of steel is given according to diameter of steel in Table 7.

Diameter of steel wire (mm)	Minimum breaking load (KN)
0.9	7
1.2	12
1.6	22
2.0	35

Table 7 Steel wire minimum breaking load

- 8.2.4 The wire shall be zinc coated to a minimum weight of 70 g/m² when tested according to ASTM A90 When the strand is cut the individual wires shall not spring open.

8.3 SHEATH**8.3.1 OUTER SHEATH**

The outer sheath shall be high-density polyethylene. The sheath shall be in figure 8 formation enclosing the suspension strand.

8.3.2 POLYETHYLENE CLASSIFICATION

The sheath shall consist of polyethylene conforming to the following classification from ASTM D1248.

Type 3 corresponding to high density polyethylene Class C corresponding to black weather resistant polyethylene containing not less than 2.5 +/- 0.5% of well dispersed carbon black and other additives as agreed upon.

Category 4 or 5 i.e polyethylene with a melt flow index less than or equal to 1.0.

Grade J4 i.e. polyethylene which has the physical properties of Grade J4 as detailed in Table 3 of ASTM D1248.

8.3.3 MECHANICAL PROPERTIES OF SHEATH

Sheath removed from cable shall be tensile tested according to the method of ASTM D2633. Tensile strength and elongation shall be as per ASTM D1248.

8.3.4 SHEATH INTEGRITY

The sheath shall be free from holes splits blisters or other imperfections and shall be as smooth and concentric as is consistent with the best manufacturing practice.

The sheath shall be continuously tested to and shall comply with the sheath integrity requirements of IEC 708-1.

8.3.5 SHEATH THICKNESS

8.3.5.1 The thickness of the sheath shall comply with the requirements of Table 8.

Cable core Diameter (mm)	Minimum Nominal Sheath Thickness (mm)
up to 19	1.5
19.1 to 28	1.8
28.1 to 37	2.0
37.1 to 46	2.5

Table 8 Sheath minimum thickness

8.3.5.2 The average thickness at any cross section shall be not less than 90% of the minimum nominal sheath thickness. The minimum spot thickness shall be not less than 75% of the specified thickness.

8.3.6 CABLE BEND TEST

8.3.6.1 After removal the suspension strand by splitting the web cable shall be tested according to the following method. A length of cable shall be bent with the moisture barrier overlap on the outside of the bend in a 180° around a mandrel, straightened, bent 180° in the opposite direction and straightened again to complete one cycle. The diameter of the mandrel shall be 15 times the outer diameter of the sheath. The cable shall then be rotated 90° and a second cycle of bending performed. The bent area of the cable shall show no external signs of rippling. After removal of the sheath or sheaths there shall be no visible evidence of fracture of the moisture barrier undue deformation of the overlap region or delamination from the sheath.

8.3.6.2 Moisture barrier sheath water vapor permeation

The water vapor permeation rate shall not exceed $0.13 \times D$ expressed in g/100m/week D is the interval diameter of the polyethylene sheath in mm. The test methods shall be in accordance with BTCW 1179.

CLAUSE 9. PROPERTIES AND TEST REQUIREMENTS**9.1 GENERAL**

- 9.1.1** This section specifies the cable and its material, physical, chemical, environmental and mechanical requirements and the tests to be applied for the determination of these requirements.
- 9.1.2** The requirements of this section refer to completed cable or material removed from completed cable unless specifically identified otherwise.
- 9.1.3** All materials used in the cable shall be non-toxic and dermatologically safe.
- 9.1.4** It's full right for OGERO to order Approval type and routine quality control test and reports when it's needed without any restriction and without further notice and at any time during the term of the contract.

CLAUSE 10. ELECTRICAL AND TRANSMISSION REQUIREMENTS

- 10.1** All electrical and transmission tests shall be performed according to the methods of IEC 189-1 unless stated otherwise.
The measurements shall be performed at, or corrected to 20 °C unless stated otherwise.

10.2 CONDUCTOR**ELECTRICAL RESISTANCE**

The electrical resistance of the conductors shall not exceed the values of Table 9.

Conductor Diameter (mm)	Maximum Resistance (ohms/Km)	
	Average	Individual
0.4	143	150
0.5	91	96
0.65	53	57
0.9	28	30

Table 9 Maximum Conductor Electrical Resistance

10.3 RESISTANCE UNBALANCE

The resistance unbalance between the two conductors of a pair shall not exceed the values shown in Table 10.

Conductor Diameter (mm)	Maximum Resistance Unbalance (%)	
	Average	Individual
0.4	1.0	3.25
0.5	0.75	2.5
0.65	0.75	2.0
0.9	0.75	2.0

Table 10 : Resistance Unbalance Limits.

The resistance unbalance shall be calculated according the formula of IEC 708-1 clause 24.

10.4 INSULATION**10.4.1 DIELECTRIC WITHSTAND VOLTAGE**

The voltages shown in table 11 shall be used for the dielectric strength test.

Type of insulation	Conductor to Conductor				Conductor to Screen			
	Test Duration	Test Voltage	Test Duration	Test Volt.	Test Duration	Test Volt	Test Duration	Test Volt.
Solid	3 s	2KV	60 s	1 KV	3 s	6 KV	60 s	3 KV
Cellular or Foam Skin	3 s	1 KV	60 s	0.5 KV	3 s	3 KV	60 s	1 KV

Table 11

Note 1 : An a.c. test voltage $V_{dc}/1.5$ may be used.

Note 2 : Higher test voltages may be applicable when the installed cables may be subjected to high voltage stress.

10.4.2 INSULATION RESISTANCE

The insulation resistance shall be measured in accordance with IEC 189-1 clause 5.3

At least one of each color of insulated conductors shall be tested. Several pairs may be tested at the same time.

The insulation resistance shall not be less than 5000 megohm.Km.

10.5 MOISTURE BARRIER

The resistance per unit length shall be measured.

10.6 MUTUAL CAPACITANCE

The mutual capacitance shall be measured in accordance with IEC 189-1 clause 5.4 at 1000 \pm 200 Hz.

The average mutual capacitance of all cables shall be 55 nF/Km and the mutual capacitance of any pair shall not exceed 64 nF/Km.

10.7 CAPACITANCE UNBALANCE

10.7.1 PAIR TO PAIR CAPACITANCE UNBALANCE

The tests shall be performed in accordance with IEC 189-1 clause 5.5 at a frequency of 1000 \pm 200 Hz. The results shall be corrected to 500 m. of cable.

Where lengths other than 500 m are measured the value shall be corrected to 500 m.

The capacitance unbalance shall not exceed the values of Table 12

Maximum Capacitance Unbalance pF /500 m	
Pair to Pair	250
Side to Side	800

Table 12 : Pair to Pair Capacitance Unbalance Limits.

The capacitance unbalance measurements within a sub-unit may be performed between adjacent pairs if a type test proves that the other combinations do not influence the test

10.7.2 PAIR TO EARTH CAPACITANCE UNBALANCE

The pair to earth unbalances shall be measured using a frequency of 1000 \pm 200 Hz. All pairs except the pair under test shall be connected to the aluminum tape and earth.

The pair to earth unbalances shall not exceed :

Maximum average	600 pF/Km
Maximum individual	2500 pF/Km

When lengths other than 1000 m are measured the value shall be corrected to 1000 m. Tenderers shall state their correction formula. Lengths less than 100m shall be considered as equal to 100m.

10.8 ATTENUATION

The attenuation shall be measured at 1khz and 1MHZ. The measured values when corrected to 20 °C shall not exceed the values of Table 13.

Conductor Diameter	Attenuation (dB/Km)	
	1KHz	1MHZ
0.4	1.89	28.6
0.5	1.51	24.2
0.65	1.16	19.8
0.9	0.84	14.3

Table 13 Attenuation Limits

Measurement shall be made on one randomly selected unit per layer or per cable if less than 300 pairs.

The maximum tolerance on individual values shall be ± 10 percent.

10.9 CROSS TALK

10.9.1 1% WORST-PAIR NEXT

The pair to pair near- end (NEXT) coupling loss of 99 percent of the pair combinations shall exceed the values shown in Table 14.

Frequency (kHz)	NEXT Limit (dB/lan)
1	85
12	80
80	67
1000	48

Table 14 : 1% Worst Pair Coupling Loss Limits

The measurement shall be performed on one randomly selected outer unit.

10.9.2 NEXT AND ELFEXT INDIVIDUAL POWER SUMS

The near end (NEXT) and equal level far end (ELFEXT) individual power sums shall exceed the values specified in Table 15.

Frequency (KHz)	Within Unit (db/Km)	
	NEXT	ELFEXT
1	70	74
12	67	71
80	55	58
1000	37	36

Table 15 : Minimum Individual Power Sum Values

The minimum cable length for Cross-talk measurements shall be 300m. The values shall be corrected to 1 Km.

10.10 DEFECTIVE PAIRS

Defective pairs are pairs that have either a cross, short, or open circuit condition or an electrical deviation.

The number of defective pairs shall not exceed the number of spare pairs in the cable. Grounded cable pairs are not acceptable.

CLAUSE 11. QUALITY ASSURANCE

Manufacturers of cable conforming to this specification must show evidence that the cable has been manufactured according to a Quality System conforming to ISO 9001 or ISO 9002. OGERO may inspect the Manufacturer's facilities at any time during the term of the contract. All cable manufactured to this specification may be inspected and tested by OGERO to check compliance at any time during the term of the contract. In case of a dispute testing shall be performed by an independent authority at the expense of the Contractor.

CLAUSE 12. PACKING AND MARKING**12.1 SHEATH MARKING**

The method of marking shall not locally decrease the thickness of the sheath. The markings shall be durable, colored white or embossed.

12.2 LENGTH MARKING

Continuous sequentially numbered length markers shall be placed at regular longitudinal intervals of one meter on outside sheath.

The numbers shall not be less than 3.0 millimeters in height and shall be spaced to produce good legibility.

The accuracy of the length marking shall be within 1 percent.

An occasional illegible marking is permissible if there is a legible marking on either side of it.

The high count length marker shall be on the outer end of the cable when drummed.

The symbol of telephone set shall be durably marked at intervals of not more than 1m on the outer sheath

12.3 APPLICATION MARKINGS: OUTER SHEATH**AERIAL CABLE**

The word "AERIAL" shall be marked at longitudinal intervals of not more than 1 meter.

12.4 CABLE DRUM LENGTH

Lengths of the cable shall be drummed in the lengths shown in hereafter table. However the supplier will be allowed to deliver 10% of the quantity of each size in shorter lengths, the minimum short length acceptable being 200 meter.

Each length of cable shall be wound on a separate drum unless otherwise specified or agreed to by OGERO.

Cable Size	Conductor Diameter				Remarks
	0.4	0.5	0.65	0.9	
10	500	500	500	500	For cables of 10 up to 50 pairs, reels carrying multiple of this length also acceptable up to a max. of 2 km/reel and up to 50 % of the itemized ordered quantity.
20	500	500	500	500	
30	500	500	500	500	
50	500	500	500	500	
70	500	500	500	500	For cables of 70 up to 200 pairs, reels carrying multiple of this length also acceptable up to a max. of 1 km/reel and up to 50 % of the itemized ordered quantity.
100	500	500	500	500	
150	500	500	500	500	
200	500	500	500	500	

Table of cable drum lengths (m)

N. B : A length tolerance of minus zero plus five percent will apply for all sizes and reels (including reels carrying multiples).

12.5 CABLE DRUMS

The drums shall be substantial and constructed so as to prevent damage to the cables during shipment and handling.

The diameter of the drum barrel shall be large enough to prevent damage to the cables during reeling and unreeling. The diameter of the barrel shall not be less than 15 times the outside diameter of the cable.

Lags or other suitable means of protection shall be applied to the drums to prevent damage to the cables during shipping and storage.

Nails and staples used in the construction of the drums must not be placed in a position where they can damage the cables.

The drums shall be non-returnable unless agreed otherwise.

The weight of any drum including cable and lagging shall not exceed 5000 Kg.

The spindle hole shall allow the use of a 75 mm diameter spindle without binding.

The drum size including lags shall not exceed 2.72 meters in diameter.

The total drum width shall not exceed 1.5 meters.

For testing purposes, the inner end of the cable shall be recessed into a slot in the drum flange and protected by a metal cover firmly secured to the flange. Alternatively, the inner end may protrude through the inside of the drum via a suitably constructed slot on the inside of the drum flange.

The cable ends shall be securely fastened to prevent the cable from becoming loose during transport and shall not protrude beyond any portion of the drum.

12.6 DRUM MARKINGS

12.6.1 FLANGE MARKING

Details given below shall be distinctly marked in a weather-proof material on both sides of the drum flanges :

- 1) MPT / OGERO Lebanon
- 2) Arrow showing which direction to roll the drum
- 3) Country of origin

- 4) The label "CAUTION-NOT TO BE LAID FLAT"
- 5) Manufacturer's name or trade mark
- 6) A mark indicating the location of the inner end of the cable if located internally. (see clause 14.3.9)

12.6.2 MARKING PLATES

Marking plates showing the following information in Arabic and English shall be securely attached to the outer side of both flanges on all drums.

- A: Material specification number i.e OGERO C02/00
- B: Number of conductor pairs
- C: Conductor diameter in millimeters
- D: Nominal Cable length in meters
- E: Gross weight in Kilograms
- F: Drum number
- G: Manufacturer's name
- H: Year of manufacture
- I: Order reference or adjudication date.

The plate shall be made of a corrosion-proof metal capable of maintaining the information in a legible format for a minimum of 5 years in the conditions of Lebanon.

The minimum size of the marking plate shall be 125 mm wide and 100 mm high.

The numerals in at least one of the languages shall be punched. Appendix 1 shows the recommended dimensions and layout for the marking plate. The lower case letters indicate Arabic numerals and the upper case letters indicate English numerals.

12.7 IDENTIFICATION OF DEFECTIVE PAIRS

A cable which contains a defective pair or pairs shall have both ends colored red by using a suitable adhesive tape or permanent non water soluble coloring.

The red marking shall completely encircle the cable sheath shall be at least 100 mm wide and shall be located within 400 mm of the end the cable.

A marking tag describing the position and type of defect shall be attached to the outer end of the cable.

In addition to this tag a marking plate containing the same information as the tag shall be attached to the inside of the flange near the cable outer end.

12.8 CABLE END SEALS

All cables shall be provided with end caps on both ends to prevent the leakage of filling compound and the ingress of moisture.

Cables shall be capped immediately after factory inspection and acceptance testing.

CLAUSE 13. COMPLIANCE STATEMENT

The Contractor must indicate his compliance or non-compliance with all clauses of this specification in a side by side format. There are two statements to describe compliance or non-compliance with each clause as detailed in sub- clauses 13.1 and 13.2.

13.1 COMPLIANCE

The Contractor agrees to the stated requirements without any reservation.

13.2 NON-COMPLIANCE

If the Contractor does not meet any respective item or clause, the reason for non-compliance shall be stated. An alternative proposal can be documented with evidences.

DROP WIRE

- CLAUSE 1 GENERAL
- CLAUSE 2 ASSOCIATED SPECIFICATIONS
- CLAUSE 3 DEFINITIONS
- CLAUSE 4 DESIGN REQUIREMENTS
- CLAUSE 5 MATERIAL PROPERTIES & TEST REQUIREMENTS
- CLAUSE 6 ELECTRICAL AND TRANSMISSION REQUIREMENTS
- CLAUSE 7 QUALITY ASSURANCE
- CLAUSE 8 INSULATION
- CLAUSE 9 PACKING AND MARKING
- CLAUSE 10 COMPLIANCE STATEMENT

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CLAUSE 1. GENERAL

This specification covers the standards and requirements for the construction, properties, testing and packing of drop wire, to be used in the telecommunications network of the Republic of Lebanon.

The drop wire is installed overhead between aerial and external wall mounted distribution points and customer premises.

The OGERO reserves the right to make changes to the specification without notice, before any tender or after any contract execution.

CLAUSE 2. ASSOCIATED SPECIFICATIONS

The following unattached international and /or national standards shall be applied, and deemed to be an integral part of this specification:

IEC 189-1	General test and measuring methods.
IEC 708-1	General design details and requirements.
ASTMD1248	Standards specification for polyethylene plastics molding and extrusion materials.
ASTME8	Standards test methods of tension testing of materials.
ASTME384	Standards test method for microhardness of materials.
ISO 9001 or ISO 9002	Quality systems - Model for quality assurance in production and installation.

CLAUSE 3. DEFINITIONS

3.1 The following definitions shall apply throughout this specification:

Conductor.

A solid continuous hard drawn copper wire, circular in section.

Insulation.

The insulation material immediately surrounding a conductor.

CLAUSE 4. DESIGN REQUIREMENTS

4.1 GENERAL

4.1.1 This section describes the drop wire design.

4.1.2 COMPATIBILITY WITH MPT PRACTICES

All drop-wire supplied in compliance with current MPT installation standards and operation and maintenance practices.

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4.2 LONG TERM PERFORMANCE REQUIREMENTS

4.2.1 All drop wire supplied in compliance with this specification shall be capable of withstanding the typical service conditions of Lebanon for a period of twenty years without detriment to the transmission or operation and maintenance characteristics of the drop wire.

4.2.2 Drop wire shall be designed, manufactured and packed so that the physical submission and operation and maintenance characteristics shall not degrade when exposed to the environmental conditions of Lebanon during storage, import, installation and operation and also when exposed to the environmental conditions during storage and transportation outside of Lebanon.

The environmental conditions of Lebanon may include ambient air temperature variations from -15°C to 37°C . In addition direct solar radiation is known to increase the temperature of some outside plant to approximately -52°C .

4.3 CONDUCTOR

4.3.1 The conductor shall comply with the requirements of clause 4.5

4.3.2 The nominal conductor diameter shall be 0.8 m.m.

4.4 INSULATION

4.4.1 The parallel conductors shall be covered with high-density polyethylene extruded in the form of a "figure 8" or back to back "D" sections.

4.4.2 The raw materials shall comply with clause 5.3

4.4.3 The overall dimensions of the insulated drop wire shall be 5.7×2.6 mm with a tolerance of ± 0.3 m.m.

4.4.4 The construction shall permit the separation of the wire into two fully insulated conductors by cutting or tearing along the interconnecting web.

4.5 CONDUCTOR IDENTIFICATION

The parallel conductor shall be identified by a single tracer ridge molded along the entire length of the wire. The tracer shall be readily perceptible to both touch and sight.

4.6 SUPPLY LENGTHS

The drop wire shall be delivered in coils in nominal lengths of 500 m unless specified otherwise.

10% of total quantity may be delivered in lengths between 200 and 500m

CLAUSE 5. MATERIAL PROPERTIES AND TEST REQUIREMENTS**5.1 GENERAL**

5.1.1 This section specifies the drop wire's material, physical, chemical environmental and mechanical requirements and tests to be applied for the determination of these requirements.

5.1.2 The requirements of this section refer to completed drop wire, or material removed from completed drop wire unless specifically identified otherwise.

5.1.3 All materials used in the drop wire shall be non-toxic and dermatologically safe.

5.2 It's full right for OGERO to order Approval Type and routine quality control test and reports when its needed without any restriction and without further notice and at any time during the term of the contract.

5.3 CONDUCTORS**5.3.1 MATERIAL**

The conductor shall be of solid hard drawn copper cylindrical in form. It shall be continuous throughout the length of the delivered coil. The nominal conductor diameter be 0.8 mm.

5.3.2 ELONGATION

The elongation shall be 2% minimum and 6% maximum when tested in accordance with ASTM E8. A guage length of 250 mm shall be used.

5.3.3 TENSILE STRENGTH OF CONDUCTOR

Minimum 28kg/sq.mm.

5.4 INSULATION**5.4.1 Polyethylene raw material classification**

The polyethylene compound shall be virgin material according to ASTM D 1248 type 111, class C, category 4 or 5, grade E8.

5.4.2 Polyethylene insulation stabilisation

The insulation shall be stabilized with both a thermal anti-oxidant and a metal deactivator in sufficient quantifies to withstand long term exposure to air at the elevated temperatures experienced within Lebanon.

For type approval the manufacturer shall show sufficient evidence to verify that the polyethylene insulation shall withstand long term exposure i.e. at least 20 years to the environmental conditions of Lebanon.

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- 5.4.3 The insulation shall be continuous and shall have a thickness such that the electrical requirements of this specification are met with a minimum thickness 0.9mm. the tender shall specify the nominal radial thickness of the insulation for Type Approval.
The minimum spot thickness shall not be less than 80 % of the specified thickness.

CLAUSE 6. ELECTRICAL AND TRANSMISSION REQUIREMENTS

6.1 GENERAL

- 6.1.1 This section details the electrical and transmission requirements of the finished drop wire.
6.1.2 All transmission and electrical tests shall be performed according to the methods of IEC 189-1, unless stated otherwise.
6.1.3 The measurements shall be performed at or corrected to 20 °C unless stated otherwise.

6.2 CONDUCTOR

6.2.1 ELECTRICAL RESISTANCE

- 6.2.1.1 The maximum average resistance of the conductors shall not exceed 37 ohms/sheath Km.
6.2.1.2 The maximum individual resistance for any conductor shall not exceed 39ohms/sheath Km.

6.2.2 RESISTANCE UNBALANCE

- 6.2.2.1 The average resistance unbalance between the two conductors shall not exceed 1.0 %, and for any individual pair the resistance unbalance shall not exceed 3.6 %.
6.2.2.2 Resistance unbalance shall be calculated according to the formula of IEC 708-1 clause 24.

6.3 INSULATION

6.3.1 DIELECTRIC WITHSTAND VOLTAGE

The insulation shall withstand a conductor to conductor dielectric withstand test of 1500 V dc for a minimum of 60 seconds without breakdown. It shall be performed according to IEC 189-1 clause 5.2

6.3.2 INSULATION RESISTANCE

The insulation resistance shall not be less than 10000 megohm.Km and shall be measured in accordance with IEC 189-1 clause 5.3.

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6.3.3 INSULATION INTEGRITY

6.3.3.1 Test pieces from each production batch of the drop wire shall be immersed in water (a minimum of 3 meters submerged) for at least 24 hours and then tested by applying 15 KV at a frequency of 50 or 60 Hz between each conductor and water. The voltage shall be applied gradually and maintained at the full value for five minutes without breakdown. The conductor not under test shall be connected to the water during the test.

6.3.3.2 No failure of the test pieces shall occur.

6.4 MUTUAL CAPACITANCE

6.4.1 The mutual capacitance shall be measured in accordance with IEC 189-1 clause 5.4 at 1000 ± 200 Hz.

6.4.2 The mutual capacitance shall not exceed 40 nF/km.

CLAUSE 7. QUALITY ASSURANCE

7.1 Manufacturers of drop wire may be required to show evidence that the drop wire has been manufactured according to a Quality System conforming to ISO 9001 or ISO 9002 or a national equivalent which has been approved by OGERO.

7.2 OGERO or its authorized representatives may inspect the Manufacturers facilities at any time during the term of the Contract, to test and check compliance of any were manufactured to this specification.

7.3 In the case of a dispute, testing shall be performed by an independent authority at the expence of the contractor.

CLAUSE 8. INSULATION

Thickness and thickness variation. Clause 5.4.3.

8.1 ELECTRICAL AND TRANSMISSION PROPERTIES

A representative sample of at least 5 % of the production batch shall be tested for the following electrical and transmission tests. If any length do not satisfy the requirements of this specification the entire delivery shall be subjected to 100% testing.

8.1.1 CONDUCTOR RESISTANCE. Clause 6.2.1. All wires shall be tested for conductor conductivity.

8.1.2 RESISTANCE UNBALANCE. Clause 6.2.2.

8.1.3 Conductor to conductor dielectric withstand voltage test Clause 6.3.1

8.1.4 INSULATION RESISTANCE. Clause 6.3.2 - 6.3.3.

8.1.5 MUTUAL CAPACITANCE. Clause 6.4.

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CLAUSE 9. PACKING AND MARKING**9.1 PACKING**

The primary requirement of packing is to provide a conveniently sized package which allows tangle free dispensing of the wire. Packaging in coils is recommended. Other methods may be used, provided that the primary requirement is met.

The wires shall be delivered in coils in nominal lengths of 500 m unless otherwise specified.

9.1.1. COILS

- 9.1.1.1 The wire shall be evenly and compactly coiled in one continuous length. Both ends of the wire in each coil shall be readily accessible.
- 9.1.1.2 The dimensions of the coil should approximately be the following:
 - Outside diameter - 320 mm max
 - Inside diameter - 150 ± 5 mm.
 - Width - 90 mm max.
- 9.1.1.3 Each coil shall be bound with a minimum of four evenly spaced ties or tapes. The coil shall be wrapped with a suitable, tough, weather resistant wrapping or packed in a disposable corrugated fibre board cartons.
- 9.1.1.4 The carton shall be of sufficient strength and durability to withstand normal handling during shipment and outdoor exposure.
- 9.1.1.5 The total weight of the 500m lengths of wire and packing shall not exceed 30 Kg. The size of the carton shall not exceed 400 x 400 x 100 mm.

9.2 MARKING

Details given below shall be distinctly marked in a weatherproof material on the outside of the coil or carton:

- a) MPT/OGERO Lebanon
- b) Country of origin
- c) Manufacturers name or trademark
- d) Material specification number
- e) Length in metres
- f) Gross weight in Kilograms
- g) Year of manufacture
- h) Order reference or adjudication date.

CLAUSE 10. COMPLIANCE STATEMENT

The Contractor must indicate his compliance or non-compliance with all clauses of this specification in a side by side format. There are two statements to describe compliance, or non-compliance with each clause, as detailed in clauses 10.1 - 10.2

10.1 COMPLIANCE

The Contractor agrees to the stated requirements without any reservation.

10.2 NON-COMPLIANCE

If the Contractor doesn't meet the respective item or clause, the reason for non-compliance shall be stated. An alternative proposal can be documented with evidences.

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JUMPER WIRES

CLAUSE 1: GENERAL

CLAUSE 2: ASSOCIATED SPECIFICATIONS

CLAUSE 3: DEFINITION

CLAUSE 4: DESIGN REQUIREMENTS

CLAUSE 5: MATERIAL PROPERTIES & TEST REQUIREMENTS

CLAUSE 6: ELECTRICAL & TRANSMISSION REQUIREMENTS

CLAUSE 7: QUALITY ASSURANCE

CLAUSE 8: PACKING AND MARKING

CLAUSE 9: COMPLIANCE STATEMENT

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CLAUSE 1. GENERAL

This specification covers the standards and requirements for the construction properties testing and packing of jumper wires for use in the telecommunications network of the Republic of Lebanon.

The polyethylene insulated jumper wires are used in cross connection cabinets between the primary and secondary terminal blocks.

The PVC insulated jumper wires are used on main distribution frames in exchange buildings.

CLAUSE 2. ASSOCIATED SPECIFICATIONS

The following unattached international and/or national standards shall be applied and deemed to be an integral part of this specification.

IEC 189-1	General test and measuring methods
IEC 189-2	Cables in pairs, triples, quads and quintuples for inside installation.
IEC 304	Standard colors for insulation for low frequency and wires
IEC 708-1	General design details and requirements
ASTM B3	Standard specification for soft or annealed copper wire
ASTM D1248	Standard specification for (polyethylene plastics molding and extrusion materials).
ASTMD2633	Standard methods of testing thermoplastic insulations and jackets for wire and cable.
ASTM D3895	Standard test method for copper-induced oxidative induction time of polyolefins by thermal analysis.
ASTM D4565	Standard test method for physical and environmental performance properties of insulations and jackets for telecommunications wire and cable.
B S 6746	Specification for PVC insulation and sheath for electric cables.
ISO 9001 or ISO 9002	Quality systems - Model for quality assurance in production and installation.
ASTMD2863	Standard test method for measuring the minimum oxygen concentration to support candle-like combustion of plastic (oxygen Index).

CLAUSE 3. DEFINITION

The following definitions shall apply throughout this specification.

Lay

The axial length of one complete turn of the helix toned around an imaginary line between the center of the conductors of a wire.

Conductor

A solid continuous copper wire, circular in section.

Insulation

The insulation material immediately surrounding a conductor.

Insulated Conductor

A conductor surrounded by insulation

CLAUSE 4. DESIGN REQUIREMENTS**4.1 GENERAL**

This section describes the jumper wire design of both types of jumper wire i.e. a PVC insulated wire for internal use and a polyethylene insulated wire for use inside cabinets.

4.2 COMPATIBILITY WITH MPT PRACTICES

All jumper wire must be compatible with current MPT installation standards and operation and maintenance practices.

4.3 LONG TERM PERFORMANCE REQUIREMENTS

4.3.1 All jumper wire supplied in compliance with this specification shall be capable of withstanding the typical service conditions of Lebanon for a period of twenty years without detriment to the transmission or operation and maintenance characteristics of the jumper wire.

4.3.2 Jumper wire shall be designed manufactured and packaged so that the physical transmission and operation and maintenance characteristics shall not degrade when exposed to the environmental conditions of Lebanon during storage, transport, installation and operation and also when exposed to the environmental conditions during storage and transportation outside of Lebanon.

4.3.3 The environmental conditions of Lebanon may include ambient air temperature variation from -15°C to +37°C. In addition direct solar radiation is known to increase the temperature of some outside plant to approximately +52°C.

4.4 CONDUCTORS

4.4.1 The conductor shall comply with requirements of clause 5.3

4.4.2 The nominal conductor diameter shall be 0.5 mm.

4.5 INSULATION

4.5.1 The conductors shall be covered with polyvinylchloride (PVC) conforming to clause 5.4

4.5.2 The standard colors for the insulation of each wire in a pair

4.5.2.1 A: Red B: White

4.5.2.2 A: Blue B: White

4.6 JUMPER WIRE SUPPLY LENGTHS

4.6.1 Insulated wires shall be delivered in coils or cartons in nominal lengths of 250 m or 500 m plus or minus five percent each.

4.6.2 OGERO may specify alternative delivery lengths for special supply orders as applicable.

- 4.6.3 10 percent of total ordered quantity may be delivered in lengths between 200m and 500m.

4.7 LAY- UP

- 4.7.1 Wire manufactured with two insulated conductors shall have a lay of 25 to 50 mm.
- 4.7.2 Wire manufactured with three or more insulated conductors shall have a lay of 20 to 40 mm.

CLAUSE 5. MATERIAL PROPERTIES AND TEST REQUIREMENTS

5.1 GENERAL

- 5.1.1 This section specifies the jumper wire material, physical, chemical environmental and mechanical requirements and the tests to be applied for the determination of these requirements.
- 5.1.2 The requirements of this section refer to completed jumper wire, or material removed from completed jumper wire unless specifically identified otherwise.
- 5.1.3 All material used in the jumper wire shall be non-toxic and dermatologically safe.
- 5.2 It s full right for OGERO to order approval type and routine quality control test and reports when it s needed without any restriction and without further notice and at any time during the term of the contract.

5.3 CONDUCTOR

- 5.3.1 Conductors shall meet the requirements of ASTM B3 with the exception that the "Dimensions and Permissible Variations" requirements are waived.
- 5.3.2 Conductor joints shall be brazed using silver solder alloy or welded by an electrical or cold welding technique.
- 5.3.3 A conductor containing a joint, made during manufacture shall have a tensile strength of not less than 90% of the joint free conductor.
- 5.3.4 Joints shall be free of burrs, undercuts or protrusions and the same diameter as the conductor the conductor shall be in line.
- 5.3.5 Joints shall be reinsulated with a material such as heat-shrink polyolefin.

5.4 PVC INSULATION

- 5.4.1 The PVC insulation raw material shall conform to BS 6746 Type T.11

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5.4.2 MECHANICAL AND CHEMICAL REQUIREMENTS

- 5.4.2.1 The tensile strength and percentage elongation removed from completed wire shall be measured according to IEC 189-1
- 5.4.2.2 The median tensile strength shall exceed 12.5 Mpa.
- 5.4.2.3 The median percentage elongation shall exceed 125%.
- 5.4.2.4 Insulation shrinkage shall not be greater than 4%. The test shall be performed according to IEC 189-2 clause 4.1.
- 5.4.2.5 The insulation shall comply with cold bend test requirements of IEC 189-2 clause 4.2.
- 5.4.2.6 The insulation shall comply with heat shock test requirements of IEC 189-2 clause 3.2.
- 5.4.2.7 The insulation shall comply with Aging test requirements of IEC 189-2, clause 3.2.
- 5.4.2.8 The oxygen index when measured in accordance ASTM D 2863 for type A or B specimens shall be greater than 29.
- 5.4.2.9 Insulation integrity
All conductors shall be continuously insulated and shall be tested by a suitable method of spark testing or bare wire detector. Tenderers shall state the voltages used. NO bare conductors are allowed.

5.5 POLYETHYLENE INSULATION**5.5.1 DIMENSIONAL REQUIREMENTS**

- 5.5.1.1 The nominal insulation thickness shall be submitted for Type Approval. The maximum insulation outside diameter shall not exceed 1.42 mm for 0.5 mm conductors.
- 5.5.1.2 The insulation eccentricity of any cross section shall not exceed 0.051 mm for 0.5 conductors

5.5.2 MECHANICAL AND CHEMICAL REQUIREMENTS

- 5.5.2.1 The tensile strength and percentage elongation shall be measured on insulation removed from completed cable according to the method specified in ASTM D2633.
- 5.5.2.2 The minimum tensile strength shall exceed 16.5 Mpa
- 5.5.2.3 The minimum percentage elongation shall exceed 300%
- 5.5.2.4 Shrinkage
Insulation shrinkage shall not be greater than 5 percent. The test shall be performed according to the requirements IEC 708-1 clause 21.4.
- 5.5.2.5 Oxidation Induction Time
Oxidation Induction Time (OIT) shall be measured on at least 3 samples of each insulation color according to ASTM D4565 using a copper pan. The insulation shall be

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removed from the cable after sheathing. The OIT shall not be less than 20 minutes.

5.5.2.6 Insulation Integrity

All conductors shall be continuous insulated and be tested by a suitable method of spark testing or bare wire detector. Tenders shall state the voltages to be used. No bare conductors are allowed.

5.6 THERMAL STABILITY TESTING OF INSULATION

5.6.1 GENERAL

5.6.1.1 The insulation shall be established with suitable anti-oxidants and metal deactivates in sufficient quantities to withstand exposure for forty years to the conditions of Lebanon.

5.6.1.2 Manufacturers are free to choose any combination of stabilizers provided all requirements of this specification are satisfied.

5.6.1.3 Manufacturers may submit the results of alternative thermal stability tests and other information to verify the suitability of insulation to the conditions of Lebanon. However, OGERO shall determine whether the test procedures results etc. are acceptable.

5.6.2 SAMPLE PREPARATION

Wire samples shall be representative lengths of at least 200mm removed from completed lengths of wire.

5.6.2.1 MEASUREMENTS

The following measurements shall be performed on insulation removed from wire prior to testing.

1- Oxidation Induction Time

OIT shall be measured on at least 5 samples of each insulation color according to ASTM D4565 using a copper pan.

2- Mechanical Properties

The tensile strength and percent elongation of 5 samples of each color shall be measured according to the method of clause 5.5.3.1

5.6.3 THERMO-OXIDATIVE AGING

5.6.3.1 10 samples of 200 mm. lengths of each of the 2 insulation colors shall be removed from the wire.

5.6.3.2 Without any further preparation 5 of the 10 samples of each color shall be suspended in an oven and aged for 26 weeks at 80°C. At the completion of this aging period the measurements of clause 5.6.3 shall be repeated.

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5.6.3.3 The remaining 5 samples of each color shall be twisted into coils of ten close tight turns around a mandrel of the same diameter as the outer diameter of the insulation. After 8 and 20 weeks of exposure a further coil shall be wound into each sample approximately 30 mm below the previous coil. The sample shall be inspected every two weeks for cracks.

5.6.4 ACCEPTANCE CRITERIA

5.6.4.1 Oxidation Induction Time

The OIT following the aging tests of clauses 563 shall be not less than 20 minutes.

5.6.4.2 Mechanical Properties

The minimum tensile strength and percent elongation of the aged straight samples i.e clause 5.6.4.2 shall not be less than 80% of the values of samples.

5.6.4.3 Coiled samples

There shall be no more than 5% of the coils including coils formed after 8 and 20 weeks aging cracked after 26 weeks aging.

CLAUSE 6. ELECTRICAL AND TRANSMISSION REQUIREMENTS

6.1 GENERAL

6.1.1 This section details the electrical and transmission requirements of the finished jumper wire.

6.1.2 All transmission and electrical tests shall be performed according to the methods of IEC 189-1, unless stated otherwise and the measurements shall be performed at or corrected to 20°C.

6.2 CONDUCTORS

6.2.1 ELECTRICAL RESISTANCE

The electrical resistance of the conductors shall not exceed the values of table 1.

Conductor diameter (mm)	Maximum Resistance (Ohms/sheath km)	
	Average	Individual conductor
0.5	92	96

Table 1: Maximum Conductor Electrical Resistance

6.2.2 RESISTANCE UNBALANCE

6.2.2.1 The resistance unbalance between the two conductors shall not exceed the values shown in Table 2

Conductor Diameter mm	Maximum Resistance Unbalance (%)	
	Average	Individual conductor
0.5	0.75	2.5

Table 2: Resistance Unbalance Limits

6.2.2.2 Resistance Unbalance shall be calculated according to the formula of 708-1 clause 24.

6.3 PVC INSULATION**6.3.1 DIELECTRIC WITHSTAND VOLTAGE**

The insulation of paired conductors shall withstand a conductor to conductor dielectric withstand test of 1500 V d.c. for a Minimum of 60 seconds without breakdown.

6.3.2 INSULATION RESISTANCE

The insulation resistance for PVC shall not be less than 5000 megohm-km and shall be measured in accordance with IEC 189-1 clause 5.3.

CLAUSE 7. QUALITY ASSURANCE**7.1 QUALITY SYSTEM ACCREDITATION**

7.1.1 Manufacturers of jumper wire to this specification may be required to show evidence that the jumper wire has been manufactured according to a Quality System conforming to ISO 9001 or ISO 9002.

7.1.2 Manufacturers may be required to supply a copy of the Quality Manual, at the time of tender, which shall be utilised for the manufacture and delivery of jumper wire complying to this specification.

7.1.3 OGERO may require the manufacturer to be accredited to the above standards either by OGERO personnel or assessors acting on behalf of OGERO.

7.2 INSPECTION

7.2.1 OGERO or its authorized representatives may inspect the Tenderers facilities at any time for the purpose of Quality Assurance surveillance.

7.2.2 All jumper wire manufactured to this specification may be inspected and tested OGERO to check compliance.

- 7.2.3 In the case of a dispute, testing shall be performed by an "independent authority" at the expense of the Contractor.

CLAUSE 8. PACKING AND MARKING

8.1 PACKING

- 8.1.1 The primary requirement of the packaging is to provide a conveniently sized package. Which allows tangle-free dispensing of the wire. Two methods of packaging are recommended. Other methods may be used, provided that the primary requirement is met.

8.1.2 COILS

- 8.1.2.1 The wire shall be evenly and compactly coiled in one continuous length. Both ends of the wire in each coil shall be readily accessible.

- 8.1.2.2 Each coil shall be bound with a minimum of four evenly spaced ties or tapes. The coil shall be wrapped with a suitable, tough, weather resistant wrapping.

- 8.1.2.3 The dimensions of the coil shall be:

Outside diameter	600 mm max.
Inside diameter	120 mm min
Width	150 mm max.

8.1.3 CARTONS

- 8.1.3.1 The wire may be supplied in disposable corrugated fiberboard carton, which can be used as a dispenser. At least one end of the wire, usually the inner end shall be accessible from the exterior of the carton. The wire shall dispense in a smooth manner without tangling.

- 8.1.3.2 The carton shall be of sufficient strength and durability to withstand normal handling during shipment and outdoor exposure without rupture or distortion which may inhibit wire dispensing.

- 8.1.3.3 The total weight of the wire and packing shall not exceed 20 kg. The size of the carton shall not exceed 605 x 605 x 155 mm.

8.2 MARKING

Details given below shall be distinctly marked in a weatherproof material on the outside of the coil or carton:

- a) MPT/OGERO
- b) Country of origin
- c) Manufacturer's name or trademark
- d) Mat, plus Insulation type

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- e) Wire length in meters
- f) Gross weight in kilograms
- g) Coil or Carton number
- h) Reference order.

CLAUSE 9. COMPLIANCE STATEMENT

The Tender must indicate his compliance or non-compliance with all clauses of this specification in a side by side format. There are two statements to describe compliance or non-compliance with each clause, as detailed in clauses 9.1 and 9.2.

9.1 COMPLIANCE

The Tenderer agrees to the stated requirements without any reservation.

9.2 NON-COMPLIANCE

If the Tenderer does not meet the respective item or clause, the reason for non-compliance shall be stated. An alternative proposal can be documented with evidences.

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